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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

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Monday, January 7, 2019  
 WELL WORK PERMIT  
 Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION  
 1615 WYNKOOP STREET  
 DENVER, CO 80202

Re: Permit approval for HAYHURST 1H  
 47-085-10376-00-00

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: HAYHURST 1H  
 Farm Name: MICHAEL GAIL UNDERWOOD  
 U.S. WELL NUMBER: 47-085-10376-00-00  
 Horizontal 6A New Drill  
 Date Issued: 1/7/2019

# 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. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. 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.
10. 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.

## PERMIT CONDITIONS

11. 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](mailto:DEPOOGNotify@wv.gov).

WW-6B  
(04/15)

API NO. 47-085

OPERATOR WELL NO. Hayhurst Unit 1H

Well Pad Name: Black Forest Pad

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 | Ellenboro 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Hayhurst Unit 1H Well Pad Name: Black Forest Pad

3) Farm Name/Surface Owner: Michael Gail Underwood et al Public Road Access: CR 1/4

4) Elevation, current ground: 1083' Elevation, proposed post-construction: \_\_\_\_\_

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

Other \_\_\_\_\_

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

Horizontal  \_\_\_\_\_

6) Existing Pad: Yes or No Yes \_\_\_\_\_

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 6700' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6700' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18400' MD

11) Proposed Horizontal Leg Length: 9654'

12) Approximate Fresh Water Strata Depths: 97', 319'

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

14) Approximate Saltwater Depths: 1507'

15) Approximate Coal Seam Depths: N/A

16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes \_\_\_\_\_ No

(a) If Yes, provide Mine Info: Name: \_\_\_\_\_

Depth: \_\_\_\_\_

Seam: \_\_\_\_\_

Owner: \_\_\_\_\_

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WW-6B  
(04/15)

4708510376  
01/11/2019  
API NO. 47- 085  
OPERATOR WELL NO. Hayhurst Unit 1H  
Well Pad Name: Black Forest Pad

18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	369 *see # 19	369 *see # 19	CTS, 513 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#	18400	18400	4652 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	24"	0.438"	1530	50	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	1000	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12,630	2500	Lead-HPOZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

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10-9-18

PACKERS

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

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WW-6B  
(10/14)

4708510376  
01/11/2019  
API NO. 47-085 -  
OPERATOR WELL NO. Hayhurst Unit 1H  
Well Pad Name: Black Forest Pad

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

Anticipated Max Pressure - 9300 lbs  
Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 23.16 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 11.71 acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers  
Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.  
Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.  
Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

24) Describe all cement additives associated with each cement type:

Conductor: no additives, Class A cement.  
Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake  
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat  
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51  
Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

25) Proposed borehole conditioning procedures:

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.  
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.  
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.  
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

\*Note: Attach additional sheets as needed.

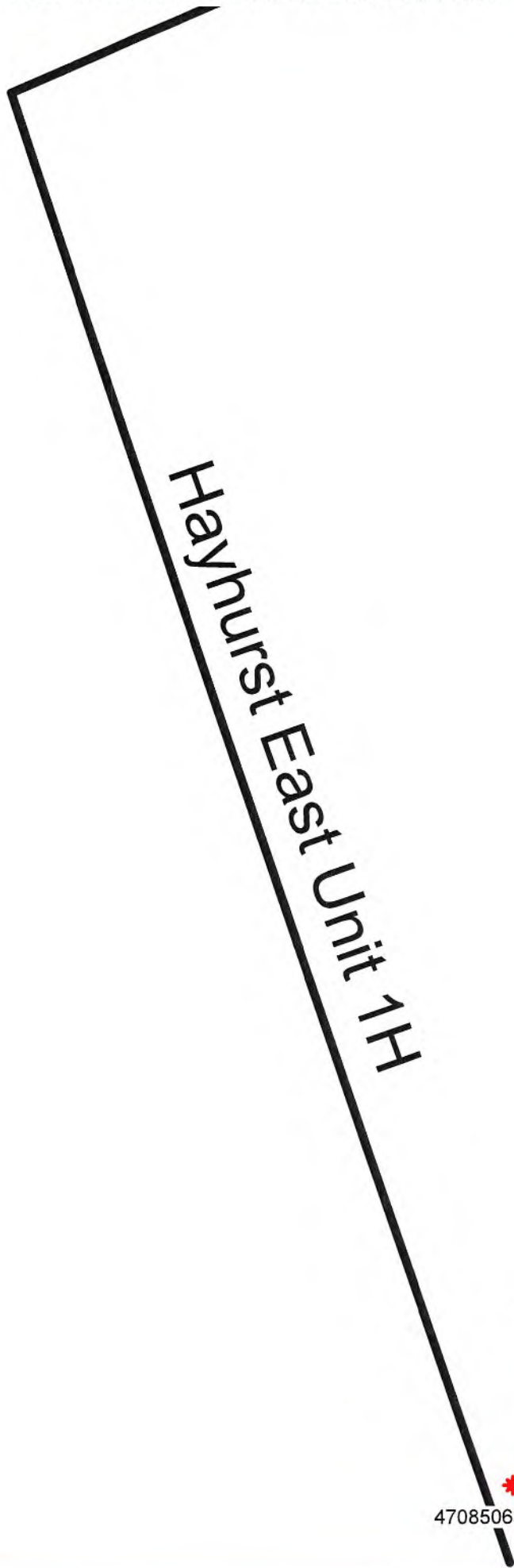
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Page 3 of 3

MDC  
10-9-18

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01/11/2019



Hayhurst East Unit 1H

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47085063070000



Antero Resources Corporation

Hayhurst East Unit 1H - AOR



WELL SYMBOLS  
Gas Well

September 10, 2018



WW-9  
(4/16)

API Number 47 - 085 - \_\_\_\_\_  
Operator's Well No. Hayhurst Unit 1H

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 Ellenboro 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)

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10-9-18

Will closed loop system be used? If so, describe: Yes, fluids stored in tanks, cuttings removed offsite and taken to landfill.

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

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

Additives to be used in drilling medium? Please See Attachment

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Drill cuttings 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 *Gretchen Kohler*

Company Official (Typed Name) Gretchen Kohler

Company Official Title Senior Environmental & Regulatory Manager

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Subscribed and sworn before me this 20th day of SEPTEMBER, 2018

OCT 10 2018

*Gretchen Kohler*

My commission expires MARCH 13, 2022

Notary Public WV Department of Environmental Protection  
MEGAN J. GIBSON  
NOTARY PUBLIC  
STATE OF COLORADO  
NOTARY ID 20184011666  
MY COMMISSION EXPIRES MARCH 13, 2022



**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 23.16 acres 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

Access Road "A" 1238' (3.86 acres) + Well Pad (11.71 acres) + Water Containment Pad (2.91 acres) + Excess/Topsoil Material Stockpiles (4.68 acres) = 23.16 Acres

**Seed Mixtures**

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	Crownvetch	10-15
Field Bromegrass	40	Tall Fescue	30

See attached Table IV-3 for additional seed type (Rush Fork Pad Design Page 24)      See attached Table IV-4A for additional seed type (Rush Fork Pad Design Page 24)

\*or type of grass seed requested by surface owner      \*or type of grass seed requested by surface owner

**Attach:**

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Michael Daff

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Title: Oil & Gas Inspector

Date: 10-9-18

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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# Well Site Safety Plan

