

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

RECEIVED
Office of Oil and Gas

MAY 16 2024

WV Department of
Environmental Protection

API 47-085-10498 County Ritchie District Union
Quad Oxford 7.5' Pad Name Cashew Pad Field/Pool Name ----
Farm name Elmer W. Pierce Well Number Twig 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 4335906m Easting 512315m
Landing Point of Curve Northing 4335913.74m Easting 512365.49m
Bottom Hole Northing 4339784m Easting 510776m

Elevation (ft) 1019' 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 7/17/2023 Date drilling commenced 8/10/2023 Date drilling ceased 11/2/2023
Date completion activities began 1/1/2024 Date completion activities ceased 3/5/2024
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 53', 184', 236' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1709', 1759', 1847' Void(s) encountered (Y/N) depths No
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

APPROVED

Reviewed by:

J. M.

06/14/2024

MAY 16 2024

WR-35
Rev. 8/23/13

API 47- 085 - 10498

Farm name Elmer W. Pierce

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Well number Twig 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	28"	20"	130'	New	91.59#, J-55	N/A	Y
Surface	17 1/2"	13-3/8"	383'	New	54.5#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2857'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	20643'	New	23#, P-110/ICY	N/A	Y
Tubing		2-3/8"	6486'		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	218 sx	15.6	1.18	257	0'	8 Hrs.
Surface	Class C	325 sx	15.8	1.16	377	0'	8 Hrs.
Coal							
Intermediate 1	Class C	1156 sx	15.8	1.16	1341	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H		12.5 (Lead), 13.5(Tail)	1.53 (Tail)		~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 20643' MD, 6506' TVD (BHL), 6520' (Deepest Point Drilled) Loggers TD (ft) 20643' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5500'

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____

Conductor - 0
 Surface - 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface
 Intermediate - 1 above float joint, 1 above float collar, 1 every 4th joint to surface
 Production - 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

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PRODUCING FORMATION(S)

DEPTHS

Marcellus

6368' (TOP) TVD 6703' (TOP) MD

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Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow

OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 2218 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 12531 mcfpd Oil 198 bpd NGL --- bpd Water 670 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 ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	

***PLEASE SEE ATTACHED EXHIBIT 3**

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 Baker Hughes
Address 1681 E Main St City Bridgeport State WV Zip 26330

Cementing Company Halliburton Energy Services
Address 3000 W. Sam Houston Pkwy City Houston State TX Zip 76114

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 5/9/2024

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

06/14/2024

LATITUDE 39°12'30" 6,883'

LATITUDE 39°12'30" 102' TO BOTTOM HOLE

423' TO BOTTOM HOLE LONGITUDE 80°52'30"

13,159' LONGITUDE 80°50'00"

Antero Resources Corporation Well No. Twig 1H

Union District - Ritchie County	
9-9.1	Naomi Cunningham
9-14	John Louke
9-15	Marvin Osborne
9-15.1	Marvin Osborne
9-16	Marvin Osborne
9-18	Jack Guthrie Trust
9-19	Twila Evitts
9-20	Twila Evitts
9-20.1	Mark Morrison
9-20.2	Brian Bonner
9-21	Stephanie Knight
9-22	Stephanie Knight
9-23	Marvin Osborne
14-3.3	Mary Harms
14-4	Stephanie Knight
14-4.1	Stephanie Knight
14-11	Nathaniel Hendricks
14-11.6	Nathaniel Hendricks
14-11.7	Nathaniel Hendricks
14-11.8	Nathaniel Hendricks
14-17	Ralph Thacker
14-20	David Weekley
15-1	Timothy Alexander
15-1.1	Ralph Thacker
15-2	Ralph Thacker
15-3	Larry Gander
15-4	Stout Valley Trust
15-5	Larry Gander
15-6	Ralph Thacker
15-7	Stephanie Knight
15-8	Stephanie Knight
21-1	Ralph Thacker
21-2	Briar Fork Trust
21-3	Dallas Smith Et Al
21-4	Larry Gander
21-4.1	Joseph Bianchini
21-4.2	Marie Bianchini
21-4.3	Joseph Bianchini
21-5	James Beck Et Al
21-6	WF Smith
21-6.1	Lois Gander
21-7	Elmer Pierce
21-7.1	Larry Gander
21-7.2	Larry Gander
21-8.4	Brian Vansant
21-10	James Beck
21-10.1	Harvey Shepler
21-10.2	James Beck

