

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

Harold D. Ward, Cabinet Secretary www.dep.wv.gov

Tuesday, November 14, 2023 PERMIT MODIFICATION APPROVAL Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET

DENVER, CO 80202

Re:

Permit Modification Approval for GUMP UNIT 1H

47-103-03603-00-00

Lateral Extension

ANTERO RESOURCES CORPORATION

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926-0450.

James A Martin

Chief

Operator's Well Number: GUMP UNIT 1H

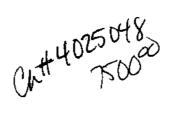
Farm Name: HAROLD S & CALANTHA A YOST

U.S. WELL NUMBER: 47-103-03603-00-00

Horizontal 6A New Drill

Date Modification Issued: 11/14/2023

Promoting a healthy environment.



API NO. 47- 103 - 03603

OPERATOR WELL NO. Gump Unit 1H MOD

Well Pad Name: Big Run Pad

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

1) Well Operato	or: Antero	Resources	Corporal	494507062	103 - Wetze	Green	Porters Falls 7.5'
. •				Operator ID	County	District	Quadrangle
2) Operator's W	Vell Number	r: Gump Uni	it 1H MOI	Well Pad	Name: Big R	un Pad	
3) Farm Name/	Surface Ow	ner: Antero Re	sources Corp	Public Roa	d Access: Wet	zel Tyler I	Ridge Road
4) Elevation, cu	irrent groun	d: <u>1250' -</u> AS	BUILT Ele	evation, proposed	post-construction	on:	
5) Well Type	(a) Gas Other	X	Oil	Unde	erground Storag	ge	
	(b)If Gas	Shallow Horizontal	<u>x</u>	Deep			
6) Existing Pad	: Yes or No	Yes			_		
· •	_			ipated Thickness a ss- 55 feet, Associa			
8) Proposed To	tal Vertical	Depth: 728	O' TVD				
9) Formation at	Total Verti	ical Depth:	Marcellus	i			
10) Proposed T	otal Measur	red Depth:	30980' M	D			
11) Proposed H	Iorizontal L	eg Length:	20190'				
12) Approxima	te Fresh Wa	ater Strata De	epths:	31'			
13) Method to 1 14) Approxima				17095027130000	Offset well re-	cords	
15) Approxima	te Coal Sea	m Depths: \(\brace{\brace}{}	None Anti	cipated			
16) Approxima	ite Depth to	Possible Voi	id (coal m	ine, karst, other):	None Anticipa	ted	
17) Does Propo directly overlyi	sed well lo	cation contain	n coal sea		No	×	RECEIVED
(a) If Yes, pro	ovide Mine	Info: Name	: :				OCT 25 7023
		Depth	n:				
		Seam	:			Env	NV Department of tronmental Protection
		Owne	er:				

WW-6B
(04/15)

API NO. 47- 103 - 03603

OPERATOR WELL NO. Gump Unit 1H MOD
Well Pad Name: Big Run Pad

18)

CASING AND TUBING PROGRAM

ТҮРЕ	Size (in)	New or Used	<u>Grade</u>	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	J-55	94#	100'	100'	CTS, 96 Cu. Ft.
Fresh Water	13-3/8*	New	J-55	54.5#	300'	300'	CTS, 313 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	3350'	3350'	CTS, 1364 Cu. Ft.
Intermediate	_		1				
Production	5-1/2"	New	P-110 ICY	23#	30980'	30980'	CTS, 6879 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

ТҮРЕ	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"	0.375"	2250	50	Class A/L	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	1000	Class A/L	~1.18 _
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A/L	~1.18
Intermediate							· <u>-</u> -
Production	5-1/2"	8-3/4" & 8-1/2"	0.415"	14,360	2500	Class G/H	~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			·· -
Liners	-		_				

RECEIVED
Office of Oil and Gas

PACKERS

OCT 25 2023

Kind:	N/A	WV Department of Environmental Protection
Sizes:	N/A	
Depths Set:	N/A	

٧	/W	-6B	
(1	.0/	14)	

OPERATOR WELL NO. Gump Unit 1H MOD
Well Pad Name: Big Run Pad

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

Drill a new horizontal shallow well into the Marcellus Shale.

*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water 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): 15.91 acres
- 22) Area to be disturbed for well pad only, less access road (acres): 9.35 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/L cement.

