

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, October 16, 2023 PERMIT MODIFICATION APPROVAL Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET

DENVER, CO 80202

Re:

Permit Modification Approval for Allender Unit 2H

47-085-10497-00-00

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.

Operator's Well Number: Allender Unit 2H Farm Name: Pierce, Elmer W.

U.S. WELL NUMBER: 47-085-10497-00-00

Horizontal 6A New Drill

Date Modification Issued: 10/16/2023

Promoting a healthy environment.

API	NO.	47-	085		10	0497		
	OPE	RAT	OR	WEL	L	NO.	Allender Unit 2H MOD)
	We	II Pa	d N	lame	: (Cashe	w Pad	-

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

1) Well Operator: Antero Resources Corporal 494507062 085-Ritchie Union / Oxford 7.5' /
Operator ID County District Quadrangle
2) Operator's Well Number: Allender Unit 2H MOD / Well Pad Name: Cashew Pad /
3) Farm Name/Surface Owner: Elmer W. Pierce / Public Road Access: Sugar Run Road /
4) Elevation, current ground: Elevation, proposed post-construction: 1019'
5) Well Type (a) Gas Oil X Underground Storage
Other
(b)If Gas Shallow X Deep
Horizontal X
6) Existing Pad: Yes or No Yes
7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s): Marcellus Shale: 6900' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2800#
8) Proposed Total Vertical Depth: 6900' TVD
9) Formation at Total Vertical Depth: Marcellus
10) Proposed Total Measured Depth: 23000' MD
11) Proposed Horizontal Leg Length: 13923.1'
12) Approximate Fresh Water Strata Depths: 53', 236'
13) Method to Determine Fresh Water Depths: 47-085-07654, 47-085-10419
14) Approximate Saltwater Depths: 1709', 1847'
15) Approximate Coal Seam Depths: None Identified
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 _X Office of Oil and Gas
(a) If Yes, provide Mine Info: Name: OCT 1 I 2023
Depth: WV Department of
Seam:
Owner:
01/44024651
CK# 4024651 # 7500° Pate 101

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OPERATOR WELL NO. Allender Unit 2H MOD
Well Pad Name: Cashew Pad

18)

CASING AND TUBING PROGRAM

TYPE	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	H-40	94#	100	100	CTS, 96 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	300	300	CTS, 417Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500 /	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	23000	23000	CTS, 5917 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			<i>U</i> :
Liners							

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/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"	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

Kind:	N/A	BECEIVED
Sizes:	N/A	Office of Oil and Gas
Depths Set:	N/A	WV Department of Environmental Protection

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WW-6B
(10/14)

API NO. 47- 085 - 10497

OPERATOR WELL NO. Allender Unit 2H MOD

Well Pad Name: Cashew Pad

19) Describe proposed well work, including	the drilling and	plugging b	ack of anv	pilot hole:
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Drill, perforate, fracture a new vertical shallow well and complete Marcellus Shale.

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): 33.75 acres
- 22) Area to be disturbed for well pad only, less access road (acres): 14.29 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 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.

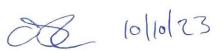
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

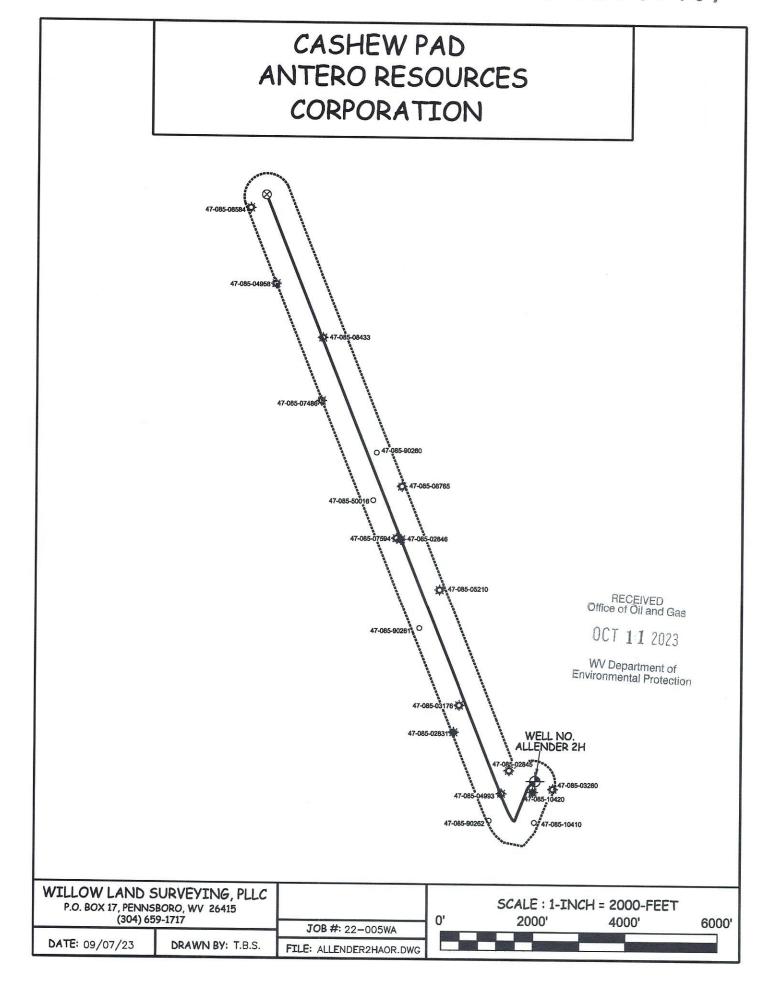
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

