

09/28/2018



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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, September 24, 2018  
NOTICE OF PERMIT CANCELLATION  
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit cancellation for HORST UNIT 1H  
47-095-02516-00-00

The FINAL INSPECTION REPORT for the CANCELLED PERMIT, issued for U.S. Well Number 47-095-02516-00-00 , has been received by the Office of Oil and Gas. The permit has been cancelled as of 9/24/2018 .

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin  
Chief

Operator's Well Number: HORST UNIT 1H  
Farm Name: ROY A. MEREDITH  
U.S. WELL NUMBER: 47-095-02516-00-00  
Horizontal 6A New Drill  
Date Cancelled: 9/24/2018

Promoting a healthy environment.

OPERATOR: Antero Resources Corporation

PAD NAME: Meredith Pad WELL: Horst Unit 1H

PAD BUILT:  YES  NO DATE REVIEWED: \_\_\_\_\_ INT. \_\_\_\_\_

REVIEWED BY (APPLICANT): Megan Griffith

CONTACT PHONE: (303) 357-7182 EMAIL: mgriffith@anteroresources.com

APPLICANT SIGNATURE: 

### CHECKLIST FOR FILING A PERMIT HORIZONTAL 6A WELL

Please include these required elements in the Horizontal Well 6A applications, in order listed below.  
Do not use staples.

First Well	Subsequent Well
\$10,150.00 <input type="checkbox"/>	\$5,150.00 <input checked="" type="checkbox"/>

*CHK# 183437*  
**RETURNED**  
**NOT ISSUED**  
*Am# 183437*  
*Date 6/18/18*

- Fees
- Checklist / Cover letter
- WW-6B Notice of Application  Field Approved
- Cement Additives
- Well Bore Schematic
- WW-9 Fluids/Cuttings Disposal and Reclamation Plan  Field Approved
- Site Safety Plan  Field Approved
- Water Management Plan  DWWM Approval
- Topographic Map w/water purveyors, showing access road
- Mylar Plat (Signed and sealed) (Surface Owner matches WW-6A)
- WW-6A1 Lease Information
- Road Crossing Letter
- WW-PN Application Notice by Publication
- Public Notice (dated copy of advertisement or affidavit of publication)

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- WW-6AC Notice Certifications, notarized
- WW-6A Notice of Application notarized w/ any attachments
- Topographic Map with labeled surrounding water wells
- Certified Mail receipts for WW-6A
- N/A WW-6A3 Notice of Entry for Plat Survey
- N/A Certified Mail receipts for WW-6A3
- WW-6A4 Notice of Intent to Drill
- Certified Mail receipts for WW-6A4
- WW-6A5 Notice of Planned Operation
- Certified Mail receipts for WW-6A5
- N/A WW-6RW Well Location Restriction Waiver
- N/A WW-6AW Voluntary Statement of No Objection
- \_\_\_\_\_ Waiver for Surface Owner at Wellhead
- \_\_\_\_\_ Waiver for Surface Owner for Roads or other Disturbances
- \_\_\_\_\_ Waiver for Coal Owner, Operator or Lessee
- \_\_\_\_\_ Waiver for surface owner for Impoundment or Pit
- \_\_\_\_\_ Waiver for Surface Owner or Water Purveyor within 1500 feet of Center of Pad
- \_\_\_\_\_ Waiver for Natural gas Storage Field Operator
- Road Bonding Agreement / DOH Certification
- Frac Additives List of Chemical Names & CAS #s
- Site Construction, Reclamation, Erosion & Sediment Control Plans \_\_\_\_\_ Field Approved
- Copy of To Scale Plans
- \_\_\_\_\_ Inspector packet mailed to inspector (Plat, Topographic Map, WW-6B, WW-9, All Plans)
- \_\_\_\_\_ Bond (\$250,000)
- \_\_\_\_\_ Operator is registered with the SOS

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\_\_\_ Workers Compensation / Unemployment Insurance account is OK

\_\_\_ Professional Engineer/Company has COA

\_\_\_ Check for Mine Data at proposed coordinates

\_\_\_ Check for Floodplain Data at proposed coordinates

\_\_\_ IMP-1A Associated Pit or Impoundment

\_\_\_ WW-6A7 Well Restrictions Form w/ Signature

\_\_\_ At Least 100 Feet from Pad and LOD (including any E&S Control Feature) to any Perennial Stream, Lake, Pond, Reservoir or Wetland

\_\_\_ DEP Waiver and Permit Conditions

\_\_\_ At Least 300 Feet from Pad and LOD (including any E&S Control Feature) to any Naturally Producing Trout Stream

\_\_\_ DEP Waiver and Permit Conditions

\_\_\_ At Least 1000 Feet from Pad and LOD (including any E&S Control Feature) to any Groundwater Intake or Public Water Supply

\_\_\_ DEP Waiver and Permit Conditions

\_\_\_ At Least 250 Feet from an Existing Water Well or Developed Spring to Well Being Drilled

\_\_\_ Surface Owner Waiver and Recorded with County Clerk, OR

\_\_\_ DEP Variance and Permit Conditions

\_\_\_ At Least 625 Feet from an Occupied Dwelling Structure to the Center of the Pad

\_\_\_ Surface Owner Waiver and Recorded with County Clerk, OR

\_\_\_ DEP Variance and Permit Conditions

\_\_\_ At Least 625 Feet from Agricultural Buildings Larger than 2500 Square Feet to the Center of the Pad

\_\_\_ Surface Owner Waiver and Recorded with County Clerk, OR

\_\_\_ DEP Variance and Permit Conditions

**RETURNED  
NOT ISSUED**

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**Kees, Kelly L**

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**From:** Karin Cox <kcox@anteroresources.com>  
**Sent:** Friday, August 31, 2018 4:01 PM  
**To:** Kees, Kelly L; Mallory Stanton  
**Cc:** Megan Griffith  
**Subject:** RE: Notice of Deficiency - Meredith Pad

Kelly,

After further consultation, we will be cancelling our permit application for the Horst Unit 1H (47-095-02516) on the Meredith Pad.

7. The SSP Lateral diagram (spider plot) is correct with the cancellation of the Horst Unit 1H, and as well as having no plans to drill the Sterling Unit 4H at this time.

Please let me know if this doesn't correct all the current Notice of Deficiencies.

Thank you so much for your patience!

*Karin Cox*



Permitting Agent  
1615 Wynkoop St.  
Denver, CO 80202  
Main: (303) 357-7310  
Direct: (303) 357-6820

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**From:** Karin Cox  
**Sent:** Friday, August 31, 2018 12:34 PM  
**To:** 'Kees, Kelly L'; Mallory Stanton  
**Cc:** Megan Griffith  
**Subject:** RE: Notice of Deficiency - Meredith Pad

4. Attached – Horst 1H updated Lease page to include the Gene Bond Lease.
5. Clarification – Horst 1H - the Nettie Leah Licot lease
  - The EXCO Resources (WV) is part of the entire company. I have fixed it on the attached 6A1 lease page to remove the commas and update the name to avoid confusion. There are no skipped leases.
6. Attached – Sterling Unit 1H - 6A1 Lease Pages
8. Attached - The correct TOPO map for the entire pad.
9. Attached – Sterling 2H 6A1 pages

09/28/2018

- The Statoilhydro name is not a typo
- The Underwood lease has been fixed

I will be addressing the last issue next (#7)

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**From:** Karin Cox  
**Sent:** Friday, August 31, 2018 11:58 AM  
**To:** 'Kees, Kelly L'; Mallory Stanton  
**Cc:** Megan Griffith  
**Subject:** RE: Notice of Deficiency - Meredith Pad

Kelly,

Emails will be in multiple parts due to the total file size. I will also be sending paper copies of everything I am emailing.

1. From geology: "The 604 salt water depth came from a well that is 1,847' away from the pad's location (47-095-01114) as a TVD corrected depth. We don't normally see fresh water deeper than 500' as such, we called this salt water."
2. Attached – AORs + Charts (Horst 1H-2H, Sarahlene 1H-2H, Sterling 1H)
3. Attached – All 5 6A7's
10. Attached – Sterling 3H updated 6A1, I cleaned it up a bit.
  - The 6B TVD and HL match the plat I have on hand, I'm attaching the most updated plat and 6B. I see a HL of 9983.9' (rounded 9984'), and a TVD of 7000', on plat and 6B.

More to come, thank you for your patience.

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**From:** Kees, Kelly L [mailto:Kelly.L.Kees@wv.gov]  
**Sent:** Friday, August 31, 2018 7:25 AM  
**To:** Mallory Stanton; Karin Cox  
**Subject:** Notice of Deficiency - Meredith Pad

I've reviewed the above-referenced permit applications, and have the following requirements that need to be met before the permits can be issued:

- ~~1. How was the 604' saltwater depth determined? Its unusual for this area to have such a shallow saltwater depth.~~
- ~~2. Horst 1H, 2H, Sarahlene 1H, 2H and Sterling 1H – the area of review is missing the charts with the well information.~~
- ~~3. Horst 1H, 2H, Sarahlene 1H, 2H and Sterling 1H – WW 6A7 is missing~~
- ~~4. Horst 1H – Gene Bond is missing from the 6A1~~
- ~~5. Horst 1H – on the Nettie Leah Licot lease there is a jump in leases after EXCO Resources (WV).~~
- ~~6. Sterling 1H – the incorrect 6A1 was included with the permit, the Horst 2H was included.~~
7. Sterling 2H, 3H, and Horst 3H – In the SSP the Horst 1H and Sterling 4H are missing from the spider plot.
- ~~8. Sterling 2H, 3H, and Horst 3H – the topo map included with the permit has the pad located incorrectly.~~

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9. ~~Sterling 2H~~ on the 6A1 is the name Statoilhydro a type? Also on the Underwood lease there are some Inc. and LLC flip flopped
10. ~~Sterling 3H~~ It appears that either the plat or 6A1 and 6B are incorrect. The TVD and HL do not match and the 6A1 has too many leases on it for the plat included.

Please contact me with any questions, and please get these items to me and/or questions answered as soon as possible by responding to this particular email.

*Kelly L Kees*

*Kelly L. Kees, P.E.  
W. Va. Department of Environmental Protection  
Office of Oil and Gas  
601 57<sup>th</sup> Street  
Charleston, WV 25304  
Office Phone 304-926-0450 ext 1734*

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Horst Unit 1H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'

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

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

6) Existing Pad: Yes or No Yes

*Day 6-21-18*  
*GCJ 6/21/2018*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19300' MD

11) Proposed Horizontal Leg Length: 9362'

12) Approximate Fresh Water Strata Depths: 349', 447', 463'

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

14) Approximate Saltwater Depths: 604', 1521', 1567'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_



WW-6B  
(04/15)

API NO. 47-095 - **4709502516**  
09/28/2018

OPERATOR WELL NO. Horst Unit 1H

Well Pad Name: Meredith 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	54.5#	513	513	CTS, 713 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19300	19300	CTS, 4899 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

*DNV  
6-21-18*

*JOB  
6/21/2018*

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

WW-6B  
(10/14)

4709502516  
09/28/2018  
API NO. 47-095 -  
OPERATOR WELL NO. Horst Unit 1H  
Well Pad Name: Meredith 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.

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

DWH  
12-18

JOB  
6/21/2018

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 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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:

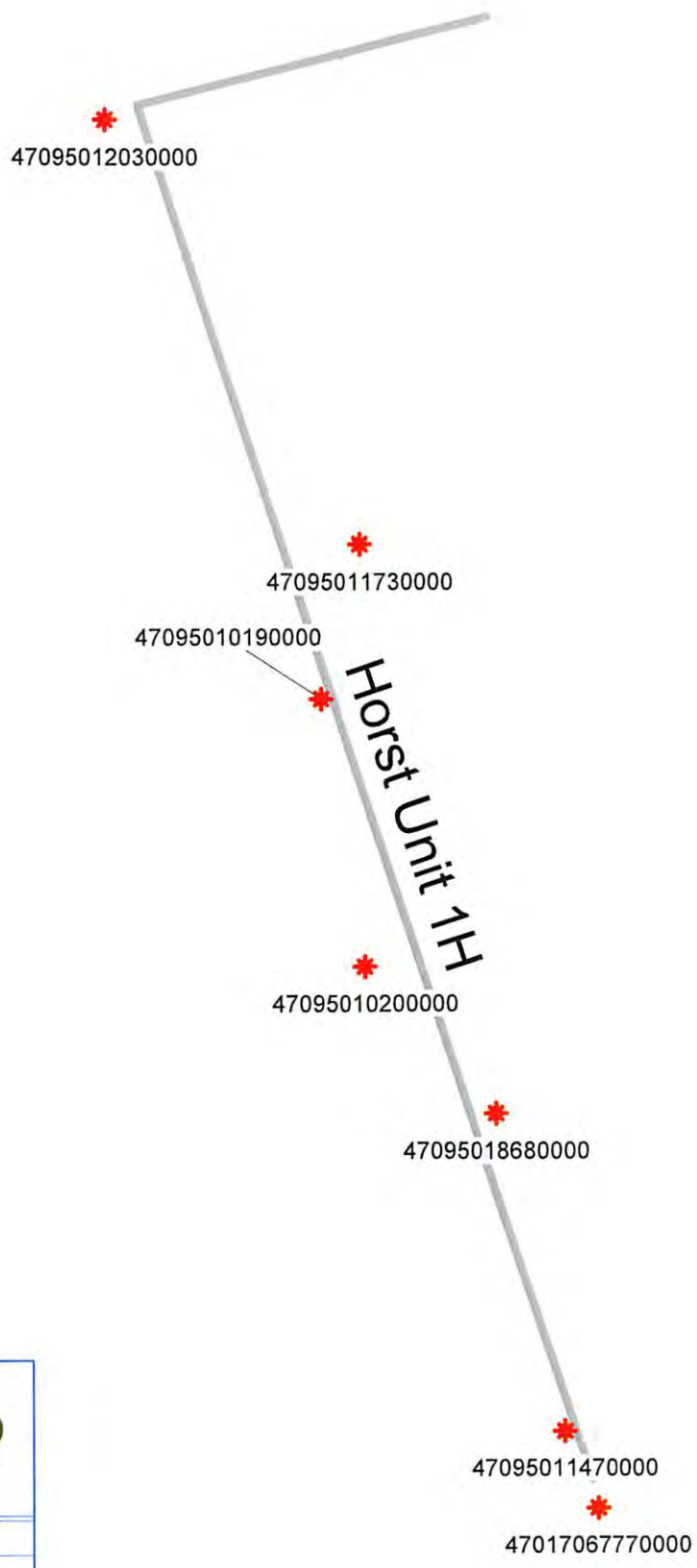
Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

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.



Antero Resources Corporation

Horst Unit 1H - AOR



WELL SYMBOLS  
Gas Well

May 1, 2018

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Environmental Protection

09/28/2018

WW-9  
(4/16)

4709502516

API Number 47 - 095

Operator's Well No. Horst 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) Headwaters Middle Island Creek Quadrangle West Union 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)

*DMH  
6-21-18*

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 - Dull/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 Sr. Environmental & Regulatory Manager

Subscribed and sworn before me this 14th day of JUNE, 2018

*Chavez* Notary Public

My commission expires MARCH 13, 2022

*JOB  
6/21/2018*

Antero Resources Corporation

Proposed Revegetation Treatment: Acres Disturbed 31.17 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" (2.55 acres) + Access Road "B" (0.25 acres) + Access Road "C" (0.52) + Access Road "D" (7.75 acres) + Access Road "E" (0.46 acres) + Well Pad (7.09 acres) + Water Containment Pad (2.33 acres) + Excess/Topsoil Material Stockpiles (10.22 acres) = 31.17 acres

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	Crownvetch	10-15
Field Bromegrass	40	Tall Fescue	30
<small>See attached Table IV-3 for additional seed type (Meredith Pad Design Page 23)</small>		<small>See attached Table IV-4A for additional seed type (Meredith Pad Design Page 23)</small>	
*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: [Signature]

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

Title: Oil & Gas Inspector Date: 6/21/2015

Field Reviewed? (  ) Yes (  ) No

**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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4709502516



**911 Address**  
**2002 Haymonds Ridge Rd.**  
**Pennsboro, WV 26415**

## Well Site Safety Plan

### Antero Resources

**Well Name:** Horst Unit 1H-3H, Sterling 1H-4H and  
Sarahlene Unit 1H-4H

**Pad Location:** MEREDITH PAD  
Tyler County/Centerville District

**GPS Coordinates:**

**Entrance** - Lat 39°20'48.69"/Long -80°52'8.20" (NAD83)

**Pad Center** - Lat 39°20'54.69"/Long -80°52'12.70" (NAD83)

**Driving Directions:**

*DMH*  
*6-21-18*

From the intersection of I79 and HWY 50 through West Union. Head west on US-50 W for 28.7 miles. Turn right onto WV-18 N for 0.6 miles. Turn left onto Davis St/Old U.S. 50 W for 0.4 miles. Turn right onto WV-18N/Sistersville Pike for 12.2 miles. Turn left onto WV-74 S for 2.0 miles. Turn left onto Co Rd 74/1 for 0.8 miles. Turn left to stay on Co Rd 74/1 for 1.0 mile. The access road will be on the left.

**Alternate Route:**

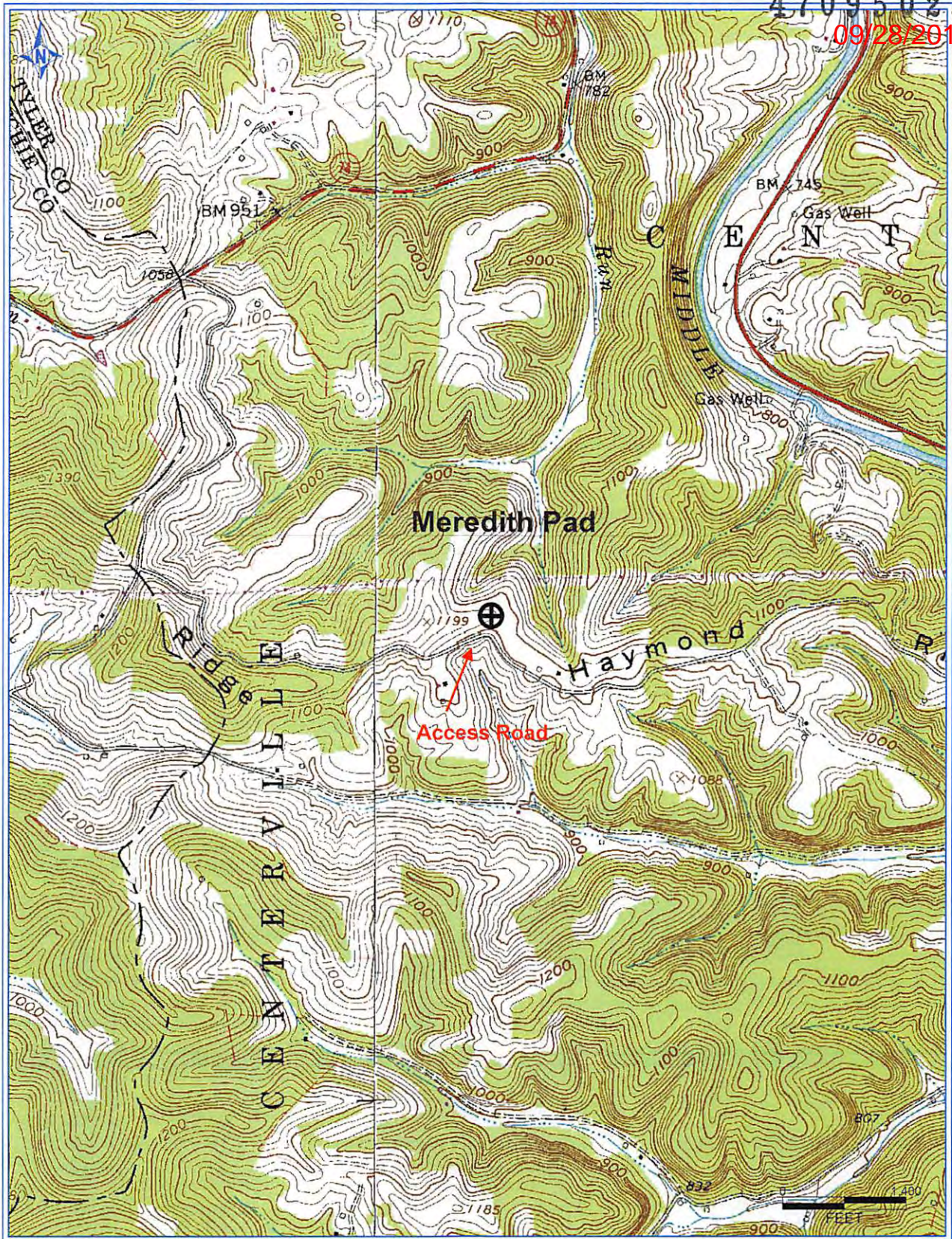
From the intersection of I79 and HWY 50 through Alma. Head west on US-50 W for 16.5 miles. Turn right onto WV-23 W for 27.0 miles. Turn left onto WV-18 S for 5.1 miles. Slight right onto WV-74 S for 2.0 miles. Turn left onto Co Rd 74/1 for 0.8 miles. Turn left to stay on Co Rd 74/1 for 1.0 mile. The access road will be on the left.

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

*JCS*  
*6/21/2018*



4709502516  
09/28/2018



**Antero Resources Corporation**  
Appalachian Basin  
Horst Unit 3H  
Tyler County  
Quadrangle: West Union  
Watershed: Middle Island Creek  
District: Centerville  
Date: 3-15-2017

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JUN 14 2018  
WV Department of  
Environmental Protection

LATITUDE 39°22'30"

10,389'

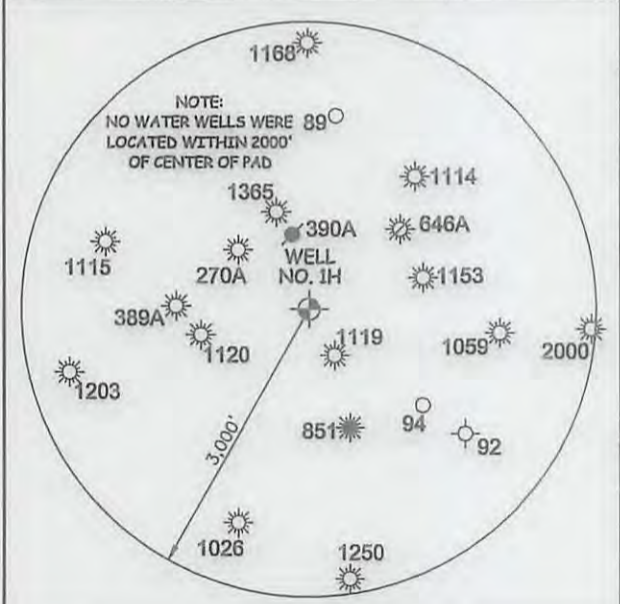
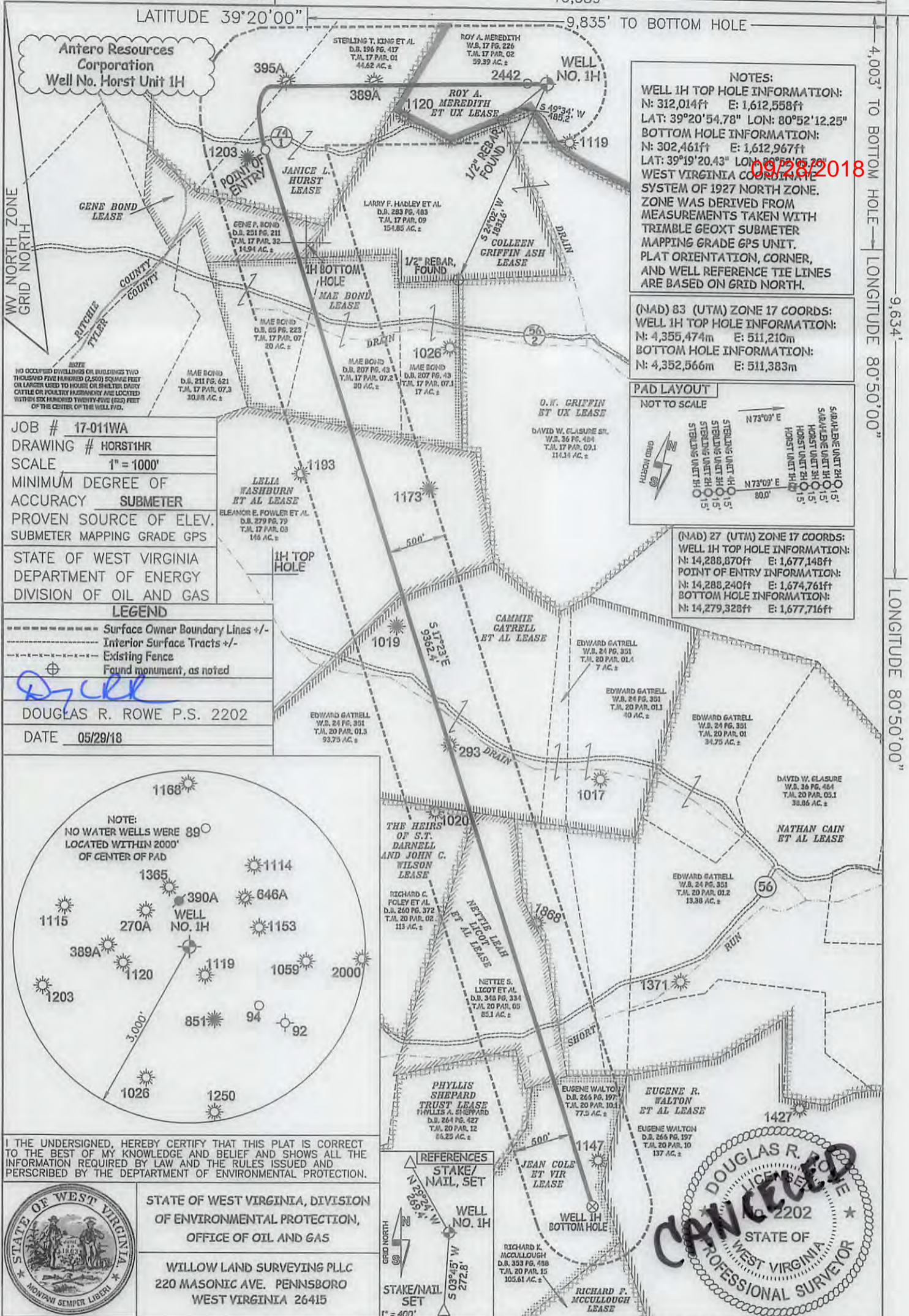
LATITUDE 39°20'00"

9,835' TO BOTTOM HOLE

4,003' TO BOTTOM HOLE

9,634'

LONGITUDE 80°50'00"



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 AVE. PENNSBORO WEST VIRGINIA 26415



WELL TYPE: OIL <input type="checkbox"/> GAS <input checked="" type="checkbox"/> LIQUID INJECTION <input type="checkbox"/> WASTE DISPOSAL <input type="checkbox"/>	OPERATOR'S WELL# 47 - 095 - 02516	COUNTY NAME
(IF "GAS") PRODUCTION <input checked="" type="checkbox"/> STORAGE <input type="checkbox"/> DEEP <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/>	STATE COUNTY PERMIT	
LOCATION: ELEVATION 1,117' - ORIGINAL 1,114' - PROPOSED	WATERSHED HEADWATERS MIDDLE ISLAND CREEK	
QUADRANGLE WEST UNION 7.5	DISTRICT CENTERVILLE	COUNTY TYLER
SURFACE OWNER ROY A. MEREDITH	ACREAGE 59.39 ACRES +/-	
OIL & GAS ROYALTY OWNER ROY A. MEREDITH ET UX; JANICE L. HURST; GENE BOND; MAE BOND; LEASE ACREAGE 80 AC±; 97.63 AC±; 14.44 AC±; 67 AC±		
LELIA WASHBURN ET AL; CAMMIE GATRELL ET AL; THE HEIRS OF S.T. DARNELL & JOHN C. WILSON; NETTIE LEAH LICOT ET AL; JEAN COLE ET VIR 150 AC±; 139.5 AC±; 113 AC±; 43 AC±; 77.5 AC±		
PROPOSED WORK: DRILL <input checked="" type="checkbox"/> CONVERT <input type="checkbox"/> DRILL DEEPER <input type="checkbox"/> REDRILL <input type="checkbox"/> FRACTURE OR STIMULATE <input checked="" type="checkbox"/>	PLUG OFF OLD FORMATION <input type="checkbox"/> PERFORATE NEW FORMATION <input checked="" type="checkbox"/> OTHER PHYSICAL CHANGE IN WELL (SPECIFY)	
TARGET FORMATION MARCELLUS	ESTIMATED DEPTH 7,000' TVD 19,300' MD	PERMIT
WELL OPERATOR ANTERO RESOURCES CORP.	DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM	
ADDRESS 1615 WYNKOOP ST. DENVER, CO 80202	ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313	

LATITUDE 39°22'30"

LATITUDE 39°20'00"

10,389'

9,835' TO BOTTOM HOLE

4,003' TO BOTTOM HOLE

9,634'

LONGITUDE 80°50'00"

LONGITUDE 80°50'00"

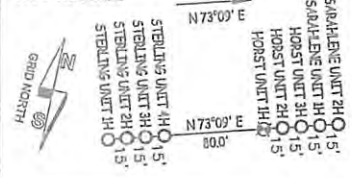
Antero Resources Corporation  
Well No. Horst Unit 1H

NOTES:  
 WELL 1H TOP HOLE INFORMATION:  
 N: 312,014ft E: 1,612,558ft  
 LAT: 39°20'54.78" LON: 80°52'12.25"  
 BOTTOM HOLE INFORMATION:  
 N: 302,461ft E: 1,612,967ft  
 LAT: 39°19'20.43" LON: 80°52'12.25"  
 WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.  
 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: 4,355,474m E: 511,210m  
 BOTTOM HOLE INFORMATION:  
 N: 4,352,566m E: 511,383m

PAD LAYOUT

NOT TO SCALE



(NAD) 27 (UTM) ZONE 17 COORDS:  
 WELL 1H TOP HOLE INFORMATION:  
 N: 14,288,870ft E: 1,677,148ft  
 POINT OF ENTRY INFORMATION:  
 N: 14,288,240ft E: 1,674,761ft  
 BOTTOM HOLE INFORMATION:  
 N: 14,279,328ft E: 1,677,716ft

WV NORTH ZONE GRID NORTH

NOTE:  
 NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHEPHERD GRAY CATTLE OR PASTURE HERDS ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.

JOB # 17-011WA  
 DRAWING # HORST1HR  
 SCALE 1" = 1000'  
 MINIMUM DEGREE OF ACCURACY SUBMETER  
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

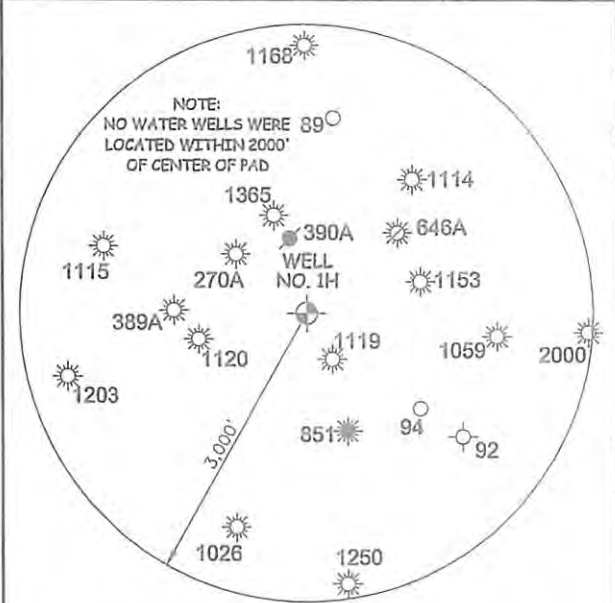
STATE OF WEST VIRGINIA  
 DEPARTMENT OF ENERGY  
 DIVISION OF OIL AND GAS

LEGEND

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

DOUGLAS R. ROWE P.S. 2202

DATE 05/29/18



NOTE:  
 NO WATER WELLS WERE LOCATED WITHIN 2000' OF CENTER OF PAD

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



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

WILLOW LAND SURVEYING PLLC  
 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415



WELL TYPE: OIL <input type="checkbox"/> GAS <input checked="" type="checkbox"/> LIQUID INJECTION <input type="checkbox"/> WASTE DISPOSAL <input type="checkbox"/>	OPERATOR'S WELL# HORST UNIT #1H
(IF "GAS") PRODUCTION <input checked="" type="checkbox"/> STORAGE <input type="checkbox"/> DEEP <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/>	47 - 095 - 02516
LOCATION: ELEVATION 1,117' - ORIGINAL 1,114' - PROPOSED WATERSHED HEADWATERS MIDDLE ISLAND CREEK	STATE COUNTY PERMIT
QUADRANGLE WEST UNION 7.5'	DISTRICT CENTERVILLE COUNTY TYLER
SURFACE OWNER ROY A. MEREDITH	ACREAGE 59.39 ACRES +/-
OIL & GAS ROYALTY OWNER ROY A. MEREDITH ET UX; JANICE L. HURST; GENE BOND; MAE BOND; LEASE	ACREAGE 80 AC±; 97.63 AC±; 14.44 AC±; 67 AC±;
LEILA WASHBURN ET AL; CAMMIE GATRELL ET AL; THE HEIRS OF S.T. DARNELL & JOHN C. WILSON; NETTIE LEAH LICOT ET AL; JEAN COLE ET VIR	150 AC±; 139.5 AC±; 113 AC±; 43 AC±; 77.5 AC±
PROPOSED WORK: DRILL <input checked="" type="checkbox"/> CONVERT <input type="checkbox"/> DRILL DEEPER <input type="checkbox"/> REDRILL <input type="checkbox"/> FRACTURE OR STIMULATE <input checked="" type="checkbox"/>	PLUG OFF OLD FORMATION <input type="checkbox"/> PERFORATE NEW FORMATION <input checked="" type="checkbox"/> OTHER PHYSICAL CHANGE IN WELL
(SPECIFY) TARGET FORMATION MARCELLUS	PLUG & ABANDON <input type="checkbox"/> CLEAN OUT & REPLUG <input type="checkbox"/>
WELL OPERATOR ANTERO RESOURCES CORP.	ESTIMATED DEPTH 7,000' TVD 19,300' MD
ADDRESS 1615 WYNKOOP ST.	DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
FORM WW-6 DENVER, CO 80202	ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

Copy

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>Roy A. Meredith, et al Lease</u></b>			
Roy A. Meredith	J & J Enterprises	1/8	0257/0527
J & J Enterprises	Eastern American Energy Corp.	Assignment	0282/0296
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0371/0528
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Janice L. Hurst Lease</u></b>			
Janice L. Hurst	Manna Oil & Gas Company	1/8	0260/0493
Manna Oil & Gas Company	SEFCO Enterprises, Inc.	Assignment	0267/0448
SEFCO Enterprises, Inc.	J&J Enterprises, Inc.	Assignment	0282/0296
J&J Enterprises, Inc.	Esatern American Energy Corporation	Assignment	0282/0296
Eastern American Energy Corporation	Energy Corporation of America	Merge	09/1993
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Mae Bond Lease</u></b>			
Mae Bond	Exxon Corporation	1/8	0209/0146
Exxon Corporation	Petro-Enterprises, Inc.	Assignment	0209/0141
Petro-Enterprises, Inc.	J&J Enterprises, Inc.	Assignment	0229/0518
J&J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0282/0296
Eastern American Energy Corp.	Energy Corporation of America	Merger	09/093
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Leila Washburn, et al Lease</u></b>			
Leila Washburn	Union Carbine Corporation	1/8+	0177/0232
Union Carbine Corporation	Perkins Oil & Gas, Inc.	Assignment	Unrecorded
Perkins Oil & Gas, Inc.	Eastern Intermountain Energy, Inc.	Assignment	0266/099
Eastern Intermountain Energy, Inc.	Appalachian Energy Development, Inc.	Assignment	0268/0197
Appalachian Energy Development, Inc.	Perkins Oil & Gas, Inc.	Assignment	0268/0197
Perkins Oil & Gas, Inc.	Antero Resources Corporation	Partial Assignment	0419/0547

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JUN 14 2018

WV Department of  
Environmental Protection

\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

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

Operator's Well Number Horst Unit 1H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>Cammie Gattrell, et al Lease</u></b>			
Cammie Gattrell, et al	Exxon Corporation	1/8	0211/0104
Exxon Corporation	Petro-Enterprises, Inc.	Assignment	0249/0141
Petro-Enterprises, Inc.	J&J Enterprises	Assignment	0229/0518
J&J Enterprises	Eastern American Energy Corporation	Assignment	0282/0296
Eastern American Energy Corporation	Energy Corporation of America	Merger	0371/0528
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	0557/0430
<b><u>The Heirs of S.T. Darnell &amp; John C. Wilson Lease</u></b>			
The Heirs of S.T. Darnell & John C. Wilson	Inco 3, Inc.	1/8	0152/0381
Inco 3, Inc.	Appalachian Energy Reserves, Inc.	Assignment	0272/0354
Appalachian Energy Reserves, Inc.	Appalachian Energy Development, Inc.	Assignment	0329/0519
Appalachian Energy Development, Inc.	Triad Energy Corporation of West Virginia	Assignment	0329/0538
Triad Energy Corp of WV	Viking International Resources Company, Inc.	Assignment	0333/0164
Viking International Resources Company, Inc.	Triad Energy Corporation	Assignment	0338/0164
Triad Energy Corporation	Triad Hunter, LLC	Assignment	0371/0608
Triad Hunter, LLC	Antero Resources Corporation	Assignment	0470/0105
<b><u>Nettie Leah Licot, et al Lease</u></b>			
Nettie Leah Licot, et al	North Coast Energy Eastern, Inc.	1/8	0349/0541
North Coast Energy Eastern, Inc.	EXCO-North Coast Energy Eastern	Name Change	0277/068
EXCO-North Coast Energy Eastern, Inc.	EXCO Resources (WV)	Named Change	WVSOS
EXCO Resources (WV)(PA), BG Production	Antero Resources Appalachian Corporation	Assignment	0406/0195
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	0557/0430

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JUN 14 2018

WV Department of  
Environmental Protection

\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

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

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

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- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Jean Cole, et vir Lease</u>	Jean Cole, et vir Clarence W. Mutschelknaus	Clarence W. Mutschelknaus Antero Resources Corporation	1/8 Name Change	0252/0379 0557/0430

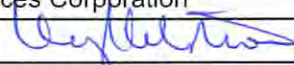
\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

**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, nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

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

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JUN 14 2018

WV Department of  
Environmental Protection

FORM WV-6A1  
EXHIBIT 1

FILED

JUN 10 2013

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



Fenny Becker, Manager  
Corporations Division  
Tel: (304)558-8000  
Fax: (304)558-8381  
Website: www.wvscot.com  
E-mail: business@wvscot.com

APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY

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

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

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

- 1. Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
- 2. Date Certificate of Authority was issued in West Virginia: 6/25/2008
- 3. Corporate name has been changed to: Antero Resources Corporation  
(Attach one Certified Copy of Name Change as filed in home state of incorporation.)
- 4. Name the corporation elects to use in WV: Antero Resources Corporation  
(due to home state name not being available)
- 5. Other amendments: \_\_\_\_\_  
(attach additional pages if necessary)

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

Alwyn A. Schopp (304) 367-7310  
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: [Handwritten Signature] Date: June 10, 2013

*\*Important Legal Notice Regarding Signatures\** For West Virginia Code §11D-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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Office of Oil and Gas  
JUN 14 2013  
WV Department of  
Environmental Protection

470 950 2516



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

June 15, 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: Horst Unit 1H  
Quadrangle: West Union 7.5'  
Tyler County/Centerville District, West Virginia

Mr. Martin:

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

Sincerely,

A handwritten signature in blue ink, appearing to read "Thomas Kuhn", is written over a horizontal line. The signature is stylized and extends to the right of the line.

Thomas Kuhn  
Senior Landman

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Office of Oil and Gas  
JUN 14 2018  
WV Department of  
Environmental Protection



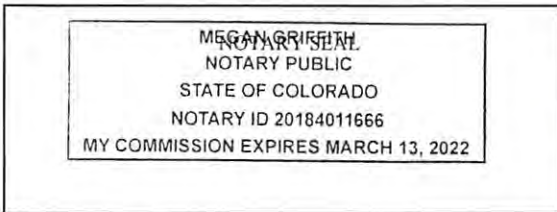


**Certification of Notice is hereby given:**

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: Antero Resources Corporation  
By: Kevin Kilstrom  
Its: Senior Vice President - Production  
Telephone: 303-357-7310

Address: 1615 Wynkoop Street  
Denver, CO 80202  
Facsimile: 303-357-7315  
Email: mgriffith@anteroresources.com



Subscribed and sworn before me this 13<sup>th</sup> day of June, 2018.  
Megan Griffith 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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JUN 14 2018  
WV Department of  
Environmental Protection

4709502516

WW-6A  
(9-13)

API NO. 47-095 - 09/28/2018  
OPERATOR WELL NO. Horst Unit 1H  
Well Pad Name: Meredith Pad

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: 6/13/2018 Date Permit Application Filed: \_\_\_\_\_

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: Roy A. Meredith & Carol A. Meredith  
Address: 86 Midland Drive  
Washington, WV 26181

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

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

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

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

SURFACE OWNER(s) (Impoundments or Pits)

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

COAL OWNER OR LESSEE

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

COAL OPERATOR

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

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

Name: 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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Office of Oil and Gas  
JUN 14 2018  
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/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/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 six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

WW-6A  
(8-13)

4709502516  
API NO. 47-095 - 09/28/2018  
OPERATOR WELL NO. Horst Unit 1H  
Well Pad Name: Meredith Pad

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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(8-13)

4709502516  
API NO. 47-095 - 09/28/2018  
OPERATOR WELL NO. Horst Unit 1H  
Well Pad Name: Meredith Pad

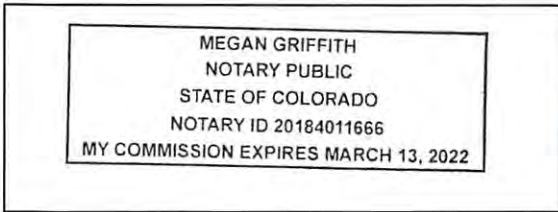
**Notice is hereby given by:**

Well Operator: Antero Resources Corporation  
Telephone: (303) 357-7223  
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, 13<sup>th</sup> day of June 2018.  
*[Signature]* Notary Public  
My Commission Expires March 13, 2022

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WV Department of  
Environmental Protection

**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:** 03/15/2018 **Date Permit Application Filed:** \_\_\_\_\_

**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: Roy A. Meredith  
Address: 86 Midland Dr.  
Washington, WV 26181

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

**Notice is hereby given:**

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

State: West Virginia UTM NAD 83 Easting: 511183.81m  
County: Tyler Northing: 4355460.10m  
District: Centerville Public Road Access: CR 74/1  
Quadrangle: West Union Generally used farm name: Roy A. Meredith  
Watershed: Headwaters Middle Island Creek

**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 Appalachian Corporation  
Address: 1615 Wynkoop St.  
Denver, CO 80202  
Telephone: 303-357-7223  
Email: mgriffith@anteroresources.com  
Facsimile: 303-357-7315

Authorized Representative: Megan Griffith  
Address: 1615 Wynkoop St.  
Denver, CO 80202  
Telephone: 303-357-7223  
Email: mgriffith@anteroresources.com  
Facsimile: 303-357-7315

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WV Department of Environmental Protection

**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).



**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:** 06/13/2018      **Date Permit Application Filed:** \_\_\_\_\_

**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: <u>Roy A. Meredith &amp; Carol A. Meredith</u>	Name: _____
Address: <u>86 Midland Drive</u>	Address: _____
<u>Washington, WV 26181</u>	_____

**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>511210m</u>
County: <u>Tyler</u>		Northing: <u>4355474m</u>
District: <u>Centerville</u>	Public Road Access: <u>Haymond Road</u>	
Quadrangle: <u>West Union 7.5'</u>	Generally used farm name: <u>Roy A. Meredith, et al</u>	
Watershed: <u>Headwaters Middle Island Creek</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: <u>Antero Resources Corporation</u>	Address: <u>1615 Wynkoop Street</u>
Telephone: <u>(303) 357-7223</u>	<u>Denver, CO 80202</u>
Email: <u>mgriffith@anteroresources.com</u>	Facsimile: <u>303-357-7315</u>

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WV Department of  
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**Oil and Gas Privacy Notice:**

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



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

June 12, 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 Meredith Pad, Tyler County  
Horst Unit 1H Well Site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2017-0517 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off of Tyler County 74/1 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,

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

Cc: Megan Griffith  
Antero Resources Corporation  
CH, OM, D-6  
File

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# List of Anticipated Additives Used for Fracturing or Stimulating Well

09/28/2018

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

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**RETURNED  
NOT ISSUED**

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:	<u>West Virginia</u>	UTM NAD 83 Easting:	<u>511210m</u>
County:	<u>Tyler</u>	UTM NAD 83 Northing:	<u>4355474m</u>
District:	<u>Centerville</u>	Public Road Access:	<u>Haymond Road</u>
Quadrangle:	<u>West Union 7.5'</u>	Generally used farm name:	<u>Roy A. Meredith, et al</u>
Watershed:	<u>Headwaters Middle Island Creek</u>		

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

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

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**Oil and Gas Privacy Notice:**

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

WW-PN  
(5-04-2012)

**Horizontal Natural Gas Well Work Permit  
Application Notice By Publication**

**Notice is hereby given:**

Pursuant to West Virginia Code 22-6A-10(e) prior to filing an application for a permit for a horizontal well the applicant shall publish in the county in which the well is located or is proposed to be located a Class II legal advertisement.

