



---

west virginia department of environmental protection

---

Office of Oil and Gas  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304  
(304) 926-0450  
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Thursday, June 14, 2018  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / Horizontal 6A Well - 1

ANTERO RESOURCES CORPORATION  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for BUFFALO UNIT 2H  
47-085-10243-00-00

**Lateral shift and extension**

ANTERO RESOURCES CORPORATION

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin  
Chief

Operator's Well Number: BUFFALO UNIT 2H  
Farm Name: COSTILOW, DONALD L.  
U.S. WELL NUMBER: 47-085-10243-00-00  
Horizontal 6A Horizontal 6A Well - 1  
Date Modification Issued: June 14, 2018

Promoting a healthy environment.

06/15/2018

WW-6B  
(04/15)

API NO. 47- 085 - 10243  
OPERATOR WELL NO. Buffalo Unit 2H  
Well Pad Name: Bison Pad

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Corp. 494488557 085 - Ritchie Clay Pennsboro 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Buffalo Unit 2H Well Pad Name: Bison Pad

3) Farm Name/Surface Owner: Donald L. Costilow Public Road Access: CR 50/26

4) Elevation, current ground: 1221' Elevation, proposed post-construction: 1221'

5) Well Type (a) Gas  Oil  Underground Storage

Other

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 7000' TVD, Anticipated Thickness 75 feet, Associated Pressure 2800#

8) Proposed Total Vertical Depth: 7000'

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 16500'

11) Proposed Horizontal Leg Length: 6494'

12) Approximate Fresh Water Strata Depths: 119', 300', 446'

13) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations.

14) Approximate Saltwater Depths: 833', 1192', 1695', 1715'

15) Approximate Coal Seam Depths: 826'

16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes  No

(a) If Yes, provide Mine Info: Name: \_\_\_\_\_  
Depth: \_\_\_\_\_  
Seam: \_\_\_\_\_  
Owner: \_\_\_\_\_

RECEIVED  
Office of Oil and Gas  
FEB 20 2018  
WV Department of  
Environmental Protection

WW-6B  
(04/15)

API NO. 47- 065 - 10243  
OPERATOR WELL NO. Buffalo Unit 2H  
Well Pad Name: Bison Pad

18)

**CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	H-40	94#	80'	80'	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	500' *see #19	500' *see #19	CTS, 695 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	16500'	16500'	4130 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

RECEIVED  
Office of Oil and Gas

FEB 20 2018

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	1000	Class A	~1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	~1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	2500	Leach-H/POZ 5 Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200			
Liners							

WV Department of Environmental Protection

**PACKERS**

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

WW-6B  
(10/14)

API NO. 47-085 - 10243

OPERATOR WELL NO. Buffalo Unit 2H

Well Pad Name: Bison Pad

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

\*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

Max Pressure - 9300 lbs

Max Rate - 80 bpm

RECEIVED  
Office of Oil and Gas

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 19.91 existing acres FEB 20 2018

22) Area to be disturbed for well pad only, less access road (acres): 6.00 existing acres

WV Department of  
Environmental Protection

23) Describe centralizer placement for each casing string:

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

24) Describe all cement additives associated with each cement type:

Conductor: no additives, Class A cement.

Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake.

Intermediate: Class A Cement with 1/4 lb of flake, 5 gallons of clay treat.

Production: Lead cement - 50/50 Class H/Poz + 1/5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.5% C51.

Production: Tail cement - Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

25) Proposed borehole conditioning procedures:

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing,

circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

\*Note: Attach additional sheets as needed.

LATITUDE 39°20'00"

7,480'

7,602' TO BOTTOM HOLE

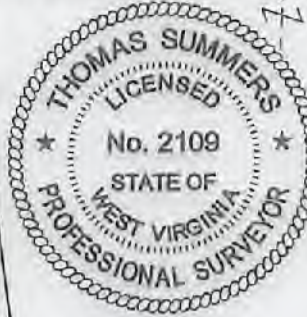
LATITUDE 39°20'00"

LONGITUDE 80°52'30"

13,888'

LONGITUDE 80°52'30"

