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

June 08, 2015

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit Modification Approval for API Number 8510205, Well #: LEFT FORK UNIT 3H

Extend Lateral, correct TVD

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,

for Gene Smith

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

June 4, 2015

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 Lockhart Heirs West pad. We are requesting to extend the horizontal laterals, which will change the bottom hole locations of the Left Fork Unit 1H (API# 47-085-10204), Left Fork Unit 3H (API# 47-085-10205), and Left Fork Unit 4H (API# 47-085-10206).

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the revised lateral lengths and updated depths
- REVISED Form WW-6A1, which shows additional leases we will be drilling into
- REVISED Mylar Plat, which shows the new bottom hole locations

If you have any questions please feel free to contact me at (303) 357-7230.

Thank you in advance for your consideration.

Sincerely,

Megan C. Darling

Megan Darling
Permitting Agent
Antero Resources Corporation

RECEIVED
Office of Oil and Gas
JUN 0 6 2015
WV Department of
Environmental Protection

Enclosures

WW-6B
(04/15)

API # 47-085-10205 PERMIT MODIFICATION

API NO. 47- 085 - 10205
OPERATOR WELL NO. Left Fork Unit 3H
Well Pad Name: Lockhart Heirs West Pad

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

1) Well Operator: Antero Resources Corp.

Operator ID	County	District	Quadrangle
494488557	085 - Ritchie	Union	Pullman 7.5'

2) Operator's Well Number: Left Fork Unit 3H Well Pad Name: Lockhart Heirs West Pad

3) Farm Name/Surface Owner: O'Neill Family Trust et al Public Road Access: CR 9

4) Elevation, current ground: 1,039' Elevation, proposed post-construction: 1,021'

5) Well Type (a) Gas X Oil ____ Underground Storage ____
Other ____
(b)If Gas Shallow X Deep ____
Horizontal X

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6,700' TVD, Anticipated Thickness- 50 feet, Associated Pressure- 3,000#

8) Proposed Total Vertical Depth: 6,700'

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 17,000'

11) Proposed Horizontal Leg Length: 9739'

12) Approximate Fresh Water Strata Depths: 12', 52', 124', 258'

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

14) Approximate Saltwater Depths: 1712', 2040'

15) Approximate Coal Seam Depths: None Identified

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 X

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

RECEIVED
Office of Oil and Gas
JUN 06 2015
WV Department of
Environmental Protection

WW-6B
(04/15)

API # 47-085-10205 PERMIT MODIFICATION

API NO. 47- 085 - 10205
OPERATOR WELL NO. Left Fork Unit 3H
Well Pad Name: Lockhart Heirs West 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#	105'	105'	CTS, 101 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	315'	315'	CTS, 438 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2410'	2410'	CTS, 981 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	17,000'	17,000'	4,294 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7200'	
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"/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"	12630	2500	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200			
Liners							

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

RECEIVED
Office of Oil and Gas

JUN 06 2015

WV Department of
Environmental Protection

WW-6B
(10/14)

API # 47-085-10205 PERMIT MODIFICATION

API NO. 47- 085 - 10205
OPERATOR WELL NO. Left Fork Unit 3H
Well Pad Name: Lockhart Heirs West 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.

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): 19.30 Acres

22) Area to be disturbed for well pad only, less access road (acres): 6.54 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 + 0.5% C51
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

RECEIVED
Office of Oil and Gas
JUL 0 8 '15
WV Department of
Environmental Protection

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.

