

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 JANUARY 10, 2022 PERMIT MODIFICATION APPROVAL New Drill / Modification Lateral Extension

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET DENVER, CO 80202

Re: Permit Modification Approval for PURPLE UNIT 1H

47-095-02758

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.

Operator's Well Number: PURPLE UNIT 1H

Farm Name: ANTERO RESOURCES CORPORATION

U.S. WELL NUMBER: 47-095-02758

New Drill Modification Lateral Extension

Date Modification Issued: 01/10/2022

Promoting a healthy environment.

API NO. 47- 095 - 02758 MOD

OPERATOR WELL NO. Purple Unit 1H

Well Pad Name: Thin Air Pad

4002034 4500000

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

1) Well Operat	or: Antero	Resources	Corpora	494507062	2	095-Tyler	Ellsworth	Porter Falls 7.5'	
7				Operator II	D	County	District	Quadrangle	
2) Operator's V	Well Numbe	r: Purple Ur	nit 1H	We	ll Pad	Name: Thin	Air Pad		_
3) Farm Name/	/Surface Ow	ner: Clara Suzani	ne Wallace & Ricki	e Wallace Public	c Roa	d Access: CR	11		_
4) Elevation, co	urrent groun	d: 1235'	El	evation, prop	osed p	post-constructi	on:		_
5) Well Type	(a) Gas	X	_ Oil		Unde	erground Storag	ge		
	Other							ental Protection	WV Ɗ≀ Environm
	(b)If Gas	Shallow	X	Dee	p			27 Z021	DEC
6) Existing Pac	l: Yes or No	Horizontal Yes	X					Qil and Gas	Office o
7) Proposed Ta	•			•		nd Expected Protect			
				33-00 1001, 74	330010	100011000010-2	.00011		_
8) Proposed To									_
9) Formation a	t Total Verti		Marcellus						_
10) Proposed T	otal Measur	red Depth:	25300' M	D /					_
11) Proposed F	Horizontal L	eg Length:	16593'						_
12) Approxima	ate Fresh Wa	ater Strata De	epths:	76' and 328	8'				_
13) Method to	Determine F	Fresh Water I	Depths: 4	17- <mark>095</mark> -02266					
14) Approxima	ite Saltwater	Depths: 16	660'						_
15) Approxima	ate Coal Sea	m Depths: N	None Iden	tified					
16) Approxima	ite Depth to	Possible Voi	d (coal mi	ne, karst, oth	er): <u>[</u>	None Anticipa	ted		_
17) Does Propo directly overlyi				ns Yes _		No	<u>X</u>		_
(a) If Yes, pro	ovide Mine	Info: Name	:						_
		Depth	n:						_
		Seam	:						_
		Owne	r:						_

Jes 2022

۸DI	NO.	17	095		02758	MOD
API	NO.	4/-	050	-	02100	IVIOD

OPERATOR WELL NO. Purple Unit 1H

Well Pad Name: Thin Air 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/K-55	54.5#	378'	378'	CTS, 341 Cu. Ft.
Coal	9-5/8"	New	J/K-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	PY-110	23#	25300'	25300' /	2457 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	30"	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"	0.361"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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		PACKERS	DEC 27	2021
Kind:	N/A		WV Depar Environmenta	
Sizes:	N/A		Fliance	
Depths Set:	N/A			

WW-6B (10/14) API NO. 47- 095 - 02758 MOD

OPERATOR WELL NO. Purple Unit 1H

Well Pad Name: Thin Air 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 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): 45.05 acres

22) Area to be disturbed for well pad only, less access road (acres): 17.67 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

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25) Proposed borehole conditioning procedures:

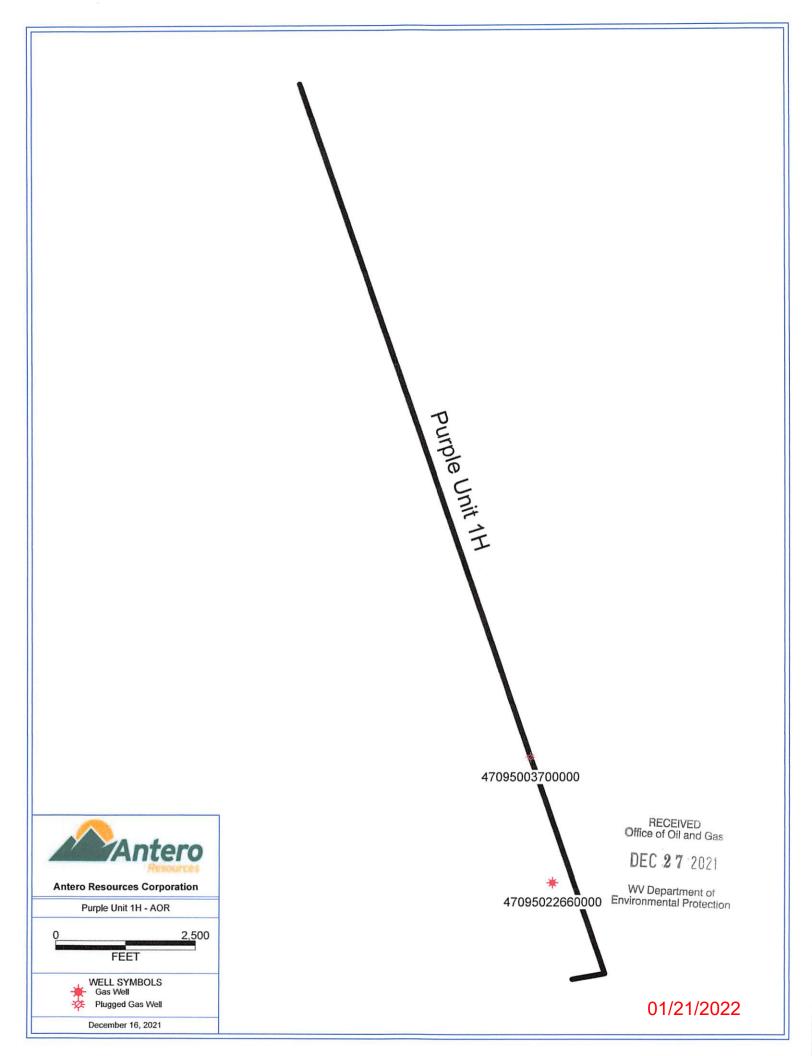
Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

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.