Southwest District - Doddridge County	
1-1	Jeffrey Polan
4-2	Cevasco Family Trust
4-10	James Webb
4-11	Juanita Leggett
4-14	Juanita Leggett
4-16	James Webb
4-18	James Webb
4-19.3	CNC Transmission Corp.
4-19.4	CNC Transmission Corp.
4-19.5	Dana Hurst
4-19.7	James Webb
4-19.8	James Webb
4-19.9	James Webb
4-21	Anthony Ayers
4-22	Reed Zinn
4-24	I L Morris
4-25	Tina Osborne
4-25.1	Stanley Chipps
4-28.3	Alfred Farley
4-31	Vicki Moore
4-31.2	Bradley Davis
4-34	Carl Ravin
8-1	Richard Brown
8-3	Randall Russell
8-4	John Gray Hrs
8-5	Larry Gander
12-1	David Ball

AS DRILLED DATA: 1H BOTTOM HOLE

WELL 1H TOP HOLE INFORMATION:
 N: 247,740ft E: 1,615,110ft
 LAT: 39°10'19.94" LON: 80°51'27.40"

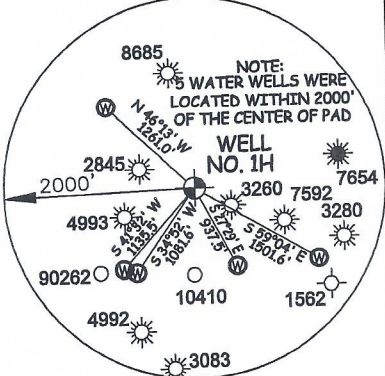
BOTTOM HOLE INFORMATION:
 N: 260,549ft E: 1,610,273ft
 LAT: 39°12'25.82" LON: 80°52'31.30"

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.

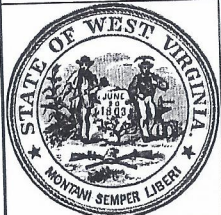
(NAD) 83 (UTM) ZONE 17 COORDS:
 WELL 1H TOP HOLE INFORMATION:
 N: 4,335,906m E: 512,315m
 BOTTOM HOLE INFORMATION:
 N: 4,339,784m E: 510,776m

(NAD) 27 (UTM) ZONE 17 COORDS:
 WELL 1H TOP HOLE INFORMATION:
 N: 14,224,670ft E: 1,680,771ft
 POINT OF ENTRY INFORMATION:
 N: 14,224,551ft E: 1,681,044ft
 BOTTOM HOLE INFORMATION:
 N: 14,237,393ft E: 1,675,723ft

- 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.



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

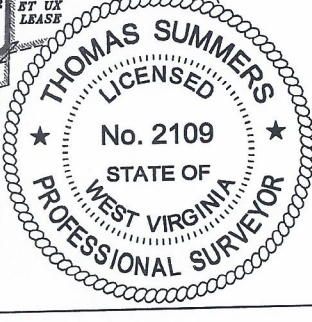
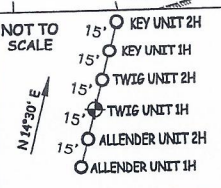
JOB # 23-007WA
 DRAWING # TWIG1HAD
 SCALE 1" = 2000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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

LEGEND	
---	Surface Owner Boundary Lines +/-
- - -	Interior Surface Tracts +/-
○	Proposed Well Path
⊗	As Drilled Well Path

THOMAS SUMMERS P.S. 2109

DATE 05/07/24
 OPERATOR'S WELL# TWIG 1H



WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ 47 - 085 - 10498
 (IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X STATE COUNTY PERMIT
 LOCATION: ELEVATION 1,019' -AS-BUILT WATERSHED SOUTH FORK HUGHES RIVER
 QUADRANGLE OXFORD 7.5' DISTRICT UNION COUNTY RITCHIE
 SURFACE OWNER ELMER W. PIERCE ACREAGE 67.78 ACRES +/- LEASE ACREAGE 70 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 6,506' TVD 20,643' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT KEVIN ELLIS
 ADDRESS 1615 WYNKOOP ST. ADDRESS 535 WHITE OAK BLVD.
 DENVER, CO 80202 BRIDGEPORT, WV 26330

