



west virginia department of environmental protection

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

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

Friday, September 09, 2016  
WELL WORK PERMIT  
Horizontal 6A / Horizontal 6A Well - 1

ANTERO RESOURCES CORPORATION  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for MANZAREK UNIT 1H  
47-017-06775-00-00

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

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

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin  
Chief

Operator's Well Number: MANZAREK UNIT 1H  
Farm Name: FOSTER, YVONNE  
U.S. WELL NUMBER: 47-017-06775-00-00  
Horizontal 6A / Horizontal 6A Well - 1  
Date Issued: 9/9/2016

Promoting a healthy environment.

**PERMIT CONDITIONS 4701706775**

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

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**CONDITIONS**

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



June 3, 2016

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

470 1706775

Ms. Laura Adkins:

Antero Resources Corporation (Antero) would like to submit the following applications for new well work permits to explore for Marcellus Shale potential. Our **Canton** project is located in Doddridge County, WV. On the new **Yvonne Pad** consists **two new horizontal** shallow wells (Manzarek Unit 1H & 2H) that we are requesting approval to drill.

Attached you will find the following:

- Permit Application packages
- CD with copy of permit applications

If you have any questions please feel free to contact me at (303) 357-7233.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in blue ink that reads "Kara Quackenbush".

Kara Quackenbush  
Permitting Supervisor  
Antero Resources Corporation

Received  
Office of Oil & Gas  
JUN 06 2016

Enclosures

**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.

4701706773

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>519873.942m</u>
County:	<u>Doddridge</u>		Northing:	<u>4355514.012m</u>
District:	<u>West Union</u>	Public Road Access:	<u>CR 24 (Knight Fork Rd.)</u>	
Quadrangle:	<u>West Union 7.5'</u>	Generally used farm name:	<u>Foster, Yvonne</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><b>*Please check the box that applies</b></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 style="text-align: center;"><b>FOR EXECUTION BY A NATURAL PERSON</b></p> <p>Signature: _____</p> <p>Print Name: _____</p> <p>Date: _____</p> <p style="text-align: center;"><b>FOR EXECUTION BY A CORPORATION, ETC.</b></p> <p>Company: _____</p> <p>By: _____</p> <p>Its: _____</p> <p>Signature: _____</p> <p>Date: _____</p> <div style="text-align: right; margin-top: 10px;"> <p>Received Office of Oil &amp; Gas JUN 06 2016</p> </div>
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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).

6/06

WW-6B  
(04/15)

API NO. 47-017 - 06775  
OPERATOR WELL NO. Manzarek Unit 1H  
Well Pad Name: Yvonne 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 017 - Doddri West Uni West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Manzarek Unit 1H Well Pad Name: Yvonne Pad

3) Farm Name/Surface Owner: Foster, Yvonne Public Road Access: CR 24 (Knight Fork Rd.)

4) Elevation, current ground: ~1253' Elevation, proposed post-construction: 1227'

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

(b) If Gas Shallow  Deep   
Horizontal

*B.O.N.  
6-10-16*

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 7400' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2950#

8) Proposed Total Vertical Depth: 7400' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 15300' MD

11) Proposed Horizontal Leg Length: 6507'

*4701705775*

12) Approximate Fresh Water Strata Depths: 287', 378', 462'

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

14) Approximate Saltwater Depths: 872', 1155', 1491'

15) Approximate Coal Seam Depths: 419', 872', 875'

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  Received

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

Office of Oil & Gas  
JUN 21 2016

WW-6B  
(04/15)

API NO. 47- 017 -  
OPERATOR WELL NO. Manzarek Unit 1H  
Well Pad Name: Yvonne 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#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	520' *see #19	520' *see #19	CTS, 722 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#	15300'	15300'	3800 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

*Sup 0' Ham  
6-10-16*

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

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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.

4701706775

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): 35.70 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.9 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:

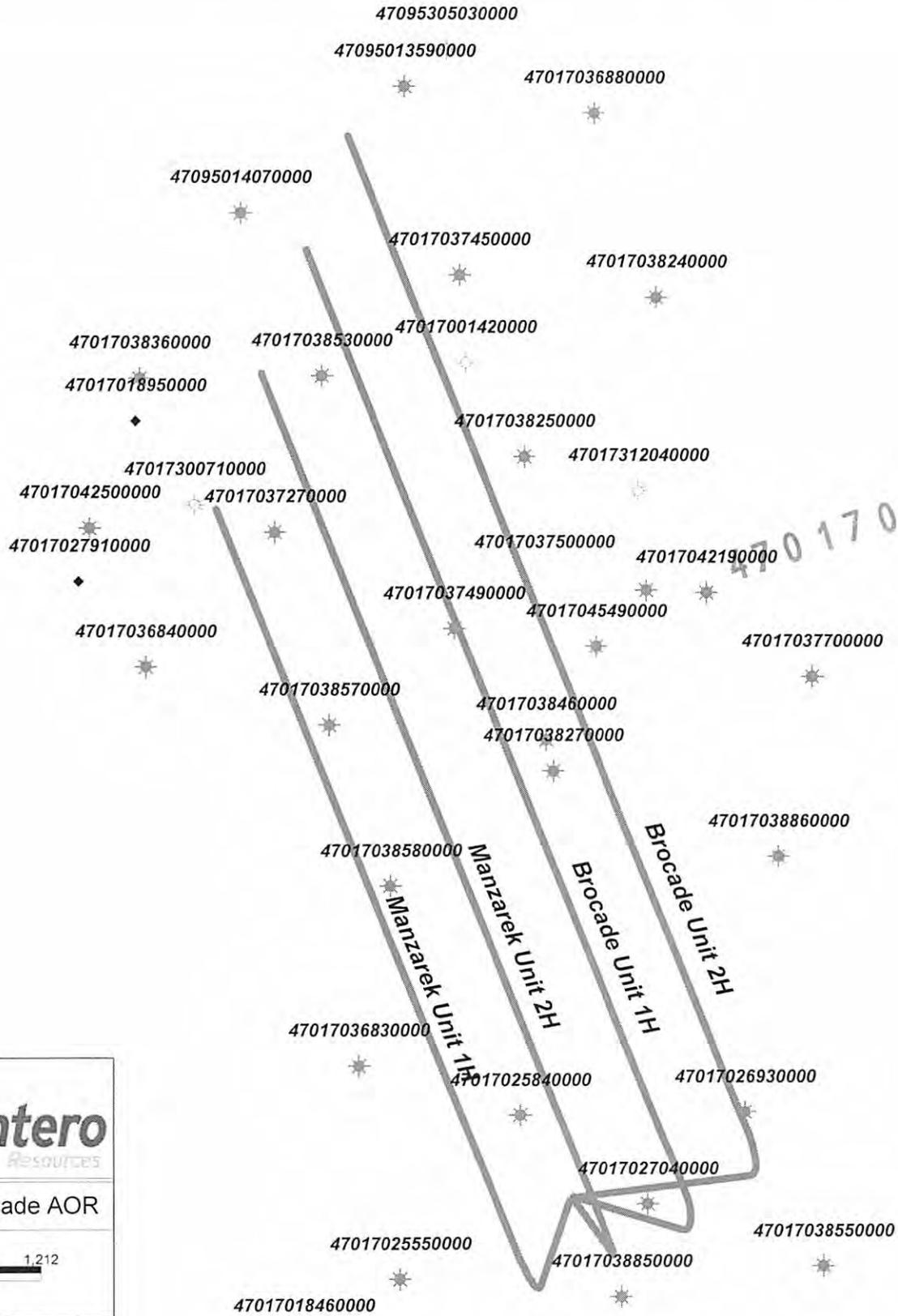
Conductor: no additives, Class A cement.  
Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake  
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat  
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% 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 40 bbls fresh water, pump 10 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

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\*Note: Attach additional sheets as needed.



