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west virginia department of environmental protection

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

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

Thursday, May 11, 2017  
WELL WORK PERMIT  
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION (A)  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for MICHELS UNIT 2H  
47-017-06812-00-00

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: MICHELS UNIT 2H  
Farm Name: ANTERO RESOURCES CORPORATION  
U.S. WELL NUMBER: 47-017-06812-00-00  
Horizontal 6A / New Drill  
Date Issued: 5/11/2017

Promoting a healthy environment.

05/12/2017

# PERMIT CONDITIONS

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

## CONDITIONS

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

API Number:

4701706812

## PERMIT CONDITIONS

11. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to [DEPOOGNotify@wv.gov](mailto:DEPOOGNotify@wv.gov).

05/12/2017

WW-6B  
(04/15)

API NO. 47-017 - 06812  
OPERATOR WELL NO. Michels Unit 2H  
Well Pad Name: Addie 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- Doddridge West Union West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Michels Unit 2H Well Pad Name: Addie Pad

3) Farm Name/Surface Owner: Antero Resources Corporation Public Road Access: WV 18

4) Elevation, current ground: 890' Elevation, proposed post-construction: 890'

5) Well Type (a) Gas  Oil  Underground Storage   
Other   
(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 6900' TVD, Anticipated Thickness- 60 feet, Associated Pressure- 3100#

8) Proposed Total Vertical Depth: 6900' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18300' MD

11) Proposed Horizontal Leg Length: 10959'

12) Approximate Fresh Water Strata Depths: 59', 175', 345'

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

14) Approximate Saltwater Depths: 650'

15) Approximate Coal Seam Depths: 516'

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

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

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

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**Office of Oil & Gas**

FEB 17 2017

*DAF*  
*2/16/17*

4701706812

WW-6B  
(04/15)

API NO. 47- 017  
 OPERATOR WELL NO. Michels Unit 2H  
 Well Pad Name: Addie 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#	400' *See #19	400' *See #19	CTS, 556 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#	18300'	18300'	CTS, 4625 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20" 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	Lab-HIPOZ & Tilt-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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2/16/17

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WW-6B  
(10/14)

API NO. 47- 017 - \_\_\_\_\_  
OPERATOR WELL NO. Michels Unit 2H  
Well Pad Name: Addie Pad

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

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

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

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 17.35 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.99 acres

**23) Describe centralizer placement for each casing string:**

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

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

Conductor: no additives, Class A cement.

Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

**25) Proposed borehole conditioning procedures:**

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

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

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

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

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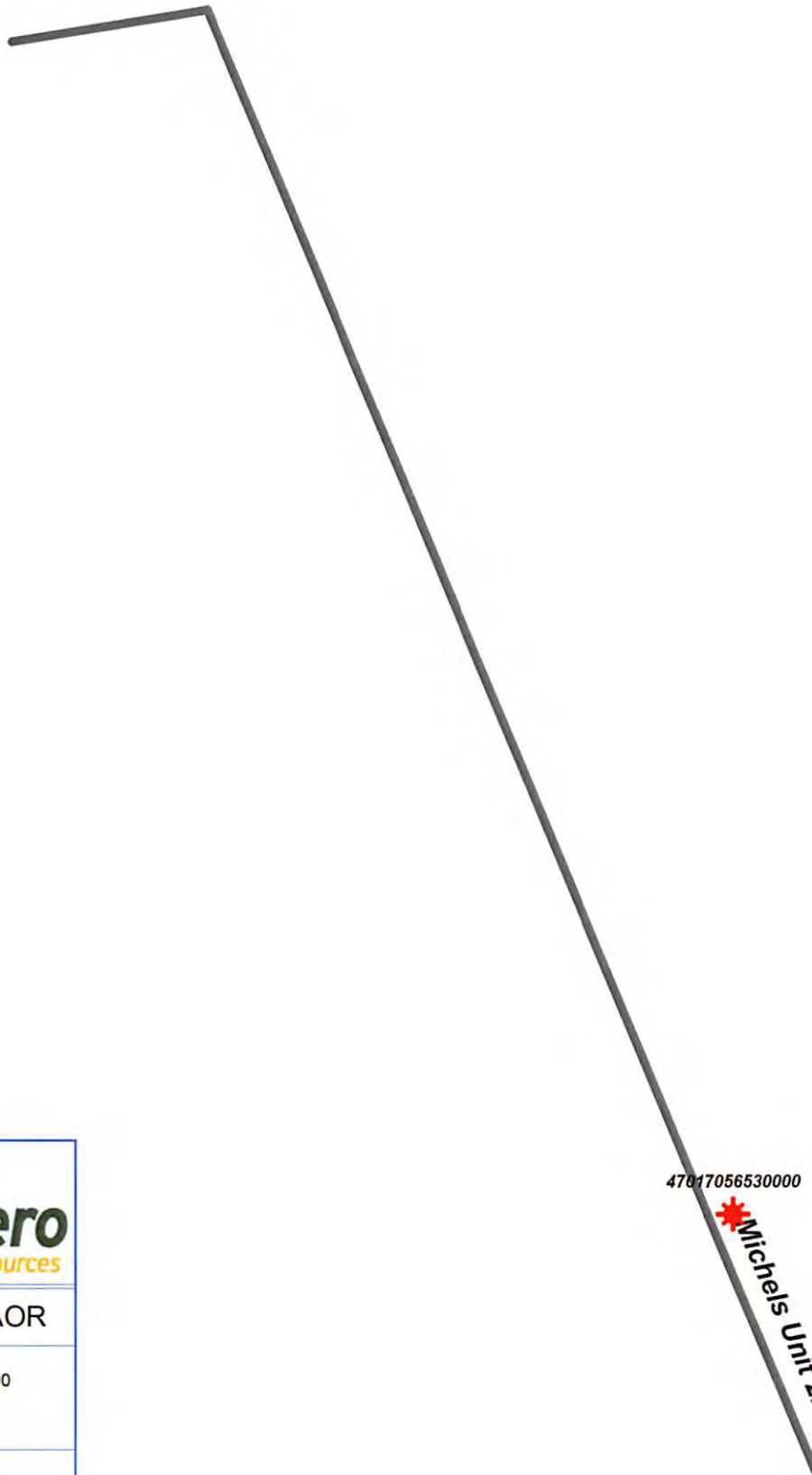
\*Note: Attach additional sheets as needed.

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Page 3 of 3


05/12/2017

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2/16/17



Michels Unit 2H - AOR



 WELL SYMBOLS  
Gas Well

February 7, 2017

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UWI (APINum)	Well Name	Well Number	Operator	Historical Operator	Approx distance to well (ft)
47017056530000	STEWART BEULAH	1	KEY OIL COMPANY	KEY OIL COMPANY	164

TD	ELEV_GR	TD (SSTVD)	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Productible Formation(s) not perf'd
5178	798	-4380	3105-5079	Warren, Riley, Benson, Alexander	Big Injun, Weir, Gordon, Balltown, Bradford

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MAY 08 2017

WV Department of  
Environmental Protection



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WW-9  
(2/15)

API Number 47 - 017  
Operator's Well No. None Unit 2H

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

**FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN**

Operator Name Antero Resources Corporation OP Code 494507022

Watershed (HUC 10) Headwaters Middle Island Creek Quadrangle West Union 7.5'

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

Will a pit be used? Yes  No

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

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

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Surface - Air, Freshwater, Intermediate - Oil Based Mud, Downhole - Steam Production - Water Based Mud

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

Additives to be used in drilling medium? Please See Attachment

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

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

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

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

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

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

Company Official Signature *Cole Kilstrom*

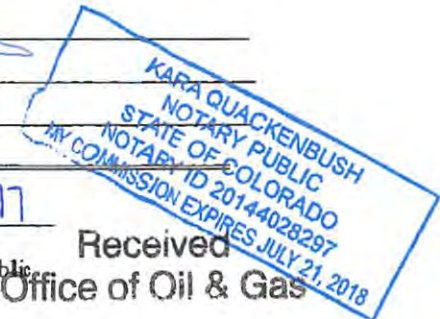
Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental & Regulatory Manager

Subscribed and sworn before me this 10 day of February, 20 17

*Kara Quackenbush*

Notary Public



My commission expires July 21, 2018

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2/16/17*

05/12/2017

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Form WW-9

Operator's Well No. Michels Unit 2H

**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 17.35 acres Prevegetation pH \_\_\_\_\_

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

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

Fertilizer amount 500 lbs/acre

Mulch 2-3 Tons/acre

Access Road "A" (4.76) + Well Pad (6.99) + Water Containment Pad (2.36) + Excess/Topsoil Material Stockpiles (3.24) = 17.35 Acres

Seed Mixtures

**Temporary**

**Permanent**

Seed Type	lbs/acre
Annual Ryegrass	40

Seed Type	lbs/acre
Crownvetch	10-15

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

Tall Fescue 30

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

\*or type of grass seed requested by surface owner

\*or type of grass seed requested by surface owner

**Attach:**

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [Signature] Daniel Flack

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

Title: Oil & Gas Inspector Date: 2/16/17

Field Reviewed?  Yes  No

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## *Form WW-9 Additives Attachment*

### SURFACE INTERVAL

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

### INTERMEDIATE INTERVAL

#### *STIFF FOAM RECIPE:*

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

### PRODUCTION INTERVAL

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

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05/12/2017

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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05/12/2017

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**911 Address**  
**8 Slaughter Run**  
**West Union, WV 26456**

## **Well Site Safety Plan**

### **Antero Resources**

**Well Name:** Addie Unit 1H & 2H, Cobra Unit 1H & 2H,  
Michels Unit 1H & 2H, Warrior Unit 1H & 2H

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

#### **GPS Coordinates:**

**Entrance** - Lat 39°20'4.47"/Long -80°48'29.33" (NAD83)  
**Pad Center** - Lat 39°20'0.98"/Long -80°48'19.81" (NAD83)

#### **Driving Directions:**

From intersection of WV-18 and HWY 50 (exit for West Union, WV): Turn off of HWY 50 onto WV-18 N and follow for ~0.6mi, when you come to a T at Main St turn right. Take your first left immediately after the bridge onto Davis St./Old U.S. 50 W and follow for 0.4 mi. Take a right onto WV-18N/ Sistersville Pike and follow for ~5.5 mi. Access Road for Addie Pad will be on the right hand side and pad will be up on the ridge.

