

### west virginia department of environmental protection

Office of Oil and Gas 601 57th Street SE Charleston, WV 25304 (304) 926-0450 (304) 926-0452 fax Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

October 31, 2014

### WELL WORK PERMIT

### Horizontal 6A Well

This permit, API Well Number: 47-9502199, issued to ANTERO RESOURCES CORPORATION, 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 all 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 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.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-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) 926-0499 ext. 1654.

James Martin

Chief

Operator's Well No: BUCK EAST UNIT 2H

Farm Name: RIPLEY, ROBERT L. ET AL

API Well Number: 47-9502199

Permit Type: Horizontal 6A Well

Date Issued: 10/31/2014

API Number: <u>95-02199</u>

## PERMIT CONDITIONS

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

#### CONDITIONS

- 1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
- 2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
- 3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
- 4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
- 5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
- 6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
- 7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
- 8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.
- 9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.

WW-6B (9/13)

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

						470
1) Well Operat	tor: Antero Res	ources Corporation	494488557	095- Tyler	Centerville	Middlebourne 7.5'
			Operator ID	County	District	Quadrangle
2) Operator's \	Well Number: B	uck East Unit 2H	Well Pa	ad Name: Sanc	ho Pad	
3) Farm Name	Surface Owner	Ripley, Robert L.	et al Public Ro	ad Access: CR	7/6	
4) Elevation, c	urrent ground:	~1035 El	evation, proposed	l post-constructi	ion: 1026'	
5) Well Type	(a) Gas	Oil	Und	derground Stora	ge	
	Other					
	(b)If Gas Sh	nallow <b>=</b>	Deep			
	H	orizontal				
<ol><li>Existing Pac</li></ol>	d: Yes or No No	0		X-1		
		s), Depth(s), Antic inticipated Thickness-				
ALLEN THE THE	otal Vertical Der	7.5 17.384 1.58		21 250300005 9 444		
	t Total Vertical		Shale			
10) Proposed T	otal Measured I	Depth: 9700' MD				
	lorizontal Leg L	THE RESERVE THE RE				
12) Approxima	ite Fresh Water	Strata Depths:	116', 227', 398'			
13) Method to	Determine Fresl	h Water Depths:	Offset well records. D	epths have been a	djusted accord	ing to surface elevations.
	ite Saltwater De			2 200 2 200 2 200 2		
15) Approxima	nte Coal Seam D	epths: 116', 519', 1	,461'			
16) Approxima	nte Depth to Pos	sible Void (coal mi	ne, karst, other):	None anticipated	ı	
The state of the s		on contain coal sear o an active mine?	ns Yes	No	<b>V</b>	
(a) If Yes, pro	ovide Mine Info	: Name:				
		Depth:	Br	meiwer	1	
		Seam:	1.00			
		Owner:	À	6 21 14		
		The second second				

WV Dept. of Environmental Protection

WW-6B (9/13)

### 18)

## **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
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#	450'	450'	CTS, 625 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2455'	2455'	CTS, 1,000 Cu. Ft.
Intermediate			-		· · · · · · · · · · · · · · · · · · ·		
Production	5-1/2"	New	P-110	20#	9,700'	9,700'	2,274 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7,100	
Liners							

noc 9-18-14

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2°	0.361"	12630	Lead-H/POZ & Tall - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners			-			

## **PACKERS**

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

WW-6B (9/13)

19) Describe proposed well work, including the drilling and plugging back of an	ny pilot hole:
Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.	Fillenand
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### 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."

21) Total Area to be disturbe	l, including roads, stockpile area,	, pits, etc., (acres):	21.84 acres
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22) Area to be disturbed for well pad only, less access road (acres): 9.13 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.

