

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

API 47-103-03602 County Wetzel District Green
Quad Porter Falls 7.5' Pad Name Big Run Field/Pool Name ----
Farm name Antero Resources Corporation Well Number Tulo 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 4378370m Easting 515569m
Landing Point of Curve Northing 4378199.85m Easting 515420.41m
Bottom Hole Northing 4383990m Easting 513473m

Elevation (ft) 1250" 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 9/5/2023 Date drilling commenced 9/8/2023 Date drilling ceased 11/17/2023
Date completion activities began 2/23/2024 Date completion activities ceased 5/11/2024
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 31' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 2311' 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: [Signature]
08/16/2024

API 47-103 - 03602 Farm name Antero Resources Corporation Well number Tulo 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"	381'	New	54.5#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	3535'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" /8-1/2"	5-1/2"	27629'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	7107'		4.7#, J-55		
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	215 sx	15.6	1.18	254	0'	8 Hrs.
Surface	Class A	330 sx	15.8	1.17	386	0'	8 Hrs.
Coal							
Intermediate 1	Class A	1250 sx	15.8	1.16	1450	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	4745 sx (Tail)	13.5 (Lead), 15.2(Tail)	1.35 (Tail)	6406	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 27629' MD, 6780' TVD (BHL), 6846' TVD (Deepest Point Drilled)

Loggers TD (ft) 27629' MD

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Deepest formation penetrated Marcellus

Plug back to (ft) N/A

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Plug back procedure N/A

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Kick off depth (ft) 5501'