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

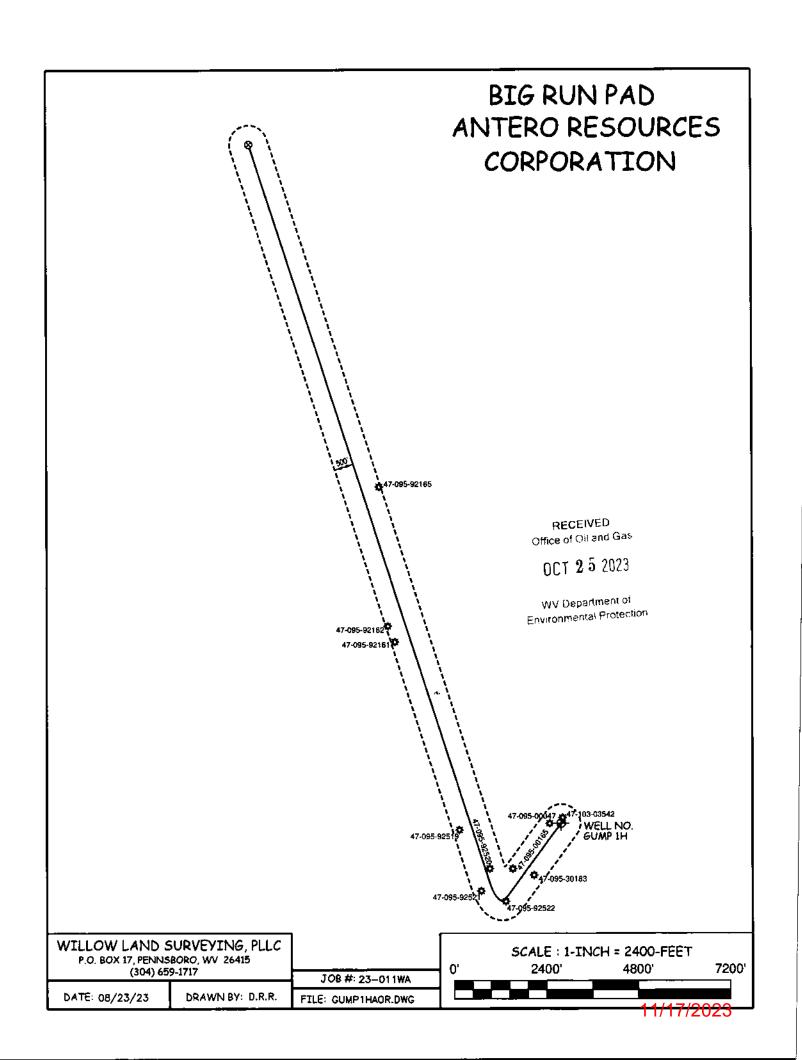
Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

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.

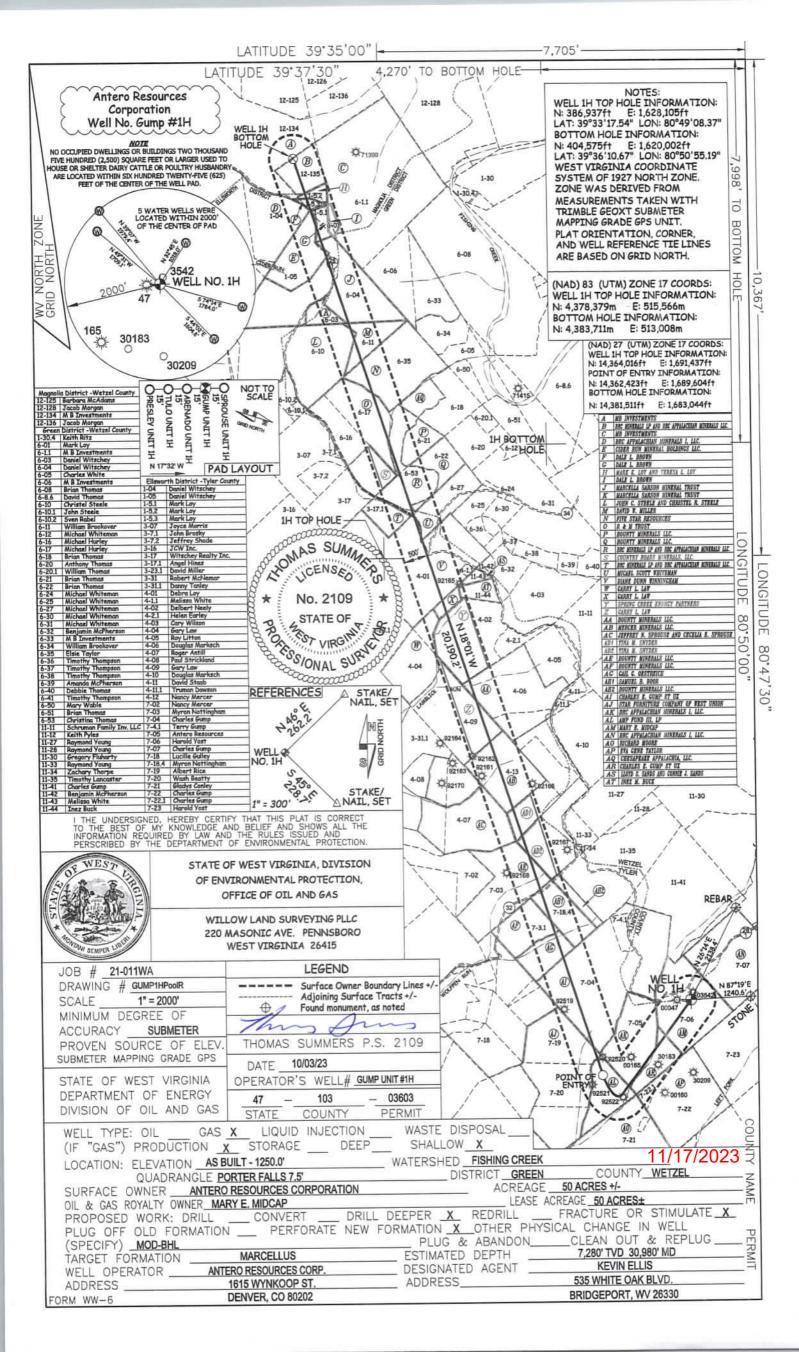
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls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