Manzarek-Brocade AOR



- WELL SYMBOLS
- ☼ Dry Hole
  - ☼ Gas Well
  - ☼ Plugged Gas Well
  - ◆ Shallow Storage Well

September 2, 2016



WW-9  
(4/16)

API Number 47 - 017 - \_\_\_\_\_  
Operator's Well No. Manzarek 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 lanked 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

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

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

Additives to be used in drilling medium? Please See Attachment

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

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

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

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

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

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

Company Official Signature [Signature]

Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental & Regulatory Manager

**KARA QUACKENBUSH**  
NOTARY PUBLIC  
STATE OF COLORADO  
NOTARY ID 2014-028897  
MY COMMISSION EXPIRES JUN 21, 2018  
Rec'd  
Office of Oil & Gas

Subscribed and sworn before me this 3 day of June, 20 16 JUN 21 2016

[Signature]  
Notary Public

My commission expires July 21, 2018

**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 35.70 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

Drill & Water Containment Pad (6.9) + Topsoil Spoil Area 2 (0.46) + Material Spoil Pile 1 (1.48) + Access Road (24.2) + Access Road to Existing Well (0.74) + Topsoil Spoil Area 1 (1.4) + Staging Area (0.52) = 35.70 Acres

Seed Mixtures

**Temporary**

**Permanent**

Seed Type	lbs/acre
Tall Fescue	45
Perennial Rye Grass	20

Seed Type	lbs/acre
Tall Fescue	45
Perennial Rye Grass	20

\*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.

470 17 06 775

Plan Approved by: Bryan O'Hara

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Title: Inspector

Date: 6-10-16

Field Reviewed?  Yes  No

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## ***Form WW-9 Additives Attachment***

### **SURFACE INTERVAL**

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

4701706775

### **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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JUN 06 2016



4701703

Antero Resources Corporation
APPALACHIAN BASIN
Yvonne Pad Manzarek Unit 1H
REMARKS Quadrangle: West Union Watershed: Headwaters Middle Island Creek District: West Union
<p>0 2,000 4,000 FEET</p>
May 20, 2014

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**911 Address**  
**1199 Knights Fork Rd.**  
**West Union, WV 26456**

# **Well Site Safety Plan**

## **Antero Resources**

*B.O.H.,  
6-10-16*

**Well Name:** Brocade Unit 1H, Brocade Unit 2H, Burlington Unit 1H, Burlington Unit 2H, Manzarek Unit 1H, Manzarek Unit 2H, Manzarek Unit 3H, Walker Unit 1H, Walker Unit 2H, Walker Unit 3H, Yoho Unit 1H

**Pad Location:** YVONNE PAD  
Doddridge County/West Union District

**GPS Coordinates:** Lat 39°20'54.82"/Long -80°46'10.12" (NAD83)

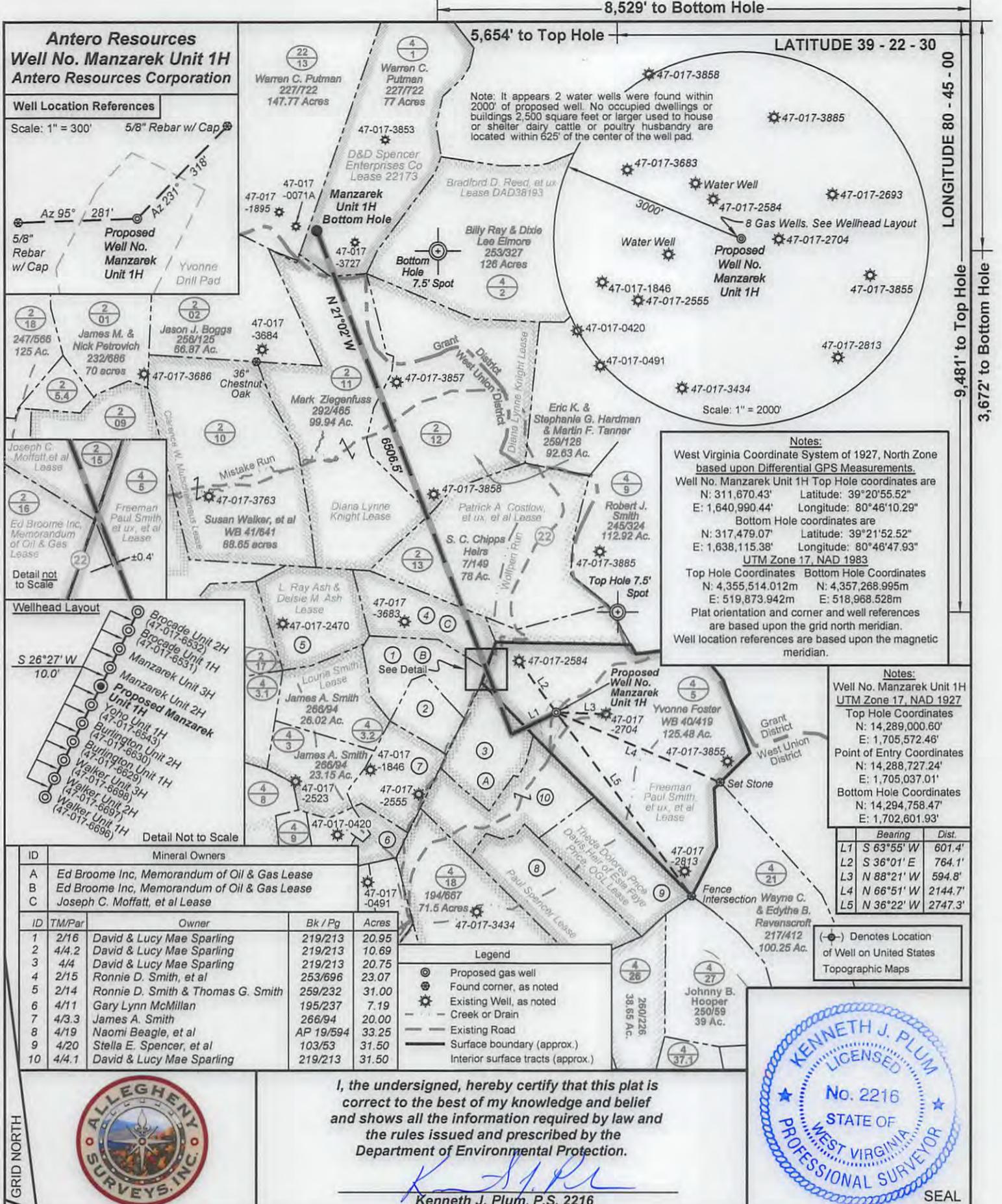
### **Driving Directions:**

From East. From the town of Clarksburg WV, head west on Hwy 50 for ~16.5 miles. Turn RIGHT onto Tarkiln Run then take immediate left onto Old U.S. 50. Take the first right onto Big Flint Rd and follow for ~10.6 miles. Turn LEFT onto Little Flint Rd and follow for ~1.9 miles. Turn right onto Co Rte 24/ Camp Mistake for ~1.2 miles. Look for rig signs and location on the left.

