Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

August 9, 2019

West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street
Charleston, WV 25304

To Whom It May Concern:

Please find enclosed the Well Operator's Report of Well Work, Form WR-35 (including As-Drilled Survey Plat, Directional Survey and FracFocus report), Discharge Monitoring Report Form WR-34 and corresponding logs for the following wells:

- Waco Unit 1H (API # 47-085-10354)—Bison Pad
- Waco Unit 2H (API # 47-085-10356)—Bison Pad
- Waldo Unit 1H (API # 47-085-10353)—Bison Pad
- Waldo Unit 2H (API # 47-085-10355)—Bison Pad

If you have any questions please feel free to contact me at (303) 357-7223.

Sincerely,

Megan Griffith
Permitting Agent
Antero Resources Corporation

Enclosures

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

API 47 - 085 - 10353 County Ritchie District Clay
Quad Pennsboro 7.5' Pad Name Bison Pad Field/Pool Name -----
Farm name Donald L. Costilow Well Number Waldo 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 4349550m Easting 508524m
Landing Point of Curve Northing 4349195.19m Easting 507839.39m
Bottom Hole Northing 4346219m Easting 508830m

Elevation (ft) 1221' 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 9/14/2015 Date drilling commenced 6/29/2017 Date drilling ceased 11/12/2018
Date completion activities began 3/15/2019 Date completion activities ceased 4/23/2019
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 None Identified Open mine(s) (Y/N) depths No
Salt water depth(s) ft None Identified 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

Reviewed by:

API 47- 085 - 10353 Farm name Donald L. Costilow Well number Waldo 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"	110'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	561'	New	54.5#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2578'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	17577'	New	23#, HCP-110	N/A	Y
Tubing		2-3/8"	6850'		4.7#, P-110		
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	204 sx	15.6	1.18	241	0'	8 Hrs.
Surface	Class A	528 sx	15.6	1.20	635	0'	8 Hrs.
Coal							
Intermediate 1	Class A	875 sx	15.6	1.19	1083	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	792 sx (Lead) 1258sx (Tail)	14.5 (Lead), 15.2(Tail)	1.4 (Lead), 1.6 (Tail)	3118	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 17912' MD, 6615' TVD (BHL), 6615' (Deepest Point Drilled) Loggers TD (ft) 17912' MD

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

Plug back procedure N/A

Kick off depth (ft) 6200'

** This is a subsequent Well. Antero only runs wireline logs on one well on a multi-well pad (Bill Unit 3H API#47-085-10257). A Cement Bond Log has been included with this submittal.

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

API 47- 085 - 10353 Farm name Donald L. Costilow Well number Waldo Unit 1H

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.

API 47- 085 - 10353 Farm name Donald L. Costilow Well number Waldo Unit 1H

PRODUCING FORMATION(S)	DEPTHS	
Marcellus	6524' (TOP) TVD	7318' (TOP) MD

Please insert additional pages as applicable.

GAS TEST □ Build up □ Drawdown ■ Open Flow OIL TEST ■ Flow □ Pump

SHUT-IN PRESSURE Surface 3000 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 11294 mcfpd Oil 70 bpd NGL --- bpd Water 390 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_2S, ETC)
***PLEASE SEE ATTACHED EXHIBIT 3**					

Please insert additional pages as applicable.

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

Logging Company KLX Energy Services
Address 6072 W Veterans Memorial Hwy City Bridgeport State WV Zip 26330

Cementing Company Schlumberger Oilfield Services
Address 300 Schlumberger Dr City Sugarland State TX Zip 77478

Stimulating Company CalFrac Well Services
Address 171 17th Street, Wuite 1445 City Denver State CO Zip 80202
Please insert additional pages as applicable.

Completed by Megan Griffith Telephone 303-357-6820
Signature _____ Title Permitting Agent Date 8/1/2019