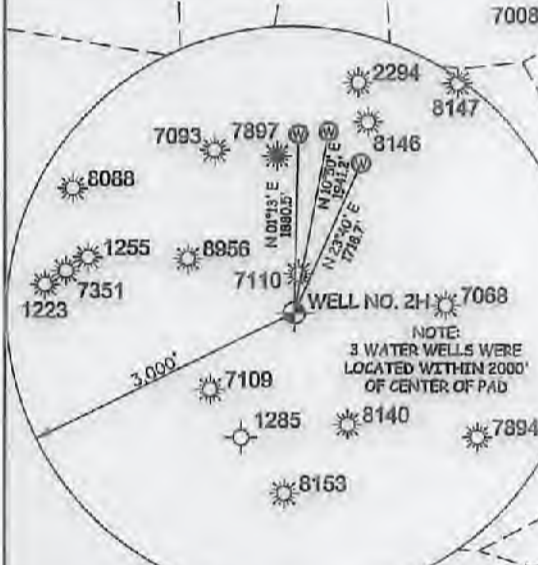
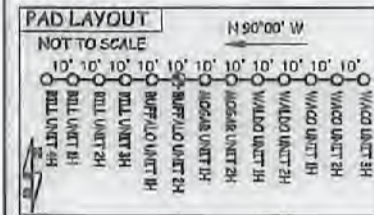
Antero Resources Corporation  
Well No. Buffalo Unit 2H  
API 47-085-10243



NOTE  
NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAILY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.

NOTES:  
WELL 2H TOP HOLE INFORMATION:  
N: 292,723ft E: 1,603,387ft  
LAT: 39°17'42.74" LON: 80°54'05.15"  
BOTTOM HOLE INFORMATION:  
N: 299,982ft E: 1,603,376ft  
LAT: 39°18'54.48" LON: 80°54'06.73"  
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:  
WELL 2H TOP HOLE INFORMATION:  
N: 4,349,550m E: 508,514m  
BOTTOM HOLE INFORMATION:  
N: 4,351,762m E: 508,474m



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 PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC  
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

JOB # 15-030WA  
DRAWING # BUFFALO2HR2  
SCALE 1" = 1000'  
MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS  
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND  
--- Surface Owner Boundary Lines +/-  
- - - Interior Surface Tracts +/-  
- x - x - Existing Fence  
⊕ Found monument, as noted  
THOMAS SUMMERS P.S. 2109  
DATE 02/12/18  
OPERATOR'S WELL # BUFFALO UNIT #2H



WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ 47 - 085 - 10243  
(IF "GAS") PRODUCTION x STORAGE \_\_\_ DEEP SHALLOW X STATE COUNTY PERMIT  
LOCATION: ELEVATION 1,221' - AS DRILLED WATERSHED NORTH FORK HUGHES RIVER COUNTY NAME  
QUADRANGLE PENNSBORO 7.5 DISTRICT CLAY COUNTY RITCHIE  
SURFACE OWNER DONALD L. COSTILOW ACREAGE 50.13 ACRES +/-  
OIL & GAS ROYALTY OWNER BERTHA D. FERREBEE; DONALD L. COSTILOW ET UX; LEASE ACREAGE 87 AC +/-; 13.05 AC +/-  
ROBERT DOTSON ET UX; LONNIE B. DOTSON ET UX; JOHN L. DOAK; MICHAEL QUINN; 19 AC +/-; 18 AC +/-; 22.5 AC +/-; 22.5 AC +/-  
MICHAEL F. QUINN; L.A. GARNER ET AL; F.M. FERREBEE ET AL; MARY FERREBEE ET AL 24.5 AC +/-; 99 AC +/-; 58 AC +/-; 72 AC +/-  
PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER X REDRILL \_\_\_ FRACTURE OR STIMULATE X  
PLUG OFF OLD FORMATION \_\_\_ PERFORATE NEW FORMATION \_\_\_ OTHER PHYSICAL CHANGE IN WELL  
(SPECIFY) MOD-BHL PLUG & ABANDON CLEAN OUT & REPLUG  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,000' TVD 16,500' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM  
ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD  
DENVER, CO 80202 CHARLESTON, WV 26313

06/15/2018

LATITUDE 39°20'00"

7,480'

