



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

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for ROBERT LEE UNIT 1H
47-095-02558-00-00

Change bottom hole location from a total measured depth from 25500' to 25300'.

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: ROBERT LEE UNIT 1H
Farm Name: JOSEPH R. RYMER JR.
U.S. WELL NUMBER: 47-095-02558-00-00
Horizontal 6A New Drill
Date Modification Issued: 04/26/2019

WW-6B
(04/15)

04/26/2019
Permit Modification API# 47-095-02558
API NO. 47-095 - 02558
OPERATOR WELL NO. Robert Lee Unit 1H
Well Pad Name: Rush Fork Pad

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 Meade Middlebourne 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Robert Lee Unit 1H Well Pad Name: Rush Fork Pad

3) Farm Name/Surface Owner: Joseph R. Rymer Jr Public Road Access: Middlebourne-Wick (CR 7)

4) Elevation, current ground: 986' 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

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6700' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

JCB
1/30/2019

8) Proposed Total Vertical Depth: 6700' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 25300' MD

11) Proposed Horizontal Leg Length: 16164'

12) Approximate Fresh Water Strata Depths: 30'

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

14) Approximate Saltwater Depths: 1485', 1485', 1510'

15) Approximate Coal Seam Depths: N/A

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: _____

WW-6B
(04/15)

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 Permit Modification API# 47-095-02558
 API NO. 47- 095 - 02558
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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#	300'	300'	CTS, 417 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#	25300'	25300'	6549 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

JEB
1/30/2019

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"/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-HPOZ & 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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 Page 2 of 3 Office of Oil and Gas
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 Environmental Protection

WW-6B
(10/14)

Permit Modification API# 47-095-02558

API NO. 47-095 - 02558

OPERATOR WELL NO. Robert Lee Unit 1H

Well Pad Name: Rush Fork 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.

Jeb
1/30/2019

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): 19.73 acres

22) Area to be disturbed for well pad only, less access road (acres): 7.78 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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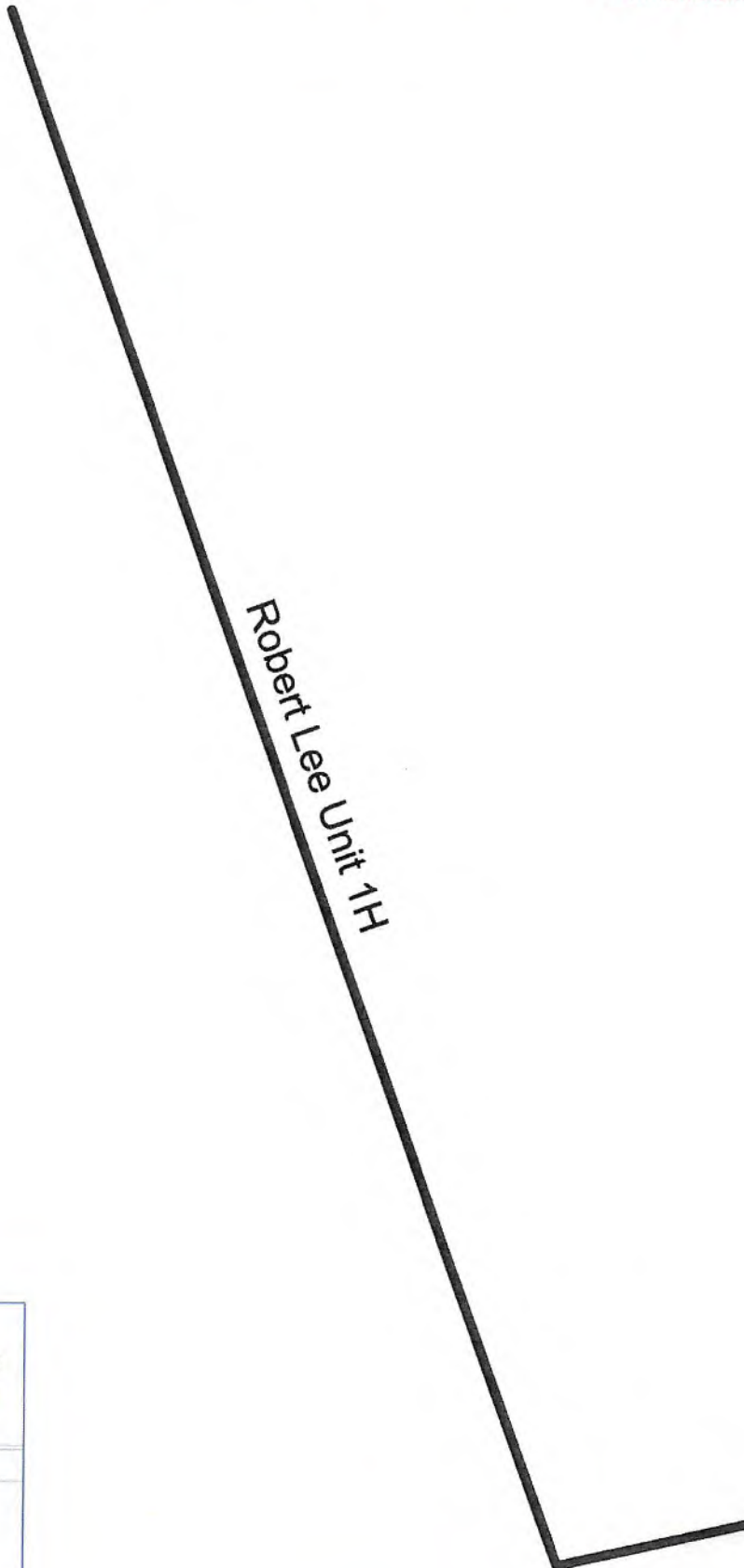
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Permit Modification API# 47-095-02558