## Antero Resources

**Well Name:** Hayhurst Unit 1H-2H, Everly Unit 1H & 3H

*Michael L. Hoff*  
10-9-18

**Pad Location:** BLACK FOREST PAD  
Ritchie County/Clay District

**GPS Coordinates:** Lat 39°18'34.54"/Long -81°01'40.63" (NAD83)

### Driving Directions:

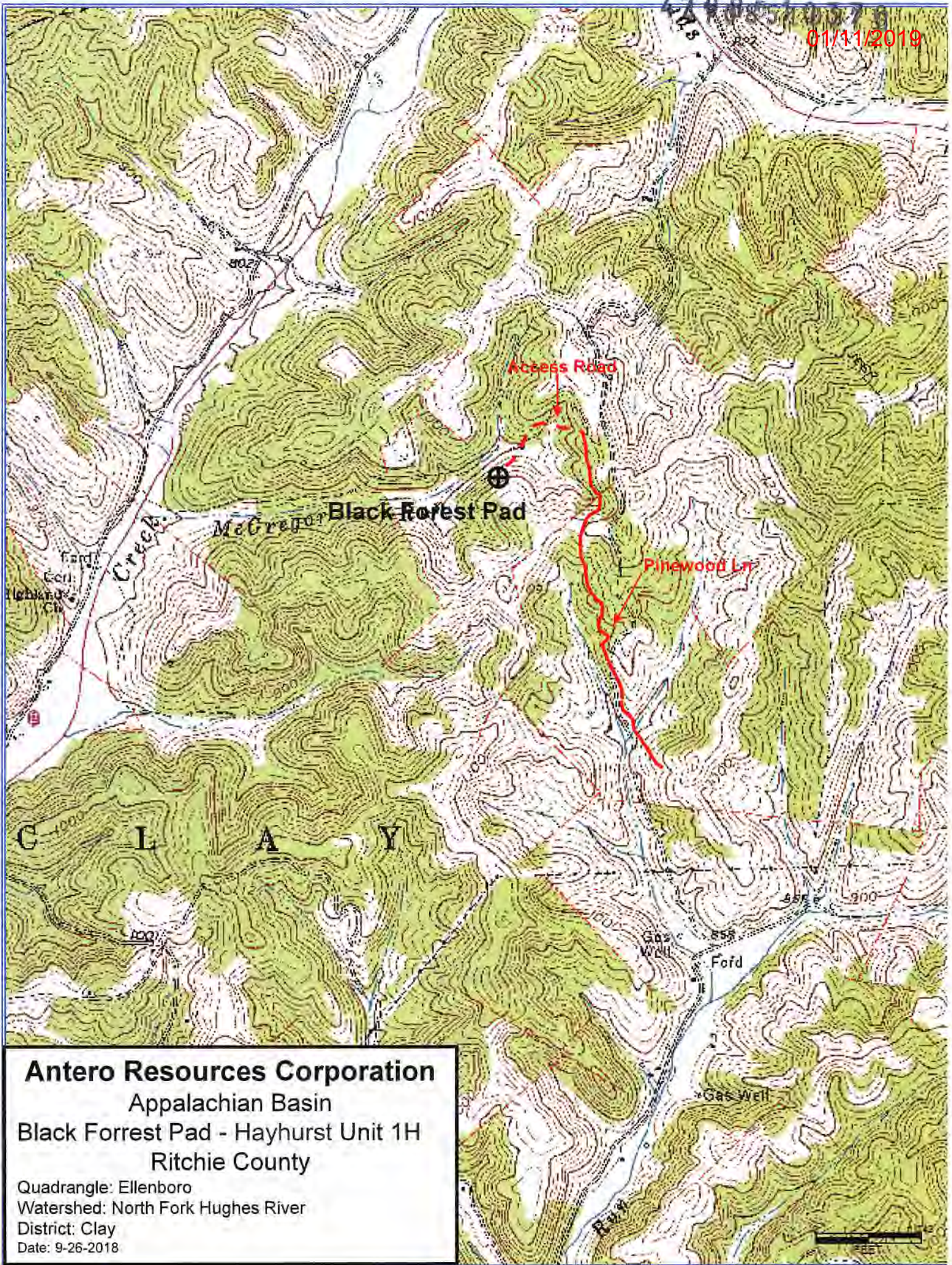
From the intersection of I-79 and HWY 50, travel west on US-50 for 41.3 miles. Turn right onto Bunnell Run Road and go 0.5 miles. Turn left onto Lamberton Road/Old US 50 E and go 2.2 miles. Turn right onto Hushers Run and go 1.2 miles. Turn left onto Hurshers Run Road and go 1.0 miles. Access Road will be on your left.

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**EMERGENCY (24 HOUR) CONTACT 1-800-878-1378**

09/28/2018  
WV Department of  
Environmental Protection

4798451077  
01/11/2019



**Antero Resources Corporation**  
Appalachian Basin  
Black Forrest Pad - Hayhurst Unit 1H  
Ritchie County

Quadrangle: Ellenboro  
Watershed: North Fork Hughes River  
District: Clay  
Date: 9-26-2018

FEET

LATITUDE 39°20'00"

8,007'

6,291' TO BOTTOM HOLE

LATITUDE 39°17'30"

LONGITUDE 81°00'00"

8,686'

LONGITUDE 81°00'00"

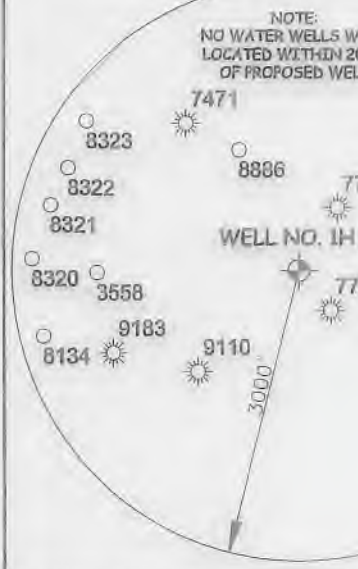
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# Antero Resources Corporation Well No. Hayhurst Unit 1H

**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.

(NAD) 27 (UTM) ZONE 17 COORDS:  
WELL 1H TOP HOLE INFORMATION:  
N: 14,274,621ft E: 1,632,412ft  
POINT OF ENTRY INFORMATION:  
N: 14,274,010ft E: 1,630,976ft  
BOTTOM HOLE INFORMATION:  
N: 14,264,888ft E: 1,634,127ft

NORTH ZONE  
GRID NORTH  
WM

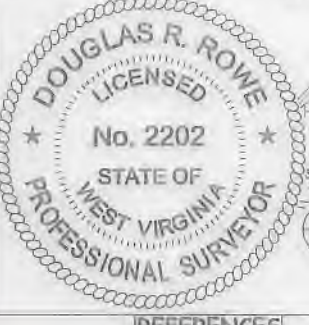


**NOTE:**  
NO WATER WELLS WERE LOCATED WITHIN 2000' OF PROPOSED WELL.

**NOTES:**  
WELL 1H TOP HOLE INFORMATION:  
N: 298,509ft E: 1,567,574ft  
LAT: 39°18'34.15" LON: 81°01'41.88"  
BOTTOM HOLE INFORMATION:  
N: 288,746ft E: 1,569,128ft  
LAT: 39°16'57.92" LON: 81°01'20.01"  
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:  
WELL 1H TOP HOLE INFORMATION:  
N: 4,351,131m E: 497,575m  
BOTTOM HOLE INFORMATION:  
N: 4,348,164m E: 498,098m

JOB # 17-018WA  
DRAWING # HAYHURST1HR2  
SCALE 1" = 1000'  
MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS  
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS



DOUGLAS R. ROWE P.S. 2202  
DATE 09/25/18  
OPERATOR'S WELL# HAYHURST UNIT #1H  
API WELL # 47 085 10376  
STATE COUNTY PERMIT



