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west virginia department of environmental protection

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

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

Thursday, April 13, 2017  
WELL WORK PERMIT  
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION (A)  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for JIM UNIT 2H  
47-095-02409-00-00

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: JIM UNIT 2H  
Farm Name: WEESE, ROGER R.  
U.S. WELL NUMBER: 47-095-02409-00-00  
Horizontal 6A / New Drill  
Date Issued: 4/13/2017

Promoting a healthy environment.

04/14/2017

# PERMIT CONDITIONS

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

## CONDITIONS

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

## PERMIT CONDITIONS

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

4709502409

WW-6B  
(04/15)

API NO. 47-095 -  
OPERATOR WELL NO. Jim Unit 2H  
Well Pad Name: Neat Pad

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

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

2) Operator's Well Number: Jim Unit 2H Well Pad Name: Neat Pad

3) Farm Name/Surface Owner: Weese, Roger R. Public Road Access: CR 7

4) Elevation, current ground: ~1032' Elevation, proposed post-construction: 1005'

5) Well Type (a) Gas  Oil  Underground Storage

Other

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No No

*JPS*  
*3/7/17*  
*DH*  
*3-7-17*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 6700' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6700' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 16000' MD

11) Proposed Horizontal Leg Length: 8386'

12) Approximate Fresh Water Strata Depths: 100', 121', 166'

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

14) Approximate Saltwater Depths: None Identified

15) Approximate Coal Seam Depths: 1441'

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

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

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

Depth: \_\_\_\_\_

Seam: \_\_\_\_\_

Owner: \_\_\_\_\_

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WW-6B  
(04/15)

API NO. 47- 095 -  
OPERATOR WELL NO. Jim Unit 2H  
Well Pad Name: Neal 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#	300'	300'	CTS, 417 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#	16000'	16000'	3992 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

JPS  
3/7/17  
DMH  
3-7-17

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 5.7ml - 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)

4709502409

API NO. 47-095 -  
OPERATOR WELL NO. Jim Unit 2H  
Well Pad Name: Neat Pad

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

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

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

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

SRS  
3/7/17

DMH

3-7-17

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 30.45 acres

22) Area to be disturbed for well pad only, less access road (acres): 8.93 acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers

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

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

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

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

Conductor: no additives, Class A cement.

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

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

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

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

25) Proposed borehole conditioning procedures:

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

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

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

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

\*Note: Attach additional sheets as needed.

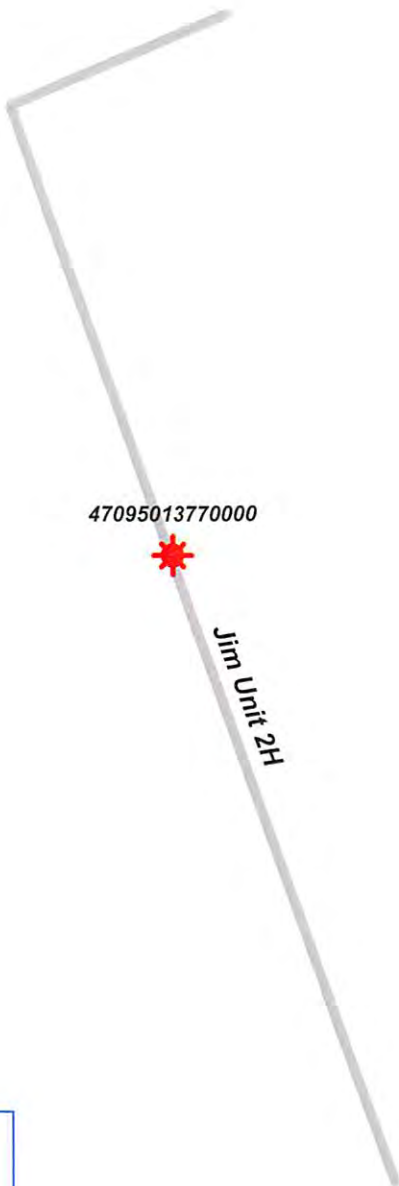
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4709502409



Jim Unit 2H - AOR



 WELL SYMBOLS  
Gas Well

January 17, 2017

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JAN 30 2017

04/14/2017

4709502405

JIM UNIT 2H (NEAT PAD) - AREA OF REVIEW 35-8-5.11 PAGE 2

UWI (API Num)	Well Name	Well Number	Operator	Historical Operator	TD	ELEV. GR	TD (SSTVD)	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Productive Formation(s) not perf'd
4709501370000	STULL CHARLES & SANDRA	1	RED GAS COMPANY	CHESTERFIELD EN CORP	5409	1100	-4309	2990-3256	Firth, Warren, Denson	Big Lujan, Bradford, Elk, Riley

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WW-9  
(4/16)

API Number 47 - 095 - \_\_\_\_\_  
Operator's Well No. Jim Unit 2H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

Watershed (HUC 10) Outlet Middle Island Creek Quadrangle Middlebourne 7.5'

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

Will a pit be used? Yes  No

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

JRS  
3/7/17

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

DNH  
3-7-17

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

Additives to be used in drilling medium? Please See Attachment

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

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

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

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

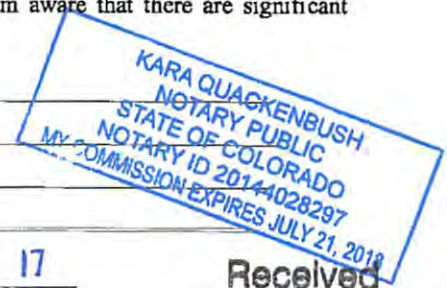
I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations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

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

Company Official Signature [Signature]

Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental & Regulatory Manager



Subscribed and sworn before me this 27 day of January, 20 17

[Signature] Notary Public

My commission expires July 21, 2018

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Form WW-9

Operator's Well No. Jim Unit 2H

**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 30.45 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" (5.30 acres) + Access Road "B" (1.22 acres) + Staging Area (0.87 acres) + Well Pad (8.93 acres) + Water Containment Pad (5.21 acres) + Pipeline bench (0.54) + Excess/Topsoil Material Stockpiles (8.38 acres) = 30.45 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 (Neat Pad Design Page 26)		See attached Table IV-4A for additional seed type (Neat Pad Design Page 26)	
*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] [Signature]

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

Title: Oil + Gas Inspect Date: 3-7-17

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

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# Well Site Safety Plan

## Antero Resources

**Well Name:** Jim Unit 1H-3H, Crown Unit 1H-3H, Jameson Unit 1H-3H, Jack Unit 1H-3H

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

### GPS Coordinates:

**Entrance** - Lat 39°25'27.34"/Long -80°56'24.51" (NAD83)

**Pad Center** - Lat 39°25'17.58"/Long -80°56'14.88" (NAD83)

### Driving Directions:

*DMH JPS  
3-7-17 3/7/17*

From the intersection of I79 and HWY 50: Travel west on US-50 for 28.7 miles. Turn right onto WV-18 N for 0.6 miles. Turn left onto Davis St/Old U.S. 50W for 0.4 miles. Turn right onto Wv-18N/Sistersville Pike for 12.2 miles. Turn left onto WV-74 S for 3.7 miles. Turn right onto Stull Hill Rd for 1.0 mile. Continue onto Big Shank Rd for 0.8miles. Continue onto Big Sanka Rd for 1.6 miles. Continue onto Bearsville Rd for 1.8 miles. Turn left onto Middlebourne Wick/Wick Rd for 0.5 miles. The access road will be on the left.

