west virginia department of environmental protection

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

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

Wednesday, August 17, 2016
WELL WORK PERMIT
Horizontal 6A / Horizontal 6A Well - 1

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for ALLI UNIT 2H
47-095-02369-00-00

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: ALLI UNIT 2H
Farm Name: JARRET W. SHEPHERD ET AL
U.S. WELL NUMBER: 47-095-02369-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: 8/17/2016

API Number: _____

4709502369

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

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.

2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.

3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.

4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.

5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations,* 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.

6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.

8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

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

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

May 24, 2016

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

Ms. Laura Adkins:

Antero Resources Corporation (Antero) would like to submit the following application for a new well work permit to explore for Marcellus Shale potential. Our **Mountain** project is located in Tyler County, WV. On the **new McKim Pad** consists **one new horizontal** shallow well (Alli Unit 2H) that we are requesting approval to drill.

Attached you will find the following:

4709502369

- Permit Application package
- CD with copy of permit application

If you have any questions please feel free to contact me at (303) 357-6820.

Thank you in advance for your consideration.

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Office of Oil and Gas
MAY 25 2016
WV Department of
Environmental Protection

Sincerely,

Natalie Komp
Permitting Agent
Antero Resources Corporation

Enclosures

WW-6AW
(1-12)

API NO. 47- 095 -
OPERATOR WELL NO. Alti Unit 2H
Well Pad Name: McKim Pad

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

VOLUNTARY STATEMENT OF NO OBJECTION

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

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

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

VOLUNTARY STATEMENT OF NO OBJECTION

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

State:	West Virginia	UTM NAD 83 Easting:	504200m
County:	Tyler	Northing:	4359574m
District:	Meade	Public Road Access:	CR 20/2
Quadrangle:	Middlebourne 7.5'	Generally used farm name:	Jarret W. Shepherd, et al
Watershed:	Outlet Middle Island Creek		

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

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

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

5/25

4709502369

WW-6B
(04/15)

API NO. 47- 095 -
OPERATOR WELL NO. Alli Unit 2H
Well Pad Name: McKim Pad

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

1) Well Operator:	Antero Resources Corporat	494507062	095 - Tyler	Meade	Middlebourne 7.5'
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: Alli Unit 2H Well Pad Name: McKim Pad

3) Farm Name/Surface Owner: Jarret W. Shepherd, et al Public Road Access: CR 20/2

4) Elevation, current ground: 1208' Elevation, proposed post-construction: 1172'

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

SRS 6/8/16 DMH 6/8/16

6) Existing Pad: Yes or No No

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

8) Proposed Total Vertical Depth: 6700' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 13,200' MD

11) Proposed Horizontal Leg Length: 5379'

12) Approximate Fresh Water Strata Depths: 308', 405'

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

14) Approximate Saltwater Depths: 1245', 1670'

15) Approximate Coal Seam Depths: 617'

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

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

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

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WW-6B
(04/15)

API NO. 47- 095 -
OPERATOR WELL NO. Alli Unit 2H
Well Pad Name: McKim 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#	460' *see #19	460' *see #19	CTS, 639 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#	13200'	13200'	3223 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

SPS 6/8/16

DMH 4709502 3 6/8/16

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

PACKERS

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

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WW-6B
(10/14)

API NO. 47- 095 -
OPERATOR WELL NO. Alli Unit 2H
Well Pad Name: McKim Pad

JPS 6/8/16

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

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.
*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

DMH 6/8/16

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

WR-35 095-02369

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 33.29 acres

22) Area to be disturbed for well pad only, less access road (acres): 10.34 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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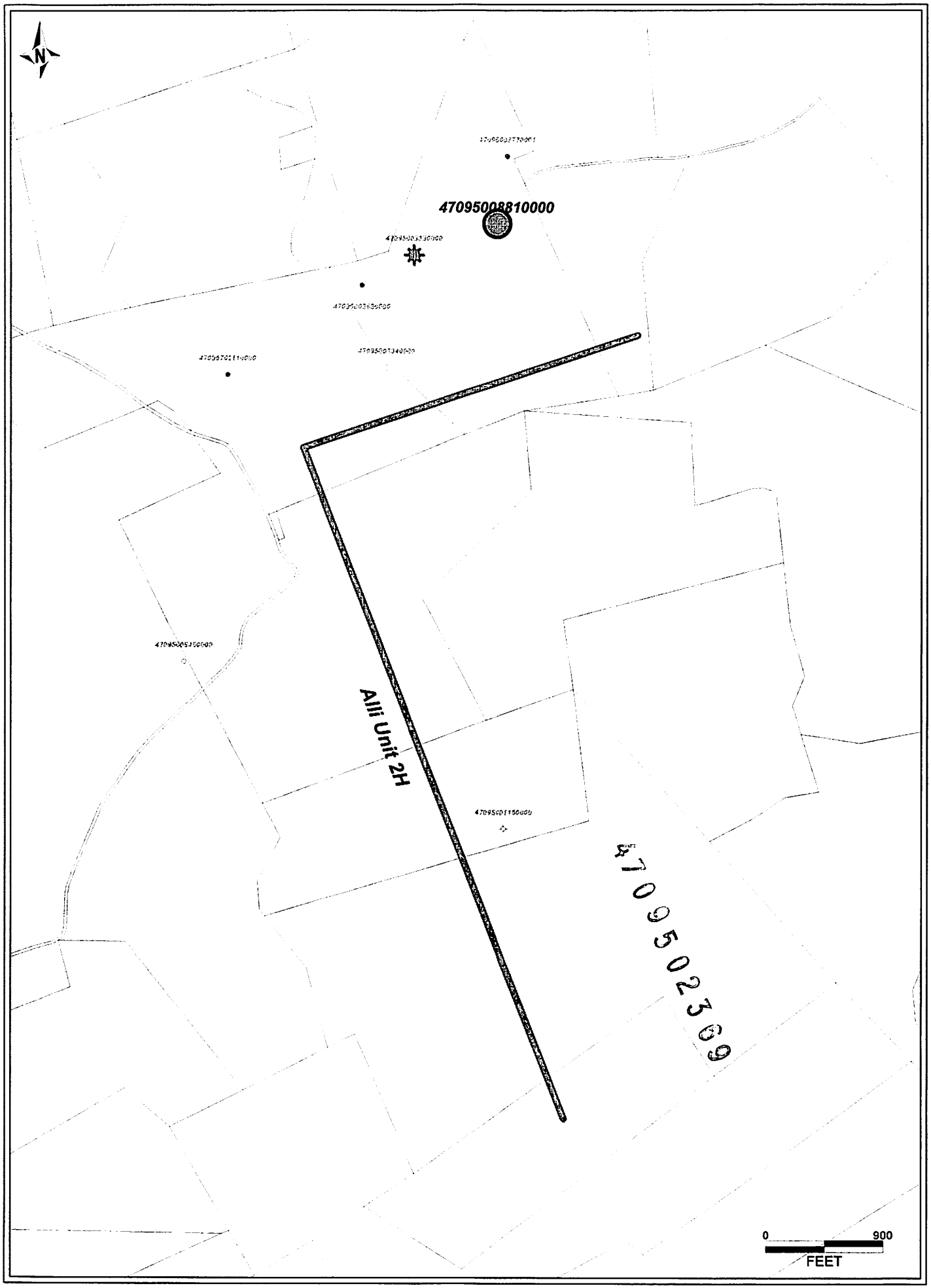
*Note: Attach additional sheets as needed.

UWI (APINum)	Well Name	Well Number	Operator	Hist Oper	TD	ELEV_GR	TD (SSTVD)	Perfs (shallowest, deepest)
47095008810000	PHILLIPS & JACKSON	H-1178	DUPKE ROGER C OIL CO	HAUGHT INCORPORATED	4408	865	-3543	Lower Huron (3941-4156)
47095008450000	LOWTHER A B HEIRS	1	L & M PETROLEUM	L & M PETROLEUM	3645	837	-2808	
47095003340000	C M HAMILTON	3	WEBBER J E	WEBBER J E	2289	867	-1422	
47095702110000	J L POE	3	CARTER OIL COMPANY	CARTER OIL COMPANY	1944	895	-1049	
47095003330000	C M HAMILTON	2	DUPKE ROGER C OIL CO	WEBBER J E	1872	887	-985	
47095003630000	C M HAMILTON	4	WEBBER J E	WEBBER J E	1090	954	-136	
47095003770001	HAMILTON C M	5	DUPKE ROGER C OIL CO	WEBBER J E	1036	917	-119	
47095001150000	MCCULLOUGH HEIRS	1	BROADWATER R J & J R	BROADWATER R J & J R	922	845	-77	

47095023 69


47095008810000
Alli Unit 2H
47095023 69
0
900
FEET

WW-9
(4/16)

API Number 47 - 095 -
Operator's Well No. Alli Unit 2H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

Watershed (HUC 10) Outlet Middle Island Creek Quadrangle Middlebourne 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 ☑

4709502317 DM 17 6/8/16

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) Northwestern Landfill Permit #SWF-1025/ WV0109410
- ☐ Other (Explain)

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

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

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

Additives to be used in drilling medium? Please See Attachment

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

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

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

Yes 6/8/16

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.

