

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

API 47 - 085 - 10215 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 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 4335961m Easting 508708m
Landing Point of Curve Northing 4335592.26m Easting 507902.25m
Bottom Hole Northing 4332105m Easting 509116m

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 10/16/2018 Date drilling commenced 11/1/2018 Date drilling ceased 12/23/2018
Date completion activities began 1/15/2019 Date completion activities ceased 3/2/2019
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 1506', 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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Office of Oil and Gas
FEB 18 2019
Department of Environmental Protection

Reviewed by:
DMH
12-7-20

API 47- 085 - 10215 Farm name Lynwood Ireland et al Well number Karen Unit 1H

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"	461'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2777'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	19831'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6417'		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 ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	514 sx	15.6	1.18	120	0'	8 Hrs.
Surface	Class A	361 sx	15.6	1.18	826	0'	8 Hrs.
Coal							
Intermediate 1	Class A	n/a 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) 19850' MD, 6323' TVD (BHL), 6374' (Deepest Point Drilled) Loggers TD (ft) 19850' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 6400'

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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FEB 19 2020
West Virginia Department of
Environmental Protection

API 47- 085 - 10215 Farm name Lynwood Ireland et al Well number Karen Unit 1H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>			
<u>Marcellus</u>	<u>6293' (TOP)</u>	<u>TVD</u>	<u>7374' (TOP)</u>	<u>MD</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

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 5843 mcfpd Oil 67 bpd NGL --- bpd Water 598 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 ₂ S, ETC)
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***PLEASE SEE ATTACHED EXHIBIT 3**

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 ₂ S, ETC)

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

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	4/30/2019	19682	19737	60	Marcellus
2	4/30/2019	19481.048	19650.508	60	Marcellus
3	5/1/2019	19280.096	19449.556	60	Marcellus
4	5/1/2019	19079.144	19248.604	60	Marcellus
5	5/1/2019	18878.192	19047.652	60	Marcellus
6	5/2/2019	18677.24	18846.7	60	Marcellus
7	5/2/2019	18476.288	18645.748	60	Marcellus
8	5/3/2019	18275.336	18444.796	60	Marcellus
9	5/3/2019	18074.384	18243.844	60	Marcellus
10	5/4/2019	17873.432	18042.892	60	Marcellus
11	5/4/2019	17672.48	17841.94	60	Marcellus
12	5/4/2019	17471.528	17640.988	60	Marcellus
13	5/4/2019	17270.576	17440.036	60	Marcellus
14	5/5/2019	17069.624	17239.084	60	Marcellus
15	5/5/2019	16868.672	17038.132	60	Marcellus
16	5/6/2019	16667.72	16837.18	60	Marcellus
17	5/6/2019	16466.768	16636.228	60	Marcellus
18	5/6/2019	16265.816	16435.276	60	Marcellus
19	5/6/2019	16064.864	16234.324	60	Marcellus
20	5/7/2019	15863.912	16033.372	60	Marcellus
21	5/7/2019	15662.96	15832.42	60	Marcellus
22	5/7/2019	15462.008	15631.468	60	Marcellus
23	5/8/2019	15261.056	15430.516	60	Marcellus
24	5/8/2019	15060.104	15229.564	60	Marcellus
25	5/9/2019	14859.152	15028.612	60	Marcellus
26	5/9/2019	14658.2	14827.66	60	Marcellus
27	5/9/2019	14457.248	14626.708	60	Marcellus
28	5/9/2019	14256.296	14425.756	60	Marcellus
29	5/10/2019	14055.344	14224.804	60	Marcellus
30	5/11/2019	13854.392	14023.852	60	Marcellus
31	5/11/2019	13653.44	13822.9	60	Marcellus
32	5/11/2019	13452.488	13621.948	60	Marcellus
33	5/12/2019	13251.536	13420.996	60	Marcellus
34	5/12/2019	13050.584	13220.044	60	Marcellus
35	5/12/2019	12849.632	13019.092	60	Marcellus
36	5/12/2019	12648.68	12818.14	60	Marcellus
37	5/13/2019	12447.728	12617.188	60	Marcellus
38	5/13/2019	12246.776	12416.236	60	Marcellus
39	5/13/2019	12045.824	12215.284	60	Marcellus
40	5/14/2019	11844.872	12014.332	60	Marcellus
41	5/14/2019	11643.92	11813.38	60	Marcellus
42	5/14/2019	11442.968	11612.428	60	Marcellus
43	5/15/2019	11242.016	11411.476	60	Marcellus
44	5/15/2019	11041.064	11210.524	60	Marcellus
45	5/15/2019	10840.112	11009.572	60	Marcellus
46	5/15/2019	10639.16	10808.62	60	Marcellus
47	5/16/2019	10438.208	10607.668	60	Marcellus
48	5/16/2019	10237.256	10406.716	60	Marcellus
49	5/16/2019	10036.304	10205.764	60	Marcellus
50	5/17/2019	9835.352	10004.812	60	Marcellus
51	5/17/2019	9634.4	9803.86	60	Marcellus
52	5/17/2019	9433.448	9602.908	60	Marcellus
53	5/18/2019	9232.496	9401.956	60	Marcellus
54	5/18/2019	9031.544	9201.004	60	Marcellus
55	5/18/2019	8830.592	9000.052	60	Marcellus
56	5/19/2019	8629.64	8799.1	60	Marcellus
57	5/19/2019	8428.688	8598.148	60	Marcellus
58	5/19/2019	8227.736	8397.196	60	Marcellus
59	5/19/2019	8026.784	8196.244	60	Marcellus
60	5/19/2019	7825.832	7995.292	60	Marcellus
61	5/20/2019	7624.88	7794.34	60	Marcellus
62	5/20/2019	7423.928	7593.388	60	Marcellus

