

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

API 47 - 017 - 06858 County Doddridge District West Union
 Quad West Union 7.5' Pad Name Alexander Pad Field/Pool Name ----
 Farm name Antero Resources Corporation Well Number Convair 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 4354062m Easting 519370m
 Landing Point of Curve Northing 4354008m Easting 519476m
 Bottom Hole Northing 4351726m Easting 520426m

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 5/1/2018
 Date completion activities began 10/20/2018 Date completion activities ceased 1/1/2019
 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 - 06858 Farm name Antero Resources Corporation Well number Convair 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	24"	20"	105'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	583'	New	54#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2575.2'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	15557'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	7053.7'		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	653	0'	8 Hrs.
Coal							
Intermediate 1	Class A	870 sx	15.6	1.21	1053	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	775 sx (Lead) 1295 sx (Tail)	14(Lead), 15.2 (Tail)	1.45 (Lead), 1.94(Tail)	3636	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15557' MD, 6921' TVD (BHL), 6943' (Deepest Point Drilled) Loggers TD (ft) 15557' MD

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

Plug back procedure N/A

Kick off depth (ft) 6372'

** 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

WR-35
Rev. 8/23/13

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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>6826' (TOP)</u>	<u>TVD</u>	<u>7128' (TOP)</u> <u>MD</u>
_____	_____	_____	_____
_____	_____	_____	_____

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 11309 mcfpd Oil 119 bpd NGL --- bpd Water 457 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 47-017-06858 Farm Name <u>Matthew W. Alexander & Linda Marie Muhly</u> Well Number <u>Convair Unit 1H</u>					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	10/20/2018	15354.2	15453.5	60	Marcellus
2	10/20/2018	15154.67	15322.945	60	Marcellus
3	10/21/2018	14955.14	15123.415	60	Marcellus
4	10/21/2018	14755.61	14923.885	60	Marcellus
5	10/21/2018	14556.08	14724.355	60	Marcellus
6	10/22/2018	14356.55	14524.825	60	Marcellus
7	10/22/2018	14157.02	14325.295	60	Marcellus
8	10/23/2018	13957.49	14125.765	60	Marcellus
9	10/23/2018	13757.96	13926.235	60	Marcellus
10	10/23/2018	13558.43	13726.705	60	Marcellus
11	10/24/2018	13358.9	13527.175	60	Marcellus
12	10/24/2018	13159.37	13327.645	60	Marcellus
13	10/25/2018	12959.84	13128.115	60	Marcellus
14	10/25/2018	12760.31	12928.585	60	Marcellus
15	10/26/2018	12560.78	12729.055	60	Marcellus
16	10/26/2018	12361.25	12529.525	60	Marcellus
17	10/26/2018	12161.72	12329.995	60	Marcellus
18	10/27/2018	11962.19	12130.465	60	Marcellus
19	10/27/2018	11762.66	11930.935	60	Marcellus
20	10/28/2018	11563.13	11731.405	60	Marcellus
21	10/28/2018	11363.6	11531.875	60	Marcellus
22	10/29/2018	11164.07	11332.345	60	Marcellus
23	10/29/2018	10964.54	11132.815	60	Marcellus
24	10/30/2018	10765.01	10933.285	60	Marcellus
25	10/30/2018	10565.48	10733.755	60	Marcellus
26	10/30/2018	10365.95	10534.225	60	Marcellus
27	10/31/2018	10166.42	10334.695	60	Marcellus
28	10/31/2018	9966.89	10135.165	60	Marcellus
29	11/1/2018	9767.36	9935.635	60	Marcellus
30	11/1/2018	9567.83	9736.105	60	Marcellus
31	11/2/2018	9368.3	9536.575	60	Marcellus
32	11/2/2018	9168.77	9337.045	60	Marcellus
33	11/2/2018	8969.24	9137.515	60	Marcellus
34	11/3/2018	8769.71	8937.985	60	Marcellus
35	11/3/2018	8570.18	8738.455	60	Marcellus
36	11/4/2018	8370.65	8538.925	60	Marcellus
37	11/4/2018	8171.12	8339.395	60	Marcellus
38	11/4/2018	7971.59	8139.865	60	Marcellus
39	11/5/2018	7772.06	7940.335	60	Marcellus
40	11/5/2018	7572.53	7740.805	60	Marcellus
41	11/5/2018	7373	7541.275	60	Marcellus
42	11/6/2018	7173.47	7341.745	60	Marcellus