KARA QUACKENBUSH
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20144026297
MY COMMISSION EXPIRES JULY 21, 2018

Company Official Signature

Company Official (Typed Name) Randy Kloberdanz

Company Official Title Environmental & Regulatory Director

Subscribed and sworn before me this 6th day of May, 20 16

Kara Quackenbush Notary Public

My commission expires July 21, 2018

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Form WW-9

Operator's Well No. Alli Unit 2H

Antero Resources Corporation

Proposed Revegetation Treatment: Acres Disturbed 33.29 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" (11.97 acres) + Staging Area (1.05 acres) + Well Pad (10.34 acres) + Water Containment Pad (3.27 acres) + Excess/Topsoil Material Stockpiles (6.66 acres) = 33.29 Acres

Seed Mixtures

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

See attached Table IV-3 for additional seed type (McKim Pad Design Page 27)

*or type of grass seed requested by surface owner

See attached Table IV-4A for additional seed type (McKim Pad Design Page 27)

*or type of grass seed requested by surface owner

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: _____

Comments: 4709502369

Title: Oil + Gas Inspector Date: 6/8/16

Field Reviewed? (✓) Yes ( ) No

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Form WW-9 Additives Attachment

SURFACE INTERVAL

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

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INTERMEDIATE INTERVAL

STIFF FOAM RECIPE:

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

PRODUCTION INTERVAL

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

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

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Well Site Safety Plan
Antero Resources

Well Name: **Alli Unit 1H, Alli Unit 2H, Haga Unit 1H, Haga Unit 2H, Haga Unit 3H, McKim Unit 1H, McKim Unit 2H, McKim Unit 3H**

Pad Location: **MCKIM PAD**
Tyler County/Meade District

GPS Coordinates: Lat 39°23'07.65"/Long -80°57'03.77" (NAD83)

Driving Directions:

From the intersection of I-79 and HWY 50: Travel west on US-50 for 39.6 miles. Turn right onto Pullman Road for 0.4 miles. Turn left onto East Myles Ave/Old US 50 E for 0.7 miles. Turn right onto Main Street for 157 feet, turn left onto Masonic Avenue for 171 feet, turn right onto Broadway Street/Main Street for 623 feet. Turn right onto Wells Ave/1st Street/WV-74 N/Mountain Drive for 4.4 miles. Turn left onto Haddox Run for 3.8 miles. Turn right onto McKim Road for 1.0 miles. Turn right onto Burch Road for 450 feet. The Access Road will be on your left.

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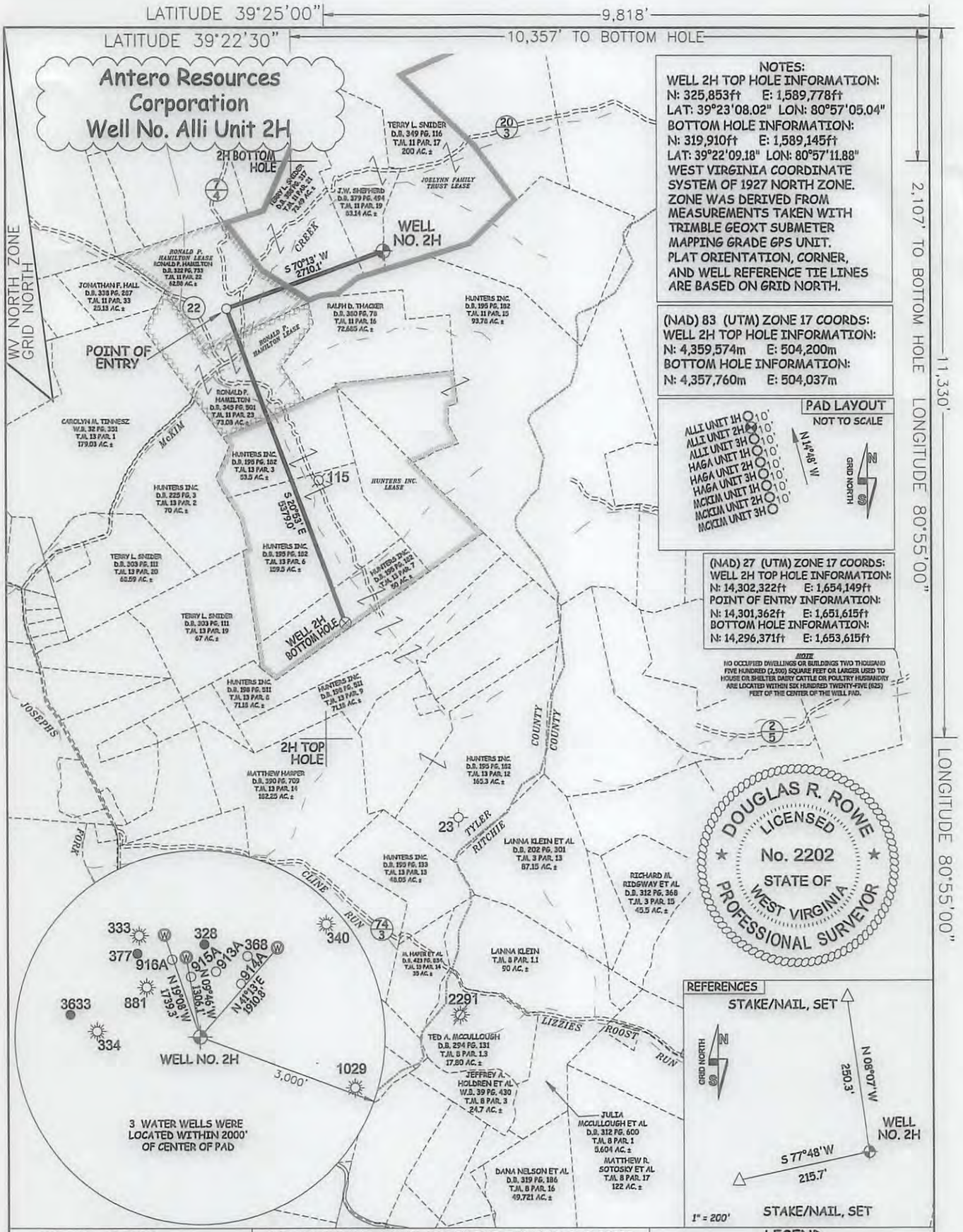
JUN 09 2016

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



JOB # 16-032WA
DRAWING # ALLI2H
SCALE 1" = 2000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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

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

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

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

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

DOUGLAS R. ROWE P.S. 2202

DATE 05/03/16

OPERATOR'S WELL# ALLI UNIT #2H

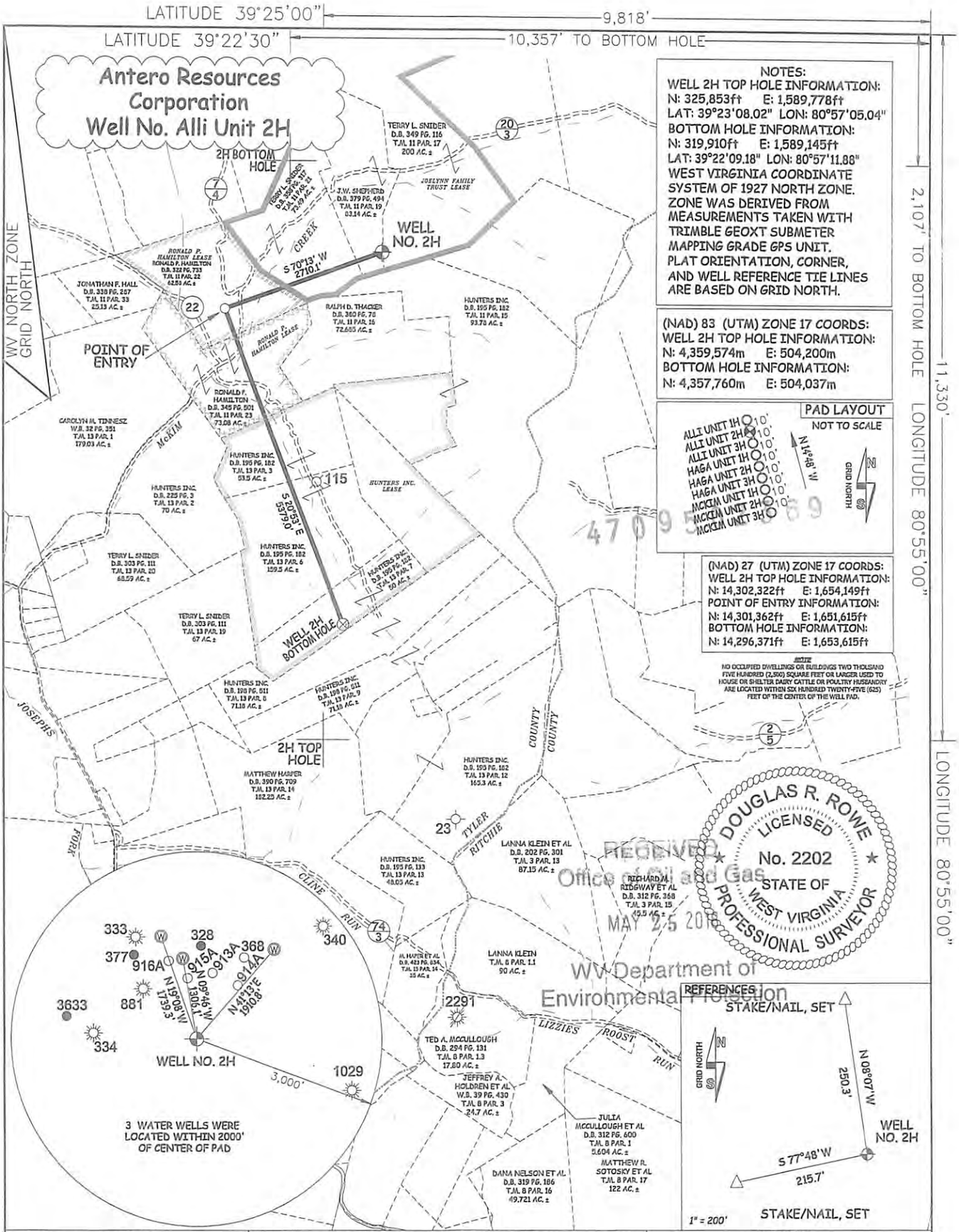
47 – 095 – 02369 HGA
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,208' - ORIGINAL 1,172' - PROPOSED WATERSHED OUTLET MIDDLE ISLAND CREEK
QUADRANGLE MIDDLEBOURNE 7.5' (TH) PENNSBORO 7.5' (BH) DISTRICT MEADE COUNTY TYLER
SURFACE OWNER JARRET W. SHEPHERD ET AL ACREAGE 83.14 ACRES +/-
OIL & GAS ROYALTY OWNER JOELYNN FAMILY TRUST; RONALD P. HAMILTON; RONALD P. HAMILTON; HUNTERS INC LEASE ACREAGE 431.53 AC±; 62.58 AC±; 73.08 AC±; 471.20 AC±;

PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) ___ PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,700' TVD 13.200' MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT

FORM WW-6



JOB # 16-032WA
DRAWING # ALLI2H
SCALE 1" = 2000'
MINIMUM DEGREE OF ACCURACY SUBMETER
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STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

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

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

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

DOUGLAS R. ROWE P.S. 2202

DATE 05/03/16
OPERATOR'S WELL# ALLI UNIT #2H

47 — 095 — 02369
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,208' - ORIGINAL 1,172' - PROPOSED WATERSHED OUTLET MIDDLE ISLAND CREEK
QUADRANGLE MIDDLEBOURNE 7.5' (TH) PENNSBORO 7.5' (BH) DISTRICT MEADE COUNTY TYLER
SURFACE OWNER JARRET W. SHEPHERD ET AL ACREAGE 83.14 ACRES +/-
OIL & GAS ROYALTY OWNER JOELYNN FAMILY TRUST; RONALD P. HAMILTON; RONALD P. HAMILTON; HUNTERS INC LEASE ACREAGE 431.53 AC±; 62.58 AC±; 73.08 AC±; 471.20 AC±;

PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) ___ PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,700' TVD 13,200' MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT

FORM WW-6

WW-6A1

Operator's Well Number Alli Unit 2H

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
Joelynn Family Trust Lease			
The Joelynn Family Preservation Trust, Robert P. Jackson, Trustee	**Antero Resources Corporation**	**1/8+**	**0483/0286**
Ronald P. Hamilton Lease			
Ronald P. Hamilton	**Antero Resources Corporation**	**1/8+**	**0439/0764**
Ronald P. Hamilton Lease			
Ronald P. Hamilton	**Antero Resources Corporation**	**1/8+**	**0436/0196**

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Environmental Protection

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

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

WW-6A1
(5/13)

Operator's Well No. Alli Unit 2H

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
Hunters, Inc. Lease				
	Hunters, Inc.	Antero Resources Corporation	1/8+	0436/0304

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

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

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

May 5, 2016

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

RE: Alli Unit 2H
Quadrangle: Middlebourne 7.5'
Tyler County/Meade District, West Virginia

Mr. Martin:

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

Sincerely,

4709502369

Tom Kuhn
Senior Landman

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MAY 25 2016
WV Department of
Environmental Protection

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

WW-6AC
(1/12)

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

Date of Notice Certification: 05/23/2016

API No. 47- 095 -
Operator's Well No. Alli Unit 2H
Well Pad Name: McKim Pad

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

State:	West Virginia	UTM NAD 83 Easting:	504200m
County:	Tyler	Northing:	4359574m
District:	Meade	Public Road Access:	CR 20/2
Quadrangle:	Middlebourne 7.5'	Generally used farm name:	Jarret W. Shepherd, et al
Watershed:	Outlet Middle Island Creek		

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

Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following: *PLEASE CHECK ALL THAT APPLY	OOG OFFICE USE ONLY
☐ 1. NOTICE OF SEISMIC ACTIVITY or ☒ NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED	☐ RECEIVED/ NOT REQUIRED
☒ 2. NOTICE OF ENTRY FOR PLAT SURVEY or ☐ NO PLAT SURVEY WAS CONDUCTED	☐ RECEIVED
☐ 3. NOTICE OF INTENT TO DRILL or ☒ NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or 4709507569 ☐ WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)	☐ RECEIVED/ NOT REQUIRED
☒ 4. NOTICE OF PLANNED OPERATION	☐ RECEIVED
☒ 5. PUBLIC NOTICE	☐ RECEIVED
☒ 6. NOTICE OF APPLICATION	☐ RECEIVED

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.

WW-6AC
(1/12)

Certification of Notice is hereby given:

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

Well Operator:	Antero Resources Corporation	Address:	1615 Wynkoop Street
By:	Kevin Kilstrom		Denver, CO 80202
Its:	Senior VP of Production	Facsimile:	303-357-7315
Telephone:	303-357-7310	Email:	asteele@anteroresources.com

NOTARY SEAL
KARA QUACKENBUSH
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20144028297
MY COMMISSION EXPIRES JULY 21, 2018

Subscribed and sworn before me this 23 day of May 2016.

Kara Quackenbush 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.

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MAY 25 2016

WV Department of
Environmental Protection

WW-6A
(9-13)

API NO. 47- 095 -
OPERATOR WELL NO. Alli Unit 2H
Well Pad Name: McKim Pad

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

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

Date of Notice: 5/24/2016 **Date Permit Application Filed:** 5/24/2016

Notice of:

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

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

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

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

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

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☑ SURFACE OWNER(s)
Name: PLEASE SEE ATTACHMENT
Address:

Name:
Address:

☑ SURFACE OWNER(s) (Road and/or Other Disturbance)
Name: PLEASE SEE ATTACHMENT
Address:

Name:
Address:

☐ SURFACE OWNER(s) (Impoundments or Pits)
Name:
Address:

☐ COAL OWNER OR LESSEE
Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address:

☐ COAL OPERATOR
Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address:

☑ WATER PURVEYOR(s)/OWNER(s) OF WATER WELL, SPRING OR OTHER WATER SUPPLY SOURCE
Name: Jarret & Chrissy Shepherd
Address: PO Box 24
Pennsboro, WV 26415

*PLEASE NOTE THERE ARE 2 ADDITIONAL WATER SOURCES SHOWN ON THE ATTACHED MAP, BUT THEY ARE LOCATED GREATER THAN 1500' FROM THE SUBJECT PAD LOCATION

☐ OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name:
Address:

*Please attach additional forms if necessary

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WV Department of Environmental Protection

WW-6A
(8-13)

API NO. 47- 095 -
OPERATOR WELL NO. Alli Unit 2H
Well Pad Name: McKim Pad

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 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting 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 1, 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

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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.

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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 57th 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.**

WW-6A
(8-13)

API NO. 47- 095 -
OPERATOR WELL NO. Alli Unit 2H
Well Pad Name: McKim Pad

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.

4709502389

WW-6A
(8-13)

API NO. 47- 095 -
OPERATOR WELL NO. Alli Unit 2H
Well Pad Name: McKim Pad

Notice is hereby given by:

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

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

Oil and Gas Privacy Notice:

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

KARA QUACKENBUSH
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20144028297
MY COMMISSION EXPIRES JULY 21, 2018

Subscribed and sworn before me this 24 day of May 2016.

