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west virginia department of environmental protection

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Office of Oil and Gas  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304  
(304) 926-0450  
fax: (304) 926-0452

Earl Ray Tomblin , Governor  
Randy C. Huffman , Cabinet Secretary  
www.dep.wv.gov

Monday, December 19, 2016  
WELL WORK PERMIT  
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for TRUST UNIT 2H  
47-085-10302-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless 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: TRUST UNIT 2H  
Farm Name: EDWIN D. MULVAY ET AL  
U.S. WELL NUMBER: 47-085-10302-00-00  
Horizontal 6A / New Drill  
Date Issued: 12/19/2016

Promoting a healthy environment.

12/23/2016

# PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

## CONDITIONS

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1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.
9. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.

**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**VOLUNTARY STATEMENT OF NO OBJECTION**

**Instructions to Persons Named on Page WW-6A**

The well operator named on page WW-6A is applying for a permit from the State of West Virginia to conduct oil or gas well work. Well work permits are valid for twenty-four (24) months. Please contact the listed well operator and the Office of Oil and Gas if you do not own any interest in the listed surface tract.

**Comment and Waiver Provisions**

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary.

Pursuant to West Virginia Code § 22-6A-8(b) No permit may be issued less than thirty days after the filing date of the application for any well work except plugging or replugging; and no permit for plugging or replugging may be issued less than five days after the filing date of the application except a permit for plugging or replugging a dry hole: *Provided*, That if the applicant certifies that all persons entitled to notice of the application under the provisions of subsection (b), section ten of this article have been served in person or by certified mail, return receipt requested, with a copy of the well work application, including the erosion and sediment control plan, if required, and the well plat, and further files written statements of no objection by all such persons, the secretary may issue the well work permit at any time.

**VOLUNTARY STATEMENT OF NO OBJECTION**

I, \_\_\_\_\_, hereby state that I have read the Instructions to Persons Named on Page WW-6A and the associated provisions listed above, and that I have received copies of a Notice of Application, an Application for a Well Work Permit on Form WW-6A and attachments consisting of pages one (1) through \_\_\_\_\_, including the erosion and sediment control plan, if required, and the well plat, all for proposed well work on the tract of land as follows:

State: _____	West Virginia	UTM NAD 83	Easting: _____	508710m
County: _____	Ritchie		Northing: _____	4352578m
District: _____	Clay	Public Road Access: _____		CR 74/5 (Short Run Rd.)
Quadrangle: _____	Pennsboro 7.5'	Generally used farm name: _____		Mulvey, Edwin D., et al
Watershed: _____	North Fork Hughes River			

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials.

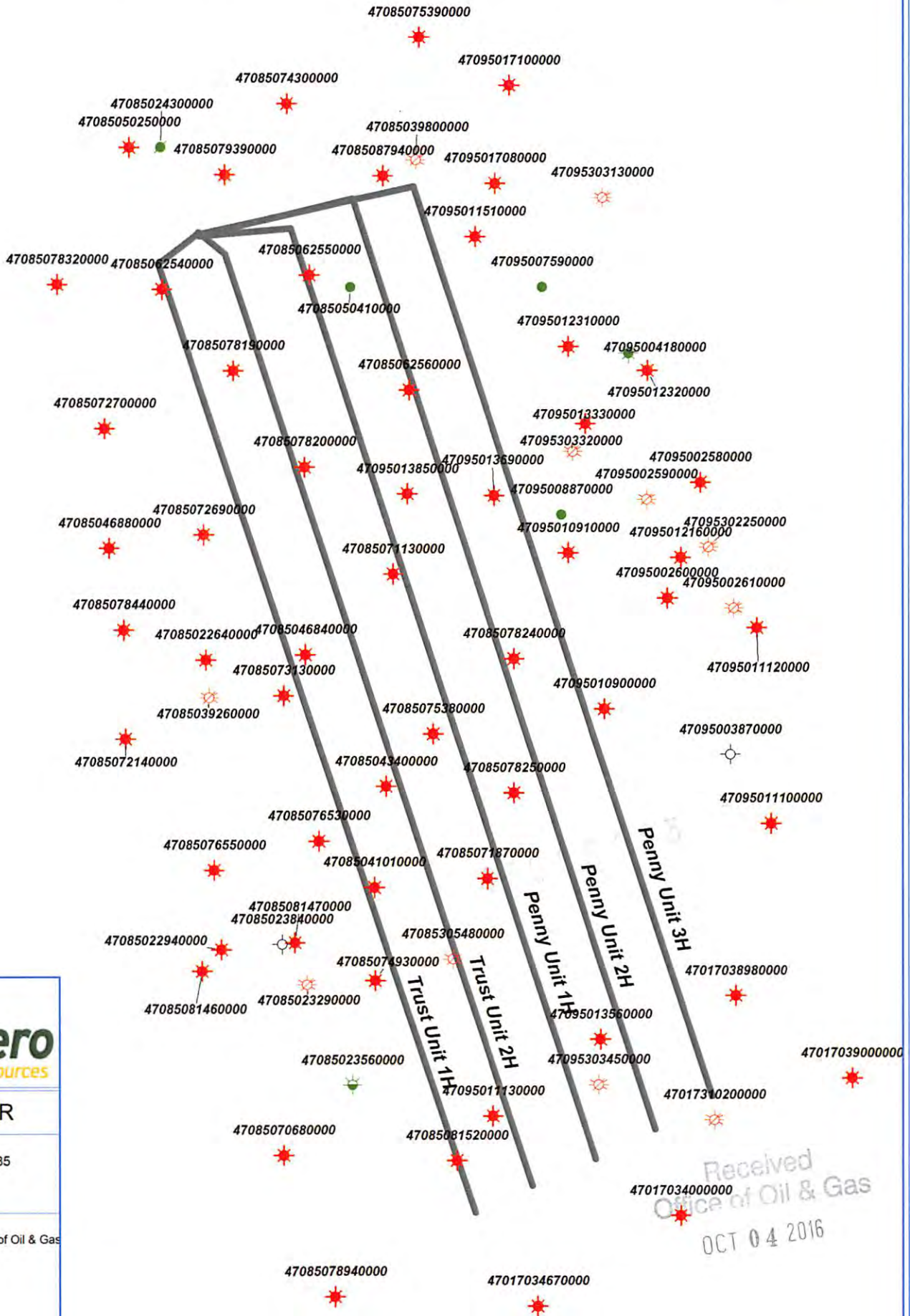
<p>*Please check the box that applies</p> <p><input type="checkbox"/> SURFACE OWNER</p> <p><input type="checkbox"/> SURFACE OWNER (Road and/or Other Disturbance)</p> <p><input type="checkbox"/> SURFACE OWNER (Impoundments/Pits)</p> <p><input type="checkbox"/> COAL OWNER OR LESSEE</p> <p><input type="checkbox"/> COAL OPERATOR</p> <p><input type="checkbox"/> WATER PURVEYOR</p> <p><input type="checkbox"/> OPERATOR OF ANY NATURAL GAS STORAGE FIELD</p>	<p><b>FOR EXECUTION BY A NATURAL PERSON</b></p> <p>Signature: _____</p> <p>Print Name: _____</p> <p>Date: _____</p> <p><b>FOR EXECUTION BY A CORPORATION, ETC.</b></p> <p>Company: _____</p> <p>By: _____</p> <p>Its: _____</p> <p>Signature: _____</p> <p>Date: _____</p>
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**Oil and Gas Privacy Notice:**

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).

12/23/2016





Penny-Trust AOR



- WELL SYMBOLS**
- Dry Hole, With Show of Oil & Gas
  - Dry Hole
  - Gas Well
  - Oil & Gas Well
  - Oil Well
  - Plugged Gas Well
  - Plugged Oil Well

September 14, 2016

Received  
Office of Oil & Gas  
OCT 04 2016

12/23/2016





WW-6B  
(04/15)

API NO. 47-085 - \_\_\_\_\_  
OPERATOR WELL NO. Trust Unit 2H  
Well Pad Name: Mulvay

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

1) Well Operator: Antero Resources Corporation 494507062 085 - Ritchie Clay Pennsboro 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Trust Unit 2H Well Pad Name: Mulvay

3) Farm Name/Surface Owner: Mulvay, Edwin D., et al Public Road Access: CR 74/5 (Short Run Rd.)

4) Elevation, current ground: ~1036' Elevation, proposed post-construction: 1029'

5) Well Type (a) Gas X Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_

(b) If Gas Shallow X Deep \_\_\_\_\_  
Horizontal X \_\_\_\_\_

*Michael Gaff*  
*10/27/16*

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 6600' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6600' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 17900' MD

11) Proposed Horizontal Leg Length: 10246'

12) Approximate Fresh Water Strata Depths: 24', 124', 422'

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

14) Approximate Saltwater Depths: 1522', 1949'

15) Approximate Coal Seam Depths: 653', 664'

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: \_\_\_\_\_

Office of Oil & Gas  
OCT 29 2016

WW-6B  
(04/15)

API NO. 47-085  
OPERATOR WELL NO. Trust Unit 2H  
Well Pad Name: Mulvey

18)

**CASING AND TUBING PROGRAM**

<u>TYPE</u>	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	20"	New	H-40	94#	75'	75'	CTS, 72 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	475' *see #19	475' *see #19	CTS, 660 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	17900'	17900'	CTS, 4515 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

*MAC*  
*10/27/14*

<u>TYPE</u>	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
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	LSH-HPOZ & Tel-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			

Office of Oil & Gas

OCT 28 2016

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WW-6B  
(10/14)

API NO. 47- 085 -  
OPERATOR WELL NO. Trust Unit 2H  
Well Pad Name: Mulvay

MAG  
10/27/16

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 will be air drilling the fresh water string which makes it difficult to determine when fresh water 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): 13.71 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.88 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-16Q + 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.



WW-9  
(2/15)

API Number 47 - 085 - \_\_\_\_\_  
Operator's Well No. Trust Unit 2H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

Watershed (HUC 10) North Fork Hughes River Quadrangle Pennsboro 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes  No

Will a pit be used? Yes  No

If so, please describe anticipated pit waste: No pit will be used at this site (Drilling and Flowback Fluids will be stored in tanks. Cuttings will be tanked and hauled off site.)

Will a synthetic liner be used in the pit? Yes  No  If so, what ml.? N/A

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection ( UIC Permit Number \*UIC Permit # will be provided on Form WR-34 )
- Reuse (at API Number Future permitted well locations when applicable. API# will be provided on Form WR-34 )
- Off Site Disposal (Supply form WW-9 for disposal location) (Meadowfill Landfill Permit #SWF-1032-98)
- Other (Explain Northwestern Landfill Permit #SWF-1025/WV0109410)

*MAG  
10/27/16*

Will closed loop system be used? If so, describe: Yes

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Surface - Air/Freshwater, Intermediate - Dust/Sulf Foam, Production - Water Based Mud

-If oil based, what type? Synthetic, petroleum, etc. N/A

Additives to be used in drilling medium? Please See Attachment

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Stored in tanks, removed offsite and taken to landfill.

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-1032-98), Northwestern Landfill (Permit # SWF-1025/WV0109410)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

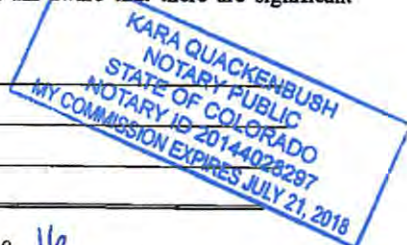
I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature *Cole Kilstrom*

Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental & Regulatory Manager



Subscribed and sworn before me this 29 day of September, 20 16

*Kara Quackenbush* Notary Public

My commission expires July 21, 2018

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**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 13.71 Prevegetation pH \_\_\_\_\_

Lime 2-4 Tons/acre or to correct to pH 6.5

Fertilizer type Hay or straw or Wood Fiber (will be used where needed)

Fertilizer amount 500 lbs/acre

Mulch 2-3 Tons/acre

Well Pad (4.88) + Water Containment Pad (2.69) + Access Road 1 (2.80) + Access Road 2 (0.40) + Staging Area (0.55) + Topsoil Spoil Area (0.97) + Material Spoil Area (0.71) + Diversion Ditches (0.71) = 13.71 Acres

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Tall Fescue	45	Tall Fescue	45
Perennial Rye Grass	20	Perennial Rye Grass	20
*or type of grass seed requested by surface owner		*or type of grass seed requested by surface owner	

**Attach:**

Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Michael Hoff

Comments: Proceed & mulch any disturbed areas per WVDEP regulations. Maintain & upgrade E&S as necessary.