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

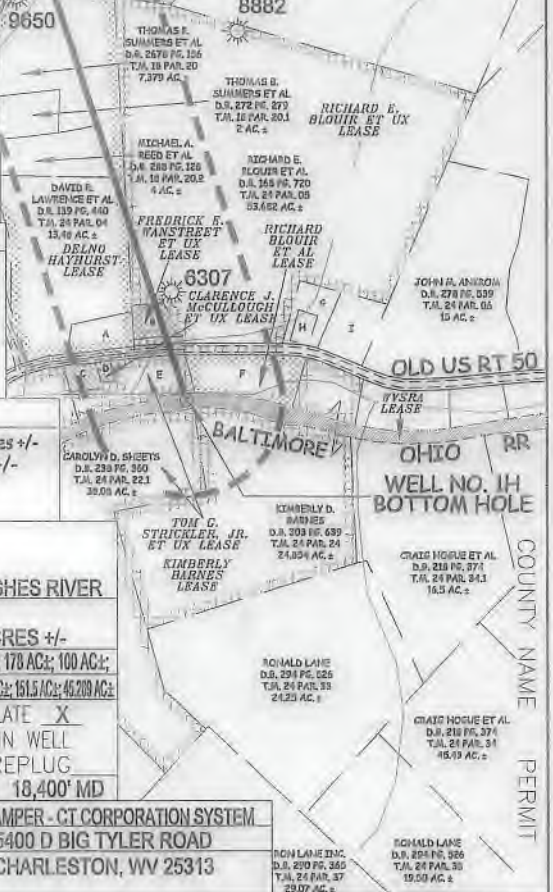


STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
WILLOW LAND SURVEYING PLLC  
220 MASONIC AVENUE PENNSBORO WEST VIRGINIA 26415

NOT TO SCALE N 28°38' E PAD LAYOUT



WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL  
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X  
LOCATION: ELEVATION 1,083' AS BUILT WATERSHED NORTH FORK HUGHES RIVER  
QUADRANGLE ELLENBORO 7.5 DISTRICT CLAY COUNTY RITCHIE  
SURFACE OWNER MICHAEL GAIL UNDERWOOD ET AL ACREAGE 6 ACRES +/-  
OIL & GAS ROYALTY OWNER RONNIE L. UNDERWOOD ET AL; KATHRYN A. STEWART; C.B. MORRIS & S.A. SMITH IRREVOCABLE TRUST; LEASE ACREAGE 188.52 AC.; 178 AC.; 100 AC.;  
FREDRICK R. HAYHURST ET AL; DELNO HAYHURST; RICHARD E. BLOUIN ET UX; FREDRICK E. WANSTREET ET UX; TOM G. STRICKLER, JR. ET UX; WISRA 182.19 AC.; 312 AC.; 51.08 AC.; 0.82 AC.; 151.5 AC.; 45,709 AC.;  
PROPOSED WORK: DRILL X CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE X  
PLUG OFF OLD FORMATION PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL  
(SPECIFY) PLUG & ABANDON CLEAN OUT & REPLUG  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,700' TVD 18,400' MD  
WELL OPERATOR ANTERO RESOURCES CORPORATION DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM  
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD  
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313



COUNTY NAME PERMIT

WW-6A1

Operator's Well Number Hayhurst Unit 1H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>Ronnell L. Underwood et al Lease</u></b>			
Ronnell L. Underwood et al	Rare Earth Energy, Inc.	1/8	0199/0020
Rare Earth Energy, Inc.	Stephen L. Thompson	Assignment	0236/0001
Stephen L. Thompson	Tri-County Oil & Gas, Inc.	Assignment	0236/0237
Tri-County Oil & Gas, Inc.	May Gas, Inc.	Assignment	0239/0229
May Gas, Inc.	Harper Crosby Holdings, LLC	Assignment	0265/0872
Harper Crosby Holdings, LLC	Antero Resources Corporation	Partial Assignment	0285/0298
<b><u>Kathryn A. Stewart Lease</u></b>			
Kathryn A. Stewart	Antero Resources Corporation	1/8	0300/0301
<b><u>Ronnell L. Underwood et al Lease</u></b>			
Ronnell L. Underwood et al	Rare Earth Energy, Inc.	1/8	0199/0020
Rare Earth Energy, Inc.	Stephen L. Thompson	Assignment	0236/0001
Stephen L. Thompson	Tri-County Oil & Gas, Inc.	Assignment	0236/0237
Tri-County Oil & Gas, Inc.	May Gas, Inc.	Assignment	0239/0229
May Gas, Inc.	Harper Crosby Holdings, LLC	Assignment	0265/0872
Harper Crosby Holdings, LLC	Antero Resources Corporation	Partial Assignment	0285/0298
<b><u>C.B. Morris &amp; S.A. Smith Irrevocable Trust Lease</u></b>			
C.B. Morris & S.A. Smith Irrevocable Trust	Jay-Bee Production Co.	1/8	0240/0203
Jay-Bee Production Co.	Antero Resources Corporation	Assignment	0293/0398
<b><u>Fredrick R. Hayhurst et al Lease</u></b>			
Fredrick R. Hayhurst et al	Clarence W. Mutschelknaus	1/8	0232/0828
Clarence W. Mutschelknaus	Antero Resources Appalachian Corporation	Assignment	0259/0874
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Delno Hayhurst Lease</u></b>			
Delno Hayhurst	Antero Resources Corporation	1/8+	0298/0395
<b><u>Richard E. Blouir et al Lease</u></b>			
Richard E. Blouir et al	Antero Resources Corporation	1/8+	0299/0762
<b><u>Fredrick E. Wanstreet et ux Lease</u></b>			
Fredrick E. Wanstreet et ux	Antero Resources Corporation	1/8+	0299/0211
<b><u>Tom G. Strickler et ux Lease</u></b>			
Tom G. Strickler et ux	Palmer Hill	1/8	0119/0405
Palmer Hill	Clyde Kelly	Assignment	0130/0048
Clyde Kelly	W.F. Zickefoose	Assignment	0201/0659
W.F. Zickefoose	Antero Resources Corporation	Assignment	0294/0971

\*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.

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WV Department of  
Environmental Protection

01/11/2019

WW-6A1  
(5/13)Operator's Well No. Hayhurst Unit 1H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

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- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>West Virginia State Railroad Authority Lease</u>	West Virginia State Railroad Authority	Antero Resources Corporation	1/8+	0300/0337

\*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 CorporationBy: Kevin KilstromIts: Senior VP - ProductionRECEIVED  
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Page 1 of 1



**FORM WV-6A1  
EXHIBIT 1**

**FILED**

**JUN 10 2013**

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



Fenney Barber, Manager  
Corporations Division  
Tel: (304)552-8000  
Fax: (304)552-8381  
Website: www.wvsoi.com  
E-mail: business@wvsoi.com

**APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY**

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

**FILE ONE ORIGINAL**  
(Two if you want a filed  
stamped copy returned to you)  
**FEE: \$25.00**

\*\*\* In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby \*\*\*  
applies for an Amended Certificate of Authority and submits the following statement:

- 1. Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachia Corporation
- 2. Date Certificate of Authority was issued in West Virginia: 6/25/2009
- 3. Corporate name has been changed to: Antero Resources Corporation  
(Attach one Certified Copy of Name Change as filed in home State of incorporation.)
- 4. Name the corporation elects to use in WV: Antero Resources Corporation  
(due to home state name not being available)
- 5. Other amendments: \_\_\_\_\_  
(attach additional pages if necessary)

6. Name and phone number of contact person. (This is optional; however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)

Alwyn A. Schopp (304) 357-7310  
Contact Name Phone Number

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

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

Signature: *Alwyn A. Schopp* Date: June 10, 2013

*\*Important Legal Notice Regarding Signatures\** For West Virginia Code §22D-1-12b. 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.

