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west virginia department of environmental protection

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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](http://www.dep.wv.gov)

## PERMIT MODIFICATION APPROVAL

December 03, 2013

ANTERO RESOURCES APPALACHIAN CORPORATION  
1625 17TH STREET, SUITE 300  
DENVER, CO 80202

Re: Permit Modification Approval for API Number 1706210 , Well #: GAINER UNIT 1H  
**Extended 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  
Regulatory/Compliance Manager  
Office of Oil and Gas



September 11, 2013

Antero Resources  
1625 17th Street  
Denver, Colorado 80202  
Office 303.357.7310  
Fax 303.357.7315

West Virginia Department of Environmental Protection  
Office of Oil and Gas  
Attn: Ms. Laura Cooper  
601 57<sup>th</sup> Street  
Charleston, WV 25304

Ms. Laura Cooper:

Antero Resources Corporation (Antero) would like to submit the following permit modifications for two approved wells on the existing Plaughter North Pad. We are requesting to extend the horizontal laterals which will change the bottom hole locations of the Gainer Unit 1H (API# 47-017-06210) and Gainer Unit 2H (API# 47-017-06226).

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the revised MD and Production Casing/Cement program
- REVISED Form WW-6A1, which shows the leases we will be drilling into
- REVISED Mylar Plat, which shows the new bottom hole location

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

Thank you in advance for your consideration. 🏔️

Sincerely,

Ashlie Mihalcin  
Permit Representative  
Antero Resources Corporation

Enclosures

Received

SEP 20 2013

Office of Oil and Gas  
WV Dept. of Environmental Protection

WW - 6B  
(3/13)

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

1) Well Operator: Antero Resources Corporation 494488557 033-Harrison Union Big Isaac  
Operator ID County District Quadrangle

2) Operator's Well Number: Gainer Unit 1H Well Pad Name: Existing Plaughter North Pad

3 Elevation, current ground: ~1382' Elevation, proposed post-construction: 1364'

4) Well Type: (a) Gas  Oil  Underground Storage   
Other \_\_\_\_\_  
(b) If Gas: Shallow  Deep   
Horizontal

5) Existing Pad? Yes or No: Yes

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Marcellus Shale: 7600' TVD, Anticipated Thickness- 50 Feet, Associated Pressure- 3200#

7) Proposed Total Vertical Depth: 7600' TVD

8) Formation at Total Vertical Depth: Marcellus Shale

9) Proposed Total Measured Depth: 16,300' MD

10) Approximate Fresh Water Strata Depths: 133'

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

12) Approximate Saltwater Depths: 781', 1867', 2097'

13) Approximate Coal Seam Depths: 641', 1109', 1633'

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

17) Describe fracturing/stimulating methods in detail:  
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."

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18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 22.79 acres (existing)

19) Area to be disturbed for well pad only, less access road (acres): 3.74 acres (existing)

WW - 6B  
(3/13)

20)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft.</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill -up (Cu. Ft.)</u>
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	300'	300'	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2520'	2520'	CTS, 1026 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	16300'	16300'	4090 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7200'	
Liners							

<b>TYPE</b>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield</u>
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	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			

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Received  
2013  
Office of Oil and Gas  
WV Dept. of Environmental Protection  
Office of Oil and Gas  
WV Dept. of Environmental Protection  
Page 2 of 3

WW - 6B  
(3/13)

21) 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.

22) Describe all cement additives associated with each cement type. \_\_\_\_\_  
Conductor: no additives, Class A cement.  
Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat  
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

23) 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.

**Received**  
 SEP 20  
 Office of Oil and Gas  
 WV Dept. of Environmental Protection



WW-6A1  
(5/13)

Operator's Well No. Gainer 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>Ruby Sadler et al Lease</u>	Ruby Sadler Clarence W. Mutschelknaus Bluestone Energy Partners	Clarence W. Mutschelknaus Bluestone Energy Partners Antero Resources Bluestone, LLC, a wholly owned subsidiary of Antero Resources Appalachian Corporation	1/8 Assignment Merger	0129/0811 0250/0651 0035/1236
	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.				

