

Reviewed

12/21/2018

WR-35
Rev. 8/23/13

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David G. ...
12/19/18

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

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WV Department of
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API 47-017-06797 County Doddridge District Central
Quad West Union 7.5' Pad Name Balli Pad Field/Pool Name -----
Farm name Jeffrey K. Jones Sr. et al Well Number California 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 4350343m Easting 513475m
Landing Point of Curve Northing 4350432.51m Easting 513364.44m
Bottom Hole Northing 4354330m Easting 512101m

Elevation (ft) 1135.5' 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 2/7/2017 Date drilling commenced 2/10/2017 Date drilling ceased 6/27/2017
Date completion activities began 9/23/2017 Date completion activities ceased 4/17/2018
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 107', 192' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 737' 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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API 47- 017 - 06797 Farm name Jeffrey K. Jones Sr. et al Well number California Unit 2H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	72'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	357'	New	54#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2570'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	20600'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6992'		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	100 sx	15.6	1.18	118	0'	8 Hrs.
Surface	Class A	370 sx	15.6	1.19	440	0'	8 Hrs.
Coal							
Intermediate 1	Class A	924 sx	15.6	1.18	1090	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	777sx (Load) 2027sx (Tail)	13.5(Load), 15.2 (Tail)	1.44 (Lead), 1.87 (Tail)	4909	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 20600' MD, 6602' TVD (BHL), 6628' (Deepest Point Drilled) Loggers TD (ft) 20600' MD

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

Plug back procedure N/A

Kick off depth (ft) 5917

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 _____

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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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WERE TRACERS USED Yes No TYPE OF TRACER(S) USED N/A

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API 47- 017 - 06797 Farm name Jeffrey K. Jones Sr. et al Well number California Unit 2H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
*PLEASE SEE ATTACHED EXHIBIT 1					

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)
*PLEASE SEE ATTACHED EXHIBIT 2								

Please insert additional pages as applicable.

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PRODUCING FORMATION(S)	DEPTHS		
Marcellus	6566' (TOP)	TVD	6878' (TOP) MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 3600 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 175.85 mcfpd Oil 36.96 bpd NGL --- bpd Water 36.03 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**

Please insert additional pages as applicable.


Drilling Contractor Frontier Drilling LLC
Address 207 Carlton Drive City Eighty Four State PA Zip 15330

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

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

Stimulating Company CalFrac Well Services
Address 717 17th Street, Suite 1445 City Denver State CO Zip 80202

Please insert additional pages as applicable.

Completed by Karin Cox Telephone 303-357-6820
Signature  Title Permitting Agent Date 9/7/2018