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Office of Oil & Gas

JUN 21 2016

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



**Antero Resources**  
**Well No. Manzarek Unit 1H**  
**Antero Resources Corporation**

**Well Location References**

Scale: 1" = 300' 5/8" Rebar w/ Cap

Az 95° 281' Az 237° 318'

Proposed Well No. Manzarek Unit 1H

Yvonne Drill Pad

Warren C. Putman 227/722 147.77 Acres

Warran C. Putman 227/722 77 Acres

47-017-3853

D&D Spencer Enterprises Co Lease 22173

47-017-0071A

47-017-1895

Manzarek Unit 1H Bottom Hole

Bradford D. Reed, et ux Lease DAD38193

Billy Ray & Dixie Lee Elmore 253/327 126 Acres

Bottom Hole 7.5' Spot

47-017-3727

47-017-3683

47-017-2584

47-017-2693

47-017-2704

47-017-1846

47-017-2555

47-017-0420

47-017-0491

47-017-3434

47-017-2813

47-017-3855

Scale: 1" = 2000'

**Wellhead Layout**

S 26°27' W 10.0'

Brocade Unit 2H (47-017-6532)

Brocade Unit 1H (47-017-6531)

Manzarek Unit 3H

Proposed Manzarek Unit 1H

Yolo Unit 1H (47-017-6543)

Burlington Unit 2H (47-017-6530)

Burlington Unit 1H (47-017-6529)

Walker Unit 3H (47-017-6598)

Walker Unit 2H (47-017-6597)

Walker Unit 1H (47-017-6596)

Detail Not to Scale

ID	TM/Par	Owner	Bk /Pg	Acres
1	2/16	David & Lucy Mae Spurling	219/213	20.95
2	4/4.2	David & Lucy Mae Spurling	219/213	10.69
3	4/4	David & Lucy Mae Spurling	219/213	20.75
4	2/15	Ronnie D. Smith, et al	253/696	23.07
5	2/14	Ronnie D. Smith & Thomas G. Smith	259/232	31.00
6	4/11	Gary Lynn McMillan	195/237	7.19
7	4/3.3	James A. Smith	266/94	20.00
8	4/19	Naomi Beagle, et al	AP 19/594	33.25
9	4/20	Stella E. Spencer, et al	103/53	31.50
10	4/4.1	David & Lucy Mae Spurling	219/213	31.50

ID	Mineral Owners
A	Ed Broome Inc, Memorandum of Oil & Gas Lease
B	Ed Broome Inc, Memorandum of Oil & Gas Lease
C	Joseph C. Moffatt, et al Lease

ID	Bearing	Dist.
L1	S 63°55' W	601.4'
L2	S 36°01' E	764.1'
L3	N 88°21' W	594.8'
L4	N 66°51' W	2144.7'
L5	N 36°22' W	2747.3'

**ALLEGHENY SURVEYS, INC.**

**KENNETH J. PLUM**  
**LICENSED PROFESSIONAL SURVEYOR**  
**No. 2216**  
**STATE OF WEST VIRGINIA**

SEAL

I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the rules issued and prescribed by the Department of Environmental Protection.

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

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

FILE NO: 264-30(54)-M(G)-14  
 DRAWING NO: Manzarek 1H Well Plat 06-01-16  
 SCALE: 1" = 1500'  
 MINIMUM DEGREE OF ACCURACY: Submeter  
 PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

DATE: June 2 20 16  
 OPERATOR'S WELL NO. Manzarek Unit 1H  
 API WELL NO. HGA  
 47 - 017 - 06775  
 STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
 (IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW  
 LOCATION: ELEVATION: Proposed Grade-1227' Original Grade-1253' WATERSHED: Headwaters Middle Island Creek QUADRANGLE: West Union  
 DISTRICT: West Union COUNTY: Doddridge  
 SURFACE OWNER: Yvonne Foster Patrick A. Costlow, et ux, et al; D&D Spencer Enterprises Co ACREAGE: 125.48 78,973; 73; 23  
 Ed Broome Inc, Memorandum of Oil & Gas Lease  
 ROYALTY OWNER: Freeman Paul Smith, et ux, et al; Joseph C. Moffatt, et al; Diana Lynne Knight LEASE NO: 22173 ACREAGE: 20.75; 125; 283  
 PROPOSED WORK:  DRILL  CONVERT  DRILL DEEPER  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ 7,400' TVD  
 PLUG AND ABANDON  CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 15,300' MD

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

8,529' to Bottom Hole

5,654' to Top Hole

LATITUDE 39 - 22 - 30

LONGITUDE 80 - 45 - 00

9,481' to Top Hole

3,672' to Bottom Hole

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

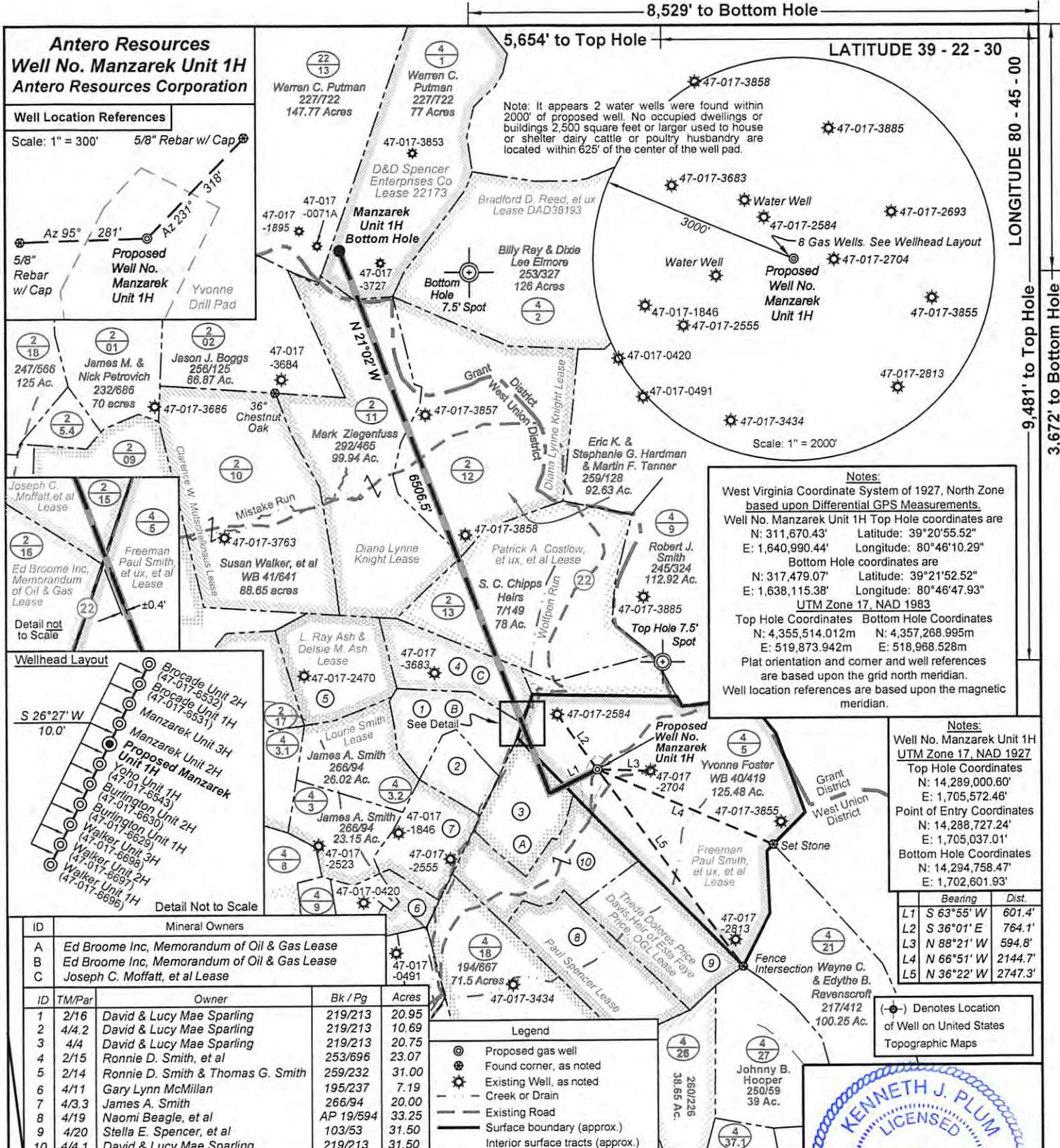
Notes:  
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.  
 Well No. Manzarek Unit 1H Top Hole coordinates are  
 N: 311,670.43' Latitude: 39°20'55.52"  
 E: 1,640,990.44' Longitude: 80°46'10.29"  
 Bottom Hole coordinates are  
 N: 317,479.07' Latitude: 39°21'52.52"  
 E: 1,638,115.38' Longitude: 80°46'47.93"  
 UTM Zone 17, NAD 1983  
 Top Hole Coordinates Bottom Hole Coordinates  
 N: 4,355,514.012m N: 4,357,268.995m  
 E: 519,873.942m E: 518,968.528m  
 Plat orientation and corner and well references are based upon the grid north meridian.  
 Well location references are based upon the magnetic meridian.