#### **Alternate Route:**

From the town of Pennsboro: Head North on WV-74 for 10.8 miles. Turn right onto WV-18 S and continue for 6.7 miles. The access road will be on your left.

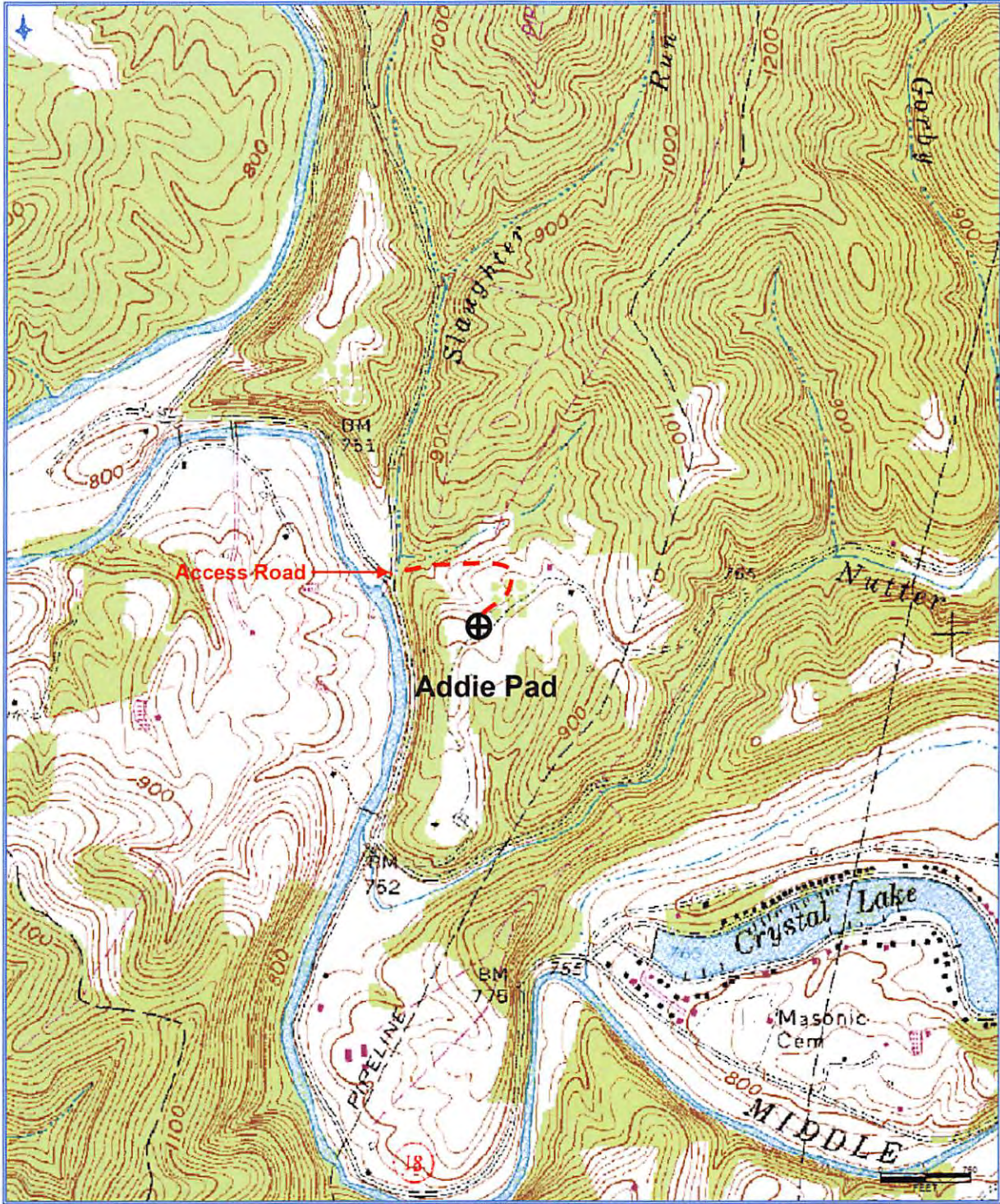
**EMERGENCY (24 HOUR) CONTACT 1-800-878-1373**

*John L. [Signature]*  
2/16/17

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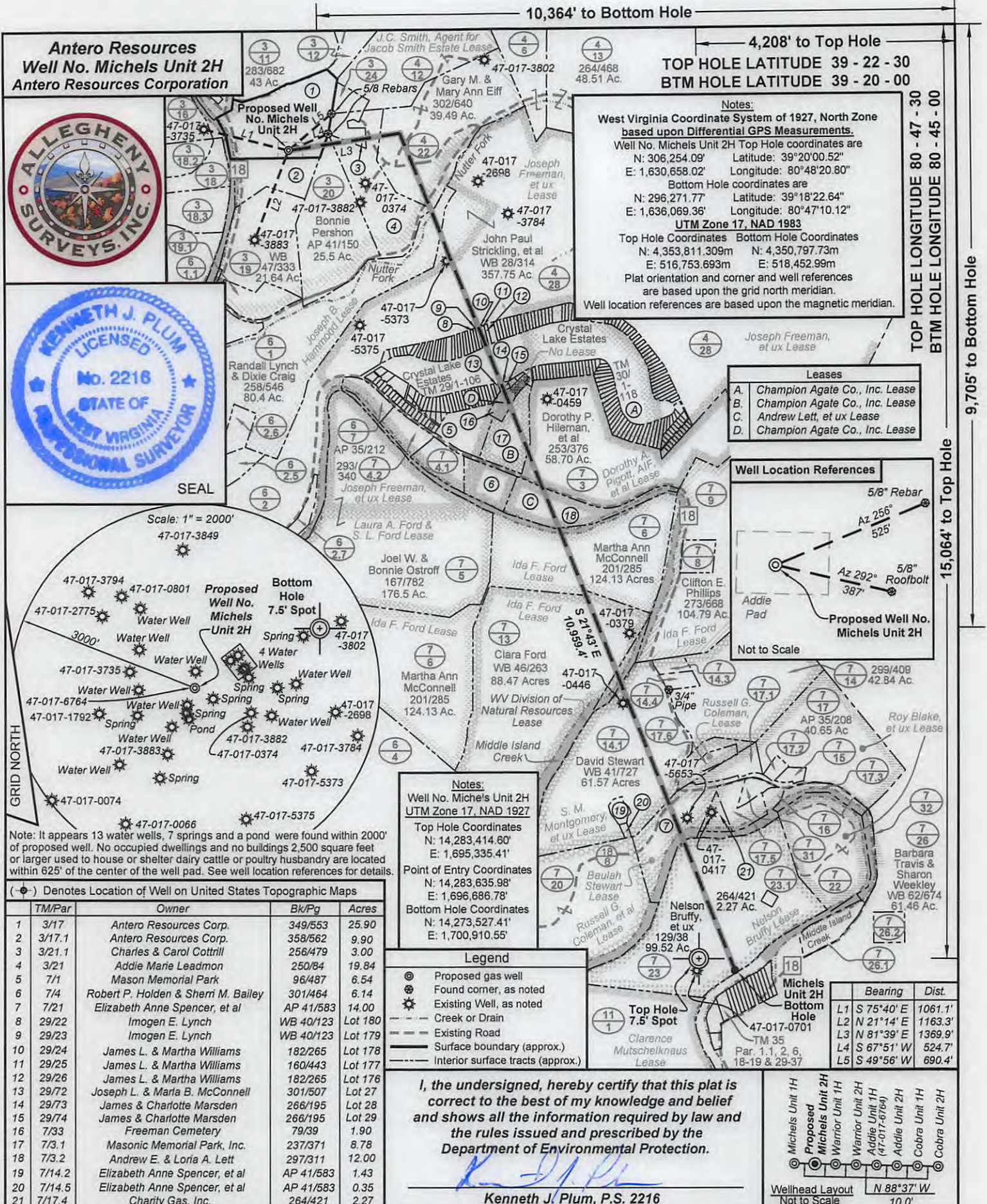
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05/12/2017  
SSP Page 1



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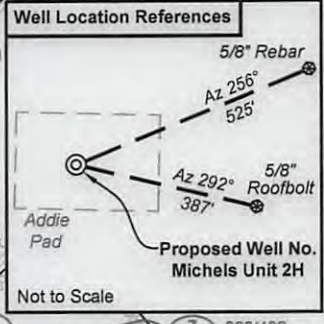
**Antero Resources Corporation**  
Appalachian Basin  
Michels Unit 2H  
Doddridge County  
Quadrangle: West Union  
Watershed: Middle Island Creek  
District: West Union  
Date: 11-3-2015



**Notes:**  
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.  
 Well No. Michels Unit 2H Top Hole coordinates are  
 N: 306,254.09' Latitude: 39°20'00.52"  
 E: 1,630,658.02' Longitude: 80°48'20.80"  
 Bottom Hole coordinates are  
 N: 296,271.77' Latitude: 39°18'22.64"  
 E: 1,636,069.36' Longitude: 80°47'10.12"  
**UTM Zone 17, NAD 1983**  
 Top Hole Coordinates Bottom Hole Coordinates  
 N: 4,353,811.309m N: 4,350,797.73m  
 E: 516,753.693m E: 518,452.99m  
 Plat orientation and corner and well references are based upon the grid north meridian.  
 Well location references are based upon the magnetic meridian.

