

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

April 25, 2014

WELL WORK PERMIT Horizontal 6A Well

This permit, API Well Number: 47-9502174, 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: SCARDINA UNIT 4H

Farm Name: WEIGLE, EDWIN C.

API Well Number: 47-9502174

Permit Type: Horizontal 6A Well

Date Issued: 04/25/2014

API Number: 95-02174

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 will require permit coverage from the United States Army Corps of Engineers (USACE) and WV DEP Department of Water and Waste Management (DWWM). No activity authorized under this permit shall be commenced until all necessary permits from USACE and DWWM are obtained.
- 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.

WW-6B (9/13)

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

1) Well Operator: Antero Resources Corporation						-	60 1
2) Operator's Well Number: Scardina Unit 4H	1) Well Operat	tor: Antero Re	sources Corporation	494488557	095- Tyler	Ellsworth	Shirley 7.5'
Second Part				Operator ID	County	District	Quadrangle
A) Elevation, current ground: —814'	2) Operator's V	Well Number:	Scardina Unit 4H	Well Pa	nd Name: Weigl	e East Pad	
Other (b)If Gas Shallow Deep Horizontal Marcellus Shale: 6600' TVD, Anticipated Thickness and Associated Pressure(s): Marcellus Shale: 6600' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2800# By Proposed Total Vertical Depth: 6600' TVD Formation at Total Vertical Depth: Marcellus Shale Proposed Total Measured Depth: 17,000' MD Proposed Horizontal Leg Length: 9,863' Approximate Fresh Water Strata Depths: 9', 194', 366' Marcellus Shale Shale Proposed Horizontal Leg Length: 1931', 1136' Marcellus Shale Proposed Horizontal Leg Length: 1931', 1136' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: 1380', 1461' Marcellus Shale Nopposition at Total Vertical Depths: Nopposition at	3) Farm Name	/Surface Owner	Edwin C. Weigle	Public Ro	ad Access: CR	18/14 & Ter	np CR 46/1
Other (b) If Gas Shallow Horizontal Horizontal Bisspire Space of Space of No No To Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s): Marcellus Shale: 6600' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2800# By Proposed Total Vertical Depth: 6600' TVD Formation at Total Vertical Depth: Marcellus Shale Dy Proposed Total Measured Depth: 17,000' MD Proposed Horizontal Leg Length: 9,863' Approximate Fresh Water Strata Depths: 9', 194', 366' Method to Determine Fresh Water Depths: 1931', 1136' Approximate Saltwater Depths: 1931', 1136' Approximate Coal Seam Depths: 1380', 1461' Approximate Depth to Possible Void (coal mine, karst, other): None anticipated Depth:	4) Elevation, c	urrent ground:	~814' Ele	evation, proposed	l post-constructi	on: 814'	
Deep Horizontal Deep Horizontal Ho	5) Well Type	(a) Gas	Oil	Und	lerground Storag	ge	
Horizontal Horizontal		Other _					
5) Existing Pad: Yes or No 7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s): Marcellus Shale: 6600' TVD, Anticipated Thickness- 55 feet, Associated Pressure-2800# 3) Proposed Total Vertical Depth: 6600' TVD 4) Formation at Total Vertical Depth: Marcellus Shale 17,000' MD 11) Proposed Horizontal Leg Length: 9,863' 22) Approximate Fresh Water Strata Depths: 9', 194', 366' 3) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations. 4) Approximate Saltwater Depths: 1380', 1461' 5) Approximate Coal Seam Depths: 1380', 1461' 6) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated 7) Does Proposed well location contain coal seams lirectly overlying or adjacent to an active mine? Yes No Depth: Depth: Seam:		(b)If Gas S	hallow	Deep	-		
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2) Approximate Fresh Water Strata Depths: 9', 194', 366' 3) Method to Determine Fresh Water Depths: 1931', 1136' 5) Approximate Coal Seam Depths: 1380', 1461' 6) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated 7) Does Proposed well location contain coal seams lirectly overlying or adjacent to an active mine? Yes No No No Seam:	10) Proposed T	otal Measured	Depth: 17,000' MD				
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Depth: Seam:					No.	V	
Seam:	(a) If Yes, pro	ovide Mine Info	: Name:				
			Depth:				
Owner:)	Seam:				
	//	11	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#	60'	60'	CTS, 58 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	440'	440' *see #19	CTS, 611 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2470'	2470'	CTS, 1006 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	17,000'	17,000'	4276 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