### Alternate Route:

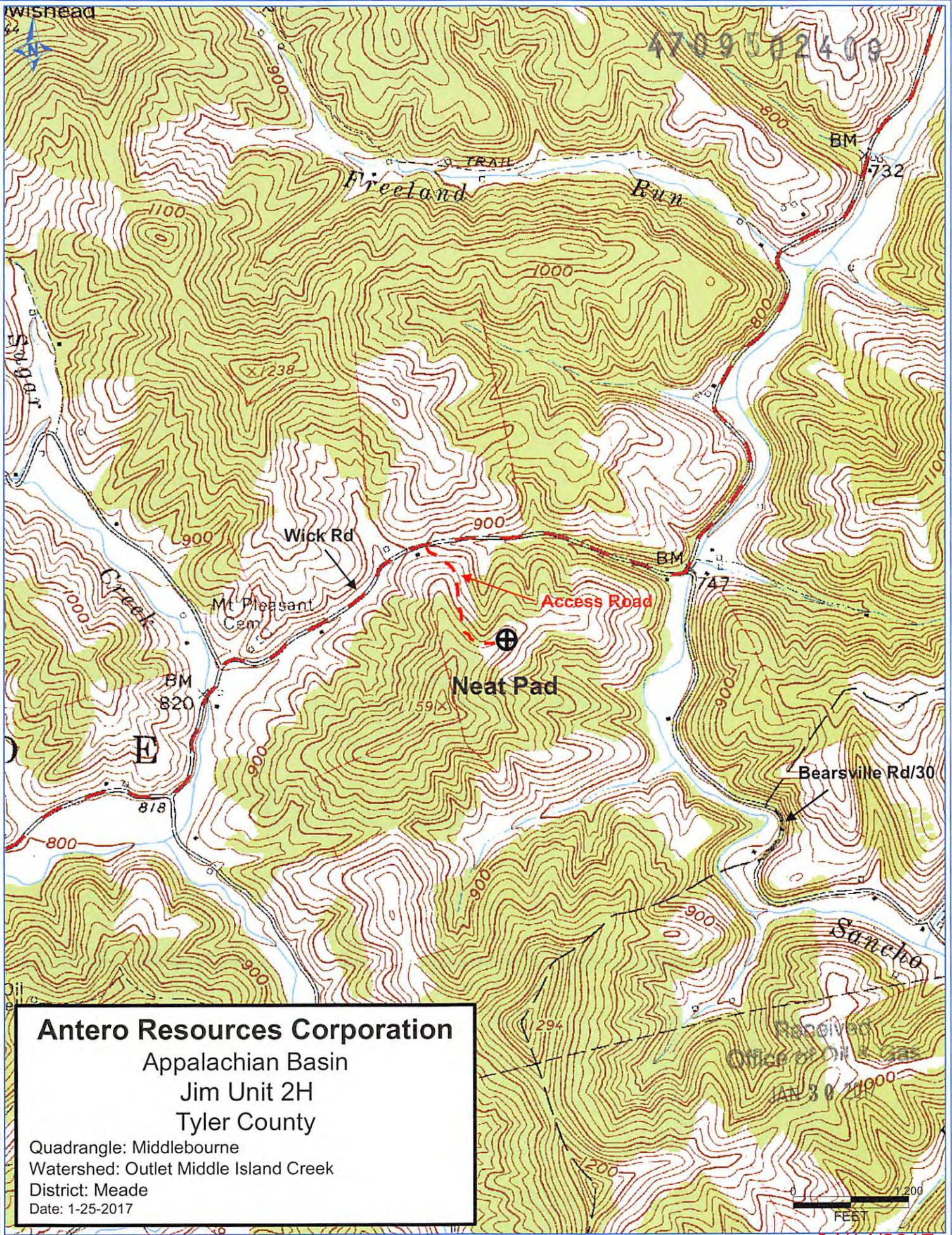
From the Volunteer Fire Department in Middlebourne: Head southwest on WV-18 S/Main St toward Wilcox Ave for 0.3 miles. Turn right onto Bridgeway Rd for 0.1 miles. Turn left onto Middlebourne-Wick/Wick Rd for 2.0 miles. Turn left onto Middlebourne-Wick for 4.6 miles. The access road will be on the left.

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

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LATITUDE 39°27'30"

5,952'

4,802' TO BOTTOM HOLE

LATITUDE 39°25'00"

LONGITUDE 80°55'00"

13,428'

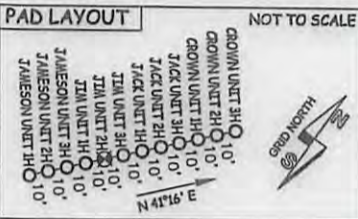
LONGITUDE 80°55'00"

NOTE: NO OCCUPIED BUILDINGS OR BUILDINGS TWO TO THOUSAND FIVE HUNDRED (2,000) SQUARE FEET OR LARGER, USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.

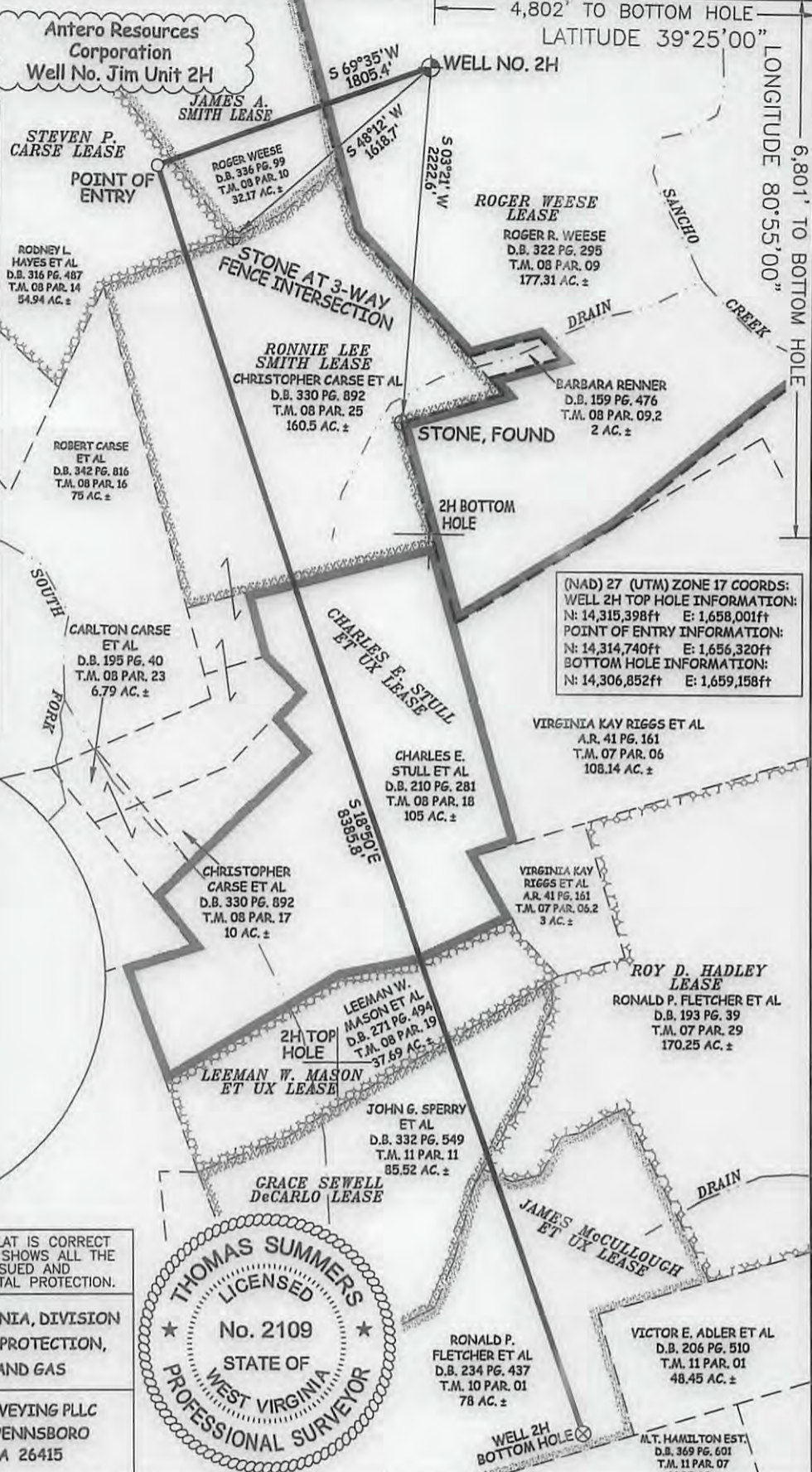
Antero Resources Corporation Well No. Jim Unit 2H