RECORDED
 11/15/2019 10:00 AM Gas
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 U.S. Department of
 Energy - Oilwell Production

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	4/30/2019	70.2626	7970.645	5892	2535	175440	5186	N/A
2	4/30/2019	73.9331	8102.296	6459	2507	406900	8989	N/A
3	5/1/2019	73.4	8011	7068	2444	413420	10779	N/A
4	5/1/2019	77.8	8096	5962	3127	406200	9064	N/A
5	5/1/2019	77.7846	8084.991	5789	2844	406400	9111	N/A
6	5/2/2019	72.6197	7796.306	6180	2937	405200	8840	N/A
7	5/2/2019	75.7783	7822.443	6151	2551	407420	9964	N/A
8	5/3/2019	71.4642	8281.359	5922	2624	409500	8873	N/A
9	5/3/2019	77.6655	7728.573	6024	2604	410200	8813	N/A
10	5/4/2019	77.6548	7486.163	6176	2549	407800	8598	N/A
11	5/4/2019	78.5253	7671.224	6014	2842	407600	10040	N/A
12	5/4/2019	78.6	8137	6171	3143	412200	10464	N/A
13	5/4/2019	76.3403	7783.091	6226	2598	408400	8824	N/A
14	5/5/2019	60.2752	8138.763	6659	2922	409400	10748	N/A
15	5/5/2019	76.9982	7589.713	6032	2834	407950	8878	N/A
16	5/6/2019	76.7559	7524.451	6580	2504	408660	8755	N/A
17	5/6/2019	75.875	7911.756	6463	2736	409300	8782	N/A
18	5/6/2019	73.6236	7595.654	6516	2954	410700	8971	N/A
19	5/6/2019	76.6478	7544.881	6453	2860	407160	8719	N/A
20	5/7/2019	69.4302	8126.418	6584	2595	407680	11193	N/A
21	5/7/2019	74.9	7540.767	6606	2580	407500	8796	N/A
22	5/7/2019	77.495	7179.342	5718	2779	406880	8946	N/A
23	5/8/2019	72.9808	7214.004	5871	2507	408280	8885	N/A
24	5/8/2019	60.8	8332	6583	2563	412000	15013	N/A
25	5/9/2019	64.4841	8161.652	5731	2962	405970	9782	N/A
26	5/9/2019	72.3124	7539.113	6127	3365	410400	8888	N/A
27	5/9/2019	69.3977	7707.352	5865	3441	410400	9146	N/A
28	5/9/2019	76.9589	8017.77	6392	3686	372760	8698	N/A
29	5/10/2019	74.2801	7465.614	6010	4088	410700	9753	N/A
30	5/11/2019	72.854	7333.772	6466	3284	411410	8901	N/A
31	5/11/2019	73.2198	7793.388	6412	2571	409700	8951	N/A
32	5/11/2019	75.074	7516.779	5198	2977	410800	9493	N/A
33	5/12/2019	70.6197	7537.179	6158	3105	417350	8806	N/A
34	5/12/2019	71.3285	7913.814	5954	3101	411600	12224	N/A
35	5/12/2019	72.162	7302.731	6202	3451	409800	9133	N/A
36	5/12/2019	72.1805	7245.085	6408	4240	409820	8891	N/A