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

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API 47-017-06797 Farm Name Jeffrey K. Jones Sr. et al Well Number California Unit 2H					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	9/23/2017	20398	0	48	Marcellus
2	12/19/2017	20197	20366	48	Marcellus
3	12/19/2017	19996	20165	48	Marcellus
4	12/20/2017	19795	19964	48	Marcellus
5	12/21/2017	19594	19763	48	Marcellus
6	12/21/2017	19393	19562	48	Marcellus
7	12/22/2017	19192	19361	48	Marcellus
8	12/22/2017	18991	19160	48	Marcellus
9	12/23/2017	18790	18959	48	Marcellus
10	12/23/2017	18589	18758	48	Marcellus
11	12/27/2017	18388	18557	48	Marcellus
12	12/27/2017	18187	18356	48	Marcellus
13	12/28/2017	17986	18155	48	Marcellus
14	12/28/2017	17785	17954	48	Marcellus
15	12/29/2017	17584	17753	48	Marcellus
16	12/29/2017	17383	17552	48	Marcellus
17	12/30/2017	17182	17351	48	Marcellus
18	12/30/2017	16981	17150	48	Marcellus
19	12/31/2017	16780	16949	48	Marcellus
20	1/1/2018	16579	16748	48	Marcellus
21	1/1/2018	16378	16547	48	Marcellus
22	1/2/2018	16177	16346	48	Marcellus
23	1/3/2018	15976	16145	48	Marcellus
24	1/5/2018	15775	15944	48	Marcellus
25	1/5/2018	15574	15743	48	Marcellus
26	1/6/2018	15372	15542	48	Marcellus
27	1/7/2018	15171	15341	48	Marcellus
28	1/8/2018	14970	15140	48	Marcellus
29	1/9/2018	14769	14939	48	Marcellus
30	1/9/2018	14568	14738	48	Marcellus
31	1/10/2018	14367	14537	48	Marcellus
32	1/11/2018	14166	14336	48	Marcellus
33	1/11/2018	13965	14135	48	Marcellus
34	1/12/2018	13764	13934	48	Marcellus
35	1/13/2018	13563	13733	48	Marcellus
36	1/14/2018	13362	13532	48	Marcellus
37	1/16/2018	13161	13331	48	Marcellus
38	1/17/2018	12960	13130	48	Marcellus
39	1/17/2018	12759	12929	48	Marcellus
40	1/18/2018	12558	12728	48	Marcellus
41	1/18/2018	12357	12527	48	Marcellus
42	1/19/2018	12156	12326	48	Marcellus
43	1/19/2018	11955	12125	48	Marcellus
44	1/20/2018	11754	11924	48	Marcellus
45	1/20/2018	11553	11723	48	Marcellus
46	1/21/2018	11352	11522	48	Marcellus
47	1/21/2018	11151	11321	48	Marcellus
48	1/22/2018	10950	11120	48	Marcellus
49	1/22/2018	10749	10919	48	Marcellus
50	1/23/2018	10548	10718	48	Marcellus
51	1/23/2018	10347	10517	48	Marcellus
52	1/24/2018	10146	10316	48	Marcellus
53	1/24/2018	9945	10115	48	Marcellus
54	1/25/2018	9744	9914	48	Marcellus
55	1/25/2018	9543	9713	48	Marcellus
56	1/26/2018	9342	9512	48	Marcellus
57	1/26/2018	9141	9311	48	Marcellus
58	1/27/2018	8940	9110	48	Marcellus
59	1/27/2018	8739	8909	48	Marcellus
60	1/27/2018	8538	8708	48	Marcellus
61	1/28/2018	8337	8507	48	Marcellus
62	1/28/2018	8136	8306	48	Marcellus
63	1/28/2018	7935	8105	48	Marcellus
64	1/29/2018	7734	7904	48	Marcellus
65	1/29/2018	7533	7703	48	Marcellus
66	1/29/2018	7332	7502	48	Marcellus
67	1/30/2018	7131	7301	48	Marcellus
68	1/30/2018	6930	7100	48	Marcellus

