

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

API 47 - 085 - 10370 County Ritchie District Union  
Quad Pullman 7.5' Pad Name Ireland North Pad Field/Pool Name -----  
Farm name Lynwood Ireland et al Well Number Karen 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 4335959m Easting 508710m  
Landing Point of Curve Northing 4335657.68m Easting 508206.45m  
Bottom Hole Northing 4332177m Easting 509415m

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 8/27/2018 Date drilling commenced 9/8/2018 Date drilling ceased 1/28/2019  
Date completion activities began 5/21/2019 Date completion activities ceased 8/5/2019  
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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E: [unclear]@dep.wv.gov

Reviewed by:  
DMH  
12-7-20

API 47-085 - 10370 Farm name Lynwood Ireland et al Well number Karen 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"	481'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2660'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	19367'	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	204 sx	15.6	1.18	120	0'	8 Hrs.
Surface	Class A	545 sx	15.6	1.18	826	0'	8 Hrs.
Coal							
Intermediate 1	Class A	1030 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) 19386' MD, 6330' TVD (BHL), 6374' (Deepest Point Drilled) Loggers TD (ft) 19386' MD

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

Plug back procedure N/A

Kick off depth (ft) 6000'

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 - 10370 Farm name Lynwood Ireland et al Well number Karen Unit 2H

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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API 47- 085 - 10370 Farm name Lynwood Ireland et al Well number Karen Unit 2H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6299' (TOP)</u> TVD	<u>6888' (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 9990 mcfpd Oil 115 bpd NGL --- bpd Water 1106 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 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

