



Antero Resources  
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Denver, CO 80202  
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August 9, 2019

West Virginia Department of Environmental Protection  
Office of Oil and Gas  
601 57<sup>th</sup> 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,

A handwritten signature in black ink, appearing to read "Megan Griffith", written in a cursive style.

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- \_\_\_\_\_ - \_\_\_\_\_ County \_\_\_\_\_ District \_\_\_\_\_  
Quad \_\_\_\_\_ Pad Name \_\_\_\_\_ Field/Pool Name \_\_\_\_\_  
Farm name \_\_\_\_\_ Well Number \_\_\_\_\_  
Operator (as registered with the OOG) \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing \_\_\_\_\_ Easting \_\_\_\_\_  
Landing Point of Curve Northing \_\_\_\_\_ Easting \_\_\_\_\_  
Bottom Hole Northing \_\_\_\_\_ Easting \_\_\_\_\_

Elevation (ft) \_\_\_\_\_ 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)  
\_\_\_\_\_  
\_\_\_\_\_

Date permit issued \_\_\_\_\_ Date drilling commenced \_\_\_\_\_ Date drilling ceased \_\_\_\_\_  
Date completion activities began \_\_\_\_\_ Date completion activities ceased \_\_\_\_\_  
Verbal plugging (Y/N) \_\_\_\_\_ Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

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

Freshwater depth(s) ft \_\_\_\_\_ Open mine(s) (Y/N) depths \_\_\_\_\_  
Salt water depth(s) ft \_\_\_\_\_ Void(s) encountered (Y/N) depths \_\_\_\_\_  
Coal depth(s) ft \_\_\_\_\_ Cavern(s) encountered (Y/N) depths \_\_\_\_\_  
Is coal being mined in area (Y/N) \_\_\_\_\_

Reviewed by:  
\_\_\_\_\_

API 47- \_\_\_\_\_ - \_\_\_\_\_ Farm name \_\_\_\_\_ Well number \_\_\_\_\_

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							
Surface							
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production							
Tubing							
Packer type and depth set							

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							
Surface							
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production							
Tubing							

Drillers TD (ft) \_\_\_\_\_ Loggers TD (ft) \_\_\_\_\_  
 Deepest formation penetrated \_\_\_\_\_ Plug back to (ft) \_\_\_\_\_  
 Plug back procedure \_\_\_\_\_

Kick off depth (ft) \_\_\_\_\_

\*\* 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 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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 \_\_\_\_\_

API 47- \_\_\_\_\_ - \_\_\_\_\_ Farm name \_\_\_\_\_ Well number \_\_\_\_\_

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.

API 47- \_\_\_\_\_ - \_\_\_\_\_ Farm name \_\_\_\_\_ Well number \_\_\_\_\_

PRODUCING FORMATION(S)

DEPTHS

_____	_____ TVD	_____ MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

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

OPEN FLOW Gas \_\_\_\_\_ mcfpd Oil \_\_\_\_\_ bpd NGL \_\_\_\_\_ bpd Water \_\_\_\_\_ bpd

GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
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**\*PLEASE SEE ATTACHED EXHIBIT 3**


Please insert additional pages as applicable.

Drilling Contractor \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Logging Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Cementing Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Stimulating Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Please insert additional pages as applicable.

Completed by \_\_\_\_\_ Telephone \_\_\_\_\_  
Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