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	NEDA

J. 12-14

Office of Oil and Gas

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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 therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure that all fresh water the casing setting depth which helps to ensure the casing setting the casing setting depth which helps to ensure the casing setting setting the casing setting settin	s encountered, er zones are covered.
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and	d max rate:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for prodube comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose at the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."	ction. The fluid will dditives as shown in
21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 37.37 acres	3
22) Area to be disturbed for well pad only, less access road (acres): 3.08 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 to surface.	hole
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.	e.
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 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 bbis fresh water.	IED, Gas
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulat fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.	e pipe capacity 40 bbls
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing	circulate 40 bblabrine
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 sweep, trip to to be seen trip to to one for the base of sweep.	30, 200
sweep, trip to top or caree, trip to portorn, circulate, paritp fight discosity sweep, trip out, tan casing, circulate to bbis4620 A	wates bump 48 bbls CL
barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.	Mr. Still, State

*Note: Attach additional sheets as needed.

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

	sources Corporation OP Code 494488557
Watershed (HUC 10) Tribu	stary of Middle Island Creek Quadrangle Shirley 7.5'
Elevation 814'	County_Tyler District_ Ellsworth
Do you anticipate using more	re than 5,000 bbls of water to complete the proposed well work? Yes No No No
If so, please describ	be 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 haused off site.
Will a synthetic lin	er be used in the pit? Yes No If so, what ml.? N/A
Proposed Disposal	Method For Treated Pit Wastes:
t	and Application Underground Injection (UIC Permit Number) Leuse (at API Number Future permitted well locations when applicable, API# will be provided on Form WR-34)
C	Off Site Disposal (Supply form WW-9 for disposal location) (Meadowfill Landfill Permit #SWF-1032-98) Other (Explain
Will closed loop system be u	used? If so, describe: Yes
Orilling medium anticipated	for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Dust/Stiff Foam, Production - Water Based Mud
-If oil based, what	type? Synthetic, petroleum, etc. N/A
	ing medium? Please See Attachment
	od? Leave in pit, landfill, removed offsite, etc. Stored in tanks, removed offsite and taken to landfill.
	an to solidify what medium will be used? (cement, lime, sawdust) N/A
	name/permit number? Meadowfill Landfill (Permit #SWF-1032-98)
and the contract of the contra	
I certify that I unde	rstand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued
on August 1, 2005, by the Oppovisions of the permit are aw or regulation can lead to I certify under penumpplication form and all at obtaining the information, I	alty of law that I have personally examined and am familiar with the information submitted on this tachments thereto and that, based on my inquiry of those individuals immediately responsible for believe that the information is true, accurate, and complete. I am aware that there are significant including the possibility of fine or imprisonment.
on August 1, 2005, by the Operovisions of the permit are aw or regulation can lead to I certify under pen pplication form and all at obtaining the information, I denalties for submitting falso. Company Official Signature	ffice of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the enforceable by law. Violations of any term or condition of the general permit and/or other applicable enforcement action. alty of law that I have personally examined and am familiar with the information submitted on this tachments thereto and that, based on my inquiry of those individuals immediately responsible for believe that the information is true, accurate, and complete. I am aware that there are significant information including the possibility of fine or imprisonment.
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Andrew Blanch and Andrew Brown	Operator's W	_{ell No.} Scardina Ur
Antero Resources Corporation		
Proposed Revegetation Treatment: Acres Disturbed 37.3	Prevegetation pH	
Lime 2-3 Tons/acre or to correct to	_{pH} 6.5	
Fertilizer type Hay or straw or Wood Fiber (will be use	ed where needed)	
Fertilizer amount 500	_lbs/acre	
2-3	ns/acre	
New Well Pad (3.08) + New Tank Pad (1.79) + New Auxiliary Pad (1.23) +	+ New Access Road (8.65) + Topsoil Stockpile (2.53) +	Additional Clearing (20,09)= 37,37
<u>s</u>	Seed Mixtures	
Temporary	Perman	ent
Seed Type lbs/acre Annual Rye 40	Seed Type Fox Tail/ Grassy	lbs/acre 40
	Perennial Rye	30
*or type of grass seed requested by surface owner	Crown Vetch	20
	*or type of grass seed requeste	d by surface owner
Attach: Drawing(s) of road, location, pit and proposed area for land provided)		
Attach: Drawing(s) of road, location, pit and proposed area for land provided) Photocopied section of involved 7.5' topographic sheet. Plan Approved by: Comments:		
Attach: Drawing(s) of road, location, pit and proposed area for land provided) Photocopied section of involved 7.5' topographic sheet. Plan Approved by:	application (unless engineered plans incl	