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API 47-017-05797 Farm Name Jeffrey K. Jones Sr. et al Well Number California Unit 2H								
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 (bbbls)	Amount of Nitrogen/ other (units)
1	9/23/2017	68.5	7662	5283	4768	212050	7274	N/A
2	12/19/2017	72.1	8223	5956	4113	406550	8821	N/A
3	12/19/2017	62.5	8504	6073	3744	406000	11896	N/A
4	12/20/2017	67.3	8036	5756	4338	406250	8973	N/A
5	12/21/2017	69.2	8116	5640	4140	406600	8823	N/A
6	12/21/2017	70	8459	5937	3370	405500	8875	N/A
7	12/22/2017	70.1	8080	5590	3757	407900	8970	N/A
8	12/22/2017	71.4	8214	6353	4754	405550	8896	N/A
9	12/23/2017	70.5	7927	5889	4513	407050	8830	N/A
10	12/23/2017	69.3	8376	6574	4095	406450	8665	N/A
11	12/27/2017	71.4	7959	6017	3844	407850	10185	N/A
12	12/27/2017	72.4	8009	6356	4184	407700	8679	N/A
13	12/28/2017	74.1	8256	6209	4287	388300	8500	N/A
14	12/28/2017	72.5	8080	6032	5050	406000	8737	N/A
15	12/29/2017	74.5	8082	5861	4612	406700	10517	N/A
16	12/29/2017	72.1	8273	6022	4886	405600	8628	N/A
17	12/30/2017	74.3	8001	6469	4392	406300	10650	N/A
18	12/30/2017	73.1	8142	5991	4852	406200	8728	N/A
19	12/31/2017	76.4	8181	5762	4169	405050	8770	N/A
20	1/1/2018	75.1	7750	5635	4147	406250	8779	N/A
21	1/1/2018	76.7	8221	5666	4028	405650	9419	N/A
22	1/2/2018	76.3	7841	6181	4722	403500	8806	N/A
23	1/3/2018	77.1	8241	5587	5165	405500	8998	N/A
24	1/5/2018	72.1	7783	6063	5249	406700	8730	N/A
25	1/5/2018	69.3	7531	6076	4684	406250	8750	N/A
26	1/6/2018	74	7619	5441	5060	405400	10039	N/A
27	1/7/2018	71	8088	5453	4993	401950	11196	N/A
28	1/8/2018	72.2	8011	6142	4751	406800	11520	N/A
29	1/9/2018	75.1	7507	5874	5310	406300	8795	N/A
30	1/9/2018	77	7625	6976	5210	406000	10471	N/A
31	1/10/2018	75.3	7720	6487	5477	405000	8664	N/A
32	1/11/2018	74.3	7879	6952	4511	405700	8918	N/A
33	1/11/2018	75	7410	6576	4787	407850	8542	N/A
34	1/12/2018	73.7	7148	6996	4270	404900	8779	N/A
35	1/13/2018	72.4	7246	6205	5292	405900	9067	N/A
36	1/14/2018	76.8	7314	6304	5301	405800	8803	N/A
37	1/16/2018	76.9	7522	6131	5543	405500	8716	N/A
38	1/17/2018	80.3	7775	6232	5476	405650	8496	N/A
39	1/17/2018	78.4	7864	6040	5513	405050	10217	N/A
40	1/18/2018	78.2	7171	6234	4940	405150	9943	N/A
41	1/18/2018	79.1	7495	5763	5052	405450	9665	N/A
42	1/19/2018	77.9	7034	5603	5173	406600	8586	N/A
43	1/19/2018	78.1	7406	5644	4820	395600	8289	N/A
44	1/20/2018	78.4	7744	5869	4881	393700	8748	N/A
45	1/20/2018	78.4	7541	5729	4977	405550	10248	N/A
46	1/21/2018	78.5	7458	5709	4088	405850	8417	N/A
47	1/21/2018	80.2	7612	5820	5540	391750	8223	N/A
48	1/22/2018	77.9	7361	6471	5260	412000	8867	N/A
49	1/22/2018	78.5	7230	6275	5369	405200	8645	N/A
50	1/23/2018	78.1	7258	5760	4964	405700	8404	N/A
51	1/23/2018	79	7237	6211	5240	405400	9478	N/A
52	1/24/2018	78.1	7383	5890	5603	407000	8473	N/A
53	1/24/2018	77.5	7017	5973	5240	406600	8283	N/A
54	1/25/2018	79.1	7472	6144	4367	406150	8692	N/A
55	1/25/2018	79	7049	6230	5111	405900	8247	N/A
56	1/26/2018	79	7059	5884	5661	405400	8337	N/A
57	1/26/2018	80	7357	5743	4680	405750	9734	N/A
58	1/27/2018	78	6865	5964	5480	406250	8347	N/A
59	1/27/2018	80	7458	6563	3896	392300	10114	N/A
60	1/27/2018	78.1	6933	5808	5620	397300	9402	N/A
61	1/28/2018	78	6879	5631	5392	406550	8251	N/A
62	1/28/2018	80	7186	6135	5420	405400	9234	N/A
63	1/28/2018	78.3	6529	5674	5262	405900	8399	N/A
64	1/29/2018	78.2	6684	5982	5126	406300	8461	N/A
65	1/29/2018	80.1	6953	6048	5292	406650	8188	N/A
66	1/29/2018	79	6608	5786	5279	405700	8146	N/A
67	1/30/2018	79.3	6619	5695	5360	406400	8379	N/A
68	1/30/2018	80.4	6747	5024	4185	410300	8183	N/A
69	3/3/2018	80	6711	6091	5102	17904	7746	N/A
70	3/4/2018	79.8	6688	5782	5240	17710	7903	N/A
71	3/4/2018	80.5	6602	6393	4120	17115	7781	N/A
	AVG=	75.7	7,550	6,004	4,832	27,397,779	636,935	TOTAL