API 47-085-10356 Farm Name Donald L. Costilow Well Number Waco Unit 2H

**EXHIBIT 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	3/16/2019	17428.3		60	Marcellus
2	3/16/2019	17227.108	17396.768	60	Marcellus
3	3/16/2019	17025.916	17195.576	60	Marcellus
4	3/17/2019	16824.724	16994.384	60	Marcellus
5	3/17/2019	16623.532	16793.192	60	Marcellus
6	3/17/2019	16422.34	16592	60	Marcellus
7	3/18/2019	16221.148	16390.808	60	Marcellus
8	3/19/2019	16019.956	16189.616	60	Marcellus
9	3/19/2019	15818.764	15988.424	60	Marcellus
10	3/19/2019	15617.572	15787.232	60	Marcellus
11	3/20/2019	15416.38	15586.04	60	Marcellus
12	3/20/2019	15215.188	15384.848	60	Marcellus
13	3/21/2019	15013.996	15183.656	60	Marcellus
14	3/21/2019	14812.804	14982.464	60	Marcellus
15	3/22/2019	14611.612	14781.272	60	Marcellus
16	3/22/2019	14410.42	14580.08	60	Marcellus
17	3/22/2019	14209.228	14378.888	60	Marcellus
18	3/22/2019	14008.036	14177.696	60	Marcellus
19	3/23/2019	13806.844	13976.504	60	Marcellus
20	3/23/2019	13605.652	13775.312	60	Marcellus
21	3/24/2019	13404.46	13574.12	60	Marcellus
22	3/24/2019	13203.268	13372.928	60	Marcellus
23	3/24/2019	13002.076	13171.736	60	Marcellus
24	3/25/2019	12800.884	12970.544	60	Marcellus
25	3/25/2019	12599.692	12769.352	60	Marcellus
26	3/25/2019	12398.5	12568.16	60	Marcellus
27	3/25/2019	12197.308	12366.968	60	Marcellus
28	3/26/2019	11996.116	12165.776	60	Marcellus
29	3/26/2019	11794.924	11964.584	60	Marcellus
30	3/26/2019	11593.732	11763.392	60	Marcellus
31	3/27/2019	11392.54	11562.2	60	Marcellus
32	3/27/2019	11191.348	11361.008	60	Marcellus
33	3/27/2019	10990.156	11159.816	60	Marcellus
34	3/27/2019	10788.964	10958.624	60	Marcellus
35	3/28/2019	10587.772	10757.432	60	Marcellus
36	3/28/2019	10386.58	10556.24	60	Marcellus
37	3/28/2019	10185.388	10355.048	60	Marcellus
38	3/29/2019	9984.196	10153.856	60	Marcellus
39	3/29/2019	9783.004	9952.664	60	Marcellus
40	3/29/2019	9581.812	9751.472	60	Marcellus
41	3/29/2019	9380.62	9550.28	60	Marcellus
42	3/30/2019	9179.428	9349.088	60	Marcellus
43	3/30/2019	8978.236	9147.896	60	Marcellus
44	3/30/2019	8777.044	8946.704	60	Marcellus
45	3/31/2019	8575.852	8745.512	60	Marcellus
46	3/31/2019	8374.66	8544.32	60	Marcellus
47	3/31/2019	8173.468	8343.128	60	Marcellus
48	3/31/2019	7972.276	8141.936	60	Marcellus
49	4/1/2019	7771.084	7940.744	60	Marcellus
50	4/1/2019	7569.892	7739.552	60	Marcellus
51	4/1/2019	7368.7	7538.36	60	Marcellus
52	4/1/2019	7167.508	7337.168	60	Marcellus
53	4/2/2019	6966.316	7135.976	60	Marcellus