*Note: Attach additional sheets as needed.



UWI (APINum)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47095925210000								
47095925220000								
47095301830000	A G BRIDGEMAN	2	UNKNOWN	UNKNOWN				
47095925200000								
47095001650000	WILEY MIDCAP	1	METZ OIL CO	METZ OIL CO	2,070			Salt Sands
47095000470000	WILEY MIDCAP	1	UNKNOWN	UNKNOWN	3,027			Keener
47103035420000	BIG RUN UNIT	5V	ANTERO RESOURCES CORP	ANTERO RESOURCES CORP				
47095925190000								
47095921610000								
47095921620000								

WV Department of Environmental Protection RECEIVED Office of Oil and Gas OCT 2 5 2023



Gump Unit 1H MOD

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
AM: Mary E. Midcap Lease Mary E. Midcap	Antero Resources Corporation	1/8+	0555/0175
AR: Charles E. Gump Et Ux Lease Charles E. Gump Et Ux	Antero Resources Corporation	1/8+	0626/0333
AK: BRC Appalachian Minerals I, LLC Lease BRC Appalachian Minerals I, LLC BRC Working Interest Company LLC Chesapeake Appalachia LLC Statoil USA Onshore Properties Inc. SWN Exchange Titleholder LLC SWN Production Company LLC Antero Exchange Properties	BRC Working Interest Company LLC Chesapeake Appalachia LLC Statoil USA Onshore Properties Inc. SWN Exchange Titleholder LLC SWN Production Company LLC Antero Exchange Properties Antero Resources Corporation	1/8+ Assignment Assignment Assignment Merger Assignment Merger	0369/0300 0369/0784 0378/0764 0470/0668 0009/0404 0544/0242 0525/0315
AL: AMP Fund III, LP Lease AMP Fund III, LP	Antero Resources Corporation	1/8+	0087/0284
AJ: Star Furniture Company of West Union Lease Star Furniture Company of West Union	Antero Resources Corporation	1/8+	0531/0806
Al: Charles E. Gump Et Ux Lease Charles E. Gump Et Ux	Antero Resources Corporation	1/8+	0626/0333
AG: Gail G. Oestreich Lease Gail G. Oestreich	Antere Resources Corneration Office of	EIVED Oil and Gas 2.5.2023	0483/0844
AF: Bounty Minerals LLC Lease Bounty Minerals LLC	Antero Resources Corporation	2 5 2023 epartment of 1/8+	0177/0025
AH1: Samuel B. Boor Lease Samuel B. Boor	Antero Resources Corporation Environm	epartment of protection 1/8+	0272/0219
AE: Bounty Minerals LLC Lease Bounty Minerals LLC	Antero Resources Corporation	1/8+	0177/0022
AD2: Tina M. Snyder Lease Tina M. Snyder	Antero Resources Corporation	1/8+	0186/0747
AD1: Tina M. Snyder Lease Tina M. Snyder	Antero Resources Corporation	1/8+	0186/0747
AB: Mercer Minerals LLC Lease Mercer Minerals LLC	Antero Resources Corporation	1/8+	0547/0637
Z: Garry L. Law Lease Garry L. Law	Antero Resources Corporation	1/8+	0559/0107
AA: Bounty Minerals LLC Lease Bounty Minerals LLC	Antero Resources Corporation	1/8+	11/17/20 2 3 ^{7/0034}

