

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

December 19, 2014

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET DENVER, CO 80202

Re: Permit Modification Approval for API Number 1706626 , Well #: WILHELM UNIT 1H Extended 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



December 17, 2014

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 Cooper 601 57th Street Charleston, WV 25304

Ms. Laura Cooper:

Antero Resources Corporation (Antero) would like to submit the following permit modification for an approved well on the McGill Pad. We are requesting to extend the horizontal lateral length which will change the bottom hole location of the Wilhelm Unit 1H (API# 47-017-06626).

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 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.

Sincerely,

Ashlie Steele

Permitting Supervisor

Antero Resources Corporation

Enclosures

Office of Oil & Gas

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

1) Well Operator:	Antero Reso	urces Corporation	494488557	017 -Doddridge	Central	West Union 7.5'
	::		Operator ID	County	District	Quadrangle
2) Operator's Well	Number: Wi	helm Unit 1H	Well Pad	Name: Existing	ng McGill P	ad
3) Farm Name/Sur	face Owner:	Mary F. Brown	Public Road	d Access: CR 5	50/3	
4) Elevation, curren	nt ground:	1164' Ele	evation, proposed p	oost-construction	on: 1164'	
5) Well Type (a)	Gas	Oil	Unde	rground Storag	e	
Oti	her					
(b)	If Gas Sha	llow _	Deep			
		rizontal				
6) Existing Pad: Ye	-					
7) Proposed Target			pated Thickness at 60 feet, Associated I		Pressure(s):	
		A A SINCE CO WAY WAY	oo leet, Associated I	-1essure- 5 100#		
8) Proposed Total '9) Formation at To			Shale			
		-F				
10) Proposed Total	Measured D	epth: 18,300' MD				
11) Proposed Horiz	zontal Leg Le	ngth: 10,218'				
12) Approximate F	resh Water S	trata Depths:	225'			
13) Method to Dete	ermine Fresh	Water Depths: N	lero Unit 1H (API# 47	7-017-06211) on	same pad	
14) Approximate S	altwater Dep	ths: 1860', 1865'				
15) Approximate C	oal Seam De	pths: 1240', 1300'	====			
16) Approximate D	epth to Possi	ble Void (coal min	ne, karst, other): 1	lone anticipated		
17) Does Proposed directly overlying of			rs Yes	No	V	
(a) If Yes, provide	e Mine Info	Name:				
(u) II 103, provid	e iviline inito.	Depth:				
		Seam:				
Received	-1	Owner:	=			
Office of Oil &		1000 N 2 T 2 T 2 T 2 T 2 T 2 T 2 T 2 T 2 T 2		=		

WW-6B (9/13)

18)

CASING AND TUBING PROGRAM

ТҮРЕ	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
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#	300'	300'	CTS, 417 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2480'	2480'	CTS, 1010 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18,300'	18,300'	4625 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		6900'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