COUNT NAME PERMIT

API 47-085-10498 Farm Name Elmer W. Pierce Well Number Twig Unit 1H

Exhibit 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	1/1/2024	20516.5	20473.9	36	Marcellus
2	1/1/2024	20435.1	20269.0	36	Marcellus
3	1/2/2024	20233.4	20067.3	36	Marcellus
4	1/2/2024	20031.7	19865.6	36	Marcellus
5	1/3/2024	19830.0	19663.9	36	Marcellus
6	1/3/2024	19628.3	19462.2	36	Marcellus
7	1/4/2024	19426.6	19260.5	36	Marcellus
8	1/4/2024	19224.9	19058.8	36	Marcellus
9	1/4/2024	19023.2	18857.1	36	Marcellus
10	1/4/2024	18821.5	18655.4	36	Marcellus
11	1/5/2024	18619.8	18453.7	36	Marcellus
12	1/6/2024	18418.1	18252.0	36	Marcellus
13	1/6/2024	18216.4	18050.3	36	Marcellus
14	1/6/2024	18014.7	17848.6	36	Marcellus
15	1/7/2024	17813.0	17646.9	36	Marcellus
16	1/7/2024	17611.3	17445.2	36	Marcellus
17	1/7/2024	17409.6	17243.5	36	Marcellus
18	1/8/2024	17207.9	17041.8	36	Marcellus
19	1/8/2024	17006.2	16840.1	36	Marcellus
20	1/8/2024	16804.5	16638.4	36	Marcellus
21	1/9/2024	16602.8	16436.7	36	Marcellus
22	1/9/2024	16401.1	16235.0	36	Marcellus
23	1/10/2024	16199.4	16033.3	36	Marcellus
24	1/10/2024	15997.7	15831.6	36	Marcellus
25	1/10/2024	15795.9	15629.9	36	Marcellus
26	1/11/2024	15594.2	15428.2	36	Marcellus
27	1/11/2024	15392.5	15226.5	36	Marcellus
28	1/11/2024	15190.8	15024.8	36	Marcellus
29	1/12/2024	14989.1	14823.1	36	Marcellus
30	1/12/2024	14787.4	14621.4	36	Marcellus
31	1/12/2024	14585.7	14419.7	36	Marcellus
32	1/13/2024	14384.0	14218.0	36	Marcellus
33	1/13/2024	14182.3	14016.3	36	Marcellus
34	1/13/2024	13980.6	13814.6	36	Marcellus
35	1/14/2024	13778.9	13612.8	36	Marcellus
36	1/14/2024	13577.2	13411.1	36	Marcellus
37	1/14/2024	13375.5	13209.4	36	Marcellus
38	1/14/2024	13173.8	13007.7	36	Marcellus
39	1/14/2024	12972.1	12806.0	36	Marcellus
40	1/15/2024	12770.4	12604.3	36	Marcellus
41	1/15/2024	12568.7	12402.6	36	Marcellus
42	1/15/2024	12367.0	12200.9	36	Marcellus
43	1/15/2024	12165.3	11999.2	36	Marcellus
44	1/15/2024	11963.6	11797.5	36	Marcellus
45	1/15/2024	11761.9	11595.8	36	Marcellus
46	1/15/2024	11560.2	11394.1	36	Marcellus
47	1/16/2024	11358.5	11192.4	36	Marcellus
48	1/16/2024	11156.8	10990.7	36	Marcellus
49	1/17/2024	10955.1	10789.0	36	Marcellus
50	1/17/2024	10753.4	10587.3	36	Marcellus
51	1/17/2024	10551.7	10385.6	36	Marcellus
52	1/17/2024	10350.0	10183.9	36	Marcellus
53	1/17/2024	10148.3	9982.2	36	Marcellus
54	1/17/2024	9946.6	9780.5	36	Marcellus
55	1/18/2024	9744.9	9578.8	36	Marcellus
56	1/18/2024	9543.2	9377.1	36	Marcellus
57	1/18/2024	9341.5	9175.4	36	Marcellus
58	1/18/2024	9139.8	8973.7	36	Marcellus
59	1/18/2024	8938.1	8772.0	36	Marcellus
60	1/18/2024	8736.4	8570.3	36	Marcellus
61	1/19/2024	8534.7	8368.6	36	Marcellus
62	1/19/2024	8333.0	8166.9	36	Marcellus
63	1/19/2024	8131.3	7965.2	36	Marcellus
64	1/19/2024	7929.6	7763.5	36	Marcellus
65	1/20/2024	7727.9	7561.8	36	Marcellus
66	1/20/2024	7526.2	7360.1	36	Marcellus
67	1/20/2024	7324.5	7158.4	36	Marcellus
68	1/21/2024	7122.8	6956.7	36	Marcellus
69	1/21/2024	6921.1	6755.0	36	Marcellus

