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

Jim Justice , Governor
Austin Caperton , Cabinet Secretary
www.dep.wv.gov

Tuesday, April 11, 2017
WELL WORK PERMIT
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION (A)
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for CABOOSE UNIT 1H
47-017-06816-00-00

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: CABOOSE UNIT 1H
Farm Name: WILLIAM RANDALL LYNCH & DIXIE CRAIG
U.S. WELL NUMBER: 47-017-06816-00-00
Horizontal 6A / New Drill
Date Issued: 4/10/2017

API Number: 17-06816

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. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.

8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.

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

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

API Number: 17-06816

PERMIT CONDITIONS

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

WW-6B
(04/15)

API NO. 47- 017 - 06816
OPERATOR WELL NO. Caboose Unit 1H
Well Pad Name: Middle Pad

3/6

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

1) Well Operator: Antero Resources Corporat | 494507062 | 017 - Doddri | West Uni | West Union 7.5'
Operator ID | County | District | Quadrangle

2) Operator's Well Number: Caboose Unit 1H Well Pad Name: Middle Pad

3) Farm Name/Surface Owner: William Randall Lynch & Dixie Craig Public Road Access: WV-18

4) Elevation, current ground: 848' Elevation, proposed post-construction: 843'

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

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6600' TVD, Anticipated Thickness- 60 feet, Associated Pressure- 3100#

8) Proposed Total Vertical Depth: 6600' TVD

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 17200' MD

11) Proposed Horizontal Leg Length: 8912'

12) Approximate Fresh Water Strata Depths: 97', 223', 388'

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

14) Approximate Saltwater Depths: 1161'

15) Approximate Coal Seam Depths: 174', 478'

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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(04/15)

API NO. 47- 017 - 06816
OPERATOR WELL NO. Caboose Unit 1H
Well Pad Name: Middle Pad

18) **CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	H-40	94#	80'	80'	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	440' *see #19	440' *see #19	CTS, 611 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	17200'	17200'	4322 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	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- 017 - 06816
OPERATOR WELL NO. Caboose Unit 1H
Well Pad Name: Middle Pad

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

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

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

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 19.05 acres

22) Area to be disturbed for well pad only, less access road (acres): 5.53 acres

23) Describe centralizer placement for each casing string:

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

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

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

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.

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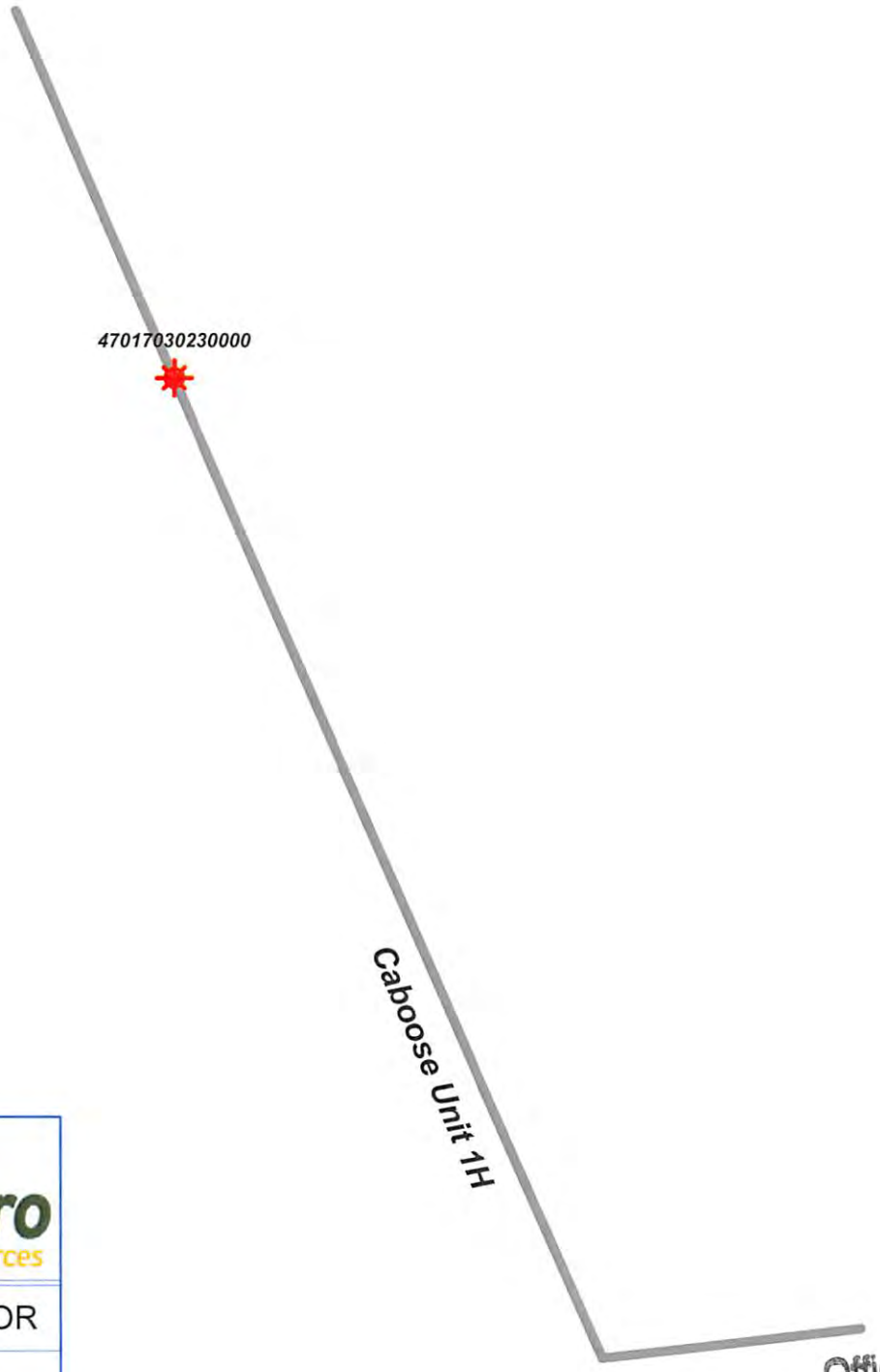
CABOOSE UNIT 1H (MIDDLE PAD) - AREA OF REVIEW 35-8-5.11 PAGE 1

17-06816



Antero Resources

Caboose Unit 1H - AOR

0 1,200
FEET

WELL SYMBOLS
Gas Well

February 21, 2017

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CABOOSE UNIT 1H (MIDDLE PAD) - AREA OF REVIEW 35-8-5.11 PAGE 2

UWI (APINum)	Well Name	Well Number	Operator	Hist Oper	TD	Approx distance to well	ELEV_GR	TD (SSTVD)	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47017030230000	MCCUTCHAN WM ET AL	J-503	ENERGY CORP OF AMER	J & J ENTERPRISES	5,305	20	785	-4520	4830-5155	Benson, Alexander	Big Injun, Weir, Warren, Speechley,Balltown, Bradford, Riley

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918690-17

WW-9
(4/16)

API Number 47 - 017 - 06816
Operator's Well No. Caboose Unit 1H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

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

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

Will a pit be used? Yes ☐ No ✓

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

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

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

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

Company Official Signature ___

Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental & Regulatory Manager

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Subscribed and sworn before me this 3rd day of March, 20 17

___ Notary Public

My commission expires 7/8/2020

SHELBY MARIE JOHNSON
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20164026060
MY COMMISSION EXPIRES JULY 8, 2020

17-06816

Form WW-9

Operator's Well No. Caboose Unit 1H

Antero Resources Corporation

Proposed Revegetation Treatment: Acres Disturbed 19.05 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 - 644' (4.29 acres) + Access Road B- 499' (0.98 acres) + Access Road C - 232' (0.42 acres) + Well Pad (5.53 acres) + Water Containment Pad (3.30 acres) + Excess/Topsoil Material Stockpiles (4.53 acres) = 19.05 Total Affected 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 (Middle Pad Design Pg 23)		See attached Table IV-4A for additional seed type (Middle Pad Design Pg 23)	
*or type of grass seed requested by surface owner		*or type of grass seed requested by surface owner	

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [signature]

Comments: _____

Title: Oil + Gas Inspector Date: 3/23/17

Field Reviewed? (_____) Yes (_____) No

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Form WW-9 Additives Attachment

SURFACE INTERVAL

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

INTERMEDIATE INTERVAL

STIFF FOAM RECIPE:

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

PRODUCTION INTERVAL

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

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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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17-06816

911 Address
4978 WV Rt 18 N
West Union, WV 26456

Well Site Safety Plan
Antero Resources

Well Name: **Chalk Unit 1H & 2H, Caboose Unit 1H & 2H, Goldsmith Unit 1H & 2H, Pickney 1H & 2H, Jay Unit 1H & 2H**

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

GPS Coordinates:

Entrance - Lat 39°19'20.3622"/Long -80°48'16.491" (NAD83)
Pad Center - Lat 39°19'20.6724"/Long -80°48'23.3202" (NAD83)

Driving Directions:

From intersection of WV-18 and HWY 50 (exit for West Union, WV): Turn off of HWY 50 onto WV-18 N and follow for ~0.6mi, when you come to a T at Main St turn right. Take your first left immediately after the bridge onto Davis St./Old U.S. 50 W and follow for 0.4 mi. Take the 2nd right onto WV-18N/ Sistersville Pike and follow for ~4.1 mi. You will pass Crystal Lake on the right. Access Road for Middle Pad will be on the right hand side and pad will be up on ridge.

Alternate Route:

From the town of Pennsboro, WV: Head northeast on WV-74 N/Mountain Dr 10.8 miles. Turn right onto WV-18 S for 8.0 miles. The access road will be on the left.

