

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

API 47 - 017 - 06857 County Doddridge District West Union
 Quad West Union 7.5' Pad Name Alexander Pad Field/Pool Name ----
 Farm name Antero Resources Corporation Well Number Northrop 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 4354059m Easting 519372m
 Landing Point of Curve Northing 4353952m Easting 519298m
 Bottom Hole Northing 4351638m Easting 520249m

Elevation (ft) 1181' 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 9/20/2017 Date drilling commenced 1/18/2018 Date drilling ceased 4/25/2018
 Date completion activities began 9/28/2018 Date completion activities ceased 1/5/2019
 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 None Identified Open mine(s) (Y/N) depths No
 Salt water depth(s) ft None Identified Void(s) encountered (Y/N) depths No
 Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths No
 Is coal being mined in area (Y/N) No

Reviewed by:

WR-35
Rev. 8/23/13

API 47-017 - 06857 Farm name Antero Resources Corporation Well number Northrop 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	24"	20"	105'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	580.3'	New	54#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2573.1'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	15544.8'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6969'		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	204 sx	15.6	1.18	241	0'	8 Hrs.
Surface	Class A	540 sx	15.6	1.21	641	0'	8 Hrs.
Coal							
Intermediate 1	Class A	880 sx	15.6	1.21	1065	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	830sx (Lead) 1300 sx (Tail)	14 (Lead), 15.2 (Tail)	1.45 (Lead), 1.94(Tail)	3726	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15565' MD, 6909' TVD (BHL), 6928' (Deepest Point Drilled) Loggers TD (ft) 15565' MD

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6400'

** This is a subsequent Well. Antero only runs wireline logs on one well on a multi-well pad (Scorpio Unit 2H API#47-017-06861). Please reference the wireline logs submitted with Form WR-35 for Scorpio Unit 2H. A Cement Bond Log has been included with this submittal.

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

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____

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

API 47- 017 - 06857 Farm name Antero Resources Corporation Well number Northrop Unit 2H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
*PLEASE SEE ATTACHED EXHIBIT 1					

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)
*PLEASE SEE ATTACHED EXHIBIT 2								

Please insert additional pages as applicable.

WR-35
Rev. 8/23/13

API 47- 017 - 06857 Farm name Antero Resources Corporation Well number Northrop Unit 2H

PRODUCING FORMATION(S)	DEPTHS			
	6812' (TOP)	TVD	7038' (TOP)	MD
Marcellus				

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 3600 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 11719 mcfpd Oil 87 bpd NGL --- bpd Water 482 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 Patterson - UTI Drilling Company LLC
Address 207 Carlton Drive City Eighty Four State PA Zip 15330

Logging Company Allied Horizontal Wireline Services
Address 381 Colonial Manor Rd City North Huntington State PA Zip 15642

Cementing Company Halliburton
Address 121 Champion Way City Canonsburg State PA Zip 15317

Stimulating Company Halliburton
Address 121 Champion Way City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Karin Cox Telephone 303-357-6820
Signature [Signature] Title Permitting Agent Date 4/30/2019

API 47-017-06857 Farm Name Matthew W. Alexander & Linda Marie Muhly Well Number Northrop Unit 2H