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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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EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	2/23/2024	27490	27447	36	Marcellus
2	2/24/2024	27408.59	27243.54	36	Marcellus
3	2/24/2024	27208.13	27043.08	36	Marcellus
4	2/25/2024	27007.67	26842.62	36	Marcellus
5	2/25/2024	26807.21	26642.16	36	Marcellus
6	2/26/2024	26606.75	26441.7	36	Marcellus
7	2/27/2024	26406.29	26241.24	36	Marcellus
8	2/28/2024	26205.83	26040.78	36	Marcellus
9	2/28/2024	26005.37	25840.32	36	Marcellus
10	2/29/2024	25804.91	25639.86	36	Marcellus
11	2/29/2024	25604.45	25439.4	36	Marcellus
12	3/1/2024	25403.99	25238.94	36	Marcellus
13	3/2/2024	25203.53	25038.48	36	Marcellus
14	3/2/2024	25003.07	24838.02	36	Marcellus
15	3/3/2024	24802.61	24637.56	36	Marcellus
16	3/3/2024	24602.15	24437.1	36	Marcellus
17	3/4/2024	24401.69	24236.64	36	Marcellus
18	3/4/2024	24201.23	24036.18	36	Marcellus
19	3/5/2024	24000.77	23835.72	36	Marcellus
20	3/5/2024	23800.31	23635.26	36	Marcellus
21	3/6/2024	23599.85	23434.8	36	Marcellus
22	3/6/2024	23399.39	23234.34	36	Marcellus
23	3/7/2024	23198.93	23033.88	36	Marcellus
24	3/7/2024	22998.47	22833.42	36	Marcellus
25	3/8/2024	22798.01	22632.96	36	Marcellus
26	3/9/2024	22597.55	22432.5	36	Marcellus
27	3/9/2024	22397.09	22232.04	36	Marcellus
28	3/10/2024	22196.63	22031.58	36	Marcellus
29	3/10/2024	21996.17	21831.12	36	Marcellus
30	3/11/2024	21795.71	21630.66	36	Marcellus
31	3/11/2024	21595.25	21430.2	36	Marcellus
32	3/12/2024	21394.79	21229.74	36	Marcellus
33	3/12/2024	21194.33	21029.28	36	Marcellus
34	3/13/2024	20993.87	20828.82	36	Marcellus
35	3/14/2024	20793.41	20628.36	36	Marcellus
36	3/14/2024	20592.95	20427.9	36	Marcellus
37	3/15/2024	20392.49	20227.44	36	Marcellus
38	3/15/2024	20192.03	20026.98	36	Marcellus
39	3/15/2024	19991.57	19826.52	36	Marcellus
40	3/16/2024	19791.11	19626.06	36	Marcellus
41	3/16/2024	19590.65	19425.6	36	Marcellus
42	3/16/2024	19390.19	19225.14	36	Marcellus
43	3/16/2024	19189.73	19024.68	36	Marcellus
44	3/17/2024	18989.27	18824.22	36	Marcellus
45	3/17/2024	18788.81	18623.76	36	Marcellus
46	3/17/2024	18588.35	18423.3	36	Marcellus
47	3/18/2024	18387.89	18222.84	36	Marcellus
48	3/18/2024	18187.43	18022.38	36	Marcellus
49	3/18/2024	17986.97	17821.92	36	Marcellus
50	3/19/2024	17786.51	17621.46	36	Marcellus
51	3/19/2024	17586.05	17421	36	Marcellus
52	3/19/2024	17385.59	17220.54	36	Marcellus
53	3/20/2024	17185.13	17020.08	36	Marcellus
54	3/20/2024	16984.67	16819.62	36	Marcellus
55	3/21/2024	16784.21	16619.16	36	Marcellus
56	3/21/2024	16583.75	16418.7	36	Marcellus
57	3/21/2024	16383.29	16218.24	36	Marcellus
58	3/22/2024	16182.83	16017.78	36	Marcellus
59	3/22/2024	15982.37	15817.32	36	Marcellus
60	3/22/2024	15781.91	15616.86	36	Marcellus
61	3/22/2024	15581.45	15416.4	36	Marcellus
62	3/23/2024	15380.99	15215.94	36	Marcellus
63	3/23/2024	15180.53	15015.48	36	Marcellus
64	3/24/2024	14980.07	14815.02	36	Marcellus
65	3/24/2024	14779.61	14614.56	36	Marcellus
66	3/24/2024	14579.15	14414.1	36	Marcellus
67	3/24/2024	14378.69	14213.64	36	Marcellus
68	3/25/2024	14178.23	14013.18	36	Marcellus
69	3/25/2024	13977.77	13812.72	36	Marcellus
70	3/25/2024	13777.31	13612.26	36	Marcellus