7,602' TO BOTTOM HOLE

LATITUDE 39°20'00"

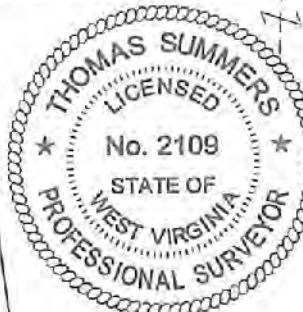
LONGITUDE 80°52'30"

6,530' TO BOTTOM HOLE

13,888'

LONGITUDE 80°52'30"

Antero Resources Corporation  
Well No. Buffalo Unit 2H  
API 47-085-10243

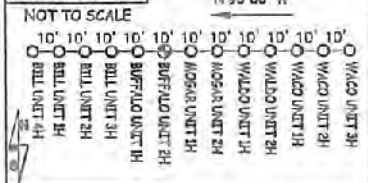


NOTE  
NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.

NOTES:  
WELL 2H TOP HOLE INFORMATION:  
N: 292,723ft E: 1,603,387ft  
LAT: 39°17'42.74" LON: 80°54'05.15"  
BOTTOM HOLE INFORMATION:  
N: 299,982ft E: 1,603,376ft  
LAT: 39°18'54.46" LON: 80°54'06.73"  
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:  
WELL 2H TOP HOLE INFORMATION:  
N: 4,349,550m E: 508,514m  
BOTTOM HOLE INFORMATION:  
N: 4,351,762m E: 508,474m

PAD LAYOUT



I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
WILLOW LAND SURVEYING PLLC  
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

JOB # 15-030WA  
DRAWING # BUFFALO2HR2  
SCALE 1" = 1000'  
MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS  
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND  
--- Surface Owner Boundary Lines +/-  
--- Interior Surface Tracts +/-  
-x-x-x- Existing Fence  
⊕ Found monument, as noted  
THOMAS SUMMERS P.S. 2109  
DATE 02/12/18  
OPERATOR'S WELL# BUFFALO UNIT #2H

REFERENCES  
WELL NO. 2H  
RECEIVED Office of Oil and Gas  
FEB 20 2018  
West Virginia Department of Environmental Protection  
STAKE/NAIL SET  
1" = 200'

WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ 47 \_\_\_ 085 \_\_\_ 10243  
(IF "GAS") PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X  
LOCATION: ELEVATION 1,221'-AS DRILLED WATERSHED NORTH FORK HUGHES RIVER  
QUADRANGLE PENNSBORO 7.5 DISTRICT CLAY COUNTY RITCHIE  
SURFACE OWNER DONALD L. COSTILOW ACREAGE 50.13 ACRES +/-  
OIL & GAS ROYALTY OWNER BERTHA D. FERREBEE; DONALD L. COSTILOW ET UX; LEASE ACREAGE 67 AC.±; 13.05 AC.±;  
MICHAEL F. QUINN; L.A. GARNER ET AL; F.M. FERREBEE ET AL; MARY FERREBEE ET AL 19 AC.±; 18 AC.±; 22.5 AC.±; 22.5 AC.±;  
24.5 AC.±; 99 AC.±; 56 AC.±; 72 AC.±;  
PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER X REDRILL \_\_\_ FRACTURE OR STIMULATE X  
PLUG OFF OLD FORMATION \_\_\_ PERFORATE NEW FORMATION \_\_\_ OTHER PHYSICAL CHANGE IN WELL  
(SPECIFY) MOD-BHL PLUG & ABANDON CLEAN OUT & REPLUG  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,000' TVD 16,500' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM  
ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD  
DENVER, CO 80202 CHARLESTON, WV 25313