**Paper:** Tyler Star News

**Public Notice Date:** 3/21/2018 & 3/28/2018

The following applicant intends to apply for a horizontal natural well work permit which disturbs three acres or more of surface excluding pipelines, gathering lines and roads or utilizes more than two hundred ten thousand gallons of water in any thirty day period.

**Applicant:** Antero Resources Corporation **Well Number:** Horst Unit 1H

**Address:** 1615 Wynkoop St. Denver, CO 80202

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NOT ISSUED

**Business Conducted:** Natural gas production.

**Location –**

State: West Virginia County: Tyler  
District: Centerville Quadrangle: West Union 7.5'  
UTM Coordinate NAD83 Northing: 4355474m  
UTM coordinate NAD83 Easting: 511210m  
Watershed: Headwaters Middle Island Creek

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**Coordinate Conversion:**

To convert the coordinates above into longitude and latitude, visit: [http://tagis.dep.wv.gov/convert/llutm\\_conus.php](http://tagis.dep.wv.gov/convert/llutm_conus.php)

**Electronic notification:**

To receive an email when applications have been received or issued by the Office of Oil and Gas, visit <http://www.dep.wv.gov/insidedep/Pages/DEPMailingLists.aspx> to sign up.

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JUN 14 2018

**Reviewing Applications:**

Copies of the proposed permit application may be reviewed at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE Charleston, WV 25304 (304-926-0450). Full copies or scans of the proposed permit application will cost \$15, whether mailed or obtained at DEP headquarters. Copies may be requested by calling the office or by sending an email to [DEP.oog@wv.gov](mailto:DEP.oog@wv.gov).

WV Department of  
Environmental Protection

**Submitting Comments:**

Comments may be submitted online at <https://apps.dep.wv.gov/oog/comments/comments.cfm>, or by letter to Permit Review, Office of Oil and Gas, 601 57<sup>th</sup> Street, SE Charleston, WV 25304. Please reference the county, well number, and operator when using this option.

Regardless of format for comment submissions, they must be received no later than thirty days after the permit application is received by the Office of Oil and Gas.

For information related to horizontal drilling visit: [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx)

**PROOF OF CLASS II LEGAL ADVERTISEMENT,  
PURSUANT TO WV CODE SECTION 22-6A-10(e)**

APR 02 2018

**PUBLIC NOTICE OF AP-  
PLICATION FOR NATU-  
RAL GAS HORIZONTAL  
WELL DRILLING PERMIT,**  
pursuant to West Virginia  
Code Section 22-6A-10(e).

Antero Resources Corpora-  
tion, 1615 Wynkoop Street,  
Denver, CO 80202, is ap-  
plying for a permit for natu-  
ral gas horizontal well,  
Horst Unit 1H, located at  
approximately UTM NAD 83  
83 Easting 517185.81m,  
UTM NAD 83 Northing  
4355460.10m, in Headwa-  
ters Middle Island Creek  
Watershed, West Union  
7.5' Quadrangle, Center-  
ville District, Tyler County,  
WV which disturbs three  
acres or more of surface  
excluding pipelines, gather-  
ing lines and roads outli-  
zizes more than two  
hundred ten thousand gal-  
lons of water in any thirty  
day period. To convert the  
coordinates above into lon-  
gitude and latitude, visit:  
[http://tagis.dep.wv.gov/con-  
vert/lutm\\_conus.php](http://tagis.dep.wv.gov/convert/lutm_conus.php). To  
receive an email when ap-  
plications have been re-  
ceived or issued by the  
Office of Oil and Gas, visit  
[http://www.dep.wv.gov/insi-  
dedep/Pages/DEPMailing  
Lists.aspx](http://www.dep.wv.gov/insi-<br/>dedep/Pages/DEPMailing<br/>Lists.aspx) to sign up.

RETURNED  
NOT ISSUED

**TYLER STAR NEWS**

Sistersville, WV March 28, 2018

State of West Virginia, County of Tyler:

Personally appeared before the undersigned, a Notary Public,  
Brian Clutter who, being duly sworn,

states that he is the manager of the Tyler Star News, a weekly  
newspaper of general circulation, published at Sistersville,  
County of Tyler, State of West Virginia, and that a copy of the  
notice attached hereto was published for 2 successive

weeks in the Tyler Star News, beginning on the 21 day  
of March 2018 and ending on the 28 day  
of March, 2018.

RETURNED  
NOT ISSUED

3 ✓

Any interested person may  
submit written comments or  
request a copy of the pro-  
posed permit application.  
Regardless of format for  
comment submissions,  
they must be received no  
later than thirty days after  
the permit application is re-  
ceived by the Office of Oil  
and Gas.

Comments may be submit-  
ted online at  
[https://apps.dep.wv.gov/og/  
comments/comments.cfm](https://apps.dep.wv.gov/og/comments/comments.cfm),  
or by letter to Permit  
Review, Office of Oil and  
Gas, 601 57th Street, SE  
Charleston, WV 25304.  
Emailed or written com-  
ments must reference the  
county, well number, and  
operator and be received  
within 30 days of the date  
of the last publication.  
Copies of the proposed  
permit application may be  
reviewed at the WV Depart-  
ment of Environmental Pro-  
tection headquarters,  
located at 601 57th Street,  
SE, Charleston, WV 25304  
(304-926-0450). Full  
copies or scans of the pro-  
posed permit application  
will cost \$15.00, whether  
mailed or obtained at DEP  
headquarters.

For information related to  
horizontal drilling, and all  
horizontal well applications  
filed in this state, visit:  
[www.dep.wv.gov/oil-and-g-  
as/Horizontal-Permits/Pag-  
es/default.aspx](http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx)

Antero Resources Corpora-  
tion  
TSN 3/21 3/28 3017

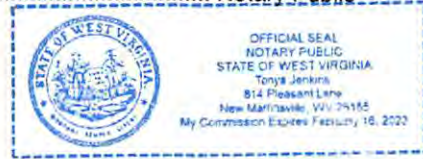
Brian Clutter  
Manager, Tyler Star News

Subscribed and sworn to before me, a Notary Public of said  
County, on this 28th day of March, 2018.

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Office of Oil and Gas  
JUN 14 2018  
WV Department of  
Environmental Protection

Tony Jenkins  
Notary Public

My commission expires



Printers Fee.....

4709502516 09/28/2018

CERTIFIED MAIL RECEIPT  
HORST UNIT 1H (MEREDITH PAD)  
WW-6A NOTICE OF APPLICATION TO SURFACE  
OWNER (Road and/or Other Disturbance)

Cut on dotted line.

### Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

<b>USPS TRACKING # :</b>	
<b>9405 5036 9930 0249 4818 67</b>	
Trans. #:	437174039
Print Date:	06/13/2018
Ship Date:	06/13/2018
Expected Delivery Date:	06/16/2018
Priority Mail® Postage:	<u>\$18.90</u>
Total	<u>\$18.90</u>
<b>RETURNED NOT ISSUED</b>	
From:	MEGAN GRIFFIN ANTERO RESOURCES 1615 WYNKOOP ST DENVER CO 80202-1106
To:	ROY A MEREDITH 86 MIDLAND DR WASHINGTON WV 26181-3568
<small>* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.</small>	



Thank you for shipping with the United States Postal Service!  
Check the status of your shipment on the USPS Tracking® page at [usps.com](http://usps.com)

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JUN 18 2018

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09/28/2018

4709502516

CERTIFIED MAIL RECEIPT  
MEREDITH PAD  
WW-6A4 NOTICE OF INTENT TO DRILL TO SURFACE  
OWNER

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### Instructions

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2. Place your label so it does not wrap around the edge of the package.
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4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

<b>USPS TRACKING # :</b>	
<b>9405 5036 9930 0249 4818 67</b>	
Trans. #:	437174039
Print Date:	06/13/2018
Ship Date:	06/13/2018
Expected Delivery Date:	06/16/2018
Priority Mail® Postage:	<u>\$18.90</u>
Total	<u>\$18.90</u>
<b>RETURNED NOT ISSUED</b>	
From:	MEGAN GRIFFITH ANTERO RESOURCES 1615 WYNKOOP ST DENVER CO 80202-1106
To:	ROY A MEREDITH 86 MIDLAND DR WASHINGTON WW 26181-3568
* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.	



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09/28/2018

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CERTIFIED MAIL RECEIPT  
HORST UNIT 1H (MEREDITH PAD)  
WW-6A5 NOTICE OF PLANNED OPERATIONS TO  
SURFACE OWNER

Cut on dotted line.

### Instructions

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3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
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5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0249 4818 67**

Trans. #:	437174039	Priority Mail® Postage:	<b>\$18.90</b>
Print Date:	06/13/2018	Total	<b>\$18.90</b>
Ship Date:	06/13/2018		
Expected			
Delivery Date:	06/16/2018		

**RETURNED  
NOT ISSUED**

**From:** MEGAN GRIFFITH  
ANTERO RESOURCES  
1615 WYNKOOP ST  
DENVER CO 80202-1106

**To:** ROY A MEREDITH  
86 MIDLAND DR  
WASHINGTON WV 26181-3568

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



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09/28/2018



June 15, 2018

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

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

Ms. Laura Adkins:

The submittal of the Meredith Pad was missing information in the recently submitted well work permits. Antero Resources Corporation (Antero) would like to submit the following additional paperwork for new well work permits to explore for Marcellus Shale potential. Our **Mountain** project is located in Tyler County, WV. On the **Meredith Pad** consists **multiple new horizontal** shallow wells (Horst Unit 1H-2H, Sarahlene Unit 1H-2H, & Sterling Unit 1H) that we are requesting approval to drill.

Attached you will find the following:

- CD with MSDS & SSP
- Copies of WW-6A Receipts
- Signed & Notarized WW-9 Forms

If you have any questions please feel free to contact me at (303) 357-7223.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in blue ink, appearing to read "Megan Griffith", is written over a light blue circular stamp.

Megan Griffith  
Permitting Agent  
Antero Resources Corporation

Enclosures

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NOT ISSUEDAPI NO. 47-095 - 09/28/2018  
OPERATOR WELL NO. Horst Unit 1H  
Well Pad Name: Meredith PadWW-6B  
(04/15)STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
WELL WORK PERMIT APPLICATION1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle2) Operator's Well Number: Horst Unit 1H Well Pad Name: Meredith Pad3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'5) 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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#8) Proposed Total Vertical Depth: 7000' TVD9) Formation at Total Vertical Depth: Marcellus10) Proposed Total Measured Depth: 19300' MD11) Proposed Horizontal Leg Length: 9362'12) Approximate Fresh Water Strata Depths: 349', 447', 463'13) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations.14) Approximate Saltwater Depths: 604', 1521', 1567'15) Approximate Coal Seam Depths: 63', 1239'16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated17) 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)

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4709502516

API NO. 47-095 - 09/28/2018  
OPERATOR WELL NO. Horst Unit 1H  
Well Pad Name: Meredith Pad

18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	513	513	CTS, 713 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19300	19300	CTS, 4899 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

Kind:	N/A			RECEIVED Office of Oil and Gas
Sizes:	N/A			JUN 14 2018
Depths Set:	N/A			WV Department of Environmental Protection

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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

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JUN 14 2018

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.

WV Department of  
Environmental Protection

\*Note: Attach additional sheets as needed.

WW-9  
(4/16)

**RETURNED  
NOT ISSUED**

Number 47 - 095 - \_\_\_\_\_  
Operator's Well No. \_\_\_\_\_ Horst 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) Headwaters Middle Island Creek Quadrangle West Union 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
- Undergound 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)

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.

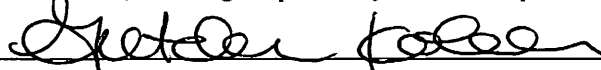
-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-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 

Company Official (Typed Name) Gretchen Kohler

Company Official Title Sr. Environmental & Regulatory Manager

Subscribed and sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_  
Notary Public

My commission expires \_\_\_\_\_

RECEIVED  
Office of Oil and Gas

JUN 14 2018

WV Department of  
Environmental Protection

**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 31.17 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" (2.55 acres) + Access Road "B" (0.25 acres) + Access Road "C" (0.52) + Access Road "D" (7.75 acres) + Access Road "E" (0.46 acres) + Well Pad (7.09 acres) + Water Containment Pad (2.33 acres) + Excess/Topsoil Material Stockpiles (10.22 acres) = 31.17 acres

**Temporary**

**Permanent**

Seed Type	lbs/acre
Annual Ryegrass	40
Field Bromegrass	40

**RETURNED  
NOT ISSUED**

Seed Type	lbs/acre
Crownvetch	10-15
Tall Fescue	30

See attached Table IV-3 for additional seed type (Meredith Pad Design Page 23)

See attached Table IV-4A for additional seed type (Meredith Pad Design Page 23)

\*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: \_\_\_\_\_

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

RECEIVED  
Office of Oil and Gas

JUN 14 2018

WV Department of  
Environmental Protection

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Field Reviewed? ( ) Yes ( ) No



**911 Address**  
**2002 Haymonds Ridge Rd.**  
**Pennsboro, WV 26415**

## Well Site Safety Plan

### Antero Resources

**Well Name:** Horst Unit 1H-3H, Sterling 1H-4H and Sarahlene Unit 1H-4H

**Pad Location:** MEREDITH PAD  
 Tyler County/Centerville District

RETURNED  
 NOT ISSUED

#### GPS Coordinates:

**Entrance** - Lat 39°20'48.69"/Long -80°52'8.20" (NAD83)

**Pad Center** - Lat 39°20'54.69"/Long -80°52'12.70" (NAD83)

RECEIVED  
 Office of Oil and Gas  
 JUN 14 2018  
 WV Department of  
 Environmental Protection

#### Driving Directions:

From the intersection of I79 and HWY 50 through West Union. Head west on US-50 W for 28.7 miles. Turn right onto WV-18 N for 0.6 miles. Turn left onto Davis St/Old U.S. 50 W for 0.4 miles. Turn right onto WV-18N/Sistersville Pike for 12.2 miles. Turn left onto WV-74 S for 2.0 miles. Turn left onto Co Rd 74/1 for 0.8 miles. Turn left to stay on Co Rd 74/1 for 1.0 mile. The access road will be on the left.

#### Alternate Route:

From the intersection of I79 and HWY 50 through Alma. Head west on US-50 W for 16.5 miles. Turn right onto WV-23 W for 27.0 miles. Turn left onto WV-18 S for 5.1 miles. Slight right onto WV-74 S for 2.0 miles. Turn left onto Co Rd 74/1 for 0.8 miles. Turn left to stay on Co Rd 74/1 for 1.0 mile. The access road will be on the left.

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



WW-9  
(4/16)

09/28/2018

RETURNED  
NOT ISSUED

API Number 47 - 095 - \_\_\_\_\_  
Operator's Well No. Horst 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) Headwaters Middle Island Creek Quadrangle West Union 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)

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.

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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 Sr. Environmental & Regulatory Manager

Subscribed and sworn before me this 14th day of JUNE, 2018

*[Signature]* Notary Public

My commission expires MARCH 13, 2022

RECEIVED  
Office of Oil and Gas

JUN 18 2018

WV Department of  
Environmental Protection

**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 31.17 acres Prevegetation pH \_\_\_\_\_

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

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Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: \_\_\_\_\_

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

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Field Reviewed? ( ) Yes ( ) No

RECEIVED  
Office of Oil and Gas

JUN 18 2018

WV Department of  
Environmental Protection

WW-6A1

Operator's Well Number Horst 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>Roy A. Meredith, et al Lease</u></b>			
Roy A. Meredith	J & J Enterprises	1/8	0257/0527
J & J Enterprises	Eastern American Energy Corp.	Assignment	0282/0296
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0371/0528
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Janice L. Hurst Lease</u></b>			
Janice L. Hurst	Manna Oil & Gas Company	1/8	0260/0493
Manna Oil & Gas Company	SEFCO Enterprises, Inc.	Assignment	0267/0448
SEFCO Enterprises, Inc.	J&J Enterprises, Inc.	Assignment	0282/0296
J&J Enterprises, Inc.	Esatern American Energy Corporation	Assignment	0282/0296
Eastern American Energy Corporation	Energy Corporation of America	Merger	09/1993
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Gene Bond Lease</u></b>			
Gene Bond	Drilling Appalachian Corporation	1/8	0296/0170
Drilling Appalachian Corporation	Dominion Exploration & Production, Inc.	Assignment	0372/0413
Dominion Exploration & Production, Inc.	CONSOL Gas Company	Name Change	0009/0206
CONSOL Gas Company	CNX Gas Company	Merger	0384/0191
CNX Gas Company	Noble Energy, Inc	Assignment	0388/0286
Noble Energy, Inc	Antero Resources Corporation	Assignment	0546/0242
<b><u>Mae Bond Lease</u></b>			
Mae Bond	Exxon Corporation	1/8	0209/0146
Exxon Corporation	Petro-Enterprises, Inc.	Assignment	0209/0141
Petro-Enterprises, Inc.	J&J Enterprises, Inc.	Assignment	0229/0518
J&J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0282/0296
Eastern American Energy Corp.	Energy Corporation of America	Merger	09/093
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Leila Washburn, et al Lease</u></b>			
Leila Washburn	Union Carbide Corporation	1/8+	0177/0232
Union Carbide Corporation	Perkins Oil & Gas, Inc.	Assignment	Unrecorded
Perkins Oil & Gas, Inc.	Eastern Intermountain Energy, Inc.	Assignment	0266/099
Eastern Intermountain Energy, Inc.	Appalachian Energy Development, Inc.	Assignment	0268/0197
Appalachian Energy Development, Inc.	Perkins Oil & Gas, Inc.	Assignment	0268/0197
Perkins Oil & Gas, Inc.	Antero Resources Corporation	Partial Assignment	0419/0547

\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

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

WW-6A1

Operator's Well Number Horst 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 –

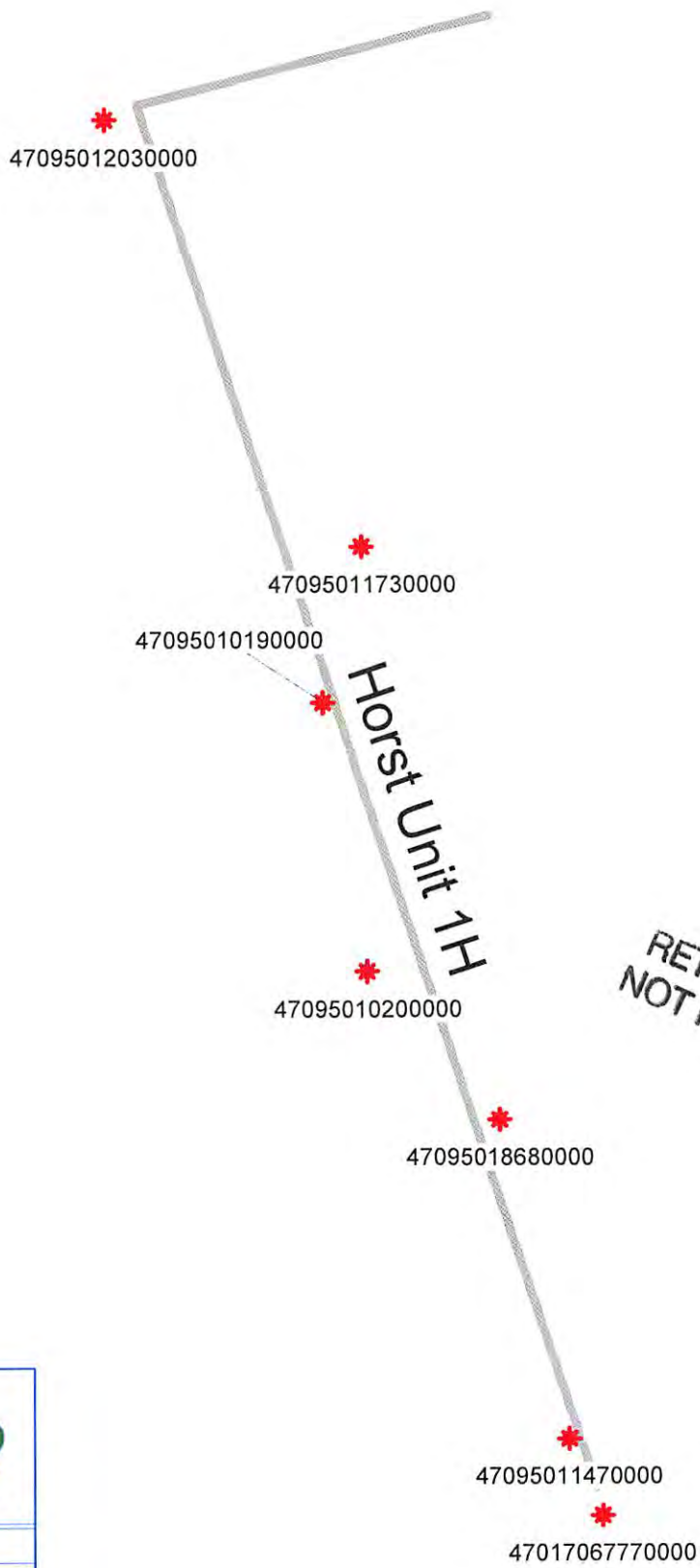
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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>Cammie Gatrell, et al Lease</u></b>			
Cammie Gatrell, et al	Exxon Corporation	1/8	0211/0104
Exxon Corporation	Petro-Enterprises, Inc.	Assignment	0249/0141
Petro-Enterprises, Inc.	J&J Enterprises	Assignment	0229/0518
J&J Enterprises	Eastern American Energy Corporation	Assignment	0282/0296
Eastern American Energy Corporation	Energy Corporation of America	Merger	0371/0528
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	0557/0430
<b><u>The Heirs of S.T. Darnell &amp; John C. Wilson Lease</u></b>			
The Heirs of S.T. Darnell & John C. Wilson	Inco 3, Inc.	1/8	0152/0381
Inco 3, Inc.	Appalachian Energy Reserves, Inc.	Assignment	0272/0354
Appalachian Energy Reserves, Inc.	Appalachian Energy Development, Inc.	Assignment	0329/0519
Appalachian Energy Development, Inc.	Triad Energy Corporation of West Virginia	Assignment	0329/0538
Triad Energy Corp of WV	Viking International Resources Company, Inc.	Assignment	0333/0164
Viking International Resources Company, Inc.	Triad Energy Corporation	Assignment	0338/0164
Triad Energy Corporation	Triad Hunter, LLC	Assignment	0371/0608
Triad Hunter, LLC	Antero Resources Corporation	Assignment	0470/0105
<b><u>Nettie Leah Licot, et al Lease</u></b>			
Nettie Leah Licot, et al	North Coast Energy Eastern, Inc.	1/8	0349/0541
North Coast Energy Eastern, Inc.	EXCO-North Coast Energy Eastern	Name Change	0277/068
EXCO-North Coast Energy Eastern, Inc.	EXCO Resources (WV)	Named Change	WVSOS
EXCO Resources (WV) EXCO Resources Co. (PA) BG Production	Antero Resources Appalachian Corporation	Assignment	0406/0195
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	0557/0430

\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

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



Antero Resources Corporation

Horst Unit 1H - AOR



WELL SYMBOLS  
Gas Well

May 1, 2018

UWI (API/Perm)	Well Name	Well Number	Operator	Hir Oper	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Productive Formation(s) not perf'd
07095012930000	HURST JANICE L	JK-1311	ALLIANCE PETR CORP	J & J ENTERPRISES	5,633	4700-5100	Riley, Benson	Big Injun, Speechley, Balltown, Bradford
07095011730000	WASHBURN LEUA ET AL	2	TRIAD HUNTER LLC	APPALACHIAN ENRG DEV	5,600	4547-5262	Riley, Benson, Alexander	Big Injun, Speechley, Balltown, Bradford
07095010190000	GATRELL HEIRS	J-742	ENERGY CORP OF AMER	J & J ENTERPRISES	5,295	4475-4878	Riley, Benson	Big Injun, Speechley, Balltown, Bradford
07095010200000	GATRELL ALBERT HEIRS	J-743	ENERGY CORP OF AMER	J & J ENTERPRISES	5,458	4511-4914	Gordon	Big Injun, Speechley, Balltown, Bradford, Riley
07095018680000	CAIN	9	ANTERO RESOURCES CORPORATION	IN COAST ENERGY E INC	5,560	4570-5297	Riley, Benson, Alexander	Big Injun, Speechley, Balltown, Bradford
07095014700000	PRATT AUSTIN E HEIRS ET AL	JK-1257	PRATT AUSTIN E HEIRS ET AL	EQT PRODUCTION CO	5,504	4610-5312	Riley, Alexander	Big Injun, Speechley, Balltown, Bradford
07095017700000	MOSSOR UNIT	1H	ANTERO RESOURCES CORPORATION	ANTERO RESOURCES CORPORATION	14,480	6818-14376	Marcellus	Big Injun, Speechley, Balltown, Bradford

RETURNED  
NOT ISSUED

WW-6A7  
(6-12)

OPERATOR: Antero Resources Corp. WELL NO: Horst Unit 1H

PAD NAME: Meredith Pad

REVIEWED BY: Karin Cox SIGNATURE: 

### WELL RESTRICTIONS CHECKLIST

#### HORIZONTAL 6A WELL

#### Well Restrictions

- At Least 100 Feet from Pad and LOD (including any E&S Control Feature) to any Perennial Stream, Lake, Pond, Reservoir or Wetland; OR
  - DEP Waiver and Permit Conditions
- At Least 300 Feet from Pad and LOD (including any E&S Control Feature) to any Naturally Producing Trout Stream; OR
  - DEP Waiver and Permit Conditions
- At Least 1000 Feet from Pad and LOD (including any E&S Control Feature) to any Groundwater Intake or Public Water Supply; OR
  - DEP Waiver and Permit Conditions
- At Least 250 Feet from an Existing Water Well or Developed Spring to Well Being Drilled; OR
  - Surface Owner Waiver and Recorded with County Clerk, OR
  - DEP Variance and Permit Conditions
- At Least 625 Feet from an Occupied Dwelling Structure to Center of the Pad; OR
  - Surface Owner Waiver and Recorded with County Clerk, OR
  - DEP Variance and Permit Conditions
- At Least 625 Feet from Agricultural Buildings Larger than 2500 Square Feet to the Center of the Pad; OR
  - Surface Owner Waiver and Recorded with County Clerk, OR
  - DEP Variance and Permit Conditions

**RETURNED  
NOT ISSUED**



**911 Address**  
**2002 Haymonds Ridge Rd.**  
**Pennsboro, WV 26415**

# **Well Site Safety Plan**

## **Antero Resources**

**Well Name: Horst Unit 1H-3H, Sterling 1H-4H and Sarahlene Unit 1H-4H**

**Pad Location: MEREDITH PAD**  
Tyler County/Centerville District

### **GPS Coordinates:**

**Entrance** - Lat 39°20'48.69"/Long -80°52'8.20" (NAD83)

**Pad Center** - Lat 39°20'54.69"/Long -80°52'12.70" (NAD83)

### **Driving Directions:**



From the intersection of I79 and HWY 50 through West Union. Head west on US-50 W for 28.7 miles. Turn right onto WV-18 N for 0.6 miles. Turn left onto Davis St/Old U.S. 50 W for 0.4 miles. Turn right onto WV-18N/Sistersville Pike for 12.2 miles. Turn left onto WV-74 S for 2.0 miles. Turn left onto Co Rd 74/1 for 0.8 miles. Turn left to stay on Co Rd 74/1 for 1.0 mile. The access road will be on the left.

### **Alternate Route:**

From the intersection of I79 and HWY 50 through Alma. Head west on US-50 W for 16.5 miles. Turn right onto WV-23 W for 27.0 miles. Turn left onto WV-18 S for 5.1 miles. Slight right onto WV-74 S for 2.0 miles. Turn left onto Co Rd 74/1 for 0.8 miles. Turn left to stay on Co Rd 74/1 for 1.0 mile. The access road will be on the left.

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



 		<b>WELL SITE SAFETY PLAN</b>	
<b>Owner:</b>	Health and Safety Director	<b>Document ID:</b>	HS-Well Site Safety Plan-C-V1.0
<b>Revision No.:</b>	V2.0	<b>Date of last revision:</b>	November 9, 2016
<b>Revision Status:</b>	Draft		

## Approval Sheet

The West Virginia Department of Environmental Protection Office of Oil and Gas has set forth minimum requirements for a Well Site Safety Plan which shall be submitted with each horizontal well application. A horizontal well shall be any well which meets the definition as provided for in Title 35, Series 8, Section 2.2 of the West Virginia Department of Environmental Protection Office of Oil and Gas.

Approved Safety Plans should be maintained and available at the drilling rig at all times and provided to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land.

The Safety Plan, once approved, may only be modified upon approval by the West Virginia Department of Environmental Protection Office of Oil and Gas ("Office").

This plan has met the requirements of the West Virginia Department of Environmental Protection Office of Oil and Gas Well Site Safety Plan Standards.

Approved this day \_\_\_\_\_ of month \_\_\_\_\_, 20\_\_ by

\_\_\_\_\_ Date: \_\_\_\_\_



<b>WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS</b>	<b>PAGE NUMBERS</b>
<b>1. Contacts, Schedules, and Meetings</b>	PG. 7-18
A. Method of notification of public of H2S gas presence and how access will be controlled.	PG 7-8
B. Emergency point of contact for the well operator covering all phases of activities and including 24 hour contact information	<u>Supplement A</u> PG. 9
C. List of telephone numbers for: <ul style="list-style-type: none"> <li>• Operator</li> <li>• Contractors</li> <li>• DEP office and oil/gas inspector</li> <li>• Local Emergency Response Units</li> <li>• Local ER personnel</li> </ul>	<u>Supplement A</u> PG. 9-13
<ul style="list-style-type: none"> <li>• All schools and public facilities within a one mile radius of proposed well site</li> </ul>	<u>PG 14</u> <u>Exhibit 3</u>
D. Pre-spud meeting held prior to drilling operations, including: <ul style="list-style-type: none"> <li>• Personnel to be employed and involved in the drilling operations</li> <li>• County oil and gas inspector or other designated Office of Oil and Gas representative</li> <li>• List of all persons involved in pre-spud meeting</li> </ul>	PG. 15
E. Describe schedule for conducting regular well site safety meetings. Log all attendance at all meeting and also initiate check in check out during drilling, completion, and work over phases.	<u>Supplement B &amp; C</u> PG. 16-17
<b>2. Maps and Diagrams</b>	PG. 18-23
A. Evacuation plan for the removal of personnel from the drilling location and residents in the surrounding area should the need arise	PG. 18
B. Plan view map of location, access road, pit(s), flare lines, nearby dwellings, note the north and prevailing wind direction	PG. 19-21 <u>Exhibit 1</u>
C. Topographic Map of well location including: <ul style="list-style-type: none"> <li>• 1 mile radius of well location</li> <li>• UTM NAD 83 Coordinates of well site entrance</li> <li>• UTM NAD 83 coordinate of the point the access road intersects the public route</li> <li>• Identify public route number and/or route name</li> </ul>	PG. 22-23 <u>Exhibit 2</u>
<b>3. Well Work</b>	PG. 24-42
A. Detailed written descriptions of well work and procedure to be used during the drilling, completion and production phases, including schematic plan views of each	PG. 24-42 <u>EXHIBITS 4 &amp; 5</u>
B. Statement detailing how a copy of the plan will be provided to the local emergency planning committee or county emergency services within at least 7 days from land disturbance or well work.	<u>PG. 43</u>

<b>WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS</b>	<b>PAGE NUMBERS</b>
<b>4. Chemical Inventory &amp; SDS</b>	PG. 44-46
A. Safety Data Sheets for all chemicals anticipated to be used in all aspects of the operation (can be provided on CD or USB drive)	PROVIDED ON CD
B. Statement that all SDS are to be readily available at the well site and their location indicated in the site safety plan including contact information for person(s) responsible maintaining them on site.	PG. 44
C. Inventory of all materials on site for mixing of mud including numbers and type of mixing units—mixed mud amount and weight, amount of weighting material and volume of mixing fluid	<u>Supplement D</u> PG. 45-46
<b>5. BOP Requirements and Well Control</b>	PG. 47-53
A. BOP equipment and casing heads with types, sizes and rating to be utilized and available during the drilling for both intermediate and lateral drilling phases	PG. 47-50
B. Procedure and schedule for testing the BOP stack for intermediate drilling phase the BOP tested upon initial set up and the annular tested to 70% of capacity and the ram preventers tested to 80%. Same testing % for the bottom and horizontal phase except testing to be done upon initial installation, weekly and after each bit trip.	PG. 51
C. BOP equipment and assembly installation schedule	PG. 51-52
D. List and names of all personnel with well control training	PG. 52
E. Description of system of maintaining detailed records of and for immediate notification to OOG inspector for all significant drilling issues, including but not limited to: <ul style="list-style-type: none"> <li>• Lost circulation</li> <li>• Hydrogen sulfide gas</li> <li>• Fluid entry</li> <li>• Abnormal pressures</li> </ul>	PG. 52
F. Notification of the oil and gas inspector or designated representative as soon as possible of any unusual drilling events, hydrogen sulfide gas or large kicks that occur during drilling	PG. 53
G. Schematic and detailed written description of the well head assembly to be placed on the well upon completion	PG. 53
<b>6. Well Killing Operations</b>	PG. 54-55
A. Method and type of kill procedures	PG. 54-55
<b>7. Hydrogen Sulfide Operations (H2S)</b>	PG. 56-57
A. Detection, monitoring and warning equipment including location of the monitoring detection equipment on the site	PG. 56
B. Statement of H2S personnel training provided	PG. 56
C. List of personal protective equipment (PPE) and the amount of each piece of PPE that will be maintained and available on site.	PG. 56

<b>WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS</b>	PAGE NUMBERS
D. Method to notify the OOG of H2S presence	PG. 56
E. Establish and maintain Protection Zones. Describe detailed written general procedures proposed in drilling phases.	PG. 57
<b>8. Well Flaring Operations</b>	PG. 58
A. Proposed written description and plan including schematic of installation for the duration of flaring activities.	PG. 58
<b>9. Collision Avoidance Safeguards, Practices and Standards Plan</b>	PG. 59-67
A. Established Definitions	PG. 59
B. Established descriptions of Risk	PG. 59
C. Plan Components	PG. 59-67 <u>EXHIBITS 6 &amp; 7</u>

# Site Specific Safety Plan

## Antero Resources

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### 1.0 Contacts, Schedules and Meetings

#### 1.1 Emergency Response Personnel

Requesting public emergency response assistance for this location would be accomplished by the Antero Representative via telephone to Local County Dispatch. From there, they will dispatch the appropriate and available emergency response agencies depending on the nature, location and extent of the emergency. Upon approval, Antero encourages anyone on the site to summon outside assistance as they deem necessary based on the emergency.

A list of Emergency Contacts, including Antero's 24 hour emergency contact telephone number, any contractors of the operator, the Department, the local oil and gas inspector, and local emergency response units are found in Supplement A. This list will be posted at the well site.

#### 1.2 Local Schools and Public Facilities

In the event of an emergency requiring the evacuation of schools and public facilities the Antero Representative will make the required notifications unless the local public emergency responders take on this responsibility. Generally, local emergency responders have stated that they will assume this responsibility. Exhibit 3 lists all schools and public facilities, with their contact information, within a one-mile radius of the horizontal well location.

#### 1.3 Method of Notification of Public

In an emergency which requires the notification of residents and emergency personnel that may be affected during drilling such as release of H<sub>2</sub>S, flaring, etc., the emergency response plan will be immediately implemented. This plan specifies the roles and responsibilities of on-site personnel in case of emergency and addresses emergency notification of potentially affected residents and public emergency response personnel.

In general under the situation presently described, after the activation of the emergency alarm, the on-site personnel will muster for a headcount by the On-Scene Incident Commander which is usually the Antero Representative. After initial assessment of the situation, the OSIC will notify the public emergency response agency from which direction will be taken. If the agency directs, on-site personnel will notify all local impacted residents of the incident by dispatching a worker by truck to each potentially affected residence. If the public emergency responder does not direct this notification to be made by the operator, then the public response agency will be

responsible for this notification. The local emergency responders have, in general, stated that emergency notification of local residents will be accomplished by their means including television and radio announcement as well as public address systems on patrol vehicles. Antero safety representatives who are located in the field may assist with the notification of local residents.

#### **1.4 Established Protection Zones**

Protection zones will be established and maintained based on the nature, extent and severity of the event. These protection zones will be based on those safe distances outlined in the applicable portions of the DOT Emergency Response Guidebook.

# SUPPLEMENT A

## EMERGENCY CONTACT LIST AND PHONE NUMBERS

Contact	Phone Number
<b><i>Designated Person and Incident Commander:</i></b>	
Joe Honeycutt – Drilling Manager Production Control Room Robert Krcek – Director of Midstream Operations Jon McEvers – Operations Manager	740-624-3873 Joe 304-842-4810 Control Room 304-641-1544 Robert 303-808-2423 Jon
<b><i>Antero Resources Emergency (24 Hour) Contact</i></b>	<b>1.800.878.1373</b>
<b><i>Designated Backup Person Response Coordinator:</i></b>	
Ben Lofthouse Steve Durment	304-960-0043 361-318-3235
<b>Drilling Engineers</b> Jola Switter Chad Daves Jonah Fryman	740-629-7279 304-871-1442 740-656-6397
<b>Drilling Rigs</b> Hall 3 Patterson 342 Patterson 343 Precision 525	713-758-0881 832-408-8282 832-531-7355 713-758-0730
Antero Resources Denver Office 1615 Wynkoop Street Denver, CO 80202	Office: 303.357.7310 Fax: 303.357.7315
<b>Senior Environmental Manager</b> Donald Gray	Direct: 303.357.6730 Cell: 303.408.9630 24hr
<b>Health &amp; Safety Director</b> Ronnie Roberts	Direct: 303.357.7174 Cell: 720.990.4399 24hr
<b>Emergency Response Coordinator – WV</b> Eli Waggoner	Direct: 304-842-4068 Cell: 304-476-9770



Contact	Phone Number
<b>Senior Vice President Production</b> Kevin Kilstrom	Direct: 303.357.7335 Cell: 303.808.0254 24hr
<b>Regional Senior Vice President</b> Al Schopp	Direct: 303.357.7325 Cell: 303.809.5522
<b>Vice President Health Safety &amp; Environment</b> Troy Roach	Direct: 303.357.7261 Cell: 713.449.5522
<b>Federal and State Agencies</b>	
National Response Center	(800) 424-8802
West Virginia Office of Water Resources' Emergency Notification Number, Oil Spill Response	1.800.642.3074
West Virginia Office of Oil and Gas Sam Ward, WVDEP – Harrison County Justin Snyder, WVDEP Inspector – Tyler County Mike Goff, WVDEP Inspector – Ritchie County Daniel Flack, WVDEP Inspector – Doddridge County	304.389.7583 cell Sam Ward 681.313.6995 cell Justin Snyder 304.549.9823 cell Mike Goff 304.545.0109 cell Daniel Flack
Environmental Protection Agency (EPA) Region 3	Phone: 215.814.3231 Fax: 215.814.3163
West Virginia Worker's Compensation	1-888-4WVCOMP 1.304.926.3400
West Virginia Fish and Wildlife Service, Field Office, Elkins, WV	<b>Phone:</b> 304.636.6586 <b>Fax:</b> 304.636.7824
US OSHA Charles Green	1-800-321-OSHA (1.800.321.6742) 304.347.5937
<b>Local Agencies and Responders</b>	
Sheriff/Police/Fire Department	<b>911</b>
Hospital- United Hospital Center--Clarksburg	304.624.2121
Harrison County Emergency and Dispatch Business Office	<b>911</b> 304.623.6559
Harrison County LEPC	304.624.9700 John Keeling

Contact	Phone Number
Doddridge County Emergency and Dispatch Business Office	<b>911</b> 304.873.3253
Doddridge County LEPC	304.782.2124 Roland W. Kniceley
Ritchie County Emergency and Dispatch Business Office	<b>911</b> 304.659.3770
Ritchie County LEPC	304.869.3231 Bill Bayless
Tyler County Emergency and Dispatch Business Office	<b>911</b> or 304.758.2911 304.758.4275
Tyler County LEPC	304.652.6932 Pat Walsh
WV Highway Patrol	304.782.2124 <a href="mailto:doddridgeoes@dishmail.net">doddridgeoes@dishmail.net</a>
Public Water Intakes (see Water Management Plan for add'l points)	to be determined
<b>Waste Removal</b>	
Stallion	330.760.4248
Waste Management	
<b>Contractors</b>	
Hall Drilling Services MT Hall	304.588.3368
<b>Cleanup Crews</b>	
Ryan Environmental	304.641.0244
Water Haulers	
Hall Drilling	304.483.8125
<b>Frac Tank Suppliers</b>	
Stallion	330.760.4248

Contact	Phone Number
Water Moving/Pumping	
TK Stanley	304.476.0396
Pumping Services—Kill Fluids	
Halliburton—Jane Lew	724.743.6601 Central Dispatch
Light Plants	254.434.1469 Hot Lights- Josh
Wolfpack	304.623.1199
BOPs	
Snubbing Services	Basic Energy- 724.825.2548 Bryan Berlison
Cudd Well Control	713.849.2769 Houston
Wild Well Control	281.353.5481
Roustabout Crews	740.473.1305 Hall Drilling Office 304.588.6474 Hall Drilling- Jack

### **WV Emergency Reporting**

In the event of a hazardous waste or hazardous material release or emergency, please contact:  
1-800-642-3074.

Additional Contact Information

**1-800-424-8802 National Response Center**

**1-304-558-5938 DEP Elkview Emergency Response Unit**

**Email Contacts:**

**Mike Dorsey [Mike.H.Dorsey@wv.gov](mailto:Mike.H.Dorsey@wv.gov)**

**Rusty Joins [Rusty.T.Joins@wv.gov](mailto:Rusty.T.Joins@wv.gov)**

# WHERE TO FIND HELP

## Tyler County:

Ambulance, Fire, Law Enforcement Emergencies **Call 911**  
 Poison Control Center....1-304-388-4211 or 1-800-222-1222  
 Emergency Alert System Radio WFBY-FM 106.5

<b>FIRE:</b>	
Tyler County Dispatch Center	304-758-4275
Tyler County Office of Emergency Service	304-758-5155
<b>EMS:</b>	
Ritchie County Ambulance Authority	304-643-2369
Ritchie County Office of Emergency Services	304-659-3334
<b>LAW ENFORCEMENT:</b>	
WV State Police, Paden City	304-455-0913
Tyler County Sheriff	304-758-4229
<b>OTHER IMPORTANT NUMBERS:</b>	
W.V. Dept. of Health & Human Resources	304-627-2295
National Response Center (Chemical, Oil Spills & Chemical/Biological Terrorism) (State Emergency Spill Notification)	1-800-424-8802
Allegheny Power	1-800-255-3443
WV State Fire Marshal ( Arson Hotline)	304-588-2191 1-800-233-3473
Dominion Hope Gas	1-800-688-4673

**MEREDITH PAD - EXHIBIT 3  
LIST OF ALL SCHOOLS & PUBLIC FACILITIES WITHIN A  
ONE- MILE RADIUS OF PROPOSED WELL SITE**

<b>Facility Name</b>	<b>Telephone Number</b>
**None identified within a 1-mile radius**	

## 1.5 Safety Meeting

Safety meetings will be conducted as follows:

- Pre-Drilling,
- Pre-Completion,
- Pre-Workover
- Post Accident/Near Miss, and
- As-Needed.

Safety meetings should be held on-site weekly, at a minimum, prior to the beginning of operations, and:

- Includes personnel employed and involved in the operations, and
- Includes the District Oil and Gas Inspector (or other designated Office of Oil and Gas representative, for the pre-spud meeting only).

Typically, contractor of the operator will conduct these safety meetings with Antero Resources personnel participating as needed. Please list the above personnel as a record of attendance using the form found in Supplement B, or one similar. These records may be maintained separate from this plan.

## 1.6 Personnel and Visitor Log

This log is intended to provide a current headcount of all persons present at the site at any given time. All personnel and visitors must sign in upon entering the site and sign out upon departure. This log, or one similar, is provided in Supplement C and will be maintained at all times by the Antero Representative or his designate.