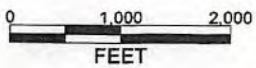


Robert Lee Unit 1H



Antero Resources Corporation

Robert Lee Unit 1H - AOR



No Wells of Interest REMARKS

January 14, 2019

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WV Department of
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Feb 1/30/2019

WW-6A1
(5/13)

Permit Modification API# 47-095-02558
Operator's Well No. Robert Lee 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:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Ann W. Clutter Lease</u>	Ann W. Clutter	Antero Resources Corporation	1/8+	0507/0553

*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 of Production

WW-6A1

Operator's Well Number Robert Lee Unit 1H
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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Howard H. Harcha III Lease</u> Howard H. Harcha III	Antero Resources Corporation	1/8+	0486/0689
<u>Theresa J. Wells Lease</u> Theresa J. Wells	Antero Resources Corporation	1/8+	0489/0653
<u>James Douglas White Lease</u> James Douglas White	Antero Resources Corporation	1/8+	0431/0560
<u>Fisher Oil Company Lease</u> Fisher Oil Company	Antero Resources Corporation	1/8+	0489/0591
<u>Kerr-McGee Oil & Gas Onshore LP Lease</u> Kerr-McGee Oil & Gas Onshore LP	Antero Resources Corporation	1/8+	0502/0272
<u>Rita G. Jarvis Lease</u> Rita G. Jarvis Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0422/0747 Exhibit 1
<u>Howard O. Flesher et ux Lease</u> Howard O. Flesher et ux Siltstone Resources II, LLC	Siltstone Resources II, LLC Antero Resources Corporation	1/8 Assignment	0482/0305 0597/0790
<u>Terri A. Gload Lease</u> Terri A. Gload	Antero Resources Corporation	1/8+	0455/0504
<u>Betty M. Knowlton Starkey Lease (TM 4 PCL 24)</u> Betty M. Knowlton Starkey	Antero Resources Corporation	1/8+	0579/0086
<u>Terrell Lee Starkey Lease</u> Terrell Lee Starkey Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0413/0714 Exhibit 1
<u>SW2 Minerals, LLC Lease</u> SW2 Minerals, LLC	Antero Resources Corporation	1/8+	0411/0794
<u>Charles H. Weekley et ux Lease</u> Charles H. Weekley et ux	Antero Resources Corporation	1/8+	0457/0533

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WW-6A1

Operator's Well Number Robert Lee Unit 1H
 Permit Modification API# 47-095-02558

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>The Thelma E. Hadley Testamentary Trust Lease</u>			
The Thelma E. Hadley Testamentary Trust	Antero Resources Appalachian Corporation	1/8+	0400/0748
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Kerr-McGhee Oil & Gas Onshore LP LLC Lease</u>			
Kerr-McGhee Oil & Gas Onshore LP LLC	Antero Resources Corporation	1/8+	0502/0270
<u>Roy D. Hadley Lease</u>			
Roy D. Hadley	Antero Resources Appalachian Corporation	1/8+	0416/0380
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Nancy P Bailey Lease</u>			
Nancy P Bailey	Antero Resources Corporation	1/8+	0585/0576
<u>Ridgewood Development, LLC Lease</u>			
Ridgewood Development, LLC	Antero Resources Corporation	1/8+	0456/0386
<u>George E. Post Lease</u>			
George E. Post	Siltstone Resources II, LLC	1/8+	0483/0617
Siltstone Resources II, LLC	Antero Resources Corporation	Assignment	0597/0790
<u>Larry D McMullen Lease</u>			
Larry D McMullen	Antero Resources Corporation	1/8+	0437/0364
<u>Geraldine Moses Lease</u>			
Geraldine Moses	Antero Resources Corporation	1/8+	0526/0194

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**FORM WV-6A1
EXHIBIT 1**

FILED

JUN 10 2013

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



Penney Barker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvsof.com
E-mail: business@wvsof.com

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

**APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY**

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

**** 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 Appalachian Corporation
- Date Certificate of Authority was issued in West Virginia: 6/26/2008
- 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.)
Alvyn A. Schopp (303) 367-7310
Contact Name Phone Number
- Signature information (See below **Important Legal Notice Regarding Signature**):
Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person
Signature: [Handwritten Signature] Date: June 10, 2013

**Important Legal Notice Regarding Signature:* Per West Virginia Code §31D-1-12D, 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 Oil and Gas
FEB - 6 2013
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04/26/2019



January 18, 2019

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

Ms. Adkins:

Antero Resources Corporation (Antero) would like to submit the following permit modification for two approved wells on the Rush Fork Pad. We are requesting to change the bottom hole locations of the Robert Lee Unit 1H (API# 47-095-02558) and the Forrest Fenn Unit 1H (API# 47-095-02560).

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the revised lateral length
- REVISED Form WW-6A1, which shows the new leases we will be drilling into
- REVISED Mylar Plats, which shows the new bottom hole location

If you have any questions please feel free to contact me at (303) 357-6820.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Karin Cox", is written over a white rectangular area.

Karin Cox
Permitting Agent
Antero Resources Corporation

Enclosures

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