API 47-017-06858 Farm Name Matthew W. Alexander & Linda Marie Muhly Well Number Convair Unit 1H

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	10/20/2018	71.45	7374	6728	3759	280910	6482.5	N/A
2	10/20/2018	72.8	7767	6016	4324	398180	7593.9	N/A
3	10/21/2018	71.45	7801	5771	5233	404180	7472.2	N/A
4	10/21/2018	77	8148	5604	5130	401440	7516.6	N/A
5	10/21/2018	78.94	7855	5710	5452	400980	7318.4	N/A
6	10/22/2018	78.63	7920	5969	5150	399460	7128.4	N/A
7	10/22/2018	78.97	7988	6222	4622	400380	7312.7	N/A
8	10/23/2018	75.26	7563	5926	3867	400500	7386.7	N/A
9	10/23/2018	76.43	7962	6268	3866	407620	7306.2	N/A
10	10/23/2018	76.6	7948	5988	5180	397340	8364.8	N/A
11	10/24/2018	76.49	7483	4695	5076	404220	7283.4	N/A
12	10/24/2018	76.4	7525	4672	5285	398960	7371.2	N/A
13	10/25/2018	53.4	8319	5916	5032	265396	8651	N/A
14	10/25/2018	70.7	7244	6098	5108	412380	7317.9	N/A
15	10/26/2018	76.7	7469	5545	5031	410280	7383.5	N/A
16	10/26/2018	78.62	7471	6241	4855	408540	7357.8	N/A
17	10/26/2018	79.6	7692	5881	3762	406920	7235.5	N/A
18	10/27/2018	80.03	7620	4931	4969	409380	7191.5	N/A
19	10/27/2018	78.2	7434	5535	4011	407280	7364.2	N/A
20	10/28/2018	79	7837	5799	4106	408620	7330.5	N/A
21	10/28/2018	54.51	8104	5760	3973	409120	11617.8	N/A
22	10/29/2018	75.2	7873	5915	3787	407640	8238.7	N/A
23	10/29/2018	69.73	7092	5697	4974	413800	11640.4	N/A
24	10/30/2018	76.8	7509	5602	5077	410000	8773.7	N/A
25	10/30/2018	79.63	7363	5832	4921	403980	7173.3	N/A
26	10/30/2018	78.5	7122	5668	3856	409060	7284.3	N/A
27	10/31/2018	80.3	7538	5495	4970	403620	7015.8	N/A
28	10/31/2018	76.1	7461	5964	5084	406640	7203.9	N/A
29	11/1/2018	66	7875	5973	3983	406580	9184.5	N/A
30	11/1/2018	75.9	7145	6046	4115	401900	7115.5	N/A
31	11/2/2018	77.9	7301	6141	3941	404280	7221.5	N/A
32	11/2/2018	75.1	7057	6008	3759	404260	7188.1	N/A
33	11/2/2018	78.9	7484	5720	4101	403700	7175.7	N/A
34	11/3/2018	75.82	6710	5947	4024	399600	7204.1	N/A
35	11/3/2018	74.2	7641	5685	3888	403240	8443.4	N/A
36	11/4/2018	78	7464	5392	4616	395900	7155	N/A
37	11/4/2018	78.03	6538	5610	3767	395500	7006.3	N/A
38	11/4/2018	78.5	6690	5107	3879	408880	7257.9	N/A
39	11/5/2018	74.4	7576	5956	4274	407240	9747	N/A
40	11/5/2018	76.28	6800	6180	4133	409000	7208.5	N/A
41	11/5/2018	78.8	6805	5808	4087	404660	7111.3	N/A
42	11/6/2018	80.2	6823	5635	3639	408060	7204.1	N/A
	AVG=	75	7,486	5,778	4,444	16,739,626	323,540	TOTAL