# SUPPLEMENT B

Safety Meeting Log, Personnel and Visitor Log & Emergency Contacts

## Safety Meeting Log

Date: \_\_\_\_\_ Location(Pad): \_\_\_\_\_ Well Name: \_\_\_\_\_

	<u>Name</u>	<u>Organization</u>	<u>Job Title</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____
11.	_____	_____	_____
12.	_____	_____	_____
13.	_____	_____	_____
14.	_____	_____	_____
15.	_____	_____	_____
16.	_____	_____	_____
18.	_____	_____	_____
19.	_____	_____	_____
20.	_____	_____	_____
21.	_____	_____	_____
22.	_____	_____	_____
23.	_____	_____	_____
24.	_____	_____	_____
25.	_____	_____	_____





# Site Specific Safety Plan

## Antero Resources

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### 2.0 Maps and Diagrams

#### 2.1 Plan View Map

Exhibit 1 provides a plan view map showing the well location, access road, pits, flare lines, dwellings, and noting the north and prevailing wind directions.

#### 2.2 Topographic Map

Exhibit 2 shown on also provides an area topographical map showing the well site location

#### 2.3 Evacuation Plan

The Antero Representative will establish a muster point at which all persons on site will assemble for personnel safety and verification of headcount. This point will be located at the entrance to the site. Alternative muster points may be established based on the hazards and operational needs.

In the event of an emergency requiring the evacuation of personnel, an audible or visual alarm will be sounded. The Antero Representative will determine if local residents should be evacuated at this time depending on the outcome of his assessment of the situation.

If local resident evacuation is indicated, the Antero Representative will be responsible for notifying the local impacted residents, or the local authorities will take this responsibility depending on the urgency, availability and direction of the local authorities. Local authorities have indicated that they will take this responsibility typically and will notify of evacuation mandates via television and radio media announcements in addition to public address units on patrol vehicles. In the event that Antero is directed to take this responsibility, notification will be by dispatching a worker to each affected residence to inform them of evacuation requirements and procedures. See section 8.1 for additional information.

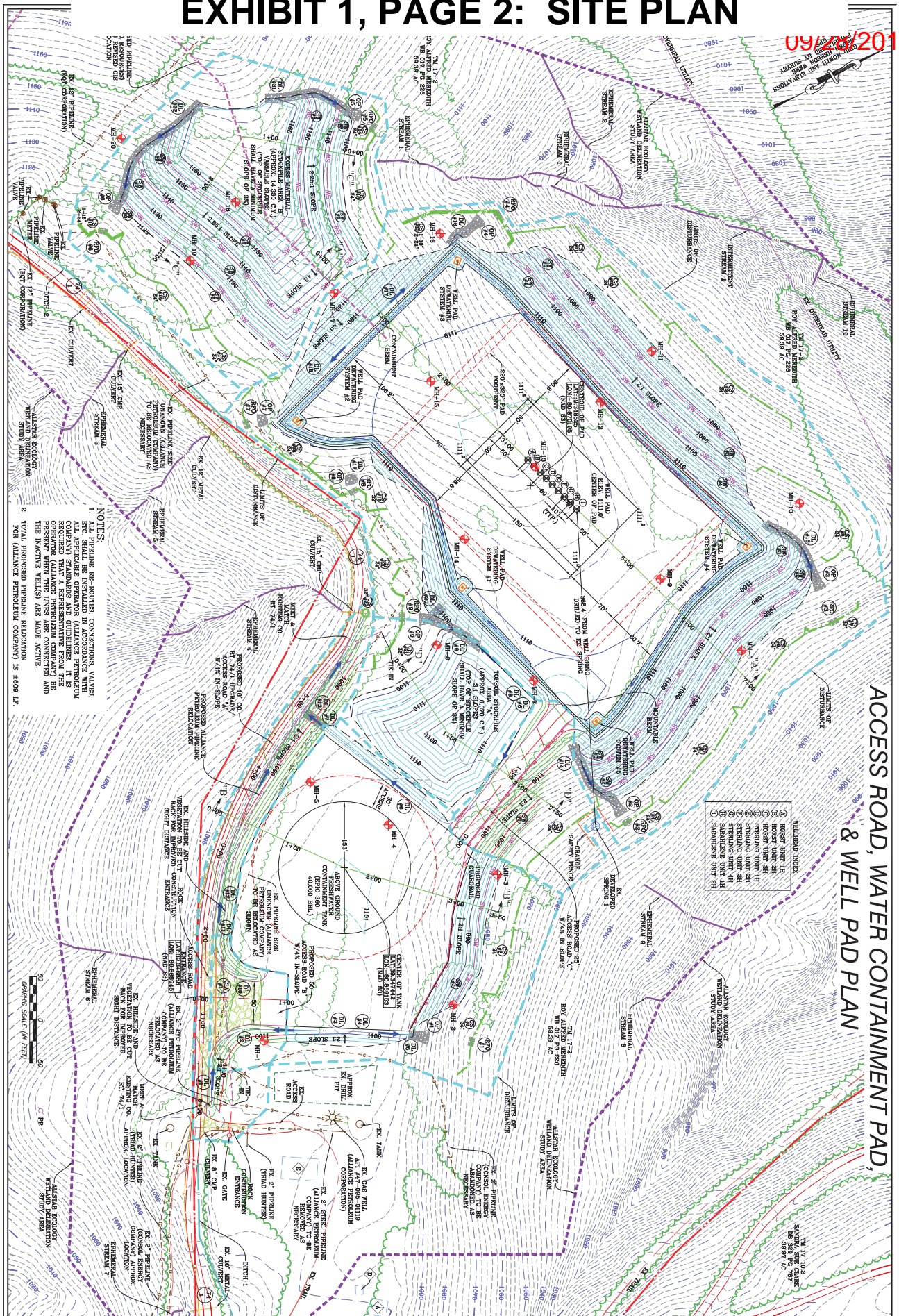
Evacuated local residents may be temporarily housed in local hotels depending on the severity and duration of the emergency. Included in Exhibits 1 & 2 are maps and drawings that may assist in the emergency response and evacuation process.

The Antero Representative will secure the Personnel and Visitor log before evacuating the site in order to perform a headcount at the muster point.



# EXHIBIT 1, PAGE 2: SITE PLAN

09/26/2018



**NOTES:**  
 1. ALL PERMITS OR ROUTES CONNECTIONS VARIATIONS SHALL BE APPROVED BY THE LOCAL HEALTH DEPARTMENT AND ALL APPLICABLE OPERATOR (ALIGNANCE PERMITS) COMPANY STANDARDS AND GUIDELINES. IT IS THE RESPONSIBILITY OF THE OPERATOR TO OBTAIN ALL NECESSARY PERMITS AND APPROVALS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS PRIOR TO CONSTRUCTION.  
 2. TOTAL PROPOSED PERMITS RELOCATION IS 4009 LF.

- ① ROCKET LAUNCH PAD
- ② ROCKET LAUNCH PAD
- ③ ROCKET LAUNCH PAD
- ④ ROCKET LAUNCH PAD
- ⑤ ROCKET LAUNCH PAD
- ⑥ ROCKET LAUNCH PAD
- ⑦ ROCKET LAUNCH PAD
- ⑧ ROCKET LAUNCH PAD
- ⑨ ROCKET LAUNCH PAD
- ⑩ ROCKET LAUNCH PAD

ACCESS ROAD, WATER CONTAINMENT PAD, & WELL PAD PLAN




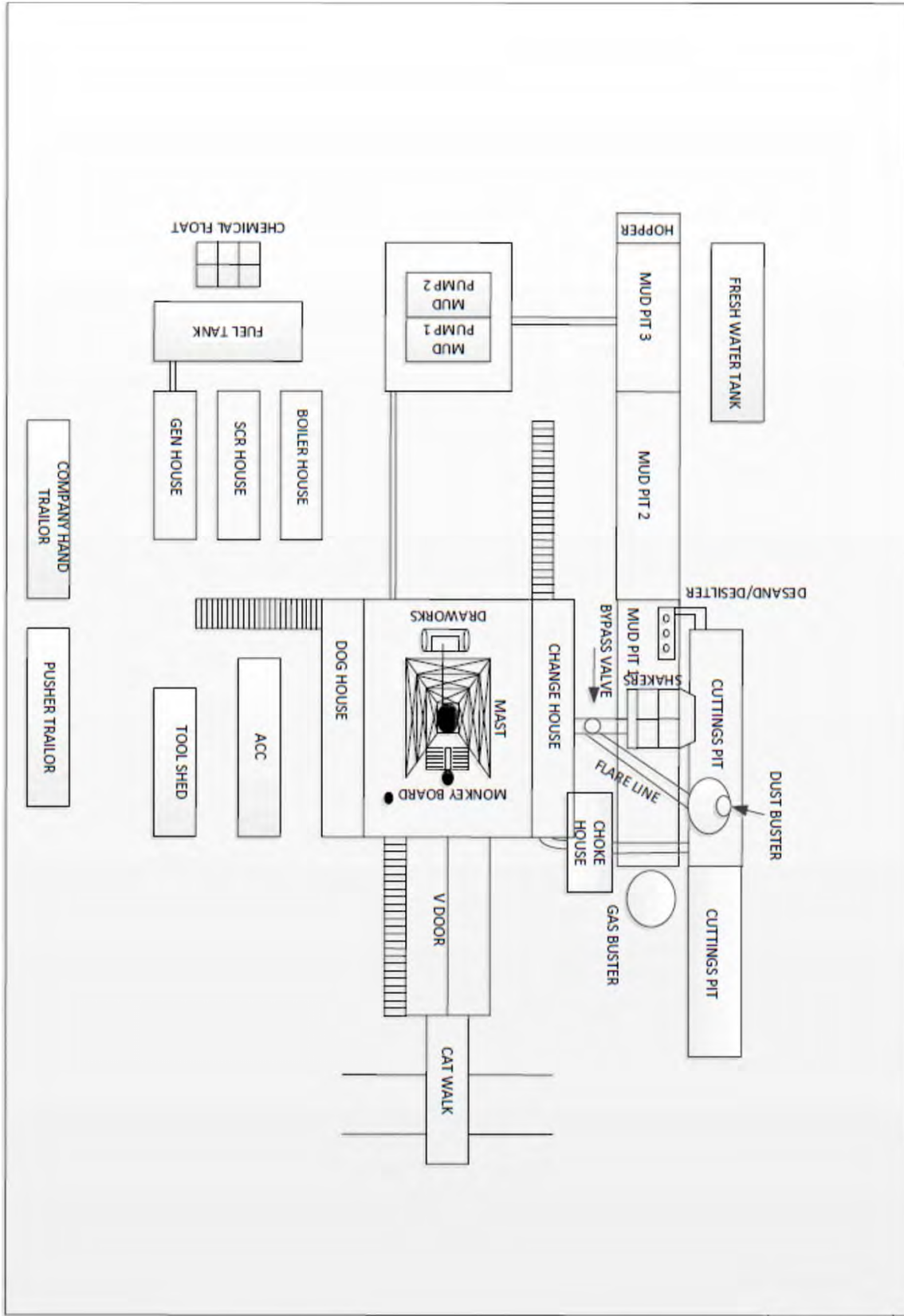
	ACCESS ROAD, WATER CONTAINMENT PAD, & WELL PAD PLAN <b>MEREDITH</b> WELL PAD & WATER CONTAINMENT PAD CENTERVILLE DISTRICT TYLER COUNTY, WEST VIRGINIA	 THIS PERMIT IS FOR THE USE OF THE WELL PADS ONLY. ALL OTHER RESOURCES ARE THE PROPERTY OF NAVITUS ENERGY ENGINEERING.	DATE: 01/17/2017 REVISION: REVISED FOR CONSTRUCTION
			DATE: 02/26/2017 REVISION: REVISED STOCKPILE "B" DATE: 02/20/2017 REVISION: REVISED PAD CONTAINMENT BERM DETAIL
SCALE: 1" = 50' SHEET: 9 OF 24	DATE: 05/23/2016	 NAVITUS ENERGY ENGINEERING Telephone: (888) 662-1155   www.NavitusEng.com	

EXHIBIT 1, PAGE 3:

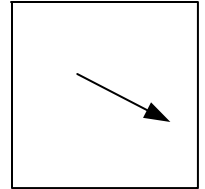
DRILLING LAYOUT, FLARE LINES & PREVAILING WINDS

09/28/2018

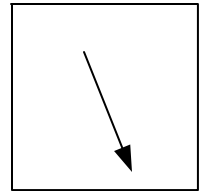
MEREDITH PAD  
RIG LAYOUT



NORTH

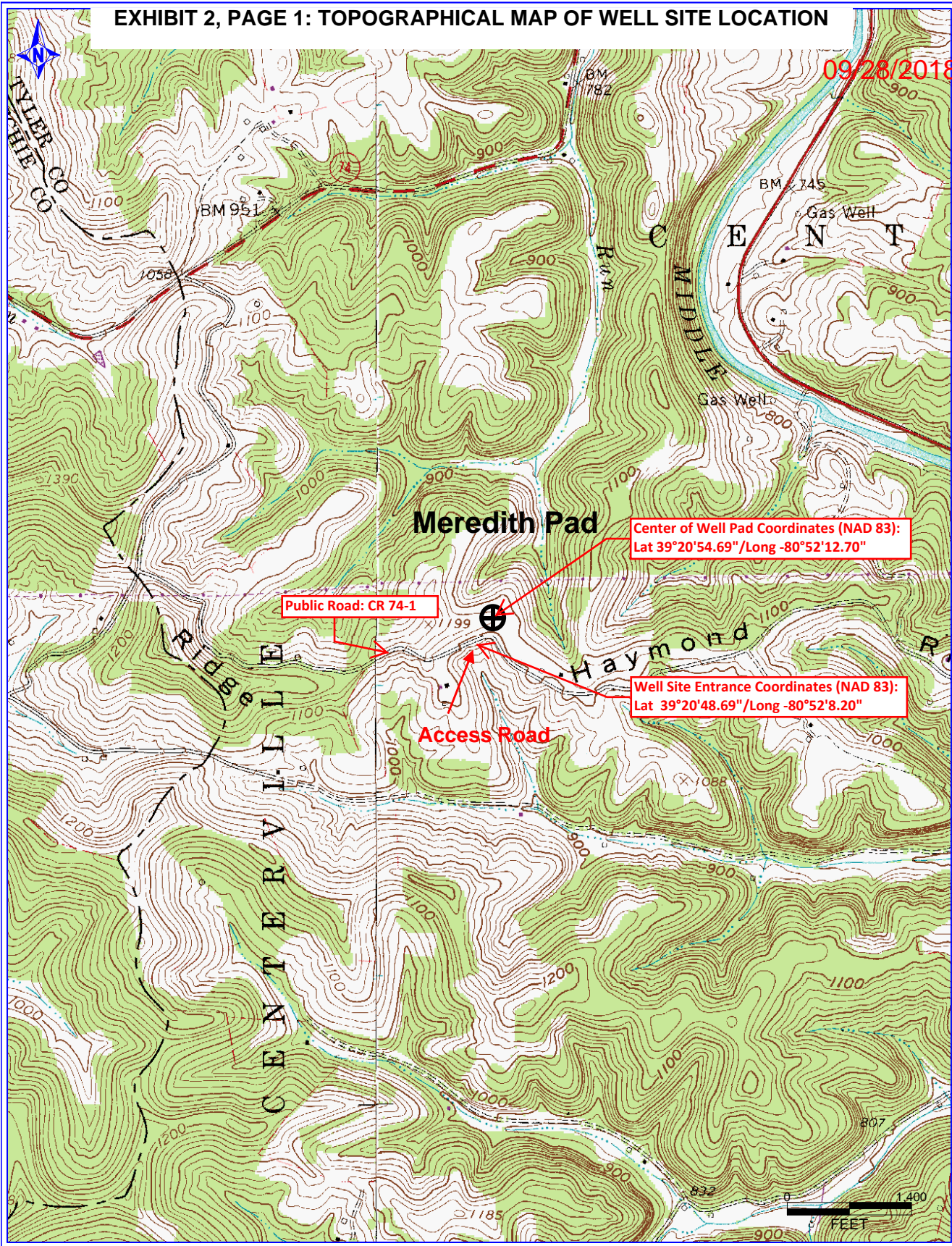


PREVAILING WIND  
DIRECTION NNE



ACCESS ROAD

09/28/2018



# Antero Resources Corporation

Appalachian Basin

Meredith Pad

Tyler County

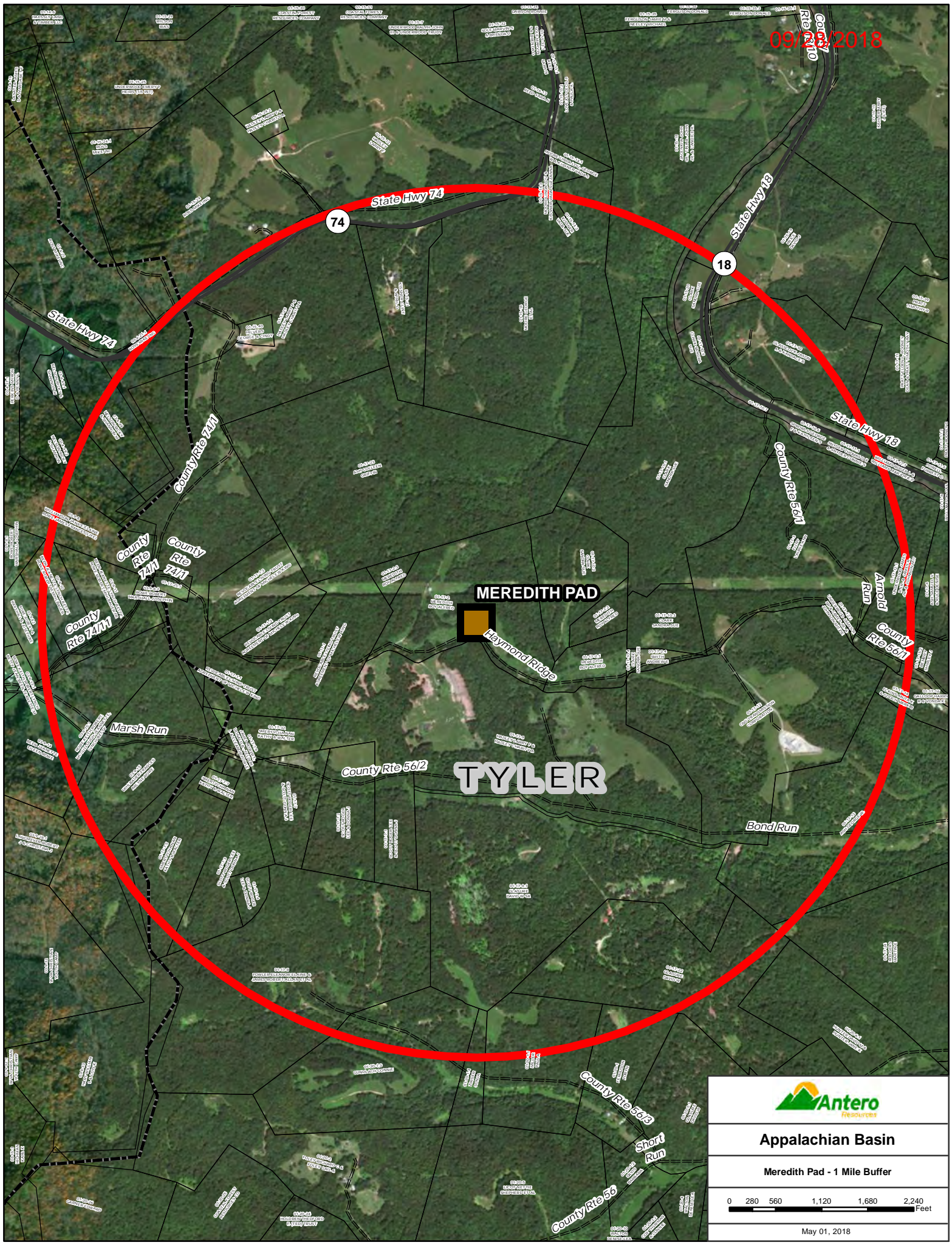
Quadrangle: West Union


Watershed: Middle Island Creek

District: Centerville

Date: 3-15-2017

09/21/2018



  
**Appalachian Basin**  
 Meredith Pad - 1 Mile Buffer

0    280    560    1,120    1,680    2,240  
 Feet

May 01, 2018

# Site Specific Safety Plan

## Antero Resources

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### 3.0 Well Work

#### 3.1 Written Description of Well Work and Schematic

Antero plans to drill, perforate, fracture multiple horizontal shallow wells and complete the Marcellus Shale. A schematic plan view is attached to this plan in Exhibit 5.

#### 3.2 Geologic Prognosis

A list of anticipated freshwater, saltwater, oil and gas, hydrogen sulfide, thief zones, and high pressure and high volume zones, including their expected depth are attached to this plan in Exhibit 4, WW-6B.

#### 3.3 Casing and Cementing Program

Exhibit 4 shows the detailed casing and cementing program, which meets the standards of the American Petroleum Institute (API) and employs a minimum of three strings of casing which are of sufficient weight, quantity and quality for the anticipated conditions to be encountered. This casing and cementing program is designed to maintain well control and integrity. The casing setting depths are sufficient to cover and seal off those zones as identified in Exhibit 4.

#### 3.4 Plan Provided to Local or County Emergency Services

Approved Safety Plans should be maintained and available at the drilling rig at all times and provided to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land.

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Horst Unit 1H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'

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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19300' MD

11) Proposed Horizontal Leg Length: 9362'

12) Approximate Fresh Water Strata Depths: 349', 447', 463'

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

14) Approximate Saltwater Depths: 604', 1521', 1567'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_



18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	513	513	CTS, 713 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19300	19300	CTS, 4899 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-HIPOZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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.

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Horst Unit 2H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'

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

Other \_\_\_\_\_

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

Horizontal X

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18400' MD

11) Proposed Horizontal Leg Length: 9155'

12) Approximate Fresh Water Strata Depths: 349', 447', 463'

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

14) Approximate Saltwater Depths: 604', 1521', 1567'

15) Approximate Coal Seam Depths: 63', 1239'

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

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

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

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	513	513	CTS, 713 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	18400	18400	CTS, 4652 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-HIPOZ & Tail ~ H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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.

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

- 1) Well Operator: Antero Resources Corporation 494507062 095 - Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle
- 2) Operator's Well Number: Horst Unit 3H Well Pad Name: Meredith Pad
- 3) Farm Name/Surface Owner: Roy A. Meredith Public Road Access: CR 74/1
- 4) Elevation, current ground: 1117' Elevation, proposed post-construction: ~1114'
- 5) Well Type (a) Gas  Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_  
(b) If Gas Shallow  Deep \_\_\_\_\_  
Horizontal
- 6) Existing Pad: Yes or No No
- 7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 6900' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#
- 8) Proposed Total Vertical Depth: 6900' TVD
- 9) Formation at Total Vertical Depth: Marcellus
- 10) Proposed Total Measured Depth: 17200' MD
- 11) Proposed Horizontal Leg Length: 9113'
- 12) Approximate Fresh Water Strata Depths: 349', 447', 463'
- 13) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations.
- 14) Approximate Saltwater Depths: 604', 1521', 1567'
- 15) Approximate Coal Seam Depths: 63', 1239'
- 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: \_\_\_\_\_

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
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#	513 *see #19	513 *see #19	CTS, 713 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#	17200	17200	4322 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
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-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 27.69 Acres

22) Area to be disturbed for well pad only, less access road (acres): 7.09 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.



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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Sarahlene Unit 1H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'

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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 16800' MD

11) Proposed Horizontal Leg Length: 9006'

12) Approximate Fresh Water Strata Depths: 349', 447', 463'

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

14) Approximate Saltwater Depths: 604', 1521', 1567'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	513	513	CTS, 713 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	16800	16800	CTS, 4212 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-HIPOZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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.

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Sarahlene Unit 2H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'

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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 16600' MD

11) Proposed Horizontal Leg Length: 8947'

12) Approximate Fresh Water Strata Depths: 349', 447', 463'

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

14) Approximate Saltwater Depths: 604', 1521', 1567'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	513	513	CTS, 713 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	16600	16600	CTS, 16600 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-HIPOZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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.

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Sterling Unit 1H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: ~1114'

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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 20500' MD

11) Proposed Horizontal Leg Length: 10693'

12) Approximate Fresh Water Strata Depths: 349', 447', 463'

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

14) Approximate Saltwater Depths: 604', 1521', 1567'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	330	330	CTS, 458 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	20500	20500	CTS, 5229 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-HIPOZ & Tail ~ H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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



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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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.

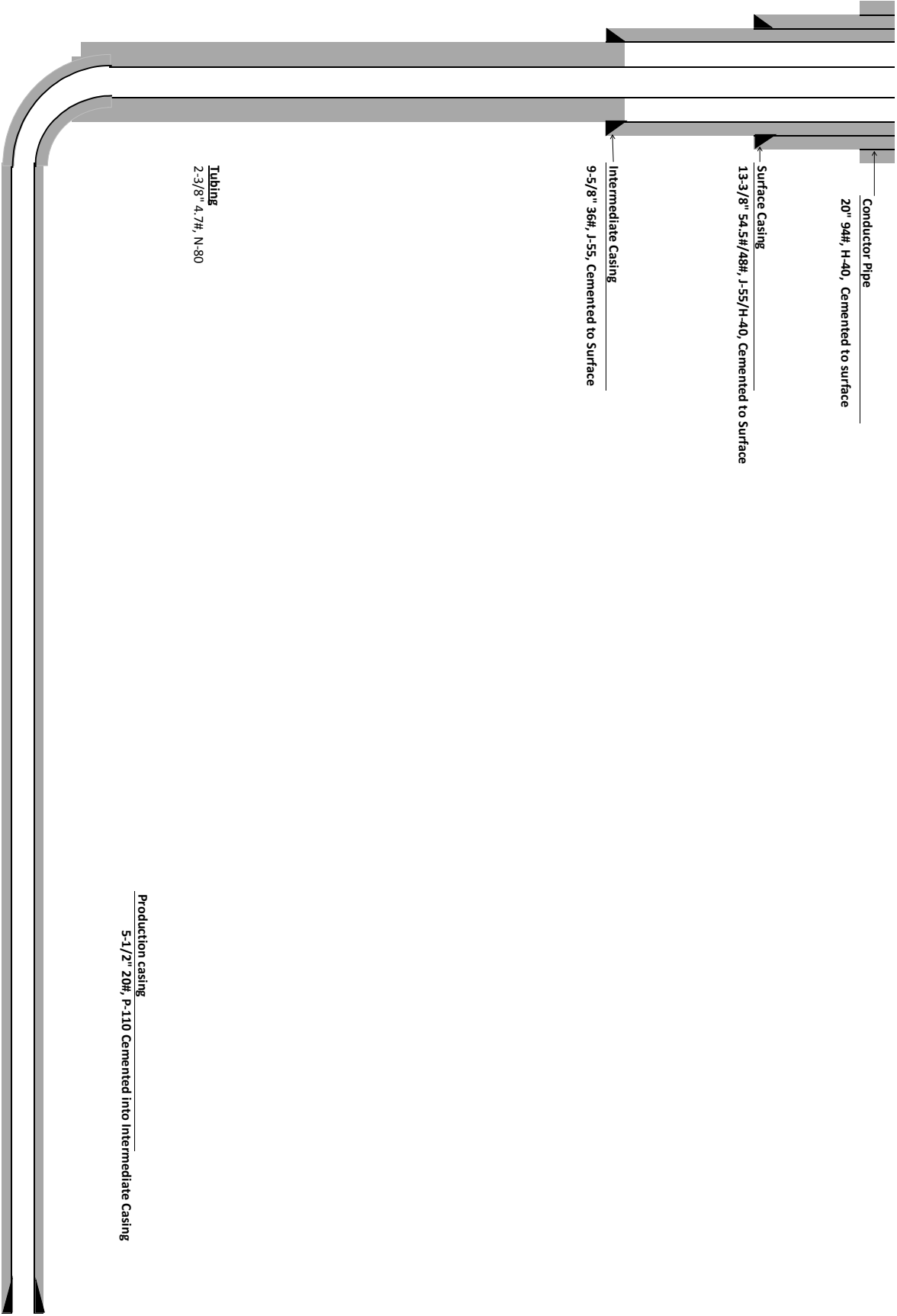
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

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.

# EXHIBIT 5: WELLBORE SCHEMATIC

09/28/2018



# Site Specific Safety Plan

## Antero Resources

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### 4.0 Chemical Inventory & SDS

#### 4.1 Safety Data Sheets

The Drilling Supervisor or Contractor of the Operator will maintain Data Safety Sheets (SDS) for all materials and chemicals used on the well site. The SDS sheets should be located in the Company Representatives Office on-site. Copies of the SDS sheets may also be obtained from the area Safety Representative, the operator contact for maintaining SDSs, by calling the local Antero Resource Office at 304-842-4100 for West Virginia or 740-760-1000 for Ohio. See Supplement D for a list of hazardous chemicals used during phases of operation.

As requested by the Office of Oil & Gas, copies of SDS have been provided on a CD submitted with each individual well work permit application.

# SUPPLEMENT D

## Anticipated List of Hazardous Chemicals used during Phases of Operation:

<u>Chemical Name</u>	<u>Daily Qty. on Location</u>	<u>Storage Container</u>
	<b><u>Construction</u></b>	
Diesel Fuel Oil	2000 Gallons	Double Walled Tank
	<b><u>Drilling</u></b>	
Airfoam HD	275 gallons	Drum
Aluminum Stearate	150 lbs.	Bag
Caustic Soda	1500 lbs.	Bag
Chek-Loss	1250 lbs.	Bag
Claytrol	440 gallons	Drum
Conqor 404	55 gallons	Drum
Diesel Fuel Oil	8000 gallons	Double Walled Tank
Gear Oil	250 gallons	Double Walled Tank
Hydraulic Fluid	250 gallons	Double Walled Tank
LD-9	100 gallons	Bucket
Mil-Bar	80000 lbs.	Super Sack
Mil-Bar 410	10000 lbs.	Bag
Mil-Carb	5000 lbs.	Bag
Mil-Carb 150	2500 lbs.	Bag
Mil-Graphite	5000 lbs.	Bag
Mil-Lime	10000 lbs.	Bag
Mil-Lube	220 gallons	Drum
Milmica	2500 lbs.	Bag
Mil-Pac LV	2500 lbs.	Bag
Mil-Pac LV Plus	2500 lbs.	Bag
Mil-Pac R	2500 lbs.	Bag
Mil-Plug (Pecan Shells)	5000 lbs.	Bag
Mil-Seal	5000 lbs.	Bag
Mil-Sorb	5000 lbs.	Bag
Milstarch	10000 lbs.	Bag
New-Drill	160 gallons	Bucket
Potassium Chloride	15000 lbs.	Bag
Perma-Lose HT	10000 lbs.	Bag
Soda Ash	1000 lbs.	Bag
Sodium Chloride	30000 lbs.	Bag
SWF (Salt Water Foamer)	265 gallons	Drum
Walnut Shells	2500 lbs.	Bag
W.O. Defoam	160 gallons	Bucket
Xan-Plex D	1200 lbs.	Bag
X-Cide 102	160 gallons	Bucket
	<b><u>Completions</u></b>	
AI-300 (Corrosion Inhibitor)	1 gallon	Tote
AP-One	25 lbs	Tote
Bio Clear	22 gallons	Tote

Frac Sand	174,450 lbs	Sand Truck
LGC-15	137 gallons	Tote
Mineral Oil Flush	10 gallons	Tote
Off Road Diesel	8000 gallons	Fuel Truck
SI-1000 (Scale Inhibitor)	34 gallons	Tote
WFRA-405	184 gallons	Tote
09-HCI All Grades	500 gallons	Acid Tanker
<b><u>Service/Work over</u></b>		
Antifreeze (NAPA)	2 gallons	Jug
Antifreeze/Coolant (Prestone)	30 gallons	Jug
Conoco Honey Oil	11000 gallons	Drum
DEF Fluid	75 gallons	Jug
Detcord	360 feet	Spool
Detonators	180 each	Box
Diesel	7200 gallons	Aux Tank
Diesel	290 gallons	Tanks
Dry Moly	60 oz.	Can
FR-1205(Pipe on Pipe)	270	Tote
FR-1405 (Gel Sweep)	270	Tote
FR-1400(Gel Sweep/Friction Reducer)	540	Tote
Lithium Grease	8 oz.	Can
LOCTITE	12 oz.	Tube
Lubriplate	72 oz.	Tube
Motor Oil 15w-40	5 gallons	Jug
Premium Hydraulic Oil	30 gallons	Bucket
Power Charge Ignitors	180 each	Box
Power Charge Cartridges	20 each	Box
Shaped Charge	1200 each	Box
Transmission fluid	20 gallons	Bucket
WD-40	36 oz.	Can
ZEP 45	25 gallons	Jug
ZEP Brake Flush	25 gallons	Jug
ZEP Dry Molly	10 gallons	Jug
ZEP REDI-GREASE	16 oz.	Tube
<b><u>Reclamation</u></b>		
Diesel Fuel Oil	2000 gallons	Double Walled Bulk Tank

**Note:** The attached list represents anticipated materials used for planned operations on the well site. In the event of an unplanned event on the well site, additional materials may be required. Additional SDS for any unplanned events will be maintained on the well site in accordance with OSHA CFR 1910.1200 standards.

The Drilling Supervisor or Contractor of the Operator will maintain Safety Data Sheets (SDS) for all materials and chemicals used on the well site in accordance with OSHA CFR 1910.1200 standards. The SDS should be located in the Company Representative's Office on-site. Copies of the SDS may also be obtained from the area Safety Coordinator, the operator contact for maintaining SDS, by calling the local Antero Resource Office at 304-842-4100 or 800-878-1373.

# Site Specific Safety Plan

## Antero Resources

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### 5.0 BOP Requirements and Well Control

#### 5.1 BOP Equipment

The following is a list of all BOP equipment with types, sizes and ratings to be utilized and available during the drilling, completion and work-over of the well.

5M system:

- Annular preventer\*
- Pipe ram, blind ram, and, if conditions warrant, as specified by the authorized officer, another pipe ram shall also be required\*
- A second pipe ram preventer shall be used with a tapered drill string
- Drilling spool, or blowout preventer with 2 side outlets (choke side shall be a 3-inch minimum diameter, kill side shall be at least 2-inch diameter)\*
- 3 inch diameter choke line
- 2 choke line valves (3 inch minimum)\*
- Kill line (2 inch minimum)
- 2 chokes with 1 remotely controlled from rig floor
- 2 kill line valves and a check valve (2 inch minimum)\*
- Upper kelly cock valve with handle available
- When the expected pressures approach working pressure of the system, 1 remote kill line tested to stack pressure (which shall run to the outer edge of the substructure and be unobstructed)
- Lower kelly cock valve with handle available
- Safety valve(s) and subs to fit all drill string connections in use
- Inside BOP or float sub available
- Pressure gauge on choke manifold
- All BOPE connections subjected to well pressure shall be flanged, welded, or clamped\*

- Fill-up line above the uppermost preventer.

If repair or replacement of the BOPE is required after testing, this work shall be performed prior to drilling out the casing shoe.

When the BOPE cannot function to secure the hole, the hole shall be secured using cement, retrievable packer or a bridge plug packer, bridge plug, or other acceptable approved method to assure safe well conditions.

Minimum standards for choke manifold equipment.

- i. All choke lines shall be straight lines unless turns use tee blocks or are targeted
- ii. Running tees, and shall be anchored to prevent whip and reduce vibration.
- iii. ii. Choke manifold equipment configuration shall be functionally equivalent to the appropriate example diagram shown in Supplement E. The actual configuration of the chokes may vary.

All valves (except chokes) in the kill line choke manifold, and choke line shall be a type that does not restrict the flow (full opening) and that allows a straight through flow).

Pressure gauges in the well control system shall be a type designed for drilling fluid service

5M and higher system accumulator shall have sufficient capacity to open the hydraulically-controlled gate valve (if so equipped) and close all rams plus the annular preventer (for 3 ram systems add a 50 percent safety factor to compensate for any fluid loss in the control system or preventers) and retain a minimum pressure of 200 psi above precharge on the closing manifold without use of the closing unit pumps. The fluid reservoir capacity shall be double the usable fluid volume of the accumulator system capacity and the fluid level of the reservoir shall be maintained at the manufacturer's recommendations. Two independent sources of power shall be available for powering the closing unit pumps. Sufficient nitrogen bottles are suitable as a backup power source only, and shall be recharged when the pressure falls below manufacturer's specifications.

Accumulator Pre-charge Pressure Test

This test shall be conducted prior to connecting the closing unit to the BOP stack and at least once every 6 months. The accumulator pressure shall be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limit specified below (only nitrogen gas may be used to pre-charge):

### Power Availability

Power for the closing unit pumps shall be available to the unit at all times so that the pumps shall automatically start when the closing valve manifold pressure has decreased to the pre-set level.

### Accumulator Pump Capacity

Each BOP closing unit shall be equipped with sufficient number and sizes of pumps so that, with the accumulator system isolated from service, the pumps shall be capable of opening the hydraulically-operated gate valve (if so equipped), plus closing the annular preventer on the smallest size drill pipe to be used within 2 minutes, and obtain a minimum of 200 psi above specified accumulator pre-charge pressure.

### Locking Devices

A manual locking device (i.e., hand wheels) or automatic locking devices shall be installed on all systems of 2M or greater. A valve shall be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative.

### Remote Controls

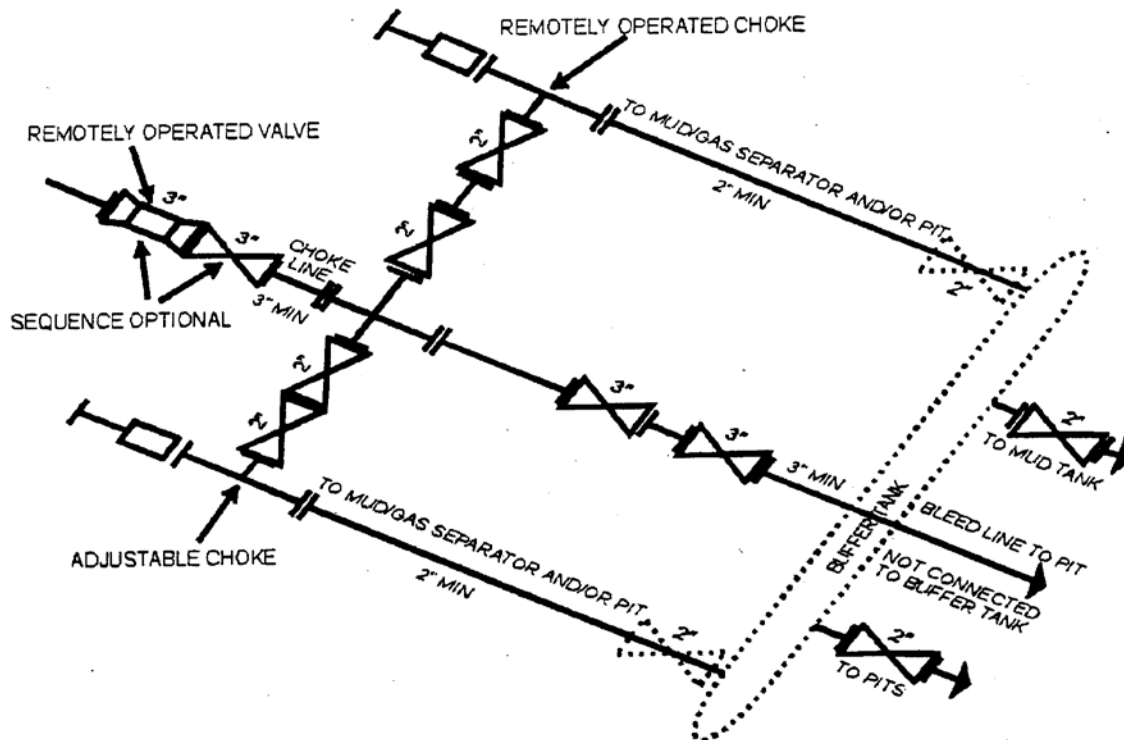
<b>Accumulator working pressure rating</b>	<b>Minimum acceptable operating pressure</b>	<b>Desired precharge pressure</b>	<b>Maximum acceptable precharge pressure</b>	<b>Minimum acceptable precharge pressure</b>
1,500 psi	1,500 psi	750 psi	800 psi	700 psi
2,000 psi	2,000 psi	1,000 psi	1,100 psi	900 psi
3,000 psi	3,000 psi	1,000 psi	1,100 psi	900 psi

Remote controls shall be readily accessible to the driller. Remote controls for all 3M or greater systems shall be capable of closing all preventers. Remote controls for 5M or greater systems shall be capable of both opening and closing all preventers. Master controls shall be at the accumulator and shall be capable of opening and closing all preventers and the choke line valve (if so equipped). No remote control for a 2M system is required.



# SUPPLEMENT E

## Choke Manifold Schematic



### 5M CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY

Although not required for any of the choke manifold systems, buffer tanks are sometimes installed downstream of the choke assemblies for the purpose of manifolding the bleed lines together. When buffer tanks are employed, valves shall be installed upstream to isolate a failure or malfunction without interrupting flow control. Though not shown on 2M, 3M, 10M, OR 15M drawings, it would also be applicable to those situations.

[54 FR 39528, Sept. 27, 1989]

## 5.2 Procedure and Schedule for Testing BOP Equipment

### Well Control Equipment Testing

- i. Perform all tests described below using clear water or an air.
- ii. Ram type preventers and associated equipment shall be tested to an approved stack working pressure if isolated by test plug or to 80 percent of internal yield pressure of casing if BOP stack is not isolated from casing. Pressure shall be maintained for at least 10 minutes or until requirements of test are met, whichever is longer. If a test plug is utilized, no bleed-off of pressure is acceptable. For a test not utilizing a test plug, if a decline in pressure of more than 10 percent in 30 minutes occurs, the test shall be considered to have failed. Valve on casing head below test plug shall be open during test of BOP stack.
- iii. Annular type preventers shall be tested to 70 percent of rated working pressure. Pressure shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer.
- iv. As a minimum, the above test shall be performed:
  - a. when initially installed:
  - b. whenever any seal subject to test pressure is broken:
  - c. following related repairs: and
  - d. 30-day intervals.
- v. Valves shall be tested from working pressure side during BOPE tests with all downstream valves open.
- vi. When testing the kill line valve(s), the check valve shall be held open or the ball removed.
- vii. Annular preventers shall be functionally operated at least weekly.
- viii. Pipe and blind rams shall be activated each trip, however, this function need not be performed more than once a day.
- ix. A BOPE pit level drill shall be conducted weekly for each drilling crew.
- x. Pressure tests shall apply to all related well control equipment.
- xi. All of the above described tests and/or drills shall be recorded in the drilling log.
- xii. For intermediate wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation.
- xiii. For the bottom and horizontal wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation, weekly, and after each bit trip.

## 5.3 BOP Installation Schedule

The BOP will be installed after running surface casing as well as after running intermediate casing. BOP equipment shall be installed on the innermost string of casing after the surface casing.

