

#### 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

November 19, 2014

#### WELL WORK PERMIT

#### Horizontal 6A Well

This permit, API Well Number: 47-9502200, 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: INGOT UNIT 1H

Farm Name: SECKMAN, LLOYD C.

API Well Number: 47-9502200

Permit Type: Horizontal 6A Well

Date Issued: 11/19/2014

API Number: 4709502200

## PERMIT CONDITIONS

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

#### **CONDITIONS**

- 1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
- 2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than 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)

4.5

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

1) Well Operato	r: Antero Reso	urces Corporation	494488557	095 - Tyler	Centerville	Shirley 7.5'
			Operator ID	County	District	Quadrangle
2) Operator's W	ell Number: Ing	ot Unit 1H	Well Pac	l Name: Existin	ng Pierpoin	t Pad
3) Farm Name/S	Surface Owner:	Seckman, Lloyd	C. Public Roa	d Access: CR	46/1	
4) Elevation, cu	rrent ground:	1201' Ele	evation, proposed	-	-	
5) Well Type	(a) GasI Other	Oil	Unde	erground Storag	ge	
	(b)If Gas Sha	llow =	Deep			1 1 2
Start State of the Start All		rizontal =				Michael 2 9-3-1
6) Existing Pad:	-			-		9-3-
		), Depth(s), Antici				*
Marcellus Sha	le: 6900' TVD, An	ticipated Thickness-	55 feet, Associated	Pressure- 2800#	ĝ.	
<ol><li>Proposed Tot</li></ol>	al Vertical Dept	h: 6900' TVD				
<ol><li>Formation at</li></ol>	Total Vertical D	Pepth: Marcellus S	Shale			
10) Proposed To	otal Measured D	epth: 14,700' MD	)			
11) Proposed H	orizontal Leg Le	ngth: 7249'				
12) Approximat	e Fresh Water S	trata Depths:	280'			
13) Method to I	Determine Fresh	Water Depths: V	Weigle Unit 1H (API#	‡ 47-095-02126) d	on same pad	
14) Approximat	e Saltwater Dep	ths: 770', 1591'	·			
15) Approximat	e Coal Seam De	pths: _896'				
16) Approximat	e Depth to Possi	ble Void (coal mi	ne, karst, other):	None anticipated		
		n contain coal sear an active mine?	ms Yes	No	<b>√</b>	
(a) If Yes, pro	vide Mine Info:	Name:				
		Depth:				
		Seam:				
		Owner:				

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#	330'	330'	CTS, 458 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2450'	2450'	CTS, 998 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	14,700'	14,700'	3650 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7,100'	
Liners							

NA 3.14

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"		1520	Class A	
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 & Tail - 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 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."
21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 22.29 existing acres
21) Total Filed to be distribute, merading round, stockpile men, pro, etc., (acres).
22) Area to be disturbed for well pad only, less access road (acres): 3.18 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.

WW-9 (9/13)

API Number 47 -	095	• ,
Operator's	Well No.	Ingot 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 _494488557
Watershed (HUC 10)Tributary of Middle Island Creek Quadrangle	Shirley 7.5'
Elevation 1201' County Tyler	District_Centerville
Do you anticipate using more than 5,000 bbls of water to complete the proposed we Will a pit be used? Yes No V  If so, please describe anticipated pit waste:  Will a synthetic liner be used in the pit? Yes No V  If so Proposed Disposal Method For Treated Pit Wastes:  Land Application  Underground Injection (UIC Permit Number  Reuse (at API Number Future permitted well locations when appl Off Site Disposal (Supply form WW-9 for disposal locations of the Carplain)	ook Fluids will be stored in tanks. Cuttings will be tanked and hauled off site.)  O, what ml.? N/A
Will closed loop system be used? If so, describe: Yes  Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater	
-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	n tanks, removed offsite and taken to landfill.
-If left in pit and plan to solidify what medium will be used? (cement, lim	
-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-103	32-98)
I certify that I understand and agree to the terms and conditions of the GI on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of provisions of the permit are enforceable by law. Violations of any term or conditional law or regulation can lead to enforcement action.  I certify under penalty of law that I have personally examined and am application form and all attachments thereto and that, based on my inquiry of obtaining the information, I believe that the information is true, accurate, and penalties for submitting false information, including the possibility of fine or impri	of Environmental Protection. I understand that the ition of the general permit and/or other applicable a familiar with the information submitted on this of those individuals immediately responsible for complete. I am aware that there are significant
Company Official Signature	
Company Official (Typed Name) Evan Foster	
Company Official Title Environmental Representative	
Subscribed and sworn before me thisday of	, 20 Notary Public
My commission expires	