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WV Department of  
Environmental Protection

01/11/2019



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

September 28, 2018

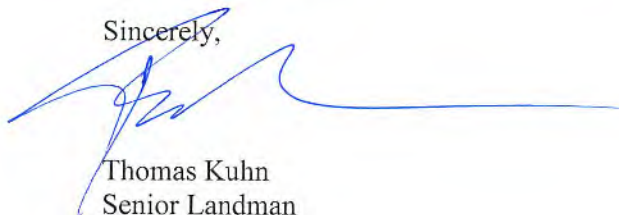
West Virginia Department of Environmental Protection  
Chief, Office of Oil and Gas  
Attn: Mr. James Martin  
601 57<sup>th</sup> Street SE  
Charleston, WV 25304

RE: Hayhurst Unit 1H  
Quadrangle: Ellenboro 7.5'  
Ritchie County/Clay District, West Virginia

Mr. Martin:

Antero Resources Corporation (Antero) is submitting the following application for a new well work permit for the Hayhurst Unit 1H 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 Hayhurst Unit 1H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,



Thomas Kuhn  
Senior Landman

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

Date of Notice Certification: 09/27/2018

API No. 47- 085 -

Operator's Well No. Hayhurst Unit 1H

Well Pad Name: Black Forest Pad

**Notice has been given:**

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State:	West Virginia	UTM NAD 83	Easting:	497575m
County:	Ritchie		Northing:	4351131m
District:	Clay	Public Road Access:		CR 1/4
Quadrangle:	Ellenboro 7.5'	Generally used farm name:		Michael Gail Underwood et al
Watershed:	North Fork Hughes River			

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:  *PLEASE CHECK ALL THAT APPLY  <input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED  <input type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input checked="" type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED  <input checked="" type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or  <input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)  <input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION  <input checked="" type="checkbox"/> 5. PUBLIC NOTICE  <input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION		<b>OOG OFFICE USE ONLY</b>  <input type="checkbox"/> RECEIVED/ NOT REQUIRED  <input type="checkbox"/> RECEIVED  <input type="checkbox"/> RECEIVED/ NOT REQUIRED  <input type="checkbox"/> RECEIVED  <input type="checkbox"/> RECEIVED  <input type="checkbox"/> RECEIVED
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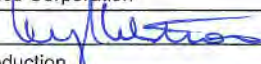
**Required Attachments:**

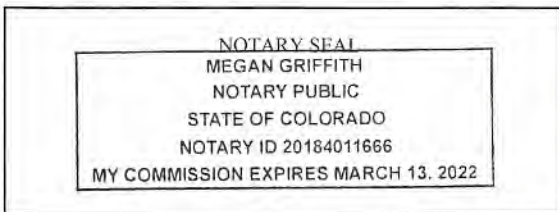
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

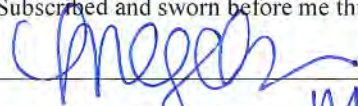
4708 \* 10376

**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 VP - Production</u>	Facsimile:	<u>303-357-7315</u>
Telephone:	<u>303-357-7310</u>	Email:	<u>mgriffith@anteroresources.com</u>



Subscribed and sworn before me this 20<sup>th</sup> day of September 2018  
  
 \_\_\_\_\_ Notary Public  
 My Commission Expires March 13, 2022

**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).

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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:** 9/28/2018 **Date Permit Application Filed:** 9/28/2018

**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: PLEASE SEE ATTACHMENT  
Address: \_\_\_\_\_

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

SURFACE OWNER(s) (Road and/or Other Disturbance)  
Name: PLEASE SEE ATTACHMENT  
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: NO DECLARATIONS ON RECORD WITH COUNTY  
Address: \_\_\_\_\_

OPERATOR OF ANY NATURAL GAS STORAGE FIELD  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

\*Please attach additional forms if necessary

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WV Department of Environmental Protection

**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/office-of-oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/office-of-oil-and-gas/pages/default.aspx).

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**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 five 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

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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.**

**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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WW-6A  
(8-13)

API NO. 47-085 - **01/11/2019**

OPERATOR WELL NO. Hayhurst Unit 1H

Well Pad Name: Black Forest Pad

**4708510376**

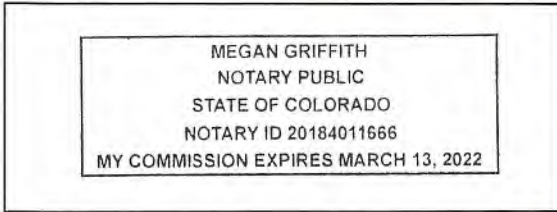
**Notice is hereby given by:**

Well Operator: Antero Resources Corporation  
Telephone: (303) 357-7310  
Email: mgriffith@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 28<sup>th</sup> day of September, 2018  
[Signature] Notary Public  
My Commission Expires MARCH 13, 2022

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**WW-6A Notice of Application Attachment (Black Forest Pad):**

**List of Surface Owner(s) with Proposed Disturbance associated with Black Forest Pad:**

**WELL PAD, ROAD and/or OTHER DISTURBANCE – All owners were notified of all well work permit applications, and have executed signed Surface Use Agreements with Antero Resources Corporation.**

**TM 12 PCL 17, 17.1**

**Owner:** Justin Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Erma Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Etta Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Daniel G. & Lori A. Everly  
**Address:** PO Box 738  
Marietta, OH 45750

**TM 12 PCL 16, 16.2, 16.3**

**Owner:** Michael Gail Underwood & Stephen Underwood  
**Address:** 321 Pinewood Lane  
Pennsboro, WV 26415

**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:** 05/23/2018      **Date Permit Application Filed:** 09/28/2018

**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: PLEASE SEE ATTACHMENT  
Address: \_\_\_\_\_  
\_\_\_\_\_

Name: PLEASE SEE ATTACHMENT  
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>497575m</u>
County:	<u>Ritchie</u>		Northing:	<u>4351131m</u>
District:	<u>Clay</u>	Public Road Access:	<u>CR 1/4</u>	
Quadrangle:	<u>Ellenboro 7.5'</u>	Generally used farm name:	<u>Michael Gail Underwood 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 St.  
Denver, CO 80202  
Telephone: 303-357-7310  
Email: mgriffith@anteroresources.com  
Facsimile: 303-357-7315

Authorized Representative: Megan Griffith  
Address: 1615 Wynkoop St.  
Denver, CO 80202  
Telephone: 303-357-7310  
Email: mgriffith@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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WW-6A4 Notice of Intent to Drill Attachment (Black Forest Pad): 4708-10376

List of Surface Owner(s) with Proposed Disturbance associated with Black Forest Pad:

WELL PAD, ROAD and/or OTHER DISTURBANCE – All owners were notified of all well work permit applications, and have executed signed Surface Use Agreements with Antero Resources Corporation.

TM 12 PCL 17, 17.1

**Owner:** Justin Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Erma Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Etta Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Daniel G. & Lori A. Everly  
**Address:** PO Box 738  
Marietta, OH 45750

TM 12 PCL 16, 16.2, 16.3

**Owner:** Michael Gail Underwood & Stephen Underwood  
**Address:** 321 Pinewood Lane  
Pennsboro, WV 26415

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**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:** 09/28/2018      **Date Permit Application Filed:** 09/28/2018

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

- CERTIFIED MAIL                                       HAND  
RETURN RECEIPT REQUESTED                                      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: PLEASE SEE ATTACHMENT \_\_\_\_\_

Name: PLEASE SEE ATTACHMENT \_\_\_\_\_

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

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

**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>497575m</u>
County: <u>Ritchie</u>		Northing: <u>4351131m</u>
District: <u>Clay</u>	Public Road Access: <u>CR 1/4</u>	
Quadrangle: <u>Ellenboro 7.5'</u>	Generally used farm name: <u>Michael Gail Underwood 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: mgriffith@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).