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API 47-017-06797 Farm Name Jeffrey K. Jones Sr. et al Well Number California Unit 2H				
EXHIBIT 3				
LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Freshwater	107'	N/A	107'	N/A
Freshwater	192'	N/A	192'	N/A
Siltstone/Sandstone	0	147	0	147
Sandstone	est. 147	205	est. 147	205
Sandstone/Siltstone/Shale	est. 205	327	est. 205	327
Sandstone/Shale/Trace Coal	est. 327	447	est. 327	447
Sandstone	est. 447	547	est. 447	547
Sandstone/Shale	est. 547	607	est. 547	607
Sandstone	est. 607	687	est. 607	687
Siltstone	est. 687	727	est. 687	727
Shale	est. 727	767	est. 727	767
Limestone	est. 767	787	est. 767	787
Siltstone	est. 787	907	est. 787	907
Shale	est. 907	1,147	est. 907	1,147
Shale/Tr Coal	est. 1147	1,167	est. 1147	1,167
Shale	est. 1167	1,207	est. 1167	1,207
Sandstone	est. 1207	1,227	est. 1207	1,227
Shale	est. 1227	1,245	est. 1227	1,245
Sandstone	est. 1245	1,307	est. 1245	1,307
Shale/Siltstone	est. 1307	1,367	est. 1307	1,367
Limestone	est. 1367	1,387	est. 1367	1,387
Sandstone	est. 1387	1,447	est. 1387	1,447
Siltstone	est. 1447	1,489	est. 1447	1,489
Sandstone/Shale/Siltstone	est. 1489	2,015	est. 1489	2,016
Big Lime	2,015	2,689	2,016	2,690
Fifty Foot Sandstone	2,689	2,733	2,690	2,734
Gordon	2,733	3,091	2,734	3,093
Fifth Sandstone	3,091	3,123	3,093	3,125
Bayard	3,123	3,733	3,125	3,740
Speechley	3,733	4,121	3,740	4,132
Balltown	4,121	4,529	4,132	4,543
Bradford	4,529	5,025	4,543	5,048
Benson	5,025	5,289	5,048	5,314
Alexander	5,289	6,216	5,314	6,261
Sycamore	6,216	6,383	6,261	6,473
Middlesex	6,383	6,503	6,473	6,685
Burkett	6,503	6,533	6,685	6,764
Tully	6,533	6,566	6,764	6,878
Marcellus	6,566	NA	6,878	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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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	12/19/2017
Job End Date:	1/30/2018
State:	West Virginia
County:	Doddridge
API Number:	47-017-67970-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	California Unit 2H
Latitude:	39.30236500
Longitude:	-80.84371200
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,602
Total Base Water Volume (gal):	26,890,301
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	Supplied by Operator	Base Fluid					
			Water	7732-18-5	70.00000	88.81183	
DAP-902	CWS	Scale Inhibitor					
				Listed Below			

DWP-111	CWS	Gel Slurry					
				Listed Below			
DAP-103	CWS	Iron Control					
				Listed Below			
Hydrochloric Acid	CWS	Clean Perforations					
				Listed Below			
DWP-641	CWS	Friction Reducer					
				Listed Below			
Sand (Proppant)	CWS	Propping Agent					
				Listed Below			
Calbreak 5501	CWS	Breaker					
				Listed Below			
SANIFRAC 8844	CWS	Biocide					
				Listed Below			
CI-9100G	CWS	Corrosion Inhibitor					
				Listed Below			
Other Chemical (s)	Listed Above	See Trade Name (s) List					

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				Listed Below			
Items above are Trade Names with the exception of Base Water . Items below are the individual ingredients.							
			Crystalline silica (Quartz)	14808-60-7	100.00000	10.82962	
			Calcite	471-34-1	1.00000	0.07831	
			Hydrochloric acid	7647-01-0	37.00000	0.04925	
			Guar gum	9000-30-0	60.00000	0.03511	
			Distillates (petroleum), hydrotreated middle	64742-46-7	60.00000	0.03511	
			Illite	12173-60-3	1.00000	0.02996	
			Polymer	26100-47-0	45.00000	0.02984	
			Distillates (petroleum), hydrotreated light	64742-47-8	30.00000	0.01989	
			Goethite	1310-14-1	0.10000	0.01083	
			Biotite	1302-27-8	0.10000	0.01083	
			Apatite	64476-38-6	0.10000	0.01083	
			Ammonium Persulfate	64742-47-8	100.00000	0.00868	
			Ammonium chloride	12125-02-9	11.00000	0.00729	
			Polyethylene glycol mixture	25322-68-3	54.50000	0.00606	
			2-Propenoic acid, homopolymer, sodium salt	9003-04-7	40.00000	0.00600	
			Ilmenite	98072-94-7	0.10000	0.00300	
			Quaternary ammonium compounds, bis (hydrogenated tallow alkyl)dimethyl, salts with bentonite	68953-58-2	5.00000	0.00293	
			Sorbitan monooleate	1338-43-8	4.00000	0.00265	
			2,2-Dibromo-3-Nitrilopropionamide	10222-01-2	20.00000	0.00222	
			Polyethylene glycol monooleate	9004-96-0	3.00000	0.00199	
			Vinylidene chloride-methyl acrylate copolymer	69418-26-4	20.00000	0.00174	