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

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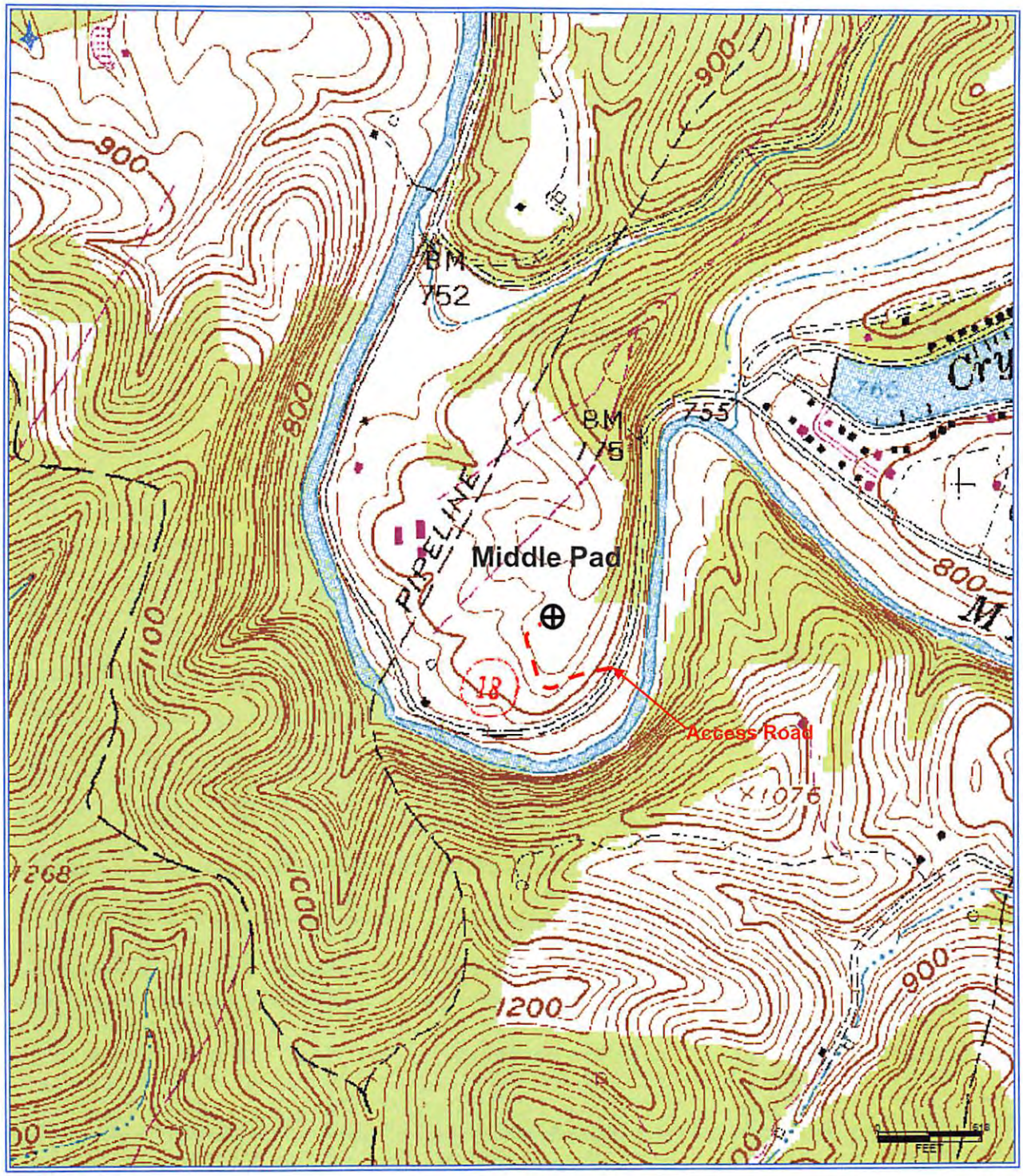

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Antero Resources Corporation

Appalachian Basin
Caboose Unit 1H
Doddridge County

Quadrangle: West Union
Watershed: Middle Island Creek
District: West Union
Date: 2-24-2017

WW-6A1

17-06816

Operator's Well Number Caboose Unit 1H

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

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

(1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;

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

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
William Randall Lynch & Dixie Craig Lease 6-2			
William R. Lynch & Dixie Craig	Murvin Oil Company	1/8	0172/0544
Murvin Oil Company	Murvin & Meier Oil Company	Assignment	0179/0193
Murvin & Meier Oil Company	Antero Resources Appalachian Corporation	*Partial Assignment of Oil & Gas Lease	0267/0467
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
William Randall Lynch et ex Memorandum of Oil and Gas Lease 6-2.5			
William R. Lynch	**Antero Resources Corporation**	**1/8+**	**0324/0311**
William Mark Smith Lease			
William Mark Smith	**Antero Resources Corporation**	**1/8+**	**0375/0519**
WV Division of Natural Resources Lease			
* **WV Division of Natural Resources**	**Antero Resources Corporation**	**1/8+**	**0416/0455**
Laura A. Ford & S.L. Ford Lease			
S.L. Ford, et ux	J.L. Neuman	1/8	0021/0172
J.L. Neuman	The Philadelphia Company	Assignment	0106/0474
The Philadelphia Company	Pittsburgh and West Virginia Gas Company	Assignment	0045/0102
Pittsburgh and West Virginia Gas Company	Equitable Gas Company	Assignment	0121/0257
Equitable Gas Company	Equitrans, Inc.	Assignment	0154/0475
Equitrans, Inc	Equitrans, L.P.	Merger	0302/0123
Equitrans, L.P.	Equitable Production-Eastern States, Inc.	Assignment	0192/0019
Equitable Production-Eastern States, Inc.	Equitable Production Company	Merger	Exhibit 2
Equitable Production Company	EQT Production Company	Name Change	0281/0346
EQT Production Company	**Antero Resources Corporation**	**Assignment**	**0325/0539**
Nelda Lou King Lease			
Nelda Lou King	**Antero Resources Corporation**	**1/8+**	**0310/0559**
Janice M. Ellifritt Cox Lease			
Janice M. Ellifritt Cox	**Antero Resources Corporation**	**1/8+**	**0310/0563**

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

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

WW-6A1

17-06816

Operator's Well Number Caboose Unit 1H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
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(2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
James Douglas White Lease			
James Douglas White	**Antero Resources Corporation**	**1/8+**	**0313/0688**
Lewis Maxwell, et al Lease			
Lewis Maxwell, et al	G.H. Trainer and J.E. Trainer	1/8	0030/0068
G.H. Trainer and J.E. Trainer	W.W. Hepburn	Assignment	0034/0244
W.W. Hepburn	Eastern Petroleum Company	Assignment	0034/0256
Eastern Petroleum Company	Clifton Oil and Gas Company	Assignment	0081/0114
Clifton Oil and Gas Company	Quaker State Oil Refining Corporation	Deed and Deed of Assignment	0056/0165
Quaker State Oil Refining Corporation	QSE&P, Inc.	Partial Assignment of Oil and Gas Lease Agreement	0159/0595
QSE&P, Inc.	Belden & Blake Corporation	Assignment, Conveyance and Bill of Sale	0175/0466
Belden & Blake Corporation	Peake Energy, Inc.	Assignment, Conveyance and Bill of Sale	0181/0114
Peake Energy, Inc.	North Coast Energy Eastern, Inc	Certificate of Amendment to the Certificate of Authority	DB 0249/0343
North Coast Energy Eastern, Inc	EXCO-North Coast Energy Eastern, Inc	Affidavit of Name Change	DB 0277/0068
EXCO-North Coast Energy Eastern Inc	EXCO Resources WV, LLC	Certificate of Amendment to the Certificate of Authority	Exhibit 3
Exco Resources WV, LLC	EXCO Production Company WV, LLC	Merger	DB 0285/0083
EXCO Production Company WV, LLC	Antero Resources Appalachian Corporation	Assignment, Bill of Sale and Conveyance	0285/0084
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
Edwin Cain, et ux Lease			
Edwin Cain and Mary R. Cain	The Carter Oil Company	1/8	0016/0085
The Carter Oil Company	Hope Natural Gas Company	Assignment	0022/0246
Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger	DB 0143/0345
Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	0135/0583
Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Name Change	Exhibit 4
CNG Transmission Corporation	Dominion Transmission, Inc.	Name Change	Exhibit 5
Dominion Transmission, Inc.	CONSOL Energy Holdings, LLC XVI	Assignment	0245/0061
CONSOL Energy Holdings, LLC XVI	CNX Gas Company, LLC	Affidavit of Name Changes and Mergers	0293/0252
CNX Gas Company, LLC	**Antero Resources Corporation**	***Partial Term Assignment of Oil and Gas Leases**	**0317/0379**

Received
Office of Oil & Gas
MAR 06 2017

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

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

WW-6A1

Operator's Well Number Caboose Unit 1H 17-06816

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
Dwight Robert Husk, et ux Lease			
Dwight Robert Hust, et ux	Antero Resources Appalachian Corporation	1/8+	0259/0389
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
William Paul McCutchan Lease			
William Paul McCutchan	Exxon Corporation	1/8	102/42
Exxon Corporation	XTO Energy Inc.	Assignment	359/150
XTO Energy Inc	**Antero Resources Corporation**	**Assignment**	**423/613**
Clarence W. Mutschelknaus et ux Lease			
Clarence Mutschelknaus, et ux	Stonewall Gas Company	1/8	0149/0618
Stonewall Gas Company	Clarence W. Mutschelknaus	Assignment	0166/0033
Clarence W. Mutschelknaus	**Antero Resources Corporation**	**Assignment**	**0327/0470**

***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.**

Received
Office of Oil & Gas
MAR 06 2017

17-0681L

WW-6A1
(5/13)

Operator's Well No. Caboose Unit 1H

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

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

(1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;

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

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Betty Ann Hurst Lease				
	Betty Ann Hurst	Exxon Corporation	1/8	102/31
	Exxon Corporation	XTO Energy Inc.	Assignment	359/150
	XTO Energy Inc.	**Antero Resources Corporation**	**Assignment**	**423/613**