## 5.4 Well Control Training

All Drilling Supervisors, Completion Supervisors, Antero Representatives and Toolpushers used on this well will be IADC Well Control trained and certified. A trained person will be present during the drilling and completion operations. Training certificates will be available for review on the location. The list of personnel with said training is provided below

### List of Well Control Trained Personnel

1. Joe Honeycutt - Antero
2. Ben Lofthouse – Antero
3. Steve Durment – Antero
4. Jeremiah Mercer – Consultant Drilling Supervisor
5. Chad May – Consultant Drilling Supervisor
6. Jim Childress – Consultant Drilling Supervisor
7. Justin Miller – Consultant Drilling Supervisor
8. Rick Mortimer – Consultant Drilling Supervisor
9. Matt Manderfeld – Consultant Drilling Supervisor
10. James Washburn – Consultant Drilling Supervisor
11. Ralph Ybarra – Consultant Drilling Supervisor
12. Rosendo Perez – Consultant Drilling Supervisor
13. Josh Allred – Consultant Drilling Supervisor
14. Jerry Holfeltz – Consultant Drilling Supervisor
15. Regan Johnson – Consultant Drilling Supervisor
16. Karlos Argo – Consultant Drilling Supervisor
17. Jake Switter – Consultant Drilling Supervisor
18. Hayes Lajeunse – Consultant Drilling Supervisor
19. Frank Doherty – Consultant Drilling Supervisor
20. Chad Daves – Antero
21. Jonah Fryman – Antero

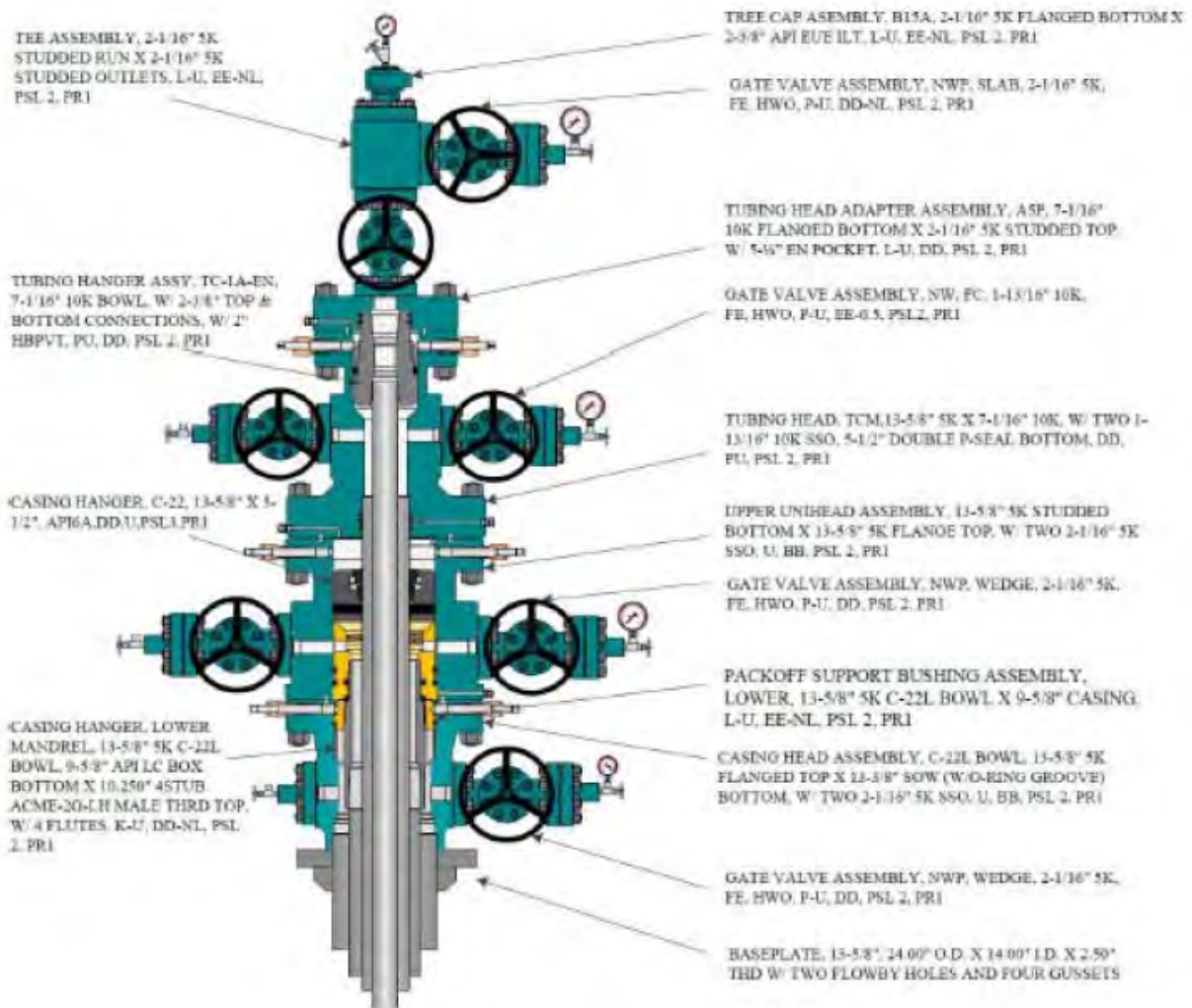
## 5.5 Drilling Record

The Drilling Supervisor will maintain detailed records of significant drilling events such as lost circulation, hydrogen sulfide gas, fluid entry, kicks and abnormal pressures through the electronic data entry and recording system, Wellview. This system allows the Drilling Supervisor to enter daily reports containing the specified information. The records are then retained electronically at Antero Resources' Main Office in Denver, CO.

## 5.6 Notification

The Emergency Response Plan for this operating area requires the Drilling Supervisor to notify the county oil and gas inspector or the designated Office of Oil and Gas representative any unusual drilling events such as hydrogen sulfide gas or significant kicks that occur during drilling operations. Any encounter of hydrogen sulfide gas requires immediate notification of the Office of Oil and Gas.

## 5.7 Schematic and Description of the Wellhead Assembly



# Site Specific Safety Plan

## Antero Resources

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### 6.0 Well Killing Operations

#### 6.1 Mud Mixing Inventory

The following shows the inventory of all materials that will be on-site for the mixing of mud:

- 20 sack of Soda Ash
- 480 sacks of KCL
- 200 sacks of Biolose
- 40 sack of Xan-Plex
- 20 buckets of X-Cide 102
- 3 Drums of KD-40
- 5 Buckets of LD-S
- 15 super sack of MIL Bar
- 100 sacks of Soletex
- 40 Sacks of Graphite
- 300 Sack of Salt

Volume of mixed mud = pit volume + equivalent volume in tanks  
 = 500 bbls + 500 bbls  
 = 1000 bbls total

Mixed Mud Weight The mixed mud weight will vary depending on the bottom hole pressures and will be calculated and adjusted as we gather more information; we intend to use 12.8 lb – 13.0 lb mud but will adjust the mud weight as information becomes available

Volume of Add'l

Weighting Mat'l

Antero will have the necessary materials available to mix up enough mud to weight the mud up 1 lb more than the mud used for drilling; as an estimate, we expect to have 10 pallets of barite on site and 12 pallets of bentonite

Volume Water for Mixing      The rig has a 400 bbl rig water tank and the location will have 800 bbls additional in separate tanks.

## **6.2 Mud Mixing Units**

The drilling rig is equipped with 2 mud tanks with agitators and jets such that it can make two pills.

## **6.3 Kill Procedures**

The following paragraph describes the methodology and type of kill procedures that will be used if needed. These procedures are recognized by the IADC.

Once a Kick is detected a prompt shut in of the well is essential. The exact shut in method will be dictated by the operation being performed at the time of the kick, available equipment, plus other extenuating circumstance. The following types of kill operations may be performed to bring the well back under control. The different methods listed below to be used will be determined by the operation being performed at the time of the kick.

### Kill Procedures

- 1.) Drillers Method
- 2.) Wait and Weight Method
- 3.) Circulate and Weight Method
- 4.) Concurrent Method
- 5.) Reverse Circulation Method
- 6.) Dynamic Kill Method
- 7.) Bullheading Method
- 8.) Volumetric Method

# Site Specific Safety Plan

## Antero Resources

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### 7.0 Hydrogen Sulfide Operations (H2S)

#### 7.1 H2S Monitoring

The equipment and method used for the monitoring, detection and warning of the presence of hydrogen sulfide gas during drilling, completions and work-over operations will be portable electronic gas detection such as BW gas detectors or equivalent. These detectors will be typically located near the well bore on the drilling rig, outside the data van or on the drillers stand. Additionally, if H2S is expected, a fixed gas detection system will be employed which will have audible and visual alarming capabilities.

#### 7.2 H2S Training

All personnel that will be involved in the drilling operations will be trained in H2S in drilling operations to a minimum of the awareness level. Additional training will be given to the Drilling Supervisors both in H2S and emergency response duties related specifically to air toxins. All of the aforementioned training will be completed prior to spudding the well. These records may be kept separate from this plan.

#### 7.3 Personal Protection Equipment

The following personal protection equipment will be available and in use as needed on location:

- Flame-Resistant Clothing (FRC),
- Hardhats,
- safety shoes,
- safety glasses and/or safety goggles/face shields,
- hearing protection earplugs,
- cotton and chemical resistant work gloves, and
- dust mask respirators.

In the event that other hazards are identified or presented during the drilling operation, we will attempt to eliminate the hazard, and if not practical, additional PPE will be provided to mitigate the risk to the worker. In the event that H2S is detected, a hazard assessment will be performed for this exposure along with risk mitigation.

## 7.4 H2S Notification and Control

The emergency alarm will be audible or visual type which will be detectable by all personnel on location. If dangerous levels of H<sub>2</sub>S are detected, we will immediately implement our Emergency Response Plan which will provide for site control and evacuation as needed. Generally, the site will be secured such that access is allowed only for trained emergency response personnel. Site security will be accomplished by trained workers stationed at safe points on the perimeter and access road to the site.

If H<sub>2</sub>S is detected and confirmed, a telephonic notification will be made to the local oil and gas inspector.



# Site Specific Safety Plan

## Antero Resources

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### 8.0 Well Flaring Operations

#### 8.1 Size, Construction and Length of Flare Line

The flare line will be a 4" diameter, steel line that extends 50' from the well. The line will be anchored to the surface of the ground by cross pinning it in place using metal staking at multiple points along the line.

The choke assembly is described in previous section of this document and in drawing "5M Choke Manifold Equipment" BLM drawing Onshore Oil and Gas Order Number 2, Supplement E.

We do not anticipate flaring since we would first attempt to route the flow to the Gas Buster and work the gas kick off from there. Flaring would occur as a last resort or if needed.

#### 8.2 Flare Lighting System

The system for lighting the flare will be an automatic flare igniter using a solar collector panel and battery charger system. A second igniter will be installed as a backup. Should flaring be required or needed.

The Drilling Supervisor will give notification to the local fire department prior to lighting the flare, if practicable, or as soon as possible thereafter.

#### 8.3 Flare Safe Distances

The flare line(s) discharge shall be located not less than 50 feet from the well head, having straight lines unless turns are targeted with running tees, and shall be positioned downwind of rig and trailers. The flare system shall have an effective method for ignition. All flammable material beyond the end of the flare line will be cleared to a minimum distance of 50feet.

#### 8.4 Flare Duration

The flare duration should not exceed the maximum time requirements needed to complete the operation.

# Site Specific Safety Plan

## Antero Resources

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### 9.0 Collision Avoidance Safeguards, Practices & Standards Plans

#### 9.1. Established Definitions

- 1.) Proposed Wellbore – Involves sections of the vertical top-hole, the KOP, the lateral landing and the lateral drilling to the total measured depth TMD.
- 2.) Nuge – Technique generally used in the vertical top-hole section. The well path is nudged from vertical to pass areas of possible magnetic interferences and to reduce the risk of collision by maintaining separation with other wellbores.
- 3.) KOP – Kick Off Point. Diverting a well path from one trajectory to another.
- 4.) MWD – Measurement while Drilling
- 5.) LWD – Logging while Drilling
- 6.) SF – Separation Factor or Clearance Factor:  

$$SF^* = CC \div [ UR_{ref} + UR_{off} ]$$
  - CC – well separation distance (center to center of wellbores)
  - UR<sub>ref</sub> - radius ellipse of uncertainty on reference well
  - UR<sub>off</sub> - radius ellipse of uncertainty on offset well

NOTE: ellipses are half-axes or radii.  
 \*Calculation options may be considered
- 7.) TMD – Total Measured Depth
- 8.) Gyro – High accuracy well bore survey instrument unaffected by magnetic interference.
- 9.) QC/QA – Quality Control and Quality Assurance
- 10.) HSE – Health Safety and the Environment

#### 9.2. Established Descriptions of Risk

- |                     |         |                          |
|---------------------|---------|--------------------------|
| 1.) SF ≤ 1.0        | Level 1 | Extreme collision risk   |
| 2.) SF = 1.0 to 1.5 | Level 2 | High collision risk      |
| 3.) SF = 1.5 to 2.0 | Level 3 | Moderate collision risk  |
| 4.) SF > 2.0        | Level 4 | Low to no collision risk |

### **9.3.Scope of Work**

The scope of this protocol pertains to all Antero Resources drilling operations in West Virginia. This protocol represents Antero Resources efforts to eliminate potential wellbore collisions resulting from directional drilling.

### **9.4. Survey Techniques**

Gyro Survey – High accuracy wellbore survey instrumentation that is unaffected by magnetic interference; gyro tools are not run in the drillstring.

MWD – Measurement While Drilling; wellbore survey instrumentation (primarily mud-pulse telemetry) located in the bottom-hole assembly of the drillstring.

### **9.5. Survey Intervals and Frequency**

To avoid collision with other wells within the vicinity of the proposed well, gyro surveying instrumentation will be used at 30' intervals until a separation factor of 1.5 (Level 3) or greater is achieved. These surveys are within +/- .5 degrees of accuracy. Antero Resources calculates the separation factor in accordance with the West Virginia DEP Separation Factor definition, as stated in the permit application guidelines. No well will be allowed to cross under a separation factor of 1.0 (Level 1, Extreme Collision Risk). If a Level 2 separation factor well approaches a separation factor of 1.0, corrective action will be taken to increase the distance between the two imposing wellbores by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 1.5 or greater. When the separation factor exceeds 1.5 and remains greater than 1.5, survey intervals will increase to 250'.

### **9.6. Tool/Muleshoe Alignment in Critical Areas, Nudge Process**

The following steps reflect the general alignment procedures for Antero Resources directional drilling operations in critical areas covering the vertical top-hole sections of the proposed wellbore. These steps are subject to extenuating circumstances and may vary based on differences in instrumentation, wellbore conditions, safety concerns or environmental effects.

- Well site supervisor, gyro surveyor and/or directional driller will all confirm scribe line and UBHO alignment at surface.
- Complete witness verification form and keep in well folder.
- Verify the correct well plan.

- Tool face orientations will be always be confirmed by a second survey at the same depth. For example: pump up survey, turn pipe to move tool face to the desired heading and work out torque, take another survey to confirm the tool face is at the correct heading. Repeat as necessary.
- Supervisor should witness orientations until the separation factor exceeds 1.5 and wells are diverging.
- When in close proximity to adjacent wells, survey intervals will not be greater than 30' until the separation factor exceeds 1.5 and well paths are diverging.
- Run the gyro in the hole and establish the tool face.
- Lay down gyro and screw back on to the pipe.
- Rotate the string to the desired direction.
- Work the pipe, set the slips and run another gyro to verify toolface.

**If the separation factor is less than 1.5**, the next joint of pipe shall be a 15' pup joint. Drill the joint down, run thru the aforementioned survey steps and confirm well divergence. Lay down pup joint, pick up full joint of drill pipe and drill down. Repeat process until separation factor returns to 1.5 or greater and well divergence is confirmed.

### **9.7. Survey Tools: Kick-off Point to Lateral Landing (Curve Assembly)**

When drilling the Curve portion of the wellbore (drilling from the end of the "top-hole" to the beginning of the lateral), Measurement While Drilling (MWD) tools will provide the wellbore surveys. The MWD equipment supplied to Antero is mud-pulse telemetry equipment with a gamma ray module for detecting formation-specific data which assists wellbore placement.

### **9.8. Well Planning and Anti-collision software**

Antero Resources uses software for wellbore placement and anti-collision planning:

- COMPASS Version EDM 5000.1.12.0 (09.06.00.068) Build 5000.1.12.0.73
- Mapping Ref: UTM NAD 27 Zone 17N
- Mag Ref used on most recent Antero Resources wells: BGGM2014
- -8.53 Declination Referenced to Grid North
- Mag and Map reference info is included on each drawing

### **9.9. Minimum Top Hole Separation Factor Standards**

a) Top Hole Separation Factor  $\geq 1.5$  Requirement

A separation factor of at least 1.5 (Level 2) shall be obtained as early as practical and maintained. If a Level 2 separation factor well approaches a separation factor of 1.0, corrective action will be taken to increase the distance between the two imposing wellbores

by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 1.5 or greater. When the separation factor exceeds 1.5 and remains greater than 1.5, survey intervals will increase to 250'.

b) Top Hole Separation Factor  $\geq$  2.0 Requirement

A separation factor of at least 2.0 (Level 4) shall be obtained as early as practical and maintained **when proposed wellbore is in proximity to any fractured or any producing well that exists on the well pad**. If a Level 4 separation factor well approaches a separation factor of 1.5, corrective action will be taken to increase the distance between the two imposing wellbores by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 2.0 or greater. When the separation factor exceeds 2.0 and remains greater than 2.0, survey intervals will increase to 250'.

### 9.10. Lateral Spacing, Spacing Safeguards, Declination/Grid/Magnetic Interference Correction

Wellbore trajectories are computed from survey measurements acquired by Measurement While Drilling (MWD) tools. MWD tools are instruments mounted inside the bottom-hole assembly (BHA) and use an accelerometer and magnetometer sensor package to determine the inclination and magnetic azimuth while drilling. The magnetic azimuth is used to calculate a true (geographic) azimuth by adding the declination angle from a geomagnetic reference model, or a grid azimuth by subtracting the grid convergence angle from the true azimuth. The largest sources of error in standard MWD surveying are inaccuracies in the global geomagnetic reference model and magnetic interference from the BHA. These error sources can be reduced significantly by using a local geomagnetic In-Field Referencing (IFR) model and by subsequently applying multi-station analysis (MSA) corrections to the raw survey measurements. IFR reduces declination error by using local magnetic data to account for crustal anomalies not expressed in standard definition geomagnetic models. MSA further reduces azimuth error by using mathematical methods to correct for magnetic drill string interference and sensor biases and scale factors. Antero Resources employs a third-party survey monitoring company to correct surveys and ensure the most accurate wellbore placement.

Antero Resources defines lateral spacing according to geologic, regulatory and land requirements. Antero uses the aforementioned means to protect and achieve the desired lateral spacing.

## 9.11. Notifications and Response Procedure

Upon discovery that the separation factor has fallen below 1.0, Antero representatives will immediately notify the WV DEP with an appropriate corrective action plan, taking into account the circumstances of the situation.

In the event that a collision is suspected, Antero will immediately notify the WV DEP of the situation and will attempt to kill the well and maintain its status. Taking into account the factors at the time of the collision, Antero will do whatever is necessary to isolate the breach and secure both wells. Once the wells are secure, Antero will convene with the WV DEP and determine the most appropriate course of action to remedy the situation. If the collision involves a fractured or producing well, potential remediation steps could involve moving the drilling rig away from the well and employing a workover rig to pull tubing and repair casing. Antero EHS will immediately notify nearby water well owners and landowners of the breach, provide them with contact information to notify Antero of any adverse effects, and implement water well monitoring to detect any gas seepage.

If the collision involves a well not yet fractured or producing, then remedial steps would most likely include plugging back to an acceptable depth and using a directional assembly to re-route the wellbore on an acceptable path with a separation factor of greater than 1.5.

## Muleshoe High Side Verification

This form is to provide verification on multiple levels for Muleshoe High Side and azimuthal direction to slide when in critical areas. The standard practice of verification should be a visual check of the high side mark and alignment of Muleshoe inside the hang-off sub. Azimuthal direction that the slide will occur toward.

**VISUAL INSPECTION**   X  

**AZMTHUAL DIRECTION TO SLIDE**   320azm  

**DIRECTIONAL DRILLER:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**MWD EMPLOYEE OR GYRO HAND:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

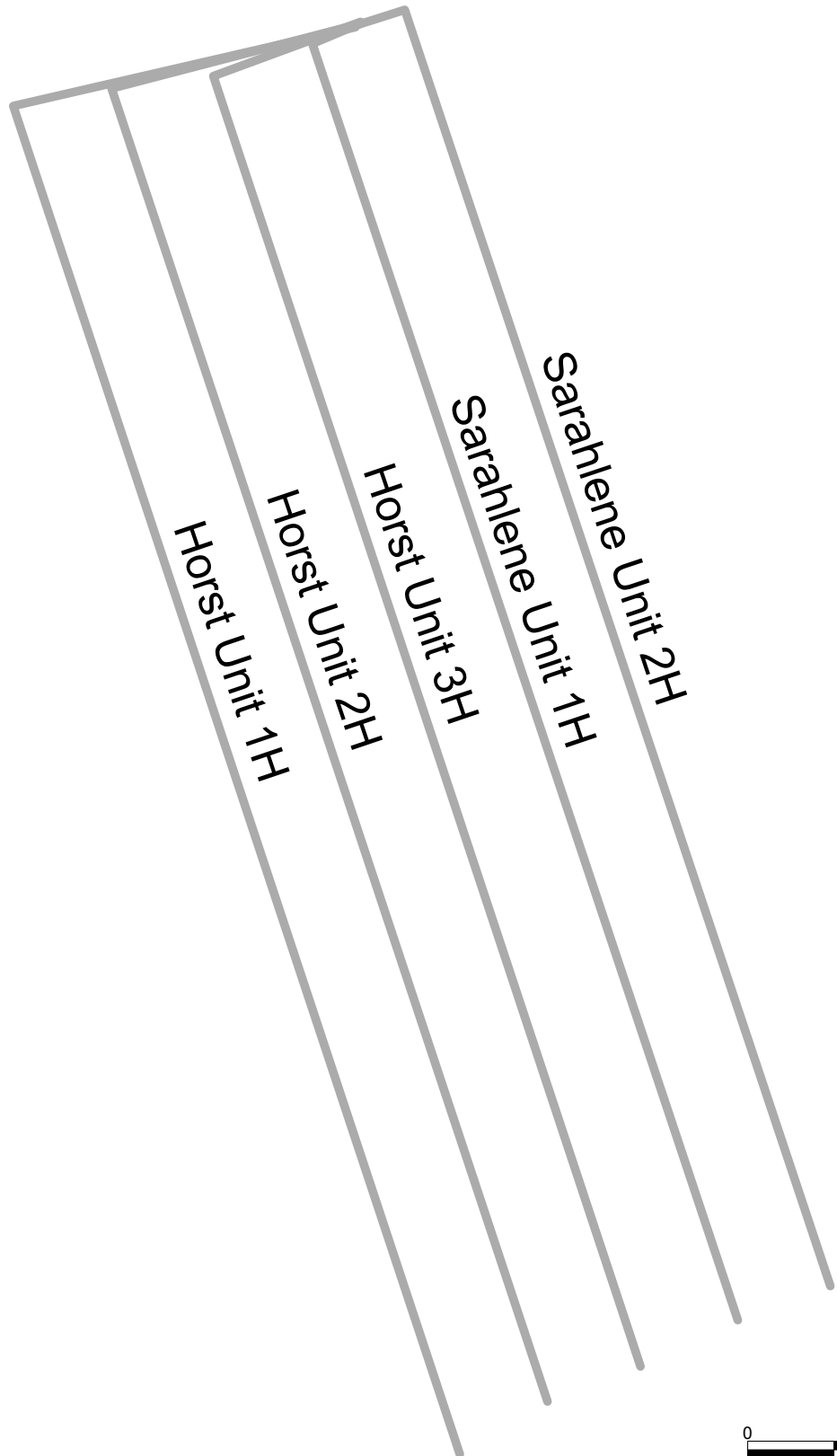
**COMPANY MAN:** \_\_\_\_\_

**DATE:** \_\_\_\_\_



09/28/2018

# Horst and Sarahlene - Lateral Diagram

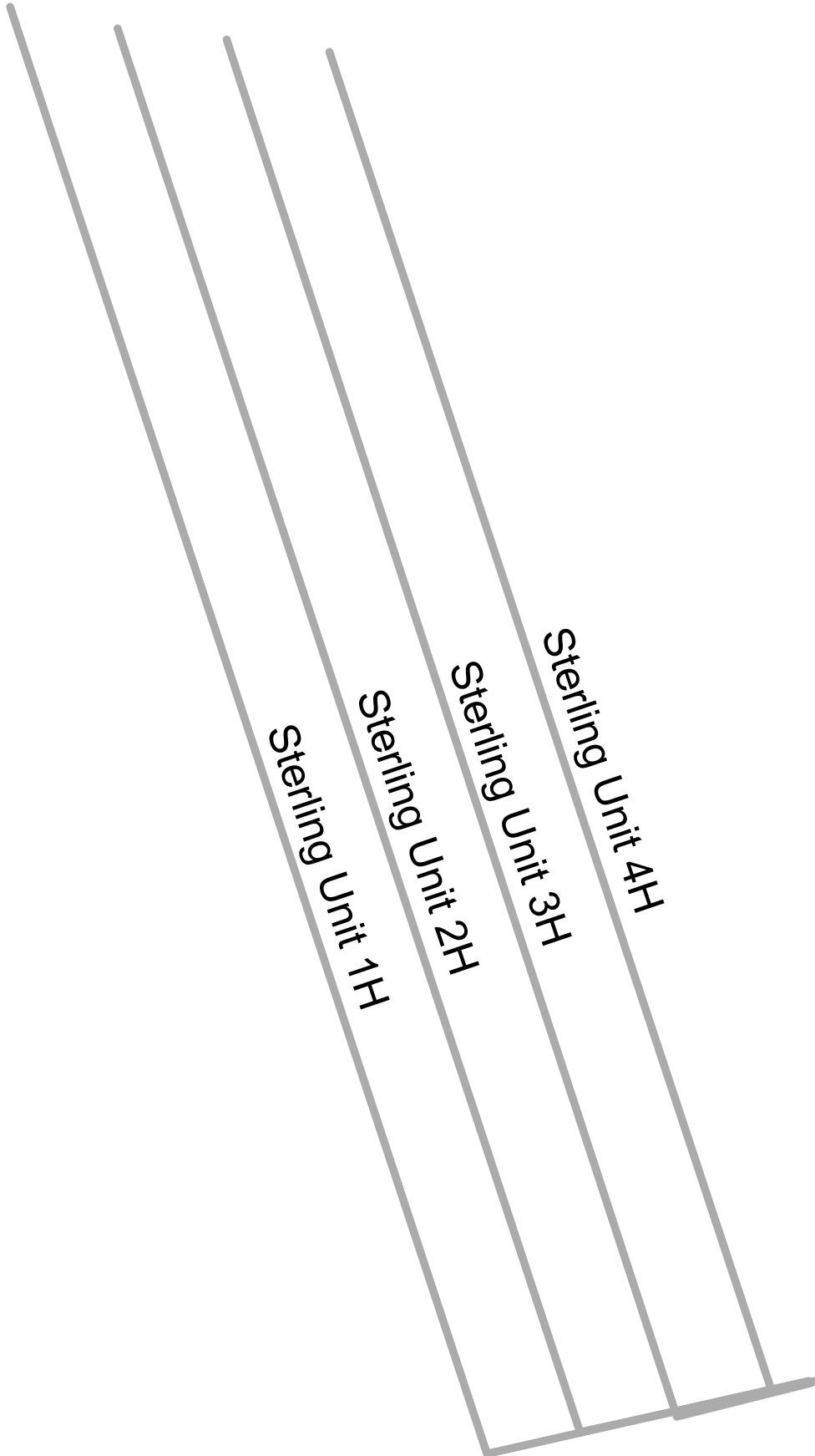


0 1,140  
FEET



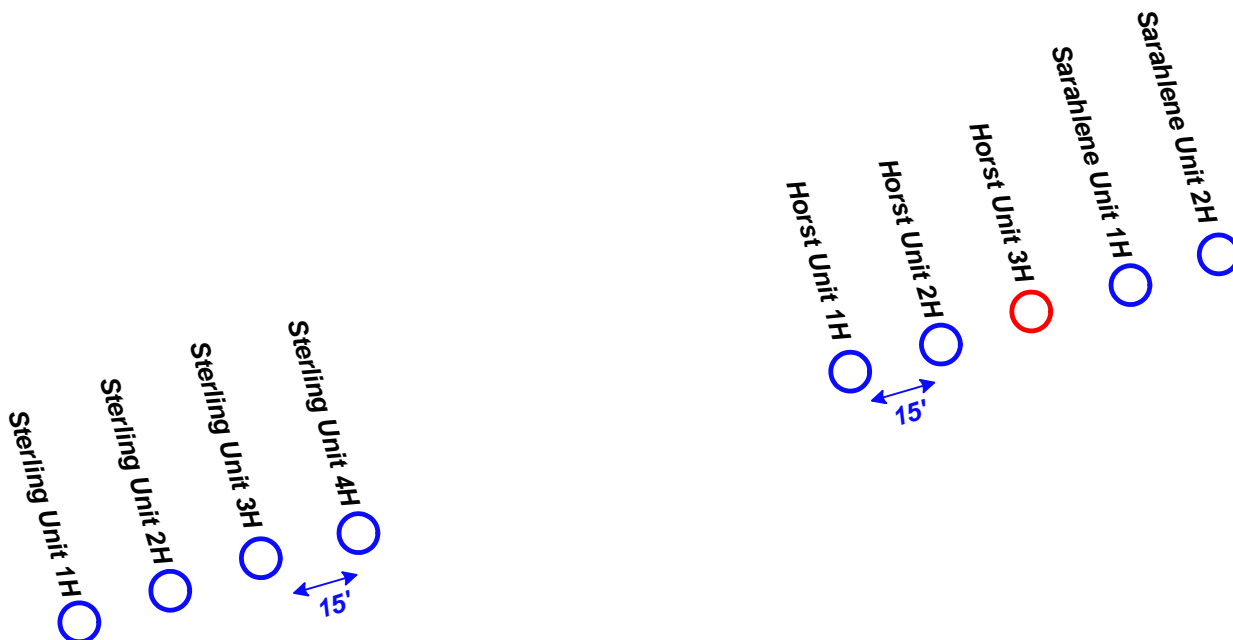


# Sterling Unit - Lateral Diagram





# Meredith Pad



WELL NAME	API NUMBER	WELL STATUS
Sarahlene Unit 2H	Proposed Well	New Well
Sarahlene Unit 1H	Proposed Well	New Well
Sterling Unit 4H	Proposed Well	Future Well
Sterling Unit 3H	Proposed Well	Future Well
Sterling Unit 2H	Proposed Well	Future Well
Sterling Unit 1H	Proposed Well	New Well
Horst Unit 3H	Proposed Well	New Well - Modified
Horst Unit 2H	Proposed Well	New Well
Horst Unit 1H	Proposed Well	New Well

**Legend**

- Existing Well
- Permitted Well
- Proposed Well

Updated: 5/29/2018



**911 Address**  
**2002 Haymonds Ridge Rd.**  
**Pennsboro, WV 26415**

# **Well Site Safety Plan**

## **Antero Resources**

**Well Name: Horst Unit 2H-3H, Sterling 1H-3H and Sarahlene Unit 1H-2H**

**Pad Location: MEREDITH PAD**  
Tyler County/Centerville District

### **GPS Coordinates:**

**Entrance** - Lat 39°20'48.69"/Long -80°52'8.20" (NAD83)

**Pad Center** - Lat 39°20'54.69"/Long -80°52'12.70" (NAD83)



### **Driving Directions:**

From the intersection of I79 and HWY 50 through West Union. Head west on US-50 W for 28.7 miles. Turn right onto WV-18 N for 0.6 miles. Turn left onto Davis St/Old U.S. 50 W for 0.4 miles. Turn right onto WV-18N/Sistersville Pike for 12.2 miles. Turn left onto WV-74 S for 2.0 miles. Turn left onto Co Rd 74/1 for 0.8 miles. Turn left to stay on Co Rd 74/1 for 1.0 mile. The access road will be on the left.

### **Alternate Route:**

From the intersection of I79 and HWY 50 through Alma. Head west on US-50 W for 16.5 miles. Turn right onto WV-23 W for 27.0 miles. Turn left onto WV-18 S for 5.1 miles. Slight right onto WV-74 S for 2.0 miles. Turn left onto Co Rd 74/1 for 0.8 miles. Turn left to stay on Co Rd 74/1 for 1.0 mile. The access road will be on the left.

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

 		<b>WELL SITE SAFETY PLAN</b>	
<b>Owner:</b>	Health and Safety Director	<b>Document ID:</b>	HS-Well Site Safety Plan-C-V1.0
<b>Revision No.:</b>	V2.0	<b>Date of last revision:</b>	November 9, 2016
<b>Revision Status:</b>	Draft		

## Approval Sheet

The West Virginia Department of Environmental Protection Office of Oil and Gas has set forth minimum requirements for a Well Site Safety Plan which shall be submitted with each horizontal well application. A horizontal well shall be any well which meets the definition as provided for in Title 35, Series 8, Section 2.2 of the West Virginia Department of Environmental Protection Office of Oil and Gas.

Approved Safety Plans should be maintained and available at the drilling rig at all times and provided to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land.

The Safety Plan, once approved, may only be modified upon approval by the West Virginia Department of Environmental Protection Office of Oil and Gas ("Office").

This plan has met the requirements of the West Virginia Department of Environmental Protection Office of Oil and Gas Well Site Safety Plan Standards.

Approved this day \_\_\_\_\_ of month \_\_\_\_\_, 20\_\_ by

\_\_\_\_\_ Date: \_\_\_\_\_



<b>WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS</b>	<b>PAGE NUMBERS</b>
<b>1. Contacts, Schedules, and Meetings</b>	PG. 7-18
A. Method of notification of public of H2S gas presence and how access will be controlled.	PG 7-8
B. Emergency point of contact for the well operator covering all phases of activities and including 24 hour contact information	<u>Supplement A</u> PG. 9
C. List of telephone numbers for: <ul style="list-style-type: none"> <li>• Operator</li> <li>• Contractors</li> <li>• DEP office and oil/gas inspector</li> <li>• Local Emergency Response Units</li> <li>• Local ER personnel</li> </ul>	<u>Supplement A</u> PG. 9-13
<ul style="list-style-type: none"> <li>• All schools and public facilities within a one mile radius of proposed well site</li> </ul>	<u>PG 14</u> <u>Exhibit 3</u>
D. Pre-spud meeting held prior to drilling operations, including: <ul style="list-style-type: none"> <li>• Personnel to be employed and involved in the drilling operations</li> <li>• County oil and gas inspector or other designated Office of Oil and Gas representative</li> <li>• List of all persons involved in pre-spud meeting</li> </ul>	PG. 15
E. Describe schedule for conducting regular well site safety meetings. Log all attendance at all meeting and also initiate check in check out during drilling, completion, and work over phases.	<u>Supplement B</u> <u>&amp;C</u> PG. 16-17
<b>2. Maps and Diagrams</b>	PG. 18-23
A. Evacuation plan for the removal of personnel from the drilling location and residents in the surrounding area should the need arise	PG. 18
B. Plan view map of location, access road, pit(s), flare lines, nearby dwellings, note the north and prevailing wind direction	PG. 19-21 <u>Exhibit 1</u>
C. Topographic Map of well location including: <ul style="list-style-type: none"> <li>• 1 mile radius of well location</li> <li>• UTM NAD 83 Coordinates of well site entrance</li> <li>• UTM NAD 83 coordinate of the point the access road intersects the public route</li> <li>• Identify public route number and/or route name</li> </ul>	PG. 22-23 <u>Exhibit 2</u>
<b>3. Well Work</b>	PG. 24-46
A. Detailed written descriptions of well work and procedure to be used during the drilling, completion and production phases, including schematic plan views of each	PG. 24-45 <u>EXHIBITS 4 &amp; 5</u>
B. Statement detailing how a copy of the plan will be provided to the local emergency planning committee or county emergency services within at least 7 days from land disturbance or well work.	<u>PG. 46</u>

<b>WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS</b>	<b>PAGE NUMBERS</b>
<b>4. Chemical Inventory &amp; SDS</b>	PG. 47-49
A. Safety Data Sheets for all chemicals anticipated to be used in all aspects of the operation (can be provided on CD or USB drive)	PROVIDED ON CD
B. Statement that all SDS are to be readily available at the well site and their location indicated in the site safety plan including contact information for person(s) responsible maintaining them on site.	PG. 47
C. Inventory of all materials on site for mixing of mud including numbers and type of mixing units—mixed mud amount and weight, amount of weighting material and volume of mixing fluid	<u>Supplement D</u> PG. 48-49
<b>5. BOP Requirements and Well Control</b>	PG. 50-56
A. BOP equipment and casing heads with types, sizes and rating to be utilized and available during the drilling for both intermediate and lateral drilling phases	PG. 50-53
B. Procedure and schedule for testing the BOP stack for intermediate drilling phase the BOP tested upon initial set up and the annular tested to 70% of capacity and the ram preventers tested to 80%. Same testing % for the bottom and horizontal phase except testing to be done upon initial installation, weekly and after each bit trip.	PG. 54
C. BOP equipment and assembly installation schedule	PG. 54-55
D. List and names of all personnel with well control training	PG. 55
E. Description of system of maintaining detailed records of and for immediate notification to OOG inspector for all significant drilling issues, including but not limited to: <ul style="list-style-type: none"> <li>• Lost circulation</li> <li>• Hydrogen sulfide gas</li> <li>• Fluid entry</li> <li>• Abnormal pressures</li> </ul>	PG. 55
F. Notification of the oil and gas inspector or designated representative as soon as possible of any unusual drilling events, hydrogen sulfide gas or large kicks that occur during drilling	PG. 56
G. Schematic and detailed written description of the well head assembly to be placed on the well upon completion	PG. 56
<b>6. Well Killing Operations</b>	PG. 57-58
A. Method and type of kill procedures	PG. 57-58
<b>7. Hydrogen Sulfide Operations (H2S)</b>	PG. 59-60
A. Detection, monitoring and warning equipment including location of the monitoring detection equipment on the site	PG. 59
B. Statement of H2S personnel training provided	PG. 59
C. List of personal protective equipment (PPE) and the amount of each piece of PPE that will be maintained and available on site.	PG. 59

<b>WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS</b>	PAGE NUMBERS
D. Method to notify the OOG of H2S presence	PG. 59
E. Establish and maintain Protection Zones. Describe detailed written general procedures proposed in drilling phases.	PG. 60
<b>8. Well Flaring Operations</b>	PG. 61
A. Proposed written description and plan including schematic of installation for the duration of flaring activities.	PG. 61
<b>9. Collision Avoidance Safeguards, Practices and Standards Plan</b>	PG. 62-70
A. Established Definitions	PG. 62
B. Established descriptions of Risk	PG. 62
C. Plan Components	PG. 62-70 <u>EXHIBITS 6 &amp; 7</u>



# Site Specific Safety Plan

## Antero Resources

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### 1.0 Contacts, Schedules and Meetings

#### 1.1 Emergency Response Personnel

Requesting public emergency response assistance for this location would be accomplished by the Antero Representative via telephone to Local County Dispatch. From there, they will dispatch the appropriate and available emergency response agencies depending on the nature, location and extent of the emergency. Upon approval, Antero encourages anyone on the site to summon outside assistance as they deem necessary based on the emergency.

A list of Emergency Contacts, including Antero's 24 hour emergency contact telephone number, any contractors of the operator, the Department, the local oil and gas inspector, and local emergency response units are found in Supplement A. This list will be posted at the well site.

#### 1.2 Local Schools and Public Facilities

In the event of an emergency requiring the evacuation of schools and public facilities the Antero Representative will make the required notifications unless the local public emergency responders take on this responsibility. Generally, local emergency responders have stated that they will assume this responsibility. Exhibit 3 lists all schools and public facilities, with their contact information, within a one-mile radius of the horizontal well location.

#### 1.3 Method of Notification of Public

In an emergency which requires the notification of residents and emergency personnel that may be affected during drilling such as release of H<sub>2</sub>S, flaring, etc., the emergency response plan will be immediately implemented. This plan specifies the roles and responsibilities of on-site personnel in case of emergency and addresses emergency notification of potentially affected residents and public emergency response personnel.

In general under the situation presently described, after the activation of the emergency alarm, the on-site personnel will muster for a headcount by the On-Scene Incident Commander which is usually the Antero Representative. After initial assessment of the situation, the OSIC will notify the public emergency response agency from which direction will be taken. If the agency directs, on-site personnel will notify all local impacted residents of the incident by dispatching a worker by truck to each potentially affected residence. If the public emergency responder does not direct this notification to be made by the operator, then the public response agency will be

responsible for this notification. The local emergency responders have, in general, stated that emergency notification of local residents will be accomplished by their means including television and radio announcement as well as public address systems on patrol vehicles. Antero safety representatives who are located in the field may assist with the notification of local residents.

#### **1.4 Established Protection Zones**

Protection zones will be established and maintained based on the nature, extent and severity of the event. These protection zones will be based on those safe distances outlined in the applicable portions of the DOT Emergency Response Guidebook.

# SUPPLEMENT A

## EMERGENCY CONTACT LIST AND PHONE NUMBERS

Contact	Phone Number
<b><i>Designated Person and Incident Commander:</i></b>	
Joe Honeycutt – Drilling Manager Production Control Room Robert Krcek – Director of Midstream Operations Jon McEvers – Operations Manager	740-624-3873 Joe 304-842-4810 Control Room 304-641-1544 Robert 303-808-2423 Jon
<b><i>Antero Resources Emergency (24 Hour) Contact</i></b>	<b>1.800.878.1373</b>
<b><i>Designated Backup Person Response Coordinator:</i></b>	
Ben Lofthouse Steve Durment	304-960-0043 361-318-3235
<b>Drilling Engineers</b> Jola Switter Chad Daves Jonah Fryman	740-629-7279 304-871-1442 740-656-6397
<b>Drilling Rigs</b> Hall 3 Patterson 342 Patterson 343 Precision 525	713-758-0881 832-408-8282 832-531-7355 713-758-0730
Antero Resources Denver Office 1615 Wynkoop Street Denver, CO 80202	Office: 303.357.7310 Fax: 303.357.7315
<b>Senior Environmental Manager</b> Donald Gray	Direct: 303.357.6730 Cell: 303.408.9630 24hr
<b>Health &amp; Safety Director</b> Ronnie Roberts	Direct: 303.357.7174 Cell: 720.990.4399 24hr
<b>Emergency Response Coordinator – WV</b> Eli Waggoner	Direct: 304-842-4068 Cell: 304-476-9770

Contact	Phone Number
<b>Senior Vice President Production</b> Kevin Kilstrom	Direct: 303.357.7335 Cell: 303.808.0254 24hr
<b>Regional Senior Vice President</b> Al Schopp	Direct: 303.357.7325 Cell: 303.809.5522
<b>Vice President Health Safety &amp; Environment</b> Troy Roach	Direct: 303.357.7261 Cell: 713.449.5522
<b>Federal and State Agencies</b>	
National Response Center	(800) 424-8802
West Virginia Office of Water Resources' Emergency Notification Number, Oil Spill Response	1.800.642.3074
West Virginia Office of Oil and Gas Sam Ward, WVDEP – Harrison County Justin Snyder, WVDEP Inspector – Tyler County Mike Goff, WVDEP Inspector – Ritchie County Daniel Flack, WVDEP Inspector – Doddridge County	304.389.7583 cell Sam Ward 681.313.6995 cell Justin Snyder 304.549.9823 cell Mike Goff 304.545.0109 cell Daniel Flack
Environmental Protection Agency (EPA) Region 3	Phone: 215.814.3231 Fax: 215.814.3163
West Virginia Worker's Compensation	1-888-4WVCOMP 1.304.926.3400
West Virginia Fish and Wildlife Service, Field Office, Elkins, WV	<b>Phone:</b> 304.636.6586 <b>Fax:</b> 304.636.7824
US OSHA Charles Green	1-800-321-OSHA (1.800.321.6742) 304.347.5937
<b>Local Agencies and Responders</b>	
Sheriff/Police/Fire Department	<b>911</b>
Hospital- United Hospital Center--Clarksburg	304.624.2121
Harrison County Emergency and Dispatch Business Office	<b>911</b> 304.623.6559
Harrison County LEPC	304.624.9700 John Keeling

Contact	Phone Number
Doddridge County Emergency and Dispatch Business Office	<b>911</b> 304.873.3253
Doddridge County LEPC	304.782.2124 Roland W. Kniceley
Ritchie County Emergency and Dispatch Business Office	<b>911</b> 304.659.3770
Ritchie County LEPC	304.869.3231 Bill Bayless
Tyler County Emergency and Dispatch Business Office	<b>911</b> or 304.758.2911 304.758.4275
Tyler County LEPC	304.652.6932 Pat Walsh
WV Highway Patrol	304.782.2124 <a href="mailto:doddridgeoes@dishmail.net">doddridgeoes@dishmail.net</a>
Public Water Intakes (see Water Management Plan for add'l points)	to be determined
<b>Waste Removal</b>	
Stallion	330.760.4248
Waste Management	
<b>Contractors</b>	
Hall Drilling Services MT Hall	304.588.3368
<b>Cleanup Crews</b>	
Ryan Environmental	304.641.0244
Water Haulers	
Hall Drilling	304.483.8125
<b>Frac Tank Suppliers</b>	
Stallion	330.760.4248

Contact	Phone Number
Water Moving/Pumping	
TK Stanley	304.476.0396
Pumping Services—Kill Fluids	
Halliburton—Jane Lew	724.743.6601 Central Dispatch
Light Plants	254.434.1469 Hot Lights- Josh
Wolfpack	304.623.1199
BOPs	
Snubbing Services	Basic Energy- 724.825.2548 Bryan Berlison
Cudd Well Control	713.849.2769 Houston
Wild Well Control	281.353.5481
Roustabout Crews	740.473.1305 Hall Drilling Office 304.588.6474 Hall Drilling- Jack

### **WV Emergency Reporting**

In the event of a hazardous waste or hazardous material release or emergency, please contact:  
1-800-642-3074.