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	9/28/2018	15336.7	15440.6	60	Marcellus
2	9/29/2018	15140.176	15305.946	60	Marcellus
3	9/29/2018	14943.652	15109.422	60	Marcellus
4	9/30/2018	14747.128	14912.898	60	Marcellus
5	10/1/2018	14550.604	14716.374	60	Marcellus
6	10/1/2018	14354.08	14519.85	60	Marcellus
7	10/2/2018	14157.556	14323.326	60	Marcellus
8	10/2/2018	13961.032	14126.802	60	Marcellus
9	10/2/2018	13764.508	13930.278	60	Marcellus
10	10/3/2018	13567.984	13733.754	60	Marcellus
11	10/3/2018	13371.46	13537.23	60	Marcellus
12	10/4/2018	13174.936	13340.706	60	Marcellus
13	10/4/2018	12978.412	13144.182	60	Marcellus
14	10/5/2018	12781.888	12947.658	60	Marcellus
15	10/5/2018	12585.364	12751.134	60	Marcellus
16	10/6/2018	12388.84	12554.61	60	Marcellus
17	10/6/2018	12192.316	12358.086	60	Marcellus
18	10/7/2018	11995.792	12161.562	60	Marcellus
19	10/7/2018	11799.268	11965.038	60	Marcellus
20	10/8/2018	11602.744	11768.514	60	Marcellus
21	10/8/2018	11406.22	11571.99	60	Marcellus
22	10/9/2018	11209.696	11375.466	60	Marcellus
23	10/11/2018	11013.172	11178.942	60	Marcellus
24	10/12/2018	10816.648	10982.418	60	Marcellus
25	10/12/2018	10620.124	10785.894	60	Marcellus
26	10/12/2018	10423.6	10589.37	60	Marcellus
27	10/13/2018	10227.076	10392.846	60	Marcellus
28	10/13/2018	10030.552	10196.322	60	Marcellus
29	10/14/2018	9834.028	9999.798	60	Marcellus
30	10/14/2018	9637.504	9803.274	60	Marcellus
31	10/14/2018	9440.98	9606.75	60	Marcellus
32	10/15/2018	9244.456	9410.226	60	Marcellus
33	10/15/2018	9047.932	9213.702	60	Marcellus
34	10/15/2018	8851.408	9017.178	60	Marcellus
35	10/16/2018	8654.884	8820.654	60	Marcellus
36	10/16/2018	8458.36	8624.13	60	Marcellus
37	10/16/2018	8261.836	8427.606	60	Marcellus
38	10/16/2018	8065.312	8231.082	60	Marcellus
39	10/17/2018	7868.788	8034.558	60	Marcellus
40	10/17/2018	7672.264	7838.034	60	Marcellus
41	10/18/2018	7475.74	7641.51	60	Marcellus
42	10/19/2018	7279.216	7444.986	60	Marcellus
43	10/19/2018	7082.692	7248.462	60	Marcellus

API 47-017-06857 Farm Name Matthew W. Alexander & Linda Marie Muhly Well Number Northrop Unit 2H

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	9/28/2018	78.27	7200	5741	3140	280250	6743	N/A
2	9/29/2018	71.84	7599	5919	5102	399680	7658	N/A
3	9/29/2018	67.68	7567	5611	5058	401040	8294	N/A
4	9/30/2018	65.89	7293	5660	4638	401000	7898	N/A
5	10/1/2018	68.4	7953	5638	4441	400420	11411	N/A
6	10/1/2018	78.32	7929	6086	4520	400980	7778	N/A
7	10/2/2018	76.75	7637	5972	4238	400700	8914	N/A
8	10/2/2018	76.09	7846	8236	4703	400560	8046	N/A
9	10/2/2018	75.48	7859	5627	5065	395940	8013	N/A
10	10/3/2018	79	7627	5720	4723	402860	7786	N/A
11	10/3/2018	75.98	7489	5614	4985	399260	7219	N/A
12	10/4/2018	79.38	7655	5701	3586	393680	7061	N/A
13	10/4/2018	75.68	7771	5878	5372	399680	7186	N/A
14	10/5/2018	77.4	7705	5630	5186	399680	7327	N/A
15	10/5/2018	76.2	7612	5941	5092	396140	7135	N/A
16	10/6/2018	79.06	7384	5950	5151	396480	7079	N/A
17	10/6/2018	76.39	7286	5945	3694	398960	7173	N/A
18	10/7/2018	76.57	7263	6012	3759	402760	8467	N/A
19	10/7/2018	78.9	7451	5413	4564	396880	7460	N/A
20	10/8/2018	75.13	7135	5747	4922	398440	9048	N/A
21	10/8/2018	80.08	7059	5768	3707	402500	7124	N/A
22	10/9/2018	66.96	6696	5835	5117	399380	10320	N/A
23	10/11/2018	79.36	7113	5148	4985	408400	7467	N/A
24	10/12/2018	79.02	7065	5538	3874	399860	7242	N/A
25	10/12/2018	78.19	7298	5751	5425	399760	7135	N/A
26	10/12/2018	76.68	7129	5096	4763	399820	7156	N/A
27	10/13/2018	74.36	6998	5084	5226	399360	7519	N/A
28	10/13/2018	79.9	7037	5284	4058	397100	7326	N/A
29	10/14/2018	77.49	6905	5831	3599	400780	8536	N/A
30	10/14/2018	73.18	6941	5238	3838	400820	8450	N/A
31	10/14/2018	70.96	7573	5340	3569	401960	8275	N/A
32	10/15/2018	75.78	6890	5401	3807	403080	7505	N/A
33	10/15/2018	78.56	7416	5794	4899	399260	7339	N/A
34	10/15/2018	75.87	7216	5540	3795	401860	7852	N/A
35	10/16/2018	73.09	6941	5428	4005	405960	7261	N/A
36	10/16/2018	79.25	6995	5208	3854	401500	7473	N/A
37	10/16/2018	75.9	6728	6147	4073	402940	7392	N/A
38	10/16/2018	75.26	6653	7003	5169	400260	7519	N/A
39	10/17/2018	77.09	6946	5204	4135	396320	7489	N/A
40	10/17/2018	78.2	6676	6879	3676	402000	7173	N/A
41	10/18/2018	76	7001	5290	3914	405720	8939	N/A
42	10/19/2018	76	6996	5612	3561	400880	7361	N/A
43	10/19/2018	80.8	6377	5135	3663	402640	7115	N/A
	AVG=	76	7,254	5,735	4,387	17,097,550	334,664	TOTAL