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 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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UWI (APINum)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)
47085032600000 R L KEISTER	R L KEISTER	3	R & R OIL & GAS LLC	OIL STATES SALES	2,013		Big Injun
47085104200000 ELKLICK UNIT	ELKLICK UNIT	2H	ANTERO RESOURCES CORP	ANTERO RESOURCES CORP	20,905	6974 - 20778	Marcellus
47085104100000 Cashew	Cashew	SH	ANTERO RESOURCES CORP	ANTERO RESOURCES CORP			
47085902620000							
47085049930000 SMITH	SMITH	2	BETA HELIX ENERGY LLC	CHASE PETROLEUM CO	5,185	4554 - 4952	Baltown, Benson, Alexander
47085028310000							Big Injun
-47085031760000 D SMITH	D SMITH	2	R & R OIL & GAS LLC	BEAR RUN OIL	2,006		Big Injun
47085902610000							
47085075940000 HART	HART	2	DIVERSIFIED PRODUCTION LLC	WACO O & G CO INC	6,378	3182 - 6214	Speechley, Riley, Benson, Rhinstreet, Genesee
47085500160000 JACOB PRUNTY	JACOB PRUNTY	3708	CONSOL GAS SUPLY CRP	CONSOL GAS SUPLY CRP	2,070		
47085074860000 PRUNTY BILL ET AL	PRUNTY BILL ET AL	2	BONNETTS PRODUCTION CO	FARR ENTERPRISES	5,285	3303 - 5167	Lower Huron, Angola
47085049580000	47085049580000 ZINN ARCHIE D ET AL	1	BETA HELIX ENERGY LLC	CHASE PETROLEUM CO	5,350	4664 - 5139	Speechley, Riley, Benson, Rhinstreet, Genesee
47085085840000 MIRACLE	MIRACLE	1	KEY OIL CO	KEY OIL CO	5,420	3396 - 5232	Warren, Baltown, Riley, Benson, Alexander
47085084330000 PRUNTY LEE HEIRS	PRUNTY LEE HEIRS	2	KEY OIL CO	KEY OIL CO	5,375	3228 - 5091	Warren, Baltown, Riley, Benson, Alexander
47085902600000							
47085087650000 NICHOLSON	NICHOLSON	3	KEY OIL CO	KEY OIL CO	5,480	3384 - 4878	Warren, Riley, Alexander
47085028460000 W W ZINN HRS	W W ZINN HRS	1	RITCHIE PETROLEUM CORP INC	HARDMAN DRILLING	1,940		Big Injun
47085052100000	47085052100000 MARTIN BELLE ET AL	2	BETA HELIX ENERGY LLC	CHASE PETROLEUM CO	5,500	4434 - 5234	Balltown, Riley, Benson, Alexander
47085028450000 HARVEY SHEPLER	HARVEY SHEPLER	1	ADAMS ENERGY CO	RUDDER OIL & GAS	1,899		Maxton

Office of Oil and Gas

OCT 11 2023

WV Department of Environmental Protection

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
R. F. Kiester, et al Lease:			
R. F. Kiester, et al	G. L. Yaste	1/8	105/504
G. L. Yaste	D. L. Y., Inc	Assignment	112/302
D. L. Y., Inc	Betty Jean Stalnaker & Rosalee Roberts	Assignment	132/565
Betty Jean Stalnaker & Rosalee Roberts	R & S Gas Company	Assignment	147/548
R & S Gas Company	BET-RO Inc	Assignment	147/554
BET-RO Inc	Roberts Energy Corporation	Assignment	240/36
Roberts Energy Corporation	Antero Resources Corporation	Assignment	329/138
Della M. Shepler, et al Lease:			
Della M. Shepler, et al	Alton Skinner	1/8	132/345
Alton Skinner	Crystal G. Skinner and Desari S. Garrett	Assignment	216/391
Crystal G. Skinner and Desari S. Garrett	D C Petroleum, Inc.	Assignment	247/245
D C Petroleum, Inc.	Antero Resources Appalachian Corporation		
Antero Resources Appalachian Corporation	Antero Resources Corporation	n Assignment Name Change	254/789 15/705
Antero Nesources Apparachian Corporation	Antero Resources Corporation	Name Change	15/705
Eddy D. Beck Lease			
Eddy D. Beck	Antero Resources Corporation	1/8+	318/650
Carol S. Love Lease		RECEIVED Office of Oil and Gas	
Carol S. Love	Willard E. Ferrell	Office of Oil and Gas 1/8	107/32
Willard E. Ferrell	Colleen F. Selsor	Will	42/15
Colleen F. Selsor	Bet-Ro, Inc	OCT 11 2023 Assignment	196/651
Bet-Ro, Inc	Jesam Energy	Assignment	239/165
Jesam Energy	Roberts Energy	WV Department of Assignment	239/564
Roberts Energy	Key Oil Company En	vironmental Protection Assignment	254/588
Key Oil Company	Antero Resources Appalachian Corporation		
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	15/705
/ C. Dale Sims, et ux Lease:			
C. Dale Sims, et ux	Chase Petroleum, Inc	1/8	146/730
Chase Petroleum, Inc	Continental Reserves 1983-1	Assignment	176/835
Continental Reserves 1983-1	Abarta Oil and Gas Company, Inc.	Assignment	247/569
Abarta Oil and Gas Company, Inc.	Antero Resources Corporation	Assignment	311/111
Addition and day company, me.	Antero Resources Corporation	Assignment	311/111
Belle Martin, et al Lease:			
Belle Martin, et al	Alton Skinner	1/8	132/663
Alton Skinner	Crystal G. Skinner and Desari S. Garrett	Assignment	216/391
Crystal G. Skinner and Desari S. Garrett	D C Petroleum, Inc.	Assignment	247/245
D C Petroleum, Inc.	Antero Resources Appalachian Corporation	n Assignment	254/789
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	15/705

