

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

API 47 - 017 - 06932 County Doddridge District West Union  
Quad West Union 7.5' Pad Name OXFD 98 Field/Pool Name -----  
Farm name Michael R. Britton & Angela D. Pratt Well Number Redwood Unit 3H  
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 4344890m Easting 517302m  
Landing Point of Curve Northing 4344779.02m Easting 517586.14m  
Bottom Hole Northing 4348227m Easting 517199m

Elevation (ft) 1120' 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

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Date permit issued 6/16/2022 Date drilling commenced 7/6/2022 Date drilling ceased 10/15/2022  
Date completion activities began 12/11/2022 Date completion activities ceased 1/14/2023  
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 123, 1001' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 1653' Void(s) encountered (Y/N) depths No  
Coal depth(s) ft 120' Cavern(s) encountered (Y/N) depths No  
Is coal being mined in area (Y/N) No

Reviewed by:  
IMR  
12/08/2023  
7/18/23

**APPROVED**

API 47-017 - 06932 Farm name Michael R. Britton & Angela D. Pratt Well number Redwood Unit 3H

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	28"	20"	125.5'	New	78.67#, X-60	N/A	Y
Surface	17-1/2"	13-3/8"	351'	New	54.5#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2609'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	17842'	New	20#, P-110	N/A	Y
Tubing		2-3/8"	6579'		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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	218 sx	15.6	1.18	257	0'	8 Hrs.
Surface	Class A	380 sx	15.6	1.20	456	0'	8 Hrs.
Coal							
Intermediate 1	Class A	903 sx	15.6	1.20	1084	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	2700 sx (Tail)	13.5 (Lead), 15.2(Tail)	1.26 (Tail)	3402	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 21400' MD, 6600' TVD (BHL), 6752' (Deepest Point Drilled) Loggers TD (ft) 21400' MD  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

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

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

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WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

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WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

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

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API 47- 017 - 06932 Farm name Michael R. Britton & Angela D. Pratt Well number Redwood Unit 3H

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>								

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Please insert additional pages as applicable.

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PRODUCING FORMATION(S)	DEPTHS	
<u>Marcellus</u>	<u>6564' (TOP)</u> TVD	<u>6796' (TOP)</u> MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 2743 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 13137 mcfpd Oil 151 bpd NGL --- bpd Water 269 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

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

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Please insert additional pages as applicable.

Drilling Contractor H & P Drilling  
Address 912 N Eagle Valley Rd City Howard State PA Zip 16841

Logging Company Nine Energy Services  
Address 6500 West Fwy City Fort Worth State TX Zip 76116

Cementing Company Schlumberger US land  
Address 1080 US-33 City Weston State WV Zip 26452

Stimulating Company Halliburton  
Address 3000 W. Sam Houston Pkwy City Houston State TX Zip 76114

Please insert additional pages as applicable.

Completed by Carly Marvel Telephone 303-357-7373  
Signature Carly Marvel Title Permitting Agent Date 3/22/2023

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

12/08/2023

API 47-017-06932 Farm Name Michael R. Britton & Angela D. Pratt Well Number Redwood Unit 3H