**Leases**

- Champion Agate Co., Inc. Lease
- Champion Agate Co., Inc. Lease
- Andrew Lett, et ux Lease
- Champion Agate Co., Inc. Lease



**Notes:**  
 Well No. Michels Unit 2H  
**UTM Zone 17, NAD 1927**  
 Top Hole Coordinates  
 N: 14,283,414.60'  
 E: 1,695,335.41'  
 Point of Entry Coordinates  
 N: 14,283,635.98'  
 E: 1,696,686.78'  
 Bottom Hole Coordinates  
 N: 14,273,527.41'  
 E: 1,700,910.55'

**Legend**

- Proposed gas well
- Found corner, as noted
- Existing Well, as noted
- Creek or Drain
- 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**

	Bearing	Dist.
L1	S 75°40' E	1061.1'
L2	N 21°14' E	1163.3'
L3	N 81°39' E	1369.9'
L4	S 67°51' W	524.7'
L5	S 49°56' W	690.4'

Wellhead Layout Not to Scale N 88°37' W 10.0'

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

TM/Par	Owner	Bk/Pg	Acres
1	Antero Resources Corp.	349/553	25.90
2	Antero Resources Corp.	358/562	9.90
3	Charles & Carol Cottrill	256/479	3.00
4	Addie Marie Leadmon	250/84	19.84
5	Mason Memorial Park	96/487	6.54
6	Robert P. Holden & Sherri M. Bailey	301/464	6.14
7	Elizabeth Anne Spencer, et al	AP 41/583	14.00
8	Imogen E. Lynch	WB 40/123	Lot 180
9	Imogen E. Lynch	WB 40/123	Lot 179
10	James L. & Martha Williams	182/265	Lot 178
11	James L. & Martha Williams	160/443	Lot 177
12	James L. & Martha Williams	182/265	Lot 176
13	Joseph L. & Marla B. McConnell	301/507	Lot 27
14	James & Charlotte Marsden	266/195	Lot 28
15	James & Charlotte Marsden	266/195	Lot 29
16	Freeman Cemetery	79/39	1.90
17	Masonic Memorial Park, Inc.	237/371	8.78
18	Andrew E. & Loria A. Lett	297/311	12.00
19	Elizabeth Anne Spencer, et al	AP 41/583	1.43
20	Elizabeth Anne Spencer, et al	AP 41/583	0.35
21	Charity Gas, Inc.	264/421	2.27

FILE NO: 53-30-WU-15  
 DRAWING NO: Michels 2H Well Plat  
 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: February 9 20 17  
 OPERATOR'S WELL NO. Michels Unit 2H  
 API WELL NO  
 47 - 017 - 06812  
 STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
 (IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW  
 LOCATION: ELEVATION: Existing 895' PROPOSED 890' WATERSHED: Headwaters Middle Island Creek QUADRANGLE: West Union  
 DISTRICT: West Union COUNTY: Doddridge  
 SURFACE OWNER: Antero Resources Corp. ACREAGE: 25.9  
 ROYALTY OWNER: J.C. Smith, Agent for Jacob Smith Estate; Ida F. Ford (2); Joseph B. Hammond LEASE NO: ACREAGE: 58.70, 112, 82.21  
 PROPOSED WORK:  DRILL  CONVERT  DRILL DEEPER  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ 6,900' TVD  
 PLUG AND ABANDON  CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 18,300' 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

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>J.C. Smith, Agent for Jacob Smith Estate Lease</u></b>			
J.C. Smith, Agent for Jacob Smith Estate	W.H. Mossor	1/8	0063/0250
W.H. Mossor	Term Energy Corporation	Assignment and Bill of Sale	0116/0519
Term Energy Corporation	Antero Resources Appalachian Corporation	*Partial Assignment of Oil & Gas Leases	DB 0271/0199
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Joseph B. Hammond Lease</u></b>			
Joseph B. Hammond	Antero Resources Appalachian Corporation	1/8+	0257/0274
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Joseph Freeman, et ux Lease</u></b>			
Joseph Freeman, et ux	G.H. Trainer	1/8	0027/0233
G.H. Trainer & J.E. Trainer	W.W. Hepburn	Assignment	0034/0244
W.W. Hepburn	Eastern Petroleum Company	Assignment	0034/0256
Eastern Petroleum Company	Clifton Oil & Gas Company	Assignment	0041/0431
Clifton Oil & Gas Company	Quaker State Refining Corporation	Assignment	0056/0165
Quaker State Refining Corporation	QSE&P, Inc.	Assignment	0159/0474
QSE&P, Inc.	The Quaker State 1989 – 1 Drilling Fund LP	Assignment	0160/0200
The Quaker State 1989 – 1 Drilling Fund LP	Belden & Blake Corporation	Assignment	0175/0466
Belden & Blake Corporation	Peake Energy, Inc.	Assignment	0181/0567
Peake Energy, Inc.	North Coast Energy Eastern, Inc.	Name Change	0249/0343
North Coast Energy Eastern, Inc.	EXCO-North Coast Energy Eastern, Inc.	Name Change	0277/0068
EXCO North Coast Energy Eastern, Inc.	EXCO Resources WV, Inc.	Name Change	Exhibit 2
EXCO Resources WV, Inc.	EXCO Resources WV, LLC.	Name Change	Exhibit 3
EXCO Resources WV, LLC.	EXCO Production Company WV, LLC	Merger	Exhibit 4
EXCO Production Company WV, LLC	Antero Resources Appalachian Corporation	Assignment	0285/0084
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Champion Agate Co., Inc. Lease (D)</u></b>			
Champion Agate Co., Inc.	Antero Resources Appalachian Corporation	1/8+	0286/0250
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Champion Agate Co., Inc. Lease (B)</u></b>			
Champion Agate Co., Inc.	Antero Resources Appalachian Corporation	1/8+	0257/0274
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

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

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

05/12/2017



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

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

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>Dorothy A. Piggott, AIF, et al Lease</u></b>			
Dorothy A. Piggott, AIF, et al	Antero Resources Appalachian Corporation	1/8	0267/0191
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Andrew Lett, et ux Lease (C)</u></b>			
Andrew Lett, et ux	Antero Resources Appalachian Corporation	1/8+	0277/0561
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>WVDNR Lease (Middle Island Creek)</u></b>			
WV Division of Natural resources	Antero Resources Corporation	1/8+	0416/0455
<b><u>Ida F. Ford Lease (8-7-6, 8-7-13)</u></b>			
Ida F. Ford	Ford Development Company	1/8	0063/0459
Ford Development Company	Antero Resources Appalachian Corporation	Assignment	0277/0482
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>S.M. Montgomery, et ux Lease</u></b>			
S.M. Montgomery, et ux	Paul B. Davis, Charter D. Stinespring and G.W. Hill	1/8	0065/0015
Paul B. Davis, Charter D. Stinespring and G.W. Hill	Trio Oil & Gas Company, Inc.	Assignment	0065/0374
Trio Oil & Gas Company, Inc.	Antero Resources Appalachian Corporation	Assignment	0279/0630
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Beulah Stewart Lease</u></b>			
Beulah Stewart	Key Oil Company	1/8	0219/0175
Key Oil Company	Antero Resources Corporation	Assignment	0276/0526

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Office of Oil & Gas

FEB 13 2017

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

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

05/12/2017

**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:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Nelson Bruffy Lease</u>	Nelson Bruffy Antero Resources Appalachian Corporation	Antero Resources Appalachian Corp. Antero Resources Corporation	1/8 Name Change	0262/0180 Exhibit 1

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

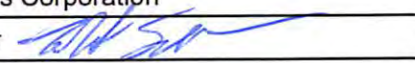
**Acknowledgement of Possible Permitting/Approval  
In Addition to the Office of Oil and Gas**

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

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

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Office of Oil & Gas  
FEB 13 2017*

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: Robert S. Tucker   
 Its: Vice President - Geology

FORM WW-6A1  
EXHIBIT 1

FILED

JUN 10 2013

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



Penney Barker, Manager  
Corporations Division  
Tel: (304)558-8000  
Fax: (304)558-8381  
Website: [www.wvsos.com](http://www.wvsos.com)  
E-mail: [business@wvsos.com](mailto:business@wvsos.com)

APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY

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

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

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

- Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
- Date Certificate of Authority was issued in West Virginia: 6/25/2008
- Corporate name has been changed to: Antero Resources Corporation  
(Attach one Certified Copy of Name Change as filed in home State of Incorporation.)
- Name the corporation elects to use in WV: Antero Resources Corporation  
(due to home state name not being available)
- Other amendments: \_\_\_\_\_  
(attach additional pages if necessary)
- Name and phone number of contact person. (This is optional, however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)  
Alvyn A. Schopp (303) 367-7310  
Contact Name Phone Number
- Signature information (See below \*Important Legal Notice Regarding Signature\*):  
Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person  
Signature: [Handwritten Signature] Date: June 10, 2013

**\*Important Legal Notice Regarding Signature:** Per West Virginia Code §31D-1-129. Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.