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			1,2-Propanediol	57-55-6	10.00000	0.00150	
			Sorbitol tetraoleate	61723-83-9	2.00000	0.00133	
			Oxirane, 2-methyl-, polymer with oxirane, monodecyl ether	37251-67-5	1.50000	0.00088	
			Amines, tallow alkyl, ethoxylated	61791-26-2	1.00000	0.00066	
			Citric acid	77-92-9	60.00000	0.00045	
			Sodium bromide	7647-15-6	4.00000	0.00044	
			Dibromoacetonitrile	3252-43-5	3.00000	0.00033	
			Alkyloxypolyethyleneoxy ethanol	84133-50-6	0.50000	0.00033	
			Acrylamide	79-06-1	0.10000	0.00007	
			Ethylene glycol	107-21-1	40.00000	0.00003	
			Formic Acid	64-18-6	10.00000	0.00001	
			Tar bases, quinolone derivs	68513-87-1	1.00000	0.00001	
			Diethylene glycol (mono) methyl ether	34590-94-8	20.00000	0.00001	
			Diethylene glycol	111-46-6	1.00000	0.00001	
			Cinnamaldehyde	104-55-2	10.00000	0.00001	
			Ethoxylated alcohols	Proprietary	10.00000	0.00001	Proprietary CAS
			Tar bases, quinolone derivs, benzyl chloride- quatenized	72480-70-7	10.00000	0.00001	
			Isopropanol	67-63-0	5.00000	0.00001	

* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

*** If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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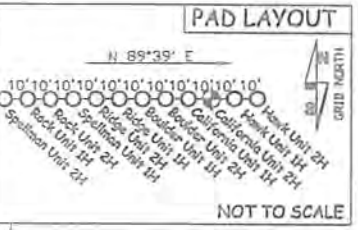
LATITUDE 39°20'00" 2,986'
 7,474' TO BOTTOM HOLE
 LATITUDE 39°22'30"

LONGITUDE 80°50'00" 1,310'
 1,393' TO BOTTOM HOLE
 LONGITUDE 80°50'00"

Antero Resources Corporation
 Well No. California Unit 2H
 47-017-06797

AS DRILLED DATA:
 WELL 2H TOP HOLE INFORMATION:
 N: 295,052ft E: 1,619,710ft
 LAT: 39°18'08.22" LON: 80°50'37.98"
 BOTTOM HOLE INFORMATION:
 N: 308,211ft E: 1,615,417ft
 LAT: 39°20'17.63" LON: 80°50'12.21" 12/21/2018
 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: 4,350,343m E: 513,475m
 BOTTOM HOLE INFORMATION:
 N: 4,354,330m E: 512,101m



- 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 HEREIN WAS PROVIDED BY ALLEGHENY SURVEYS, INC.
 3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
 4. WLS IS NOT CERTIFYING THE DATA AND INFORMATION PROVIDED LISTED IN NOTES 2 AND 3, ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LEASE BOUNDARIES.
 5. WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.