Title: Oil & Gas Inspector Date: 10/27/16

Field Reviewed?  Yes  No

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***Form WW-9 Additives Attachment*****SURFACE INTERVAL**

1. Fresh Water
2. Soap –Foamer AC
3. Air

**INTERMEDIATE INTERVAL*****STIFF FOAM RECIPE:***

- 1) 1 ppb Soda Ash / Sodium Carbonate-Alkalinity Control Agent
- 2) 1 ppb Conqor 404 ( 11.76 ppg) / Corrosion Inhibitor
- 3) 4 ppb KLA-Gard ( 9.17 ppg) / Amine Acid Complex-Shale Stabilizer
- 4) 1ppb Mil Pac R / Sodium Carboxymethylcellulose-Filtration Control Agent
- 5) 12 ppb KCL / Potassium Chloride-inorganic Salt
- 6) Fresh Water 80 bbls
- 7) Air

**PRODUCTION INTERVAL**

1. Alpha 1655  
Salt Inhibitor
2. Mil-Carb  
Calcium Carbonate
3. Cottonseed Hulls  
Cellulose-Cottonseed Pellets – LCM
4. Mil-Seal  
Vegetable, Cotton & Cellulose-Based Fiber Blend – LCM
5. Clay-Trol  
Amine Acid Complex – Shale Stabilizer
6. Xan-Plex  
Viscosifier For Water Based Muds
7. Mil-Pac (All Grades)  
Sodium Carboxymethylcellulose – Filtration Control Agent
8. New Drill  
Anionic Polyacrylamide Copolymer Emulsion – Shale Stabilizer
9. Caustic Soda  
Sodium Hydroxide – Alkalinity Control
10. Mil-Lime  
Calcium Hydroxide – Lime
11. LD-9  
Polyether Polyol – Drilling Fluid Defoamer
12. Mil Mica  
Hydro-Biotite Mica – LCM

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13. Escaid 110  
Drilling Fluid Solvent – Aliphatic Hydrocarbon
14. Ligco  
Highly Oxidized Leonardite – Filtration Control Agent
15. Super Sweep  
Polypropylene – Hole Cleaning Agent
16. Sulfatrol K  
Drilling Fluid Additive – Sulfonated Asphalt Residuum
17. Sodium Chloride, Anhydrous  
Inorganic Salt
18. D-D  
Drilling Detergent – Surfactant
19. Terra-Rate  
Organic Surfactant Blend
20. W.O. Defoam  
Alcohol-Based Defoamer
21. Perma-Lose HT  
Fluid Loss Reducer For Water-Based Muds
22. Xan-Plex D  
Polysaccharide Polymer – Drilling Fluid Viscosifier
23. Walnut Shells  
Ground Cellulosic Material – Ground Walnut Shells – LCM
24. Mil-Graphite  
Natural Graphite – LCM
25. Mil Bar  
Barite – Weighting Agent
26. X-Cide 102  
Biocide
27. Soda Ash  
Sodium Carbonate – Alkalinity Control Agent
28. Clay Trol  
Amine Acid complex – Shale Stabilizer
29. Sulfatrol  
Sulfonated Asphalt – Shale Control Additive
30. Xanvis  
Viscosifier For Water-Based Muds
31. Milstarch  
Starch – Fluid Loss Reducer For Water Based Muds
32. Mil-Lube  
Drilling Fluid Lubricant

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**911 Address**  
**375 Short Run Road**  
**Pennsboro, WV 26415**

## **Well Site Safety Plan**

### **Antero Resources**

**Well Name:** Penny Unit 1H, Penny Unit 2H, Penny Unit 3H,  
Trust Unit 1H, Trust Unit 2H, Niley Unit 1H,  
Niley Unit 2H, Niley Unit 3H, Stronsnider Unit  
1H, Stronsnider Unit 2H, Stronsnider Unit 3H

**Pad Location:** MULVAY PAD  
Ritchie County/Clay District

*Michael Goff*  
*10/27/16*

**GPS Coordinates:** Lat 39°19'21.34"/Long -80°53'56.78" (NAD83)

### **Driving Directions:**

From the intersection of WV-74 and US Route 50 in Pennsboro, go North on WV-74 for 1.7 miles. Continue North for 4.94 miles on WV-74 until you reach the intersection with Burton Run Road/WV-74/5 on the right. Go Southeast on Burton Run Road for 1.98 miles until you reach the beginning of Access Road "A."

**EMERGENCY (24 HOUR) CONTACT 1-800-878-1373**

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LATITUDE 39°20'00" 6,823'

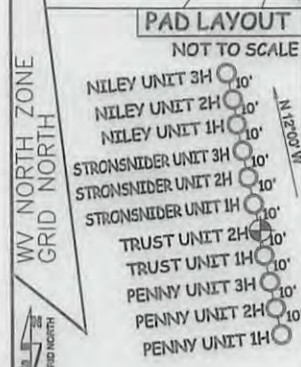
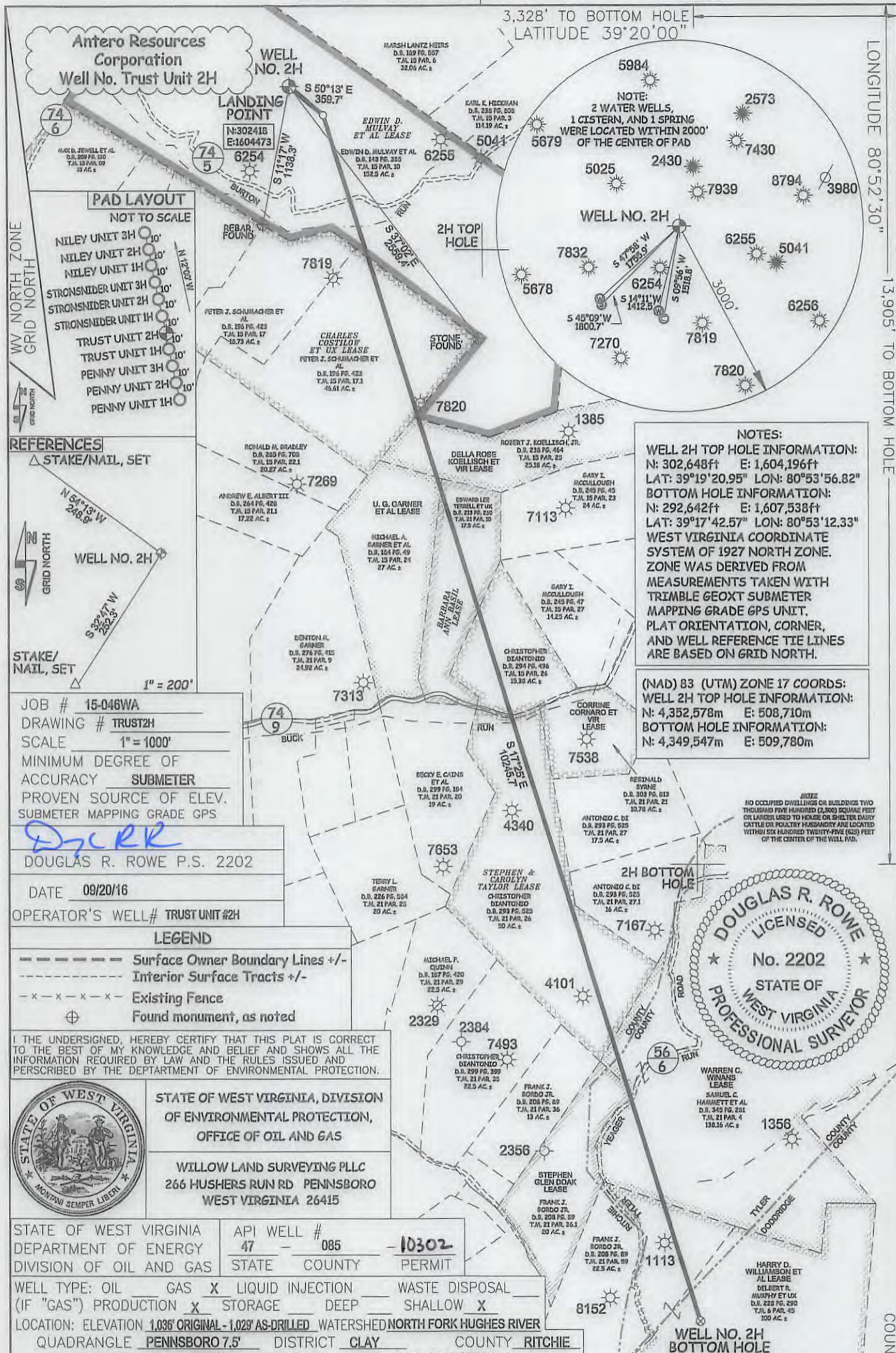
3,328' TO BOTTOM HOLE  
LATITUDE 39°20'00"

LONGITUDE 80°52'30"

3,951'

LONGITUDE 80°52'30"

13,905' TO BOTTOM HOLE



JOB # 15-046WA  
DRAWING # TRUST2H  
SCALE 1" = 1000'  
MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

*D.R.R.*  
DOUGLAS R. ROWE P.S. 2202  
DATE 09/20/16  
OPERATOR'S WELL# TRUST UNIT #2H

**LEGEND**

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

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  
266 HUSHERS RUN RD PENNSBORO WEST VIRGINIA 26415

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS  
API WELL # 47 - 085 - 10302  
STATE COUNTY PERMIT

WELL TYPE: OIL \_\_\_ GAS  LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_  
(IF "GAS") PRODUCTION  STORAGE \_\_\_ DEEP \_\_\_ SHALLOW   
LOCATION: ELEVATION 1,036' ORIGINAL - 1,029' AS-DRILLED WATERSHED NORTH FORK HUGHES RIVER  
QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE  
SURFACE OWNER EDWIN D. MULVAY ET AL ACREAGE 152.5 ACRES +/-

OIL & GAS ROYALTY OWNER EDWIN DELMAR MULVAY ET AL; CHARLES COSTILOU ET UX; DELLA ROSE KOELLISCH ET VIR; LEASE ACREAGE 152 AC±; 222 AC±; 25 AC±;  
U. G. GARNER ET AL; BARBARA ANN BASIL; CORRINE CORNARO ET VIR; STEPHEN & CAROLYN TAYLOR; 27 AC±; 18.42 AC±; 27 AC±; 50 AC±;  
WARREN C. WINANS; STEPHEN GLEN DOAK; HARRY D. WILLIAMSON ET AL 70 AC±; 18.69 AC±; 176 AC±

PROPOSED WORK: DRILL  CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE   
PLUG OFF OLD FORMATION \_\_\_ PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_ PLUG & ABANDON \_\_\_ CLEAN OUT & REPLUG

TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,600' TVD 17,900' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM  
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

12/23/2016

COUNTY NAME PERMIT



LATITUDE 39°20'00"

6,823'

