

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

February 23, 2016

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET DENVER, CO 80202

Re: Permit Modification Approval for API Number 1706401, Well #: KNIGHT UNIT 1H

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, Taph The

Gene Smith

Assistant Chief of Permitting

Office of Oil and Gas



February 11, 2016

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 57th Street Charleston, WV 25304

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Ms. Adkins:

WV Department of avironmental.Protection

Antero Resources Corporation (Antero) would like to submit the following permit modification for the Protection approved well on the existing Hamilton Pad. We are requesting to extend the lateral length and associated Estimated Measured Depth for the Knight Unit 1H (API #47-017-06401).

Attached you will find the following documents:

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

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

Thank you in advance for your consideration.

mon Steele

Sincerely,

Ashlie Steele

Permitting Supervisor

Antero Resources Corporation

Enclosures

4701706401 MD

API NO. 47-017 - 06401

OPERATOR WELL NO. Knight Unit 1H

Well Pad Name: Hamilton Pad

API# 47-017-06401 PERMIT MODIFICATION

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

1) Well Operator: Antero	Resources	Corporal	494488557	017-Doddrid	Grant	Smithburg 7.5'
			Operator ID	County	District	Quadrangle
2) Operator's Well Number	r: Knight Un	it 1H	Well Pac	Name: Hamil	ton Pad	
3) Farm Name/Surface Ow	ner: Hamilton	, Kenneth E.	, et al Public Roa	d Access: CR	24	
4) Elevation, current groun	id: 1157'	Ele	evation, proposed	post-construction	on: 1157'	
5) Well Type (a) Gas Other	X	_ Oil	Unde	erground Storag	e Off	ice of Oil and Gas
(b)If Gas	Shallow Horizontal	X	Deep			FEB 1 2 2016
6) Existing Pad: Yes or No					W	V Department of
7) Proposed Target Format Marcellus Shale: 7200' T					essure(s):	ronmental Protection
8) Proposed Total Vertical	Depth: 7200	O' TVD				
9) Formation at Total Vert		Marcellus	Shale			
10) Proposed Total Measur	red Depth:	17700' ME)	/		
11) Proposed Horizontal L	eg Length:	9884'		4/0	170	6401 Mer.
12) Approximate Fresh Wa	iter Strata Dej	pths:	220'			Mev
13) Method to Determine I 14) Approximate Saltwater		_	Saskins Unit 1H (API# 47-017-0	6260) on	same pad.
15) Approximate Coal Sea	m Depths: 83	21'				
16) Approximate Depth to	Possible Voic	d (coal min	ne, karst, other):	None anticipat	ed	
17) Does Proposed well loo directly overlying or adjace			Yes	No	X	
(a) If Yes, provide Mine	Info: Name:					
	Depth:					
	Seam:	-				
	Owner	:				

API NO. 47- 017 _ 06401

OPERATOR WELL NO. Knight Unit 1H

Well Pad Name: Hamilton Pad

API# 47-017-06401 PERMIT MODIFICATION

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#	391'	391'	CTS, 543 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2515'	2515'	CTS, 1024 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	17700'	17700'	4455 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

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	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 & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners						REC	EIVED
					-	office of	Til and Cas

Office of Oil and Gas

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Environmental Protection

Kind: N/A

Sizes: N/A

Depths Set: N/A

OPERATOR WELL NO. Knight Unit 1H

Well Pad Name: Hamilton Pad

API# 47-017-06401 PERMIT MODIFICATION

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."

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

- 21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 27.12 Existing Acres
- 22) Area to be disturbed for well pad only, less access road (acres): 3.14 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

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.

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Operator's Well Number

Knig	ht L	Jnit	1H

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
Silas Ash Lease			
Silas Ash	The South Penn Oil Co.	Flat Rate	0007/0494
South Penn Oil Company	The Pennzoil Company, et al	Name Change	0201/0510
The Pennzoil Company, et al	Devon Energy Production Company L. P.	Name Change	0244/0399
Devon Energy Production Company L. P.	East Resources, Inc.	Assignment	0247/0337
East Resources. Inc.	Antero Resources Appalachian Corp.	*Partial Assignment of Oil and	0271/0155
Eddt (Goodfood, filo.	Autoro (Cocaroco Appaiacina) Corp.	Gas Leases	027 110 100
Antero Resources Appalachian	Antero Resources Corporation	Name Change	Exhibit 1
Corporation		e ege	
Angelina Duncan Lease			
Angelina B. Duncan	Stonewall Gas Company	1/8	0154/0594
Stonewall Gas Company	Drilling Appalachian Corp.	Assignment	0158/0304
Drilling Appalachian Corp.	Dominion Appalachian Development	Assignment	0181/0667
Dominion Appalachian Development, LLC,	Antero Resources Appalachian Corp.	*Partial Assignment of Oil and	0230/0113
DEPI, & DTI, Inc.	Processing Co.p.	Gas Leases	3230/0110
Antero Resources Appalachian	Antero Resources Corporation	Name Change	Exhibit 1
Corporation	• • • • • • • • • • • • • • • • • • • •		
Charles N. Costilow Lease Charles N. Costilow Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0288/0471 Exhibit 1
Emory Kimball Lease Emory and Gladys Kimball Drilling Appalachian Corporation	Drilling Appalachian Corporation Dominion Exploration & Production, Inc.	1/8 Assignment	0156/0331 0243/0397
• • • •		•	
Dominion Exploration & Production, Inc. CNX Gas Company LLC	CNX Gas Company, LLC	Assignment	0292/0469
Antero Resources Appalachian	Antero Resources Appalachian Corporation	Assignment	0260/0125
Corporation	Antero Resources Corporation	Name Change	Exhibit 1
·	4704	706401 Mod	
Maude Shrader et al Lease	470 1	7 0 9	
Maude Shrader, et al	C.E. Beck	1/8	0104/0504
C.E. Beck	Pennzoil Company	Assignment	0104/0573
Pennzoil Company	Chesterfield Energy Corporation	Assignment	0166/0121
Chesterfield Energy Corporation	Dominion Appalachian Development, Inc.	Merger	Unrecorded Document
Dominion Appalachian Development, Inc.	Dominion Appalachian Development, LLC	Certificate of Conversion	Exhibit 2
Dominion Appalachian Development, LLC,	Antero Resources Appalachian Corp.	*Partial Assignment of Oil and	0230/0113
DEPI, & DTI, Inc.		Gas Leases	
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
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*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 and Gas

