

west virginia department of environmental protection

Office of Oil and Gas 601 57th Street SE Charleston, WV 25304 (304) 926-0450 (304) 926-0452 fax Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

PERMIT MODIFICATION APPROVAL

June 04, 2015

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET DENVER, CO 80202

Re: Permit Modification Approval for API Number 8510198, Well #: MCNABB UNIT 3H

Extend Lateral

Oil and Gas Operator:

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.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

Gene Smith

Assistant Chief of Permitting

Office of Oil and Gas



May 29, 2015

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. Melanie Hankins 601 57th Street Charleston, WV 25304

Ms. Hankins:

Antero Resources Corporation (Antero) would like to submit the following permit modifications for four approved wells on the Mackay Pad. We are requesting to extend the horizontal lateral lengths which will change the bottom hole locations of the McNabb Unit 1H (API# 47-085-10196), McNabb Unit 2H (API# 47-085-10197), McNabb Unit 3H (API# 47-085-10198) and McNabb Unit 4H (API# 47-085-10199).

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the revised MD and Production Casing/Cement program
- > REVISED Form WW-6A1, which shows the new leases we will be drilling into
- REVISED Mylar Plat, which shows the new bottom hole location.

If you have any questions please feel free to contact me at (303) 357-7323.

Thank you in advance for your consideration.

Mi Steele

Sincerely.

Ashlie Steele

Permitting Supervisor

Antero Resources Corporation

Enclosures

RECEIVED
Office of Oil and Gas

JUN 0 2 2015

WV Department of Environmental Protection 06/05/2015 WW-6B (04/15) API NO. 47- 085 - 10198

OPERATOR WELL NO. McNabb Unit 3H

Well Pad Name: Mackay Pad

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

1) Well Operator: Antero Res	ources Corporat	494488557	085-Ritchie	Clay	Pullman 7.5'				
	•	Operator ID	County	District	Quadrangle				
2) Operator's Well Number: Mo	Nabb Unit 3H	Well Pad	Name: Mack	ay Pad					
3) Farm Name/Surface Owner:	Mackay, Jack D.	et al Public Road	d Access: CR	19/3					
Elevation, current ground: ~ 1128' Elevation, proposed post-construction: 1099'									
5) Well Type (a) Gas X	Oil	Unde	rground Storag	e					
Other									
(b)If Gas Sha	llow	Deep	X						
	rizontal X								
6) Existing Pad: Yes or No No									
 Proposed Target Formation(s Marcellus Shale: 6700' TVD, A 		•	1.00 m	3 5					
8) Proposed Total Vertical Dept	h: 6700' TVD								
9) Formation at Total Vertical D	epth: Marcellus	Shale							
10) Proposed Total Measured D	epth: 19,600' M	D							
11) Proposed Horizontal Leg Le	ength: 12,443'								
12) Approximate Fresh Water S	trata Depths:	177', 225', 437'							
13) Method to Determine Fresh	Water Depths:	ffset well records. Dep	ths have been ad	usted accordi	ng to surface elevations.				
14) Approximate Saltwater Dep	ths: 1991', 2053'	, 2057'							
15) Approximate Coal Seam De	pths: N/A								
16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated									
17) Does Proposed well location directly overlying or adjacent to		Yes	No	X					
(a) If Yes, provide Mine Info:	Name:								
The section of the second of the section of the se	Depth:			RECEIVE					
	Seam:		Unic	e of Oil ar	10 005				
	Owner:			JUN 0 2 2	015				
	:								

WV Department of Environmental Protection

WW-6B
(04/15)

API# 47-085-10198 PERMIT MODIFICATION

API NO. 47- 085 - 10198

OPERATOR WELL NO. McNabb Unit 3H
Well Pad Name: Mackay 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#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	490'	490'* See #19	CTS, 681 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2400'	2400'	CTS, 977 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	19,600'	19,600'	5012 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

NSAV 6/4/15

ТҮРЕ	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	24"	0.438"	1530	50	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	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"	12,630	2500	Lead-H/POZ & Tall - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

N/A	RECEIVED
N/A	Office of Oil and Gas
N/A	JUN 0 2 2015 WV Department of
	N/A

Environmental Protection

WW-6B	
(10/14)	

API# 47-085-10198 PERMIT MODIFICATION

API NO. 47- 085 - 10198

OPERATOR WELL NO. McNabb Unit 3H

Well Pad Name: Mackay 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 fresh water 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."

