

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

Monday, June 26, 2023 PERMIT MODIFICATION APPROVAL Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION **1615 WYNKOOP STREET**

DENVER, CO 80202

Permit Modification Approval for RINGNUS UNIT 2H Re: 47-095-02863-00-00

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-

James A. Martin

Chief

Operator's Well Number: RINGNUS UNIT 2H Farm Name: DAVID E BOWYER U.S. WELL NUMBER: 47-095-02863-00-00 Horizontal 6A New Drill Date Modification Issued: 06/26/2023

Promoting a healthy environment.

4709502863 API NO. 47-095 - 02863 OPERATOR WELL NO. Ringnus Unit 2H MOD Well Pad Name: Dry Run Pad

WW-6B (04/15)

DEPAR	TMENT O		IRONI	MENTAL	PROTI	IRGINIA ECTION, PPLICA	OFFICE OF O	IL AND G	AS
1) Well Operato	or: Antero	Resou	urces (Corpora	49450 Operat	7062 tor ID	095 - Tyler County	Lincoln District	Paden City 7.5' Quadrangle
2) Operator's W 3) Farm Name/S									
4) Elevation, cu	rrent groun (a) Gas			El		proposed	post-constructi erground Stora	ion: 1007'	
	Other (b)If Gas	Shall Horiz	ow zontal	X X		Deep			
 6) Existing Pad 7) Proposed Tai Marcellus Sh 	rget Format	ion(s),	Depth	(s), Antic d Thickne	cipated T ess- 55 fe	hickness et, Associ	and Expected P ated Pressure-	Pressure(s): 2850#	
 8) Proposed To 9) Formation at 10) Proposed T 	Total Verti	ical De	pth:	0' TVD Marcellu: 27300' M					
11) Proposed H12) Approxima	lorizontal L	eg Len	gth:	18807' pths:	3 75', 5	520' -			
13) Method to 114) Approxima				opuis.	4709500275	0000 Offset we	ell records. Depths hav	ve been adjusted	according to surface elevations.
15) Approxima	te Coal Sea	m Dep	ths: <u>N</u>	lone Ant	icipated				
16) Approxima	te Depth to	Possib	le Voi	d (coal m	ine, kars	st, other):	None Anticipa	ated	
17) Does Propo directly overlyi	osed well lo ing or adjac	cation ent to a	contair an activ	n coal sea ve mine?	ums Y	es	N	o <u>X</u>	
(a) If Yes, pro	ovide Mine	Info:	Name	:					RECEIVED Office of Oil and Gas
			Depth	.:					JUN 2 1 2023
			Seam	:				_	1An /
			Owne	er:				Er	WV Department or Millionment - Protection
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Page 1 of 3 Steven 19 6-16-23

API NO. 47- 095 - 02863 OPERATOR WELL NO. Ringnus Unit 2H MOD Well Pad Name: Dry Run Pad

WW-6B (04/15)

18)

CASING AND TUBING PROGRAM

ТҮРЕ	<u>Size</u> (in)	<u>New</u> or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	<u>CEMENT:</u> <u>Fill-up</u> (Cu. Ft.)/CTS
Conductor	20"	New	H-40	79#	100'	100' 🦯	CTS, 96 Cu. Ft.
Fresh Water	13-3/8"	New	J/K-55	54.5#	570'	570' 🗸	CTS, 594 Cu. Ft.
Coal	9-5/8"	New	J-/K55	36#	2500'	2500' 🗸	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110CY	20#	27300'	27300' 🖌	CTS, 5951 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

ТҮРЕ	Size (in)	Wellbore Diameter (in)	<u>Wall</u> <u>Thickness</u> (in)	<u>Burst Pressure</u> (psi)	Anticipated Max. Internal Pressure (psi)	<u>Cement</u> <u>Type</u>	<u>Cement</u> <u>Yield</u> (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							
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	-						

PACKERS

Kind:	N/A	
Sizes:	N/A	RECEIVED Office of Oil and G
Depths Set:	N/A	JUN 2 1 2023

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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): 22.85 acres

22) Area to be disturbed for well pad only, less access road (acres): 9.70 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

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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.

