



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Wednesday, May 16, 2018
WELL WORK PERMIT
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for WALDO UNIT 1H
47-085-10353-00-00

This well work permit 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 any additional specific 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 of 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.

Per 35 CSR 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- 0450.

James A. Martin
Chief

A blue ink signature of James A. Martin, written in a cursive style.

Operator's Well Number: WALDO UNIT 1H
Farm Name: DONALD L. COSTILOW
U.S. WELL NUMBER: 47-085-10353-00-00
Horizontal 6A New Drill
Date Issued: 5/16/2018

PERMIT CONDITIONS

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

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) 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. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. 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.
10. 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.

API Number: 47 085 10 353

PERMIT CONDITIONS

11. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.

2/21

WW-6B
(04/15)

API NO. 47-085 - 10353
OPERATOR WELL NO. Waldo Unit 1H
Well Pad Name: Bison Pad

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

1) Well Operator: Antero Resources Corporation 494507062 085 - Ritchie Clay Pennsboro 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Waldo Unit 1H Well Pad Name: Bison Pad

3) Farm Name/Surface Owner: Donald L. Costilow Public Road Access: CR 50/26

4) Elevation, current ground: 1221' Elevation, proposed post-construction: 1221'

5) Well Type (a) Gas Oil Underground Storage
Other
(b) If Gas Shallow Deep
Horizontal

Michael Goff
3/1/18

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 7000' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 20500' MD

11) Proposed Horizontal Leg Length: 10479'

12) Approximate Fresh Water Strata Depths: 119', 300', 446'

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

14) Approximate Saltwater Depths: 833', 1192', 1695', 1715'

15) Approximate Coal Seam Depths: 826'

16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No

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(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

WW-6B
(04/15)

API NO. 47-085 - 10353
 OPERATOR WELL NO. Walco Unit 1H
 Well Pad Name: Bison Pad

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	H-40	94#	80'	80'	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	500' *See #19	500' *See #19	CTS, 695 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	20500'	20500'	5229 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

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3/1/18

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	1000	Class A	~1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	~1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.415"	12,630	2500	LMH-HPOZ & TBI-H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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

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WW-6B
(10/14)

API NO. 47-085 - 10353
OPERATOR WELL NO. Waldo Unit 1H
Well Pad Name: Bison Pad

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

Anticipated Max Pressure - 9300 lbs
Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 19.91 existing acres

22) Area to be disturbed for well pad only, less access road (acres): 6.00 existing acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

24) Describe all cement additives associated with each cement type:

Conductor: no additives, Class A cement.

Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

25) Proposed borehole conditioning procedures:

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.



47085073950000



47085074990000



Waldo 1H

47017035840000



AOR



WELL SYMBOLS
Gas Well

February 6, 2018

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UWI (API#)	Well Name	Well Number	Operator	Well Owner	TD	Approximate Distance to Well	DEV. GR.	TD (ESTVD)	Performed Interval (shallowest, deepest)	Perforated Formations	Producing Formation(s) (not part)
470657795000	BOSTON W 1H 1S	25-119	ALLIANCE PETR CORP	J.B. JENNIFER/SSS	5950	363	1071	-4879	4514-5321	Blay, Benson, Alexander, Bluestreet	
470657795000	HAWKWOOD 1H 1S	25-125	ALLIANCE PETR CORP	J.B. JENNIFER/SSS	5348	138	1198	-4990	4598-5277	Blay, Benson, Alexander	
470170384000	BUSLOW BARR 1H 1N/1E/1S	25-45	ALLIANCE PETR CORP	BACON DRILLING CO	5315	143	950	-4985	4601-5067	Blay, Alexander	Boston

API reasonably expected to penetrate a depth that could be within range of fracture propagation
 ** All reported data is correct to the best of our knowledge with the resources available

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WW-9
(4/16)

API Number 47 - 085 - 10353
Operator's Well No. Waldo Unit 1H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

Watershed (HUC 10) North Fork Hughes River Quadrangle Pennsboro 7.5'

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

Will a pit be used? Yes No

If so, please describe 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 hauled off site.)

Will a synthetic liner be used in the pit? Yes No If so, what ml.? N/A

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number *UIC Permit # will be provided on Form WR-34)
- Reuse (at API Number Future permitted well locations when applicable. API# will be provided on Form WR-34)
- Off Site Disposal (Supply form WW-9 for disposal location) (Meadowfill Landfill Permit #SWF-1032-98)
- Other (Explain Northwestern Landfill Permit #SWF-1025/WV0109410)

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Will closed loop system be used? If so, describe: Yes, fluids stored in tanks, cuttings removed offsite and taken to landfill.

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc.

Surface - Air/freshwater, Intermediate -
Dust/Still Resin, Production - Water Based Mud

-If oil based, what type? Synthetic, petroleum, etc. Synthetic

Additives to be used in drilling medium? Please See Attachment

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Drill cuttings 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), Northwestern Landfill (Permit # SWF-1025/WV0109410)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

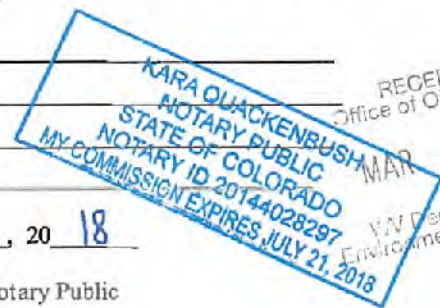
I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations 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 am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature Gretchen Kohler

Company Official (Typed Name) Gretchen Kohler

Company Official Title Senior Environmental & Regulatory Manager



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W.V. Department of
Environmental Protection

Subscribed and sworn before me this 20 day of February, 20 18

Kara Quackenbush

Notary Public

My commission expires July 21, 2018

4708510353

Form WW-9

Operator's Well No. Waldo Unit 1H

Antero Resources Corporation

Proposed Revegetation Treatment: Acres Disturbed 19.91 existing acres Prevegetation pH _____

Lime 2-4 Tons/acre or to correct to pH 6.5

Fertilizer type Hay or straw or Wood Fiber (will be used where needed)

Fertilizer amount 500 lbs/acre

Mulch 2-3 Tons/acre

Access Road "A" (5.49) + Access Road "B" (0.23) + Access Road "C" (2.26) + Access Road "D" (0.76) + Well Pad (6.00) + Water Containment Pad (1.43) + Excess/Topssoil Material Stockpiles (3.74) = 19.91 Acres

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Annual Ryegrass	40

Seed Type	lbs/acre
Crownvetch	10-15

See attached Table IV-3 for additional seed type (Bison Pad Design Page 24)

Tall Fescue 30

See attached Table IV-4 for additional seed type (Bison Pad Design Page 24)

*or type of grass seed requested by surface owner

*or type of grass seed requested by surface owner

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Michael Gaff

Comments: _____

Title: Oil & Gas Inspector

Date: 3/1/18

Field Reviewed? Yes No

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Form WW-9 Additives Attachment

SURFACE INTERVAL

1. Fresh Water
2. Soap –Foamer AC
3. Air

INTERMEDIATE INTERVAL

STIFF FOAM RECIPE:

- 1) 1 ppb Soda Ash / Sodium Carbonate-Alkalinity Control Agent
- 2) 1 ppb Conqor 404 (11.76 ppg) / Corrosion Inhibitor
- 3) 4 ppb KLA-Gard (9.17 ppg) / Amine Acid Complex-Shale Stabilizer
- 4) 1ppb Mil Pac R / Sodium Carboxymethylcellulose-Filtration Control Agent
- 5) 12 ppb KCL / Potassium Chloride-inorganic Salt
- 6) Fresh Water 80 bbls
- 7) Air

