



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

Wednesday, June 26, 2019
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for RODZINA UNIT 1H
47-095-02585-00-00

Extending lateral

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: RODZINA UNIT 1H
Farm Name: GARY D. DAWSON ET UX
U.S. WELL NUMBER: 47-095-02585-00-00
Horizontal 6A New Drill
Date Modification Issued: 6/26/2019

Promoting a healthy environment.

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

1) Well Operator: Antero Resources Corporation 494507062 095 - Tyler Centerville Shirley 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Rodzina Unit 1H Well Pad Name: Dawson Pad

3) Farm Name/Surface Owner: Gary D. Dawson et ux Public Road Access: State Route 18

4) Elevation, current ground: 1009' Elevation, proposed post-construction: _____

5) Well Type (a) Gas Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow Deep _____

Horizontal _____

6) Existing Pad: Yes or No Yes

JCS
6/26/2019

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6900' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6900' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 20000' MD

11) Proposed Horizontal Leg Length: 9842'

12) Approximate Fresh Water Strata Depths: 115', 320', 455'

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

14) Approximate Saltwater Depths: 551', 1583', 1830'

15) Approximate Coal Seam Depths: 275', 424', 975'

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: _____

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WW-6B
(04/15)

API NO. 47-095 - 02585
OPERATOR WELL NO. Rodzina Unit 1H
Well Pad Name: Dawson 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#	505 *see # 19	505 *see #19	CTS, 702 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#	20000	20000	5092 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

JCB
6/26/2019

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			
Depths Set:	N/A			

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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.

JCS
6/26/2019

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): Existing 28.65 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 9.14 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.

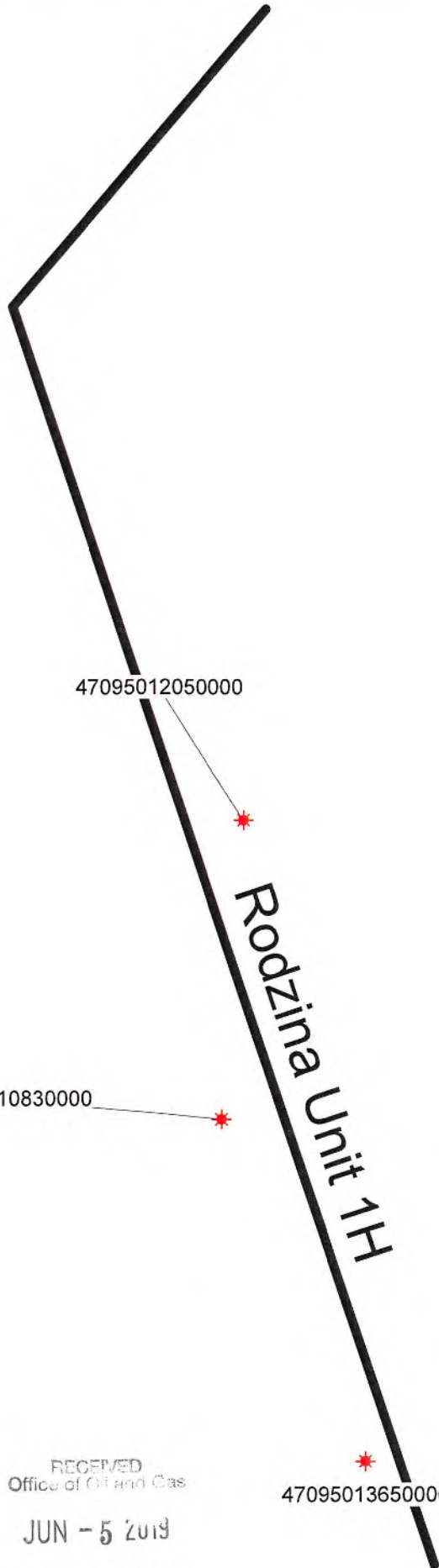
*Note: Attach additional sheets as needed.

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Antero Resources Corporation

Rodzina Unit 1H - AOR



WELL SYMBOLS
Gas Well

November 27, 2018

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UWI (API/Num)	Well Name	Well Number	Operator	Hist Oper	ID	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Productible Formation(s) not perf'd
47095012050000	HADLEY CLARENCE	1	CONSOL GAS COMPANY	ANVIL OIL COMPANY	5,134	4529 - 4951	Riley, Benson	Big Injun, Weir, Alexander
47095010830000	GRIFFIN O W & L A	JK-991	ENERGY CORP OF AMER	J & J ENTERPRISES	5,996	4596 - 5943	Riley, Benson, Rhinestreet	Big Injun, Weir, Alexander
47095013650000	MEREDITH ROY	3	ENERGY CORP OF AMER	EASTERN AMERICAN ENE	5,610	4587 - 4990	Keener, Riley, Benson	Big Injun, Weir, Alexander