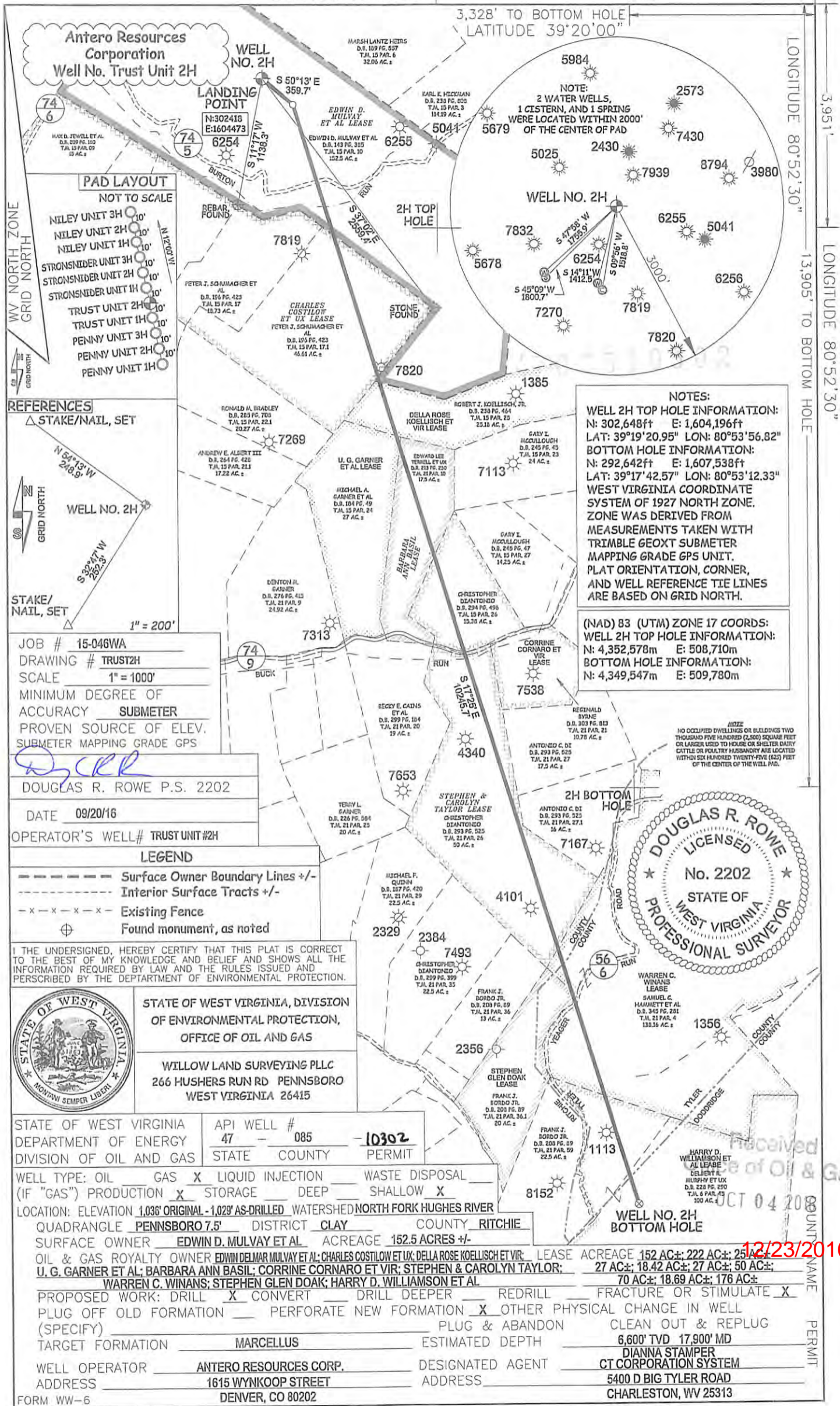
3,328' TO BOTTOM HOLE  
LATITUDE 39°20'00"

LONGITUDE 80°52'30"

3,951'

LONGITUDE 80°52'30"

13,905' TO BOTTOM HOLE



**Antero Resources Corporation**  
Well No. Trust Unit 2H

WELL NO. 2H  
LANDING POINT

PAD LAYOUT  
NOT TO SCALE

- NILEY UNIT 3H
- NILEY UNIT 2H
- NILEY UNIT 1H
- STRONSNIDER UNIT 3H
- STRONSNIDER UNIT 2H
- STRONSNIDER UNIT 1H
- TRUST UNIT 2H
- TRUST UNIT 1H
- PENNY UNIT 3H
- PENNY UNIT 2H
- PENNY UNIT 1H

**REFERENCES**



JOB # 15-046WA  
DRAWING # TRUST2H  
SCALE 1" = 1000'  
MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

DOUGLAS R. ROWE P.S. 2202  
DATE 09/20/16  
OPERATOR'S WELL# TRUST UNIT #2H

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

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  
266 HUSHERS RUN RD PENNSBORO WEST VIRGINIA 26415

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS  
API WELL # 47 - 085 - 10302  
STATE COUNTY PERMIT

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
(IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
LOCATION: ELEVATION 1,036' ORIGINAL - 1,029' AS-DRILLED WATERSHED NORTH FORK HUGHES RIVER  
QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE

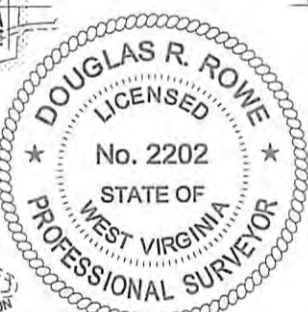
SURFACE OWNER EDWIN D. MULVAY ET AL ACREAGE 152.5 ACRES +/-  
OIL & GAS ROYALTY OWNER EDWIN DELMAR MULVAY ET AL; CHARLES COSTILOV ET UX; DELLA ROSE KOELLISCH ET VIR; LEASE ACREAGE 152 AC±; 222 AC±; 25 AC±; 12/23/2016  
U. G. GARNER ET AL; BARBARA ANN BASIL; CORRINE CORNARO ET VIR; STEPHEN & CAROLYN TAYLOR; 27 AC±; 18.42 AC±; 27 AC±; 50 AC±;  
WARREN C. WINANS; STEPHEN GLEN DOAK; HARRY D. WILLIAMSON ET AL 70 AC±; 18.69 AC±; 176 AC±

PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,600' TVD 17,900' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM  
DENVER, CO 80202 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

**NOTES:**  
WELL 2H TOP HOLE INFORMATION:  
N: 302,648ft E: 1,604,196ft  
LAT: 39°19'20.95" LON: 80°53'56.82"  
BOTTOM HOLE INFORMATION:  
N: 292,642ft E: 1,607,538ft  
LAT: 39°17'42.57" LON: 80°53'12.33"  
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE 6EOXT 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: 4,352,578m E: 508,710m  
BOTTOM HOLE INFORMATION:  
N: 4,349,547m E: 509,780m

**NOTE:**  
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.



Received  
Department of Oil & Gas  
OCT 04 2016



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
<b><u>Edwin D. Mulvay, et al Lease</u></b>			
Edwin Delmar Mulvay, et al	Petroleum Services, Inc.	1/8	0129/0536
Petroleum Services, Inc.	J & J Enterprises, Inc.	Assignment	0132/0572
J & J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Certificate of Merger	0006/0450
Energy Corporation of America	Antero Resources Appalachian Corporation	*Partial Assignment	0257/0377
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Charles Costilow, et ux Lease</u></b>			
Charles U. Costilow, et ux	Trio Petroleum Corporation	1/8	0194/0724
Trio Petroleum Corporation	Waco Holding Company	Articles of Incorporation	0059/0386
Waco Holding Company	Waco Oil & Gas Company	Articles of Incorporation	0059/0395
Waco Oil & Gas Company	Antero Resources Appalachian Corporation	Assignment	0261/0446
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Name Exhibit
<b><u>Della Rose Koellisch, et vir Lease</u></b>			
Della Rose Koellisch, et vir	Appalachian Energy Reserves, Inc.	1/8	0207/0558
Appalachian Energy Reserves, Inc.	Appalachian Energy Development, Inc.	Assignment	0329/0519
Appalachian Energy Development, Inc.	Triad Energy Corporation of WV, Inc.	Assignment	0329/0538
Triad Energy Corporation of WV, Inc.	Viking International Resources Co., Inc.	Assignment	0333/0230
Viking International Resources Co., Inc.	Triad Energy Corporation	Assignment	0338/0164
Triad Energy Corporation	Triad Hunter, LLC	Assignment	0250/0196
Triad Hunter, LLC	Antero Resources Corporation	Assignment	0525/0250
<b><u>U.G. Garner, et al Lease</u></b>			
U.G. Garner, et al	O.S. Garner	1/8	0055/0491
O.S. Garner	John R. Ridgeway	Assignment	0079/0376
John R. Ridgeway	Palmer Hill	Assignment	0079/0378
Palmer Hill	J & J Enterprises	Assignment	0169/0360
J & J Enterprises	Eastern American Energy Corporation	Assignment	0231/0732
Eastern American Energy Corporation	Energy Corp. of America	Assignment	0306/0836
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Barbara Ann Basil Lease</u></b>			
Barbara Ann Basil Lease	Antero Resources Corporation	1/8+	0271/0126

\*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\*\*

12/23/2016

**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)**

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- (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
<b><u>Corrine Cornaro, et vir Lease</u></b>			
Corrine Cornaro, et vir	J & J Enterprises, Inc.	1/8	0185/0414
J & J Enterprises, Inc.	Eastern American Energy Corporation	Merger	LB 0159/0139
Eastern American Energy Corporation	Energy Corporation of America	Assignment	LB 0240/0498
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Stephen &amp; Carolyn Taylor Lease</u></b>			
Stephen Taylor, et ux	Dennis Blauser	1/8	0123/0351
Dennis Blauser	C.C. Blauser	Assignment	0126/0306
C.C. Blauser	Antero Resources Corporation	Assignment	0265/0652
<b><u>Warren C. Winans Lease</u></b>			
Warren C. Winans, et ux	Eastern American Energy Corporation	1/8	0284/0011
Eastern American Energy Corporation	Energy Corporation of America	Merger	0240/0498
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Stephen Glen Doak Lease</u></b>			
Stephen Glen Doak	Antero Resources Corporation	1/8+	0265/0318

Received  
Office of Oil & Gas  
OCT 04 2016

\*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.



**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)**

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- (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>Harry D. Williamson, et al Lease</u>				
	Harry D. Williamson, et ux, et al	C.E. Young & L.C. Young	1/8	LB 0069/0347
	L.C. Young & Maisie Young	W. Leslie Rogers	Assignment	LB 0090/0135
	William L. Rogers, Mary Elizabeth Rich	J & J Enterprises, Inc.	Assignment	LB 0139/0570
	J & J Enterprises, Inc.	Eastern American Energy Corporation	Merger	LB 0159/0139
	Eastern American Energy Corporation	Energy Corporation of America	Assignment	LB 0240/0498
	Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	LB 0272/0307
	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: Senior Vice President of Production

Received  
Office of Oil & Gas  
OCT 04 2016

FILED

JUN 10 2013

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



Penny Barker, Manager  
Corporations Division  
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:

- 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) 357-7310  
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-1-129, 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  
Revised 4/13  
Office of Oil & Gas  
OCT 04 2016





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

September 30, 2016

West Virginia Department of Environmental Protection  
Chief, Office of Oil and Gas  
Attn: Mr. James Martin  
601 57<sup>th</sup> Street SE  
Charleston, WV 25304

RE: Trust Unit 2H  
Quadrangle: Pennsboro 7.5'  
Clay County/Ritchie District, West Virginia

Mr. Martin:

Antero Resources Corporation (Antero) is submitting the following application for a new well work permit for the Trust Unit 2H horizontal shallow well. As an authorized representative, I certify that Antero has the right to extract, produce or market the oil or gas for all leases through which the Trust Unit 2H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,

A handwritten signature in blue ink, appearing to read "Thomas Kuhn", followed by a long horizontal line extending to the right.

Thomas Kuhn  
Landman

Received  
Office of Oil & Gas  
OCT 04 2016

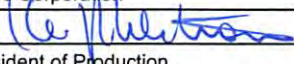
12/23/2016

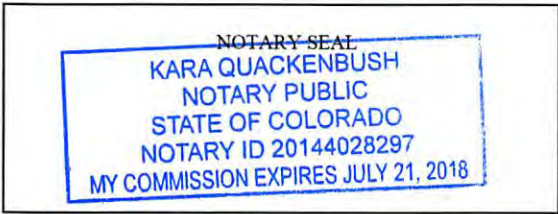


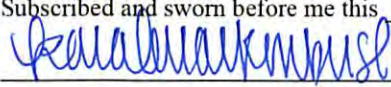


**Certification of Notice is hereby given:**

THEREFORE, I Kevin Kilstrom, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	<u>Antero Resources Corporation</u>	Address:	<u>1615 Wynkoop Street</u>
By:	<u>Kevin Kilstrom</u> 		<u>Denver, CO 80202</u>
Its:	<u>Senior Vice President of Production</u>	Facsimile:	<u>303-357-7315</u>
Telephone:	<u>303-357-7310</u>	Email:	<u>kquackenbush@anteroresources.com</u>



Subscribed and sworn before me this 29 day of September 2016  
  
 \_\_\_\_\_ Notary Public  
 My Commission Expires July 21, 2018

**Oil and Gas Privacy Notice:**

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at [deprivacyofficer@wv.gov](mailto:deprivacyofficer@wv.gov).