WW-6A1

API #47-085-10205 PERMIT MODIFICATION

Operator's Well Number Left Fork Unit 3H

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
O'Neill Family Trust et al Lease			
Daniel J. O'Neill, Trustee for the O'Neill Family Trust, et al	Key Oil Company	1/8	0252/1053
Key Oil Company	Antero Resources Appalachian Corp.	*Partial Assignment of Oil & Gas Leases	0253/0747
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
W.G. Burgan et al Lease			
W.G. Burgan, et al	Key Oil Company	1/8	0224/0649
Key Oil Company	Antero Resources Appalachian Corporation	*Partial Assignment of Oil & Gas Leases	0253/0747
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
J.B. Elliott et ux Lease			
J.B. Elliott, et ux	Carnegie Natural Gas Company	1/8	0041/0184
Carnegie Natural Gas company	Carnegie Production Company	Assignment & Bill of Sale	0228/0859
Carnegie Production Company	EQT Production Company	Name Change	Exhibit 2
EQT Production Company	Antero Resources Appalachian Corporation	Assignment	0267/0477
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
Mitchie Cottrill et al Lease			
Mitchie Cottrill, et al	G.B. Langford, dba C&L Fuel Co.	1/8	0122/0249
G.B. Langford, dba C&L Fuel Co.	Zenith Oil & Gas, Inc.	Agreement	0132/0589
Zenith Oil & Gas, Inc.	R.G. Gisinger & Joseph P. McMahon	Assignment	0146/0286
R.G. Gisinger & Joseph P. McMahon	Oil Development Company	Assignment	0150/0397
Oil Development Company	Alan Gable Oil Development Energy Trust	Amended Plan of Reorganization	0207/0623
Alan Gable Oil Development Energy Trust	Gassearch Corporation	Assignment	0207/0628
Gassearch Corporation	Linn Energy Holdings, LLC	Assignment	0239/0118
Linn Energy Holdings, LLC	XTO Energy, Inc.	Assignment	0252/0614
XTO Energy, Inc.	**Antero Resources Corporation**	**Notice of Agreement**	**0283/0474**

RECEIVED
Office of Oil and Gas
JUN 06 2...
WV Department of
Environmental Protection

***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.**

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

API # 47-085-10205 PERMIT MODIFICATION

WW-6A1
(5/13)

Operator's Well No. Left Fork Unit 3H

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
Bernard W. Richards et al Lease				
	Bernard W. Richards & Fredia Richards	Warren R. Haught	1/8	0127/0483
	Warren R. Haught	Rainbow 10, 11, 12, 1980 LTD	Assignment	0144/0028
	Rainbow 10, 11, 12, 1980 LTD	Mountain V Oil & Gas, Inc.	Assignment	0243/0876
	Mountain V Oil & Gas, Inc.	Robert Matthey, Jr.	Assignment	0243/0911
	Robert Matthey, Jr.	Genesis Exploration & Production Company, LLC	Assignment	0244/1079
	Genesis Exploration & Production Company, LLC	Antero Resources Appalachian Corporation	Assignment	0260/1028
	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

RECEIVED
Office of Oil and Gas
JUN 0 6 2015
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: Kevin Kilstrom
Its: VP - Production

FORM WW-6A1
EXHIBIT 1

FILED
JUN 10 2013
IN THE OFFICE OF SECRETARY OF STATE

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.wvsos.com
E-mail: business@wvsos.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 — Contact Name
   (303) 357-7310 — Phone Number

7. **Signature information** (See below **Important Legal Notice Regarding Signature*):

   Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person

   Signature: [signature] Date: June 10, 2013

**Important Legal Notice Regarding Signature*: Per West Virginia Code §31D-1-129. 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.

RECEIVED
Office of Oil and Gas
JUN 06 2015
WV Department of Environmental Protection

FORM WW-6A1
EXHIBIT 2

Ac

State of West Virginia

Certificate

I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that

EQT PRODUCTION COMPANY

has filed a "Certificate of Registration of Trade Name" in my office according to the provisions of Chapter 47 of the West Virginia Code and was found to conform to law.