Notes:  
 Well No. Manzarek Unit 1H UTM Zone 17, NAD 1927  
 Top Hole Coordinates  
 N: 14,289,000.60'  
 E: 1,705,572.46'  
 Point of Entry Coordinates  
 N: 14,288,727.24'  
 E: 1,705,037.01'  
 Bottom Hole Coordinates  
 N: 14,294,758.47'  
 E: 1,702,601.93'

Legend

- Proposed gas well
- Found corner, as noted
- Existing Well, as noted
- Creek or Drain
- Existing Road
- Surface boundary (approx.)
- Interior surface tracts (approx.)

(-) Denotes Location of Well on United States Topographic Maps



**Antero Resources**  
**Well No. Manzarek Unit 1H**  
**Antero Resources Corporation**

**Well Location References**

Scale: 1" = 300' 5/8" Rebar w/ Cap

Az 95° 281' Az 231° 318'

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8 Gas Wells. See Wellhead Layout

Proposed Well No. Manzarek Unit 1H

**Wellhead Layout**

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Brocade Unit 1H (47-017-6531)

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Proposed Manzarek Unit 1H

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Burlington Unit 1H (47-017-6629)

Walker Unit 3H (47-017-6698)

Walker Unit 2H (47-017-6697)

Walker Unit 1H (47-017-6696)

Detail Not to Scale

ID	Mineral Owners
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B	Ed Broome Inc, Memorandum of Oil & Gas Lease
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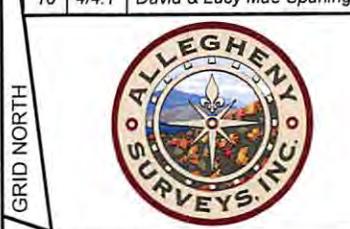
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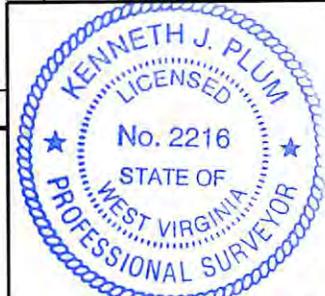
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- Existing Well, as noted
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- Existing Road
- Surface boundary (approx.)
- Interior surface tracts (approx.)



I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the rules issued and prescribed by the Department of Environmental Protection.

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



FILE NO: 264-30(54)-M(G)-14  
 DRAWING NO: Manzarek 1H Well Plat\_06-01-16  
 SCALE: 1" = 1500'  
 MINIMUM DEGREE OF ACCURACY: Submeter  
 PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

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

DATE: June 2 20 16  
 OPERATOR'S WELL NO. Manzarek Unit 1H  
 API WELL NO  
 47 - 017  
 STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
 (IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW

LOCATION: ELEVATION: Proposed Grade-1227' Original Grade-1253' WATERSHED: Headwaters Middle Island Creek QUADRANGLE: West Union  
 DISTRICT: West Union COUNTY: Doddridge

SURFACE OWNER: Yvonne Foster Patrick A. Costlow, et ux, et al; D&D Spencer Enterprises Co ACREAGE: 125.48 78,973; 73; 23  
 Ed Broome Inc, Memorandum of Oil & Gas Lease

ROYALTY OWNER: Freeman Paul Smith, et ux, et al; Joseph C. Moffatt, et al; Diana Lynne Knight LEASE NO: 22173 ACREAGE: 20.75; 125; 283

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 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ 7,400' TVD

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

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>Freeman Paul Smith et ux, et al Lease</u></b>			
Freeman Paul Smith	Key Oil Company	1/8	0108/0423
Key Oil Company	J&J Enterprises, Inc.	Assignment & Security Agreement	0115/0558
J&J Enterprises, Inc.	Eastern American Energy Corporation	Confirmatory Deed & Assignment of Leases	0159/0139
Eastern American Energy Corporation	Energy Corporation of America	Confirmatory Deed & Assignment of Leases	0240/0498
Energy Corporation of America	Antero Resources Appalachian Corporation	Partial Assignment of Oil & Gas Leases	0272/0307
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Ed Broome, Inc., Memorandum of Oil &amp; Gas Lease</u></b>			
Ed Broome, Inc.	Antero Resources Appalachian Corporation	1/8+	0290/0007
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Ed Broome Inc., Memorandum of Oil &amp; Gas Lease</u></b>			
Ed Broome, Inc.	Antero Resources Appalachian Corporation	1/8+	0292/0724
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Joseph C. Moffatt, et al Lease</u></b>			
Joseph C. Moffatt	Clarence W. Mutschelknaus	1/8	0157/0325
Clarence W. Mutschelknaus	Bluestone Energy partners	Amended and Restated Memorandum Affidavit Regarding Merger	0232/0021
Bluestone Energy Partners	Antero Resources Bluestone, LLC, a wholly owned subsidiary of Antero Resources Appalachian Corporation		DB 0288/0001
Antero Resources Bluestone, LLC	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Patrick A. Costlow, et ux, et al Lease</u></b>			
Patrick A. Costlow, et ux	Antero Resources Corporation	1/8+	0307/25
<b><u>Diana Lynne Knight Lease</u></b>			
Diana Lynne Knight	Antero Resources Corporation	1/8+	0371/330

470 1706775

Received  
Office of State & Local Government Services  
JUN 06 2016

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

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

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

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>D &amp; D Spencer Enterprises Co Lease 22173</u>	D & D Spencer Enterprise Co. Antero Resources Appalachian Corp.	Antero Resources Appalachian Corp. Antero Resources Corporation	1/8+ Assignment	262/595 Exhibit 1

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

4701706775

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

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated:

Well Operator: Antero Resources Corporation  
 By: Kevin Kilstrom  
 Its: Senior VP of Production

Received  
Office of Oil & Gas  
JUN 06 2016





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

June 3, 2016

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

RE: Manzarek Unit 1H  
Quadrangle: West Union 7.5<sup>+</sup>  
Doddridge County/West Union District, West Virginia

Mr. Martin:

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

Sincerely,

Brett Kuhn  
Landman

A handwritten signature in blue ink, appearing to read "Brett Kuhn", is written over the typed name and title.