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

API 47-085-10353 **Farm Name** Donald L. Costilow **Well Number** Waldo Unit 1H

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	2/24/2019	17795.9		60	Marcellus
2	2/25/2019	17714.57	17550.42	60	Marcellus
3	2/26/2019	17515.19	17351.04	60	Marcellus
4	2/26/2019	17315.81	17151.66	60	Marcellus
5	2/26/2019	17116.43	16952.28	60	Marcellus
6	2/27/2019	16917.05	16752.9	60	Marcellus
7	2/27/2019	16717.67	16553.52	60	Marcellus
8	2/27/2019	16518.29	16354.14	60	Marcellus
9	2/28/2019	16318.91	16154.76	60	Marcellus
10	2/28/2019	16119.53	15955.38	60	Marcellus
11	2/28/2019	15920.15	15756	60	Marcellus
12	3/1/2019	15720.77	15556.62	60	Marcellus
13	3/1/2019	15521.39	15357.24	60	Marcellus
14	3/1/2019	15322.01	15157.86	60	Marcellus
15	3/1/2019	15122.63	14958.48	60	Marcellus
16	3/2/2019	14923.25	14759.1	60	Marcellus
17	3/2/2019	14723.87	14559.72	60	Marcellus
18	3/2/2019	14524.49	14360.34	60	Marcellus
19	3/3/2019	14325.11	14160.96	60	Marcellus
20	3/3/2019	14125.73	13961.58	60	Marcellus
21	3/3/2019	13926.35	13762.2	60	Marcellus
22	3/4/2019	13726.97	13562.82	60	Marcellus
23	3/4/2019	13527.59	13363.44	60	Marcellus
24	3/4/2019	13328.21	13164.06	60	Marcellus
25	3/4/2019	13128.83	12964.68	60	Marcellus
26	3/5/2019	12929.45	12765.3	60	Marcellus
27	3/5/2019	12730.07	12565.92	60	Marcellus
28	3/6/2019	12530.69	12366.54	60	Marcellus
29	3/6/2019	12331.31	12167.16	60	Marcellus
30	3/6/2019	12131.93	11967.78	60	Marcellus
31	3/6/2019	11932.55	11768.4	60	Marcellus
32	3/7/2019	11733.17	11569.02	60	Marcellus
33	3/7/2019	11533.79	11369.64	60	Marcellus
34	3/7/2019	11334.41	11170.26	60	Marcellus
35	3/8/2019	11135.03	10970.88	60	Marcellus
36	3/8/2019	10935.65	10771.5	60	Marcellus
37	3/8/2019	10736.27	10572.12	60	Marcellus
38	3/8/2019	10536.89	10372.74	60	Marcellus
39	3/9/2019	10337.51	10173.36	60	Marcellus
40	3/9/2019	10138.13	9973.98	60	Marcellus
41	3/9/2019	9938.75	9774.6	60	Marcellus
42	3/10/2019	9739.37	9575.22	60	Marcellus
43	3/10/2019	9539.99	9375.84	60	Marcellus
44	3/11/2019	9340.61	9176.46	60	Marcellus
45	3/11/2019	9141.23	8977.08	60	Marcellus
46	3/11/2019	8941.85	8777.7	60	Marcellus
47	3/12/2019	8742.47	8578.32	60	Marcellus
48	3/12/2019	8543.09	8378.94	60	Marcellus
49	3/12/2019	8343.71	8179.56	60	Marcellus
50	3/13/2019	8144.33	7980.18	60	Marcellus
51	3/13/2019	7944.95	7780.8	60	Marcellus
52	3/13/2019	7745.57	7581.42	60	Marcellus
53	3/14/2019	7546.19	7382.04	60	Marcellus

