



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

June 26, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-1706266, issued to ANTERO RESOURCES APPALACHIAN 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: MARKS UNIT 1H
Farm Name: VOGT, GREGORY R. & CAROLYN
API Well Number: 47-1706266
Permit Type: Horizontal 6A Well
Date Issued: 06/26/2013

Promoting a healthy environment.

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. 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.
2. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the fill material shall be within plus or minus 2% (unless soil test results show a greater range of moisture content is appropriate and 95% compaction can still be achieved) of the optimum moisture content as determined by the standard proctor density test, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. Each lift must meet 95 % compaction of the optimum density based on results from the standard proctor density test of the actual soils used in specific engineered fill sites. 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.
3. 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.
4. 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.
5. 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.

WW - 6B
(3/13)

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

1) Well Operator: Antero Resources Appalachian Corporation 494488557 017-Doddridge Central West Union 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Marks Unit 1H Well Pad Name: Vogt Pad

3 Elevation, current ground: ~1118' Elevation, proposed post-construction: 1109'

4) Well Type: (a) Gas Oil Underground Storage
Other _____
(b) If Gas: Shallow Deep
Horizontal

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 6,800' TVD, Anticipated Thickness- 60 Feet, Feet, Associated Pressure- 3,100#

7) Proposed Total Vertical Depth: 6800' TVD

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 18500' MD

10) Approximate Fresh Water Strata Depths: 164', 186'

11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.

12) Approximate Saltwater Depths: 1581', 1872'

13) Approximate Coal Seam Depths: None Reported

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

17) Describe fracturing/stimulating methods in detail:
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."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 11.52 acres

19) Area to be disturbed for well pad only, less access road (acres): 2.57 acres

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(3/13)

20)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per 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#	310'	310'	CTS, 431 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2535'	2535'	CTS, 1036 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18,500'	18,500'	4663 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		6,900'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
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			

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- 21) 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.
-
- 22) Describe all cement additives associated with each cement type. _____
- ✓ Conductor: no additives, Class A cement.
- Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat
- 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
-
- 23) 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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WV Department of
Environmental Protection

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Appalachian Corporation OP Code 494488557

Watershed (HUC 10) Tributary of Wilhelm Run Quadrangle West Union 7.5'

Elevation 1109' County Doddridge District Central

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

Will a pit be used for drill cuttings? Yes No X (*An associated frac pit will be used for flowback fluids)

If so, please describe anticipated pit waste: Drilling and Flowback Fluids

Will a synthetic liner be used in the pit? Yes X No If so, what ml.? 60 mil

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number)
- Reuse (at API Number Future permitted well locations when applicable. API# will be provided on Form WR-34)
- Off Site Disposal (Meadowfill Landfill Permit #SWF-1032-98)
- Other (Explain)

Will closed loop system be used? Yes

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Surface - Air/Freshwater, Intermediate - Dust/Stiff 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)

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 understand that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature *Cole Kilstrom* APR 12 2013

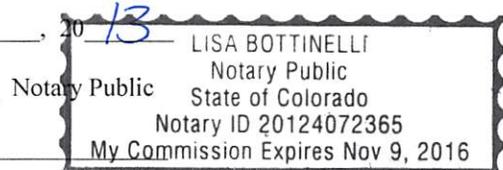
Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental Specialist

**WV Department of
Environmental Protection**

Subscribed and sworn before me this 8 day of April, 2013

J. Bottinelli



My commission expires 11/9/16

Form WW-9

Operator's Well No. Marks Unit 1H

Antero Resources Appalachian Corporation

Proposed Revegetation Treatment: Acres Disturbed 11.52 Prevegetation pH _____

Lime 4 Tons/acre or to correct to pH 6.5

Fertilizer (10-20-20 or equivalent) 500 lbs/acre (500 lbs minimum)

Mulch 2-3 Tons/acre Hay or straw or Wood Fiber (will be used where needed)

Access Road (2.65) + Drill Pad (2.57) + Gathering Facilities (1.27) + Spoil Pad A (.68) + Spoil Pad B (.95) + Frac Pit (3.40) + = 11.52 Acres
Seed Mixtures

Seed Type	Area I (Temporary)		Seed Type	Area II (Permanent)	
	lbs/acre			lbs/acre	
Tall Fescue	45		Tall Fescue	45	
Perennial Rye Grass	20		Perennial Rye Grass	20	
*or type of grass seed requested by surface owner			*or type of grass seed requested by surface owner		

Attach:
Drawing(s) of road, location, pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Douglas Newton

Comments: Keep ERS in place

Title: Oil & Gas inspector Date: 4-17-2013

Field Reviewed? () Yes (/) No

Received
Office of Oil & Gas

APR 23 2013



Water Management Plan: Primary Water Sources



WMP-01189

API/ID Number:

047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Important:

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP’s assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator’s responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

APPROVED MAY 28 2013

Source Summary

WMP- 01189

API Number:

047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Stream/River

● Source **Ohio River @ Ben's Run Withdrawal Site** Owner: **Ben's Run Land Company Limited Partnership**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000		39.46593	-81.110781

Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999999 Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm): **3,360** Min. Gauge Reading (cfs): **6,468.00** Min. Passby (cfs)

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: <http://www.erh.noaa.gov/ohrfc//flows.shtml>

● Source **West Fork River @ JCP Withdrawal** Owner: **James & Brenda Raines**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000		39.320913	-80.337572

Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): **2,000** Min. Gauge Reading (cfs): **175.00** Min. Passby (cfs) **146.25**

DEP Comments:

● Source **West Fork River @ McDonald Withdrawal** Owner: **David Shrieves**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000		39.16761	-80.45069

Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): **3,000** Min. Gauge Reading (cfs): **175.00** Min. Passby (cfs) **106.30**

DEP Comments:

Source **West Fork River @ GAL Withdrawal** Owner: **David Shrieves**
 Start Date: 8/6/2014 End Date: 8/6/2015 Total Volume (gal): 12,080,000 Max. daily purchase (gal): Intake Latitude: 39.16422 Intake Longitude: -80.45173
 Regulated Stream? **Stonewall Jackson Dam** Ref. Gauge ID: **3061000** **WEST FORK RIVER AT ENTERPRISE, WV**
Max. Pump rate (gpm): 2,000 Min. Gauge Reading (cfs): 175.00 Min. Passby (cfs) 106.30
 DEP Comments:

Source **Middle Island Creek @ Dawson Withdrawal** Owner: **Gary D. and Rella A. Dawson**
 Start Date: 8/6/2014 End Date: 8/6/2015 Total Volume (gal): 12,080,000 Max. daily purchase (gal): Intake Latitude: 39.379292 Intake Longitude: -80.867803
 Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**
Max. Pump rate (gpm): 3,000 Min. Gauge Reading (cfs): 76.03 Min. Passby (cfs) 28.83
 DEP Comments:

Source **McElroy Creek @ Forest Withdrawal** Owner: **Forest C. & Brenda L. Moore**
 Start Date: 8/6/2014 End Date: 8/6/2015 Total Volume (gal): 12,080,000 Max. daily purchase (gal): Intake Latitude: 39.39675 Intake Longitude: -80.738197
 Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**
Max. Pump rate (gpm): 1,000 Min. Gauge Reading (cfs): 74.77 Min. Passby (cfs) 13.10
 DEP Comments:

Source **McElroy Creek @ Sweeney Withdrawal** Owner: **Bill Sweeney**
 Start Date: 8/6/2014 End Date: 8/6/2015 Total Volume (gal): 12,080,000 Max. daily purchase (gal): Intake Latitude: 39.398123 Intake Longitude: -80.656808
 Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV
 Max. Pump rate (gpm): **1,000** Min. Gauge Reading (cfs): **69.73** Min. Passby (cfs) **6.66**
 DEP Comments:

Source **Meathouse Fork @ Gagnon Withdrawal** Owner: **George L. Gagnon and Susan C. Gagnon**
 Start Date: 8/6/2014 End Date: 8/6/2015 Total Volume (gal): 12,080,000 Max. daily purchase (gal): Intake Latitude: 39.26054 Intake Longitude: -80.720998
 Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV
 Max. Pump rate (gpm): **1,000** Min. Gauge Reading (cfs): **71.96** Min. Passby (cfs) **11.74**
 DEP Comments:

Source **Meathouse Fork @ Whitehair Withdrawal** Owner: **Elton Whitehair**
 Start Date: 8/6/2014 End Date: 8/6/2015 Total Volume (gal): 12,080,000 Max. daily purchase (gal): Intake Latitude: 39.211317 Intake Longitude: -80.679592
 Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV
 Max. Pump rate (gpm): **1,000** Min. Gauge Reading (cfs): **69.73** Min. Passby (cfs) **7.28**
 DEP Comments:

Source **Tom's Fork @ Erwin Withdrawal**

Owner: **John F. Erwin and Sandra E. Erwin**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000		39.174306	-80.702992

Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 0.59**

DEP Comments:

Source **Arnold Creek @ Davis Withdrawal**

Owner: **Jonathon Davis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000		39.302006	-80.824561

Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 3.08**

DEP Comments:

Source **Buckeye Creek @ Powell Withdrawal**

Owner: **Dennis Powell**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000		39.277142	-80.690386

Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 4.59**

DEP Comments:

● Source **South Fork of Hughes River @ Knight Withdrawal**

Owner: **Tracy C. Knight & Stephanie C. Knight**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000		39.198369	-80.870969

Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Max. Pump rate (gpm): **3,000** Min. Gauge Reading (cfs): **39.80** Min. Passby (cfs) **1.95**

DEP Comments:

● Source **North Fork of Hughes River @ Davis Withdrawal**

Owner: **Lewis P. Davis and Norma J. Davis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000		39.322363	-80.936771

Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Max. Pump rate (gpm): **1,000** Min. Gauge Reading (cfs): **35.23** Min. Passby (cfs) **2.19**

DEP Comments:

Source Summary

WMP-01189

API Number:

047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Purchased Water

● Source **Middle Island Creek @ Solo Construction** Owner: **Solo Construction, LLC**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000	1,000,000	39.399094	-81.185548

Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999999 Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm): Min. Gauge Reading (cfs): **6,468.00** Min. Passby (cfs)

DEP Comments:

Elevation analysis indicates that this location has the same elevation as Middle Island Creek's pour point into the Ohio River. As such, it is deemed that water flow at this location is heavily influenced by the Ohio River.

● Source **Sun Valley Public Service District** Owner: **Sun Valley PSD**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/6/2014	8/6/2015	12,080,000	200,000	-	-

Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): Min. Gauge Reading (cfs): **171.48** Min. Passby (cfs)

DEP Comments:

Source Detail

WMP- 01189

API/ID Number: 047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Source ID: 16838 Source Name Middle Island Creek @ Solo Construction
Solo Construction, LLC

Source Latitude: 39.399094

Source Longitude: -81.185548

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 25000

County: Pleasants

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm) 0

Endangered Species? Mussel Stream?

Trout Stream? Tier 3?

Regulated Stream? Ohio River Min. Flow

Proximate PSD? City of St. Marys

Gauged Stream?

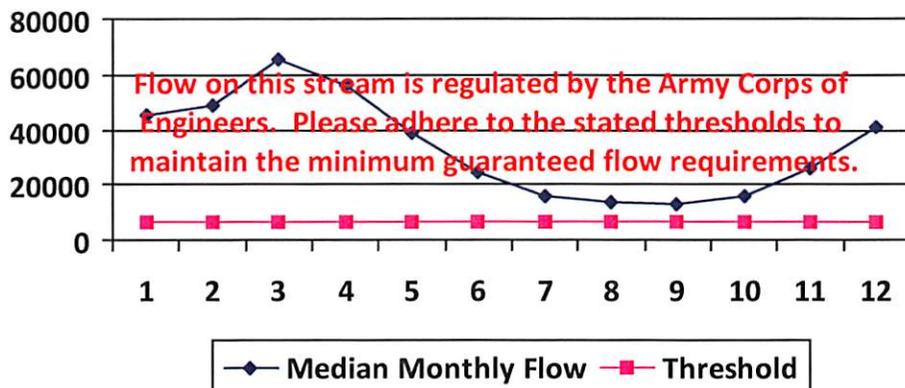
Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.) 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs):

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16839 Source Name: Sun Valley Public Service District Sun Valley PSD Source Latitude: - Source Longitude: -

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 391.85 County: Harrison

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Total Volume from Source (gal): 12,080,000

Endangered Species? Mussel Stream?

Trout Stream? Tier 3?

Regulated Stream? Stonewall Jackson Dam

Proximate PSD?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Gauged Stream?

Max. Truck pump rate (gpm):

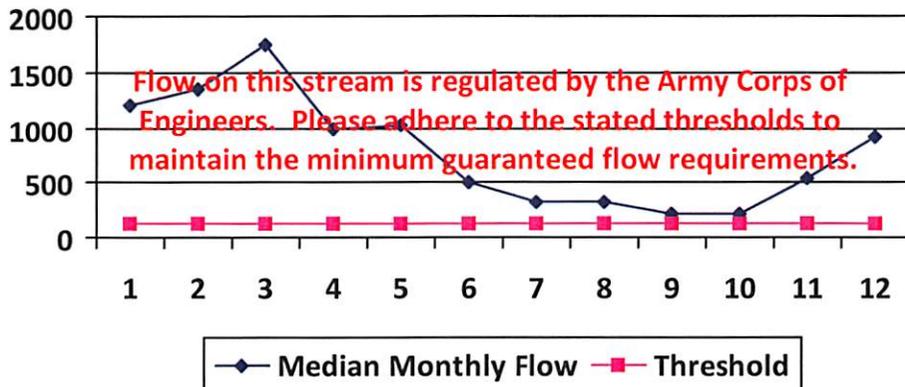
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	1,200.75	-	-
2	1,351.92	-	-
3	1,741.33	-	-
4	995.89	-	-
5	1,022.23	-	-
6	512.21	-	-
7	331.86	-	-
8	316.87	-	-
9	220.48	-	-
10	216.17	-	-
11	542.45	-	-
12	926.12	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16824 Source Name: Ohio River @ Ben's Run Withdrawal Site
 Ben's Run Land Company Limited Partnership

Source Latitude: 39.46593
 Source Longitude: -81.110781

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 25000 County: Tyler

Anticipated withdrawal start date: 8/6/2014
 Anticipated withdrawal end date: 8/6/2015

- Endangered Species?
- Trout Stream?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?
- Mussel Stream?
- Tier 3?