Therefore, I hereby issue this

CERTIFICATE OF REGISTRATION OF TRADE NAME

authorizing it to transact business in West Virginia under the assumed name of

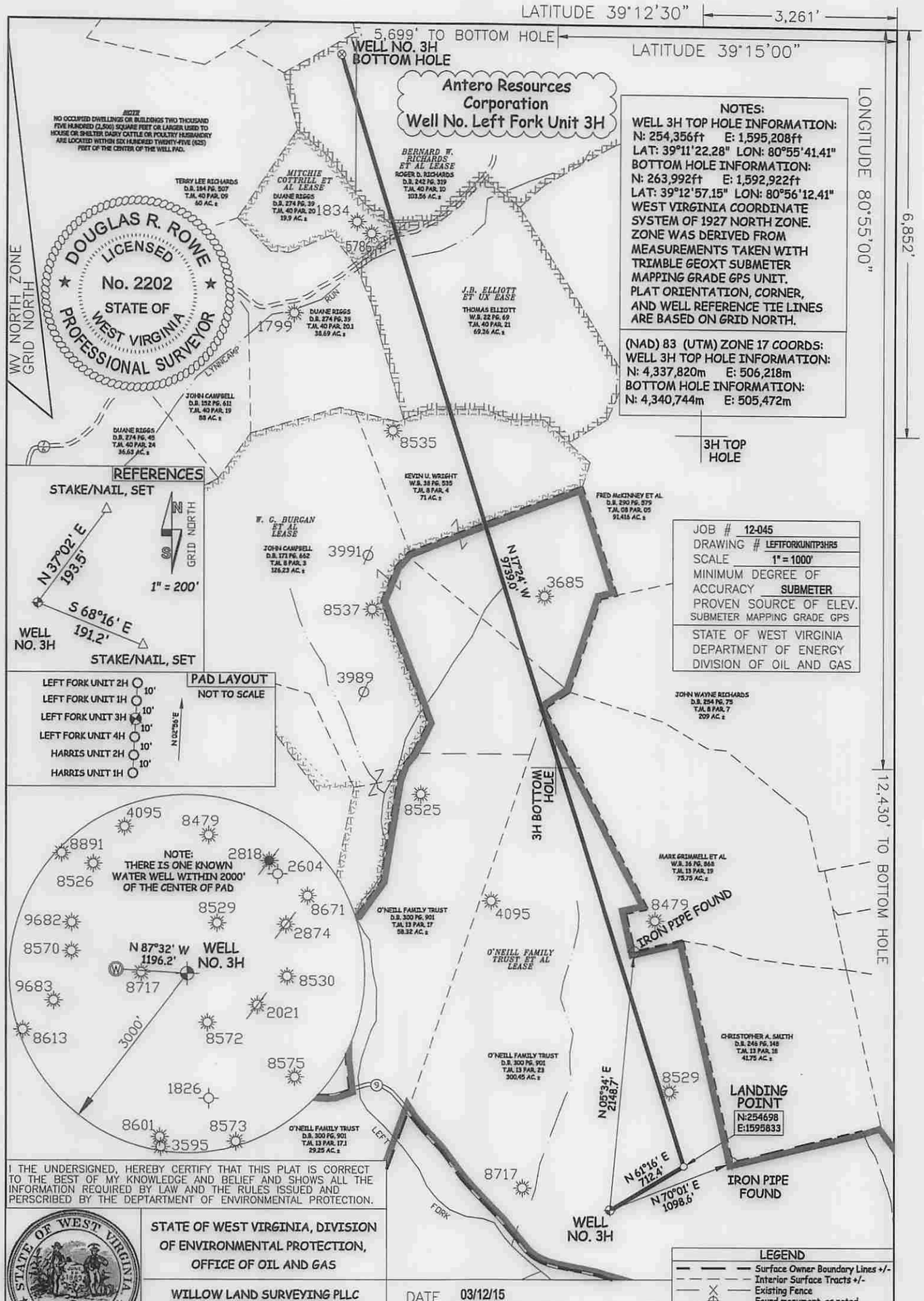
CARNEGIE PRODUCTION COMPANY

RECEIVED
Office of Oil and Ga
JUN 06 2015
WV Department of
Environmental Protect

Given under my hand and the Great Seal of the State of West Virginia on this day of April 9, 2009

Natalie E Tennant

Secretary of State



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 DEPTARTMENT OF ENVIRONMENTAL PROTECTION.

STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
266 HUSHERS RUN RD PENNSBORO
WEST VIRGINIA 26415

DATE 03/12/15
OPERATOR'S WELL# LEFT FORK UNIT #3H

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ API WELL # 47 – 085 – 10205 MOD
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X STATE COUNTY PERMIT
LOCATION: ORIGINAL GROUND ELEV. 1,039' PROPOSED ELEV. 1,021' WATERSHED SOUTH FORK HUGHES RIVER
QUADRANGLE PULLMAN 7.5' DISTRICT UNION COUNTY RITCHIE
SURFACE OWNER O'NEILL FAMILY TRUST ET AL ACREAGE 300.45 ACRES +/-
OIL & GAS ROYALTY OWNER O'NEILL FAMILY TRUST ET AL; W. G. BURGAN ET AL; J.B. ELLIOTT ET UX; MITCHIE COTTRILL ET AL; BERNARD W. RICHARDS ET AL LEASE ACREAGE 517.83 ACRES±; 154 ACRES±; 70 ACRES±; 19.9 ACRES±; 114 ACRES±
PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL
(SPECIFY) Permit Modification - BHL PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,700' TVD 17,000' MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT

FORM WW-6