

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 - 10499 County Ritchie District Union
Quad Oxford 7.5' Pad Name Cashew Pad Field/Pool Name -----
Farm name Elmer W. Pierce Well Number Twig Unit 2H
Operator (as registered with the OOG) Antero Resources Corporation
Address 1615 Wynkoop Street City Denver State CO Zip 80202

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4335910m Easting 512316m
Landing Point of Curve Northing 4336003.57m Easting 512652.22m
Bottom Hole Northing 4339940m Easting 511028m

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 10/25/2023
Date completion activities began 1/22/2024 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

WV Department of
Environmental Protection

API 47-085 - 10499

Farm name Elmer W. Pierce

Well number Twig Unit 2H

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"	371'	New	54.5#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2915'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	20977'	New	23#, P-110/ICY	N/A	Y
Tubing		2-3/8"	6604'		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	330 sx	15.8	1.16	383	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) 20977' MD, 6513' TVD (BHL), 6516' (Deepest Point Drilled)

Loggers TD (ft) 20977' MD

Deepest formation penetrated Marcellus

Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 5740'

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	6369' (TOP)	TVD	6818' (TOP)	MD
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 2304 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 12570 mcfpd Oil 217 bpd NGL --- bpd Water 748 bpd GAS MEASURED BY Estimated Orifice Pilot

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

Please insert additional pages as applicable.

Drilling Contractor 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"

6,880'

LATITUDE 39°15'00"

11,080' TO BOTTOM HOLE

Antero Resources Corporation Well No. Twig 2H

Union District - Ritchie County	
9-9.1	Naomi Cunningham
9-14	John Lauke
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	Brian Park 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	CNG Transmission Corp.
4-19.4	CNG 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:
WELL 2H TOP HOLE INFORMATION:
 N: 247,755ft E: 1,615,114ft
 LAT: 39°10'20.09" LON: 80°51'27.36"
BOTTOM HOLE INFORMATION:
 N: 261,049ft E: 1,611,111ft
 LAT: 39°12'30.88" LON: 80°52'20.76"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.
 ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
 N: 4,335,910m E: 512,316m
BOTTOM HOLE INFORMATION:
 N: 4,339,940m E: 511,028m

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
 N: 14,224,685ft E: 1,680,775ft
POINT OF ENTRY INFORMATION:
 N: 14,224,874ft E: 1,681,988ft
BOTTOM HOLE INFORMATION:
 N: 14,237,906ft E: 1,676,552ft

- 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.

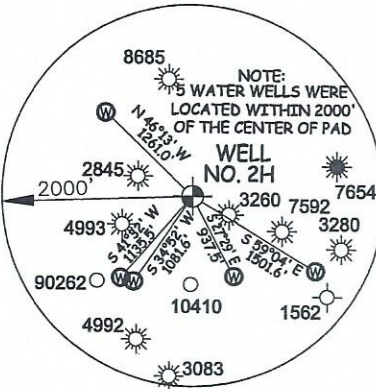
WV NORTH ZONE GRID NORTH

15,087' TO BOTTOM HOLE

13,144'

LONGITUDE 80°50'00"

LONGITUDE 80°52'30"



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 # 23-007WA
 DRAWING # TWIG2HAD
 SCALE 1" = 2000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

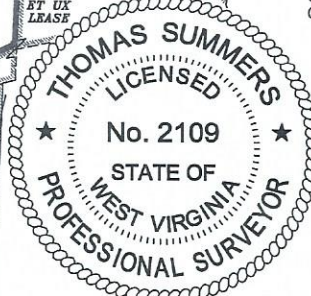
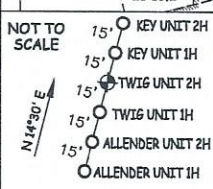
LEGEND

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

THOMAS SUMMERS P.S. 2109

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

DATE 05/07/24
 OPERATOR'S WELL# TWIG 2H



WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ 47 ___ 085 ___ 10499
 (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 +/-
 OIL & GAS ROYALTY OWNER R. F. KIESTER ET AL LEASE ACREAGE 70 AC.±

06/14/2024

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 6,513' TVD 20,977' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT KEVIN ELLIS
 ADDRESS 1615 WYNKOOP ST. ADDRESS 535 WHITE OAK BLVD.
 FORM WW-6 DENVER, CO 80202 BRIDGEPORT, WV 26330