Notary Public

My Commission Expires July 21, 2018

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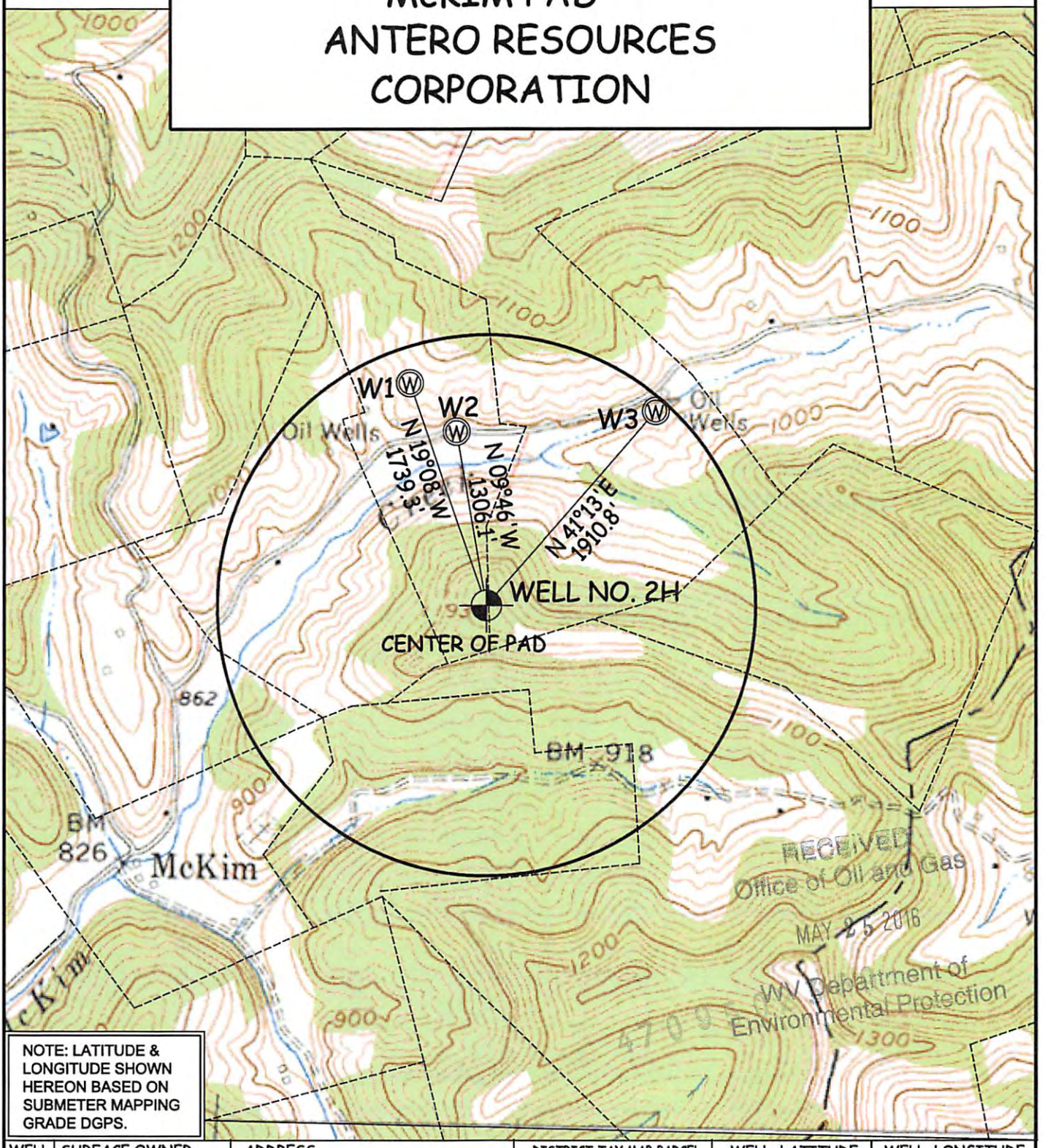
FORM WW-9

McKIM PAD
ANTERO RESOURCES CORPORATION

PAGE OF



NOTE: LATITUDE & LONGITUDE SHOWN HEREON BASED ON SUBMETER MAPPING GRADE DGPS.

WELL	SURFACE OWNER	ADDRESS	DISTRICT-TAX MAP-PARCEL	WELL LATITUDE	WELL LONGITUDE
W1	Jarret & Chrissy Shepherd	PO BOX 24, PENNSBORO, WV 26415	6-11-19	39°23'24.17"	80°57'12.65"
W2	Jarret & Chrissy Shepherd	PO BOX 24, PENNSBORO, WV 26415	6-11-19	39°23'20.70"	80°57'08.13"
W3	TERRY L. SNIDER	PO BOX 545, PENNSBORO, WV 26415	6-11-17	39°23'22.42"	80°56'49.30"

WILLOW LAND SURVEYING, PLLC
P.O. BOX 17, PENNSBORO, WV 26415
(304) 659-1717

TOPO SECTION(S) OF : MIDDLEBOURNE 7.5'

JOB #: 16-032WA

DATE: 05/04/16

DRAWN BY: J.C.W

FILE: McKIMWATERMAP

SCALE : 1-INCH = 1000-FEET

0' 1000' 2000' 3000'

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

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

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

TM 11 PCL 15
Owner: Hunters, Inc.
Address: 810 N. Main Street
N Martinsville, WV 26155

4709502369

TM 11 PCL 19
Owner: Jarret & Chrissy Shepherd
Address: PO Box 24
Pennsboro, WV 26415

TM 11 PCL 17
Owner: Terry L. Snider
Address: PO Box 545
Pennsboro, WV 26415

ROAD AND/OR OTHER DISTURBANCE – All owners have executed signed Surface Use and/or Road Agreements with Antero Resources Corporation. However, they were only notified if their tracts were overlying the oil and gas leasehold being developed by the proposed well work.

TM 11 PCL 23.1
Owner: Dale E. Hamilton (OFF LEASE)
Address: PO Box 62
Inez, KY 41224

TM 11 PCL 16
Owner: Ralph Thacker & Maurice Carlisle, Jr. (OFF LEASE)
Address: 20021 Thacker Drive
Boonsboro, MD 21713

TM 11 PCL 22
Owner: Ronald Hamilton (ON LEASE)
Address: 3165 Hog Run Road
Middlebourne, WV 26149

TM 11 PCL 15
Owner: Hunters, Inc. (OFF LEASE)
Address: 810 N. Main Street
N Martinsville, WV 26155

TM 11 PCL 19
Owner: Jarret & Chrissy Shepherd (ON LEASE)
Address: PO Box 24
Pennsboro, WV 26415

TM 11 PCL 21
Owner: Terry L. Snider (ON LEASE)
Address: PO Box 545
Pennsboro, WV 26415

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WW-6A3
(1/12)

Operator Well No. Alli Unit 2H

Multiple Wells on the McKim Pad

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: 8/17/2014 **Date of Planned Entry:** *8/27/2014

*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.

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Notice is hereby provided to:

☒ SURFACE OWNER(s)

Name: Jerry W. Shepherd & Crissy A. Shepherd
Address: PO Box 24 (TM 11 PCL 19)
Pennsboro, WV 26415

Name: Terry L. Snider
Address: PO Box 454 (TM 11 PCL 17)
Pennsboro, WV 26415

Name: Hunters, Inc. c/o John Bridgeman
Address: 810 N. Main St. (TM 11 PCL 15)
New Martinsville, WV 26155

☐ COAL OWNER OR LESSEE

Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address:

☒ MINERAL OWNER(s)

Name: PLEASE SEE ATTACHMENT
Address:

*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: West Virginia
County: Tyler
District: Meade
Quadrangle: Middlebourne 7.5'
Approx. Latitude & Longitude: Approx. 39.345551, -80.669877
Public Road Access: CR 20/2 / Burch Road
Watershed: Outlet Middle Island Creek
Generally used farm name: The Joelynn Family Preservation Trust

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 57th 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.

Notice is hereby given by:

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

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WV Department of Environmental Protection

Oil and Gas Privacy Notice:

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

Tax Map 11 Parcel 19
Tax Map 11 Parcel 17
Tax Map 11 Parcel 15

WW-6A3 Notice of Entry For Plat Survey Attachment:

Mineral Owners:
Tax Parcel ID: 11-19

Owner: The Joelynn Family Preservation Trust
Address: 305 Stewart's Run
Harrisville, WV 26362

Mineral Owners:
Tax Parcel ID: 11-17

Owner: The Joelynn Family Preservation Trust
Address: 305 Stewart's Run
Harrisville, WV 26362

Mineral Owners:
Tax Parcel ID: 11-15

Owner: Hunters, Inc. c/o John Bridgeman
Address: 810 N. Main St.
New Martinsville, WV 26155

Owner: Jo Ellen Harper Paden
(aka Jo Ellen Day)
Address: 13 Ashwood Dr.
Vienna, WV 26105

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WW-6A5
(1/12)

Operator Well No. Alli Unit 2H

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: 05/24/2016 **Date Permit Application Filed:** 05/24/2016

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

☒ CERTIFIED MAIL RETURN RECEIPT REQUESTED ☐ HAND DELIVERY

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

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

Name: PLEASE SEE ATTACHMENT
Address:

Name:
Address:

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

State:	West Virginia	UTM NAD 83 Easting:	504200m
County:	Tyler	Northing:	4359574m
District:	Meade	Public Road Access:	CR 20/2
Quadrangle:	Middlebourne 7.5'	Generally used farm name:	Jarret W. Shepherd, et al
Watershed:	Outlet Middle Island Creek		

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 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

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

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

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WW-6A5 Notice of Planned Operations Attachment (MCKIM PAD):

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

TM 11 PCL 15
Owner: Hunters, Inc.
Address: 810 N. Main Street
N Martinsville, WV 26155

TM 11 PCL 19
Owner: Jarret & Chrissy Shepherd
Address: PO Box 24
Pennsboro, WV 26415

TM 11 PCL 17
Owner: Terry L. Snider
Address: PO Box 545
Pennsboro, WV 26415

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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

Earl Ray Tomblin
Governor

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

May 23, 2016

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

Subject: DOH Permit for the McKim Pad, Tyler County
Alli Unit 2H Well site

4709502369

Dear Mr. Martin,

This well site will be accessed from a DOH permit which has been applied for by Antero Resources Corporation for access to the State Road for a well site located off of Tyler County Route 20/2.