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

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

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

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

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

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

Received
Office of Oil & Gas
MAR 06 2017

17-06816

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

March 3, 2017

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

RE: Caboose Unit 1H
Quadrangle: West Union 7.5'
Doddridge County/West Union District, West Virginia

Mr. Martin:

Antero Resources Corporation (Antero) is submitting the following application for a new well work permit for the Caboose Unit 1H horizontal shallow well. As an authorized representative, I certify that Antero has the right to extract, produce or market the oil or gas for all leases through which the Caboose Unit 1H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,

Jared Hurst
SR Landman

Received
Office of Oil & Gas
MAR 06 2017

Antero Resources
Well No. Caboose Unit 1H
Antero Resources Corporation

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

	Bearing	Dist.
L1	S 84°39' W	1583.6'
L2	S 36°59' W	634.8'
L3	S 85°07' W	603.8'
L4	N 06°39' E	500.0'
L5	N 24°06' E	829.5'

Well Location References
Scale: 1" = 400'

9,534' to Bottom Hole

4,301' to Top Hole

BTM LATITUDE 39 - 22 - 30
TOP LATITUDE 39 - 20 - 00

LONGITUDE 80 - 47 - 30

3,883' to Top Hole

10,982' to Bottom Hole

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

Note: It appears 23 water wells were found within 2000' of proposed well. No occupied dwellings or buildings 2,500 square feet or larger used to house or shelter dairy cattle or poultry husbandry are located within 625' of the center of the well pad.

Notes:
West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
Well No. Caboose Unit 1H Top Hole coordinates are
N: 302,260.74' Latitude: 39°19'21.01"
E: 1,630,347.23' Longitude: 80°48'24.02"
Bottom Hole coordinates are
N: 310,335.20' Latitude: 39°20'40.09"
E: 1,625,332.25' Longitude: 80°49'29.34"
UTM Zone 17, NAD 1983
Top Hole Coordinates Bottom Hole Coordinates
N: 4,352,593.145m N: 4,355,027.512m
E: 516,679.309m E: 515,110.451m
Plat orientation and corner and well references are based upon the grid north meridian.
Well location references are based upon the magnetic meridian.

Notes:
Well No. Caboose Unit 1H UTM Zone 17, NAD 1927
Top Hole Coordinates Bottom Hole Coordinates
N: 14,279,418.02' N: 14,287,404.89'
E: 1,695,091.36' E: 1,689,944.18'
Point of Entry Coordinates
N: 14,279,244.09'
E: 1,693,517.95'

	TM/Par	Bk / Pg	Acres	Owner(s)
1	6/2	214 / 279	32.19	William Randall Lynch & Dixie Janet Craig
2	6/2.5	253 / 222	8.66	
3	6/2.8	305 / 419	2.68	
4	6/2.6	266 / 36	3.52	Dominion Field Services, Inc.
5	6/1.3	305 / 416	4.68	Equitrans, L.P.
6	6/2.4	163 / 44	14.98	
7	6/2.3	197 / 659	4.15	Carol & Alfrieda Painter
8	4/28	WB 28/314	357.75	John Paul Strickling, et al
9	3/15.1	235 / 236	0.56	Richard J. & S. Jean Kruse

Wellhead Layout
Detail Not to Scale

Scale: 1" = 2000'

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

Kenneth J. Plum, P.S. 2216

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

ALLEGHENY SURVEYS, INC.

FILE NO: 236-30-WU-14
DRAWING NO: Caboose 1H Well Plat
SCALE: 1" = 1200'
MINIMUM DEGREE OF ACCURACY: Submeter
PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

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

DATE: September 6 2016
OPERATOR'S WELL NO. Caboose Unit 1H
API WELL NO H6A
47 - 017 - 06816
STATE COUNTY PERMIT

WELL TYPE: ☐ OIL ☒ GAS ☐ LIQUID INJECTION ☐ WASTE DISPOSAL
(IF GAS) PRODUCTION: ☐ STORAGE ☐ DEEP ☒ SHALLOW
LOCATION ELEVATION: Existing Grade - 848' Proposed Grade - 843' WATERSHED: Headwaters Middle Island Creek QUADRANGLE: West Union
DISTRICT: West Union COUNTY: Doddridge
SURFACE OWNER: William Randall Lynch & Dixie Craig ACREAGE: 32.19
ROYALTY OWNER: Clarence W. Mutschelknaus, et ux; WV Div. of Natural Resources; William Randall Lynch, et ux, Memorandum of Oil & Gas Lease; William Randall Lynch & Dixie Craig; Janice M. Ellifritt Cox; Laura A. Ford & S. L. Ford; William Mark Smith; Nelda Lou King; James Douglas White; Betty Ann Hurst; Lewis Maxwell, et al; Dwight Robert Husk, et ux; Edwin Cain, et ux; William Paul McCutchan LEASE NO: ____ ACREAGE: 56.07; 86.5 97; 8.66; 32.15 168; 180; 20.25 32.75; 20.49; 150 78.75; 105; 61.36
PROPOSED WORK: ☒ DRILL ☐ CONVERT ☐ DRILL DEEPER ☒ FRACTURE OR STIMULATE ☐ PLUG OFF OLD FORMATION
☒ PERFORATE NEW FORMATION ☐ OTHER PHYSICAL CHANGE IN WELL (SPECIFY) ____
☐ PLUG AND ABANDON ☐ CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 6,600' TVD 17,200' MD

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

17-06816

FORM WW-6A1
EXHIBIT 1

FILED
JUN 10 2013
IN THE OFFICE OF SECRETARY OF STATE

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

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

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

APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY

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

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

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

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

Alvyn A. Schopp — (303) 357-7310
Contact Name — Phone Number

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

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

Signature: [signature] — Date: June 10, 2013

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

Received
Office of Oil & Gas
MAR 06 2017

FORM WW-6A1
EXHIBIT 2

17-06816

State of West Virginia

Certificate

I, Joe Manchin III, Secretary of State of the State of West Virginia, hereby certify that

by the provisions of Chapter 31 of the West Virginia Code, Articles of Merger were received and filed

MERGING EQUITABLE PRODUCTION - EASTERN STATES, INC., A QUALIFIED DE ORGANIZATION, WITH AND INTO EQUITABLE PRODUCTION COMPANY, A QUALIFIED ORGANIZATION.

Therefore, I hereby issue this

CERTIFICATE OF MERGER

Given under my hand and the Great Seal of the State of West Virginia on this day of June 28, 2001

Received
Office of Oil & Gas
MAR 06 2017

Secretary of State

17-06816

FORM WW-6A1
EXHIBIT 3

State of West Virginia

Certificate

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

an Amended Certificate of Authority of

EXCO - NORTH COAST ENERGY EASTERN, INC.

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

Therefore I issue this

CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the corporation to

EXCO RESOURCES (WV) , INC.

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

Received
Office of Oil & Gas
MAR 06 2017

Natalie E Tennant

Secretary of State

17-068116

FORM WW-6A1
EXHIBIT 4

State of West Virginia

CERTIFICATE

I, Ken Hechler, - Secretary of State of the State of West Virginia, hereby certify that

originals of an application by

CONSOLIDATED GAS TRANSMISSION CORPORATION

for an amended certificate of authority to transact business in West Virginia are filed in my office, as required by the provisions of Chapter 31, Article 1, Sections 57 and 59 of the West Virginia Code and conform to law. Therefore, I issue this

AMENDED CERTIFICATE OF AUTHORITY

to transact business in West Virginia under the name of

CNG TRANSMISSION CORPORATION

and I attach to this certificate a duplicate original of the application.

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

THIRTEENTH *day of*

JANUARY *19* 88

Ken Hechler

Secretary of State.

Received
Office of Oil & Gas
MAR 06 2017

FORM WW-6A1
EXHIBIT 5

17-06816

State of West Virginia

Certificate

I, Ken Hechler, Secretary of State of the State of West Virginia, hereby certify that

riginals of an application by

CNG TRANSMISSION CORPORATION

for an amended certificate of authority to transact business in West Virginia are filed in my office, as required by the provisions of Chapter 31, Article 1, Sections 57 and 59 of the West Virginia Code and conform to law. Therefore, I issue this

AMENDED CERTIFICATE OF AUTHORITY

to transact business in West Virginia under the name of

DOMINION TRANSMISSION, INC.

and I attach to this certificate a duplicate original of the application.

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

May 10, 2000

Received
Office of Oil & Ga
MAR 06 2017

Secretary of State

WW-6AC
(1/12)

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

Date of Notice Certification: 03/02/2017

API No. 47- 017 -
Operator's Well No. Caboose Unit 1H
Well Pad Name: Middle 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:	516679.309m
County:	Doddridge		Northing:	4352593.145m
District:	West Union	Public Road Access:		WV-18
Quadrangle:	West Union 7.5'	Generally used farm name:		William Randall Lynch & Dixie Craig
Watershed:	Headwaters 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 ☐ 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

Received
Office of Oil & Gas
MAR 06 2017

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 Vice President - Production	Facsimile:	303-357-7315
Telephone:	303-357-7310	Email:	shjohnson@anteroresources.com

NOTARY SEAL
SHELBY MARIE JOHNSON
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20164026060
MY COMMISSION EXPIRES JULY 8, 2020

Subscribed and sworn before me this 2 day of March.

Notary Public

My Commission Expires 7/8/2020

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.