PRODUCTION INTERVAL

1. Alpha 1655
Salt Inhibitor
2. Mil-Carb
Calcium Carbonate
3. Cottonseed Hulls
Cellulose-Cottonseed Pellets – LCM
4. Mil-Seal
Vegetable, Cotton & Cellulose-Based Fiber Blend – LCM
5. Clay-Trol
Amine Acid Complex – Shale Stabilizer
6. Xan-Plex
Viscosifier For Water Based Muds
7. Mil-Pac (All Grades)
Sodium Carboxymethylcellulose – Filtration Control Agent
8. New Drill
Anionic Polyacrylamide Copolymer Emulsion – Shale Stabilizer
9. Caustic Soda
Sodium Hydroxide – Alkalinity Control
10. Mil-Lime
Calcium Hydroxide – Lime
11. LD-9
Polyether Polyol – Drilling Fluid Defoamer
12. Mil Mica
Hydro-Biotite Mica – LCM

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13. Escaid 110
Drilling Fluid Solvent – Aliphatic Hydrocarbon
14. Ligco
Highly Oxidized Leonardite – Filtration 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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911 Address
1462 Sugar Run Rd.
Pennsboro, WV 26415

Well Site Safety Plan

Antero Resources

Well Name: Bill Unit 1H-4H, Buffalo Unit 1H & 2H, Mogar Unit 1H & 2H, Waldo Unit 1H & 2H, Waco Unit 1H-3H

Pad Location: BISON PAD
 Ritchie County/Clay District

Michael Goff
 3/1/18

GPS Coordinates:

Entrance - Lat 39°18'51.21"/Long -80°54'44.88" (NAD83)

Pad Center - Lat 39°17'40.52"/Long -80°54'19.58" (NAD83)

Driving Directions:

From the intersection of I-79 and Hwy 50 near Clarksburg WV. Head west on Hwy 50 for ~ 35.6 miles. Turn RIGHT on Old U.S 50 E (Northwest Turnpike), and follow for ~1.3 miles. Turn RIGHT on Sugar Run Rd and follow that for ~1.5 miles. Rig access road will be on the right.

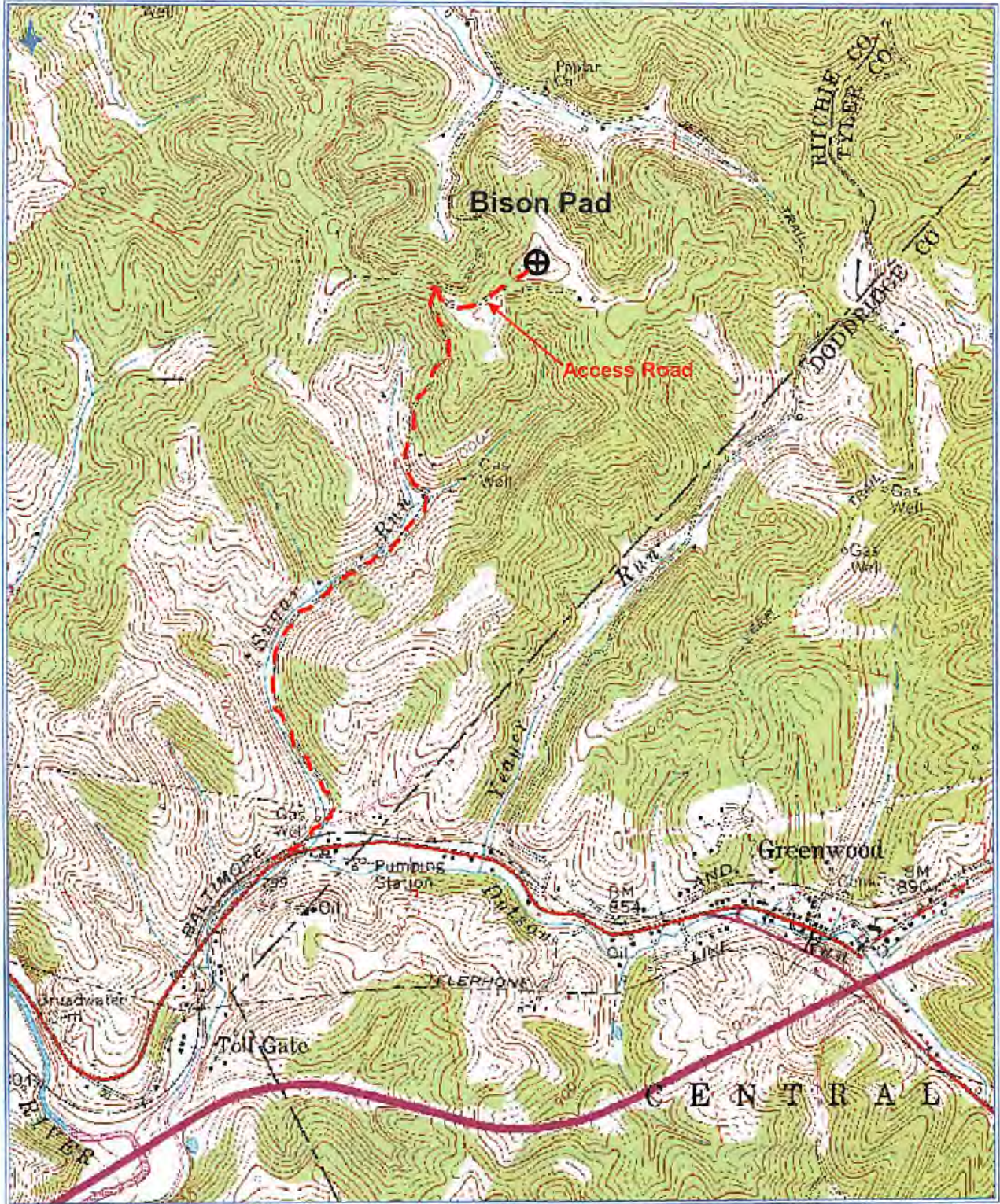
Alternate Route:

From the Town of Pennsboro. Take Main St. south out of town. Turn left onto E. Myles/ Old US 50W (3 miles). Continue onto Northwest Turnpike (0.8 miles). Turn left onto Sugar Run Rd. (1.6 miles). Pad access road will be on your right.

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

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Antero Resources Corporation

Appalachian Basin

Waldo Unit 1H

Ritchie County

Quadrangle: Pennsboro

Watershed: North Fork Hughes River

District: Clay

Date: 7-20-2015

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LATITUDE 39°20'00"

7,450'

6,456' TO BOTTOM HOLE

LATITUDE 39°17'30"

LONGITUDE 80°52'30"