RECEIVED
Office of Oil and Gas

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Environmental Protection

API 47-085-10499 Farm Name Elmer W. Pierce Well Number Twig Unit 2H					
Exhibit 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	1/22/2024	20848.6	20804.6	36	Marcellus
2	1/23/2024	20765.7	20599.5	36	Marcellus
3	1/23/2024	20563.8	20397.6	36	Marcellus
4	1/23/2024	20361.9	20195.7	36	Marcellus
5	1/24/2024	20160.0	19993.8	36	Marcellus
6	1/24/2024	19958.1	19791.9	36	Marcellus
7	1/24/2024	19756.2	19590.0	36	Marcellus
8	1/24/2024	19554.3	19388.1	36	Marcellus
9	1/25/2024	19352.4	19186.2	36	Marcellus
10	1/25/2024	19150.5	18984.3	36	Marcellus
11	1/25/2024	18948.6	18782.4	36	Marcellus
12	1/26/2024	18746.7	18580.5	36	Marcellus
13	1/26/2024	18544.8	18378.5	36	Marcellus
14	1/26/2024	18342.9	18176.6	36	Marcellus
15	1/26/2024	18141.0	17974.7	36	Marcellus
16	1/27/2024	17939.1	17772.8	36	Marcellus
17	1/27/2024	17737.2	17570.9	36	Marcellus
18	1/27/2024	17535.3	17369.0	36	Marcellus
19	1/27/2024	17333.4	17167.1	36	Marcellus
20	1/28/2024	17131.5	16965.2	36	Marcellus
21	1/28/2024	16929.6	16763.3	36	Marcellus
22	1/28/2024	16727.7	16561.4	36	Marcellus
23	1/28/2024	16525.8	16359.5	36	Marcellus
24	1/29/2024	16323.9	16157.6	36	Marcellus
25	1/29/2024	16121.9	15955.7	36	Marcellus
26	1/29/2024	15920.0	15753.8	36	Marcellus
27	1/30/2024	15718.1	15551.9	36	Marcellus
28	1/30/2024	15516.2	15350.0	36	Marcellus
29	1/30/2024	15314.3	15148.1	36	Marcellus
30	1/30/2024	15112.4	14946.2	36	Marcellus
31	1/30/2024	14910.5	14744.3	36	Marcellus
32	1/31/2024	14708.6	14542.4	36	Marcellus
33	1/31/2024	14506.7	14340.5	36	Marcellus
34	1/31/2024	14304.8	14138.6	36	Marcellus
35	1/31/2024	14102.9	13936.7	36	Marcellus
36	2/1/2024	13901.0	13734.7	36	Marcellus
37	2/1/2024	13699.1	13532.8	36	Marcellus
38	2/1/2024	13497.2	13330.9	36	Marcellus
39	2/2/2024	13295.3	13129.0	36	Marcellus
40	2/2/2024	13093.4	12927.1	36	Marcellus
41	2/2/2024	12891.5	12725.2	36	Marcellus
42	2/2/2024	12689.6	12523.3	36	Marcellus
43	2/2/2024	12487.7	12321.4	36	Marcellus
44	2/3/2024	12285.8	12119.5	36	Marcellus
45	2/3/2024	12083.9	11917.6	36	Marcellus
46	2/3/2024	11882.0	11715.7	36	Marcellus
47	2/3/2024	11680.1	11513.8	36	Marcellus
48	2/4/2024	11478.1	11311.9	36	Marcellus
49	2/4/2024	11276.2	11110.0	36	Marcellus
50	2/4/2024	11074.3	10908.1	36	Marcellus
51	2/4/2024	10872.4	10706.2	36	Marcellus
52	2/4/2024	10670.5	10504.3	36	Marcellus
53	2/5/2024	10468.6	10302.4	36	Marcellus
54	2/5/2024	10266.7	10100.5	36	Marcellus
55	2/5/2024	10064.8	9898.6	36	Marcellus
56	2/5/2024	9862.9	9696.7	36	Marcellus
57	2/5/2024	9661.0	9494.8	36	Marcellus
58	2/6/2024	9459.1	9292.9	36	Marcellus
59	2/6/2024	9257.2	9090.9	36	Marcellus
60	2/6/2024	9055.3	8889.0	36	Marcellus
61	2/6/2024	8853.4	8687.1	36	Marcellus
62	2/7/2024	8651.5	8485.2	36	Marcellus
63	2/7/2024	8449.6	8283.3	36	Marcellus
64	2/7/2024	8247.7	8081.4	36	Marcellus
65	2/7/2024	8045.8	7879.5	36	Marcellus
66	2/7/2024	7843.9	7677.6	36	Marcellus
67	2/8/2024	7642.0	7475.7	36	Marcellus
68	2/8/2024	7440.1	7273.8	36	Marcellus
69	2/8/2024	7238.2	7071.9	36	Marcellus
70	2/8/2024	7036.3	6870.0	36	Marcellus