Received
Office of Oil & Gas
MAR 06 2017

WW-6A
(9-13)

API NO. 47- 017 -
OPERATOR WELL NO. Caboose Unit 1H
Well Pad Name: Middle 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: 3/3/2017 **Date Permit Application Filed:** 3/3/2017

Notice of:

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

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

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

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

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

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

Name:
Address:

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

Name:
Address:

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

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

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

☑ WATER PURVEYOR(s)/OWNER(s) OF WATER WELL, SPRING OR OTHER WATER SUPPLY SOURCE
Name: PLEASE SEE ATTACHMENT
Address:

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

*Please attach additional forms if necessary

Received
Office of Oil & Gas
MAR 06 2017

WW-6A
(8-13)

API NO. 47- 017 -
OPERATOR WELL NO. Caboose Unit 1H
Well Pad Name: Middle 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.

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

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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.

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- 017 -
OPERATOR WELL NO. Caboose Unit 1H
Well Pad Name: Middle 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.

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WW-6A
(8-13)

API NO. 47- 017 -
OPERATOR WELL NO. Caboose Unit 1H
Well Pad Name: Middle Pad

Notice is hereby given by:

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

SHELBY MARIE JOHNSON
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20164026060
MY COMMISSION EXPIRES JULY 8, 2020

Subscribed and sworn before me this 3 day of March 2017

Notary Public

My Commission Expires 7/8/2020

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WW-6A Notice of Application Attachment (Caboose Unit 1H):

List of Owners with Proposed Disturbance associated with Caboose Unit 1H (Middle Pad):

SURFACE OWNERS –

Owner: William Randall Lynch & Dixie Janet Craig
Address: HC 69 Box 35
West Union, WV 26456

Owner: Randall Lynch & Dixie Craig (2nd Address)
Address: 5534 WV Rt 18 N
West Union, WV 26456

SURFACE OWNERS (Roads and/or Other Disturbances) –

Owner: William Randall Lynch & Dixie Janet Craig
Address: HC 69 Box 35
West Union, WV 26456

Owner: Randall Lynch & Dixie Craig
Address: 5534 WV Rt 18 N
West Union, WV 26456

WATER SOURCE OWNERS –

Owner: Randy K. Smith
Address: HC 69 Box 41F
West Union, WV 26456

Owner: Carol & Alfrieda (Surv.) Painter
Address: HC 69 Box 35G
West Union, WV 26456

Owner: Dominion Field Services, Inc.
Address: PO Box 2450
Clarksburg, WV 26302

Owner: Equitrans, Inc
Address: 100 Allegheny Center Mall
Pittsburgh, PA 15212

Owner: William Randall Lynch & Dixie Janet Craig
Address: HC 69 Box 35
West Union, WV 26456

*Please note there are 14 additional water sources listed on the attached map, however they are located greater than 1500' from the proposed well location.

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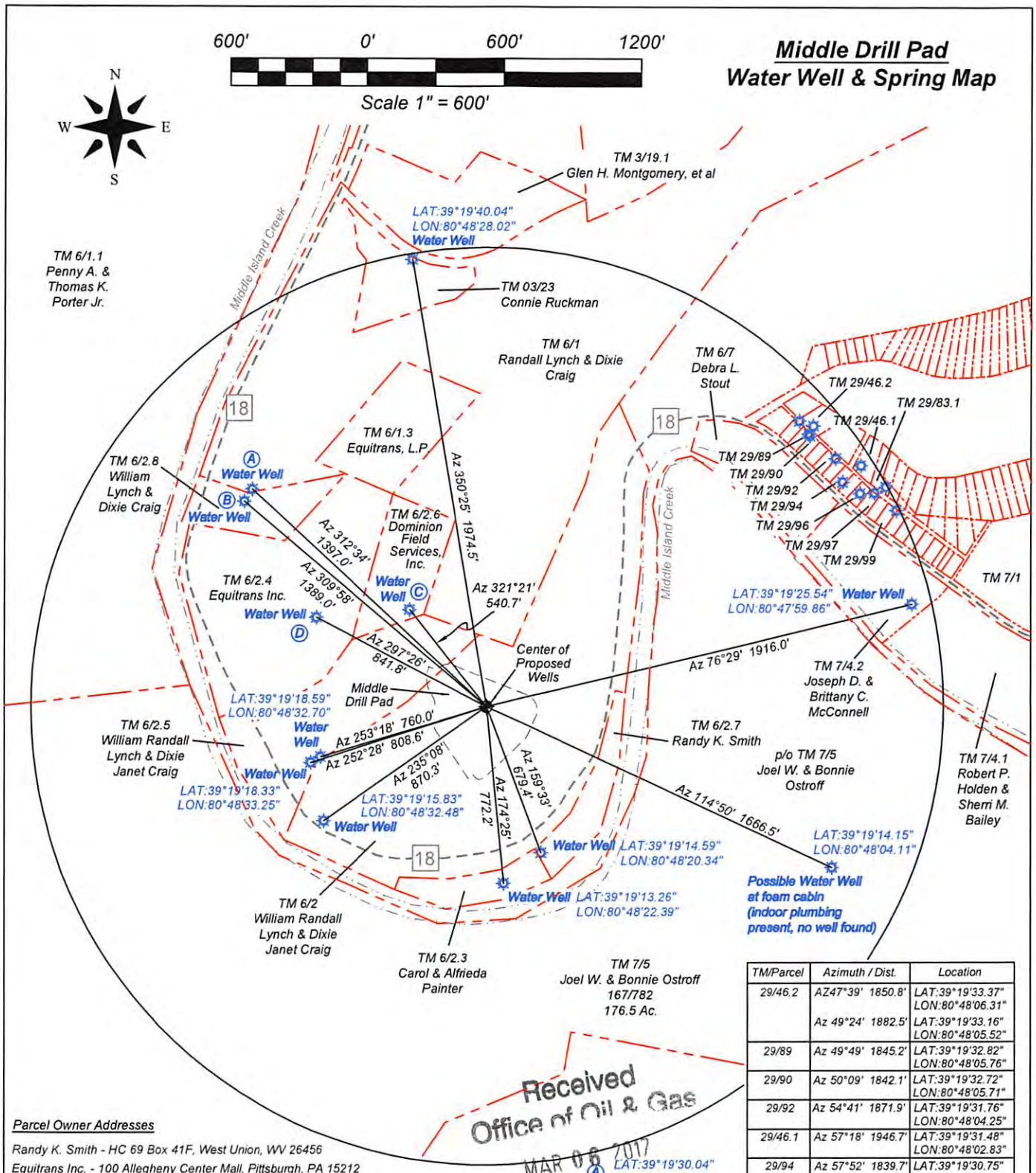
Middle Drill Pad
Water Well & Spring Map



TM/Parcel	Azimuth / Dist.	Location
29/46.2	AZ47°39' 1850.8'	LAT:39°19'33.37" LON:80°48'06.31"
	Az 49°24' 1882.5'	LAT:39°19'33.16" LON:80°48'05.52"
29/89	Az 49°49' 1845.2'	LAT:39°19'32.82" LON:80°48'05.76"
29/90	Az 50°09' 1842.1'	LAT:39°19'32.72" LON:80°48'05.71"
29/92	Az 54°41' 1871.9'	LAT:39°19'31.76" LON:80°48'04.25"
29/46.1	Az 57°18' 1946.7'	LAT:39°19'31.48" LON:80°48'02.83"
29/94	Az 57°52' 1839.7'	LAT:39°19'30.75" LON:80°48'03.84"
29/96	AZ60°23' 1879.3'	LAT:39°19'30.26" LON:80°48'02.87"
29/83.1	Az 61°17' 1993.1'	LAT:39°19'30.56" LON:80°48'01.42"
29/97	Az 61°16' 1936.8'	LAT:39°19'30.29" LON:80°48'02.04"
29/99	Az 64°32' 1988.7'	LAT:39°19'29.56" LON:80°48'00.80"

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A LAT:39°19'30.04" LON:80°48'36.75"

B LAT:39°19'29.51" LON:80°48'37.19"

C LAT:39°19'24.97" LON:80°48'27.86"

D LAT:39°19'24.58" LON:80°48'33.06"

Parcel Owner Addresses

Randy K. Smith - HC 69 Box 41F, West Union, WV 26456
Equitrans Inc. - 100 Allegheny Center Mall, Pittsburgh, PA 15212
Carol & Alfrieda (Surv.) Painter - HC 69 Box 35G, West Union, WV 26456
Glen H. Montgomery, et al - 119 Gabriels Way, West Union, WV 26456
Connie Ruckman & Gene Rowe - HC 69 Box 38B, West Union, WV 26456
Dominion Field Services, Inc. - PO Box 2450, Clarksburg, WV 26302
Joseph D. & Brittany C. McConnell - HC 69 Box 19, West Union, WV 26456
William Randall Lynch & Dixie Janet Craig - HC 69 Box 35, West Union, WV 26456
Joel W. & Bonnie Ostroff - 2912 Joyce Road, Roslyn, PA 19001

WW-6A4
(1/12)

Operator Well No. Caboose Unit 1H
Multiple Wells on Middle Pad

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

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

Notice Time Requirement: Notice shall be provided at least **TEN (10)** days prior to filing a permit application.
Date of Notice: 05/20/2016 **Date Permit Application Filed:** 03/03/2017

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

☐ HAND DELIVERY ☒ CERTIFIED MAIL RETURN RECEIPT REQUESTED

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

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

Name: William Randall Lynch & Dixie Janet Craig
Address: HC 69, Box 35
West Union, WV 26456

Name: William Randall Lynch & Dixie Janet Craig (2nd Address)
Address: 5534 WV Route 18 N
West Union, WV 26456

Notice is hereby given:

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

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

UTM NAD 83 Easting: 516681.13m (Approximate Pad Center)
Northing: 4352573.53m (Approximate Pad Center)
Public Road Access: WV 18
Generally used farm name: William Randall Lynch & Dixie Craig

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

Well Operator: Antero Resources Appalachian Corporation
Address: 1615 Wynkoop St.
Denver, CO 80202
Telephone: 303-357-7323
Email: asteele@anteroresources.com
Facsimile: 303-357-7315

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

Oil and Gas Privacy Notice:

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

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WW-6A5
(1/12)

Operator Well No. Caboose Unit 1H

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: 03/03/2017 **Date Permit Application Filed:** 03/03/2017

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: William Randall Lynch & Dixie Janet Craig
Address: HC 69 Box 35
West Union, WV 26456

Name: Randall Lynch & Dixie Craig (2nd Address)
Address: 5534 WV Route 18 N
West Union, WV 26456

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

UTM NAD 83 Easting: 516679.309m
Northing: 4352593.145m
Public Road Access: WV-18
Generally used farm name: William Randall Lynch & Dixie Craig

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
Telephone: (303) 357-7310
Email: shjohnson@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.