Anticipated Max Pressure - 9300 lbs Anticipated Max Rate - 80 bpm

- 21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 35.10 acres
- 22) Area to be disturbed for well pad only, less access road (acres): 3.95 acres

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 + 0.05% C-51

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

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Office of Oil and Gas

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25) Proposed borehole conditioning procedures:

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

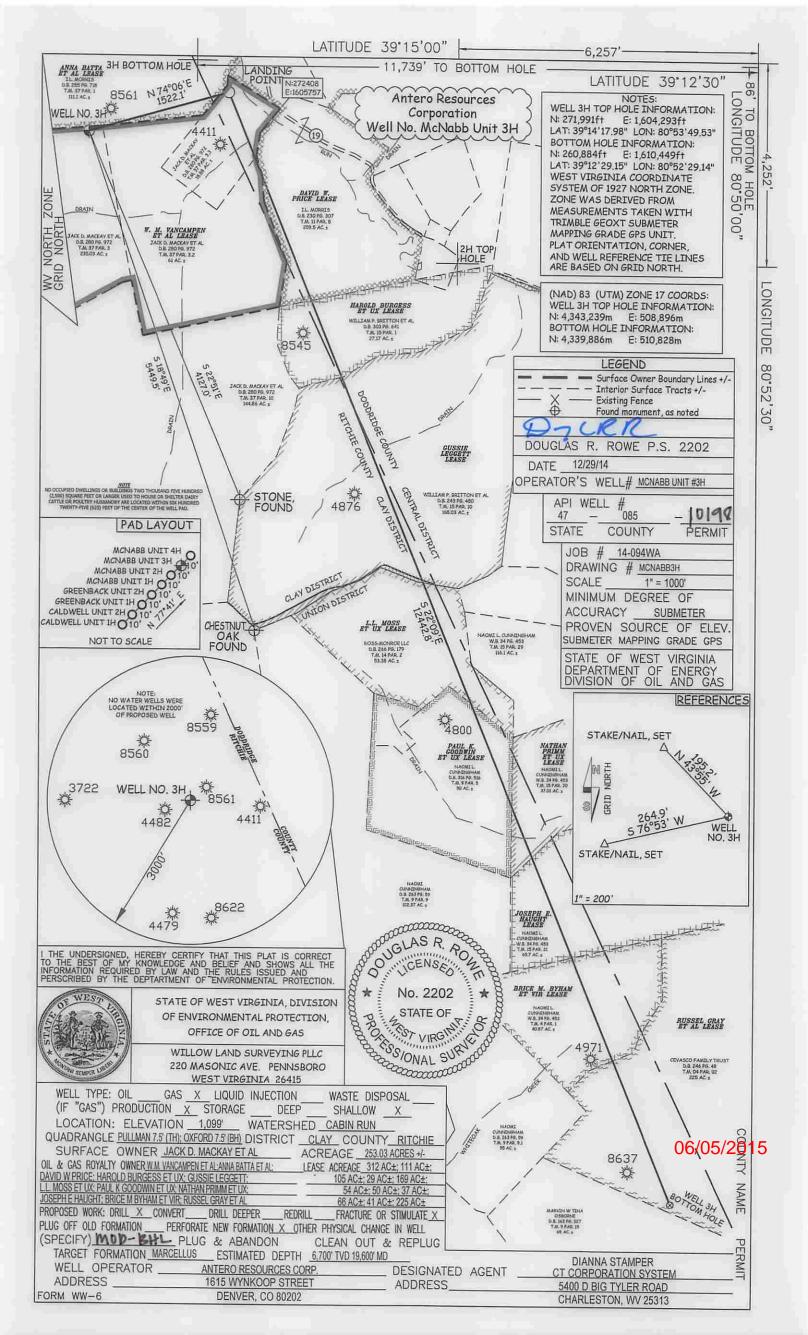
WV Department of Environmental Protection

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.