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**WW-6A5 Notice of Planned Operations Attachment (Black Forest Pad):**

**List of Surface Owner(s) with Proposed Disturbance associated with Black Forest Pad:**

**WELL PAD, ROAD and/or OTHER DISTURBANCE – All owners were notified of all well work permit applications, and have executed signed Surface Use Agreements with Antero Resources Corporation.**

**TM 12 PCL 17, 17.1**

**Owner:** Justin Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Erma Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Etta Smith  
**Address:** 659 Farleys Run Road  
Pennsboro, WV 26415

**Owner:** Daniel G. & Lori A. Everly  
**Address:** PO Box 738  
Marietta, OH 45750

**TM 12 PCL 16, 16.2, 16.3**

**Owner:** Michael Gail Underwood & Stephen Underwood  
**Address:** 321 Pinewood Lane  
Pennsboro, WV 26415

**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.

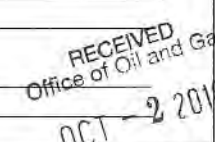
Pursuant to West Virginia Code § 22-6A-8(b) No permit may be issued less than thirty days after the filing date of the application for any well work except plugging or replugging; and no permit for plugging or replugging may be issued less than five days after the filing date of the application except 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:	497575m
County:	Ritchie	UTM NAD 83 Northing:	4351131m
District:	Clay	Public Road Access:	CR 1/4
Quadrangle:	Ellenboro 7.5'	Generally used farm name:	Michael Gail Underwood 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> <div style="text-align: right;">  </div>
---	--

**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).

01/11/2019



4708 \* 10376

**WEST VIRGINIA DEPARTMENT OF TRANSPORTATION**

**Division of Highways**

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

**Thomas J. Smith, P. E.**  
Secretary of Transportation/  
Commissioner of Highways

**September 7, 2018**

**Jill M. Newman**  
Deputy Commissioner

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 Black Forest Pad, Ritchie County  
Hayhurst Unit 1H Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #03-2015-0120 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off of Ritchie County Route 6/2 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

A handwritten signature in cursive script that reads "Gary K. Clayton".

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

Cc: Megan Griffith  
Antero Resources Corporation  
CH, OM, D-3  
File

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10376

## 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
Sillica, 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

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**LOCATION COORDINATES:**  
 ACCESS ROAD ENTRANCE  
 LATITUDE: 38.311931 LONGITUDE: -81.022777 (NAD 83)  
 N 4351356.95 E 487950.18 (UTM ZONE 17 METERS)  
 CENTER OF FUTURE TANK  
 LATITUDE: 38.311547 LONGITUDE: -81.028483 (NAD 83)  
 N 4351350.56 E 487716.54 (UTM ZONE 17 METERS)  
 CENTER OF PAD  
 LATITUDE: 38.309656 LONGITUDE: -81.027953 (NAD 83)  
 N 4351338.95 E 487690.03 (UTM ZONE 17 METERS)

# BLACK FOREST WELL PAD & WATER CONTAINMENT PAD

## AS-BUILT AND EROSION & SEDIMENT CONTROL IMPROVEMENT PLAN

CLAY DISTRICT, RITCHIE COUNTY, WEST VIRGINIA  
 BONDS CREEK WATERSHED

USGS 7.5 ELLENBORO QUAD MAP

**WVDEP 00G**  
**ACCEPTED AS-BUILT**  
 1/7/2019

**GENERAL DESCRIPTION:**

THE ACCESS ROAD(S), WELL PAD AND WATER CONTAINMENT PAD HAVE BEEN CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS GAS WELLS.

**FLOODPLAIN NOTES:**

THE SITE IS LOCATED WITHIN FEMA FLOOD ZONE 'X' PER FEMA FLOOD MAP 454085C0050C.

**MISS UTILITY STATEMENT:**

ANTERO RESOURCES CORPORATION HAS NOTIFIED MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. TRUCKY #3484281486.

**ENTRANCE PERMIT:**

ANTERO RESOURCES CORPORATION HAS OBTAINED AN ENCROACHMENT PERMIT (FORM MM-107) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS. PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

**ENVIRONMENTAL NOTES:**

WETLAND DELINEATIONS WERE PERFORMED IN JANUARY, 2018 BY KC HARVEY ENVIRONMENTAL, LLC TO REVIEW THE SITE FOR WETLANDS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY SCOPE OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE JANUARY 12, 2018 POTENTIALLY JURISDICTIONAL AQUATIC FEATURES MAP WAS PREPARED BY KC HARVEY ENVIRONMENTAL, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE EXHIBIT DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WETLANDS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP.

**GEOTECHNICAL NOTES:**

A SUBSURFACE INVESTIGATION OF THE SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. BETWEEN APRIL 3, 2018 AND APRIL 9, 2018. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED APRIL 11, 2018, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

**PROJECT CONTACTS:**

**OPERATOR:**  
 ANTERO RESOURCES CORPORATION  
 515 WHITE OAKS BLVD  
 BRIDGEPORT, WV 26330  
 PHONE: (304) 842-4100  
 FAX: (304) 842-4132

**BLI WAGGONER - ENVIRONMENTAL ENGINEER**  
 OFFICE: (304) 842-4068 CELL: (304) 478-9770

**JON MEYERS - OPERATIONS SUPERINTENDENT**  
 OFFICE: (304) 397-6799 CELL: (304) 804-8463

**AARON KUNGLER - CONSTRUCTION SUPERVISOR**  
 CELL: (405) 227-6344

**HORRIT B. WIRKS - FIELD ENGINEER**  
 OFFICE: (304) 842-4150 CELL: (304) 827-7405

**CHARLES E. COMPTON III - SURVEYING COORDINATOR**  
 CELL: (304) 719-6449

**BURT SMOCK - LAND AGENT**  
 CELL: (304) 282-8272

**ENGINEER/SURVEYOR:**  
 NAVITUS ENGINEERING, INC.  
 CRYSTAL KIMBLE PE - PROJECT MANAGER/SNG-NEEP  
 OFFICE: (800) 652-4155 CELL: (540) 886-6747

**ENVIRONMENTAL:**  
 KC HARVEY ENVIRONMENTAL, LLC  
 SHARON THOMPSON - SENIOR SCIENTIST  
 OFFICE: (740) 373-1970 CELL: (970) 398-6253

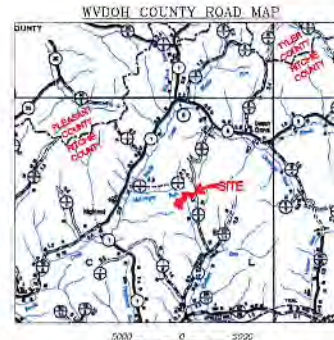
**GEOTECHNICAL:**  
 PENNSYLVANIA SOIL & ROCK, INC.  
 CHRISTOPHER W. SAMOS - PROJECT ENGINEER  
 OFFICE: (412) 372-1900 CELL: (412) 328-0066

**RESTRICTIONS NOTES:**

- THERE ARE NO PERENNIAL STREAMS, WETLANDS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD.
- THERE ARE NO NATURALLY PRODUCING TIGHT STRATA WITHIN 300 FEET OF THE WELL PAD AND LOD.
- THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
- THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
- THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.
- THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,000 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

