



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

October 17, 2014

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

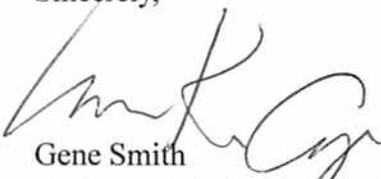
Re: Permit Modification Approval for API Number 1706286 , Well #: RANDALL UNIT 1H
changed lateral leg

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
Assistant Chief of Permitting
Office of Oil and Gas



October 2, 2014

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 Cooper
601 57th 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 Stewart Pad. We are requesting to move the horizontal laterals, to accommodate 660 foot spacing between wells, which will change the bottom hole locations of the Randall Unit 1H (API# 47-017-06286), and Randall Unit 2H (API# 47-017-06287).

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,

A handwritten signature in blue ink that reads "Ashlie Steele".

Ashlie Steele
Permitting Supervisor
Antero Resources Corporation

Enclosures

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Office of Oil & Gas
OCT 06 2014

10/17/2014

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

1) Well Operator: Antero Resources Corporation 494488557 017-Doddridge New Milton New Milton
Operator ID County District Quadrangle

2) Operator's Well Number: Randall Unit 1H Well Pad Name: Stewart Pad (Existing)

3) Farm Name/Surface Owner: Randall & Carolyn S. Stewart Public Road Access: CR 56

4) Elevation, current ground: 1332' Elevation, proposed post-construction: 1332'

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 Associated Pressure(s):
Marcellus Shale: 7600' TVD, Anticipated Thickness- 60 Feet, Associated Pressure- 3250#

8) Proposed Total Vertical Depth: 7600' TVD

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 19,900' MD

11) Proposed Horizontal Leg Length: 11,892'

12) Approximate Fresh Water Strata Depths: 420'

13) Method to Determine Fresh Water Depths: Dorothy Unit 2H (API# 47-017-06244) on same pad.

14) Approximate Saltwater Depths: 2345'

15) Approximate Coal Seam Depths: 825', 945', 1167', 1776'

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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OCT 06 2014

18)

CASING AND TUBING PROGRAM

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/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#	475'	475'	CTS, 660 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2490'	2490'	CTS, 1014 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	19900'	19900'	5070 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7200'	
Liners							

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</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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OCT 06 2014

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."

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 25.09 acres

22) Area to be disturbed for well pad only, less access road (acres): 2.26 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:

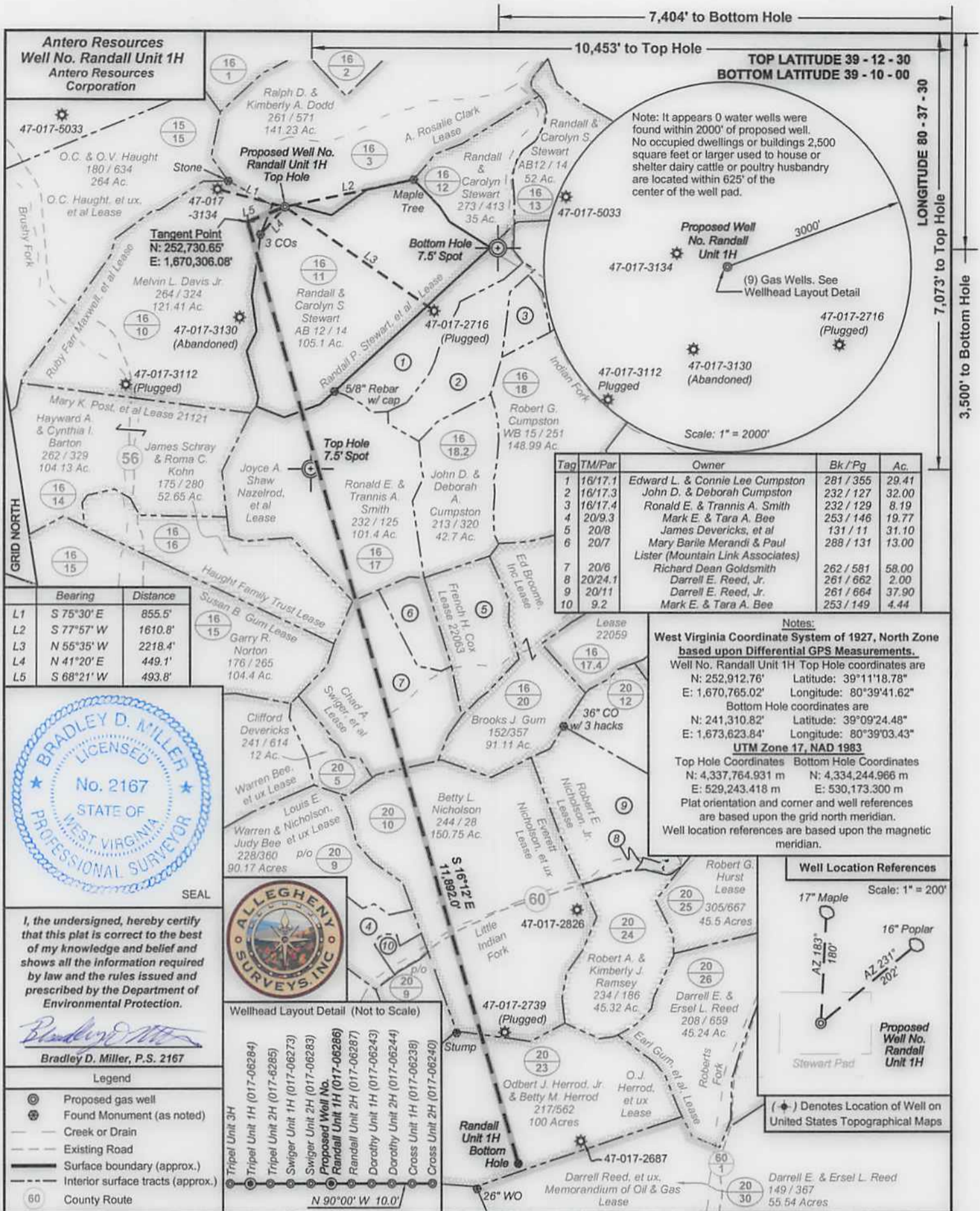
Conductor: no additives, Class A cement.
Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51
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.