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Office of Oil & Gas

FEB 13 2017

05/12/2017



# Certificate

*I, Natalie E. Tennant, Secretary of State of the  
State of West Virginia, hereby certify that*

an Amended Certificate of Authority of

**EXCO - NORTH COAST ENERGY EASTERN, INC.**

was filed in my office as required by the provisions of the West Virginia Code and was found to conform to law.

Therefore I issue this

## CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the corporation to

**EXCO RESOURCES (WV), INC.**

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Office of Oil & Gas  
FEB 13 2017



*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
December 2, 2009*

*Natalie E. Tennant*

Secretary of State

# State of West Virginia



## Certificate

*I, Natalie E. Tennant, Secretary of State of the  
State of West Virginia, hereby certify that*

**EXCO RESOURCES (WV), INC.**  
*(A Delaware Corporation)*

*filed Articles of Conversion in my office as required by the provisions of the West Virginia Code  
and was found to conform to law.*

*Therefore, I issue this*

### CERTIFICATE OF CONVERSION

*Converting the corporation to:*

**EXCO RESOURCES (WV), LLC**  
*(A Delaware Limited Liability Company)*



*Given under my hand and the  
Great Seal of the State of  
West Virginia on*

July 7, 2010

Received  
Office of Oil & Gas  
FEB 13 2017

*Natalie E. Tennant*

*Secretary of State*

05/12/2017

# State of West Virginia



## Certificate

*I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that*

by the provisions of the West Virginia Code, Articles of Merger were received and filed

MERGING EXCO RESOURCES (PA), LLC, A QUALIFIED TX ORGANIZATION WITH EXCO RESOURCES (WV), LLC, A QUALIFIED TX ORGANIZATION, AS SURVIVORS AND CREATING THE FOLLOWING NON-QUALIFIED TX ORGANIZATIONS: BG NATURAL GAS PRODUCTION COMPANY (PA), LLC, APPALACHIA MIDSTREAM, LLC, EXCO RESOURCES (XA), LLC, BG NATURAL GAS PRODUCTION COMPANY (WV), LLC AND EXCO PRODUCTION COMPANY (PA), LLC. IN THE MERGER EXCO RESOURCES (WV), LLC CHANGED ITS NAME TO EXCO PRODUCTION COMPANY (WV), LLC.

Therefore, I hereby issue this

### CERTIFICATE OF MERGER



*Given under my hand and the Great Seal of the State of West Virginia on*

Received  
July 7, 2010  
Office of Oil & Gas  
FEB 13 2017

*Natalie E. Tennant*

Secretary of State

05/12/2017



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

February 10, 2017

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: Michels Unit 2H  
Quadrangle: West Union 7.5'  
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 Michels Unit 2H horizontal shallow well. As an authorized representative, I certify that Antero has the right to extract, produce or market the oil or gas from all leases through which the Michels Unit 2H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,

A handwritten signature in blue ink, appearing to read "H West", is written over the word "Sincerely,".

Haley West  
Landman

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Office of Oil & Gas  
FEB 13 2017

05/12/2017

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

**Date of Notice Certification:** 02/09/2017

**API No.** 47- 017 -  
**Operator's Well No.** Michels Unit 2H  
**Well Pad Name:** Addie 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:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>516753.693m</u>
County:	<u>Doddridge</u>		Northing:	<u>4353811.309m</u>
District:	<u>West Union</u>	Public Road Access:	<u>WV 18</u>	
Quadrangle:	<u>West Union 7.5'</u>	Generally used farm name:	<u>Antero Resources Corporation</u>	
Watershed:	<u>Headwaters Middle Island Creek</u>			

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 checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" 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 checked="" type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" 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.

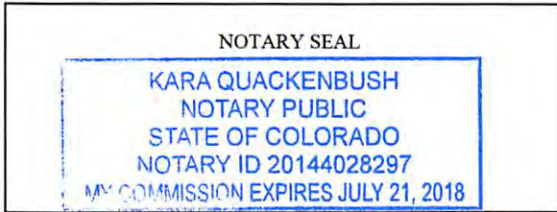
Received  
Office of Oil & Gas  
FEB 13 2017  
**05/12/2017**




**Certification of Notice is hereby given:**

THEREFORE, I Robert S. Tucker, 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>Robert S. Tucker</u> 		<u>Denver, CO 80202</u>
Its:	<u>Vice President - Geology</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 9 day of February 2017  
  
 \_\_\_\_\_ 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).

Received  
Office of Oil & Gas  
FEB 13 2017

**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:** 2/10/2017 **Date Permit Application Filed:** 2/10/2017

**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: \_\_\_\_\_  
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  
FEB 13 2017

05/12/2017

**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

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

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

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

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**Well Location Restrictions**

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

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

**Water Well Testing:**

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

**Water Testing Laboratories:**

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

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

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

**Written Comment:**

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

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

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

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

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

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

**Comment Requirements**

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

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

**Permit Denial or Condition**

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

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

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

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

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WW-6A  
(8-13)

API NO. 47-017 **4701706812**  
OPERATOR WELL NO. Michels Unit 2H  
Well Pad Name: Addie Pad

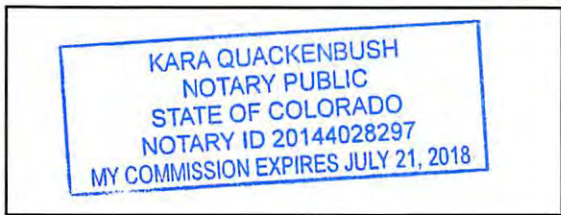
**Notice is hereby given by:**

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

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

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 10 day of February 2017.  
*Kara Quackenbush* Notary Public  
My Commission Expires July 21, 2018

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05/12/2017

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

**List of Surface Owner(s) with Proposed Disturbance associated with Addie Well Pad:**

**WELL PAD DISTURBANCE:**

**TM 6 PCLS 5**

**Owner:** Antero Resources Corporation  
**Address:** 1615 Wynkoop St.  
 Denver, CO 80202

**WATER SOURCE OWNERS: These owners of water sources, within 1500' of the well pad, were notified of all well work permit applications.**

1 Water Well: 1098' (WW1)  
**Owner:** James W. & Lynda S. Beatty  
**Address:** PO Box 295  
 West Union, WV 26456

1 Pond: 518' (PD1)  
 1 Water Well: 741' (WW10)  
**Owner:** Skylar Ora & Clifford Warren  
 Montgomery, et al  
**Address:** 1607 Rayon Dr.  
 Parkersburg, WV 26101

2 Water Wells: 273' (WW3), 305' (WW9)  
 2 Springs: 345' (SP4) & 432' (SP5)  
**Owner:** Antero Resources Corporation  
**Address:** 1615 Wynkoop St.  
 Denver, CO 80202

1 Spring: 1039'  
 1 Water Well: 915'  
**Owner:** Thomas K. & Penny A. Porter  
**Address:** 457 Cedar Lane  
 West Union, WV 26456

2 Water Wells: 733' (WW4), 879' (WW5)  
 1 Spring: 889' (SP2)  
**Owner:** Charles L. & Carol J. Cottrill  
**Address:** 3839 Smithton Rd.  
 West Union, WV 26456

2 Water Wells: 834' (WW-6A) & 881' (WW6)  
**Owner:** Addie Marie Leadmon  
**Address:** 87 Spruce St.  
 Elizabeth, WV 26143



1 Water Well: 1324' (WW8)  
 1 Spring: 1339' (SP3)  
**Owner:** Gary M. & Mary Ann Eiff  
**Address:** 12954 Soundings Rd.  
 Lusby, MD 20657

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**WW-6A Notice of Application Attachment (ADDIE PAD) – CONTINUED...****WATER SOURCE OWNERS: Greater than 1500'**

**\*NOTE: On attached water well map, 3 other water wells and 2 springs are identified, but they are located greater than 1500' from the subject well pad location.**