Form WW-9

Form WW-9			Operator's Well	No. Ingot Unit 1	
Antero Resources	Corporation				
Proposed Revegetation Treatm	ent: Acres Disturbed 22.29 (	existing)	_ 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 wh	gere needed)			
Fertilizer amount 50	0lbs/	/acre			
Mulch 2-3	Tons/ac	ere			
	onstruction (3.18) + Auxillary Pad Construction n (2.88) + Additional Clearing (10.80) = 22,29		Impoundment Construction (4.0	5) + Access Road	
Tem	porary	<del></del>	Permaner	at	
Seed Type	lbs/acre		Seed Type	lbs/acre	
Tall Fescue	45	Tall Fe	scue	45	
Perennial Rye Gras	s 20	Perenni	20		
*or type of grass seed requ	ested by surface owner	*or type of grass seed requested by surface owner			
Photocopied section of involve  Plan Approved by: Media  Comments: Present	at A. John and	d'st	inched a	greas	
per WV I	DEP regulations.				
			***		
Title: 0, 1 & G	V Yes (	Date: 9	-3-121		

#### 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

Received

AUG 2 1 114

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

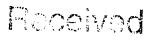
Viscosifier For Water-Based Muds

31. Milstarch

Starch - Fluid Loss Reducer For Water Based Muds

32. Mil-Lube

**Drilling Fluid Lubricant** 



AUG 2 1 7 14



# 911 ADDRESS: 314 JUG RUN ROAD ALMA, WEST VIRGINIA 26320

# Well Site Safety Plan Antero Resources

Well Name: Klondike Unit 3H, Klondike Unit 2H, Klondike

Unit 1H, Weigle Unit 1H, Ingot Unit 1H, Ingot

Unit 2H, Wall Unit 1H, Wall Unit 2H

Pad Location: PIERPOINT PAD

Tyler County/ Centerville District

GPS Coordinates: Lat 39°27′07.57"/Long 80°51′31.66" (NAD83)

# **Driving Directions:**

From Sistersville, at the intersection of Diamond Street and Chelsea Street, head southwest on Chelsea Street and follow for about 1 mile. Turn left onto WV-18 South/Tyler Highway and follow for about 20 miles (passing through Middlebourne). Turn right onto County Road 46/Klondike Ridge and follow for about 2 miles. Turn right onto County Road 46/1/Jug Run and go approximately 0.3 miles. Access road will be on the right.

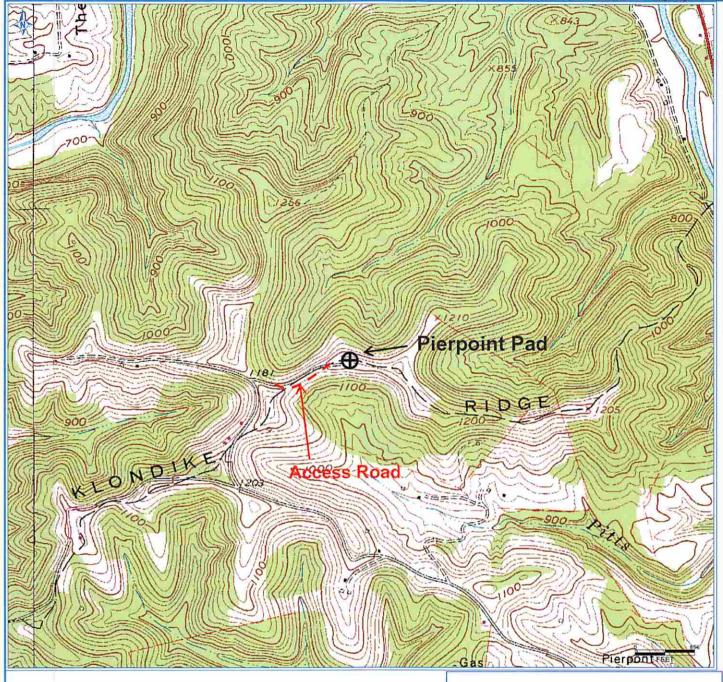
From Pennsboro, at the intersection of Main Street and Collins Avenue, head north on Main Street and take the first right onto Wells Avenue. Road turns left and becomes 1<sup>st</sup> Street. Follow for approximately 0.1 miles. Take a slight right onto WV-74 North/Mountain Drive and follow for approximately 10.8 miles. Continue onto WV-18 North and follow for approximately 4.5 miles. Turn left onto County Road 46/Klondike Ridge and follow for approximately 2miles. Turn right onto County Road 46/1/Jug Run and go approximately 0.3 miles. Access road will be on the right.

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

<del>11/21/2014</del>

Mchal D-M 9-3-4

4709502200



# Received

AUG 21 114

Office of Oil and Gas WV Dept of Environmental Protection

# Antero Resources Corporation

#### APPALACHIAN BASIN

Ingot Unit 1H Tyler County

#### REMARKS

QUADRANGLE: Shirley 7.5' WATERSHED:TRIB. OF MIDDLE ISLAND CR

DISTRICT: Centerville

Date: 7/11/2013 1/21/2014