Ohio River Min. Flow

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 3,360

Max. Simultaneous Trucks: 0

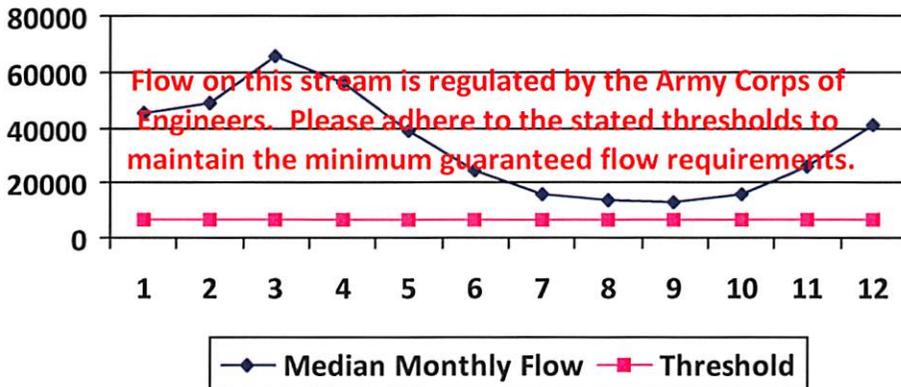
Max. Truck pump rate (gpm): 0

Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00 Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -
 Upstream Demand (cfs): 0.00
 Downstream Demand (cfs): 0.00
 Pump rate (cfs): 7.49
 Headwater Safety (cfs): 0.00
 Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -
 Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16825 Source Name: West Fork River @ JCP Withdrawal
James & Brenda Raines

Source Latitude: 39.320913
Source Longitude: -80.337572

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 532.2 County: Harrison

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 12,080,000

Trout Stream?

Tier 3?

Max. Pump rate (gpm): 2,000

Regulated Stream?

Stonewall Jackson Dam

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

Gauged Stream?

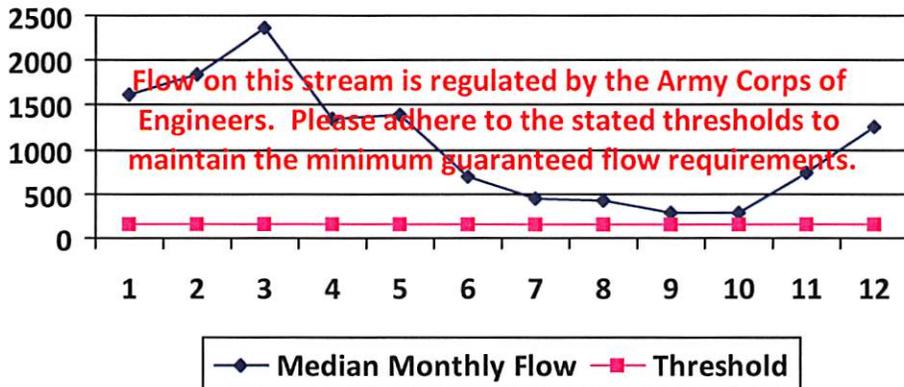
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	1,630.82	-	-
2	1,836.14	-	-
3	2,365.03	-	-
4	1,352.59	-	-
5	1,388.37	-	-
6	695.67	-	-
7	450.73	-	-
8	430.37	-	-
9	299.45	-	-
10	293.59	-	-
11	736.74	-	-
12	1,257.84	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 24.29

Downstream Demand (cfs): 0.00

Pump rate (cfs): 4.46

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16826 Source Name: West Fork River @ McDonald Withdrawal
David Shrieves Source Latitude: 39.16761
Source Longitude: -80.45069

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 314.91 County: Harrison

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 12,080,000

Trout Stream?

Tier 3?

Max. Pump rate (gpm): 3,000

Regulated Stream? Stonewall Jackson Dam

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

Gauged Stream?

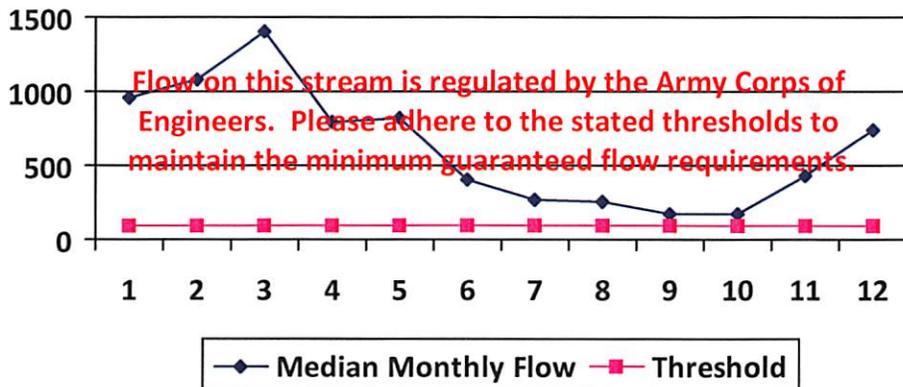
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	964.98	-	-
2	1,086.47	-	-
3	1,399.42	-	-
4	800.34	-	-
5	821.52	-	-
6	411.64	-	-
7	266.70	-	-
8	254.66	-	-
9	177.19	-	-
10	173.72	-	-
11	435.94	-	-
12	744.28	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 24.29

Downstream Demand (cfs): 0.00

Pump rate (cfs): 6.68

Headwater Safety (cfs): 24.27

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01189 API/ID Number: 047-017-06266 Operator: Antero Resources

Marks Unit 1H

Source ID: 16827 Source Name: West Fork River @ GAL Withdrawal
 Source Latitude: 39.16422
 Source Longitude: -80.45173

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 313.67 County: Harrison

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream? Stonewall Jackson Dam
- Proximate PSD?
- Gauged Stream?

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 2,000

Max. Simultaneous Trucks: 0

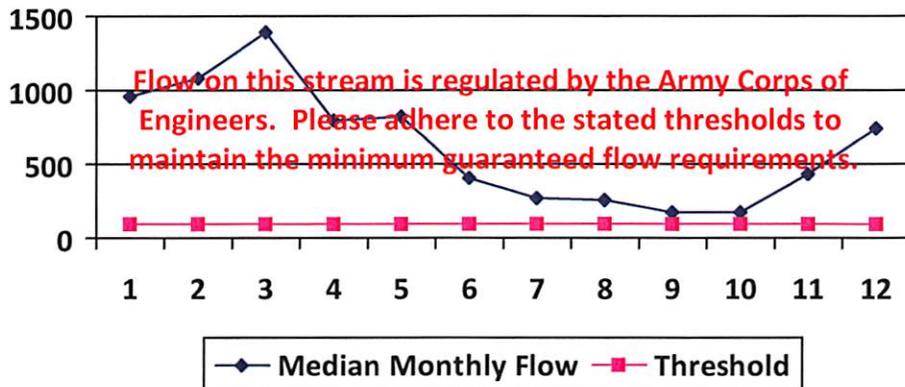
Max. Truck pump rate (gpm): 0

Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00 Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	961.18	-	-
2	1,082.19	-	-
3	1,393.91	-	-
4	797.19	-	-
5	818.28	-	-
6	410.02	-	-
7	265.65	-	-
8	253.65	-	-
9	176.49	-	-
10	173.04	-	-
11	434.22	-	-
12	741.35	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 24.29

Downstream Demand (cfs): 0.00

Pump rate (cfs): 4.46

Headwater Safety (cfs): 24.18

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01189

API/ID Number: 047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Source ID: 16828 Source Name: Middle Island Creek @ Dawson Withdrawal
Gary D. and Rella A. Dawson

Source Latitude: 39.379292

Source Longitude: -80.867803

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 181.34 County: Tyler

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 3,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

- Endangered Species?
- Trout Stream?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?
- Mussel Stream?
- Tier 3?