1 Water Well: 1567' (WW2)

**Owner:** James W. & Lynda S. Beatty  
**Address:** PO Box 295  
West Union, WV 26456

1 Water Well: 1644' (WW7)

1 Spring: 1954' (SP1)

**Owner:** Gary M. & Mary Ann Eiff  
**Address:** 12954 Soundings Rd.  
Lusby, MD 20657

1 Spring: 1576' (SP6)

**Owner:** Skylar Ora & Clifford Warren  
Montgomery, et al  
**Address:** 1607 Rayon Dr.  
Parkersburg, WV 26101

1 Water Well: 1751' (WW)

**Owner:** Skylar Ora & Clifford Warren  
Montgomery, et al  
**Address:** 1607 Rayon Dr.  
Parkersburg, WV 26101

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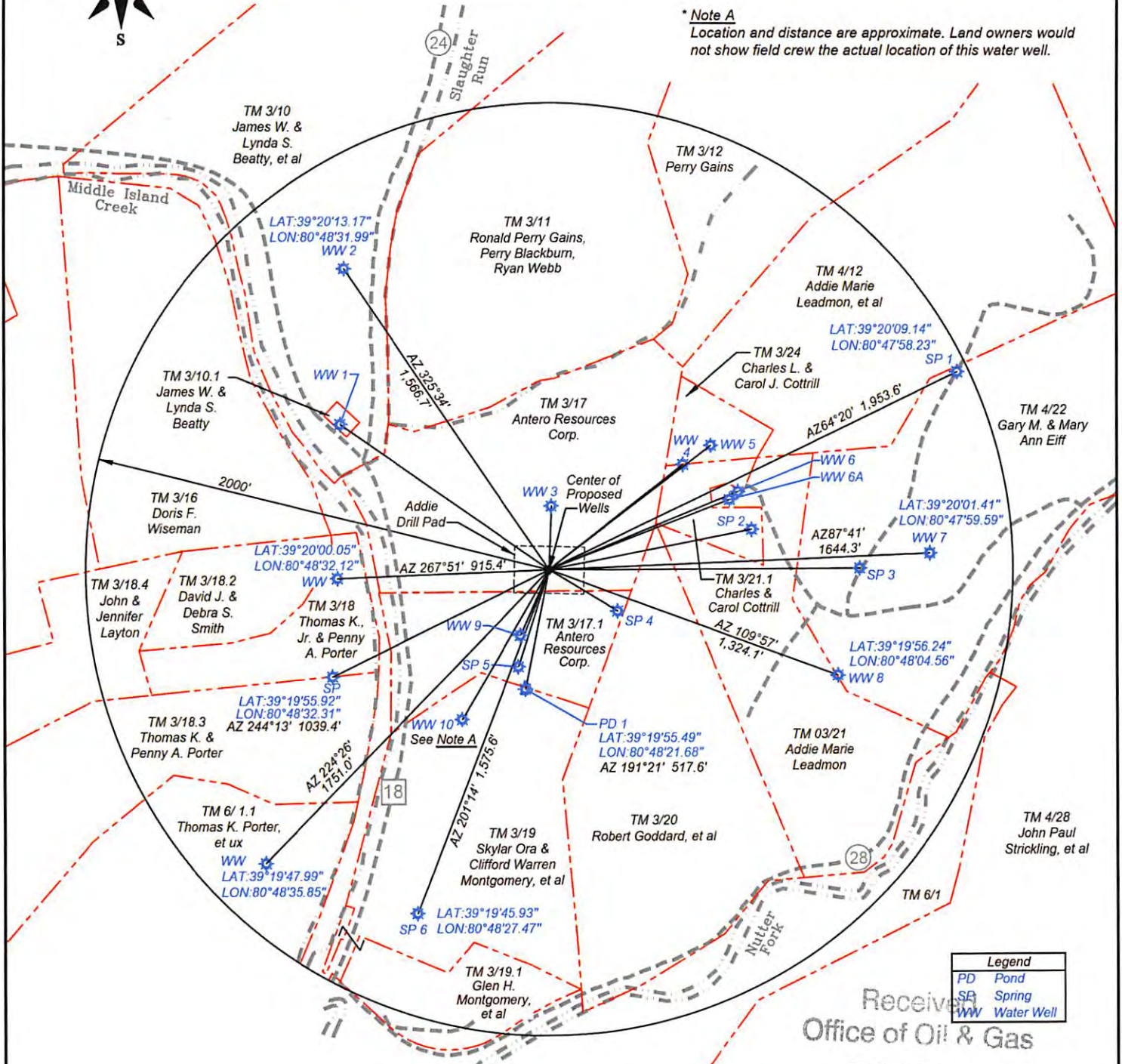
### Addie Drill Pad Water Well & Spring Map



ID	LAT/LONG	AZ/DIST	ID	LAT/LONG	AZ/DIST
WW 1	LAT:39°20'06.59" LON:80°48'32.07"	AZ 304°49' 1,098.4'	WW 9	LAT:39°19'57.75" LON:80°48'22.00"	AZ 203°54' 304.7'
WW 3	LAT:39°20'03.22" LON:80°48'20.39"	AZ 02°17' 273.2'	WW 10	LAT:39°19'54.16" LON:80°48'25.15"	AZ 210°31' 740.6'
WW 4	LAT:39°20'05.07" LON:80°48'13.22"	AZ 51°55' 733.3'	SP 2	LAT:39°20'02.35" LON:80°48'09.41"	AZ 78°51' 889.3'
WW 5	LAT:39°20'05.91" LON:80°48'11.70"	AZ 52°33' 879.2'	SP 3	LAT:39°20'00.75" LON:80°48'03.44"	AZ 89°51' 1,339.0'
WW 6	LAT:39°20'03.95" LON:80°48'10.17"	AZ 67°39' 881.4'	SP 4	LAT:39°19'58.83" LON:80°48'16.68"	AZ 120°43' 344.6'
WW 6A	LAT:39°20'03.60" LON:80°48'10.64"	AZ 68°52' 833.5'	SP 5	LAT:39°19'56.44" LON:80°48'22.08"	AZ 197°46' 432.0'

**Note A**

Location and distance are approximate. Land owners would not show field crew the actual location of this water well.



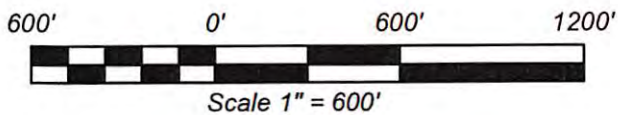
Legend	
PD	Pond
SP	Spring
WW	Water Well

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Parcel Owner Addresses

- Addie Marie Leadmon - 87 Spruce St. Elizabeth, WV 26143
- Antero Resources Corp. - 1615 Wynkoop Street, Denver, CO 80202
- Gary M. & Mary Ann Eiff - 12954 Soundings Road Lusby, MD 20657
- James W. & Lynda S. Beatty - P.O. Box 295 West Union, WV 26456
- Charles L. & Carol J. Cottrill - 3839 Smithton Road West Union, WV 26456
- Skylar Ora & Clifford Warren Montgomery - 1607 Rayon Drive Parkersburg, WV 26101
- Thomas K. & Penny A. Porter - 457 Cedar Lane, West Union, WV 26456



**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF ENTRY FOR PLAT SURVEY**

**Notice Time Requirement:** Notice shall be provided at least **SEVEN (7)** days but no more than **FORTY-FIVE (45)** days prior to entry

**Date of Notice:** 8/6/2015      **Date of Planned Entry:** \*8/16/2015

\*Please note that this is an estimated date. Antero may begin surveying seven (7) days but no more than forty-five (45) after your receipt of this notice (whichever comes first).

**Delivery method pursuant to West Virginia Code § 22-6A-10a**

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

Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry on to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary.

**Notice is hereby provided to:**

SURFACE OWNER(s)

Name: Antero Resources Corporation

Address: 1615 Wynkoop St.  
Denver, CO 80202

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

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

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

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

COAL OWNER OR LESSEE

Name: NO DECLARATIONS ON RECORD WITH COUNTY

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

MINERAL OWNER(s)

Name: Mary Maxine Welch

Address: PO Box 4308  
Parkersburg, WV 26104

\*please attach additional forms if necessary

**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

State: <u>West Virginia</u>	Approx. Latitude & Longitude: <u>Approx. 39.333605, -80.805504</u>
County: <u>Doddridge</u>	Public Road Access: <u>WV 18</u>
District: <u>West Union</u>	Watershed: <u>Headwaters Middle Island Creek</u>
Quadrangle: <u>West Union 7.5'</u>	Generally used farm name: <u>Antero Resources Corporation</u>

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production 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). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary 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: <u>Antero Resources Corporation</u>	Address: <u>1615 Wynkoop Street</u>
Telephone: <u>(303) 357- 7310</u>	<u>Denver, CO 80202</u>
Email: <u>asteele@anteroresources.com</u>	Facsimile: <u>(303) 357-7315</u>

**Oil and Gas Privacy Notice:**

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

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FEB 12 2017  
Tax Map 3 Parcel 17  
Tax Map 3 Parcel 17.1

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

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

**Date of Notice:** 02/10/2017      **Date Permit Application Filed:** 02/10/2017

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

- CERTIFIED MAIL                                       HAND
- RETURN RECEIPT REQUESTED                                      DELIVERY

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

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

(at the address listed in the records of the sheriff at the time of notice):

Name: <u>Antero Resources Corporation</u>	Name: _____
Address: <u>1615 Wynkoop St.</u>	Address: _____
<u>Denver, CO 80202</u>	_____

**Notice is hereby given:**

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

State: <u>West Virginia</u>	UTM NAD 83    Easting: <u>516753.693m</u>
County: <u>Doddridge</u>	Northing: <u>4353811.309m</u>
District: <u>West Union</u>	Public Road Access: <u>WV 18</u>
Quadrangle: <u>West Union 7.5'</u>	Generally used farm name: <u>Antero Resources Corporation</u>
Watershed: <u>Headwaters Middle Island Creek</u>	

**This Notice Shall Include:**

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

Well Operator: <u>Antero Resources Corporation</u>	Address: <u>1615 Wynkoop Street</u>
Telephone: <u>(303) 357-7310</u>	<u>Denver, CO 80202</u>
Email: <u>kquackenbush@anteroresources.com</u>	Facsimile: <u>303-357-7315</u>

**Oil and Gas Privacy Notice:**

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

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

Jim Justice  
Governor

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

February 8, 2017

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 Addie Pad, Doddridge County  
Michels Unit 2H Well site 41-017-06812

Dear Mr. Martin,

This well site will be accessed from a DOH permit #04-2015-0281 issued to Antero Resources Corporation for access to the State Road for a well site located off of WV Route 18 in Doddridge County.