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11/17/2014

*Note: Attach additional sheets as needed.



7,404' to Bottom Hole

10,453' to Top Hole

TOP LATITUDE 39 - 12 - 30
BOTTOM LATITUDE 39 - 10 - 00

LONGITUDE 80 - 37 - 30

3,500' to Bottom Hole

7,073' to Top Hole

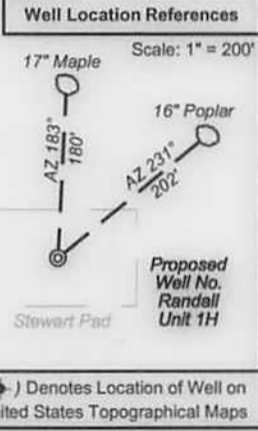
Note: It appears 0 water wells were found within 2000' of proposed well. No occupied dwellings or buildings 2,500 square feet or larger used to house or shelter dairy cattle or poultry husbandry are located within 625' of the center of the well pad.

(9) Gas Wells. See Wellhead Layout Detail

Scale: 1" = 2000'

Tag	TM/Par	Owner	Bk/Pg	Ac.
1	16/17.1	Edward L. & Connie Lee Cumpston	281 / 355	29.41
2	16/17.3	John D. & Deborah Cumpston	232 / 127	32.00
3	16/17.4	Ronald E. & Trannis A. Smith	232 / 129	8.19
4	20/9.3	Mark E. & Tara A. Bee	253 / 146	19.77
5	20/8	James Devericks, et al	131 / 11	31.10
6	20/7	Mary Barile Merandi & Paul Lister (Mountain Link Associates)	288 / 131	13.00
7	20/6	Richard Dean Goldsmith	262 / 581	58.00
8	20/24.1	Darrell E. Reed, Jr.	261 / 662	2.00
9	20/11	Darrell E. Reed, Jr.	261 / 664	37.90
10	9.2	Mark E. & Tara A. Bee	253 / 149	4.44

Notes:
West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
Well No. Randall Unit 1H Top Hole coordinates are N: 252,912.76' Latitude: 39°11'18.78"
E: 1,670,765.02' Longitude: 80°39'41.62"
Bottom Hole coordinates are N: 241,310.82' Latitude: 39°09'24.48"
E: 1,673,623.84' Longitude: 80°39'03.43"
UTM Zone 17, NAD 1983
Top Hole Coordinates Bottom Hole Coordinates
N: 4,337,764.931 m N: 4,334,244.966 m
E: 529,243.418 m E: 530,173.300 m
Plat orientation and corner and well references are based upon the grid north meridian.
Well location references are based upon the magnetic meridian.



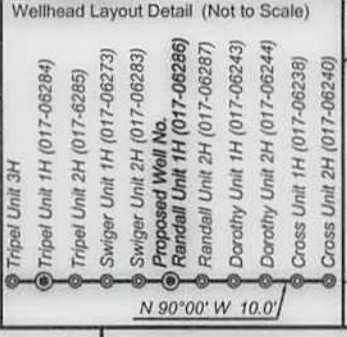
	Bearing	Distance
L1	S 75°30' E	855.5'
L2	S 77°57' W	1610.8'
L3	N 55°35' W	2218.4'
L4	N 41°20' E	449.1'
L5	S 68°21' W	493.8'



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.

Bradley D. Miller, P.S. 2167

- Legend**
- ⊙ Proposed gas well
 - ⊛ Found Monument (as noted)
 - Creek or Drain
 - Existing Road
 - Surface boundary (approx.)
 - Interior surface tracts (approx.)
 - 60 County Route



FILE NO: 74-30-NM-13
DRAWING NO: 74-13 Randall 1H Well
SCALE: 1" = 1500'
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 11 2014
OPERATOR'S WELL NO. Randall Unit 1H
API WELL NO MOD
47 - 017 - 06286 H6A
STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
LOCATION: ELEVATION: 1332' WATERSHED: Indian Fork QUADRANGLE: New Milton
DISTRICT: New Milton COUNTY: Doddridge
SURFACE OWNER: Randall & Carolyn S. Stewart Ruby Farr Maxwell, et al
ROYALTY OWNER: O.J. Herrod, et ux; Randall P. Stewart, et al; Joyce A. Shaw Nazelrod, et al LEASE NO: ACREAGE: 69.54; 195; 384; 150
PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) Modification to BHL
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 7,600' TVD
19,900' MD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
Denver, CO 80202 Charleston, WV 25313