470 1706775

Received  
Office of Oil & Gas  
JUN 06 2016

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

Date of Notice Certification: 06/02/2016

API No. 47- 017 - \_\_\_\_\_

Operator's Well No. Manzarek Unit 1H

Well Pad Name: Yvonne Pad

**Notice has been given:**

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

State: West Virginia  
County: Doddridge  
District: West Union  
Quadrangle: West Union 7.5'  
Watershed: Headwaters Middle Island Creek

UTM NAD 83 Easting: 4 519873.942m  
Northing: 7 4355514.012m 007  
Public Road Access: CR 24 (Knight Fork Rd.)  
Generally used farm name: Foster, Yvonne

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

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input checked="" type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p><b>OOG OFFICE USE ONLY</b></p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
--	---

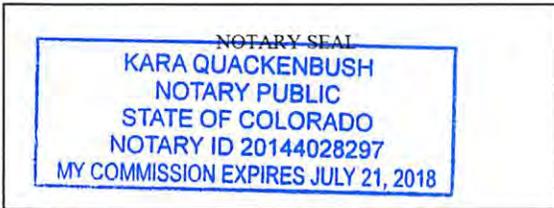
**Required Attachments:**

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

**Certification of Notice is hereby given:**

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

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



Subscribed and sworn before me this 2 day of JUNE 2016  
*[Signature]* Notary Public  
 My Commission Expires JULY 21, 2018

**Oil and Gas Privacy Notice:**

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

470 1706775

Received  
Office of Oil & Gas  
JUN 06 2016

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

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

**Date of Notice:** 6/3/2016 **Date Permit Application Filed:** 6/3/2016

**Notice of:**

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

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

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

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

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

SURFACE OWNER(s)

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

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

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

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

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

SURFACE OWNER(s) (Impoundments or Pits)

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

COAL OWNER OR LESSEE

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

COAL OPERATOR

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

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

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

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

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

\*Please attach additional forms if necessary

Received  
Office of Oil & Gas  
JUN 06 2016

**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

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

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

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

**Well Location Restrictions**

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

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

**Water Well Testing:**

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

**Water Testing Laboratories:**

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

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

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

**Written Comment:**

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

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

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

Received  
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JUN 06 2016

### **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.

470170 Received  
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JUN 06 2016

WW-6A  
(8-13)

API NO. 47- 017 -  
OPERATOR WELL NO. Manzarek Unit 1H  
Well Pad Name: Yvonne

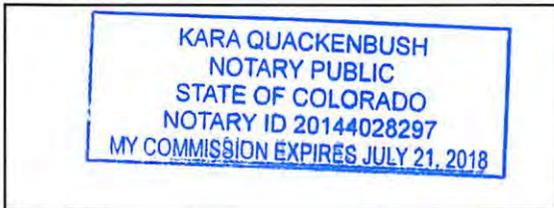
**Notice is hereby given by:**

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

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

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 3 day of June 2016.  
[Signature] Notary Public  
My Commission Expires July 21, 2018

470 1706775

Received  
Office of Oil & Gas  
JUN 06 2016

**WW-6A Notice of Application Attachment (YVONNEPAD):****List of Surface Owner(s) with Proposed Disturbance associated with Yvonne Well Pad:**

**WELL PAD – This owner was notified of all well work permit applications, and has executed signed Surface Use Agreements with Antero Resources Corporation.**

**TM 4 PCL 5**

**Owner:** Yvonne R. Foster ✓  
**Address:** 2395 Tallmansville Road  
 Buckhannon, WV 26201

**Owner:** Yvonne R. Foster (2<sup>nd</sup> Address) ✓  
**Address:** HC 36 Box 335  
 Buckhannon, WV 26201

**ROAD AND/OR OTHER DISTURBANCE – These owners have executed a signed Agreement with Antero Resources Corporation. However, they were only notified if their tract is overlying the oil and gas leasehold being developed by the proposed well work as outlined in WV Code 22-6A-10(b)(2).**

**TM 4 PCL 4.1**

**Owner:** David & Lucy Mae Sparling ✓  
 (ON LEASE)  
**Address:** 1024 Chipps Run  
 West Union, WV 26456

**TM 4 PCL 11.1**

**Owner:** Antero Resources Corp  
 (OFF LEASE)  
**Address:** 1615 Wynkoop St.  
 Denver, CO 80202

**TM 4 PCL 5**

**Owner:** Yvonne R. Foster ✓  
 (ON LEASE)  
**Address:** 2395 Tallmansville Road  
 Buckhannon, WV 26201

**TM 4 PCL 11**

**Owner:** Antero Resources Corp  
 (OFF LEASE)  
**Address:** 1615 Wynkoop St.  
 Denver, CO 80202

**Owner:** Yvonne R. Foster (2<sup>nd</sup> Address) ✓  
 (ON LEASE)  
**Address:** HC 36 Box 335  
 Buckhannon, WV 26201