WW-9 (9/13)

API Number 47 - 095	
Operator's We	II No. Buck East Unit 2H

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



### FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporati	on	OI	Code 494488557	Aug. 2 1 14
Watershed (HUC 10) Wheeler Run		Quadrangle Midd	dlebourne 7.5' WV	Tend of Assessment Selection (Control Control
Elevation 1026	County_Tyler		District Centerville	
Do you anticipate using more than 5,000 b Will a pit be used? Yes No _	<b>✓</b>	te the proposed well v		No
If so, please describe anticipated p Will a synthetic liner be used in the	on waste.		hat ml.? N/A	
Proposed Disposal Method For Tr		11 SO, W	nat nn.: N/A	
Land Application Underground In Reuse (at API)	on jection ( UIC Permit ) NumberFuture permitted al (Supply form WW-	well locations when applicable		) Form WR-34 ) 1 Permit #SWF-1032-98)
Will closed loop system be used? If so, de	scribe: Yes			
Orilling medium anticipated for this well (	vertical and horizontal	)? Air, freshwater, oi	based, etc. Dust/Stiff Foam	shwater, Intermediate - Production - Water Based Mud
-If oil based, what type? Syntheti	c, petroleum, etc. N/A			
Additives to be used in drilling medium?	Please See Attachment			
Orill cuttings disposal method? Leave in p		ffsite, etc. Stored in tank	ks, removed offsite and	taken to landfill.
-If left in pit and plan to solidify v			76.7465	
-Landfill or offsite name/permit n				
I certify that I understand and agron August 1, 2005, by the Office of Oil and provisions of the permit are enforceable blaw or regulation can lead to enforcement at I certify under penalty of law the application form and all attachments the obtaining the information, I believe that penalties for submitting false information,	d Gas of the West Virg y law. Violations of action. hat I have personally ereto and that, based the information is tru	ginia Department of E any term or condition examined and am far on my inquiry of the, accurate, and com	nvironmental Protect of the general perm miliar with the info nose individuals im aplete. I am aware	tion. I understand that the nit and/or other applicable rmation submitted on this mediately responsible for
Company Official Signature	leton			THA MARSH
Company Official (Typed Name) Cole Kil				RY PUBLIC F COLORADO
Company Official Title Environmental Spo	ecialist		NOTARY II	20134079428 PIRES DECEMBER 20, 2017
2 14 12 2 2 2 2 3 3 1	bth day of	August	14	
Subscribed and sworn before me this	be day of	tugust	, 20	
My commission expires W.C.M.M	ect 20,201	7		10/31/20

Form WW-9	Omanada	Well No. Buck East Unit 2
Antero Resources Corporation	Operator s	well No.
Proposed Revegetation Treatment: Acres Disturbed 21.84  Lime 2-4 Tons/acre or to correct to pH	C E	Н
Fertilizer type Hay or straw or Wood Fiber (will be used v		
500	os/acre	
Mulch 2-3 Tons/s	acre	
Access Road "A" (3.89) + Access Road "B"(3.99) + Staging Area (0.42) + We	ell Pad (9.13) + Excess/Topsoil Material Stockpiles	1(4.41) = 21.84 Existing Acres
See	d Mixtures	
Temporary	Perm	anent
Seed Type lbs/acre	Seed Type	lbs/acre
Annual Rye Grass 10	Crownvetch	10-15
*Soe attached Table 3 for additional seed type Sancho Pad Dosign Page 24)	*See attached Table 4a for additional see	ed typo Sancho Pad Design Page 24)
*or type of grass seed requested by surface owner	*or type of grass seed requ	ested by surface owner
NOTE: No Fescue or Timothy Grass shall t	pe used.	
Attach: Drawing(s) of road, location, pit and proposed area for land approvided)  Photocopied section of involved 7.5' topographic sheet.  Plan Approved by:  Comments:  Pessed 4 Mulch any  WVDEP 1egs VAgrade  Accessary.	disturbed area 4 maintain Fin	A Der

# 4709502199

### 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

Roosived

11. LD-9

Polyether Polyol – Drilling Fluid Defoamer

12. Mil Mica

Hydro-Biotite Mica – LCM

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Office of Oil and Gas WV Dept. of Environmental Protection 13. Escaid 110