API 47-017-06858 Farm Name Matthew W. Alexander & Linda Marie Muhly Well Number Convair Unit 1H

EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD) From Surface	BOTTOM DEPTH (TVD) From Surface	TOP DEPTH (MD) From Surface	BOTTOM DEPTH (MD) 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	2,655	2,088	2,655
Fifty Foot Sandstone	2,655	2,871	2,655	2,871
Gordon	2,871	3,077	2,871	3,077
Fifth Sandstone	3,077	3,131	3,077	3,131
Bayard	3,131	3,918	3,131	3,925
Speechley	3,918	4,221	3,925	4,232
Balltown	4,221	4,705	4,232	4,722
Bradford	4,705	5,166	4,722	5,190
Benson	5,166	5,430	5,190	5,459
Alexander	5,430	6,436	5,459	6,483
Sycamore	6,436	6,610	6,483	6,691
Middlesex	6,610	6,746	6,691	6,927
Burkett	6,746	6,776	6,927	6,993
Tully	6,776	6,826	6,993	7,128
Marcellus	6,826	NA	7,128	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:	10/20/2018
Job End Date:	11/6/2018
State:	West Virginia
County:	Doddridge
API Number:	47-017-06858-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Convair 1H
Latitude:	39.33568100
Longitude:	-80.77540800
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,943
Total Base Water Volume (gal):	13,949,079
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	87.11965	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.22939	

Brine Water	Operator	Base Fluid							
			Water		7732-18-5	100.00000	0.04631	Density = 9.800	
SAND-COMMON WHITE-100 MESH	Halliburton	Proppant							
SP BREAKER	Halliburton	Breaker			Listed Below				
					Listed Below				
HYDROCHLORI C ACID	Halliburton	Solvent							
					Listed Below				
SCALECHEK LP-70	Halliburton	Scale Inhibitor							
					Listed Below				
EXCELERATE PS-2	Halliburton	Friction Reducer							
					Listed Below				
FDP-S1296-17	Halliburton	Corrosion Inhibitor							
					Listed Below				
WG-36 GELLING AGENT	Halliburton	Gelling Agent							
					Listed Below				
SAND- PREMIUM WHITE-40/70	Halliburton	Proppant							

MC B-8614	Halliburton	Biocide			Listed Below			
					Listed Below			
SAND- PREMIUM WHITE-30/50	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	12.55651	
			Hydrochloric acid	7647-01-0		15.00000	0.02704	
			Guar gum	9000-30-0		100.00000	0.01784	
			Acrylamide acrylate polymer	Proprietary		30.00000	0.01686	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Inorganic salt	Proprietary		30.00000	0.01686	
			Hydrotreated light petroleum distillate	64742-47-8		30.00000	0.01686	
			Ethylene glycol	107-21-1		60.00000	0.00851	
			Glutaraldehyde	111-30-8		30.00000	0.00248	
			Telmer	Proprietary		10.00000	0.00142	
			Sodium persulfate	7775-27-1		100.00000	0.00060	
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1		5.00000	0.00041	
			Methanol	67-56-1		100.00000	0.00014	
			Sodium polyacrylate	9003-04-7		1.00000	0.00014	
			Ethanol	64-17-5		1.00000	0.00008	
			Modified thiourea polymer	Proprietary		30.00000	0.00004	
			Phosphoric acid	7664-38-2		0.10000	0.00001	

