

#### west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary www.dep.wv.gov

# Friday, March 1, 2019 PERMIT MODIFICATION APPROVAL Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for BRADEN UNIT 3H

47-095-02503-00-00

Modified Well Bore Point of Entry

#### 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: BRADEN UNIT 3H

Farm Name: STEPHEN GRIMM

U.S. WELL NUMBER: 47-095-02503-00-00

Horizontal 6A New Drill
Date Modification Issued: March 1, 2019

Promoting a healthy environment.

OPERATOR WELL NO. Braden Unit 3H Well Pad Name: Alta Pad

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

1) Well Operate	or: Antero l	Resources	Corporat	494507062	095 - Tyler	McElroy	Centerpoint 7.5'
			<del>_</del> _	Operator ID	County	District	Quadrangle
2) Operator's V	Vell Number:	Braden U	nit 3H	Well Pad	Name: Alta P	ad	
3) Farm Name/	Surface Own	er: Stephe	n Grimm	Public Road	d Access: CR	23	
4) Elevation, cu	irrent ground	: 827'	Ele	evation, proposed p	ost-construction	on:	
5) Well Type	(a) Gas 2	Χ	_ Oil	Unde	rground Storag	ge	
	-	Shallow	X	Deep		<del></del>	
	` '	Horizontal	X				
6) Existing Pad	: Yes or No	Yes					
· •	_	–		pated Thickness ar ss- 55 feet, Associa			
8) Proposed To	tal Vertical I	Depth: 710	0' TVD				
9) Formation at			Marcellus				
10) Proposed T	otal Measure	ed Depth:	21700' MI	D			
11) Proposed H	Iorizontal Le	g Length:	12628'				
12) Approxima	te Fresh Wat	er Strata De	pths:	29', 369'			
13) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations.							
14) Approxima	te Saltwater	Depths: 10	93', 1159'	', 1260'			
15) Approxima	te Coal Seam	Depths: 1	lone Iden	tified			
16) Approxima	te Depth to P	Possible Voi	d (coal mi	ne, karst, other):	None Anticipa	ted	
17) Does Propo directly overlyi				ns Yes	No	X	
(a) If Yes, pro	ovide Mine Ir	nfo: Name	:offic	RECEIVED se of Oil and Gas			
		Depth		FB - 7 2019			
		Seam	: <u> </u>	W Department of			
		Owne	r: Envi	N Department of ronmental Protection			

OPERATOR WELL NO. Braden Unit 3H

Well Pad Name: Alta Pad

# 18)

# **CASING AND TUBING PROGRAM**

ТҮРЕ	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#	420' *see #19	420' *see #19	CTS, 583 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#	21700'	21700'	5559 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	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"	0.415"	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							

# **PACKERS**

Kind:	N/A		
Sizes:	N/A	RECEIVED, Co.	
Depths Set:	N/A	Office of Oil and Gas	

WV Department of Environmental Protection WW-6B (10/14)

OPERATOR WELL NO. Braden Unit 3H

Well Pad Name: Alta 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): 17.43 acres
- 22) Area to be disturbed for well pad only, less access road (acres): 7.28 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.



47095022390000

Braden Unit 3r



0 1,000 2,000 FEET

WELL SYMBOLS
Gas Well

February 28, 2018

RECEIVED Office of Oil and Gas

FEB - 7 2019

WV Department of Environmental Protection

Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf
O Dopev	m	Jav-Bee Oil & Gas	Jay-Bee Oil & Gas	12,084	6821 - 12007	Marcellus Shale	Big Injun, Weir, Alexander