Additional Contact Information

**1-800-424-8802 National Response Center**

**1-304-558-5938 DEP Elkview Emergency Response Unit**

**Email Contacts:**

**Mike Dorsey [Mike.H.Dorsey@wv.gov](mailto:Mike.H.Dorsey@wv.gov)**

**Rusty Joins [Rusty.T.Joins@wv.gov](mailto:Rusty.T.Joins@wv.gov)**

# WHERE TO FIND HELP

## Tyler County:

Ambulance, Fire, Law Enforcement Emergencies **Call 911**  
 Poison Control Center....1-304-388-4211 or 1-800-222-1222  
 Emergency Alert System Radio WFBY-FM 106.5

<b>FIRE:</b>	
Tyler County Dispatch Center	304-758-4275
Tyler County Office of Emergency Service	304-758-5155
<b>EMS:</b>	
Ritchie County Ambulance Authority	304-643-2369
Ritchie County Office of Emergency Services	304-659-3334
<b>LAW ENFORCEMENT:</b>	
WV State Police, Paden City	304-455-0913
Tyler County Sheriff	304-758-4229
<b>OTHER IMPORTANT NUMBERS:</b>	
W.V. Dept. of Health & Human Resources	304-627-2295
National Response Center (Chemical, Oil Spills & Chemical/Biological Terrorism) (State Emergency Spill Notification)	1-800-424-8802
Allegheny Power	1-800-255-3443
WV State Fire Marshal ( Arson Hotline)	304-588-2191 1-800-233-3473
Dominion Hope Gas	1-800-688-4673

**MEREDITH PAD - EXHIBIT 3  
LIST OF ALL SCHOOLS & PUBLIC FACILITIES WITHIN A  
ONE- MILE RADIUS OF PROPOSED WELL SITE**

<b>Facility Name</b>	<b>Telephone Number</b>
**None identified within a 1-mile radius**	



## 1.5 Safety Meeting

Safety meetings will be conducted as follows:

- Pre-Drilling,
- Pre-Completion,
- Pre-Workover
- Post Accident/Near Miss, and
- As-Needed.

Safety meetings should be held on-site weekly, at a minimum, prior to the beginning of operations, and:

- Includes personnel employed and involved in the operations, and
- Includes the District Oil and Gas Inspector (or other designated Office of Oil and Gas representative, for the pre-spud meeting only).

Typically, contractor of the operator will conduct these safety meetings with Antero Resources personnel participating as needed. Please list the above personnel as a record of attendance using the form found in Supplement B, or one similar. These records may be maintained separate from this plan.

## 1.6 Personnel and Visitor Log

This log is intended to provide a current headcount of all persons present at the site at any given time. All personnel and visitors must sign in upon entering the site and sign out upon departure. This log, or one similar, is provided in Supplement C and will be maintained at all times by the Antero Representative or his designate.

# SUPPLEMENT B

Safety Meeting Log, Personnel and Visitor Log & Emergency Contacts

## Safety Meeting Log

Date: \_\_\_\_\_ Location(Pad): \_\_\_\_\_ Well Name: \_\_\_\_\_

	<u>Name</u>	<u>Organization</u>	<u>Job Title</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____
11.	_____	_____	_____
12.	_____	_____	_____
13.	_____	_____	_____
14.	_____	_____	_____
15.	_____	_____	_____
16.	_____	_____	_____
18.	_____	_____	_____
19.	_____	_____	_____
20.	_____	_____	_____
21.	_____	_____	_____
22.	_____	_____	_____
23.	_____	_____	_____
24.	_____	_____	_____
25.	_____	_____	_____



# Site Specific Safety Plan

## Antero Resources

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### 2.0 Maps and Diagrams

#### 2.1 Plan View Map

Exhibit 1 provides a plan view map showing the well location, access road, pits, flare lines, dwellings, and noting the north and prevailing wind directions.

#### 2.2 Topographic Map

Exhibit 2 shown on also provides an area topographical map showing the well site location

#### 2.3 Evacuation Plan

The Antero Representative will establish a muster point at which all persons on site will assemble for personnel safety and verification of headcount. This point will be located at the entrance to the site. Alternative muster points may be established based on the hazards and operational needs.

In the event of an emergency requiring the evacuation of personnel, an audible or visual alarm will be sounded. The Antero Representative will determine if local residents should be evacuated at this time depending on the outcome of his assessment of the situation.

If local resident evacuation is indicated, the Antero Representative will be responsible for notifying the local impacted residents, or the local authorities will take this responsibility depending on the urgency, availability and direction of the local authorities. Local authorities have indicated that they will take this responsibility typically and will notify of evacuation mandates via television and radio media announcements in addition to public address units on patrol vehicles. In the event that Antero is directed to take this responsibility, notification will be by dispatching a worker to each affected residence to inform them of evacuation requirements and procedures. See section 8.1 for additional information.

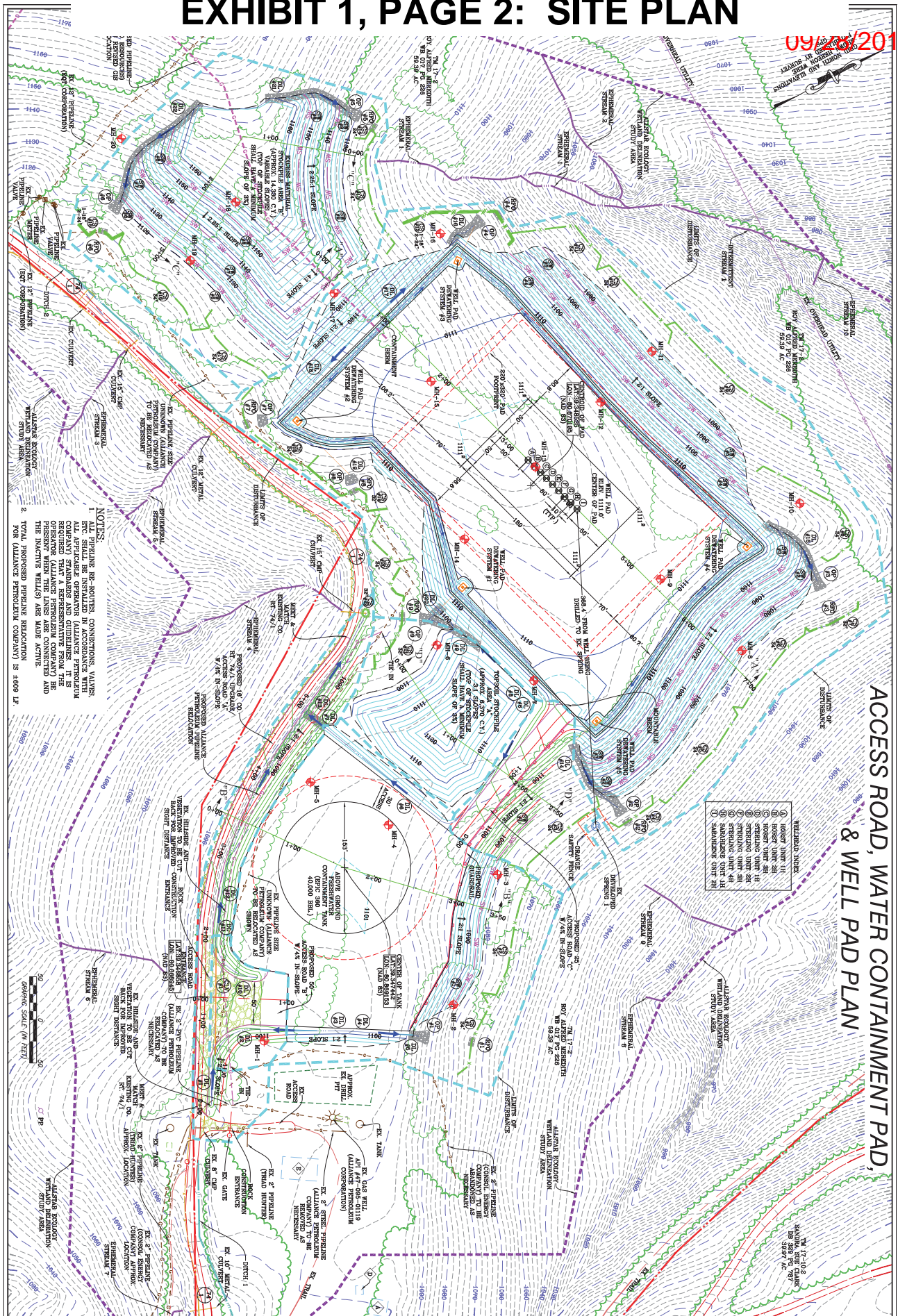
Evacuated local residents may be temporarily housed in local hotels depending on the severity and duration of the emergency. Included in Exhibits 1 & 2 are maps and drawings that may assist in the emergency response and evacuation process.

The Antero Representative will secure the Personnel and Visitor log before evacuating the site in order to perform a headcount at the muster point.



# EXHIBIT 1, PAGE 2: SITE PLAN

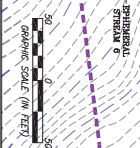
09/18/2018



ACCESS ROAD, WATER CONTAINMENT PAD, & WELL PAD PLAN

**NOTES:**  
 1. ALL PERMITS OR ROUTES CONNECTIONS VAIN...  
 ALL APPLICABLE OPERATOR (ALLIANCE PERIODICA...  
 COMPANY STANDARDS AND GUIDELINES. IT IS...  
 PRESIDENT WHEN THE LINES ARE MADE ACTIVE.  
 2. TOTAL PROPOSED PERMITS RELOCATION IS 4899 LF.

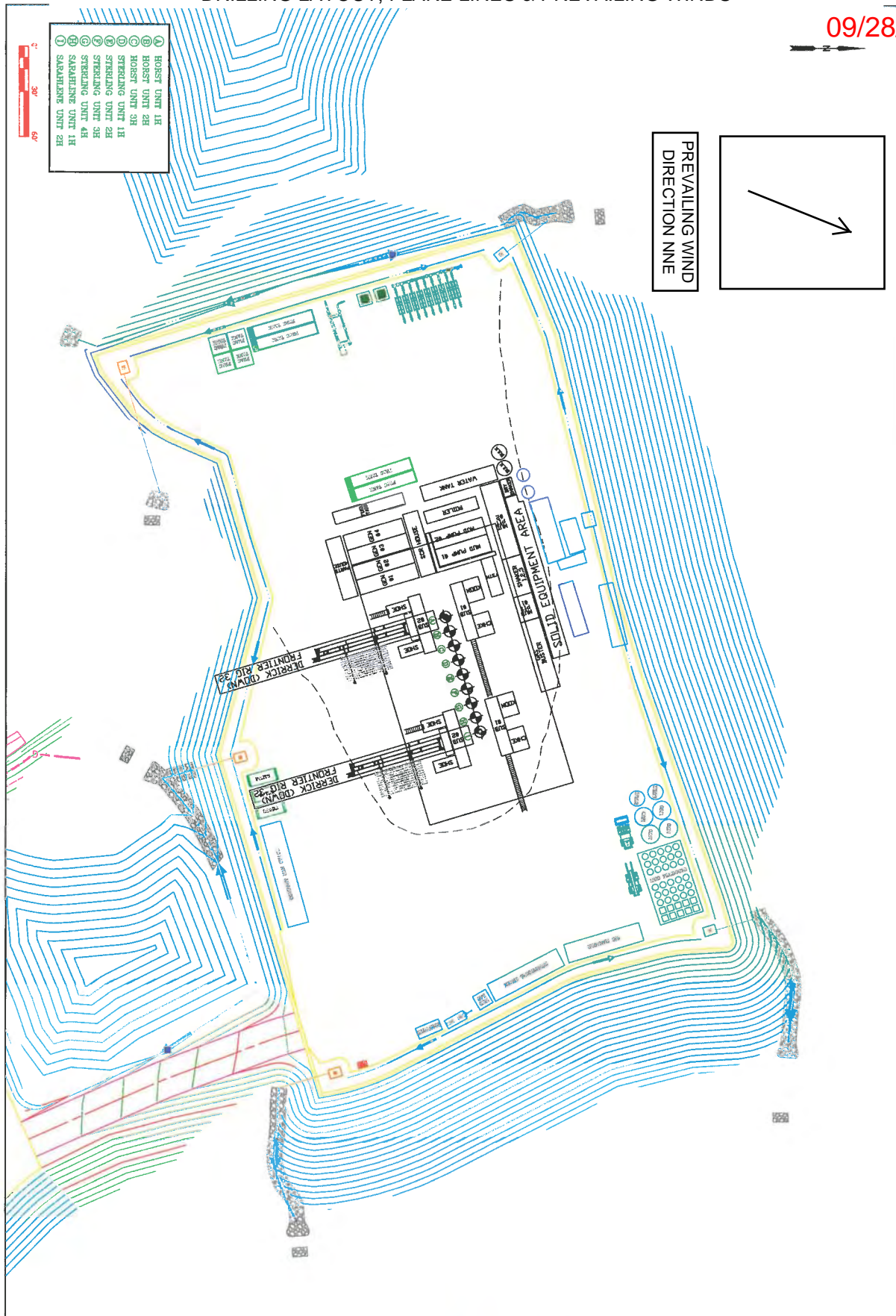
- ① EXISTING UNIT 2A
- ② EXISTING UNIT 2B
- ③ EXISTING UNIT 2C
- ④ EXISTING UNIT 2D
- ⑤ EXISTING UNIT 2E
- ⑥ EXISTING UNIT 2F
- ⑦ EXISTING UNIT 2G
- ⑧ EXISTING UNIT 2H
- ⑨ EXISTING UNIT 2I
- ⑩ EXISTING UNIT 2J



	ACCESS ROAD, WATER CONTAINMENT PAD, & WELL PAD PLAN		
	MEREDITH WELL PAD & WATER CONTAINMENT PAD CENTERVILLE DISTRICT TYLER COUNTY, WEST VIRGINIA		
DATE: 01/17/2017 01/26/2017 02/20/2017	REVISION REVISED FOR CONSTRUCTION REVISED STOCKPILE "B" REVISED PAD CONTAINMENT BERM DETAIL	THIS PERMIT IS FOR THE PROPOSED WELL PADS AND WATER CONTAINMENT PADS ONLY. ALL OTHERS ARE TO BE OBTAINED FROM THE STATE OF WEST VIRGINIA.	
SCALE: 1" = 50' SHEET: 9 OF 24	DATE: 05/23/2016		Telephone: (888) 662-1155   www.NaviusEng.com

EXHIBIT 1, PAGE 3:  
DRILLING LAYOUT, FLARE LINES & PREVAILING WINDS

09/28/2018



Date: 1/11/17  
Drawn By: BR  
Scale: As Shown

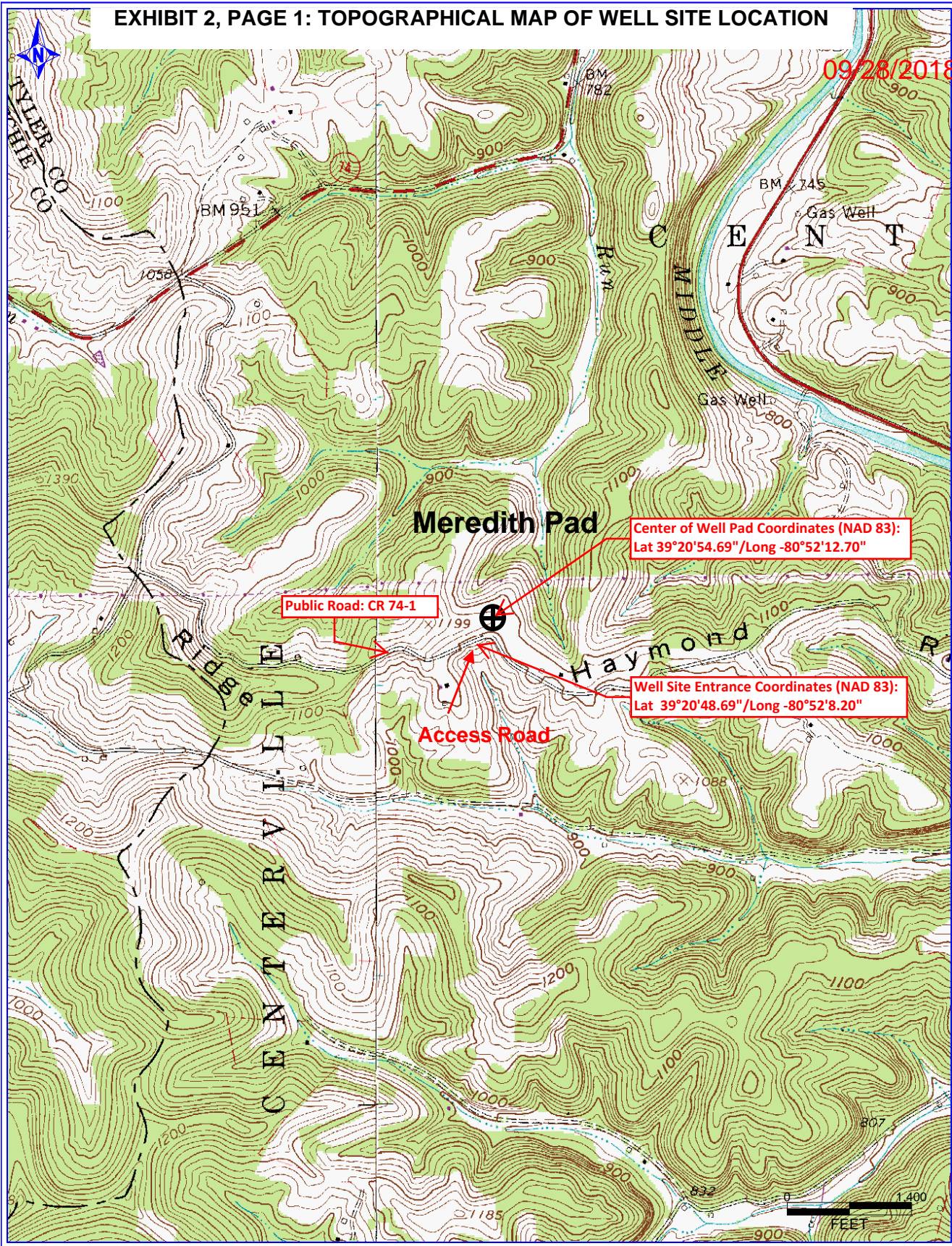
**MEREDITH PAD  
DRILLING EXHIBIT  
FRONTIER 32 RIG**

MOUNTAIN PROSPECT  
TYLER COUNTY, WV



DATE	REVISION

09/28/2018



Center of Well Pad Coordinates (NAD 83):  
Lat 39°20'54.69"/Long -80°52'12.70"

Public Road: CR 74-1

Well Site Entrance Coordinates (NAD 83):  
Lat 39°20'48.69"/Long -80°52'8.20"

Access Road

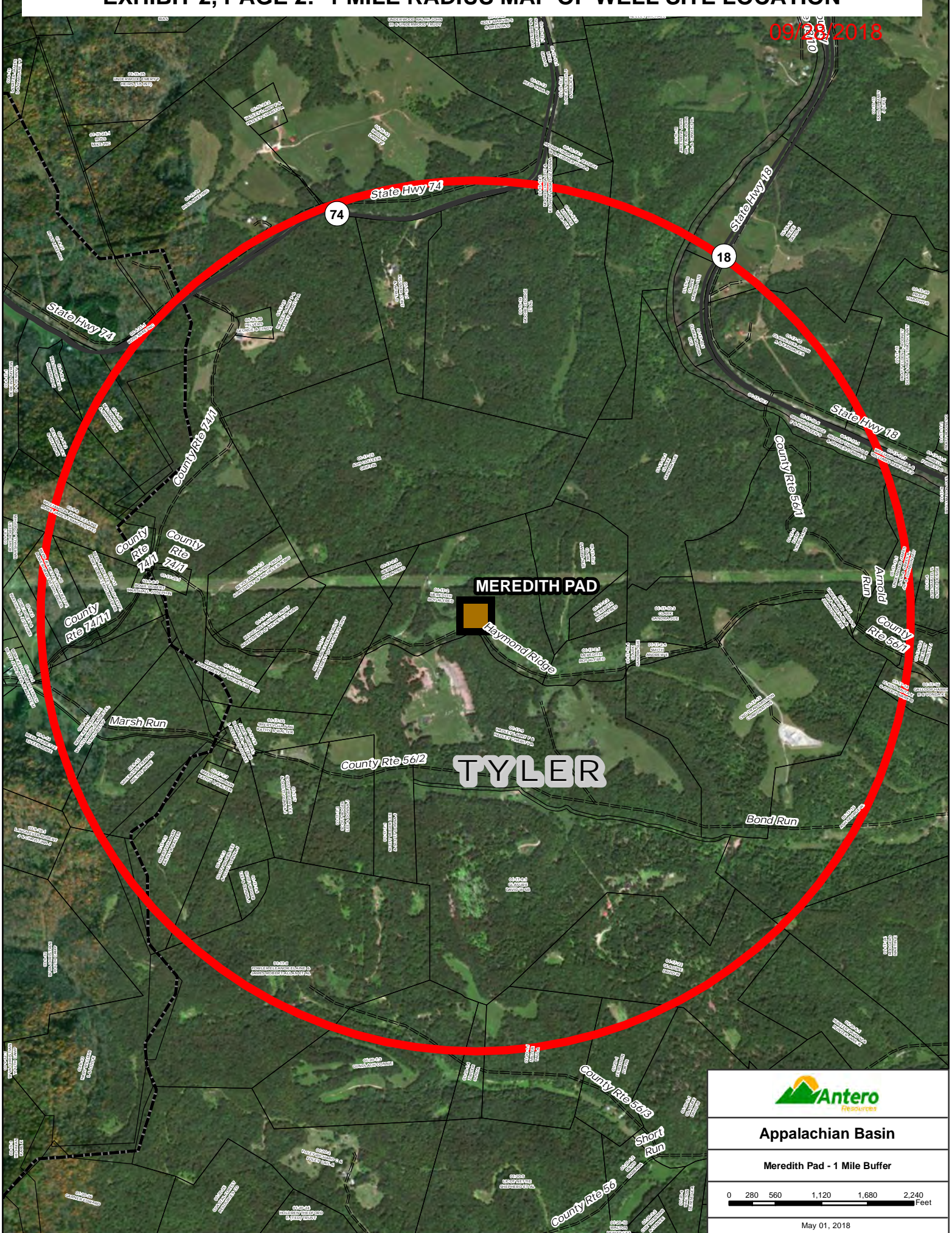
**Antero Resources Corporation**  
 Appalachian Basin  
 Meredith Pad  
 Tyler County

Quadrangle: West Union  
 Watershed: Middle Island Creek  
 District: Centerville  
 Date: 3-15-2017



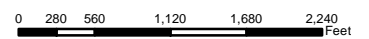
# EXHIBIT 2, PAGE 2: 1 MILE RADIUS MAP OF WELL SITE LOCATION

09/19/2018



**Appalachian Basin**

Meredith Pad - 1 Mile Buffer



May 01, 2018

# Site Specific Safety Plan

## Antero Resources

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### **3.0 Well Work**

#### **3.1 Written Description of Well Work and Schematic**

Antero plans to drill, perforate, fracture multiple horizontal shallow wells and complete the Marcellus Shale. A schematic plan view is attached to this plan in Exhibit 5.

#### **3.2 Geologic Prognosis**

A list of anticipated freshwater, saltwater, oil and gas, hydrogen sulfide, thief zones, and high pressure and high volume zones, including their expected depth are attached to this plan in Exhibit 4, WW-6B.

#### **3.3 Casing and Cementing Program**

Exhibit 4 shows the detailed casing and cementing program, which meets the standards of the American Petroleum Institute (API) and employs a minimum of three strings of casing which are of sufficient weight, quantity and quality for the anticipated conditions to be encountered. This casing and cementing program is designed to maintain well control and integrity. The casing setting depths are sufficient to cover and seal off those zones as identified in Exhibit 4.

#### **3.4 Plan Provided to Local or County Emergency Services**

Approved Safety Plans should be maintained and available at the drilling rig at all times and provided to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land.

# EXHIBIT 4.A- FORM WW-6B

09/28/2018

WW-6B  
(04/15)

API NO. 47-095

OPERATOR WELL NO. Sarahlene Unit 1H

Well Pad Name: Meredith 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 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Sarahlene Unit 1H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'

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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 16800' MD

11) Proposed Horizontal Leg Length: 9006'

12) Approximate Fresh Water Strata Depths: 463', 604', 683'

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

14) Approximate Saltwater Depths: 1521', 1567', 2109'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	93	93	CTS, 89 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	740 *see#19	740 *see#19	CTS, 1028 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	16800	16800	CTS, 4212 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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.

# EXHIBIT 4.A- FORM WW-6B

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Sarahlene Unit 2H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'

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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 16600' MD

11) Proposed Horizontal Leg Length: 8947'

12) Approximate Fresh Water Strata Depths: 463', 604', 683'

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

14) Approximate Saltwater Depths: 1521', 1567', 2109'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	93	93	CTS, 89 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	740 *see#19	740 *see#19	CTS, 1028 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	16600	16600	CTS, 4157 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-HIPOZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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.



# EXHIBIT 4.A- FORM WW-6B

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Horst Unit 2H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: 1114'

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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18400' MD

11) Proposed Horizontal Leg Length: 9155'

12) Approximate Fresh Water Strata Depths: 463', 604', 683'

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

14) Approximate Saltwater Depths: 1521', 1567', 2109'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	93	93	CTS, 89 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	740 *see#19	740 *see#19	CTS, 1028 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	18400	18400	CTS, 4652 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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.

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Anticipated Max Pressure - 9300 lbs  
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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.

# EXHIBIT 4.A- FORM WW-6B

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

1) Well Operator: Antero Resources Corporation 494507062 095 - Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Horst Unit 3H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith Public Road Access: CR 74/1

4) Elevation, current ground: 1117' Elevation, proposed post-construction: ~1114'

5) Well Type (a) Gas  Oil  Underground Storage

Other \_\_\_\_\_

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18000' MD

11) Proposed Horizontal Leg Length: 9178'

12) Approximate Fresh Water Strata Depths: 463', 604', 683'

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

14) Approximate Saltwater Depths: 1521', 1567', 2109'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	93	93	CTS, 89 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	740 *see#19	740 *see#19	CTS, 1028 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#	18000	18000	4542 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	30"	24"	0.438"	1530	50	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12630	2500	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 31.17 Acres

22) Area to be disturbed for well pad only, less access road (acres): 7.09 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.

# EXHIBIT 4.A- FORM WW-6B

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Sterling Unit 1H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: ~1114'

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: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 20500' MD

11) Proposed Horizontal Leg Length: 10693'

12) Approximate Fresh Water Strata Depths: 463', 604', 683'

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

14) Approximate Saltwater Depths: 1521', 1567', 2109'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	93	93	CTS, 89 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	740 *see#19	740 *see#19	CTS, 1028 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	20500	20500	CTS, 5229 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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



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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 7.09 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.

# EXHIBIT 4.A- FORM WW-6B

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Sterling Unit 2H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: ~1114'

5) Well Type (a) Gas  Oil  Underground Storage

Other \_\_\_\_\_

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19500' MD

11) Proposed Horizontal Leg Length: 10193'

12) Approximate Fresh Water Strata Depths: 463', 604', 683'

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

14) Approximate Saltwater Depths: 1521', 1567', 2109'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

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#	93	93	CTS, 89 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	740 *see#19	740 *see#19	CTS, 1028 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19500	19500	CTS, 4954 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	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): 7.09 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.

# EXHIBIT 4.A- FORM WW-6B

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Centerville West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Sterling Unit 3H Well Pad Name: Meredith Pad

3) Farm Name/Surface Owner: Roy A. Meredith, et al Public Road Access: Haymond Road

4) Elevation, current ground: 1117' Elevation, proposed post-construction: ~1114'

5) Well Type (a) Gas  Oil  Underground Storage

Other \_\_\_\_\_

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19500' MD

11) Proposed Horizontal Leg Length: 9984'

12) Approximate Fresh Water Strata Depths: 463', 604', 683'

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

14) Approximate Saltwater Depths: 1521', 1567', 2109'

15) Approximate Coal Seam Depths: 63', 1239'

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: \_\_\_\_\_

18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	93	93	CTS, 89 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	740 *see#19	740 *see#19	CTS, 1028 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19500	19500	CTS, 4954 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

<b>TYPE</b>	<b>Size (in)</b>	<b>Wellbore Diameter (in)</b>	<b>Wall Thickness (in)</b>	<b>Burst Pressure (psi)</b>	<b>Anticipated Max. Internal Pressure (psi)</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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

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

\*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 31.17 acres

22) Area to be disturbed for well pad only, less access road (acres): 7.09 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

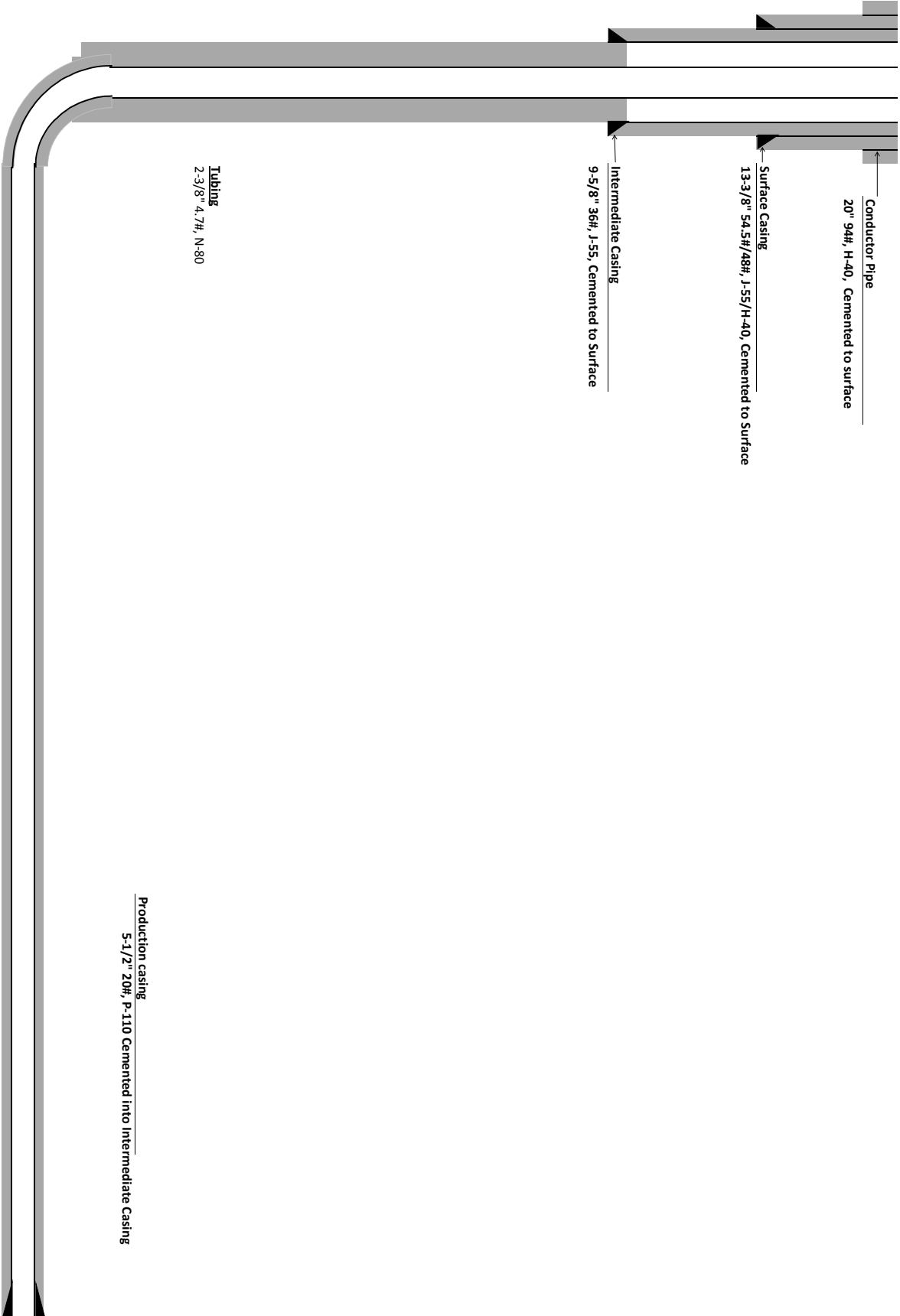
25) Proposed borehole conditioning procedures:

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.

# EXHIBIT 5: WELLBORE SCHEMATIC

09/28/2018





# Site Specific Safety Plan

## Antero Resources

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### 4.0 Chemical Inventory & SDS

#### 4.1 Safety Data Sheets

The Drilling Supervisor or Contractor of the Operator will maintain Data Safety Sheets (SDS) for all materials and chemicals used on the well site. The SDS sheets should be located in the Company Representatives Office on-site. Copies of the SDS sheets may also be obtained from the area Safety Representative, the operator contact for maintaining SDSs, by calling the local Antero Resource Office at 304-842-4100 for West Virginia or 740-760-1000 for Ohio. See Supplement D for a list of hazardous chemicals used during phases of operation.

As requested by the Office of Oil & Gas, copies of SDS have been provided on a CD submitted with each individual well work permit application.

# SUPPLEMENT D

## Anticipated List of Hazardous Chemicals used during Phases of Operation:

<u>Chemical Name</u>	<u>Daily Qty. on Location</u>	<u>Storage Container</u>
	<b><u>Construction</u></b>	
Diesel Fuel Oil	2000 Gallons	Double Walled Tank
	<b><u>Drilling</u></b>	
Airfoam HD	275 gallons	Drum
Aluminum Stearate	150 lbs.	Bag
Caustic Soda	1500 lbs.	Bag
Chek-Loss	1250 lbs.	Bag
Claytrol	440 gallons	Drum
Conqor 404	55 gallons	Drum
Diesel Fuel Oil	8000 gallons	Double Walled Tank
Gear Oil	250 gallons	Double Walled Tank
Hydraulic Fluid	250 gallons	Double Walled Tank
LD-9	100 gallons	Bucket
Mil-Bar	80000 lbs.	Super Sack
Mil-Bar 410	10000 lbs.	Bag
Mil-Carb	5000 lbs.	Bag
Mil-Carb 150	2500 lbs.	Bag
Mil-Graphite	5000 lbs.	Bag
Mil-Lime	10000 lbs.	Bag
Mil-Lube	220 gallons	Drum
Milmica	2500 lbs.	Bag
Mil-Pac LV	2500 lbs.	Bag
Mil-Pac LV Plus	2500 lbs.	Bag
Mil-Pac R	2500 lbs.	Bag
Mil-Plug (Pecan Shells)	5000 lbs.	Bag
Mil-Seal	5000 lbs.	Bag
Mil-Sorb	5000 lbs.	Bag
Milstarch	10000 lbs.	Bag
New-Drill	160 gallons	Bucket
Potassium Chloride	15000 lbs.	Bag
Perma-Lose HT	10000 lbs.	Bag
Soda Ash	1000 lbs.	Bag
Sodium Chloride	30000 lbs.	Bag
SWF (Salt Water Foamer)	265 gallons	Drum
Walnut Shells	2500 lbs.	Bag
W.O. Defoam	160 gallons	Bucket
Xan-Plex D	1200 lbs.	Bag
X-Cide 102	160 gallons	Bucket
	<b><u>Completions</u></b>	
AI-300 (Corrosion Inhibitor)	1 gallon	Tote
AP-One	25 lbs	Tote
Bio Clear	22 gallons	Tote

Frac Sand	174,450 lbs	Sand Truck
LGC-15	137 gallons	Tote
Mineral Oil Flush	10 gallons	Tote
Off Road Diesel	8000 gallons	Fuel Truck
SI-1000 (Scale Inhibitor)	34 gallons	Tote
WFRA-405	184 gallons	Tote
09-HCI All Grades	500 gallons	Acid Tanker
<b><u>Service/Work over</u></b>		
Antifreeze (NAPA)	2 gallons	Jug
Antifreeze/Coolant (Prestone)	30 gallons	Jug
Conoco Honey Oil	11000 gallons	Drum
DEF Fluid	75 gallons	Jug
Detcord	360 feet	Spool
Detonators	180 each	Box
Diesel	7200 gallons	Aux Tank
Diesel	290 gallons	Tanks
Dry Moly	60 oz.	Can
FR-1205(Pipe on Pipe)	270	Tote
FR-1405 (Gel Sweep)	270	Tote
FR-1400(Gel Sweep/Friction Reducer)	540	Tote
Lithium Grease	8 oz.	Can
LOCTITE	12 oz.	Tube
Lubriplate	72 oz.	Tube
Motor Oil 15w-40	5 gallons	Jug
Premium Hydraulic Oil	30 gallons	Bucket
Power Charge Ignitors	180 each	Box
Power Charge Cartridges	20 each	Box
Shaped Charge	1200 each	Box
Transmission fluid	20 gallons	Bucket
WD-40	36 oz.	Can
ZEP 45	25 gallons	Jug
ZEP Brake Flush	25 gallons	Jug
ZEP Dry Molly	10 gallons	Jug
ZEP REDI-GREASE	16 oz.	Tube
<b><u>Reclamation</u></b>		
Diesel Fuel Oil	2000 gallons	Double Walled Bulk Tank

**Note:** The attached list represents anticipated materials used for planned operations on the well site. In the event of an unplanned event on the well site, additional materials may be required. Additional SDS for any unplanned events will be maintained on the well site in accordance with OSHA CFR 1910.1200 standards.

The Drilling Supervisor or Contractor of the Operator will maintain Safety Data Sheets (SDS) for all materials and chemicals used on the well site in accordance with OSHA CFR 1910.1200 standards. The SDS should be located in the Company Representative's Office on-site. Copies of the SDS may also be obtained from the area Safety Coordinator, the operator contact for maintaining SDS, by calling the local Antero Resource Office at 304-842-4100 or 800-878-1373.

# Site Specific Safety Plan

## Antero Resources

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### 5.0 BOP Requirements and Well Control

#### 5.1 BOP Equipment

The following is a list of all BOP equipment with types, sizes and ratings to be utilized and available during the drilling, completion and work-over of the well.

5M system:

- Annular preventer\*
- Pipe ram, blind ram, and, if conditions warrant, as specified by the authorized officer, another pipe ram shall also be required\*
- A second pipe ram preventer shall be used with a tapered drill string
- Drilling spool, or blowout preventer with 2 side outlets (choke side shall be a 3-inch minimum diameter, kill side shall be at least 2-inch diameter)\*
- 3 inch diameter choke line
- 2 choke line valves (3 inch minimum)\*
- Kill line (2 inch minimum)
- 2 chokes with 1 remotely controlled from rig floor
- 2 kill line valves and a check valve (2 inch minimum)\*
- Upper kelly cock valve with handle available
- When the expected pressures approach working pressure of the system, 1 remote kill line tested to stack pressure (which shall run to the outer edge of the substructure and be unobstructed)
- Lower kelly cock valve with handle available
- Safety valve(s) and subs to fit all drill string connections in use
- Inside BOP or float sub available
- Pressure gauge on choke manifold
- All BOPE connections subjected to well pressure shall be flanged, welded, or clamped\*

- Fill-up line above the uppermost preventer.

If repair or replacement of the BOPE is required after testing, this work shall be performed prior to drilling out the casing shoe.

When the BOPE cannot function to secure the hole, the hole shall be secured using cement, retrievable packer or a bridge plug packer, bridge plug, or other acceptable approved method to assure safe well conditions.

Minimum standards for choke manifold equipment.

- i. All choke lines shall be straight lines unless turns use tee blocks or are targeted
- ii. Running tees, and shall be anchored to prevent whip and reduce vibration.
- iii. ii. Choke manifold equipment configuration shall be functionally equivalent to the appropriate example diagram shown in Supplement E. The actual configuration of the chokes may vary.

All valves (except chokes) in the kill line choke manifold, and choke line shall be a type that does not restrict the flow (full opening) and that allows a straight through flow).

Pressure gauges in the well control system shall be a type designed for drilling fluid service

5M and higher system accumulator shall have sufficient capacity to open the hydraulically-controlled gate valve (if so equipped) and close all rams plus the annular preventer (for 3 ram systems add a 50 percent safety factor to compensate for any fluid loss in the control system or preventers) and retain a minimum pressure of 200 psi above precharge on the closing manifold without use of the closing unit pumps. The fluid reservoir capacity shall be double the usable fluid volume of the accumulator system capacity and the fluid level of the reservoir shall be maintained at the manufacturer's recommendations. Two independent sources of power shall be available for powering the closing unit pumps. Sufficient nitrogen bottles are suitable as a backup power source only, and shall be recharged when the pressure falls below manufacturer's specifications.

Accumulator Pre-charge Pressure Test

This test shall be conducted prior to connecting the closing unit to the BOP stack and at least once every 6 months. The accumulator pressure shall be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limit specified below (only nitrogen gas may be used to pre-charge):

### Power Availability

Power for the closing unit pumps shall be available to the unit at all times so that the pumps shall automatically start when the closing valve manifold pressure has decreased to the pre-set level.

### Accumulator Pump Capacity

Each BOP closing unit shall be equipped with sufficient number and sizes of pumps so that, with the accumulator system isolated from service, the pumps shall be capable of opening the hydraulically-operated gate valve (if so equipped), plus closing the annular preventer on the smallest size drill pipe to be used within 2 minutes, and obtain a minimum of 200 psi above specified accumulator pre-charge pressure.

### Locking Devices

A manual locking device (i.e., hand wheels) or automatic locking devices shall be installed on all systems of 2M or greater. A valve shall be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative.

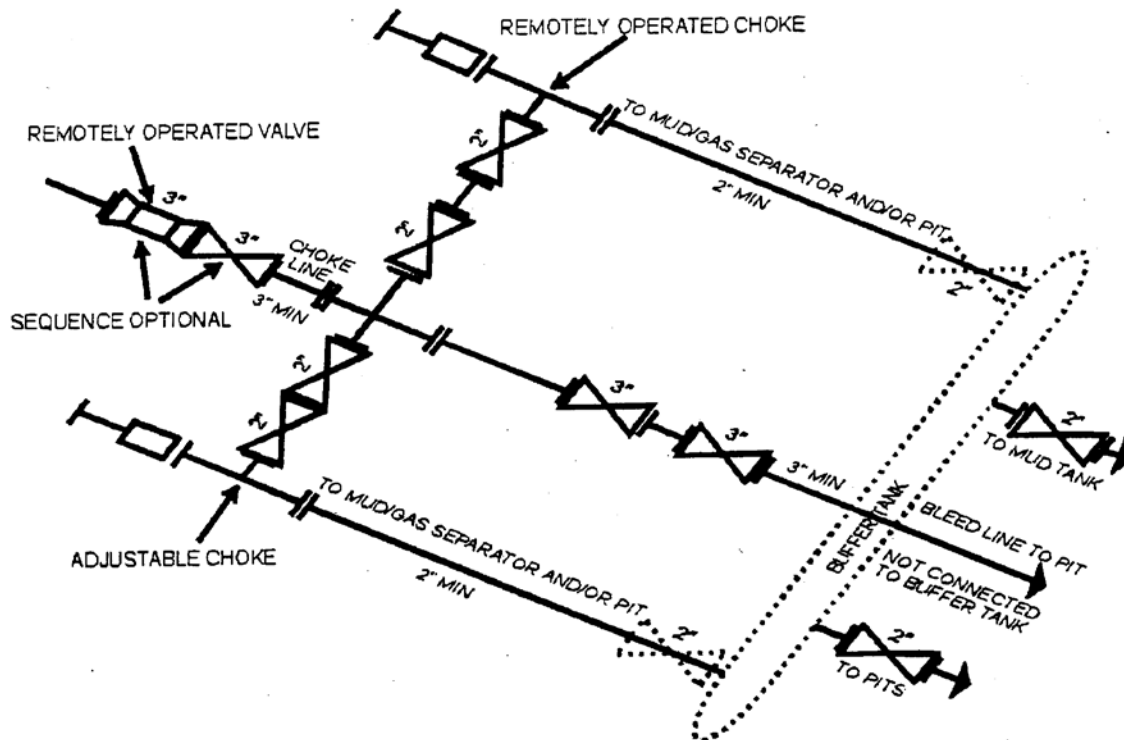
### Remote Controls

<b>Accumulator working pressure rating</b>	<b>Minimum acceptable operating pressure</b>	<b>Desired precharge pressure</b>	<b>Maximum acceptable precharge pressure</b>	<b>Minimum acceptable precharge pressure</b>
1,500 psi	1,500 psi	750 psi	800 psi	700 psi
2,000 psi	2,000 psi	1,000 psi	1,100 psi	900 psi
3,000 psi	3,000 psi	1,000 psi	1,100 psi	900 psi

Remote controls shall be readily accessible to the driller. Remote controls for all 3M or greater systems shall be capable of closing all preventers. Remote controls for 5M or greater systems shall be capable of both opening and closing all preventers. Master controls shall be at the accumulator and shall be capable of opening and closing all preventers and the choke line valve (if so equipped). No remote control for a 2M system is required.