NOTES: WELL 2H TOP HOLE INFORMATION: N: 338,868ft E: 1,593,850ft LAT: 39°25'17.29" LON: 80°56'15.84" BOTTOM HOLE INFORMATION: N: 330,301ft E: 1,594,864ft LAT: 39°23'52.78" LON: 80°56'01.18" WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

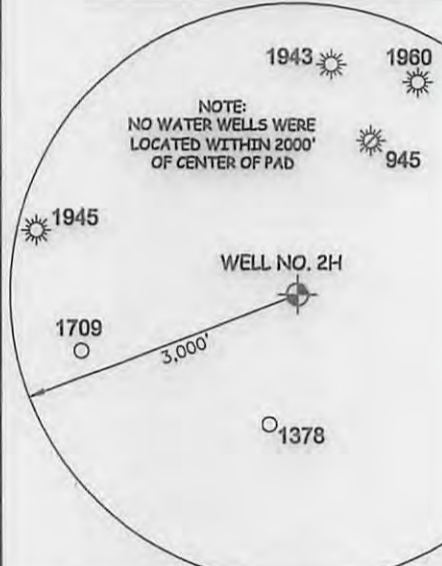
(NAD) 83 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 4,363,560m E: 505,374m BOTTOM HOLE INFORMATION: N: 4,360,955m E: 505,727m



WV NORTH ZONE GRID NORTH



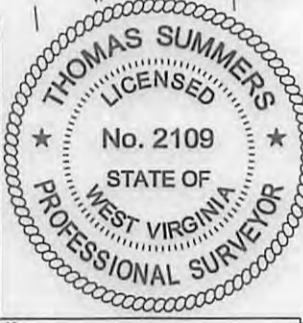
(NAD) 27 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 14,315,398ft E: 1,658,001ft POINT OF ENTRY INFORMATION: N: 14,314,740ft E: 1,656,320ft BOTTOM HOLE INFORMATION: N: 14,306,852ft E: 1,659,158ft



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

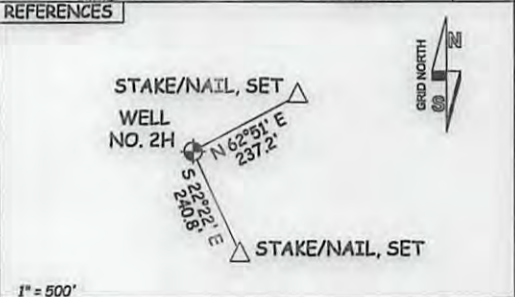


STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS. WILLOW LAND SURVEYING PLLC 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415



JOB # 14-128WA DRAWING # JIM2HR1 SCALE 1" = 1000' MINIMUM DEGREE OF ACCURACY SUBMETER PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND: Surface Owner Boundary Lines +/-, Interior Surface Tracts +/-, Existing Fence, Found monument, as noted. THOMAS SUMMERS P.S. 2109 DATE 01/23/17 OPERATOR'S WELL# JIM UNIT #2H



WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 - 095 - 02409 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT LOCATION: ELEVATION 1,005' - PROPOSED 1,032' - ORIGINAL WATERSHED OUTLET MIDDLE ISLAND CREEK QUADRANGLE MIDDLEBOURNE 7.5' DISTRICT MEADE COUNTY TYLER SURFACE OWNER ROGER R. WEESE ACREAGE 177.31 ACRES +/- OIL & GAS ROYALTY OWNER ROGER WEESE; JAMES A. SMITH; STEVEN P. CARSE; RONNIE LEE SMITH; LEASE ACREAGE 196.709 AC±; 31.919 AC±; 81.57 AC±; 97.544 AC±; CHARLES E. STULL ET UX; LEEMAN W. MASON ET UX; GRACE SEWELL DeCARLO; ROY D. HADLEY; JAMES McCULLOUGH ET UX 105 AC±; 37.69 AC±; 85.52 AC±; 170.25 AC±; 78 AC± PROPOSED WORK: DRILL X CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) PLUG & ABANDON CLEAN OUT & REPLUG TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,700' TVD 16,000' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

04/14/2017



WW-6A1

Operator's Well Number Jim Unit 2H

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

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

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

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

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>Roger Weese Lease</u></b>			
Roger R. Weese	Antero Resources Appalachian Corporation	1/8+	0435/0766
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>James A. Smith Lease</u></b>			
James A. Smith	Antero Resources Appalachian Corporation	1/8+	0420/0406
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Steven P. Carse Lease</u></b>			
Steven P. Carse	Antero Resources Corporation	1/8+	0449/0036
<b><u>Ronnie Lee Smith Lease (6-8 p/o 25)</u></b>			
Ronnie Lee Smith	Antero Resources Corporation	1/8+	0434/0519
<b><u>Charles E. Stull, et ux Lease</u></b>			
Charles E. Stull, et ux	Antero Resources Appalachian Corporation	1/8+	0433/0508
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Leeman W. Mason, et ux Lease</u></b>			
Leeman W. Mason, et ux	Antero Resources Corporation	1/8+	0456/0417
<b><u>Grace Sewell DeCarlo Lease</u></b>			
Grace Sewell DeCarlo	Antero Resources Corporation	1/8+	0430/0470

\*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.

\*\*CONTINUED ON NEXT PAGE\*\*  
04/14/2017



WW-6A1  
(5/13)

Operator's Well No. Jim Unit 2H

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

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

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

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>James McCullough, et ux Lease</u>				
	James A. McCullough, et ux	Chesapeake Appalachian, LLC	1/8	0376/0366
	Chesapeake Appalachian, LLC	Statoil USA Onshore Properties, Inc.	Assignment	0384/0359
	Statoil USA Onshore Properties, Inc.	Antero Resources Corporation	Assignment	0544/0291

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

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

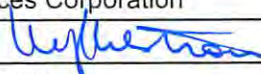
The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

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

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JAN 30 2017

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

Well Operator: Antero Resources Corporation

By: Kevin Kilstrom 

Its: Senior VP Production

FORM WW-6A1  
EXHIBIT 1

FILED

JUN 10 2013

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



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

APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY

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

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

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

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

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

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: *Alvyn A. Schopp* Date: June 10, 2013

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

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Revised 4/13  
JAN 30 2017

4709502409



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

January 27, 2017

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

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

Mr. Martin:

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

Sincerely,

A handwritten signature in blue ink, appearing to read "Ken Vaughn", is written over a light blue horizontal line.

