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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

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

Friday, February 09, 2018  
WELL WORK PERMIT  
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for ORVIS UNIT 1H  
47-095-02481-00-00

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: ORVIS UNIT 1H  
Farm Name: JAMES SINE ET AL  
U.S. WELL NUMBER: 47-095-02481-00-00  
Horizontal 6A / New Drill  
Date Issued: 2/9/2018

Promoting a healthy environment.

# PERMIT CONDITIONS

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

## CONDITIONS

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

API Number:

4709502481

## 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).

10/31

47 09 50 24 8 1

WW-6B  
(04/15)

API NO. 47-095  
OPERATOR WELL NO. Orvis Unit 1H  
Well Pad Name: Sine 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: Orvis Unit 1H Well Pad Name: Sine Pad  
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Office of Oil and Gas

3) Farm Name/Surface Owner: James Sine et al Public Road Access: CR 7 (Middlebourne-Wick)  
DEC 1 2017

4) Elevation, current ground: ~791' Elevation, proposed post-construction: 799'  
WV Department of Environmental Protection

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

(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No No

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

*DMH*  
*11-27-17*  
*[Signature]*  
*11/27/2017*

8) Proposed Total Vertical Depth: 6700' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 14900' MD

11) Proposed Horizontal Leg Length: 7698'

12) Approximate Fresh Water Strata Depths: 42'

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

14) Approximate Saltwater Depths: 1269', 1274'

15) Approximate Coal Seam Depths: 154', 278'

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: \_\_\_\_\_



WW-6B  
(04/15)

API NO. 47-095 - \_\_\_\_\_  
 OPERATOR WELL NO. Orvis Unit 1H  
 Well Pad Name: Sine 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#	95' *see #19	95' *see #19	CTS, 91 Cu. Ft.
Fresh Water							
Coal	13-3/8"	New	J-55	54.5#	308'	308'	CTS, 428 Cu. Ft.
Intermediate	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Production	5-1/2"	New	P-110	23#	14900'	14900'	CTS, 3690 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

*DmH  
11/27/17*

*JPB  
11/27/2017*

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water							
Coal	13-3/8"	17-1/2"	0.38"	2730	1000	Class A	~1.18
Intermediate	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	~1.18
Production	5-1/2"	8-3/4" & 8-1/2"	0.415"	12,630	2500	Level-H/POZ & Tel-H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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WW-6B  
(10/14)

API NO. 47-095 - \_\_\_\_\_  
OPERATOR WELL NO. Orvis Unit 1H  
Well Pad Name: Sine 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

*DMH*  
*11/27-17*

*Feb*  
*11/27/2017*

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 14.88 acres

22) Area to be disturbed for well pad only, less access road (acres): 5.55 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

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25) Proposed borehole conditioning procedures:

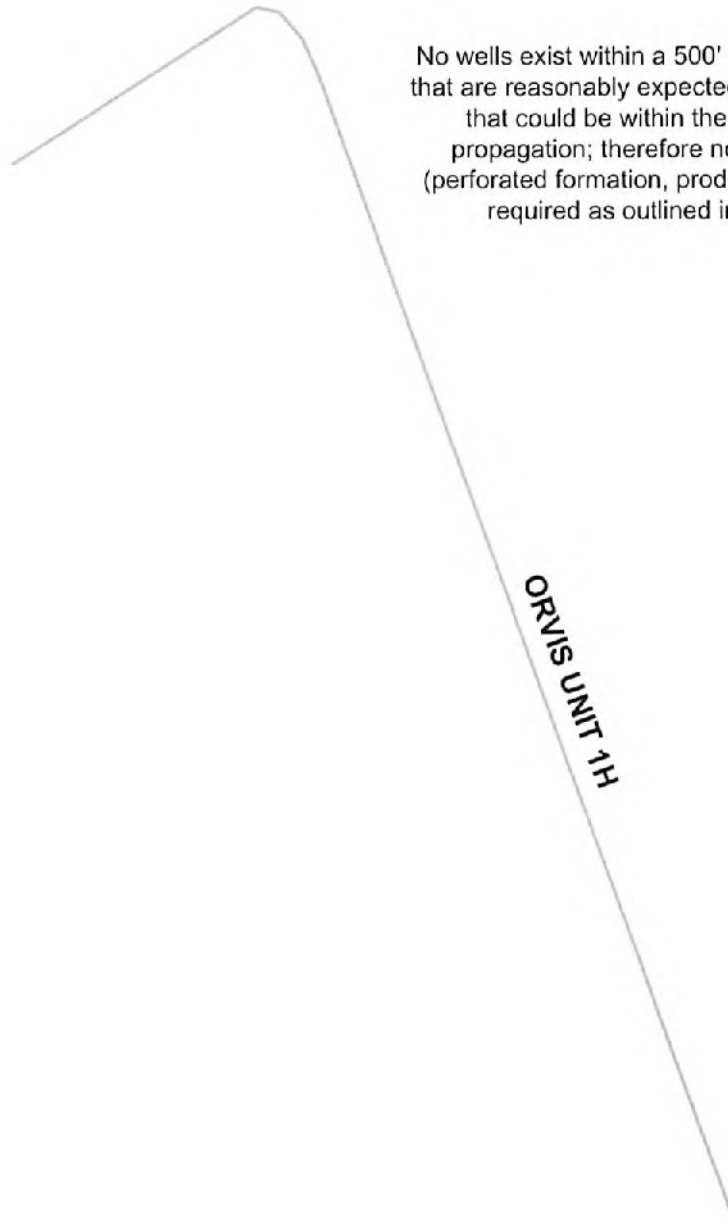
Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

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.



No wells exist within a 500' radius of the wellbore that are reasonably expected to penetrate a depth that could be within the range of fracture propagation; therefore no additional details (perforated formation, producing zones etc.) are required as outlined in 35CSR8-5.11



Orvis Unit 1H - AOR



**WELL SYMBOLS**  
 \* Gas Well  
 ○ Location Only

**REMARKS**  
 No wells of interest within area of Review

October 25, 2017

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WW-9  
(4/16)

API Number 47 - 095 - \_\_\_\_\_  
Operator's Well No. Orvis Unit 1H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

Watershed (HUC 10) 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 landed 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)

*DMH  
11/27/2017*

Will closed loop system be used? If so, describe: Yes, fluids stored in tanks, cuttings removed offsite and taken to landfill.

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc.