API 47-017-06857 Farm Name Matthew W. Alexander & Linda Marie Muhly Well Number Northrop 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
Shaly Sandstone	0	155	0	155
Sandy Shale	est 155	215	est 155	215
Shaly Sandstone	est 215	255	est 215	255
Sandstone	est 255	395	est 255	395
Shaly Sandstone	est 395	505	est 395	505
Sandstone	est 505	575	est 505	575
Carbonaceous shale	est 575	615	est 575	615
Sandstone	est 615	765	est 615	765
Shaly sandstone tr coal	est 765	1,025	est 765	1,025
Shaly Siltstone	est 1025	1,305	est 1025	1,305
Sandstone	est 1305	1,455	est 1305	1,455
Sandy siltstone	est 1455	1,855	est 1455	1,855
Sandstone	est 1855	2,087	est 1855	2,088
Big Lime	2,087	2,652	2,088	2,658
Fifty Foot Sandstone	2,652	2,866	2,658	2,874
Gordon	2,866	3,076	2,874	3,086
Fifth Sandstone	3,076	3,133	3,086	3,143
Bayard	3,133	3,915	3,143	3,933
Speechley	3,915	4,227	3,933	4,246
Balltown	4,227	4,701	4,246	4,725
Bradford	4,701	5,163	4,725	5,192
Benson	5,163	5,425	5,192	5,455
Alexander	5,425	6,434	5,455	6,480
Sycamore	6,434	6,602	6,480	6,679
Middlesex	6,602	6,734	6,679	6,872
Burkett	6,734	6,764	6,872	6,928
Tully	6,764	6,812	6,928	7,038
Marcellus	6,812	NA	7,038	NA

*Please note Antero determines formation tops based on mud logs that are only run on one well on a multi-well pad. The measured depth (MD) data on subsequent wells may be slightly different due to the well's unique departure.

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/28/2018
Job End Date:	10/19/2018
State:	West Virginia
County:	Doddridge
API Number:	47-017-06857-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Northrop 2H
Latitude:	39.33565556
Longitude:	-80.75872778
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,928
Total Base Water Volume (gal):	14,407,939
Total Base Non Water Volume:	0



Hydraulic Fracturing Fluid Composition:

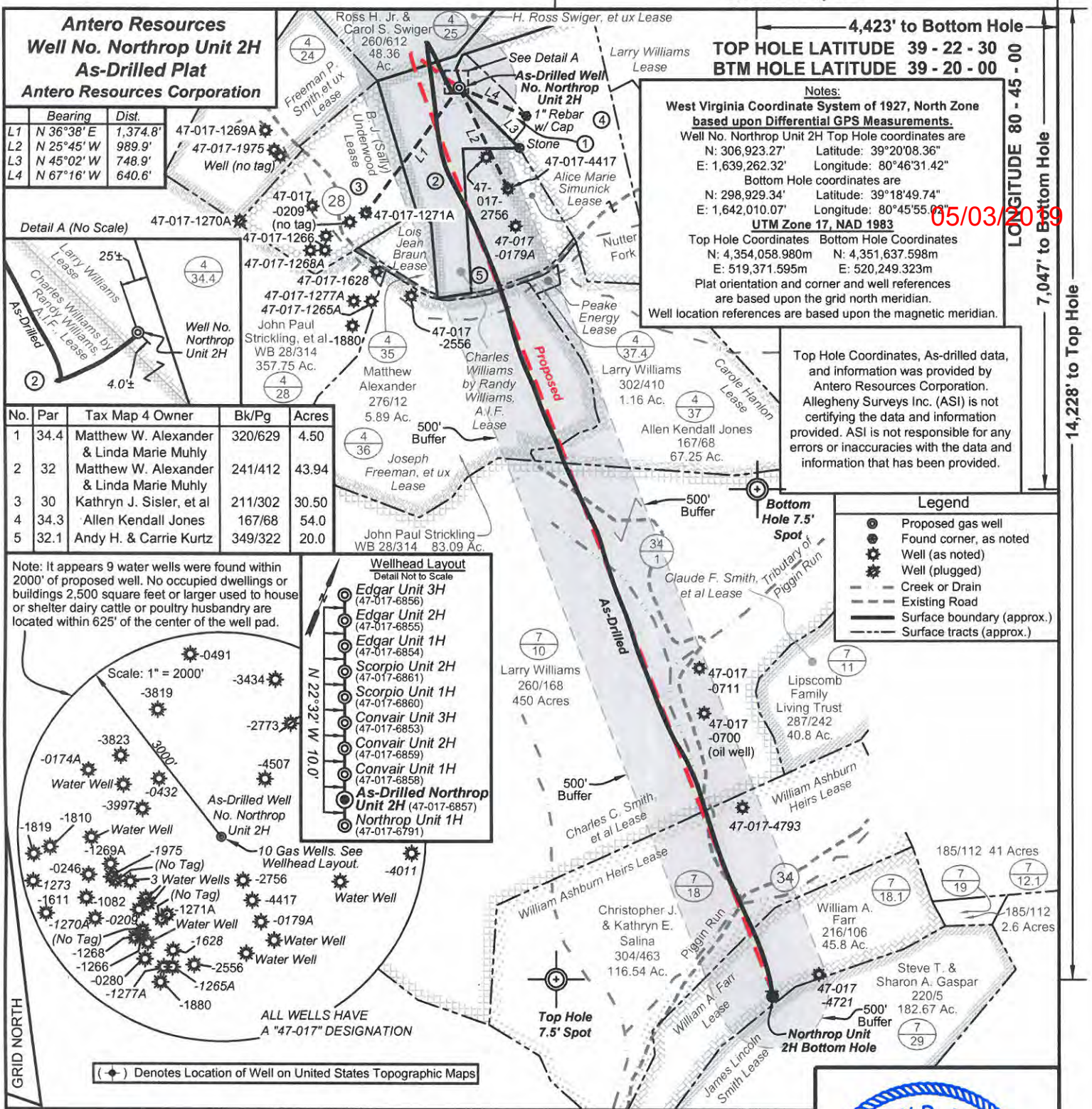
Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Fresh Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	87.28518	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.23159	

SCALECHEK LP-70	Halliburton	Scale Inhibitor								
						Listed Below				
FDP-51296-17	Halliburton	Corrosion Inhibitor								
						Listed Below				
EXCELERATE PS-2	Halliburton	Friction Reducer								
						Listed Below				
WG-36 GELLING AGENT	Halliburton	Gelling Agent								
						Listed Below				
SP BREAKER	Halliburton	Breaker								
						Listed Below				
SAND-PREMIUM WHITE-30/50, BULK	Halliburton	Proppant								
						Listed Below				
MC B-8614	Halliburton	Biocide								
						Listed Below				
HYDROCHLORIC ACID	Halliburton	Solvent								
						Listed Below				

SAND- PREMIUM WHITE-40/70, BULK	Halliburton	Proppant								
				Listed Below						
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant								
				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	12.43449				
			Hydrochloric acid	7647-01-0	15.00000	0.02678				
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01799				
			Acrylamide acrylate polymer	Proprietary	30.00000	0.01799				Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Inorganic salt	Proprietary	30.00000	0.01799				
			Guar gum	9000-30-0	100.00000	0.01681				
			Ethylene glycol	107-21-1	60.00000	0.00874				
			Glutaraldehyde	111-30-8	30.00000	0.00301				
			Telmer	Proprietary	10.00000	0.00146				
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00050				
			Sodium persulfate	7775-27-1	100.00000	0.00028				
			Sodium polyacrylate	9003-04-7	1.00000	0.00015				
			Methanol	67-56-1	100.00000	0.00014				
			Ethanol	64-17-5	1.00000	0.00010				
			Modified thiourea polymer	Proprietary	30.00000	0.00004				