API 47-085-10353 **Farm Name** Donald L. Costilow **Well Number** Waldo Unit 1H

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	2/24/2019	69.14791	7570.212	5250	4906	12545.35975	5289	N/A
2	2/25/2019	68.38775	7625.365	5155	5067	12760.75288	8802	N/A
3	2/26/2019	73.08974	7874.004	4563	4488	12435.09328	8384	N/A
4	2/26/2019	70.89758	7744.326	4723	4640	12455.224	8464	N/A
5	2/26/2019	73.49855	7979.665	5348	5055	13108.16328	8717	N/A
6	2/27/2019	73.78364	7885.419	4589	4465	12424.20277	8467	N/A
7	2/27/2019	72.91487	7753.473	5409	3840	11666.38789	9106	N/A
8	2/27/2019	73.12064	8093.032	5847	5140	13306.15271	8406	N/A
9	2/28/2019	75.81035	8076.826	5803	4430	12582.63644	8194	N/A
10	2/28/2019	73.10899	7674.174	5477	3609	11356.28321	8365	N/A
11	2/28/2019	67.42675	7807.007	5056	4024	11898.43357	9360	N/A
12	3/1/2019	74.32848	7864.72	4852	4357	12296.0483	8462	N/A
13	3/1/2019	75.98884	7701.756	5431	3720	11497.74518	8010	N/A
14	3/1/2019	74.10148	7676.519	5180	4556	12306.62052	8202	N/A
15	3/1/2019	79.50091	8097.045	5429	4018	12194.54639	8266	N/A
16	3/2/2019	81.25144	8064.947	6772	4681	12827.19847	8196	N/A
17	3/2/2019	70.29721	7413.889	5203	3948	11432.1864	8222	N/A
18	3/2/2019	80.41526	8154.225	4175	4610	12844.64039	8200	N/A
19	3/3/2019	78.13342	7969.851	4693	4963	13010.98457	8304	N/A
20	3/3/2019	76.47539	7633.227	5062	3954	11663.70226	8134	N/A
21	3/3/2019	76.58035	7646.463	4896	3519	11242.04286	8893	N/A
22	3/4/2019	81.87104	8044.389	5625	4710	12836.25967	8184	N/A
23	3/4/2019	76.28422	7454.263	4071	3943	11473.54681	9416	N/A
24	3/4/2019	80.34935	7741.519	4507	4128	11949.86813	8260	N/A
25	3/4/2019	84.53404	8005.522	4375	4240	12330.05628	8231	N/A
26	3/5/2019	78.1959	7756.504	4710	3940	11774.69988	8276	N/A
27	3/5/2019	84.27598	8014.227	5215	4344	12442.50315	8185	N/A
28	3/6/2019	85.78724	8104.806	4705	4631	12821.5937	8095	N/A
29	3/6/2019	74.49512	7379.117	5120	4017	11470.61232	9164	N/A
30	3/6/2019	82.3	7536	5326	3664	11282.3	8214	N/A
31	3/6/2019	83.10758	8152.45	4790	3736	11971.55759	8143	N/A
32	3/7/2019	79.7	7908	4692	3912	11899.7	7997	N/A
33	3/7/2019	79	7961	4926	4031	12071	8363	N/A
34	3/7/2019	84.33475	8097.384	4715	4983	13164.71879	8079	N/A
35	3/8/2019	88.7	8390	4551	4905	13383.7	8052	N/A
36	3/8/2019	87.9	8220	4931	3989	12296.9	8375	N/A
37	3/8/2019	83.26607	7782.632	5667	3886	11751.89775	8201	N/A
38	3/8/2019	86.93807	7654.238	4705	4080	11821.17583	8551	N/A
39	3/9/2019	82.71353	7245.065	4562	3840	11167.77843	8131	N/A
40	3/9/2019	84.07264	7838.158	4948	4399	12321.23113	7916	N/A
41	3/9/2019	89.94329	7830.355	4568	4166	12086.2985	8025	N/A
42	3/10/2019	82.71266	7475.225	5282	4187	11744.93745	7792	N/A
43	3/10/2019	81.75331	7086.063	4822	4018	11185.81627	8053	N/A
44	3/11/2019	88.42036	7661.808	4352	4379	12129.22858	7956	N/A
45	3/11/2019	75.6576	7266.298	5510	3895	11236.95605	9101	N/A
46	3/11/2019	87.50167	8219.656	5895	4215	12522.15729	8040	N/A
47	3/12/2019	75.10784	7530.505	5318	4525	12130.61321	11729	N/A
48	3/12/2019	81.63849	7281.143	5458	3730	11092.78198	7913	N/A
49	3/12/2019	84.02306	7603.703	4858	4813	12500.72583	8969	N/A
50	3/13/2019	83.84246	7176.025	5577	3669	10928.86713	7802	N/A
51	3/13/2019	86.91473	6946.44	5240	4038	11071.35465	7843	N/A
52	3/13/2019	89.39175	7464.657	4567	4027	11581.04847	7901	N/A
53	3/14/2019	90.23255	6916.261	5506	3213	10219.4939	7844	N/A
	AVG=	**77**	**7,829**	**5,060**	**4,281**	**402,178**	**274,971**	TOTAL

API 47-085-10353 **Farm Name** Donald L. Costilow **Well Number** Waldo Unit 1H

EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD) From Surface	BOTTOM DEPTH (TVD) From Surface	TOP DEPTH (MD) From Surface	BOTTOM DEPTH (MD) From Surface
Silty Sandstone	0	190	0	190
Sandy siltstone	190	290	190	290
Sandstone	290	600	290	600
Silty Sandstone	600	870	600	870
limey siltstone	870	945	870	945
silty sandstone, tr. coal	945	1,095	945	1,095
silty sandstone	1,095	1,490	1,095	1,490
silty shale	1,490	1,620	1,490	1,620
sandstone, tr coal	1,620	1,630	1,620	1,630
silty sandstone	1,630	1,670	1,630	1,670
sandstone	1,670	1,745	1,670	1,745
sandy shale	1,745	1,770	1,745	1,770
shaly sand	1,770	1,983	1,770	2,034
Big Lime	1,998	2,787	2,049	2,925
Fifty Foot Sandstone	2,787	2,893	2,925	3,043
Gordon	2,893	3,044	3,043	3,211
Fifth Sandstone	3,044	3,294	3,211	3,489
Bayard	3,294	3,746	3,489	3,994
Speechley	3,746	3,971	3,994	4,245
Balltown	3,971	4,686	4,245	5,041
Bradford	4,686	5,032	5,041	5,426
Benson	5,032	5,296	5,426	5,714
Alexander	5,296	6,384	5,714	6,976
Sycamore	6,247	6,354	6,798	6,946
Middlesex	6,354	6,465	6,946	7,145
Burkett	6,465	6,498	7,145	7,228
Tully	6,498	6,524	7,228	7,318
Marcellus	6,524	NA	7,318	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:	2/24/2019
Job End Date:	3/14/2019
State:	West Virginia
County:	Ritchie
API Number:	47-085-10353-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Waldo Unit 1H
Latitude:	39.29520600
Longitude:	-80.90132500
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,613
Total Base Water Volume (gal):	19,247,734
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	100.00000	88.22118	
15% HCl Acid	CWS	Clean Perforations					
				Listed Below			