Surface - Air/Freshwater, Intermediate -  
Dust/Surf Foam, Production - Water Based Mud

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

Additives to be used in drilling medium? Please See Attachment

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Drill cuttings 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 Gretchen Kohler

Company Official (Typed Name) Gretchen Kohler

Company Official Title Regulatory & Environmental Manager

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Subscribed and sworn before me this 27 day of October, 2017

Spahnson

Notary Public

My commission expires 7/8/2020





Form WW-9

Operator's Well No. Orvis Unit 1H

**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 14.88 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" (0.43 acres) + Access Road "B" (2.32 acres) + Access Road "C" (0.17 acres) + Well Pad (5.55 acres) + Water Containment Pad (1.4 acres) + Borrow Area (4.76 acres) + Excess/Topsoil Material Stockpiles (0.25 acres) = 14.88 Total Affected Acres

**Seed Mixtures**

**Temporary**

**Permanent**

Seed Type	lbs/acre
Annual Ryegrass	40
Field Bromegrass	40

Seed Type	lbs/acre
Crownvetch	10-15
Tall Fescue	30

See attached Table 3 for additional seed type (Page 22 Site Pad Design)

See attached Table 4A for additional seed type (Page 22 Site Pad Design)

\*or type of grass seed requested by surface owner

\*or type of grass seed requested by surface owner

*QEB*  
*11/27/2017*

**Attach:**

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [Signature]

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

Title: Oil + Gas Inspector

Date: 11-27-17

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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**911 Address**  
**8086 Wick Rd**  
**Middlebourne, WV 26149**

## Well Site Safety Plan

### Antero Resources

**Well Name:** Alpine Unit 1H – 4H, Garmin Unit 1H – 2H,  
 Remington Unit 1H – 2H, Winchester Unit 1H –  
 2H, Orvis Unit 1H – 2H

**Pad Location:** Sine Pad  
 Tyler County/Meade District

*geb 11/27/2017*

**GPS Coordinates:**

**Entrance** - Lat 39°24'56.6634"/Long -80°57'28.5696" (NAD83)

**Pad Center** - Lat 39°24'54.4032"/Long -80°57'24.4866" (NAD83)

*DMH  
1/27-17*

### Driving Directions:

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 0.8 miles. 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 1.8 miles. The access road will be on the left.

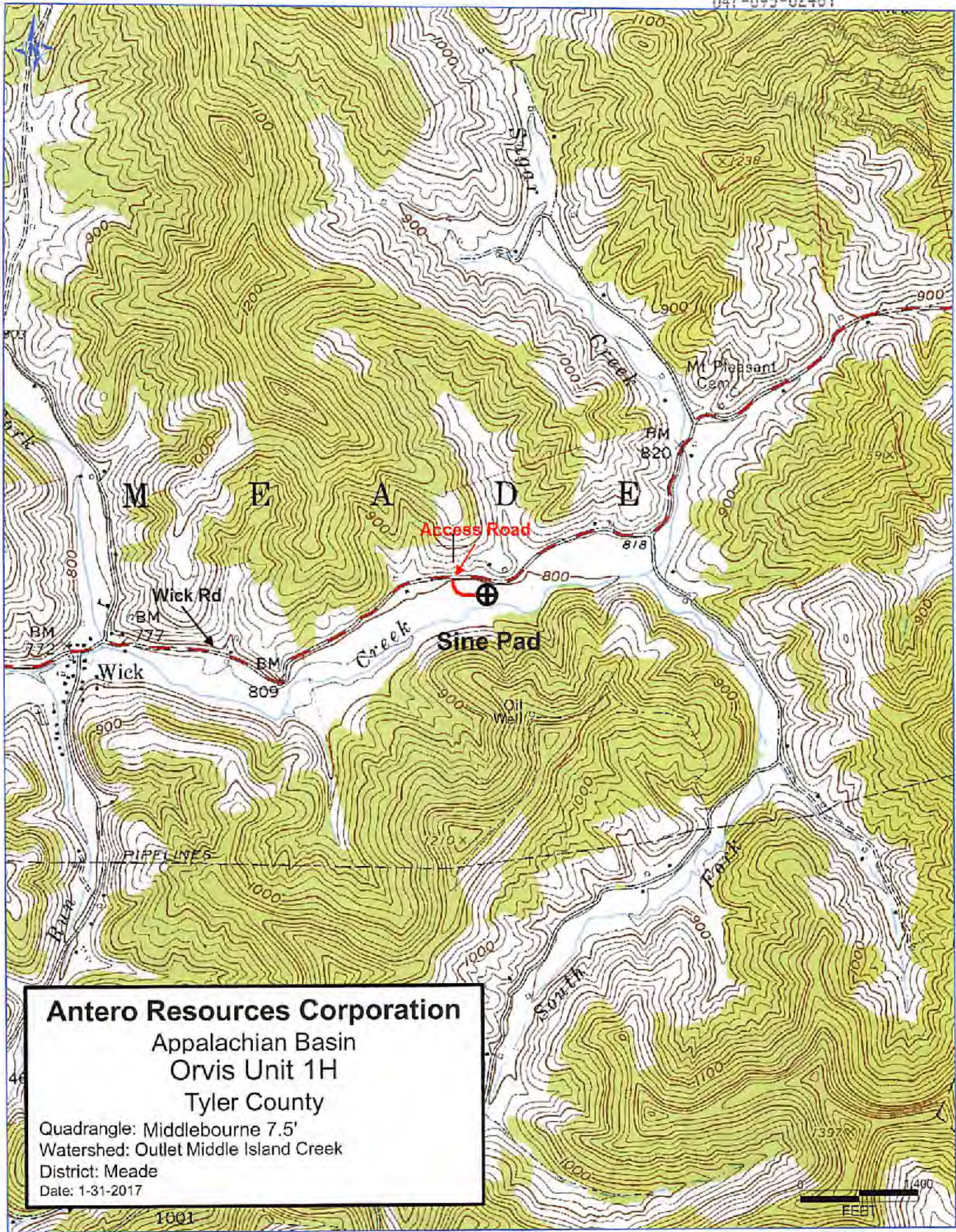
### Alternate Route:

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 5.8 miles. The access road will be on the left.

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

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**Antero Resources Corporation**  
 Appalachian Basin  
 Orvis Unit 1H  
 Tyler County

Quadrangle: Middlebourne 7.5'  
 Watershed: Outlet Middle Island Creek  
 District: Meade  
 Date: 1-31-2017



LATITUDE 39°25'00"

11,303'

6,720' TO BOTTOM HOLE

LATITUDE 39°25'00"

577' LONGITUDE 80°55'00"

7,265' TO BOTTOM HOLE

Antero Resources Corporation Well No. Orvis Unit 1H

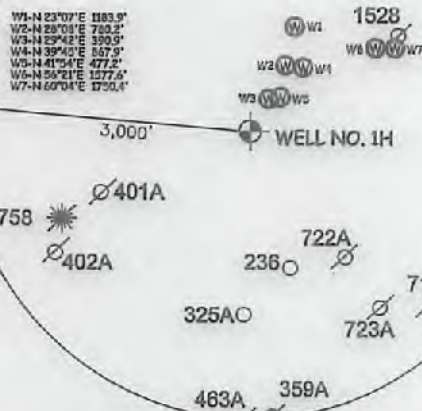
- A - SURFACE - RAYMOND L. MOORE D.B. 265 PG. 310 T.M. 08 PAR. 29.110 AC. ±
- A - LEASE - RAYMOND L. MOORE ET UX
- B - SURFACE - DESTROY S. NELSON ET AL D.B. 347 PG. 643 T.M. 08 PAR. 23.1236 AC. ±
- B - LEASE - DAVID E. BOWYER
- C1, C2, C3 - SURFACE - DONALD R. ROBINSON ET AL D.B. 294 PG. 713 T.M. 08 PAR. 28.0514 AC. ±
- C1 - LEASE - LILLIAN LEE EDDY
- C2 - LEASE - DONALD E. ROBINSON ET UX
- C3 - LEASE - EARL G. GLENDENNING