**TM 4 PCL 9**

**Owner:** Robert J. Smith ✓  
 (OFF LEASE)  
**Address:** 2725 Canton Rd.  
 West Union, WV 26456

**TM 4 PCL 10**

**Owner:** Antero Resources Corp  
 (OFF LEASE)  
**Address:** 1615 Wynkoop St.  
 Denver, CO 80202

470 1706776

Flamingo  
 Office of Oil & Gas  
 JUN 06 2016

**WW-6A Notice of Application Attachment (YVONNE PAD):**

**WATER SOURCE OWNERS: Within 1500'**

**Owner:** Ronnie D. Smith, et al  
**Address:** 114 Marshall Ct.  
Parkersburg, WV 26101

**Owner:** David & Lucy Mae Sparling  
**Address:** 1024 Chipps Run  
West Union, WV 26456

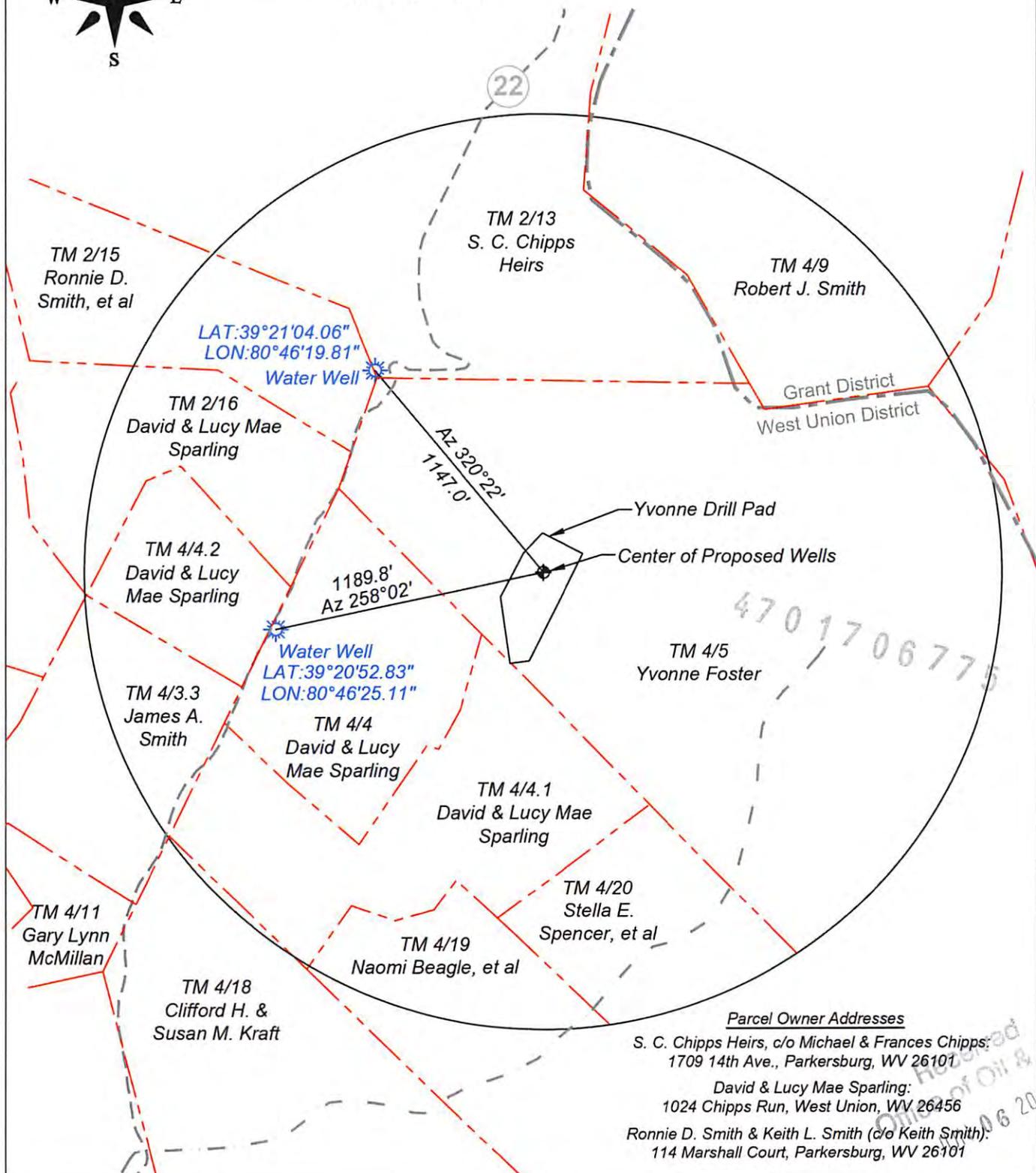
470170

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Scale 1" = 600'

### Yvonne Drill Pad Water Well & Spring Map



TM 2/15  
Ronnie D.  
Smith, et al

TM 2/13  
S. C. Chipps  
Heirs

TM 4/9  
Robert J. Smith

LAT:39°21'04.06"  
LON:80°46'19.81"  
Water Well

TM 2/16  
David & Lucy Mae  
Sparling

Grant District  
West Union District

Az 320°22'  
1147.0'

Yvonne Drill Pad

Center of Proposed Wells

TM 4/4.2  
David & Lucy  
Mae Sparling

1189.8'  
Az 258°02'

Water Well  
LAT:39°20'52.83"  
LON:80°46'25.11"

TM 4/5  
Yvonne Foster

TM 4/3.3  
James A.  
Smith

TM 4/4  
David & Lucy  
Mae Sparling

TM 4/4.1  
David & Lucy Mae  
Sparling

TM 4/11  
Gary Lynn  
McMillan

TM 4/20  
Stella E.  
Spencer, et al

TM 4/19  
Naomi Beagle, et al

TM 4/18  
Clifford H. &  
Susan M. Kraft

#### Parcel Owner Addresses

S. C. Chipps Heirs, c/o Michael & Frances Chipps:  
1709 14th Ave., Parkersburg, WV 26101

David & Lucy Mae Sparling:  
1024 Chipps Run, West Union, WV 26456

Ronnie D. Smith & Keith L. Smith (c/o Keith Smith):  
114 Marshall Court, Parkersburg, WV 26101

Oil & Gas  
06 2016

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

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

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

**Date of Notice:** 05/20/2016      **Date Permit Application Filed:** 06/03/2016

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

HAND DELIVERY       CERTIFIED MAIL RETURN RECEIPT REQUESTED

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

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

Name: Yvonne R. Foster  
Address: HC 63 Box 335  
Buckhannon, WV 26201

Name: Yvonne R. Foster (2nd Address)  
Address: 2395 Tallmansville Rd.  
Buckhannon, WV 26201

**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: 519863.03m (Approximate Pad Center)  
County: Doddridge      Northing: 4355483.28m (Approximate Pad Center)  
District: Grant      Public Road Access: CR 24 (Knights Fork Rd.)  
Quadrangle: West Union 7.5'      Generally used farm name: Yvonne R. Foster  
Watershed: McElroy 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: 303-357-7323  
Email: asteele@anteroresources.com  
Facsimile: 303-357-7315

Authorized Representative: Ashlie Steele  
Address: 1615 Wynkoop St.  
Denver, CO 80202  
Telephone: 303-357-7323  
Email: asteele@anteroresources.com  
Facsimile: 303-357-7315

**Oil and Gas Privacy Notice:**

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

Office of Oil and Gas  
JUN 06 2016



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

**Division of Highways**

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

Earl Ray Tomblin  
Governor

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

Reissued June 3, 2016

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

Subject: DOH Permit for the Yvonne Pad, Doddridge County  
Manzarek Unit 1H Well site

470 1706775

Dear Mr. Martin,

This well site will be accessed from a DOH permit #04-2014-0257 which has been applied for by Antero Resources Corporation for access to the State Road for a well site located off of Doddridge County Route 24 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: Kara Quackenbush  
Antero Resources Corporation  
CH, OM, D-4  
File

Received  
Office of Oil & Gas  
JUN 06 2016

# List of Anticipated Additives Used for Fracturing or Stimulating Well

Additives	Chemical Abstract Service Number (CAS #)
Fresh Water	7732-18-5
2 Phosphobutane 1,2,4 tricarboxylic acid	37971-36-1
Ammonium Persulfate	7727-54-0
Anionic copolymer	Proprietary
Anionic polymer	Proprietary
BTEX Free Hydrotreated Heavy Naphtha	64742-48-9
Cellulase enzyme	Proprietary
Demulsifier Base	Proprietary
Ethoxylated alcohol blend	Mixture
Ethoxylated Nonylphenol	68412-54-4
Ethoxylated oleylamine	26635-93-8
Ethylene Glycol	107-21-1
Glycol Ethers	111-76-2
Guar gum	9000-30-0
Hydrogen Chloride	7647-01-0
Hydrotreated light distillates, non-aromatic, BTEX free	64742-47-8
Isopropyl alcohol	67-63-0
liquid, 2,2-dibromo-3-nitrilopropionamide	10222-01-2
Microparticle	Proprietary
Petroleum Distillates (BTEX Below Detect)	64742-47-8
Polyacrylamide	57-55-6
Propargyl Alcohol	107-19-7
Propylene Glycol	57-55-6
Quartz	14808-60-7
Sillica, crystalline quartz	7631-86-9
Sodium Chloride	7647-14-5
Sodium Hydroxide	1310-73-2
Sugar	57-50-1
Surfactant	68439-51-0
Suspending agent (solid)	14808-60-7
Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7
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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 JUN 06 2016



# CONTAINMENT PAD CONSTRUCTION PLAN, CONTROL PLANS CORPORATION

## PLAN REPRODUCTION WARNING

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

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

\*\*WARNING\*\*: INFORMATION MAY BE LOST IN COPYING AND/OR GRAY SCALE PLOTTING.