JOB # 16-059WA
 DRAWING # CALIFORNIA2HAD
 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
 WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X
 LOCATION: ELEVATION 1,135.5' AS BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK
 QUADRANGLE WEST UNION 7.5' DISTRICT CENTRAL COUNTY DODDRIDGE
 SURFACE OWNER JEFFREY K. JONES SR. ET AL ACREAGE 77.32 ACRES +/-
 OIL & GAS ROYALTY OWNER DONALD L. PIGGOTT; NELL ALLEN; MARY MAXINE WELCH; LEASE ACREAGE 81 AC±; 176 AC±; 96 AC±;
 SHIPLEY LOHR BETTY COTTRILL; CARROLL SHEPHERD; CARROLL E. SHEPHERD ET UX; HULL MILLER; MICHAEL JOE SHEPHERD; RICHARD MCCULLOUGH ET UX; 35.38 AC±; 24.5 AC±; 17.18 AC±; 17.5 AC±; 53.8 AC±; 12.025 AC±; 29 AC±;
 EUGENE R. WALTON; KATHERINE MONTGOMERY; JA. EXLINE ET UX; NATHAN CAIN ET AL.; N.M. WELCH HEIRS; INA MONTGOMERY 137 AC±; 26.13 AC±; 60 AC±; 278 AC±; 95 AC±; 142.25 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 6,602' TVD 20,600' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
 DENVER, CO 80202 CHARLESTON, WV 25313

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED 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

DOUGLAS R. ROWE P.S. 2202
 DATE 07/17/18
 OPERATOR'S WELL# CALIFORNIA UNIT #2H
 API WELL # 47 - 017 - 06797
 STATE COUNTY PERMIT

12/21/2018

RECEIVED
Office of Oil and Gas
SEP 10 2018
WV Department of
Environmental Protection

LATITUDE 39°20'00" 2,986'

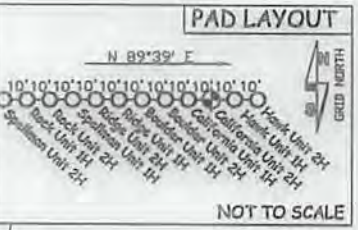
7,474' TO BOTTOM HOLE
LATITUDE 39°22'30"

LONGITUDE 80°50'00"
11,310'
13,393' TO BOTTOM HOLE

Antero Resources Corporation
Well No. California Unit 2H
47-017-06797

AS DRILLED DATA:
WELL 2H TOP HOLE INFORMATION:
N: 295,052ft E: 1,619,710ft
LAT: 39°18'08.22" LON: 80°50'37.98"
BOTTOM HOLE INFORMATION:
N: 308,211ft E: 1,615,417ft
LAT: 39°20'17.63" LON: 80°49'21.20"
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: 4,350,343m E: 513,475m
BOTTOM HOLE INFORMATION:
N: 4,354,330m E: 512,101m



- 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 SHOWS HERSON WAS PROVIDED BY ALLEGHENY SURVEYS, INC.
- 3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
- 4. WLS IS NOT CERTIFYING THE DATA AND INFORMATION PROVIDED LISTED IN NOTES 2 AND 3, ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LESSEE BOUNDARIES.
- 5. WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.



JOB # 16-059WA
DRAWING # CALIFORNIAZHAD
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

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,135.5' AS BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK
QUADRANGLE WEST UNION 7.5' DISTRICT CENTRAL COUNTY DODDRIDGE

SURFACE OWNER JEFFREY K. JONES SR. ET AL ACREAGE 77.32 ACRES +/-
OIL & GAS ROYALTY OWNER DONALD L. PIGGOTT; NEIL ALLEN; MARY MAXINE WELCH; LEASE ACREAGE 81 AC±; 176 AC±; 96 AC±;
SHIRLEY LOHR; BETTY COTTELL; CARROLL SHEPHERD; CARROLL E. SHEPHERD ET UX; HULL MILLER; MICHAEL JOE SHEPHERD; RICHARD MCCULLOUGH ET UX; 36.38 AC±; 24.5 AC±; 17.18 AC±; 17.5 AC±; 53.8 AC±; 12.025 AC±; 29 AC±;
EUGENE R. WALTON; KATHERINE MONTGOMERY; J.A. EQUINE ET UX; NATHAN CANN ET AL; N.M. WELCH HERS; INA MONTGOMERY 137 AC±; 26.13 AC±; 60 AC±; 278 AC±; 95 AC±; 142.26 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
TARGET FORMATION MARCELLUS PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
WELL OPERATOR ANTERO RESOURCES CORP. ESTIMATED DEPTH 6,602' TVD 20,600' MD
ADDRESS 1615 WYNKOOP STREET DENVER, CO 80202 DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM ADDRESS 5400 D. BIG TYLER ROAD CHARLESTON, WV 25313

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED 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