NOTES:

WELL 1H TOP HOLE INFORMATION:  
N: 336,628ft E: 1,588,463ft  
LAT: 39°24'54.30" LON: 80°57'24.02"  
BOTTOM HOLE INFORMATION:  
N: 329,868ft E: 1,592,939ft  
LAT: 39°23'48.20" LON: 80°56'25.61"  
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 1H TOP HOLE INFORMATION:  
N: 4,362,850m E: 503,744m  
BOTTOM HOLE INFORMATION:  
N: 4,360,813m E: 505,143m

NOTE:  
7 WATER WELLS WERE LOCATED WITHIN 2000' OF CENTER OF PAD

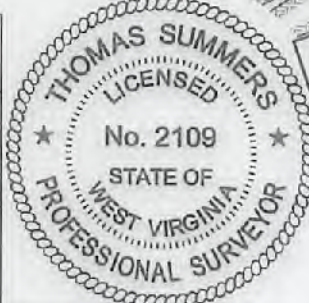


I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



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 # 17-003WA  
DRAWING # ORVIS1H  
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*  
THOMAS SUMMERS P.S. 2109  
DATE 10/12/17  
OPERATOR'S WELL # ORVIS UNIT #1H



WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  47 - 085 - 02481  
(IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
LOCATION: ELEVATION 799' - PROPOSED 791' - ORIGINAL \_\_\_\_\_ WATERSHED \_\_\_\_\_ STATE \_\_\_\_\_ COUNTY \_\_\_\_\_ PERMIT \_\_\_\_\_  
QUADRANGLE MIDDLEBOURNE 7.5' DISTRICT MEADE COUNTY TYLER  
SURFACE OWNER JAMES SINE ET AL ACREAGE 32.395 ACRES +/-  
OIL & GAS ROYALTY OWNER JAMES L. SINE ET UX; ROBERT S. CARSE ET UX; JASON GREATHOUSE; DAVID E. BOWYER LEASE ACREAGE 54.74 ACRES; 140 ACRES; 9.40 ACRES; 3.20 ACRES;  
DAVID W. JUDGE; DAVID CARSE; THOMAS W. MOORE ET AL; THOMAS W. MOORE ET AL; REITA J. HALL; GRACE SEWELL DeCARLO; TESSA PETERZAK 13.65 ACRES; 16 ACRES; 56.25 ACRES; 175.07 ACRES; 23.31 ACRES; 35.52 ACRES; 3 ACRES;  
PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,700' TVD 14,900' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM  
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD  
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT



WW-6A1

Operator's Well Number Orvis Unit 1H

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

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

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

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>James L. Sine et ux Lease</u></b>			
James L. Sine et ux Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	400/422 Exhibit 1
<b><u>Robert S. Carse et ux Lease</u></b>			
Robert S. Carse et ux Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	428/21 Exhibit 1
<b><u>Jason Greathouse Lease</u></b>			
Jason Greathouse	Antero Resources Corporation	1/8+	538/337
<b><u>David W. Judge Lease</u></b>			
David W. Judge	Antero Resources Corporation	1/8+	580/247
<b><u>Robert S. Carse et ux Lease</u></b>			
Robert S. Carse et ux Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	428/21 Exhibit 1
<b><u>David Carse Lease</u></b>			
David Carse Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	413/710 Exhibit 1
<b><u>Thomas W. Moore et al Lease (TM 8 PCL 22)</u></b>			
Thomas W. Moore et al	Antero Resources Corporation	1/8+	442/588
<b><u>Thomas W. Moore et al Lease (TM 11 PCL 9)</u></b>			
Thomas W. Moore et al	Antero Resources Corporation	1/8+	442/590
<b><u>Reita J. Hall Lease</u></b>			
Reita J. Hall	Antero Resources Corporation	1/8	522/823
<b><u>Grace Sewell DeCarlo Lease</u></b>			
Grace Sewell DeCarlo	Antero Resources Corporation	1/8+	430/470
<b><u>The Joelynn Family Preservation Trust Lease</u></b>			
The Joelynn Family Preservation Trust	Antero Resources Corporation	1/8+	483/286
<b><u>Tessa Peterzak Lease</u></b>			
Tessa Peterzak	Antero Resources Corporation	1/8+	525/399

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

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

WW-6A1  
(5/13)

Operator's Well No. Orvis Unit 1H

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

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

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

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>James McCullough et ux Lease</u>				
	James McCullough et ux	Chesapeake Appalachia, LLC	1/8	376/366
	Chesapeake Appalachia, LLC	SWN Production Company, LLC	Assignment	465/463
	SWN Production Company, LLC	Antero Exchange Properties, LLC	Assignment	544/242
	Antero Exchange Properties, LLC	Antero Resources Corporation	Merger	552/315

\*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**

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WV Department of  
Environmental Protection

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

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

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

Well Operator: Antero Resources Corporation

By: Kevin Kilstrom 

Its: Senior Vice President - Production

**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



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

**APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY**

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

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

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

- 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: 6/26/2008
- 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:** For West Virginia Code §11D-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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WV Department of  
Environmental Protection





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

October 27, 2017

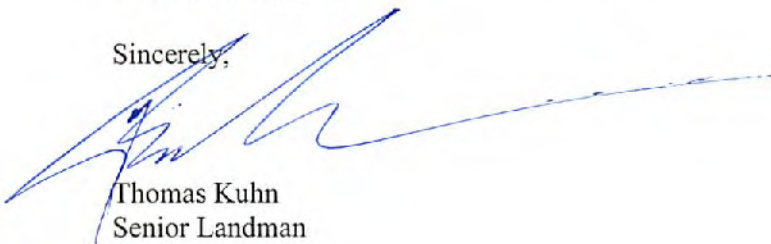
West Virginia Department of Environmental Protection  
Chief, Office of Oil and Gas  
Attn: Mr. James Martin  
601 57<sup>th</sup> Street SE  
Charleston, WV 25304

RE: Orvis Unit 1H  
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 Orvis Unit 1H horizontal shallow well. As an authorized representative, I certify that Antero has the right to extract, produce or market the oil or gas for all leases through which the Orvis Unit 1H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,



Thomas Kuhn  
Senior Landman

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WV Department of  
Environmental Protection