06/15/2018

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>Bertha D. Ferrebee Lease</u></b>			
Bertha D. Ferrebee	J&J Enterprises, Inc.	1/8	0170/0080
J&J Enterprises, Inc.	Eastern American Energy Corporation	Confirmatory Deed and Assignment of Leases	DB 0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Certificate of Merger	COI 0006/0450
Energy Corporation of America	Antero Resources Appalachian Corporation	Memorandum of Agreement	0257/0397
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Donald L. Costilow, et ux Lease</u></b>			
Donald L. Costilow, et ux	Antero Resources Appalachian Corporation	1/8+	0264/0811
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Hobert Dotson, et ux Lease</u></b>			
Hobert Dotson, et ux	J & J Enterprises, Inc.	1/8	0170/0076
J & J Enterprises, Inc.	Eastern American Energy Corporation	Merger	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0306/0836
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0397
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Lonnie B. Dotson, et ux Lease</u></b>			
Lonnie B. Dotson, et ux	B & M Associates	1/8	0214/0515
B & M Associates	Key Oil Company, Inc.	Assignment	0214/0560
Key Oil Company, Inc.	Key Oil Company	Assignment	0214/0691
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0253/0747
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Stephen Glen Doak Lease</u></b>			
Stephen Glen Doak	Antero Resources Corporation	1/8	0265/0318
<b><u>David W. Dotson Lease (TM21-34)</u></b>			
David W. Dotson	Antero Resources Appalachian Corporation	1/8+	0264/0065
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>John L. Doak Lease</u></b>			
John L. Doak	Antero Resources Appalachian Corporation	1/8+	0265/0707

RECEIVED  
Office of Oil and Gas  
FEB 20 2018  
WV Department of  
Environmental Protection

\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

\*\*CONTINUED ON NEXT PAGE\*\*

06/15/2018

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b>Michael F. Quinn Lease (TM 21-29)</b>			
Michael F. Quinn	Appalachian Energy Reserves, Inc.	1/8	0214/0441
Appalachian Energy Reserves, Inc.	Appalachian Energy Development, Inc.	Assignment	0229/0100
Appalachian Energy Development, Inc.	Triad Energy Corporation of WV, Inc.	Assignment	0229/0108
Triad Energy Corporation of WV, Inc.	Triad Hunter, LLC	Assignment	0250/0196
Triad Hunter, LLC	Antero Resources Corporation	Assignment	0270/0270
<b>Michael F. Quinn Lease (TM 21-28.4)</b>			
Michael F. Quinn	Appalachian Energy Reserves, Inc.	1/8	0214/0439
Appalachian Energy Reserves, Inc.	Appalachian Energy Development, Inc.	Assignment	0229/0100
Appalachian Energy Development, Inc.	Triad Energy Corporation of WV, Inc.	Assignment	0229/0108
Triad Energy Corporation of WV, Inc.	Triad Hunter, LLC	Assignment	0250/0196
Triad Hunter, LLC	Antero Resources Corporation	Assignment	0270/0270
<b>L.A. Garner, et al Lease</b>			
L.A. Garner, et al	Carnegie Natural Gas Company	1/8	0039/0517
Carnegie Natural Gas Company	Carnegie Production Company	Assignment	0228/0859
Carnegie Production Company	EQT Production Company	Merger	0015/0705
EQT Production Company	Antero Resources Corporation	Assignment	0268/0465
<b>Eugene Costilow, et ux Lease</b>			
Eugene Costilow, et ux	J&J Enterprises, Inc.	1/8	0167/0293
J&J Enterprises, Inc.	Equitable Resources Energy Company	Assignment	0208/0132
Equitable Resources Energy Company	Enervest East Limited Partnership	Assignment	0222/0273
Enervest East Limited Partnership	The Houston Exploration Company	Assignment	0234/0890
The Houston Exploration Company	Seneca-Upshur Petroleum, Inc.	Assignment	0236/0650
Seneca-Upshur Petroleum, Inc.	Eastern American Energy Corporation	Assignment	0243/0849
Eastern American Energy Corporation	Energy Corporation of America	Certificate of Merger	CR 0006/0450
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b>F.M. Ferrebee, et al Lease</b>			
F.M. & Pauline Ferrebee and A.J. & Letha Ferrebee	Carnegie Natural Gas Company	1/8	0041/0188
Carnegie Natural Gas Company	Carnegie Production Company	Assignment	0228/0859
Carnegie Production Company	Equitable Resources, Inc.	Merger	Exhibit 2
Equitable Resources, Inc.	EQT Production Company	Name Change	0230/0047
EQT Production Company	Antero Resources Corporation	Assignment	0268/0465

RECEIVED  
Office of Oil and Gas  
FEB 20 2018  
WV Department of  
Environmental Protection

\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.