Received  
Office of Oil & Gas  
OCT 04 2016

**STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
NOTICE OF APPLICATION**

**Notice Time Requirement:** notice shall be provided no later than the **filing date of permit application.**

**Date of Notice:** 9/30/2016 **Date Permit Application Filed:** 9/30/2016

**Notice of:**

- PERMIT FOR ANY WELL WORK
- CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

**Delivery method pursuant to West Virginia Code § 22-6A-10(b)**

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice  WSSP Notice  E&S Plan Notice  Well Plat Notice is hereby provided to:

SURFACE OWNER(s)

Name: Edwin D. & Patricia L. Mulvay  
Address: 17579 Middle Island Rd.  
West Union, WV 26456

Name: Edwin D. & Patricia L. Mulvay (2nd Address)  
Address: HC 69 Box 45  
West Union, WV 26456

SURFACE OWNER(s) (Road and/or Other Disturbance)

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

SURFACE OWNER(s) (Impoundments or Pits)

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

COAL OWNER OR LESSEE

Name: NO DECLARATIONS ON RECORD WITH COUNTY  
Address: \_\_\_\_\_

COAL OPERATOR

Name: NO DECLARATIONS ON RECORD WITH COUNTY  
Address: \_\_\_\_\_

WATER PURVEYOR(s)/OWNER(s) OF WATER WELL, SPRING OR OTHER WATER SUPPLY SOURCE

Name: Peter Schumacher, et al  
Address: RR 3 Box 153-B  
Pennsboro, WV 26415

\*NOTE: 3 other water sources were identified; however, they are located greater than 1500' from the subject well pad location

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

\*Please attach additional forms if necessary

Received  
Office of Oil & Gas

OCT 04 2016



**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

**This Notice Shall Include:**

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

**Well Location Restrictions**

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items



examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

**Water Well Testing:**

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

**Water Testing Laboratories:**

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

**Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:**

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

**Written Comment:**

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas  
Department of Environmental Protection  
601 57<sup>th</sup> St. SE  
Charleston, WV 25304  
(304) 926-0450

Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

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**Time Limits and Methods for Filing Comments.**

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

**Comment Requirements**

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

**Permit Denial or Condition**

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

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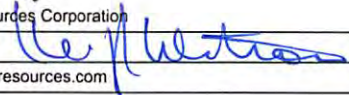
12/23/2016

WW-6A  
(8-13)

API NO. 47-085 -  
OPERATOR WELL NO. Trust Unit 2H  
Well Pad Name: Mulvay

**Notice is hereby given by:**

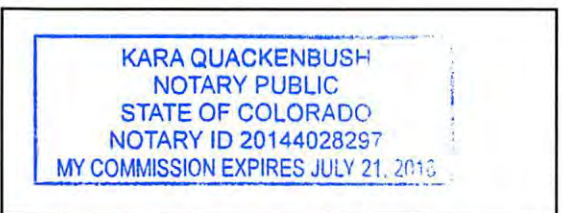
Well Operator: Antero Resources Corporation  
Telephone: (303) 357-7310  
Email: kquackenbush@anteroresources.com



Address: 1615 Wynkoop Street  
Denver, CO 80202  
Facsimile: 303-357-7315

**Oil and Gas Privacy Notice:**

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).



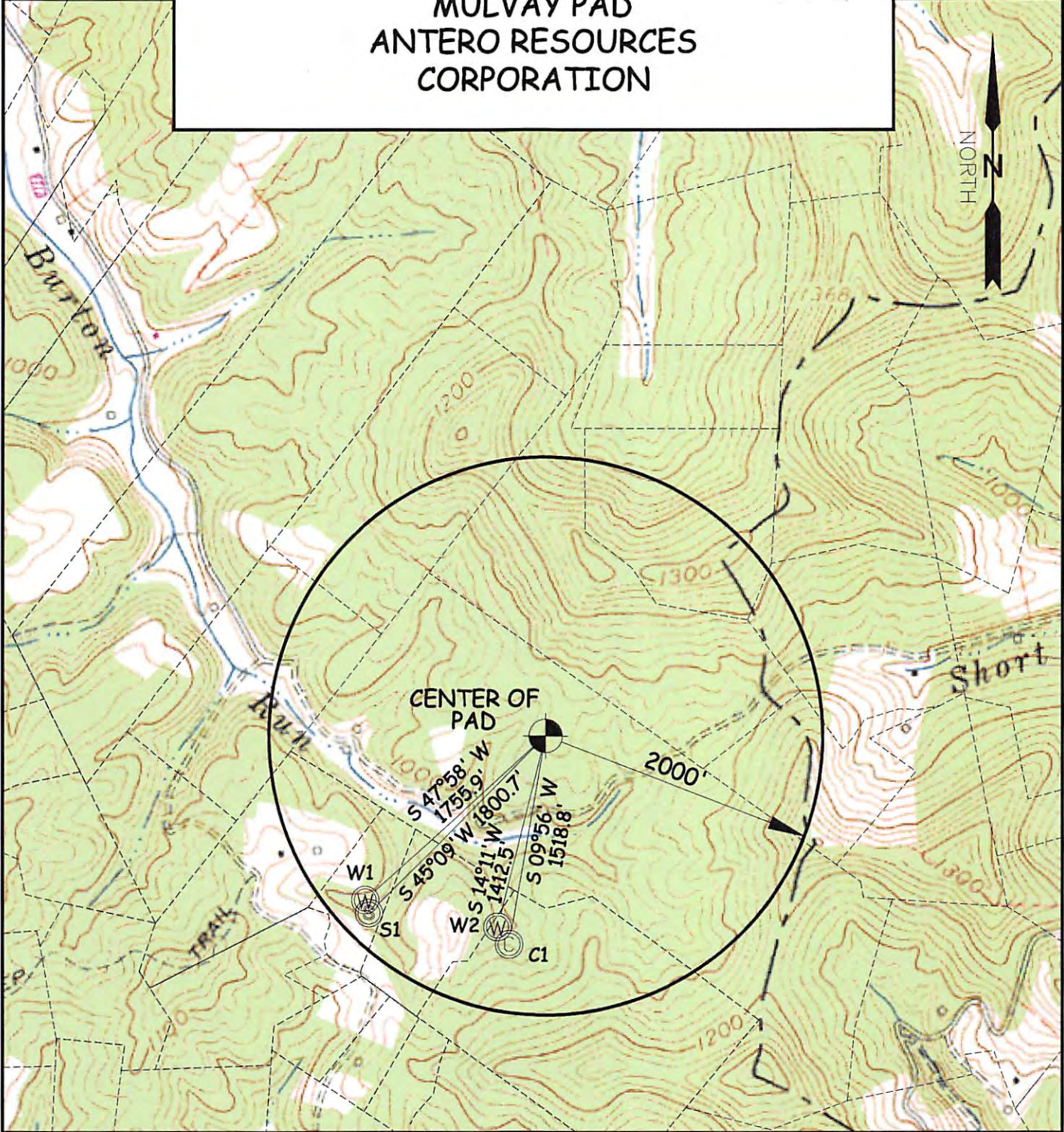
Subscribed and sworn before me this 30 day of September 2016  
Kara Quackenbush Notary Public  
My Commission Expires July 21, 2018

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12/23/2016



# MULVAY PAD ANTERO RESOURCES CORPORATION



WELL	SURFACE OWNER	ADDRESS	DISTRICT-TAX MAP-PARCEL	WELL LATITUDE	WELL LONGITUDE
W1	ANGELA D. DEMOSS ET AL	1669 BUCK RUN RD PENNSBORO, WV 26415	3-15-15.1	39° 19' 09.66"	80° 54' 13.03"
W2	PETER SCHUMACHER ET AL	RR 3 BOX 153-B PENNSBORO, WV 26415	3-15-17	39° 19' 07.27"	80° 54' 00.93"
C1	PETER SCHUMACHER ET AL	RR 3 BOX 153-B PENNSBORO, WV 26415	3-15-17	39° 19' 06.65"	80° 53' 59.71"
S1	ANGELA D. DEMOSS ET AL	1669 BUCK RUN RD PENNSBORO, WV 26415	3-15-15.1	39° 19' 08.11"	80° 54' 12.79"

<b>WILLOW LAND SURVEYING PLLC</b> P.O. BOX 17, PENNSBORO, WV 26415 (304) 659-1717	TOPO SECTION OF :  PENNSBORO 7.5' QUAD.	SCALE : 1-INCH = 1000-Feet 0'      1000'      2000'      3000' 
	DATE: 09/19/16      DRAWN BY: D.L.P.	



**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF INTENT TO DRILL**

Pursuant to W. Va. Code § 22-6A-16(b), the Notice of Intent to Drill is only required if the notice requirements of W. Va. Code § 22-6A-10(a) have NOT been met or if the Notice of Intent to Drill requirement has NOT been waived in writing by the surface owner.

**Notice Time Requirement:** Notice shall be provided at least **TEN (10)** days prior to filing a permit application.

**Date of Notice:** 04/14/2016      **Date Permit Application Filed:** 09/30/2016

**Delivery method pursuant to West Virginia Code § 22-6A-16(b)**

HAND DELIVERY       CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

Pursuant to W. Va. Code § 22-6A-16(b), at least ten days prior to filing a permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner notice of its intent to enter upon the surface owner's land for the purpose of drilling a horizontal well: *Provided*, That notice given pursuant to subsection (a), section ten of this article satisfies the requirements of this subsection as of the date the notice was provided to the surface owner: *Provided, however*, That the notice requirements of this subsection may be waived in writing by the surface owner. The notice, if required, shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative.

**Notice is hereby provided to the SURFACE OWNER(s):**

Name: Edwin D. & Patricia L. Mulvay  
Address: 17579 Middle Island Road  
West Union, WV 26456

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-16(b), notice is hereby given that the undersigned well operator has an intent to enter upon the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83 Easting:	<u>508696.6559m (Approx. Pad Center)</u>
County:	<u>Ritchie</u>	UTM NAD 83 Northing:	<u>4352581.3762m (Approx. Pad Center)</u>
District:	<u>Clay</u>	Public Road Access:	<u>CR 74/5</u>
Quadrangle:	<u>Pennsboro 7.5'</u>	Generally used farm name:	<u>Edwin D. Mulvay, et al</u>
Watershed:	<u>North Fork Hughes River</u>		

**This Notice Shall Include:**

Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

**Notice is hereby given by:**

Well Operator: Antero Resources Corporation  
Address: 1615 Wynkoop Street  
Denver, CO 80202  
Telephone: 303-357-7310  
Email: asteele@anteroresources.com  
Facsimile: 303-357-7315

Authorized Representative: Ashlie Steele  
Address: 1615 Wynkoop Street  
Denver, CO 80202  
Telephone: 303-357-7310  
Email: asteele@anteroresources.com  
Facsimile: 303-357-7315

**Oil and Gas Privacy Notice:**

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).

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OCT 04 2016

**12/23/2016**



**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF PLANNED OPERATION**

**Notice Time Requirement:** notice shall be provided no later than the **filing date of permit application.**

**Date of Notice:** 09/30/2016      **Date Permit Application Filed:** 09/30/2016

**Delivery method pursuant to West Virginia Code § 22-6A-16(c)**

- CERTIFIED MAIL  
RETURN RECEIPT REQUESTED
- HAND  
DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

**Notice is hereby provided to the SURFACE OWNER(s)**  
(at the address listed in the records of the sheriff at the time of notice):

Name: Edwin D. & Patricia L. Mulvay  
Address: 17579 Middle Island Rd.  
West Union, WV 26456

Name: Edwin D. & Patricia L. Mulvay (2nd Address)  
Address: HC 69 Box 45  
West Union, WV 26456

**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83	Easting: <u>508710m</u>
County: <u>Ritchie</u>		Northing: <u>4352578m</u>
District: <u>Clay</u>	Public Road Access: <u>CR 74/5 (Short Run Rd.)</u>	
Quadrangle: <u>Pennsboro 7.5'</u>	Generally used farm name: <u>Mulvay, Edwin D., et al</u>	
Watershed: <u>North Fork Hughes River</u>		

**This Notice Shall Include:**

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by W. Va. Code § 22-6A-10(b) to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

Well Operator: Antero Resources Corporation  
Telephone: (303) 357-7310  
Email: kquackenbush@anteroresources.com

Address: 1615 Wynkoop Street  
Denver, CO 80202  
Facsimile: 303-357-7315

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The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).

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OCT 04 2016



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

**Division of Highways**

1900 Kanawha Boulevard East • Building Five • Room 110  
Charleston, West Virginia 25305-0430 • (304) 558-3505

Earl Ray Tomblin  
Governor

Paul A. Mattox, Jr., P. E.  
Secretary of Transportation/  
Commissioner of Highways

Reissued September 21, 2016

James A. Martin, Chief  
Office of Oil and Gas  
Department of Environmental Protection  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304

Subject: DOH Permit for the Mulvay Pad, Ritchie County  
Trust Unit 2H Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #03-2014-0530 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off County Route 74/5 in Ritchie County.

This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

A handwritten signature in blue ink that reads "Gary K. Clayton".