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

Very Truly Yours,

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

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

Cc: Kara Quackenbush  
Antero Resources Corporation  
CH, OM, D-6  
File

Received  
Office of Oil & Gas  
FEB 13 2017

05/12/2017

# List of Anticipated Additives Used for Fracturing or Stimulating Well

4701706812

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-ol compound with methyloxirane	38172-91-7

Received  
Office of Oil & Gas  
FEB 13 2017

05/12/2017

# ADDIE WELL PAD & WATER CONTAINMENT PAD AS-BUILT AND EROSION & SEDIMENT CONTROL IMPROVEMENT PLAN

WEST UNION DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA  
CONAWAY RUN-MIDDLE ISLAND CREEK WATERSHED

**WVDEP 006**  
**ACCEPTED AS-BUILT**  
4/15/2017

**LOCATION COORDINATES:**  
ACCESS ROAD ENTRANCE  
N 4359623.29 E 516554.46 (UTM ZONE 17 METERS)  
CENTER OF TANK  
N 4359481.91 E 516790.46 (UTM ZONE 17 METERS)  
CENTROID OF PAD  
N 4359416.14 E 516792.33 (UTM ZONE 17 METERS)  
**GENERAL DESCRIPTION:**  
THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS  
REQUIRES THE INSTALLATION OF WATER CONTAINMENT PADS AND WELL PADS TO PREVENT  
WATER CONTAMINATION FROM THE LOCATING OF WELLS.

**FLOODPLAIN NOTES:**  
THE SITE IS LOCATED IN FLOOD ZONES X & A. PER FEMA MAP NUMBER #54017C010C. THE SITE  
IS NOT PROTECTED BY FLOOD INSURANCE. THE AREA OF THE SITE LOCATED IN FLOOD ZONE  
X AND A WAS EXCLUDED FROM THE FIRM MAP OF THE SITE EXAMINED IN THE 2010 FIRM  
AND WAS THE ONLY DISTURBANCE IN FLOOD ZONE X. NO FILL WAS CONSTRUCTED IN FLOOD ZONE X.  
**MISS UTILITY STATEMENT:**  
ANTERO RESOURCES CORPORATION HAS NOTIFIED MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF  
WELLS PRIOR TO THIS PROJECT DESIGN. TICKET #164934948.

**ENTRANCE PERMIT:**  
ANTERO RESOURCES CORPORATION HAS OBTAINED AN ENCROACHMENT PERMIT (FORM MM-109) FROM THE  
CONSTRUCTION DIVISION OF TRANSPORTATION DIVISION OF HIGHWAYS PRIOR TO COMMENCEMENT OF  
CONSTRUCTION ACTIVITIES.

**ENVIRONMENTAL NOTES:**  
STREAM AND WETLAND DETERMINATIONS WERE PERFORMED IN DECEMBER, 2015 BY GAI CONSULTANTS, INC.  
TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY  
LIMITS OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF  
ENVIRONMENTAL POLICY AND NATURE (WVDEP). THE RESULTS OF THE FIELD DELINEATION  
AND WETLAND MAPPING WERE REVIEWED BY THE USACE AND WVDEP. THE RESULTS OF THE  
LIMITS OF WATERS AND WETLANDS MAPPING MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS  
STONGLY RECOMMENDED THAT THE APPROPRIATE AGENCIES BE CONSULTED IN AN EFFORT TO GAIN  
PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS  
TO WATERS OF THE U.S. INCLUDING WETLANDS AND STREAM CROSSINGS.

**RESTRICTIONS NOTES:**  
1. THERE ARE NO LAKES, PONDS OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LAD. THERE  
ARE TWO EXISTING WETLANDS ADJACENT TO ACCESS ROAD 'A' THAT HAVE REMAINED UNDISTURBED.  
2. THERE ARE NO NATURALLY FLOWING TRIBUTARIES WITHIN 100 FEET OF THE WELL PAD AND LAD.  
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE  
WELL PAD AND LAD.  
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE  
WELL PAD AND LAD.  
5. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 600 FEET OF THE  
CENTER OF THE WELL PAD.

**PROJECT CONTACTS:**  
**OPERATOR:**  
ANTERO RESOURCES CORPORATION  
PHONE: (604) 942-4100  
FAX: (604) 942-4100  
**ENGINEER/SUPERVISOR:**  
EJ WAGNER - ENVIRONMENTAL ENGINEER  
PHONE: (604) 942-4100 CELL: (304) 478-9770  
JON McVEYER - OPERATIONS SUPERINTENDENT  
PHONE: (604) 351-6799 CELL: (303) 608-3463  
AMARON KUNZLER - CONSTRUCTION SUPERVISOR  
PHONE: (604) 467-6844  
SEBASTIAN WIERA - FIELD ENGINEER  
PHONE: (604) 942-4104 CELL: (304) 627-7405

**NOTES:**  
1. PERMANENTLY STABILIZED AREAS AND PERMANENTLY STABILIZED AREAS WITHIN THE LIMITS OF DISTURBANCE ARE COMPLETE AND  
EVENT IN EXCESS OF 2.0 AND ON A BIENNIAL BASIS.  
2. THE DISTURBANCE AREA SHALL BE MONITORED FOR EROSION AND SEDIMENT CONTROLS AFTER EACH BROOD  
ACTIVITY IS COMPLETED AND WITHIN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DESTABILIZING  
MATERIALS HAVE BEEN REMOVED AND THE AREA IS COVERED WITH A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER. HAS BEEN  
NOTED THAT THE 70% REPAIRING MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS  
OBTAINED FROM WVDEP. THE REPAIRING MEASURES SHALL BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS  
OBTAINED FROM WVDEP.  
3. ALL AREAS DESTABILIZED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDED  
AS ABOVE MENTIONED DATES.  
4. THE DISTURBANCE AREA SHALL BE MONITORED FOR EROSION AND SEDIMENT CONTROLS AFTER EACH BROOD ACTIVITY.  
5. THE DISTURBANCE AREA SHALL BE MONITORED FOR EROSION AND SEDIMENT CONTROLS AFTER EACH BROOD ACTIVITY.  
6. THE DISTURBANCE AREA SHALL BE MONITORED FOR EROSION AND SEDIMENT CONTROLS AFTER EACH BROOD ACTIVITY.

**AS-BUILT CERTIFICATIONS:**  
THE DRAWING, CONSTRUCTION NOTES, AND FIELD DATA HAS BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA  
REGULATORY CODE CHAPTER 24-C (Section XIV, Chapter 24-C) business days before you dig in  
the state of West Virginia.  
**IT'S THE LAW!**

**MISS UTILITY OF West Virginia**  
West Virginia State Law  
(Section XIV, Chapter 24-C)  
Requires that you call two  
business days before you dig in  
the state of West Virginia.  
**IT'S THE LAW!**

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

**SHEET INDEX:**  
1 - COVER SHEET  
2 - LOGGING & DETAILS  
3 - ACCESS ROAD & WATER CONTAINMENT PAD AS-BUILT PLAN  
4 - ACCESS ROAD & WATER CONTAINMENT PAD & WELL PAD AS-BUILT PLAN  
5 - ACCESS ROAD & WATER CONTAINMENT PAD AS-BUILT PLAN  
6 - ACCESS ROAD & WATER CONTAINMENT PAD AS-BUILT PLAN  
7 - WELL PAD & WATER CONTAINMENT PAD AS-BUILT SECTIONS

**ADDIE LIMITS OF DISTURBANCE AREA (AC)**

Access Road 'A' (1,428')	4.76
Water Containment Pad	4.00
Water Containment Pad	2.00
Excavation/Spill/Unvented Storage	3.74
<b>Total Affected Area</b>	<b>17.50</b>
Top Wooded Acres (Dudford)	17.35
Impacts to Antero Resources Corporation (TM 21-17)	4.76
Water Pad	5.19
Water Containment Pad	2.30
Excavation/Spill/Unvented Storage	14.54
Top Wooded Acres (Dudford)	3.89
Impacts to Antero Resources Corporation (TM 21-17)	1.80
Water Pad	1.80
<b>Total Affected Area</b>	<b>6.00</b>
Top Wooded Acres (Dudford)	

**ADDIE PERENNIAL STREAM IMPACT (LINEAR FEET)**

Stream and Impact Cause	Perennial Impacts (L.F.)	Temp. Impacts (L.F.)	Temp. Disturbance (L.F.)	Total Disturbance (L.F.)
Perennial Stream 2 (Access Road 'A')	4	0	0	4