37	5/13/2019	75.1511	6877.438	4741	3611	412500	9055	N/A
38	5/13/2019	75.3937	7192.49	5972	3816	412800	9159	N/A
39	5/13/2019	74.7319	7120.818	5902	4222	411020	8660	N/A
40	5/14/2019	72.5056	6790.782	5403	3243	410540	8600	N/A
41	5/14/2019	74.3335	7892.57	6075	2691	406100	10923	N/A
42	5/14/2019	69.8189	7218.774	1837	2816	411390	8864	N/A
43	5/15/2019	69.1116	7406.777	6136	2981	404960	9820	N/A
44	5/15/2019	69.7636	6862.396	5807	2864	406000	8802	N/A
45	5/15/2019	75.2392	6953.902	6390	4229	407580	8796	N/A
46	5/15/2019	74.8011	7076.478	6311	3743	416460	8681	N/A
47	5/16/2019	72.679	7274.126	6112	3422	407780	8584	N/A
48	5/16/2019	72.9907	7389.698	6166	3015	408300	8948	N/A
49	5/16/2019	72.5061	7146.039	6323	3190	408080	8535	N/A
50	5/17/2019	72.413	7081.913	6235	3215	412950	8451	N/A
51	5/17/2019	77.3332	6687.528	5556	3496	407920	8696	N/A
52	5/17/2019	74.1297	7004.683	5640	3834	411880	8472	N/A
53	5/18/2019	74.953	6867.508	5373	3341	407080	8443	N/A
54	5/18/2019	70.4	7143	6111	3979	343880	11531	N/A
55	5/18/2019	72.4066	6780.079	5411	2877	418610	8651	N/A
56	5/19/2019	73.8036	6717.047	5891	2986	408160	8419	N/A
57	5/19/2019	74.4854	6537.724	6051	2825	406520	8575	N/A
58	5/19/2019	75.6886	6556.714	6111	2977	407700	8626	N/A
59	5/19/2019	74.9443	6656.189	6028	3412	405860	8542	N/A
60	5/19/2019	76.9292	6876.737	5989	2963	406830	8484	N/A
61	5/20/2019	70.8	6828	5649	3489	406470	12682	N/A
62	5/20/2019	74.6586	6283.82	6091	2966	10500	8578	N/A
	AVG.	73.3	7,634	6,029	3,020	18,145,790	420,576	TOTAL

APPROVED
 UNPAC and Gas

FEB 19 2020

With approval of
 the Board of Directors

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	1,889	1,705	1,956
Big Lime	1,904	2,411	1,926	2,539
Fifty Foot Sandstone	2,411	2,644	2,509	2,812
Gordon	2,644	2,887	2,782	3,101
Fifth Sandstone	2,887	2,966	3,071	3,197
Bayard	2,966	3,725	3,167	4,079
Speechley	3,725	3,889	4,049	4,269
Balltown	3,889	4,424	4,239	4,896
Bradford	4,424	4,811	4,866	5,364
Benson	4,811	5,053	5,334	5,648
Alexander	5,053	6,162	5,618	6,958
Sycamore	5,968	6,132	6,716	6,928
Middlesex	6,132	6,240	6,928	7,132
Burkett	6,240	6,273	7,132	7,255
Tully	6,273	6,293	7,255	7,374
Marcellus	6,293	NA	7,374	NA