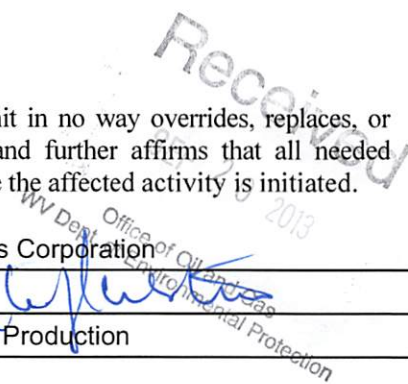
**Acknowledgement of Possible Permitting/Approval  
In Addition to the Office of Oil and Gas**

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.

Well Operator: Antero Resources Corporation  
 By: Kevin Kilstrom  
 Its: Vice President of Production



47-017-06210  
MOO

**FORM WW-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  
IN THE OFFICE OF  
SECRETARY OF STATE  
Tel: (304)558-8000  
Fax: (304)558-8381  
Website: [www.wvsos.com](http://www.wvsos.com)  
E-mail: [business@wvsos.com](mailto:business@wvsos.com)

**APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY**

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

**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:

- 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: 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) 357-7310
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: <u><i>Alvyn A. Schopp</i></u>	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  
20 2013  
Office of Oil and Gas  
WV Dept. of Environmental Protection



47-017-06210 MOD

WW-60  
(7-01)

DATE: September 11, 20 13

OPERATOR'S

WELL NO. Gainer Unit 1H

API NO: 47- 017 00210  
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, Tim Rady (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 11 day of Sept, 20 13.

[Signature]  
Notary Public

My Commission expires: 11/9/2014

LISA BOTTINELLI  
Notary Public  
State of Colorado  
Notary ID 20124072365  
My Commission Expires Nov 9, 2016

Received  
SEP 20 2013  
Office of Oil and Gas  
Dept. of Environmental Protection

RECEIVED  
Office of Oil and Gas  
DEC 03 2013  
WV Department of  
Environmental Protection

**Lease Assignments and Interest of Chesterfield Energy Corporation**

n. [NOTE: By unrecorded document Chesterfield Energy Corporation merged with and into Dominion Appalachian Development, Inc.]



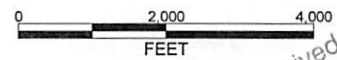
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Antero Resources Corporation