**NOTES:**

- ALL BMP'S MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF DISTURBANCE ARE COMPLETELY AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RAINFALL EVENT IN EXCESS OF 0.5" AND ON A WEEKLY BASIS.
- THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DEVELOPING ACTIVITIES ARE COMPLETED AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY HARD COVER SUCH AS PAVEMENT OR BUILDINGS. IT SHOULD BE NOTED THAT THE 70% REQUIREMENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE SITE.
- ALL PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP.
- ANY AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDDED.
- THE AS-BUILT INFORMATION SHOWN HEREON REFLECTS FIELD DATA COLLECTED RELATING TO THE FINAL GRADING OF THE DISTURBED AREA AS OF FEBRUARY 6, 2017. THE AS-BUILT INFORMATION SHOWN HEREON REFLECTS FIELD DATA COLLECTED RELATING TO THE FINAL GRADING OF THE WELL PAD AREA AND PRODUCTION EQUIPMENT AS OF FEBRUARY 6, 2017. NAVITUS ENGINEERING IS NOT RESPONSIBLE FOR ANY CHANGES MADE TO THE SITE AFTER THE ABOVE MENTIONED DATES.
- THE EXISTING CONTAINMENT BERM AROUND THE WELL PAD SHALL BE REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.
- THE EXISTING EGRESSSES TO THE WELL PAD SHALL HAVE THE MOUNTABLE BERMS REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.



**AS-BUILT CERTIFICATIONS:**

THE DRAINAGE, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS CR6 35-8.

MISS Utility of West Virginia  
 1-800-245-4040  
 West Virginia State Law  
 (Section XIV Chapter 24-C)  
 Requires that you call two business days before you dig in the state of West Virginia.  
 IT'S THE LAW!!

WEST VIRGINIA STATE PLANE COORDINATE SYSTEM  
 NAVITUS ENGINEERING, INC. SURVEY GRADE GPS & GIS  
 WEST VIRGINIA STATE PLANE COORDINATE SYSTEM  
 NAVITUS ENGINEERING, INC. SURVEY GRADE GPS & GIS

**SHEET INDEX:**

- COVER SHEET
- LEGEND
- OVERALL PLAN SHEET INDEX
- ACCESS ROAD & WATER CONTAINMENT PAD AS-BUILT PLAN
- WELL PAD AS-BUILT PLAN
- ACCESS ROAD AS-BUILT PROFILES
- WELL PAD, WATER CONTAINMENT PAD, & STOCKPILE AS-BUILT ECTIONS
- CONSTRUCTION DETAILS
- ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
- WELL PAD RECLAMATION PLAN

BLACK FOREST LIMITS OF DISTURBANCE AREA (AC)	
	Permitted
Access Road "A" (1236')	3.69
Well Pad	11.71
Water Containment Pad	2.91
Excess/Opsoil Material Stockpiles	4.68
<b>Total Affected Area</b>	<b>23.16</b>
<b>Total Wooded Acres Disturbed</b>	<b>10.74</b>
<b>Impacts to Eln L., Joseph R., &amp; Justin R. Smith &amp; Ellen L. - Virco TM 12-147</b>	
Access Road "A" (344')	2.86
Well Pad	3.05
Excess/Opsoil Material Stockpiles	4.88
<b>Total Affected Area</b>	<b>10.82</b>
<b>Total Wooded Acres Disturbed</b>	<b>5.33</b>
<b>Impacts to Adams County Hunt Club, L.L.F. TM 17-028-2</b>	
Access Road "A" (344')	0.89
Water Containment Pad	2.51
<b>Total Affected Area</b>	<b>3.80</b>
<b>Total Wooded Acres Disturbed</b>	<b>2.84</b>
<b>Impacts to Michael G. &amp; Stephen D. Underwood TM 12-18</b>	
Access Road "A"	0.68
Well Pad	3.11
<b>Total Affected Area</b>	<b>3.19</b>
<b>Total Wooded Acres Disturbed</b>	<b>1.61</b>
<b>Impacts to Michael G. &amp; Stephen D. Underwood TM 12-18-2</b>	
Well Pad	2.86
<b>Total Affected Area</b>	<b>4.88</b>
<b>Total Wooded Acres Disturbed</b>	<b>0.97</b>
<b>Impacts to Michael G. &amp; Stephen D. Underwood TM 12-18-3</b>	
Well Pad	0.67
<b>Total Affected Area</b>	<b>0.67</b>
<b>Total Wooded Acres Disturbed</b>	<b>0.15</b>

Proposed Well Name	W North	N North	UTM (METERS)	NAD 83 Lat & Long
	Mag. 27'	Mag. 03'	Zone 17	
Open Well	N 208452.90	N 238418.14	N 4351122.35	LA 76-16-34 1682
Blot	E 1567005.05	E 1530126.58	E 487676.77	LONG 41-01-41 4371
Open Well	N 208461.34	N 238526.01	N 4351125.10	LA 76-16-34 2543
Blot	E 1567009.44	E 1530127.94	E 487677.09	LONG 41-01-41 5021
Open Well	N 208458.40	N 238534.72	N 4351127.82	LA 76-16-34 2486
Blot	E 1567007.91	E 1530129.07	E 487673.81	LONG 41-01-41 3272
Hayhurst Unit 1H	N 208450.43	N 238492.97	N 4351125.93	LA 76-16-34 1328
Unit 1H	E 1567074.39	E 1530132.49	E 487674.72	LONG 41-01-41 5722
Hayhurst Unit 2H	N 208416.27	N 238505.97	N 4351121.34	LA 76-16-34 0318
Unit 2H	E 1567078.86	E 1530127.00	E 487673.54	LONG 41-01-41 2172
Everly Unit 1H	N 208427.31	N 238466.85	N 4351126.09	LA 76-16-34 0109
Unit 1H	E 1567065.34	E 1530142.43	E 487677.91	LONG 41-01-41 0872
Everly Unit 2H	N 208435.28	N 238466.85	N 4351126.09	LA 76-16-34 7990
Unit 2H	E 1567047.41	E 1530145.01	E 487675.64	LONG 41-01-41 5072
Well Pad Elevation	1081.0			

Stream and Impact Cause	BLACK FOREST EPHEMERAL STREAM IMPACT (LINEAR FEET)				Total Disturbance (LF)
	Culvert/Fill (LF)	Inlets/Outlets Structures (LF)	Temp. Impacts Controls (LF)	Temp. Disturb. L.O.O. (LF)	
Stream 23 (Stockpiles Area 'B')	0	0	0	31	31
Stream 31 (Well Pad)	0	0	0	31	31

**REPRODUCTION NOTE**  
 THESE PLANS WERE CREATED TO BE PRINTED ON 24" X 36" (ANSI) LARGE 'D' PAPER. HALF SCALE DRAWINGS ARE ON 'E' (11" X 17") LARGE 'B' PAPER.  
 THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

**NAVITUS**  
 ENERGY ENGINEERING

REVISION  
 DATE: 02/23/2017  
 REVISION 1: 02/23/2017 REVISION 2: 02/23/2017 REVISION 3: 02/23/2017 REVISION 4: 02/23/2017