# SUPPLEMENT E

## Choke Manifold Schematic



### 5M CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY

Although not required for any of the choke manifold systems, buffer tanks are sometimes installed downstream of the choke assemblies for the purpose of manifolding the bleed lines together. When buffer tanks are employed, valves shall be installed upstream to isolate a failure or malfunction without interrupting flow control. Though not shown on 2M, 3M, 10M, OR 15M drawings, it would also be applicable to those situations.

[54 FR 39528, Sept. 27, 1989]

## 5.2 Procedure and Schedule for Testing BOP Equipment

### Well Control Equipment Testing

- i. Perform all tests described below using clear water or an air.
- ii. Ram type preventers and associated equipment shall be tested to an approved stack working pressure if isolated by test plug or to 80 percent of internal yield pressure of casing if BOP stack is not isolated from casing. Pressure shall be maintained for at least 10 minutes or until requirements of test are met, whichever is longer. If a test plug is utilized, no bleed-off of pressure is acceptable. For a test not utilizing a test plug, if a decline in pressure of more than 10 percent in 30 minutes occurs, the test shall be considered to have failed. Valve on casing head below test plug shall be open during test of BOP stack.
- iii. Annular type preventers shall be tested to 70 percent of rated working pressure. Pressure shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer.
- iv. As a minimum, the above test shall be performed:
  - a. when initially installed:
  - b. whenever any seal subject to test pressure is broken:
  - c. following related repairs: and
  - d. 30-day intervals.
- v. Valves shall be tested from working pressure side during BOPE tests with all downstream valves open.
- vi. When testing the kill line valve(s), the check valve shall be held open or the ball removed.
- vii. Annular preventers shall be functionally operated at least weekly.
- viii. Pipe and blind rams shall be activated each trip, however, this function need not be performed more than once a day.
- ix. A BOPE pit level drill shall be conducted weekly for each drilling crew.
- x. Pressure tests shall apply to all related well control equipment.
- xi. All of the above described tests and/or drills shall be recorded in the drilling log.
- xii. For intermediate wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation.
- xiii. For the bottom and horizontal wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation, weekly, and after each bit trip.

## 5.3 BOP Installation Schedule

The BOP will be installed after running surface casing as well as after running intermediate casing. BOP equipment shall be installed on the innermost string of casing after the surface casing.



## 5.4 Well Control Training

All Drilling Supervisors, Completion Supervisors, Antero Representatives and Toolpushers used on this well will be IADC Well Control trained and certified. A trained person will be present during the drilling and completion operations. Training certificates will be available for review on the location. The list of personnel with said training is provided below

### List of Well Control Trained Personnel

1. Joe Honeycutt - Antero
2. Ben Lofthouse – Antero
3. Steve Durment – Antero
4. Jeremiah Mercer – Consultant Drilling Supervisor
5. Chad May – Consultant Drilling Supervisor
6. Jim Childress – Consultant Drilling Supervisor
7. Justin Miller – Consultant Drilling Supervisor
8. Rick Mortimer – Consultant Drilling Supervisor
9. Matt Manderfeld – Consultant Drilling Supervisor
10. James Washburn – Consultant Drilling Supervisor
11. Ralph Ybarra – Consultant Drilling Supervisor
12. Rosendo Perez – Consultant Drilling Supervisor
13. Josh Allred – Consultant Drilling Supervisor
14. Jerry Holfeltz – Consultant Drilling Supervisor
15. Regan Johnson – Consultant Drilling Supervisor
16. Karlos Argo – Consultant Drilling Supervisor
17. Jake Switter – Consultant Drilling Supervisor
18. Hayes Lajeunse – Consultant Drilling Supervisor
19. Frank Doherty – Consultant Drilling Supervisor
20. Chad Daves – Antero
21. Jonah Fryman – Antero

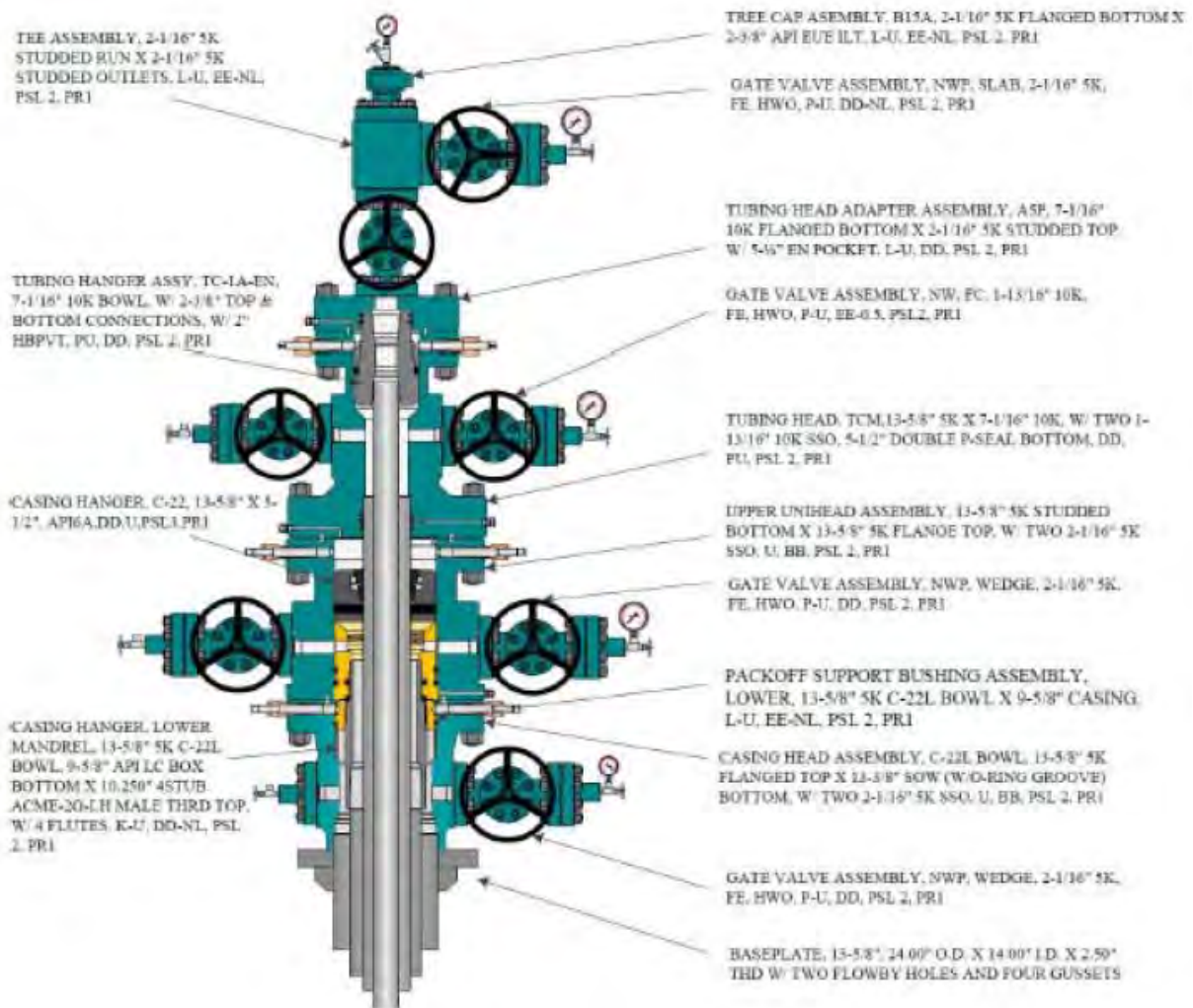
## 5.5 Drilling Record

The Drilling Supervisor will maintain detailed records of significant drilling events such as lost circulation, hydrogen sulfide gas, fluid entry, kicks and abnormal pressures through the electronic data entry and recording system, Wellview. This system allows the Drilling Supervisor to enter daily reports containing the specified information. The records are then retained electronically at Antero Resources' Main Office in Denver, CO.

## 5.6 Notification

The Emergency Response Plan for this operating area requires the Drilling Supervisor to notify the county oil and gas inspector or the designated Office of Oil and Gas representative any unusual drilling events such as hydrogen sulfide gas or significant kicks that occur during drilling operations. Any encounter of hydrogen sulfide gas requires immediate notification of the Office of Oil and Gas.

## 5.7 Schematic and Description of the Wellhead Assembly



# Site Specific Safety Plan

## Antero Resources

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### 6.0 Well Killing Operations

#### 6.1 Mud Mixing Inventory

The following shows the inventory of all materials that will be on-site for the mixing of mud:

- 20 sack of Soda Ash
- 480 sacks of KCL
- 200 sacks of Biolose
- 40 sack of Xan-Plex
- 20 buckets of X-Cide 102
- 3 Drums of KD-40
- 5 Buckets of LD-S
- 15 super sack of MIL Bar
- 100 sacks of Soletex
- 40 Sacks of Graphite
- 300 Sack of Salt

Volume of mixed mud = pit volume + equivalent volume in tanks  
 = 500 bbls + 500 bbls  
 = 1000 bbls total

Mixed Mud Weight The mixed mud weight will vary depending on the bottom hole pressures and will be calculated and adjusted as we gather more information; we intend to use 12.8 lb – 13.0 lb mud but will adjust the mud weight as information becomes available

Volume of Add'l

Weighting Mat'l

Antero will have the necessary materials available to mix up enough mud to weight the mud up 1 lb more than the mud used for drilling; as an estimate, we expect to have 10 pallets of barite on site and 12 pallets of bentonite

Volume Water for Mixing      The rig has a 400 bbl rig water tank and the location will have 800 bbls additional in separate tanks.

## **6.2 Mud Mixing Units**

The drilling rig is equipped with 2 mud tanks with agitators and jets such that it can make two pills.

## **6.3 Kill Procedures**

The following paragraph describes the methodology and type of kill procedures that will be used if needed. These procedures are recognized by the IADC.

Once a Kick is detected a prompt shut in of the well is essential. The exact shut in method will be dictated by the operation being performed at the time of the kick, available equipment, plus other extenuating circumstance. The following types of kill operations may be performed to bring the well back under control. The different methods listed below to be used will be determined by the operation being performed at the time of the kick.

### Kill Procedures

- 1.) Drillers Method
- 2.) Wait and Weight Method
- 3.) Circulate and Weight Method
- 4.) Concurrent Method
- 5.) Reverse Circulation Method
- 6.) Dynamic Kill Method
- 7.) Bullheading Method
- 8.) Volumetric Method

# Site Specific Safety Plan

## Antero Resources

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### 7.0 Hydrogen Sulfide Operations (H2S)

#### 7.1 H2S Monitoring

The equipment and method used for the monitoring, detection and warning of the presence of hydrogen sulfide gas during drilling, completions and work-over operations will be portable electronic gas detection such as BW gas detectors or equivalent. These detectors will be typically located near the well bore on the drilling rig, outside the data van or on the drillers stand. Additionally, if H2S is expected, a fixed gas detection system will be employed which will have audible and visual alarming capabilities.

#### 7.2 H2S Training

All personnel that will be involved in the drilling operations will be trained in H2S in drilling operations to a minimum of the awareness level. Additional training will be given to the Drilling Supervisors both in H2S and emergency response duties related specifically to air toxins. All of the aforementioned training will be completed prior to spudding the well. These records may be kept separate from this plan.

#### 7.3 Personal Protection Equipment

The following personal protection equipment will be available and in use as needed on location:

- Flame-Resistant Clothing (FRC),
- Hardhats,
- safety shoes,
- safety glasses and/or safety goggles/face shields,
- hearing protection earplugs,
- cotton and chemical resistant work gloves, and
- dust mask respirators.

In the event that other hazards are identified or presented during the drilling operation, we will attempt to eliminate the hazard, and if not practical, additional PPE will be provided to mitigate the risk to the worker. In the event that H2S is detected, a hazard assessment will be performed for this exposure along with risk mitigation.

## 7.4 H2S Notification and Control

The emergency alarm will be audible or visual type which will be detectable by all personnel on location. If dangerous levels of H<sub>2</sub>S are detected, we will immediately implement our Emergency Response Plan which will provide for site control and evacuation as needed. Generally, the site will be secured such that access is allowed only for trained emergency response personnel. Site security will be accomplished by trained workers stationed at safe points on the perimeter and access road to the site.

If H<sub>2</sub>S is detected and confirmed, a telephonic notification will be made to the local oil and gas inspector.

# Site Specific Safety Plan

## Antero Resources

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### 8.0 Well Flaring Operations

#### 8.1 Size, Construction and Length of Flare Line

The flare line will be a 4" diameter, steel line that extends 50' from the well. The line will be anchored to the surface of the ground by cross pinning it in place using metal staking at multiple points along the line.

The choke assembly is described in previous section of this document and in drawing "5M Choke Manifold Equipment" BLM drawing Onshore Oil and Gas Order Number 2, Supplement E.

We do not anticipate flaring since we would first attempt to route the flow to the Gas Buster and work the gas kick off from there. Flaring would occur as a last resort or if needed.

#### 8.2 Flare Lighting System

The system for lighting the flare will be an automatic flare igniter using a solar collector panel and battery charger system. A second igniter will be installed as a backup. Should flaring be required or needed.

The Drilling Supervisor will give notification to the local fire department prior to lighting the flare, if practicable, or as soon as possible thereafter.

#### 8.3 Flare Safe Distances

The flare line(s) discharge shall be located not less than 50 feet from the well head, having straight lines unless turns are targeted with running tees, and shall be positioned downwind of rig and trailers. The flare system shall have an effective method for ignition. All flammable material beyond the end of the flare line will be cleared to a minimum distance of 50feet.

#### 8.4 Flare Duration

The flare duration should not exceed the maximum time requirements needed to complete the operation.

# Site Specific Safety Plan

## Antero Resources

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### 9.0 Collision Avoidance Safeguards, Practices & Standards Plans

#### 9.1. Established Definitions

- 1.) Proposed Wellbore – Involves sections of the vertical top-hole, the KOP, the lateral landing and the lateral drilling to the total measured depth TMD.
- 2.) Nuge – Technique generally used in the vertical top-hole section. The well path is nudged from vertical to pass areas of possible magnetic interferences and to reduce the risk of collision by maintaining separation with other wellbores.
- 3.) KOP – Kick Off Point. Diverting a well path from one trajectory to another.
- 4.) MWD – Measurement while Drilling
- 5.) LWD – Logging while Drilling
- 6.) SF – Separation Factor or Clearance Factor:  

$$SF^* = CC \div [ UR_{ref} + UR_{off} ]$$
  - CC – well separation distance (center to center of wellbores)
  - UR<sub>ref</sub> - radius ellipse of uncertainty on reference well
  - UR<sub>off</sub> - radius ellipse of uncertainty on offset well

NOTE: ellipses are half-axes or radii.  
 \*Calculation options may be considered
- 7.) TMD – Total Measured Depth
- 8.) Gyro – High accuracy well bore survey instrument unaffected by magnetic interference.
- 9.) QC/QA – Quality Control and Quality Assurance
- 10.) HSE – Health Safety and the Environment

#### 9.2. Established Descriptions of Risk

- |                     |         |                          |
|---------------------|---------|--------------------------|
| 1.) SF ≤ 1.0        | Level 1 | Extreme collision risk   |
| 2.) SF = 1.0 to 1.5 | Level 2 | High collision risk      |
| 3.) SF = 1.5 to 2.0 | Level 3 | Moderate collision risk  |
| 4.) SF > 2.0        | Level 4 | Low to no collision risk |



### **9.3.Scope of Work**

The scope of this protocol pertains to all Antero Resources drilling operations in West Virginia. This protocol represents Antero Resources efforts to eliminate potential wellbore collisions resulting from directional drilling.

### **9.4. Survey Techniques**

Gyro Survey – High accuracy wellbore survey instrumentation that is unaffected by magnetic interference; gyro tools are not run in the drillstring.

MWD – Measurement While Drilling; wellbore survey instrumentation (primarily mud-pulse telemetry) located in the bottom-hole assembly of the drillstring.

### **9.5. Survey Intervals and Frequency**

To avoid collision with other wells within the vicinity of the proposed well, gyro surveying instrumentation will be used at 30' intervals until a separation factor of 1.5 (Level 3) or greater is achieved. These surveys are within +/- .5 degrees of accuracy. Antero Resources calculates the separation factor in accordance with the West Virginia DEP Separation Factor definition, as stated in the permit application guidelines. No well will be allowed to cross under a separation factor of 1.0 (Level 1, Extreme Collision Risk). If a Level 2 separation factor well approaches a separation factor of 1.0, corrective action will be taken to increase the distance between the two imposing wellbores by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 1.5 or greater. When the separation factor exceeds 1.5 and remains greater than 1.5, survey intervals will increase to 250'.

### **9.6. Tool/Muleshoe Alignment in Critical Areas, Nudge Process**

The following steps reflect the general alignment procedures for Antero Resources directional drilling operations in critical areas covering the vertical top-hole sections of the proposed wellbore. These steps are subject to extenuating circumstances and may vary based on differences in instrumentation, wellbore conditions, safety concerns or environmental effects.

- Well site supervisor, gyro surveyor and/or directional driller will all confirm scribe line and UBHO alignment at surface.
- Complete witness verification form and keep in well folder.
- Verify the correct well plan.

- Tool face orientations will be always be confirmed by a second survey at the same depth. For example: pump up survey, turn pipe to move tool face to the desired heading and work out torque, take another survey to confirm the tool face is at the correct heading. Repeat as necessary.
- Supervisor should witness orientations until the separation factor exceeds 1.5 and wells are diverging.
- When in close proximity to adjacent wells, survey intervals will not be greater than 30' until the separation factor exceeds 1.5 and well paths are diverging.
- Run the gyro in the hole and establish the tool face.
- Lay down gyro and screw back on to the pipe.
- Rotate the string to the desired direction.
- Work the pipe, set the slips and run another gyro to verify toolface.

**If the separation factor is less than 1.5**, the next joint of pipe shall be a 15' pup joint. Drill the joint down, run thru the aforementioned survey steps and confirm well divergence. Lay down pup joint, pick up full joint of drill pipe and drill down. Repeat process until separation factor returns to 1.5 or greater and well divergence is confirmed.

### **9.7. Survey Tools: Kick-off Point to Lateral Landing (Curve Assembly)**

When drilling the Curve portion of the wellbore (drilling from the end of the "top-hole" to the beginning of the lateral), Measurement While Drilling (MWD) tools will provide the wellbore surveys. The MWD equipment supplied to Antero is mud-pulse telemetry equipment with a gamma ray module for detecting formation-specific data which assists wellbore placement.

### **9.8. Well Planning and Anti-collision software**

Antero Resources uses software for wellbore placement and anti-collision planning:

- COMPASS Version EDM 5000.1.12.0 (09.06.00.068) Build 5000.1.12.0.73
- Mapping Ref: UTM NAD 27 Zone 17N
- Mag Ref used on most recent Antero Resources wells: BGGM2014
- -8.53 Declination Referenced to Grid North
- Mag and Map reference info is included on each drawing

### **9.9. Minimum Top Hole Separation Factor Standards**

a) Top Hole Separation Factor  $\geq 1.5$  Requirement

A separation factor of at least 1.5 (Level 2) shall be obtained as early as practical and maintained. If a Level 2 separation factor well approaches a separation factor of 1.0, corrective action will be taken to increase the distance between the two imposing wellbores

by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 1.5 or greater. When the separation factor exceeds 1.5 and remains greater than 1.5, survey intervals will increase to 250'.

b) Top Hole Separation Factor  $\geq$  2.0 Requirement

A separation factor of at least 2.0 (Level 4) shall be obtained as early as practical and maintained **when proposed wellbore is in proximity to any fractured or any producing well that exists on the well pad**. If a Level 4 separation factor well approaches a separation factor of 1.5, corrective action will be taken to increase the distance between the two imposing wellbores by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 2.0 or greater. When the separation factor exceeds 2.0 and remains greater than 2.0, survey intervals will increase to 250'.

### 9.10. Lateral Spacing, Spacing Safeguards, Declination/Grid/Magnetic Interference Correction

Wellbore trajectories are computed from survey measurements acquired by Measurement While Drilling (MWD) tools. MWD tools are instruments mounted inside the bottom-hole assembly (BHA) and use an accelerometer and magnetometer sensor package to determine the inclination and magnetic azimuth while drilling. The magnetic azimuth is used to calculate a true (geographic) azimuth by adding the declination angle from a geomagnetic reference model, or a grid azimuth by subtracting the grid convergence angle from the true azimuth. The largest sources of error in standard MWD surveying are inaccuracies in the global geomagnetic reference model and magnetic interference from the BHA. These error sources can be reduced significantly by using a local geomagnetic In-Field Referencing (IFR) model and by subsequently applying multi-station analysis (MSA) corrections to the raw survey measurements. IFR reduces declination error by using local magnetic data to account for crustal anomalies not expressed in standard definition geomagnetic models. MSA further reduces azimuth error by using mathematical methods to correct for magnetic drill string interference and sensor biases and scale factors. Antero Resources employs a third-party survey monitoring company to correct surveys and ensure the most accurate wellbore placement.

Antero Resources defines lateral spacing according to geologic, regulatory and land requirements. Antero uses the aforementioned means to protect and achieve the desired lateral spacing.

## 9.11. Notifications and Response Procedure

Upon discovery that the separation factor has fallen below 1.0, Antero representatives will immediately notify the WV DEP with an appropriate corrective action plan, taking into account the circumstances of the situation.

In the event that a collision is suspected, Antero will immediately notify the WV DEP of the situation and will attempt to kill the well and maintain its status. Taking into account the factors at the time of the collision, Antero will do whatever is necessary to isolate the breach and secure both wells. Once the wells are secure, Antero will convene with the WV DEP and determine the most appropriate course of action to remedy the situation. If the collision involves a fractured or producing well, potential remediation steps could involve moving the drilling rig away from the well and employing a workover rig to pull tubing and repair casing. Antero EHS will immediately notify nearby water well owners and landowners of the breach, provide them with contact information to notify Antero of any adverse effects, and implement water well monitoring to detect any gas seepage.

If the collision involves a well not yet fractured or producing, then remedial steps would most likely include plugging back to an acceptable depth and using a directional assembly to re-route the wellbore on an acceptable path with a separation factor of greater than 1.5.

## Muleshoe High Side Verification

This form is to provide verification on multiple levels for Muleshoe High Side and azimuthal direction to slide when in critical areas. The standard practice of verification should be a visual check of the high side mark and alignment of Muleshoe inside the hang-off sub. Azimuthal direction that the slide will occur toward.

**VISUAL INSPECTION**   X  

**AZMUTHUAL DIRECTION TO SLIDE**   320azm  

**DIRECTIONAL DRILLER:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**MWD EMPLOYEE OR GYRO HAND:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

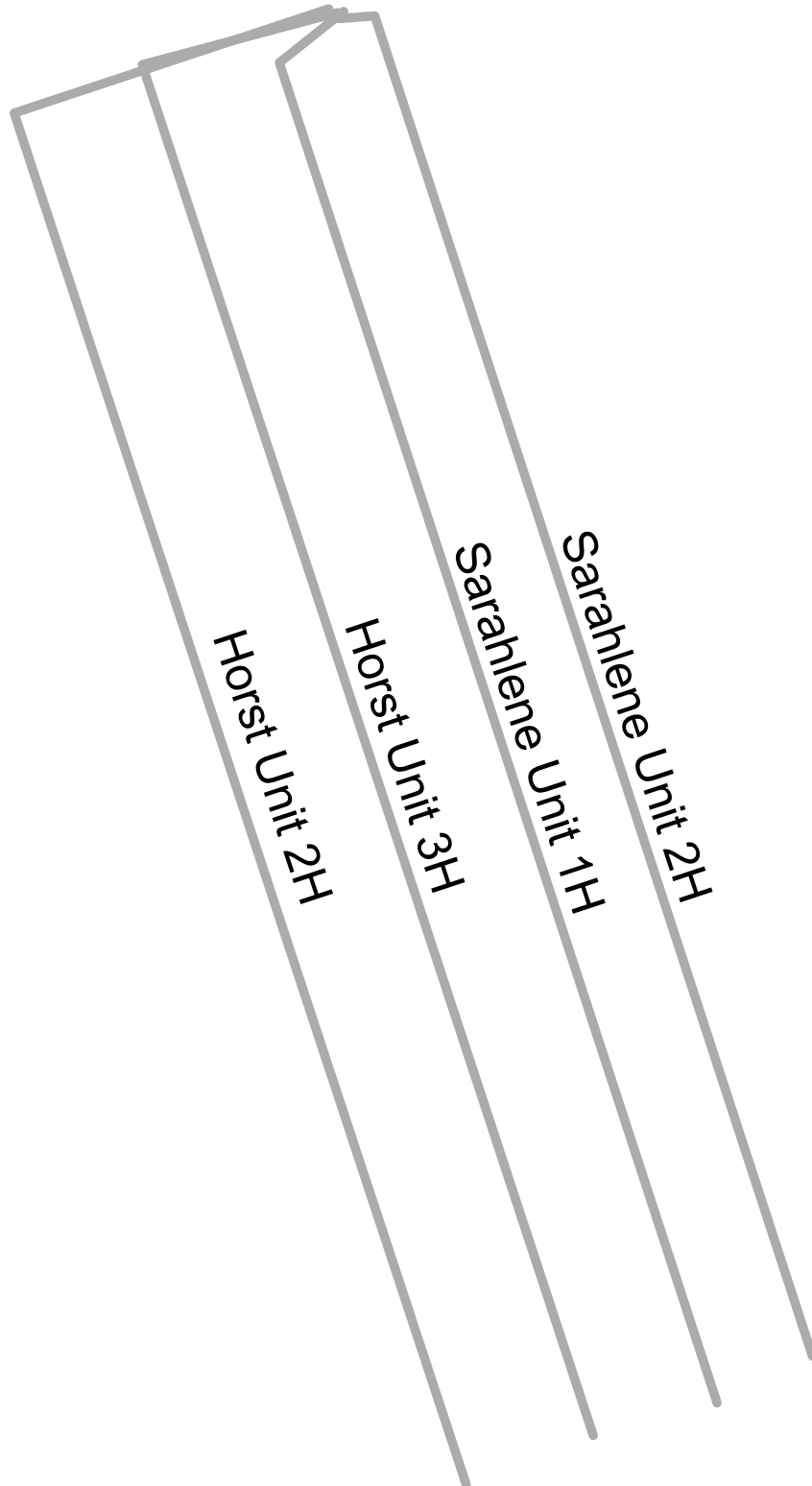
**COMPANY MAN:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

# EXHIBIT 6: LATERAL DIAGRAM

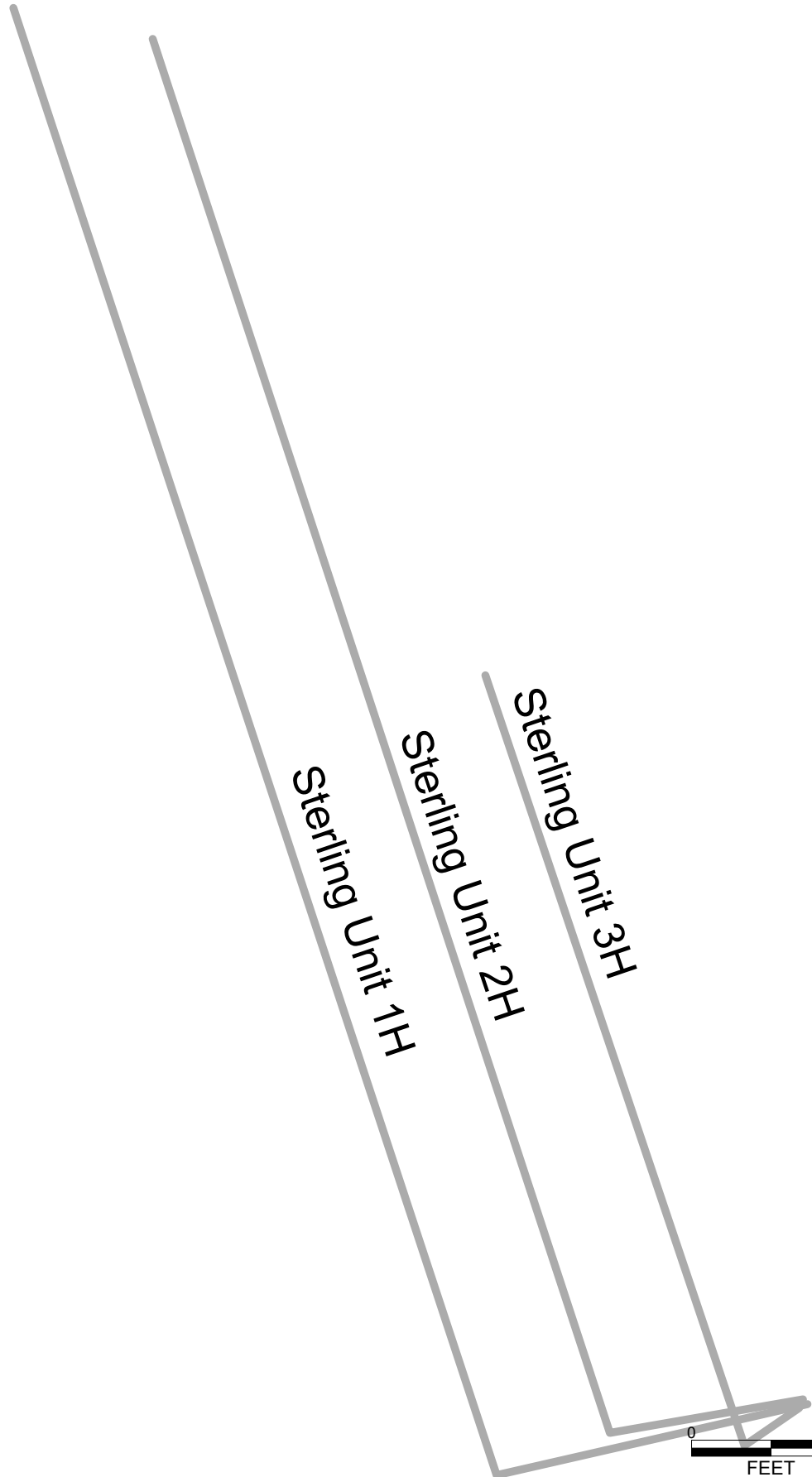


## Horst / Sarahlene Unit - Lateral Diagram





# Sterling Unit - Lateral Diagram

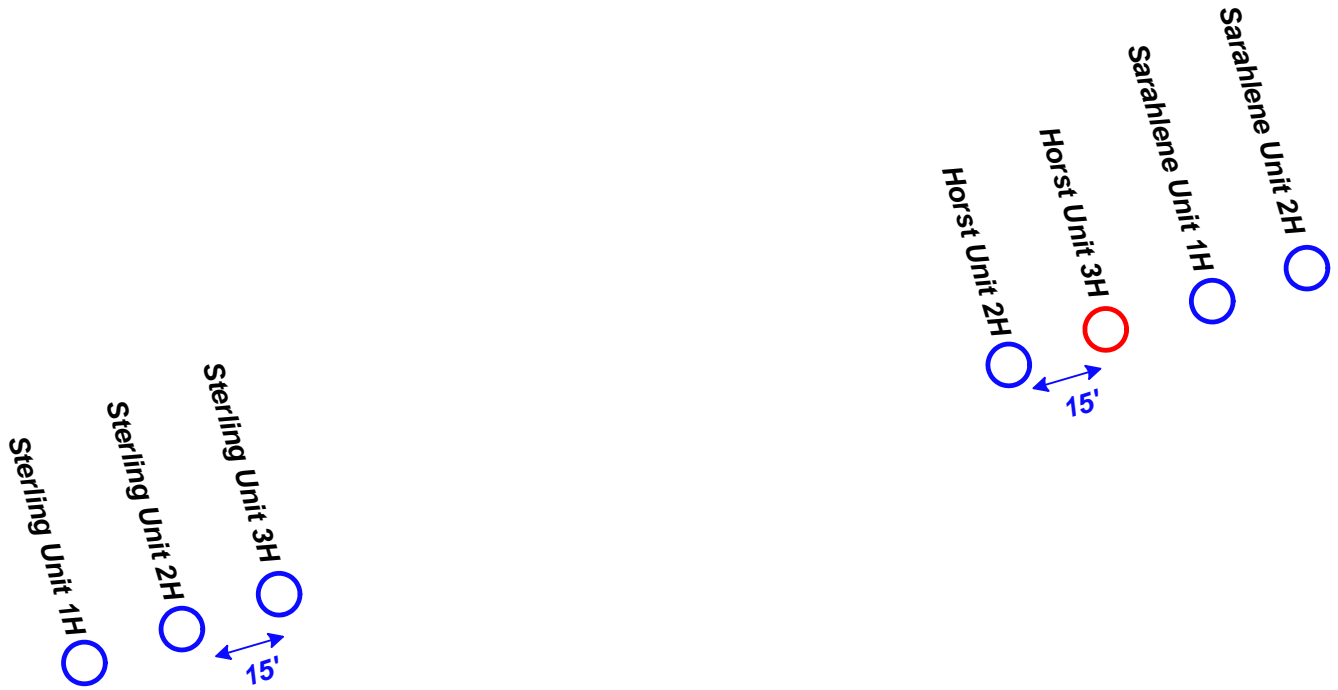




# EXHIBIT 7: WELL PAD SURFACE DIAGRAM


09/28/2018


## Meredith Pad




WELL NAME	API NUMBER	WELL STATUS
Sterling Unit 1H	Proposed Well	Proposed Well
Sterling Unit 2H	Proposed Well	Proposed Well
Sterling Unit 3H	Proposed Well	Proposed Well
Horst Unit 2H	Proposed Well	Proposed Well
Horst Unit 3H	Proposed Well	Permitted Well
Sarahlene Unit 1H	Proposed Well	Proposed Well
Sarahlene Unit 2H	Proposed Well	Proposed Well

**Legend**

 Existing Well

 Permitted Well

 Proposed Well

Updated: 7/24/2018

Not to Scale







west virginia department of environmental protection  
601 57th Street SE  
Charleston, WV 25304-2345  
Office of Oil and Gas  
Phone: (304) 926-0450

**WATER MANAGEMENT PLAN/  
WATER ADDENDUM**

- Horizontal Oil and Gas Well Permits
- Horizontal Oil and Gas Well Pads

DEP Office Use only	
Date Received by Oil & Gas:	7/27/18
Administratively Complete – Oil & Gas:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No: WS
Date Received by Water Use:	
Complete – Water Use:	<input type="checkbox"/> Yes <input type="checkbox"/> No

API: 047-095 - 02529  
(for modification requests, list all wells in Section IIb)

**Section I - Operator Information**

Operator Name: Antero Resources Corporation	
Operator ID: 494507062	*Registered in the Frac Water Reporting Website? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Contact Name/Title (Water Resources Manager): Gretchen Kohler/ Environmental and Regulatory Manager	Contact Mailing Address: 1615 Wynkoop Street Denver, CO 80202
Contact Phone: (303) 357-6718	Contact Email: gkohler@anteroresources.com

\*If no, the operator will be required to register with the WVDEP Water Use Section; contact [dep.water.use@wv.gov](mailto:dep.water.use@wv.gov)

**Section II(a)– Water Management Plan Overview**

Plan Type
<input type="checkbox"/> Well (individual)
<input checked="" type="checkbox"/> Well Pad

Plan Status
<input type="checkbox"/> New (include full application)
<input type="checkbox"/> Co-pending (include full application)
<input type="checkbox"/> Approved (include previously approved pad plan plus sections I - III)
<input checked="" type="checkbox"/> Modification* (include full application)

\*All modifications for well WMPs will be converted to Well Pad WMPs unless otherwise requested

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Well Number: <b>Sterling Unit 2H</b>	Well Pad Name (if applicable): <b>Meredith Pad</b>	
Well/Well Pad Location (decimal degrees, NAD83)		
Latitude: <b>39.348539</b>	Longitude: <b>-80.870270</b>	County: <b>Tyler</b>

**Section II(b) – Water Management Plan Coverage Detail (for pad plans only)**

Well Pad Name (for all well and well pad plans): Meredith Pad			County: Tyler	
			Location (decimal degrees, NAD83)	
WMP (old)	Well Number	API	Lat	Long
	Horst Unit 3H	047-095-02531	39.348656	-80.869798
	Horst Unit 1H	047-095-02517	39.348631	-80.869898
	Horst Unit 2H	047-095-02516	39.348645	-80.869848
	Sarahlene Unit 1H	047-095-02518	39.348670	-80.869748
	Sarahlene Unit 2H	047-095-02519	39.348681	-80.869698
	Sterling Unit 1H	047-095-02520	39.348528	-80.870320
	Sterling Unit 2H	047-095-02529	39.348539	-80.870270
	Sterling Unit 3H	047-095-02530	39.348553	-80.870220

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**Section III(a) – Source Water Overview**

**Estimated Water Needs:**

	Gallons
Construction (compaction)	44,062
Drilling (cement, mud systems)	1,512,000
Hydraulic Fracturing	110,825,000
Post-Fracturing (coil tubing, drill-outs)	90,000
Reclamation (hydroseeding)	55,000
Incidental Use (dust suppression)	142,800
Total	112,668,862
Onsite Storage Capacity	1,680,000

Anticipated Withdrawal Dates
Pad Construction Start: <b>06/01/2017</b>
Pad Reclamation End: 06/01/2022

**Anticipated water sources (check all that apply)**

<input checked="" type="checkbox"/> Streams/Rivers	<input type="checkbox"/> Groundwater	<input checked="" type="checkbox"/> Brokered Water	<input checked="" type="checkbox"/> Lake/Reservoir/Pond
<input checked="" type="checkbox"/> Centralized Freshwater Impoundment	<input checked="" type="checkbox"/> Centralized Waste Pit	<input type="checkbox"/> Aboveground Storage Tank	
<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Recycled Frac Water		

**Section III(b) — Aquatic Life Protection (if utilizing surface water, provide the following details)**

Describe Entrainment and Impingement Prevention Plan:

The water withdrawal hoses will be installed a minimum of 300 mm (12 in) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the streambed. Fish screens will be installed on the water withdrawal intake hoses to prevent losses of resident fresh water fish with a maximum opening size of 3/8th inch (~1 cm). The sizing of the fish screen will also afford protection of mussels. All withdrawal locations are inspected routinely by operations and environmental personnel.

Describe Invasive Species Transfer Prevention Plan:

Water withdrawal trucks and intake hoses will be disinfected on a routine basis.

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: <b>Fishing Creek at Blair Withdrawal</b>		
Landowner name and address: Charles & Kay Blair 10146 Shortline Highway Reader, WV 26167	Phone:  (304) 386-4618	
Intake Location (decimal degrees, NAD83)		
Latitude: <b>39.564294</b>	Longitude: <b>-80.727809</b>	County: <b>Wetzel</b>

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) <b>2,100</b>	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
(If no, advance written authorization by DEP is required. Attach authorization and details.)		

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge:
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: <b>Fishing Creek at McDiffitt Withdrawal</b>		
Landowner name and address: Tim McDiffitt 123 King Lane Porter Falls, WV 26162		Mike McDiffitt PO Box 332 Pine Grove, WV 26419
Phone:  (304) 266-8612		
Intake Location (decimal degrees, NAD83)		
Latitude: <b>39.569872</b>	Longitude: <b>-80.730877</b>	County: <b>Wetzel</b>

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) <b>2,100</b>	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
(If no, advance written authorization by DEP is required. Attach authorization and details.)		

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: McElroy Creek at Forest Withdrawal		
Landowner name and address: Forest C. Moore, Jr. and Brenda L. Moore HC 67 Box 157 West Union, WV 26456	Phone:  (304) 758-5127	
Intake Location (decimal degrees, NAD83)		
Latitude: 39.394932	Longitude: -80.739865	County: Tyler

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) 2,000	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
(If no, advance written authorization by DEP is required. Attach authorization and details.)		

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: <b>Meathouse Fork at Gagnon Withdrawal</b>		
Landowner name and address: George L. and Susan C. Gagnon Rt.1 Box 312 West Union, WV 26456		Phone:
Intake Location (decimal degrees, NAD83)		
Latitude: <b>39.261004</b>	Longitude: <b>-80.721239</b>	County: <b>Doddridge</b>

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) <b>3,000</b>	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
(If no, advance written authorization by DEP is required. Attach authorization and details.)		

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge:
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: Middle Island Creek at Dawson Withdrawal		
Landowner name and address: Gary D. Dawson and Rella A. Dawson HC 69, Box 31A Alma, WV 2630	Phone:  (304) 758-0160	
Intake Location (decimal degrees, NAD83)		
Latitude: 39.379292	Longitude: -80.867803	County: Tyler

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) 3,000	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
(If no, advance written authorization by DEP is required. Attach authorization and details.)

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: Middle Island Creek at Mees Withdrawal		
Landowner name and address: Sarah E. Mees 223 Autumn Run Rd. Friendly, WV 26146	Phone:  (304) 684-3940	
Intake Location (decimal degrees, NAD83)		
Latitude: 39.431130	Longitude: -81.079567	County: Pleasants

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) 3,360	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes  No   
(If no, advance written authorization by DEP is required. Attach authorization and details.)

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge:
Gauged Stream ; <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: Middle Island Creek at Weekley Withdrawal		
Landowner name and address: Roger and Claudia Weekley 1502 Next Road Sistersville, WV 26175	Phone:  (304) 758-0715	
Intake Location (decimal degrees, NAD83)		
Latitude: 39.506766	Longitude: -80.963050	County: Tyler

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) 3,000	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, advance written authorization by DEP is required. Attach authorization and details.)
---

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: Middle Island Creek at Weese Withdrawal		
Landowner name and address: Roger and Sandy Weese 105 Jefferson Run Road Alma, West Virginia 26320	Phone:  (304) 758-2633	
Intake Location (decimal degrees, NAD83)		
Latitude: 39.457959	Longitude: -80.839738	County: Tyler

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) 3,000	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
(If no, advance written authorization by DEP is required. Attach authorization and details.)		

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: <b>North Fork of Hughes River at Davis Withdrawal</b>		
Landowner name and address: Lewis P. and Norma J. Davis 4146 Mountain Dr. Pennsboro, WV 26415	Phone:  (304) 659-2249	
Intake Location (decimal degrees, NAD83)		
Latitude: <b>39.322363</b>	Longitude: <b>-80.936771</b>	County: <b>Ritchie</b>

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) <b>3,000</b>	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes <input type="checkbox"/> No <input type="checkbox"/>
(If no, advance written authorization by DEP is required. Attach authorization and details.)

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge:
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: Ohio River at Bens Run Withdrawal		
Landowner name and address: Bens Run Land Company Limited Partnership 1105 Schrock Road, Suite 602 Columbus, OH 43229	Phone:  (614) 885-1901	
Intake Location (decimal degrees, NAD83)		
Latitude: 39.465930	Longitude: -81.110781	County: Tyler

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) 4,200	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes  No   
(If no, advance written authorization by DEP is required. Attach authorization and details.)

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: <b>Ohio River at Webb Withdrawal</b>		
Landowner name and address: Larry Webb 1029 Hebron Road St. Mary's, WV 26170	Phone:  (304) 299-3088	
Intake Location (decimal degrees, NAD83)		
Latitude: <b>39.535300</b>	Longitude: <b>-81.039400</b>	County: <b>Tyler</b>

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) <b>5,040</b>	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes  No   
(If no, advance written authorization by DEP is required. Attach authorization and details.)

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: <b>Point Pleasant Creek @ Reel Withdrawal</b>		
Landowner name and address: John E. Roberts 433 Elk Fork Road Middlebourne, WV 26149	Phone:  (304) 758-2511	
Intake Location (decimal degrees, NAD83)		
Latitude: <b>39.539732</b>	Longitude: <b>-80.889712</b>	County: <b>Tyler</b>

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) <b>2,520</b>	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes  No   
(If no, advance written authorization by DEP is required. Attach authorization and details.)

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: South Fork of Hughes River at Knight Withdrawal		
Landowner name and address: Tracy C. Knight and Stephanie C. Knight P.O. Box 138 Pullman, WV 26421	Phone:  (304) 349-2121	
Intake Location (decimal degrees, NAD83)		
Latitude: 39.198369	Longitude: -80.870969	County: Ritchie

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) 3,000	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes  No   
(If no, advance written authorization by DEP is required. Attach authorization and details.)