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

Office of Oil and Gas

MAR 1 4 2014

WV Department 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

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Office of Oil and Gas

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WV Department of
Environmental Protection

04/25/2014





Well Site Safety Plan Antero Resources

Well Name: Hawkeye Unit 1H, Hawkeye Unit 2H, Hawkeye Unit 3H, Scardina Unit 1H, Scardina Unit 2H, Scardina Unit 3H, Scardina Unit 4H, Dean Unit 1H, Dean Unit 2H, Goodfellow Unit 1H and Goodfellow Unit 2H

Pad Location: WEIGLE EAST PAD

Tyler County/ Ellsworth District

GPS Coordinates: Lat 39°27′58.60"/Long -80°51′09.51" (NAD83)

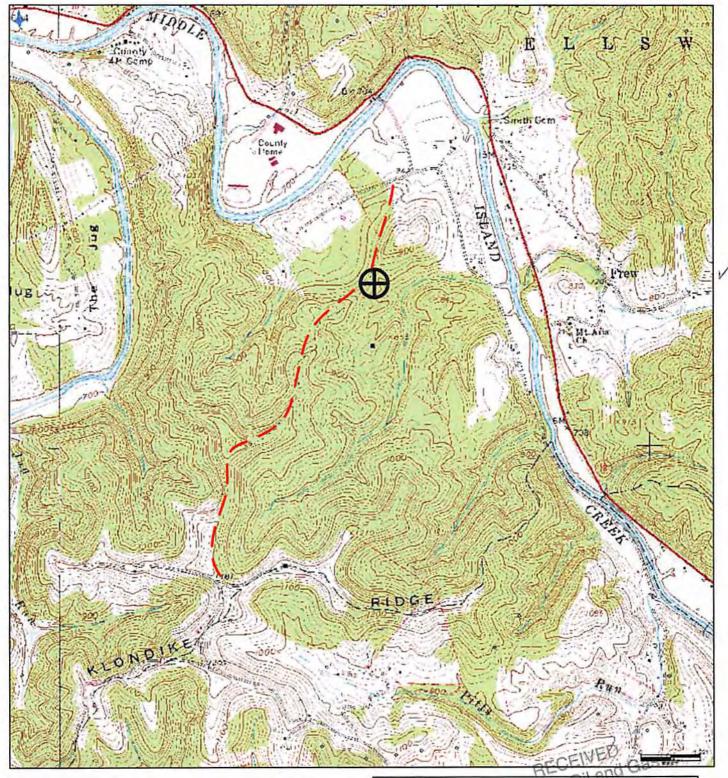
Driving Directions:

Main Access:

From US Route 50, turn onto WV Route 18 (towards West Union). Follow WV Route 18 North for 22.8 miles. Turn Left onto County Route 18/7 (Lemasters Bridge Road). Follow County Route 18/7 for .3 miles. Turn Right onto County Route 18/4. Follow County Route 18/4 for .1 miles. The site entrance will be on the left (South) side of the road.

Temporary Access:

From US Route 50, turn onto WV Route 18 North (towards West Union). Follow WV Route 18 North for 17.8 miles. Turn Left onto County Route 46 (Klondike Ridge). Follow County Route 46 for 2 miles. Turn Right onto County Route 46/1. Follow County Route 46/1 for .3 miles. The temporary site entrance will be on the Right (North) side of the road. (Near the existing Pierpoint Site Entrance).



Antero Resources Corporation Appalachian Basin 2014 Scardina Unit 4H

Tyler County partment of WY Protection Quadrangle: Smithburg
Watershed: Gorrell Run Run Filliddle Island Creek
District: Ellsworth
Date: 02/21/2014