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

Very Truly Yours,

Gary K. Clayton

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

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

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List of Anticipated Additives Used for Fracturing or Stimulating Well

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

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Antero Resources Corporation Site Construction Plan for

McKim Well Pad & Water Containment Pad

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

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

Antero Response
The nature and purpose of the subject project is to perforate, fracture, and complete one or more horizontal shallow wells. Procedures to achieve site stability include seeding and mulching of earth disturbed areas and implementation of erosion and sediment best management practices (BMPs). Details of seeding and mulching rates as well as procedures for installation and maintenance of erosion and sediment BMPs are outlined on page 2 of "McKim Well Pad & Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans" (Site Design) prepared and certified by Navitus Engineering Inc. of West Virginia.

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

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

Antero Response
Please refer to the vicinity maps on page 1 for the location of the site in relation to the surrounding area and roads.

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

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

Antero Response
"Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," and "Access Road & Well Pad Plan" maps are included on pages 8-11 of the Site Design.

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

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Antero Response
Please refer to the "Existing Conditions" map on page 6 of the Site Design for the current topographic conditions for the constructed pad on a contour interval that affords sufficient detail to illustrate site terrain conditions.

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

Antero Response
Please refer to "Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," and "Access Road & Well Pad Plan" maps on pages 8-11 as well as the "Well Pad Grading Plan," "Water Containment Pad Grading Plan," "Access Road Profiles," "Access Road Sections," "Well Pad & Water Containment Pad Sections," and "Well Pad & Stockpile Sections" maps on pages 12-19 of the Site Design for proposed cut and fill areas with grading contours.

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

Antero Response
Please refer to "Existing Structures & Features," "Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," and "Access Road & Well Pad Plan" maps on pages 7-11 for the maps identifying any structures, roads, water bodies, and other critical areas within the area of interest that would be most likely affected by construction.

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

Antero Response
Please refer to "Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," and "Access Road & Well Pad Plan" maps on pages 8-11 as well as the "Well Pad Grading Plan," "Water Containment Pad Grading Plan," "Access Road Profiles," "Access Road Sections," "Well Pad & Water Containment Pad Sections," and "Well Pad & Stockpile Sections" maps on pages 12-19 for a cross-section of the location. The cut and fill volumes can be found in "Material Quantities" on page 4.

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

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

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

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

> ***Requirement §5.5.c.1.*** *All woody material, brush, and trees shall be cleared from the site area and kept to the minimum necessary for proper construction, including the installation of necessary sediment controls. Trees six inches in diameter and larger shall be cut and logs stacked;*

Antero Response
The Site Design outlines measures to maintain compliance with Section 201 of the WVDOH Specifications which outlines clearing and grubbing measures. Please refer to Construction and E&S Control Notes on page 2 of the Site Design.

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

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

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

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

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

Antero Response
The Site Design outlines procedures for stripping and stocking topsoil. Please refer to Construction and E&S Control Notes on page 2 of the Site Design. In addition, soil shall be further defined to the measures outlined in Section 5.5.c.4. of §35-8-5.5.

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

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

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

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

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

Antero Response
Please refer to the Construction and E&S Control Notes on page 2 of the Site Design. Fill shall be placed in horizontal lifts of maximum loose depth of 12 inches. Compaction will be performed with a compactor with a minimum of five ton static drum weight vibratory roller or five ton static drum weight sheeps footed compactor as appropriate for the type of soil material at the site or other compactor approved by the Engineer.

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

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

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

Antero Response
Compaction compliance measures are outlined in the Construction and E&S Notes on page 2. Compaction is required with a compactor with a minimum of five ton static drum weight vibratory roller or five ton static drum weight sheeps footed compactor as appropriate for the type of soil material at the site or other compactor approved by the Engineer.

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

Antero Response
Construction and E&S Control Notes on page 2 of the Site Design identifies the surface diversions used to prevent surface water and subsurface water from flowing on to the well pad and coming into contact with the stormwater associated with the well pad. Additional Erosion & Sediment BMPs will be used to prevent sediment discharges from the project.

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

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

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MAY 25 2016

WV Department of
Environmental Protection

Antero Resources Corporation Erosion and Sediment Control Plan for McKim Well Pad & Water Containment Pad

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

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

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

1. A pre-construction conference with the contactor and the appropriate erosion and sediment control inspector 48 hours prior to beginning work to review the construction drawings and provide any requested guidance.
2. Stake the limits of construction and mark/flag all identified wetlands, streams, utilities, and other areas of concern for construction activities. Install signs to designate the areas and orange safety fence to identify important project attributes such as approved access roads, no refueling zones, wetlands/steam bounds, Etc.
3. Construct the rock construction entrance. All vehicles entering and exiting the site shall do so via the rock construction entrance.
4. Construct all BMP's as soon as clearing and grubbing operations allow. Diversions and sediment trap(s)/basin(s) shall be seeded and mulched immediately.
5. If applicable, convey upslope drainage around the Access Road, Well Pad, and Water Containment pad areas by constructing all diversion berm(s) and/or compost filter sock diversion(s) as shown on the plans.
6. Clear and grub the site. All woody material, brush, trees, stumps, large roots, boulders, and debris shall be cleared from the site area and kept to the minimum necessary for proper construction, including the installation of necessary sediment controls. Trees six inches in diameter and larger shall be cut and logs stacked. Smaller trees, brush, & stumps shall be cut and/or grubbed and windrowed in appropriate areas for use as sediment barriers at water drainage outlets (as shown on the plans), windrowed below the well site, used for wildlife habitat, burned (as per WV forest fire laws), removed from site, or disposed of by other methods approved by WV DEP.

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Environmental Protection

7. If applicable, install all wetland or stream crossings as shown on the plans.
8. Strip the topsoil from the access road. Prior to placing any fill, the exposed subgrade shall be compacted and proof rolled to produce a stable and unyielding site. All stripped topsoil shall be stockpiled in areas shown in the plans, or re-spread at an approximate depth of 2-4 inches on all proposed 2:1 or flatter slopes, and immediately stabilized. Additional BMP measures shall be constructed around topsoil stockpiles, if necessary.
9. Construct the access road. All fill areas, including excess material stockpiles, shall be "Keyed In" and compacted in horizontal lifts with a maximum loose lift thickness of 12" and maximum particle size as outlined in the geotechnical report. All fill shall be compacted by a vibrating sheepsfoot roller to 95% per the standard proctor test (ASTM – D698). Moisture content will be controlled in accordance with the standard proctor test (ASTM – D698) results. It is also recommended that each lift be proof rolled with a loaded haul truck where applicable. Ditch relief culverts shall be installed at a grade of 1-8% to minimize outlet velocities to the extent possible. Install outlet protection once ditch relief culverts are installed, as shown on plans. Stabilize the road with geotextile fabric & stone and side slopes as specified with permanent seeding. Excess material shall be stockpiled (if necessary) in areas shown in the plans and immediately stabilized. Topsoil shall be stripped from all stockpile areas prior to construction of stockpiles. After stockpiles are constructed, topsoil is to be reapplied at a depth of 2"-4". Slopes shall be tracked by running tracked machinery up and down the slope, leaving tread marks parallel to the contour. All ditch lines shall be cleaned prior to installation of lined protection.
10. Strip the topsoil from the well pad and water containment pad. Prior to placing any fill, the exposed subgrade shall be compacted and proof rolled to produce a stable and unyielding site. All stripped topsoil shall be stockpiled in areas shown in the plans, or re-spread at an approximate depth of 2-4 inches on all proposed 2:1 or flatter slopes, and immediately stabilized. Additional BMP measures shall be constructed around topsoil stockpiles, if necessary.
11. Grade the well pad and water containment pad areas as shown on the plans. Install pad sumps (with 4" PVC drain pipe and outlet protection) and containment berm liner system. Immediately stabilize the outer areas of the well pad and water containment pad. The well pad and water containment pad areas shall be stabilized with geotextile fabric & stone and the side slopes with seed and mulch. Install all straw wattles as shown on plans. Apply seed and mulch to all disturbed areas. This shall include all areas that will not be subject to regular traffic activity (to be stabilized with stone), or any disturbed area that will not be re-disturbed before site reclamation begins.
12. Commence well drilling activity.
13. 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.
14. 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 had 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.
15. All permanent sediment control measures can be removed after the site is permanently stabilized and approval is received from the WVDEP.
16. Any areas disturbed by removal of controls shall be repaired, stabilized, and permanently seeded.