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

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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	5/22/2019	19219	19273	60	Marcellus
2	5/22/2019	19017.67	19187.445	60	Marcellus
3	5/23/2019	18816.34	18986.115	60	Marcellus
4	5/23/2019	18615.01	18784.785	60	Marcellus
5	5/24/2019	18413.68	18583.455	60	Marcellus
6	5/24/2019	18212.35	18382.125	60	Marcellus
7	5/25/2019	18011.02	18180.795	60	Marcellus
8	5/26/2019	17809.69	17979.465	60	Marcellus
9	5/26/2019	17608.36	17778.135	60	Marcellus
10	5/27/2019	17407.03	17576.805	60	Marcellus
11	5/27/2019	17205.7	17375.475	60	Marcellus
12	5/28/2019	17004.37	17174.145	60	Marcellus
13	5/29/2019	16803.04	16972.815	60	Marcellus
14	5/29/2019	16601.71	16771.485	60	Marcellus
15	5/29/2019	16400.38	16570.155	60	Marcellus
16	5/30/2019	16199.05	16368.825	60	Marcellus
17	5/30/2019	15997.72	16167.495	60	Marcellus
18	5/31/2019	15796.39	15966.165	60	Marcellus
19	5/31/2019	15595.06	15764.835	60	Marcellus
20	6/1/2019	15393.73	15563.505	60	Marcellus
21	6/2/2019	15192.4	15362.175	60	Marcellus
22	6/4/2019	14991.07	15160.845	60	Marcellus
23	6/4/2019	14789.74	14959.515	60	Marcellus
24	6/5/2019	14588.41	14758.185	60	Marcellus
25	6/6/2019	14387.08	14556.855	60	Marcellus
26	6/6/2019	14185.75	14355.525	60	Marcellus
27	6/8/2019	13984.42	14154.195	60	Marcellus
28	6/8/2019	13783.09	13952.865	60	Marcellus
29	6/9/2019	13581.76	13751.535	60	Marcellus
30	6/9/2019	13380.43	13550.205	60	Marcellus
31	6/9/2019	13179.1	13348.875	60	Marcellus
32	6/10/2019	12977.77	13147.545	60	Marcellus
33	6/10/2019	12776.44	12946.215	60	Marcellus
34	6/10/2019	12575.11	12744.885	60	Marcellus
35	6/10/2019	12373.78	12543.555	60	Marcellus
36	6/11/2019	12172.45	12342.225	60	Marcellus
37	6/11/2019	11971.12	12140.895	60	Marcellus
38	6/11/2019	11769.79	11939.565	60	Marcellus
39	6/12/2019	11568.46	11738.235	60	Marcellus
40	6/12/2019	11367.13	11536.905	60	Marcellus
41	6/12/2019	11165.8	11335.575	60	Marcellus
42	6/13/2019	10964.47	11134.245	60	Marcellus
43	6/13/2019	10763.14	10932.915	60	Marcellus
44	6/13/2019	10561.81	10731.585	60	Marcellus
45	6/14/2019	10360.48	10530.255	60	Marcellus
46	6/16/2019	10159.15	10328.925	60	Marcellus
47	6/23/2019	9957.82	10127.595	60	Marcellus
48	6/23/2019	9756.49	9926.265	60	Marcellus
49	6/24/2019	9555.16	9724.935	60	Marcellus
50	6/24/2019	9353.83	9523.605	60	Marcellus
51	6/25/2019	9152.5	9322.275	60	Marcellus
52	6/25/2019	8951.17	9120.945	60	Marcellus
53	6/25/2019	8749.84	8919.615	60	Marcellus
54	6/26/2019	8548.51	8718.285	60	Marcellus
55	6/26/2019	8347.18	8516.955	60	Marcellus
56	6/27/2019	8145.85	8315.625	60	Marcellus
57	6/27/2019	7944.52	8114.295	60	Marcellus
58	6/28/2019	7743.19	7912.965	60	Marcellus
59	6/28/2019	7541.86	7711.635	60	Marcellus
60	6/28/2019	7340.53	7510.305	60	Marcellus
61	6/29/2019	7139.2	7308.975	60	Marcellus
62	6/29/2019	6937.87	7107.645	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	5/22/2019	45.2978	8736.492	6300	6070	404300	8641	N/A
2	5/22/2019	71.9469	7903.669	7268	2818	407800	9033	N/A
3	5/23/2019	76.175	8163.837	6225	3056	407820	9129	N/A
4	5/23/2019	72.5397	7996.153	6210	2907	406720	9121	N/A
5	5/24/2019	72.2738	7686.252	6072	2827	409100	8838	N/A
6	5/24/2019	71.0189	8101.102	6412	2819	408000	8854	N/A
7	5/25/2019	71.0271	7976.86	5749	2844	408700	9128	N/A
8	5/26/2019	70.4679	7850.267	4807	2766	413800	11335	N/A
9	5/26/2019	68.1	7996	6847	3033	407200	12589	N/A
10	5/27/2019	62.7899	7660.017	6787	2873	414300	10650	N/A
11	5/27/2019	72.3886	8068.771	6407	2821	410200	10319	N/A