WELL HEAD LAYOUT				
WELL NAME	NAD 83 (WV NORTH ZONE)			
	NORTHING	EASTING	LATITUDE	LONGITUDE
WALKER UNIT 1H	311652.18	1609522.47	39° 20' 55.28"	-80° 46' 09.99"
WALKER UNIT 2H	311661.13	1609526.93	39° 20' 55.37"	-80° 46' 09.94"
WALKER UNIT 3H	311670.08	1609531.38	39° 20' 55.46"	-80° 46' 09.88"
BURLINGTON UNIT 1H	311679.04	1609535.84	39° 20' 55.55"	-80° 46' 09.83"
BURLINGTON UNIT 2H	311687.99	1609540.29	39° 20' 55.64"	-80° 46' 09.77"
YOHO UNIT 1H	311696.94	1609544.75	39° 20' 55.73"	-80° 46' 09.72"
MANZAREK UNIT 1H	311705.89	1609549.20	39° 20' 55.82"	-80° 46' 09.66"
MANZAREK UNIT 2H	311714.85	1609553.66	39° 20' 55.91"	-80° 46' 09.61"
MANZAREK UNIT 3H	311723.80	1609558.12	39° 20' 55.99"	-80° 46' 09.55"
BROCADE UNIT 1H	311732.75	1609562.57	39° 20' 56.08"	-80° 46' 09.49"
BROCADE UNIT 2H	311741.70	1609567.03	39° 20' 56.17"	-80° 46' 09.44"

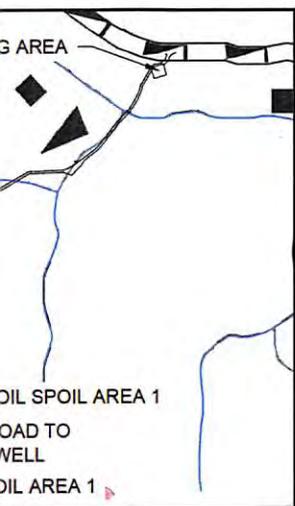
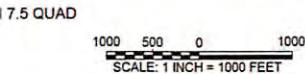
WELL HEAD LAYOUT				
WELL NAME	NAD 27 (WV NORTH ZONE)		UTM ZONE 17 (METERS)	
	NORTHING	EASTING	NORTHING	EASTING
WALKER UNIT 1H	311616.72	1640963.71	4355497.51	519866.07
WALKER UNIT 2H	311625.67	1640968.16	4355500.26	519867.38
WALKER UNIT 3H	311634.62	1640972.60	4355503.01	519868.69
BURLINGTON UNIT 1H	311643.57	1640977.05	4355505.76	519870.00
BURLINGTON UNIT 2H	311652.52	1640981.50	4355508.51	519871.31
YOHO UNIT 1H	311661.48	1640985.99	4355511.26	519872.63
MANZAREK UNIT 1H	311670.43	1640990.43	4355514.01	519873.94
MANZAREK UNIT 2H	311679.38	1640994.88	4355516.76	519875.25
MANZAREK UNIT 3H	311688.33	1640999.33	4355519.51	519876.56
BROCADE UNIT 1H	311697.29	1641003.78	4355522.26	519877.87
BROCADE UNIT 2H	311706.24	1641008.26	4355525.01	519879.19

SHEET INDEX	
PAGE NO.	DESCRIPTION
1	COVER PAGE AND LOCATION MAP
2	SCHEDULE OF QUANTITIES
3	NOTES
4 - 5	EXISTING CONDITIONS
6	OVERALL PLAN
7 - 11	SITE PLANS
12	WELL & W.C. PAD CROSS SECTIONS & PROFILE
13 - 17	ACCESS ROAD CROSS SECTIONS & PROFILE
18	ACCESS ROAD TO EXISTING WELL CROSS SECTIONS & PROFILE
19 - 24	DETAILS
25 - 29	RECLAMATION PLAN

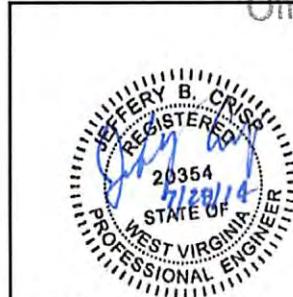
### WELL LOCATION RESTRICTIONS

- WELL PAD IS TO COMPLY WITH WELL LOCATION RESTRICTIONS OF WV CODE 22-6A-12. THE PADS COMPLY WITH THE FOLLOWING RESTRICTIONS:
- 250' FROM AN EXISTING WELL OR DEVELOPED SPRING USED FOR HUMAN OR DOMESTIC ANIMALS
  - 625' FROM AN OCCUPIED DWELLING OR BARN GREATER THAN 2500 SF USED FOR POULTRY OR DAIRY MEASURED FROM THE CENTER OF THE PAD
  - 100' FROM EDGE OF DISTURBANCE TO WETLANDS, PERENNIAL STREAMS, NATURAL OR ARTIFICIAL LAKE, POND OR RESERVOIR
  - 300' FROM EDGE OF DISTURBANCE TO NATURALLY REPRODUCING TROUT STREAMS
  - 1000' OF SURFACE OR GROUND WATER INTAKE TO A PUBLIC WATER SUPPLY

Reviewed at: Q:\OIL GAS\SAY FILES\REVIEWS



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CONSTRUCTION



SEAL

NO.	REVISION	BY	DATE
1	EC & TOE BENCH REVISIONS	KLF	04-08-14
2	REVISED WELL HEAD LAYOUT	KLF	05-14-14
3	CORPORATE ADDRESS	KLF	06-03-14
4	DEP COMMENTS	KLF	07-28-14

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

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PROJ. NO. 134371  
ACAD FILE COVER.dwg