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(a) – Stream/River Source** (to be completed for each surface water withdrawal location, print more pages as necessary)

Stream/River Name: West Fork River at McDonald		
Landowner name and address: William M. McDonald RR2 Box 215A Jane Lew, WV 26378	Phone:  (304) 677-5944	
Intake Location (decimal degrees, NAD83)		
Latitude: 39.167610	Longitude: -80.450690	County: Harrison

**Proposed Withdrawal Details**

Stationary Pump:	Total Maximum Pump Rate (gpm) 3,360	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

**Determination that sufficient flow is available downstream from proposed intake point**

Allow passby to be calculated by the DEP (Preferred)? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, advance written authorization by DEP is required. Attach authorization and details.)
---

**Stream details**

DEP Office Use Only			
Contact Recreation <input type="checkbox"/>	Aquatic Life-Trout Water <input type="checkbox"/>	Aquatic Life-Warm Water <input type="checkbox"/>	Drinking Water Supply <input type="checkbox"/>
Industrial <input type="checkbox"/>	Agriculture <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Reference Gauge: <input type="checkbox"/>
Gauged Stream : <input type="checkbox"/>	Stream Final Code:	Regulated by:	
Trout <input type="checkbox"/>	Sensitive Aquatic Species <input type="checkbox"/>	Tier 3 Streams <input type="checkbox"/>	Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>
Upstream Drainage Area?		Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(c) - Brokered Water Source** (to be completed for each water supplier; include each hydrant/tap location, print more pages as necessary)

Supplier Name: <b>Antero Clearwater Facility</b>		
Supplier name and address: Antero Clearwater Facility 364 Gum Run Road Pennsboro, WV 26415		Phone:
Hydrant/Tap Location(decimal degrees, NAD83)		
Latitude: 39.269603	Longitude: -80.892221	County: Doddridge
Supplier type		
<input type="checkbox"/> Public Water Provider	<input checked="" type="checkbox"/> Waste Water Treatment Plant	<input type="checkbox"/> Industrial (raw water intake locations must be provided below)
<input type="checkbox"/> Commercial Supplier (raw water intake location must be provided below)		<input type="checkbox"/> Private (raw water intake locations must be provided below)
Purchase Details		
Max. total daily purchase (gal): <b>1,700,000</b>	Additional location information:	

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**Section IV(c) - Brokered Water Source** (to be completed for each water supplier;  
include each hydrant/tap location, print more pages as necessary)

Supplier Name: <b>Claywood PSD</b>		
Supplier name and address: <b>James E. Burchard 1835 Montgomery Hill Road Walker, WV 26180</b>		Phone:
Hydrant/Tap Location(decimal degrees, NAD83)		
Latitude: <b>39.206358</b>	Longitude: <b>-81.497625</b>	County: <b>Wood</b>
Supplier type		
<input checked="" type="checkbox"/> Public Water Provider	<input type="checkbox"/> Waste Water Treatment Plant	<input type="checkbox"/> Industrial (raw water intake locations must be provided below)
<input type="checkbox"/> Commercial Supplier (raw water intake location must be provided below)		<input type="checkbox"/> Private (raw water intake locations must be provided below)
Purchase Details		
Max. total daily purchase (gal): <b>750,000</b>	Additional location information:	

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**Section IV(c) - Brokered Water Source** (to be completed for each water supplier; include each hydrant/tap location, print more pages as necessary)

Supplier Name: <b>Hall Yard Ellenboro Tap</b>		
Supplier name and address: Hall Yard 1137 E Washington Ave Ellenboro, WV 26346		Phone:
Hydrant/Tap Location(decimal degrees, NAD83)		
Latitude: 39.272104	Longitude: -80.045658	County: Ritchie
Supplier type		
<input checked="" type="checkbox"/> Public Water Provider	<input type="checkbox"/> Waste Water Treatment Plant	<input type="checkbox"/> Industrial (raw water intake locations must be provided below)
<input type="checkbox"/> Commercial Supplier (raw water intake location must be provided below)		<input type="checkbox"/> Private (raw water intake locations must be provided below)
Purchase Details		
Max. total daily purchase (gal): 200,000	Additional location information:	

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**Section IV(c) - Brokered Water Source** (to be completed for each water supplier; include each hydrant/tap location, print more pages as necessary)

Supplier Name: <b>Sun Valley Withdrawal</b>		
Supplier name and address: <b>Jeff Sperry 234 Power Road Salem, WV 26426</b>		Phone:
Hydrant/Tap Location(decimal degrees, NAD83)		
Latitude: <b>39.290626</b>	Longitude: <b>-80.518586</b>	County: <b>Harrison</b>
Supplier type		
<input checked="" type="checkbox"/> Public Water Provider	<input type="checkbox"/> Waste Water Treatment Plant	<input type="checkbox"/> Industrial (raw water intake locations must be provided below)
<input type="checkbox"/> Commercial Supplier (raw water intake location must be provided below)		<input type="checkbox"/> Private (raw water intake locations must be provided below)
Purchase Details		
Max. total daily purchase (gal): <b>200,000</b>	Additional location information:	

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**Section IV(c) - Brokered Water Source** (to be completed for each water supplier;  
include each hydrant/tap location, print more pages as necessary)

Supplier Name: The Town of Salem		
Supplier name and address: The Town of Salem 229 West Main Street Salem, WV 26426		Phone:
Hydrant/Tap Location(decimal degrees, NAD83)		
Latitude: 39.285930	Longitude: -80.546050	County: Harrison
Supplier type		
<input checked="" type="checkbox"/> Public Water Provider	<input type="checkbox"/> Waste Water Treatment Plant	<input type="checkbox"/> Industrial (raw water intake locations must be provided below)
<input type="checkbox"/> Commercial Supplier (raw water intake location must be provided below)		<input type="checkbox"/> Private (raw water intake locations must be provided below)
Purchase Details		
Max. total daily purchase (gal): 2,000,000	Additional location information:	

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**Section IV(d) - Lake/Reservoir/Farm Pond Water Source\*** (to be completed for each lake/reservoir, print more pages as necessary)

Lake/Reservoir/Farm Pond Name: <b>City of Pennsboro Lake</b>		
Owner name and address: City of Pennsboro 422 Main Street Pennsboro, WV 26415	Phone:	
Intake Location (decimal degrees, NAD83)		
Latitude: <b>39.283470</b>	Longitude <b>-80.924770</b>	County: <b>Ritchie</b>
Minimum release, if applicable (cfs):		
Withdrawal Details		
Stationary Pump:	Total Maximum Pump Rate (gpm) <b>1,000</b>	
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Annie Horizontal Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1211		COA ID: 085-FWC-00003	
Landowner name and address:  Annie B Haymond      Eddy F Landrum 4884 Mountian Drive    365 Burton Run Road Pennsboro, WV 26415    Pennsboro, WV 26415		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.327594</b>	Longitude: <b>-80.923932</b>	County: <b>Ritchie</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Bee Lewis Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1278		COA ID: 017-FWC-00011	
Landowner name and address: Lewis P. Bee                      Key Oil Company Route 1, Box 240-B              22 Garton Plaza West Union, WV 26456      Weston, WV 26452		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.253775</b>	Longitude: <b>-80.823197</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Bonnell Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1082		COA ID: 017-FWC-00006	
Landowner name and address: <b>James F and Jacqueline S Bonnell 184 Needmore Road New Milton, WV 26411</b>		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.208300</b>	Longitude: <b>-80.697500</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Foreman Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1418		COA ID: 017-FWC-00012	
Landowner name and address: Bruner Land Co. Inc., PO Box 98 Byesville, OH 43723 Dennis F. Foreman, Rt 1, Box 340, Salem, WV 26426 Richard D. & Marguerite A. Clevenger, Rt 1, Box 370, Salem, WV 26426		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.224865</b>	Longitude: <b>-80.624513</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit (to be completed for each source, print more pages as necessary)**

Centralized Impoundment/Pit Name: <b>Harshbarger North Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1295		COA ID: 085-FWC-00001	
Landowner name and address: <b>Jason Harshbarger 2551 Oxford Road Pullman, WV 26421</b>		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.185667</b>	Longitude: <b>-80.893694</b>	County: <b>Ritchie</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Harshbarger South Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1296		COA ID: 085-FWC-00002	
Landowner name and address: <b>Jason Harshbarger 2551 Oxford Road Pullman, WV 26421</b>		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.184222</b>	Longitude: <b>-80.893028</b>	County: <b>Ritchie</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Heaster Centralized Freshwater Impoundment</b>			
Referenced WMP#: 2054		COA ID: 095-FWC-00013	
Landowner name and address: Ray Edward & Susan P. Adkins 106 Harper Avenue Morrisville, PA 19067		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.437918</b>	Longitude: <b>-80.894090</b>	County: <b>Tyler</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Heflin Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1754		COA ID: 017-FWC-00018	
Landowner name and address: See attached list of Surface owners.		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.204619</b>	Longitude: <b>-80.551906</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Surface Owners (Impoundments/Pits):**

**Owner:** Virginia Catherine Cavezza  
**Address:** 340 Jackson Ave.  
 Sistersville, WV 26175

**Owner:** Jean A. Nicholson  
**Address:** 2200 Capital Dr.  
 Parkersburg, WV 26101

**Owner:** Gary L. Nicholson  
**Address:** 2264 Berry Creek Drive  
 Kettering, OH 45440

**Owner:** Clarence Everett Sperry  
**Address:** 112 Keys Ave.  
 Philippi, WV 26416

**Owner:** Peggy Lou Hurst  
**Address:** Route 1, Box 284  
 Lost Creek, WV 26385

**Owner:** David Nicholson  
**Address:** Route 2, Box 220  
 Jane Lew, WV 26378

**Owner:** Kristi Nicholson  
**Address:** 823 Westview Dr.  
 Belpre, OH 45714

**Owner:** Bernard Hurst, Jr.  
**Address:** Route 1, Box 284-A  
 Lost Creek, WV 26385

**Owner:** Clifford Bash  
**Address:** 5657 Lake Michigan Dr.  
 Fairfield, OH 45014

**Owner:** Laura Matundan  
**Address:** 10330 Hunters Path  
 New Braunfels, TX 78132

**Owner:** Katherine (Bash) Taylor  
**Address:** 1130 Doree Dr.  
 Marion, TX 78124

**Owner:** Janet L. Sperry  
**Address:** 5412 Chieftain Circle  
 Alexandria, VA 22312

**Owner:** L. Diane Sperry  
**Address:** 12427 Melling Lane  
 Bowie, MD 20715

**Owner:** Jeffrey J. Ford  
**Address:** 15 Meadow Lane  
 Bridgeport, WV 26330

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Hinte Heirs North Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1079		COA ID: 017-FWC-00001	
Landowner name and address: David and Vivian Burton 1094 Williamstown Pike Williamstown, WV 26187		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.187643</b>	Longitude: <b>-80.707398</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Hinter Heirs South Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1080		COA ID: 017-FWC-00002	
Landowner name and address: <b>David and Vivian Burton 1094 Williamstown Pike Williamstown, WV 26187</b>		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.186011</b>	Longitude: <b>-80.706206</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>James Webb Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1585		COA ID: 017-FWC-00017	
Landowner name and address: <b>James E. Webb Route 1 Box 208-A West Union, WV 26456</b>		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.237935</b>	Longitude: <b>-80.871925</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Lake Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1208	COA ID: 017-FWC-00007		
Landowner name and address: Antero Resources Corporation 1615 Wynkoop Street Denver, CO 80202		Phone:  (303) 357-7310	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.203073</b>	Longitude: <b>-80.539371</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Lemley Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1831		COA ID: 017-FWC-00021	
Landowner name and address: Mt. Salem Revival Grounds - PO Box 186, West Union, WV 26456 Mt. Salem Revival Grounds - PO Box 177, West Union, WV 26456 Jeffrey Hill - 35 Timberland Dr., Parkersburg, WV 26104 Craig A. Hill - 15 James Ct, Parkersburg, WV 26105 Phillip N. Hill - 3509 11th Ave., Vienna, WV 26105 Phillip N. Hill - 35 Timberland, WV 26104		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.324698</b>	Longitude: <b>-80.686529</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Long Run Centralized Impoundment</b>			
Referenced WMP#: 2326		COA ID: 017-FWC-00280	
Landowner name and address: Richard F. McCullough RR 1 Box 770 Greenwood, WV 26415		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.299561</b>	Longitude: <b>-80.860082</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Marsden Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1081		COA ID: 017-FWC-00010	
Landowner name and address: Richard and Wilma Marsden 3107 E Nance Street Mesa, AZ 85213		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.247110</b>	Longitude: <b>-80.600019</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Melody Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1886		COA ID: 017-FWC-00049	
Landowner name and address: Robert J. and Cindy L. Smith 2725 Canton Road West Union, WV 26456		Landowner name and address: Larry M. and Carolyn A. Sams RT 2 Box 293 West Union, WV 26456	
Phone:			
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.358483</b>	Longitude: <b>-80.761030</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Nimowicz East Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1373		COA ID: 033-FWC-00005	
Landowner name and address: Tillman Lee Williams      Donna Frumento & Robert Nimowicz RR 5 Box 706                6816 Kingfisher Ct Salem, WV 26426          Frederick, MD 21703		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.248678</b>	Longitude: <b>-80.562731</b>	County: <b>Harrison</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Nimorwicz West Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1372		COA ID: 033-FWC-00006	
Landowner name and address: Tillman Lee Williams      Donna Frumento & Robert Nimorwicz RR 5 Box 706                6816 Kingfisher Ct Salem, WV 26426            Frederick, MD 21703		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.247626</b>	Longitude: <b>-80.563944</b>	County: <b>Harrison</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Pearl Jean North Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1175		COA ID: 017-FWC-00009	
Landowner name and address: Dean R. and Martha A. Pennington Rt 2 Box 207 West Union, WV 26456		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.288155</b>	Longitude: <b>-80.674637</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Pearl Jean South Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1176		COA ID: 017-FWC-00008	
Landowner name and address: Dean R. & Martha A. Pennington Rt 2 Box 207 West Union, WV 26456		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.288155</b>	Longitude: <b>-80.674637</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Pierpoint Centralized Freshwater Impoundment</b>			
Referenced WMP#: 2055		COA ID: 095-FWC-00014	
Landowner name and address: Lloyd Carl Seckman - PO Box 8, Alma, WV 26320 Jeffrey Allen Seckman - RR 2 Box 227, New Martinsville, WV 26155 Randall Joseph Seckman - 43008 West Union Road, Sardis, OH 43946		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.452811</b>	Longitude: <b>-80.855064</b>	County: <b>Tyler</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Quinn Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1209		COA ID: 033-FWC-00004	
Landowner name and address: <b>Antero Resources Corporation 1615 Wynkoop Street Denver, CO 80202</b>		Phone:  <b>(303) 357-7310</b>	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.197389</b>	Longitude: <b>-80.506639</b>	County: <b>Harrison</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Within zone of critical concern? Yes <input type="checkbox"/> No <input type="checkbox"/>	

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Spiker Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1914		COA ID: 017-FWC-00056	
Landowner name and address: George Adrain et al - 196 Trails End Rd, West Union, WV 26456 Nelson & Donna Ellmore - 10 Burke Circle, Hamilton, VA 20158 Larry & Cynthia Bassett - 89 Chillott Lane, Bluemont, VA 20135 Paul & Rhema Crowley - 112 W Virginia Ave, Hamilton, VA 20159 Ronnie Yopp - 3 Ballenger Way, Round Hill, VA 20141 John & Sue Spiker - 166 Linden Lane, Jane Lew, WV 26378		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.242601</b>	Longitude: <b>-80.745903</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Whitehair Centralized Freshwater Impoundment</b>			
Referenced WMP#: 1419		COA ID: 017-FWC-00013	
Landowner name and address: Elton & Judith Whitehair - 3108 Meathouse Fork Rd, New Milton, WV 26411 Judith Ann Hickman - 474 Valley Manor Lane, Williamstown, WV 26187 Coastal Forest Resources, PO Box 709, Buckhannon, WV 26201 Rexall Crislip, et al - 4497 Brushy Fork Rd, New Milton, WV 26411		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.202767</b>	Longitude: <b>-80.688767</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Coastal 1 North Centralized Waste Pit</b>			
Referenced WMP#: 2271		COA ID: 095-WPC-00001	
Landowner name and address: Coastal Forest Resources Company P.O. Box 709 Buckhannon, WV 26201		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.426401</b>	Longitude: <b>-80.731033</b>	County: <b>Tyler</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Hamilton Centralized Waste Pit</b>			
Referenced WMP#: 2269		COA ID: 017-WPC-00169	
Landowner name and address: Kenny Hamilton - 3295 Canton Road, West Union, WV 26456 Robert J Smith - 2725 Canton Road, West Union, WV 26456		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.136854</b>	Longitude: <b>-80.740099</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Hubert Centralized Waste Pit</b>			
Referenced WMP#: 2263		COA ID: 033-WPC-00001	
Landowner name and address: Hubert Bland 3912 Halls Run Rd Salem, WV 26426		Arnet & Ophelia Thompson 10736 Amez Road Jacksonville, FL 32218	
		Phone:  (304) 871-1915	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.251019</b>	Longitude: <b>-80.558642</b>	County: <b>Harrison</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Lockhart Heirs Centralized Waste Pit</b>			
Referenced WMP#: 2251		COA ID: 085-WPC-00063	
Landowner name and address: Mary Frances Harms - 4368 Steuben Woods Dr., Steubenville, OH 43952 Nancy Louise Antill - 114 Melinda Dr., Wintersville, OH 43953 Karen Hooven - #4 Amador, Newport Coast, CA 92567 Karah & Kelcie Loftin - 226 Surrey Ct., OFallon, MO 63366 O'Neill Family Trust - 30640 Rapids Hollow, Gravois Mills, MO 65037 Sharon O'Neill - 696 San Ramon Vally #510, Danville, CA 94526 Romario LLC - 757SE 17th St, Ste 1085, FtLauderdale, FL 33316 Timothy O'Neill - 15025 Iona Lake Dr., Meyers Beach, FL 33908		Phone:  <b>(573) 372-9977</b>	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.189694</b>	Longitude: <b>-80.889806</b>	County: <b>Ritchie</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>McGill Centralized Waste Pit</b>			
Referenced WMP#: 2270		COA ID: 017-WPC-00170	
Landowner name and address: James & Thomas Starcher 7840 Woodside Terrace ,T2 Glen Burnie, MD 21061  Frank and Shirley McGill 703 Amanda Lea Lane West Union, WV 26456		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.272922</b>	Longitude: <b>-80.849311</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Pennington North Centralized Waste Pit</b>			
Referenced WMP#: 2252		COA ID: 017-WPC-00167	
Landowner name and address: Bernard and Maureen Pennington, 1989 Webley Fork Rd., New Milton, WV 26411  Ike Morris, 1595 US 33, Glenville, WV 26351		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.210446</b>	Longitude: <b>-80.740887</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Richard Garry Centralized Waste Pit</b>			
Referenced WMP#: 2273		COA ID: 017-WPC-00272	
Landowner name and address: Richard Garry Robinson 173 Rainbow Drive 7340 Livingston, TX 77399		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.190667</b>	Longitude: <b>-80.715571</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

<b>DEP Office Use Only</b>	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(e) – Centralized Impoundment/Waste Pit** (to be completed for each source, print more pages as necessary)

Centralized Impoundment/Pit Name: <b>Vogt Centralized Waste Pit</b>			
Referenced WMP#: 2268		COA ID: 017-WPC-00168	
Landowner name and address: Troy Cunningham - 1643 Duckworth Rd., Pennsboro, WV 26415 Annabelle Riffle - 1538 Duckworth Rd., Pennsboro, WV 26415 Greg & Carolyn Vogt - 29 Lois Lane, Greenwood, WV 26415		Phone:	
Facility Location (decimal degrees, NAD83)			
Latitude: <b>39.277517</b>	Longitude: <b>-80.864889</b>	County: <b>Doddridge</b>	Registered LQU? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operator name and address (if different than applicant):		Phone (if different than applicant):	
Withdrawal Details			
Stationary Pump:	Total Maximum Pump Rate (gpm)		
Direct Truck Withdrawal:	Max. Pump Rate per Truck (gpm):	No. Trucks Simultaneously Pumping:	

DEP Office Use Only	
Within 1 mile upstream of a PSD?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within zone of critical concern?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>

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**Section IV(g) - Reused Frac Water (to be completed for each anticipated source)**

Well Pad (where water was obtained from): <b>Mulvay Pad</b>	Well Pad (where water was obtained from): <b>Middle Pad</b>
Well Pad (where water was obtained from): <b>Lemuel Pad</b>	Well Pad (where water was obtained from): <b>Bison Pad</b>
Well Pad (where water was obtained from): <b>Gadd Pad</b>	Well Pad (where water was obtained from): <b>OXFD13 Pad</b>
Well Pad (where water was obtained from): <b>Pyle Run Pad</b>	Well Pad (where water was obtained from): <b>Dogwood Pad</b>
Well Pad (where water was obtained from): <b>OXFD97 Pad</b>	Well Pad (where water was obtained from): <b>Hadley Pad</b>
Well Pad (where water was obtained from): <b>Lettie Pad</b>	Well Pad (where water was obtained from): <b>Balli Pad</b>
Well Pad (where water was obtained from): <b>Dawson Pad</b>	Well Pad (where water was obtained from): <b>Weigle East Pad</b>
Well Pad (where water was obtained from): <b>Pool Pad</b>	Well Pad (where water was obtained from): <b>Strickling Pad</b>
Well Pad (where water was obtained from): <b>Alexander Pad</b>	Well Pad (where water was obtained from): <b>Hichman Pad</b>
Well Pad (where water was obtained from): <b>Sine Pad</b>	Well Pad (where water was obtained from): <b>Terry Snider Pad</b>
Well Pad (where water was obtained from): <b>Ritchie Petroleum Pad</b>	Well Pad (where water was obtained from): <b>Stonefly Pad</b>
Well Pad (where water was obtained from): <b>Neat Pad</b>	Well Pad (where water was obtained from): <b>Jackman Pad</b>

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\*Water to be obtained from nearby well pads. Pad sites subject to change based on operational needs.\*

**Section IV(g) - Reused Frac Water (to be completed for each anticipated source)**

Well Pad (where water was obtained from): <b>Deets Pad</b>	Well Pad (where water was obtained from): <b>Vera Pad</b>
Well Pad (where water was obtained from): <b>McKim Pad</b>	Well Pad (where water was obtained from): <b>Lemley Pad</b>
Well Pad (where water was obtained from): <b>Weekley Trust Pad</b>	Well Pad (where water was obtained from): <b>Meredith Pad</b>
Well Pad (where water was obtained from): <b>Ferrell Pad</b>	Well Pad (where water was obtained from): <b>Addie Pad</b>
Well Pad (where water was obtained from): <b>Reel Pad</b>	Well Pad (where water was obtained from): <b>Rush Fork Pad</b>
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):
Well Pad (where water was obtained from):	Well Pad (where water was obtained from):

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\*Water to be obtained from nearby well pads. Pad sites subject to change based on operational needs.\*

**Section V – Planned Disposal Method**

			<i>Estimate % each facility is to receive</i>			
	Name	Location (decimal degrees, NAD83)	Permit #	Fracturing	Stimulation	Production
UIC	See Below Attachment	Lat:  Long:		9 0		
NPDES (Treatment Plant)		Lat:  Long:		0		
Re-Use	See Section IV(g)	Lat:  Long:		9		
Other	Solidification Petta Enterprises, LLC	Lat:  Long:		1		

**Section VI - Planned Additives to be used in Fracturing or Stimulations** (attach list to form)

**Section VII - Operator Comments**

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**Section VIII – Plan Reviewed By**

DEP Office Use only		
API #		
Name:	Signature:	Date:
DEP Comments:		

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**Subdivision 3.3.e A listing of the anticipated additives that may be used in the water used for fracturing or stimulating the well.** (A listing of the additives that were actually used in the fracturing or stimulating of the well shall be submitted as part of the completion report required by W. Va. Code 22-6-22.)

**FRACTURING/STIMULATING INTERVAL**

Additive	Chemical Abstract Service Number (CAS #)
1. Fresh Water	7732-18-5
2. 2 Phosphobutane 1,2,4 tricarboxylic acid	37971-36-1
3. Ammonium Persulfate	7727-54-0
4. Anionic copolymer	Proprietary
5. Anionic polymer	Proprietary
6. BTEX Free Hydrotreated Heavy Naphtha	64742-48-9
7. Cellulase enzyme	(Proprietary)
8. Demulsifier Base	(Proprietary)
9. Ethoxylated alcohol blend	Mixture
10. Ethoxylated Nonylphenol	68412-54-4
11. Ethoxylated oleylamine	26635-93-8
12. Ethylene Glycol	107-21-1
13. Glycol Ethers	111-76-2
14. Guar gum	9000-30-0
15. Hydrogen Chloride	7647-01-0
16. Hydrotreated light distillates, non-aromatic, BTEX free	64742-47-8
17. Isopropyl alcohol	67-63-0
18. Liquid, 2,2-dibromo-3- nitrilopropionamide	10222-01-2
19. Microparticle	Proprietary
20. Petroleum Distillates (BTEX Below Detect)	64742-47-8
21. Polyacrylamide	57-55-6
22. Propargyl Alcohol	107-19-7
23. Propylene Glycol	57-55-6
24. Quartz	14808-60-7
25. Sillica crystalline quartz	7631-86-9
26. Sodium Chloride	7647-14-5
27. Sodium Hydroxide	1310-73-2
28. Sugar	57-50-1
29. Surfactant	68439-51-0
30. Suspending agent (solid)	14808-60-7
31. Tar bases, quinolone derivs, benzyl chloride-quarternized	72480-70-7
32. Solvent Naptha, petroleum, heavy aliph	64742-96-7
33. Soybean Oil, Me ester	67784-80-9
34. Copolymer of Maleic and Acrylic Acid	52255-49-9
35. DETA Phosphonate	15827-60-8
36. Hexamethylene Triamine Penta	34690-00-1
37. Phosphino Carboxylic acid polymer	71050-62-9
38. Hexamethylene diamine penta	23605-74-5
39. 2-Propenoic acid, polymer with 2 propenamide	9003-06-9
40. Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5
41. Diethylene Glycol	111-46-6
42. Methenamine	100-97-0
43. Polyethylene polyamine	68603-67-8
44. Coco amine	61791-14-8
45. 2-Propyn-1-olcompound with methyloxirane	38172-91-7

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## Planned Disposal Method-UIC

API	Operator	Well Name	State	Coordinates Lat/Long NAD 83
3400923821	Central Environmental Services, LLC	K&H Partners LLC #1 (SWIW #8)	OH	39.226075, - 81.761403
3400923823	Central Environmental Services, LLC	K&H Partners LLC #2 (SWIW #10)	OH	39.234815, - 81.757166
3400923824	Central Environmental Services, LLC	K&H Partners LLC #3 (SWIW #11)	OH	39.235082, - 81.748312
3416729731	Redbird Development, LLC	Redbird #2 (SWIW #18)	OH	39.337326, - 81.674314
3410523651	GreenHunter Water, LLC	Murphy Hunter #3 (SWIW #23)	OH	38.964640, - 81.785835
3410523637	GreenHunter Water, LLC	Mills Hunter #3 (SWIW #22)	OH	38.969738, - 81.786124
3410523652	GreenHunter Water, LLC	Mills Hunter #2 (SWIW #21)	OH	38.932919, - 81.788641
3410523619	GreenHunter Water, LLC	Mills Hunter #1 (SWIW #19)	OH	38.940522, - 81.787707
3412123995	GreenHunter Water, LLC	Warren Drilling Co. (SWIW #6)	OH	39.653808, - 81.475312
3412124086	GreenHunter Water, LLC	Travis Unit (SWIW #7)	OH	39.656785, - 81.480809
3405923986	Clearwater Solutions, LLC	Clearwater III #1 (SWIW #15)	OH	40.027300, - 81.511168
3405924473	Clearwater Solutions, LLC	Bo #1 (SWIW #20)	OH	40.027878, - 81.509974
3405924445	Clearwater Solutions, LLC	Effie #1 (SWIW#17)	OH	40.027364, - 81.449869
4708510142	GreenHunter Water, LLC	Ritchie Hunter #2 (2W-1652) (UIC2D08510142)	WV	39.256623, - 81.097484

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## Water Management Plan: Well Pad Overview



WMP 02320

Operator:

Antero Resources

Plan Type: Well Pad

Meredith Well Pad

County:

Tyler

**MODIFICATION Effective: 9/21/2018**

This Water Management Plan governs all water withdrawals associated with the identified well pad. This plan supercedes any previously approved water management plans issued for the included wells. This plan is not in effect until at least one well-work permit identified below has been issued, and remains valid until all listed permits are released or expire.

API Number:	Well Name/Number:
047-095-02531	Horst Unit 3H
047-095-02517	Horst Unit 1H
047-095-02516	Horst Unit 2H
047-095-02518	Sarahlene Unit 1H
047-095-02519	Sarahlene Unit 2H
047-095-02520	Sterling Unit 1H
047-095-02529	Sterling Unit 2H
047-095-02530	Sterling Unit 3H

API Number:	Well Name/Number:

The following water consumption estimates (in gallons) have been reported for this plan:

Construction:	44,062
Drilling Activities:	1,512,000
Hydraulic Fracture:	110,825,000
Post-Fracture:	90,000
Incidental Uses:	142,800
Reclamation Activities:	55,000
<b>Total for Well Pad</b>	<b>112,668,862</b>

Est. Construction Start:	6/1/2017
Est. Reclamation End:	6/1/2022





## Water Management Plan: Primary Water Sources



WMP 02320

API/ID Number

see overview

Operator:

Antero Resources

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP’s assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

For any sources identified by DEP as having known mussel, trout, or endangered species populations, the operator should consult with the Department of Natural Resources and the United States Fish and Wildlife Service prior to initiating any withdrawals.

**DEP is aware that some intake points will be used for multiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interpreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.**

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator’s responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov. Signage requirements must be satisfied within 24 hours of activating this water management plan.



Source Summary

MODIFICATION

09/28/2018

WMP 02320

API Number:

Operator:

Plan Type Well Pad

**Stream/River**

● Source **Fishing Creek @ Blair** Wetzel Owner: **Charles and Kay Blair**

Max. daily purchase (gal)

Intake Latitude: Intake Longitude:

39.564294 -80.727809

Regulated Stream?

Ref. Gauge ID: 3114500

MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 2,100 Min. Gauge Reading (cfs): 72.18 Min. Passby (cfs): 20.43**

DEP Comments:

● Source **Fishing Creek @ McDiffitt** Wetzel Owner: **Tim McDiffitt**

Max. daily purchase (gal)

Intake Latitude: Intake Longitude:

39.569872 -80.730877

Regulated Stream?

Ref. Gauge ID: 3114500

MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 2,100 Min. Gauge Reading (cfs): 72.18 Min. Passby (cfs): 20.43**

DEP Comments:

● Source **McElroy Creek @ Forest Withdrawal** Tyler Owner: **Forest C. & Brenda L. Moore**

Max. daily purchase (gal)

Intake Latitude: Intake Longitude:

39.39675 -80.738197

Regulated Stream?

Ref. Gauge ID: 3114500

MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 2,000 Min. Gauge Reading (cfs): 72.54 Min. Passby (cfs): 13.10**

DEP Comments:

● Source **Meathouse Fork @ Gagnon Withdrawal** Doddridge Owner: **Susan C. Gagnon and Susan C. Gagnon** ~~09/28/2018~~

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.26054 -80.720998

Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 3,000 Min. Gauge Reading (cfs): 76.42 Min. Passby (cfs): 11.74**

DEP Comments:

● Source **Middle Island Creek @ Dawson Withdrawal** Tyler Owner: **Gary D. and Rella A. Dawson**

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.379292 -80.867803

Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 3,000 Min. Gauge Reading (cfs): 76.03 Min. Passby (cfs): 28.83**

DEP Comments:

● Source **Middle Island Creek @ Mees Withdrawal Site** Pleasants Owner: **Sarah E. Mees**

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.43113 -81.079567

Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 3,360 Min. Gauge Reading (cfs): 52.59 Min. Passby (cfs): 47.63**

DEP Comments:

● Source **Middle Island Creek @ Weekley** Tyler Owner: **09/28/2018** ~~09/28/2018~~ **Cladia M. Weekley**

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.50677 -80.963058

Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 3,000 Min. Gauge Reading (cfs): 54.56 Min. Passby (cfs): 44.28**

DEP Comments:

● Source **Middle Island Creek @ Weese Withdrawal Site** Tyler Owner: **Roger & Sandy Weese**

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.457972 -80.839742

Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 3,000 Min. Gauge Reading (cfs): 65.60 Min. Passby (cfs): 44.97**

DEP Comments:

● Source **North Fork of Hughes River @ Davis Withdrawal** Ritchie Owner: **Lewis P. Davis and Norma J. Davis**

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.322363 -80.936771

Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

**Max. Pump rate (gpm): 3,000 Min. Gauge Reading (cfs): 39.69 Min. Passby (cfs): 2.19**

DEP Comments:

● Source **Ohio River @ Ben's Run Withdrawal Site** Tyler Owner: **Ben's Run Company Limited Partnership** 09/28/2018

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.46593 -81.110781

Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999999 Ohio River Station: Willow Island Lock & Dam

**Max. Pump rate (gpm): 4,200 Min. Gauge Reading (cfs): 6,468.00 Min. Passby (cfs):**

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: <http://www.erh.noaa.gov/ohrfc//flows.shtml>

● Source **Ohio River @ Webb** Tyler Owner: **Larry Webb**

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.5353 -81.0394

Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999999 Ohio River Station: Willow Island Lock & Dam

**Max. Pump rate (gpm): 5,040 Min. Gauge Reading (cfs): 6,468.00 Min. Passby (cfs):**

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: <http://www.erh.noaa.gov/ohrfc//flows.shtml>

● Source **Point Pleasant Creek @ Reel** Tyler Owner: **John E. Roberts**

Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
39.539732 -80.889712

Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

**Max. Pump rate (gpm): 2,520 Min. Gauge Reading (cfs): 73.11 Min. Passby (cfs): 6.70**

DEP Comments:

● Source **South Fork of Hughes River @ Knight Withdrawal** Ritchie Owner: **09/28/2018 Knight & Stephanie C. Knight**

Max. daily purchase (gal)

Intake Latitude: Intake Longitude:

39.198369

-80.870969

Regulated Stream?

Ref. Gauge ID: 3155220

SOUTH FORK HUGHES RIVER BELOW  
MACFARLAN, WV

**Max. Pump rate (gpm): 3,000 Min. Gauge Reading (cfs): 39.80 Min. Passby (cfs): 1.95**

DEP Comments:

● Source **West Fork River @ McDonald Withdrawal** Harrison Owner: **David Shrieves**

Max. daily purchase (gal)

Intake Latitude: Intake Longitude:

39.16761

-80.45069

Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

**Max. Pump rate (gpm): 3,360 Min. Gauge Reading (cfs): 175.80 Min. Passby (cfs): 106.30**

DEP Comments:

Source Summary

**MODIFICATION**

**Effective: 9/21/2018  
09/28/2018**

WMP 02320

API Number: see overview

Operator: Antero Resources

Plan Type Well Pad

Meredith Well Pad

**Purchased Water**

● Source **Claywood Park PSD** Wood Owner: **Claywood Park PSD**

Max. daily purchase (gal)  
750,000

Intake Latitude: - Intake Longitude: -

Regulated Stream?

Ref. Gauge ID: 9999998

Ohio River Station: Racine Dam

**Max. Pump rate (gpm):**

**Min. Gauge Reading (cfs): 7,216.00**

**Min. Passby (cfs):**

DEP Comments:

Elevation analysis indicates that this location has approximately the same elevation as Little Kanawha's pour point into the Ohio River. As such, it is deemed that water flow at this location is heavily influenced by the Ohio River.

● Source **Sun Valley Public Service District** Harrison Owner: **Sun Valley PSD**

Max. daily purchase (gal)  
200,000

Intake Latitude: - Intake Longitude: -

Regulated Stream?

Stonewall Jackson Dam Ref. Gauge ID: 3061000

WEST FORK RIVER AT ENTERPRISE, WV

**Max. Pump rate (gpm):**

**Min. Gauge Reading (cfs): 171.48**

**Min. Passby (cfs):**

DEP Comments:

## Source Detail

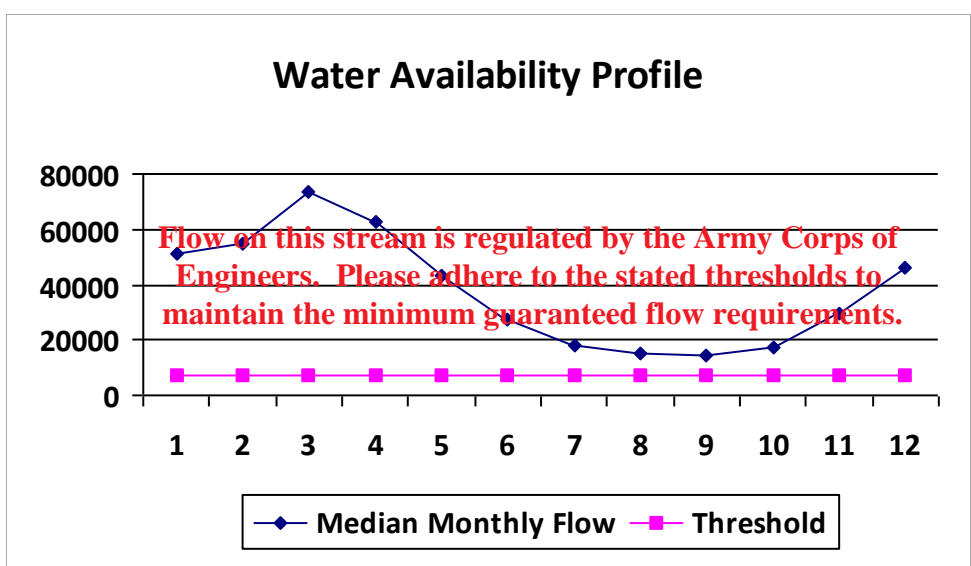
**MODIFICATION** 09/28/2018  
Effective: 9/21/2018

WMP 02320	API/ID Number	see overview	Operator:	Antero Resources
Plan Type: Well Pad	Meredith Well Pad			

Source ID:	64108	Source Name:	Claywood Park PSD	Source Latitude:	-
			Claywood Park PSD	Source Longitude:	-
HUC-8 Code:	5030203	Drainage Area (sq. mi.):	25000	County:	Wood
<input type="checkbox"/> Endangered Species?	<input checked="" type="checkbox"/> Mussel Stream?	<input type="checkbox"/> ZCC			
<input type="checkbox"/> Trout Stream?	<input type="checkbox"/> Tier 3?	<input type="checkbox"/> WH			
<input checked="" type="checkbox"/> Regulated Stream?					Max. Pump rate (gpm):
<input checked="" type="checkbox"/> Proximate PSD?	Claywood Park PSD				Max. Simultaneous Trucks:
<input checked="" type="checkbox"/> Gauged Stream?					Max. Truck pump rate (gpm):
					0
					0

Reference Gauge:	999998	Ohio River Station: Racine Dam
Drainage Area (sq. mi.):	25,000.00	Gauge Threshold (cfs):
		7216

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	50,956.00	-	-
2	54,858.00	-	-
3	73,256.00	-	-
4	62,552.00	-	-
5	43,151.00	-	-
6	27,095.00	-	-
7	17,840.00	-	-
8	14,941.00	-	-
9	14,272.00	-	-
10	17,283.00	-	-
11	29,325.00	-	-
12	46,050.00	-	-



### Water Availability Assessment of Location

Base Threshold (cfs)	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	-
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
<hr/>	
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

**Source Detail**

**MODIFICATION** 09/28/2018

WMP 02320

API/ID Number

Operator:

Plan Type: Well Pad

Source ID:  Source Name:

Source Latitude:   
 Source Longitude:

HUC-8 Code:

Drainage Area (sq. mi.)  County:

- Endangered Species?  Mussel Stream?  ZCC
- Trout Stream?  Tier 3?  WH
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

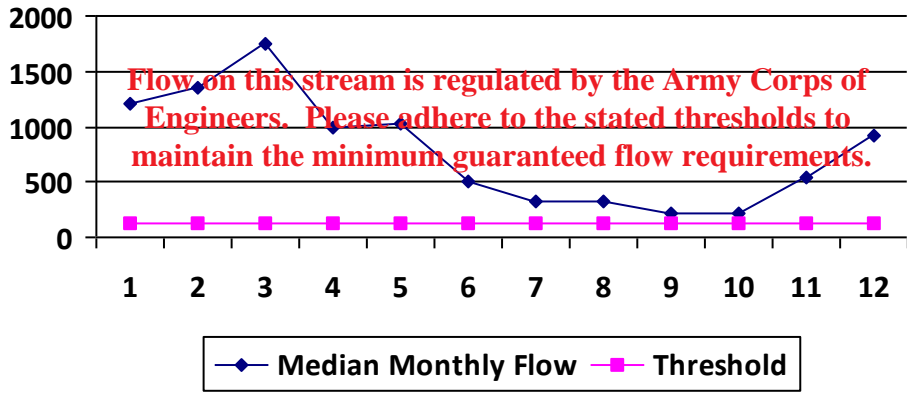
Reference Gauge:

Drainage Area (sq. mi.):

Gauge Threshold (cfs):

<u>Month</u>	<u>Median monthly flow (cfs)</u>	<u>Threshold (+ pump rate)</u>	<u>Estimated Available water (cfs)</u>
1	1,200.75	-	-
2	1,351.92	-	-
3	1,741.33	-	-
4	995.89	-	-
5	1,022.23	-	-
6	512.21	-	-
7	331.86	-	-
8	316.87	-	-
9	220.48	-	-
10	216.17	-	-
11	542.45	-	-
12	926.12	-	-

**Water Availability Profile**



**Water Availability Assessment of Location**

Base Threshold (cfs)

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs):

Ungauged Stream Safety (cfs):

---

Min. Gauge Reading (cfs):

Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



**Source Detail**

**MODIFICATION 09/28/2018**

WMP 02320

API/ID Number

Operator:

Plan Type: Well Pad

Source ID:  Source Name:

Source Latitude:   
 Source Longitude:

HUC-8 Code:

Drainage Area (sq. mi.)  County:

- Endangered Species?  Mussel Stream?  ZCC
- Trout Stream?  Tier 3?  WH
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

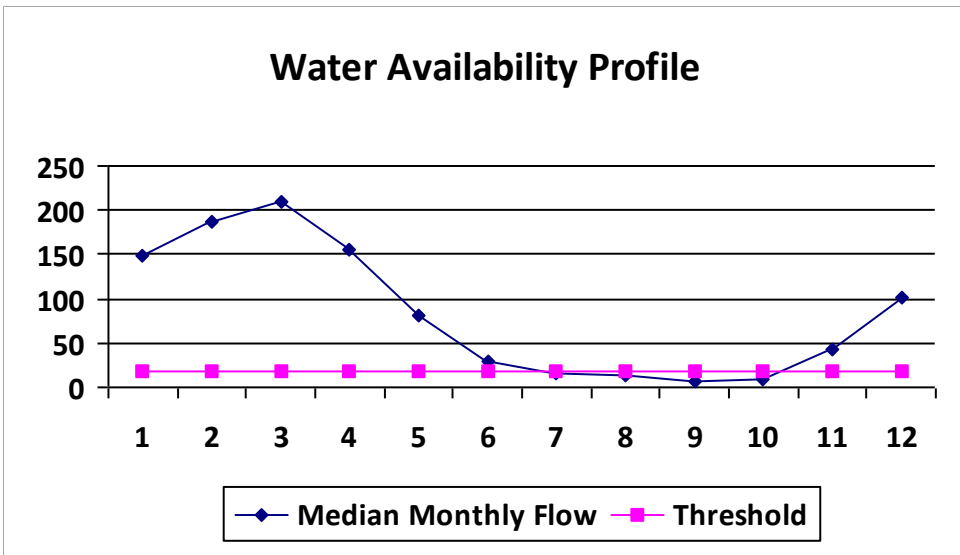
Max. Truck pump rate (gpm):

Reference Gauge:

Drainage Area (sq. mi.):

Gauge Threshold (cfs):

<u>Month</u>	<u>Median monthly flow (cfs)</u>	<u>Threshold (+ pump rate)</u>	<u>Estimated Available water (cfs)</u>
1	148.71	25.12	123.72
2	187.06	25.12	162.07
3	209.31	25.12	184.32
4	155.43	25.12	130.44
5	81.99	25.12	57.00
6	28.63	25.12	3.64
7	16.20	25.12	-8.79
8	13.34	25.12	-11.65
9	6.83	25.12	-18.16
10	8.59	25.12	-16.41
11	41.92	25.12	16.93
12	102.43	25.12	77.44



**Water Availability Assessment of Location**

Base Threshold (cfs)   
 Upstream Demand (cfs):   
 Downstream Demand (cfs):   
 Pump rate (cfs):   
 Headwater Safety (cfs):   
 Ungauged Stream Safety (cfs):

Min. Gauge Reading (cfs):

Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

MODIFICATION ~~09/28/2018~~ 09/28/2018

WMP 02320	API/ID Number	see overview	Operator:	Antero Resources
Plan Type: Well Pad	Meredith Well Pad			

Source ID: 64094	Source Name: Fishing Creek @ McDiffitt	Source Latitude: 39.569872
	Tim McDiffitt	Source Longitude: -80.730877

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 138.67 County: Wetzel

- |  |   |                              |
|--|---|------------------------------|
| <input type="checkbox"/> Endangered Species? | <input type="checkbox"/> Mussel Stream? | <input type="checkbox"/> ZCC |
| <input type="checkbox"/> Trout Stream?       | <input type="checkbox"/> Tier 3?        | <input type="checkbox"/> WH  |
| <input type="checkbox"/> Regulated Stream?   |   |                              |
| <input type="checkbox"/> Proximate PSD?      |   |                              |
| <input type="checkbox"/> Gauged Stream?      |   |                              |