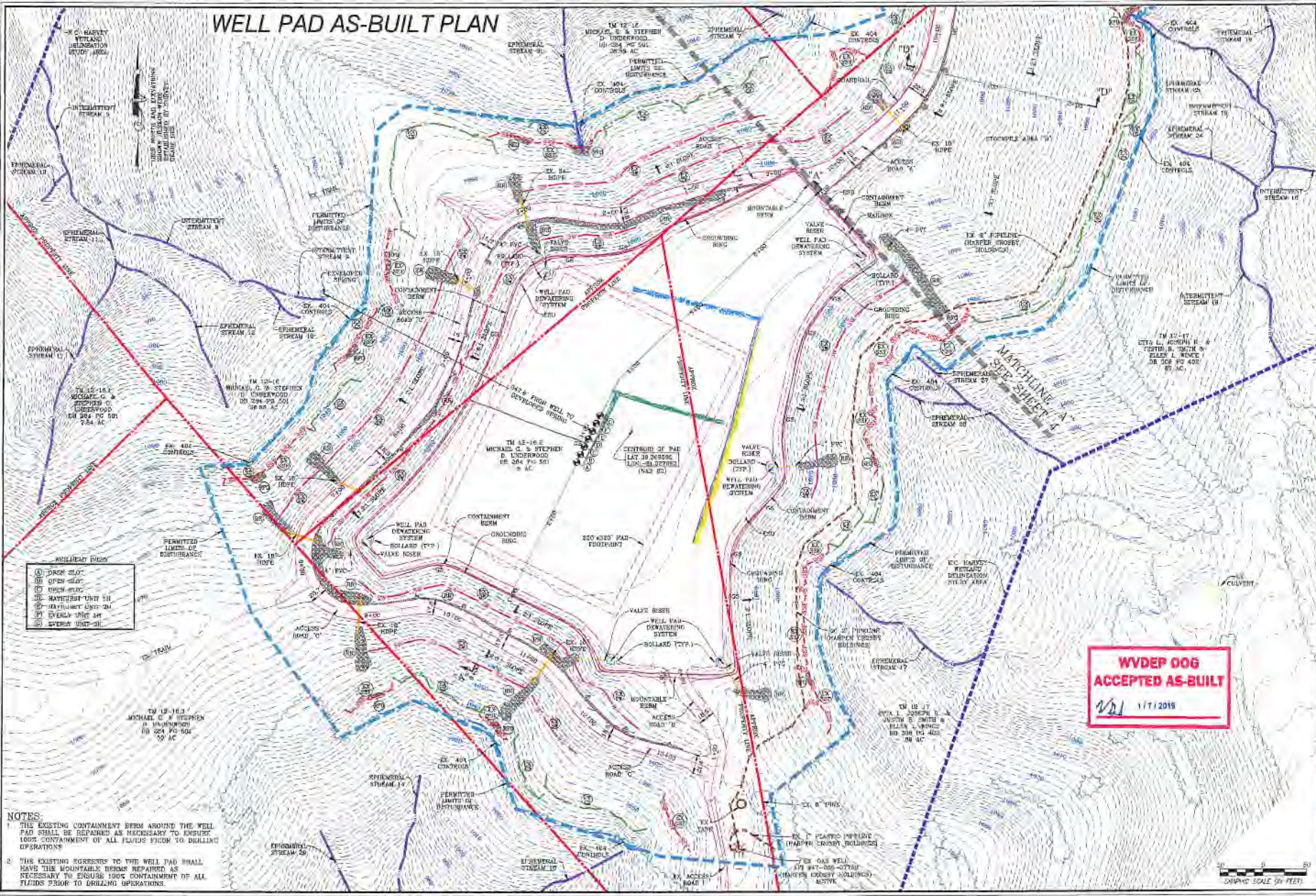
THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

**BLACK FOREST**  
 WELL PAD & WATER CONTAINMENT PAD  
 CLAY DISTRICT  
 RITCHIE COUNTY, WEST VIRGINIA



DATE: 02/23/2017  
 SCALE: AS SHOWN  
 SHEET 1 OF 10

# WELL PAD AS-BUILT PLAN



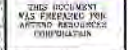
- WELL PAD DEWATERING SYSTEM**
- (1) FROM SLOTT
  - (2) OPEN SLOTT
  - (3) FROM SLOTT
  - (4) HANDED UNIT 5H
  - (5) HANDED UNIT 2H
  - (6) EVERY UNIT 4H
  - (7) EVERY UNIT 3H

**NOTES**

- THE EXISTING CONTAINMENT BEAM AROUND THE WELL PAD SHALL BE REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.
- THE EXISTING EGRESSORS TO THE WELL PAD SHALL HAVE THE MOUNTABLE RISERS REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.

**NAVITUS**  
ENERGY ENGINEERING

DATE	REVISION
11/23/2017	REVISED FOR SURFACE CONSTRUCTION
11/23/2018	REVISED PER WV DEP COMMENTS



THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

**BLACK FOREST**  
WELL PAD & WATER CONTAINMENT PAD  
CLAY DISTRICT  
RITCHIE COUNTY, WEST VIRGINIA



DATE 02/23/2017  
SCALE 1" = 50'  
SHEET 5 OF 10

**WVDEP OOG  
ACCEPTED AS-BUILT**  
1/17/2019



# BLACK FOREST WELL PAD & WATER CONTAINMENT PAD AS-BUILT AND EROSION CONTROL IMPROVEMENTS

CLAY DISTRICT, RITCHIE COUNTY  
BONDS CREEK WATERWAY

USGS 7.5 ELLENBORO QUAD

## LOCATION COORDINATES:

ACCESS ROAD ENTRANCE  
LATITUDE: 39.311631 LONGITUDE: -81.023777 (NAD 83)  
N 4351359.85 E 497950.18 (UTM ZONE 17 METERS)  
CENTER OF TANK  
LATITUDE: 39.311647 LONGITUDE: -81.026483 (NAD 83)  
N 4351350.58 E 497716.84 (UTM ZONE 17 METERS)  
CENTROID OF PAD  
LATITUDE: 39.309596 LONGITUDE: -81.027963 (NAD 83)  
N 4351139.93 E 497590.05 (UTM ZONE 17 METERS)

## GENERAL DESCRIPTION:

THE ACCESS ROAD(S), WELL PAD AND WATER CONTAINMENT PAD HAVE BEEN CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

## FLOODPLAIN NOTES:

THE SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54085C0095C.

## MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION HAS NOTIFIED MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1434291486.

## ENTRANCE PERMIT:

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

## ENVIRONMENTAL NOTES:

WETLAND DELINEATIONS WERE PERFORMED IN JANUARY, 2016 BY KC HARVEY ENVIRONMENTAL, LLC TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE JANUARY 12, 2016 POTENTIALLY JURISDICTIONAL AQUATIC FEATURES MAP WAS PREPARED BY KC HARVEY ENVIRONMENTAL, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE EXHIBIT DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP.

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## PROJECT CONTACTS:

### OPERATOR:

ANTERO RESOURCES CORPORATION  
535 WHITE OAKS BLVD.  
BRIDGEPORT, WV 26330  
PHONE: (304) 842-4100  
FAX: (304) 842-4102

ELI WAGONER - ENVIRONMENTAL ENGINEER  
OFFICE: (304) 842-4068 CELL: (304) 478-9770

JOH McEVERS - OPERATIONS SUPERINTENDENT  
OFFICE: (303) 357-6799 CELL: (303) 808-2423

AARON KUNZLER - CONSTRUCTION SUPERVISOR  
CELL: (405) 227-8344

ROBERT B. WIRKS - FIELD ENGINEER  
OFFICE: (304) 842-4100 CELL: (304) 627-7405

CHARLES E. COMPTON, III - SURVEYING COORDINATOR  
CELL: (304) 719-8449

BURT SIMCOX - LAND AGENT  
CELL: (304) 282-9372

### ENGINEER/SURVEYOR:

NAVITUS ENGINEERING, INC.  
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER  
OFFICE: (888) 862-4185 CELL: (540) 686-6747

### ENVIRONMENTAL:

KC HARVEY ENVIRONMENTAL, LLC  
SHANNON THOMPSON - STAFF SCIENTIST  
OFFICE (740) 373-1970 CELL: (970) 396-8250

### GEOTECHNICAL:

PENNSYLVANIA SOIL & ROCK, INC.  
CHRISTOPHER W. SAMIOS - PROJECT ENGINEER  
OFFICE: (412) 372-4000 CELL: (412) 589-0662

## RESTRICTIONS NOTES:

1. THERE ARE NO PERENNIAL STREAMS, WETLANDS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 825 FEET OF THE CENTER OF THE WELL PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 825 FEET OF THE CENTER OF THE WELL PAD.