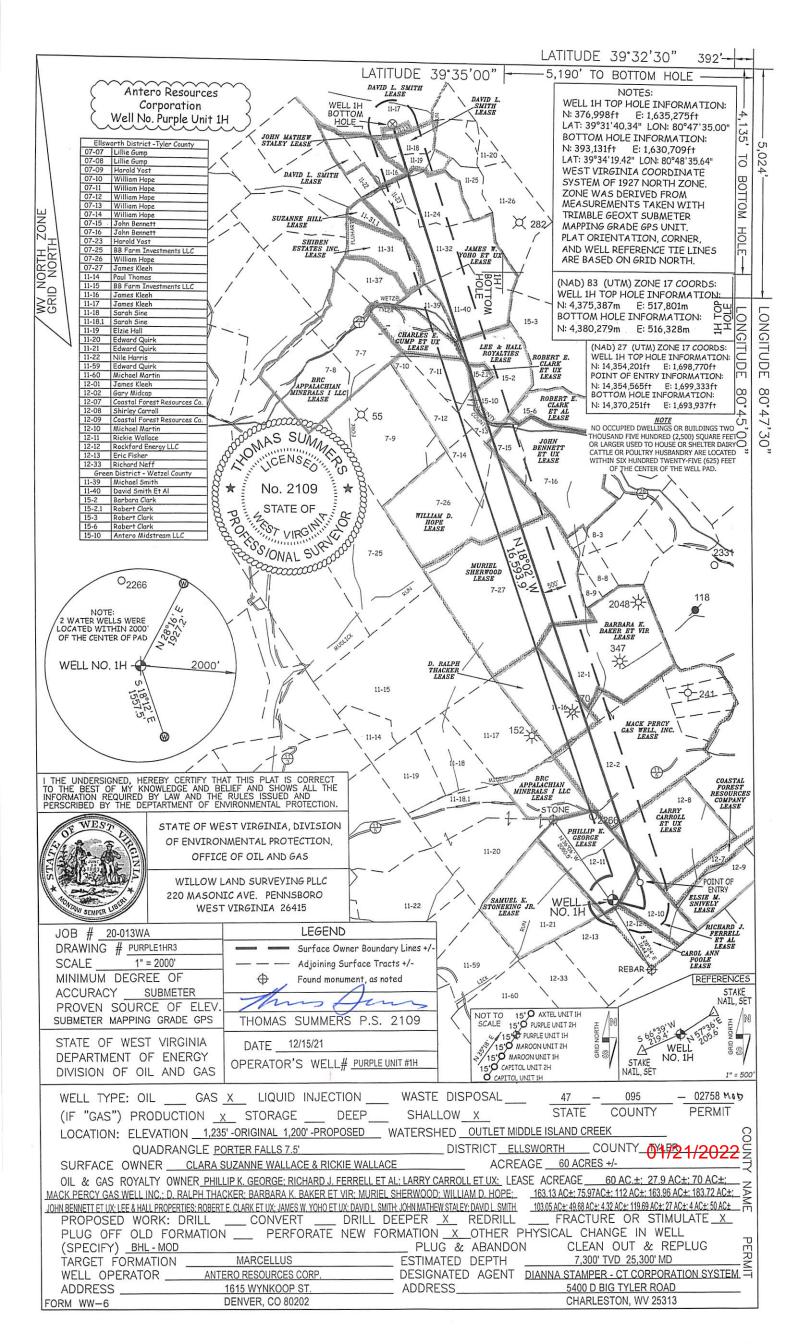
*Note: Attach additional sheets as needed.