PACKERS

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

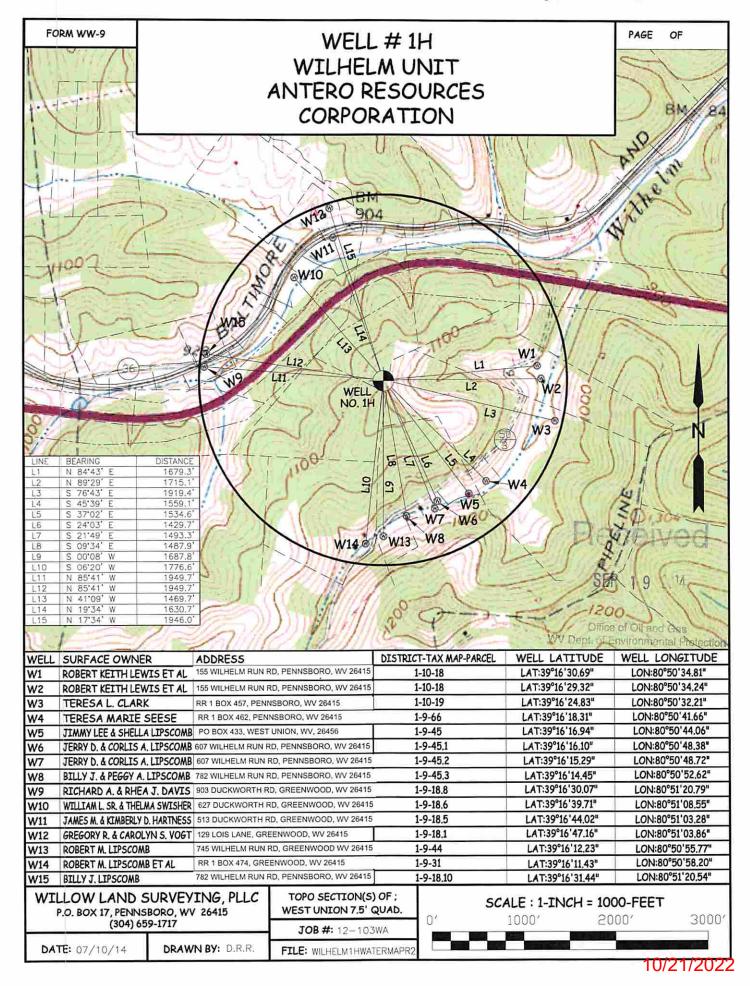
Office of Oil & Gas

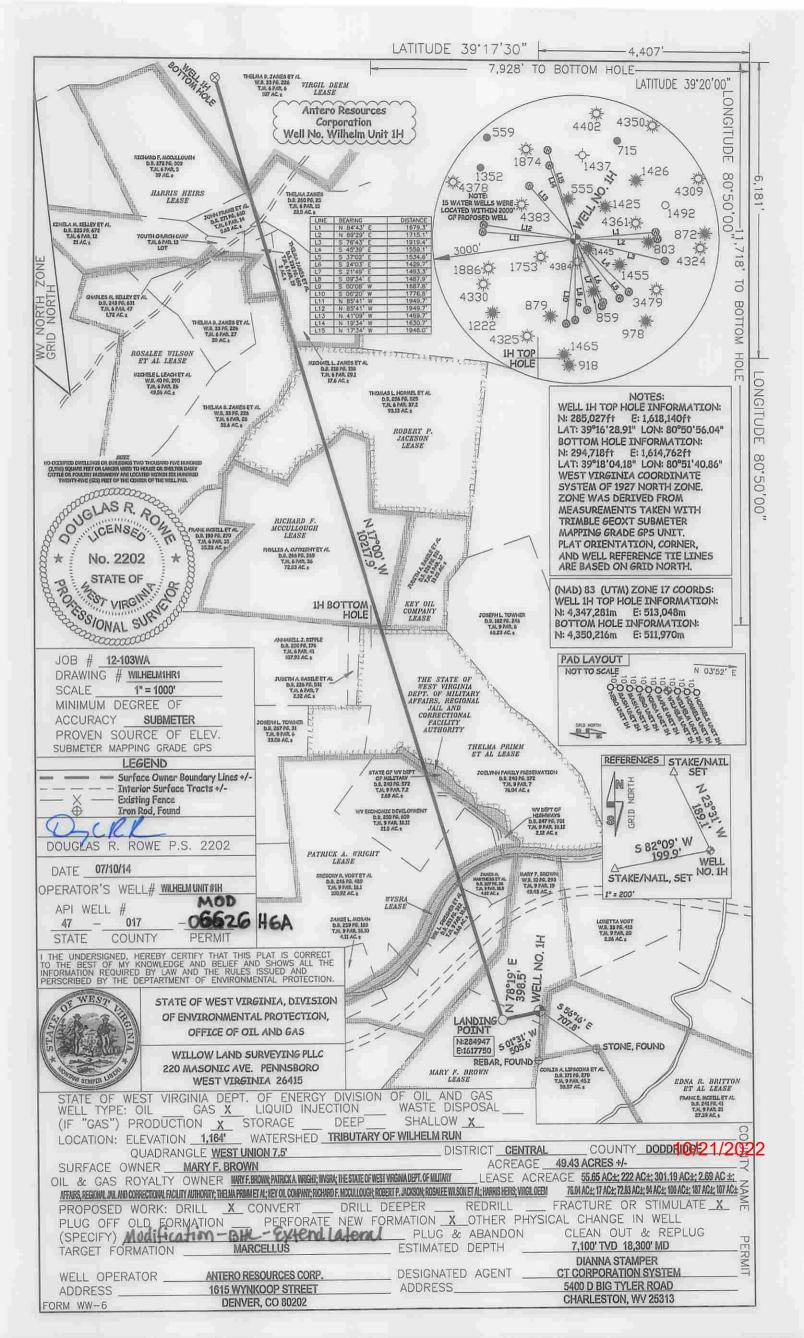
19) Describe proposed well work, including the drilling and plugging back of any pilot hole:
Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:
Antero plans to pump 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."
21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 21.69 existing acres
22) Area to be disturbed for well pad only, less access road (acres): 3.85 existing 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
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.