9,658' TO BOTTOM HOLE

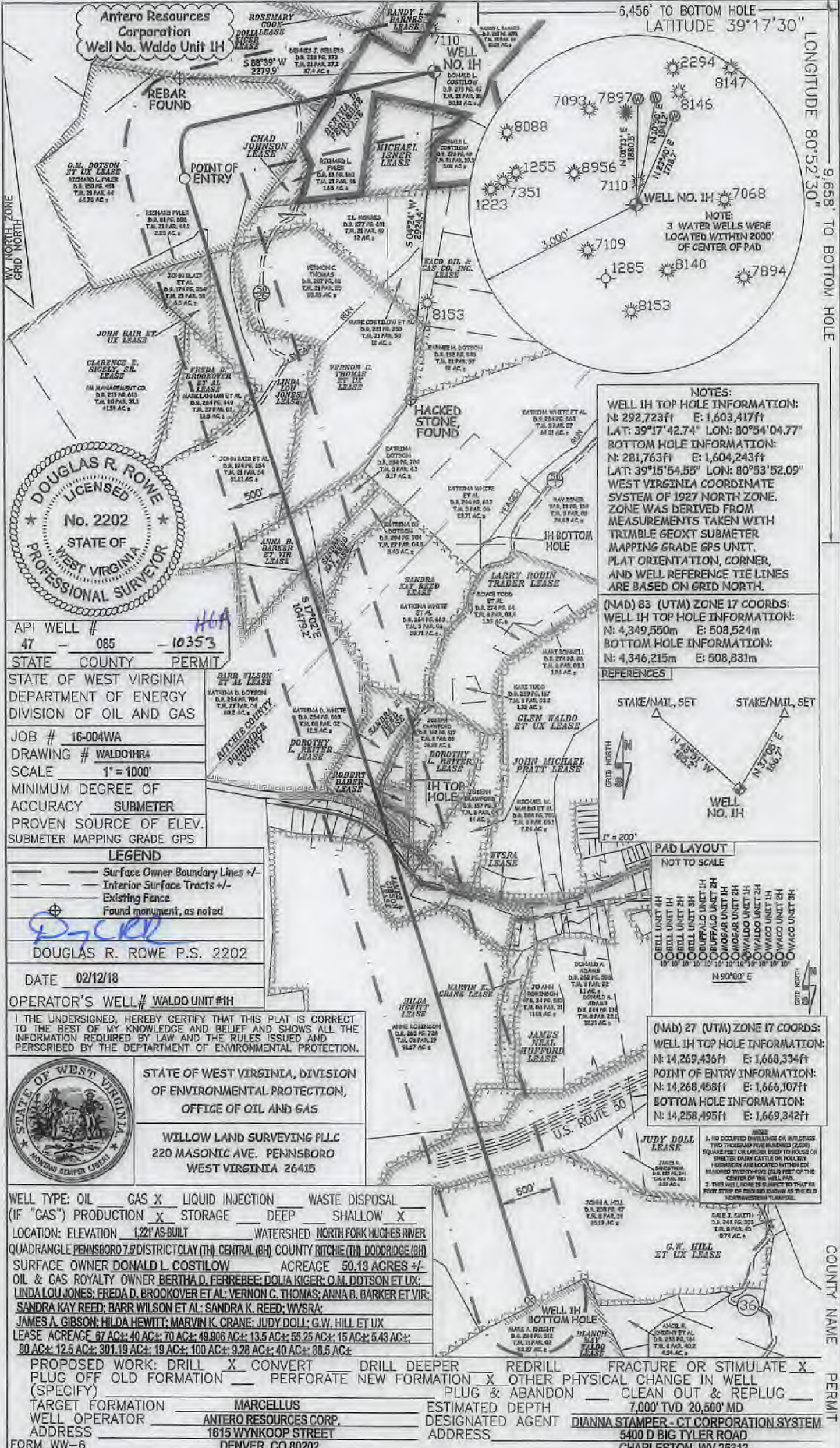
13,887'

LONGITUDE 80°52'30"

COUNTY NAME

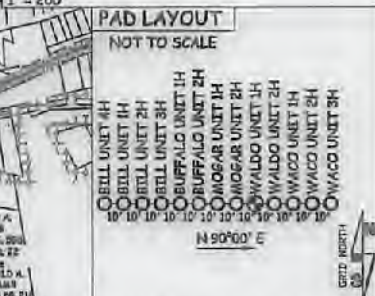
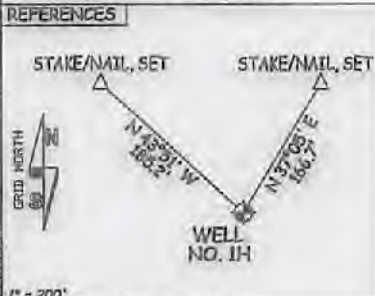
PERMIT

Antero Resources Corporation
Well No. Waldo Unit 1H



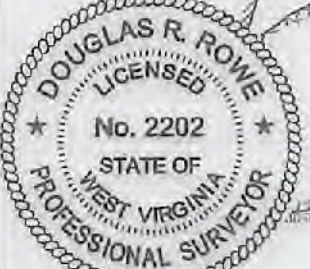
NOTES:
WELL 1H TOP HOLE INFORMATION:
 N: 292,723ft E: 1,603,417ft
 LAT: 39°17'42.74" LON: 80°54'04.77"
BOTTOM HOLE INFORMATION:
 N: 281,763ft E: 1,604,243ft
 LAT: 39°15'54.55" LON: 80°53'52.09"
 WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE 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: 4,349,550m E: 508,524m
BOTTOM HOLE INFORMATION:
 N: 4,346,215m E: 508,831m



(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
 N: 14,269,436ft E: 1,668,334ft
POINT OF ENTRY INFORMATION:
 N: 14,268,458ft E: 1,666,107ft
BOTTOM HOLE INFORMATION:
 N: 14,258,495ft E: 1,669,342ft

- NOTES:**
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2500) SQUARE FEET OR LARGER USED TO HOUSE OR SHEAR OR FEED CATTLE OR HOLSTEIN HEIFERS AND LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THIS WELL PAD.
 2. THIS WELL PAD IS SUBJECT TO THREE FOUR STRIP OR CHAIN ROW AS THE OLD NORTHWESTERN TRAILPAD.



API WELL # 47 - 085 - 10353
 STATE COUNTY PERMIT

STATE OF WEST VIRGINIA
 DEPARTMENT OF ENERGY
 DIVISION OF OIL AND GAS

JOB # 16-004WA
 DRAWING # WALDO1HRA
 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
- Found monument, as noted

DOUGLAS R. ROWE P.S. 2202
 DATE 02/12/18

OPERATOR'S WELL # WALDO UNIT #1H

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 RULES 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

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
 LOCATION: ELEVATION 1,221' AS-BUILT WATERSHED NORTH FORK WUCHES RIVER
 QUADRANGLE PENNSBORO 7.5 DISTRICT CLAY (TH) CENTRAL (BH) COUNTY RITCHE (TH) DODDRIDGE (BH)
 SURFACE OWNER DONALD L. COSTILOU ACREAGE 50.13 ACRES +/-
 OIL & GAS ROYALTY OWNER BERTHA D. FERREBEE; DOLIA KIGER; O.M. DOTSON ET UX;
 LINDA LOU JONES; FRED A. BROOKOVER ET AL.; VERNON C. THOMAS; ANNA B. BARKER ET VIR;
 SANDRA KAY REED; BARR WILSON ET AL.; SANDRA K. REED; WVSRA;
 JAMES A. GIBSON; HILDA HEWITT; MARVIN K. CRANE; JUDY DOLL; G.W. HILL ET UX
 LEASE ACREAGE 87 AC +/-; 40 AC +/-; 70 AC +/-; 49,906 AC +/-; 13.5 AC +/-; 55.25 AC +/-; 15 AC +/-; 5.43 AC +/-;
 80 AC +/-; 12.5 AC +/-; 301.19 AC +/-; 19 AC +/-; 100 AC +/-; 9.28 AC +/-; 40 AC +/-; 88.5 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 7,000' TVD 20,500' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
 DENVER, CO 80202 CHARLESTON, WV 25313

FORM WW-6

WW-6A1

Operator's Well Number Waldo Unit 1H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

(1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;