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

Antero Response:
Stabilization methods used include seeding and mulching of disturbed areas as well as the implementation of erosion and sediment control BMPs. Please refer to "Construction and E&S Control Notes" on page 2 and "Construction Details" on pages 20-26 for detailed descriptions of the different stabilization methods to be used. Seeding and mulching is to be in accordance with the WVDOT Standard Specifications unless specified otherwise in the plans or unless specified otherwise by the construction engineer or Antero representative. Please refer to "Erosion and Sediment Control Narrative" under Construction and "E&S Control Notes" on page 2 as well as "Revegetation" on page 27 of the Site Design for more specific information regarding application, liming, and mulching rates.

Erosion and sediment BMPs will be constructed, stabilized, and functional before site disturbance begins within the tributary areas of those BMPs. In a timely manner after earth disturbance activities cease, Antero shall stabilize any areas disturbed by the activities. During non-germination periods, mulch must be applied at the specified rates. Disturbed areas which are not at finish grade and which will be re-disturbed within 1 year will be stabilized in accordance with the temporary vegetative stabilization and specifications. Disturbed areas which are finished grade or which will not be re-disturbed within 1 year will be stabilized in accordance with the permanent vegetative stabilization specification. Please refer to "Construction and E&S Control Notes" on page 2 for more information regarding timeframes for establishing stabilization and erosion and sediment BMPs.

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

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

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Antero Response:
Please refer to the "Construction and E&S Control Notes," and "Construction Details" on pages 2 and 20-26 in the Site Design for specifications including instructions for installation, inspection, and maintenance for erosion and sediment control BMPs employed at this site.

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

Antero Response:
A vicinity map locating the site in relation to the surrounding area and roads is included on page 1 of the Site Design.

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

Antero Response:
"Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," and "Access Road & Well Pad Plan" maps are included on pages 8-11 of the Site Design. Specific design and layout and inspection and maintenance notes for a stabilized construction entrance are included in the "Construction and E&S Control Notes" verbiage on page 2.

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

Antero Response:
"Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," and "Access Road & Well Pad Plan" maps included on pages 8-11 of the Site Design locate all proposed erosion and sediment control BMPs.

McKIM WELL PAD & WATER CONTAINMENT PAD

SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

MEADE DISTRICT, TYLER COUNTY, WEST VIRGINIA
McKIM CREEK WATERSHED

USGS 7.5 MIDDLEBOURNE & PENNSBORO QUAD MAPS

LOCATION COORDINATES:

ACCESS ROAD ENTRANCE
LATITUDE: 39.379624 LONGITUDE: -80.959503 (NAD 83)
N 4358905.99 E 503487.90 (UTM ZONE 17 METERS)

CENTER OF TANK
LATITUDE: 39.382883 LONGITUDE: -80.956763 (NAD 83)
N 4359267.83 E 503723.68 (UTM ZONE 17 METERS)

CENTROID OF PAD
LATITUDE: 39.385459 LONGITUDE: -80.951047 (NAD 83)
N 4359553.97 E 504215.83 (UTM ZONE 17 METERS)

APPROVED
WVDEP OOG
7/08/2016

GENERAL DESCRIPTION:
THE ACCESS ROAD(S), WATER CONTAINMENT PAD, AND WELL PAD ARE BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

FLOODPLAIN NOTES:
THE PROPOSED SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54095C0150C.

MISS UTILITY STATEMENT:
ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1500897244. IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

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

ENVIRONMENTAL NOTES:
WETLAND DELINEATIONS WERE PERFORMED IN OCTOBER, 2015 BY KC HARVEY ENVIRONMENTAL, LLC TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE OCTOBER 13, 2015 AQUATIC FEATURES INDEX MAP WAS PREPARED BY KC HARVEY ENVIRONMENTAL, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE EXHIBIT DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP.

McKIM EPHEMERAL STREAM IMPACT (LINEAR FEET)					
Stream and Impact Cause	Permanent Impacts		Temp. Impacts	Temp. Disturb.	Total Disturbance (LF)
	Culvert / Fill (LF)	Inlets/Outlets Structures (LF)	Cofferdam/ E&S Controls (LF)	Distance to L.O.D. (LF)	
Stream 3 (Water Containment Pad)	0	0	0	32	32

GEOTECHNICAL NOTES:
A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. BETWEEN FEBRUARY 2, 2015 & FEBRUARY 10, 2015. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED MARCH 16, 2015, REVISED FEBRUARY 3, 2016, 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

ANTHONY SMITH - FIELD ENGINEER
OFFICE: (304) 842-4208 CELL: (304) 673-6196

CHARLES E. COMPTON, III - SURVEYING COORDINATOR
(304) 719-6449

DAVID PATSY - LAND AGENT
CELL: (304) 476-6090

ENGINEER/SURVEYOR:
NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
OFFICE: (888) 662-4185 CELL: (540) 686-6747

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

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

RESTRICTIONS NOTES:

1. THERE ARE NO WETLANDS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE ARE PERENNIAL STREAMS ADJACENT TO THE PROPOSED ACCESS ROAD "A" THAT WILL REMAIN UNDISTURBED.
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.

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.

2000 0 2000
SCALE: 1" = 2000'

WEST VIRGINIA STATE PLANE COORDINATE SYSTEM
NORTH ZONE, NAD83
ELEVATION BASED ON NAVD88
ESTABLISHED BY SURVEY GRADE GPS & OPUS
POST-PROCESSING

WEST VIRGINIA COUNTY MAP

(NOT TO SCALE)

WVDOH COUNTY ROAD MAP

5000 0 5000
SCALE: 1" = 5000'

DESIGN CERTIFICATION:
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.

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!!

SHEET INDEX:

1 - COVER SHEET
2 - CONSTRUCTION AND E&S CONTROL NOTES
3 - LEGEND
4 - MATERIAL QUANTITIES
5 - STORM DRAINAGE COMPUTATIONS
6 - EXISTING CONDITIONS
7 - EXISTING STRUCTURES & FEATURES
8 - OVERALL PLAN SHEET INDEX & VOLUMES
9 - ACCESS ROAD PLAN
10 - ACCESS ROAD & WATER CONTAINMENT PAD PLAN
11 - ACCESS ROAD & WELL PAD PLAN
12 - WELL PAD GRADING PLAN
13 - WATER CONTAINMENT PAD GRADING PLAN
14-15 - ACCESS ROAD PROFILES
16-17 - ACCESS ROAD SECTIONS
18 - WELL PAD & WATER CONTAINMENT PAD SECTIONS
19 - WELL PAD & STOCKPILE SECTIONS
20-27 - CONSTRUCTION DETAILS
28 - ACCESS ROAD RECLAMATION PLAN
29 - ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
30 - ACCESS ROAD & WELL PAD RECLAMATION PLAN
GE500-GE507 - GEOTECHNICAL DETAILS

McKIM LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (3,275')	11.97
Staging Area	1.05
Well Pad	10.34
Water Containment Pad	3.27
Excess/Topsoil Material Stockpiles	6.66
Total Affected Area	**33.29**
Total Wooded Acres Disturbed	23.90
Impacts to Dale E. Hamilton TM 11-23.1	
Access Road "A" (1,656')	5.18
Staging Area	1.05
Water Containment Pad	0.94
Excess/Topsoil Material Stockpiles	2.48
Total Affected Area	**9.65**
Total Wooded Acres Disturbed	2.29
Impacts to D. Ralph Thacker & J. Mauice Carlisle, Jr. TM 11-18	
Excess/Topsoil Material Stockpiles	1.56
Total Affected Area	**1.56**
Total Wooded Acres Disturbed	1.21
Impacts to Ronald P. Hamilton TM 11-22	
Access Road "A" (151')	0.33
Water Containment Pad	2.33
Excess/Topsoil Material Stockpiles	0.27
Total Affected Area	**2.93**
Total Wooded Acres Disturbed	1.27
Impacts to Terry L. Snider TM 11-21	
Access Road "A" (1,107')	4.49
Excess/Topsoil Material Stockpiles	2.35
Total Affected Area	**6.84**
Total Wooded Acres Disturbed	6.83
Impacts to Hunters, Inc. TM 11-15	
Access Road "A" (203')	1.08
Well Pad	1.13
Total Affected Area	**2.21**
Total Wooded Acres Disturbed	2.20
Impacts to Jarret W. & Crissy A. Shepherd TM 11-19	
Access Road "A" (158')	0.89
Well Pad	4.45
Total Affected Area	**5.34**
Total Wooded Acres Disturbed	5.34
Impacts to Terry L. Snider TM 11-17	
Well Pad	4.76
Total Affected Area	**4.76**
Total Wooded Acres Disturbed	4.76