Gary K. Clayton, P.E.  
Regional Maintenance Engineer  
Central Office O&G Coordinator

Cc: Natalie Komp  
Antero Resources Corporation  
CH, OM, D-3  
File

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OCT 04 2016



# List of Anticipated Additives Used for Fracturing or Stimulating Well

Additives	Chemical Abstract Service Number (CAS #)
Fresh Water	7732-18-5
2 Phosphobutane 1,2,4 tricarboxylic acid	37971-36-1
Ammonium Persulfate	7727-54-0
Anionic copolymer	Proprietary
Anionic polymer	Proprietary
BTEX Free Hydrotreated Heavy Naphtha	64742-48-9
Cellulase enzyme	Proprietary
Demulsifier Base	Proprietary
Ethoxylated alcohol blend	Mixture
Ethoxylated Nonylphenol	68412-54-4
Ethoxylated oleylamine	26635-93-8
Ethylene Glycol	107-21-1
Glycol Ethers	111-76-2
Guar gum	9000-30-0
Hydrogen Chloride	7647-01-0
Hydrotreated light distillates, non-aromatic, BTEX free	64742-47-8
Isopropyl alcohol	67-63-0
liquid, 2,2-dibromo-3-nitrilopropionamide	10222-01-2
Microparticle	Proprietary
Petroleum Distillates (BTEX Below Detect)	64742-47-8
Polyacrylamide	57-55-6
Propargyl Alcohol	107-19-7
Propylene Glycol	57-55-6
Quartz	14808-60-7
Silica, crystalline quartz	7631-86-9
Sodium Chloride	7647-14-5
Sodium Hydroxide	1310-73-2
Sugar	57-50-1
Surfactant	68439-51-0
Suspending agent (solid)	14808-60-7
Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7
Solvent Naphtha, petroleum, heavy aliph	64742-96-7
Soybean Oil, Me ester	67784-80-9
Copolymer of Maleic and Acrylic Acid	52255-49-9
DETA phosphonate	15827-60-8
Hexamethylene Triamine Penta	34690-00-1
Phosphino Carboxylic acid polymer	71050-62-9
Hexamethylene Diamine Tetra	23605-75-5
2-Propenoic acid, polymer with 2 propenamide	9003-06-9
Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5
Diethylene Glycol	111-46-6
Methenamine	100-97-0
Polyethylene polyamine	68603-67-8
Coco amine	61791-14-8
2-Propyn-1-olcompound with methyloxirane	38172-91-7

Prepared  
 Oil & Gas  
 OCT 04 2016

# WATER PAD CONSTRUCTION PLAN, CONTROL PLANS CORPORATION



SCALE: 1 INCH = 500 FEET



WELL HEAD LAYOUT				
WELL NAME	NAD 83 (WV NORTH ZONE)			
	NORTHING	EASTING	LATITUDE	LONGITUDE
PENNY UNIT 1H	302643.7101	1572763.4607	39.32246017°	-80.89891586°
PENNY UNIT 2H	302653.4919	1572761.3828	39.32248693°	-80.89892374°
PENNY UNIT 3H	302663.2736	1572759.3049	39.32251370°	-80.89893162°
TRUST UNIT 1H	302673.0553	1572757.2269	39.32254046°	-80.89893951°
TRUST UNIT 2H	302682.8371	1572755.1490	39.32256723°	-80.89894739°
STRONSNIDER UNIT 1H	302692.6188	1572753.0711	39.32259399°	-80.89895527°
STRONSNIDER UNIT 2H	302702.4005	1572750.9932	39.32262075°	-80.89896315°
STRONSNIDER UNIT 3H	302712.1823	1572748.9153	39.32264752°	-80.89897104°
NILEY UNIT 1H	302721.9640	1572746.8373	39.32267428°	-80.89897892°
NILEY UNIT 2H	302731.7457	1572744.7594	39.32270105°	-80.89898680°
NILEY UNIT 3H	302741.5274	1572742.6815	39.32272781°	-80.89899468°

WELL HEAD LAYOUT				
WELL NAME	NAD 27 (WV NORTH ZONE)		UTM ZONE 17 (METERS)	
	NORTHING	EASTING	NORTHING	EASTING
PENNY UNIT 1H	302609.2517	1604204.5489	4352566.1978	508713.1851
PENNY UNIT 2H	302619.0335	1604202.4710	4352569.1672	508712.5023
PENNY UNIT 3H	302628.8153	1604200.3930	4352572.1367	508711.8195
TRUST UNIT 1H	302638.5970	1604198.3151	4352575.1061	508711.1367
TRUST UNIT 2H	302648.3788	1604196.2372	4352578.0755	508710.4540
STRONSNIDER UNIT 1H	302658.1606	1604194.1592	4352581.0450	508709.7712
STRONSNIDER UNIT 2H	302667.9423	1604192.0813	4352584.0144	508709.0884
STRONSNIDER UNIT 3H	302677.7241	1604190.0034	4352586.9839	508708.4056
NILEY UNIT 1H	302687.5058	1604187.9255	4352589.9533	508707.7228
NILEY UNIT 2H	302697.2876	1604185.8475	4352592.9227	508707.0401
NILEY UNIT 3H	302707.0694	1604183.7696	4352595.8922	508706.3573

SHEET INDEX	
PAGE NO.	DESCRIPTION
1	COVER PAGE & LOCATION MAP
2	SCHEDULE OF QUANTITIES
3	NOTES
4	EXISTING CONDITIONS
5	OVERALL PLAN
6	SITE PLAN
7	WELL PAD GRADING PLAN
8	WATER CONTAINMENT PAD GRADING PLAN
9	WELL PAD CROSS SECTIONS AND PROFILE
10	WATER CONTAINMENT PAD CROSS SECTIONS AND PROFILE
11	ACCESS ROAD 1 CROSS SECTIONS AND PROFILE
12	ACCESS ROAD 2 CROSS SECTIONS AND PROFILE
13 - 19	DETAILS
20	RECLAMATION PLAN

MULVAY LOD AREAS		
DESCRIPTION	AREA (ACRES)	AFFECTED TAX PARCELS
WELL PAD	4.88	EDWIN D. & PATRICIA L. MULVAY TM: 15 / PARCEL: 10 DB: 143 / PG: 385
WATER CONTAINMENT PAD	2.69	
ACCESS ROAD 1	2.80	
ACCESS ROAD 2	0.40	
STAGING AREA	0.55	
TOPSOIL SPOIL AREA	0.97	
MATERIAL SPOIL AREA	0.71	
DIVERSION DITCHES	0.71	
TOTAL	13.71	
TOTAL WOODED ACRES DISTURBED	12.74	
TOTAL LINEAR FOOTAGE OF ACCESS ROAD 1	779	
TOTAL LINEAR FOOTAGE OF ACCESS ROAD 2	143	

LIMIT OF DISTURBANCE	
DESCRIPTION	AREAS (ACRES)
WELL PAD	4.88
WATER CONTAINMENT PAD	2.69
ACCESS ROAD 1	2.80
ACCESS ROAD 2	0.40
STAGING AREA	0.55
TOPSOIL SPOIL AREA	0.97
MATERIAL SPOIL AREA	0.71
DIVERSION DITCHES	0.71
TOTAL	13.71

**ISSUED FOR CONSTRUCTION**



SEAL

**KLEINFELDER**  
Bright People. Right Solutions.  
230 EXECUTIVE DRIVE, SUITE 122  
CRANBERRY TOWNSHIP, PA 16066  
PH. 724-772-7072 FAX. 724-772-7079  
www.kleinfelder.com

PROJ. NO. 20150963  
ACAD FILE: COVER.dwg

**MULVAY WELL & W.C. PAD  
COVER PAGE & LOCATION MAP**

ANTERO RESOURCES CORPORATION  
MULVAY WELL & WATER CONTAINMENT PAD  
CLAY DISTRICT  
WEST VIRGINIA  
RITCHIE COUNTY

DESIGNED BY:	CHT
MODIFIED BY:	-
CHECKED BY:	JBC
DATE:	08-21-2014
SCALE:	
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	
CONSTRUCTION	1

Received  
Office of Oil & Gas

OCT 28 2016

MDC  
10/27/14





## PROJECT CONTACTS

### PROJECT OWNER

ANTERO RESOURCES  
1615 WYNKOOP STREET  
DENVER, CO 80202

CONTACT: ROBERT WIRKS  
DESIGN MANAGER  
304.869.3405 OFFICE  
304.673.6196 CELL

CONTACT: JOHN KAWCAK  
ENGINEER  
817.368.1553

CONTACT: ELI WAGONER  
ENVIRONMENTAL  
ENGINEER  
304.622.3842, EXT 311  
OFFICE

CONTACT: AARON KUNZLER  
CONSTRUCTION MANAGER  
304.641.8242

### LOCATION SURVEYOR

WHITE BROTHERS CONSULTING  
CONTACT: LEE SNYDER, PS  
447 CALL ROAD SUITE 216  
CHARLESTON, WV 25312  
304.550.9484

### ENGINEER OF RECORD

KLEINFELDER EAST, INC.  
CONTACT: JOSH D. FREGOSI, PE  
WV PE #020261  
230 EXECUTIVE DRIVE, SUITE 122  
CRANBERRY TOWNSHIP, PA 16066  
724.772.7072 OFFICE  
724.772.7079 FAX

### ENVIRONMENTAL/ DELINEATION BOUNDARY

ALLSTAR ECOLOGY, LLC  
CONTACT: TERRY BURHANS  
1582 MEADOWDALE ROAD  
FAIRMONT, WV 26554  
304.816.3490 OFFICE  
858.243.9900 CELL

### TOPO SURVEYOR

BLUE MOUNTAIN AERIAL MAPPING  
CONTACT: CRAIG FRY  
11023 MASON DIXON HIGHWAY  
BURTON, WV 26562  
304.662.2626 OFFICE  
304.815.4890 CELL

### SITE LOCATIONS

DESCRIPTION	NAD 83 (WV NORTH)		UTM ZONE 17 (METERS)	
	LATITUDE	LONGITUDE	NORTHING	EASTING
CENTER OF WELL PAD	39.32259708°	-80.89910740°	4352581.3762	508696.6559
CENTER OF WATER CONTAINMENT PAD	39.32235392°	-80.89775070°	4352554.5197	508813.6316
ACCESS ROAD ENTRANCE	39.32023207°	-80.89963016°	4352318.8606	508651.8887

### FLOODPLAIN CONDITIONS

DO SITE CONSTRUCTION ACTIVITIES TAKE PLACE IN FLOODPLAIN:	NO
PERMIT NEEDED FROM COUNTY FLOODPLAIN COORDINATOR:	NO
HEC-RAS STUDY COMPLETED:	N/A
FLOODPLAIN SHOWN ON DRAWINGS:	N/A
FIRM MAP NUMBER(S) FOR SITE:	54085C0125C
ACREAGES OF CONSTRUCTION IN FLOODPLAIN:	N/A

### ACCESS ROAD LENGTH (FEET)

DESCRIPTION	FEET
ACCESS ROAD 1	779
ACCESS ROAD 2	143
TOTAL	922

### DESIGN CERTIFICATION

THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS §35-8.

### MM-109 PERMIT

ANTERO RESOURCES WILL OBTAIN AN ENCROACHMENT PERMIT (MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES.



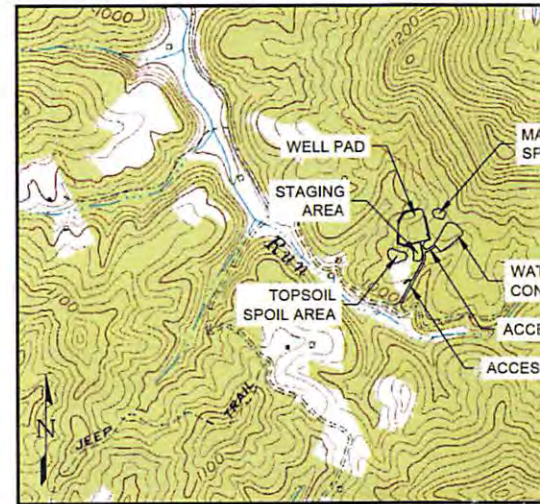
MISS UTILITY OF WEST VIRGINIA  
1-800-245-4848  
WEST VIRGINIA STATE LAW  
REQUIRES THAT YOU CALL TWO  
BUSINESS DAYS BEFORE YOU  
DIG IN THE STATE OF WEST  
VIRGINIA. IT'S THE LAW!!