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

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	4/30/2019
Job End Date	5/20/2019
State	West Virginia
County	Ritchie
API Number	47-085-10215-00-00
Operator Name	Antero Resources Corporation
Well Name and Number	Karen 1H
Latitude	39.17274440
Longitude	-80.89936380
Datum	NAD83
Federal Well	NO
Indian Well	NO
True Vertical Depth	6,373
Total Base Water Volume (gal)	24,831,622
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	88.96931	
Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	10.75661	
HCL Acid (12.6%-17.5%)	J.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.40000	0.11653	
			Hydrogen Chloride	7647-01-0	17.50000	0.02709	
LGC-15	J.S. Well Services, LLC	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.03418	
			Petroleum Distillates	64742-47-8	60.00000	0.03237	
			Suspending agent (solid)	14808-60-7	3.00000	0.00523	
			Surfactant	68439-51-0	3.00000	0.00205	
WFRA-405	J.S. Well Services, LLC	Friction Reducer	2-Propanoic acid, polymer with 2-propanamide	29003-06-9	30.00000	0.01934	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01557	

SI-1200s	U.S. Well Services, LLC	Scale Inhibitor	Water	7732-18-5	98.00000	0.00826
			Sodium Chloride	7647-14-5	10.00000	0.00084
			Sodium Salt of Diethylenetriaminepenta (methylenephosphonic acid)	58155-78-2	10.00000	0.00084
Bioclear 2000	U.S. Well Services, LLC	Anti-Bacterial Agent	2,2-dibromo-3-nitropropionamide	10222-01-2	20.00000	0.00414
			Deionized Water	7732-18-5	28.00000	0.00236
SI-1300	U.S. Well Services, LLC	Scale Inhibitor	Ethylene glycol	107-21-1	40.00000	0.00188
			Proprietary Scale Inhibitor	Proprietary	20.00000	0.00070
SI-1200	U.S. Well Services, LLC	Scale Inhibitor	Water	7732-18-5	80.00000	0.00082
			Ethylene Glycol	107-21-1	40.00000	0.00058
			Sodium Chloride	7647-14-5	10.00000	0.00010
			Sodium Salt of Diethylenetriaminepenta (methylenephosphonic acid)	58155-78-2	10.00000	0.00010
AP One	U.S. Well Services, LLC	Gel Breakers	Ammonium Persulfate	7727-54-0	100.00000	0.00102
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	64-18-6	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	58527-49-1	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)



ANTERO RESOURCES CORPORATION

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

Slot: Slot #05
 Well: Karen Unit 1H
 Wellbore: Karen Unit 1H PWB



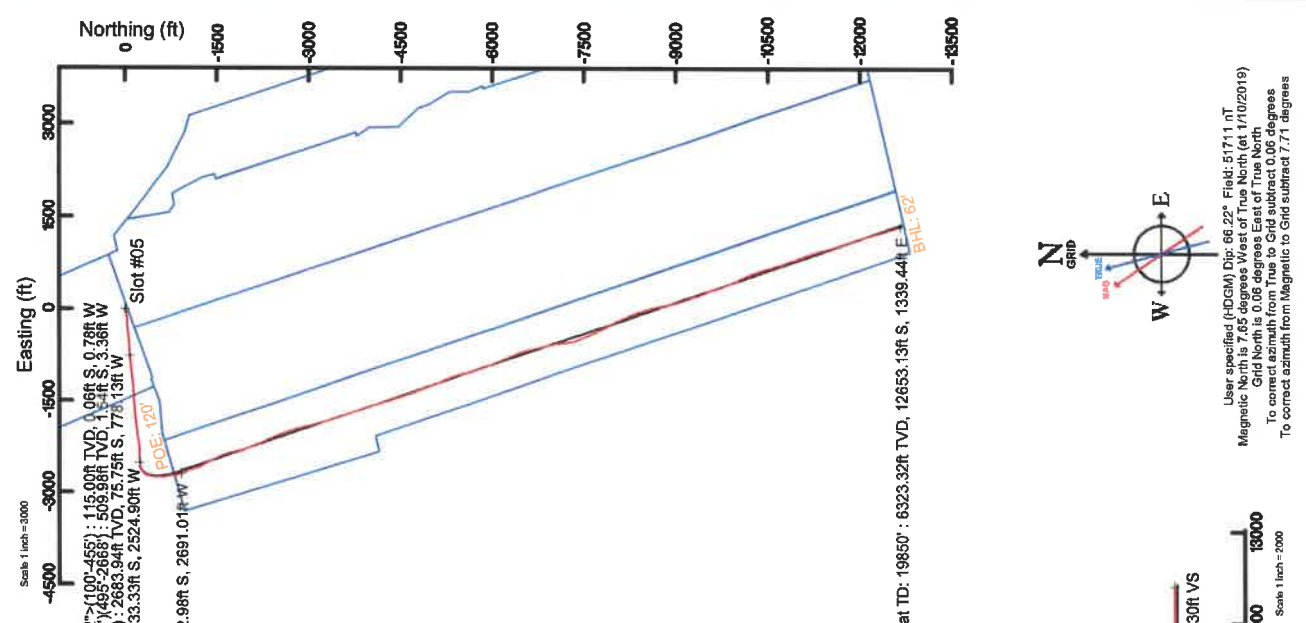
API: 47-085-10215-0000
 BHI Job #: 109581868
 Rig: H&P 519
 Duration: 01/14/2019-01/18/2019