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Alli Unit 1H	N 325862.49 E 1589775.53	N 325896.62 E 1558334.48	N 4359576.84 E 504199.12	LAT 39-23-08.3954 LONG -80-57-04.4670
Alli Unit 2H	N 325852.82 E 1589778.08	N 325886.95 E 1558337.04	N 4359573.91 E 504199.95	LAT 39-23-08.3003 LONG -80-57-04.4325
Alli Unit 3H	N 325843.15 E 1589780.63	N 325877.28 E 1558339.59	N 4359570.97 E 504200.78	LAT 39-23-08.2051 LONG -80-57-04.3980
Haga Unit 1H	N 325833.48 E 1589783.19	N 325867.61 E 1558342.14	N 4359568.04 E 504201.61	LAT 39-23-08.1100 LONG -80-57-04.3635
Haga Unit 2H	N 325823.82 E 1589785.74	N 325857.95 E 1558344.70	N 4359565.11 E 504202.43	LAT 39-23-08.0148 LONG -80-57-04.3290
Haga Unit 3H	N 325814.15 E 1589788.29	N 325848.28 E 1558347.25	N 4359562.18 E 504203.26	LAT 39-23-07.9197 LONG -80-57-04.2945
McKim Unit 1H	N 325804.48 E 1589790.85	N 325838.61 E 1558349.81	N 4359559.24 E 504204.09	LAT 39-23-07.8245 LONG -80-57-04.2600
McKim Unit 2H	N 325794.81 E 1589793.40	N 325828.94 E 1558352.36	N 4359556.31 E 504204.91	LAT 39-23-07.7294 LONG -80-57-04.2255
McKim Unit 3H	N 325785.14 E 1589795.96	N 325819.27 E 1558354.91	N 4359553.38 E 504205.74	LAT 39-23-07.6343 LONG -80-57-04.1909
Well Pad Elevation	1,172.0			

NAVITUS
ENERGY ENGINEERING
Telephone: (888) 662-4185 | www.NavitusEng.com

DATE	REVISION
04/01/2016	REVISED SURFACE CONFIGURATION
07/06/2016	REVISED PER WVDEP COMMENTS

Antero

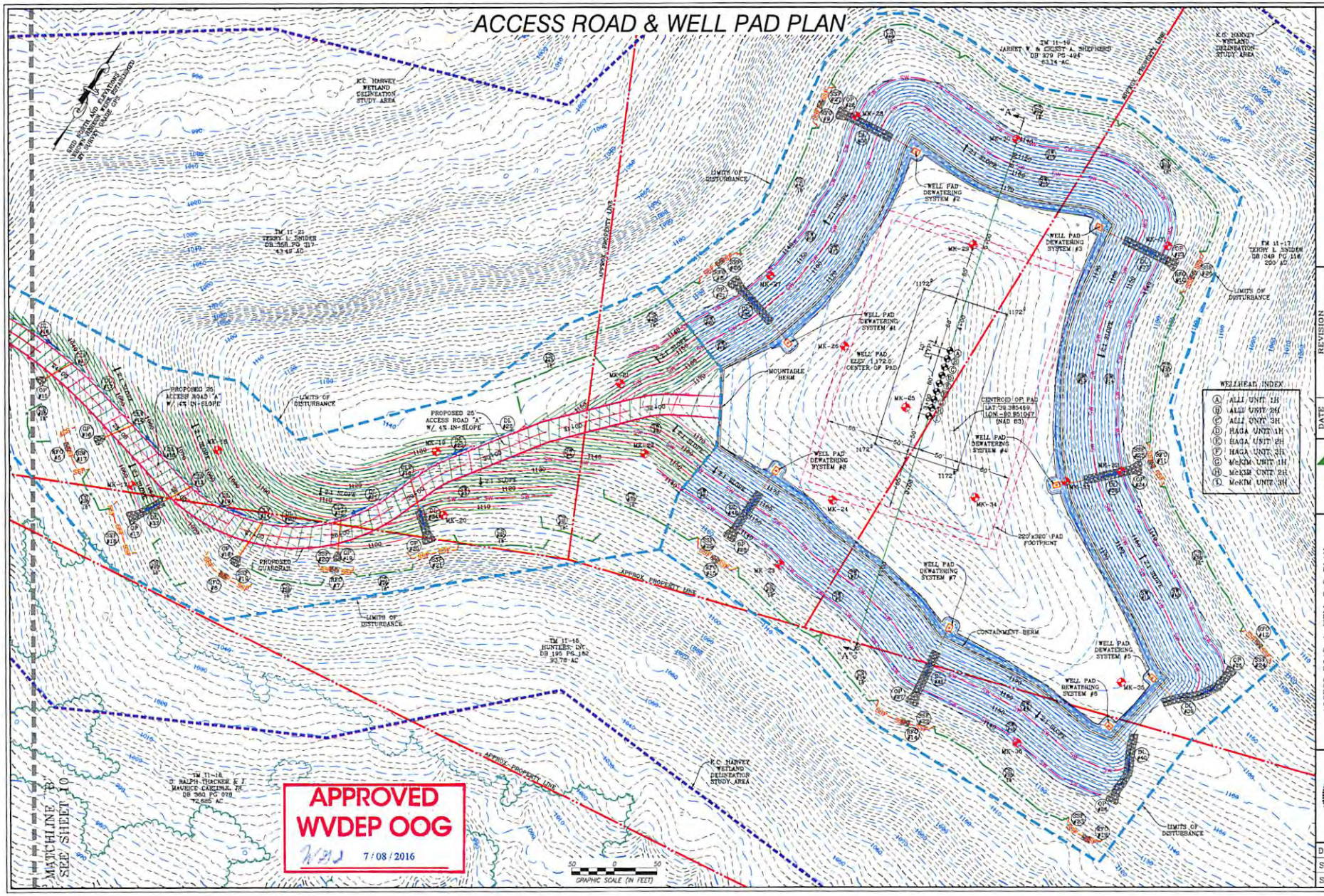
THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

COVER SHEET
McKIM
WELL PAD & WATER CONTAINMENT PAD
MEADE DISTRICT
TYLER COUNTY, WEST VIRGINIA

07/06/2016

DATE: 02/26/2016
SCALE: AS SHOWN
SHEET 1 OF 30

ACCESS ROAD & WELL PAD PLAN



APPROVED
WVDEP OOG
7/08/2016

NAVITUS
ENERGY ENGINEERING
Telephone: (888) 662-4185 | www.NavitusEng.com

DATE	REVISION
04/01/2016	REVISED SURFACE CONFIGURATION
07/06/2016	REVISED PER WVDEP COMMENTS

Antero Resources

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

ACCESS ROAD & WELL PAD PLAN

McKIM

WELL PAD & WATER CONTAINMENT PAD

MEADE DISTRICT
TYLER COUNTY, WEST VIRGINIA

CYRUS S. KIMP REGISTERED 19678 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
07/06/2016

DATE: 02/26/2016
SCALE: 1" = 50'
SHEET 11 OF 30

McKIM WELL PAD & WATER

SITE DESIGN & CONSTR

EROSION & SEDIMENT C

MEADE DISTRICT, TYLER COUNT

McKIM CREEK WATER

LOCATION COORDINATES:

ACCESS ROAD ENTRANCE
LATITUDE: 39.379624 LONGITUDE: -80.959503 (NAD 83)
N 4358905.99 E 503487.90 (UTM ZONE 17 METERS)

CENTER OF TANK
LATITUDE: 39.382883 LONGITUDE: -80.956763 (NAD 83)
N 4359267.83 E 503723.68 (UTM ZONE 17 METERS)

CENTROID OF PAD
LATITUDE: 39.385459 LONGITUDE: -80.951047 (NAD 83)
N 4359553.97 E 504215.83 (UTM ZONE 17 METERS)

GENERAL DESCRIPTION:

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

FLOODPLAIN NOTES:

THE PROPOSED SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54095C0150C.

MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1500897244. IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

ENTRANCE PERMIT:

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

ENVIRONMENTAL NOTES:

WETLAND DELINEATIONS WERE PERFORMED IN OCTOBER, 2015 BY KC HARVEY ENVIRONMENTAL, LLC TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE OCTOBER 13, 2015 AQUATIC FEATURES INDEX MAP WAS PREPARED BY KC HARVEY ENVIRONMENTAL, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE EXHIBIT DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP.