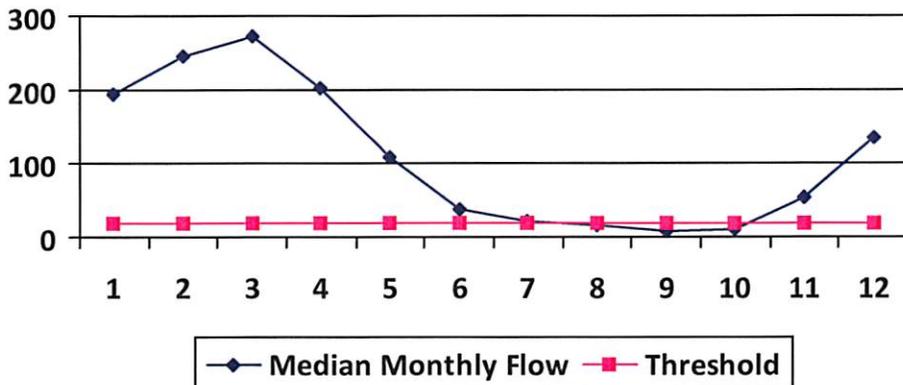
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	194.47	42.06	152.68
2	244.62	42.06	202.83
3	273.72	42.06	231.93
4	203.26	42.06	161.47
5	107.22	42.06	65.43
6	37.44	42.06	-4.35
7	21.19	42.06	-20.60
8	17.45	42.06	-24.34
9	8.94	42.06	-32.85
10	11.23	42.06	-30.56
11	54.82	42.06	13.04
12	133.96	42.06	92.17

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 17.82

Upstream Demand (cfs): 13.10

Downstream Demand (cfs): 6.55

Pump rate (cfs): 6.68

Headwater Safety (cfs): 4.45

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 76.03

Passby at Location (cfs): 28.82

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16829 Source Name: McElroy Creek @ Forest Withdrawal
Forest C. & Brenda L. Moore

Source Latitude: 39.39675
Source Longitude: -80.738197

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 88.85 County: Tyler

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

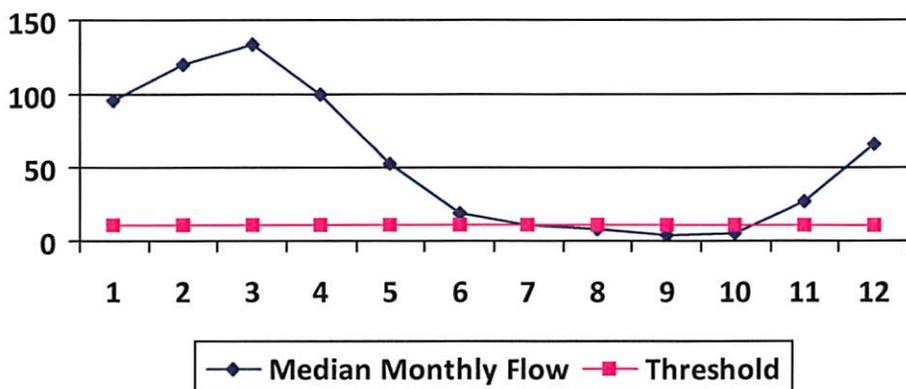
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	95.28	19.78	75.68
2	119.86	19.78	100.25
3	134.11	19.78	114.51
4	99.59	19.78	79.99
5	52.54	19.78	32.93
6	18.35	19.78	-1.26
7	10.38	19.78	-9.22
8	8.55	19.78	-11.05
9	4.38	19.78	-15.23
10	5.50	19.78	-14.10
11	26.86	19.78	7.26
12	65.63	19.78	46.03

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 8.73

Upstream Demand (cfs): 4.46

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 2.18

Ungauged Stream Safety (cfs): 2.18

Min. Gauge Reading (cfs): 74.19

Passby at Location (cfs): 13.09

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01189

API/ID Number: 047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Source ID: 16830 Source Name: McElroy Creek @ Sweeney Withdrawal
Bill Sweeney

Source Latitude: 39.398123
Source Longitude: -80.656808

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 45.16 County: Doddridge

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

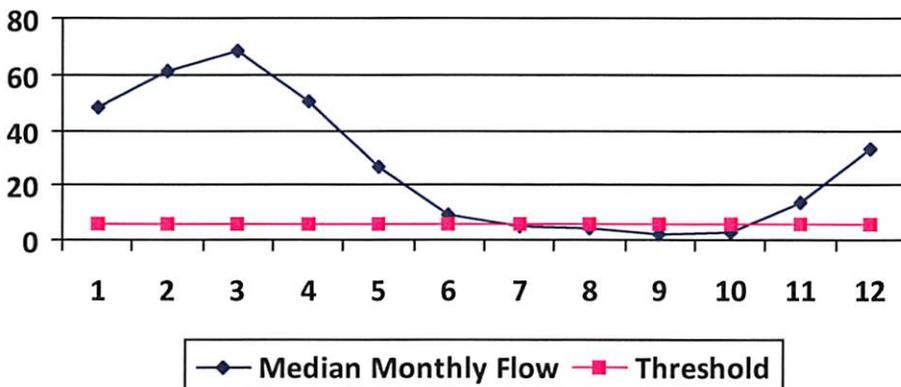
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	48.43	8.88	39.93
2	60.92	8.88	52.42
3	68.17	8.88	59.67
4	50.62	8.88	42.12
5	26.70	8.88	18.21
6	9.32	8.88	0.83
7	5.28	8.88	-3.22
8	4.34	8.88	-4.15
9	2.23	8.88	-6.27
10	2.80	8.88	-5.70
11	13.65	8.88	5.16
12	33.36	8.88	24.86

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 4.44

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 1.11

Ungauged Stream Safety (cfs): 1.11

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 6.66

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16831 Source Name: Meathouse Fork @ Gagnon Withdrawal
George L. Gagnon and Susan C. Gagnon

Source Latitude: 39.26054
Source Longitude: -80.720998

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 60.6 County: Doddridge

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

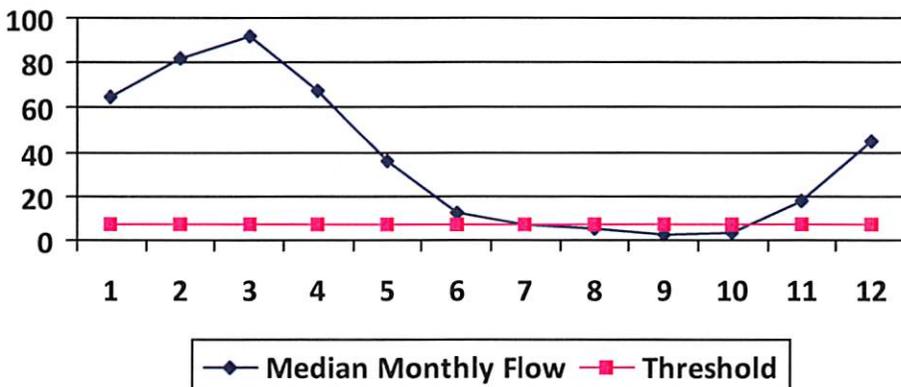
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	64.99	13.39	51.70
2	81.75	13.39	68.46
3	91.47	13.39	78.19
4	67.93	13.39	54.64
5	35.83	13.39	22.55
6	12.51	13.39	-0.77
7	7.08	13.39	-6.20
8	5.83	13.39	-7.45
9	2.99	13.39	-10.30
10	3.75	13.39	-9.53
11	18.32	13.39	5.04
12	44.76	13.39	31.48