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
Y: Spring Creek Energy Partners Lease			
Spring Creek Energy Partners	Antero Resources Corporation	1/8+	0208/0732
X: Garry L. Law Lease			
Garry L. Law	Antero Resources Corporation	1/8+	0026/0346
V: Diane Dunn Winningham Lease			
Diane Dunn Winningham	Antero Resources Corporation	1/8+	0217/0180
U: Michael Scott Whiteman Lease			
Michael Scott Whiteman	Antero Resources Corporation	1/8+	342A/0457
T: BRC Minerals LP and BRC Appalachian			
Minerals LLC Lease BRC Minerals LP and BRC Appalachian Minerals	ppc w - li - l - l - l - l - l - l - l - l -	274	
LLC	BRC Working Interest Company LLC	1/8+	102A/0505
BRC Working Interest Company LLC	Chesapeake Appalachia LLC	Assignment	103A/0470
Chesapeake Appalachia LLC	SWN Production Company	Assignment	157A/0540
SWN Production Company	Antero Exchange Properties LLC	Assignment	177A/0533
Antero Exchange Properties LLC	Antero Resources Corporation	Merger	0009/0404
Q: Bounty Minerals LLC Lease			
Bounty Minerals LLC	Antero Resources Corporation	1/8+	329A/0814
R: BRC Minerals LP and BRC Appalachian			
Minerals LLC Lease			
BRC Minerals LP and BRC Appalachian Minerals	BRC Working Interest Company LLC	1/8+	102A/0505
LLC			
BRC Working Interest Company LLC	Chesapeake Appalachia LLC	Assignment	103A/0470
Chesapeake Appalachia LLC	SWN Production Company	Assignment	157A/0540
SWN Production Company	Antero Exchange Properties LLC	Assignment	177A/0533
Antero Exchange Properties LLC	Antero Resources Corporation	Merger	0009/0404
O: R&M Trust Lease			
R&M Trust	TH Exploration LLC	1/8+	202A/0810
TH Exploration LLC	Antero Resources Corporation	Assignment	254A/0933
N: Five Star Resources Lease			
Five Star Resources	Antero Resources Corporation	1/8+	218A/0472
M: David W. Miller Lease			
David W. Miller	Antero Resources Corporation	1/8+	330A/0458
L: John C. Steele and Christel R. Steele Lease			
John C. Steele and Christel R. Steele	Antero Resources Corporation	1/8+	0177/0198
M: David W. Miller Lease			
David W. Miller	Antero Resources Corporation	1/8+	330A/0458
J: Marcella Sarson Mineral Trust Lease			44/47/0000
Marcella Sarson Mineral Trust	Antero Resources Corporation	1/8+	11/17/2023

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
E: Cider Run Mineral Holdings LLC Lease			
Cider Run Mineral Holdings LLC	Antero Resources Corporation	1/8+	0177/0165
G: Dale L. Brown Lease			
Dale L. Brown	Antero Resources Corporation	1/8+	333A/0907
E: Cider Run Mineral Holdings LLC Lease			
Cider Run Mineral Holdings LLC	Antero Resources Corporation	1/8+	0177/0165
D: BRC Appalachian Minerals I, LLC Lease			
BRC Appalachian Minerals I, LLC	BRC Working Interest Company LLC	1/8	0369/0300
BRC Working Interest Company LLC	Chesapeake Appalachia LLC	Assignment	0369/0784
Chesapeake Appalachia LLC	Statoil USA Onshore Properties Inc.	Assignment	0378/0764
Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
F: Dale L. Brown Lease			
Dale L. Brown	Antero Resources Corporation	1/8+	333A/0907
H: Mark K. Loy and Teresa L. Loy Lease			
Mark K. Loy and Teresa L. Loy	Antero Resources Corporation	1/8	Pooled Tract

RECEIVED Office of Oil and Gas

OCT 2 5 2023

WV Department of Environmental Protection

Co-tenancy utilization – Antero is utilizing the Co-tenancy Modernization and Majority Protection Act to proceed with development of certain royalty owners' interests in this tract.

^{*}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.

WW-6A1 (5/13)

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
B: BRC Minerals LP and BRC Appalachian Minerals LLC Lease				-
	BRC Minerals LP and BRC Appalachian Minerals LLC	BRC Working Interest Company LLC	1/8+	102A/0505
	BRC Working Interest Company LLC	Chesapeake Appalachia LLC	Assignment	103A/0470
	Chesapeake Appalachia LLC	SWN Production Company	Assignment	157A/0540
	SWN Production Company	Antero Exchange Properties LLC	Assignment	177A/0533
	Antero Exchange Properties LLC	Antero Resources Corporation	Merge	0009/0404

^{*}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.

*Co-tenancy utilization – Antero is utilizing the Co-tenancy Modernization and Majority Protection Act to proceed with the development of certain royalty owners' interests in this tract.

**Pooling/Unitization — Antero has filed a horizontal well unitization application with the West Virginia Oil and Gas Conservation Commission that seeks to pool certain owners in this tract.

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

Office of Oil and Gas

OCT 2 5 2023

001 20 2025

WV Department of Environmental Protection

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:	Tim Rady Led
Its:	Senior Vice President of Land

Page 1 of _____