McKIM EPHEMERAL STREAM IMPACT (LINEAR FEET)

Stream and Impact Cause	Permanent Impacts		Temp. Impacts	Temp. Disturb.	Total Disturbance (LF)
	Culvert / Fill (LF)	Inlets/Outlets Structures (LF)	Cofferdam/ E&S Controls (LF)	Distance to L.O.D. (LF)	
Stream 3 (Water Containment Pad)	0	0	0	32	32

GEOTECHNICAL NOTES:

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. BETWEEN FEBRUARY 2, 2015 & FEBRUARY 10, 2015. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED MARCH 16, 2015, REVISED FEBRUARY 3, 2016, 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

ANTHONY SMITH - FIELD ENGINEER
OFFICE: (304) 842-4208 CELL: (304) 673-6196

CHARLES E. COMPTON, III - SURVEYING COORDINATOR
(304) 719-6449

DAVID PATSY - LAND AGENT
CELL: (304) 476-6090

ENGINEER/SURVEYOR:
NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
OFFICE: (888) 662-4185 CELL: (540) 686-6747

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

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

RESTRICTIONS NOTES:

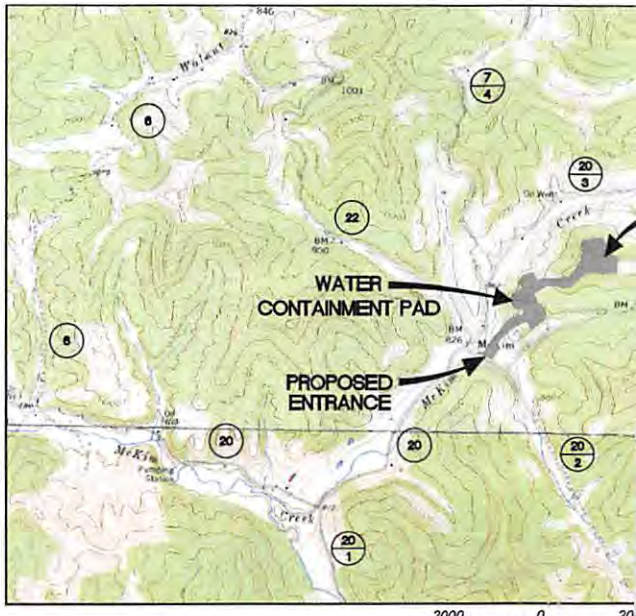
1. THERE ARE NO WETLANDS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE ARE PERENNIAL STREAMS ADJACENT TO THE PROPOSED ACCESS ROAD "A" THAT WILL REMAIN UNDISTURBED.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3. THERE ARE NO 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.

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.

USGS 7.5 MIDDLEBOURNE & PENNS



WEST VIRGINIA COUNTY MAP

(NOT TO SCALE)

DESIGN CERTIFICATION:

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.

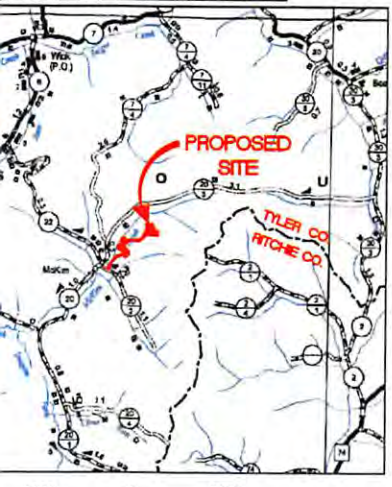
CONTAINMENT PAD
ICTION PLAN,
NTROL PLANS

EST VIRGINIA
D

0 QUAD MAPS

WEST VIRGINIA STATE PLANE COORDINATE SYSTEM
NORTH ZONE, NAD83
ELEVATION BASED ON NAVD88
ESTABLISHED BY SURVEY GRADE GPS & OPUS
POST-PROCESSING

VDOH COUNTY ROAD MAP



5000 0 5000
SCALE: 1" = 5000'

SS Utility of West Virginia
1-800-245-4848
West Virginia State Law
ection XIV: Chapter 24-C)
equires that you call two
ness days before you dig in
ne state of West Virginia.
IT'S THE LAW!!

SHEET INDEX:

1 - COVER SHEET
2 - CONSTRUCTION AND E&S CONTROL NOTES
3 - LEGEND
4 - MATERIAL QUANTITIES
5 - STORM DRAINAGE COMPUTATIONS
6 - EXISTING CONDITIONS
7 - EXISTING STRUCTURES & FEATURES
8 - OVERALL PLAN SHEET INDEX & VOLUMES
9 - ACCESS ROAD PLAN
10 - ACCESS ROAD & WATER CONTAINMENT PAD PLAN
11 - ACCESS ROAD & WELL PAD PLAN
12 - WELL PAD GRADING PLAN
13 - WATER CONTAINMENT PAD GRADING PLAN
14-15 - ACCESS ROAD PROFILES
16-17 - ACCESS ROAD SECTIONS
18 - WELL PAD & WATER CONTAINMENT PAD SECTIONS
19 - WELL PAD & STOCKPILE SECTIONS
20-27 - CONSTRUCTION DETAILS
28 - ACCESS ROAD RECLAMATION PLAN
29 - ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
30 - ACCESS ROAD & WELL PAD RECLAMATION PLAN
GE500-GE507 - GEOTECHNICAL DETAILS

4709502369

McKIM LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A' (3,275')	11.97
Staging Area	1.05
Well Pad	10.34
Water Containment Pad	3.27
Excess/Topsoil Material Stockpiles	6.66
Total Affected Area	**33.29**
Total Wooded Acres Disturbed	23.90
Impacts to Dale E. Hamilton TM 11-23.1	
Access Road "A' (1,656')	5.18
Staging Area	1.05
Water Containment Pad	0.94
Excess/Topsoil Material Stockpiles	2.48
Total Affected Area	**9.65**
Total Wooded Acres Disturbed	2.29
Impacts to D. Ralph Thacker & J. Maurice Carlisle, Jr. TM 11-16	
Excess/Topsoil Material Stockpiles	1.56
Total Affected Area	**1.56**
Total Wooded Acres Disturbed	1.21
Impacts to Ronald P. Hamilton TM 11-22	
Access Road "A" (151')	0.33
Water Containment Pad	2.33
Excess/Topsoil Material Stockpiles	0.27
Total Affected Area	**2.93**
Total Wooded Acres Disturbed	1.27
Impacts to Terry L. Snider TM 11-21	
Access Road "A' (1,107')	4.49
Excess/Topsoil Material Stockpiles	2.35
Total Affected Area	**6.84**
Total Wooded Acres Disturbed	6.83
Impacts to Hunters, Inc. TM 11-15	
Access Road "A" (203')	1.08
Well Pad	1.13
Total Affected Area	**2.21**
Total Wooded Acres Disturbed	2.20
Impacts to Jarret W. & Crissy A. Shepherd TM 11-19	
Access Road "A" (158')	0.89
Well Pad	4.45
Total Affected Area	**5.34**
Total Wooded Acres Disturbed	5.34
Impacts to Terry L. Snider TM 11-17	
Well Pad	4.76
Total Affected Area	**4.76**
Total Wooded Acres Disturbed	4.76

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Alli	N 325862.49	N 325896.62	N 4359576.84	LAT 39-23-08.3954
Unit 1H	E 1589775.53	E 1558334.48	E 504199.12	LONG -80-57-04.4670
Alli	N 325852.82	N 325886.95	N 4359573.91	LAT 39-23-08.3003
Unit 2H	E 1589776.08	E 1558337.04	E 504199.95	LONG -80-57-04.4325
Alli	N 325843.15	N 325877.28	N 4359570.97	LAT 39-23-08.2051
Unit 3H	E 1589780.63	E 1558339.59	E 504200.78	LONG -80-57-04.3980
Haga	N 325833.48	N 325867.61	N 4359568.04	LAT 39-23-08.1100
Unit 1H	E 1589783.19	E 1558342.14	E 504201.61	LONG -80-57-04.3635
Haga	N 325823.82	N 325857.95	N 4359565.11	LAT 39-23-08.0148
Unit 2H	E 1589785.74	E 1558344.70	E 504202.43	LONG -80-57-04.3290
Haga	N 325814.15	N 325848.28	N 4359562.18	LAT 39-23-07.9197
Unit 3H	E 1589788.29	E 1558347.25	E 504203.26	LONG -80-57-04.2945
McKim	N 325804.48	N 325838.61	N 4359559.24	LAT 39-23-07.8245
Unit 1H	E 1589790.85	E 1558349.81	E 504204.09	LONG -80-57-04.2600
McKim	N 325794.81	N 325828.94	N 4359556.31	LAT 39-23-07.7294
Unit 2H	E 1589793.40	E 1558352.36	E 504204.91	LONG -80-57-04.2255
McKim	N 325785.14	N 325819.27	N 4359553.38	LAT 39-23-07.6343
Unit 3H	E 1589795.96	E 1558354.91	E 504205.74	LONG -80-57-04.1909
Well Pad Elevation	1,172.0			

DMH 6-8-16

NAVITUS
ENERGY ENGINEERING
Telephone: (888) 662-4185 | www.NavitusEng.com

DATE	REVISION
04/01/2016	REVISED SURFACE CONFIGURATION

Antero RESOURCES

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

COVER SHEET
McKIM
WELL PAD & WATER CONTAINMENT PAD
MEADE DISTRICT
TYLER COUNTY, WEST VIRGINIA

Received
Office of Oil &
APR 09 2016

CYRUS B. KUHN
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
04/01/2016

DATE: 02/26/2016
SCALE: AS SHOWN
SHEET 1 OF 30