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Office of Oil and Gas

MAY 16 2024

WV Department of
Environmental Protection

06/14/2024

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	1/1/2024	84.2	9421.7	4376.0	3429.0	170180	4462.6	N/A
2	1/1/2024	92.6	10222.9	4621.9	3728.8	410140	7884.0	N/A
3	1/2/2024	90.6	10026.4	5659.3	3812.0	411040	7518.2	N/A
4	1/2/2024	89.6	10060.9	4475.8	3384.2	397300	7139.8	N/A
5	1/3/2024	94.2	10511.6	5486.8	3901.3	410580	7360.4	N/A
6	1/3/2024	88.9	10517.1	4986.0	3285.3	414620	7376.7	N/A
7	1/4/2024	88.1	10537.5	5621.5	3296.9	413740	7320.7	N/A
8	1/4/2024	93.5	10401.6	4677.5	3605.3	404980	7194.7	N/A
9	1/4/2024	93.5	10348.5	4482.9	3786.3	416760	7229.3	N/A
10	1/4/2024	95.0	10458.6	4588.0	3656.4	406280	7139.1	N/A
11	1/5/2024	96.2	10108.9	4845.2	3364.3	410780	7204.2	N/A
12	1/6/2024	92.3	9987.2	5261.3	3457.2	403440	8377.7	N/A
13	1/6/2024	94.9	9959.7	2540.1	3773.5	412360	6906.0	N/A
14	1/6/2024	95.1	9936.6	5264.3	3800.0	407760	7114.0	N/A
15	1/7/2024	97.3	10039.5	4212.0	4213.0	416120	7058.7	N/A
16	1/7/2024	96.6	9828.7	4909.8	3176.2	419020	7078.8	N/A
17	1/7/2024	95.7	9819.1	4252.0	3501.0	414600	6852.8	N/A
18	1/8/2024	96.4	9914.8	3674.3	3185.1	410780	7322.2	N/A
19	1/8/2024	95.5	9834.9	2593.0	3144.6	412080	6900.5	N/A
20	1/8/2024	96.5	9792.4	7180.0	3412.7	414960	7106.0	N/A
21	1/9/2024	97.5	9898.1	6389.7	3046.5	421580	6858.0	N/A
22	1/9/2024	97.0	9350.3	6560.0	2728.2	414280	7266.4	N/A
23	1/10/2024	97.2	9894.0	5474.3	3720.0	410160	6921.7	N/A
24	1/10/2024	93.9	9977.3	8031.4	3271.0	403620	7198.7	N/A
25	1/10/2024	95.7	9892.0	6526.2	3470.0	410040	6920.3	N/A
26	1/11/2024	94.6	9767.2	5828.1	3208.0	409760	7125.9	N/A
27	1/11/2024	95.4	9856.4	6279.1	2822.0	395500	6746.6	N/A
28	1/11/2024	95.9	9909.3	5510.3	2765.6	412780	6918.4	N/A
29	1/12/2024	97.7	9714.1	6468.8	3256.0	411620	6785.8	N/A
30	1/12/2024	97.5	9921.9	9441.0	2805.0	409360	7095.8	N/A
31	1/12/2024	98.3	9895.3	5276.4	2682.0	416080	6962.3	N/A
32	1/13/2024	96.5	9631.1	6471.5	3387.0	424120	6828.3	N/A
33	1/13/2024	93.8	9948.9	6411.2	2934.0	410880	7173.6	N/A
34	1/13/2024	96.1	9806.8	5643.8	2742.0	413080	6874.3	N/A
35	1/14/2024	95.9	9712.1	5861.3	2837.9	417840	6891.2	N/A
36	1/14/2024	96.5	9840.7	5788.7	2936.2	407060	6875.3	N/A
37	1/14/2024	96.3	9710.2	6147.3	2751.0	405560	6873.0	N/A
38	1/14/2024	96.7	9776.1	6492.7	2626.8	412920	7064.2	N/A
39	1/14/2024	96.4	9448.4	4372.3	2670.0	411670	6796.5	N/A
40	1/15/2024	96.4	9386.7	6938.0	2681.0	414300	6919.8	N/A
41	1/15/2024	97.4	9656.2	6573.2	3124.0	410980	6881.2	N/A
42	1/15/2024	96.5	9608.6	6957.9	3029.0	409420	7049.6	N/A
43	1/15/2024	96.1	9335.7	6409.2	2905.8	412820	7020.5	N/A
44	1/15/2024	94.9	9000.7	5931.7	3193.9	414520	6852.1	N/A
45	1/15/2024	97.7	9303.7	6034.7	3001.4	417420	6723.1	N/A
46	1/15/2024	97.6	9059.3	6195.8	2994.1	418800	6772.7	N/A
