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west virginia department of environmental protection

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

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

Tuesday, February 07, 2017  
WELL WORK PERMIT  
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION (A)  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for CALIFORNIA UNIT 1H  
47-017-06796-00-00

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: CALIFORNIA UNIT 1H  
Farm Name: JEFFREY K. JONES, SR. ET AL  
U.S. WELL NUMBER: 47-017-06796-00-00  
Horizontal 6A / New Drill  
Date Issued: 2/7/2017

Promoting a healthy environment.

02/10/2017

# PERMIT CONDITIONS 47 0 17 0 67 0 0

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

## CONDITIONS

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

# PERMIT CONDITIONS 47 0 17 0 0 7 9 3

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).



December 7, 2016

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

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

Ms. Laura Adkins:

Antero Resources Corporation (Antero) would like to submit the following applications for new well work permits to explore for Marcellus Shale potential. Our **West Union** project is located in Doddridge County, WV. On the **existing Balli Pad** consists **four new horizontal** shallow wells (Boulder Unit 1H & 2H and California Unit 1H & 2H) that we are requesting approval to drill.

Attached you will find the following:

- Permit Application packages
- CD with copy of permit applications

If you have any questions please feel free to contact me at (303) 357-7345.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in blue ink that reads "Samantha Marsh".

Samantha Marsh  
Permitting Agent  
Antero Resources Corporation

Enclosures

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02/10/2017

**STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
VOLUNTARY STATEMENT OF NO OBJECTION**

**Instructions to Persons Named on Page WW-6A**

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

**Comment and Waiver Provisions**

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

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

**VOLUNTARY STATEMENT OF NO OBJECTION**

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

State:	<u>West Virginia</u>	UTM NAD 83	Eastings:	<u>513472m</u>
County:	<u>Doddridge</u>		Northing:	<u>4350343m</u>
District:	<u>Center</u>	Public Road Access:	<u>CR 11/1 (Ramseys Ridge Road)</u>	
Quadrangle:	<u>West Union 7.5'</u>	Generally used farm name:	<u>Jeffrey K. Jones Sr. et al</u>	
Watershed:	<u>Headwaters Middle Island Creek</u>			

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.

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

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**Oil and Gas Privacy Notice:**

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

12/8

WW-6B  
(04/15)

API NO. 47-017 -  
OPERATOR WELL NO. California Unit 1H  
Well Pad Name: Existing Balli Pad

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

1) Well Operator: Antero Resources Corporation 494507062 017-Doddridge Central West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: California Unit 1H Well Pad Name: Existing Balli Pad

3) Farm Name/Surface Owner: Jeffrey K. Jones, Sr. et al Public Road Access: CR 11/1 (Ramseys Ridge Rd)

4) Elevation, current ground: 1135' Elevation, proposed post-construction: 1135'

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

Other \_\_\_\_\_

(b) If Gas Shallow X Deep \_\_\_\_\_

Horizontal X

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 6800' TVD, Anticipated Thickness- 50 feet, Associated Pressure- 3000#

8) Proposed Total Vertical Depth: 6800' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 21,650' MD

4701706793

11) Proposed Horizontal Leg Length: 14179'

12) Approximate Fresh Water Strata Depths: 107', 192'

13) Method to Determine Fresh Water Depths: Spellman Unit 2H (API # 47-017-06693) on the same pad.

14) Approximate Saltwater Depths: 737'

15) Approximate Coal Seam Depths: Trace coal @ 327' & 1,149'

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

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

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

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

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

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

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18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	300'	300'	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	21650'	21650'	5545 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

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

**PACKERS**

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

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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.

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

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."  
  
Anticipated Max Pressure - 9300 lbs  
Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 14.56 existing acres

22) Area to be disturbed for well pad only, less access road (acres): 8.83 existing acres

23) Describe centralizer placement for each casing string:

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

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

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

25) Proposed borehole conditioning procedures:

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

\*Note: Attach additional sheets as needed.

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47017038180000



California Unit 1H

47017044210000



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California Unit 1H - AOR



WELL SYMBOLS  
Gas Well  
Oil Well

December 2, 2016

02/10/2017

UWI (API#)	Well Name	Well Number	Operator	Historical Operator	TD (EUV, GS)	TD (RTVD)	Perforated Interval (shallower, deeper)	Perforated Formation(s)	Predictable formation(s) not part of
459902110000	GLAUNT DAVID	3-1134	ENERGY CORP OF AMER	U.S. ENTERPRISES	5651	4274	5435-5500	Wey, Benson	Big Ligon, Weyr, Glant, Gordon, Forth, RH, Warren, Ballisack, Bradford, Altonside
459902110000	GLAUNT DAVID	3-1135	ENERGY CORP OF AMER	EASTERN AMERICAN INC	5627	4367	5405-5514	Wey, Benson, Alexander	Big Ligon, Weyr, Glant, Gordon, Forth, RH, Warren, Ballisack, Bradford
4701704810000	PROFIT DONALD LEROY ET AL	1-MW	MCULLOUGH RICHARD F	KEY OIL INC CORPORATED	5444	4396	4354-5236	Ballisack, Eley, Benson, Alexander	Big Ligon, Weyr, Glant, Gordon, Forth, RH, Warren, Bradford
4701704810000	PROFIT DONALD LEROY ET AL	1	MCULLOUGH RICHARD F	KEY OIL INC CORPORATED	5410	4325	4304-5250	Ballisack, Eley, Benson, Alexander	Big Ligon, Weyr, Glant, Gordon, Forth, RH, Warren, Bradford
4701704810000	PROFIT DONALD LEROY ET AL	1	MCULLOUGH RICHARD F	COVORHAM APPALACHIAN	5395	4405	2013-206	Wey, Benson, Alexander	Big Ligon, Weyr, Glant, Gordon, Forth, RH, Warren, Ballisack, Bradford
4701704810000	PROFIT DONALD LEROY ET AL	1	MCULLOUGH RICHARD F	COVORHAM APPALACHIAN	5321	4271	2188-494	Wey, Benson, Alexander	Big Ligon, Gordon, Forth, Warren, Ballisack

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WW-9  
(4/16)

API Number 47 - 017 - \_\_\_\_\_

Operator's Well No. California Unit 1H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

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

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

Will a pit be used? Yes  No

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

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

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

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

Additives to be used in drilling medium? Please See Attachment

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

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

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

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

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

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

Company Official Signature *Cole Kilstrom*

Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental & Regulatory Manager

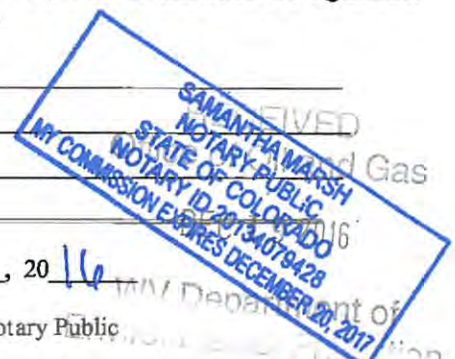
Subscribed and sworn before me this 6th day of December, 2016