DOUGLAS R. ROWE P.S. 2202

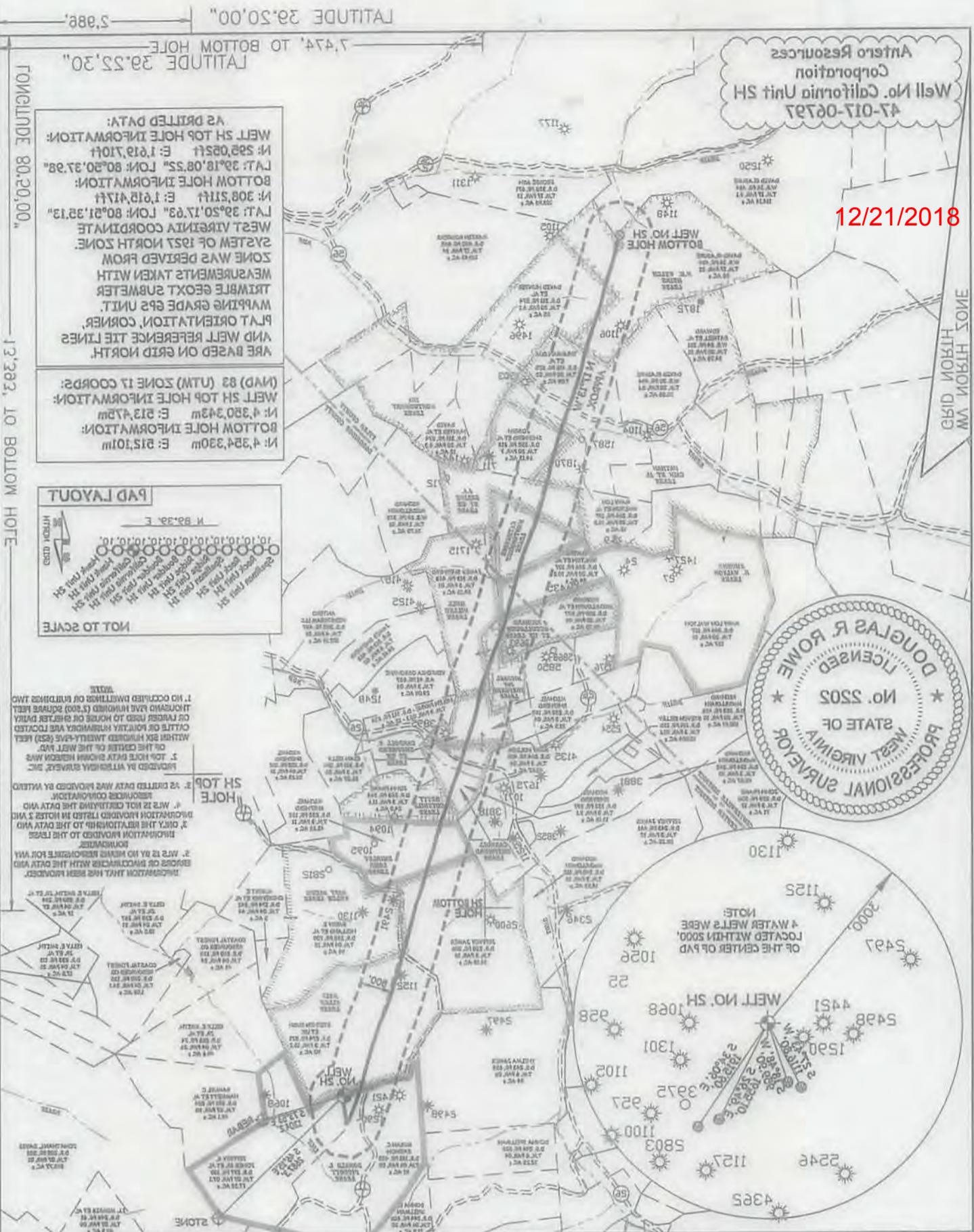
DATE 07/17/18
OPERATOR'S WELL# CALIFORNIA UNIT #2H