47	1/16/2024	96.9	9531.2	6275.4	3000.9	419120	6884.0	N/A
48	1/16/2024	95.9	9512.5	5747.4	3277.0	401880	7210.3	N/A
49	1/17/2024	90.8	8486.8	6041.6	3091.6	415420	8278.7	N/A
50	1/17/2024	95.8	8532.4	5817.3	3028.5	411860	6841.6	N/A
51	1/17/2024	95.8	9099.1	5911.7	2692.1	412640	7046.4	N/A
52	1/17/2024	95.9	9016.4	6810.6	2560.0	409020	7175.8	N/A
53	1/17/2024	96.4	8749.9	6024.2	2748.9	412040	6756.5	N/A
54	1/17/2024	96.2	8918.8	5458.8	2755.2	417420	6792.6	N/A
55	1/18/2024	96.9	8746.1	4956.2	2909.9	418900	6802.3	N/A
56	1/18/2024	96.4	9552.6	3696.0	2869.4	407980	6764.3	N/A
57	1/18/2024	96.5	9198.4	5892.0	2963.8	406700	6764.3	N/A
58	1/18/2024	94.9	8753.8	6297.5	3152.0	411720.0	6683.4	N/A
59	1/18/2024	97.6	8381.8	5270.2	2756.0	421620.0	7032.5	N/A
60	1/18/2024	96.3	7997.7	5704.1	2716.7	417100.0	6916.3	N/A
61	1/19/2024	96.7	7927.9	3360.9	2726.8	420860.0	7245.3	N/A
62	1/19/2024	97.6	8142.1	5643.6	2938.3	419140.0	7619.3	N/A
63	1/19/2024	96.6	7797.4	5588.7	2939.3	398100.0	6875.2	N/A
64	1/19/2024	97.0	8281.4	3931.1	2942.0	405220.0	6816.0	N/A
65	1/20/2024	97.4	8121.4	5881.4	2971.5	406580.0	6753.7	N/A
66	1/20/2024	97.5	7956.5	5889.7	2781.0	394660.0	6812.7	N/A
67	1/20/2024	86.2	7933.6	5202.2	2676.6	403860.0	8581.7	N/A
68	1/21/2024	96.3	7204.1	5392.9	3089.9	409160.0	6861.5	N/A
69	1/21/2024	97.2	7363.9	5175.9	2998.7	406160.0	6735.1	N/A
	AVERAGE	95	9,395	5,561	3,117	28,140,850	485,370	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
Sandy Siltstone, tr LS	100	280	100	280
Sandy Siltstone, occ LS	280	430	280	430
Shaly Siltstone, tr SS	430	490	430	490
Shaly Siltstone, Coal	490	520	490	520
Shaly Siltstone, occ SS, tr Coal	520	610	520	610
Shaly Siltstone	610	730	610	730
Silty Shale, tr ls, coal	730	820	730	820
Sandy Shale, tr coal	820	970	820	970
Shaly Sandstone, tr coal	970	1,300	970	1,300
Sandy Shale, occ Siltstone	1,300	1,540	1,300	1,540
Silty Shale, occ sandstone	1,540	1,930	1,540	1,930
Shale, occ sandstone	1,930	1,846	1,930	1,846
Big Lime	1,876	2,391	1,846	2,394
Fifty Foot Sandstone	2,391	2,576	2,364	2,582
Gordon	2,576	2,856	2,552	2,868
Fifth Sandstone	2,856	2,949	2,838	2,963
Bayard	2,949	3,673	2,933	3,708
Speechley	3,673	3,832	3,678	3,872
Balltown	3,832	4,383	3,842	4,436
Bradford	4,383	4,780	4,406	4,842
Benson	4,780	5,036	4,812	5,105
Alexander	5,036	6,218	5,075	6,363
Sycamore	6,007	6,188	6,104	6,333
Middlesex	6,188	6,300	6,333	6,523
Burkett	6,300	6,343	6,523	6,625
Tully	6,343	6,368	6,625	6,703
Marcellus	6,368	NA	6,703	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:	01/01/2024
Job End Date:	01/21/2024
State:	West Virginia
County:	Ritchie
API Number:	47-085-10498-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	TWIG UNIT 1H
Latitude:	39.172
Longitude:	-80.857
Datum:	WGS84
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6521
Total Base Water Volume (gal)*:	21411179
Total Base Non Water Volume:	0