**Exhibit 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	12/11/2022	17705	17664	60	Marcellus
2	12/12/2022	17624.61728	17459.7037	60	Marcellus
3	12/12/2022	17424.32099	17259.4074	60	Marcellus
4	12/12/2022	17224.02469	17059.1111	60	Marcellus
5	12/12/2022	17023.7284	16858.8148	60	Marcellus
6	12/12/2022	16823.4321	16658.5185	60	Marcellus
7	12/13/2022	16623.1358	16458.2222	60	Marcellus
8	12/13/2022	16422.83951	16257.9259	60	Marcellus
9	12/13/2022	16222.54321	16057.6296	60	Marcellus
10	12/13/2022	16022.24691	15857.3333	60	Marcellus
11	12/13/2022	15821.95062	15657.037	60	Marcellus
12	12/13/2022	15621.65432	15456.7407	60	Marcellus
13	12/14/2022	15421.35802	15256.4444	60	Marcellus
14	12/14/2022	15221.06173	15056.1481	60	Marcellus
15	12/14/2022	15020.76543	14855.8519	60	Marcellus
16	12/14/2022	14820.46914	14655.5556	60	Marcellus
17	12/14/2022	14620.17284	14455.2593	60	Marcellus
18	12/14/2022	14419.87654	14254.963	60	Marcellus
19	12/15/2022	14219.58025	14054.6667	60	Marcellus
20	12/15/2022	14019.28395	13854.3704	60	Marcellus
21	12/15/2022	13818.98765	13654.0741	60	Marcellus
22	12/15/2022	13618.69136	13453.7778	60	Marcellus
23	12/15/2022	13418.39506	13253.4815	60	Marcellus
24	12/15/2022	13218.09877	13053.1852	60	Marcellus
25	12/16/2022	13017.80247	12852.8889	60	Marcellus
26	12/16/2022	12817.50617	12652.5926	60	Marcellus
27	12/16/2022	12617.20988	12452.2963	60	Marcellus
28	12/16/2022	12416.91358	12252	60	Marcellus
29	12/16/2022	12216.61728	12051.7037	60	Marcellus
30	12/16/2022	12016.32099	11851.4074	60	Marcellus
31	12/17/2022	11816.02469	11651.1111	60	Marcellus
32	12/17/2022	11615.7284	11450.8148	60	Marcellus
33	12/17/2022	11415.4321	11250.5185	60	Marcellus
34	12/17/2022	11215.1358	11050.2222	60	Marcellus
35	12/17/2022	11014.83951	10849.9259	60	Marcellus
36	12/17/2022	10814.54321	10649.6296	60	Marcellus
37	12/18/2022	10614.24691	10449.3333	60	Marcellus
38	12/18/2022	10413.95062	10249.037	60	Marcellus
39	12/18/2022	10213.65432	10048.7407	60	Marcellus
40	12/18/2022	10013.35802	9848.44444	60	Marcellus
41	12/18/2022	9813.061728	9648.14815	60	Marcellus
42	12/18/2022	9612.765432	9447.85185	60	Marcellus
43	12/19/2022	9412.469136	9247.55556	60	Marcellus
44	12/19/2022	9212.17284	9047.25926	60	Marcellus
45	12/19/2022	9011.876543	8846.96296	60	Marcellus
46	12/19/2022	8811.580247	8646.66667	60	Marcellus
47	12/19/2022	8611.283951	8446.37037	60	Marcellus
48	12/20/2022	8410.987654	8246.07407	60	Marcellus
49	12/20/2022	8210.691358	8045.77778	60	Marcellus
50	12/20/2022	8010.395062	7845.48148	60	Marcellus
51	12/20/2022	7810.098765	7645.18519	60	Marcellus
52	12/20/2022	7609.802469	7444.88889	60	Marcellus
53	12/20/2022	7409.506173	7244.59259	60	Marcellus
54	12/20/2022	7209.209877	7044.2963	60	Marcellus
55	12/21/2022	7008.91358	6844	60	Marcellus