CalGel 4000	CWS	Gel Slurry					
				Listed Below			
Sand (Proppant)	CWS	Propping Agent					
				Listed Below			
SaniFrac 8844	CWS	Biocide					
				Listed Below			
DAP-902	CWS	Scale Inhibitor					
				Listed Below			
CI-9100G	CWS	Corrosion Inhibitor					
				Listed Below			
DAP-103	CWS	Iron Control					
				Listed Below			
Calbreak 5501	CWS	Breaker					
				Listed Below			
DWP-641	CWS	Friction Reducer					
				Listed Below			
Other Chemical (s)	Listed Above	See Trade Name (s) List					

				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	11.45728	
			Calcite	471-34-1	1.00000	0.07998	
			Hydrochloric acid	7647-01-0	37.00000	0.05650	
			Illite	12173-60-3	1.00000	0.03458	
			Polymer	26100-47-0	45.00000	0.02600	
			Distillates (petroleum), hydrotreated middle	64742-46-7	60.00000	0.02224	
			Guar gum	9000-30-0	60.00000	0.02224	
			Distillates (petroleum), hydrotreated light	64742-47-8	30.00000	0.01733	
			Goethite	1310-14-1	0.10000	0.01146	
			Biotite	1302-27-8	0.10000	0.01146	
			Apatite	64476-38-6	0.10000	0.01146	
			Ammonium chloride	12125-02-9	11.00000	0.00635	
			Polyethylene glycol mixture	25322-68-3	54.50000	0.00568	
			Ilmenite	98072-94-7	0.10000	0.00346	
			Sorbitan monooleate	1338-43-8	4.00000	0.00231	
			2,2-Dibromo-3-Nitrilopropionamide	10222-01-2	20.00000	0.00209	
			Quaternary ammonium compounds, bis (hydrogenated tallow alkyl)dimethyl, salts with bentonite	68953-58-2	5.00000	0.00185	
			Polyethylene glycol monooleate	9004-96-0	3.00000	0.00173	
			Sorbitol tetraoleate	61723-83-9	2.00000	0.00116	
			Ammonium Persulfate	7727-54-0	100.00000	0.00072	
			Amines, tallow alkyl, ethoxylated	61791-26-2	1.00000	0.00058	
			Oxirane, 2-methyl-, polymer with oxirane, monodecyl ether	37251-67-5	1.50000	0.00056	

			Citric acid	77-92-9	60.00000	0.00051	
			Sodium bromide	7647-15-6	4.00000	0.00042	
			Dibromoacetonitrile	3252-43-5	3.00000	0.00031	
			Alkyloxypolyethyleneoxy ethanol	84133-50-6	0.50000	0.00029	
			Vinylidene chloride-methyl acrylate copolymer	25038-72-6	20.00000	0.00014	
			Acrylamide	79-06-1	0.10000	0.00006	
			Ethylene Glycol	107-21-1	40.00000	0.00003	
			Diethylene glycol, monomethyl ether	34590-94-8	20.00000	0.00002	
			Tar bases, quinolone derivs, benzyl chloride-quatenized	72480-70-7	10.00000	0.00001	
			Ethoxylated Alcohols	68131-39-5	10.00000	0.00001	
			Cinnamaldehyde	104-55-2	10.00000	0.00001	
			Formic acid	64-18-6	10.00000	0.00001	
			Isopropyl alcohol	67-63-0	5.00000	0.00001	
			Organic Acid Salts	9003-04-7			Proprietary Additive Concentration
			Glycol	57-55-6			Proprietary Additive Concentration

* 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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Rev. 10-10

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Discharge Monitoring Report
Oil and Gas General Permit