Water Source	Percent
Produced Water	100.00%

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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
FDP-S1464-22	Halliburton	Friction Reducer					
HAI-501	Halliburton	Acid Corrosion Inhibitor					
HYDROCHLORIC ACID, 22 BAUME	Halliburton	Solvent					
MC B-8614A	MultiChem	Biocide					
OPTIFLO-II DELAYED RELEASE BREAKER	Halliburton	Breaker					
Produced Water (Density 10.0)	Operator	Base Fluid					
Sand-Common White-100 Mesh, SSA-2	Halliburton	Proppant					
WG-36 GELLING AGENT	Halliburton	Gelling Agent					

Items above are Trade Names. Items below are the individual ingredients.

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			Water	7732-18-5	100.00000	88.23610	None
			Crystalline silica, quartz	14808-60-7	100.00000	11.59694	None
			Water	7732-18-5	100.00000	0.14407	None
			Hydrochloric acid	7647-01-0	30.00000	0.03309	None
			Complex amine compound	Proprietary	60.00000	0.02663	None
			Hydrotreated distillate	Proprietary	30.00000	0.01332	None
			Guar gum	9000-30-0	100.00000	0.00479	None
			Ammonium chloride	12125-02-9	5.00000	0.00222	None
			Fatty nitrogen derived amides	Proprietary	5.00000	0.00222	None
			Ethoxylated alcohol	Proprietary	5.00000	0.00222	None
			Glutaraldehyde	111-30-8	30.00000	0.00214	None
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8	1.00000	0.00044	None
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6	1.00000	0.00044	None
			Alkyl (C12-16) dimethylbenzyl ammonium chloride	68424-85-1	5.00000	0.00036	None
		RECEIVED Office of Oil and Gas	Methanol	67-56-1	100.00000	0.00021	None
		MAY 16 2024	Ammonium persulfate	7727-54-0	100.00000	0.00015	None
		W/ Department of Environmental Protection	Ethanol	64-17-5	1.00000	0.00007	None
			Mixture of dimer and trimer fatty acids of indefinite composition derived from tall oil	61790-12-3	30.00000	0.00006	None
			Modified thiourea polymer	Proprietary	30.00000	0.00006	None
			Oxylated phenolic resin	Proprietary	30.00000	0.00005	None
			Propargyl alcohol	107-19-7	5.00000	0.00001	None
			Hexadecene	629-73-2	5.00000	0.00001	None
			Ethoxylated alcohols	Proprietary	5.00000	0.00001	None
			C.I. pigment Orange 5	3468-63-1	1.00000	0.00000	None

* 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%

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

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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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