



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

August 11, 2015

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit Modification Approval for API Number 9502167, Well #: PRUDENCE UNIT 2H

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,

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

Promoting a healthy environment.

08//14/2015



July 28, 2015

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. Melanie Hankins
601 57th Street
Charleston, WV 25304

Ms. Hankins:

Antero Resources Corporation (Antero) would like to submit the following permit modifications for three approved wells on the existing Coastal 2 Pad. We are requesting to extend the horizontal lateral lengths which will change the bottom hole locations of the Prudence Unit 1H (API# 47-095-02166), the Prudence Unit 2H (API# 47-095-02167), and the Tabor Unit 2H (API# 47-095-02165).

Attached you will find the following documents:

- REVISED Forms WW-6B, which show the revised MD and Production Casing/Cement programs
- REVISED Forms WW-6A1, which show the new leases we will be drilling into
- REVISED Mylar Plats, which show the new bottom hole locations

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

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in cursive script that reads "Ashlie Steele".

Ashlie Steele
Permitting Supervisor
Antero Resources Corporation

Enclosures

Received
Office of Oil & Gas
JUL 29 2015

08/14/2015

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

1) Well Operator: Antero Resources Corpora

<u>494488557</u>	<u>095 - Tyler</u>	<u>McElroy</u>	<u>Centerpoint 7.5'</u>
------------------	--------------------	----------------	-------------------------

Operator ID County District Quadrangle

2) Operator's Well Number: Prudence Unit 2H Well Pad Name: Existing Coastal 2 Pad

3) Farm Name/Surface Owner: Coastal Lumber Company Public Road Access: CR 64

4) Elevation, current ground: ~1,215' Elevation, proposed post-construction: 1,188'

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: 7,400' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2,950#

8) Proposed Total Vertical Depth: 7,400' TVD

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 20,700' MD

11) Proposed Horizontal Leg Length: 12,328'

12) Approximate Fresh Water Strata Depths: 180', 290'

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

14) Approximate Saltwater Depths: 1,705'

15) Approximate Coal Seam Depths: 905', 925', 935'

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

Received
Office of Oil & Gas
JUL 29 2015

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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, 109 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	345'	345'	CTS, 479 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2,485'	2,485'	CTS, 1,012 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	20,700'	20,700'	5,289 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7,100'	
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-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			

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 air drills the fresh water string which makes it difficult to determine when freshwater 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): 35.03 existing acres

22) Area to be disturbed for well pad only, less access road (acres): 5.66 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.

Received
Office of Oil & Gas
JUL 29 2015

*Note: Attach additional sheets as needed.

LATITUDE 39°27'30"