(2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Bertha D. Ferrebee Lease</u> ✓			
Bertha D. Ferrebee	J & J Enterprises, Inc.	1/8	0170/0080
J & J Enterprises, Inc.	Eastern American Energy Corporation	Confirmatory Deed and Assignment of Leases	DB 0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Certificate of Merger	COI 0006/0450
Energy Corporation of America	Antero Resources Appalachian Corporation	Memorandum of Agreement	0257/0397
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Dolia Kiger Lease</u> ✓			
Dolia Kiger	J & J Enterprises, Inc.	1/8	0177/0404
J & J Enterprises, Inc.	Eastern American Energy Corporation	Confirmatory Deed and Assignment of Leases	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Certificate of Merger	0006/0450
Energy Corporation of America	Antero Resources Appalachian Corporation	Memorandum of Agreement	0257/0397
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>O.M. Dotson, et ux Lease</u> ✓			
O.M. Dotson and M.A. Dotson, his wife	M.G. Zinn	1/8	0031/0195
M.G. Zinn	J.L. Newman	Assignment	0126/0415
J.L. Newman	The Philadelphia Company of West Virginia	Assignment	0091/0265
The Philadelphia Company of West Virginia	Pittsburgh and West Virginia Gas Company	Assignment	0055/0362
Pittsburgh and West Virginia Gas Company	Equitable Gas Company	Assignment	DB 0126/0473
Equitable Gas Company	Equitrans, Inc.	Assignment	0201/0253
Equitrans, Inc.	Equitable Production – Eastern States, Inc.	Assignment	0234/0830
Equitable Production – Eastern States, Inc.	Equitable Production Company	Merger	Exhibit 2
Equitable Production Company	EQT Production Company	Name Change	CR 0006/0443
EQT Production Company	Antero Resources Corporation	*Partial Assignment	0277/0836
<u>John Blair, et ux Lease</u> ✓			
John R. Blair, et ux	Antero Resources Corporation	1/8+	0267/0808
<u>Linda Lou Jones Lease</u> ✓			
Linda Lou Jones	Antero Resources Corporation	1/8+	0267/0260

*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

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Office of Oil and Gas
FEB 21 2018
WV Department of
Environmental Protection

WW-6A1

Operator's Well Number Waldo Unit 1H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

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(2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Freda D. Brookover, et al Lease</u> ✓ Freda D. Brookover, et al J & J Enterprises, Inc.	J & J Enterprises, Inc. Equitable Resources Energy Company, Eastern Pennsylvania Exploration Company, New Jersey Natural Resources Company	1/8 Assignment	0176/0353 0208/0132
Equitable Resources Energy Company, a WV Corporation	Enervest East Limited Partnership, a Texas Limited Partnership	Assignment	0222/0273
Enervest East Limited Partnership, a Texas Limited Partnership	The Houston Exploration Company, a Delaware Corporation	Assignment	0234/0890
The Houston Exploration Company	Seneca-Upshur Petroleum, Inc.	Assignment	0236/0650
Seneca-Upshur Petroleum, Inc.	Seneca Upshur Petroleum, LLC	Name Change	0311/0863
Seneca Upshur Petroleum, LLC	Antero Resources Appalachian Corporation	Assignment	0258/0987
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Vernon C. Thomas, et ux Lease</u> ✓ Vernon C. Thomas, et ux	Antero Resources Corporation	1/8+	0307/0132
<u>Anna B. Barker, et vir. Lease</u> ✓ Anna B. Barker, et vir J & J Enterprises, Inc.	J & J Enterprises, Inc. Eastern American Energy Corporation	1/8 Merger	0192/0735 0231/0732
Eastern American Energy Corporation	Seneca-Upshur Petroleum, Inc.	Assignment	0243/0839
Seneca-Upshur Petroleum, Inc.	Antero Resources Appalachian Corporation	Assignment	0258/0987
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Sandra Kay Reed Lease</u> ✓ Sandra Kay Reed	Antero Resources Corporation	1/8+	0290/0774
<u>Barr Wilson, et al Lease</u> ✓ Barr Wilson, et al J & J Enterprises, Inc.	J & J Enterprises, Inc. Eastern American Energy Corporation	1/8 Merger	0196/0177 0231/0732
Eastern American Energy Corporation	Seneca-Upshur Petroleum, Inc.	Assignment	0243/0839
Seneca-Upshur Petroleum, Inc.	Seneca Upshur Petroleum, LLC	Assignment	0311/0863
Seneca-Upshur Petroleum, LLC	Antero Resources Appalachian Corporation	Assignment	0258/0987
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Sandra K. Reed Lease</u> ✓ Sandra Kay Reed	Antero Resources Corporation	1/8+	0414/0190
<u>Robert Barber Lease</u> ✓ Robert Barber	Antero Resources Corporation	1/8+	0380/0575
<u>WVSRA Lease</u> ✓ West Virginia State Rail Authority	Antero Resources Appalachian Corporation	1/8+	0253/0409
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	0046/0523

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WV Department of
Environmental Protection

*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

CONTINUED ON NEXT PAGE

Operator's Well Number Waldo Unit 1H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

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(2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>James A. Gibson Lease</u> ✓ James A. Gibson	Antero Resources Corporation	1/8+	0410/0472
<u>Hilda Hewitt Lease</u> ✓ Hilda Hewitt Key Oil Company J & J Enterprises, Inc. Eastern American Energy Corporation Eastern American Energy Corporation Energy Corporation of America Antero Resources Appalachian Corporation	Key Oil Company J & J Enterprises, Inc. Eastern American Energy Corporation Energy Corporation of America Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Assignment Merger Merger Assignment Name Change	0107/0315 0111/0326 0211/0137 0283/0431 0272/0307 0046/0523
<u>James Neal Hufford Lease</u> ✓ James Neal Hufford Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0311/0535 0046/0523
<u>Judy Doll Lease</u> ✓ Judy Doll Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0293/0554 0046/0523
<u>G.W. Hill, et ux Lease</u> ✓ G.W. Hill, et ux Fluharty Enterprises, Inc. Chase Petroleum, Inc. Antero Resources Appalachian Corporation	Fluharty Enterprises, Inc. Chase Petroleum, Inc. Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Assignment Assignment Name Change	0122/0223 0124/0323 0288/0656 0046/0523

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WV Department of
Environmental Protection

*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

CONTINUED ON NEXT PAGE

WW-6A1
(5/13)

Operator's Well No. Waldo Unit 1H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Blanche May Waldo Lease</u>				
✓	Blanche May Waldo	Petroleum Services, Inc.	1/8+	0113/0619
	Petroleum Services, Inc.	J & J Enterprises, Inc.	Assignment	0117/0226
	J & J Enterprises, Inc.	Eastern American Energy Corporation	Merger	0211/0137
	Eastern American Energy Corporation	Energy Corporation of America	Merger	0240/0498
	Energy Corporation of America	Antero Resources Appalachian Corp.	Assignment	0288/0451
	Antero Resources Appalachian Corp.	Antero Resources Corporation	Name Change	Exhibit 1

*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Antero Resources Corporation

By: Kevin Kilstrom  RECEIVED
Office of Oil and Gas

Its: Senior Vice President - Production

FEB 21 2018

FORM WW-6A1
EXHIBIT 1

FILED

JUN 10 2013

Natalie E. Tennant,
Secretary of State
1900 Kanawha Blvd E
Bldg 1, Suite 157-K
Charleston, WV 25305



Penney Barker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvsof.com
E-mail: business@wvsof.com

APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY

Office Hours: Monday - Friday
8:30 a.m. - 5:00 p.m. ET

FILE ONE ORIGINAL
(Two if you want a filed
stamped copy returned to you)
FEE: \$25.00

**** In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby ****
applies for an Amended Certificate of Authority and submits the following statement:

- Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
- Date Certificate of Authority was issued in West Virginia: 6/25/2008
- Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of Incorporation.)
- Name the corporation elects to use in WV: Antero Resources Corporation
(due to home state name not being available)
- Other amendments: _____
(attach additional pages if necessary)
- Name and phone number of contact person. (This is optional; however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)
Alvyn A. Schopp (303) 357-7310
Contact Name Phone Number
- Signature information (See below *Important Legal Notice Regarding Signature*):
Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person
Signature: [Handwritten Signature] Date: June 10, 2013

***Important Legal Notice Regarding Signature:** Per West Virginia Code §31D-1-129, Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.



Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

February 16, 2018

West Virginia Department of Environmental Protection
Chief, Office of Oil and Gas
Attn: Mr. James Martin
601 57th Street SE
Charleston, WV 25304

RE: Waldo Unit 1H
Quadrangle: Pennsboro 7.5'
Ritchie County/Clay District, West Virginia

Mr. Martin:

Antero Resources Corporation (Antero) is submitting the following application for a new well work permit for the Waldo Unit 1H horizontal shallow well. As an authorized representative, I certify that Antero has the right to extract, produce or market the oil or gas for all leases through which the Waldo Unit 1H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,

A handwritten signature in blue ink, appearing to read "Tyler Adams", is written over a light blue horizontal line.

Tyler Adams
Landman

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Office of Oil and Gas
FEB 21 2018
WV Department of
Environmental Protection

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

Date of Notice Certification: 02/19/2018

API No. 47- 085 - _____
Operator's Well No. Waldo Unit 1H
Well Pad Name: Bison Pad

Notice has been given:

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83	Easting: <u>508524m</u>
County: <u>Ritchie</u>		Northing: <u>4349550m</u>
District: <u>Clay</u>	Public Road Access: _____	<u>CR 50/26</u>
Quadrangle: <u>Pennsboro 7.5'</u>	Generally used farm name: _____	<u>Donald L. Costlow</u>
Watershed: <u>North Fork Hughes River</u>		

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input checked="" type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
--	---

Required Attachments:

The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

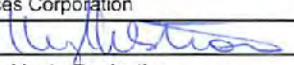
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Office of Oil and Gas

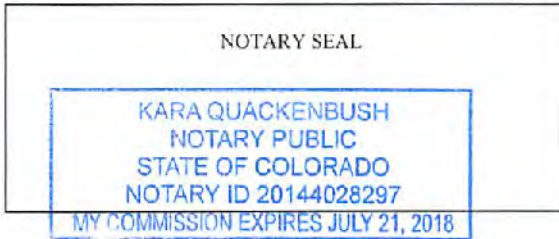
FEB 21 2018

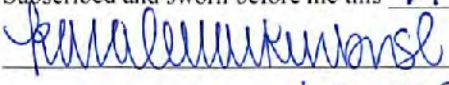
WW-6AC
(1/12)

Certification of Notice is hereby given:

THEREFORE, I Kevin Kilstrom, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, 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 am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	<u>Antero Resources Corporation</u>	Address:	<u>1615 Wynkoop Street</u>
By:	<u>Kevin Kilstrom</u> 		<u>Denver, CO 80202</u>
Its:	<u>Senior Vice President - Production</u>	Facsimile:	<u>303-357-7315</u>
Telephone:	<u>303-357-7310</u>	Email:	<u>kquackenbush@anteroresources.com</u>



Subscribed and sworn before me this 19 day of February 2018

 _____ Notary Public
 My Commission Expires July 21, 2018

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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Office of Oil and Gas
FEB 21 2018
WV Department of
Environmental Protection

WW-6A
(9-13)

API NO. 47- 085 -
OPERATOR WELL NO. Waldo Unit 1H
Well Pad Name: Bison Pad

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION

Notice Time Requirement: notice shall be provided no later than the filing date of permit application.

Date of Notice: 2/20/2018 Date Permit Application Filed: 2/20/2018

Notice of:

- PERMIT FOR ANY WELL WORK CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE REGISTERED MAIL METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to:

SURFACE OWNER(s)
Name: PLEASE SEE ATTACHMENT
Address: _____

Name: _____
Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)
Name: PLEASE SEE ATTACHMENT
Address: _____

Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)
Name: _____
Address: _____

COAL OWNER OR LESSEE
Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address: _____

COAL OPERATOR
Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address: _____

WATER PURVEYOR(s)/OWNER(s) OF WATER WELL, SPRING OR OTHER WATER SUPPLY SOURCE
Name: NONE IDENTIFIED WITHIN 1500'
Address: _____

*NOTE: 3 water wells were identified but are located greater than 1500' from subject pad location

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name: _____
Address: _____

*Please attach additional forms if necessary

RECEIVED
Office of Oil and Gas

FEB 21 2018

WV Department of
Environmental Protection

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

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(8-13)

API NO. 47-085 - 10353
OPERATOR WELL NO. Waldo Unit 1H
Well Pad Name: Bison Pad

examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

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Time Limits and Methods for Filing Comments.

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

Permit Denial or Condition

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

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WW-6A
(8-13)

API NO. 47-085 - 10 353
OPERATOR WELL NO. Waldo Unit 1H
Well Pad Name: Bison Pad

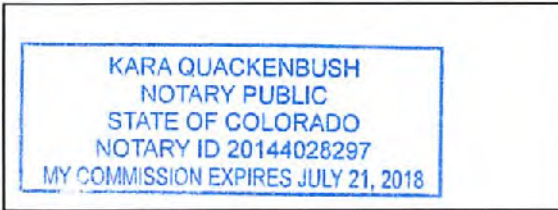
Notice is hereby given by:

Well Operator: Antero Resources Corporation
Telephone: (303) 357-7310
Email: kquackenbush@anteroresources.com

Address: 1615 Wynkoop Street
Denver, CO 80202
Facsimile: 303-357-7315

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



Subscribed and sworn before me this 20 day of February 2018
Kara Quackenbush Notary Public
My Commission Expires July 21, 2018

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WW-6A Notice of Application Attachment (BISON PAD):**List of Surface Owner(s) with Proposed Disturbance associated with Bison Well Pad:**

WELL PAD – This owner was notified of all well work permit applications, and has executed signed Surface Use Agreements with Antero Resources Corporation.

TM 21 PCL 39

Owner: Donald L. & Patricia L. Costilow
Address: 608 Carson Rd.
 Ashtabula, OH 44004

TM 21 PCL 38

Owner: Randy L. Barnes
Address: 48 Cloverdale Rd.
 Pennsboro, WV 26415

ROAD AND/OR OTHER DISTURBANCE – These owners has executed a signed Agreement with Antero Resources Corporation. However, they were only notified if their tract is overlying the oil and gas leasehold being developed by the proposed well work as outlined in WV Code 22-6A-10(b)(2).

TM 21 PCL 37.2 & 37.3

Owner: Dennis J. & Delsa R. Sellers
Address: 531 Park Dr.
 Pennsboro, WV 26415

TM 21 PCL 44

Owner: Richard L. Fyler
Address: 1010 York Rd.
 Dillsburg, PA 17019

TM 21 PCL 39, 39.1

Owner: Donald L. & Patricia L. Costilow
Address: 608 Carson Rd.
 Ashtabula, OH 44004

TM 21 PCL 38

Owner: Randy L. Barnes
Address: 48 Cloverdale Rd.
 Pennsboro, WV 26415

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WW-6A4
(1/12)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF INTENT TO DRILL

Pursuant to W. Va. Code § 22-6A-16(b), the Notice of Intent to Drill is only required if the notice requirements of W. Va. Code § 22-6A-10(a) have NOT been met or if the Notice of Intent to Drill requirement has NOT been waived in writing by the surface owner.

