

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

API 47 - 017 - 06819 County Doddridge District West Union
 Quad West Union 7.5' Pad Name Middle Pad Field/Pool Name ----
 Farm name Antero Resources Corporation Well Number Chalk 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 4352583.197m Easting 516704.756m
 Landing Point of Curve Northing 4352375.49m Easting 517334.81m
 Bottom Hole Northing 4350344.37m Easting 518201.031m

Elevation (ft) 843' 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 6/19/2017 Date drilling commenced 9/29/2017 Date drilling ceased 2/18/2018
 Date completion activities began 6/5/2018 Date completion activities ceased 9/25/2018
 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 - 06819 Farm name Antero Resources Corporation Well number Chalk 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"	112'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	551'	New	54#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2666'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	15388'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6778'		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	480 sx	15.6	1.21	581	0'	8 Hrs.
Coal							
Intermediate 1	Class A	890 sx	15.6	1.21	1077	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	688 sx (Lead) 1370 sx (Tail)	13.5(Lead), 15.2 (Tail)	1.53 (Lead), 1.83 (Tail)	3560	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15388' MD, 6543' TVD (BHL), 6562' (Deepest Point Drilled) Loggers TD (ft) 15388' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 6019'

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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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
Marcellus	6380' (TOP)	TVD	6826' (TOP) MD

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 13702.4 mcfpd Oil 178.56 bpd NGL --- bpd Water 665.43 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 Frontier Drilling LLC
Address 562 Spring Run Road City Pennsboro State WV Zip 26415

Logging Company Nine Energy Service
Address 125 Museum Rd City Washington State PA Zip 15301

Cementing Company C&J Energy Services
Address 1650 Hackers Creek City Lane Jew State WV Zip 26378

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 _____ Title Permitting Agent Date _____

API 47-017-06819 Farm Name Antero Resources Corp Well Number Chalk Unit 2H					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	6/5/2018	15195	15287.9	60	Marcellus
2	6/6/2018	14996.982	15163.997	60	Marcellus
3	6/6/2018	14798.964	14965.979	60	Marcellus
4	6/7/2018	14600.946	14767.961	60	Marcellus
5	6/7/2018	14402.928	14569.943	60	Marcellus
6	6/8/2018	14204.91	14371.925	60	Marcellus
7	6/8/2018	14006.892	14173.907	60	Marcellus
8	6/9/2018	13808.874	13975.889	60	Marcellus
9	6/9/2018	13610.856	13777.871	60	Marcellus
10	6/9/2018	13412.838	13579.853	60	Marcellus
11	6/10/2018	13214.82	13381.835	60	Marcellus
12	6/10/2018	13016.802	13183.817	60	Marcellus
13	6/12/2018	12818.784	12985.799	60	Marcellus
14	6/12/2018	12620.766	12787.781	60	Marcellus
15	6/12/2018	12422.748	12589.763	60	Marcellus
16	6/13/2018	12224.73	12391.745	60	Marcellus
17	6/13/2018	12026.712	12193.727	60	Marcellus
18	6/13/2018	11828.694	11995.709	60	Marcellus
19	6/14/2018	11630.676	11797.691	60	Marcellus
20	6/14/2018	11432.658	11599.673	60	Marcellus
21	6/14/2018	11234.64	11401.655	60	Marcellus
22	6/15/2018	11036.622	11203.637	60	Marcellus
23	6/15/2018	10838.604	11005.619	60	Marcellus
24	6/15/2018	10640.586	10807.601	60	Marcellus
25	6/16/2018	10442.568	10609.583	60	Marcellus
26	6/16/2018	10244.55	10411.565	60	Marcellus
27	6/16/2018	10046.532	10213.547	60	Marcellus
28	6/17/2018	9848.514	10015.529	60	Marcellus
29	6/17/2018	9650.496	9817.511	60	Marcellus
30	6/17/2018	9452.478	9619.493	60	Marcellus
31	6/18/2018	9254.46	9421.475	60	Marcellus
32	6/18/2018	9056.442	9223.457	60	Marcellus
33	6/20/2018	8858.424	9025.439	60	Marcellus
34	6/21/2018	8660.406	8827.421	60	Marcellus
35	6/22/2018	8462.388	8629.403	60	Marcellus
36	6/22/2018	8264.37	8431.385	60	Marcellus
37	6/23/2018	8066.352	8233.367	60	Marcellus
38	6/23/2018	7868.334	8035.349	60	Marcellus
39	6/23/2018	7670.316	7837.331	60	Marcellus
40	6/24/2018	7472.298	7639.313	60	Marcellus
41	6/24/2018	7274.28	7441.295	60	Marcellus
42	6/25/2018	7076.262	7243.277	60	Marcellus
43	6/25/2018	6878.244	7045.259	60	Marcellus