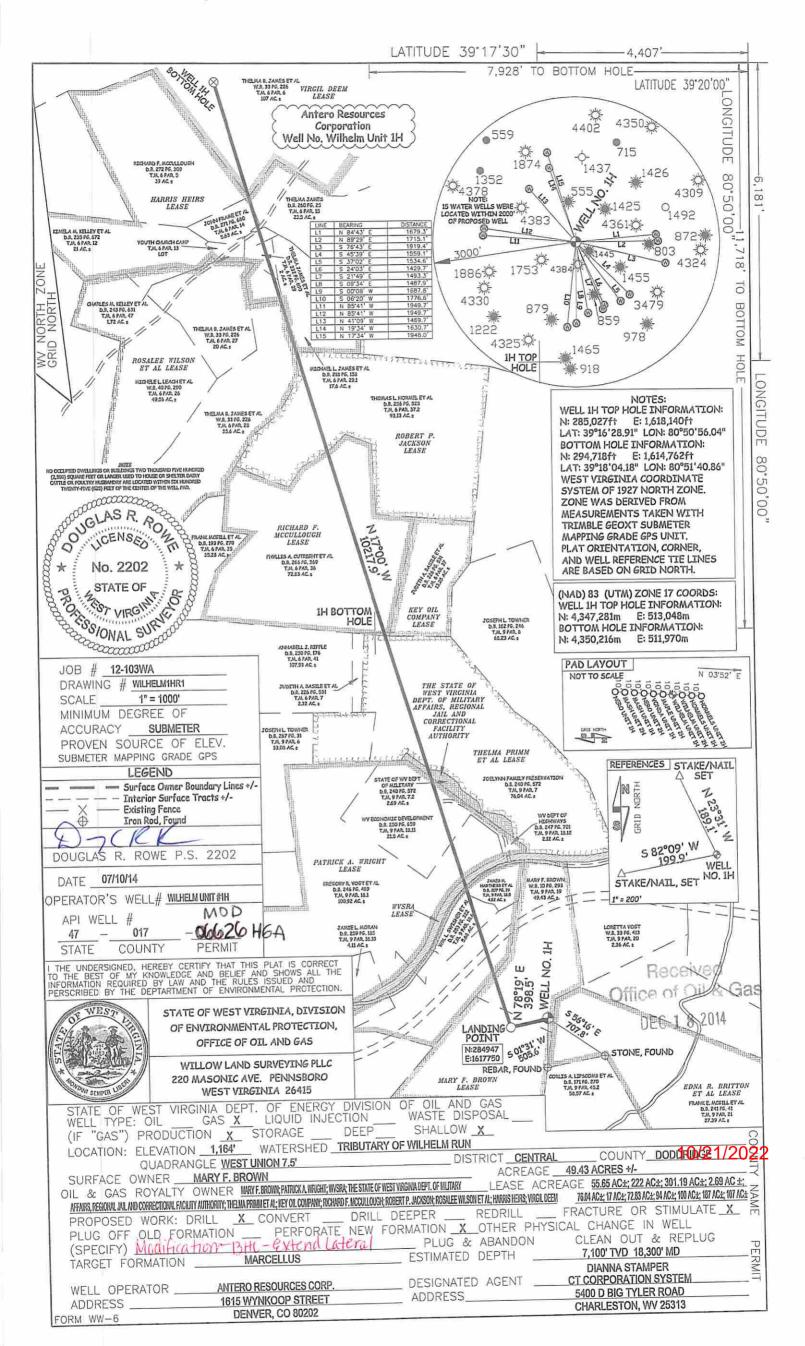
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls

barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

^{*}Note: Attach additional sheets as needed.







17-06/024

Operator's Well Number

Wilhelm Unit 1H

API# 47-017-06626 PERMIT MODIFICATION

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:

,	Granto	or, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
1	Mary F. Brown Lease				
		Mary F. Brown	N.G. Clark	Flat Rate	0097/0049
		N.G. Clark	C.C. Adams	Assignment	0098/0095
		C.C. Adams	Cecil Pruit, Jr.	Assignment	0100/0205
		Cecil Pruit, Jr.	Petroleum Resources, Inc.	Assignment of Oil and Gas Lease	0180/0222
		Petroleum Resources, Inc.	MBM Interests, Inc.	Assignment Agreement	0214/0073
		MBM Interests, Inc.	Antero Resources Appalachian Corp.	*Partial Assignment of Oil and Gas Leases	0270/0059
		Antero Resources Appalachian Corporation	Antero Resources Corp.	Name Change	Exhibit 1
1	Edna R. Britton, et al Le	ease_			
		Edna R. Britton, et vir	Samuel D. Gaston	1/8	0137/0375
		Samuel D. Gaston	Eastern American Energy Corporation	Assignment	0174/0361
		Eastern American Energy Corporat	o ,	Confirmatory Deed and Assignment of Leases	0240/0498
		Energy Corporation of America	Corp.	*Partial Assignment of Oil and Gas Leases	0272/0307
		Antero Resources Appalachian Co	orp. Antero Resources Corp.	Name Change	Exhibit 1
	Patrick A. Wright Lease				
		Patrick A. Wright	Key Oil Company	1/8	0179/0260
		Key Oil Company	Antero Resources Appalachian Cor	p. *Partial Assignment of Oil & Gas Leases	0256/0285
		Antero Resources Appalachian Corp	o. Antero Resources Corp.	Name Change	Exhibit 1
/	WVSRA Lease				
		West Virginia State Rail Authority Antero Resources Appalachian Corp	Antero Resources Appalachian Cor Antero Resources Corp.	p. 1/8+ Name Change	0253/0409 Exhibit 1
	The State of West Virging Jail & Correctional Facil	nia Dept. Of Military Affairs, Regiona ity Lease	1		
		State of West Virginia Department of Military Affairs, Regional Jail & Correctional Facility Authority	of Antero Resources Corporation	1/8	0336/0469

*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.

Office of Oil & Gas

CONTINUED ON NEXT PAGE

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	Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
1				
•	Thelma Primm et al Lease Robert P. Jackson, Harry E. Grit Judith A. Basile, as Trustee for	The	orp. 1/8+	0261/0525
,	Joelynn Family Preservation Tr Antero Resources Appalachia		Name Change	Exhibit 1
$\sqrt{}$	Key Oil Company Lease			
-	Key Oil Company	Key Oil Company	1/8	0181/0725
	Key Oil Company	Antero Resources Corporation	n *Partial Assignment of Oil & Gas Leases	0256/0285
	Antero Resources Appalachia	an Corp. Antero Resources Corp.	Name Change	Exhibit 1
/	Richard F. McCullough Lease			
/	Richard F. McCullough Carolyi Irrevocable Trust	n E. Farr Key Oil Company	1/8	0182/0319
	Key Oil Company	Antero Resources Appalachian Corporation	*Partial Assignment of Oil & Gas Leases	0256/0285
	Antero Resources Appalachia	an Corp. Antero Resources Corp.	Name Change	Exhibit 1
/	Robert P. Jackson Lease			
/	Robert P. Jackson	Antero Resources Appalachian Corporation	1/8+	0264/0121
	Antero Resources Appalachia	•	Name Change	Exhibit 1
	Rosalee Wilson et al Lease			
V	Rosalee Wilson	Antero Resources Appalachian Corporation	1/8+	0266/0708
	Antero Resources Appalachia	•	Name Change	Exhibit 1
/	Harris Heirs Lease			
V	Harris Heirs	Devonian Appalachian Co., Inc.	1/8	0161/0194
	Devonian Appalachian Co.,		Deed, Assignment and Agreement	0200/0563
	New Freedom Energy,	, LLC Antero Resources Corp.	*Partial Assignment of Oil and Gas Leases	0336/0127
	Received			
	Received Office of Oil & Gas			
	DEC 1 8 2014			