Notice Time Requirement: Notice shall be provided at least **TEN (10)** days prior to filing a permit application.

Date of Notice: 07/31/2017 **Date Permit Application Filed:** 02/20/2018

Delivery method pursuant to West Virginia Code § 22-6A-16(b)

HAND DELIVERY CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Pursuant to W. Va. Code § 22-6A-16(b), at least ten days prior to filing a permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner notice of its intent to enter upon the surface owner's land for the purpose of drilling a horizontal well: *Provided*, That notice given pursuant to subsection (a), section ten of this article satisfies the requirements of this subsection as of the date the notice was provided to the surface owner: *Provided, however*, That the notice requirements of this subsection may be waived in writing by the surface owner. The notice, if required, shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative.

Notice is hereby provided to the SURFACE OWNER(s):

Name: Donald L. & Patricia L. Costilow
Address: 608 Carson Rd.
Ashtabula, OH 44004

Name: Randy L. Barnes
Address: 48 Cloverdale Rd.
Pennsboro, WV 26415

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(b), notice is hereby given that the undersigned well operator has an intent to enter upon the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83 Easting:	<u>508524.63m (Approximate Pad Center)</u>
County:	<u>Ritchie</u>	Northing:	<u>4349558.08m (Approximate Pad Center)</u>
District:	<u>Clay</u>	Public Road Access:	<u>CR 50/26</u>
Quadrangle:	<u>Pennsboro 7.5'</u>	Generally used farm name:	<u>Costilow, Donald</u>
Watershed:	<u>North Fork Hughes River</u>		

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

Well Operator: Antero Resources Corporation
Address: 1615 Wynkoop St.
Denver, CO 80202
Telephone: 303-357-7323
Email: kquackenbush@anteroresources.com
Facsimile: 303-357-7315

Authorized Representative: Kara Quackenbush
Address: 1615 Wynkoop St.
Denver, CO 80202
Telephone: 303-357-7323
Email: kquackenbush@anteroresources.com
Facsimile: 303-357-7315

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

WW-6A5
(1/12)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF PLANNED OPERATION

Notice Time Requirement: notice shall be provided no later than the filing date of permit application.

Date of Notice: 02/20/2018 **Date Permit Application Filed:** 02/20/2018

Delivery method pursuant to West Virginia Code § 22-6A-16(c)

CERTIFIED MAIL HAND
RETURN RECEIPT REQUESTED DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

Notice is hereby provided to the SURFACE OWNER(s)
(at the address listed in the records of the sheriff at the time of notice):

Name: Donald L. & Patricia L. Costilow
Address: 608 Carson Road
Ashtabula, OH 44004

Name: Randy Bames
Address: 48 Cloverdale Rd.
Pennsboro, WV 26415

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83 Easting: <u>508524m</u>
County: <u>Ritchie</u>	Northing: <u>4349550m</u>
District: <u>Clay</u>	Public Road Access: <u>CR 50/26</u>
Quadrangle: <u>Pennsboro 7.5'</u>	Generally used farm name: <u>Donald L. Costilow</u>
Watershed: <u>North Fork Hughes River</u>	

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by W. Va. Code § 22-6A-10(b) to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Operator: Antero Resources Corporation
Telephone: (303) 357-7310
Email: kquackenbush@anteroresources.com

Address: 1615 Wynkoop Street
Denver, CO 80202
Facsimile: 303-357-7315

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
 Charleston, West Virginia 25305-0430 • (304) 558-3505

Thomas J. Smith, P. E.
 Secretary of Transportation/
 Commissioner of Highways

Reissued February 9, 2018

Jill M. Newman
 Deputy Commissioner

James A. Martin, Chief
 Office of Oil and Gas
 Department of Environmental Protection
 601 57th Street, SE
 Charleston, WV 25304

Subject: DOH Permit for the Bison Pad, Ritchie County
Waldo Unit 1H Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #03-2014-0425 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off of Ritchie County Route 50/26 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

Gary K. Clayton, P.E.
 Regional Maintenance Engineer
 Central Office O&G Coordinator

Cc: Kara Quackenbush
 Antero Resources Corporation
 CH, OM, D-3
 File

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List of Anticipated Additives Used for Fracturing or Stimulating Well

Additives	Chemical Abstract Service Number (CAS #)
Fresh Water	7732-18-5
2 Phosphobutane 1,2,4 tricarboxylic acid	37971-36-1
Ammonium Persulfate	7727-54-0
Anionic copolymer	Proprietary
Anionic polymer	Proprietary
BTEX Free Hydrotreated Heavy Naphtha	64742-48-9
Cellulase enzyme	Proprietary
Demulsifier Base	Proprietary
Ethoxylated alcohol blend	Mixture
Ethoxylated Nonylphenol	68412-54-4
Ethoxylated oleylamine	26635-93-8
Ethylene Glycol	107-21-1
Glycol Ethers	111-76-2
Guar gum	9000-30-0
Hydrogen Chloride	7647-01-0
Hydrotreated light distillates, non-aromatic, BTEX free	64742-47-8
Isopropyl alcohol	67-63-0
liquid, 2,2-dibromo-3-nitrilopropionamide	10222-01-2
Microparticle	Proprietary
Petroleum Distillates (BTEX Below Detect)	64742-47-8
Polyacrylamide	57-55-6
Propargyl Alcohol	107-19-7
Propylene Glycol	57-55-6
Quartz	14808-60-7
Sillica, crystalline quartz	7631-86-9
Sodium Chloride	7647-14-5
Sodium Hydroxide	1310-73-2
Sugar	57-50-1
Surfactant	68439-51-0
Suspending agent (solid)	14808-60-7
Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7
Solvent Naphtha, petroleum, heavy aliph	64742-96-7
Soybean Oil, Me ester	67784-80-9
Copolymer of Maleic and Acrylic Acid	52255-49-9
DETA phosphonate	15827-60-8
Hexamethylene Triamine Penta	34690-00-1
Phosphino Carboxylic acid polymer	71050-62-9
Hexamethylene Diamine Tetra	23605-75-5
2-Propenoic acid, polymer with 2 propenamide	9003-06-9
Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5
Diethylene Glycol	111-46-6
Methenamine	100-97-0
Polyethylene polyamine	68603-67-8
Coco amine	61791-14-8
2-Propyn-1-olcompound with methyloxirane	38172-91-7

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LOCATION COORDINATES

ACCESS ROAD ENTRANCE POINT (20140520) (RAD 87)
LATITUDE: 38.241439 LONGITUDE: -80.863438 (RAD 87)
N 4364475.24 E 526154.24 (UTM ZONE 17T UTM COORDS BY METERS)

CENTER OF WELL PAD
LATITUDE: 38.236209 LONGITUDE: -80.865438 (RAD 87)
N 4362609.19 E 526245.38 (UTM ZONE 17T UTM COORDS BY METERS)

CENTROID OF PAD
LATITUDE: 38.236209 LONGITUDE: 80.861338 (RAD 87)
N 4362609.19 E 526245.11 (UTM ZONE 17T METERS)

GENERAL DESCRIPTION
THE ACCESS ROAD, WATER CONTAINMENT PAD, AND WELL PAD HAVE BEEN CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL WATERSHEDS AS WELL AS

FLOORPLAIN NOTES
THE PROPOSED SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #4606210252.

MISS UTILITY STATEMENT
ANTHRO RESOURCES CORPORATION HAS NOTIFIED MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. TICKET #1320408280.

ENTRANCE PERMIT
ANTHRO RESOURCES CORPORATION HAS OBTAINED AN ENTRANCE PERMIT (APR 2014) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS. PERMIT TO CONSTRUCTION OF CONSTRUCTION ACTIVITIES.