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 5.95

Upstream Demand (cfs): 2.23

Downstream Demand (cfs): 2.81

Pump rate (cfs): 2.23

Headwater Safety (cfs): 1.49

Ungauged Stream Safety (cfs): 1.49

Min. Gauge Reading (cfs): 71.96

Passby at Location (cfs): 11.74

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01189

API/ID Number: 047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Source ID: 16832 Source Name Meathouse Fork @ Whitehair Withdrawal
Elton Whitehair

Source Latitude: 39.211317

Source Longitude: -80.679592

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 30.37 County: Doddridge

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

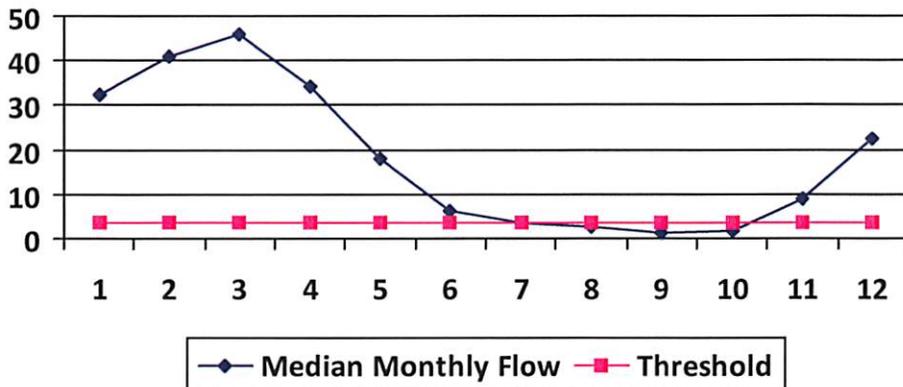
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	32.57	6.70	26.15
2	40.97	6.70	34.55
3	45.84	6.70	39.42
4	34.04	6.70	27.62
5	17.96	6.70	11.54
6	6.27	6.70	-0.15
7	3.55	6.70	-2.87
8	2.92	6.70	-3.50
9	1.50	6.70	-4.92
10	1.88	6.70	-4.54
11	9.18	6.70	2.76
12	22.43	6.70	16.01

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 2.98

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 2.81

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.75

Ungauged Stream Safety (cfs): 0.75

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 7.29

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16833 Source Name: Tom's Fork @ Erwin Withdrawal
 John F. Erwin and Sandra E. Erwin Source Latitude: 39.174306
 Source Longitude: -80.702992

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 4.01 County: Doddridge

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

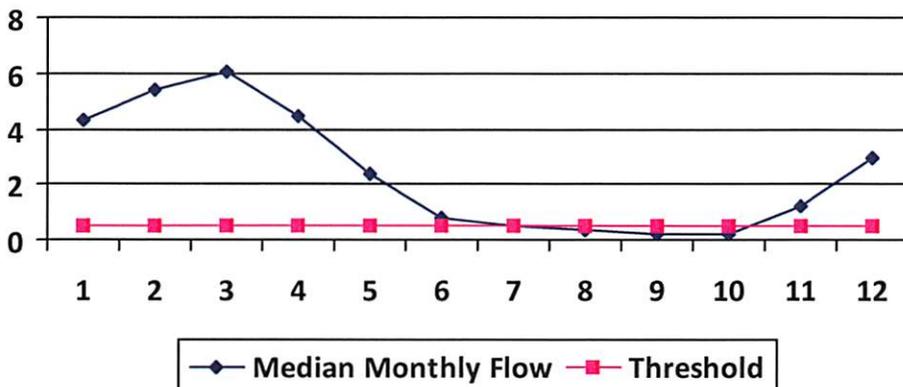
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	4.30	2.82	1.88
2	5.41	2.82	2.98
3	6.05	2.82	3.63
4	4.49	2.82	2.07
5	2.37	2.82	-0.05
6	0.83	2.82	-1.60
7	0.47	2.82	-1.96
8	0.39	2.82	-2.04
9	0.20	2.82	-2.23
10	0.25	2.82	-2.18
11	1.21	2.82	-1.21
12	2.96	2.82	0.54

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 0.39

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.10

Ungauged Stream Safety (cfs): 0.10

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 0.59

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16834 Source Name: Arnold Creek @ Davis Withdrawal
 Jonathon Davis Source Latitude: 39.302006
 Source Longitude: -80.824561

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 20.83 County: Doddridge

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 12,080,000

Trout Stream? Tier 3?

Max. Pump rate (gpm): 1,000

Regulated Stream?

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

Gauged Stream?

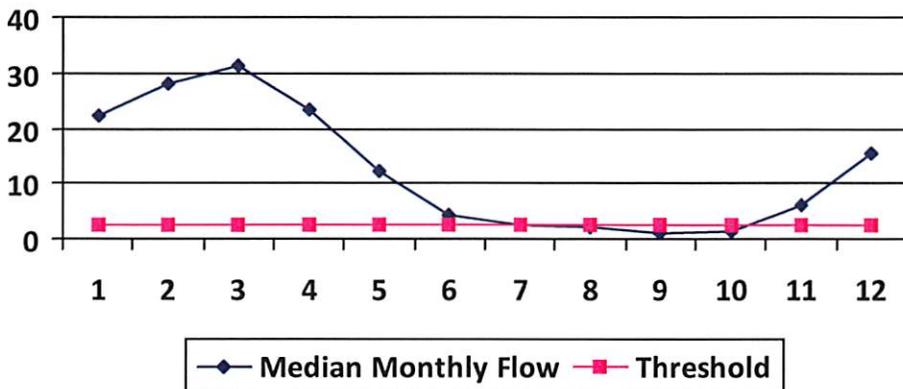
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	22.34	5.30	17.29
2	28.10	5.30	23.05
3	31.44	5.30	26.39
4	23.35	5.30	18.30
5	12.32	5.30	7.26
6	4.30	5.30	-0.75
7	2.43	5.30	-2.62
8	2.00	5.30	-3.05
9	1.03	5.30	-4.03
10	1.29	5.30	-3.76
11	6.30	5.30	1.25
12	15.39	5.30	10.34

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 2.05

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.51

Ungauged Stream Safety (cfs): 0.51

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 3.07

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16835 Source Name: Buckeye Creek @ Powell Withdrawal
Dennis Powell

Source Latitude: 39.277142
Source Longitude: -80.690386

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 31.15 County: Doddridge

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Total Volume from Source (gal): 12,080,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