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

**Date of Notice Certification:** 10/26/2017

**API No.** 47- 095 -  
**Operator's Well No.** Orvis Unit 1H  
**Well Pad Name:** Sine Pad

**Notice has been given:**

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

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>503744m</u>
County:	<u>Tyler</u>		Northing:	<u>4362850m</u>
District:	<u>Meade</u>	Public Road Access:	<u>CR 7 (Middlebourne-Wick)</u>	
Quadrangle:	<u>Middlebourne 7.5'</u>	Generally used farm name:	<u>James Sine et al</u>	
Watershed:	<u>Outlet Middle Island Creek</u>			

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

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p align="center"><b>OOG OFFICE USE ONLY</b></p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p align="center"><i>RECEIVED Office of Oil and Gas OCT 31 2017 WV Department of Environmental Protection</i></p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Required Attachments:**

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

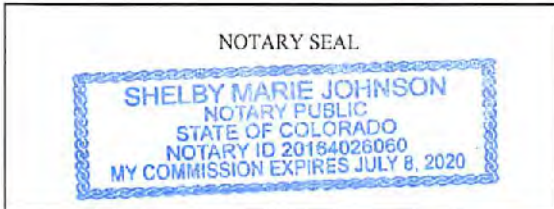


**Certification of Notice is hereby given:**

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

Well Operator: Antero Resources Corporation  
By: Kevin Kilstrom  
Its: Senior Vice President - Production  
Telephone: 303-357-7310

Address: 1615 Wynkoop Street  
Denver, CO 80202  
Facsimile: 303-357-7315  
Email: shjohnson@anteroresources.com



Subscribed and sworn before me this 26 day of October 2017  
S Johnson Notary Public  
My Commission Expires 7/8/2020

**Oil and Gas Privacy Notice:**

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

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OCT 31 2017  
WV Department of  
Environmental Protection



WW-6A  
(9-13)

API NO. 47-095 -  
OPERATOR WELL NO. Orvis Unit 1H  
Well Pad Name: Sine Pad

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

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

**Date of Notice:** 10/27/2017 **Date Permit Application Filed:** 10/27/2017

**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: James L. & Kathy J. Sine  
Address: 7914 Wick Rd.  
Middlebourne, WV 26149

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

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

Name: James L. & Kathy J. Sine  
Address: 7914 Wick Rd.  
Middlebourne, WV 26149

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

SURFACE OWNER(s) (Impoundments or Pits)

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

COAL OWNER OR LESSEE

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

COAL OPERATOR

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

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

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

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

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

\*Please attach additional forms if necessary

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(8-13)

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047-095-02481

OCT 31 2017

API NO. 47-095 -

OPERATOR WELL NO. Orvis Unit 1H

Well Pad Name: Sine Pad

WV Department of  
Environmental Protection

**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

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(8-13)

API NO. 47-095 - 047-095-02481  
OPERATOR WELL NO. Orvis Unit 1H  
Well Pad Name: Sine Pad

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

**Water Well Testing:**

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

**Water Testing Laboratories:**

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

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

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

**Written Comment:**

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

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

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

Oil and Gas  
OCT 31 2017  
Department of



WW-6A  
(8-13)

API NO. 47- 095 - \_\_\_\_\_  
 OPERATOR WELL NO. Orvis Unit 1H  
 Well Pad Name: Sine Pad

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

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

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

**Comment Requirements**

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

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

**Permit Denial or Condition**

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

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

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

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

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WW-6A  
(8-13)

API NO. 47-095 -  
OPERATOR WELL NO. Orvis Unit 1H  
Well Pad Name: Sine Pad

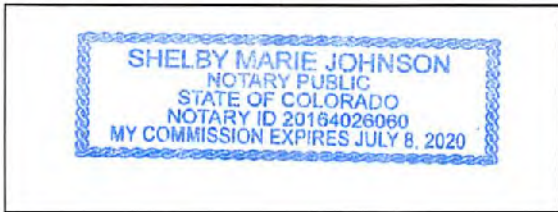
**Notice is hereby given by:**

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

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

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 27 day of October 2017

S. Johnson Notary Public

My Commission Expires 7/8/2020

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**WW-6A Notice of Application Attachment (Sine Pad):****List of Owners with Proposed Disturbance associated with Sine Well Pad:****WATER SOURCE OWNERS –**

**Owner:** Donald Robinson  
**Address:** 3029 Sellers Rd  
Middlebourne, WV 26149

**Owner:** Raymond Moore  
**Address:** RR 1 Box 568  
Middlebourne, WV 26149

**Owner:** James Sine  
**Address:** 7914 Wick Rd  
Middlebourne, WV 26149

**Owner:** Destry Nelson  
**Address:** GENERAL DELIVERY  
Middlebourne, WV 26149

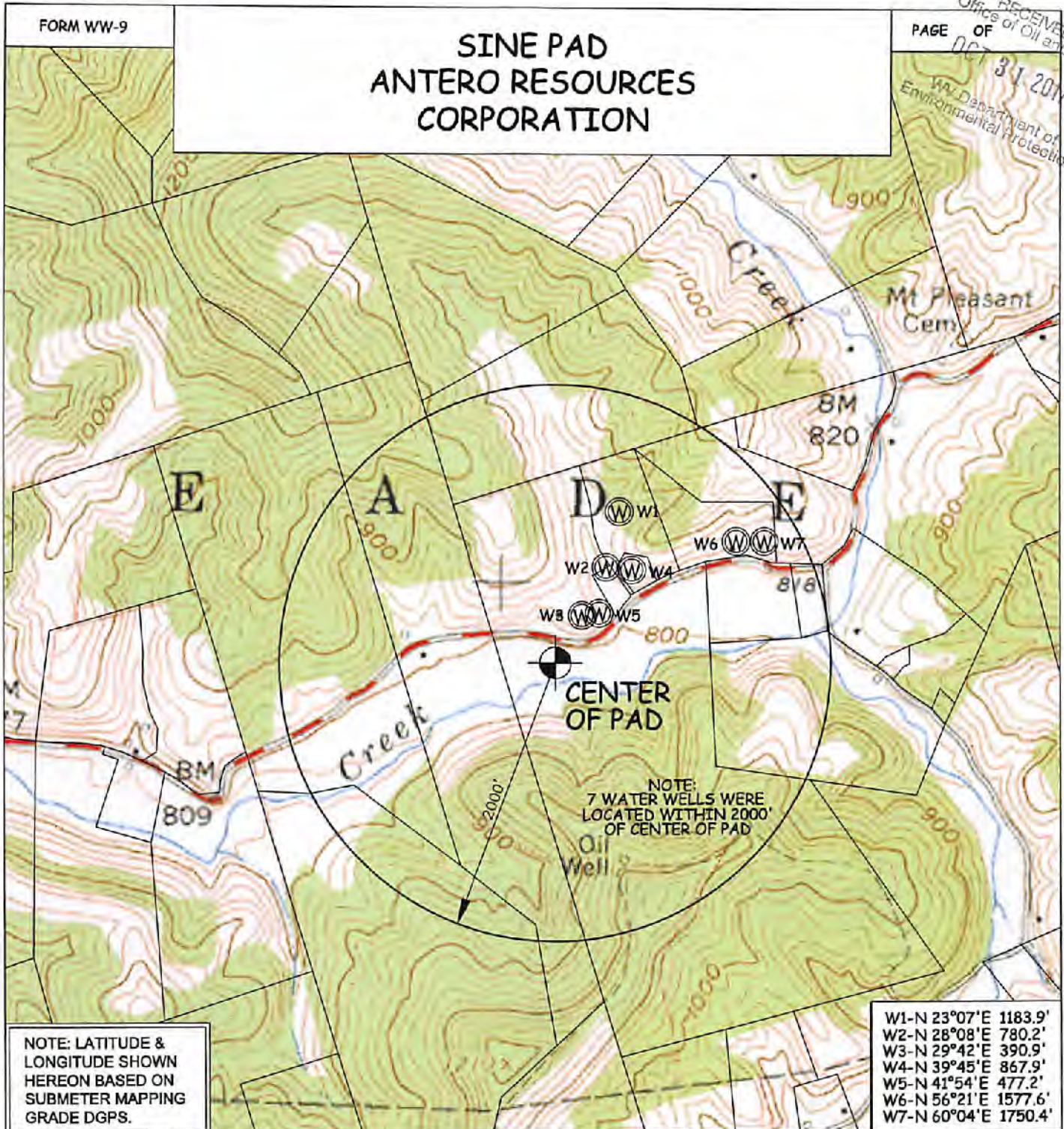
\*Please note there are 2 additional water sources shown on the attached map, however they are located greater than 1500' from the proposed well location