## 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	3/16/2019	74.12878	7959.761	5464	4806	171440	5276	N/A
2	3/16/2019	71.87879	7854.008	5404	4454	406350	9303	N/A
3	3/16/2019	74.14095	7871.809	5387	5038	406200	9012	N/A
4	3/17/2019	72.31939	8006.667	5011	4656	406550	8968	N/A
5	3/17/2019	68.8355	7665.103	2437	4568	404250	9008	N/A
6	3/17/2019	75.61806	8105.969	4320	3795	406050	8974	N/A
7	3/18/2019	74.97378	8083.27	5315	4496	405900	9440	N/A
8	3/19/2019	73.61928	8154.764	5172	4231	403600	8990	N/A
9	3/19/2019	72.36453	7966.059	5382	4728	406000	9031	N/A
10	3/19/2019	75.11295	8004.752	5454	3660	406900	8971	N/A
11	3/20/2019	68.95055	7759.769	5649	4159	405900	9310	N/A
12	3/20/2019	77.97585	8181.358	5376	4081	406150	8934	N/A
13	3/21/2019	79.47531	8250.41	5574	3636	406600	8719	N/A
14	3/21/2019	78.20275	7882.334	5227	3638	406300	8775	N/A
15	3/22/2019	75.43239	8154.276	5400	3515	405150	8877	N/A
16	3/22/2019	77.64867	8001.342	5075	3642	407150	8830	N/A
17	3/22/2019	78.05584	8127.202	4854	3627	407100	8866	N/A
18	3/22/2019	75.83548	8010.558	4897	3361	406200	8860	N/A
19	3/23/2019	79.15081	7873.295	5101	3817	405550	8832	N/A
20	3/23/2019	73.30179	7609.428	4858	3830	405800	9595	N/A
21	3/24/2019	74.83912	8009.378	4976	3372	406900	9817	N/A
22	3/24/2019	69.77766	7985.632	4916	4133	405600	9891	N/A
23	3/24/2019	75.57052	7851.227	5400	3606	404400	8818	N/A
24	3/25/2019	79.68384	7763.855	5472	3320	405950	8607	N/A
25	3/25/2019	75.64148	7291.319	5205	3511	406150	8708	N/A
26	3/25/2019	78.95565	7736.727	4964	3650	405900	8785	N/A
27	3/25/2019	79.04194	7810.504	5545	4189	404650	8906	N/A
28	3/26/2019	80.80134	7779.528	5658	3695	407100	8852	N/A
29	3/26/2019	80.75411	7704.571	5088	3538	407600	8663	N/A
30	3/26/2019	82.09098	7935.124	5604	3431	403150	8920	N/A
31	3/27/2019	85.09967	7921.003	4700	3811	405450	8800	N/A
32	3/27/2019	83.97548	7844.318	5301	3612	406450	8760	N/A
33	3/27/2019	87.1647	8037.664	5407	3480	407800	8675	N/A
34	3/27/2019	82.35975	7605.811	5705	3656	406450	8760	N/A
35	3/28/2019	80.47601	7514.036	5568	3518	406800	8976	N/A
36	3/28/2019	78.01236	7300.201	6093	3915	407450	9494	N/A
37	3/28/2019	86.73134	7748.553	5466	3659	405750	8729	N/A
38	3/29/2019	87.2	7604	5607	3448	406750	8968	N/A
39	3/29/2019	87.66059	7332.477	5880	3345	407150	8661	N/A
40	3/29/2019	86.97611	7491.407	5702	3427	408150	8728	N/A
41	3/29/2019	89.20571	7910.542	5795	3661	406500	8643	N/A
42	3/30/2019	88.0721	7685.937	5659	3740	405100	8740	N/A
43	3/30/2019	88.62602	7326.204	5140	3431	406400	8584	N/A
44	3/30/2019	85.70689	7850.454	5601	3350	406350	8643	N/A
45	3/31/2019	85.46416	7375.409	5633	3695	407450	8668	N/A
46	3/31/2019	86.66183	7488.085	5181	4399	407750	8557	N/A
47	3/31/2019	80.33951	7249.617	6165	3498	407300	8396	N/A
48	3/31/2019	89.17708	7279.964	6140	3523	407600	8608	N/A
49	4/1/2019	88.52053	7322.75	5351	3752	406650	8608	N/A
50	4/1/2019	88.65061	7057.494	4934	4247	404850	8470	N/A
51	4/1/2019	89.29952	6945.42	5335	4062	407675	8562	N/A
52	4/1/2019	88.2696	7019.002	5337	3747	406800	8560	N/A
53	4/2/2019	84.53362	6841.531	4602	3488	404900	8436	N/A
	AVG=	77	7,915	5,139	3,912	13,162,240	292,773	TOTAL