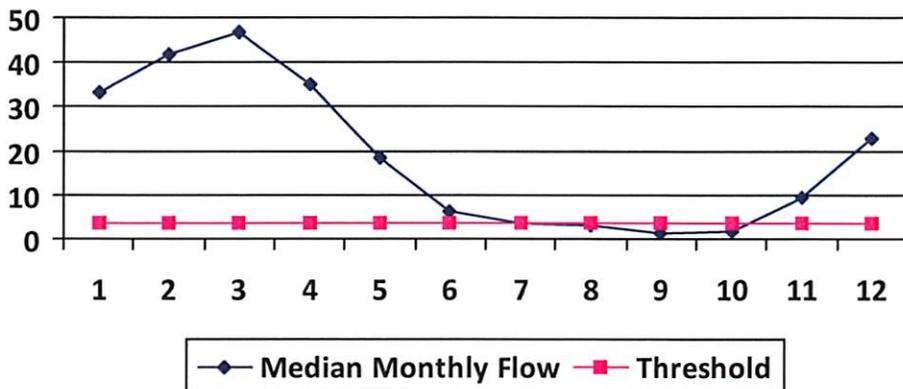
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	33.41	6.82	26.95
2	42.02	6.82	35.56
3	47.02	6.82	40.56
4	34.92	6.82	28.46
5	18.42	6.82	11.96
6	6.43	6.82	-0.03
7	3.64	6.82	-2.82
8	3.00	6.82	-3.46
9	1.53	6.82	-4.92
10	1.93	6.82	-4.53
11	9.42	6.82	2.96
12	23.01	6.82	16.55

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 3.06

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.77

Ungauged Stream Safety (cfs): 0.77

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 4.59

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01189

API/ID Number: 047-017-06266

Operator: Antero Resources

Marks Unit 1H

Source ID: 16836 Source Name: South Fork of Hughes River @ Knight Withdrawal
Tracy C. Knight & Stephanie C. Knight

Source Latitude: 39.198369

Source Longitude: -80.870969

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 16.26 County: Ritchie

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 12,080,000

Trout Stream?

Tier 3?

Max. Pump rate (gpm): 3,000

Regulated Stream?

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

Gauged Stream?

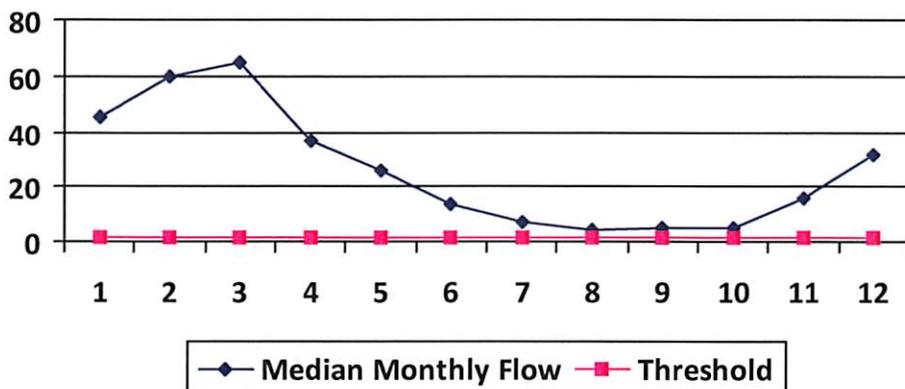
Reference Gaug: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.): 229.00

Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45.67	14.26	31.44
2	59.55	14.26	45.31
3	65.21	14.26	50.97
4	36.87	14.26	22.63
5	25.86	14.26	11.63
6	13.90	14.26	-0.33
7	6.89	14.26	-7.34
8	3.98	14.26	-10.25
9	4.79	14.26	-9.45
10	5.20	14.26	-9.04
11	15.54	14.26	1.30
12	32.06	14.26	17.82

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 1.56

Upstream Demand (cfs): 5.62

Downstream Demand (cfs): 0.00

Pump rate (cfs): 6.68

Headwater Safety (cfs): 0.39

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 39.80

Passby at Location (cfs): 1.95

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01189 API/ID Number: 047-017-06266 Operator: Antero Resources
 Marks Unit 1H

Source ID: 16837 Source Name: North Fork of Hughes River @ Davis Withdrawal Source Latitude: 39.322363
 Lewis P. Davis and Norma J. Davis Source Longitude: -80.936771

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 15.18 County: Ritchie

Anticipated withdrawal start date: 8/6/2014

Anticipated withdrawal end date: 8/6/2015

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 12,080,000

Trout Stream?

Tier 3?

Max. Pump rate (gpm): 1,000

Regulated Stream?

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

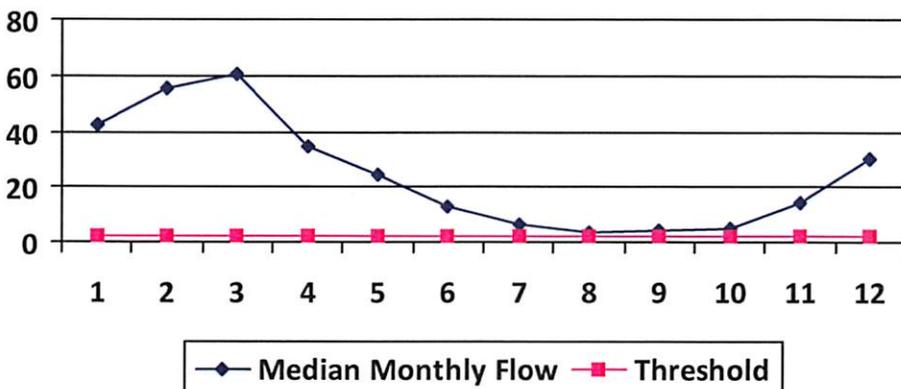
Gauged Stream?

Reference Gaug: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.): 229.00 Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	42.64	4.42	38.36
2	55.59	4.42	51.32
3	60.88	4.42	56.60
4	34.42	4.42	30.14
5	24.15	4.42	19.87
6	12.98	4.42	8.70
7	6.44	4.42	2.16
8	3.72	4.42	-0.56
9	4.47	4.42	0.19
10	4.85	4.42	0.57
11	14.50	4.42	10.23
12	29.93	4.42	25.65

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 1.46

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.36

Ungauged Stream Safety (cfs): 0.36

Min. Gauge Reading (cfs): 35.23

Passby at Location (cfs): 2.19

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



Water Management Plan: Secondary Water Sources



WMP-01189	API/ID Number	047-017-06266	Operator:	Antero Resources
Marks Unit 1H				

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Lake/Reservoir

Source ID:	16840	Source Name	City of Salem Reservoir (Lower Dog Run)		Source start date:	8/6/2014
			Public Water Provider		Source end date:	8/6/2015
Source Lat:	39.28834	Source Long:	-80.54966	County	Harrison	
Max. Daily Purchase (gal)	1,000,000	Total Volume from Source (gal):	12,080,000			
DEP Comments:						

WMP- 01189

API/ID Number

047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:	16841	Source Name	Pennsboro Lake		Source start date:	8/6/2014
					Source end date:	8/6/2015
Source Lat:	39.281689	Source Long:	-80.925526	County	Ritchie	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	12,080,000			
DEP Comments:						

Source ID:	16842	Source Name	Powers Lake (Wilderness Water Park Dam)		Source start date:	8/6/2014
					Source end date:	8/6/2015
Source Lat:	39.255752	Source Long:	-80.463262	County	Harrison	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	12,080,000			
DEP Comments:						

WMP-01189

API/ID Number

047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:	16843	Source Name	Powers Lake Two		Source start date:	8/6/2014
					Source end date:	8/6/2015
Source Lat:	39.247604	Source Long:	-80.466642	County	Harrison	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	12,080,000			
DEP Comments:						

WMP-01189

API/ID Number

047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Other

Source ID: 16844 Source Name Poth Lake (Landowner Pond) Source start date: 8/6/2014
 Private Owner Source end date: 8/6/2015