Appalachian Basin

Gainer Unit 1H

Doddridge County



REMARKS  
 QUADRANGLE: SALEM  
 WATERSHED: BUFFALO CALF FORK  
 DISTRICT: GREENBRIER

February 11, 2013

Received  
 Office of Oil & Gas  
 FEB 20 2013

2,914' to Bottom Hole

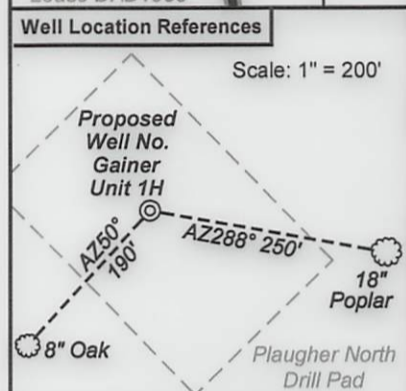
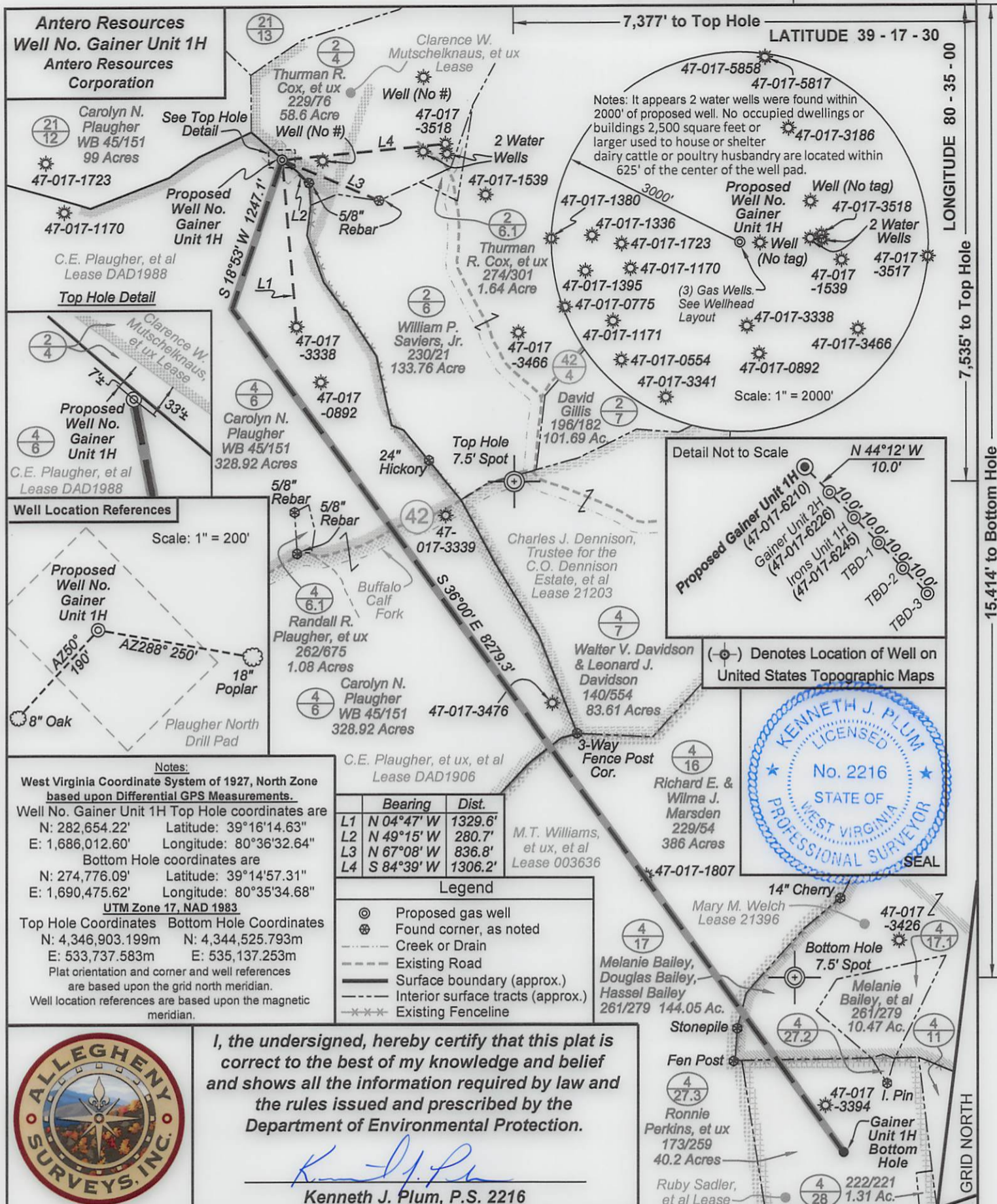
7,377' to Top Hole

LATITUDE 39 - 17 - 30

LONGITUDE 80 - 35 - 00

7,535' to Top Hole

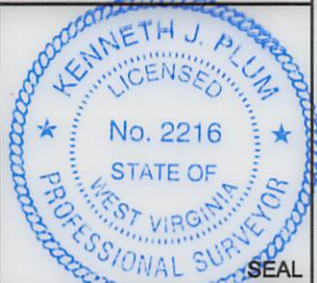
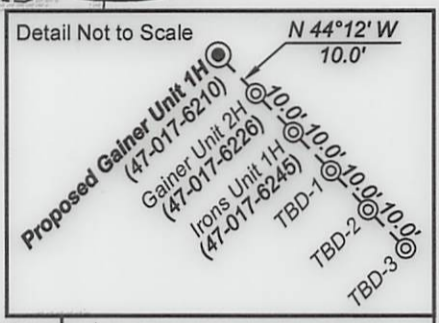
15,414' to Bottom Hole