**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	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	1,980	1,770	1,994
Big Lime	1,995	2,876	2,009	2,902
Fifty Foot Sandstone	2,876	3,024	2,902	3,052
Gordon	3,024	3,188	3,052	3,218
Fifth Sandstone	3,188	3,443	3,218	3,477
Bayard	3,443	3,943	3,477	3,983
Speechley	3,943	4,185	3,983	4,227
Balltown	4,185	4,770	4,227	4,822
Bradford	4,770	5,164	4,822	5,221
Benson	5,164	5,409	5,221	5,469
Alexander	5,409	6,398	5,469	6,542
Sycamore	6,259	6,368	6,366	6,512
Middlesex	6,368	6,479	6,512	6,700
Burkett	6,479	6,511	6,700	6,784
Tully	6,511	6,540	6,784	6,916
Marcellus	6,540	NA	6,916	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:	3/15/2019
Job End Date:	4/2/2019
State:	West Virginia
County:	Ritchie
API Number:	47-085-10356-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Waco Unit 2H
Latitude:	39.29520800
Longitude:	-80.90121700
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,625
Total Base Water Volume (gal):	20,231,992
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	88.53322	
Sand (Proppant)	CWS	Propping Agent					
				Listed Below			

DAP-103	CWS	Iron Control					
				Listed Below			
SaniFrac 8844	CWS	Biocide					
				Listed Below			
DWP-641	CWS	Friction Reducer					
				Listed Below			
Calbreak 5501	CWS	Breaker					
				Listed Below			
15% HCl Acid	CWS	Clean Perforations					
				Listed Below			
CI-9100G	CWS	Corrosion Inhibitor					
				Listed Below			
CalGel 4000	CWS	Gel Slurry					
				Listed Below			
DAP-902	CWS	Scale Inhibitor					
				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	11.16262	
			Calcite	471-34-1	1.00000	0.07761	
			Hydrochloric acid	7647-01-0	37.00000	0.05220	
			Illite	12173-60-3	1.00000	0.03400	
			Polymer	26100-47-0	45.00000	0.02658	
			Distillates (petroleum), hydrotreated light	64742-47-8	30.00000	0.01772	
			Guar gum	9000-30-0	60.00000	0.01731	
			Distillates (petroleum), hydrotreated middle	64742-46-7	60.00000	0.01731	
			Goethite	1310-14-1	0.10000	0.01116	
			Biotite	1302-27-8	0.10000	0.01116	
			Apatite	64476-38-6	0.10000	0.01116	
			Ammonium chloride	12125-02-9	11.00000	0.00650	
			Polyethylene glycol mixture	25322-68-3	54.50000	0.00575	
			Ilmenite	98072-94-7	0.10000	0.00340	
			Sorbitan monooleate	1338-43-8	4.00000	0.00236	
			2,2-Dibromo-3-Nitrilopropionamide	10222-01-2	20.00000	0.00211	
			Polyethylene glycol monooleate	9004-96-0	3.00000	0.00177	
			Quaternary ammonium compounds, bis (hydrogenated tallow alkyl)dimethyl, salts with bentonite	68953-58-2	5.00000	0.00144	
			Sorbitol tetraoleate	61723-83-9	2.00000	0.00118	
			Ammonium Persulfate	7727-54-0	100.00000	0.00063	
			Amines, tallow alkyl, ethoxylated	61791-26-2	1.00000	0.00059	
			Citric acid	77-92-9	60.00000	0.00047	

			Oxirane, 2-methyl-, polymer with oxirane, monodecyl ether	37251-67-5	1.50000	0.00043	
			Sodium bromide	7647-15-6	4.00000	0.00042	
			Dibromoacetonitrile	3252-43-5	3.00000	0.00032	
			Alkyloxypolyethyleneoxy ethanol	84133-50-6	0.50000	0.00030	
			Vinylidene chloride-methyl acrylate copolymer	25038-72-6	20.00000	0.00013	
			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	0.00001	
			Tar bases, quinolone derivs, benzyl chloride- quatenized	72480-70-7	10.00000	0.00001	
			Formic acid	64-18-6	10.00000	0.00001	
			Ethoxylated Alcohols	68131-39-5	10.00000	0.00001	
			Cinnamaldehyde	104-55-2	10.00000	0.00001	
			Isopropyl alcohol	67-63-0	5.00000	0.00001	
			Glycol	57-55-6			Proprietary Additive Concentration
			Organic Acid Salts	9003-04-7			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)