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	1/22/2024	76.5	8229.2	7918.9	2369.7	186920	5119.9	N/A
2	1/23/2024	93.7	10054.5	6899.4	3592.5	406940	7098.2	N/A
3	1/23/2024	88.9	10363.7	7109.5	3997.7	417420	7054.4	N/A
4	1/23/2024	91.1	10245.2	6720.7	3441.6	413620	6921.7	N/A
5	1/24/2024	87.3	10133.7	5850.5	3347.5	420100	7012.4	N/A
6	1/24/2024	91.6	10292.9	6679.3	3700.0	404231	6992.4	N/A
7	1/24/2024	93.0	10339.5	6645.7	3545.4	406280	7051.2	N/A
8	1/24/2024	94.8	10128.5	6467.3	3354.5	414000	6976.7	N/A
9	1/25/2024	91.0	9689.9	6484.0	3513.0	411320	8666.8	N/A
10	1/25/2024	97.1	10093.4	6456.7	3812.0	416260	7063.6	N/A
11	1/25/2024	96.6	9918.5	6193.0	3347.9	414760	6965.0	N/A
12	1/26/2024	96.6	9819.0	6151.4	3205.0	412800	6881.0	N/A
13	1/26/2024	95.4	10238.3	6662.4	3350.0	406600	7015.6	N/A
14	1/26/2024	97.4	10024.8	7162.1	3696.0	405540	7005.8	N/A
15	1/26/2024	92.4	9721.6	6332.8	3140.0	409620	6743.8	N/A
16	1/27/2024	96.0	9604.3	6350.8	3281.9	408560	7020.6	N/A
17	1/27/2024	95.8	9870.0	6793.2	3300.0	407400	7106.5	N/A
18	1/27/2024	97.1	9971.7	6746.3	3848.0	409300	6903.4	N/A
19	1/27/2024	95.3	9901.4	5105.3	3656.6	415100	6929.2	N/A
20	1/28/2024	96.8	9889.9	5012.3	3582.9	405320	6895.1	N/A
21	1/28/2024	97.2	10030.5	6763.0	3945.0	409580	6951.8	N/A
22	1/28/2024	96.4	9810.2	6549.0	3744.0	410560	6916.9	N/A
23	1/28/2024	96.2	9661.3	4984.4	3209.1	405720	6899.5	N/A
24	1/29/2024	91.6	9312.1	4537.9	3440.2	410560	6934.7	N/A
25	1/29/2024	95.9	9908.6	7474.8	3974.0	411200	7035.4	N/A
26	1/29/2024	96.8	9659.3	6802.2	3082.9	404200	6994.6	N/A
27	1/30/2024	97.0	9476.6	6210.0	3143.0	407440	6819.6	N/A
28	1/30/2024	95.9	9943.5	6262.4	3788.0	403780	6824.3	N/A
29	1/30/2024	94.4	9871.0	6708.9	3768.0	403620	6791.8	N/A
30	1/30/2024	97.6	9819.6	7164.5	3831.0	411460	7016.8	N/A
31	1/30/2024	96.2	9567.9	6770.0	3078.0	404400	7072.0	N/A
32	1/31/2024	96.1	9558.3	6695.8	3160.0	409740	6971.5	N/A
33	1/31/2024	96.6	9563.4	7099.8	3273.0	407940	7085.7	N/A
34	1/31/2024	97.5	9864.3	7480.4	3437.0	417400	7128.5	N/A
35	1/31/2024	93.1	9260.7	6784.6	2832.0	421540	7580.6	N/A
36	2/1/2024	96.1	9507.4	7210.4	2999.0	414700	6985.5	N/A
37	2/1/2024	97.6	9764.2	7331.8	3544.0	412700	7086.3	N/A
38	2/1/2024	96.6	9781.8	4893.3	3513.0	416620	7184.4	N/A
39	2/2/2024	69.0	7543.0	7410.3	4117.0	418460	10514.4	N/A
40	2/2/2024	95.8	9505.5	7759.8	3815.0	415300	7066.3	N/A
41	2/2/2024	97.1	9687.3	6711.6	3300.0	417660	7197.5	N/A
42	2/2/2024	95.3	9729.3	7304.3	3692.0	416060	7007.7	N/A
43	2/2/2024	97.4	8810.4	6481.6	3204.0	417120	7062.8	N/A
44	2/3/2024	96.6	9226.6	6272.5	3154.0	414180	7259.1	N/A
45	2/3/2024	97.3	9520.0	6601.8	3707.0	410680	7123.5	N/A
46	2/3/2024	97.0	9777.0	7809.4	3583.0	425480	7307.3	N/A
47	2/3/2024	97.2	9103.8	6919.4	3512.0	416360	7144.4	N/A
48	2/4/2024	97.4	9104.4	6377.9	3137.0	415580	7138.0	N/A
49	2/4/2024	95.7	9045.8	7380.2	3628.0	413520	7066.1	N/A
50	2/4/2024	96.9	9004.6	6611.2	3562.0	423920	7147.4	N/A
51	2/4/2024	98.1	8812.7	7234.9	3311.0	417540	7035.8	N/A
52	2/4/2024	96.6	8708.9	6862.1	3176.0	401440	7041.4	N/A
53	2/5/2024	97.6	8763.4	6833.7	3161.0	411080	7150.1	N/A
54	2/5/2024	97.3	8244.4	6038.9	3195.0	404572	6966.0	N/A
55	2/5/2024	97.8	8675.3	6575.8	3507.0	416640	7168.9	N/A
56	2/5/2024	97.8	8714.9	6596.0	3858.0	419300	6916.4	N/A
57	2/5/2024	98.3	8725.8	7100.3	2782.0	415680	6939.6	N/A
58	2/6/2024	97.4	8269.1	7215.4	2966.0	419080.0	7057.1	N/A
59	2/6/2024	97.0	8381.8	6577.6	3095.7	421600.0	7176.3	N/A
60	2/6/2024	98.3	8337.7	6762.6	2963.6	421300.0	7173.1	N/A
61	2/6/2024	97.9	8360.2	6261.8	2928.0	409460.0	6952.3	N/A
62	2/7/2024	97.6	8214.2	6607.5	2895.0	417300.0	6951.2	N/A
63	2/7/2024	96.8	8128.8	6716.7	3049.2	418840.0	6953.9	N/A
64	2/7/2024	98.3	8268.5	6377.1	3016.4	415680.0	7393.4	N/A
65	2/7/2024	97.7	7888.9	5766.5	2781.5	400680.0	7025.7	N/A
66	2/7/2024	98.0	8259.0	6067.6	3020.0	415460.0	7048.3	N/A
67	2/8/2024	98.0	8097.8	6896.7	3030.0	414000.0	7008.4	N/A
68	2/8/2024	97.7	7790.6	6120.7	3072.1	419000.0	6991.2	N/A
69	2/8/2024	97.6	7713.8	5881.9	3128.0	418600.0	6978.3	N/A
70	2/8/2024	98.0	7658.6	6018.3	2939.6	414820.0	6886.8	N/A
	AVERAGE	95	9,271	6,595	3,359	28,671,643	495,552	TOTAL