Company Name: Antero Resources Corporation
API No: 47-085-10353 County: Ritchie
District: Clay Well No: Waldo Unit 1H
Farm Name: Antero Resources Corporation
Discharge Date/s From:(MMDDYY) 05/06/19 To: (MMDDYY) 06/05/19
Discharge Times. From: 0:00 To: 24:00
Total Volume to be Disposed from this facility (gallons): 593,873
Disposal Option(s) Utilized (write volumes in gallons):

(1) Land Application: _____ (Include a topographical map of the Area.)
(2) UIC: 104,515 Permit No. 3416729731, 3400923821
(3) Offsite Disposal: _____ Site Location: _____
(4) Reuse: 489,359 Alternate Permit Number: _____
(5) Centralized Facility: _____ Permit No. _____
(6) Other method: _____ (Include an explanation)

Follow Instructions below to determine your treatment category:
Optional Pretreatment test: n/a Cl- mg/l n/a DO mg/l

1. Do you have permission to use expedited treatment from the Director or his representative? (Y/N) n/a If yes, who? _____ and place a four (4) on line 7. If not go to line 2
2. Was Frac Fluid or flowback put into the pit? (Y/N) n/a If yes, go to line 5. If not, go to line 3.
3. Do you have a chloride value pretreatment (see above)? (Y/N) n/a If yes, go to line 4 If not, go to line 5.
4. Is the Chloride level less than 5000 mg/l? (Y/N) n/a If yes, then enter a one (1) on line 7.
5. Do you have a pretreatment value for DO? (See above) (Y/N) n/a If yes, go to line 6 If not, enter a three (3) in line 7.
6. Is the DO level greater than 2.5 mg/l?(Y/N) n/a If yes, enter a two (2) on line 7. If not, enter a three (3) on line 7.
7. n/a is the category of your pit. Use the Appropriate section.
8. Comments on Pit condition: n/a No pit on site.

Name of Principal Exec. Officer: Gretchen Kohler
Title of Officer: Senior Environmental and Regulatory Manager
Date Completed: 7/18/19

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of a Principal Exec. Officer or Authorized agent.

Category 1
Sampling Results
API No : _____

Parameter	Predischarge Limits	Predischarge Reported	Discharge Limits	Discharge Reported	Units
pH	6-10		6-10		S.U
Settling Time	5		N/A	N/A	Days
Fe	6		6		mg/l
D.O.	2.5		2.5		mg/l
Settleable Sol.	0.5		0.5		mg/l
Cl	5,000		5,000		mg/l
Oil	Trace		Trace		Obs.
TOC**			Monitor		mg/l
Oil and Grease			Monitor		mg/l
Total Al***			Monitor		mg/l
TSS			Monitor		mg/l
Total Mn	Monitor		Monitor		mg/l
Volume			Monitor		Gal
Flow			Monitor		Gal/min
Disposal Area			Monitor		Acres

*** Al is only reported if the pH is above 9.0

Category 2
Sampling Results
API No : _____

Parameter	Predischarge Limits	Predischarge Reported	Discharge Limits	Discharge Reported	Units
pH	6-10		6-10		S.U
Settling Time	10		N/A	N/A	Days
Fe	6		6		mg/l
D.O.	2.5		2.5		mg/l
Settleable Sol.	0.5		0.5		mg/l
Cl*	12,500		12,500		mg/l
Oil	Trace		Trace		Obs.
TOC**			Monitor		mg/l
Oil and Grease			Monitor		mg/l
Total Al***			Monitor		mg/l
TSS			Monitor		mg/l
Total Mn	Monitor		Monitor		mg/l
Volume			Monitor		Gal
Flow			Monitor		Gal/min
Disposal Area			Monitor		Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____ Date: _____
** Include a description of your aeration technique. Aeration Code: _____
*** Al is only reported if the pH is above 9.0

Category 3
Sampling Results
API No : _____

Parameter	Predischarge Limits	Predischarge Reported	Discharge Limits	Discharge Reported	Units
pH	6-10		6-10		S.U
Settling Time	20		N/A	N/A	Days
Fe	6		6		mg/l
D.O.	2.5		2.5		mg/l
Settleable Sol.	0.5		0.5		mg/l
Cl*	12,500		12,500		mg/l
Oil	Trace		Trace		Obs.
TOC**			Monitor		mg/l
Oil and Grease			Monitor		mg/l
Total Al***			Monitor		mg/l
TSS			Monitor		mg/l
Total Mn	Monitor		Monitor		mg/l
Volume			Monitor		Gal
Flow			Monitor		Gal/min
Disposal Area			Monitor		Acres