Operator's Well Number

Knight Unit 1H

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>David E. Bowyer Lease</u> David E. Bowyer Antero Resources Appalachian Corporation	Antero Resources Appalachian Corp. Antero Resources Corporation	1/8+ Name Change	0400/0513 Exhibit 1
Gwendolyn Coffman, et al Lease Gwendolyn Coffman & L. Brooks Coffman Drilling Appalachian Corporation Antero Resources Appalachian Corporation	Drilling Appalachian Corporation Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Assignment Name Change	0276/0010 0401/0499 Exhibit 1
Edgar Hartley Lease Edgar B. Hartley	Antero Resources Corporation	1/8+	0498/0328

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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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Lease Name or				
Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Anna Sweeney Lease				
	Anna Sweeney	Four Leaf Land Company	1/8	0370/0635
	Four Leaf Land Company	Antero Resources Appalachian Corp.	Assignment	0403/0566
	Antero Resources Appalachian Corp.	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.

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

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 PAPED Office of Oil and Gas 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

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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 Corporation

By: Ward McNeilly

Its: Senior Vice President - Reserves Planning & Midstream

Page 1 of

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API# 47-017-06401 PERMIT MODIFICATION

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	DATE: F	ebruar	y 11	, 20 16
	OPERATOR		Coakle -	
	WELL NO.	Knight Ur	nit 1H	
	API NO:		017	06401
	S	tate	County	Permit No.
STATE OF	WEST VI	RGTNTA		or operator, do owner of the shall tender
OFFICE (OF OIL AN	D GAS		<u> </u>
DEPARTMENT OF EN	IVIRONMEN'	ral pro	OTECTION	ĮĮ.
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tate of Colorado			- 1	2 10 1
County of Denver		- 0	1770	0 .,
2000-00		41) ,	
Brett Kuhn		signat	ed owner	or operator,
or authorized representative	thereof),	after	being d	uly sworn, do
leclare that the undersigned		orized	by the	owner of the
orking interest in the well affidavit is attached to state	that (h	e she	or it	chall tender
o the owner of the oil and g				
of the total amount paid to				
wner of the working interest				
o extracted, produced, or ma				
o be paid or set aside for the				
r all such oil or gas to k rom the well. West Virginia				or marketed
Tom the well. West Virginia	Code 22-6	5-6(E)	•	
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signed:				
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February , 20 16	· ·	rore in	e chis —	day of
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y Commission expires: TNIM	71, 7018			

KARA QUACKENBUSH
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20144028297
MY COMMISSION EXPIRES JULY 21, 2018
02/26/2016

Wy Department of

Gas

Office of Oil and

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DRM WW-6A1 **EXHIBIT 1**



JUN 1 0 2013

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

FEE: 825:00

APPLICATION FOR **FILE ONE ORIGINAL** (Two if you want n filled AMENDED CERTIFICATE stamped copy returned to you) OF AUTHORITY

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

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

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

hash 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:

	Contact Name	Phone Number
	Alvyn A. Schopp	(303) 367-7310
	Name and phone number of contact person. (the filing, listing a contact person and phone num document.)	This is optional, however, if there is a problem with aber may avoid having to return or reject the
	:	
5.	Other amendments: (attach additional pages if necessary)	47011
1.	Name the corporation elects to use in WV: (due to home state name not being available)	Aftero Resources Corporation
3,	Corporate name has been changed to: (Attach one Certified Conv of Name Change as filed in home State of incorporation.)	II.
	issued in West Virginia:	Antero Resources Corporation
2.	Date Certificate of Authority was	6/25/2008
	authorized to transact business in WV:	Antero Resources Appalachian Corporation
1.	Name under which the corporation was	

*Important Legal Notice Reparting Standing: For West Virginia Code 5310-1-129. Penalty for signing false document.

Any person who signs a document his 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 misdomesnor and, upon conviction theseof, shall be fined not more than one thousand delites or confised in the county or regional jall as more than one year, or both.

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lisued by the Office of the Becretary of State -

Revised 4/13

WV011 - 0446/2011 Walters Klawer Osline

FORM WW-6A1 **EXHIBIT 2**



Certificate

I, Betty Ireland, Secretary of State of the State of West Virginia, hereby certify that

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Environmental Protectior WV Department of

DOMINION APPALACHIAN DEVELOPMENT, INC.

(a Virginia corporation)

filed an application for Conversion in my office as required by the provisions of the West Virginia Code and was found to conform to law.

Therefore, I issue this

CERTIFICATE OF CONVERSION

converting the corporation to

DOMINION APPALACHIAN DEVELOPMENT, LLC (a Virginia Limited Liability Company)



Given under my hand and the Great Seal of the State of West Virginia on

February 23, 2006

Setty Treland

Secretary of State 02/26/2016