71	3/26/2024	13576.85	13411.8	36	Marcellus
72	3/26/2024	13376.39	13211.34	36	Marcellus
73	3/26/2024	13175.93	13010.88	36	Marcellus
74	3/27/2024	12975.47	12810.42	36	Marcellus
75	3/27/2024	12775.01	12609.96	36	Marcellus
76	3/27/2024	12574.55	12409.5	36	Marcellus
77	3/28/2024	12374.09	12209.04	36	Marcellus
78	3/28/2024	12173.63	12008.58	36	Marcellus
79	3/28/2024	11973.17	11808.12	36	Marcellus
80	3/29/2024	11772.71	11607.66	36	Marcellus
81	3/29/2024	11572.25	11407.2	36	Marcellus
82	3/29/2024	11371.79	11206.74	36	Marcellus
83	3/29/2024	11171.33	11006.28	36	Marcellus
84	3/30/2024	10970.87	10805.82	36	Marcellus
85	3/30/2024	10770.41	10605.36	36	Marcellus
86	3/30/2024	10569.95	10404.9	36	Marcellus
87	3/31/2024	10369.49	10204.44	36	Marcellus
88	3/31/2024	10169.03	10003.98	36	Marcellus
89	3/31/2024	9968.57	9803.52	36	Marcellus
90	3/31/2024	9768.11	9603.06	36	Marcellus
91	4/1/2024	9567.65	9402.6	36	Marcellus
92	4/1/2024	9367.19	9202.14	36	Marcellus
93	4/1/2024	9166.73	9001.68	36	Marcellus
94	4/1/2024	8966.27	8801.22	36	Marcellus
95	4/2/2024	8765.81	8600.76	36	Marcellus
96	4/2/2024	8565.35	8400.3	36	Marcellus
97	4/2/2024	8364.89	8199.84	36	Marcellus
98	4/3/2024	8164.43	7999.38	36	Marcellus
99	4/3/2024	7963.97	7798.92	36	Marcellus
100	4/3/2024	7763.51	7598.46	36	Marcellus
101	4/3/2024	7563.05	7398	36	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	2/23/2024	79.66481	9559.233	5017.78	2724.541	166720	5335.78571	N/A	
2	2/24/2024	81.24024	10081.34	4809.12	3719.013	412620	7574.45238	N/A	
3	2/24/2024	81.53892	10239.41	6808.66	4022.668	418320	7909.69048	N/A	
4	2/25/2024	83.72803	10483.07	7008.07	4036.64	422700	7418.80952	N/A	
5	2/25/2024	81.42324	10435.26	6903.54	4055.207	418660	7371.02381	N/A	
6	2/26/2024	83.18126	10567.68	6948.7	3752	415770	7219.09524	N/A	
7	2/27/2024	84.76452	10491.74	7116.82	4241.1	417000	7221.2381	N/A	
8	2/28/2024	87.75121	10416.23	6592.38	4230	420060	7168.28571	N/A	
9	2/28/2024	90.0457	10559.04	7129.5	3835.766	419280	7120.11905	N/A	
10	2/29/2024	84.38704	10075.07	5485.27	3717.037	423860	8344.14286	N/A	
11	2/29/2024	90.59372	10364.83	5111.26	3882.695	416520	7267.54762	N/A	
12	3/1/2024	90.54872	10409.41	6444.75	3998.803	423120	7206.21429	N/A	
13	3/2/2024	84.23698	10306.16	5779.36	4149.251	417360	7076.07143	N/A	
14	3/2/2024	87.57226	9842.768	6880.6	4118.617	416828	7088.52381	N/A	
15	3/3/2024	92.52169	10123.6	4369.64	4364.552	423160	7115.83333	N/A	
16	3/3/2024	88.63486	10636.21	5416.68	4098.889	415560	7012.71429	N/A	
17	3/4/2024	87.01179	10508.17	5000.41	3937.734	417040	7265.45238	N/A	
18	3/4/2024	84.38636	10487.9	7097.99	3938.459	421380	7371.66667	N/A	
19	3/5/2024	88.83393	10463.53	6324.22	4120.715	420100	7443.69048	N/A	
20	3/5/2024	87.90179	10576	6556.5	4148.987	416580	7312.64286	N/A	
21	3/6/2024	88.5851	10440.07	6428.79	3774.941	420160	7291.2619	N/A	
22	3/6/2024	90.84451	10404.51	5858.2	4252	419380	7204.66667	N/A	
23	3/7/2024	92.18591	10470.17	5989.41	4246.97	418680	7190.88095	N/A	
24	3/7/2024	91.39399	10353.06	7234.33	4086	418320	7258.59524	N/A	
25	3/8/2024	93.30641	10531.96	7604.03	4162.027	418060	7166.47619	N/A	
26	3/9/2024	95.56483	10472.72	6549.59	4390.345	416580	7168.35714	N/A	
27	3/9/2024	89.60826	10573.63	6956.33	4166.852	421360	7047.90476	N/A	