*Samantha Marsh*

Notary Public

My commission expires 12-20-2017

*DAF*  
*12/05/16*



02/10/2017

**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 14.56 existing 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

Existing Well Pad (8.83 acres) + Existing Access Road "A" (1.14 acres) + Existing Excess/Topsoil Material Stockpile (4.59 acres) = 14.56 Existing Acres

**Seed Mixtures**

**Temporary**

**Permanent**

Seed Type lbs/acre  
**Annual Ryegrass 40**

Seed Type lbs/acre  
**Crown Vetch 10-15**

See Table IV-3 for additional seed type (Ball Pad Design Page 18)

See Table IV-3 for additional seed type (Ball Pad Design Page 18)

\*or type of grass seed requested by surface owner

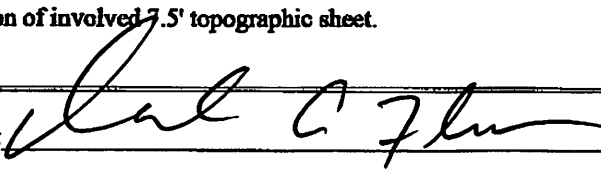
\*or type of grass seed requested by surface owner

**Attach:**

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: \_\_\_\_\_



47017000000

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

Title: Oil & Gas Inspector

Date: 12/15/16

Field Reviewed?  Yes  No

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## ***Form WW-9 Additives Attachment***

### **SURFACE INTERVAL**

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

### **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**  
**2475 Mountain Drive**  
**Pennsboro, WV 26415**

## **Well Site Safety Plan**

### **Antero Resources**

**Well Name:** Spellman Unit 1H & 2H, Rock Unit 1H & 2H,  
Ridge Unit 1H & 2H, Boulder Unit 1H & 2H,  
California Unit 1H & 2H, Hawk Unit 1H & 2H

**Pad Location:** BALLI PAD  
Doddridge County/Central District

**GPS Coordinates:**

**Entrance** - Lat 39°18'4.75"/Long -80°50'40.90" (NAD83)

**Pad Center** - Lat 39°18'7.99"/Long -80°50'37.48" (NAD83)

**Driving Directions:** From Clarksburg: Drive west on US-50 W for 29.7 miles. Turn Right onto Wilhelm Run Rd, 0.1 miles. Continue onto Stone Valley Rd, 1.2 miles. Sharp left onto CO Rte 36/1, 1.1 miles. Keep right to continue on Ramsey Ridge Rd, 0.4 miles. Access road will be on your right.

**Alternate Route:** From intersection of HWY 74 and US-50 near Pennsboro: Drive East on US-50E for 6.6 miles. Turn left onto Wilhelm Run Rd for 0.1 miles, then continue onto Stone Valley Rd. Take a sharp left onto Co Rte 36/1 for 1.1 miles. Keep right to continue on Ramsey Ridge Rd, 0.4 miles. Access road will be on your right.

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

*Dave C. [Signature]*  
12/15/16

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LATITUDE 39°20'00"

2.996'

8,364' TO BOTTOM HOLE

LATITUDE 39°22'30"

LONGITUDE 80°50'00"

12,900' TO BOTTOM HOLE

11,310'

LONGITUDE 80°50'00"

Antero Resources Corporation  
Well No. California Unit 1H

NOTES:  
WELL 1H TOP HOLE INFORMATION:  
N: 295,052ft E: 1,619,700ft  
LAT: 39°18'08.21" LON: 80°50'38.11"  
BOTTOM HOLE INFORMATION:  
N: 308,718ft E: 1,614,534ft  
LAT: 39°20'22.51" LON: 80°51'46.46"  
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: 4,350,343m E: 513,472m  
BOTTOM HOLE INFORMATION:  
N: 4,354,480m E: 511,829m

REFERENCES

1" = 200'

STAKE/ NAIL, SET

STAKE/ NAIL, SET

N 80°28'W

186.9'

N 26°03'E

189.9'

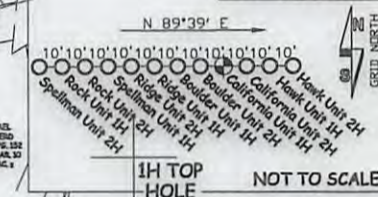
WELL NO. 1H

(NAD) 27 (UTM) ZONE 17 COORDS:  
WELL 1H TOP HOLE INFORMATION:  
N: 14,272,035ft E: 1,684,570ft  
POINT OF ENTRY INFORMATION:  
N: 14,272,156ft E: 1,683,642ft  
BOTTOM HOLE INFORMATION:  
N: 14,285,608ft E: 1,679,178ft

WV NORTH ZONE GRID NORTH

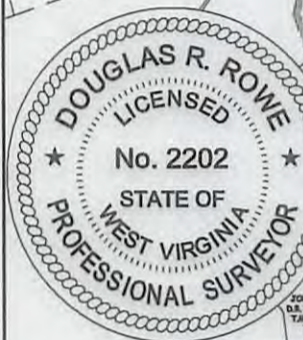
LONGITUDE 80°50'00"

PAD LAYOUT



NOTE

NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.



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

JOB # 16-059WA  
DRAWING # CALIFORNIA1HR  
SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL  
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X  
LOCATION: ELEVATION 1,135' PROPOSED - 1,160' ORIGINAL WATERSHED HEADWATERS MIDDLE ISLAND CREEK  
QUADRANGLE WEST UNION 7.5' DISTRICT CENTRAL COUNTY DODDRIDGE

SURFACE OWNER JEFFREY K. JONES SR. ET AL ACREAGE 77.32 ACRES +/-  
OIL & GAS ROYALTY OWNER DONALD L. PIGGOTT; NELL ALLEN; RICHARD F. MCCULLOUGH ET UX; LEASE ACREAGE 81 AC±; 176 AC±; 63.5 AC±;  
JOHN STATLER ET UX; CARROLL SHEPHERD; CARROLL E. SHEPHERD ET UX; RICHARD MCCULLOUGH; MICHAEL JOE SHEPHERD; RICHARD MCCULLOUGH; RICHARD MCCULLOUGH ET UX; 58 AC±; 17.18 AC±; 26 AC±; 15 AC±; 12.025 AC±; 29 AC±;  
EUGENE R. WALTON; KATHERINE MONTGOMERY; J.A. EXLINE ET UX; NATHAN CAIN ET AL; N.M. WELCH HEIRS 137 AC±; 26.13 AC±; 60 AC±; 278 AC±; 95 AC±