WW-6A1  
(5/13)

Operator's Well No. Buffalo Unit 2H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Mary Ferreebe, et al Lease</u>	Mary Ferreebe, et al	Palmer Hill	1/8	0087/0538
	Palmer Hill	J & J Enterprises	Assignment	0169/0360
	J & J Enterprises	Eastern American Energy Corp.	Assignment	0231/0732
	Eastern American Energy Corp.	Energy Corp. of America	Assignment	0306/0835
	Energy Corp. of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
	Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

RECEIVED  
Office of Oil and Gas

FEB 20 2018

WV Department of  
Environmental Protection

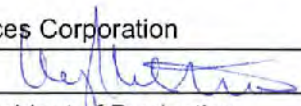
**Acknowledgement of Possible Permitting/Approval  
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Antero Resources Corporation

By: Kevin Kilstrom 

Its: Senior Vice President of Production

FORM WW-6A1  
EXHIBIT 1

FILED

JUN 10 2013

Natalie E. Tennant,  
Secretary of State  
1900 Kanawha Blvd E  
Bldg 1, Suite 157-K  
Charleston, WV 25305



Penney Barker, Manager  
Corporations Division  
Tel: (304)558-8000  
Fax: (304)558-8381  
Website: [www.wvsos.com](http://www.wvsos.com)  
E-mail: [business@wvsos.com](mailto:business@wvsos.com)

APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY

Office Hours: Monday - Friday  
8:30 a.m. - 5:00 p.m. ET

FILE ONE ORIGINAL  
(Two if you want a filed  
stamped copy returned to you)  
FEE: \$25.00

\*\*\*\* In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby \*\*\*\*  
applies for an Amended Certificate of Authority and submits the following statement:

- Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
- Date Certificate of Authority was issued in West Virginia: 6/25/2008
- Corporate name has been changed to: Antero Resources Corporation  
(Attach one Certified Copy of Name Change as filed in home State of Incorporation.)
- Name the corporation elects to use in WV: Antero Resources Corporation  
(due to home state name not being available)
- Other amendments: \_\_\_\_\_  
(attach additional pages if necessary)

RECEIVED  
Office of Oil and Gas  
FEB 20 2018  
WV Department of  
Environmental Protection

- Name and phone number of contact person. (This is optional; however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)  
Alvyn A. Schopp (303) 357-7310  
Contact Name Phone Number

- Signature Information (See below Important Legal Notice Regarding Signature):  
Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person  
Signature: [Handwritten Signature] Date: June 10, 2013

**\*Important Legal Notice Regarding Signature:** Per West Virginia Code §31D-1-129. Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.



February 16, 2018

Antero Resources  
1615 Wynkoop Street  
Denver, CO 80202  
Office 303.357.7310  
Fax 303.357.7315

West Virginia Department of Environmental Protection  
Office of Oil and Gas  
Attn: Ms. Laura Adkins  
601 57<sup>th</sup> Street  
Charleston, WV 25304

Ms. Adkins:

Antero Resources Corporation (Antero) would like to submit the following permit modifications for five approved wells on the existing Bison Pad. We are requesting to slightly shift the horizontal lateral to accommodate 1000' spacing between wells. Additionally, we are requesting to extend the lateral lengths and associated Estimated Measured Depths for the following wells:

- Bill Unit 1H – API #47-085-10240 ~~2B~~
- Bill Unit 2H – API #47-085-10241
- Bill Unit 3H – API #47-085-10257
- Buffalo Unit 1H – API #47-085-10249 ← *Not received*
- Buffalo Unit 2H – API #47-085-10243

RECEIVED  
Office of Oil and Gas

FEB 20 2018

WV Department of  
Environmental Protection

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the updated BHL and Measured Depth
- REVISED Form WW-6A1, which shows the new leases we will be drilling into
- REVISED Mylar Plat, which shows the new Lateral Length and Estimated Measured Depth

If you have any questions please feel free to contact me at (303) 357-7233.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in blue ink that reads "Kara Quackenbush". The signature is fluid and cursive.

Kara Quackenbush  
Permitting Agent  
Antero Resources Corporation

Enclosures

06/15/2018