12	5/28/2019	71.6592	7715.801	4138	2954	414900	8671	N/A
13	5/29/2019	69.1	7644	4526	3829	413560	14217	N/A
14	5/29/2019	71.1381	7510.081	6238	2746	403100	9651	N/A
15	5/29/2019	74.3741	7574.688	6037	2911	406140	8841	N/A
16	5/30/2019	69.062	7417.654	6553	2770	405800	8814	N/A
17	5/30/2019	75.8136	7537.55	6034	3237	410220	8791	N/A
18	5/31/2019	68.1105	7512.251	5798	3142	404200	8889	N/A
19	5/31/2019	71.535	7733.918	6963	2897	406760	8826	N/A
20	6/1/2019	69.9623	7228.515	6304	3055	410200	8783	N/A
21	6/2/2019	61.2363	8252.245	5114	2960	410200	9611	N/A
22	6/4/2019	59.7543	7857.121	6117	3284	403640	11640	N/A
23	6/4/2019	61.5936	7706.44	6938	2824	400800	8735	N/A
24	6/5/2019	63.1045	7375.122	6505	2971	401500	8622	N/A
25	6/6/2019	63.9275	7212.577	6842	3164	287780	9765	N/A
26	6/6/2019	62.3792	7764.969	6086	5859	270080	8565	N/A
27	6/8/2019	62.1574	7684.645	5647	4179	403680	7431	N/A
28	6/8/2019	64.6275	7216.298	6114	3242	402210	8420	N/A
29	6/9/2019	67.5219	7421.197	6776	3296	402500	8793	N/A
30	6/9/2019	64.7751	7344.374	6621	4362	403740	11440	N/A
31	6/9/2019	68.1306	7018.491	6045	3025	405124	8560	N/A
32	6/10/2019	71.1971	7143.484	6494	3115	390286	8689	N/A
33	6/10/2019	69.528	7093.349	6193	3647	397880	8485	N/A
34	6/10/2019	65.0961	7033.116	6268	3020	407486	8710	N/A
35	6/10/2019	71.8	7320	5873	3473	405037	8754	N/A
36	6/11/2019	72.3481	7232.225	5832	3317	405960	8676	N/A
37	6/11/2019	71.0419	7296.059	5946	3494	408423	9142	N/A
38	6/11/2019	72.0391	7141.306	6188	3349	401490	8701	N/A
39	6/12/2019	73.2947	7222.095	6401	3461	404800	8568	N/A
40	6/12/2019	70.5029	6834.238	4251	3545	401448	8658	N/A
41	6/12/2019	68.1588	7335.844	6460	3442	399709	8713	N/A
42	6/13/2019	73.2308	7012.341	5245	3054	402900	8574	N/A
43	6/13/2019	72.407	6938.571	6567	3145	402594	8463	N/A
44	6/13/2019	69.9024	6822.061	3848	3351	403366	8397	N/A
45	6/14/2019	72.8931	6980.385	4317	3377	6350	8604	N/A
46	6/16/2019	28.07	7823.819	6413	4882	402700	2280	N/A
47	6/23/2019	59.6362	7803.035	7981	3358	400100	10344	N/A
48	6/23/2019	68.9	7153.6	4231	3588	398720	10110	N/A
49	6/24/2019	72.9427	7095.949	6092	3531	400730	8565	N/A
50	6/24/2019	74.4356	6608.421	6108	3727	403850	9482	N/A
51	6/25/2019	74.2775	6773.149	6639	3475	413400	8511	N/A
52	6/25/2019	71.9271	6831.397	7276	3304	405740	8794	N/A
53	6/25/2019	72.7108	6850.803	6438	3388	406940	8437	N/A
54	6/26/2019	71.6094	6850.057	6324	3690	406000	8438	N/A
55	6/26/2019	72.8089	6637.677	6014	4293	401250	8498	N/A
56	6/27/2019	75.3612	6667.984	6519	3295	404390	8480	N/A
57	6/27/2019	71.3391	6860.871	5922	3301	401440	8528	N/A
58	6/28/2019	72.0499	6945.548	7324	3208	400160	8448	N/A
59	6/28/2019	73.3991	7022.971	7232	3156	405100	8434	N/A
60	6/28/2019	73.7722	6581.497	6661	3713	407100	8463	N/A
61	6/29/2019	72.7963	7042.188	6659	3471	411720	8476	N/A
62	6/29/2019	74.8362	6609.825	7552	3246	281735	8452	N/A
	<b>AVG.</b>	<b>68.6</b>	<b>7,517</b>	<b>6,008</b>	<b>3,296</b>	<b>17,601,803</b>	<b>415,836</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	1,886	1,705	1,936
Big Lime	1,901	2,413	1,906	2,486
Fifty Foot Sandstone	2,413	2,609	2,456	2,693
Gordon	2,609	2,889	2,663	2,990
Fifth Sandstone	2,889	2,977	2,960	3,085
Bayard	2,977	3,737	3,055	3,898
Speechley	3,737	3,904	3,868	4,080
Balltown	3,904	4,436	4,050	4,655
Bradford	4,436	4,818	4,625	5,065
Benson	4,818	5,060	5,035	5,327
Alexander	5,060	6,168	5,297	6,565
Sycamore	5,970	6,138	6,314	6,535
Middlesex	6,138	6,244	6,535	6,733
Burkett	6,244	6,282	6,733	6,834
Tully	6,282	6,299	6,834	6,888
Marcellus	6,299	NA	6,888	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.