* Can be 25,000 with inspector's approval,

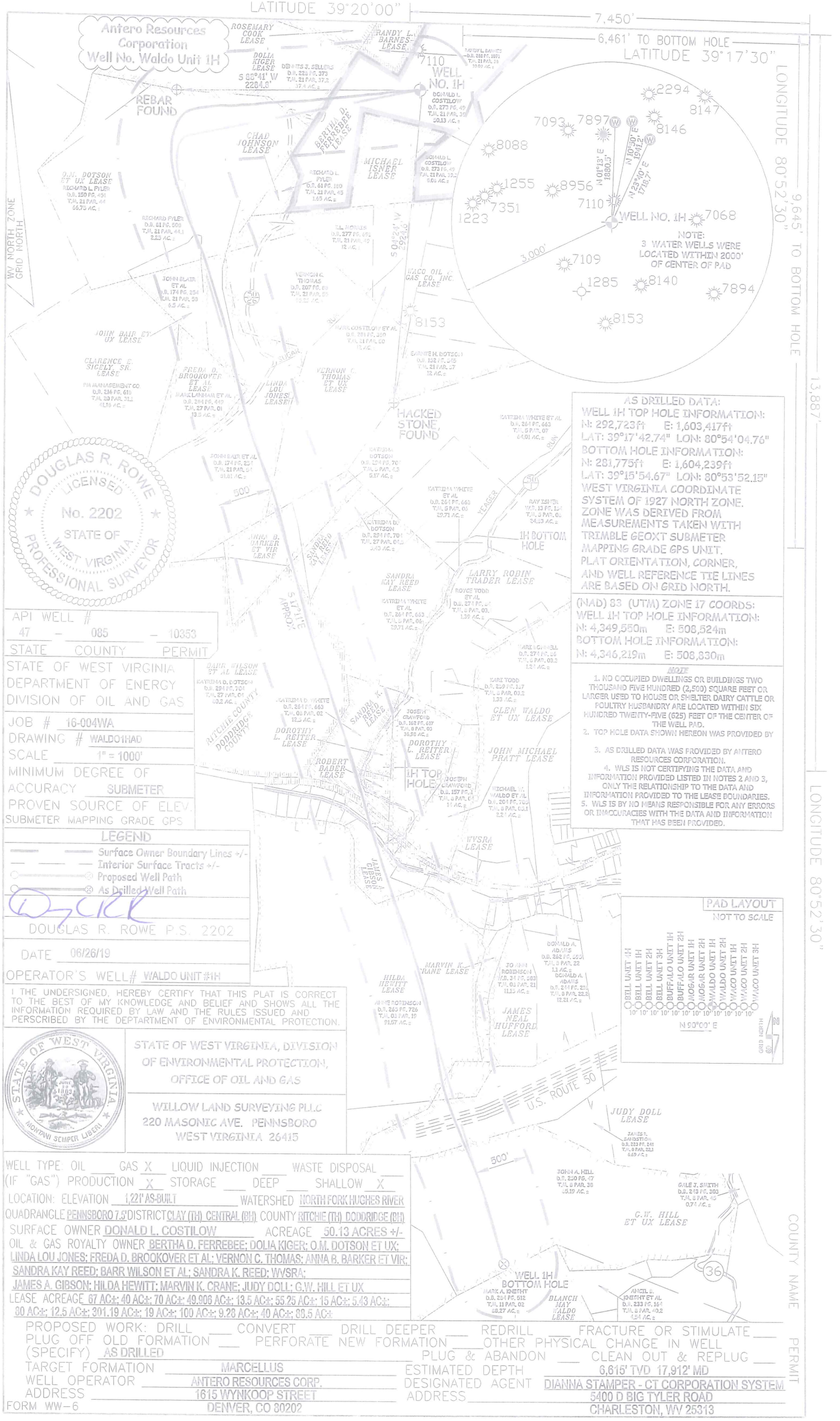
(Inspector's signature): _____ Date: _____
** Include a description of your aeration technique. Aeration Code: _____
*** Al is only reported if the pH is above 9.0.

Category 4
Sampling Results
API No: _____

Parameter	Predischarge Limits	Predischarge Reported	Discharge Limits	Discharge Reported	Units
pH	6-10		6-10		S.U
Settling Time	1		N/A	N/A	Days
Fe	Monitor		Monitor		mg/l
D.O.	Monitor		Monitor		mg/l
Settleable Sol.	Monitor		Monitor		mg/l
Cl*	12,500		12,500		mg/l
Oil	Trace		Trace		Obs.
TOC**			Monitor		mg/l
Oil and Grease			Monitor		mg/l
TSS			Monitor		mg/l
Total Mn	Monitor		Monitor		mg/l
Volume			Monitor		Gal
Flow			Monitor		Gal/min
Activated Carbon (0.175)			N/A	N/A	lb/Bl
Date Site Reclaimed	N/A	N/A			10 days from dis.
Disposal Area			Monitor		Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____ Date: _____