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

W1-N	23°07'E	1183.9'
W2-N	28°08'E	780.2'
W3-N	29°42'E	390.9'
W4-N	39°45'E	867.9'
W5-N	41°54'E	477.2'
W6-N	56°21'E	1577.6'
W7-N	60°04'E	1750.4'

WELL	SURFACE OWNER	ADDRESS	DISTRICT-TAX MAP-PARCEL	WELL LATITUDE	WELL LONGITUDE
W1	DONALD ROBINSON	RR 1 BOX 23, MIDDLEBOURNE, WV 26149	6-08-28	39°25'05.16"	80°57'18.89"
W2	RAYMOND MOORE	RR 1 BOX 568, MIDDLEBOURNE, WV 26149	6-08-29.1	39°25'01.18"	80°57'20.04"
W3	JAMES SINE	RR 1 BOX 567, MIDDLEBOURNE, WV 26149	6-08-29	39°24'57.71"	80°57'22.19"
W4	DESTRY NELSON	GENERAL DELIVERY, MIDDLEBOURNE, WV 26149	6-08-28.1	39°25'01.01"	80°57'17.66"
W5	JAMES SINE	RR 1 BOX 567, MIDDLEBOURNE, WV 26149	6-08-29	39°24'57.88"	80°57'20.60"
W6	DAVID JUDGE	RR 1 BOX 570, MIDDLEBOURNE, WV 26149	6-08-27	39°25'03.17"	80°57'08.04"
W7	DAVID JUDGE	RR 1 BOX 570, MIDDLEBOURNE, WV 26149	6-08-27	39°25'03.20"	80°57'05.44"

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

TOPO SECTION(S) OF ;  
MIDDLEBOURNE 7.5'

JOB #:17-001WA

SCALE : 1-INCH = 1000- FEET

0' 1000' 2000' 3000'



DATE: 01/31/17

DRAWN BY: D.R.R.

FILE: SINEPADWM



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

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

**Date of Notice:** 1/18/2016      **Date of Planned Entry:** \*1/28/2016

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

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

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

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

**Notice is hereby provided to:**

SURFACE OWNER(s)

Name: James & Kathy Sine (Life)

Address: 7914 Wick Rd  
Middlebourne, WV 26149

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

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

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

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

COAL OWNER OR LESSEE

Name: NO DECLARATIONS ON RECORD WITH COUNTY

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

MINERAL OWNER(s)

Name: James & Kathy Sine (Life)

Address: 7914 Wick Rd  
Middlebourne, WV 26149

\*please attach additional forms if necessary

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WV Department of Environmental Protection

**Notice is hereby given:**

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

State: <u>West Virginia</u>	Approx. Latitude & Longitude: <u>Approx. Pad Center 39.415162, -80.956872</u>
County: <u>Tyler</u>	Public Road Access: <u>CR 7</u>
District: <u>Meade</u>	Watershed: <u>Outlet Middle Island Creek</u>
Quadrangle: <u>Middlebourne 7.5'</u>	Generally used farm name: <u>James L Sine et al</u>

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

**Notice is hereby given by:**

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







WW-6RW  
(1-12)

ATTN: JIM WILSON  
ANTERO RESOURCES  
535 WHITE OAKS BLVD  
BRIDGEPORT, WV 26330-4649

API NO. 47- 095 -  
OPERATOR WELL NO. Multiple Wells on Site Pad  
Well Pad Name: Sine Pad

047-095-02481

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
**WELL LOCATION RESTRICTION WAIVER**

The well operator, Antero Resources Corporation is applying for a permit from the State of West Virginia to conduct oil or gas well work. Please be advised that well work permits are valid for twenty-four (24) months.

**Well Location Restrictions**

Pursuant to West Virginia Code § 22-6A-12(a), 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.

*JAMES L SINE*  
*Kathy J Sine*

**WAIVER**

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

State: West Virginia  
County: Tyler  
District: Meade  
Quadrangle: Middlebourne 7.5'  
Watershed: Outlet Middle Island Creek

UTM NAD 83 Easting: 504215.83m (pad center)  
UTM NAD 83 Northing: 4359553.97m (pad center)  
Public Road Access: CR 7 (Middlebourne Wick)  
Generally used farm name: James Sine et al

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I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials and I therefore waive all well site restrictions listed under West Virginia Code § 22-6A-12(a).