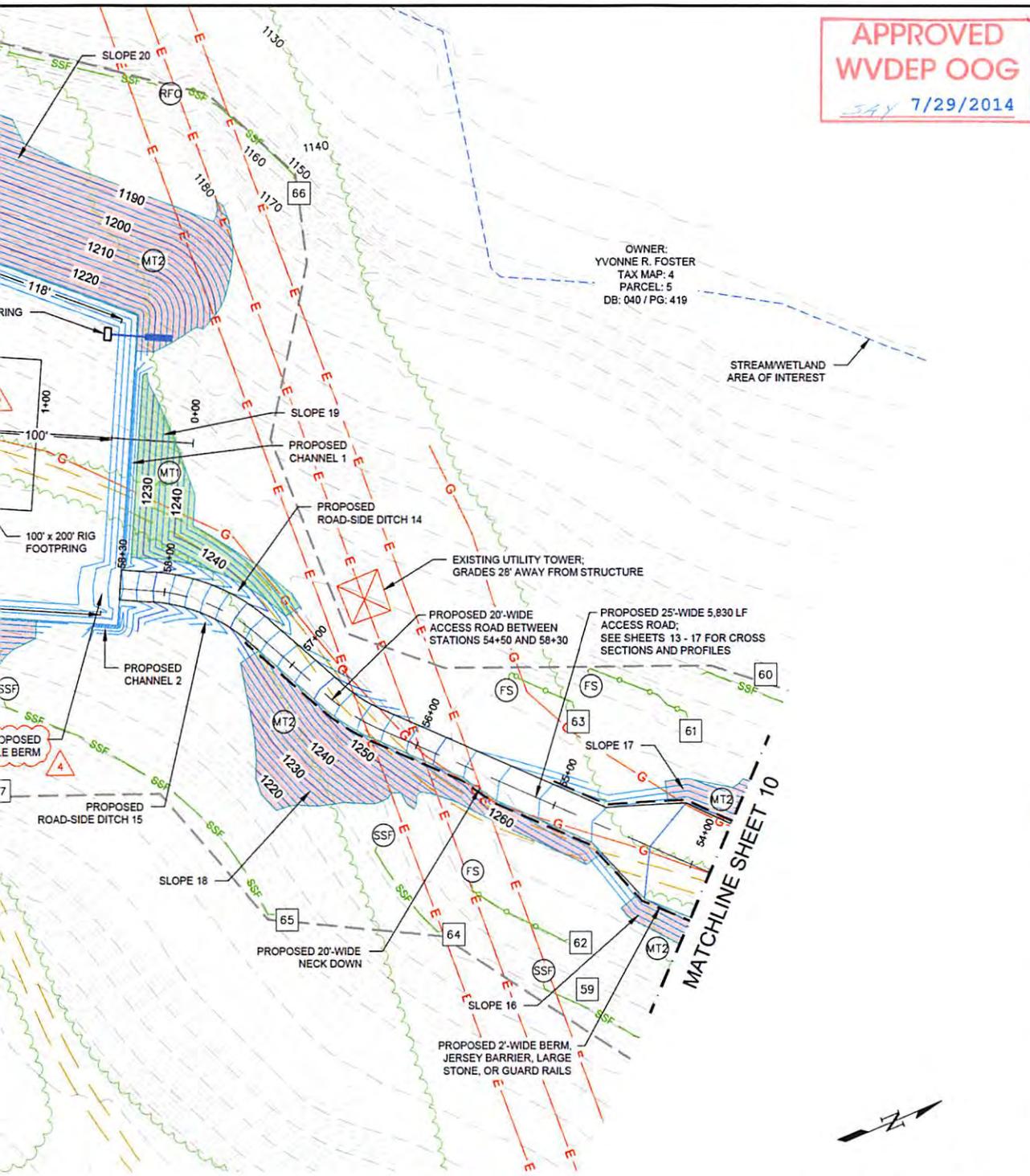
**YVONNE WELL & W.C. PAD  
COVER PAGE & LOCATION MAP**

ANTERO RESOURCES CORPORATION  
YVONNE WELL & WATER CONTAINMENT PAD  
(WEST UNION DISTRICT)  
DODDRIDGE COUNTY WEST VIRGINIA

DESIGNED BY: RAP
MODIFIED BY: -
CHECKED BY: JBC
DATE: 03-21-2014
SCALE:
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 0.5 1.0 1.5 2.0
CONSTRUCTION
<b>1</b>
1 of 29 sheets



APPROVED  
WVDEP OOG  
SAY 7/29/2014



OWNER:  
YVONNE R. FOSTER  
TAX MAP: 4  
PARCEL: 5  
DB: 040 / PG: 419

STREAM/WETLAND  
AREA OF INTEREST

UTILITIES WITHIN PROPOSED  
GRADING TO BE RELOCATED;  
SEE UTILITY EXHIBIT



50 25 0 50  
SCALE: 1 INCH=50 FEET

ISSUED FOR  
CONSTRUCTION



SEAL

NO.	REVISION	BY	DATE
△	EC & TOE BENCH REVISIONS	KLF	04-08-14
△	REVISED WELL HEAD LAYOUT	KLF	05-14-14
△	CORPORATE ADDRESS	KLF	06-03-14
△	DEP COMMENTS	KLF	07-28-14

ACAD FILE:  
SITE PLAN.dwg

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PROJ. NO. 134371

**YVONNE WELL & W.C. PAD  
SITE PLANS**

ANTERO RESOURCES CORPORATION  
YVONNE WELL & WATER CONTAINMENT PAD  
WEST UNION DISTRICT  
DODDRIDGE COUNTY WEST VIRGINIA

DESIGNED BY: RAP
MODIFIED BY: -
CHECKED BY: JBC
DATE: 03-21-2014
SCALE: ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 0.5 1.0 1.5 2.0

CONSTRUCTION  
**11**  
11 of 29 sheets

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

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

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

### **Antero Response:**

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

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

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

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

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

**Antero Response:**

Stabilization methods used include seeding and mulching of disturbed areas as well as the implementation of erosion and sediment control BMPs. Please refer to Notes on page 3 as well as "Details" on page 19-24 for detailed descriptions of the different stabilization methods to be used. Seeding and mulching is to be in accordance with the WVDOT Standard Specifications unless specified otherwise in the plans or unless specified otherwise by the construction engineer or Antero representative. Please refer to number 11 under General Erosion & Sediment Control Notes on page 3 of the Site Design for more specific information regarding application, liming, and mulching rates.

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

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

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

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

**Antero Response:**

Please refer to the "Notes" on pages 3 and "Details" on pages 19-24 in the Site Design for specifications including instructions for installation, inspection, and maintenance for erosion and sediment control BMPs employed at this site.

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

**Antero Response:**

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

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

**Antero Response:**

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

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

**Antero Response:**

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

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

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

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

### **Antero Response**

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

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

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

### **Antero Response**

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

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

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

### **Antero Response**

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

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

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**Antero Response**

Please refer to the "Existing Conditions" map on page 4-5 of the Site Design for the current topographic conditions for the constructed pad on a contour interval that affords sufficient detail to illustrate site terrain conditions.

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

**Antero Response**

Please refer to the "Overall Site Plan" on page 6 as well as the "Well & W.C Pad Cross Sections & Profile," "Access Road Cross Sections & Profile," and "Access Road to Existing well Cross Sections & Profile," on pages 12-18 of the Site Design for proposed cut and fill areas with grading contours.

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

**Antero Response**

Please refer to "Overall Site Plan" and "Site Plans" on pages 6-11 of the Site Design for the maps identifying any structures, roads, water bodies, and other critical areas within the area of interest that would be most likely affected by construction.

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

**Antero Response**

Please refer to the the "Overall Site Plan" on page 6 as well as the "Well & W.C Pad Cross Sections & Profile," "Access Road Cross Sections & Profile," and "Access Road to Existing well Cross Sections & Profile," on pages 12-18 for a cross-section of the location. The cut and fill volumes can be found in "Schedule of Quantities" on page 2.

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

**Antero Response**

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

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

**Antero Response**

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

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

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

**Antero Response**

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

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

**Antero Response**

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

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

**Antero Response**

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

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

**Antero Response**

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

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

**Antero Response**

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

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

**Antero Response**

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

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

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**Antero Response**

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

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

**Antero Response**

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

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

**Antero Response**

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

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

**Antero Response**

"Notes," "Site Plans" and "Details" on pages 3, 7-11, and 19-24 of the Site Design identifies the surface diversions used to prevent surface water and subsurface water from flowing on to the well pad and coming into contact with the stormwater associated with the well pad. Additional Erosion & Sediment BMPs will be used to prevent sediment discharges from the project.

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

**Antero Response**

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

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