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WW-6A1

Operator's Well Number Rodzina Unit 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
<u>Gary D. Dawson et ux Lease</u>			
Gary D. Dawson et ux	Antero Resources Corporation	1/8+	0459/0133
<u>Coastal Forest Resources Co. Lease (TM 15 P 28)</u>			
Coastal Forest Resources Co.	Noble Energy Inc	1/8+	0534/0250
Noble Energy Inc	CNX Gas Co. LLC	Assignment	0549/0523
CNX Gas Co. LLC	Antero Resources Corporation	Assignment	0564/0704
<u>Ralph Freeman Wilson Sr. Lease</u>			
Ralph Freeman Wilson Sr.	Antero Resources Corporation	1/8+	0567/0302
<u>Coastal Forest Resources Co. Lease (TM 15 P 31)</u>			
Coastal Forest Resources Co.	Noble Energy Inc	1/8+	0534/0250
Noble Energy Inc	CNX Gas Co. LLC	Assignment	0549/0523
CNX Gas Co. LLC	Antero Resources Corporation	Assignment	0564/0704
<u>Ralph J. Underwood et ux Lease</u>			
Ralph J. Underwood et ux	Chesterfield Energy Corporation	1/8	0267/0125
Chesterfield Energy Corporation	Dominion Appalachian Development	Assignment	0312/0505
Dominion Appalachian Development	Consol Gas Appalachian Development	Name Change	0009/0124
Consol Gas Appalachian Development	Consol Gas Reserves Inc	Merger	0009/0144
Consol Gas Reserves Inc	Consol Gas Company	Merger	0009/0156
Consol Gas Company	CNX Gas Company LLC	Name Change	0009/0206
CNX Gas Company LLC	Antero Resources Corporation	Agreement	0626/0386
<u>Clarence Hadley et ux Lease</u>			
Clarence Hadley et ux	Jack Burg	1/8+	0264/0637
Jack Burg	Anvil Oil Company Inc	Agreement	0265/0055
Anvil Oil Company Inc	Anvil Oil & Gas Company Inc	Name Change	WVSOS
Anvil Oil & Gas Company Inc	Dominio Appalachian Development Inc	Assignment	0232/0383
Dominio Appalachian Development Inc	Dominion Appalachian Development LLC	Name Change	WVSOS
Dominion Appalachian Development LLC	Consol Gas Appalachian Development LLC	Name Change	0009/0131
Consol Gas Appalachian Development LLC	Consol Gas Reserves Inc	Merger	0009/0144
Consol Gas Reserves Inc	Consol Gas Company	Merger	0009/0156
Consol Gas Company	CNX Gas Company LLC	Merger	0009/0206
CNX Gas Company LLC	Noble Energy Inc	Assignment	0388/0286
Noble Energy Inc	CNX Gas Company LLC	Assignment	0550/0273
CNX Gas Company LLC	Antero Resources Corporation	Agreement	0626/0386

*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.

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

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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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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Vada Sue Kissner Lease</u>			
Vada Sue Kissner	Antero Resources Corporation	1/8+	0446/0269
Antero Resources Corporation	CNX Gas Company LLC	Assignment	0503/0724
CNX Gas Company LLC	Antero Resources Corporation	Agreement	0626/0386
<u>Emerson Laurence Moore et ux Lease</u>			
Emerson Laurence Moore et ux	Royal Resources Corporation	1/8+	0190/0478
Royal Resources Corporation	Columbia Gas Transmission Corporation	Assignment	0191/0235
Columbia Gas Transmission Corporation	Anvil Oil Company Inc	Assignment	0265/0112
Anvil Oil Company Inc	Dominion Appalachian Development Inc	Assignment	0323/0383
Dominion Appalachian Development Inc	Dominion Appalachian Development LLC	Name Change	WVSOS
Dominion Appalachian Development LLC	Consol Gas Appalachian Development	Name Change	0009/0131
Consol Gas Appalachian Development	Consol Gas Reserves Inc	Merger	0009/0144
Consol Gas Reserves Inc	Consol Gas Company	Merger	0009/0156
Consol Gas Company	CNX Gas Company	Name Change	0009/0206
CNX Gas Company LLC	Antero Resources Corporation	Agreement	0626/0386
<u>Joseph E. Michael et ux Lease</u>			
Joseph E. Michael et ux	Antero Resources Corporation	1/8+	0557/0292
Antero Resources Corporation	CNX Gas Company LLC	Assignment	0503/0738
CNX Gas Company LLC	Antero Resources Corporation	Agreement	0626/0386

WW-6A1
(5/13)

Operator's Well No. Rodzina Unit 1H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Roy A. Meredith et ux Lease</u>	Roy A. Meredith et ux J & J Enterprises Inc. Eastern American Energy Corporation Energy Corporation of America Antero Resources Appalachian Corporation	J & J Enterprises Inc. Eastern American Energy Coporation Energy Corporation of America Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Assignment Certificate Merger Assignment Name Change	0257/0527 0282/0296 0009/0093 0398/0416 Exhibit 1

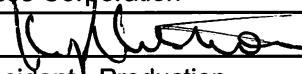
*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

**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 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, Production

FORM WV-6A1
EXHIBIT 1

FILED

JUN 10 2013

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



IN THE OFFICE OF
SECRETARY OF STATE

Fenny Baker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvscd.com
E-mail: business@wvscd.com

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

APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY

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

*** 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 Appalachia 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)

- 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.)

<u>Alvyn A. Schopp</u>	<u>(303) 357-7310</u>
Contact Name	Phone Number

- Signature information (See below **Important Legal Notice Regarding Signatures**):

Print Name of Signer: <u>Alvyn A. Schopp</u>	Title/Capacity: <u>Authorized Person</u>
Signature: <u><i>Alvyn A. Schopp</i></u>	Date: <u>June 10, 2013</u>

Important Legal Notice Regarding Signatures For West Virginia Code §31D-1-12. 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.

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Office of the Secretary of State

JUN - 5 2013

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