**WELL SITE RESTRICTIONS BEING WAIVED**

\*Please check all that apply

- EXISTING WATER WELLS
- DEVELOPED SPRINGS
- DWELLINGS
- AGRICULTURAL BUILDINGS

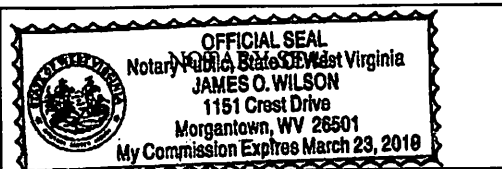
**FOR EXECUTION BY A NATURAL PERSON**

Signature: Kathy J Sine  
Print Name: James L Sine / Kathy J Sine  
Date: 2/16/2017  
**FOR EXECUTION BY A CORPORATION, ETC.**  
Company: Neil A Archer II  
By: Tyler County 11:52:32 AM  
Its: Instrument No 1167068  
Signature: \_\_\_\_\_  
Date: Date Recorded 02/06/2017

Well Operator: \_\_\_\_\_  
By: \_\_\_\_\_  
Its: \_\_\_\_\_

Signature: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Pages Recorded 1  
Book-Page 554-469

Recording Fee \$5.00  
Additional \$6.00



Subscribed and sworn before me this 6<sup>th</sup> day of February

J. Wilson Notary Public

My Commission Expires March 23, 2019

**Oil and Gas Privacy Notice:**

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



## WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

## Division of Highways

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

Jim Justice  
 Governor

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

October 23, 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 Sine Pad, Tyler County  
 Orvis Unit 1H Well site

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Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2014-0702 which has been issued to Antero Resources Corporation for access to the State Road for a 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: Shelly Johnson  
 Antero Resources Corporation  
 CH, OM, D-6  
 File



# List of Anticipated Additives Used for Fracturing or Stimulating Well

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

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**LOCATION COORDINATES:**

ACCESS ROAD ENTRANCE (ROAD "A")  
LATITUDE: 39.415740 LONGITUDE: -80.957936 (NAD 83)  
N 4362914.18 E 503621.00 (UTM ZONE 17 METERS)

ACCESS ROAD ENTRANCE (ROAD "B")  
LATITUDE: 39.415785 LONGITUDE: -80.957940 (NAD 83)  
N 4362919.17 E 503626.80 (UTM ZONE 17 METERS)

ACCESS ROAD ENTRANCE (ROAD "C")  
LATITUDE: 39.415959 LONGITUDE: -80.955560 (NAD 83)  
N 4362905.20 E 503825.49 (UTM ZONE 17 METERS)

CENTER OF TANK  
LATITUDE: 39.414976 LONGITUDE: -80.955256 (NAD 83)  
N 4362829.77 E 503851.73 (UTM ZONE 17 METERS)

CENTROID OF PAD  
LATITUDE: 39.415112 LONGITUDE: -80.956902 (NAD 83)  
N 4362844.58 E 503718.86 (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 #64086C0150C.

**MISS UTILITY STATEMENT:**

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1426068897. 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 DECEMBER, 2015 BY KC HARVEY ENVIRONMENTAL, LLC TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE OCTOBER 21, 2016 POTENTIALLY JURISDICTIONAL WATERS MAP WAS PREPARED BY KC HARVEY ENVIRONMENTAL, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS STRONGLY RECOMMENDED THAT THE AFOREMENTIONED AGENCIES BE CONSULTED IN AN EFFORT TO GAIN WRITTEN CONFIRMATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

**GEOTECHNICAL NOTES:**

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. BETWEEN SEPTEMBER 25, 2014 & OCTOBER 1, 2014. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED OCTOBER 13, 2014, REVISED MARCH 15, 2017, 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) 842-4066 CELL: (304) 476-9770

JON MCEVERS - OPERATIONS SUPERINTENDENT  
OFFICE: (303) 357-8799 CELL: (303) 808-2423

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

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

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

JIM WILSON - LAND AGENT  
OFFICE: (304) 842-4419 CELL: (304) 671-2708

ENGINEER/SURVEYOR:  
NAVITUS ENGINEERING, INC.  
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER  
OFFICE: (888) 682-4185 CELL: (540) 696-0747

ENVIRONMENTAL:  
KC HARVEY ENVIRONMENTAL, LLC  
SHANNON THOMPSON - STAFF SCIENTIST  
OFFICE: (740) 373-1970 CELL: (970) 396-6250

GEOTECHNICAL:  
PENNSYLVANIA SOIL & ROCK, INC.  
CHRISTOPHER W. SAMOIS - PROJECT ENGINEER  
OFFICE: (412) 372-4000 CELL: (412) 586-0662

**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 IS AN OCCUPIED DWELLING 398.8' FEET AWAY FROM THE CENTER OF THE PROPOSED WELL PAD. A DEP WAIVER IS REQUIRED.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 825 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.

# SINE WELL PAD & WATER SITE DESIGN & CONST EROSION & SEDIMENT C

MEADE DISTRICT, TYLER COUNTY  
SUGAR CREEK WATER

USGS 7.5 MIDDLEBOURNE

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



**WEST VIRGINIA COUNTY MAP**



(NOT TO SCALE)

**DESIGN CERTIFICATION:**

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

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1/27/17



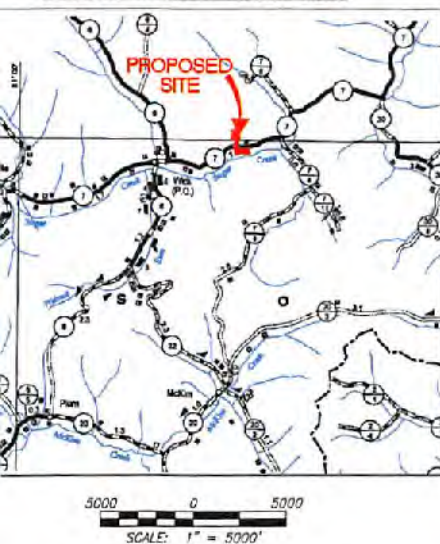
# CONTAINMENT PAD CONSTRUCTION PLAN, CONTROL PLANS

TYLER COUNTY, WEST VIRGINIA  
UNDEVELOPED AREA

QUAD MAP



WVDH COUNTY ROAD MAP



Department of West Virginia  
202-245-4848  
West Virginia State Law  
(Code of West Virginia, Chapter 24-C)  
that you call two days before you dig in the ground.  
Department of West Virginia.  
DON'T BREAK THE LAW!!

RECEIVED  
Office of Oil and Gas

DEC 1 2017

WV Department of Environmental Protection

## SHEET INDEX:

- 1 - COVER SHEET
- 2 - CONSTRUCTION AND E&S CONTROL NOTES
- 3 - LEGEND
- 4 - MATERIAL QUANTITIES
- 5 - STORM DRAINAGE COMPUTATIONS
- 6 - EXISTING CONDITIONS
- 7 - EXISTING STRUCTURES AND FEATURES
- 8 - OVERALL PLAN SHEET INDEX & VOLUMES
- 9 - ACCESS ROAD, WELL PAD, & WATER CONTAINMENT PAD PLAN
- 10 - WELL PAD GRADING PLAN
- 11 - WATER CONTAINMENT PAD GRADING PLAN
- 12 - ACCESS ROAD PROFILES, ACCESS ROAD SECTIONS, & BORROW AREA SECTIONS
- 13 - WELL PAD, WATER CONTAINMENT PAD, & STOCKPILE SECTIONS
- 14 - WELL PAD DEWATERING PIPE SECTIONS
- 15-22 - CONSTRUCTION DETAILS
- 23 - ACCESS ROAD, WELL PAD, & WATER CONTAINMENT PAD RECLAMATION PLAN
- GE500-GE504 - GEOTECHNICAL DETAILS

