

#### 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

January 26, 2015

#### WELL WORK PERMIT

#### Horizontal 6A Well

This permit, API Well Number: 47-1706655, 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: MCCUE UNIT 1H

Farm Name: WILLIAMS, LARRY ET AL

API Well Number: 47-1706655

Permit Type: Horizontal 6A Well

Date Issued: 01/26/2015

#### 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</u> 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)

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

1) Well Operat	tor: Antero	Resources Co	rporation	494488557	017 - Doddridge	Grant	Smithburg 7.5'
				Operator ID	County	District	Quadrangle
2) Operator's V	Well Numbe	r: McCue Uni	t1H	Well Pad	Name: Existin	ng Revival	Pad
3) Farm Name	/Surface Ow	ner: Larry W	illiams et	al Public Road	d Access: CR	30	
4) Elevation, c	urrent groun	d: <u>1,375</u> '	Ele	evation, proposed p	oost-construction	on: 1,375'	
5) Well Type	(a) Gas Other		Oil	Unde	rground Storag	ge	
	(b)If Gas	Shallow	В	Dеер			21 N a. 7
6) Existing Pad	i: Yes or No	Horizontal Yes					20,29.2
			3 322	pated Thickness ar 55 feet, Associated I		Pressure(s)	: 10
8) Proposed To	tal Vertical	Depth: 7,400	0,				·
9) Formation at	t Total Verti	cal Depth: _	/arcellus S	hale			
10) Proposed T	otal Measur	ed Depth: _1	5,700'				
11) Proposed H	lorizontal Le	eg Length: 6	,962'				
12) Approxima	te Fresh Wa	ter Strata Dep	ths:	450'			
13) Method to 1 14) Approxima			epths: <u>G</u> 79', 1808'	ains-Koch Unit 1H (/	API# 47-017-062	18) on same	pad.
15) Approxima	te Coal Sear	n Depths: 32	28', 863'				
16) Approxima	te Depth to I	Possible Void	(coal min	ie, karst, other): _	lone Anticipated		
17) Does Propo directly overlyi				Yes	No	<b>7</b>	
(a) If Yes, pro	vide Mine I	nfo: Name:					
		Depth:					
		Seam:					
		Owner:					

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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#	510'	510' * See # 19	CTS, 708 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2,450'	2,450'	CTS, 998 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	15,700'	15,700'	3,925 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7,100'	
Liners							

10-20-2016

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 & 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	

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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.  *Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."
21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 15.45 Existing Acres
22) Area to be disturbed for well pad only, less access road (acres):  4.95 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.
and the state of t
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 bbis fresh water, pump 48 bbis barite pill, pump 10 bbis fresh water followed by 48 bbis mud flush and 10 bbis water.
*Note: Attach additional sheets as needed.
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WW-9 (9/13)

API Number	47 -	017	•	
Ope	rator's	Well No.	McCue 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) Wolfpen Run Quadrangle St	mithburg 7.5'
Elevation 1375' County Doddridge	District_Grant
Do you anticipate using more than 5,000 bbls of water to complete the proposed well Will a pit be used? Yes No	work? Yes No
If so, please describe anticipated pit waste: No pit will be used at this site (Drilling & Flow Will a synthetic liner be used in the pit? Yes No✓ 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 application Off Site Disposal (Supply form WW-9 for disposal location Other (Explain)	what ml.? N/A    O 7 7 7 0 1 7 1 7 0 1 7 1 7 0 1 7 1 7 0 1 7 1 7
Will closed loop system be used? If so, describe: Yes  Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, of the original of the second	Surface - Aliffreshwater, Intermediate - Distant Feam, Production - Water Based Mad
Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Stored in ta	riks, removed offsite and taken to landfill
-If left in pit and plan to solidify what medium will be used? (cement, lime,	1000 H
-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-1032-	
I certify that I understand and agree to the terms and conditions of the GEN 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 condition law or regulation can lead to enforcement action.  I certify under penalty of law that I have personally examined and am fa 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 compensations for submitting false information, including the possibility of fine or imprison	Environmental Protection. I understand that the on of the general permit and/or other applicable amiliar with the information submitted on this those individuals immediately responsible for applete. I am aware that there are significant
Company Official Signature  Company Official (Typed Name) Evan Foster	NOTARY ID 20144028112
	MY COMMISSION EXPIRES JULY 17, 2018
Company Official Title Environmental Representative	
Subscribed and sworn before me this 15th day of October  Megan Danling  My commission expires July 17, 2018	, 20
	JANAN 02 2018 015

