

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

API 47 - 017 - 06853 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 3H  
 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 7354067m Easting 519368m  
 Landing Point of Curve Northing m Easting m  
 Bottom Hole Northing 4351860m Easting 520820m

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 9/15/2017 Date drilling commenced 1/18/2018 Date drilling ceased 5/14/2018  
 Date completion activities began 10/22/2018 Date completion activities ceased 12/23/2018  
 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 - 06853 Farm name Antero Resources Corporation Well number Convair Unit 3H

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"	580.4'	New	54#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2574.4'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	15822'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	7221.4'		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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	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	880 sx	15.6	1.21	1065	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	805 sx (Lead) 1305 sx (Tail)	14(Lead), 15.2 (Tail)	1.45 (Lead), 1.94(Tail)	3699	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15822' MD, 6941' TVD (BHL), 6958' (Deepest Point Drilled) Loggers TD (ft) 15822' MD

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

Plug back procedure N/A

Kick off depth (ft) 6487'

\*\* 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

API 47- 017 - 06853 Farm name Antero Resources Corporation Well number Convair Unit 3H

PRODUCING FORMATION(S)	DEPTHS		
<u>Marcellus</u>	<u>6839' (TOP)</u>	<u>TVD</u>	<u>7296' (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 10950 mcfpd Oil 114 bpd NGL --- bpd Water 441 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 <sub>2</sub> 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  Title Permitting Agent Date 4/30/2019

API 47-017-06853 Farm Name Matthew W. Alexander & Linda Marie Muhly Well Number Convair Unit 3H					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	10/22/2018	15422.1	15588.35	60	Marcellus
2	10/22/2018	15225	15391.25	60	Marcellus
3	10/22/2018	15027.9	15194.15	60	Marcellus
4	10/23/2018	14830.8	14997.05	60	Marcellus
5	10/23/2018	14633.7	14799.95	60	Marcellus
6	10/24/2018	14436.6	14602.85	60	Marcellus
7	10/24/2018	14239.5	14405.75	60	Marcellus
8	10/25/2018	14042.4	14208.65	60	Marcellus
9	10/25/2018	13845.3	14011.55	60	Marcellus
10	10/25/2018	13648.2	13814.45	60	Marcellus
11	10/26/2018	13451.1	13617.35	60	Marcellus
12	10/26/2018	13254	13420.25	60	Marcellus
13	10/27/2018	13056.9	13223.15	60	Marcellus
14	10/27/2018	12859.8	13026.05	60	Marcellus
15	10/28/2018	12662.7	12828.95	60	Marcellus
16	10/28/2018	12465.6	12631.85	60	Marcellus
17	10/28/2018	12268.5	12434.75	60	Marcellus
18	10/29/2018	12071.4	12237.65	60	Marcellus
19	10/29/2018	11874.3	12040.55	60	Marcellus
20	10/30/2018	11677.2	11843.45	60	Marcellus
21	10/30/2018	11480.1	11646.35	60	Marcellus
22	10/31/2018	11283	11449.25	60	Marcellus
23	10/31/2018	11085.9	11252.15	60	Marcellus
24	11/1/2018	10888.8	11055.05	60	Marcellus
25	11/1/2018	10691.7	10857.95	60	Marcellus
26	11/2/2018	10494.6	10660.85	60	Marcellus
27	11/2/2018	10297.5	10463.75	60	Marcellus
28	11/2/2018	10100.4	10266.65	60	Marcellus
29	11/3/2018	9903.3	10069.55	60	Marcellus
30	11/3/2018	9706.2	9872.45	60	Marcellus
31	11/3/2018	9509.1	9675.35	60	Marcellus
32	11/4/2018	9312	9478.25	60	Marcellus
33	11/4/2018	9114.9	9281.15	60	Marcellus
34	11/5/2018	8917.8	9084.05	60	Marcellus
35	11/5/2018	8720.7	8886.95	60	Marcellus
36	11/5/2018	8523.6	8689.85	60	Marcellus
37	11/6/2018	8326.5	8492.75	60	Marcellus
38	11/6/2018	8129.4	8295.65	60	Marcellus
39	11/6/2018	7932.3	8098.55	60	Marcellus
40	11/7/2018	7735.2	7901.45	60	Marcellus
41	11/7/2018	7538.1	7704.35	60	Marcellus
42	11/7/2018	7341	7507.25	60	Marcellus

API 47-017-06853 Farm Name Matthew W. Alexander &amp; Linda Marie Muhly Well Number Convair Unit 3H