# Actual Wellpath Report

Karen Unit 2H AWP Proj: 19386'  
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REFERENCE WELLPATH IDENTIFICATION		
Operator	ANTERO RESOURCES CORPORATION	Slot #06
Area	Ritchie County, WV	Karen Unit 2H
Field	Ritchie	Karen Unit 2H AWB
Facility	Ireland North Pad	

REPORT SETUP INFORMATION		
Projection System	MAD27 / UTM Zone 17 North, US feet	
North Reference	Grid	WellArchitect® 5.1
Scale	0.999601	Delaset
Convergence at slot	0.06° East	Report Generated 1/29/2019 at 11:36:49 AM
		Database/Source file WA_MPL_EasternUS_Defn/Karen_Unit_2H_AWP_Proj_19386_.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-4.04	9.46	1668946.45	14224846.09	39°10'21.840"N	80°53'57.600"W
Facility Reference Pt			1668936.99	14224850.13	39°10'21.880"N	80°53'57.720"W
Field Reference Pt			0.00	0.00	0°00'00.000"	85°29'19.301"W

WELLPATH DATUM		
Calculation method	Minimum curvature	
Horizontal Reference Pt	Slot	H&P 519 (RKB) to Facility Vertical Datum
Vertical Reference Pt	H&P 519 (RKB)	H&P 519 (RKB) to Mean Sea Level
MD Reference Pt	H&P 519 (RKB)	H&P 519 (RKB) to Ground Level at Slot (Slot #06)
Field Vertical Reference	Mean Sea Level	Section Origin
		Section Azimuth
		30.00ft
		975.50ft
		30.00ft
		N 0.00, E 0.00 ft
		161.15°

Antero Resources Inc.  
10000 Antero Way  
Denver, CO 80201  
www.atero.com



# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	5/21/2019
Job End Date	6/29/2019
State	West Virginia
County	Ritchie
API Number	47-085-10370-00-00
Operator Name	Antero Resources Corporation
Well Name and Number	Karen 2H
Latitude	39.17273000
Longitude	-80.89933000
Datum	NAD83
Federal Well	NO
Indian Well	NO
True Vertical Depth	6,373
Total Base Water Volume (gal)	24,113,282
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	88.91854	
Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	10.64774	
HCl Acid (12.6%-17.5%)	J.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.40000	0.19882	
			Hydrogen Chloride	7647-01-0	17.50000	0.04622	
GC-15	J.S. Well Services, LLC	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.06255	
			Petroleum Distillates	64742-47-8	60.00000	0.05924	
			Suspending agent (solid)	14808-60-7	3.00000	0.00957	
			Surfactant	68439-51-0	3.00000	0.00375	
WFRA-405	J.S. Well Services, LLC	Friction Reducer	2-Propenoic acid, polymer with propenamide	290003-06-9	30.00000	0.01670	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01345	

SI-1200s	U.S. Well Services, LLC	Scale Inhibitor					
			Water	7732-18-5	98.00000	0.01256	
			Sodium Salt of Diethylenetriaminepenta(methylene phosphonic acid)	68155-78-2	10.00000	0.00128	
			Sodium Chloride	7647-14-5	10.00000	0.00128	
Bloclear 2000	U.S. Well Services, LLC	Anti-Bacterial Agent					
			2,2-dibromo-3-nitropropionamide	10222-01-2	20.00000	0.00421	
			Deionized Water	7732-18-5	28.00000	0.00240	
AP One	U.S. Well Services, LLC	Gel Breakers					
			Ammonium Persulfate	7727-54-0	100.00000	0.00153	
AI-303	U.S. Well Services, LLC	Acid Corrosion Inhibitors					
			Ethylene glycol	107-21-1	40.00000	0.00007	
			Cinnamaldehyde	104-55-2	20.00000	0.00002	
			Formic acid	64-18-6	20.00000	0.00002	
			Butyl cellosolve	111-76-2	20.00000	0.00002	
			Polyether	50828-78-6	10.00000	0.00001	
			Acetophenone, thiourea, formaldehyde polymer	68527-49-1	5.00000	0.00001	

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"

6,899'

LATITUDE 39°10'00"

4,604' TO BOTTOM HOLE

LONGITUDE 80°52'30"

10,208' TO BOTTOM HOLE

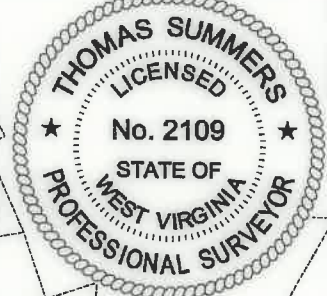
12,967'

LONGITUDE 80°52'30"

# Antero Resources Corporation Well No. Karen Unit 2H

**AS DRILLED DATA:**  
**WELL 2H TOP HOLE INFORMATION:**  
 N: 248,113ft E: 1,603,286ft  
 LAT: 39°10'21.84" LON: 80°53'57.60"  
**BOTTOM HOLE INFORMATION:**  
 N: 235,662ft E: 1,605,390ft  
 LAT: 39°08'19.11" LON: 80°53'28.43"  
**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.**