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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

Reissued November 4, 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 Middle Pad, Doddridge County
Caboose Unit 1H Well Site 47-017-06816

Dear Mr. Martin,

This well site will be accessed from a DOH permit #04-2013-0352 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off of WV route 18 F in Doddridge County.

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

Very Truly Yours,

Gary K. Clayton

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

Cc: Samantha Marsh
Antero Resources Corporation
CH, OM, D-4
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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MAR 06 2017

Antero Resources Corporation Site Construction Plan for

Middle 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 Middle 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 "Middle 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.2.A.*** *Clearly identifies the limit of disturbance for the project;*

Antero Response
"Overall Plan Sheet Index & Volumes" and "Well Pad & Water Containment Pad Plan," maps are included on pages 8-9 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" and "Existing Structures & Features" map on page 6-7 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" and "Well Pad & Water Containment Pad Plan," maps on pages 8-9 as well as the "Well Pad Grading Plan," "Water Containment Pad Grading Plan," "Access Road Profiles," "Access Road Sections," "Access Road & Stockpile Sections," and "Well Pad & Water Containment Pad Sections," on pages 10-15 of the Site Design for proposed cut and fill areas with grading contours.

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

Antero Response
Please refer to "Overall Plan Sheet Index & Volumes" and "Well Pad & Water Containment Pad Plan," maps on pages 8-9 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" and "Well Pad & Water Containment Pad Plan," maps on pages 8-9 as well as the "Well Pad Grading Plan," "Water Containment Pad Grading Plan," "Access Road Profiles," "Access Road Sections," "Access Road & Stockpile Sections," and "Well Pad & Water Containment Pad Sections," on pages 10-15 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:*

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

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

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

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

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

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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.*

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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MAR 06 2017

Antero Resources Corporation Erosion and Sediment Control Plan for Middle 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 Middle 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 Middle 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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MAR 06 2017

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 has been stabilized by hard cover such as pavement or buildings. It should be noted that the 70% requirement refers to the total area vegetated and not just a percent of the site.
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 16-23 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 23 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.*

Antero Response:
Please refer to the "Construction and E&S Control Notes," and "Construction Details" on pages 2 and 16-23 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.c.1. *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.

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MAR 06 2017

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, " "Well Pad & Water Containment Pad Plan," "Well Pad Grading Plan," and "Water Containment Pad Grading Plan," maps are included on pages 8-11 of the Site Design. Specific design, 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, " "Well Pad & Water Containment Pad Plan," "Well Pad Grading Plan," and "Water Containment Pad Grading Plan," maps are included on pages 8-11 of the Site Design locate all proposed erosion and sediment control BMPs.

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MAR 06 2017

MIDDLE WELL PAD & WATE

SITE DESIGN & CONST

EROSION & SEDIMENT

WEST UNION DISTRICT, DODDRIDGE

MIDDLE ISLAND CREEK

APPROVED
WVDEP OOG
Modification
3/1/2017

LOCATION COORDINATES:

ACCESS ROAD ENTRANCE
LATITUDE: 39.322323 LONGITUDE: -80.804581 (NAD 83)
N 4352564.36 E 516844.60 (UTM ZONE 17 METERS)

CENTER OF TANK
LATITUDE: 39.323633 LONGITUDE: -80.806236 (NAD 83)
N 4352709.35 E 516701.67 (UTM ZONE 17 METERS)

CENTROID OF WELL PAD
LATITUDE: 39.322409 LONGITUDE: -80.806478 (NAD 83)
N 4352573.53 E 516681.13 (UTM ZONE 17 METERS)

GENERAL DESCRIPTION:

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

FLOODPLAIN NOTES:

THE PROPOSED SITE IS LOCATED IN FLOODZONE "X" PER FEMA FLOOD MAP #54017C0110C.

MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1309921758.
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 ON APRIL 2012, FEBRUARY 2014 & DECEMBER 2016 BY ALLSTAR ECOLOGY, 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 DECEMBER 5, 2016 WETLAND DELINEATION AND STREAM IDENTIFICATION REPORT WAS PREPARED BY ALLSTAR ECOLOGY, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE REPORT 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.

MIDDLE JURISDICTIONAL DITCH 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)	
Ditch 1 (Access Road "A")	214	28	0	10	252
Ditch 2 (Access Road "A")	13	0	0	0	13

GEOTECHNICAL NOTES:

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY TERRA TESTING, INC. UNDER THE TECHNICAL SUPERVISION OF KLEINFELDER ON JULY 11, 2013-OCTOBER 10, 2013 AND REVISITED BY PENNSYLVANIA SOIL & ROCK, INC. ON MARCH 28-29, 2016. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC., DATED APRIL 18, 2016, REVISED DECEMBER 8, 2016, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THEIR REPORT WAS USED IN THE PREPARATION OF THESE PLANS, HOWEVER, ADDITIONAL INVESTIGATION IS NECESSARY TO CONFIRM THE ESTIMATED TOE KEY DEPTHS. 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
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AARON KUNZLER - CONSTRUCTION SUPERVISOR
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CHARLES E. COMPTON, III - SURVEYING COORDINATOR
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ENGINEER/SURVEYOR:
NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
OFFICE: (888) 662-4185 CELL: (540) 686-6747

ENVIRONMENTAL:
ALLSTAR ECOLOGY, LLC
RYAN L. WARD - ENVIRONMENTAL SCIENTIST
OFFICE: (866) 213-2666 CELL: (304) 692-7477

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

RESTRICTIONS NOTES:

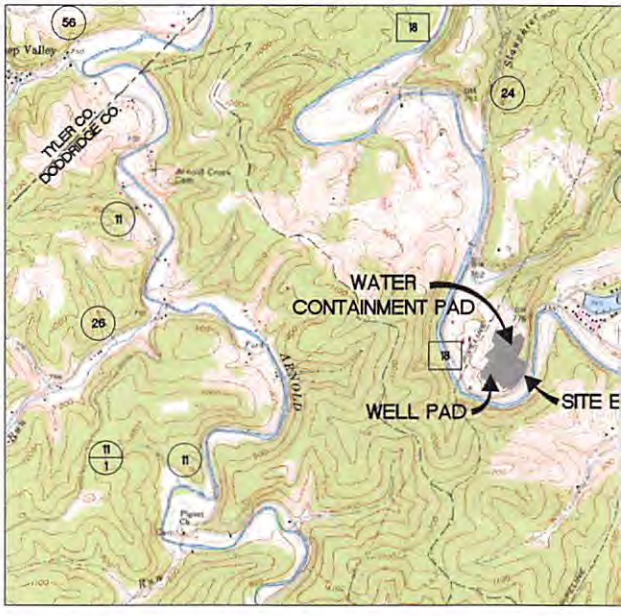
1. THERE ARE NO LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE ARE 2 EXISTING WETLANDS AND A PERENNIAL STREAM WITHIN 100' OF THE ACCESS ROAD "A" LOD THAT WILL REMAIN UNDISTURBED.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3.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



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.

R CONTAINMENT PAD
RUCTION PLAN,
CONTROL PLANS

COUNTY, WEST VIRGINIA
ATERSHED

UAD MAP

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

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 – WELL PAD & WATER CONTAINMENT PAD PLAN
10 – WELL PAD GRADING PLAN
11 – WATER CONTAINMENT GRADING PLAN
12 – ACCESS ROAD PROFILES
13– ACCESS ROAD SECTIONS
14 – ACCESS ROAD SECTIONS & STOCKPILE SECTIONS
15 – WELL PAD & WATER CONTAINMENT PAD SECTIONS
16–23 – CONSTRUCTION DETAILS
24 – WELL PAD & WATER CONTAINMENT PAD RECLAMATION PLAN
25 – FIRM EXHIBIT
GE500–GE503 – GEOTECHNICAL DETAILS

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Caboose Unit 1H	N 302260.74 E 1630347.23	N 302295.90 E 1598908.05	N 4352593.14 E 516679.31	LAT 39-19-21.3098 LONG -80-48-23.3938
Caboose Unit 2H	N 302256.92 E 1630356.48	N 302292.08 E 1598915.29	N 4352592.03 E 516682.15	LAT 39-19-21.2734 LONG -80-48-23.2755
Pickney Unit 1H	N 302253.11 E 1630365.72	N 302288.27 E 1598924.53	N 4352590.91 E 516684.98	LAT 39-19-21.2370 LONG -80-48-23.1572
Pickney Unit 2H	N 302249.29 E 1630374.97	N 302284.45 E 1598933.78	N 4352589.80 E 516687.82	LAT 39-19-21.2007 LONG -80-48-23.0388
Goldsmith Unit 1H	N 302245.48 E 1630384.21	N 302280.64 E 1598943.02	N 4352588.68 E 516690.65	LAT 39-19-21.1643 LONG -80-48-22.9205
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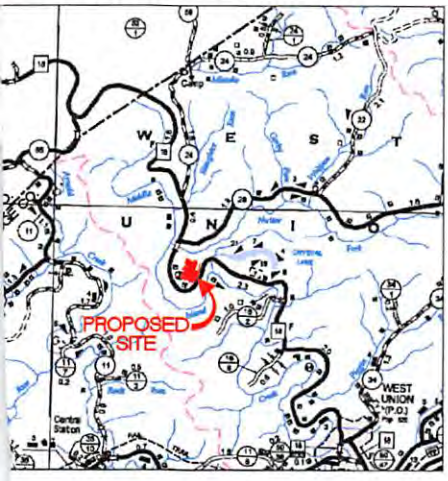
Jay Unit 1H	N 302237.85 E 1630402.70	N 302273.01 E 1598961.51	N 4352586.45 E 516696.32	LAT 39-19-21.0915 LONG -80-48-22.6839
Jay Unit 2H	N 302234.03 E 1630411.94	N 302269.19 E 1598970.75	N 4352585.34 E 516699.16	LAT 39-19-21.0551 LONG -80-48-22.5656
Chalk Unit 1H	N 302230.22 E 1630421.18	N 302265.38 E 1598979.99	N 4352584.22 E 516701.99	LAT 39-19-21.0188 LONG -80-48-22.4472
Chalk Unit 2H	N 302226.40 E 1630430.43	N 302261.56 E 1598989.24	N 4352583.11 E 516704.83	LAT 39-19-20.9824 LONG -80-48-22.3289
Well Pad Elevation	843.0			

WVDOH COUNTY ROAD MAP



5000 0 5000
SCALE: 1" = 5000'

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!!