Kenneth Vaughn  
Senior Landman

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Office of Oil & Gas  
JAN 30 2017

04/14/2017

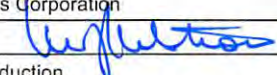


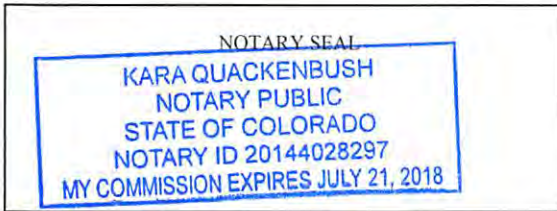


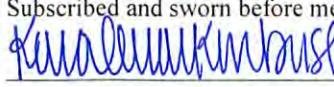


**Certification of Notice is hereby given:**

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

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



Subscribed and sworn before me this 26 day of January 2017  
 Notary Public  
 My Commission Expires July 21, 2017

**Oil and Gas Privacy Notice:**

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

Received  
Office of Oil & Gas  
JAN 30 2017

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

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

**Date of Notice:** 1/27/2017 **Date Permit Application Filed:** 1/27/2017

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: Roger R. Weese  
Address: 105 Jefferson Run Rd.  
Alma, WV 26320

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

SURFACE OWNER(s) (Road and/or Other Disturbance)  
Name: Roger R. Weese  
Address: 105 Jefferson Run Rd.  
Alma, WV 26320

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: NONE IDENTIFIED WITHIN 1500'  
Address: \_\_\_\_\_

OPERATOR OF ANY NATURAL GAS STORAGE FIELD  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

\*Please attach additional forms if necessary

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Office of Oil & Gas  
JAN 30 2017



**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

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

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

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

**Well Location Restrictions**

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



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

**Water Well Testing:**

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

**Water Testing Laboratories:**

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

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

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

**Written Comment:**

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

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

Received  
Office of Oil & Gas  
JAN 30 2017

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

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

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

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

**Comment Requirements**

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

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

**Permit Denial or Condition**

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

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

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

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

Received  
Office of Oil & Gas  
JAN 30 2017

04/14/2017

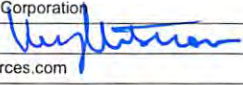


WW-6A  
(8-13)

4709502409  
API NO. 47-095 -  
OPERATOR WELL NO. Jim Unit 2H  
Well Pad Name: Neat Pad

**Notice is hereby given by:**

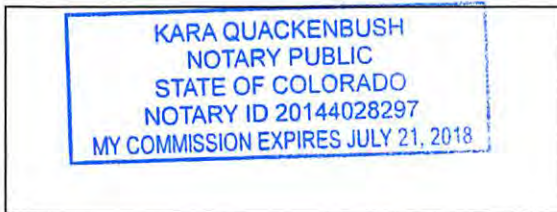
Well Operator: Antero Resources Corporation  
Telephone: (303) 357-7310  
Email: kquackenbush@anteroresources.com



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

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 27 day of January 2017,  
Kara Quackenbush Notary Public

My Commission Expires July 21, 2017

Received  
Office of Oil & Gas  
JAN 30 2017

04/14/2017





**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:** 01/27/2017      **Date Permit Application Filed:** 01/27/2017

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

- CERTIFIED MAIL                                       HAND
- RETURN RECEIPT REQUESTED                                      DELIVERY

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

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

Name: <u>Roger R. Weese</u>	Name: _____
Address: <u>105 Jefferson Run Rd.</u>	Address: _____
<u>Alma, WV 26320</u>	_____

**Notice is hereby given:**

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

State: <u>West Virginia</u>	UTM NAD 83    Easting: <u>505374m</u>
County: <u>Tyler</u>	Northing: <u>4363560m</u>
District: <u>Meade</u>	Public Road Access: <u>CR 7</u>
Quadrangle: <u>Middlebourne 7.5'</u>	Generally used farm name: <u>Weese, Roger R.</u>
Watershed: <u>Outlet Middle Island Creek</u>	

**This Notice Shall Include:**

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

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

**Oil and Gas Privacy Notice:**

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

Received  
Office of Oil & Gas  
JAN 30 2017



## WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

**Division of Highways**

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

Jim Justice  
 Governor

Gregory L. Bailey, P. E.  
 Acting Commissioner of Highways

Reissued January 25, 2017

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

Subject: DOH Permit for the Neat Pad, Tyler County

**Jim Unit 2H Well Site** 47-095-02409

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2015-0468 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off of Tyler County Route 7 SLS.

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

Very Truly Yours,

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

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

Received  
 Office of Oil & Gas  
 JAN 30 2017



## 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
Silica, crystalline quartz	7631-86-9
Sodium Chloride	7647-14-5
Sodium Hydroxide	1310-73-2
Sugar	57-50-1
Surfactant	68439-51-0
Suspending agent (solid)	14808-60-7
Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7
Solvent Naphtha, petroleum, heavy aliph	64742-96-7
Soybean Oil, Me ester	67784-80-9
Copolymer of Maleic and Acrylic Acid	52255-49-9
DETA phosphonate	15827-60-8
Hexamethylene Triamine Penta	34690-00-1
Phosphino Carboxylic acid polymer	71050-62-9
Hexamethylene Diamine Tetra	23605-75-5
2-Propenoic acid, polymer with 2 propenamide	9003-06-9
Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5
Diethylene Glycol	111-46-6
Methenamine	100-97-0
Polyethylene polyamine	68603-67-8
Coco amine	61791-14-8
2-Propyn-1-ol compound with methyloxirane	38172-91-7

Received  
Office of Oil & Gas  
JAN 30 2017

# NEAT WELL PAD & WATER CONTAINMENT PAD

## SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

MEADE DISTRICT, TYLER COUNTY, WEST VIRGINIA  
SANCHO CREEK WATERSHED

**LOCATION COORDINATES:**  
ACCESS ROAD ENTRANCE:  
LATITUDE: 39.421402 LONGITUDE: -80.940141 (NAD 83)  
N 4363660.85 E 505152.18 (UTM ZONE 17 METERS)  
CENTER OF TANK:  
LATITUDE: 39.422111 LONGITUDE: -80.934548 (NAD 83)  
N 4363622.40 E 505607.96 (UTM ZONE 17 METERS)  
CENTROID OF PAD:  
LATITUDE: 39.421551 LONGITUDE: -80.937467 (NAD 83)  
N 4363560.06 E 505322.58 (UTM ZONE 17 METERS)



**GENERAL DESCRIPTION:**

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

**FLOODPLAIN NOTES:**

THE PROPOSED SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54095C0100C.

**MISS UTILITY STATEMENT:**

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. TICKET #1536405261. 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 VM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

**ENVIRONMENTAL NOTES:**

STREAM AND WETLAND DELINEATIONS WERE PERFORMED IN JANUARY, 2016 BY ALLSTAR ECOLOGY TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY JURISDICTION OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE JANUARY 6, 2016 STREAM AND WETLAND DELINEATION INDEX MAP WAS PREPARED BY ALLSTAR ECOLOGY AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS STRONGLY RECOMMENDED THAT THE APPOINTED AGENCIES BE CONSULTED IN AN EFFORT TO OBTAIN WRITTEN CONFIRMATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

**GEOTECHNICAL NOTES:**

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. ON JANUARY 21 - FEBRUARY 1, 2016. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED MARCH 8, 2016, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

**PROJECT CONTACTS:**

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

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

DAVID PATSY - LAND AGENT  
(304) 478-6090

ELI WAGONER - ENVIRONMENTAL ENGINEER  
OFFICE: (304) 842-4068 CELL: (304) 478-9770

**ENGINEER/SURVEYOR:**  
NAVITUS ENGINEERING, INC.  
CIRIUS S. KUMP, PE - PROJECT MANAGER/ENGINEER  
OFFICE: (888) 562-4185 CELL: (304) 686-5747

JOHN McEVERS - OPERATIONS SUPERINTENDENT  
OFFICE: (303) 257-6799 CELL: (303) 808-2423

**ENVIRONMENTAL:**  
ALLSTAR ECOLOGY, LLC  
RYAN L. WARD - ENVIRONMENTAL SCIENTIST  
(866) 312-2659 CELL: (304) 692-7477

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

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

**RESTRICTIONS NOTES:**

- THERE ARE NO PERENNIAL STREAMS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE ARE WETLAND IMPACTS THAT WILL NEED TO BE PERMITTED BY THE APPROPRIATE AGENCIES.
- THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
- THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
- THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELLS BEING DRILLED.
- THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.
- THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

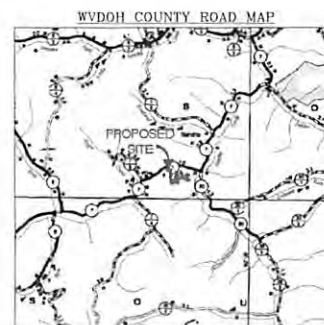
**REPRODUCTION NOTE**

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.