### WELL LOCATION RESTRICTIONS

WELL PAD IS TO COMPLY WITH WELL LOCATION RESTRICTIONS OF WV CODE 22-6A-12. THE PADS COMPLY WITH THE FOLLOWING RESTRICTIONS:

- 250' FROM AN EXISTING WELL OR DEVELOPED SPRING USED FOR HUMAN OR DOMESTIC ANIMALS
- 625' FROM AN OCCUPIED DWELLING OR BARN GREATER THAN 2500 SF USED FOR POULTRY OR DAIRY MEASURED FROM THE CENTER OF THE PAD
- 100' FROM EDGE OF DISTURBANCE TO WETLANDS, PERENNIAL STREAMS, NATURAL OR ARTIFICIAL LAKE, POND OR RESERVOIR
- 300' FROM EDGE OF DISTURBANCE TO NATURALLY REPRODUCING TROUT STREAMS
- 1000' OF SURFACE OR GROUND WATER INTAKE TO A PUBLIC WATER SUPPLY

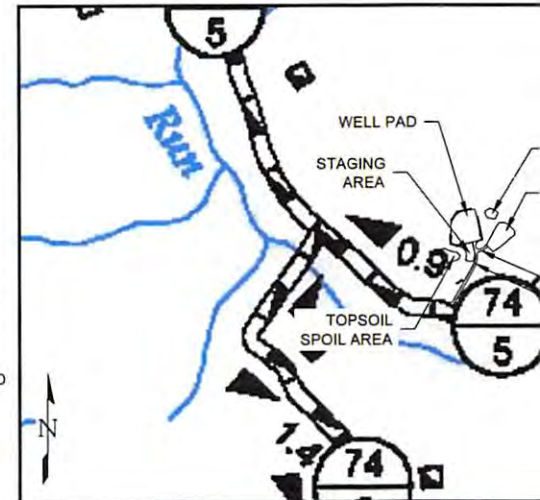
# MULVAY WELL AND CONTAINMENT SITE DESIGN & CONSTRUCTION EROSION & SEDIMENT CONTROL ANTERO RESOURCES COMPANY



NORTH MERIDIAN  
REFERENCED TO NAD83  
WEST VIRGINIA STATE  
PLANE NORTH ZONE

AFFECTED TAX PARCELS:  
SEE TABLE TO THE RIGHT

PENNSB  
QUA



### PLAN REPRODUCTION WARNING

THE PLANS HAVE BEEN CREATED ON ANSI D (22"x34") S  
REDUCTIONS, REFER TO GRAPHIC SCALE.

THE PLANS HAVE BEEN CREATED FOR FULL COLOR PL  
OF THE PLANS THAT IS NOT PLOTTED IN FULL COLOR S  
CONSIDERED ADEQUATE FOR CONSTRUCTION PURPOSES.

"WARNING": INFORMATION MAY BE LOST IN COPYING  
SCALE PLOTTING.

12/23/2016





**PROJECT CONTACTS**

**PROJECT OWNER**

ANTERO RESOURCES  
1615 WYNKOOP STREET  
DENVER, CO 80202

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DESIGN MANAGER  
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304.573.6196 CELL

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ENGINEER  
617.368.1553

CONTACT: ELI WAGNER  
ENVIRONMENTAL  
ENGINEER  
334.622.2842, EXT 311  
OFFICE

CONTACT: AARON KUNZLER  
CONSTRUCTION MANAGER  
304.641.8242

**LOCATION SURVEYOR**

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CONTACT: LEE SNYDER, P.E.  
447 CALL ROAD SUITE 210  
CHARLESTON, WV 25312  
304.550.9484

**ENGINEER OF RECORD**

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CONTACT: JOSE D. FREGOSI, PE  
WV PE #202251  
230 EXECUTIVE DRIVE, SUITE 122  
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BLUE MOUNTAIN AERIAL MAPPING  
CONTACT: CRAIG FRY  
11023 WILSON DIXON HIGHWAY  
BURTON, WV 25622  
304.662.2625 OFFICE  
304.815.4890 CELL

**SITE LOCATIONS**

DESCRIPTION	NAD 83 (WV NORTH)		UTM ZONE 17 (METERS)	
	LATITUDE	LONGITUDE	NORTHING	EASTING
CENTER OF WELL PAD	39.32259708°	-80.89910740°	4352981.3782	508696.6556
CENTER OF WATER CONTAINMENT PAD	39.32235392°	-80.89775070°	4352654.6167	508613.6316
ACCESS ROAD ENTRANCE	39.32022207°	-80.89963016°	4352318.8606	508661.8807

**FLOODPLAIN CONDITIONS**

DO SITE CONSTRUCTION ACTIVITIES TAKE PLACE IN FLOODPLAIN:	NO
PERMIT NEEDED FROM COUNTY FLOODPLAIN COORDINATOR:	NO
HEC-RAS STUDY COMPLETED:	N/A
FLOODPLAIN SHOWN ON DRAWINGS:	N/A
FIRM MAP NUMBER(S) FOR SITE:	34085C0125C
ACREAGES OF CONSTRUCTION IN FLOODPLAIN:	N/A

**ACCESS ROAD LENGTH (FEET)**

DESCRIPTION	FEET
ACCESS ROAD 1	779
ACCESS ROAD 2	143
<b>TOTAL</b>	<b>922</b>

**DESIGN CERTIFICATION**

THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS §36.6.

**MM-109 PERMIT**

ANTERO RESOURCES WILL OBTAIN AN ENCROACHMENT PERMIT (MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES.



**WELL LOCATION RESTRICTIONS**

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- 250' FROM AN EXISTING WELL OR DEVELOPED SPRING USED FOR HUMAN OR DOMESTIC ANIMALS
  - 62' FROM AN OCCUPIED DWELLING OR BARN GREATER THAN 2500 SF USED FOR POULTRY OR DAIRY MEASURED FROM THE CENTER OF THE PAD
  - 100' FROM EDGE OF DISTURBANCE TO WETLANDS, PERENNIAL STREAMS, NATURAL OR ARTIFICIAL LAKE, POND OR RESERVOIR
  - 300' FROM EDGE OF DISTURBANCE TO NATURALLY REPRODUCING TROUT STREAMS
  - 1000' OF SURFACE OR GROUND WATER INTAKE TO A PUBLIC WATER SUPPLY

**PLAN REPRODUCTION WARNING**

THE PLANS HAVE BEEN PREPARED OR ADDED TO EXISTING SHEETS FOR REDUCTION. REF: 1/8 TO GRAPHIC SCALE.

THE PLANS HAVE BEEN CREATED FOR FULL COLOR PLOTTING. ANY SET OF THE PLANS THAT IS NOT PLOTTED IN FULL COLOR OR SHALL NOT BE CONSIDERED ADEQUATE FOR CONSTRUCTION PURPOSES.

\*UNANNOUNCED INFORMATION MAY BE LOST IN COPYING AND/OR PLOTTING.

**MULVAY WELL AND WATER CONTAINMENT PAD SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS**  
ANTERO RESOURCES CORPORATION

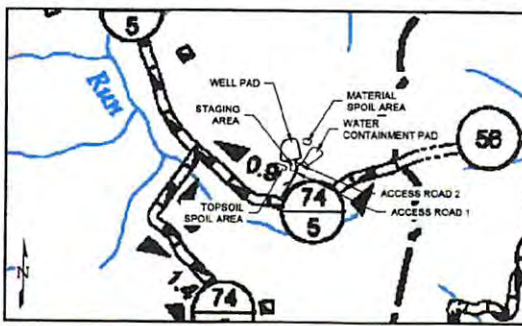


**APPROVED WVDEP OOG**  
12-19-2016



- API# 4785010201
- API# 4785010202
- API# 4785010203
- API# 4785010250
- API# 4785010251
- API# 4785010252
- API# 4785010298
- API# 4785010299
- API# 4785010300
- API# 4785010301
- API# 4785010302

NORTH-MERIDIAN REFERENCED TO NAD83 WEST VIRGINIA STATE PLANE NORTH ZONE  
AFFECTED TAX PARCELS SEE TABLE TO THE RIGHT  
PENNSBORO 7.5 QUAD  
SCALE: 1 INCH = 500 FEET



**WELL HEAD LAYOUT**

NAD 83 (WV NORTH ZONE)

WELL NAME	NORTHING	EASTING	LATITUDE	LONGITUDE
PENNY UNIT 1H	302843.7101	1972763.4607	39.32246017°	-80.89891586°
PENNY UNIT 2H	302653.4919	1972761.3828	39.32248803°	-80.89892234°
PENNY UNIT 3H	302663.2736	1972759.3049	39.32251370°	-80.89893162°
TRUST UNIT 1H	302673.0563	1972757.2269	39.32254346°	-80.89893651°
TRUST UNIT 2H	302682.8371	1972755.1490	39.32256723°	-80.89894739°
STRONSNIDER UNIT 1H	302692.6188	1972753.0711	39.32259199°	-80.89895827°
STRONSNIDER UNIT 2H	302702.4005	1972750.9932	39.32262075°	-80.89896915°
STRONSNIDER UNIT 3H	302712.1823	1972748.9153	39.32264752°	-80.89897904°
NILEY UNIT 1H	302721.9640	1972746.8373	39.32267429°	-80.89898992°
NILEY UNIT 2H	302731.7457	1972744.7594	39.32270105°	-80.89899980°
NILEY UNIT 3H	302741.5274	1972742.6815	39.32272781°	-80.89900968°

**WELL HEAD LAYOUT**

UTM ZONE 17 (METERS)

WELL NAME	NORTHING	EASTING	NORTHING	EASTING
PENNY UNIT 1H	302609.2517	1604204.5489	4352566.1978	508713.1861
PENNY UNIT 2H	302619.0335	1604202.4710	4352569.1672	508712.5023
PENNY UNIT 3H	302628.8153	1604200.3936	4352572.1367	508711.8185
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TRUST UNIT 2H	302648.3788	1604196.2372	4352578.0755	508710.4540
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STRONSNIDER UNIT 2H	302667.9423	1604192.0813	4352584.0144	508709.0884
STRONSNIDER UNIT 3H	302677.7241	1604190.0034	4352586.9838	508708.4056
NILEY UNIT 1H	302687.5058	1604187.9255	4352589.9533	508707.7228
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**SHEET INDEX**

PAGE NO.	DESCRIPTION
1	COVER PAGE & LOCATION MAP
2	SCHEDULE OF QUANTITIES
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6	SITE PLAN
7	WELL PAD GRADING PLAN
8	WATER CONTAINMENT PAD GRADING PLAN
9	WELL PAD CROSS SECTIONS AND PROFILE
10	WATER CONTAINMENT PAD CROSS SECTIONS AND PROFILE
11	ACCESS ROAD 1 CROSS SECTIONS AND PROFILE
12	ACCESS ROAD 2 CROSS SECTIONS AND PROFILE
13-19	DETAILS
20	RECLAMATION PLAN

**MULVAY LOD AREAS**

DESCRIPTION	AREA (ACRES)	AFFECTED TAX PARCELS
WELL PAD	4.88	
WATER CONTAINMENT PAD	2.80	
ACCESS ROAD 1	0.40	
ACCESS ROAD 2	0.35	
STAGING AREA	0.55	EDWING & PATRICIA L. MULVAY TM 11 PARCEL 10 DB 143 PG 345
TOPSOIL SPOIL AREA	0.97	
MATERIAL SPOIL AREA	0.71	
DIVERSION DITCHES	0.71	
<b>TOTAL</b>	<b>13.71</b>	
TOTAL WOODED ACRES DISTURBED	12.74	
TOTAL LINEAR FOOTAGE OF ACCESS ROAD 1	776	
TOTAL LINEAR FOOTAGE OF ACCESS ROAD 2	143	

**LIMIT OF DISTURBANCE**

DESCRIPTION	AREA (ACRES)
WELL PAD	4.88
WATER CONTAINMENT PAD	2.80
ACCESS ROAD 1	2.80
ACCESS ROAD 2	0.40
STAGING AREA	0.55
TOPSOIL SPOIL AREA	0.97
MATERIAL SPOIL AREA	0.71
DIVERSION DITCHES	0.71
<b>TOTAL</b>	<b>13.71</b>

**ISSUED FOR CONSTRUCTION**



NO.	REVISION	BY	DATE
1	DESIGN CHANGES	KLF	03-10-15
2	DELINEATION CHANGES	KLF	07-02-15
3	QUANTITY & DETAIL UPDATES	CRN	07-09-15