MIDDLE LIMITS OF DISTURBANCE AREA (AC)			
Total Site	Permitted	Modification	Total
Access Road "A" (644')	3.29	1.00	4.29
Access Road "B" (499')	0.98	0.00	0.98
Access Road "C" (232')	0.42	0.00	0.42
Well Pad	5.53	0.00	5.53
Water Containment Pad	3.30	0.00	3.30
Excess/Topsoil Material Stockpiles	4.53	0.00	4.53
Total Affected Area	**18.05**	**1.00**	**19.05**
Total Wooded Acres Disturbed	3.62	0.76	4.38
Impacts to William R Lynch & Dixie J. Craig TM 6-2			
Access Road "A" (644')	3.29	1.00	4.29
Access Road "B" (499')	0.98	0.00	0.98
Well Pad	5.01	0.00	5.01
Water Containment Pad	0.73	0.00	0.73
Excess/Topsoil Material Stockpiles	4.53	0.00	4.53
Total Affected Area	**14.54**	**1.00**	**15.54**
Total Wooded Acres Disturbed	2.31	0.76	3.07
Impacts to William R Lynch & Dixie J. Craig TM 6-2.5			
Access Road "C" (218')	0.40	0.00	0.40
Well Pad	0.52	0.00	0.52
Water Containment Pad	0.14	0.00	0.14
Total Affected Area	**1.06**	**0.00**	**1.06**
Total Wooded Acres Disturbed	0.02	0.00	0.02
Impacts to Randall Lynch & Dixie Craig TM 6-1			
Access Road "C" (14')	0.02	0.00	0.02
Water Containment Pad	2.43	0.00	2.43
Total Affected Area	**2.45**	**0.00**	**2.45**
Total Wooded Acres Disturbed	1.29	0.00	1.29

Received
Office of Oil & Gas
MAR 06 2017

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

REVISION	
DATE	
01/26/2016	REVISED PER DRILLING COMMENTS
04/19/2016	REVISED PER CONSTRUCTION
12/09/2016	REVISED ENTRANCE LOCATION

Antero Resources

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

COVER SHEET
MIDDLE
WELL PAD & WATER CONTAINMENT PAD
WEST UNION DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CYRUS B. KUHN REGISTERED 19578 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
12/09/2016

DATE: 12/09/2016
SCALE: AS SHOWN
SHEET 1 OF 25

OVERALL PLAN SHEET

APPROVED
WVDEP OOG
Modification
3/1/2017

NOTES:

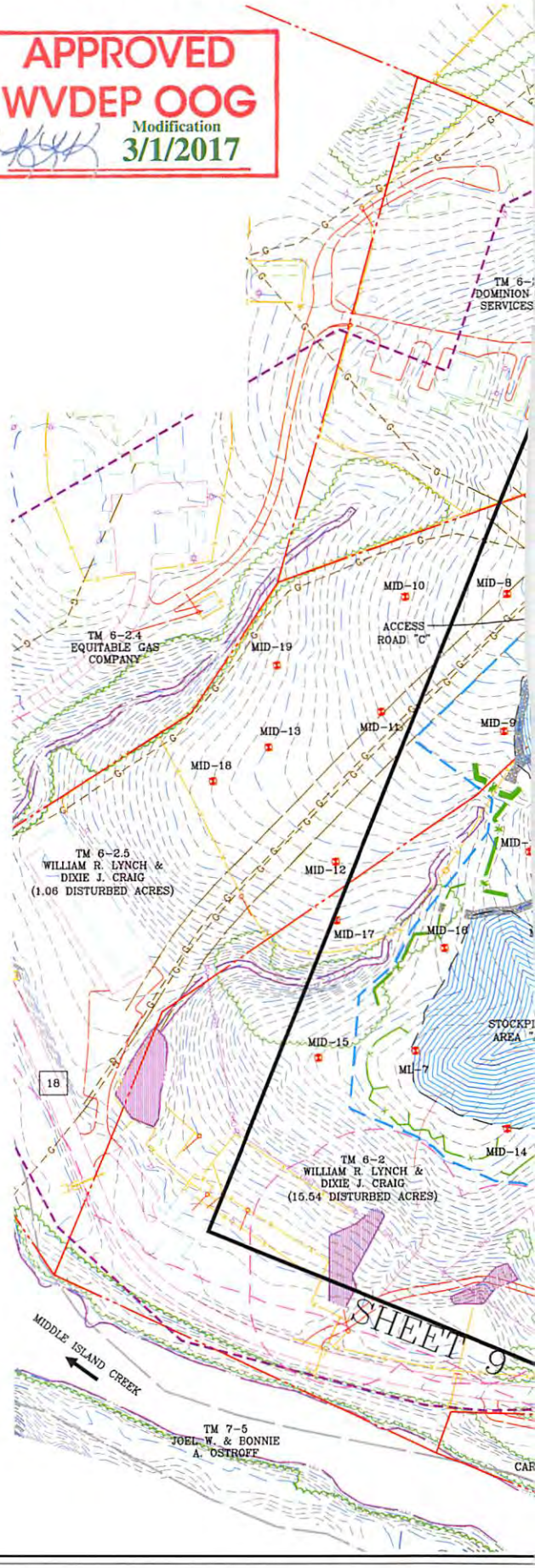
1. THE EARTHWORK QUANTITIES PROVIDED ARE AN ESTIMATE FOR CONSIDERATION. THE QUANTITIES SHOWN ARE CALCULATED USING A 1:1 CUT/SWELL & FILL SHRINK FACTOR. THE EXCESS MATERIAL & TOPSOIL STOCKPILES ARE SIZED TO ACCOMMODATE A CUT/SWELL FACTOR OF 1.1:1. THIS ADDITIONAL MATERIAL IS REFLECTED IN THE TOTAL SPOIL SHOWN ON THE MATERIAL QUANTITIES TABLE. IF THE CALCULATED SWELL IS LESS THAN 1.1:1, THE STOCKPILES SIZES CAN BE REDUCED DURING CONSTRUCTION. THE QUANTITIES SHOWN MAY BE GREATER OR LESSER THAN ACTUALLY EXCAVATED. THE ENGINEER IS NOT RESPONSIBLE FOR VARIANCES FROM THE ESTIMATED QUANTITIES AND DOES NOT CERTIFY THEIR ACCURACY.

2. THE TOE BENCH DEPTHS AND QUANTITIES PROVIDED IN THE TABLE ARE AN ESTIMATE, CALCULATED FROM THE RECOMMENDATIONS PROVIDED IN THE GEOTECHINCAL REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. SEE PAGES GE500–GE503 & GEOTECHNICAL INVESTIGATION REPORT PROVIDED BY PENNSYLVANIA SOIL & ROCK, INC. FOR TOE BENCH DETAILS, VOLUMES, AND SPECIFICATIONS.

MIDDLE WELL PAD & WATER CONTAINMENT PAD						
Description	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope (%)	Length of Slope (FT)
Access Road "A"	12,205.8	6,337.7	5,868.1	0.0	15.0	290.0
Access Road "B"	286.2	789.9	0.0	503.7	10.0	50.0
Access Road "C"	52.5	328.0	0.0	275.5	11.5	125.0
Well Pad	21,565.6	16,309.0	5,256.6	0.0	n/a	n/a
Water Containment Pad	877.0	1,511.2	0.0	634.2	n/a	n/a
Stripped Topsoil (12")	13,355.5	0.0	13,355.5	0.0	n/a	n/a
Material Stockpiles	0.0	32,180.0	0.0	32,180.0	n/a	n/a
Totals	48,342.6	57,455.8	24,480.2	33,593.4	n/a	n/a
	Total Spoil (CY) =		-9,113.2			

MATERIAL STOCKPILES		
Name	Excess	Topsoil
3" Topsoil Respread	N/A	1,000
A	5,910	14,990
B	10,280	0
TOTAL	**16,190**	**15,990**