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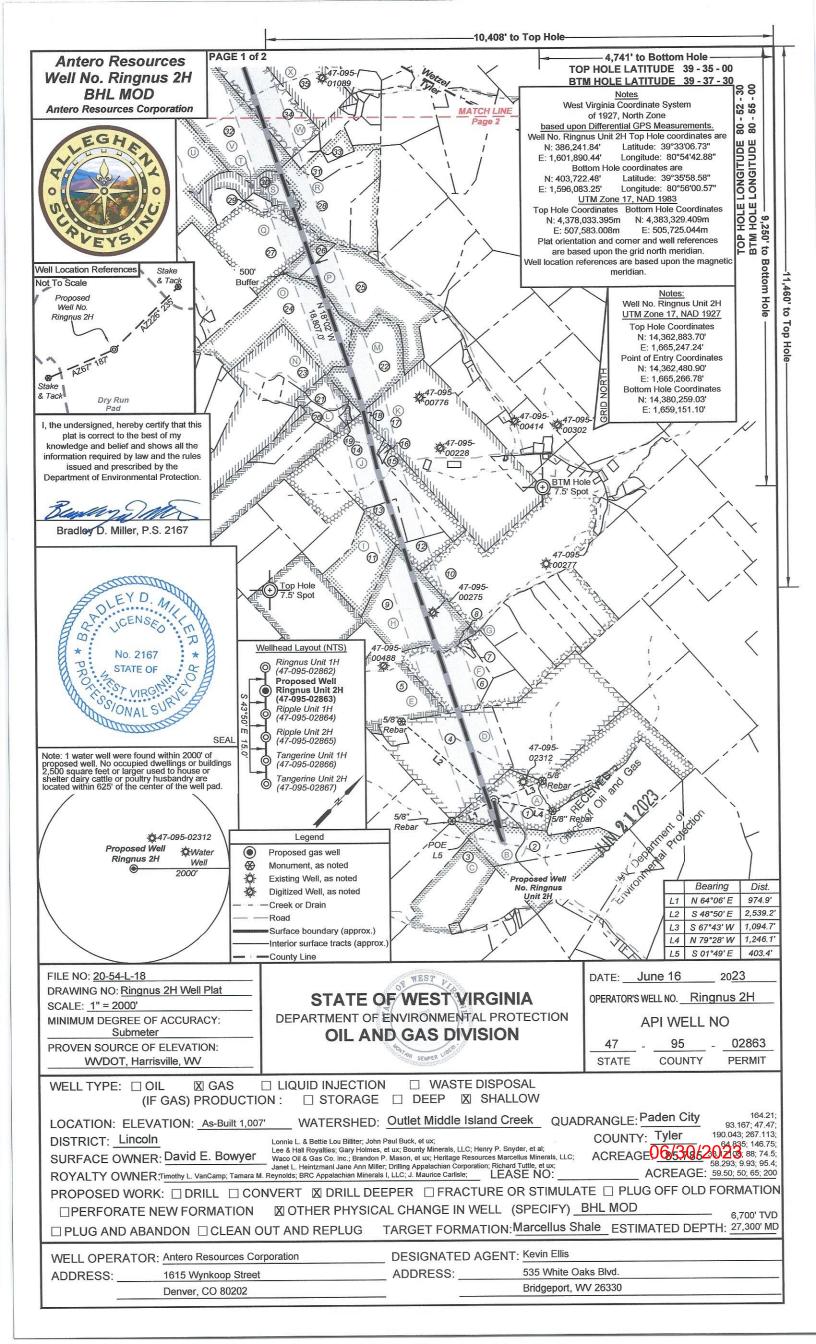
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UWI (APINum)	Well Name	well number	5				at 1.1	Mair Bancon Alexander