WEST VIRGINIA STATE PLANE COORDINATE SYSTEM  
NORTH ZONE, NAD83  
ELEVATION BASED ON NAVD83  
PROJECTIONS: UTM, STATE GPS & GPX  
POST-PROCESSING



**SHEET INDEX**

- COVER SHEET
- CONSTRUCTION AND EAS CONTROL NOTES
- LEGEND
- MATERIAL QUANTITIES
- STORM DRAINAGE COMPUTATIONS
- EXISTING CONDITIONS
- OVERALL PLAN SHEET INDEX & VOLUMES
- ACCESS ROAD PLAN
- WELL PAD PLAN
- ACCESS ROAD & WATER CONTAINMENT PAD PLAN
- WELL PAD GRADING PLAN
- WATER CONTAINMENT PAD GRADING PLAN
- ACCESS ROAD PROFILES
- ACCESS ROAD SECTIONS
- WELL PAD & WATER CONTAINMENT PAD SECTIONS
- WELL PAD SECTIONS
- WELL PAD STOCKPILE SECTIONS
- CONSTRUCTION DETAILS
- ACCESS ROAD RECLAMATION PLAN
- WELL PAD RECLAMATION PLAN
- ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
- CE500-CE507 - GEOTECHNICAL DETAILS

NEAT LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (1,321)	5.30
Access Road "B" (360)	1.22
Staging Area	0.87
Well Pad	8.93
Water Containment Pad	5.21
Pipeline Bench	0.54
Excess/Topsoil Material Stockpiles	8.38
<b>Total Affected Area</b>	<b>36.45</b>
Total Wooded Acres Disturbed	29.90
<b>Impacts to Roper R. Weese TM 1-B</b>	
Access Road "A" (504)	2.75
Staging Area	0.87
Excess/Topsoil Material Stockpiles	0.11
<b>Total Affected Area</b>	<b>3.73</b>
Total Wooded Acres Disturbed	3.25
<b>Impacts to Roper R. Weese TM 8-B</b>	
Access Road "A" (727)	2.55
Access Road "B" (360)	1.22
Well Pad	8.93
Water Containment Pad	5.21
Pipeline Bench	0.54
Excess/Topsoil Material Stockpiles	8.27
<b>Total Affected Area</b>	<b>26.72</b>
Total Wooded Acres Disturbed	26.65

Proposed Well Name	WV North NAD 83	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Jackson	N 2254.17	N 33859.13	N 43704.92	LAT 39-25-17.2413
Unit 1H	E 150128.78	E 156235.73	E 50287.36	LONG -80-56-15.6177
Jackson	N 23843.05	N 33867.32	N 436552.07	LAT 39-25-17.3031
Unit 2H	E 150128.48	E 156235.73	E 50287.36	LONG -80-56-15.6177
Jackson	N 23843.26	N 33868.52	N 436544.93	LAT 39-25-17.4090
Unit 3H	E 150236.22	E 156229.16	E 50237.76	LONG -80-56-15.3750
Jim	N 23859.45	N 33853.71	N 436357.12	LAT 39-25-17.4892
Unit 1H	E 150128.98	E 156235.89	E 50237.47	LONG -80-56-15.3038
Jim	N 23867.85	N 33851.91	N 436459.85	LAT 39-25-17.6688
Unit 2H	E 150236.05	E 156240.63	E 50237.17	LONG -80-56-15.2322
Jim	N 23875.84	N 33861.10	N 436362.18	LAT 39-25-17.6907
Unit 3H	E 150128.42	E 156244.98	E 50237.88	LONG -80-56-15.1858
Jack	N 23894.03	N 33858.30	N 436354.70	LAT 39-25-17.7326
Unit 1H	E 150231.15	E 156240.09	E 50237.58	LONG -80-56-15.0815
Jack	N 23892.23	N 33859.49	N 436357.23	LAT 39-25-17.8145
Unit 2H	E 150128.89	E 156242.82	E 50237.29	LONG -80-56-15.0183
Jack	N 23920.42	N 33854.08	N 436359.73	LAT 39-25-17.8964
Unit 3H	E 150232.61	E 156243.56	E 50280.86	LONG -80-56-14.9488
Crown	N 23926.82	N 33862.68	N 436372.28	LAT 39-25-17.9792
Unit 1H	E 150128.34	E 156243.29	E 50237.69	LONG -80-56-14.8755
Crown	N 23924.91	N 33861.08	N 436374.80	LAT 39-25-18.0001
Unit 2H	E 150238.04	E 156244.02	E 50234.40	LONG -80-56-14.8041
Crown	N 23929.01	N 33865.27	N 436387.33	LAT 39-25-18.1420
Unit 3H	E 150128.81	E 156244.79	E 50236.10	LONG -80-56-14.7327
Well Pad Elevation	1,025.0			

NEAT WETLAND IMPACT (SQUARE FEET)			
Wetland and Impact Cause	FBI (SF)	Total Impact (SF)	Total Impact (AC)
Wetland 2	1,800	1,800	0.04
Wetland 3	1,243	1,243	0.03

NEAT EPHEMERAL STREAM IMPACT (LINEAR FEET)					
Stream and Impact Cause	Permanent Impacts		Temp. Impacts		Total Disturbance (LF)
	Culvert/Fill (LF)	Inlets/Outlets Structures (LF)	Cofferdam/E&S Controls (LF)	Temp. Disturb. Distance to L.O.D. (LF)	
Stream 4 (Well Pad)	0	0	0	24	24
Stream 10 (Water Containment Pad)	0	0	0	8	8
Stream 11 (Water Containment Pad)	0	0	0	24	24
Stream 16 (Access Road "A")	69	0	9	45	123
Stream 17 (Well Pad)	0	0	0	18	18
Stream 21 (Access Road "A")	0	0	0	25	25

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!!**

**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 CSR 35-B.

**NAVITUS**  
ENERGY ENGINEERING

DATE	REVISION	BY	REASON
12/06/2016	REVISED DRAINAGE	ANTERO	REVISED DRAINAGE
01/25/2017	REVISED DRAINAGE	ANTERO	REVISED DRAINAGE
03/16/2017	REVISED PER WVDEP COMMENTS	ANTERO	REVISED PER WVDEP COMMENTS



THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

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



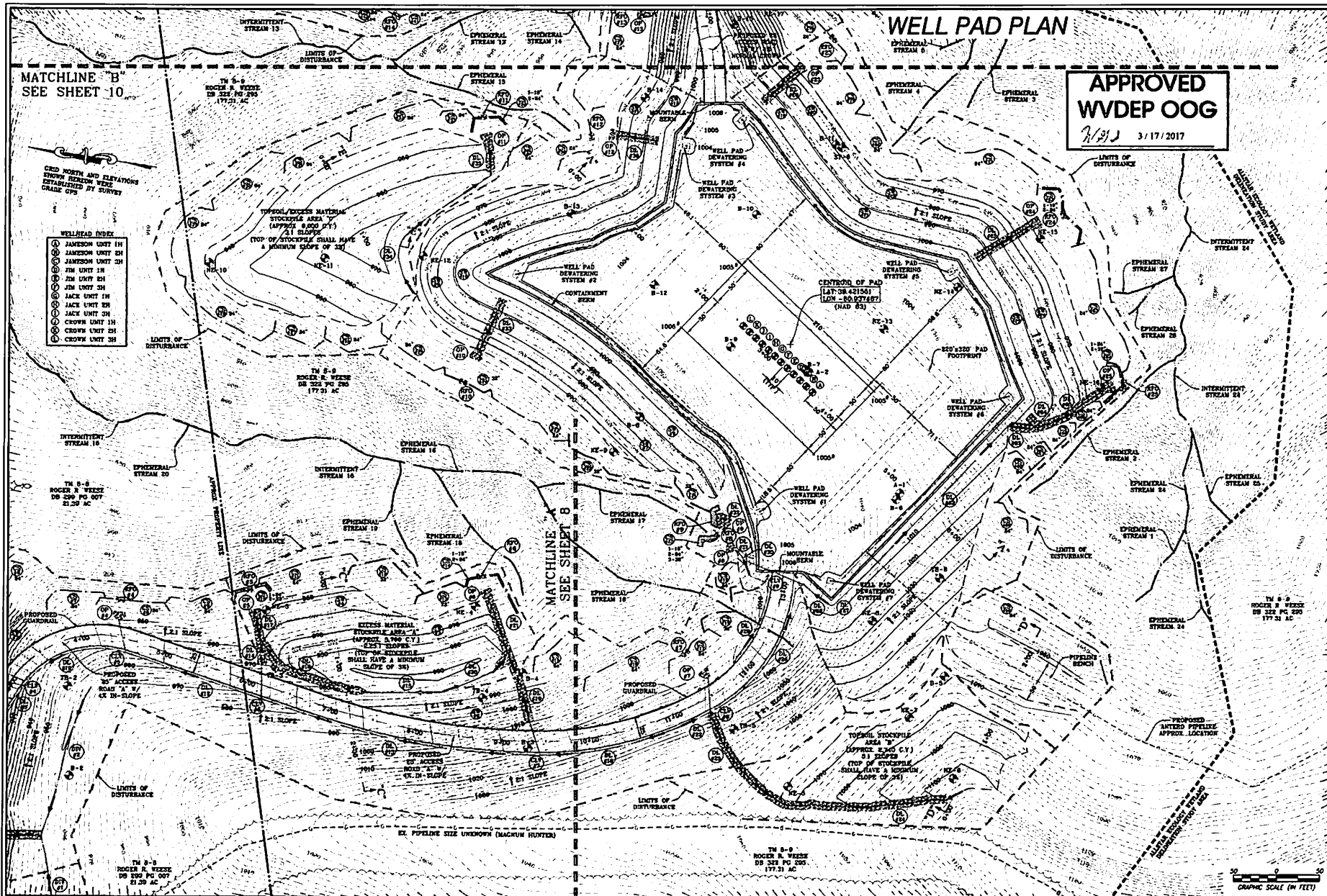
02/16/2017

DATE: 03/31/2016

SCALE: AS SHOWN

SHEET 1 OF 29





MATCHLINE "B"  
SEE SHEET 10

**APPROVED  
WVDEP OOG**  
3/17/2017

- WELLHEAD INDEX**
- ① JAMESON UNIT 1H
  - ② JAMESON UNIT 2H
  - ③ JIM UNIT 1H
  - ④ JIM UNIT 2H
  - ⑤ JIM UNIT 3H
  - ⑥ JACK UNIT 1H
  - ⑦ JACK UNIT 2H
  - ⑧ JACK UNIT 3H
  - ⑨ CROWN UNIT 1H
  - ⑩ CROWN UNIT 2H
  - ⑪ CROWN UNIT 3H

**NAVITUS**  
ENERGY ENGINEERING

DATE	REVISION
12/09/2016	REVISED STOCKPILE PER PIPELINE
07/23/2017	REVISED DEWATERING SYSTEM DETAIL
07/23/2017	REVISED DEWATERING SYSTEM #3
03/16/2017	REVISED PER WVDEP COMMENTS



THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

**WELL PAD PLAN**

**NEAT**

**WELL PAD & WATER CONTAINMENT PAD**

MEADE DISTRICT  
TYLER COUNTY, WEST VIRGINIA



DATE: 03/31/2018  
SCALE: 1" = 50'  
SHEET 8 OF 29

# NEAT WELL PAD & WATER SITE DESIGN & CONSTRUCTION EROSION & SEDIMENT CONTROL

MEADE DISTRICT, TYLER COUNTY  
SANCHO CREEK WATER

## LOCATION COORDINATES:

ACCESS ROAD ENTRANCE  
LATITUDE: 39.424262 LONGITUDE: -80.940141 (NAD 83)  
N 4363860.85 E 505152.18 (UTM ZONE 17 METERS)

CENTER OF TANK  
LATITUDE: 39.422111 LONGITUDE: -80.934848 (NAD 83)  
N 4363622.40 E 505607.96 (UTM ZONE 17 METERS)

CENTROID OF PAD  
LATITUDE: 39.421551 LONGITUDE: -80.937467 (NAD 83)  
N 4363560.06 E 505382.58 (UTM ZONE 17 METERS)

## GENERAL DESCRIPTION:

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

## FLOODPLAIN NOTES:

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

## MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1536405301. 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:

STREAM AND WETLAND DELINEATIONS WERE PERFORMED IN JANUARY, 2016 BY ALLSTAR ECOLOGY 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 JANUARY 6, 2016 STREAM AND WETLAND DELINEATION INDEX MAP WAS PREPARED BY ALLSTAR ECOLOGY AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS STRONGLY RECOMMENDED THAT THE FOREMENTIONED AGENCIES BE CONSULTED IN AN EFFORT TO GAIN WRITTEN CONFIRMATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

## GEOTECHNICAL NOTES:

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. ON JANUARY 21 - FEBRUARY 1, 2016. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED MARCH 8, 2016, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

## PROJECT CONTACTS:

### OPERATOR:

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

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

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

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

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

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

DAVID PATSY - LAND AGENT  
(304) 476-6090

### ENGINEER/SURVEYOR:

NAVITUS ENGINEERING, INC.  
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER  
OFFICE: (866) 662-4185 CELL: (540) 686-6747

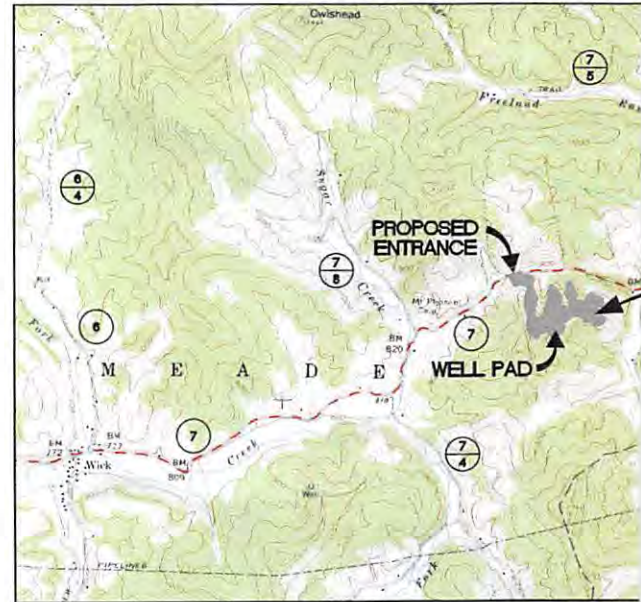
### ENVIRONMENTAL:

ALLSTAR ECOLOGY, LLC  
RYAN L. WARD - ENVIRONMENTAL SCIENTIST  
(866) 213-2666 CELL: (304) 892-7477

### GEOTECHNICAL:

PENNSYLVANIA SOIL & ROCK, INC.  
CHRISTOPHER W. SAMIOS - PROJECT ENGINEER  
(412) 372-4000 CELL: (412) 589-0862

USGS 7.5 MIDDLEBOURNE



## WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

## RESTRICTIONS NOTES:

1. THERE ARE NO PERENNIAL STREAMS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE ARE WETLAND IMPACTS THAT WILL NEED TO BE PERMITTED BY THE APPROPRIATE AGENCIES.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