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06/14/2024

MAY 16 2024

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API 47-085-10499 Farm Name Elmer W. Pierce Well Number Twig Unit 2H				
EXHIBIT 3				
LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
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	1,836	1,930	1,874
Big Lime	1,866	2,383	1,874	2,443
Fifty Foot Sandstone	2,383	2,564	2,413	2,631
Gordon	2,564	2,845	2,601	2,923
Fifth Sandstone	2,845	2,929	2,893	3,011
Bayard	2,929	3,647	2,981	3,757
Speechley	3,647	3,800	3,727	3,916
Balltown	3,800	4,358	3,886	4,492
Bradford	4,358	4,772	4,462	4,919
Benson	4,772	5,018	4,889	5,170
Alexander	5,018	6,218	5,140	6,465
Sycamore	6,009	6,188	6,207	6,435
Middlesex	6,188	6,300	6,435	6,628
Burkett	6,300	6,342	6,628	6,731
Tully	6,342	6,369	6,731	6,818
Marcellus	6,369	NA	6,818	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.

06/14/2024

MAY 16 2024

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	01/22/2024
Job End Date:	02/08/2024
State:	West Virginia
County:	Ritchie
API Number:	47-085-10499-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	TWIG UNIT 2H
Latitude:	39.172
Longitude:	-80.857
Datum:	WGS84
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6521
Total Base Water Volume (gal)*:	21735254.5
Total Base Non Water Volume:	0



Water Source	Percent
Produced Water	100.00%

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.

06/14/2024

			Water	7732-18-5	100.00000	88.19373	None
			Crystalline silica, quartz	14808-60-7	100.00000	11.63392	None
			Water	7732-18-5	100.00000	0.14865	None
			Hydrochloric acid	7647-01-0	30.00000	0.03421	None
			Complex amine compound	Proprietary	60.00000	0.02743	None
			Hydrotreated distillate	Proprietary	30.00000	0.01371	None
			Guar gum	9000-30-0	100.00000	0.00506	None
			Ammonium chloride	12125-02-9	5.00000	0.00229	None
			Fatty nitrogen derived amides	Proprietary	5.00000	0.00229	None
			Ethoxylated alcohol	Proprietary	5.00000	0.00229	None
			Glutaraldehyde	111-30-8	30.00000	0.00216	None
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8	1.00000	0.00046	None
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6	1.00000	0.00046	None
			Alkyl (C12-16) dimethylbenzyl ammonium chloride	68424-85-1	5.00000	0.00036	None
			Methanol	67-56-1	100.00000	0.00021	None
			Ammonium persulfate	7727-54-0	100.00000	0.00015	None
			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.

06/14/2024

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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06/14/2024