RECEIVED Office of Oil and Gas

FEB - 7 2019

WV Department of Environmental Protection

Permit Modification API# 47-095-02503 MeD

# 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
M.V. B. George Lease			
M. V. B. George	IM Underwood	1/8	66/621
IM Underwood	Hope Natural Gas Company	Assignment	71/610
Hope Natural Gas Company	Consolidated Gas Supply Corp	Assignment	169/26
Consolidated Gas Supply Corp	Consolidated Gas Transmission Corp	Assignment	249/287
Consolidated Gas Transmission Corp	CNG Transmission Corp	Name Change	Exhibit 2
CNG Transmission Corp	Dominion Transmission, Inc	Name Change	Exhibit 3
Dominion Transmission, Inc	CONSOL Energy Holding LLC	Assignment	374/187
CONSOL Energy Holdings, LLC	CNX Gas Company	Name Change	293/252
CNX Gas Company	Antero Resources Appalachian Corp	Assignment	425/725
Antero Resources Appalachian Corp	Antero Resources Corp	Name Change	Exhibit 1
C.B. Morris & S.A. Smith Irrevocable Trust Leas			
C.B. Morris & S.A. Smith Irrevocable Trust	Antero Resources Corporation	1/8	0632/0551
Donna Fogus Lease			
Donna Fogus	Antero Resources Corporation	1/8+	404/558
Eliza Underwood Et, Al Lease			
Eliza Underwood Et, al	South Penn Oil Company	1/8	23/126
South Penn Oil Company	Hope Natural Gas Company	Assignment	22/240
Hope Natural Gas Company	Consolidated Gas Supply Corp	Assignment	143/345
Consolidated Gas Supply Corp	Consolidated Gas Transmission Corp	Assignment	135/583
Consolidated Gas Transmission Corp	CNG Transmission Corp	Name Change	Exhibit 2
CNG Transmission Corp	Dominion Transmission, Inc	Name Change	Exhibit 3
Dominion Transmission, Inc	CONSOL Energy Holdings LLC	Assignment	224/1
CONSOL Energy Holdings LLC	CNX Gas Company	Name Change	293/252
CNX Gas Company	Antero Resources Appalachian Corp	Assignment	0317/0379
Antero Resources Appalachian Corp	Antero Resources Corp Office of Oil and Gas	Name Change	Exhibit 1
,	FEB - 7 2019		
BRC Appalachian Minerals I, LLC Lease			
BRC Appalachian Minerals I, LLC	BRC Working Interest Company, LLC WV Department of Chesapeake Appalachia, LLC Environmental Protection	1/8	369/300
BRC Working Interest Company, LLC	Chesapeake Appalachia, LLC Environmental Protection	Assignment	368/784
Chesapeake Appalachia, LLC	SWN Production Company	Assignment	465/463
SWN Production Company	Antero Exchange Properties, LLC	Assignment	465/463
Antero Exchange Properties, LLC	Antero Resources Corporation	Merger	544/242
Life & Abby LLC Lease (TM16-4) & (TM 16-5)	/		
Life & Abby LLC	Antero Resources Corporation	1/8	534/716

<sup>\*</sup>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 No. Braden Unit 3H

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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 Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Bayard Sweeney, Jr., et ux Le	ease 🗸			
	Bayard Sweeney, Jr., et ux	Drilling Appalachian Corporation	1/8	0319/0308
	Drilling Appalachian Corporation  Antero Resources Appalachian Corp.	Antero Resources Appalachian Corporation  Antero Resources Corporation	1/8 Name Change	0391/0416 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 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 Pighways Gas

U.S. Army Corps of Engineers

U.S. Fish and Wildlife Service

FEB - 7 2019

County Floodplain Coordinator

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 Resource	s Cor	poration	
By:	Kevin Kilstrom	lles	Retie	
Its:	Senior Vice Pres			

# FORM WW-6A1 **EXHIBIT 1**

Natalie E. Tennant.

FILE ONE ORIGINAL (Two if you want a Med

Scoretary of State 1900 Kanawha Bivd E Bidg 1, Suite 157-K Charleston, WV 25305 FILED

applies for an Amended Certificate of Authority and submits the following statement:

JUN 1 0 2013

Penney Barker, Manager IN THE OFFICE OF Corporations Division ECRETARY OF STATE Part (304)558-8000

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

APPLICATION FOR AMENDED CERTIFICATE

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

stamped copy returned to you) FEE: \$25.00 OF AUTHORITY \*\*\*\* In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby \*\*\*\*

1.	Name under which the corporation was authorized to transact business in WV:	Antero Resources Appalachian Corporation
2.	Date Certificate of Authority was issued in West Virginia:	6/26/2008
3.	Corporate name has been changed to: (Attach one <u>Certified Copy of Name Change</u> as filed in home State of theorperation.)	Antero Resources Corporation
4.	Name the corporation elects to use in WV: (due to home state name not being available)	Antero Resources Corporation
5.	Other amendments: (attach additional pages if necessary)	
	1	
6.	the filing, listing a contact person and phone num document.)	ECEIVED
	Alvyn A. Schopp Office of	of Oil and Gas (303) 357-7310
	Contact Name FEB	3 - 7 2019 Phone Number
7.	Signature information (See below *Important)	Department of Legis Worker Referding Signature):  Title/Capacity: Authorized Person
	Print Name of Signer: Aleyn A. Schopp	Title/Capacity:
	Signature: TYSHOCKOPP	Date: June 10, 2013
	, ,,	
Any		into Code <u>5311)-1-129</u> . Penalty for signing faite document, ly material respect and knows that the document is to be delive

Form CF-4

listed by the Office of the Secretary of State

Revised 4/15