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: 47-085-10356 County: Ritchie  
District: Clay Well No: Waco Unit 2H  
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: 7/12/19

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		Discharge		Units
	Limits	Reported	Limits	Reported	
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		Discharge		Units
	Limits	Reported	Limits	Reported	
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		Discharge		Units
	Limits	Reported	Limits	Reported	
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		Discharge		Units
	Limits	Reported	Limits	Reported	
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: \_\_\_\_\_



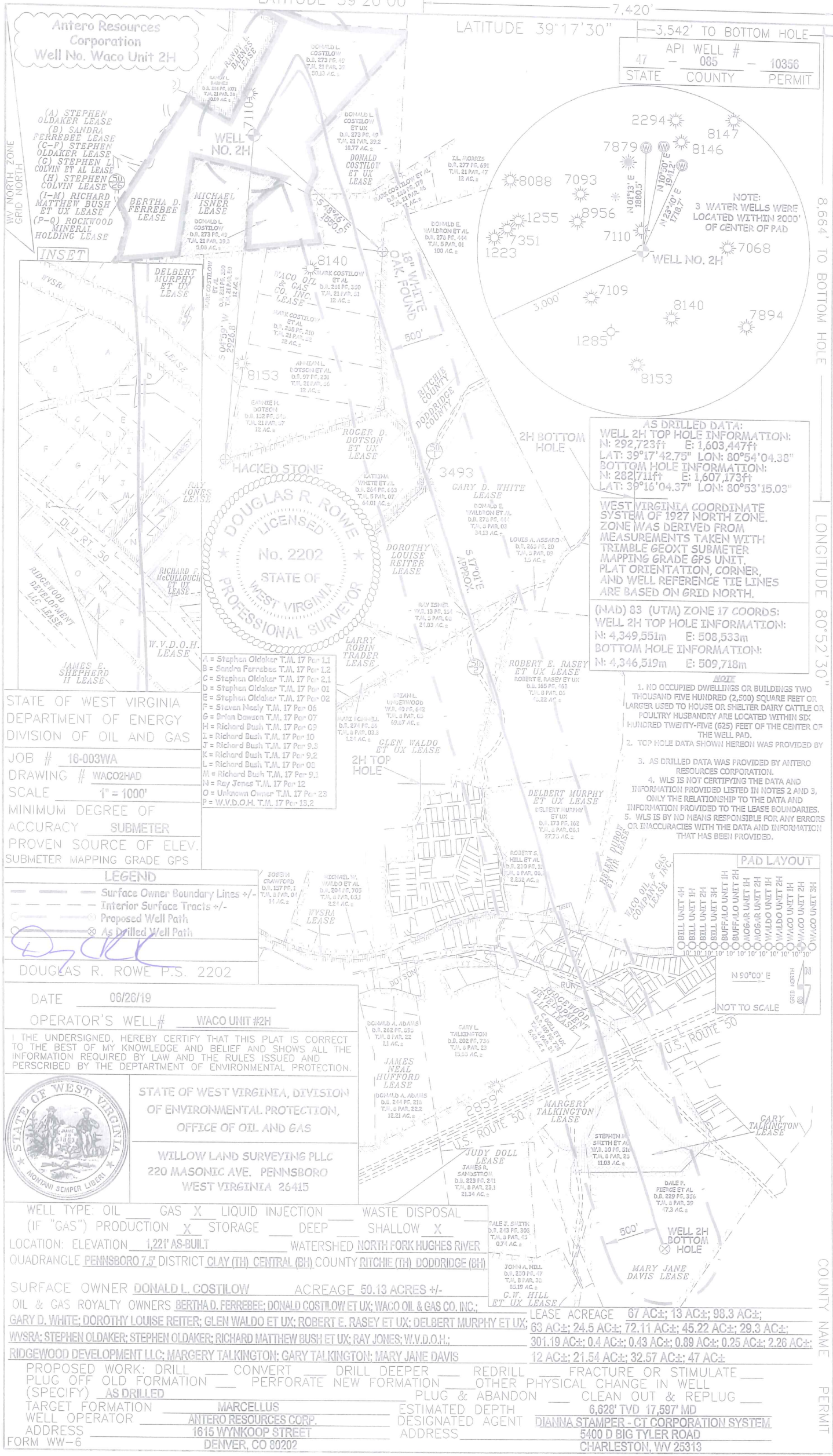
LATITUDE 39°20'00"