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	Lease Name or				
_	Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
J	Virgil Deem Lease				
		Virgil Deem Petroleum Development Corp. PDC Mountaineer, LLC	Petroleum Development Corp. PDC Mountaineer, LLC Antero Resources Appalachian Corp.	1/8 Assignment *Partial Assignment of Leases	0123/0211 0240/0118 0278/0607
		Antero Resources Appalachian Corp.	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

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.

Descinat	Well Operator:	Antero Resources Corporation
Received Office of Oil & Gas	By:	Ward McNeilly W. MWX
	Its:	Vice President Reserves, Planning & Midstream
DEC 1 8 2014		

Natalic E. Tennant.

1900 Kanawha Bivd E Bldg 1, Suite 157-K

Secretary of State

FILED

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

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

APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY

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

Charleston, WV 25305 **FILE ONE ORIGINAL** (Two if you want a filted stamped copy returned to you) FEE: \$25:00

1. 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 Conv of Name Change as filed in home State of incorporation.) Antero Resources Corporation 4. Name the corporation elects to use in WV: (due to home state name not being available) 5. 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 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

**** 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:

**Im<u>nortant Leval Notice Revarillur Siznatur</u>g:* Pex West Virginia Code <u>531D-1-129</u>. Penalty for sigaing false document. Any person who signs a document he or she knows is thise in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdymosnor and, upon conviction thereof, shall be fixed not more than one thousand dollars or confined in the county or regional jall not more than one year, or both.

Form CF-4

Signature:

listed by the Office of the Secretary of Sinte .

Revised 4/13

Title/Capacity: Authorized Person

Date: June 10, 2013

WY012 - 04/16/2011 Walters Kkinver Oellin

Received Office of Oil & Gas

7. Signature information (See below *Important Legal Notice Regarding Signature):

Print Name of Signer: Abyn A. Schop

WW-60 (7-01)

DATE: Sep	otember 12	,	20	14	
OPERATOR'S	}	_			_
WELL NO. v	Vilhelm Unit 1H				
API NO: <u>4</u> Sta		Pe	ermi	it No.	

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

AFFIDAVIT

State of Colorado
County of Denver
I, Max Green (the designated owner or operator or authorized representative thereof), after being duly sworn, do declare that the undersigned is authorized by the owner of the working interest in the well permit application to which this affidavit is attached to state that (he, she, or it) shall tender to the owner of the oil and gas in place not less than one-eighth of the total amount paid to or received by or allowed to the owner of the working interest at the wellhead for the oil or gas so extracted, produced, or marketed before deducting the amount to be paid or set aside for the owner of the oil or gas in place, or all such oil or gas to be extracted, produced, or marketed from the well. West Virginia Code 22-6-8(e).
Signed:
Taken, subscribed and sworn to before me this day of
Notary Public
My Commission expires: $\frac{6/3/18}{}$
WY COMMISSION EXPINE 3, 2018 WY COMMISSION EXPINE 3, 2018 BACK DE STANE 3, 2018 WY COMMISSION EXPINE 3, 2018 BACK DE STANE 3, 2018 OUT OF STANE 3, 2018 COMMISSION EXPINE 3, 2018 BACK DE STANE 3, 2018