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**EXHIBIT 2**

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	12/11/2022	79.2	8182	8216	3997	177670	205580	N/A
2	12/12/2022	88.6	8353	3116	4980	390670	324754	N/A
3	12/12/2022	82.2	8216	4642	4149	394940	295073	N/A
4	12/12/2022	83.4	8227.984	4633.26	3598.058	409000	302769	N/A
5	12/12/2022	84.7	8368.686	4643.02	3800.257	393400	287927	N/A
6	12/12/2022	87.6	8369	3088	2997	390780	332443	N/A
7	12/13/2022	83.7	8425	5336	5004	394990	283210	N/A
8	12/13/2022	89.7	8476	5396	3923	391420	313801	N/A
9	12/13/2022	89.8	8432.576	5990.88	3663.993	397440	302463	N/A
10	12/13/2022	90.5	8498.942	5522	3807.097	409060	283665	N/A
11	12/13/2022	89.8	8420.642	6121.57	3944.154	393070	280966	N/A
12	12/13/2022	67.2	6981	3253	3607	399570	343962	N/A
13	12/14/2022	93.2	8421	3089	4009	390740	308218	N/A
14	12/14/2022	93.3	8365.02	5323.25	3819.301	390570	320699	N/A
15	12/14/2022	97.3	8395	5795	3987	392210	324882	N/A
16	12/14/2022	95.5	8298	5564	3518	386840	377837	N/A
17	12/14/2022	91.3	8360	3088	3591	393490	285597	N/A
18	12/14/2022	91.2	8382	4868	3991	389830	278608	N/A
19	12/15/2022	90.0	8322	3968	4000	404930	285784	N/A
20	12/15/2022	90.7	8452.749	3312.82	3611.022	393780	283851	N/A
21	12/15/2022	92.3	8333	6071	3571	394880	375104	N/A
22	12/15/2022	92.9	8341	5680	3558	396770	317678	N/A
23	12/15/2022	96.0	8278	5741	3979	389300	281897	N/A
24	12/15/2022	98.0	8276	3178	3714	384940	320957	N/A
25	12/16/2022	98.1	8362	3152	3787	393540	309701	N/A
26	12/16/2022	97.3	8157.684	3164.19	3684.715	399660	277872	N/A
27	12/16/2022	96.4	8276	6541	3715	394930	283940	N/A
28	12/16/2022	96.5	8250.154	5632.82	3592.741	398590	285245	N/A
29	12/16/2022	96.1	8362	6132	3632	397130	279871	N/A
30	12/16/2022	97.1	8389	3041	3759	392810	272107	N/A
31	12/17/2022	97.8	8241	4417	3660	395260	278007	N/A
32	12/17/2022	97.6	8364	5535	3672	399820	277707	N/A
33	12/17/2022	97.2	8322.375	6169.8	3550.7	397130	278243	N/A
34	12/17/2022	97.0	8222	5951	3716	398480	276488	N/A
35	12/17/2022	97.8	8243	5763	3523	391760	272614	N/A
36	12/17/2022	97.4	7989	5354	3730	396510	288358	N/A
37	12/18/2022	97.9	8265	5348	3502	395520	271316	N/A
38	12/18/2022	97.3	8005	4328	3646	396910	271422	N/A
39	12/18/2022	97.7	7915.223	5964.61	3441.726	402600	277716	N/A
40	12/18/2022	94.9	7958	6218	3728	397280	274382	N/A
41	12/18/2022	97.1	8048.541	6435.02	3543.442	392470	280510	N/A
42	12/18/2022	98.1	7952	5953	3630	388940	278958	N/A
43	12/19/2022	96.6	8019.576	6579.46	3440.723	386080	280632	N/A
44	12/19/2022	96.8	8042.854	6565.2	3242.098	397520	301998	N/A
45	12/19/2022	97.1	7799	6091	3935	390400	270549	N/A
46	12/19/2022	97.6	7826	5766	3757	395170	270402	N/A
47	12/19/2022	96.8	7572	3015	3728	393190	276899	N/A
48	12/20/2022	98.5	7720	4365	4075	406875	273594	N/A
49	12/20/2022	96.3	7399.109	3009.02	3478.771	388720	275788	N/A
50	12/20/2022	97.4	7386.089	5297.99	3843.785	391720	273202	N/A
51	12/20/2022	97.6	7477	5722	4010	391500	275474	N/A
52	12/20/2022	97.1	7359	5054	4421	395610	274363	N/A
53	12/20/2022	96.3	7311	6165	3902	397820	273021	N/A
54	12/20/2022	97.1	7512	5331	4412	391980	272836	N/A
55	12/21/2022	96.0	7026	5981	3851	399860	273075	N/A
	AVERAGE	94	8,090	5,085	3,790	21,506,075	15,944,015	TOTAL

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## EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Sandstone, tr coal	154	304	154	304
Shaley Siltstone	304	424	304	424
Sandy Siltstone	424	664	424	664
Shaley Siltstone, tr coal	544	754	544	754
Shaley Siltstone	664	754	664	754
Shaley Siltstone, tr coal	754	814	754	814
Shaley Siltstone, tr SS	814	934	814	934
Sandy Shale w/ coal	934	1,054	934	1,054
Sandy Shale w/ tr coal	1,054	1,234	1,054	1,234
Shaley Sandstone w/ coal	1,234	1,324	1,234	1,324
Silty Sandstone, tr shale	1,324	1,594	1,324	1,594
Silty Sandstone w/ shale	1,594	1,684	1,594	1,684
Shaly Sandstone w/ tr siltstone	1,684	1,744	1,684	1,744
Silty Sandstone w/ tr coal	1,744	1,804	1,744	1,804
Silty Sandstone, tr shale	1,804	1,912	1,804	1,954
Big Lime	1,938	2,528	1,954	2,590
Fifty Foot Sandstone	2,528	2,593	2,564	2,657
Gordon	2,593	2,824	2,631	2,894
Fifth Sandstone	2,824	3,030	2,868	3,104
Bayard	3,030	3,679	3,078	3,770
Speechley	3,679	3,929	3,744	4,026
Balltown	3,929	4,430	4,000	4,537
Bradford	4,430	4,866	4,511	4,983
Benson	4,866	5,143	4,957	5,267
Alexander	5,143	6,382	5,241	6,541
Sycamore	6,226	6,356	6,375	6,515
Middlesex	6,356	6,489	6,515	6,678
Burkett	6,489	6,520	6,678	6,721
Tully	6,520	6,564	6,721	6,796
Marcellus	6,564	NA	6,796	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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LATITUDE 39°17'30" 2,526' TO BOTTOM HOLE 2,259'