Plot reference wellbore is Karen Unit 1H PWP Rev-A.0		Grid System: MAD27 / UTM Zone 17 North, US feet	
True vertical depths are referenced to H&P 519 (RKB)		North Reference: Grid north	
Measured depths are referenced to H&P 519 (RKB)		Scale: True distance	
H&P 519 (RKB) to Mean Sea Level: 975.5 feet		Depths are in feet	
Mean Sea Level to Ground level (At Slot, Slot #05) : -445.5 feet		Created by: deland on 2019-01-28	
Coordinates are in feet referenced to Slot		Database: WA_MPL_EasternUS_Dein	

Location Information			
Facility Name	Grid East (US ft)	Grid North (US ft)	Longitude
Ireland North Pad	1668936.993	14224650.126	80°53'57.720"W
Slot	Local N (ft)	Local E (ft)	Local N (US ft)
Slot #05	0.00	0.00	39°10'21.890"N
H&P 519 (RKB) to Ground level (At Slot, Slot #05)	1668936.993	14224650.126	80°53'57.720"W
H&P 519 (RKB) to Ground level (At Slot, Slot #05)	30ft		30ft
Mean Sea Level to Ground level (At Slot, Slot #05)	-445.5ft		-445.5ft
H&P 519 (RKB) to Mean Sea Level	975.5ft		975.5ft

Well Data			
Well	Wellbore	Wellbath	
Slot #05	Karen Unit 1H	Karen Unit 1H AWP	19850'
Slot #05	Karen Unit 1H	Karen Unit 1H PWP	12405.30ft

Well Profile Data								
Design Comment	MD (ft)	Inc (ft)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (ft/00ft)	VS (ft)
Tile On	6153.00	29.460	287.690	5488.52	-232.21	-2495.36	0.23	-589.18
Prof. to Bottom	6244.00	28.930	287.110	5567.96	-234.22	-2539.70	0.88	-600.63
Curve KOP	6274.00	28.930	287.110	5594.21	-234.95	-2554.20	0.00	-604.63
End of 3D Arc	6289.76	29.983	285.613	5607.86	-235.45	-2561.94	8.14	-608.07
POE	7319.54	74.663	161.104	6322.00	-836.03	-2876.40	8.14	-76.45
Landing PL	7597.70	90.000	161.104	6347.00	-1011.94	-2819.18	8.14	108.47
BHL	19828.45	90.000	161.104	6347.00	-12688.89	1370.84	0.00	12430.22



Users specified (MDCM) Dis: 66.22° Field: 51711.0T
 Magnetic North is 7.65 degrees West of True North (at 1/10/2019)
 Grid North is 0.66 degrees East of True North
 To correct azimuth from True to Grid subtract 0.06 degrees
 To correct azimuth from Magnetic to Grid subtract 7.71 degrees

LATITUDE 39°12'30"

6,908'

LATITUDE 39°10'00"

5,586' TO BOTTOM HOLE

LONGITUDE 80°52'30"

10,441' TO BOTTOM HOLE

12,963'

LONGITUDE 80°52'30"

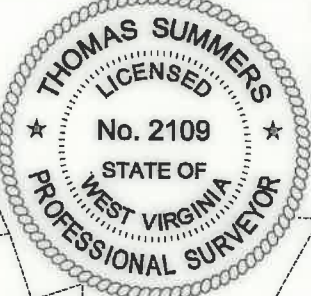
COUNTY NAME

PERMIT

Antero Resources Corporation Well No. Karen Unit 1H

AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
 N: 248,117ft E: 1,603,277ft
BOTTOM HOLE INFORMATION:
 N: 235,444ft E: 1,604,405ft
LAT: 39°10'21.88" LON: 80°53'57.71"
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.