28	3/10/2024	93.48796	10541.34	6178.78	3954.623	414460	7284.09524	N/A	
29	3/10/2024	93.57272	10511.17	7069.73	3985.246	418740	7189.40476	N/A	
30	3/11/2024	92.77918	10582.35	7299.12	4254.431	411640	7263.85714	N/A	
31	3/11/2024	95.71988	10462.26	6212.31	3878.689	413700	7071.66667	N/A	
32	3/12/2024	94.2725	10550.96	6291.88	3869.659	417940	7168.40476	N/A	
33	3/12/2024	96.15513	10496.41	6239.31	4034.109	413180	7256	N/A	
34	3/13/2024	96.56431	10436.96	7297.88	3869.125	418920	7189.7381	N/A	
35	3/14/2024	95.50916	10511.35	5875.72	4150.913	413460	7195.88095	N/A	
36	3/14/2024	88.69263	10072.49	7089.76	4117.422	419760	7165.40476	N/A	
37	3/15/2024	96.78143	10082.67	6292.03	4238.245	418400	7251.92857	N/A	
38	3/15/2024	95.48448	10419.86	7458.88	3962.174	400800	7005.09524	N/A	
39	3/15/2024	96.43623	10082.54	6711.53	3954.281	413260	7130.45238	N/A	
40	3/16/2024	96.84038	10100	6588.23	4124.803	414020	7171.40476	N/A	
41	3/16/2024	98.20438	10096.25	6768.6	4029.235	410620	7134.14286	N/A	
42	3/16/2024	98.28903	10021.17	6911.72	4242.914	416280	7197.57143	N/A	
43	3/16/2024	96.03376	9946.263	6508.52	4141.422	412880	7112.30952	N/A	
44	3/17/2024	97.17498	10044.38	6814.46	4048.435	410520	7165	N/A	
45	3/17/2024	96.83188	9911.169	6602.1	4041.429	416140	7125.28571	N/A	
46	3/17/2024	97.20418	9974.622	6740.31	3944.321	419480	7136.04762	N/A	
47	3/18/2024	98.00949	10025.67	6604.35	3859.412	418400	7178.07143	N/A	
48	3/18/2024	97.74509	9857.22	5212.14	3851.235	419480	7167.71429	N/A	
49	3/18/2024	97.91336	9768.277	6091.6	3894.596	415500	7148.33333	N/A	
50	3/19/2024	97.09626	9885.791	6594.83	3946.962	420660	7223.80952	N/A	
51	3/19/2024	96.73685	9785.936	5277.21	3608	420460	7261.14286	N/A	
52	3/19/2024	98.07009	9788.793	6563.43	3814.878	416520	7167.5	N/A	
53	3/20/2024	93.62921	9549.628	6514.16	4090.67	421740	9199.28571	N/A	
54	3/20/2024	98.01172	9889.026	5429.96	3767	415260	7182.42857	N/A	
55	3/21/2024	96.89452	9574.289	6536.81	3949.862	419500	7260.71429	N/A	
56	3/21/2024	97.11144	9820.576	6418.88	3638.835	419550	7012.33333	N/A	
57	3/21/2024	96.96717	9881.322	6516.92	3933.789	422200	7053	N/A	
58	3/22/2024	97.67177	9853.219	6535.27	3928.563	415860	6946.47619	N/A	
59	3/22/2024	95.69795	9724.364	6719.24	3703.894	419520	7008.47619	N/A	
60	3/22/2024	96.93538	9256.143	6052.16	3988.41	418840	6993.47619	N/A	
61	3/22/2024	97.01544	9723.369	6695.73	3967.282	421900	7034.04762	N/A	
62	3/23/2024	96.89109	9551.144	6523.18	3908.608	416880	7014.2381	N/A	
63	3/23/2024	97.11891	9791.56	6454.66	3710.046	411460	7000.19048	N/A	
64	3/24/2024	98.06016	9589.451	6808.87	3759.134	413020	6959.85714	N/A	
65	3/24/2024	96.57888	9628.726	7064.43	3706	414880	6965.7619	N/A	
66	3/24/2024	97.1109	9709.983	5856.26	3746.874	421240	7023.83333	N/A	
67	3/24/2024	97.66099	9591.147	6651.78	3689.509	411480	6886.02381	N/A	
68	3/25/2024	97.16581	9167.826	5121.13	3612.4	411440	7001.83333	N/A	
69	3/25/2024	91.89745	9114.531	7489.99	3522.249	416640	6955	N/A	
70	3/25/2024	96.03627	9464.812	7334.73	3694.419	415740	6981.54762	N/A	
71	3/25/2024	97.07084	9312.585	6740	3472.609	423900	7033.88095	N/A	
72	3/26/2024	97.43924	9356.044	6958.34	3465.181	416020	6913.85714	N/A	
73	3/26/2024	98.73655	8999.359	5167.15	3435.209	419480	6660.5	N/A	