**ADDIE PERENNIAL STREAM IMPACT (LINEAR FEET)**

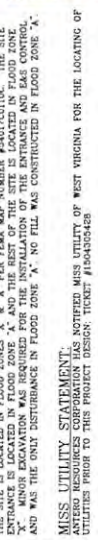
Stream and Impact Cause	Perennial Impacts (L.F.)	Temp. Impacts (L.F.)	Temp. Disturbance (L.F.)	Total Disturbance (L.F.)
Perennial Stream 1 (Access Road 'A')	44	49	10	26
Perennial Stream 4 (Access Road 'A')				129

**ADDIE PERENNIAL STREAM IMPACT (LINEAR FEET)**

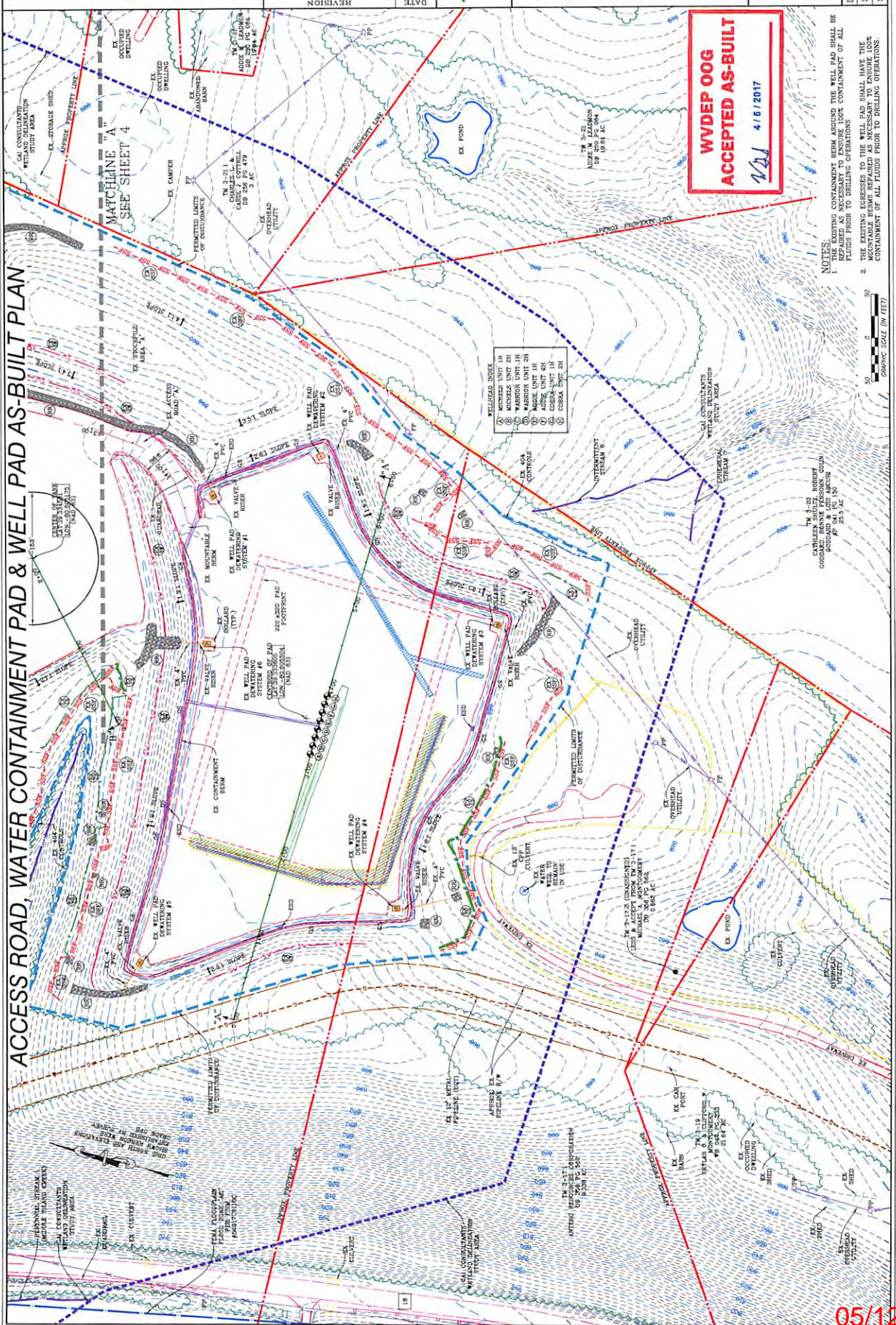
Stream and Impact Cause	Perennial Impacts (L.F.)	Temp. Impacts (L.F.)	Temp. Disturbance (L.F.)	Total Disturbance (L.F.)
Perennial Stream 2 (Access Road 'A')	4	0	0	4

**ADDIE PERENNIAL STREAM IMPACT (LINEAR FEET)**

Stream and Impact Cause	Perennial Impacts (L.F.)	Temp. Impacts (L.F.)	Temp. Disturbance (L.F.)	Total Disturbance (L.F.)
Perennial Stream 1 (Access Road 'A')	44	49	10	26
Perennial Stream 4 (Access Road 'A')				129



**ACCESS ROAD, WATER CONTAINMENT PAD & WELL PAD AS-BUILT PLAN**



DATE	REVISION
04/03/2017	REVISED PER DEP COMMENTS

**Antero**  
 THIS DOCUMENT IS THE PROPERTY OF ANTERO ENERGY SERVICES CORPORATION  
 ACCESS ROAD, WATER CONTAINMENT PAD & WELL PAD AS-BUILT PLAN  
 ADDIE  
 WEST UNION DISTRICT  
 DODDRIDGE COUNTY, WEST VIRGINIA

**WVDEP 00G ACCEPTED AS-BUILT**  
 4/6/2017

DATE: 12/15/2016  
 SCALE: 1" = 50'  
 SHEET: 5 OF 7

**NOTES:**  
 1. THE EXISTING CONTAINMENT BEAM AROUND THE WELL PAD SHALL BE REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS  
 2. THE EXISTING EGRESS TO THE WELL PAD SHALL HAVE THE SAME 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.



TM 3-23 (UNASSIGNED)  
 GROUNDWATER MONITORING  
 GROUNDWATER PRESSURE GAUGE  
 GROUNDWATER MONITORING  
 AT 25.3 AC

TM 3-21  
 ADGE W. LEASING  
 DE 19.4 AC

TM 3-12.2 (UNASSIGNED)  
 GROUNDWATER MONITORING  
 AT 306.7 AC

TM 3-15  
 BELLAR & GRIFFIN  
 DE 34.7 AC

TM 3-21  
 ADGE W. LEASING  
 DE 19.4 AC

# ADDIE WELL PAD & WATER AS-BUILT AND EROSION CONTROL IMPROVEMENTS

WEST UNION DISTRICT, DODDRIDGE CONAWAY RUN-MIDDLE ISLAND

USGS 7.5 WEST UNION

## LOCATION COORDINATES:

ACCESS ROAD ENTRANCE  
 LATITUDE: 39.334574 LONGITUDE: -80.808146 (NAD 83)  
 N 4353923.29 E 516534.48 (UTM ZONE 17 METERS)

CENTER OF TANK  
 LATITUDE: 39.334581 LONGITUDE: -80.805175 (NAD 83)  
 N 4353924.60 E 516790.48 (UTM ZONE 17 METERS)

CENTROID OF PAD  
 LATITUDE: 39.333605 LONGITUDE: -80.805504 (NAD 83)  
 N 4353816.14 E 516762.38 (UTM ZONE 17 METERS)

## GENERAL DESCRIPTION:

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

## FLOODPLAIN NOTES:

THE SITE IS LOCATED IN FLOOD ZONES "X" & "A" PER FEMA MAP NUMBER #54017C0110C. THE SITE ENTRANCE IS LOCATED IN FLOOD ZONE "A" AND THE REST OF THE SITE IS LOCATED IN FLOOD ZONE "X". MINOR EXCAVATION WAS REQUIRED FOR THE INSTALLATION OF THE ENTRANCE AND E&S CONTROL AND WAS THE ONLY DISTURBANCE IN FLOOD ZONE "A". NO FILL WAS CONSTRUCTED IN FLOOD ZONE "A".

## MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION HAS NOTIFIED MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1504305428.