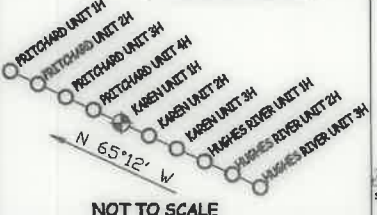
(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
 N: 4,335,961m E: 508,708m
BOTTOM HOLE INFORMATION:
 N: 4,332,105m E: 509,116m



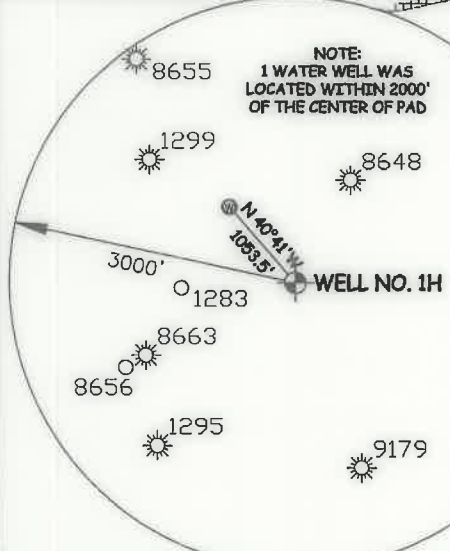
WV NORTH ZONE GRID NORTH

- NOTE**
- 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.
 - TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY
 - AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
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PAD LAYOUT



NOT TO SCALE



JOB # **14-127WA**
 DRAWING # **KAREN1HAD**
 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# **KAREN UNIT #1H**

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; W. P. IRELAND ET UX; JOYCE E. WEBER; JOYCE E. WEBER; PHYLLIS JEAN KNIGHT; ZIMRY FLANAGHAN ET UX; EARL E. FLESHER ET AL; DONALD C. MORRIS ET AL; EARL E. FLESHER; LYNWOOD IRELAND ET UX; ELSIE O. BONNELL ET AL; CAROLYN ERCANBRACK** LEASE ACREAGE **416 AC±; 722 AC±; 445.67 AC±; 69.84 AC±; 33 AC±; 671.17 AC±; 57 AC±; 24.37 AC±; 82 AC±; 27.75 AC±; 84.25 AC±; 64.5 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 **6,323' TVD 19,850' 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"

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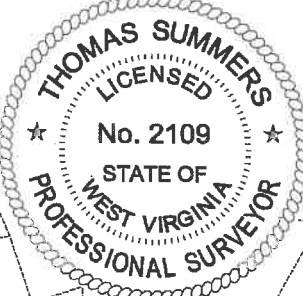
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Antero Resources Corporation Well No. Karen Unit 1H

WELL NO. 1H

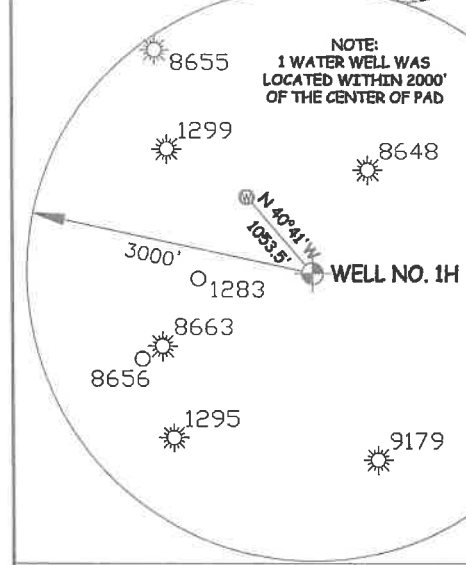
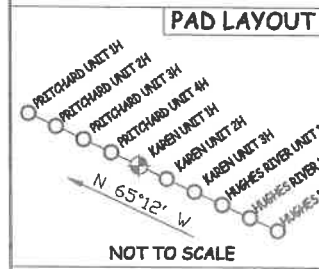
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WILLOW LAND SURVEYING PLLC
 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415



LEGEND

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DENVER, CO 80202 **5400 D BIG TYLER ROAD**
FORM WW-6 **CHARLESTON, WV 25313**

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