74	3/27/2024	96.28757	9033.739	6830.44	3679.948	409220	6889.42857	N/A	
75	3/27/2024	97.11594	9024.824	4931.05	3808.304	411460	6832.97619	N/A	
76	3/27/2024	97.33461	8926.259	6689.43	3748.418	418740	6954.11905	N/A	
77	3/28/2024	98.37807	8857.145	6308.08	3679.802	410680	6815.47619	N/A	
78	3/28/2024	97.09837	8496.395	4996.19	3704.701	411820	6869.07143	N/A	
79	3/28/2024	97.40147	8397.965	6776.75	3665.282	417400	6821.28571	N/A	
80	3/29/2024	97.43864	8438.365	6452.71	3883.683	413440	6826.38095	N/A	
81	3/29/2024	96.98152	8779.784	6687.49	3769.688	421660	6929.69048	N/A	
82	3/29/2024	97.29653	8545.238	6476.22	3758.214	420960	6943.97619	N/A	
83	3/29/2024	97.5928	8396.084	6540.16	3743.271	420560	6917.80952	N/A	
84	3/30/2024	97.68313	8421.207	4866.39	3871.265	418240	6872.54762	N/A	
85	3/30/2024	97.11333	8295.246	6955.31	4110	417240	6933.85714	N/A	
86	3/30/2024	97.00051	8297	6578.87	3569.351	420080	6922.19048	N/A	
87	3/31/2024	97.66385	8192.337	4738.61	4220	412700	6854.69048	N/A	
88	3/31/2024	96.88585	7676.48	4662.35	3461	417940	6723.19048	N/A	
89	3/31/2024	97.13649	8051.281	6266.02	3540.271	418720	6862.21429	N/A	
90	3/31/2024	97.79702	7974.564	4628.36	4166	422660	6871.35714	N/A	
91	4/1/2024	88.07804	7839.309	6514.21	3581.727	412420	6783.85714	N/A	
92	4/1/2024	92.13592	7564.521	6076.57	3800.52	419380	7621.59524	N/A	
93	4/1/2024	95.35941	7891.484	6805.82	3481.522	417560	6902.90476	N/A	
94	4/1/2024	92.45172	7385.955	6509.06	3932	413400	6823.09524	N/A	
95	4/2/2024	97.62608	7580.999	6558.03	4135	417460	6798.64286	N/A	
96	4/2/2024	97.91011	7526.006	6146.41	3580.574	419460	6959.45238	N/A	
97	4/2/2024	98.39474	7507.689	6385.18	3650.124	419240	6617.57143	N/A	
98	4/3/2024	97.84152	7345.638	6002.5	3810.836	424000	6778.04762	N/A	
99	4/3/2024	98.41847	7262.795	5636.29	3668.863	417440	6723.54762	N/A	
100	4/3/2024	97.9759	7095.501	5685.58	3696.218	413480	6773.85714	N/A	
101	4/3/2024	98.24418	7095.475	5424.14	3827.459	419360	6985.7619	N/A	
AVERAGE	94	9.508	6.353	8.885	41,883,228	715,637	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	From Surface	From Surface	From Surface	From Surface
Sandstone	70		470		70		470	
Sandy Siltstone	470		720		470		720	
Siltstone, occ Sandstone	720		820		720		820	
Siltstone, rr Limestone	820		870		820		870	
Siltstone, occ Sandstone	870		1,170		870		1,170	
Shaly Siltstone, occ LS	1,170		1,270		1,170		1,270	
Siltstone, rr SH, rr Coal	1,270		1,470		1,270		1,470	
Shaly Siltstone	1,470		1,620		1,470		1,620	
Shaly Sandstone	1,620		1,670		1,620		1,670	
Silty, Shaly, Sandstone	1,670		1,920		1,670		1,920	
Silty Sandstone, Tr Coal	1,920		1,970		1,920		1,970	
Silty Sandstone	1,970		2,070		1,970		2,070	
Silty Sandstone, calc cmt	2,070		2,129		2,070		2,178	
Big Lime	2,159		2,861		2,208		2,941	
Fifty Foot Sandstone	2,861		3,000		2,941		3,087	
Gordon	3,000		3,239		3,087		3,337	
Fifth Sandstone	3,239		3,284		3,337		3,385	
Bayard	3,284		4,143		3,385		4,293	
Speechley	4,143		4,360		4,293		4,520	
Balltown	4,360		4,914		4,520		5,108	
Bradford	4,914		5,173		5,108		5,380	
Benson	5,173		5,524		5,380		5,746	
Alexander	5,524		6,640		5,746		6,993	
Sycamore	6,498		6,610		6,811		6,963	
Middlesex	6,610		6,704		6,963		7,126	
Burkett	6,704		6,723		7,126		7,166	
Tully	6,723		6,790		7,166		7,346	
Marcellus	6790		NA		7346		NA	