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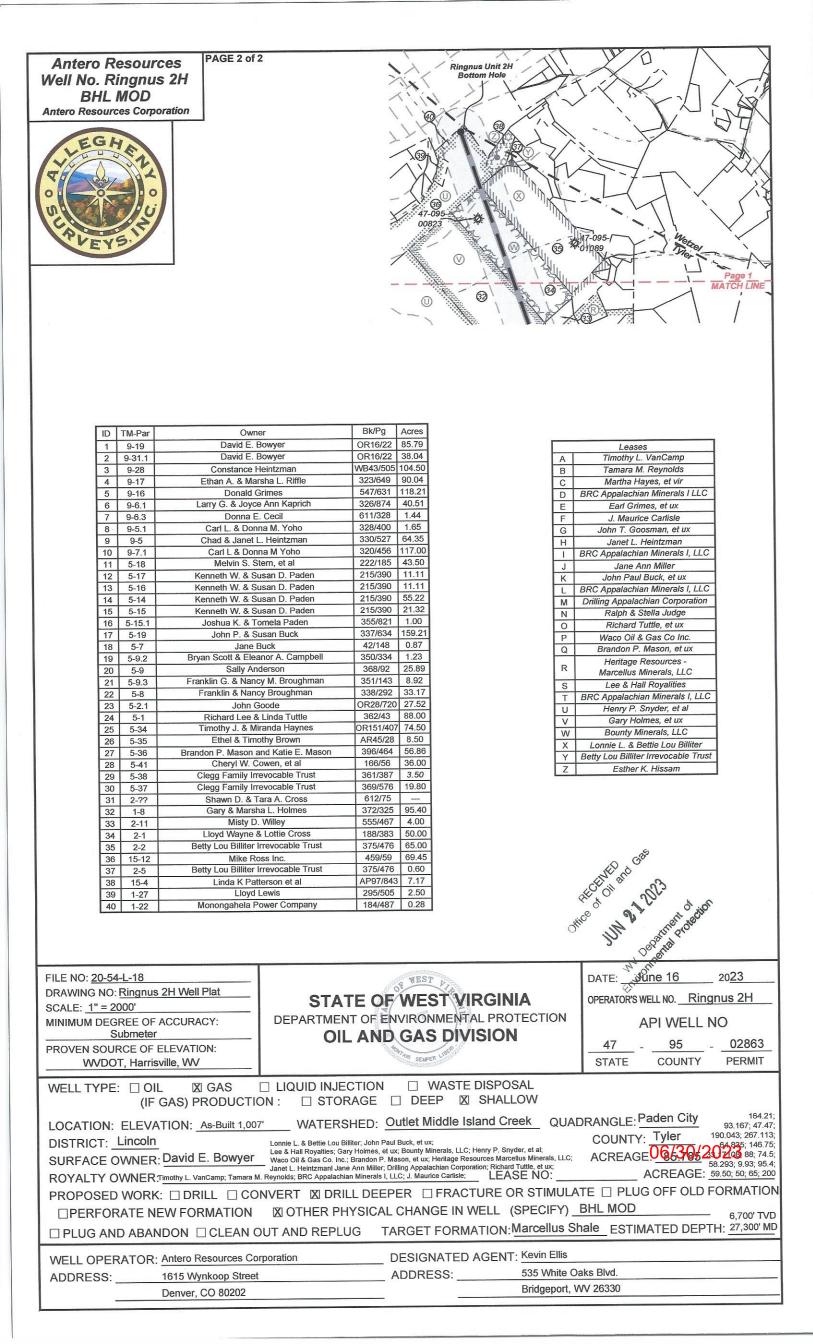
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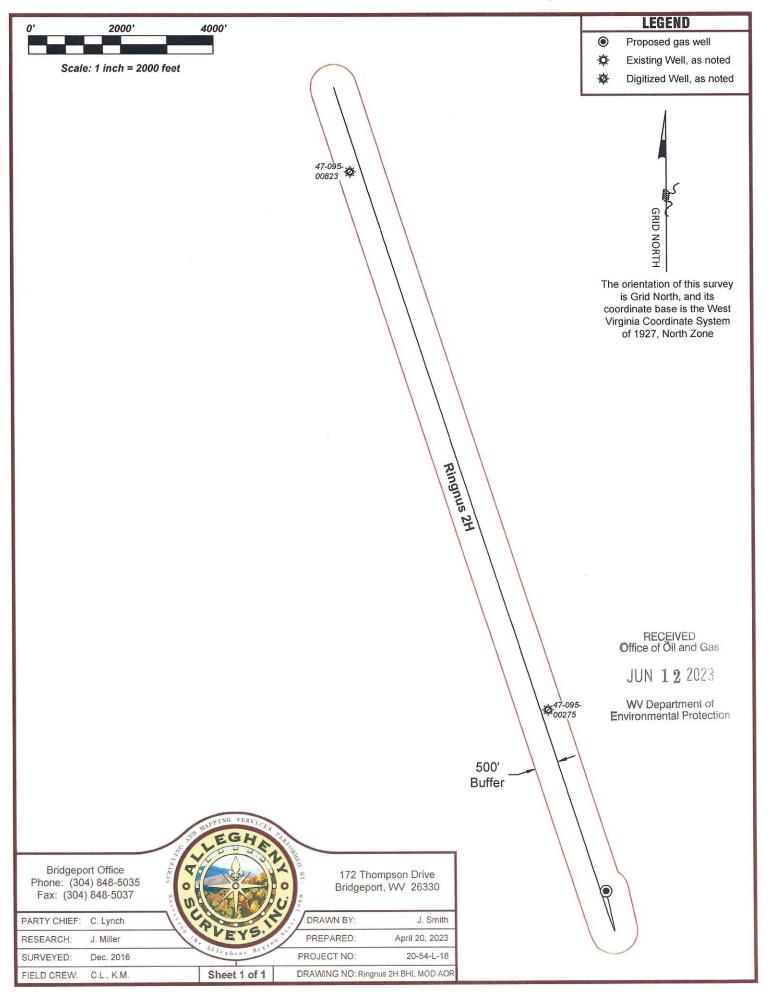
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4709502863