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

SINE LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (157')	0.43
Access Road "B" (601')	2.32
Access Road "C" (100')	0.17
Well Pad	5.55
Water Containment Pad	1.40
Borrow Area	4.76
Excess/Topsoil Material Stockpiles	0.25
<b>Total Affected Area</b>	<b>14.88</b>
Total Wooded Acres Disturbed	1.14
Impacts to James L. & Kathy J. Sine TM 8-30	
Access Road "A" (157')	0.43
Access Road "C" (100')	0.17
Well Pad	5.55
Water Containment Pad	1.40
Excess/Topsoil Material Stockpiles	0.25
<b>Total Affected Area</b>	<b>7.80</b>
Total Wooded Acres Disturbed	0.00
Impacts to James L. & Kathy J. Sine TM 8-29	
Access Road "B" (601')	2.32
Borrow Area	4.76
<b>Total Affected Area</b>	<b>7.08</b>
Total Wooded Acres Disturbed	1.14

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Alpine Unit 1H	N 336635.61 E 1588363.12	N 336669.72 E 1586922.07	N 4362851.70 E 503714.03	LAT 39-24-54.6356 LONG -80-57-24.6795
Alpine Unit 2H	N 336634.85 E 1588373.00	N 336668.98 E 1586932.05	N 4362851.62 E 503717.08	LAT 39-24-54.6206 LONG -80-57-24.6523
Alpine Unit 3H	N 336634.09 E 1588383.06	N 336668.20 E 1586942.02	N 4362851.34 E 503720.12	LAT 39-24-54.6207 LONG -80-57-24.4251
Alpine Unit 4H	N 336633.33 E 1588393.03	N 336667.44 E 1586951.99	N 4362851.16 E 503723.16	LAT 39-24-54.6178 LONG -80-57-24.2979
Garrin Unit 1H	N 336632.57 E 1588403.00	N 336666.08 E 1586961.96	N 4362850.98 E 503726.20	LAT 39-24-54.6119 LONG -80-57-24.1707
Garrin Unit 2H	N 336631.81 E 1588412.97	N 336665.92 E 1586971.93	N 4362850.80 E 503729.24	LAT 39-24-54.6060 LONG -80-57-24.0435
Remington Unit 1H	N 336631.05 E 1588422.94	N 336665.16 E 1586981.90	N 4362850.62 E 503732.26	LAT 39-24-54.6000 LONG -80-57-23.9183
Remington Unit 2H	N 336630.29 E 1588432.91	N 336664.40 E 1586991.87	N 4362850.44 E 503735.33	LAT 39-24-54.5941 LONG -80-57-23.7801
Winchester Unit 1H	N 336629.53 E 1588442.89	N 336663.64 E 1587001.84	N 4362850.26 E 503738.37	LAT 39-24-54.5882 LONG -80-57-23.6610
Winchester Unit 2H	N 336628.77 E 1588452.86	N 336662.88 E 1587011.81	N 4362850.08 E 503741.41	LAT 39-24-54.5823 LONG -80-57-23.5347
Orvis Unit 1H	N 336628.01 E 1588462.83	N 336662.12 E 1587021.79	N 4362849.89 E 503744.45	LAT 39-24-54.5764 LONG -80-57-23.4075
Orvis Unit 2H	N 336627.25 E 1588472.80	N 336661.36 E 1587031.76	N 4362849.71 E 503747.49	LAT 39-24-54.5705 LONG -80-57-23.2803
Well Pad Elevation	799.0			

SINE WETLAND IMPACT (SQUARE FEET)			
Wetland and Impact Cause	Fill (SF)	Total Impact (SF)	Total Impact (AC)
KLF-Wetland 219 (Well Pad)	148	148	0.00
Wetland 6 (Well Pad)	459	459	0.01
Wetland 7 (Well Pad)	1,718	1,718	0.04

SINE 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)	
KLF-Stream 246 (Well Pad)	0	0	0	32	32



Telephone: (858) 662-4105 | www.Navitus-Eng.com

DATE	REVISION	REVISED PER CONSTRUCTION	REVISED PER SURFACE CONFIG	REVISED FOR CONSTRUCTION	ADDED WATER CONTAINMENT PAD
		04/07/2016	05/24/2016	01/16/2017	03/15/2017



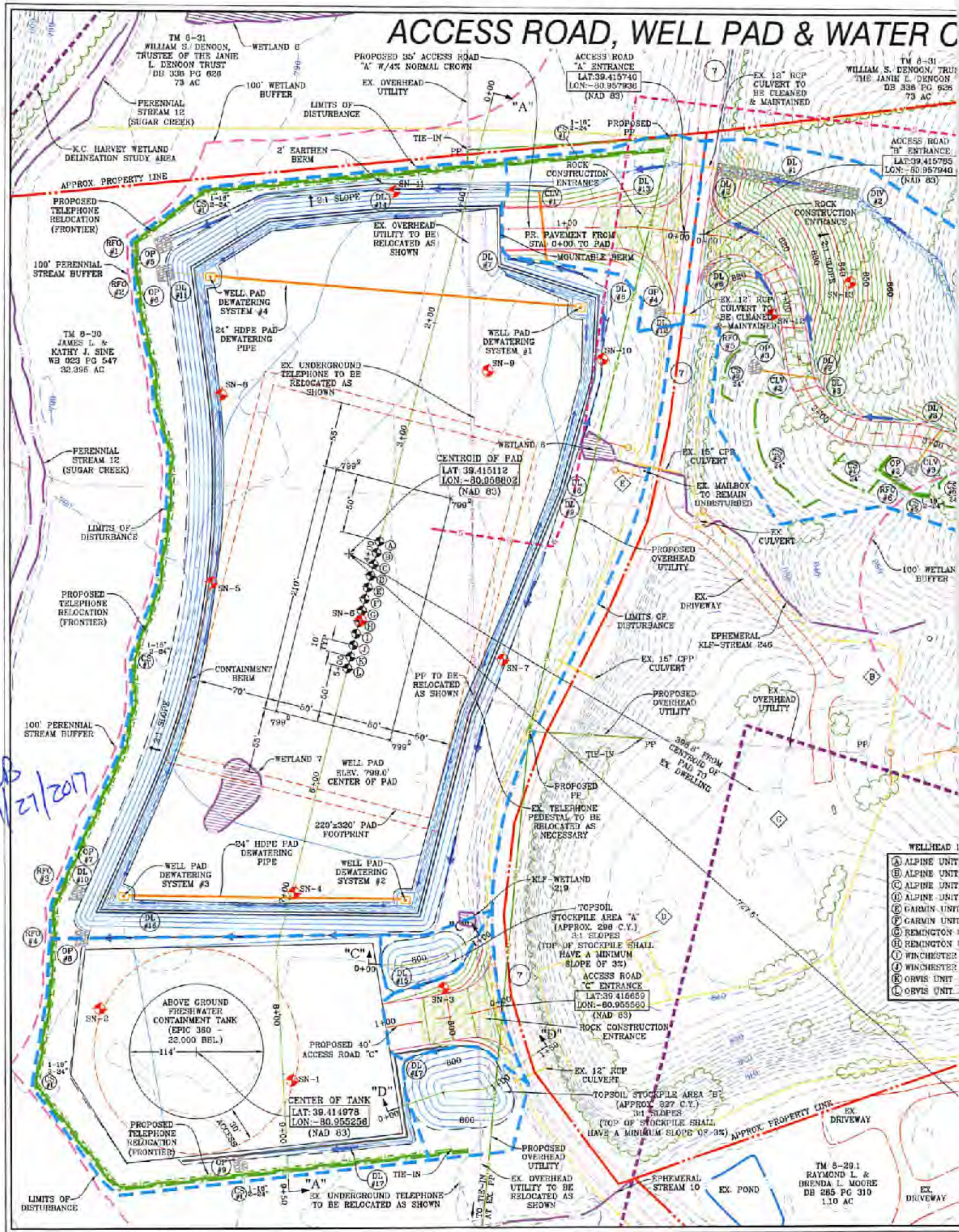
COVER SHEET  
**SINE**  
WELL PAD & WATER CONTAINMENT PAD  
MEADE DISTRICT  
TYLER COUNTY, WEST VIRGINIA



DATE: 02/24/2016  
SCALE: AS SHOWN  
SHEET 1 OF 33



# ACCESS ROAD, WELL PAD & WATER C



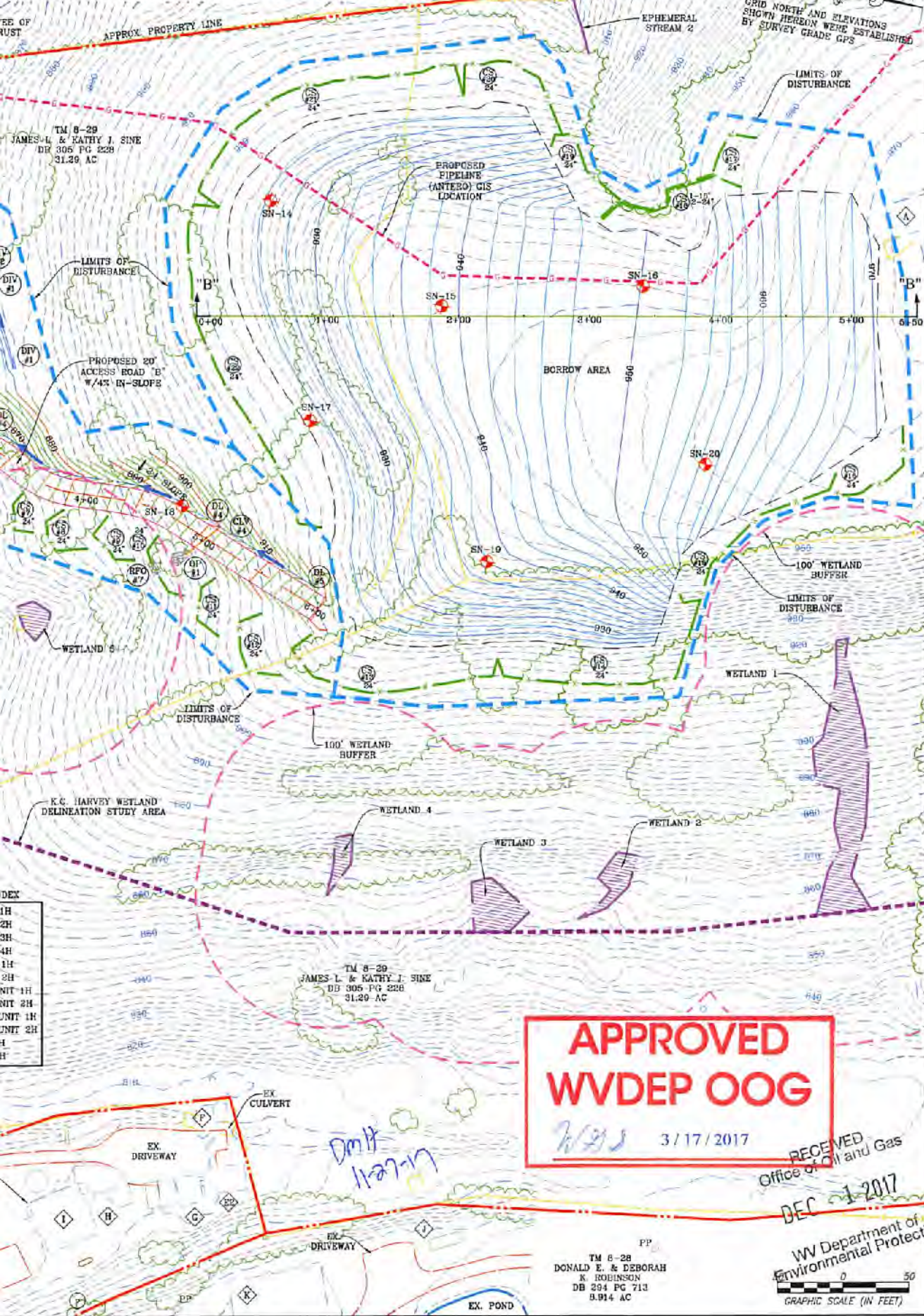
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- WELLHEAD 1**
- (A) ALPINE UNIT
  - (B) ALPINE UNIT
  - (C) ALPINE UNIT
  - (D) ALPINE UNIT
  - (E) GARMIN UNIT
  - (F) GARMIN UNIT
  - (G) REMINGTON 3
  - (H) REMINGTON 3
  - (I) WINCHESTER
  - (J) WINCHESTER
  - (K) ORVIS UNIT
  - (L) ORVIS UNIT

TM 5-28.1  
RAYMOND L. &  
DRENDIA L. MOORE  
DB 285 PG 310  
1.10 AC



# CONTAINMENT PAD PLAN



**NAVITUS**  
ENERGY ENGINEERING

Telephone: (888) 562-4195 | www.NavitusEng.com

DATE	REVISION
04/07/2016	REVISED PER CONSTRUCTION
05/24/2016	REVISED PER SURFACE CONFIG
01/10/2017	REVISED FOR CONSTRUCTION
03/15/2017	ADDED WATER CONTAINMENT PAD



ACCESS ROAD, WELL PAD & WATER CONTAINMENT PAD PLAN  
**SINE**  
WELL PAD & WATER CONTAINMENT PAD  
MEADE DISTRICT  
TYLER COUNTY, WEST VIRGINIA

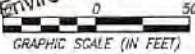


DATE: 02/24/2016  
SCALE: 1" = 50'  
SHEET 9 OF 23

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

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WV Department of  
Environmental Protection



TM 8-28  
DONALD E. & DEBORAH  
K. ROBINSON  
DB 294 PG 713  
B.914 AC

INDEX

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2H
3H
4H
1H
2H
NIT 1H
NIT 2H
UNIT 1H
UNIT 2H
1H
1H