ENVIRONMENTAL NOTES
FIELD AND WELLSIDE INVESTIGATIONS WERE PERFORMED IN JULY 2014, JANUARY 2015, AND FEBRUARY 2015 BY AN ALPHEA CONSULTANT TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY JURISDICTION OF THE U.S. ARMY CORPS OF ENGINEERS (ACEC) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL RESTORATION (WVDER). THE APPROVED AS-BUILT PLAN, GENERAL DESCRIPTION MAP AND FLOORPLAIN MAP ARE PROVIDED AS A SUMMARY AND SUMMARIZES THE RESULTS OF THE FIELD INVESTIGATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE EXACT LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE CORPS OR THE WVPD. IT IS STRONGLY RECOMMENDED THAT THE APPROVED-TO-GO AGENCIES BE CONSULTED IN AN EFFORT TO OBTAIN WRITTEN COOPERATION OF THE REGULATORY AGENCIES ON THIS SUBJECT PRIOR TO BEGINKING CONSTRUCTION OF THE PROPOSED FACILITIES. FOR DEVELOPER INFO, VISIT THE APPROPRIATE WEBSITE FOR THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS, WATERS AND STREAM CHANNELS.

PERMITS/NOTES
A DETERMINATE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SURVEYING & RECORDING COMPANY (PSR) ON MAY 13, 2014, & JANUARY 16, 2015. THE REPORT PREPARED BY PSR, INC. ON MAY 13, 2014, & JANUARY 16, 2015, IS REFERRED TO AS THE "PSR REPORT". THE RESULTS OF THE SURVEYING INVESTIGATION, THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SURVEYING INVESTIGATION REPORT BY PENNSYLVANIA SURVEYING & RECORDING COMPANY FOR ADDITIONAL INFORMATION. AS NEEDED.

PROJECT CONTACTS
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ENVIRONMENTAL
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FIELD ENGINEER
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RESTRICTIONS NOTES
1. THERE ARE NO PERMANENT STREAMS, LAKES, POND, OR RESERVOIRS WITHIN 500 FEET OF THE WELL PAD AND LEO. THERE IS A WETLAND IMPACT THAT HAS BEEN PROMISED BY THE APPLICANT AGENCIES.

2. THERE ARE NO NATURALLY OCCURRING "THROU STREAMS" WITHIN 500 FEET OF THE WELL PAD AND LEO.

3. THERE ARE NO GROUNDWATER INTAKES OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LEO.

4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED STORAGE WITHIN 250 FEET OF THE WELL PAD BOUNDARIES.

5. THERE ARE NO OCCUPIED BUILDING STRUCTURES WITHIN 525 FEET OF THE CENTER OF THE WELL PAD.

6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2500 SQUARE FEET WITHIN 525 FEET OF THE CENTER OF THE WELL PAD.

NOTES
1. ALL EMPS MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREA WITHIN THE ZONE OF DISTURBANCE ARE COMPLETELY AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE RESEEDING OF ALL (EROSION AND SEDIMENT) CONTROLS AFTER EACH RAINFALL EVENT IN EXCESS OF 0.5" AND ON A WEEKLY BASIS.

2. THE CONSTRUCTION SITE SHOULD BE ESTABLISHED AS SOON AS POSSIBLE AFTER COMPLETION OF ESTABLISHMENT OF EROSION CONTROL MEASURES. THE SITE SHOULD NOT BE LEFT OPEN TO THE PUBLIC FOR MORE THAN 14 DAYS AFTER STARTING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL NON-VEGETATIVE ACTIVITIES ARE COMPLETED AND THAT A PERMANENT VEGETATIVE COVER WITH A MINIMUM OF 75% OR GREATER HAS BEEN ESTABLISHED ON THAT THE SURFACE HAS BEEN STABILIZED BY MEANS OTHER THAN AN EROSION OR SEDIMENT CONTROL MEASURE. IT SHOULD BE NOTED THAT THE PERCENTAGE REFERS TO THE TOTAL AREA DISTURBED AND NOT JUST A PORTION OF THE SITE.

3. ALL PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE ERS IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVPD.

4. ANY AREA DISTURBED BY REMOVAL OF CONTROLS SHALL BE RESEED, STABILIZED, AND PERMANENTLY COVERED.

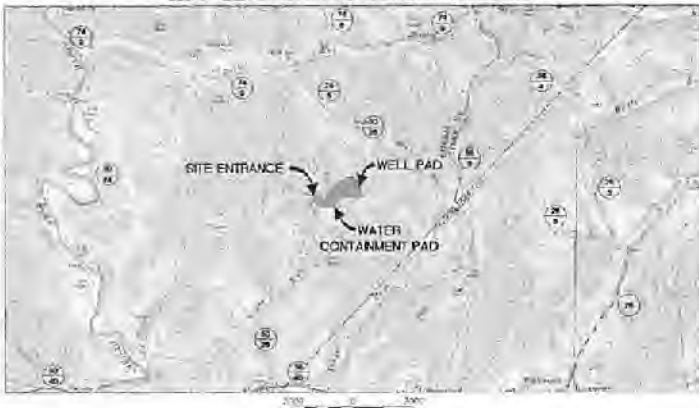
5. THE AS-BUILT INFORMATION SHOWN HEREON REFLECTS FIELD DATA COLLECTED RELATIVE TO THE FINAL CHANGING OF THE SURFACE AREA AS OF NOVEMBER 11, 2016. ANY CHANGES TO THIS REPORT SHALL BE THE RESPONSIBILITY FOR ANY CHANGES MADE TO THE SITE AFTER THE ABOVE MENTIONED DATE.

6. THE DESIGN CONSTRUCTION DATA AROUND THE WELL PAD SHALL BE REFINISHED AS NECESSARY TO MAINTAIN 50% CONTAMINATION OF ALL FLOODS PRIOR TO DRILLING OPERATIONS.

7. THE EXISTING CONDUITS TO THE WELL PAD SHALL HAVE THE MOUNTABLE BARRIERS REPAIRED AS NECESSARY TO ENSURE 100% CONTAMINATION OF ALL FLOODS PRIOR TO DRILLING OPERATIONS.

WV DEP O&G ACCEPTED AS-BUILT 5/11/2018

CLAY DISTRICT, RITCHIE COUNTY, WEST VIRGINIA
CABIN RUN-NORTH FORK HUGHES WATERSHED
W/SDS 7.5 PENNSYLVANIA & WEST VIRGINIA QUAD MAPS



WEST VIRGINIA STATE BOUNDARY COORDINATE SYSTEM
NAD 83 UTM 17T UTM 50N UTM 30E UTM 22E UTM 15E UTM 08E
Easting: 515885.00 North: 4155270.00 Zone: 17T UTM 50N UTM 30E UTM 22E UTM 15E UTM 08E

REPRODUCTION NOTE
THREE PLANS WERE CREATED FOR THIS PROJECT AND ALL INFORMATION ON THIS PLAN MAY BE OBTAINED IN A LARGER INFORMATION AND SHOULD BE USED FOR IDENTIFICATION PURPOSES.