## 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.

## 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.

04/14/2017



# CONTAINMENT PAD

## CONSTRUCTION PLAN, CONTROL PLANS

WEST VIRGINIA  
SHED

ROAD MAP



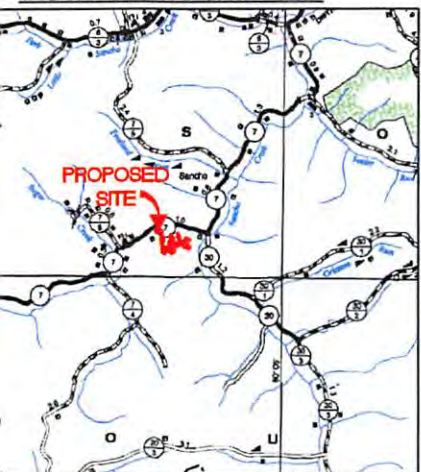
WEST VIRGINIA STATE PLANE COORDINATE SYSTEM  
NORTH ZONE NAD83  
ELEVATION BASED ON NAVD83  
ESTABLISHED BY SURVEY GRADE GPS & OPUS  
POST-PROCESSING

### SHEET INDEX

- 1 - COVER SHEET
- 2 - CONSTRUCTION AND E&S CONTROL NOTES
- 3 - LEGEND
- 4 - MATERIAL QUANTITIES
- 5 - STORM DRAINAGE COMPUTATIONS
- 6 - EXISTING CONDITIONS
- 7 - OVERALL PLAN SHEET INDEX & VOLUMES
- 8 - ACCESS ROAD PLAN
- 9 - WELL PAD PLAN
- 10 - ACCESS ROAD & WATER CONTAINMENT PAD PLAN
- 11 - WELL PAD GRADING PLAN
- 12 - WATER CONTAINMENT PAD GRADING PLAN
- 13 - ACCESS ROAD PROFILES
- 14-15 ACCESS ROAD SECTIONS
- 16 - WELL PAD & WATER CONTAINMENT PAD SECTIONS
- 17 - WELL PAD SECTIONS
- 18 - WELL PAD & STOCKPILE SECTIONS
- 19-26 - CONSTRUCTION DETAILS
- 27 - ACCESS ROAD RECLAMATION PLAN
- 28 - WELL PAD RECLAMATION PLAN
- 29 - ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
- GE500-GE507 - GEOTECHNICAL DETAILS

NEAT LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (1,321')	5.30
Access Road "B" (360')	1.22
Staging Area	0.87
Well Pad	8.93
Water Containment Pad	5.21
Pipeline Bench	0.54
Excess/Topsoil Material Stockpiles	8.38
<b>Total Affected Area</b>	<b>30.45</b>
Total Wooded Acres Disturbed	
29.90	
Impacts to Roger R. Weese TM 8-8	
Access Road "A" (594')	2.75
Staging Area	0.87
Excess/Topsoil Material Stockpiles	0.11
<b>Total Affected Area</b>	<b>3.73</b>
Total Wooded Acres Disturbed	
3.25	
Impacts to Roger R. Weese TM 8-9	
Access Road "A" (727')	2.55
Access Road "B" (360')	1.22
Well Pad	8.93
Water Containment Pad	5.21
Pipeline Bench	0.54
Excess/Topsoil Material Stockpiles	8.27
<b>Total Affected Area</b>	<b>26.72</b>
Total Wooded Acres Disturbed	
26.65	

### WVDOH COUNTY ROAD MAP



Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Jameson Unit 1H	N 338834.87 E 1593826.76	N 338869.13 E 1562335.70	N 4363549.55 E 505367.35	LAT 39-25-17.2412 LONG -80-56-15.5177
Jameson Unit 2H	N 338843.06 E 1593832.49	N 338877.32 E 1562391.43	N 4363552.07 E 505369.06	LAT 39-25-17.3231 LONG -80-56-15.4463
Jameson Unit 3H	N 338851.26 E 1593838.22	N 338885.52 E 1562397.16	N 4363554.60 E 505370.76	LAT 39-25-17.4060 LONG -80-56-15.3750
Jim Unit 1H	N 338859.45 E 1593843.96	N 338893.71 E 1562402.90	N 4363557.12 E 505372.47	LAT 39-25-17.4869 LONG -80-56-15.3036
Jim Unit 2H	N 338867.65 E 1593849.69	N 338901.91 E 1562408.63	N 4363559.65 E 505374.17	LAT 39-25-17.5688 LONG -80-56-15.2322
Jim Unit 3H	N 338875.84 E 1593855.42	N 338910.10 E 1562414.36	N 4363562.18 E 505375.86	LAT 39-25-17.6507 LONG -80-56-15.1609
Jack Unit 1H	N 338884.03 E 1593861.15	N 338918.30 E 1562420.09	N 4363564.70 E 505377.58	LAT 39-25-17.7326 LONG -80-56-15.0895
Jack Unit 2H	N 338892.23 E 1593866.88	N 338926.49 E 1562425.82	N 4363567.23 E 505379.25	LAT 39-25-17.8145 LONG -80-56-15.0182
Jack Unit 3H	N 338900.42 E 1593872.61	N 338934.69 E 1562431.55	N 4363569.75 E 505380.96	LAT 39-25-17.8964 LONG -80-56-14.9468
Crown Unit 1H	N 338908.62 E 1593878.34	N 338942.88 E 1562437.23	N 4363572.28 E 505382.66	LAT 39-25-17.9782 LONG -80-56-14.8755
Crown Unit 2H	N 338916.81 E 1593884.08	N 338951.08 E 1562443.02	N 4363574.80 E 505384.40	LAT 39-25-18.0601 LONG -80-56-14.8041
Crown Unit 3H	N 338925.01 E 1593889.81	N 338959.27 E 1562448.75	N 4363577.33 E 505386.10	LAT 39-25-18.1420 LONG -80-56-14.7327
Well Pad Elevation	1,005.0			

NEAT WETLAND IMPACT (SQUARE FEET)			
Wetland and Impact Cause	Fill (SF)	Total Impact (SF)	Total Impact (AC)
Wetland 2	1,600	1,600	0.04
Wetland 3	1,243	1,243	0.03

NEAT EPHEMERAL STREAM IMPACT (LINEAR FEET)					
Stream and Impact Cause	Permanent Impacts		Temp. Impacts	Temp. Disturb.	Total Disturbance (LF)
	Culvert / Fill (LF)	Inlets/Outlets Structures (LF)	Cofferdam/ E&S Controls (LF)	Distance to L.O.D. (LF)	
Stream 4 (Well Pad)	0	0	0	24	24
Stream 10 (Water Containment Pad)	0	0	0	8	8
Stream 11 (Water Containment Pad)	0	0	0	24	24
Stream 16 (Access Road "A")	69	0	9	45	123
Stream 17 (Well Pad)	0	0	0	18	18
Stream 2' (Access Road "A")	0	0	0	25	25

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!!**

**NAVITUS**  
ENERGY ENGINEERING

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

DATE	REVISION	REVISION	REVISION	REVISION
12/06/2016	REVISED STOCKPILES PER PIPELINE			
01/12/2017	REVISED DEWATERING SYSTEM DETAIL			
01/25/2017	REVISED DEWATERING SYSTEM #3			

**Antero**  
THIS DOCUMENT  
WAS PREPARED FOR:  
ANTERO RESOURCES  
CORPORATION

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

Received  
Office of Oil & Gas  
MAR 10 2017

PROFESSIONAL ENGINEER  
REGISTERED  
1978  
STATE OF  
WEST VIRGINIA  
01/25/2017

DATE: 03/31/2016  
SCALE: AS SHOWN  
SHEET 1 OF 29

04/14/2017



# OVERALL PLAN SHEET IN

GRID NORTH AND ELEVATIONS  
SHOWN HEREON WERE  
ESTABLISHED BY SURVEY  
GRADE GPS

TM 8-9A  
ESTELLA GOODFELLOW, ET AL.  
KENNETH & JENNIFER L. MASON  
CLARENCE W. MUTSCHELKNAUS, SR &  
CLARENCE W. MUTSCHELKNAUS, JR.