API WELL # 47 - 017 - 06797
STATE COUNTY PERMIT

COUNTY NAME PERMIT

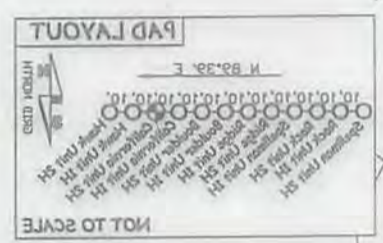
12/21/2018

Antero Resources Corporation
Well No. California Unit 5H
47-017-06797



AS DRILLED DATA:
WELL 5H TOP HOLE INFORMATION:
N: 525.085ft E: 1.619.710ft
LAT: 39°18'08.22" LON: 80°50'37.98"
BOTTOM HOLE INFORMATION:
N: 308.511ft E: 1.619.417ft
LAT: 39°20'17.63" LON: 80°51'25.13"
WEST VIRGINIA COORDINATE
SYSTEM OF 1927 NORTH ZONE
ZONE WAS DERIVED FROM
MEASUREMENTS TAKEN WITH
TRIANGULAR GEODYSUBMETER
MAPPING GRADE 625 UNIT.
PLT ORIENTATION, CORNER,
AND WELL REFERENCE TIE LINES
ARE BASED ON GRID NORTH.

(NAD 83 UTM) ZONE 17 COORDS:
WELL 5H TOP HOLE INFORMATION:
N: 4380.243m E: 513.472m
BOTTOM HOLE INFORMATION:
N: 4354.330m E: 513.101m



1. NO OCCUPIED BUILDINGS OR BUILDINGS TWO
THOUSAND FEET MINIMUM (500) FEET
OR LARGER LEAD TO HOUSE OR OTHER DAILY
CATTLE OR HORSE RUMINANTS ARE LOCATED
WITHIN ONE HUNDRED TWENTY-FIVE (25) FEET
OF THE CENTER OF THE WELL PAD.
2. TOP HOLE DATA SHOWS HORIZON HAS
PROVIDED BY ANTHERO SURVEYING, INC.
REGULATORY COMPLIANCE.
3. WAS 25 NOT CONTAINING THE DATA AND
INFORMATION PROVIDED LISTED IN NOTES 2 AND
3 ONLY. THE INFORMATION TO THE DATA AND
INFORMATION LISTED TO THE DATA
AND INFORMATION.

4. WAS 25 BY NO HAVING RESPONSES FOR WHY
DISCREPANCY THAT HAS BEEN PROVIDED.
5. WAS 25 BY NO HAVING RESPONSES FOR WHY
DISCREPANCY THAT HAS BEEN PROVIDED.
6. WAS 25 BY NO HAVING RESPONSES FOR WHY
DISCREPANCY THAT HAS BEEN PROVIDED.
7. WAS 25 BY NO HAVING RESPONSES FOR WHY
DISCREPANCY THAT HAS BEEN PROVIDED.
8. WAS 25 BY NO HAVING RESPONSES FOR WHY
DISCREPANCY THAT HAS BEEN PROVIDED.
9. WAS 25 BY NO HAVING RESPONSES FOR WHY
DISCREPANCY THAT HAS BEEN PROVIDED.
10. WAS 25 BY NO HAVING RESPONSES FOR WHY
DISCREPANCY THAT HAS BEEN PROVIDED.

LEGEND

- Surface Owner Boundary Lines +/-
- - - Interior Surface Tracts +/-
- Proposed Well Path
- ⊙ As Drilled Well Path

CHARLESTON, WV 25313
400 D BIG TYLER ROAD
DIANNA STAMPER - CT CORPORATION SYSTEM
DESIGNATED AGENT
ANTERO RESOURCES CORP.
MARCELLUS
TARGET FORMATION

STATE OF WEST VIRGINIA
OFFICE OF OIL AND GAS
DIVISION OF ENVIRONMENTAL PROTECTION
WITLOW LAND SURVEYING P.L.L.C.
520 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26109

FORM W-8
ADDRESS 1815 WYNKOP STREET
DENVER, CO 80202
WELL OPERATOR ANTERO RESOURCES CORP.
WELL OPERATOR MARCELLUS
TARGET FORMATION

STATE OF WEST VIRGINIA
DIVISION OF OIL AND GAS
DEPARTMENT OF ENERGY
PROVEN SOURCE OF ELEV.
SUBMETER MAPPING GRADE GPS
ACCURACY SUBMETER
MINIMUM DEGREE OF
SCALE 1" = 2000'
DRAWING # CALFORMASHD
JOB # 18-028WA