Max. Pump rate (gpm): 2,100

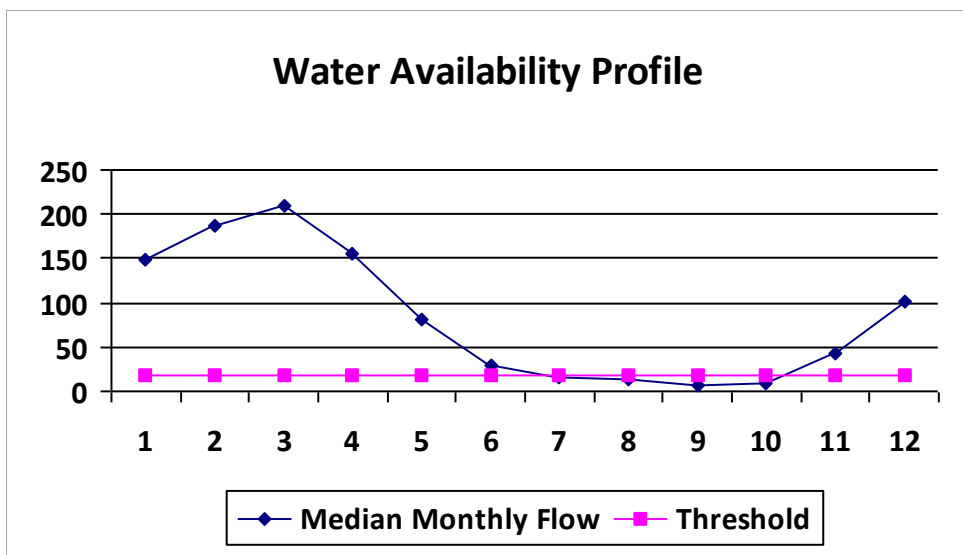
Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

Reference Gauge: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00 Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	148.71	25.12	123.72
2	187.06	25.12	162.07
3	209.31	25.12	184.32
4	155.43	25.12	130.44
5	81.99	25.12	57.00
6	28.63	25.12	3.64
7	16.20	25.12	-8.79
8	13.34	25.12	-11.65
9	6.83	25.12	-18.16
10	8.59	25.12	-16.41
11	41.92	25.12	16.93
12	102.43	25.12	77.44



### Water Availability Assessment of Location

Base Threshold (cfs)	13.62
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	4.68
Headwater Safety (cfs):	3.41
Ungauged Stream Safety (cfs):	3.41

Min. Gauge Reading (cfs):	72.18
Passby at Location (cfs):	20.44

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

**Source Detail**

**MODIFICATION** 09/28/2018

WMP 02320      API/ID Number       Operator:   
 Plan Type: Well Pad     

Source ID:  Source Name:   
 Source Latitude:   
 Source Longitude:

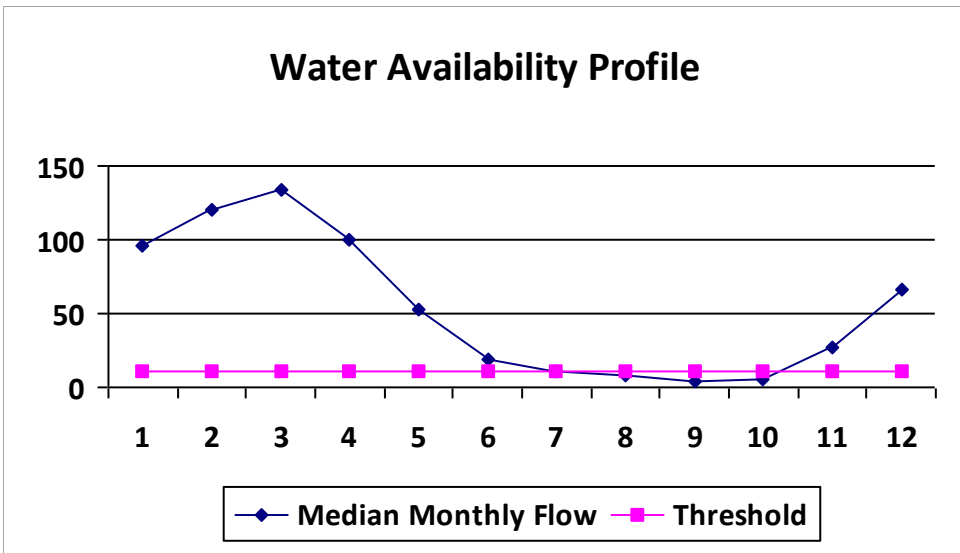
HUC-8 Code:   
 Drainage Area (sq. mi.):  County:

- Endangered Species?     Mussel Stream?     ZCC
- Trout Stream?             Tier 3?               WH
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Max. Pump rate (gpm):   
 Max. Simultaneous Trucks:   
 Max. Truck pump rate (gpm):

Reference Gauge:    
 Drainage Area (sq. mi.):  Gauge Threshold (cfs):

Month	<u>Median monthly flow (cfs)</u>	<u>Threshold (+ pump rate)</u>	<u>Estimated Available water (cfs)</u>
1	95.28	22.01	73.45
2	119.86	22.01	98.02
3	134.11	22.01	112.28
4	99.59	22.01	77.76
5	52.54	22.01	30.70
6	18.35	22.01	-3.49
7	10.38	22.01	-11.45
8	8.55	22.01	-13.28
9	4.38	22.01	-17.45
10	5.50	22.01	-16.33
11	26.86	22.01	5.03
12	65.63	22.01	43.80



**Water Availability Assessment of Location**

Base Threshold (cfs)   
 Upstream Demand (cfs):   
 Downstream Demand (cfs):   
 Pump rate (cfs):   
 Headwater Safety (cfs):   
 Ungauged Stream Safety (cfs):   


---

 Min. Gauge Reading (cfs):   
 Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

**Source Detail**

**MODIFICATION** ~~09/28/2018~~ **09/28/2018**

WMP 02320

API/ID Number

Operator:

Plan Type: Well Pad

Source ID:  Source Name:

Source Latitude:   
 Source Longitude:

HUC-8 Code:

Drainage Area (sq. mi.)  County:

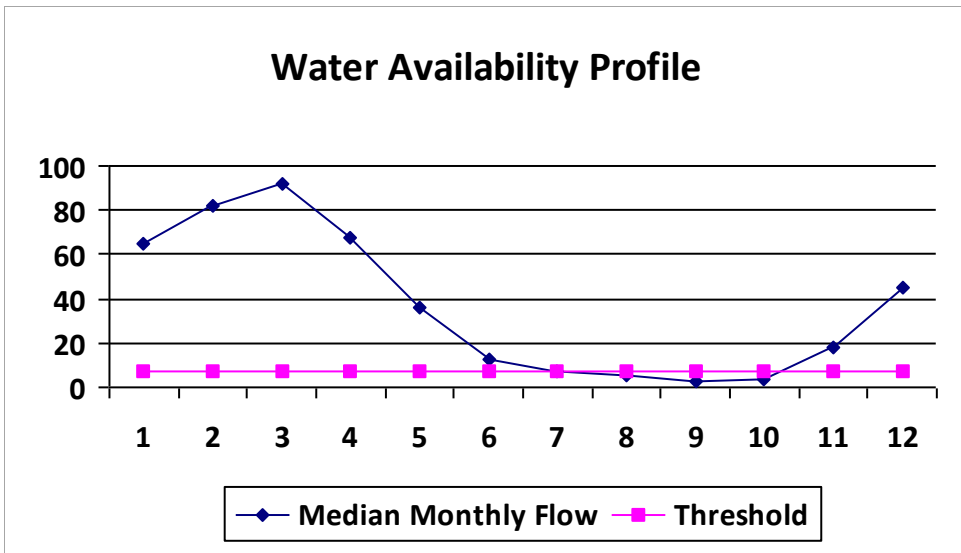
- Endangered Species?  Mussel Stream?  ZCC
- Trout Stream?  Tier 3?  WH
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Max. Pump rate (gpm):   
 Max. Simultaneous Trucks:   
 Max. Truck pump rate (gpm):

Reference Gauge:

Drainage Area (sq. mi.):  Gauge Threshold (cfs):

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	64.99	17.85	47.25
2	81.75	17.85	64.01
3	91.47	17.85	73.73
4	67.93	17.85	50.18
5	35.83	17.85	18.09
6	12.51	17.85	-5.23
7	7.08	17.85	-10.66
8	5.83	17.85	-11.91
9	2.99	17.85	-14.76
10	3.75	17.85	-13.99
11	18.32	17.85	0.58
12	44.76	17.85	27.02



**Water Availability Assessment of Location**

Base Threshold (cfs)   
 Upstream Demand (cfs):   
 Downstream Demand (cfs):   
 Pump rate (cfs):   
 Headwater Safety (cfs):   
 Ungauged Stream Safety (cfs):

Min. Gauge Reading (cfs):   
 Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

MODIFICATION ~~09/28/2018~~ 09/28/2018

WMP 02320	API/ID Number	see overview	Operator:	Antero Resources
Plan Type: Well Pad	Meredith Well Pad			

Source ID: 64097	Source Name: Middle Island Creek @ Dawson Withdrawal	Source Latitude: 39.379292
	Gary D. and Rella A. Dawson	Source Longitude: -80.867803

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 181.34 County: Tyler

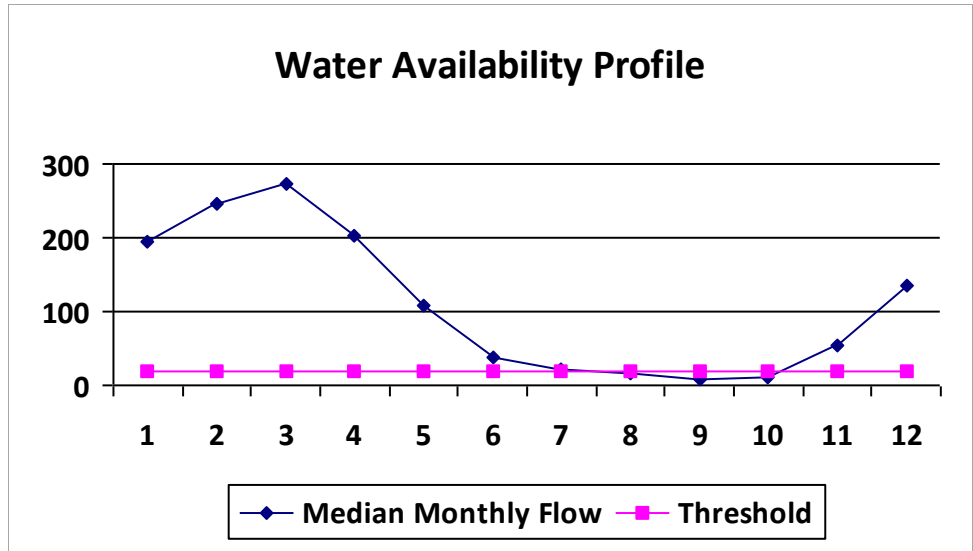
<input checked="" type="checkbox"/> Endangered Species?	<input checked="" type="checkbox"/> Mussel Stream?	<input type="checkbox"/> ZCC
<input type="checkbox"/> Trout Stream?	<input type="checkbox"/> Tier 3?	<input type="checkbox"/> WH
<input type="checkbox"/> Regulated Stream?		
<input type="checkbox"/> Proximate PSD?		
<input checked="" type="checkbox"/> Gauged Stream?		

Max. Pump rate (gpm):	3,000
Max. Simultaneous Trucks:	0
Max. Truck pump rate (gpm):	0

Reference Gauge: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00 Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	194.47	42.06	152.68
2	244.62	42.06	202.83
3	273.72	42.06	231.93
4	203.26	42.06	161.47
5	107.22	42.06	65.43
6	37.44	42.06	-4.35
7	21.19	42.06	-20.60
8	17.45	42.06	-24.34
9	8.94	42.06	-32.85
10	11.23	42.06	-30.56
11	54.82	42.06	13.04
12	133.96	42.06	92.17



### Water Availability Assessment of Location

Base Threshold (cfs)	17.82
Upstream Demand (cfs):	13.10
Downstream Demand (cfs):	6.55
Pump rate (cfs):	6.68
Headwater Safety (cfs):	4.45
Ungauged Stream Safety (cfs):	0.00

---

<b>Min. Gauge Reading (cfs):</b>	<b>76.03</b>
<b>Passby at Location (cfs):</b>	<b>28.82</b>

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

**Source Detail**

**MODIFICATION** ~~09/28/2018~~ **09/28/2018**

WMP 02320

API/ID Number

Operator:

Plan Type: Well Pad

Source ID:  Source Name:

Source Latitude:   
 Source Longitude:

HUC-8 Code:

Drainage Area (sq. mi.)  County:

- Endangered Species?  Mussel Stream?  ZCC
- Trout Stream?  Tier 3?  WH
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

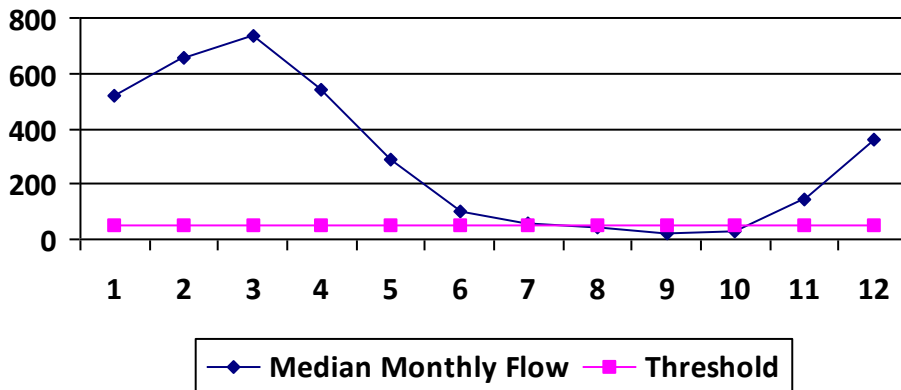
Reference Gauge:

Drainage Area (sq. mi.):

Gauge Threshold (cfs):

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	519.88	55.12	465.14
2	653.95	55.12	599.22
3	731.75	55.12	677.01
4	543.38	55.12	488.65
5	286.64	55.12	231.90
6	100.10	55.12	45.36
7	56.65	55.12	1.91
8	46.64	55.12	-8.10
9	23.89	55.12	-30.85
10	30.01	55.12	-24.72
11	146.56	55.12	91.83
12	358.10	55.12	303.37

**Water Availability Profile**



**Water Availability Assessment of Location**

Base Threshold (cfs)

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs):

Ungauged Stream Safety (cfs):

Min. Gauge Reading (cfs):

Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

**Source Detail**

**MODIFICATION** ~~09/28/2018~~ **09/28/2018**

WMP 02320

API/ID Number

Operator:

Plan Type: Well Pad

Source ID:  Source Name:

Source Latitude:   
 Source Longitude:

HUC-8 Code:

Drainage Area (sq. mi.)  County:

- Endangered Species?  Mussel Stream?  ZCC
- Trout Stream?  Tier 3?  WH
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

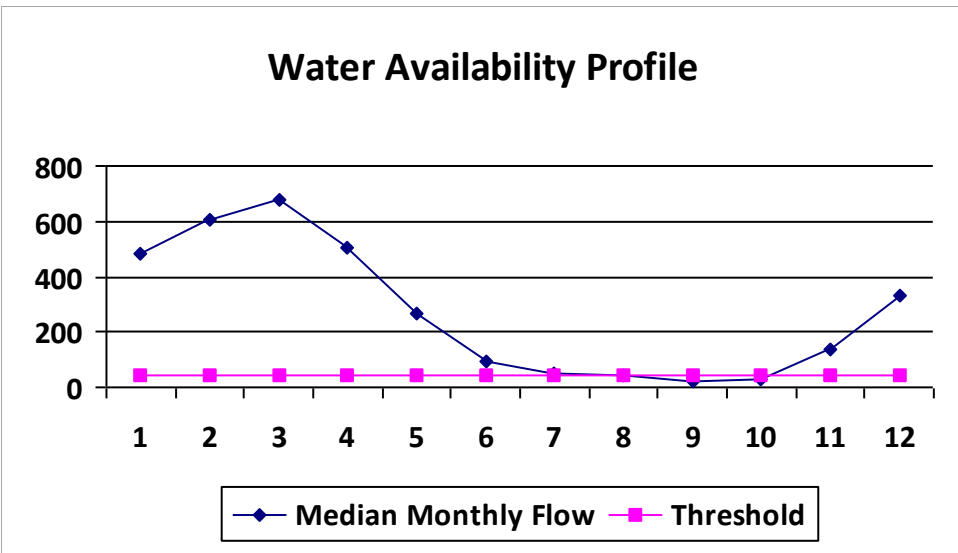
Max. Truck pump rate (gpm):

Reference Gauge:

Drainage Area (sq. mi.):

Gauge Threshold (cfs):

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	483.26	53.84	429.59
2	607.89	53.84	554.22
3	680.20	53.84	626.53
4	505.11	53.84	451.44
5	266.45	53.84	212.78
6	93.04	53.84	39.38
7	52.65	53.84	-1.01
8	43.36	53.84	-10.31
9	22.20	53.84	-31.46
10	27.90	53.84	-25.77
11	136.24	53.84	82.57
12	332.88	53.84	279.21



**Water Availability Assessment of Location**

Base Threshold (cfs)   
 Upstream Demand (cfs):   
 Downstream Demand (cfs):   
 Pump rate (cfs):   
 Headwater Safety (cfs):   
 Ungauged Stream Safety (cfs):

Min. Gauge Reading (cfs):   
 Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

MODIFICATION ~~09/28/2018~~ 09/28/2018

WMP 02320	API/ID Number <input type="text" value="see overview"/>	Operator: <input type="text" value="Antero Resources"/>
Plan Type: Well Pad	<input type="text" value="Meredith Well Pad"/>	

Source ID: <input type="text" value="64100"/>	Source Name: <input type="text" value="Middle Island Creek @ Weese Withdrawal Site"/> <input type="text" value="Roger &amp; Sandy Weese"/>	Source Latitude: <input type="text" value="39.457972"/>
		Source Longitude: <input type="text" value="-80.839742"/>

HUC-8 Code:

Drainage Area (sq. mi.)  County:

- |   |  |                              |
|---|--|------------------------------|
| <input checked="" type="checkbox"/> Endangered Species? | <input checked="" type="checkbox"/> Mussel Stream? | <input type="checkbox"/> ZCC |
| <input type="checkbox"/> Trout Stream?                  | <input type="checkbox"/> Tier 3?                   | <input type="checkbox"/> WH  |
| <input type="checkbox"/> Regulated Stream?              | <input type="text"/>                               |                              |
| <input type="checkbox"/> Proximate PSD?                 | <input type="text"/>                               |                              |
| <input checked="" type="checkbox"/> Gauged Stream?      |  |                              |

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

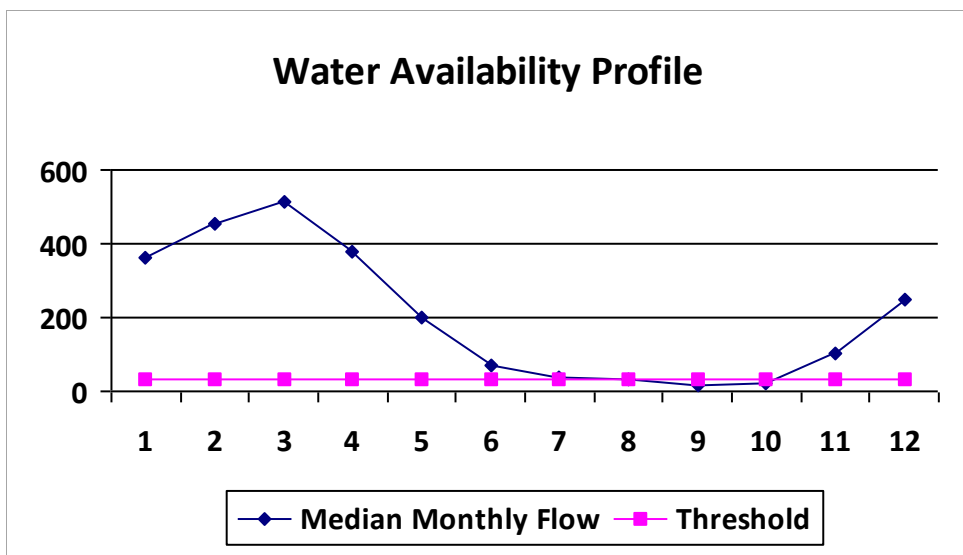
Max. Truck pump rate (gpm)

Reference Gauge:

Drainage Area (sq. mi.):

Gauge Threshold (cfs):

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	362.92	53.86	309.47
2	456.52	53.86	403.06
3	510.82	53.86	457.37
4	379.33	53.86	325.88
5	200.10	53.86	146.65
6	69.88	53.86	16.42
7	39.54	53.86	-13.91
8	32.56	53.86	-20.89
9	16.67	53.86	-36.78
10	20.95	53.86	-32.50
11	102.31	53.86	48.86
12	249.99	53.86	196.53



### Water Availability Assessment of Location

Base Threshold (cfs)

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs):

Ungauged Stream Safety (cfs):

**Min. Gauge Reading (cfs):**

**Passby at Location (cfs):**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



**Source Detail**

**MODIFICATION** ~~09/28/2018~~ **09/28/2018**

WMP 02320

API/ID Number

Operator:

Plan Type: Well Pad

Source ID:  Source Name:

Source Latitude:   
 Source Longitude:

HUC-8 Code:

Drainage Area (sq. mi.)  County:

- Endangered Species?  Mussel Stream?  ZCC
- Trout Stream?  Tier 3?  WH
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

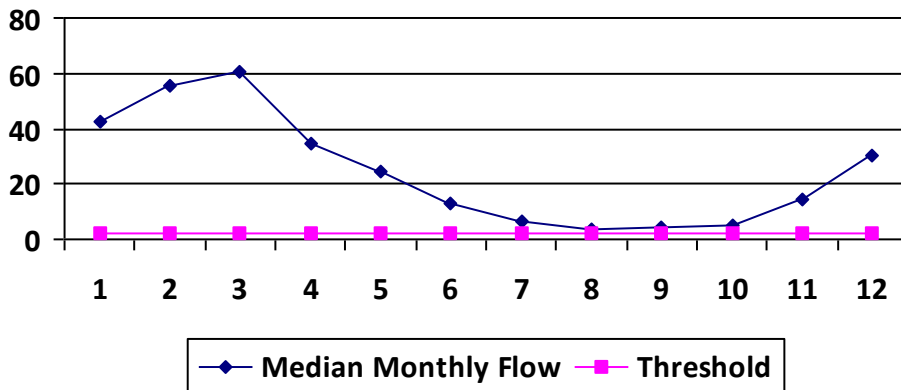
Reference Gauge:

Drainage Area (sq. mi.):

Gauge Threshold (cfs):

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	42.64	8.87	33.90
2	55.59	8.87	46.86
3	60.88	8.87	52.14
4	34.42	8.87	25.68
5	24.15	8.87	15.41
6	12.98	8.87	4.24
7	6.44	8.87	-2.30
8	3.72	8.87	-5.02
9	4.47	8.87	-4.27
10	4.85	8.87	-3.88
11	14.50	8.87	5.77
12	29.93	8.87	21.20

**Water Availability Profile**



**Water Availability Assessment of Location**

Base Threshold (cfs)   
 Upstream Demand (cfs):   
 Downstream Demand (cfs):   
 Pump rate (cfs):   
 Headwater Safety (cfs):   
 Ungauged Stream Safety (cfs):   


---

 Min. Gauge Reading (cfs):   
 Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

**Source Detail**

**MODIFICATION** 09/28/2018

WMP 02320      API/ID Number       Operator:   
 Plan Type: Well Pad     

Source ID:       Source Name:   
      Source Latitude:   
 Source Longitude:

HUC-8 Code:   
 Drainage Area (sq. mi.):       County:

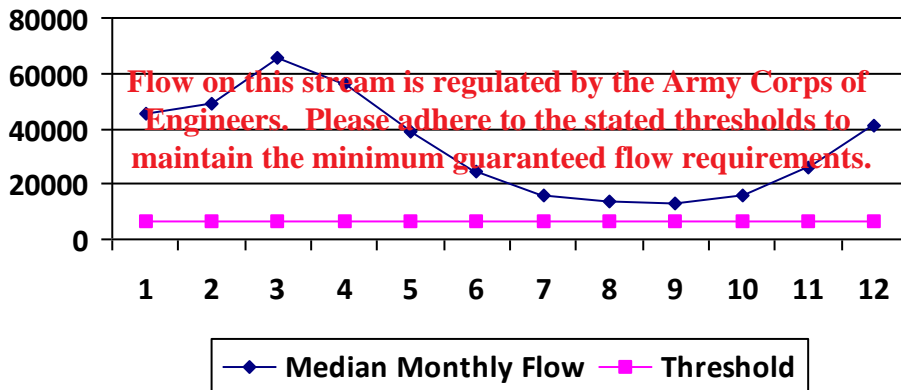
Endangered Species?       Mussel Stream?       ZCC  
 Trout Stream?       Tier 3?       WH  
 Regulated Stream?        
 Proximate PSD?        
 Gauged Stream?

Max. Pump rate (gpm):   
 Max. Simultaneous Trucks:   
 Max. Truck pump rate (gpm):

Reference Gauge:         
 Drainage Area (sq. mi.):       Gauge Threshold (cfs):

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

**Water Availability Profile**



**Water Availability Assessment of Location**

Base Threshold (cfs):   
 Upstream Demand (cfs):   
 Downstream Demand (cfs):   
 Pump rate (cfs):   
 Headwater Safety (cfs):   
 Ungauged Stream Safety (cfs):   
 Min. Gauge Reading (cfs):   
 Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

**Source Detail**

**MODIFICATION** 09/28/2018

WMP 02320      API/ID Number       Operator:   
 Plan Type: Well Pad     

Source ID:  Source Name:   
      Source Latitude:   
 Source Longitude:

HUC-8 Code:

Drainage Area (sq. mi.)  County:

Endangered Species?     Mussel Stream?     ZCC  
 Trout Stream?     Tier 3?     WH  
 Regulated Stream?      
 Proximate PSD?   

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

Reference Gauge:  Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.):  Gauge Threshold (cfs):

<u>Month</u>	<u>Median monthly flow (cfs)</u>	<u>Threshold (+ pump rate)</u>	<u>Estimated Available water (cfs)</u>
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

**Water Availability Assessment of Location**

Base Threshold (cfs)

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

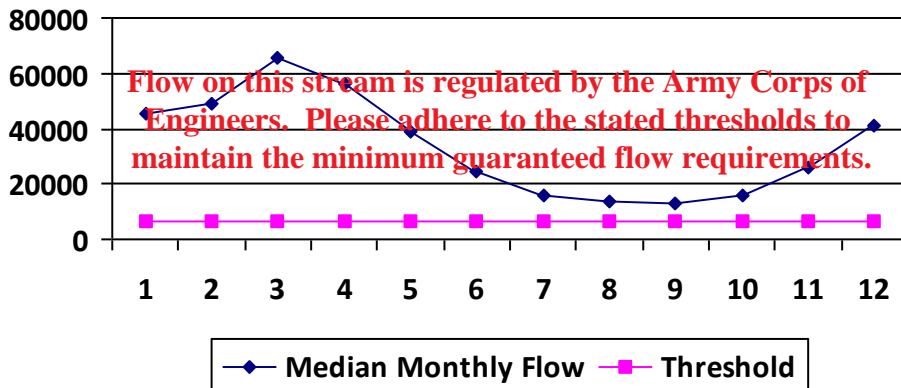
Headwater Safety (cfs):

Ungauged Stream Safety (cfs):

Min. Gauge Reading (cfs):

Passby at Location (cfs):

**Water Availability Profile**



"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

MODIFICATION ~~09/28/2018~~ 09/28/2018

WMP 02320	API/ID Number	see overview	Operator:	Antero Resources
Plan Type: Well Pad	Meredith Well Pad			

Source ID: 64104	Source Name: Point Pleasant Creek @ Reel	Source Latitude: 39.539732
	John E. Roberts	Source Longitude: -80.889712

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 22.7 County: Tyler

- |  |  |                              |
|--|--|------------------------------|
| <input type="checkbox"/> Endangered Species? | <input checked="" type="checkbox"/> Mussel Stream? | <input type="checkbox"/> ZCC |
| <input type="checkbox"/> Trout Stream?       | <input type="checkbox"/> Tier 3?                   | <input type="checkbox"/> WH  |
| <input type="checkbox"/> Regulated Stream?   |  |                              |
| <input type="checkbox"/> Proximate PSD?      |  |                              |
| <input type="checkbox"/> Gauged Stream?      |  |                              |

Max. Pump rate (gpm): 2,520

Max. Simultaneous Trucks:

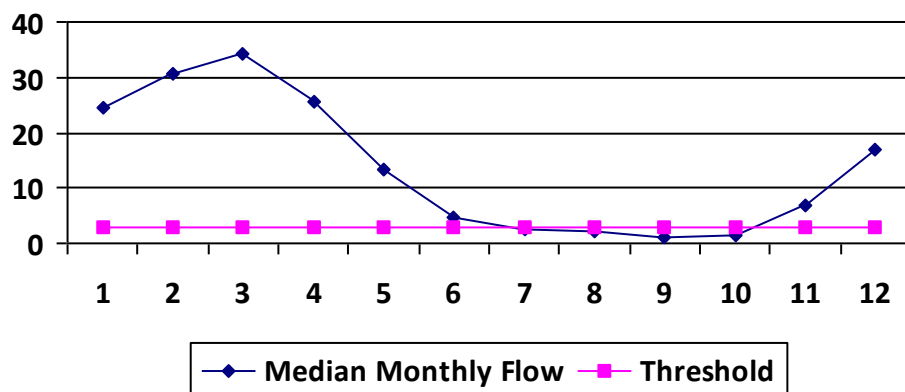
Max. Truck pump rate (gpm)

Reference Gauge: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00 Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	24.34	8.96	15.81
2	30.62	8.96	22.09
3	34.26	8.96	25.73
4	25.44	8.96	16.91
5	13.42	8.96	4.89
6	4.69	8.96	-3.84
7	2.65	8.96	-5.88
8	2.18	8.96	-6.35
9	1.12	8.96	-7.41
10	1.41	8.96	-7.12
11	6.86	8.96	-1.67
12	16.77	8.96	8.24

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 2.23

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 5.61

Headwater Safety (cfs): 0.56

Ungauged Stream Safety (cfs): 0.56

**Min. Gauge Reading (cfs): 73.11**

**Passby at Location (cfs): 3.35**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

MODIFICATION ~~09/28/2018~~ 09/28/2018

WMP 02320	API/ID Number <input type="text" value="see overview"/>	Operator: <input type="text" value="Antero Resources"/>
Plan Type: <input type="text" value="Well Pad"/>	<input type="text" value="Meredith Well Pad"/>	

Source ID: <input type="text" value="64105"/>	Source Name: <input type="text" value="South Fork of Hughes River @ Knight Withdrawal"/> <input type="text" value="Tracy C. Knight &amp; Stephanie C. Knight"/>	Source Latitude: <input type="text" value="39.198369"/>
		Source Longitude: <input type="text" value="-80.870969"/>

HUC-8 Code:

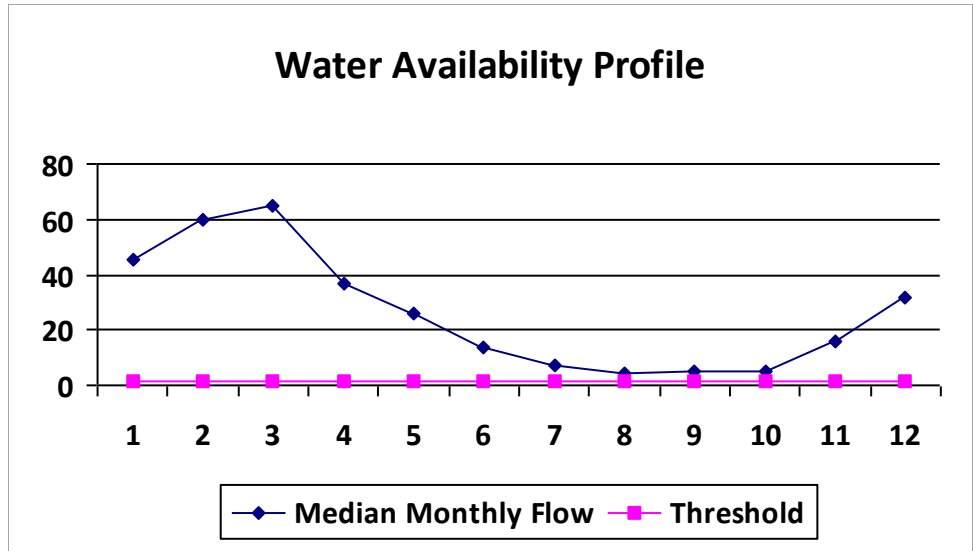
Drainage Area (sq. mi.):  County:

- |   |  |                              |
|---|--|------------------------------|
| <input checked="" type="checkbox"/> Endangered Species? | <input checked="" type="checkbox"/> Mussel Stream? | <input type="checkbox"/> ZCC |
| <input type="checkbox"/> Trout Stream?                  | <input type="checkbox"/> Tier 3?                   | <input type="checkbox"/> WH  |
| <input type="checkbox"/> Regulated Stream?              | <input type="text"/>                               |                              |
| <input type="checkbox"/> Proximate PSD?                 | <input type="text"/>                               |                              |
| <input checked="" type="checkbox"/> Gauged Stream?      |  |                              |

Max. Pump rate (gpm):	<input type="text" value="3,000"/>
Max. Simultaneous Trucks:	<input type="text" value="0"/>
Max. Truck pump rate (gpm)	<input type="text" value="0"/>

Reference Gauge: <input type="text" value="3155220"/>	<input type="text" value="SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV"/>
Drainage Area (sq. mi.): <input type="text" value="229.00"/>	Gauge Threshold (cfs): <input type="text" value="22"/>

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	45.67	14.26	31.44
2	59.55	14.26	45.31
3	65.21	14.26	50.97
4	36.87	14.26	22.63
5	25.86	14.26	11.63
6	13.90	14.26	-0.33
7	6.89	14.26	-7.34
8	3.98	14.26	-10.25
9	4.79	14.26	-9.45
10	5.20	14.26	-9.04
11	15.54	14.26	1.30
12	32.06	14.26	17.82



### Water Availability Assessment of Location

Base Threshold (cfs)	<input type="text" value="1.56"/>
Upstream Demand (cfs):	<input type="text" value="5.62"/>
Downstream Demand (cfs):	<input type="text" value="0.00"/>
Pump rate (cfs):	<input type="text" value="6.68"/>
Headwater Safety (cfs):	<input type="text" value="0.39"/>
Ungauged Stream Safety (cfs):	<input type="text" value="0.00"/>

---

Min. Gauge Reading (cfs):	<input type="text" value="39.80"/>
Passby at Location (cfs):	<input type="text" value="1.95"/>

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

MODIFICATION **09/28/2018**

WMP 02320

API/ID Number

Operator:

Plan Type: Well Pad

Source ID:  Source Name:

Source Latitude:   
 Source Longitude:

HUC-8 Code:

Drainage Area (sq. mi.)  County:

- Endangered Species?  Mussel Stream?  ZCC
- Trout Stream?  Tier 3?  WH
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

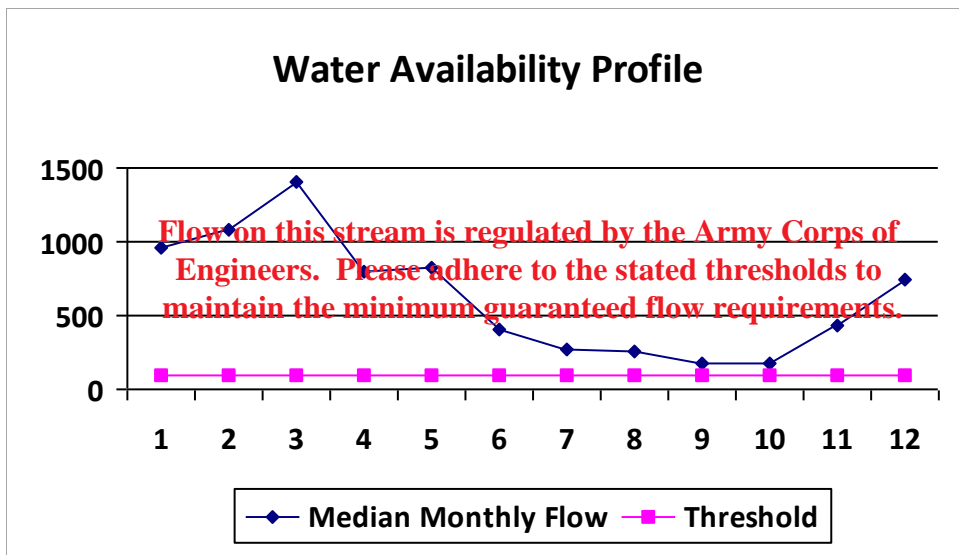
Max. Truck pump rate (gpm):

Reference Gauge:

Drainage Area (sq. mi.):

Gauge Threshold (cfs):

Month	Median monthly flow (cfs)	Threshold (+ pump rate)	Estimated Available water (cfs)
1	964.98	-	-
2	1,086.47	-	-
3	1,399.42	-	-
4	800.34	-	-
5	821.52	-	-
6	411.64	-	-
7	266.70	-	-
8	254.66	-	-
9	177.19	-	-
10	173.72	-	-
11	435.94	-	-
12	744.28	-	-



Water Availability Assessment of Location

Base Threshold (cfs)

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs):

Ungauged Stream Safety (cfs):

Min. Gauge Reading (cfs):

Passby at Location (cfs):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Water Management Plan: Secondary Water Sources



WMP 02320

API/ID Number:

Operator:

Plan Type:

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

### Centralized Freshwater Impoundment

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.

Reference: WMP-1211

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1278**

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1082**



WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1418**

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1296**

WMP 02320

API/ID Number: see overview

Operator: Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1295**

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-2054**

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1754**

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1080**

WMP 02320

API/ID Number: see overview

Operator: Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1079**

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1585**

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1208**

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1831**

WMP 02320

API/ID Number: see overview

Operator: Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1081**

WMP 02320

API/ID Number: see overview

Operator: Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1886**

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1372**

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 64130 Source Name: Nimorwicz East Freshwater Impoundment

Source Lat: 39.248678 Source Long: -80.562731 County: Harrison

Max. Daily Purchase (gal)

DEP Comments: 033-FWC-00005

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1373**

Source ID: 64131 Source Name: Pearl Jean South Freshwater Impoundment

Source Lat: 39.288155 Source Long: -80.674637 County: Doddridge

Max. Daily Purchase (gal)

DEP Comments: 017-FWC-00008

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1176**



WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1175**

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-2055**

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1209**

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1914**

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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Source ID: 64136

Source Name:

Whitehair Freshwater Impoundment

Source Lat:

39.202767

Source Long:

-80.688767

County:

Doddridge

Max. Daily Purchase (gal)

DEP Comments:

017-FWC-00013

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-1419**

WMP 02320

API/ID Number:

Operator:

09/28/2018

Plan Type: Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

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•For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

### Centralized Waste Pit

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

Source ID:  Source Name:

Source Lat:  Source Long:  County:

Max. Daily Purchase (gal)

DEP Comments:

WMP 02320

API/ID Number: see overview

Operator: Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-2251**

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-2252**

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

Source ID:  Source Name:   
  
 Source Lat:  Source Long:  County:   
 Max. Daily Purchase (gal)   
 DEP Comments:

**The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.**

**Reference: WMP-2268**

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

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### Lake/Reservoir

Source ID: 64111 Source Name: City of Salem Reservoir (Lower Dog Run)  
Public Water Provider

Source Lat: 39.28834 Source Long: -80.54966 County: Harrison

Max. Daily Purchase (gal) 1,814,400

DEP Comments:

### Lake/Reservoir

Source ID: 64112 Source Name: Pennsboro Lake

Source Lat: 39.281689 Source Long: -80.925526 County: Ritchie

Max. Daily Purchase (gal)

DEP Comments:



WMP 02320

API/ID Number: see overview

Operator: Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

### Purchased Water

Source ID: 64107 Source Name: Antero Clearwater Facility  
Oil & Gas Operator

Source Lat: 39.269603 Source Long: -80.892221 County: Doddridge

Max. Daily Purchase (gal) 1,700,000

DEP Comments:

Source ID: 64109 Source Name: Hall Yard Ellenboro Tap  
Public Water Provider

Source Lat: 39.272104 Source Long: -80.045658 County: Ritchie

Max. Daily Purchase (gal) 200,000

DEP Comments:

WMP 02320

API/ID Number:

see overview

Operator:

Antero Resources

09/28/2018

Plan Type: Well Pad

Meredith Well Pad

**Important:**

**MODIFICATION Effective: 9/21/2018**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

## Recycled Frac Water

Source ID:

64145

Source Name:

Various

Source Lat:

Source Long:

County:

Max. Daily Purchase (gal)

DEP Comments:

Sources may include, but are not limited to the Meredith Well Pad.

09/28/2018

## Planned Disposal Method-UIC

API	Operator	Well Name	State	Coordinates Lat/Long NAD 83
3400923821	Central Environmental Services, LLC	K&H Partners LLC #1 (SWIW #8)	OH	39.226075, - 81.761403
3400923823	Central Environmental Services, LLC	K&H Partners LLC #2 (SWIW #10)	OH	39.234815, - 81.757166
3400923824	Central Environmental Services, LLC	K&H Partners LLC #3 (SWIW #11)	OH	39.235082, - 81.748312
3416729731	Redbird Development, LLC	Redbird #2 (SWIW #18)	OH	39.337326, - 81.674314
3410523651	GreenHunter Water, LLC	Murphy Hunter #3 (SWIW #23)	OH	38.964640, - 81.785835
3410523637	GreenHunter Water, LLC	Mills Hunter #3 (SWIW #22)	OH	38.969738, - 81.786124
3410523652	GreenHunter Water, LLC	Mills Hunter #2 (SWIW #21)	OH	38.932919, - 81.788641
3410523619	GreenHunter Water, LLC	Mills Hunter #1 (SWIW #19)	OH	38.940522, - 81.787707
3412123995	GreenHunter Water, LLC	Warren Drilling Co. (SWIW #6)	OH	39.653808, - 81.475312
3412124086	GreenHunter Water, LLC	Travis Unit (SWIW #7)	OH	39.656785, - 81.480809
3405923986	Clearwater Solutions, LLC	Clearwater III #1 (SWIW #15)	OH	40.027300, - 81.511168
3405924473	Clearwater Solutions, LLC	Bo #1 (SWIW #20)	OH	40.027878, - 81.509974
3405924445	Clearwater Solutions, LLC	Effie #1 (SWIW#17)	OH	40.027364, - 81.449869
4708510142	GreenHunter Water, LLC	Ritchie Hunter #2 (2W-1652) (UIC2D08510142)	WV	39.256623, - 81.097484

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**Section III(a) – Source Water Overview**

**Estimated Water Needs:**

	Gallons
Construction (compaction)	44,062
Drilling (cement, mud systems)	1,512,000
Hydraulic Fracturing	110,825,000
Post-Fracturing (coil tubing, drill-outs)	90,000
Reclamation (hydroseeding)	55,000
Incidental Use (dust suppression)	142,800
Total	112,668,862
Onsite Storage Capacity	1,680,000

Anticipated Withdrawal Dates
Pad Construction Start: <b>06/01/2017</b>
Pad Reclamation End: 06/01/2022

**Anticipated water sources (check all that apply)**

<input checked="" type="checkbox"/> Streams/Rivers	<input type="checkbox"/> Groundwater	<input checked="" type="checkbox"/> Brokered Water	<input checked="" type="checkbox"/> Lake/Reservoir/Pond
<input checked="" type="checkbox"/> Centralized Freshwater Impoundment	<input checked="" type="checkbox"/> Centralized Waste Pit	<input type="checkbox"/> Aboveground Storage Tank	
<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Recycled Frac Water		

**Section III(b) — Aquatic Life Protection (if utilizing surface water, provide the following details)**

Describe Entrainment and Impingement Prevention Plan:

The water withdrawal hoses will be installed a minimum of 300 mm (12 in) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the streambed. Fish screens will be installed on the water withdrawal intake hoses to prevent losses of resident fresh water fish with a maximum opening size of 3/8th inch (~1 cm). The sizing of the fish screen will also afford protection of mussels. All withdrawal locations are inspected routinely by operations and environmental personnel.

Describe Invasive Species Transfer Prevention Plan:

Water withdrawal trucks and intake hoses will be disinfected on a routine basis.

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