**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	10/22/2018	76.97	7869	5210	4789	399820	8077	N/A
2	10/22/2018	78.33	7977	5933	3509	399760	8230.9	N/A
3	10/22/2018	71.6	7955	6464	3525	398540	8355.5	N/A
4	10/23/2018	75.6	8088	6350	4875	409140	8136.6	N/A
5	10/23/2018	67.2	8311	6072	5060	401360	9904.8	N/A
6	10/24/2018	77.27	7903	5487	3896	392720	8044.2	N/A
7	10/24/2018	73.52	7621	5812	5044	409800	9748.9	N/A
8	10/25/2018	77	7944	5740	4510	408780	8123.7	N/A
9	10/25/2018	71.11	7743	5876	5188	405500	8225.6	N/A
10	10/25/2018	74.3	7630	6131	3605	403240	8134.4	N/A
11	10/26/2018	78.64	7623	6041	5214	406980	8143.6	N/A
12	10/26/2018	80.2	7464	5866	4095	407800	8335	N/A
13	10/27/2018	78.7	7857	6194	3853	408000	8031.4	N/A
14	10/27/2018	71.68	7599	6037	4235	411740	8466.8	N/A
15	10/28/2018	79.2	7854	6320	5442	407180	8116.3	N/A
16	10/28/2018	79.35	7723	6099	3872	412380	8140.9	N/A
17	10/28/2018	78	7732	6215	5315	410480	8226	N/A
18	10/29/2018	65.59	8085	6117	4925	412020	10358	N/A
19	10/29/2018	77.7	7992	5947	4096	407140	8028.4	N/A
20	10/30/2018	77.14	7969	5981	4794	407120	8158.2	N/A
21	10/30/2018	78.3	7717	5720	4278	407920	8193.5	N/A
22	10/31/2018	68.6	8110	5906	4425	354800	10217.1	N/A
23	10/31/2018	77.6	7617	5948	3750	406780	8124.6	N/A
24	11/1/2018	77.6	7840	5843	3918	393480	8010.6	N/A
25	11/1/2018	69.7	7901	5970	4087	403360	12443.3	N/A
26	11/2/2018	75.8	7775	6334	4145	408760	8057.8	N/A
27	11/2/2018	71.4	7899	6541	4548	407600	10314.8	N/A
28	11/2/2018	78.6	7690	5491	5862	410420	8209	N/A
29	11/3/2018	78	7513	5596	5272	404680	8068.1	N/A
30	11/3/2018	75.69	7317	5662	4094	402420	8418.2	N/A
31	11/3/2018	78.7	7088	5978	5093	401300	8014.2	N/A
32	11/4/2018	78.52	7455	6213	3985	401080	7956.9	N/A
33	11/4/2018	74.13	7921	6078	4760	403140	9904.7	N/A
34	11/5/2018	75.6	7293	5823	3905	410180	8145.8	N/A
35	11/5/2018	77.43	7096	5983	3888	403580	8012.2	N/A
36	11/5/2018	76.5	6870	5851	3986	407040	8227	N/A
37	11/6/2018	78.4	7243	5613	4634	402900	8070.1	N/A
38	11/6/2018	78.95	7266	5793	4135	404100	7971	N/A
39	11/6/2018	78.9	7319	6040	4410	407580	7919.9	N/A
40	11/7/2018	76.7	7266	5895	5126	393130	7694.4	N/A
41	11/7/2018	79.1	7109	5773	4699	407920	7887.5	N/A
42	11/7/2018	76.18	6580	6077	3967	407820	8142.3	N/A
	AVG=	<b>76</b>	<b>7,639</b>	<b>5,953</b>	<b>4,448</b>	<b>16,969,490</b>	<b>356,989</b>	TOTAL

API 47-017-06853 Farm Name Matthew W. Alexander &amp; Linda Marie Muhly Well Number Convair Unit 3H

**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	2,660	2,088	2,727
Fifty Foot Sandstone	2,660	2,872	2,727	2,947
Gordon	2,872	3,079	2,947	3,161
Fifth Sandstone	3,079	3,139	3,161	3,223
Bayard	3,139	3,925	3,223	4,037
Speechley	3,925	4,231	4,037	4,354
Balltown	4,231	4,716	4,354	4,857
Bradford	4,716	5,174	4,857	5,333
Benson	5,174	5,443	5,333	5,612
Alexander	5,443	6,455	5,612	6,671
Sycamore	6,455	6,628	6,671	6,885
Middlesex	6,628	6,760	6,885	7,108
Burkett	6,760	6,787	7,108	7,166
Tully	6,787	6,839	7,166	7,296
Marcellus	6,839	NA	7,296	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:	10/22/2018
Job End Date:	11/7/2018
State:	West Virginia
County:	Doddridge
API Number:	47-017-06853-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Convair 3H
Latitude:	39.33153900
Longitude:	-80.77782100
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,958
Total Base Water Volume (gal):	15,358,920
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	88.01312	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.21724	