MIDDLE TOE BENCH QUANTITIES			
Description	Keyway #1A	Keyway #1B	Total
Drainage Method	D2	D1	N/A
Toe Bench			
Approximate Depth (LF)	15	6	N/A
Approximate Width (15' min.) (LF)	15	15	N/A
Length (LF)	560	750	1,310
Perimeter Drain (LF)	560	750	1,310
AASHTO #57 Gravel (TONS)	85	1,105	1,190
6 oz. Non-woven Geotextile (SF)	3,606	22,137	25,744
Overexcavation (CY)	12,320	6,125	18,445
Toe Bench Outlet Drain			
Average Length of Outlet Drain Pipe (LF)	60	55	N/A
Outlet Drain Pipe (LF)	360	440	800
6 oz. Non-woven Geotextile (SF)	2,520	3,080	5,600
AASHTO #57 Gravel (TONS)	40	49	89
Bonding Bench			
Approximate Depth (LF)	0	0	N/A
Approximate Width (LF)	10	0	N/A
Number of Benches (EA)	2	0	N/A
Length (LF)	420	0	420
Perimeter Drain (LF)	840	0	840
AASHTO #57 Gravel (TONS)	64	0	64
6 oz. Non-woven Geotextile (SF)	5,410	0	5,410
Overexcavation (CY)	4,340	0	4,340
Bonding Bench Outlet Drain			
Average Length of Outlet Drain Pipe (LF)	55	0	N/A
Outlet Drain Pipe (LF)	495	0	495
6 oz. Non-woven Geotextile (SF)	3,465	0	3,465
AASHTO #57 Gravel (TONS)	55	0	55
Additional Excavation			
Colluvium Material Rework (CY)	N/A	N/A	0



T INDEX & VOLUMES

NAVITUS
ENERGY ENGINEERING
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DATE	REVISION
01/26/2016	REVISED PER DRILLING COMMENTS
04/19/2016	REVISED PER CONSTRUCTION
12/09/2016	REVISED ENTRANCE LOCATION

Antero Resources

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

OVERALL PLAN SHEET INDEX & VOLUMES

MIDDLE

WELL PAD & WATER CONTAINMENT PAD

WEST UNION DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHUB S. KUMP
REGISTERED
19578
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER
12/09/2016

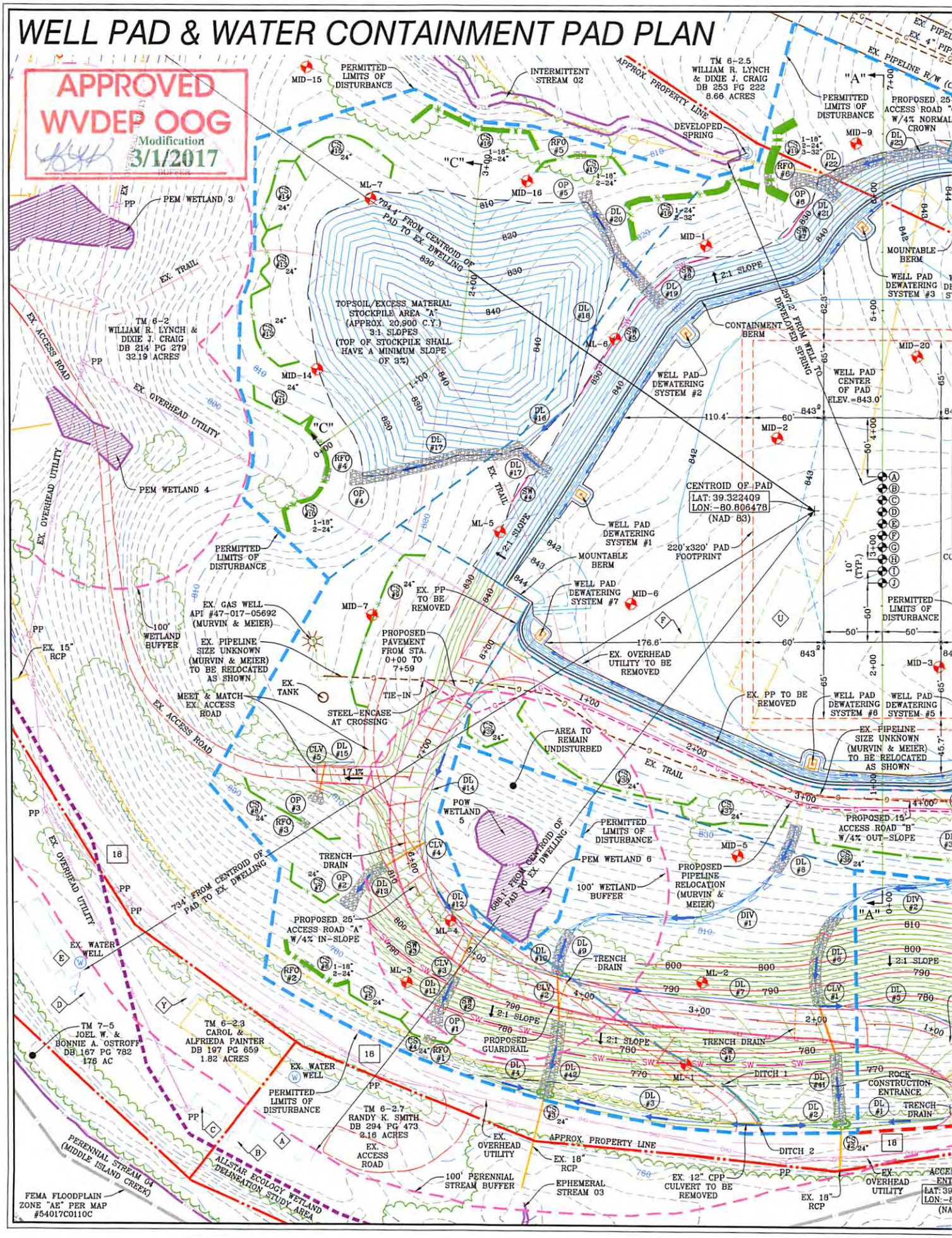
DATE: 12/09/2016

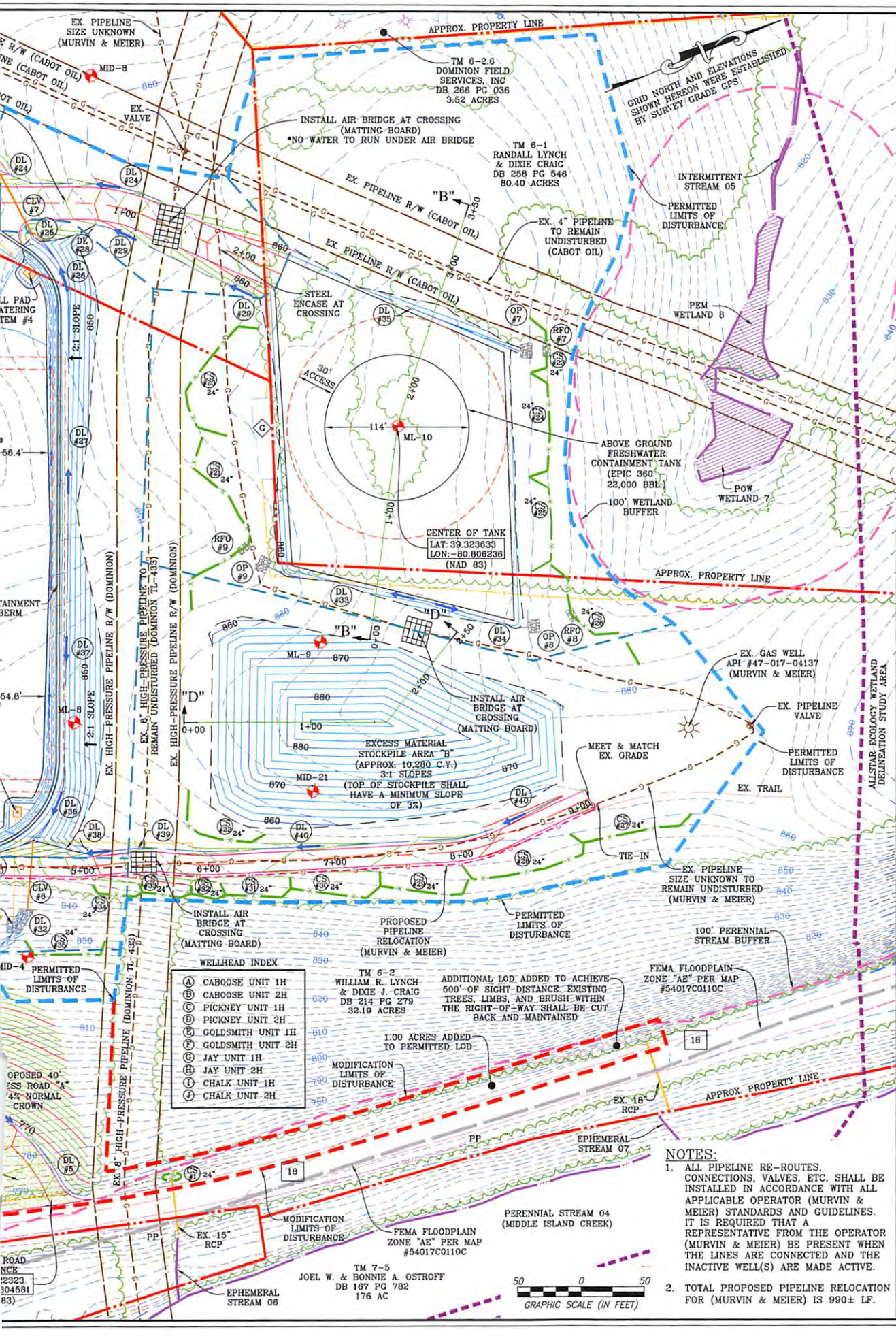
SCALE: 1" = 100'

SHEET 8 OF 25

WELL PAD & WATER CONTAINMENT PAD PLAN

APPROVED
WVDEP OOG
Modification
3/1/2017





NOTES:

1. ALL PIPELINE RE-ROUTES, CONNECTIONS, VALVES, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE OPERATOR (MURVIN & MEIER) STANDARDS AND GUIDELINES. IT IS REQUIRED THAT A REPRESENTATIVE FROM THE OPERATOR (MURVIN & MEIER) BE PRESENT WHEN THE LINES ARE CONNECTED AND THE INACTIVE WELL(S) ARE MADE ACTIVE.
2. TOTAL PROPOSED PIPELINE RELOCATION FOR (MURVIN & MEIER) IS 990± LF.