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

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

DOUGLAS R. ROWE P.S. 2202

DATE 12/05/16  
OPERATOR'S WELL# CALIFORNIA UNIT #1H

API WELL # 47 - 017 - 06796 HGA  
STATE COUNTY PERMIT

PROPOSED WORK: DRILL X CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE X  
PLUG OFF OLD FORMATION PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) PLUG & ABANDON CLEAN OUT & REPLUG  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,800' TVD 21,650' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM  
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313



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>Donald L. Piggott Lease</u></b>			
Donald L. Piggott	Key Oil Company	1/8	0179/0682
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0276/0526
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>C. Burke Morris et al Lease</u></b>			
C. Burke Morris et al	Key Oil Company	1/8	0105/0715
Key Oil Company	J&J Enterprises	Assignment	0111/0326
J&J Enterprises	Eastern American Energy Company	Confirmatory Deed	0159/0139
Eastern American Energy Company	Energy Corporation of America	Confirmatory Deed	0240/0498
Energy Corporation of America	Antero Resources Appalachian Corporation	Partial Assignment	0281/0569
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Neil Allen Lease</u></b>			
Neil Allen, Widow	Key Oil Company	1/8	0107/0743
Key Oil Company	J&J Enterprises	Assignment	0111/0326
J&J Enterprises	Eastern American Energy Company	Confirmatory Deed	0159/0139
Eastern American Energy Company	Energy Corporation of America	Confirmatory Deed	0240/0498
Energy Corporation of America	Antero Resources Appalachian Corporation	Partial Assignment	0328/0648
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Richard F. McCullough, et ux Lease</u></b>			
Richard F. McCullough, et ux	Devonian Appalachian Corporation	1/8	0159/0649
Devonian Appalachian Corporation	New Freedom Energy, LLC	Assignment	0203/0346
New Freedom Energy, LLC	Antero Resources Corporation	Assignment	0336/0127
<b><u>Shirley Lohr Lease</u></b>			
Shirley Lohr	Antero Resources Corporation	1/8+	0417/284
<b><u>John Statler, et ux Lease</u></b>			
John A. Statler, et al	Joseph M. Pope & James P. Droppleman	1/8	0082/0224
Joseph M. Pope & James P. Droppleman	Rudder Oil & Gas Company	Assignment	0082/0225
Rudder Oil & Gas Company	Richard McCullough	Assignment	0098/0072
Richard McCullough	Key Oil Company	Assignment	0171/0159
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0268/0607
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Carroll E. Shepherd et ux Lease</u></b>			
Carroll E. Shepherd, et vir	Eastern American Energy Corporation	1/8	0161/0574
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0240/0298
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0272/0307
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

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 WV Department of Environmental Protection

\*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.

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Richard McCullough Lease</u>			
Richard McCullough	Antero Resources Corporation	1/8+	0420/0476
<u>Michael Joe Shepherd Lease</u>			
Michael Joe Shepherd	Antero Resources Corporation	1/8+	438/68
<u>Richard McCullough Lease</u>			
Richard McCullough	Antero Resources Corporation	1/8+	332/11
<u>Richard McCullough et ux Lease</u>			
Richard F. McCullough et ux	Appalachian Energy Reserves Inc.	1/8	0274/0045
Appalachian Energy Reserves Inc.	Devonian Appalachian Co. Inc.	Assignment	0156/0001
Devonian Appalachian Co. Inc.	Richard Stephens	Assignment	0200/0684
New Freedom Energy Inc.	Antero Resources Corporation	Assignment	0444/0722
<u>Eugene R. Walton Lease</u>			
Eugene R. Walton, et al	Eastern American Energy Corporation	1/8	0282/0033
Eastern American Energy Corporation	Energy Corporation of America	Merger	0009/0093
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0398/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Katherine Montgomery Lease</u>			
Katherine Montgomery	Antero Resources Corporation	1/8	0543/0019
<u>J.A. Exline, et ux Lease</u>			
J.A. Exline, et ux	Carnegie Natural Gas Company	1/8	0084/0043
Carnegie Natural Gas Company	D.A. Dorward	Assignment	0185/0055
D.A. Dorward	Dorva Corporation	Assignment	0093/0595
Dorva Corporation	Dorward Energy Corporation	Merger	0285/0893
Doward Energy Corporation	DEC Lease Management, Inc.	Assignment	0491/0173
DEC Lease Management, Inc.	Antero Resources Corporation	Assignment	0491/0453
<u>Nathan Cain et al Lease</u>			
Nathan Cain et al	J.E. Trainer	1/8	0072/0216
J.E. Trainer	W.W. Hepburn	Assignment	0080/0346
W.W. Hepburn	Eastern Petroleum Company	Assignment	0080/338
Eastern Petroleum Company	Clifton Oil & Gas Company	Assignment	0094/0061
Clifton Oil & Gas Company	Quaker State Oil Refining Corporation	Assignment	0270/0111
Quaker State Oil Refining Corporation	Quaker State Corporation	Name Change	Exhibit 2
Quaker State Corporation	Belden & Blake Corporation	Assignment	0311/0584
Belden & Blake Corporation	Peake Energy, Inc.	Assignment	0321/0340
Peake Energy, Inc.	North Coast Energy Eastern Inc.	Name Change	0008/0702

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 Environmental Protection

\*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.

02/10/2017

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

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
North Coast Energy Eastern, Inc.	Exco-North Coast Energy Eastern, Inc.	Name Change	0009/0080
Exco-North Coast Energy Eastern, Inc.	EXCO Resources (WV), Inc.	Name Change	Exhibit 3
EXCO Resources (WV), Inc.	EXCO Resources Company (WV), LLC	Name Change	Exhibit 4
EXCO Resources Company (WV), LLC	EXCO Production Company (WV), LLC	Name Change	Exhibit 5
EXCO Production Company (WV), LLC	Antero Resources Appalachian Corporation	Assignment	0406/0195
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

4701700000

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02/10/2017

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

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>N.M. Welch Heirs Lease</u>	N.M. Welch Heirs	Petroleum Services Inc.	1/8	0229/0452
	Petroleum Services Inc.	J&J Enterprises	Assignment	0231/0301
	J&J Enterprises	Eastern American Energy Corporation	Assignment	0282/0296
	Eastern American Energy Corporation	Energy Corporation of America	Merger	0009/0093
	Energy Corporation of America	Antero Resources Appalachian Corp.	Partial Assignment	0398/0416
	Antero Resources Appalachian Corp.	Antero Resources Corporation	Name Change	Exhibit 1

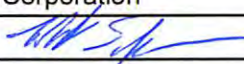
\*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

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

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

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

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

Well Operator: Antero Resources Corporation  
 By: Robert S. Tucker   
 Its: VP Geology

**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.wvgsos.com](http://www.wvgsos.com)  
E-mail: [business@wvgsos.com](mailto:business@wvgsos.com)

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

**APPLICATION FOR  
AMENDED CERTIFICATE  
OF AUTHORITY**

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

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

1. Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
2. Date Certificate of Authority was issued in West Virginia: 6/25/2008
3. Corporate name has been changed to: Antero Resources Corporation  
(Attach one Certified Copy of Name Change as filed in home State of Incorporation.)
4. Name the corporation elects to use in WV: Antero Resources Corporation  
(due to home state name not being available)
5. Other amendments: \_\_\_\_\_  
(attach additional pages if necessary)
6. Name and phone number of contact person. (This is optional, however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)  
Alvyn A. Schopp (303) 357-7310  
Contact Name Phone Number
7. Signature information (See below *\*Important Legal Notice Regarding Signature\**):  
Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person  
Signature: [Signature] Date: June 10, 2013

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

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Office of Oil and Gas

DEC 08 2016

WV Department of  
Environmental Protection



*I, Ken Heckler, Secretary of State of the  
State of West Virginia, hereby certify that*  
originals of an application by

**QUAKER STATE OIL REFINING CORPORATION**

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

**AMENDED CERTIFICATE OF AUTHORITY**

to transact business in West Virginia under the name of

**QUAKER STATE CORPORATION**

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

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

TWENTIETH \_\_\_\_\_ day of  
JULY 19 87



*Ken Heckler*

*Secretary of State*



# Certificate

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

an Amended Certificate of Authority of

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

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

Therefore I issue this

## CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the corporation to

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

470170821



Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
December 2, 2009  
DEC 08 2016

*Natalie E. Tennant*  
Secretary of State

# State of West Virginia



## Certificate

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

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

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

*Therefore, I issue this*

### CERTIFICATE OF CONVERSION

*Converting the corporation to:*

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



*Given under my hand and the Great Seal of the State of West Virginia on*  
July 7, 2010

RECEIVED  
WV Department of

*Natalie E. Tennant*

*Secretary of State*

02/10/2017



# State of West Virginia



## Certificate

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

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

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

Therefore, I hereby issue this

### CERTIFICATE OF MERGER



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

July 1, 2010  
WV Department of Environmental Protection

*Natalie E. Tennant*

Secretary of State

02/10/2017



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

November 29, 2016

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: California Unit 1H  
Quadrangle: West Union 7.5'  
Doddridge County/Central District, West Virginia

Mr. Martin:

Antero Resources Corporation (Antero) is submitting the following application for a new well work permit for the California 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 California Unit 1H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,

A handwritten signature in blue ink that reads "Haley West". The signature is fluid and cursive, with a large loop at the end.

Haley West  
Landman

02/10/2017

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

Date of Notice Certification: 12/07/2016

API No. 47- 017 -  
Operator's Well No. California Unit 1H  
Well Pad Name: Existing Balli 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>513472m</u>
County: <u>Doddridge</u>	UTM NAD 83 Northing: <u>4350343m</u>
District: <u>Central</u>	Public Road Access: <u>CR 11/1 (Ramseys Ridge Road)</u>
Quadrangle: <u>West Union 7.5'</u>	Generally used farm name: <u>Jeffrey K. Jones Sr. et al</u>
Watershed: <u>Headwaters Middle Island Creek</u>	

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

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input checked="" type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p><b>OOG OFFICE USE ONLY</b></p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><b>RECEIVED</b></p>
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Office of Oil and Gas

**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-11(b). 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.

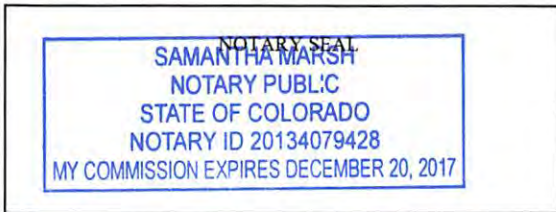
02/10/2017

**Certification of Notice is hereby given:**

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

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

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



Subscribed and sworn before me this 7<sup>th</sup> day of December 2016  
Samantha Marsh Notary Public  
My Commission Expires 12-20-2017

**Oil and Gas Privacy Notice:**

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

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DEC 08 2016  
WV Department of  
Environmental Protection

**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:** 12/7/2016 **Date Permit Application Filed:** 12/7/2016

**Notice of:**

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

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

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

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

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

SURFACE OWNER(s)  
 Name: Aaron P. Marshok \*PLEASE NOTE THAT TM 7-7.1 WAS TRANSFERRED FROM JEFFREY K. SR. & CHARLENE H. JONES AS RECENTLY IDENTIFIED ON COUNTY RECORD.  
 Address: 888 Ramsey Ridge Road  
West Union, WV 26456

Name: Stephen G. & Sherry L. Bush  
 Address: 320 N Prague Ave  
Egg Harbor City, NJ 08215

SURFACE OWNER(s) (Road and/or Other Disturbance)  
 Name: Susan C. Gagnon  
 Address: 1210 Ramsey Ridge Road  
West Union, WV 26456

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: Susan C. Gagnon \*PLEASE NOTE THERE ARE 2 ADDITIONAL WATER SOURCES SHOWN ON THE ATTACHED MAP, BUT THEY ARE LOCATED GREATER THAN 1500' FROM THE SUBJECT PAD LOCATION.  
 Address: 1210 Ramsey Ridge Road  
West Union, WV 26456

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

\*Please attach additional forms if necessary

WV Department of Environmental Protection

02/10/2017

**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

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

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

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

**Well Location Restrictions**

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

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

**Water Well Testing:**

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

**Water Testing Laboratories:**

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

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

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

**Written Comment:**

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

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

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WV Department of  
Environmental Protection

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

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

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

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

**Comment Requirements**

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

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

**Permit Denial or Condition**

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

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

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

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

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Environmental Protection

02/10/2017



WW-6A  
(8-13)

API NO. 47- 017 -  
OPERATOR WELL NO. California Unit 1H  
Well Pad Name: Existing Balli Pad

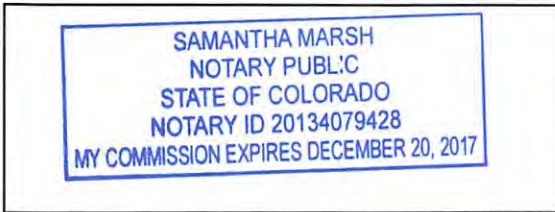
**Notice is hereby given by:**

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

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

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 7<sup>th</sup> day of December 2016  
Samantha Marsh Notary Public  
My Commission Expires 12-20-2017

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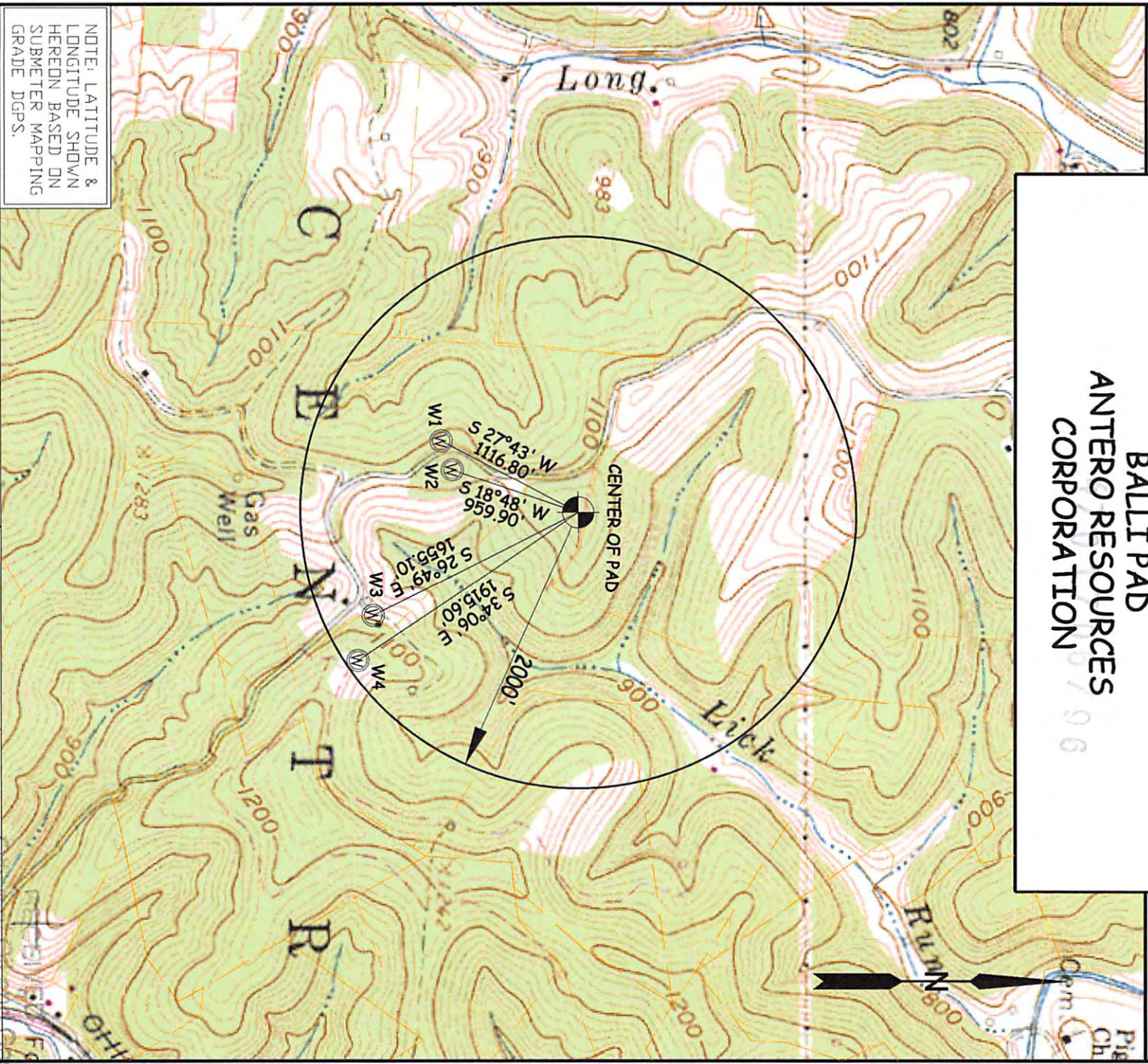
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Environmental Protection

02/10/2017

**BALLI PAD  
ANTERO RESOURCES  
CORPORATION**



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

WELL	SURFACE OWNER	ADDRESS	DISTRICT-TAX MAP-PARCEL	WELL LATITUDE	WELL LONGITUDE
W1	SUSAN C. GARNON	1210 Ramsey Ridge Rd West Union, WV 26456	1-6-9	39° 17' 59.48"	80° 50' 41.57"
W2	SUSAN C. GARNON	1210 Ramsey Ridge Rd West Union, WV 26456	1-6-9	39° 17' 58.66"	80° 50' 44.23"
W3	SUSAN C. GARNON	1210 Ramsey Ridge Rd West Union, WV 26456	1-6-9	39° 17' 54.02"	80° 50' 28.03"
W4	JEFFREY JONES SR. ET UX	888 Ramsey Ridge Rd West Union, WV 26456	1-7-7.1	39° 17' 52.99"	80° 50' 23.85"

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

TOPO SECTION(S) OF:  
 WEST UNION 7.5' QUAD.  
 & PENNSBORO 7.5' QUAD.  
 JOB #: 14-084WA

SCALE : 1-INCH = 1000-FEET  
 0' 1000' 2000' 3000'

DATE: 12/02/16 DRAWN BY: T.B.S. FILE: BALLI PAD WATERMAP

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

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

**Notice Time Requirement:** Notice shall be provided at least **TEN (10)** days prior to filing a permit application.

**Date of Notice:** 06/07/2016      **Date Permit Application Filed:** 12/07/2016

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

**HAND DELIVERY**       **CERTIFIED MAIL RETURN RECEIPT REQUESTED**

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

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

**Name:** Stephen G. & Sherry L. Bush  
**Address:** 320 N. Prague Ave.  
Egg Harbor City, NJ 08215

**Name:** Jeffrey K. Jones, Sr. & Charlene H. Jones  
**Address:** 888 Ramsays Ridge Rd.  
West Union, WV 26456

**Notice is hereby given:**

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

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>513472.78m</u>
County:	<u>Doddridge</u>		Northing:	<u>4350326.81m</u>
District:	<u>Central</u>	Public Road Access:		<u>CR 11/1</u>
Quadrangle:	<u>West Union 7.5'</u>	Generally used farm name:		<u>Jones, Jeffrey K., Sr., et al</u>
Watershed:	<u>Headwaters Middle Island Creek</u>			

**This Notice Shall Include:**

Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 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).