Antero Resources Corporation  
Well No. Redwood 3H

NOTES:  
WELL 3H TOP HOLE INFORMATION:  
N: 276,950ft E: 1,631,969ft  
LAT: 39°15'11.09" LON: 80°47'58.72"  
BOTTOM HOLE INFORMATION:  
N: 287,349ft E: 1,631,852ft  
LAT: 39°16'53.86" LON: 80°48'02.12"  
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 3H TOP HOLE INFORMATION:  
N: 4,344,890m E: 517,302m  
BOTTOM HOLE INFORMATION:  
N: 4,348,058m E: 517,214m

(NAD) 27 (UTM) ZONE 17 COORDS:  
WELL 3H TOP HOLE INFORMATION:  
N: 14,254,147ft E: 1,697,134ft  
POINT OF ENTRY INFORMATION:  
N: 14,253,616ft E: 1,698,094ft  
BOTTOM HOLE INFORMATION:  
N: 14,264,539ft E: 1,696,844ft

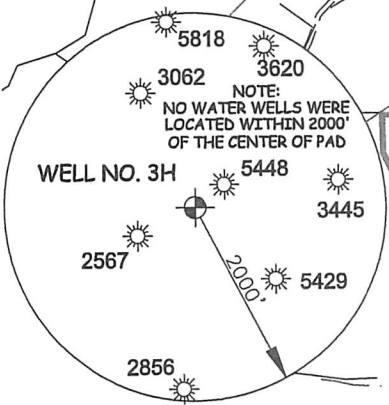
WV NORTH ZONE GRID NORTH

West Union District	
14-02	Alfred Perrine
14-03	Gail DeBerry
14-06	Lisa Meyer
14-07	Denris Hayes
14-09	Marvin Rollins
14-16	Glenn Whitehair
14-17	Mark Smith
14-18	Michael Mignaneli
14-19.1	Richard Leggett
14-19.3	Richard Leggett
14-19.4	Richard Leggett
14-20	Mary Nesler
15-01	Danny Harris
15-1.1	Roger Batton
15-02	Danny Harris
15-06	Coastal Forest Resources Co
15-6.1	Doddridge County Board of Education
15-6.2	Coastal Forest Resources Co
15-10	Coastal Forest Resources Co
15-11	Coastal Forest Resources Co
15-12	Drexelene Perrine
15-12.1	Michael Wilkinson
15-12.2	Michael Wilkinson
15-12.4	John Trent
15-13	Loren Smith
15-14	Kenneth Hughes
15-16	Glade Perrine
19-09	Donald Perrine
19-10	EQM Gathering OPCO LLC
19-15	Michael Britton
19-23.2	Russell Nelson
20-01	Arnolds Creek UB Church
20-02	Michael Wilkinson
20-03	Loren Smith
20-04	EQM Gathering OPCO LLC
20-05	Loren Smith
20-08	Loren Smith
20-8.1	Jessie Vanscoy
20-09	Loren Smith
20-11	Diane Bennett
20-12	CNG Transmission Corp
20-13	Loren Smith
20-14	Mary Sechrist

3,657' TO BOTTOM HOLE LONGITUDE 80°47'30"

14,054'

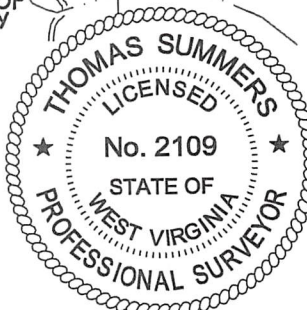
LONGITUDE 80°47'30"



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.

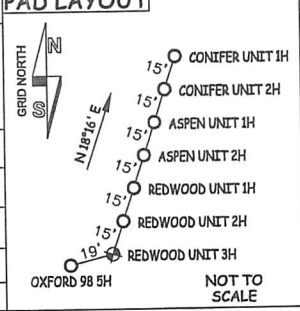


STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
WILLOW LAND SURVEYING PLLC  
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415



JOB # 19-039WA  
DRAWING # REDWOOD3HAD  
SCALE 1" = 2000'  
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  
*Thomas Summers*  
THOMAS SUMMERS P.S. 2109



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 ANTERO RESOURCES CORPORATION.  
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