API 47-017-06819 Farm Name Antero Resources Corp Well Number Chalk 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	6/5/2018	73.88	7577	5635	4654	258180	5470	N/A
2	6/6/2018	74.5	7850	5349	4756	403660	7725	N/A
3	6/6/2018	74.39	7959	5404	4500	402080	7749	N/A
4	6/7/2018	73.7	7975	5780	5106	392400	7702	N/A
5	6/7/2018	77.3	8048	5438	5329	397120	7904	N/A
6	6/8/2018	73.8	7916	5423	5559	402860	7952	N/A
7	6/8/2018	79.2	7918	5270	4874	396280	8372	N/A
8	6/9/2018	75.76	7954	8198	4941	397300	8190	N/A
9	6/9/2018	72.1	8122	5335	4090	400040	10646	N/A
10	6/9/2018	75.7	8020	5354	3892	403680	9989	N/A
11	6/10/2018	74.77	8019	5459	4232	402500	10367	N/A
12	6/10/2018	78.4	7877	5115	4992	396400	8374	N/A
13	6/12/2018	72.55	7748	5709	4809	399920	8560	N/A
14	6/12/2018	73.9	7698	5927	4367	402580	8892	N/A
15	6/12/2018	71.98	8174	5547	4256	386380	8911	N/A
16	6/13/2018	76.58	7946	5611	4142	411260	8854	N/A
17	6/13/2018	67.9	8002	5221	3792	342000	10286	N/A
18	6/13/2018	70.41	7948	5395	4415	423820	10968	N/A
19	6/14/2018	73.57	7541	5936	4880	420670	9958	N/A
20	6/14/2018	73.5	7661	6306	3772	412150	8438	N/A
21	6/14/2018	53.62	8182	5709	4457	397820	10633	N/A
22	6/15/2018	71.7	8012	5570	4471	394220	9881	N/A
23	6/15/2018	74.3	7928	5985	4368	406340	9587	N/A
24	6/15/2018	68.12	7974	6299	4250	397380	10088	N/A
25	6/16/2018	57.41	8295	5725	4275	391820	12839	N/A
26	6/16/2018	74.04	7489	5781	4510	403940	8312	N/A
27	6/16/2018	72.01	8018	5983	4000	397740	11251	N/A
28	6/17/2018	77.24	7988	5864	4350	402560	8079	N/A
29	6/17/2018	74.77	7359	5678	4882	402900	8130	N/A
30	6/17/2018	73.39	7022	5847	4015	394440	8079	N/A
31	6/18/2018	74.79	7149	5763	4725	398900	8038	N/A
32	6/18/2018	72.86	7352	5774	4479	404840	8004	N/A
33	6/20/2018	68.45	7306	5985	3935	402340	8173	N/A
34	6/21/2018	68.6	7618	6211	4844	404820	10259	N/A
35	6/22/2018	73.58	7083	5729	5153	398520	7610	N/A
36	6/22/2018	71.29	7008	5653	5111	399220	8075	N/A
37	6/23/2018	74.86	7121	5965	4045	404200	8085	N/A
38	6/23/2018	77.35	7388	5991	4037	407160	8193	N/A
39	6/23/2018	71.41	7119	5649	4892	405120	7872	N/A
40	6/24/2018	71.77	6880	5876	4209	410260	8882	N/A
41	6/24/2018	75.14	6906	5859	4865	401600	8472	N/A
42	6/25/2018	73.9	6998	5719	3708	406460	8480	N/A
43	6/25/2018	72.51	7797	6154	3912	405720	8569	N/A
	AVG=	73	7,673	5,772	4,485	17,089,600	380,898	TOTAL