NAVITUS ENERGY ENGINEERING
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Antero Resources

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

WELL PAD AND WATER CONTAINMENT PAD PLAN

MIDDLE

WELL PAD & WATER CONTAINMENT PAD

WEST UNION DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CYRUS B. KUMP REGISTERED PROFESSIONAL ENGINEER 19578 STATE OF WEST VIRGINIA
12/09/2016

DATE: 12/09/2016
SCALE: 1" = 50'
SHEET 9 OF 25

MIDDLE WELL PAD & WATE

SITE DESIGN & CONST

EROSION & SEDIMENT

WEST UNION DISTRICT, DODDRIDGE

MIDDLE ISLAND CREEK

APPROVED
WVDEP OOG
Modification
3/1/2017

LOCATION COORDINATES:

ACCESS ROAD ENTRANCE
LATITUDE: 39.322323 LONGITUDE: -80.804581 (NAD 83)
N 4352564.36 E 516844.60 (UTM ZONE 17 METERS)

CENTER OF TANK
LATITUDE: 39.323633 LONGITUDE: -80.806236 (NAD 83)
N 4352709.35 E 516701.67 (UTM ZONE 17 METERS)

CENTROID OF WELL PAD
LATITUDE: 39.322409 LONGITUDE: -80.806478 (NAD 83)
N 4352573.53 E 516681.13 (UTM ZONE 17 METERS)

GENERAL DESCRIPTION:

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

FLOODPLAIN NOTES:

THE PROPOSED SITE IS LOCATED IN FLOODZONE "X" PER FEMA FLOOD MAP #54017C0110C.

MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1309921758.
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 ON APRIL 2012, FEBRUARY 2014 & DECEMBER 2016 BY ALLSTAR ECOLOGY, 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 DECEMBER 5, 2016 WETLAND DELINEATION AND STREAM IDENTIFICATION REPORT WAS PREPARED BY ALLSTAR ECOLOGY, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE REPORT 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.

MIDDLE JURISDICTIONAL DITCH 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)	
Ditch 1 (Access Road "A")	214	28	0	10	252
Ditch 2 (Access Road "A")	13	0	0	0	13

GEOTECHNICAL NOTES:

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY TERRA TESTING, INC. UNDER THE TECHNICAL SUPERVISION OF KLEINFELDER ON JULY 11, 2013-OCTOBER 10, 2013 AND REVISITED BY PENNSYLVANIA SOIL & ROCK, INC. ON MARCH 28-29, 2016. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC., DATED APRIL 18, 2016, REVISED DECEMBER 8, 2016, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THEIR REPORT WAS USED IN THE PREPARATION OF THESE PLANS, HOWEVER, ADDITIONAL INVESTIGATION IS NECESSARY TO CONFIRM THE ESTIMATED TOE KEY DEPTHS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

PROJECT CONTACTS:

OPERATOR:

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

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

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

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

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

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

DAVE CAVA - LAND AGENT
CELL: (304) 641-5814

ENGINEER/SURVEYOR:

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

ENVIRONMENTAL:

ALLSTAR ECOLOGY, LLC
RYAN L. WARD - ENVIRONMENTAL SCIENTIST
OFFICE: (866) 213-2666 CELL: (304) 692-7477

GEOTECHNICAL:

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

RESTRICTIONS NOTES:

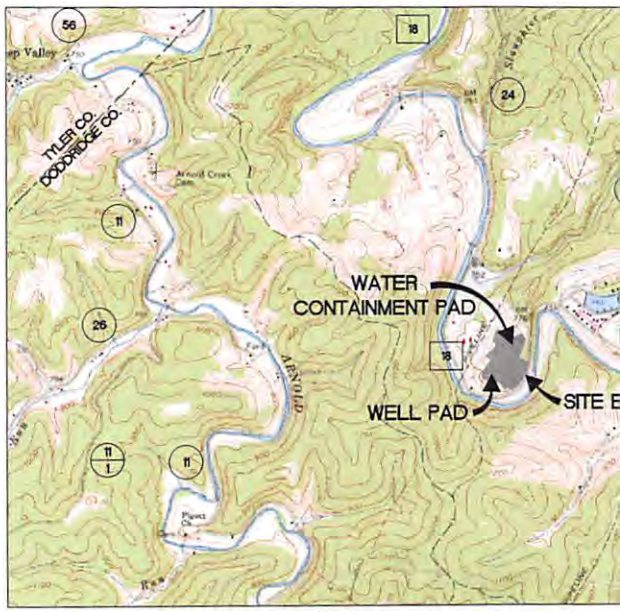
1. THERE ARE NO LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE ARE 2 EXISTING WETLANDS AND A PERENNIAL STREAM WITHIN 100' OF THE ACCESS ROAD "A" LOD THAT WILL REMAIN UNDISTURBED.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3.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



2000 0
SCALE: 1" = 2000'

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.

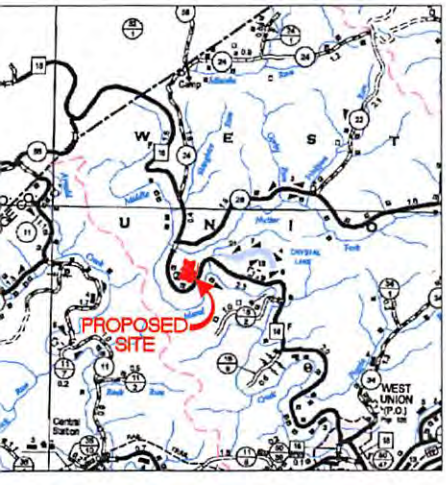
17-06816

R CONTAINMENT PAD
RUCTION PLAN,
CONTROL PLANS

COUNTY, WEST VIRGINIA
ATERSHED

UAD MAP

WVDOH COUNTY ROAD MAP



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

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 - WELL PAD & WATER CONTAINMENT PAD PLAN
10 - WELL PAD GRADING PLAN
11 - WATER CONTAINMENT GRADING PLAN
12 - ACCESS ROAD PROFILES
13- ACCESS ROAD SECTIONS
14 - ACCESS ROAD SECTIONS & STOCKPILE SECTIONS
15 - WELL PAD & WATER CONTAINMENT PAD SECTIONS
16-23 - CONSTRUCTION DETAILS
24 - WELL PAD & WATER CONTAINMENT PAD RECLAMATION PLAN
25 - FIRM EXHIBIT
GE500-GE503 - GEOTECHNICAL DETAILS

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Caboose Unit 1H	N 302260.74 E 1630347.23	N 302295.90 E 1598906.05	N 4352593.14 E 516679.31	LAT 39-19-21.3098 LONG -80-48-23.3938
Caboose Unit 2H	N 302256.92 E 1630356.48	N 302292.08 E 1598915.29	N 4352592.03 E 516682.15	LAT 39-19-21.2734 LONG -80-48-23.2755
Pickney Unit 1H	N 302253.11 E 1630365.72	N 302288.27 E 1598924.53	N 4352590.91 E 516684.98	LAT 39-19-21.2370 LONG -80-48-23.1572
Pickney Unit 2H	N 302249.29 E 1630374.97	N 302284.45 E 1598933.78	N 4352589.80 E 516687.82	LAT 39-19-21.2007 LONG -80-48-23.0388
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Jay Unit 2H	N 302234.03 E 1630411.94	N 302269.19 E 1598970.75	N 4352585.34 E 516699.16	LAT 39-19-21.0551 LONG -80-48-22.5656
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Chalk Unit 2H	N 302226.40 E 1630430.43	N 302261.56 E 1598989.24	N 4352583.11 E 516704.83	LAT 39-19-20.9824 LONG -80-48-22.3289
Well Pad Elevation	843.0			

MIDDLE LIMITS OF DISTURBANCE AREA (AC)			
Total Site	Permitted	Modification	Total
Access Road "A" (644')	3.29	1.00	4.29
Access Road "B" (499')	0.98	0.00	0.98
Access Road "C" (232')	0.42	0.00	0.42
Well Pad	5.53	0.00	5.53
Water Containment Pad	3.30	0.00	3.30
Excess/Topsoil Material Stockpiles	4.53	0.00	4.53
Total Affected Area	**18.05**	**1.00**	**19.05**
Total Wooded Acres Disturbed	3.62	0.76	4.38
Impacts to William R Lynch & Dixie J. Craig TM 6-2			
Access Road "A" (644')	3.29	1.00	4.29
Access Road "B" (499')	0.98	0.00	0.98
Well Pad	5.01	0.00	5.01
Water Containment Pad	0.73	0.00	0.73
Excess/Topsoil Material Stockpiles	4.53	0.00	4.53
Total Affected Area	**14.54**	**1.00**	**15.54**
Total Wooded Acres Disturbed	2.31	0.76	3.07
Impacts to William R Lynch & Dixie J. Craig TM 6-2.5			
Access Road "C" (218')	0.40	0.00	0.40
Well Pad	0.52	0.00	0.52
Water Containment Pad	0.14	0.00	0.14
Total Affected Area	**1.06**	**0.00**	**1.06**
Total Wooded Acres Disturbed	0.02	0.00	0.02
Impacts to Randall Lynch & Dixie Craig TM 6-1			
Access Road "C" (14')	0.02	0.00	0.02
Water Containment Pad	2.43	0.00	2.43
Total Affected Area	**2.45**	**0.00**	**2.45**
Total Wooded Acres Disturbed	1.29	0.00	1.29

Allan 3/23/17

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

DATE	REVISION
01/26/2016	REVISED PER DRILLING COMMENTS
04/19/2016	REVISED PER CONSTRUCTION
12/09/2016	REVISED ENTRANCE LOCATION

Antero Resources

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

COVER SHEET
MIDDLE
WELL PAD & WATER CONTAINMENT PAD
WEST UNION DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CYRUS S. KUMP REGISTERED 19578 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
12/09/2016

DATE: 12/09/2016
SCALE: AS SHOWN
SHEET 1 OF 25

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