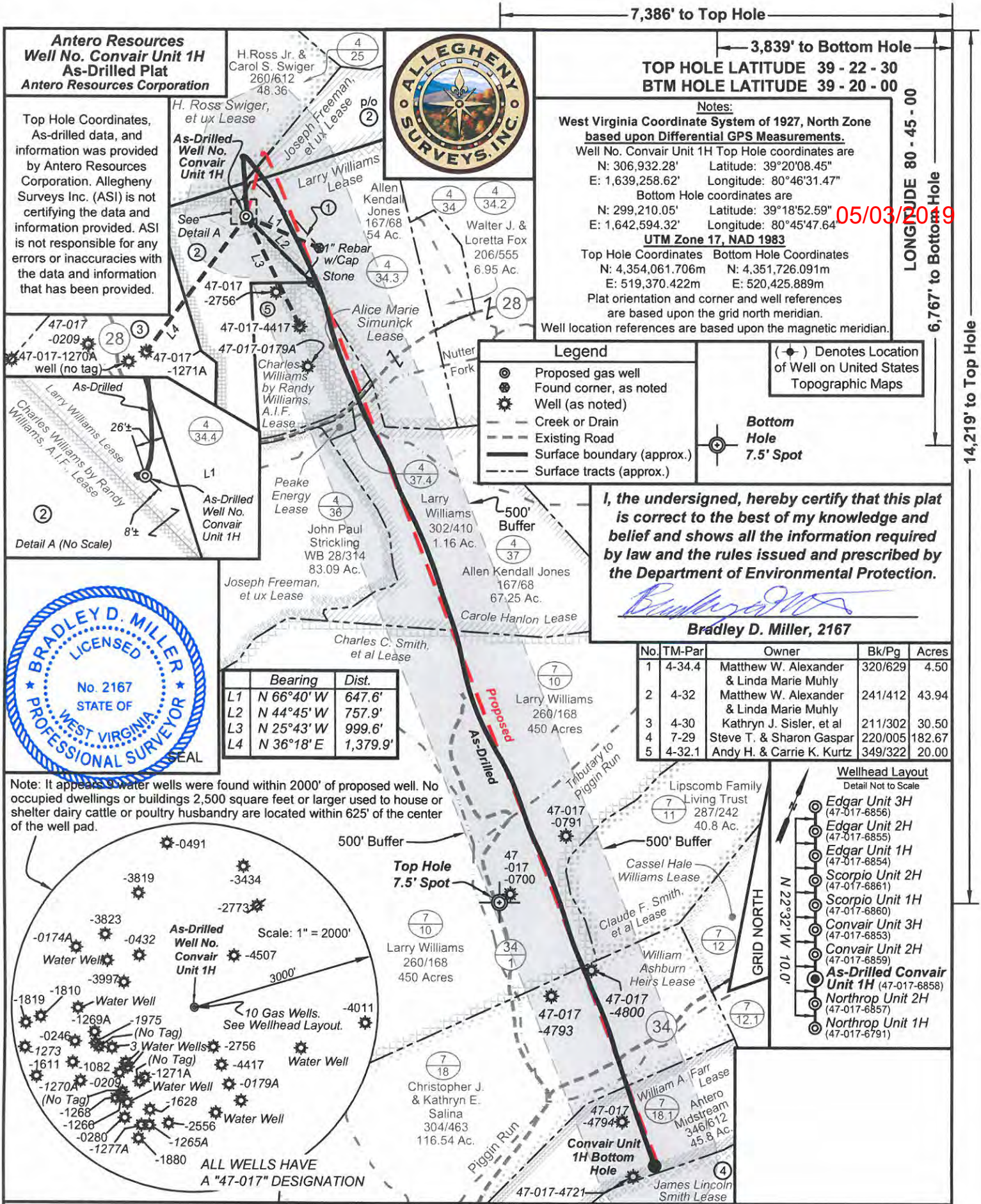
			Propargyl alcohol	107-19-7	5.00000	0.00001
			Ethoxylated alcohols	Proprietary	5.00000	0.00001
			Acrylic acid	79-10-7	0.01000	0.00000
			Sodium sulfate	7757-82-6	0.10000	0.00000

* 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(l) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)



FILE NO: 47-30-WU-14
DRAWING NO: Convair 1H Well Plat
SCALE: 1" = 1000'
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 20 18
Operator's Well No. Convair Unit 1H
API WELL NO
47 - 017 - 06858
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 H. Ross Swiger, et ux; Joseph Freeman, et ux ACREAGE: 43.94 120; 450; 45.8
ROYALTY OWNER: Larry Williams; Carole Hanlon; Charles C. Smith, et al; William A. Farr LEASE NO: ACREAGE: 60; 428.51; 71.5

PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) As-Drilled 6,921' TVD
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 15,557' MD

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