**^** Office of Oil and Gas WV Dept. of <mark>6¶//30∮20¶/5</mark>ection

Form WW-9		Omaratowa Wal	I No. McCue Unit 1
Antero Resources Co	orporation	Operator's wei	TNO.
Proposed Revegetation Treatment	: Acres Disturbed 15.45 E	Existing Acres Prevegetation pH	
	Tons/acre or to correct to pH	121 122	
	w or Wood Fiber (will be used v	where needed)	
Fertilizer amount 500		os/acre	
Mulch 2-3	Tons/a	acre	
Existing Road A (6,36) + Existing	g Drill Pad (4.95) + Existing W	Vater Tank Pad (2.24) + Existing Spoil Pad (	1.90) = 15.45 Existing Acres
	Seed	d Mixtures	
Tempo	rary	Permane	nt
Seed Type Tall Fescue	lbs/acre 45	Seed Type Tall Fescue	lbs/acre 45
Perennial Rye Grass	20	Perennial Rye Grass	20
*or type of grass seed reques	ted by surface owner	*or type of grass seed request	ed by surface owner
Photocopied section of involved 7  Plan Approved by: Dougo  Comments: Secol + M		Torbed areas moini	tain EtS
Fitle: Oil + bas ins		Date: 10 - 28 - 201	
Field Reviewed?	) Yes (	) No	
			Rec

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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 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** 

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WM Debt, at Eastronmartal Protection



#### 911 ADDRESS: 3193 Morgans Run Rd West Union, WV 26456

# Well Site Safety Plan Antero Resources

Well Name: Gains Unit 1H, Gains Unit 2H, Gains-Koch Unit

1H, Koch Unit 2H, McCue Unit 1H, McCue Unit 2H, Milo Unit 1H, Mt. Salem Rev. Unit 1H, Mt.

Salem Rev. Unit 2H, Rollins Unit 1H

Pad Location: REVIVAL PAD

Doddridge County/ Grant District

GPS Coordinates: Lat 39°19'27.11"/Long 80°41'24.34" (NAD83)

#### **Driving Directions:**

From Smithburg, head East on US-50 for ~1.7 miles. Turn left onto Co Route 20 (Morgans Run). After 1.5 miles, road name becomes Co Route 30 (Israels Fork/Wolf Pen), continue for 1.6 more miles. Turn right onto Main Camp Rd (Access Road). Drive for approximately 0.6 miles to top of access road/Pad site.

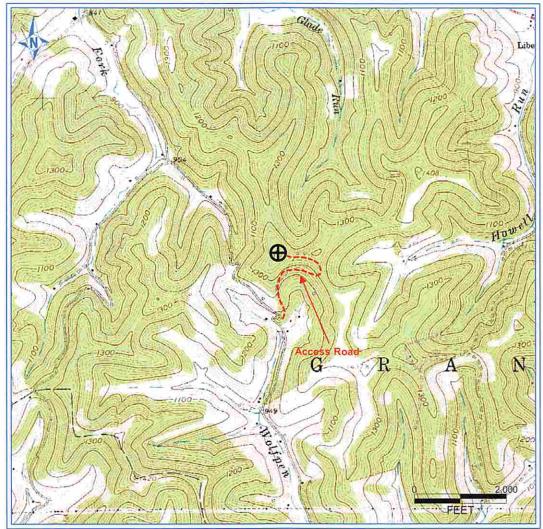
**EMERGENCY (24 HOUR) CONTACT 1-800-878-1373** 

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