TM 8-9  
ROGER R. WEESE  
(26.72 DISTURBED ACRES)

TM 6-1  
D. RALPH THACKER & J.  
MAURICE CARISLE, JR.

TM 8-  
ROGER R. W  
(26.72 DISTURB

TM 8-7  
ROGER R. WEESE

TM 8-8  
ROGER R. WEESE  
(3.73 DISTURBED  
ACRES)

TM 8-9  
ROGER R. WEESE  
(26.72 DISTURBED ACRES)

TM 8-6  
ROBERT A. DAVIS

TM 8-5  
ROGER R. WEESE

TM 8-11  
ROGER R.  
WEESE

TM 8-10  
ROGER R. WEESE

TM 8  
DAVID  
MATTHE  
CAR

SHEET 8

SHEET 10

SHEET 9

SHEET 10

SHEET 9

SHEET 8



04/14/2017





# INDEX & VOLUMES



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

NEAT WELL PAD & WATER CONTAINMENT PAD						
Description	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope (%)	Length of Slope (FT)
Access Road "A"	10,877.4	7,264.5	3,512.9	0.0	15.0	367.0
Access Road "B"	225.6	10,129.4	0.0	9,903.8	15.0	240.0
Staging Area	2,367.7	492.2	1,575.5	0.0	n/a	n/a
Well Pad	97,000.9	50,328.2	46,672.7	0.0	n/a	n/a
Water Containment Pad	3,161.2	30,268.6	0.0	36,107.4	n/a	n/a
Pipeline Bench	557.6	261.1	296.5	0.0	n/a	n/a
Stripped Topsoil (12")	23,149.6	0.0	23,149.6	0.0	n/a	n/a
Material Stockpiles	0.0	45,160.0	0.0	45,160.0	n/a	n/a
<b>Totals</b>	<b>137,340.0</b>	<b>152,904.0</b>	<b>75,607.2</b>	<b>91,171.2</b>	<b>n/a</b>	<b>n/a</b>
		<b>Total Spoil (CY) =</b>	<b>-15,564.0</b>			

MATERIAL STOCKPILES		
Name	Excess	Topsoil
3" Topsoil Respread	N/A	3,160
A	5,700	0
B	0	2,740
C	700	8,300
D	12,390	0
E	0	7,070
F	0	5,100
<b>TOTAL</b>	<b>18,790</b>	<b>26,370</b>

### ADDITIONAL NOTES:

- BORINGS B-1 TO B-30 WERE COMPLETED DURING A PREVIOUS SUBSURFACE INVESTIGATION OF THE PROPOSED SITE BY KLEINFELDER.
- BORINGS ST-1 TO ST-6, TB-1 TO TB-6, AND A-1 TO A-2 WERE COMPLETED DURING A PREVIOUS SUBSURFACE INVESTIGATION OF THE PROPOSED SITE BY LARSON DESIGN GROUP.
- BORINGS NE-1 TO NE-26 ARE SHOWN IN THEIR PROPOSED LOCATIONS AND HAVE BEEN DRILLED BY PENNSYLVANIA SOIL & ROCK, INC.

*DMH*  
*3-2-17*

### NOTES:

- 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.
- THE TOE BENCH DEPTHS AND QUANTITIES PROVIDED IN THE TABLE ARE AN ESTIMATE, CALCULATED FROM THE RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. SEE PAGES GE500-GE507 & GEOTECHNICAL INVESTIGATION REPORT PROVIDED BY PENNSYLVANIA SOIL & ROCK, INC. FOR TOE BENCH DETAILS, VOLUMES, AND SPECIFICATIONS.

DATE	REVISION
12/06/2016	REVISED STOCKPILES PER PIPELINE
01/12/2017	REVISED DEWATERING SYSTEM DETAIL
01/25/2017	REVISED DEWATERING SYSTEM #3



OVERALL PLAN SHEET INDEX & VOLUMES

**NEAT**

WELL PAD & WATER CONTAINMENT PAD

MEADE DISTRICT

TYLER COUNTY, WEST VIRGINIA

NEAT TOE BENCH QUANTITIES														
Description	Keyway #1A	Keyway #1B	Keyway #1C	Keyway #1D	Keyway #1E	Keyway #1F	Keyway #1G	Keyway #1H	Keyway #1J	Keyway #1K	Keyway #2A	Keyway #2B	Keyway #2C	Total
Drainage Method	D2	D2	D2	D2	D2	D2	D2	D1	D2	D2	D1	D1	D1	N/A
<b>Toe Bench</b>														
Approximate Depth (LF)	3	6	8	6	6	6	4	3	4	7	6	6	6	N/A
Approximate Width (15' min.) (LF)	15	15	15	15	15	15	15	15	15	15	15	15	15	N/A
Length (LF)	200	310	700	360	640	700	640	570	450	510	1,020	900	790	7,790
Perimeter Drain (LF)	200	310	700	360	640	700	640	570	450	510	1,020	900	790	7,790
AASHTO #57 Gravel (TONS)	30	47	106	55	97	106	97	638	68	77	1,503	1,326	1,164	5,314
6 oz. Non-woven Geotextile (SF)	1,288	1,996	4,508	2,318	4,122	4,508	4,122	13,197	2,898	3,284	30,107	26,565	23,318	122,231
Overexcavation (CY)	840	3,030	12,050	4,650	4,450	3,750	4,250	3,380	2,390	5,380	9,300	6,580	6,250	66,300
<b>Toe Bench Outlet Drain</b>														
Average Length of Outlet Drain Pipe (LF)	40	50	55	40	45	35	40	50	40	75	50	50	50	N/A
Outlet Drain Pipe (LF)	80	200	385	160	315	245	280	300	200	450	550	450	400	4,015
6 oz. Non-woven Geotextile (SF)	560	1,400	2,695	1,120	2,205	1,715	1,960	2,100	1,400	3,150	3,850	3,150	2,800	28,105
AASHTO #57 Gravel (TONS)	9	22	43	18	35	27	31	33	22	50	61	50	44	446
<b>Bonding Bench</b>														
Approximate Depth (LF)	0	0	0	0	0	0	0	0	0	0	0	0	0	N/A
Approximate Width (LF)	0	0	0	0	0	0	0	10	0	0	10	10	10	N/A
Number of Benches (EA)	0	0	0	0	0	0	0	1	0	0	2	2	1	N/A
Length (LF)	0	0	0	0	0	0	0	450	0	0	800	650	500	2,400
Perimeter Drain (LF)	0	0	0	0	0	0	0	450	0	0	1,600	1,300	500	3,850
AASHTO #57 Gravel (TONS)	0	0	0	0	0	0	0	166	0	0	974	791	379	2,309
6 oz. Non-woven Geotextile (SF)	0	0	0	0	0	0	0	4,329	0	0	22,328	18,142	8,320	53,119
Overexcavation (CY)	0	0	0	0	0	0	0	990	0	0	4,027	3,272	1,583	9,872
<b>Bonding Bench Outlet Drain</b>														
Average Length of Outlet Drain Pipe (LF)	0	0	0	0	0	0	0	50	0	0	55	55	50	N/A
Outlet Drain Pipe (LF)	0	0	0	0	0	0	0	250	0	0	880	715	250	2,095
6 oz. Non-woven Geotextile (SF)	0	0	0	0	0	0	0	1,750	0	0	6,160	5,005	1,750	14,665
AASHTO #57 Gravel (TONS)	0	0	0	0	0	0	0	28	0	0	98	79	28	233
<b>Additional Excavation</b>														
Colluvium Material Rework (CY)	0	0	0	0	0	0	0	0	0	0	7,100	4,800	5,100	17,000



DATE: 03/31/2016

SCALE: 1" = 150'

SHEET 7 OF 29

04/14/2017