API 47-017-06819 Farm Name Antero Resources Corp Well Number Chalk Unit 2H				
EXHIBIT 3				
LITHOLOGY/ FORMATION	TOP DEPTH (TVD) From Surface	BOTTOM DEPTH (TVD) From Surface	TOP DEPTH (MD) From Surface	BOTTOM DEPTH (MD) From Surface
Sandstone	0	177	0	177
Sandstone tr coal	est. 177	217	est. 177	217
Sandy shale	est. 217	232	est. 217	232
Calcareous Shale	est. 232	319	est. 232	319
Sandstone	est. 319	373	est. 319	373
Calcareous Shale	est. 373	1,065	est. 373	1,065
Silty Sandstone	est. 1065	1,137	est. 1065	1,137
Silty shale	est. 1137	1,287	est. 1137	1,287
Sandy Shale	est. 1287	1,357	est. 1287	1,357
Shale	est. 1357	1,567	est. 1357	1,591
Big Lime	1,567	2,187	1,591	2,243
Fifty Foot Sandstone	2,187	2,442	2,243	2,507
Gordon	2,442	2,665	2,507	2,739
Fifth Sandstone	2,665	2,729	2,739	2,806
Bayard	2,729	3,536	2,806	3,652
Speechley	3,536	3,822	3,652	3,948
Balltown	3,822	4,323	3,948	4,470
Bradford	4,323	4,749	4,470	4,917
Benson	4,749	5,009	4,917	5,188
Alexander	5,009	5,984	5,188	6,217
Sycamore	5,984	6,173	6,217	6,441
Middlesex	6,173	6,306	6,441	6,654
Burkett	6,306	6,335	6,654	6,714
Tully	6,335	6,380	6,714	6,826
Marcellus	6,380	NA	6,826	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:	6/5/2018
Job End Date:	6/28/2018
State:	West Virginia
County:	Doddridge
API Number:	47-017-06819-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Chalk 2H
Latitude:	39.32232000
Longitude:	-80.80458100
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,561
Total Base Water Volume (gal):	16,379,066
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	88.57457	Density = 8.340
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.28769	

SP BREAKER	Halliburton	Breaker							
					Listed Below				
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor							
					Listed Below				
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant							
					Listed Below				
MC B-8614	Halliburton	Biocide							
					Listed Below				
HYDROCHLORIC ACID	Halliburton	Solvent							
					Listed Below				
WG-36 GELLING AGENT	Halliburton	Gelling Agent							
					Listed Below				
EXCELERATE PS-2	Halliburton	Friction Reducer							
					Listed Below				
SCALECHECK LP-70	Halliburton	Scale Inhibitor							
					Listed Below				