LATITUDE 39°20'00"
7,450'
6,461' TO BOTTOM HOLE
LATITUDE 39°17'30"
LONGITUDE 80°52'30"
9,645' TO BOTTOM HOLE
13,887'
LONGITUDE 80°52'30"
Antero Resources Corporation
Well No. Waldo Unit 1H
WELL NO. 1H
7110
REBAR FOUND
S 88°41' W 2284.0'
ROSEMARY COOK LEASE
RANDY L. BARNES LEASE
DOLLA KIGER LEASE
DENNIS J. SELLERS D.B. 225 PG. 373 T.M. 21 PAR. 37.2 37.4 AC.±
DONALD L. COSTILOW D.B. 273 PG. 49 T.M. 21 PAR. 39 50.13 AC.±
CHAD JOHNSON LEASE
BERTHA D. FERREBEE LEASE
MICHAEL ISNER LEASE
RICHARD L. FYLER D.B. 61 PG. 180 T.M. 21 PAR. 45 1.65 AC.±
O.M. DOTSON ET UX LEASE
RICHARD L. FYLER D.B. 150 PG. 451 T.M. 21 PAR. 44 66.75 AC.±
RICHARD FYLER D.B. 61 PG. 506 T.M. 21 PAR. 44.1 2.23 AC.±
J.L. MORRIS D.B. 277 PG. 692 T.M. 21 PAR. 42 12 AC.±
VERNON C. THOMAS D.B. 207 PG. 89 T.M. 21 PAR. 55 52.57 AC.±
WACO OIL & GAS CO. INC. LEASE
JOHN BLAIR ET AL D.B. 174 PG. 254 T.M. 21 PAR. 58 6.5 AC.±
JOHN BAIR ET UX LEASE
CLARENCE E. SIGELY, SR. LEASE
PM MANAGEMENT CO. D.B. 236 PG. 619 T.M. 20 PAR. 31.1 41.19 AC.±
FREDA D. BROOKOVER ET AL LEASE
MARKLAMAN ET AL D.B. 284 PG. 449 T.M. 27 PAR. 01 19.5 AC.±
LINDA LOU JONES LEASE
VERNON C. THOMAS ET UX LEASE
CARL COSTILOW ET AL D.B. 201 PG. 350 T.M. 21 PAR. 60 12 AC.±
BARNIE H. DOTSON D.B. 152 PG. 478 T.M. 21 PAR. 57 12 AC.±
8153
HACKED STONE, FOUND
KATRINA WHITE ET AL D.B. 264 PG. 663 T.M. 5 PAR. 07 64.01 AC.±
KATRINA D. DOTSON D.B. 284 PG. 701 T.M. 5 PAR. 43 5.17 AC.±
KATRINA WHITE ET AL D.B. 264 PG. 663 T.M. 5 PAR. 06 29.71 AC.±
RAY ISNER W.B. 13 PG. 124 T.M. 5 PAR. 6.1 34.33 AC.±
1H BOTTOM HOLE
JOHN BAIR ET AL D.B. 174 PG. 254 T.M. 21 PAR. 54 91.61 AC.±
ANNA B. BARKER ET VIR LEASE
SANDRA KAY REED LEASE
LARRY ROBIN TRADER LEASE
ROYCE TODD ET AL D.B. 271 PG. 1 T.M. 5 PAR. 03 1.39 AC.±
KATRINA WHITE ET AL D.B. 264 PG. 663 T.M. 5 PAR. 08 29.71 AC.±
KARL CAMPBELL D.B. 271 PG. 16 T.M. 5 PAR. 03.2 1.21 AC.±
KARL TODD D.B. 249 PG. 147 T.M. 5 PAR. 03.2 1.33 AC.±
GLEN WALDO ET UX LEASE
JOHN MICHAEL PRATT LEASE
BARR, WILSON ET AL LEASE
KATRINA D. DOTSON D.B. 284 PG. 704 T.M. 27 PAR. 01 10.2 AC.±
KATRINA D. WHITE D.B. 264 PG. 663 T.M. 08 PAR. 02 15.2 AC.±
RITCHIE COUNTY DODDRIDGE COUNTY
DOROTHY L. REITER LEASE
JOSEPH CRAWFORD D.B. 268 PG. 617 T.M. 8 PAR. 03 36.98 AC.±
DOROTHY C. REITER LEASE
ROBERT BABER LEASE
1H TOP HOLE
JOSEPH CRAWFORD D.B. 157 PG. 1 T.M. 8 PAR. 6.1 15 AC.±
MICHAEL M. WALDO ET AL D.B. 264 PG. 700 T.M. 8 PAR. 6.1 2.5 AC.±
WVSRA LEASE
JAMES A. GIBSON LEASE
MARVIN K. CRANE LEASE
HILDA HEWITT LEASE
ANNE ROBINSON D.B. 265 PG. 726 T.M. 08 PAR. 10 91.57 AC.±
JO ANN ROBINSON D.B. 241 PG. 283 T.M. 08 PAR. 21 11.15 AC.±
DONALD A. ADAMS D.B. 262 PG. 353 T.M. 8 PAR. 22 11 AC.±
DONALD A. ADAMS D.B. 241 PG. 211 T.M. 8 PAR. 22.2 12.21 AC.±
JAMES NEAL HUFFORD LEASE
U.S. ROUTE 50
JUDY DOLL LEASE