Operator's Well Number

McNabb Unit 3H

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
Anna Batta et al Lease			
Anna S. Batta et vir	Northeastern Operating Company, Inc.	1/8	0225/0699
Northeastern Operating Company, Inc.	Key Oil Company	Assignment	0226/0163
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0253/0747
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
WM VanCampen, et al Lease			
William Charles VanCampen	Warren R. Haught, et al	1/8	0122/0565
Warren R. Haught, et al	Haught, Inc.	Assignment	0124/0296
Haught, Inc.	Mountaineer 1979-A	Assignment	0129/0449
Mountaineer 1979-A	Mountain V Oil and Gas Co.	Assignment	0230/0253
Mountain V Oil and Gas Co.	Robert Matheny, Jr. & HMS Resources, Inc.	Assignment	0243/0911
Robert Matheny, Jr. & HMS Resources, Inc.	Genesis Exploration & Production	Assignment	0244/1079
Genesis Exploration & Production	Antero Resources Appalachian Corporation	Assignment	0260/1028
HMS Resources	Antero Resources Appalachian Corporation	Assignment	0260/1035
Robert Matheny, Jr. & HMS	Antero Resources Appalachian Corporation	Assignment	0260/1042
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
David W. Price Lease			
David W. Price	Antero Resources Corporation	1/8+	0348/0729
Harold Burgess, et ux Lease			
Harold R. Burgess, et ux	Key Oil Company	1/8	0181/0267
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0256/0285
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0276/0526
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
Gussie Leggett Lease			
Gussie Leggett	Alton Skinner	1/8	0107/0480
Alton Skinner II, et al as Co-Administrator for the	Desari S. Garrett, et al	Assignment	0169/0193
Estate of Alton Skinner		RECI	EIVED
Desari S. Garrett, et al	DC Petroleum, Inc. Antero Resources Appalachian Corporation	Assignment ffice of C	Oil and Gas
DC Petroleum, Inc. & Chase Petroleum, Inc. Antero Resources Appalachian Corporation	Antero Resources Apparachian Corporation	Name Change	Exhibit 1
/	Antelo hesoaries corporation		2 2015
L.L. Moss, et ux Lease	Alban Chinana	1/0	0112/0178
L.L. Moss, et ux Alton Skinner II, et al as Co-Administrator for the	Alton Skinner Desari S. Garrett et al	1/8 AssignmenWV Depa	
Estate of Alton Skinner	=	•	
Desari S. Garrett, et al	DC Petroleum, Inc.	Assign Environmen	itai protechasis
DC Petroleum, Inc. & Chase Petroleum, Inc.	Antero Resources Appalachian Corporation	Assignment	0257/0062
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.

Operator's Well Number

McNabb Unit 3H

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)

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	Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
	Crantor, 100001, 0to.	Cranice, ledded, die.	rtoyalty	Dookii ago
1	Paul K. Goodwin, et ux Lease			
/	Paul K. Goodwin	Alton Skinner	1/8	0128/0384
	Alton Skinner	Alton L. Skinner, II, Crystal G. Skinner & Desari S. Garrett	Intestate Conveyance	Recital in 0216/0391
	Alton L. Skinner, II, et al	Crystal G. Skinner & Desari S. Garrett	Deed of Conveyance	0216/0391
	Crystal G. Skinner & Desari S. Garrett	DC Petroleum, Inc.	Deed of Conveyance	0247/0245
	DC Petroleum, Inc., et al	Antero Resources Appalachian Corporation	*Partial Assignment of Oil and Gas Leases	0254/0133
	Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
-	Nathan R. Primm, et ux Lease			
1	Nathan R. Primm and Thelma Primm, his wife	C.A. Stricklin	1/8	0067/0190
	rectain it. Thinh and Themas thin, ins wife	CIAI STILLARIII	1,0	0007/0120
	C.A. Stricklin	Alton Skinner	Assignment	0118/0536
	Alton Skinner and Chase Petroleum, Inc., a WV corporation wholly owned by Alton L. Skinner, deceased	Desari S. Garrett, Alton L. Skinner, II and Crystal G. Skinner, Heirs at Law	Assignment	AP 0025/0684
	Alton Skinner, II	Desari S. Garrett and Crystal G. Skinner	Assignment	DB 0222/0266
	Desari S. Garrett and Crystal G. Skinner	DC Petroleum, Inc.	Assignment	DB 0224/0140
	DC Petroleum, Inc. & Chase Petroleum, Inc.	Antero Resources Appalachian Corporation	Assignment	0254/0133
	Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
	/			
/	Joseph E. Haught Lease	Alban Chianna	1/8	0112/0154
/	Joseph E. Haught and Carolyn B. Haught, his wife Alton Skinner and Chase Petroleum, Inc., a WV	Alton Skinner Desari Garrett, Alton L. Skinner, II and Crystal G.	Assignment	AP 0025/0684
	corporation wholly owned by Alton L. Skinner	Skinner, Heirs at Law	Assignment	AF 0023/0064
	Alton L. Skinner, II	Desari S. Garrett and Crystal G. Skinner	Assignment	DB 0222/0266
	Crystal G. Skinner & Desari S. Garrett	DC Petroleum, Inc.	Assignment	DB 0224/0140
	DC Petroleum, Inc and Chase Petroleum, Inc.	Antero Resources Appalachian Corporation	Assignment	0257/0062
	Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
	/		DECE	VED
\mathcal{I}	Brice M. Byham,et vir Lease	70 80	RECEI	
	Brice M. Byham and Edgar W. Byham, her husband	Alton Skinner	Office of Oil	ano Ga ^{9116/0437}
	Alton Skinner and Chase Petroleum, Inc., a WV	Desari Garrett, Alton L. Skinner, II and Crystal G.	Assignment	AP 0025/0684
	corporation wholly owned by Alton L. Skinner	Skinner, Heirs at Law	JUN 0 2	2.2015
	Alton L. Skinner, II	Desari S. Garrett and Crystal G. Skinner	Assignment	DB 0222/0266
	Crystal G. Skinner & Desari S. Garrett	DC Petroleum, Inc.	Assignment	DB 0224/0140
	DC Petroleum, Inc and Chase Petroleum, Inc.	Antero Resources Appalachian Corporation	Assignment Depar	tment of0257/0062
	Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change Environmenta	Drotactic Exhibit 1
				II FIUIBUIUII