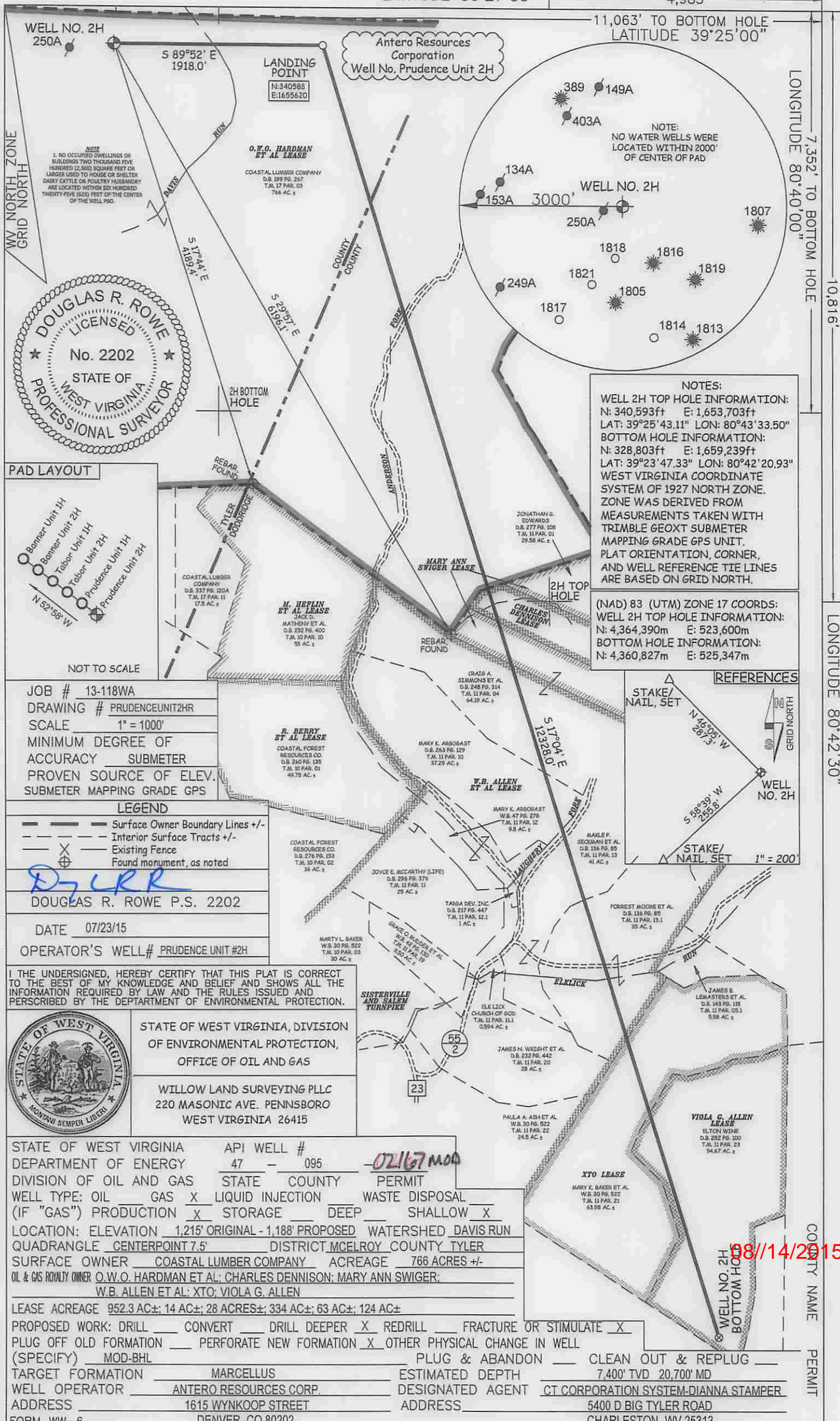
4,983'

11,063' TO BOTTOM HOLE
LATITUDE 39°25'00"

LONGITUDE 80°40'00"

10,816'

LONGITUDE 80°42'30"



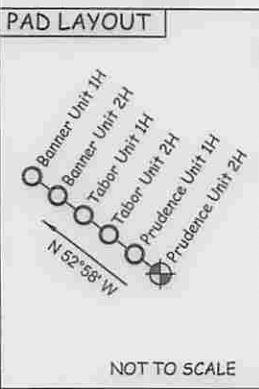
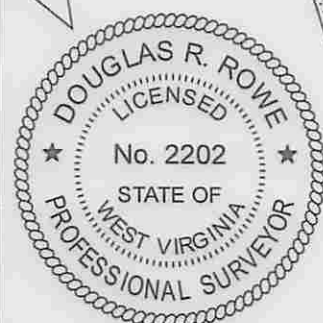
WELL NO. 2H
250A

S 89°52' E
1918.0'

LANDING POINT
N:340583
E:1659620

Antero Resources Corporation
Well No. Prudence Unit 2H

NOTE:
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.



NOTES:

WELL 2H TOP HOLE INFORMATION:
N: 340,593ft E: 1,653,703ft
LAT: 39°25'43.11" LON: 80°43'33.50"
BOTTOM HOLE INFORMATION:
N: 328,803ft E: 1,659,239ft
LAT: 39°23'47.33" LON: 80°42'20.93"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD 83 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
N: 4,364,390m E: 523,600m
BOTTOM HOLE INFORMATION:
N: 4,360,827m E: 525,347m

JOB # 13-118WA
DRAWING # PRUDENCEUNIT2HR
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND

--- Surface Owner Boundary Lines +/-
--- Interior Surface Tracts +/-
--- Existing Fence
⊕ Found monument, as noted

DOUGLAS R. ROWE P.S. 2202
DATE 07/23/15
OPERATOR'S WELL# PRUDENCE UNIT #2H

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

API WELL # 47 - 095 - 02167 MOD

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF "GAS") PRODUCTION STORAGE DEEP SHALLOW

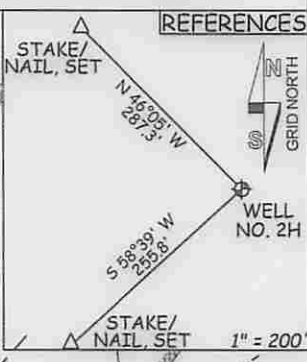
LOCATION: ELEVATION 1,215' ORIGINAL - 1,188' PROPOSED WATERSHED DAVIS RUN QUADRANGLE CENTERPOINT 7.5' DISTRICT MCELROY COUNTY TYLER