LATITUDE 39°17'30"

7,420'

3,542' TO BOTTOM HOLE

47	API WELL #	085	10356
STATE	COUNTY	PERMIT	



**AS DRILLED DATA:**  
**WELL 2H TOP HOLE INFORMATION:**  
 N: 292,723ft E: 1,603,447ft  
 LAT: 39°17'42.75" LON: 80°54'04.38"  
**BOTTOM HOLE INFORMATION:**  
 N: 282,711ft E: 1,607,173ft  
 LAT: 39°16'04.37" LON: 80°53'15.03"

**WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE**  
 MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

**(NAD) 83 (UTM) ZONE 17 COORDS:**  
**WELL 2H TOP HOLE INFORMATION:**  
 N: 4,349,551m E: 508,533m  
**BOTTOM HOLE INFORMATION:**  
 N: 4,346,519m E: 509,718m

- NOTE:**  
 3 WATER WELLS WERE LOCATED WITHIN 2000' OF CENTER OF PAD
- 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.

STATE OF WEST VIRGINIA  
 DEPARTMENT OF ENERGY  
 DIVISION OF OIL AND GAS

JOB # 16-003WA  
 DRAWING # WACO2HAD  
 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# WACO UNIT #2H

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  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION,  
 OFFICE OF OIL AND GAS

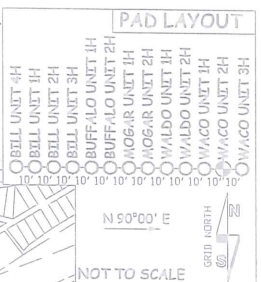
WILLOW LAND SURVEYING PLLC  
 220 MASONIC AVE. PENNSBORO  
 WEST VIRGINIA 26415

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 OWNERS BERTHA D. FERREBEE; DONALD COSTILOW ET UX; WACO OIL & GAS CO. INC.;  
 GARY D. WHITE; DOROTHY LOUISE REITER; GLEN WALDO ET UX; ROBERT E. RASEY ET UX; DELBERT MURPHY ET UX;  
 WVSRA; STEPHEN OLDAKER; STEPHEN OLDAKER; RICHARD MATTHEW BUSH ET UX; RAY JONES; W.V.D.O.H.;  
 RIDGEWOOD DEVELOPMENT LLC; MARGERY TALKINGTON; GARY TALKINGTON; MARY JANE DAVIS

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 6,628' TVD 17,597' MD  
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM  
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD  
 FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

LEASE ACREAGE	67 AC±; 13 AC±; 98.3 AC±;
	63 AC±; 24.5 AC±; 72.11 AC±; 45.22 AC±; 29.3 AC±;
	301.19 AC±; 0.4 AC±; 0.43 AC±; 0.89 AC±; 0.25 AC±; 2.26 AC±;
	12 AC±; 21.54 AC±; 32.57 AC±; 47 AC±;



8,664' TO BOTTOM HOLE  
 13,887'  
 LONGITUDE 80°52'30"  
 LONGITUDE 80°52'30"  
 COUNTY NAME PERMIT