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
Elizabeth Hart Lease:			
Elizabeth Hart	John M. Walton	1/8	108/384
John M. Walton	Allstate Securities, INC	Assignment	118/377
Allstate Securities, INC	B & L Oil Company	Assignment	121/491
B & L Oil Company	Waco Oil and Gas Company Inc	Assignment	181/614
Waco Oil and Gas Company Inc	Ashland Inc	Assignment	221/1
Ashland Inc	Ashland Exploration INC	Assignment	222/169
Ashland Exploration INC	Blazer Energy Corporation	Assignment	225/170
Blazer Energy Corporation	Eastern State Oil & Gas Inc	Name Change	5/778
Eastern State Oil & Gas Inc	Equitable Production Company	Name Change	6/443
Equitable Production Company	EQT Production Company	Name Change	6/443
EQT Production Company	Antero Resources Appalachian Corporation	Assignment	264/477
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	15/705
Charles E. Nicholson Lease:			
Charles E. Nicholson	Key Oil Company	1/8	230/274
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	258/509
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	15/705
William F. Prunty Lease:			
William F. Prunty	Farr Enterprises	1/8	182/810
Farr Enterprises	Key Oil	Assignment	224/545
Key Oil	Antero Resources Appalachian Corporation	Assignment	256/488
Antero Resources Appalachian Corporation	Antero Resources Corporation	BECEIVED ALL C	15/705
*************************************		Office of Oil and Gas	13,703
✓ C.O. Wise, et al Lease			
C.O. Wise, et al	W. D. Gribble	OCT 1 1 2023 1/8	79/209
W. D. Gribble	Carolyn E. Farr	Will	3/97
Carolyn E. Farr	Carolyn E. Farr trust by its trustee Clarence E		220/233
Carolyn E. Farr trust by its trustee Clarence E	Antero Resources Appalachian Corporation	Wironmental Protection Assignment	223/509
Sigley		Total Control of the	223/303
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	15/705
Archie D. Zinn, et ux Lease:			
Archie D. Zinn, et ux	Alton Skinner	1/8	132/394
Alton Skinner	Crystal G. Skinner and Desari S. Garrett	Assignment	216/391
Crystal G. Skinner and Desari S. Garrett	DC Petroleum	Assignment	247/245
DC Petroleum and Chase Petroleum	Antero Resources Corporation	Assignment	254/133
		Hoolginicite	237/133

*Cotenancy Utilization - Antero is utilizing the Co-tenancy Modernization and Majority Protection Act to proceed with 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

*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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Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Willa G. Nicholson	Clarence W. Mutschelknaus	1/8	146/36
		•	162/16
Alton Skinner	Alton L. Skinner, II, Crystal G. Skinner and Desari S. Garrett	Will	216/391
Alton L. Skinner, II, Crystal G. Skinner and Desari S. Garrett	DC Petroleum	Assignment	170/583
DC Petroleum Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	n Assignment Name Change	254/133 15/705
	Willa G. Nicholson Clarence W. Mutschelknaus Alton Skinner Alton L. Skinner, II, Crystal G. Skinner and Desari S. Garrett DC Petroleum	Willa G. Nicholson Clarence W. Mutschelknaus Alton Skinner Alton Skinner Alton L. Skinner, II, Crystal G. Skinner and Desari S. Garrett DC Petroleum Antero Resources Appalachian Corporation	Willa G. Nicholson Clarence W. Mutschelknaus Alton Skinner Alton Skinner Alton L. Skinner, II, Crystal G. Skinner and Desari S. Garrett DC Petroleum Antero Resources Appalachian Corporation Assignment Assignment Assignment Assignment

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

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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 (ed)
Its:	Senior Vice President of Land

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