SHEET INDEX table listing sheet numbers and titles: 1 - COVER SHEET, 2 - LEGEND, 3 - OVERALL PLAN SHEET INDEX, 4 - ACCESS ROAD & WATER CONTAINMENT PAD AS-BUILT PLAN, 5 - ACCESS ROAD & WELL PAD AS-BUILT PLAN, 6 - ACCESS ROAD AS-BUILT PROFILES, 7 - ACCESS ROAD AS-BUILT PROFILES, 8 - ACCESS ROAD AS-BUILT PROFILES

Process Data table with columns: Process #, Well Name, NW North, W North, UTM (N/E/E/S), and RAD (W/E/E/W) Long. Rows include Well 01, Well 02, Well 03, Well 04, Well 05, Well 06, Well 07, Well 08, Well 09, Well 10, Well 11, Well 12, Well 13, Well 14, Well 15, Well 16, Well 17, Well 18, Well 19, Well 20, Well 21, Well 22.

BISON LIMITS OF DISTURBANCE AREA (AC) table with columns: Total Area, Access Road, Access Road, Access Road, Well Pad, Water Containment Pad, Erosion/Sediment Control, Total Wooded Acres Disturbed.

Impacts to Daniels & Dorse, 6, Sectors TM 21-37-2 table with columns: Access Road, Total Affected Area, Total Wooded Acres Disturbed.

Impacts to Daniels & Dorse, 6, Sectors TM 21-37-3 table with columns: Access Road, Total Affected Area, Total Wooded Acres Disturbed.

Impacts to Daniels & Dorse, 6, Sectors TM 21-37-4 table with columns: Access Road, Total Affected Area, Total Wooded Acres Disturbed.

Impacts to Daniels & Dorse, 6, Sectors TM 21-38-1 table with columns: Access Road, Total Affected Area, Total Wooded Acres Disturbed.

DESIGN CERTIFICATION table with columns: Wetland and Impact Cause, FIB (SF), Total Impact (SF), Total Impact (AC).

BISON INTERMEDIATE STREAM IMPACT (3 NEAR FEET) table with columns: Stream and Impact Cause, Culvert, Inlets/Outlets, Cofferdam/EAS, Controls, Temp. Disturb., Distance to L.O.D., Total Disturbance.

BISON EPHEMERAL/5 STREAM IMPACT (3 NEAR FEET) table with columns: Stream and Impact Cause, Culvert, Inlets/Outlets, Cofferdam/EAS, Controls, Temp. Disturb., Distance to L.O.D., Total Disturbance.

MISS Utility of West Virginia
1-800-248-4848
West Virginia State Law (Section XIV, Chapter 24-C)
Requires that you call two business days before you dig in the state of West Virginia. IT'S THE LAW!



DATE: 07/27/2017
REVISION:
DATE: 07/27/2017
REVISION:
DATE: 07/27/2017
REVISION:



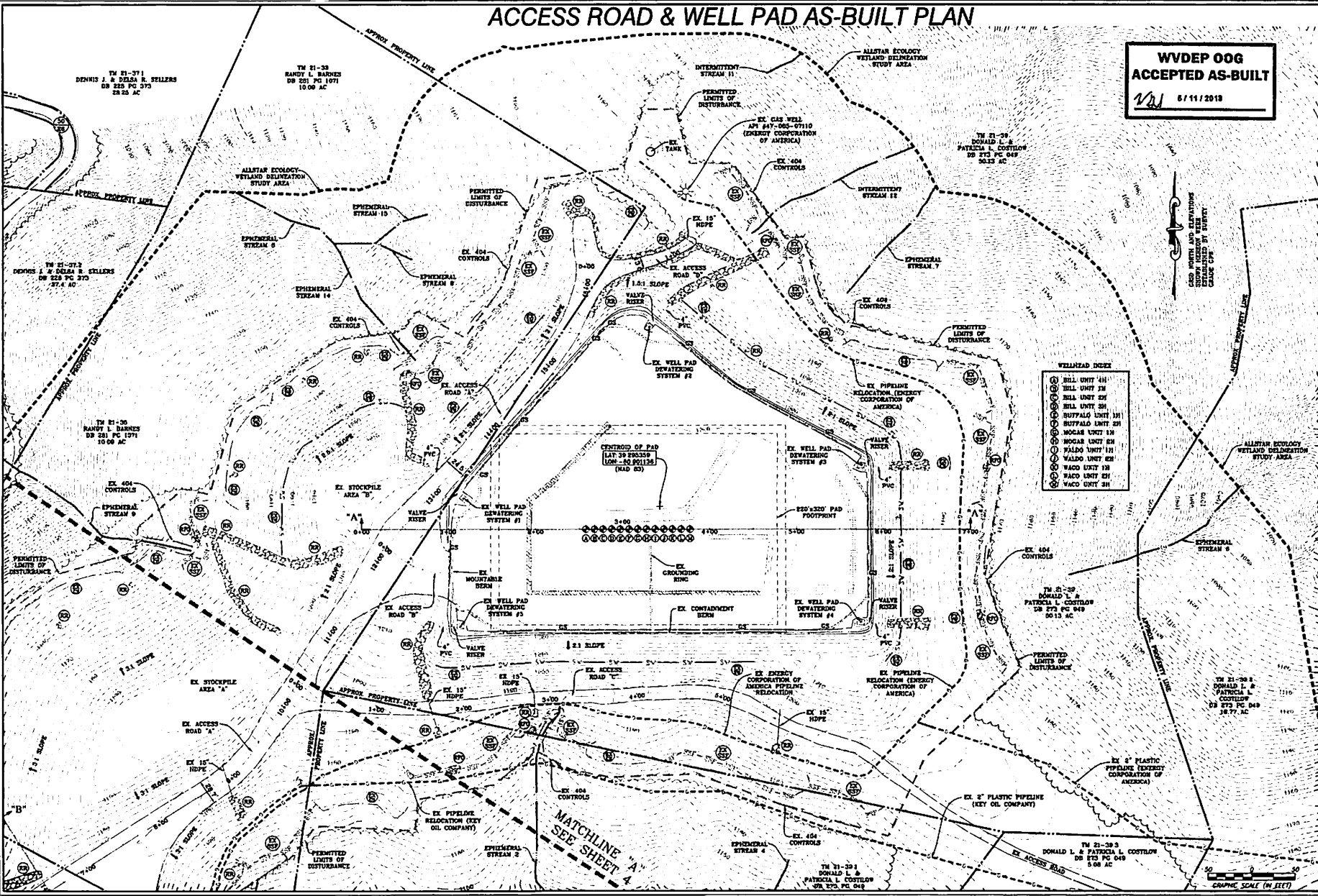
THIS DOCUMENT HAS BEEN PREPARED FOR ANTHRO RESOURCES CORPORATION



DATE: 11/29/2016
SCALE: AS SHOWN
SHEET: 1 OF 8

ACCESS ROAD & WELL PAD AS-BUILT PLAN

**WVDEP OOG
ACCEPTED AS-BUILT**
1/21 6/11/2018



- WELLHEAD INDEX**
- ① WELL UNIT 4H
 - ② WELL UNIT 2H
 - ③ WELL UNIT 2H
 - ④ BUFFALO UNIT 1H
 - ⑤ BUFFALO UNIT 2H
 - ⑥ MOGAR UNIT 1H
 - ⑦ MOGAR UNIT 2H
 - ⑧ WALDO UNIT 1H
 - ⑨ WALDO UNIT 2H
 - ⑩ WACO UNIT 2H
 - ⑪ WACO UNIT 3H

NAVITUS
ENERGY ENGINEERING

DATE	REVISION
07/21/2017	REVISED SURFACE CONFIGURATION



THIS DOCUMENT
WAS PREPARED FOR
ANTERO RESOURCES
CORPORATION

ACCESS ROAD & WELL PAD AS-BUILT PLAN
BISON
WELL PAD & WATER CONTAINMENT PAD
RITCHIE COUNTY, WEST VIRGINIA



DATE: 11/28/2018
SCALE: 1" = 50'
SHEET 5 OF 8