## NOTES:

1. ALL BMP'S MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF DISTURBANCE ARE COMPLETE AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RUNOFF EVENT IN EXCESS OF 0.5" AND ON A BIWEEKLY BASIS.
2. THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY HARD COVER SUCH AS PAVEMENT OR BUILDINGS. IT SHOULD BE NOTED THAT THE 70% REQUIREMENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE SITE.
3. ALL PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP.
4. ANY AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDED.
5. THE AS-BUILT INFORMATION SHOWN HEREON REFLECTS FIELD DATA COLLECTED RELATING TO THE FINAL GRADING OF THE DISTURBED AREA AS OF FEBRUARY 6, 2017. THE AS-BUILT INFORMATION SHOWN HEREON REFLECTS FIELD DATA COLLECTED RELATING TO THE FINAL GRADING OF THE WELL PAD AREA AND PRODUCTION EQUIPMENT AS OF FEBRUARY 6, 2017. NAVITUS ENGINEERING IS NOT RESPONSIBLE FOR ANY CHANGES MADE TO THE SITE AFTER THE ABOVE MENTIONED DATES.
6. THE EXISTING CONTAINMENT BERM AROUND THE WELL PAD SHALL BE REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS
7. THE EXISTING EGREGESSES TO THE WELL PAD SHALL HAVE THE MOUNTABLE BERMS REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.



2000 0 2000  
SCALE: 1" = 2000'

## WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

## AS-BUILT CERTIFICATIONS:

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

# WATER CONTAINMENT PAD & SEDIMENT RETENTION PLAN

WEST VIRGINIA  
SHEED  
ROAD MAP

**SHEET INDEX:**

- 1 - COVER SHEET
- 2 - LEGEND
- 3 - OVERALL PLAN SHEET INDEX
- 4 - ACCESS ROAD & WATER CONTAINMENT PAD AS-BUILT PLAN
- 5 - WELL PAD AS-BUILT PLAN
- 6 - ACCESS ROAD AS-BUILT PROFILES
- 7 - WELL PAD, WATER CONTAINMENT PAD, & STOCKPILE AS-BUILT SECTIONS



WEST VIRGINIA STATE PLANE COORDINATE SYSTEM  
NORTH ZONE, NAD83  
ELEVATION BASED ON NAVD83  
ESTABLISHED BY SURVEY GRADE GPS & OPUS  
POST-PROCESSING

*Michael Goff  
10-9-18*

BLACK FOREST LIMITS OF DISTURBANCE AREA (AC)	
	Permitted
Access Road "A" (1,238')	3.86
Well Pad	11.71
Water Containment Pad	2.91
Excess/Topsoil Material Stockpiles	4.68
<b>Total Affected Area</b>	<b>23.16</b>
Total Wooded Acres Disturbed	10.74
Impacts to Etta L., Joseph R., & Justin R. Smith & Ellen L. Wince TM 12-17	
Access Road "A" (844')	2.89
Well Pad	3.05
Excess/Topsoil Material Stockpiles	4.68
<b>Total Affected Area</b>	<b>10.62</b>
Total Wooded Acres Disturbed	5.33
Impacts to Adams County Hunt Club, LLP TM 12-06.2	
Access Road "A" (394')	0.89
Water Containment Pad	2.91
<b>Total Affected Area</b>	<b>3.80</b>
Total Wooded Acres Disturbed	2.64
Impacts to Michael G. & Stephen D. Underwood TM 12-16	
Access Road "A"	0.08
Well Pad	3.11
<b>Total Affected Area</b>	<b>3.19</b>
Total Wooded Acres Disturbed	1.61
Impacts to Michael G. & Stephen D. Underwood TM 12-16.2	
Well Pad	4.88
<b>Total Affected Area</b>	<b>4.88</b>
Total Wooded Acres Disturbed	0.97
Impacts to Michael G. & Stephen D. Underwood TM 12-16.3	
Well Pad	0.67
<b>Total Affected Area</b>	<b>0.67</b>
Total Wooded Acres Disturbed	0.19



DATE	REVISION
08/28/2018	REVISED PER SURFACE CONFIGURATION
06/20/2018	REVISED PER SURFACE CONFIGURATION



**WVDOH COUNTY ROAD MAP**



Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Open Slot	N 298482.80 E 1567560.96	N 298515.14 E 1536120.06	N 4351122.35 E 497570.77	LAT 39-18-34.1652 LONG -81-01-41.4371
Open Slot	N 298491.54 E 1567565.44	N 298525.08 E 1536124.54	N 4351125.10 E 497572.09	LAT 39-18-34.2543 LONG -81-01-41.3821
Open Slot	N 298500.48 E 1567569.91	N 298534.02 E 1536129.01	N 4351127.85 E 497573.41	LAT 39-18-34.3435 LONG -81-01-41.3272
Hayhurst Unit 1H	N 298508.43 E 1567574.39	N 298542.97 E 1536133.49	N 4351130.59 E 497574.72	LAT 39-18-34.4326 LONG -81-01-41.2722
Hayhurst Unit 2H	N 298518.37 E 1567578.86	N 298551.91 E 1536137.96	N 4351133.34 E 497578.04	LAT 39-18-34.5218 LONG -81-01-41.2172
Everly Unit 1H	N 298527.31 E 1567583.34	N 298560.85 E 1536142.43	N 4351136.09 E 497577.36	LAT 39-18-34.6109 LONG -81-01-41.1622
Everly Unit 3H	N 298536.26 E 1567587.81	N 298569.90 E 1536146.91	N 4351138.83 E 497578.88	LAT 39-18-34.7000 LONG -81-01-41.1072
Well Pad Elevation	1,083.0			

Stream and Impact Cause	BLACK FOREST EPHEMERAL STREAM IMPACT (LINEAR FEET)				Total Disturbance (LF)
	Permanent Impacts Culvert/Fill (LF)	Inlets/Outlets Structures (LF)	Temp. Impacts Cofferdam/E&S Controls (LF)	Temp. Disturb. Distance to L.O.D. (LF)	
Stream 25 (Stockpile Area "B")	0	0	0	0	0
Stream 31 (Well Pad)	0	0	0	0	0

MISS Utility of West Virginia  
1-800-245-4848  
West Virginia State Law  
Section XIV: Chapter 24-C  
Requires that you call two  
business days before you dig in  
the state of West Virginia.  
**IT'S THE LAW!!**

**REPRODUCTION NOTE**  
THESE PLANS WERE CREATED TO BE PLOTTED ON 22"x34" (ANSI A) PAPER. HALF SCALE DRAWINGS ARE ON 11"x17" (ANSI B) PAPER.  
THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

OCT 10 2018



DATE: 02/23/2017  
SCALE: AS SHOWN  
SHEET 1 OF 7

RECEIVED  
Office of Oil and Gas

WV Department of Environmental Protection

COVER SHEET  
**BLACK FOREST**  
WELL PAD & WATER CONTAINMENT PAD  
CLAY DISTRICT  
RITCHIE COUNTY, WEST VIRGINIA