**Notes:**  
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.  
 Well No. Gainer Unit 1H Top Hole coordinates are  
 N: 282,654.22' Latitude: 39°16'14.63"  
 E: 1,686,012.60' Longitude: 80°36'32.64"  
 Bottom Hole coordinates are  
 N: 274,776.09' Latitude: 39°14'57.31"  
 E: 1,690,475.62' Longitude: 80°35'34.68"  
 UTM Zone 17, NAD 1983  
 Top Hole Coordinates Bottom Hole Coordinates  
 N: 4,346,903.199m N: 4,344,525.793m  
 E: 533,737.583m E: 535,137.253m  
 Plat orientation and corner and well references are based upon the grid north meridian.  
 Well location references are based upon the magnetic meridian.

	Bearing	Dist.
L1	N 04°47' W	1329.6'
L2	N 49°15' W	280.7'
L3	N 67°08' W	836.8'
L4	S 84°39' W	1306.2'

- Legend**
- ⊙ Proposed gas well
  - ⊗ Found corner, as noted
  - Creek or Drain
  - Existing Road
  - Surface boundary (approx.)
  - Interior surface tracts (approx.)
  - Existing Fenceline



*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 prescribed by the Department of Environmental Protection.*

*Kenneth J. Plum*  
 Kenneth J. Plum, P.S. 2216

FILE NO: 42-30-G-13  
 DRAWING NO: 42-13 Gainer 1H Well Plat  
 SCALE: 1" = 1000'  
 MINIMUM DEGREE OF ACCURACY: Submeter  
 PROVEN SOURCE OF ELEVATION: WVDOT, Bridgeport, WV

**STATE OF WEST VIRGINIA**  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**OIL AND GAS DIVISION**

DATE: September 5 2013  
 OPERATOR'S WELL NO. Gainer Unit 1H  
 API WELL NO. MOD  
 47 - 017 - 06210H 6A  
 STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
 (IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW  
 LOCATION: ELEVATION: 1364' WATERSHED: Buffalo Calf Fork QUADRANGLE: Salem  
 DISTRICT: Greenbrier COUNTY: Doddridge  
 SURFACE OWNER: Carolyn N. Plaucher Ruby Sadler, et al 003636; 21396 ACREAGE: 328.92 51; 90  
 ROYALTY OWNER: C.E. Plaucher, et al; C.E. Plaucher, et ux, et al; Mary M. Welch LEASE NO: DAD1988; DAD1906 ACREAGE: 165; 165; 376.78  
 PROPOSED WORK:  DRILL  CONVERT  DRILL DEEPER  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) Modification - BHL  
 PLUG AND ABANDON  CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 7,600' TVD 16,300' MD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System  
 ADDRESS: 1625 17th Street ADDRESS: 5400 D Big Tyler Road  
 Denver, CO 80202 Charleston, WV 25313