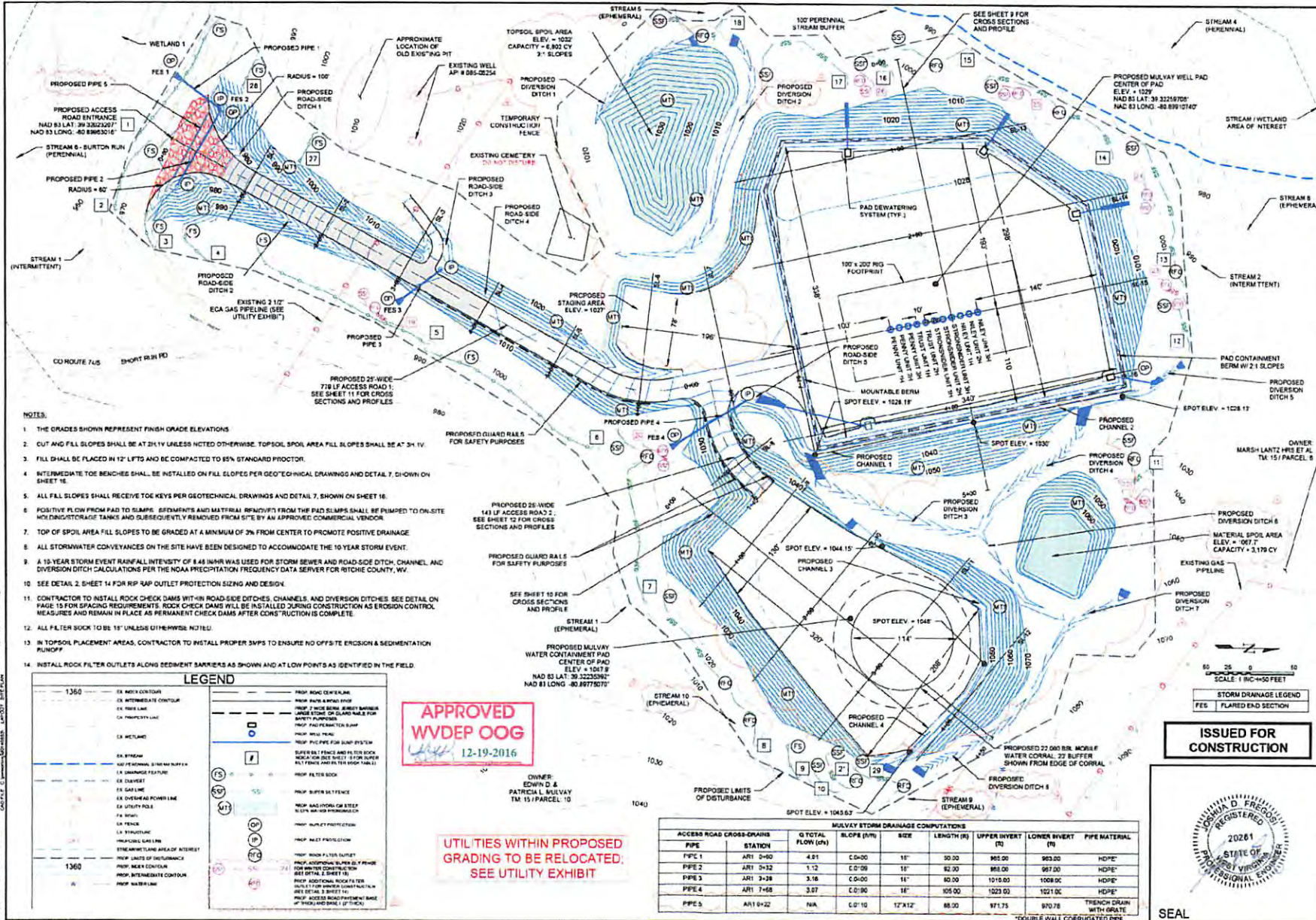
**MULVAY WELL & W.C. PAD COVER PAGE & LOCATION MAP**

ANTERO RESOURCES CORPORATION  
MULVAY WELL & WATER CONTAINMENT PAD  
CLAY DISTRICT  
RITCHIE COUNTY  
WEST VIRGINIA

DESIGNED BY:	CHT
MODIFIED BY:	
CHECKED BY:	JBC
DATE:	08-21-2016
SCALE:	
ORIGNAL SCALE IN INCHES FOR REDUCED PLAN:	1" = 10' 1" = 15' 1" = 30'
CONSTRUCTION	
<b>1</b>	
1 of 20 sheets	

1. THESE MAPS AND DRAWINGS HAVE BEEN PREPARED BY AN INDIVIDUAL OR FIRM WHO IS NOT A LICENSED PROFESSIONAL ENGINEER OR SURVEYOR IN THE STATE OF WEST VIRGINIA. THE STATE OF WEST VIRGINIA DOES NOT REGULATE THE PRACTICE OF ENGINEERING OR SURVEYING. THEREFORE, THE STATE OF WEST VIRGINIA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THESE MAPS AND DRAWINGS. THE USER OF THESE MAPS AND DRAWINGS ASSUMES ALL LIABILITY FOR ANY DAMAGE OR INJURY RESULTING FROM THE USE OF THESE MAPS AND DRAWINGS.





- NOTES:**
1. THE GRADES SHOWN REPRESENT FINISH GRADE ELEVATIONS
  2. CUT AND FILL SLOPES SHALL BE AT 2H:1V UNLESS NOTED OTHERWISE. TOPSOIL SPOIL AREA FILL SLOPES SHALL BE AT 3H:1V
  3. FILL SHALL BE PLACED IN 12" LIFTS AND BE COMPACTED TO 85% STANDARD PROCTOR.
  4. INTERMEDIATE TOE BENCHES SHALL BE INSTALLED ON FILL SLOPES PER GEOTECHNICAL DRAWINGS AND DETAIL 7, SHOWN ON SHEET 1E.
  5. ALL FILL SLOPES SHALL RECEIVE TOE KEYS PER GEOTECHNICAL DRAWINGS AND DETAIL 7, SHOWN ON SHEET 1E.
  6. POSITIVE FLOW FROM PAD TO SLURRY BENCHES AND MATERIAL BENCHES FROM THE PAD SLURPS SHALL BE PUMPED TO ON-SITE HOLDING/STORAGE TANKS AND SUBSEQUENTLY REMOVED FROM SITE BY AN APPROVED COMMERCIAL VENDOR.
  7. TOP OF SPOIL AREA FILL SLOPES TO BE GRADED AT A MINIMUM OF 3% FROM CENTER TO PROMOTE POSITIVE DRAINAGE.
  8. ALL STORMWATER CONVEYANCES ON THE SITE HAVE BEEN DESIGNED TO ACCOMMODATE THE 10-YEAR STORM EVENT.
  9. A 10-YEAR STORM EVENT RAINFALL INTENSITY OF 8.48 IN/HR WAS USED FOR STORM SEWER AND ROAD-SIDE DITCH, CHANNEL, AND DIVERSION DITCH CALCULATIONS PER THE NOAA PRECIPITATION FREQUENCY DATA SERVER FOR RITCHIE COUNTY, WV.
  10. SEE DETAIL 2, SHEET 14 FOR R/W RAMP OUTLET PROTECTION SIZING AND DESIGN.
  11. CONTRACTOR TO INSTALL ROCK CHECK DAMS WITH-IN ROAD-SIDE DITCHES, CHANNELS, AND DIVERSION DITCHES. SEE DETAIL ON PAGE 15 FOR SPACING REQUIREMENTS. ROCK CHECK DAMS WILL BE INSTALLED DURING CONSTRUCTION AS EROSION CONTROL MEASURES AND REMAIN IN PLACE AS PERMANENT CHECK DAMS AFTER CONSTRUCTION IS COMPLETE.
  12. ALL FILTER SOCK TO BE 18" UNLESS OTHERWISE NOTED.
  13. IN SLOPE PLACEMENT AREAS, CONTRACTOR TO INSTALL PROPER SMPs TO ENSURE NO OFF-SITE EROSION & SEDIMENTATION RUNOFF.
  14. INSTALL ROCK FILTER OUTLETS ALONG SEDIMENT BARRIERS AS SHOWN AND AT LOW POINTS AS IDENTIFIED IN THE FIELD.

**LEGEND**

1360	EX. 100' CONTOUR	PROF. ROAD CENTERLINE
1360	EX. INTERMEDIATE CONTOUR	PROF. ROAD & DRIVE HOOP
1360	EX. 50' PERMANENT STREAM BUFFER	PROF. 2" HOSE BOND BURIED BARRIER
1360	EX. 10' PERMANENT STREAM BUFFER	PROF. 1" HOSE BOND BURIED BARRIER
1360	EX. 5' PERMANENT STREAM BUFFER	PROF. 3/4" HOSE BOND BURIED BARRIER
1360	EX. 2' PERMANENT STREAM BUFFER	PROF. 1/2" HOSE BOND BURIED BARRIER
1360	EX. 1' PERMANENT STREAM BUFFER	PROF. 3/8" HOSE BOND BURIED BARRIER
1360	EX. 6" PERMANENT STREAM BUFFER	PROF. 1/4" HOSE BOND BURIED BARRIER
1360	EX. 3" PERMANENT STREAM BUFFER	PROF. 1/8" HOSE BOND BURIED BARRIER
1360	EX. 1.5" PERMANENT STREAM BUFFER	PROF. 1/16" HOSE BOND BURIED BARRIER
1360	EX. 0.75" PERMANENT STREAM BUFFER	PROF. 1/32" HOSE BOND BURIED BARRIER
1360	EX. 0.375" PERMANENT STREAM BUFFER	PROF. 1/64" HOSE BOND BURIED BARRIER
1360	EX. 0.1875" PERMANENT STREAM BUFFER	PROF. 1/128" HOSE BOND BURIED BARRIER
1360	EX. 0.09375" PERMANENT STREAM BUFFER	PROF. 1/256" HOSE BOND BURIED BARRIER
1360	EX. 0.046875" PERMANENT STREAM BUFFER	PROF. 1/512" HOSE BOND BURIED BARRIER
1360	EX. 0.0234375" PERMANENT STREAM BUFFER	PROF. 1/1024" HOSE BOND BURIED BARRIER
1360	EX. 0.01171875" PERMANENT STREAM BUFFER	PROF. 1/2048" HOSE BOND BURIED BARRIER
1360	EX. 0.005859375" PERMANENT STREAM BUFFER	PROF. 1/4096" HOSE BOND BURIED BARRIER
1360	EX. 0.0029296875" PERMANENT STREAM BUFFER	PROF. 1/8192" HOSE BOND BURIED BARRIER
1360	EX. 0.00146484375" PERMANENT STREAM BUFFER	PROF. 1/16384" HOSE BOND BURIED BARRIER
1360	EX. 0.000732421875" PERMANENT STREAM BUFFER	PROF. 1/32768" HOSE BOND BURIED BARRIER
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1360	EX. 0.0000457763671875" PERMANENT STREAM BUFFER	PROF. 1/524288" HOSE BOND BURIED BARRIER
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1360	EX. 0.0000000000000000000000000000001479114083330056818234375" PERMANENT STREAM BUFFER	PROF. 1/162259272664174534921220288" HO



## Antero Resources Corporation Site Construction Plan for Mulvay Well and Water Containment Pad

*Antero Resources Corporation (Antero) is submitting the following Site Construction Plan in compliance with §35-8-5.5. This plan is submitted in conjunction with the Mulvay Well and Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection and Office of Oil and Gas, and certified by Kleinfelder., a West Virginia registered professional engineer.*

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**Requirement §5.5.a.** *The plan should describe the nature and purpose of the construction project and identify the procedures for construction that will be used to achieve site stability. The plan shall be considered conditions of the permit and be enforceable as such.*

### **Antero Response**

The nature and purpose of the subject project is to perforate, fracture, and complete one or more horizontal shallow wells. Procedures to achieve site stability include seeding and mulching of earth disturbed areas and implementation of erosion and sediment best management practices (BMPs). Details of seeding and mulching rates as well as procedures for installation and maintenance of erosion and sediment BMPs are outlined on pages 3 of “Mulvay Well and Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans” (Site Design) prepared and certified by Kleinfelder. of West Virginia.

These procedures will be considered as conditions of the permit and shall be inspected and maintained for continual compliance measures outlined in §35-8-5.5.

**Requirement §5.5.b.1.** *A vicinity map location the site in relation to the surrounding area and roads;*

### **Antero Response**

Please refer to the vicinity map on page 1 for the location the site in relation to the surrounding area and roads.

**Requirement §5.5.b.2.** *A plan view site map at a scale of one inch equal to one hundred feet (1”=100’) or greater that shows appropriate detail of all site features and:*

**Requirement §5.5.b.A..** *Clearly identifies the limit of disturbance for the project;*

### **Antero Response**

The limit of disturbance for the Mulvay Well and Water Containment Pad can be found on “Site Plan” on page 6 of the Site Design.

**Requirement §5.5.b.2.B.** *Provides existing topographic information on a contour interval that affords sufficient detail to illustrate site terrain conditions*

### **Antero Response**

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Please refer to the "Existing Conditions" map on page 4 of the Site Design for the current topographic conditions for the constructed pad on a contour interval that affords sufficient detail to illustrate site terrain conditions.