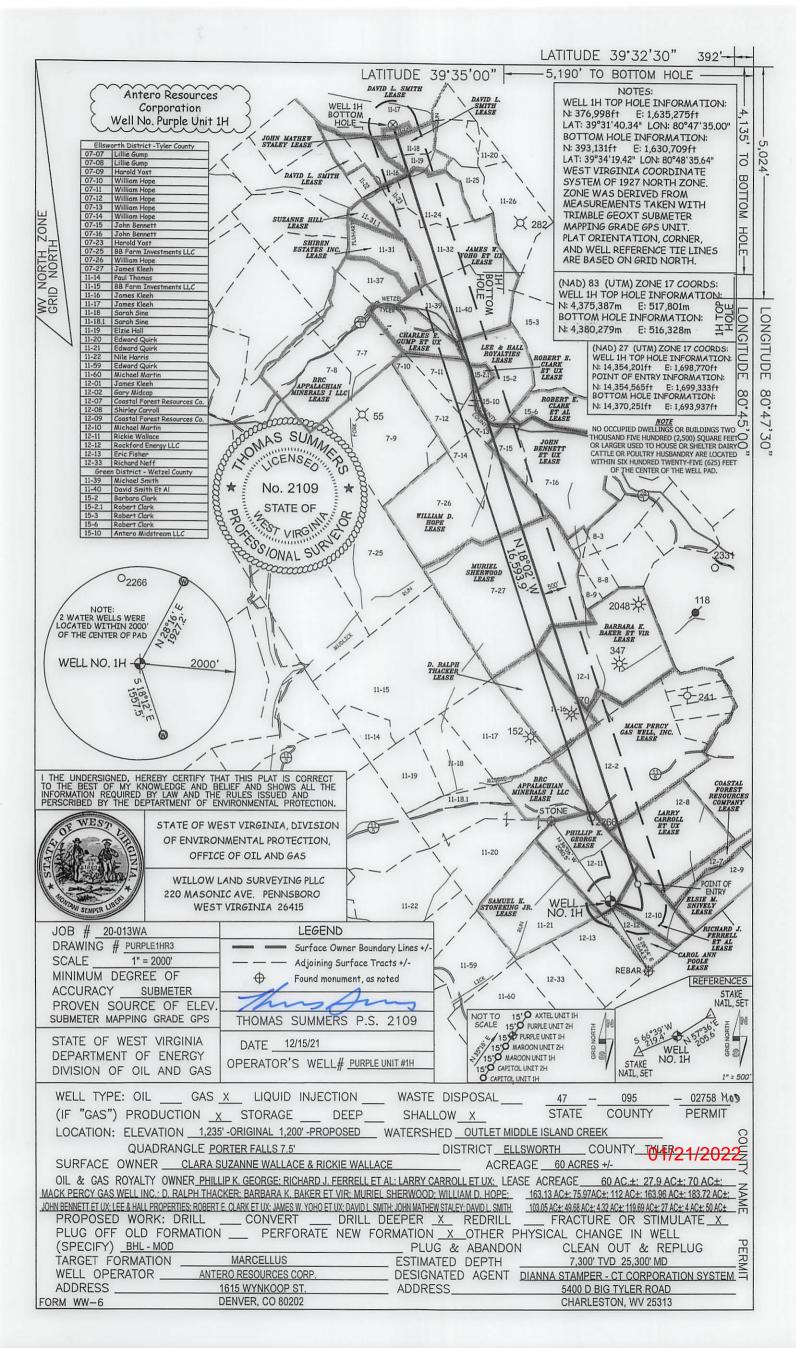


UWI (APINum)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47095003700000	HOMER D LEEK	1	WILHITE MARVIN E	WILHITE MARVIN'E	2,807		Gordon	Berea, Weir, Alexander
47095022660000	KLEEH	2VS	BOWYER DAVID	ALLIANCE PETR CORP	4,000	2530 - 2970	Big Injun, Weir, Gordon	Berea, Weir, Alexander

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Purple 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
Philip K. George Lease			
Philip K. George	Statoil USA Onshore Properties	1/8+	0466/0193
Statoil USA Onshore Properties	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
Richard J. Ferrell et al Lease			
Richard J. Ferrell et al	Stone Energy Corporation	1/8	394/294
Stone Energy Corporation	EQT Production Company	Assignment	547/662
EQT Production Company	Antero Resources Corporation	Assignment	663/1
Larry Carroll et ux Lease			
Larry Carroll et ux	Stone Energy Corporation	1/8+	393/96
Stone Energy Corporation	EQT Production Company	Assignment	556/132
EQT Production Company	Antero Resources Corporation	Assignment	148/620
Mack Percy Gas Well Inc Lease Mack Percy Gas Well Inc	Antero Resources Corporation	1/8+	108/411
D Ralph Thacker Lease			
D Ralph Thacker	Antero Resources Corporation	1/8+	96/1
Barbara K Baker et vir Lease			(
Barbara K Baker et vir	Mountain Link Associates Inc	1/8	355/307
Mountain Link Associates Inc	Whittle Corporation	Assignment	363/68
Whittle Corporation	Montani Energy	Assignment	404/496
Montani Energy	Antero Resources Appalachian Corporation	Assignment	409/593
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	557/430
Antero Resources Corporation	Stone Energy Corporation	Assignment	447/772
Stone Energy Corporation	EQT Production Company	Assignment	556/132
EQT Production Company	Antero Resources Corporation	Assignment	663/1
, <u>Muriel Sherwood Lease</u> Muriel Sherwood	Petroedge Energy LLC	1/8	383/318
Petroedge Energy LLC	Statoil USA Onshore Properties Inc	Assignment	406/147
Statoil USA Onshore Properties Inc	EQT Production Company	Assignment	539/239
EQT Production Company	Antero Resources Corporation	Assignment	663/1
/ <mark>William D Hope Lease</mark> William D Hope	Antero Resources Corporation	1/8+	4/734
	Afficio Resources Corporation	1/6+	4,734
John B Bennett et ux Lease John B Bennett et ux	EQT Production Company	1/8+ RECEIVED	606/779
EQT Production Company	Antero Resources Corporation	Assignment Office of Oil and Gas	663/1
Lee & Hall Royalties Lease		DEC 27 2021	
Lee & Hall Royalties	Antero Resources Corporation	1/8+ WV Department of	258A/551
Robert E Clark et ux Lease		Environmental Protection	
Robert E Clark et ux	Antero Resources Corporation	01/21/	268A/525 2022