## ENTRANCE PERMIT:

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

## ENVIRONMENTAL NOTES:

STREAM AND WETLAND DELINEATIONS WERE PERFORMED IN DECEMBER, 2015 BY GAI CONSULTANTS, INC. TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE DECEMBER 8, 2015 POTENTIALLY JURISDICTIONAL WATERS MAP WAS PREPARED BY GAI CONSULTANTS, INC. AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS STRONGLY RECOMMENDED THAT THE AFOREMENTIONED AGENCIES BE CONSULTED IN AN EFFORT TO GAIN WRITTEN CONFIRMATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

## GEOTECHNICAL NOTES:

THE PROPOSED ACCESS ROAD CUT SLOPE (1.5:1) SHALL BE FIELD VERIFIED BY A CERTIFIED GEOTECHNICAL ENGINEER TO ENSURE THE PROPOSED SLOPES ARE ADEQUATE PRIOR TO CONSTRUCTION. ACCESS ROAD CONSTRUCTION SHALL BE MONITORED BY A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER OR PROJECT DESIGN ENGINEER DURING CONSTRUCTION. A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. BETWEEN FEBRUARY 26, 2015 & MARCH 3, 2015. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED APRIL 10, 2015, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

## PROJECT CONTACTS:

### OPERATOR:

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

ELI WAGONER - ENVIRONMENTAL ENGINEER  
 OFFICE: (304) 842-4068 CELL: (304) 476-9770

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

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

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

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

RICHARD LYLES - LAND AGENT  
 CELL: (770) 378-8833

### ENGINEER/SURVEYOR:

NAVITUS ENGINEERING, INC.  
 CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER  
 OFFICE: (888) 662-4185 CELL: (540) 866-6747

### ENVIRONMENTAL:

GAI CONSULTANTS, INC.  
 JASON A. COOK - SENIOR ENVIRONMENTAL SPECIALIST  
 OFFICE: (304) 926-8100 CELL: (303) 709-3306

### GEOTECHNICAL:

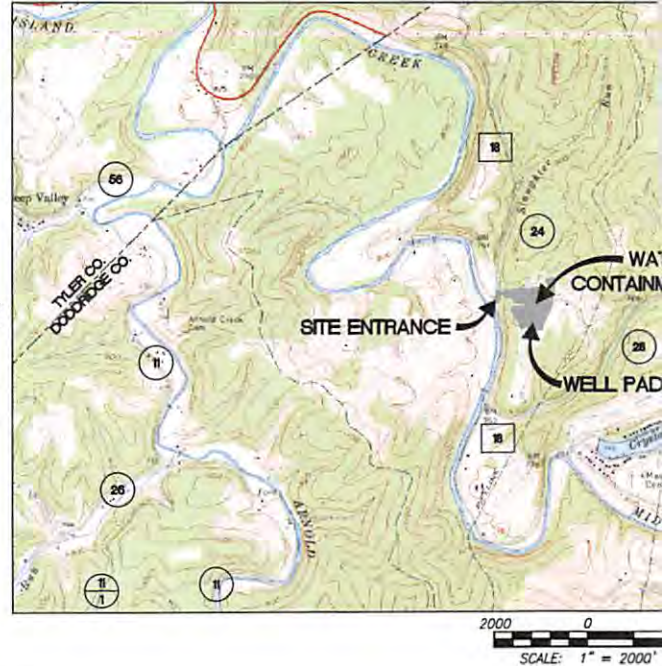
PENNSYLVANIA SOIL & ROCK, INC.  
 CHRISTOPHER W. SAMIOS - PROJECT ENGINEER  
 OFFICE: (412) 372-4000 CELL: (412) 589-0662

## RESTRICTIONS NOTES:

1. THERE ARE NO LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE ARE TWO EXISTING WETLANDS ADJACENT TO ACCESS ROAD "A" THAT HAVE REMAINED UNDISTURBED. THERE WAS A PERENNIAL STREAM IMPACT THAT HAS BEEN PERMITTED BY THE APPROPRIATE AGENCIES.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

## NOTES:

1. ALL BMP'S MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF DISTURBANCE ARE COMPLETE AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RUNOFF EVENT IN EXCESS OF 0.5" AND ON A BIWEEKLY BASIS.
2. THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY HARD COVER SUCH AS PAVEMENT OR BUILDINGS. IT SHOULD BE NOTED THAT THE 70% REQUIREMENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE SITE.
3. ALL PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP.
4. ANY AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDS.
5. THE AS-BUILT INFORMATION SHOWN HEREON REFLECTS FIELD DATA COLLECTED RELATING TO THE FINAL GRADING OF THE DISTURBED AREA AS OF DECEMBER 14, 2016. NAVITUS ENGINEERING IS NOT RESPONSIBLE FOR ANY CHANGES MADE TO THE SITE AFTER THE ABOVE MENTIONED DATES.
6. THE EXISTING CONTAINMENT BERM AROUND THE WELL PAD SHALL BE REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.
7. THE EXISTING EGRESSES TO THE WELL PAD SHALL HAVE THE MOUNTABLE BERMS REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.



## WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

## AS-BUILT CERTIFICATIONS:

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

05/12/2017



# WATER CONTAINMENT PAD DESIGN & SEDIMENT RETENTION PLAN

WVDOH COUNTY, WEST VIRGINIA  
CREEK WATERSHED

## QUAD MAP



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

### SHEET INDEX:

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

**REPRODUCTION NOTE**

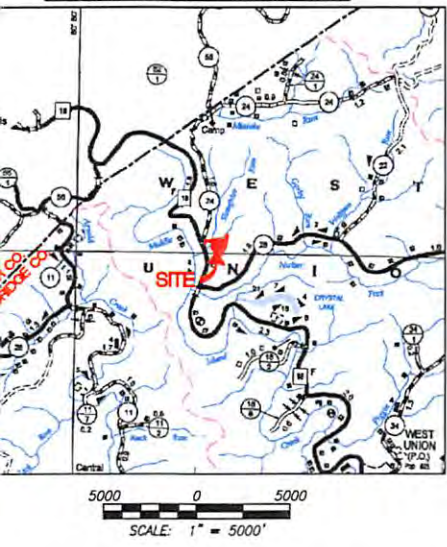
THESE PLANS WERE CREATED TO BE PLOTTED ON 22"X34" (ANSI D) PAPER. HALF SCALE DRAWINGS ARE ON 11"X17" (ANSI B) PAPER.

THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.



ADDIE LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (1,468')	4.76
Well Pad	6.99
Water Containment Pad	2.36
Excess/Topsoil Material Stockpiles	3.24
<b>Total Affected Area</b>	<b>17.35</b>
Total Wooded Acres Disturbed	
	3.89
Impacts to Antero Resources Corporation TM 3-17	
Access Road "A" (1,468')	4.76
Well Pad	5.19
Water Containment Pad	2.36
Excess/Topsoil Material Stockpiles	3.24
<b>Total Affected Area</b>	<b>15.55</b>
Total Wooded Acres Disturbed	
	3.89
Impacts to Antero Resources Corporation TM 3-17.1	
Well Pad	1.80
<b>Total Affected Area</b>	<b>1.80</b>
Total Wooded Acres Disturbed	
	0.00

## WVDOH COUNTY ROAD MAP



Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Michels Unit 1H	N 306254.33 E 1630648.02	N 306289.50 E 1599206.83	N 4353811.33 E 516750.65	LAT 39-20-00.8214 LONG -80-48-20.3052
Michels Unit 2H	N 306254.09 E 1630658.02	N 306289.26 E 1599216.83	N 4353811.31 E 516753.69	LAT 39-20-00.8204 LONG -80-48-20.1770
Warrior Unit 1H	N 306253.85 E 1630668.01	N 306289.02 E 1599226.82	N 4353811.29 E 516756.74	LAT 39-20-00.8195 LONG -80-48-20.0506
Warrior Unit 2H	N 306253.61 E 1630676.01	N 306288.78 E 1599236.82	N 4353811.26 E 516759.79	LAT 39-20-00.8186 LONG -80-48-19.9234
Addie Unit 1H	N 306253.37 E 1630688.01	N 306288.54 E 1599246.82	N 4353811.24 E 516752.83	LAT 39-20-00.8177 LONG -80-48-19.7961
Addie Unit 2H	N 306253.13 E 1630698.00	N 306288.30 E 1599256.82	N 4353811.22 E 516765.88	LAT 39-20-00.8167 LONG -80-48-19.6988
Cobra Unit 1H	N 306252.89 E 1630708.00	N 306288.07 E 1599266.81	N 4353811.20 E 516768.93	LAT 39-20-00.8158 LONG -80-48-19.5416
Cobra Unit 2H	N 306252.65 E 1630718.00	N 306287.83 E 1599276.81	N 4353811.18 E 516771.97	LAT 39-20-00.8149 LONG -80-48-19.4143
Well Pad Elevation	890.0			

Stream and Impact Cause	ADDIE PERENNIAL STREAM IMPACT (LINEAR FEET)				
	Permanent Impacts Culvert /Fill (LF)	Inlets/Outlets Structures (LF)	Temp. Impacts Cofferdam/ E&S Controls (LF)	Temp. Disturb. Distance to L.O.D. (LF)	Total Disturbance (LF)
Perennial Stream 2 (Access Road "A")	4	0	0	0	4

Stream and Impact Cause	ADDIE INTERMITTENT STREAM IMPACT (LINEAR FEET)				
	Permanent Impacts Culvert /Fill (LF)	Inlets/Outlets Structures (LF)	Temp. Impacts Cofferdam/ E&S Controls (LF)	Temp. Disturb. Distance to L.O.D. (LF)	Total Disturbance (LF)
Intermittent Stream 4 (Access Road "A")	44	49	10	26	129

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

REVISION	DATE



**COVER SHEET**

**ADDIE**

**WELL PAD & WATER CONTAINMENT PAD**  
WEST UNION DISTRICT  
DODDRIDGE COUNTY, WEST VIRGINIA



Received  
Office of Oil & Gas  
FEB 17 2017

DATE: 12/15/2016  
SCALE: AS SHOWN  
SHEET 1 OF 7

Addie C. Kemp  
2/16/17

05/12/2017