**Requirement §5.5.b.2.C.** *Identifies proposed cut and fill areas with grading contours at an interval that provides sufficient detail to accurately depict slope ratios, indicating top and bottom of slopes; and*

**Antero Response**

Please refer to the "Site Plan" on page 6 as well as the "Well Pad Cross Sections and Profile," "Water Containment Pad Cross Sections and Profile," "Access Road 1 Cross Sections and Profile," and "Access Road 2 Cross Sections and Profile," on pages 7-10 and of the Site Design for proposed cut and fill areas with grading contours.

**Requirement §5.5.b.2.D.** *Identifies any existing structures, roads, water bodies, and other critical areas within the area that would most likely be affected by the construction.*

**Antero Response**

Please refer to "Site Plan" of the Site Design on page 6 for the map identifying any structures, roads, water bodies, and other critical areas within the area of interest that would be most likely affected by construction.

**Requirement §5.5.b.3.** *A cross-section of the length and width of the location, providing cut and fill volumes; and*

**Antero Response**

Please refer to the "Site Plan" on page 6 as well as the "Well Pad Cross Sections and Profile," "Water Containment Pad Cross Sections and Profile," "Access Road 1 Cross Sections and Profile," and "Access Road 2 Cross Sections and Profile," on pages 7-10 for a cross-section of the location. The cut and fill volumes can be found in "Schedule of Quantities" on page 2.

**Requirement §5.5.b.4.** *Any other engineering designs or drawings necessary to construct the project.*

**Antero Response**

All other engineering designs and drawings necessary to construct this project are included in the Site Design.

**Requirement §5.5.c.** *At a minimum, site construction shall be conducted in accordance with the following criteria:*

**Antero Response**

All Antero contractors shall be notified of and comply with the measures outlined in Section 5.5.c. of §35-8.

**Requirement §5.5.c.1.** *All woody material, brush, and trees shall be cleared from the site area and kept to the minimum necessary for proper construction, including the installation of*

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*necessary sediment controls. Trees six inches in diameter and larger shall be cut and logs stacked;*

**Antero Response**

The Site Design outlines measures to maintain compliance with Section 201 of the WVDOH Specifications which outlines clearing and grubbing measures. Please refer to Notes on pages 3 of the Site Design.

*Requirement §5.5.c.2. Topsoil shall be removed from construction areas and stockpiled for reuse during reclamation. In woodland areas, tree stumps, large roots, large rocks, tree and leaf debris, and ground vegetation shall be removed prior to actual site constructions;*

**Antero Response**

The Site Design outlines procedures for stripping and stocking topsoil. Please refer to Notes on pages 3 of the Site Design. In addition, soil for stockpiling and use as fill shall be further compliant with measures outlined in Section 5.5.c.2. of §35-8-5.5.

*Requirement §5.5.c.3. No embankment fill shall be placed on frozen material;*

**Antero Response**

All Antero contractors shall be notified of and comply with measures outlined in Section 5.5.c.3. of §35-8-5.5.

*Requirement §5.5.c.4. The fill material shall be clean mineral soil, free of roots, woody vegetation, stumps, sod, large rocks, frozen soil or other objectionable material;*

**Antero Response**

The Site Design outlines procedures for stripping and stocking topsoil. Please refer to Notes on page 3 of the Site Design. In addition, soil shall be further defined to the measures outlined in Section 5.5.c.4. of §35-8-5.5.

*Requirement §3.2.b.5. Embankment material shall exhibit adequate soil strength and contain the proper amount of moisture to ensure that compaction will be achieved;*

**Antero Response**

All Antero contractors shall be notified of and comply with measures outlined in Section 5.5.c.5. of §35-8-5.5.

*Requirement §5.5.c.6 Earthen fill slopes should be constructed with slopes no steeper than a ratio of two to one (2:1);*

**Antero Response**

The Site Design outlines all earthen fill slopes to be constructed with slopes no steeper than a ratio of two to one (2:1).

*Requirement §5.5.c.7. Fill material will be placed in lifts or layers over the length of the fill. Lift thickness of soil shall be as thin as the suitable random excavated material will permit, typically from six to twelve (12) inches; and*

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**Antero Response**

Please refer to the Notes on pages 3 of the Site Design. Fill shall be placed in horizontal lifts of maximum loose depth of 12 inches. Compaction will be performed with a compactor with a minimum of five ton static drum weight vibratory roller or five ton static drum weight sheeps footed compactor as appropriate for the type of soil material at the site or other compactor approved by the Engineer.

*Requirement §5.5.c.8. The size of rock lifts shall not exceed thirty-six (36) inches. The rock shall not be greater in any dimension than thirty-six (36) inches;*

**Antero Response**

All Antero contractors shall be notified of and comply with measures outlined in Section 5.5.c.8. of §35-8-5.5.

*Requirement §5.5.c.9. Compaction shall be obtained by compaction equipment or by routing the hauling equipment over the fill so that the entire surface of each fill lift is compacted by at least one wheel or tread track of equipment or by a compactor. Each lift shall be compacted before beginning the next lift;*

**Antero Response**

Compaction compliance measures are outlined in the Notes on pages 3. Compaction is required with a compactor with a minimum of five ton static drum weight vibratory roller or five ton static drum weight sheeps footed compactor as appropriate for the type of soil material at the site or other compactor approved by the Engineer.

*Requirement §5.5.c.10. Surface water diversion ditches shall be constructed above the disturbed area to intercept water and to divert surface water runoff around the site; and*

**Antero Response**

“Notes” and “Site Plan” on pages 3 and 6 of the Site Design identifies the surface diversions used to prevent surface water and subsurface water from flowing on to the well pad and coming into contact with the stormwater associated with the well pad. Additional Erosion & Sediment BMPs will be used to prevent sediment discharges from the project.

*Requirement §5.5.c.11. In areas of steep terrain, a terraced bench shall be constructed at the base of the slope where fill is to be placed, creating a toe foundation and aid in holding fill material. Additional terracing shall be constructed from each additional fifty (50) vertical feet of slope and shall be a minimum of ten (10) feet wide.*

**Antero Response**

All Antero contractors shall be notified of and comply with the measures outlined in Section 5.5.c.11.. of §35-8-5.5.

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## Antero Resources Corporation Erosion and Sediment Control Plan for Mulvay Well and Water Containment Pad

*Antero Resources Corporation (Antero) is submitting the following narrative and set of drawings in compliance with §35-8-5.4. This plan is submitted in conjunction with the Mulvay Well and Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection and Office of Oil and Gas, and certified by Kleinfelder., a West Virginia registered professional engineer.*

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**Requirement §5.4.b.1.** *A general sequence of events that describe in relative terms how and when each construction phase (i.e. clearing and grubbing, mass grading, stabilization) will occur and when each erosion and sediment control best management practice ("BMP") will be installed;*

### **Antero Response:**

The following includes a general sequence of events that describe in relative terms how and when each construction phase is anticipated to occur and erosion and sediment control BMPs to be installed. Please refer to the Mulvay Well and Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans (Site Design) prepared and certified by Kelinfelder. for specific construction measures. Compliance with the measures outlined in the Site Construction Plan (§35-8-5.4) submitted in conjunction with this plan will also be maintained.

1. A pre-construction conference will be held on site with contractor to review the construction drawings and provide any requested guidance.
2. Stake/Flag distributed work area, clearly identifying wetland and stream edges and buffers. Install signs to designate the area and orange safety fence to identify important project attributes such as approved access roads, no refueling zones, wetland/stream bounds, ETC.
3. Construct the construction entrance.
4. Construct all proposed sediment control devices as soon as clearing and grubbing operations allow. Diversions and sediment basins shall be seeded and mulched immediately.
5. Prior to grading or other earth disturbance on the parcel, permanent down slope BMPs are to be installed.
6. Clear and grub, remove topsoil and place as shown on the plans. Topsoil stockpile to be seeded and mulched. E&S BMPs shall be constructed around topsoil stockpiles as shown.
7. Grading operations as required. Cut slopes and all slopes shall be topsoiled as needed. Ditch lines shall be cleaned. All ditches will have at least grass lining protection or as specified in site calculations on sheet 11.
8. The access road shall be constructed up to the proposed pads. The access road shall receive a stone surface.
9. Install proposed equipment pad and equipment pad berms.
10. Culvert inlet and outlet protection shall be constructed immediately upon placement of inlets and culverts. Installation of matting and/or RIP RAP to occur once ditches are constructed.
11. Side slope stabilization matting and stabilization shall occur as soon as possible.
12. At the end of each work day, where the parcel has been graded, including any stripping, stumping, leveling, 2:1 on side slopes, ETC. BMPs are to be installed. In no case is the contractor

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to leave the job site at the end of the work day without temporary or permanent BMPs being installed. The contractor is not required to maintain waterbars during the work day unless the environmental inspector determines that there is a risk of a rain event that warrants their immediate installation.

13. When final grade is achieved, topsoil to be placed on all disturbed areas not lined. Seed all disturbed areas as required. A soil sample should be taken and tested to determine recommended rates. If no soils sample is taken the following rates should be applied as a minimum: Lime at a rate of 4 tons per acre. Fertilize at a rate of 500 lbs. of 10-20-10 per acre. Seed with 45 lbs. per acre of tall fescue and 20 lbs. per acre of perennial rye grass.
14. Lime, fertilizer, and seed will be applied. Hydro-mulch products shall be mixed and installed in accordance with manufacturer's specifications, or erosion control blanket shall be installed per plans & specifications.
15. Final seeding must occur within 7 days of final grading.
16. When site is stabilized, all erosion and sediment control measures can be removed and repair/stabilize those areas in accordance with state standards.
17. Final site inspection. A notice of termination should be filed with DEP upon final stabilization.

**Requirement §5.4.b.2.** *A description of the stabilization methods to be used, including the application rates for temporary and permanent seeding and mulching, and provide the timeframes for establishing stabilization*

**Antero Response:**

Stabilization methods used include seeding and mulching of disturbed areas as well as the implementation of erosion and sediment control BMPs. Please refer to Notes on page 3 as well as "Details" on page 11-16 for detailed descriptions of the different stabilization methods to be used. Seeding and mulching is to be in accordance with the WVDOT Standard Specifications unless specified otherwise in the plans or unless specified otherwise by the construction engineer or Antero representative. Please refer to number 11 under General Erosion & Sediment Control Notes on page 3 of the Site Design for more specific information regarding application, liming, and mulching rates.

Erosion and sediment BMPs will be constructed, stabilized, and functional before site disturbance begins within the tributary areas of those BMPs. In a timely manner after earth disturbance activities cease, Antero shall stabilize any areas disturbed by the activities. During non-germination periods, mulch must be applied at the specified rates. Disturbed areas which are not at finish grade and which will be re-disturbed within 1 year will be stabilized in accordance with the temporary vegetative stabilization and specifications. Disturbed areas which are finished grade or which will not be re-disturbed within 1 year will be stabilized in accordance with the permanent vegetative stabilization specification. Please refer to "Notes" on page 3 for more information regarding timeframes for establishing stabilization and erosion and sediment BMPs.

The site shall be considered to have achieved full stabilization when it has a minimum uniform 70% perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics to resist sliding and other movements. Until the site achieves final stabilization, Antero will assure that the best management practices (BMPs) are implemented, inspected, operated, and maintained. As such, Antero will maintain written inspection logs. All maintenance work, including cleaning, repair, replacement, regarding, and re-stabilization shall be performed immediately upon discovery of deficiency. After final stabilization has been achieved,

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temporary erosion and sediment BMPs controls will be removed. Areas disturbed during removal of the BMPs will be stabilized immediately.

**Requirement §5.4.b.3.** *Details of specifications for the erosion and sediment control BMPs employed on the project.*

**Antero Response:**

Please refer to the “Notes” on pages 3 and “Details” on pages 11-16 in the Site Design for specifications including instructions for installation, inspection, and maintenance for erosion and sediment control BMPs employed at this site.

**Requirement §5.4.b.3.** *A vicinity map locating the site in relation to the surrounding area and roads;*

**Antero Response:**

A “Vicinity Map” locating the site in relation to the surrounding area and roads is included on page 1 the Site Design.

**Requirement §5.4.c.2** *A plan view site map at a scale of one inch equal to one hundred feet (1”=100’) or greater, showing appropriate detail of all site features, including the identification of site access that provides for a stabilized construction entrance and exit to reduce tracking of sediment onto public or private roads; and*

**Antero Response:**

“Site plan” maps are included on page 6 of the Site Design. Specific design and layout and inspection and maintenance notes for a stabilized construction entrance are included in the “Notes” verbiage on pages 3.

**Requirement §5.4.c.3.** *The location of all proposed erosion and sediment control BMPs*

**Antero Response:**

“Notes” and “Site Plans” maps included on pages 3 and 6 of the Site Design locate all proposed erosion and sediment control BMPs.

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