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	02/23/2024
Job End Date:	04/04/2024
State:	West Virginia
County:	Wetzel
API Number:	47-103-03602-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	TULO UNIT 1H
Latitude:	39.5547
Longitude:	-80.8189
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6845
Total Base Water Volume (gal)*:	31786329.000000004
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
Excelerate LX-21	Halliburton	Friction Reducer					
FDP-S1470-23	Halliburton	Friction Reducer					
FDP-S1489-23	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,	Halliburton	Proppant					

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SSA-2							
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
Items above are Trade Names. Items below are the individual ingredients.							
			Water	7732-18-5	100.00000	88.20568	None
			Crystalline silica, quartz	14808-60-7	100.00000	11.62242	None
			Water	7732-18-5	100.00000	0.14674	None
			Hydrochloric acid	7647-01-0	30.00000	0.03310	None
			Complex amine compound	Proprietary	60.00000	0.02826	None
			Hydrotreated distillate	Proprietary	30.00000	0.01408	None
			Guar gum	9000-30-0	100.00000	0.00345	None
			Ammonium chloride	12125-02-9	5.00000	0.00253	None
			Ethoxylated alcohol	Proprietary	5.00000	0.00235	None
			Fatty nitrogen derived amides	Proprietary	5.00000	0.00235	None
			Ethanaminium, N,N,N-trimethyl-2-(1-oxo-2-propen-1-yl)oxy-, chloride (1:1), polymer with 2-propenamide	69418-26-4	60.00000	0.00219	None
			Glutaraldehyde	111-30-8	30.00000	0.00212	None
			Hydrotreated light petroleum distillates	64742-47-8	30.00000	0.00109	None
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8	1.00000	0.00051	None
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6	1.00000	0.00051	None
			Alkyl (C12-16) dimethylbenzyl ammonium chloride	68424-85-1	5.00000	0.00035	None
			Methanol	67-56-1	100.00000	0.00021	None
			Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	5.00000	0.00018	None
			Ethoxylated branched C13 alcohol	78330-21-9	5.00000	0.00018	None
			Ammonium persulfate	7727-54-0	100.00000	0.00008	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
			Petroleum distillate	Proprietary	30.00000	0.00005	None
			Oxylated phenolic resin	Proprietary	30.00000	0.00002	None
			Propargyl alcohol	107-19-7	5.00000	0.00001	None

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			Hexadecene	629-73-2	5.00000	0.00001	None
			Ethoxylated alcohols	Proprietary	5.00000	0.00001	None
			Sodium chloride	7647-14-5	5.00000	0.00001	None
			Ethoxylated fatty acid	Proprietary	5.00000	0.00001	None
			Amide	Proprietary	5.00000	0.00001	None
			C.I. pigment Orange 5	3468-63-1	1.00000	0.00000	None
			Diethanolamine	111-42-2	0.10000	0.00000	None
			Hydroquinone monomethyl ether	150-76-5	0.10000	0.00000	None
			Ethylenediaminetetraacetic acid, tetrasodium salt	64-02-8	0.10000	0.00000	None
			1,2,4 Trimethylbenzene	95-63-6	0.10000	0.00000	None
			Fatty acid ester	Proprietary	0.10000	0.00000	None
			Inorganic acid salt	Proprietary	0.10000	0.00000	None
			Oleic acids	112-80-1	0.01000	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. 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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