Source Lat: 39.221306 Source Long: -80.463028 County Harrison

Max. Daily Purchase (gal) Total Volume from Source (gal): 12,080,000

DEP Comments:

Source ID: 16845 Source Name Williamson Pond (Landowner Pond) Source start date: 8/6/2014
 Source end date: 8/6/2015

Source Lat: 39.19924 Source Long: -80.886161 County Ritchie

Max. Daily Purchase (gal) Total Volume from Source (gal): 12,080,000

DEP Comments:

WMP-01189

API/ID Number

047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:	16846	Source Name	Eddy Pond (Landowner Pond)		Source start date:	8/6/2014
					Source end date:	8/6/2015
	Source Lat:	39.19924	Source Long:	-80.886161	County	Ritchie
	Max. Daily Purchase (gal)		Total Volume from Source (gal):	12,080,000		
DEP Comments:						

Source ID:	16847	Source Name	Hog Lick Quarry Industrial Facility		Source start date:	8/6/2014
					Source end date:	8/6/2015
	Source Lat:	39.419272	Source Long:	-80.217941	County	Marion
	Max. Daily Purchase (gal)	1,000,000	Total Volume from Source (gal):	12,080,000		
DEP Comments:						

WMP-01189

API/ID Number

047-017-06266

Operator:

Antero Resources

Marks Unit 1H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 16848 Source Name: Glade Fork Mine Industrial Facility Source start date: 8/6/2014 Source end date: 8/6/2015

Source Lat: 38.965767 Source Long: -80.299313 County: Upshur

Max. Daily Purchase (gal): 1,000,000 Total Volume from Source (gal): 12,080,000

DEP Comments:

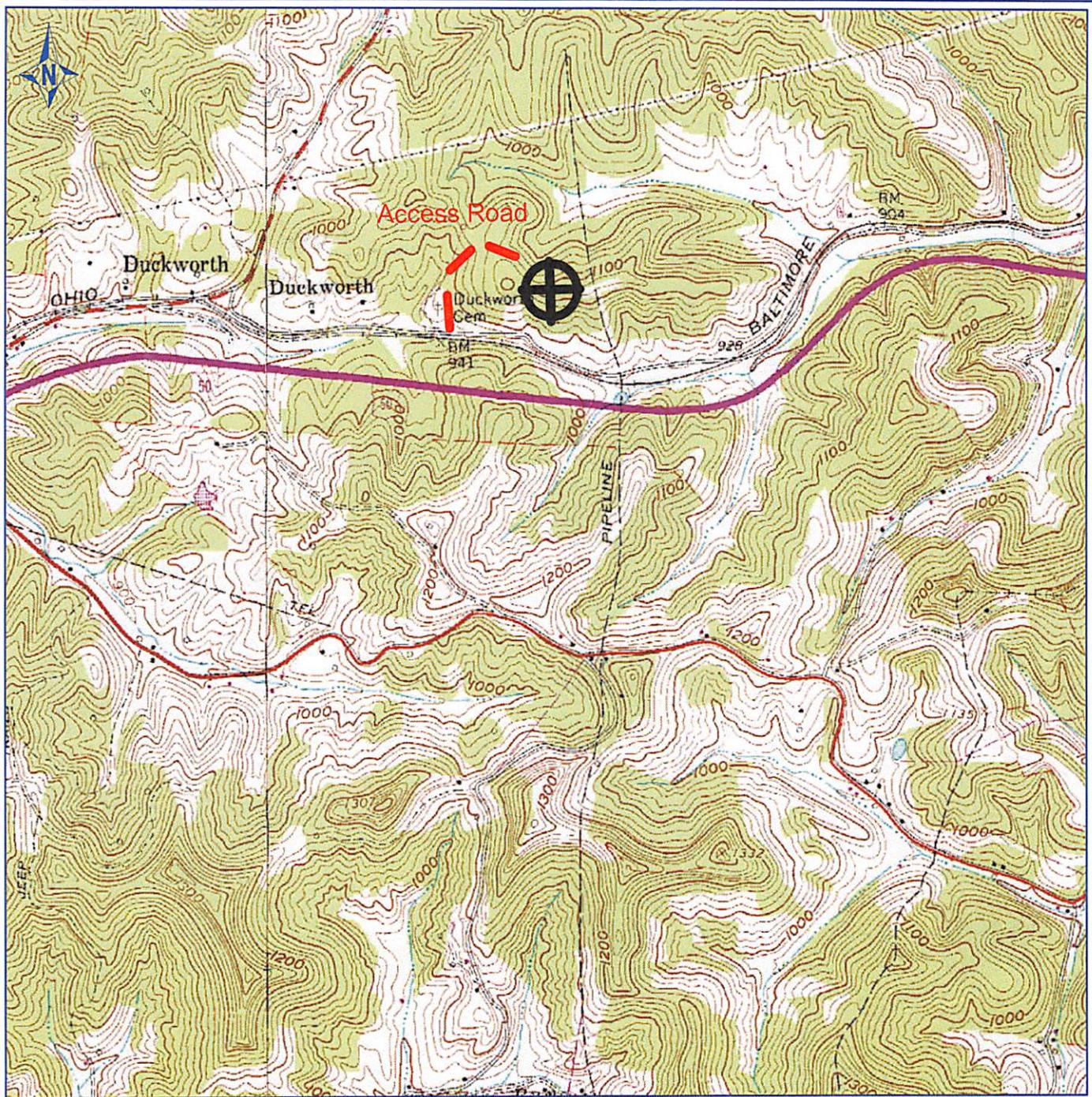
Recycled Frac Water

Source ID: 16849 Source Name: West Union 123H Source start date: 8/6/2014 Source end date: 8/6/2015

Source Lat: Source Long: County:

Max. Daily Purchase (gal): Total Volume from Source (gal): 12,080,000

DEP Comments:



PETRA 10/19/2012 9:31:07 AM

ANTERO RESOURCES CORPORATION

APPALACHIAN BASIN

Marks Unit 1H



REMARKS
QUADRANGLE: WEST UNION
WATERSHED: TRIB. OF WILHELM RUN
DISTRICT: CENTRAL

October 19, 2012

RECEIVED
Office of Oil and Gas

APR 12 2013

WV Department of
Environmental Protection

LATITUDE 39°17'30"

8,250'