**Notice is hereby given by:**

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

**Authorized Representative:** Kara Quackenbush  
**Address:** 1615 Wynkoop St.  
Denver, CO 80202  
**Telephone:** 303-357-7323  
**Email:** kquackenbush@anteroresources.com  
**Facsimile:** 303-357-7315

**Oil and Gas Privacy Notice:**

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

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

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

**Date of Notice:** 12/07/2016      **Date Permit Application Filed:** 12/07/2016

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

**CERTIFIED MAIL**                                       **HAND**  
**RETURN RECEIPT REQUESTED**                                      **DELIVERY**

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

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

**Name:** Aaron P. Marshok  
**Address:** 888 Ramsey Ridge Road  
West Union, WV 26456

**Name:** Stephen G. & Sherry L. Bush  
**Address:** 320 N Prague Ave  
Egg Harbor City, NJ 08215

4701700700

**Notice is hereby given:**

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

<b>State:</b> <u>West Virginia</u>	<b>UTM NAD 83 Easting:</b> <u>513472m</u>
<b>County:</b> <u>Doddridge</u>	<b>Northing:</b> <u>4350343m</u>
<b>District:</b> <u>Center</u>	<b>Public Road Access:</b> <u>CR 11/1</u>
<b>Quadrangle:</b> <u>West Union 7.5'</u>	<b>Generally used farm name:</b> <u>Jeffrey K. Jones Sr. et al</u>
<b>Watershed:</b> <u>Headwaters Middle Island Creek</u>	

**This Notice Shall Include:**

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

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

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

**Oil and Gas Privacy Notice:**

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



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

**Division of Highways**

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

Earl Ray Tomblin  
Governor

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

Reissued December 2, 2016

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

4701706796

Subject: DOH Permit for the Balli Pad, Doddridge County  
California Unit 1H Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #04-2013-1042 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off of Doddridge County Route 11/1 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: Samantha Marsh  
Antero Resources Corporation  
CH, OM, D-4  
File

02/10/2017

# List of Anticipated Additives Used for Fracturing or Stimulating Well

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



# BALLI WELL PAD & WATER CONTAINMENT PAD SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

CENTRAL DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA  
ARNOLD CREEK & LONG RUN WATERSHEDS

USGS 7.5 WEST UNION QUAD MAP

**LOCATION COORDINATES**  
ACCESS ROAD ENTRANCE  
LATITUDE 39.202220 LONGITUDE -80.444200 (NAD 83)  
N 4350269.53 E 511893.18 (CYL ZONE 17 METERS)  
CENTRE OF WATER CONTAINMENT TANK  
LATITUDE 39.202220 LONGITUDE -80.443744 (NAD 83)  
N 4350269.53 E 511893.18 (CYL ZONE 17 METERS)  
CENTRE OF WELL PAD  
LATITUDE 39.202220 LONGITUDE -80.443744 (NAD 83)  
N 4350269.53 E 511893.18 (CYL ZONE 17 METERS)

**GENERAL DESCRIPTION**  
THE PROPOSED WATER CONTAINMENT TANK AND WELL PAD ARE BEING CONSTRUCTED TO ADD IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

**FLOODPLAIN NOTE**  
THE PROPOSED SITE IS LOCATED IN FLOOD ZONE "X" FROM FEMA MAP #44401610C.

**MISS UTILITY STATEMENT**  
ATLANTA RESOURCE CORPORATION HAS CONDUCTED A MISS UTILITY SURVEY OF WEST VIRGINIA FOR THE LOCATION OF UTILITIES PRIOR TO THIS PROJECT DESIGN. TICKET #414528092 IN ARDITON, MISS UTILITY HAS BEEN CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

**ENTRANCE PERMIT**  
ATLANTA RESOURCE CORPORATION HAS OBTAINED AN ENTRANCE PERMIT (FORM MA-109) FROM THE MISSISSIPPI DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PAPER 19 COMMANDMENT OF CONSTRUCTION ACTIVITIES.

**ENVIRONMENTAL NOTES**  
WETLAND Delineations were performed in August & October 2013 by ATLANTA RESOURCE, LLC TO DETERMINE THE SET BACK FOR WELLS AND WELLS THAT ARE NOT SET BACK WITHIN THE REGULATORY PERMITS ENVIRONMENTAL PROTECTION (WET) THE OCTOBER 9, 2013 STREAM AND WETLAND DELINEATION WAS PERFORMED BY ATLANTA RESOURCE, LLC AND SUBMITTALS THE RESULTS OF THE FIELD DELINEATION THE RESULTS OF WELLS AND WETLANDS WHICH MAY BE REGULATED BY THE STATE OF WEST VIRGINIA. IT IS STRONGLY RECOMMENDED THAT THE APPLICATED AGENCIES BE CONSULTED IN AN EFFORT TO OBTAIN WRITTEN CONFIRMATION OF THE INFORMATION SHOWN ON THIS EXHIBIT PRIOR TO COMMENCING CONSTRUCTION ON THE FEDERAL AND/OR STATE REGULATIONS APPLICABLE PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S. INCLUDING WETLAND FILL AND STREAM CROSSINGS.

**GEOTECHNICAL NOTE**  
A GEOTECHNICAL INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA, SOIL & ROCK, INC. ON 08/28/2013. THE INVESTIGATION WAS CONDUCTED IN ACCORDANCE WITH THE WEST VIRGINIA CODE, TITLE 20, CHAPTER 20-20, REGULATION 20-20-2. THE RESULTS OF THE INVESTIGATION ARE SET FORTH IN THE ATTACHED REPORT. THE RESULTS OF THE INVESTIGATION ARE SET FORTH IN THE ATTACHED REPORT. THE RESULTS OF THE INVESTIGATION ARE SET FORTH IN THE ATTACHED REPORT. THE RESULTS OF THE INVESTIGATION ARE SET FORTH IN THE ATTACHED REPORT.

**PROJECT CONTACTS**

**OPERATOR:**  
ATLANTA RESOURCE CORPORATION  
605 WHITE OAK BLVD  
ARLINGTON, VA 22204  
TEL: (703) 542-4200  
FAX: (703) 542-4102

**ENGINEER/SUPERVISOR:**  
NAVITAS ENGINEERING, INC.  
1000 WEST VIRGINIA AVENUE, SUITE 100  
FARMINGTON, WV 26031  
OFFICE: (680) 662-4100 CELL: (640) 666-0147

**ENVIRONMENTAL:**  
ATLANTA RESOURCE CORPORATION  
605 WHITE OAK BLVD  
ARLINGTON, VA 22204  
TEL: (703) 542-4200 CELL: (304) 673-6196

**GEOTECHNICAL:**  
PENNSYLVANIA, SOIL & ROCK, INC.  
1000 WEST VIRGINIA AVENUE, SUITE 100  
FARMINGTON, WV 26031  
OFFICE: (680) 662-4100 CELL: (640) 666-0147

**RESTRICTIONS NOTES:**  
1. THERE ARE NO PERENNIAL STREAMS, WETLANDS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LUD.

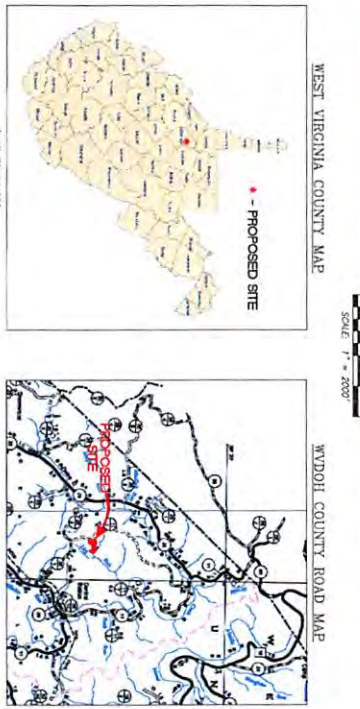
2. THERE ARE NO NATURALLY PRODUCING TIGHT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LUD.

3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LUD.

4. THERE ARE NO ADJACENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELLS BEING DRILLED.

5. THERE ARE NO OCCURRING DWELING STRUCTURES WITHIN 625 FEET OF THE CENTRE OF THE WELL PAD.

6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTRE OF THE WELL PAD.



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

Electronic version of these plans may be viewed at: Q:\OIL GAS\ISAY FILES\REVIEWS

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

AP# 1706636  
API# 1706637  
API# 1706693

**SHEET INDEX**

- COVER SHEET
- CONSTRUCTION AND E&S CONTROL NOTES
- MATERIAL QUANTITIES
- STORM DRAINAGE COMPUTATIONS
- EROSION CONDITIONS
- OVERALL PLAN SHEET INDEX & VOLUMES
- WELL PAD & WATER CONTAINMENT PAD PLAN
- WELL PAD GRADING PLAN
- ACCESS ROAD/CLAYPIT PROFILES & SECTIONS
- 10-13 - WELL PAD SECTIONS
- 14-18 - CONSTRUCTION DETAILS
- 19 - WELL PAD & WATER CONTAINMENT PAD RECLAMATION PLAN
- 20 - FIRM EXHIBIT

02500-02509 - GEOTECHNICAL DETAILS

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

Access Road 'X' (100') SW	Area
Access Road 'X' (100') SW	1.14
Excavation/Impoundment Stationing	8.83
Total Affected Area	4.59
Tom Wooded Acres Disturbed	14.56
Impacts to Stream C (Dipnet TM 6-6)	12.94
Access Road 'X' (23')	0.23
WVI Pad	0.12
Total Affected Area	0.27
Tom Wooded Acres Disturbed	0.27
Excavation/Impoundment Stationing	0.11
Access Road 'X' (23')	5.10
WVI Pad	2.33
Excavation/Impoundment Stationing	8.24
Total Affected Area	8.23
Impacts to Stream G & Stream L (Dipnet TM 3-16,2)	3.51
WVI Pad	1.51
Excavation/Impoundment Stationing	5.87
Total Affected Area	5.87
Tom Wooded Acres Disturbed	4.44

Proposed Well Name	W/N	E/N	UTM (EASTING)	NAD 83 UTM (NORTHING)
Unit 2F	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 2E	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 2D	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 2C	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 2B	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 2A	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1H	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1G	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1F	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1E	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1D	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1C	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1B	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1A	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432
Unit 1	N 24001.12	E 118403.07	17 79 424 432	17 79 424 432

COVER SHEET

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

DATE: 06/18/2014  
SCALE: AS SHOWN  
SHEET 1 OF 20

NAVITUS ENERGY ENGINEERING  
Telephone: (881) 622-4185 | www.NavitusEng.com

02/10/2017





# BALL WELL PAD & WATER CO AS-BUILT AND EROSION CONTROL IMPROV CENTRAL DISTRICT, DODDRIDGE CO ARNOLD CREEK & LONG RUN

USGS 7.5 WEST UNION

## LOCATION COORDINATES

ACCESS ROAD ENTRANCE  
LATITUDE: 39.301318 LONGITUDE: -80.844693 (NAD 83)  
N 4350228.53 E 513391.05 (UTM ZONE 17 METERS)

CENTER OF WATER CONTAINMENT TANK  
LATITUDE: 39.301860 LONGITUDE: -80.844044 (NAD 83)  
N 4350286.80 E 513446.93 (UTM ZONE 17 METERS)

CENTROID OF WELL PAD  
LATITUDE: 39.302220 LONGITUDE: -80.843744 (NAD 83)  
N 4350326.81 E 513472.78 (UTM ZONE 17 METERS)

## GENERAL DESCRIPTION

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

## FLOODPLAIN NOTE

THE SITE IS LOCATED IN FLOOD ZONE "X" PER FEMA MAP #54017C0115C.

## MISS UTILITY STATEMENT

ANTERO RESOURCES CORPORATION HAS NOTIFIED MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1413226892.

## ENTRANCE PERMIT

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

## ENVIRONMENTAL NOTES

WETLAND DELINEATIONS WERE PERFORMED IN AUGUST & OCTOBER 2013 BY ALLSTAR ECOLOGY, LLC TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE OCTOBER 9, 2013 STREAM AND WETLAND EXHIBIT WAS PREPARED BY ALLSTAR ECOLOGY, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE EXHIBIT DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP.

## GEOTECHNICAL NOTE

A SUBSURFACE INVESTIGATION OF THE SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. ON MAY 15, 16, 19 & 20, 2014. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED JUNE 10, 2014, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WAS USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

## PROJECT CONTACTS

### OPERATOR:

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

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

JOHN KAWCAK - OPERATIONS SUPERINTENDENT  
CELL: (917) 368-1553

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

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

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

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

### ENGINEER/SURVEYOR:

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

### ENVIRONMENTAL:

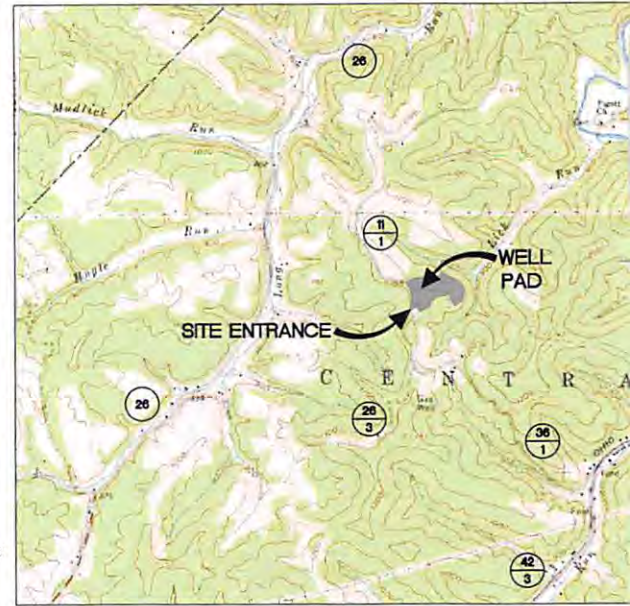
ALLSTAR ECOLOGY, LLC  
RYAN L. WARD - ENVIRONMENTAL SCIENTIST  
OFFICE: (866) 213-2666 CELL: (304) 692-7477

### GEOTECHNICAL:

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

## RESTRICTIONS NOTES:

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



2000 0  
SCALE: 1" = 2000'

## WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

## 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.

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

02/10/2017

# CONTAINMENT PAD

## ON & SEDIMENT

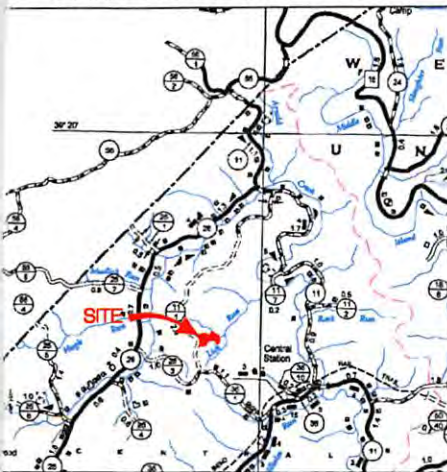
### EMENT PLAN

OUNTY, WEST VIRGINIA  
N WATERSHEDS

QUAD MAP



WVDOH COUNTY ROAD MAP



5000 0 5000  
SCALE: 1" = 5000'

#### AS-BUILT CERTIFICATIONS:

THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS CRS 35-6.

#### SHEET INDEX:

- 1 - COVER SHEET
- 2 - LEGEND
- 3 - OVERALL PLAN SHEET INDEX
- 4 - WELL PAD & WATER CONTAINMENT PAD AS-BUILT PLAN
- 5 - ACCESS ROAD PROFILE & WELL PAD SECTION

BALLI LIMITS OF DISTURBANCE AREA (AC)	
<b>Total Site</b>	
Access Road "A" (304')	1.14
Well Pad	8.83
Excess/Topsoil Material Stockpiles	4.59
<b>Total Affected Area</b>	<b>14.56</b>
<b>Total Wooded Acres Disturbed</b>	
12.94	
<b>Impacts to Susan C. Gagnon TM 6-9</b>	
Access Road "A" (23')	0.33
Well Pad	0.12
<b>Total Affected Area</b>	<b>0.45</b>
<b>Total Wooded Acres Disturbed</b>	
0.27	
<b>Impacts to Jeffrey K. Sr &amp; Charlene H. Jones TM 7-7.1</b>	
Access Road "A" (281')	0.81
Well Pad	5.10
Excess/Topsoil Material Stockpiles	2.33
<b>Total Affected Area</b>	<b>8.24</b>
<b>Total Wooded Acres Disturbed</b>	
8.23	
<b>Impacts to Stephen G. &amp; Sherry L. Bush TM 3-16.2</b>	
Well Pad	3.61
Excess/Topsoil Material Stockpiles	2.26
<b>Total Affected Area</b>	<b>5.87</b>
<b>Total Wooded Acres Disturbed</b>	
4.44	

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

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Spellman Unit 2H (Permitted Well) API #47-017-06693	N 295051.30 E 1619620.47	N 295086.15 E 1588179.32	N 4350342.16 E 513448.06	LAT 39-18-08.4928 LONG -80-50-38.5077
Rock Unit 1H (Permitted Well) API #47-017-06636	N 295051.36 E 1619630.47	N 295086.22 E 1588189.32	N 4350342.23 E 513451.10	LAT 39-18-08.4949 LONG -80-50-38.3606
Rock Unit 2H (Permitted Well) API #47-017-06637	N 295051.42 E 1619640.47	N 295086.28 E 1588199.32	N 4350342.30 E 513454.15	LAT 39-18-08.4970 LONG -80-50-38.2534
Spellman Unit 1H (Permitted Well) API #47-017-06713	N 295051.48 E 1619650.47	N 295086.34 E 1588209.32	N 4350342.37 E 513457.19	LAT 39-18-08.4991 LONG -80-50-38.1262
Ridge Unit 2H (Permitted Well) API #47-017-06717	N 295051.54 E 1619660.47	N 295086.40 E 1588219.32	N 4350342.44 E 513460.24	LAT 39-18-08.5012 LONG -80-50-37.9990
Ridge Unit 1H (Permitted Well) API #47-017-06716	N 295051.61 E 1619670.47	N 295086.47 E 1588229.32	N 4350342.51 E 513463.29	LAT 39-18-08.5033 LONG -80-50-37.3718
Boulder Unit 1H	N 295051.67 E 1619680.47	N 295086.53 E 1588239.32	N 4350342.58 E 513466.33	LAT 39-18-08.5054 LONG -80-50-37.7446
Boulder Unit 2H	N 295051.73 E 1619690.47	N 295086.59 E 1588249.32	N 4350342.65 E 513469.38	LAT 39-18-08.5075 LONG -80-50-37.6174
California Unit 1H	N 295051.79 E 1619700.47	N 295086.65 E 1588259.32	N 4350342.72 E 513472.43	LAT 39-18-08.5096 LONG -80-50-37.4902
California Unit 2H	N 295051.86 E 1619710.47	N 295086.72 E 1588269.32	N 4350342.79 E 513475.47	LAT 39-18-08.5117 LONG -80-50-37.3630
Hawk Unit 1H	N 295051.92 E 1619720.47	N 295086.78 E 1588279.32	N 4350342.86 E 513478.52	LAT 39-18-08.5138 LONG -80-50-37.2359
Hawk Unit 2H	N 295051.98 E 1619730.47	N 295086.84 E 1588289.32	N 4350342.93 E 513481.56	LAT 39-18-08.5159 LONG -80-50-37.1087
Well Pad Elevation	1,135.5			

#### NOTES:

1. ALL BMP'S MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF DISTURBANCE ARE COMPLETE AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RUNOFF EVENT IN EXCESS OF 0.5" AND ON A BIWEEKLY BASIS.
2. THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY HARD COVER SUCH AS PAVEMENT OR BUILDINGS. IT SHOULD BE NOTED THAT THE 70% REQUIREMENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE SITE.
3. ALL PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP.
4. ANY AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDED.
5. THE AS-BUILT INFORMATION SHOWN HEREON REFLECTS FIELD DATA COLLECTED RELATING TO THE FINAL GRADING OF THE DISTURBED AREA AS OF OCTOBER 26, 2015. NAVITUS ENGINEERING IS NOT RESPONSIBLE FOR ANY CHANGES MADE TO THE SITE AFTER THE ABOVE MENTIONED DATES.
6. THE EXISTING CONTAINMENT BERM AROUND THE WELL PAD SHALL BE REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.
7. THE EXISTING EGRESSES TO THE WELL PAD SHALL HAVE THE MOUNTABLE BERMS REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.

**NAVITUS**  
ENERGY ENGINEERING

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

REVISION	DATE

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

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

COVER SHEET  
PROFESSIONAL ENGINEERING  
STATE OF WEST VIRGINIA  
19/05/2015

DATE: 11/05/2015  
SCALE: AS SHOWN  
SHEET 1 OF 5

02/10/2017