JAMES D. SAMPSTON D.B. 233 PG. 241 T.M. 8 PAR. 23.1 0.69 AC.±
500'
JOHN A. HILL D.B. 220 PG. 47 T.M. 8 PAR. 38 45.19 AC.±
GALE J. SMITH D.B. 213 PG. 303 T.M. 8 PAR. 40 0.71 AC.±
G.W. HILL ET UX LEASE
WELL 1H BOTTOM HOLE
FRANK A. KNIGHT D.B. 224 PG. 512 T.M. 11 PAR. 62 68.27 AC.±
BLANCH MAY WALDO LEASE
AMOS B. KNIGHT ET AL D.B. 233 PG. 161 T.M. 8 PAR. 40.2 1.54 AC.±
36
COUNTY NAME
PERMIT
WV NORTH ZONE GRID NORTH
2294
8147
7093
7897
8146
8088
1255
8956
7351
1223
7110
WELL NO. 1H
7068
N 10°13' E 1880.5'
N 10°50' E 1942'
N 23°10' E 1787'
3,000'
7109
1285
8140
7894
8153
NOTE:
3 WATER WELLS WERE LOCATED WITHIN 2000' OF CENTER OF PAD
AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
N: 292,723ft E: 1,603,417ft
LAT: 39°17'42.74" LON: 80°54'04.76"
BOTTOM HOLE INFORMATION:
N: 281,775ft E: 1,604,239ft
LAT: 39°15'54.67" LON: 80°53'52.15"
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 1H TOP HOLE INFORMATION:
N: 4,349,550m E: 508,524m
BOTTOM HOLE INFORMATION:
N: 4,346,219m E: 508,830m
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
BELL UNIT 4H
BELL UNIT 1H
BELL UNIT 2H
BELL UNIT 3H
BUFFALO UNIT 1H
BUFFALO UNIT 2H
MOGAR UNIT 1H
MOGAR UNIT 2H
WALDO UNIT 1H
WALDO UNIT 2H
WACO UNIT 1H
WACO UNIT 2H
WACO UNIT 3H
10' 10' 10' 10' 10' 10' 10' 10' 10' 10' 10' 10' 10' 10'
N 90°00' E
GRID NORTH
0 100
DOUGLAS R. ROWE LICENSED No. 2202 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR
API WELL #
47 – 085 – 10353
STATE COUNTY PERMIT
STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS
JOB # 16-004WA
DRAWING # WALDO1HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS
LEGEND
Surface Owner Boundary Lines +/-
Interior Surface Tracts +/-
Proposed Well Path
As Drilled Well Path
DOUGLAS R. ROWE P.S. 2202
DATE 06/26/19
OPERATOR'S WELL# WALDO UNIT #1H
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 DEPTARTMENT 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
WELL TYPE OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,221' AS-BUILT WATERSHED NORTH FORK HUGHES RIVER
QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY (TH), CENTRAL (BH) COUNTY RITCHIE (TH), DODDRIDGE (BH)
SURFACE OWNER DONALD L. COSTILOW ACREAGE 50.13 ACRES +/-
OIL & GAS ROYALTY OWNER BERTHA D. FERREBEE; DOLIA KIGER; O.M. DOTSON ET UX; LINDA LOU JONES; FREDA D. BROOKOVER ET AL; VERNON C. THOMAS; ANNA B. BARKER ET VIR; SANDRA KAY REED; BARR WILSON ET AL; SANDRA K. REED; WVSRA; JAMES A. GIBSON; HILDA HEWITT; MARVIN K. CRANE; JUDY DOLL; G.W. HILL ET UX
LEASE ACREAGE 67 AC±; 40 AC±; 70 AC±; 49.906 AC±; 13.5 AC±; 55.25 AC±; 15 AC±; 5.43 AC±; 80 AC±; 12.5 AC±; 301.19 AC±; 19 AC±; 100 AC±; 9.28 AC±; 40 AC±; 68.5 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 6,615' TVD 17,912' 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
FORM WW-6