			Phosphoric acid	7664-38-2	0.10000	0.00001
			Propargyl alcohol	107-19-7	5.00000	0.00001
			Ethoxylated alcohols	Proprietary	5.00000	0.00001
			Acrylic acid	79-10-7	0.01000	0.00000
			Sodium sulfate	7757-82-6	0.10000	0.00000

* 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)



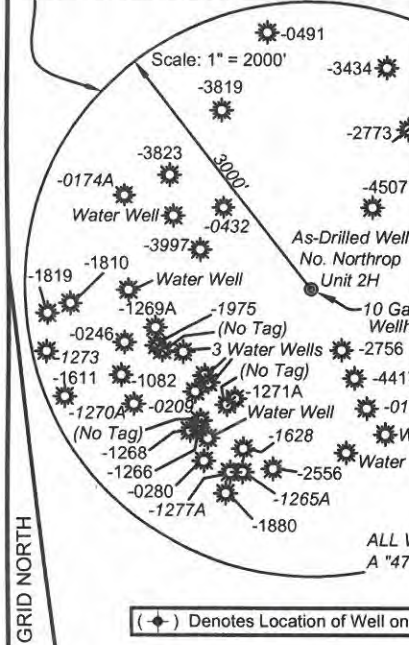
7,382' to Top Hole
4,423' to Bottom Hole
TOP HOLE LATITUDE 39 - 22 - 30
BTM HOLE LATITUDE 39 - 20 - 00

Notes:
West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
Well No. Northrop Unit 2H Top Hole coordinates are
N: 306,923.27' Latitude: 39°20'08.36"
E: 1,639,262.32' Longitude: 80°46'31.42"
Bottom Hole coordinates are
N: 298,929.34' Latitude: 39°18'49.74"
E: 1,642,010.07' Longitude: 80°45'55.03"
UTM Zone 17, NAD 1983
Top Hole Coordinates Bottom Hole Coordinates
N: 4,354,058.980m N: 4,351,637.598m
E: 519,371.595m E: 520,249.323m
Plat orientation and corner and well references are based upon the grid north meridian.
Well location references are based upon the magnetic meridian.

Top Hole Coordinates, As-drilled data, and information was provided by Antero Resources Corporation. Allegheny Surveys Inc. (ASI) is not certifying the data and information provided. ASI is not responsible for any errors or inaccuracies with the data and information that has been provided.

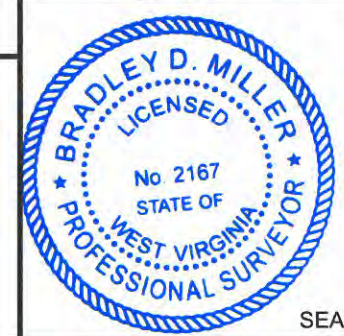
- Legend**
- Proposed gas well
 - ⊙ Found corner, as noted
 - ⊙ Well (as noted)
 - ⊙ Well (plugged)
 - - - Creek or Drain
 - - - Existing Road
 - Surface boundary (approx.)
 - - - Surface tracts (approx.)

Note: It appears 9 water wells were found within 2000' of proposed well. No occupied dwellings or buildings 2,500 square feet or larger used to house or shelter dairy cattle or poultry husbandry are located within 625' of the center of the well pad.



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 prescribed by the Department of Environmental Protection.

Bradley D. Miller
Bradley D. Miller, P.S. 2167



FILE NO: 48-30-WU-14
DRAWING NO: Northrop 2H Well Plat
SCALE: 1" = 1200'
MINIMUM DEGREE OF ACCURACY: Submeter
PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS DIVISION

DATE: October 8 2018
Operator's Well No. Northrop Unit 2H
API WELL NO
47 - 017 - 06857
STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
LOCATION: ELEVATION: As-Drilled Grade - 1181' WATERSHED: Headwaters Middle Island Creek QUADRANGLE: West Union
DISTRICT: West Union COUNTY: Doddridge
SURFACE OWNER: Matthew W. Alexander & Linda Marie Muhly William A. Farr; Carole Hanlon; H. Ross Swiger, et ux; Charles C. Smith, et al; William Ashburn Heirs; ACREAGE: 43.94 45.0; 71.5
ROYALTY OWNER: Larry Williams; Charles Williams by Randy Williams, A.I.F.; Joseph Freeman, et ux LEASE NO: ACREAGE: 428.51; 67; 600
PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) As-Drilled
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 15,565' MD 6,909' TVD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
Denver, CO 80202 Charleston, WV 25313