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	Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
1	James W Yoho et ux Lease James W Yoho et ux Gastrar Exploration USA Inc Stone Energy Corporation EQT Production Company	Gastrar Exploration Inc Stone Energy Corporation EQT Production Company Antero Resources Corporation	1/8+ Assignment Assignment Assignment	111A/718 152A/521 183A/305 230/501
	<u>David L Smith Lease</u> David L Smith	Antero Resources Corporation	1/8+	273A/442
	John Mathew Staley Lease John Mathew Staley	Antero Resources Corporation	1/8+	266A/26

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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.

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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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
David I. Smith Lease				
	David L Smith As	ntero Resources Corporation	1/8+	273/442

*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	RECEIVED Office of Oil and Gas
By:	Tim Rady (Ledy	
Its:	VP of Land	DEC 27 2021
		W Department of

Environmental Protection



December 22, 2021

West Virginia Department of Environmental Protection Office of Oil and Gas Attn: Mr. Taylor Brewer 601 57th Street Charleston, WV 25304 Antero Resources 1615 Wynkoop Street Denver, CO 80202 Office 303.357.7310 Fax 303.357.7315

Mr. Brewer:

Antero Resources Corporation (Antero) would like to submit the following permit modifications for approved well on the existing Thin Air Pad: Maroon Unit 2H (47-095-02757-00), Axtel Unit 1H (47-095-02753-00) and Purple Unit 1H & 2H (47-095-02758-00, 47-095-02759-00) Expedited.

Attached you will find the following:

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

If you have any questions please feel free to contact me at (303) 357-7182.

Thank you in advance for your consideration.

Sincerely,

Mallory Stanton Permitting Supervisor

Antero Resources Corporation

Enclosures

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Stansberry, Wade A <wade.a.stansberry@wv.gov>

Expedited Horizontal H6A Well Work Permits Thin Air Pad

Stansberry, Wade A <wade.a.stansberry@wv.gov>

Wed, Jan 19, 2022 at 10:09 AM

To: Mallory Stanton <mstanton@anteroresources.com>, Dani DeVito <ddevito@shalepro.com>, mhamsher@anteroresources.com, Douglas Newlon <douglas.c.newlon@wv.gov>, ljackson@wvassessor.com

I have attached a copy of the newly issued well permit number. This will serve as your copy.

47-095-02753 - AXTEL UNIT 1H 47-095-02758 - PURPLE UNIT 1H 47-095-02759 - PURPLE UNIT 2H

If you have any questions, then please contact us here at the Office of Oil and Gas.

Thank you,

Wade A. Stansberry

Environmental Resource Specialist 3

West Virginia Department of Environmental Protection

Office of Oil & Gas

601 57th St. SE

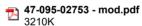
Charleston, WV 25304

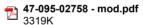
(304) 926-0499 ext. 41115

(304) 926-0452 fax

Wade.A.Stansberry@wv.gov

3 attachments





47-095-02759 - mod.pdf 2953K