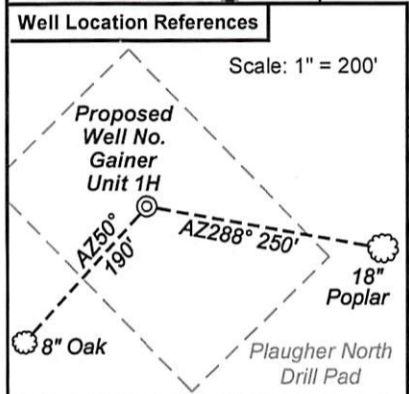
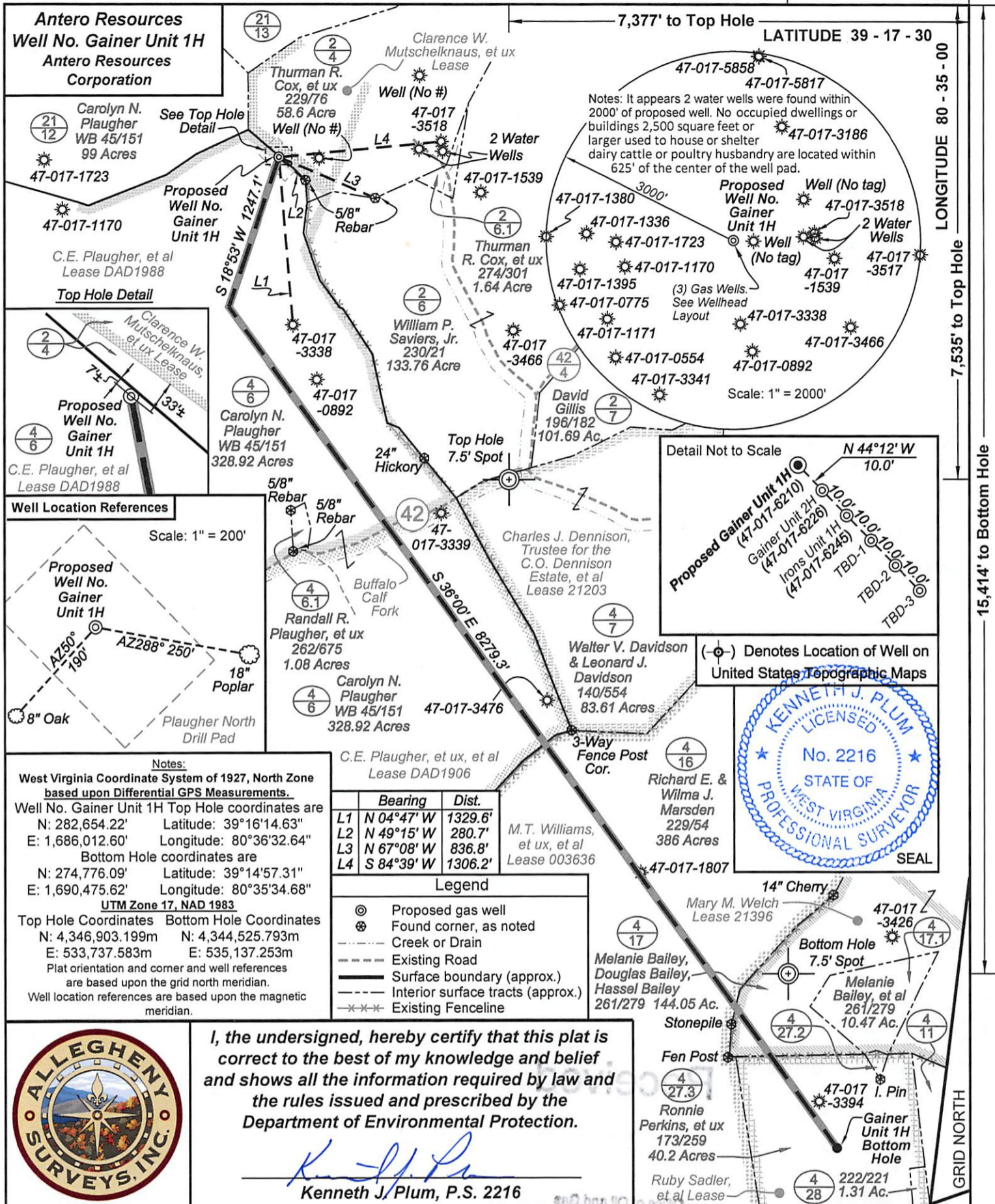
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  - - - - - Creek or Drain
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  - Surface boundary (approx.)
  - - - Interior surface tracts (approx.)
  - \* \* \* Existing Fenceline



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*Kenneth J. Plum*  
Kenneth J. Plum, P.S. 2216

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PROVEN SOURCE OF ELEVATION: WVDOT, Bridgeport, WV

**STATE OF WEST VIRGINIA**  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**OIL AND GAS DIVISION**

DATE: September 5 2013  
OPERATOR'S WELL NO. Gainer Unit 1H  
API WELL NO. **MOB**  
47 - 017 - 06210  
STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
(IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW  
LOCATION: ELEVATION: 1364' WATERSHED: Buffalo Calf Fork QUADRANGLE: Salem  
DISTRICT: Greenbrier COUNTY: Doddridge  
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ADDRESS: 1625 17th Street ADDRESS: 5400 D Big Tyler Road  
Denver, CO 80202 Charleston, WV 25313