SAND- PREMIUM WHITE-40/70, BULK	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	11.08191				
		Hydrochloric acid	7647-01-0	15.00000	0.03582				
		Guar gum	9000-30-0	100.00000	0.02601				
		Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01640				
		Acrylamide acrylate polymer	Proprietary	30.00000	0.01640				Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
		Inorganic salt	Proprietary	30.00000	0.01640				
		Ethylene glycol	107-21-1	60.00000	0.00856				
		Glutaraldehyde	111-30-8	30.00000	0.00273				
		Telmer	Proprietary	10.00000	0.00143				
		Sodium persulfate	7775-27-1	100.00000	0.00052				
		Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00045				
		Sodium polyacrylate	9003-04-7	1.00000	0.00014				
		Methanol	67-56-1	60.00000	0.00012				
		Ethanol	64-17-5	1.00000	0.00009				
		Modified thiourea polymer	Proprietary	30.00000	0.00005				
		Fatty acids, tall oil	Proprietary	30.00000	0.00005				
		Ethoxylated alcohols	Proprietary	30.00000	0.00005				
		Olefins	Proprietary	5.00000	0.00002				
		Propargyl alcohol	107-19-7	10.00000	0.00002				
		Phosphoric acid	7664-38-2	0.10000	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)

11,215' to Bottom Hole

4,218' to Top Hole
LATITUDE 39 - 20 - 00

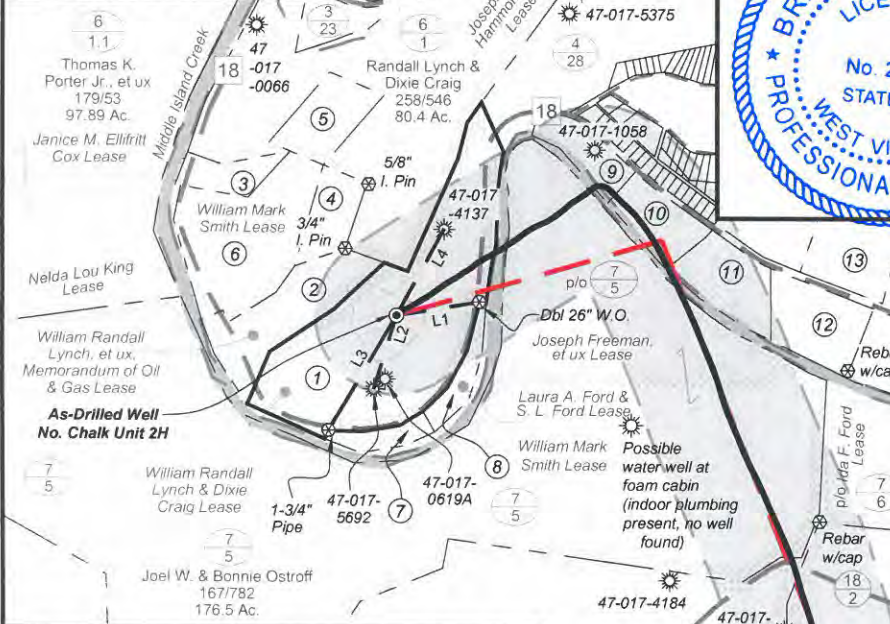
02/08/2019

TOP LONGITUDE 80 - 47 - 30
BTM LONGITUDE 80 - 45 - 00

3,917' to Top Hole

11,179' to Bottom Hole

**Antero Resources
Well No. Chalk Unit 2H
As-Drilled Plat**
Antero Resources Corporation



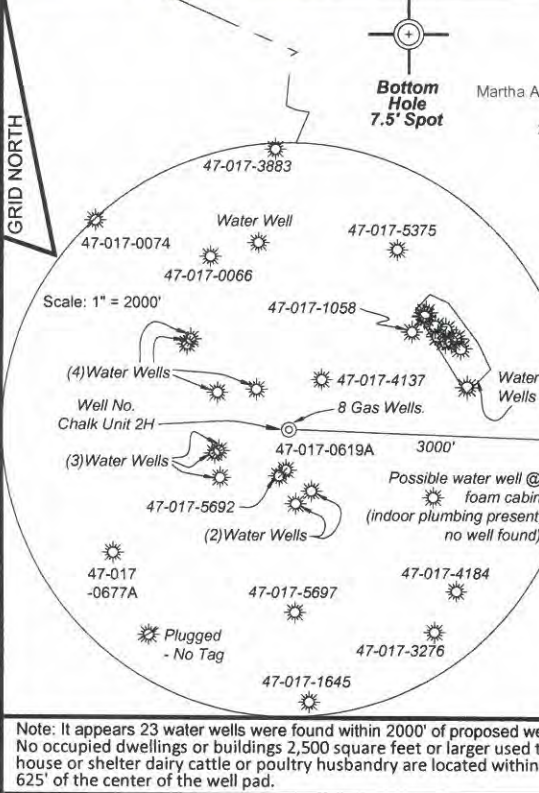
TM/Par	Bk / Pg	Acres	Owner(s)	
1	6/2	214 / 279	32.19	William Randall Lynch & Dixie Janet Craig
2	6/2.5	253 / 222	8.66	
3	6/2.8	305 / 419	2.68	
4	6/2.6	266 / 36	3.52	Dominion Field Services, Inc.
5	6/1.3	305 / 416	4.68	
6	6/2.4	163 / 44	14.98	Equitrans, L.P.
7	6/2.3	197 / 659	4.15	Carol & Alfreda Painter
8	6/2.7	294 / 473	2.16	Randy K. Smith
9	6/7	AP 35 / 212	3.46	Debra L. Stout
10	7/4.2	293 / 340	4.19	Joseph D./Brittany C. McConnell
11	7/4.1	301 / 466	5.49	Robert P. Holden & Sherri M. Bailey
12	7/4	301 / 464	6.14	
13	6/3.1	237 / 371	8.78	Mason Memorial Park