SURFACE OWNER COASTAL LUMBER COMPANY ACREAGE 766 ACRES +/-
OIL & GAS ROYALTY OWNER O.W.O. HARDMAN ET AL; CHARLES DENNISON; MARY ANN SWIGER; W.B. ALLEN ET AL; XTO; VIOLA G. ALLEN

LEASE ACREAGE 952.3 AC±; 14 AC±; 28 ACRES±; 334 AC±; 63 AC±; 124 AC±

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL
(SPECIFY) MOD-BHL PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,400' TVD 20,700' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT CT CORPORATION SYSTEM-DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313



08/14/2015

WW-6A1

Operator's Well Number Prudence Unit 2H

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>O.W.O Hardman et al Lease</u>			
O.W.O. Harman, et al	Michael Murphey	Flat Rate	0009/0013
Michael Murphy	Jennings Oil Company	Assignment	0024/0184
Jennings Oil Company	John A. Murphy	Assignment	0036/0415
John A. Murphy	Murphy Oil Company	Assignment	0040/0123
Murphy Oil Company	Dilmur Oil Company	Assignment	0091/0730
Dilmur Oil Company	Targa Development, Inc.	Assignment	0165/0428
Targa Development, Inc.	Antero Resources Appalachian Corporation	*Partial Assignment of Oil & Gas Leases	0257/0362
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Charles Dennison Lease</u>			
Charles O. Dennison Trust	Antero Resources Appalachian Corporation	1/8+	0305/0264
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Mary Ann Swiger Lease</u>			
Marry Ann Swiger, heir of Jacob M. Swiger	Antero Resources Appalachian Corporation	1/8	0282/0597
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>W.B. Allen et al Lease</u>			
W.B. Allen et ux	M. Murphy and E.H. Jennings & Bros	Flat Rate	0009/0102
M. Murphy and E.H. Jennings & Bros	Jennings Oil Co	Assignment	0024/0184
Jennings Oil Co	John A. Murphy	Assignment	0036/0415
John A. Murphy	Murphy Oil Co.	Assignment	0040/0123
Murphy Oil Co	Dilmur Oil Co.	Assignment	0091/0730
Dilmur Oil Co.	Targa Development, Inc.	Assignment	0165/0428
Targa Development, Inc.	Antero Resources Appalachian Corporation	Assignment	0257/0362
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>XTO Lease</u>			
XTO Energy, Inc.	Antero Resources Corporation	1/8+	0354/0263

Received
Office of Oil & Gas
JUL 29 2015

*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.

API# 47-095-02167 PERMIT MODIFICATION

WW-6A1
(5/13)

Operator's Well No. Prudence Unit 2H

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
Viola G. Allen Lease	Viola G. Allen	Antero Resources Appalachian Corporation	1/8+	0275/0657
	Antero Resources Appalachian Corporation	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 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.

Received
Office of Oil & Gas
JUL 29 2015

Well Operator: Antero Resources Corporation
By: Ward McNeilly
Its: VP Reserves Planning & Midstream

**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



**IN THE OFFICE OF
SECRETARY OF STATE**
Penney Barker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvso.com
E-mail: business@wvso.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:

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: 6/25/2008
3. Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of Incorporation.)
4. Name the corporation elects to use in WV: Antero Resources Corporation
(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) 367-7310
Contact Name Phone Number

7. 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

Received
Office of Oil & Gas
JUN 29 2013

***Important Legal Notice Regarding Signature:** Per West Virginia Code §31D-1-129, Penalty for signing false documents: 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.

API# 47-095-02167 PERMIT MODIFICATION

WW-60
(7-01)

DATE: July 28, 20 15
OPERATOR'S
WELL NO. Prudence Unit 2H

API NO: 47- 095 02167
State County Permit No.

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

A F F I D A V I T

State of Colorado

County of Denver

I, Brett Kuhn (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: [Signature]

Taken, subscribed and sworn to before me this 28th day of July, 20 15.

[Signature]
Notary Public

Received
Office of Oil & Gas
JUL 29 2015

My Commission expires: July 17, 2018

MEGAN DARLING
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20144028112
MY COMMISSION EXPIRES JULY 17, 2018

08/14/2015