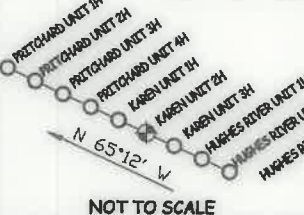
**(NAD) 83 (UTM) ZONE 17 COORDS:**  
**WELL 2H TOP HOLE INFORMATION:**  
 N: 4,335,959m E: 508,710m  
**BOTTOM HOLE INFORMATION:**  
 N: 4,332,177m E: 509,415m



WV NORTH ZONE GRID NORTH

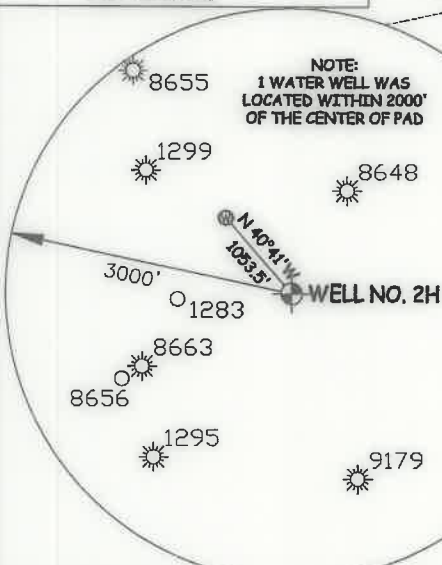
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  2. TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY
  3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
  4. WLS IS NOT CERTIFYING THE DATA AND INFORMATION PROVIDED LISTED IN NOTES 2 AND 3, ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LEASE BOUNDARIES.
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### PAD LAYOUT



NOT TO SCALE

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



JOB # **14-127WA**  
 DRAWING # **KAREN2HAD**  
 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 +/-  
 O - - - - - Proposed Well Path  
 O - - - - - As Drilled Well Path

*Thomas Summers*  
 THOMAS SUMMERS P.S. 2109  
 DATE **11/20/19**  
 OPERATOR'S WELL# **KAREN UNIT #2H**

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** ACREAGE **144.276 ACRES +/-**  
 OIL & GAS ROYALTY OWNER **BELLE PRITCHARD; W. P. IRELAND ET UX;**  
**JOYCE E. WEBER; EARL E. FLESHER ET AL; EARL E. FLESHER; CAROLYN ERCANBRACK;**  
**ELBERT SHEETS HEIRS; LEWIS A. ADAMS ET UX** LEASE ACREAGE **415 AC±; 222 AC±;**  
**445.67 AC±; 57 AC±; 82 AC±; 64.5 AC±;**  
**70.25 AC±; 26 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 **6,330' TVD 19,388' 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**

COUNTY NAME PERMIT

LATITUDE 39°12'30"

6,899'

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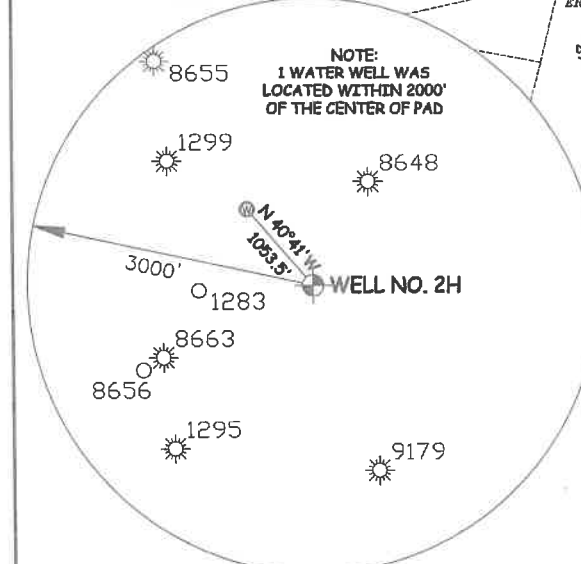
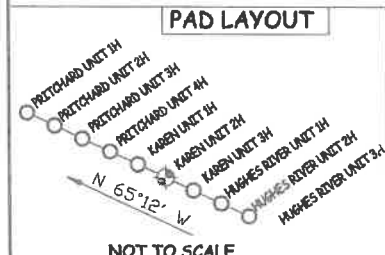
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