Operator's Well Number Ringnus Unit 2H 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/Pag
A: Timothy L. VanCamp Lease			
Timothy L. VanCamp	Chesapeake Appalachia LLC	1/8	354/704
Chesapeake Appalachia LLC	Statoil USA Onshore Properties Inc.	Assignment	423/152
Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	539/239
EQT Production Company	Antero Resources Corporation	Assignment	134/172
B: Tamara M. Reynolds Lease			c4c/c24
Tamara M. Reynolds	Antero Resources Corporation	1/8+	616/634
A: Timothy L. VanCamp Lease		1/8	354/704
Timothy L. VanCamp	Chesapeake Appalachia LLC	Assignment	423/152
Chesapeake Appalachia LLC	Statoil USA Onshore Properties Inc.	Assignment	539/239
Statoil USA Onshore Properties Inc.	EQT Production Company		134/172
EQT Production Company	Antero Resources Corporation	Assignment	134/1/2
D: BRC Appalachian Minerals I LLC Lease		1/8	369/300
BRC Appalachian Minerals I LLC	BRC Working Interest Company LLC	Assignment	369/784
BRC Working Interest Company LLC	Chesapeake Appalachia LLC	Assignment	378/764
Chesapeake Appalachia LLC	Statoil USA Onshore Properties Inc.	Assignment	470/668
Statoil USA Onshore Properties Inc.	SWN Exchange Titleholder LLC	Merger	9/404
SWN Exchange Titleholder LLC	SWN Production Company LLC	Assignment	544/242
SWN Production Company LLC	Antero Exchange Properties	Merger	525/315
Antero Exchange Properties	Antero Resources Corporation	Merger	525/525
F: J. Maurice Carlisle Lease J. Maurice Carlisle	Antero Resources Corporation	1/8+	229/723
H: Janet L. Heintzman Lease		1/8+	235/414
Janet L. Heintzman	Antero Resources Corporation	1/07	2007 121
J: Jane Ann Miller Lease	Antero Resources Corporation	1/8+ BECEN	11/400
Jane Ann Miller	Antero Resources corporation	1/8+ RECEN Office of Õil	and Gas
∕ <u>K: John Paul Buck, et ux Lease</u> John Paul Buck, et ux	Antero Resources Corporation	1/8+ JUN 12	2023 233/451
L: BRC Appalachian Minerals I, LLC Lease		1/8 WV Departm	nent of aco (200
BRC Appalachian Minerals I LLC	BRC Working Interest Company LLC	1/0 Civironmental	Drotosti
BRC Working Interest Company LLC	Chesapeake Appalachia LLC	Assignment	505/101
Chesapeake Appalachia LLC	Statoil USA Onshore Properties Inc.	Assignment	378/764
Statoil USA Onshore Properties Inc.	SWN Exchange Titleholder LLC	Assignment	470/668
SWN Exchange Titleholder LLC	SWN Production Company LLC	Merger	9/404
SWN Production Company LLC	Antero Exchange Properties	Assignment	544/242
Antero Exchange Properties	Antero Resources Corporation	Merger	525/315
<u>M: Drilling Appalachian Corporation Lease</u>		1/01	180/475
Drilling Appalachian Corporation	Antero Resources Corporation	1/8+	100/4/3