^{*}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**

WW-6A1 (5/13)

Operator's Well No.	McNabb Unit 3H
operator a men mo.	

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)

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- (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	Nan	1e	or

1	Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Russ	el Gray, et al Lease				
		Russel H. Gray and Edith Gray, his wife, et ux	Alton Skinner	1/8	0121/0123
		Alton Skinner and Chase Petroleum, Inc., a WV Corporation Wholly Owned by Alton L. Skinner	Desari Garrett, Alton L. Skinner, and Crystal G. Skinner, Heirs at Law	Assignment	AP 0025/0684
		Alton L. Skinner, II	Desari S. Garrett and Crystal G. Skinner	Assignment	DB 0222/0266
		Crystal G. Skinner & Desari S. Garrett	DC Petroleum, Inc.	Assignment	DB 0224/0140
		DC Petroleum, Inc. and Chase Petroleum, Inc.	Antero Resources Appalachian Corporation	Assignment	0257/0062
		Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

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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

Office of Oil and Gas

JUN 0 2 2015

WV Department of Environmental Protection

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	s Corpo	ration	
By:	Kevin Kilstrom	Lev	Cultion	
Its:	VP of Production	Ó		

Page 1 of ____

FORM WW-6A1 EXHIBIT 1

FILED

Natalie E. Tennant Scoretary of State 1900 Kanawha Bivd B Bldg 1, Suite 157-K Charleston, WV 25305

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



Penney Barker, Manager
IN THE OFFICE OF Corporations Division
SECRETARY OF STATE Tel: (304)558-8000
Fax: (304)558-8381

Website: www.wvsos.com
E-mail: business@wvsos.com

APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY

**** In accordance with the providors of the West Virginia Code, the undersigned corporation hereby ****

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

applies for an Amended Cortificate of Authority and submits the following statement: Name under which the corporation was Antero Resources Appalachian Corporation authorized to transact business in WV: 2. Date Certificate of Authority was 6/25/2008 issued in West Virginia: Antero Resources Corporation 3. Corporate name has been changed to: (Attach one Certified Copy of Name Change as filed in home State of incorporation.) Antero Resources Corporation Name the corporation elects to use in WV: (due to home state name not being available) Other amendments: (attach additional pages if necessary) 6. Name and phone number of contact person. (This is optional, however, if there is a problem with the filling, 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 7. Signature information (See below *Important Legal Notice Regarding Signature): Title/Capacity: Authorized Person Print Name of Signer: Akyn A. Schop Date: June 10, 2013 Signature: *Important Level Notice Rescriber Standard: For West Virginia Code 5310-1-129. Penalty for signing false document.

Any person who signs a document like or she knows is false in any motorial respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdomesnor and, upon conviction thereof, shall be fined not more than one thousand dellars or confined in the county or regional jail not more than one year, or both.

Form CF-4

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Office of Oil and Gas

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