Brine Water	Operator	Base Fluid							
			Water		7732-18-5	100.00000	0.04137	Density = 9.800	
WG-36 GELLING AGENT	Halliburton	Gelling Agent			Listed Below				
MC B-8614	Halliburton	Biocide			Listed Below				
SCALECHEK LP-70	Halliburton	Scale Inhibitor			Listed Below				
FDP-S1296-17	Halliburton	Corrosion Inhibitor			Listed Below				
SAND-COMMON WHITE - 100 MESH	Halliburton	Proppant			Listed Below				
EXCELERATE PS-2	Halliburton	Friction Reducer			Listed Below				
SP BREAKER	Halliburton	Breaker			Listed Below				
SAND-PREMIUM WHITE-40/70	Halliburton	Proppant			Listed Below				



			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)

2,537' to Bottom Hole

7,393' to Top Hole

TOP HOLE LATITUDE 39 - 22 - 30  
BTM HOLE LATITUDE 39 - 20 - 00

LONGITUDE 80 - 45 - 00  
6,350' to Bottom Hole  
14,200' to Top Hole

**Antero Resources  
Well No. Convair Unit 3H  
As-Drilled Plat  
Antero Resources Corporation**

(\*) Denotes Location of Well on  
United States Topographical Maps

**Wellhead Layout**  
Detail Not to Scale

Edgar Unit 3H (47-017-6856)
Edgar Unit 2H (47-017-6855)
Edgar Unit 1H (47-017-6854)
Scorpio Unit 2H (47-017-6861)
Scorpio Unit 1H (47-017-6860)
As-Drilled Convair Unit 3H (47-017-6853)
Convair Unit 2H (47-017-6859)
Convair Unit 1H (47-017-6858)
Northrop Unit 2H (47-017-6857)
Northrop Unit 1H (47-017-6791)

Bearing	Dist.	No.	TM-Par	Owner	Bk/Pg	Acres
L1 S 36°35' W	1,072.7'	1	7-19	Janet L. & James R. Fraley	185/112	2.60
L2 N 65°28' W	661.9'	2	4-34.4	Matthew W. Alexander & Linda Marie Muhly	320/629	4.50
L3 N 44°12' W	776.2'	3	4-32.1	Andy H. & Carrie K. Kurtz	349/322	20.00
L4 N 25°40' W	1,019.3'	4	4-32	Matthew W. Alexander & Linda Marie Muhly	241/412	43.94

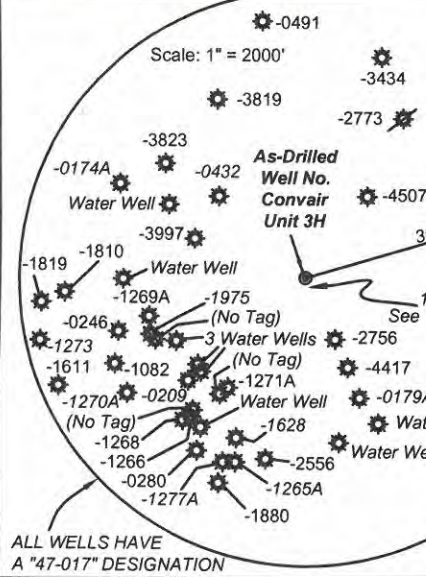
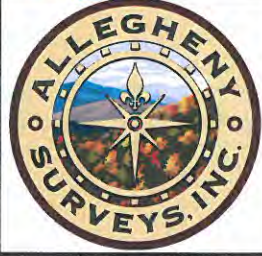
**Notes:**  
West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.  
Well No. Convair Unit 3H Top Hole coordinates are N: 306,950.53' Latitude: 39°20'08.63"  
E: 1,639,251.01' Longitude: 80°46'31.57"  
Bottom Hole coordinates are N: 299,626.78' Latitude: 39°18'56.89"  
E: 1,643,896.36' Longitude: 80°08'03.29"  
**UTM Zone 17, NAD 1983**  
Top Hole Coordinates N: 4,354,067.227m E: 519,368.011m  
Bottom Hole Coordinates N: 4,351,859.676m E: 520,820.438m  
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
  - Creek or Drain
  - Existing Road
  - Surface boundary (approx.)
  - Surface tracts (approx.)
  - Well (as noted)

**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, 2167**



FILE NO: 47-30-WU-14  
DRAWING NO: Convair 3H 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 20 18  
Operator's Well No. Convair Unit 3H  
API WELL NO  
47 - 017 - 06853  
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 60;  
SURFACE OWNER: Matthew W. Alexander & Linda Marie Muhly Carole Hanlon; Joseph Freeman, et ux Janice Cowan (AKA) Janice Cowman ACREAGE: 43.94 428.58; 71.5;  
ROYALTY OWNER: Cassel Hale Williams; James R. Fraley, et ux; David Lipscomb; Larry Williams LEASE NO: \_\_\_\_\_ ACREAGE: 41; 2.96; 428.51  
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: 6,941' TVD  
15,822' 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