Operator's Well Number Ringnus Unit 2H MOD

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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
O: Richard Tuttle, et ux Lease Richard Tuttle, et ux	Antero Resources Corporation	1/8+	211/512
 P: Waco Oil & Gas Co Inc. Lease Waco Oil & Gas Co Inc. 	Antero Resources Corporation	1/8+	198/721
✓ <u>Q: Brandon P. Mason, et ux Lease</u> Brandon P. Mason, et ux	Antero Resources Corporation	1/8+	182/307
✓ <u>R: Heritage Resources – Marcellus Minerals, LLC</u> Lease Heritage Resources – Marcellus Minerals LLC	Antero Resources Corporation	1/8+	627/139
 <u>S: Lee & Hall Royalties Lease</u> Lee & Hall Royalties 	Antero Resources Corporation	1/8+	248/741
 T: 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 Merger Assignment Merger	369/300 369/784 378/764 470/668 9/404 544/242 525/315
<u>V: Gary Holmes, et ux Lease</u> Gary Holmes, et ux	Antero Resources Corporation	1/8+	211/503
<u>W: Bounty Minerals, LLC</u> Bounty Minerals, LLC	Antero Resources Corporation	1/8+	178/164

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*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) Operator's Well No. Ringnus Unit 2H MOD

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Henry P. Snyder, et al Lease	Henry P. Snyder, et al	Charles L. Stout	1/8	282/338
	Charles L. Stout	Applied Mechanics Corporation	Assignment	385/100
	Applied Mechanics Corporation	Triad Hunter LLC	Assignment	385/566
	Triad Hunter, LLC	Antero Resources Corporation	Assignment	56/718

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

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- 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 Reso	ources Corporation
By:	Tim Rady	In Verly
Its:	Senior Vice	President of Land

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06/30/2023

JUN 12 2023

WV Department of Environmental Protection



June 9th, 2023

West Virginia Department of Environmental Protection Office of Oil and Gas Attn: Mr. Taylor Brewer 601 57th Street Charleston, WV 25304

Mr. Brewer:

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

CK # 4020197 # 50000

\$250000

Antero Resources Corporation (Antero) would like to submit the following permit modifications for approved well on the existing Dry Run Pad: Ringnus Unit 2H (47-095-02863) Expedited.

Attached you will find the following:

- > AOR
- Revised Form WW-6B
- Revised Form WW-6A1
- Revised Mylar Plat

If you have any questions please feel free to contact me at (303) 357-7373.

Thank you in advance for your consideration.

Sincerely, Magn CA

Carly Marvel Permitting Agent Antero Resources Corporation

Enclosures

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JUN 12 2023

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