14	7/23	129 / 38	99.52	Nelson Bruffy, et ux

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

Notes:
West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
Well No. Chalk Unit 2H Top Hole coordinates are N: 302,226.70' Longitude: 39°19'20.69" E: 1,630,430.19' Longitude: 80°48'22.95"
Bottom Hole coordinates are N: 294,797.89' Longitude: 39°18'07.92" E: 1,635,217.72' Longitude: 80°47'20.68"
UTM Zone 17, NAD 1983
Top Hole Coordinates Bottom Hole Coordinates
N: 4,352,583.197m N: 4,350,344.370m
E: 516,704.756m E: 518,201.031m
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.



Note: It appears 23 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.

(⊕) Denotes Location of Well on United States Topographic Maps

Wellhead Layout
Detail Not to Scale



Legend

- ⊕ Proposed gas well
- ⊙ Found corner, as noted
- ☀ Existing Well, as noted
- Creek or Drain
- Existing Road
- Surface boundary (approx.)
- Interior surface tracts (approx.)

Bearing	Dist.
L1	S 80°39' W 525.6'
L2	N 16°57' E 483.5'
L3	N 30°15' E 837.1'
L4	S 28°55' W 618.2'



FILE NO: 237-30-WU-14
DRAWING NO: Chalk 2H As-Drilled Well Plat
SCALE: 1" = 1200'
MINIMUM DEGREE OF ACCURACY: Submeter
PROVEN SOURCE OF ELEVATION: CORS, Marietta, OH

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

DATE: January 16 2019
Operator's Well No. Chalk Unit 2H
API WELL NO
47 - 017 - 06819
STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF GAS) PRODUCTION: STORAGE DEEP SHALLOW

LOCATION: ELEVATION: As-Built Grade - 843' WATERSHED: Headwaters Middle Island Creek QUADRANGLE: West Union
DISTRICT: West Union COUNTY: Doddridge 32.15
SURFACE OWNER: William Randall Lynch & Dixie Craig Clarence Mutschelknaus; WV Division of Natural Resources; Russell Coleman, et al; Nelson Bruffy; ACREAGE: 32.19 600; 180; 56.07
ROYALTY OWNER: William Randall Lynch & Dixie Craig; Joseph Freeman, et ux; Ida F. Ford (2) LEASE NO: ACREAGE: 50; 100; 102.85
PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) As-Drilled 6,543' TVD
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 15,388' 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