Drilling Fluild Solvent - Aliphatic Hydrocarbon

14. Ligco

Highly Oxidized Leonardite - Filteration Control Agent

15. Super Sweep

Polypropylene - Hole Cleaning Agent

16. Sulfatrol K

Drilling Fluid Additive - Sulfonated Asphalt Residuum

17. Sodium Chloride, Anhydrous

**Inorganic Salt** 

18. D-D

Drilling Detergent - Surfactant

19. Terra-Rate

Organic Surfactant Blend

20. W.O. Defoam

Alcohol-Based Defoamer

21. Perma-Lose HT

Fluid Loss Reducer For Water-Based Muds

22. Xan-Plex D

Polysaccharide Polymer - Drilling Fluid Viscosifier

23. Walnut Shells

Ground Cellulosic Material - Ground Walnut Shells - LCM

24. Mil-Graphite

Natural Graphite – LCM

25. Mil Bar

Barite - Weighting Agent

26. X-Cide 102

Biocide

27. Soda Ash

Sodium Carbonate - Alkalinity Control Agent

28. Clay Trol

Amine Acid complex - Shale Stabilizer

29. Sulfatrol

Sulfonated Asphalt – Shale Control Additive

30. Xanvis

Viscosifier For Water-Based Muds

31. Milstarch

Starch - Fluid Loss Reducer For Water Based Muds

32. Mil-Lube

**Drilling Fluid Lubricant** 

Received

AUG 2 1 114

Office of Oil and Gas
WV Dept. of Environmental Protection

Michael Doff 9-18-14



# Well Site Safety Plan Antero Resources

Well Name: Seckman Unit 1H, Seckman Unit 2H, Buck East

Unit 2H, Buck East Unit 1H, Buck West Unit 2H,

Buck West Unit 1H, Lucy Unit 1H, Leaseburg

Unit 1H

Pad Location: SANCHO PAD

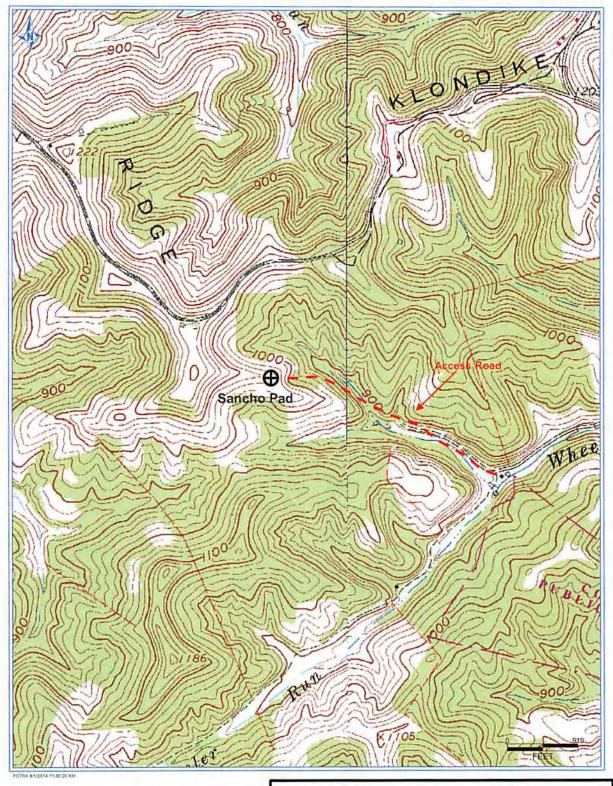
Tyler County/ Centerville District

GPS Coordinates: Lat 39°26′10.45″/Long 80°52′39.42″ (NAD83)

# **Driving Directions:**

From Clarksburg, travel approximately 25.5 miles on US-50 West. Turn right onto WV-18 North, go 0.6 miles. Turn left onto Davis Street/Old US 50 West and go 0.4 miles. Take the second right onto WV-18 North/Sistersville Pike and go 16.8 miles. Turn left onto Klondike Ridge and go 0.1 miles. Turn left onto Wheelers Run and go 2.0 miles. Entrance to the pad will be on your right.

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



# Received

AUG 21 : 14

Office of Oil and Gas WV Dept. of Environmental Protection

# **Antero Resources Corporation**

Appalachian Basin
Buck East Unit 2++
Tyler County

Quadrangle: Middlebourne

Watershed: Headwaters Middle Island Creek

District: Centerville Date: 8-1-2014