DATE 04/14/23  
OPERATOR'S WELL# REDWOOD 3H

WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ 47 - 017 - 06932  
(IF "GAS") PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X STATE COUNTY PERMIT  
LOCATION: ELEVATION 1,120' - AS BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK  
QUADRANGLE WEST UNION 7.5' DISTRICT WEST UNION COUNTY DODDRIDGE  
SURFACE OWNER MICHAEL R. BRITTON & ANGELA D. PRATT ACREAGE 136.56 ACRES +/- 12/08/2023  
OIL & GAS ROYALTY OWNER MICHAEL S. FRANCIS ET AL; RICHARD W. MINNIS ET AL; LEASE ACREAGE 173 AC±; 69 AC±;  
JAMES P. GAINES ET UX; SHIRLEY W. FLEMING; FRANKLIN L. BUTLER; J.S. NETZER ET UX; 200 AC±; 29 AC±; 109 AC±; 85 AC±;  
WILMER ROLLINS ET UX; A. K. ROLLINS ET UX; MELISSA A. CROSS; EVERETT ALLEN BATTON ET AL 75 AC±; 40 AC±; 62.5 AC±; 53 AC±  
PROPOSED WORK: DRILL \_\_\_ CONVERT \_\_\_ DRILL DEEPER X REDRILL \_\_\_ FRACTURE OR STIMULATE X  
PLUG OFF OLD FORMATION \_\_\_ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL  
(SPECIFY) AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,752' TVD 17,842' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT KEVIN ELLIS  
ADDRESS 1615 WYNKOOP ST. ADDRESS 554 WHITE OAKS BLVD  
DENVER, CO 80202 BRIDGEPORT, WV 26330

COUNTY NAME PERMIT



## Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	12/11/2022
Job End Date:	12/21/2022
State:	West Virginia
County:	Doddridge
API Number:	47-017-06932-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Redwood 3H
Latitude:	39.25308000
Longitude:	-80.79964000
Datum:	WGS84
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,752
Total Base Water Volume (gal):	16,567,975
Total Base Non Water Volume:	0

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### 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
Fresh Water	Halliburton	Base Fluid					
			Water	7732-18-5	100.00000	86.34092	Density = 8.34
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.15353	

LEGEND(TM) LD-7750W	MultiChem	Scale Control					
				Listed Below			
MC B-8614A	MultiChem	Biocide					
				Listed Below			
Chemstream StimSTREAM FR 9750	Chemstream Oilfield Services	Friction Reducer					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
Chemstream StimSTREAM FR 9800	Chemstream, Inc.	Friction Reducer					
				Listed Below			
HYDROCHLORI C ACID, 22 BAUME	Halliburton	Solvent					
				Listed Below			
HAI-501	Halliburton	Acid Corrosion Inhibitor					
				Listed Below			
Sand-Common White-100 Mesh, SSA-2	Halliburton	Proppant					
				Listed Below			

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OPTIFLO-II DELAYED RELEASE BREAKER	Halliburton	Breaker					
				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	13.43825	
			Hydrochloric acid	7647-01-0	30.00000	0.04071	
			Distillates (petroleum), hydrotreated light	64742-47-8	25.00000	0.01533	
			Methanol	67-56-1	100.00000	0.00715	
			Guar gum	9000-30-0	100.00000	0.00560	
			Alcohols, C11-14-iso, C- 13-rich, ethoxylated	78330-21-9	5.00000	0.00307	
			Glutaraldehyde	111-30-8	30.00000	0.00247	
			Phosphoric Acid Salt	Proprietary	5.00000	0.00058	
			Sodium chloride	7647-14-5	5.00000	0.00058	
			Alkyl (C12-16) dimethylbenzyl ammonium chloride	68424-85-1	5.00000	0.00041	
			Ammonium persulfate	7727-54-0	100.00000	0.00013	
			Ethanol	64-17-5	1.00000	0.00008	
			Mixture of dimer and trimer fatty acids of indefinite composition derived from tall oil	61790-12-3	30.00000	0.00008	
			Modified thiourea polymer	Proprietary	30.00000	0.00008	
			Oxylated phenolic resin	Proprietary	30.00000	0.00004	
			Propargyl alcohol	107-19-7	5.00000	0.00001	
			Ethoxylated alcohols	Proprietary	5.00000	0.00001	
			Hexadecene	629-73-2	5.00000	0.00001	
			Formaldehyde	50-00-0	0.10000	0.00001	
			C.I. pigment Orange 5	3468-63-1	1.00000	0.00000	
			Ethoxylated alcohols (C12-16)	68213-23-0	3.00000		

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			Butene, homopolymer	9003-29-6	25.00000		
			Alkanes, C16-20-iso-	Proprietary	25.00000		

\* 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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