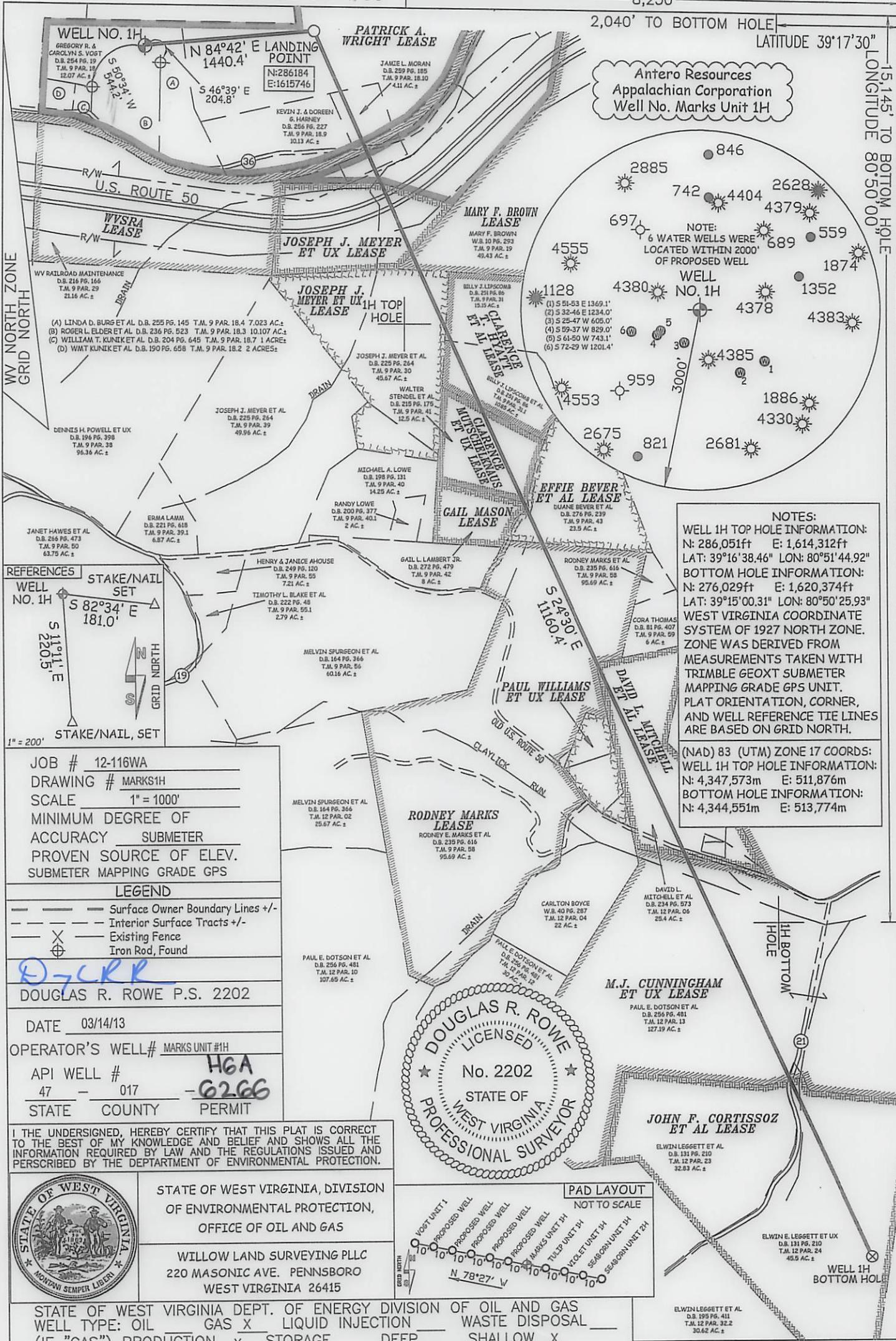
2,040' TO BOTTOM HOLE

LATITUDE 39°17'30"

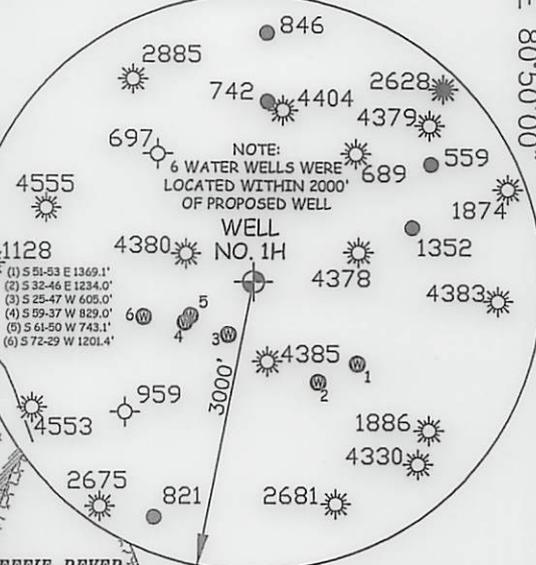
LONGITUDE 80°50'00"

5,215'

LONGITUDE 80°50'00"



Antero Resources
Appalachian Corporation
Well No. Marks Unit 1H



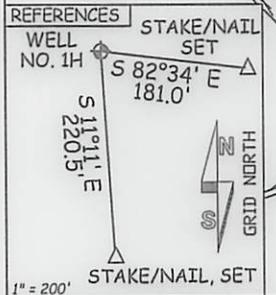
NOTES:

WELL 1H TOP HOLE INFORMATION:
N: 286,051ft E: 1,614,312ft
LAT: 39°16'38.46" LON: 80°51'44.92"

BOTTOM HOLE INFORMATION:
N: 276,029ft E: 1,620,374ft
LAT: 39°15'00.31" LON: 80°50'25.93"

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: 4,347,573m E: 511,876m
BOTTOM HOLE INFORMATION:
N: 4,344,551m E: 513,774m



JOB # 12-116WA
DRAWING # MARKS1H
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND

- Surface Owner Boundary Lines +/-
- Interior Surface Tracts +/-
- Existing Fence
- Iron Rod, Found

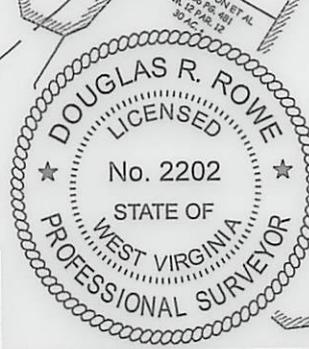
DOUGLAS R. ROWE P.S. 2202

DATE 03/14/13

OPERATOR'S WELL# MARKS UNIT #1H

API WELL # 47 - 017 - HGA - 6266

STATE COUNTY PERMIT

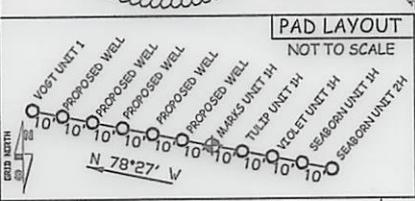


I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26415



STATE OF WEST VIRGINIA DEPT. OF ENERGY DIVISION OF OIL AND GAS
WELL TYPE: OIL ___ GAS LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION STORAGE ___ DEEP ___ SHALLOW
LOCATION: ELEVATION 1,109' WATERSHED TRIBUTARY OF WILHELM RUN
QUADRANGLE WEST UNION 7.5' DISTRICT CENTRAL COUNTY DODDRIDGE
SURFACE OWNER GREGORY R. & CAROLYN S. VOGT ACREAGE 12.07 ACRES +/-
OIL & GAS ROYALTY OWNER PATRICK A. WRIGHT; WVSRA; JOSEPH J. MEYER ET UX; MARY F. BROWN; JOSEPH J. MEYER ET UX; LEASE ACREAGE 222 AC±; 301.19 AC±; 8.63 AC±; 55.65 AC±; 37.25 AC±
CLARENCE T. HYATT ET AL.; CLARENCE MUTSCHELKNAUS ET UX; GAIL MASON; EFFIE BEVER ET AL.; RODNEY MARKS; DAVID L. MITCHELL ET AL.; M.J. CUNNINGHAM ET UX; JOHN F. CORTISSOZ ET AL. 31.5 AC±; 12.5 AC±; 7.086 AC±; 23.5 AC±; 100 AC±; 26.017 AC±; 228 AC±; 79.5 AC±

PROPOSED WORK: DRILL CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL
(SPECIFY) ___ PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,800' TVD 18,500' MD

WELL OPERATOR ANTERO RESOURCES APPALACHIAN CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1625 17TH STREET ADDRESS 5400 D BIG TYLER ROAD
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT