

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

Friday, May 31, 2024 PERMIT MODIFICATION APPROVAL Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET

DENVER, CO 80202

Re:

Permit Modification Approval for BOXCAR UNIT 1H

47-085-10515-00-00

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: BOXCAR UNIT 1H

Farm Name: NELSON MARK HAYHURST

U.S. WELL NUMBER: 47-085-10515-00-00

Horizontal 6A New Drill Date Modification Issued: 05/31/2024

Promoting a healthy environment.

	_ 10515		
API NO. 47-085	WELL NO.	Boxcar Unit 1H MOD	1
Well Pad Na	me: Olymp	ous Pad	

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

DEPARTMENT OF ENVIRONMENT APPLICATION WELL WORK PERMIT APPLICATION
WEDE Fllenboro 7.5'
Antero Resources Corpora County District Quadrange
1) Well Operator Well Pad Name: Olympus Pad
2) Operator's Well Number: Boxcar Unit 1H MOD Well Pad Name: Olympus Pad Well Pad Name: Lamberton Rd
2) Operator's Welson Mark Hayhurst Public Road Access: Lumber Public Road Access:
2) Operator's Well Number: Boxcar Unit 1H MOD 3) Farm Name/Surface Owner: Nelson Mark Hayhurst Public Road Access: Lamberton Rd Nelson Mark Hayhurst Public Road Access: Lamberton Rd 1025' - AS BUILT Elevation, proposed post-construction:
4) Elevation, current ground: 1025' - AS BUILT Elevation, proposed post-construction. Underground Storage Underground Storage
5) Well Type (a) Gas X Oil Oil
0.1
GNF Gas Shallow X
Horizontal X
6) Existing Pad: Yes or No Yes 7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s): 7) Proposed Target Formation(s), Depth(s), Anticipated Thickness- 55 feet, Associated Pressure- 2850#
6) Existing 1 ad. 1966. Existing 1 ad. 1976. Expensed Target Formation(s), Depth(s), Anticipated Thickness and Expensed Target Formation(s), Depth(s), Anticipated Target Formation(s), Anticipated
Marcellus Silale. O'CC 172
8) Proposed Total Vertical Depth: 6700' TVD Marcellus
- et Total Verifical Depui.
1 Danth: 2/400 MD
10) Proposed Total Metsured Dopan.
11) Proposed Horizontal Leg Lengui.
12) Approximate Fresh Water Strata Depths: 173, 230 47085011840000, 47085066360000 Offset well records. Depths have been adjusted according to surface elevation.
13) Method to Determine Fresh Water Depths: 47085011840000, 47085086360000 Oliset Well received to the control of the control
14) Approximate Saltv/ater Depths: 430'
15) Approximate Coal Seam Depths: N/A
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
(a) If Yes, provide Mine Info: Name: RECEIVED Office of Oil and Gas
Depth: MAY 2 4 2024
CU# 4031426 Seam: WAT 24 2024
CK# 4031426 Seam: #WDepartment of Environmental Protection
12, 7024
2/4

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Page 1 of 3

API NO. 47-085 - 10515

OPERATOR WELL NO. Boxcar Unit 1H MOD Well Pad Name: Olympus Pad

18)

CASING AND TUBING PROGRAM

[8]			440000000000000000000000000000000000000				FEED TOTA
ГҮРЕ	Size (in)	New or	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	Used New	J-55	94#	100'	100'	CTS, 96 Cu. Ft. CTS, 313 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	300'	3000'	CTS, 1221 Cu. Ft
Coal	9-5/8"	New	J-55	36#	3000		
Intermediate					27400'	27400' /	CTS, 5977 Cu. F
Production	5-1/2"	Nev/	P110-ICY		27400		
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

				1	Anticipated	~	Cement
ТҮРЕ	Size (in)	Wellbore Diameter (in)	Wall Thickness	Burst Pressure (psi)	Max. Internal Pressure (psi)	<u>Cement</u> <u>Type</u>	Yield (cu. ft./k)
			(in)	2250	50	Class A/L	~1.18
Conductor	20"	24"	0.375"		1000	Class A/L	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730			~1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A/L	71.10
Intermediate						0/11	~1.8
Production	5-1/2"	8-3/4" & 8-1/2"	0.415"	14,360	2500	Class G/H	1.0
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

Kind:	N/A	RECEIVED Office of Oil and Gas
Sizes:	N/A	MAY 2 4 7024
Depths Set:	N/A	WV Department of Environmental Protection
		January Her C. Page 2 of 3

API NO. 47- 085 - 10515

OPERATOR WELL NO. Boxcar Unit 1H MOD

Well Pad Name: Olympus 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 zone; are covered.

20) Describe fracturing/st mulating 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 w ll 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): 18.11 acres
- 22) Area to be disturbed for well pad only, less access road (acres): 10.00 acres

23) Describe centralizer placement for each casing string:

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

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:

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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 cemen 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

WV Department of

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 20vironmental Protection

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.

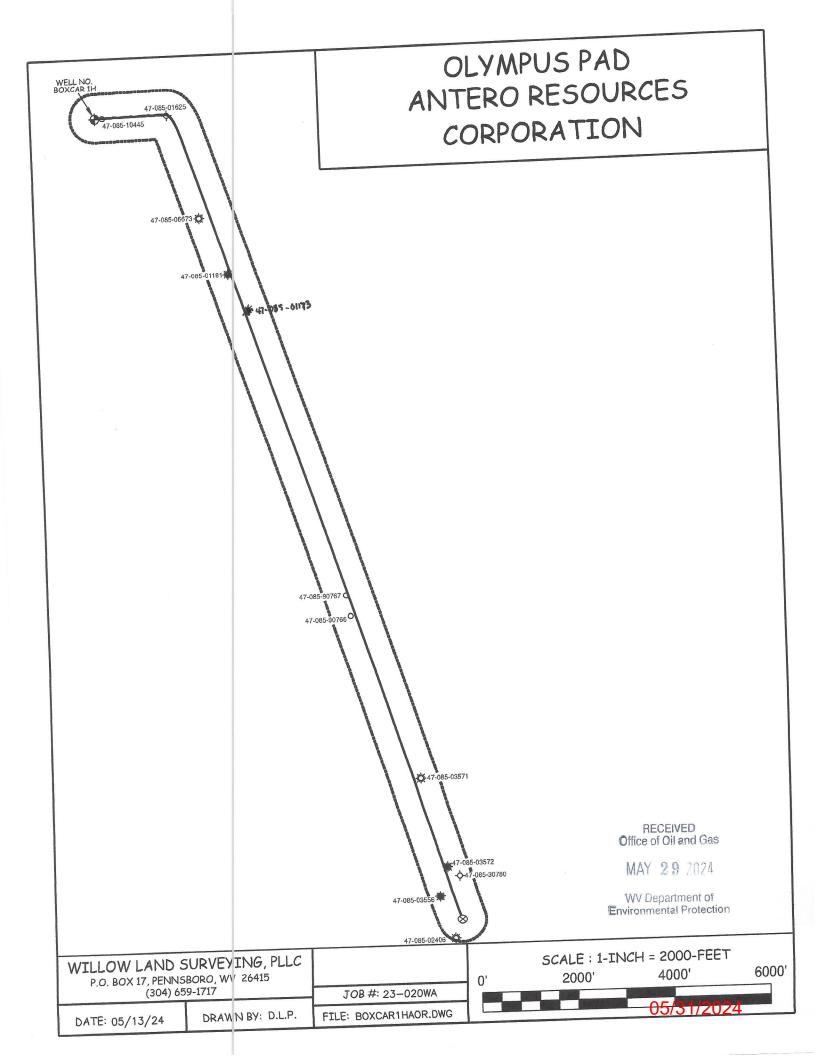
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

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 sweer, 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.

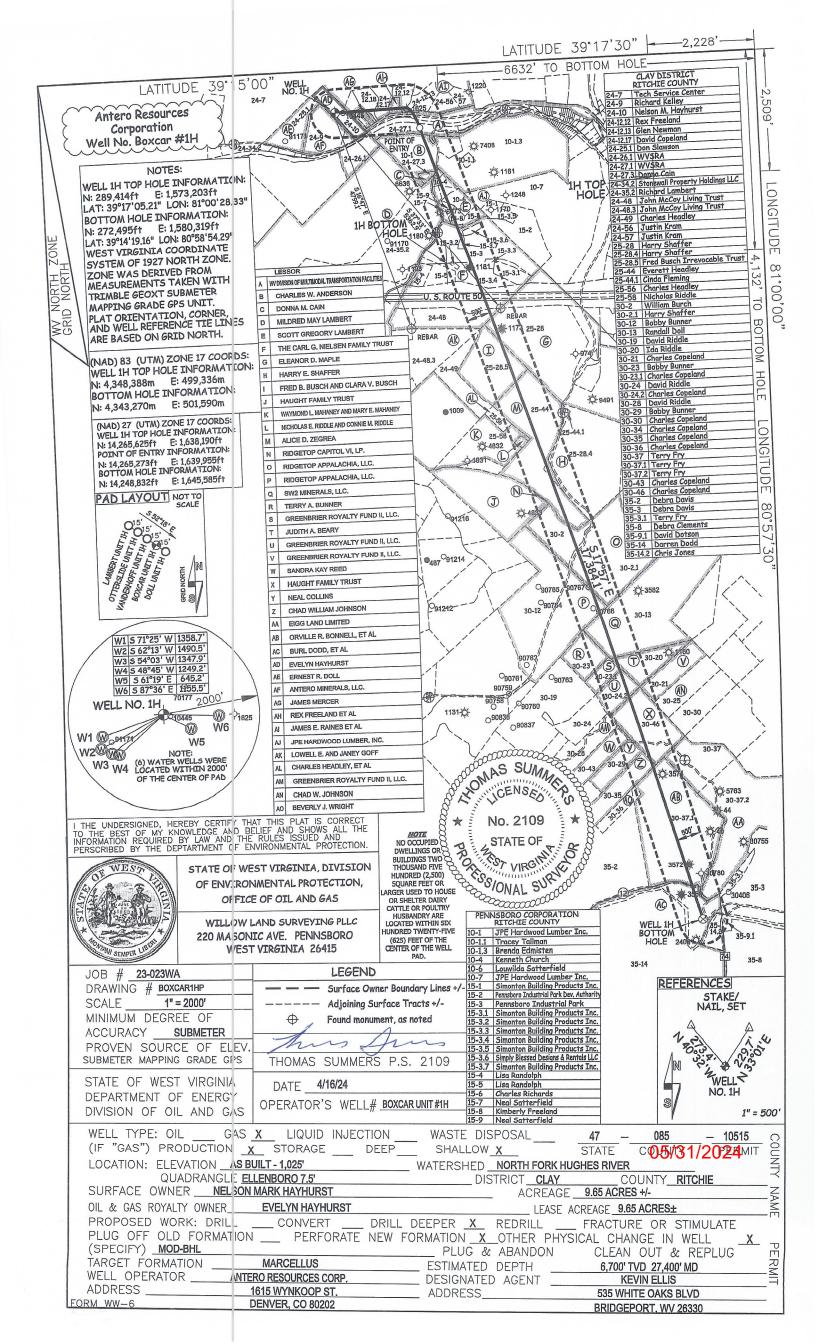
*Note: Attach additional sheets as needed.

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05/31/2024



Well Name Well Name Well Name 47085104450000 OLYMPUS UNIT 47085066730000 LAMBERT MILDRED A7085016130000 H C SHUJTE A7085016130000 MARY LOFTUS 47085907670000 MARY LOFTUS 47085907670000 OR BONNELL 4708593730000 OR BONNELL 4708593730000 OR BONNELL 4708593730000 OR BONNELL 47085937300000 OR BONNELL 470859335000000 OR BONNELL 47085933500000 OR B		
Well Number ANTERO RESOURCES CORP 2 ZICKEFOOSE W F & R L 4 KOHLTH 4 MYERS HOMER W 1 LUCAS WELL SERVICE INC 7 TARGA DEVELOPMENT INC 2 TARGA DEVELOPMENT INC 1 LUCAS WELL SERVICE INC 3 LUCAS WELL SERVICE INC 1 NICKANDOWN 1 UNKNOWN	Operator	
ANTERO RESOURCES CORP 5,053 6,08 6,10 6 7,00	1D	
2548 - 4941 1924 - 2023 1947 - 1923 1847 - 1923 1665 - 1782	Perforated interval (shallowest, deepest)	
Squaw, Up Speechley, Udev, Lower Huron, Benson, Java Big Injun Big Injun Big Injun Big Injun Big Injun, Squaw Big Injun Big Injun, Squaw Squaw Squaw		Perforated Formation(s)
Weir, Alexander, Gordon Weir, Benson, Alexander, Gordon		Producible Formation(s) not perr a



Operator's Well Number

Boxcar 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:

Applicant claims the right to	extract, produce or market the oil of go	- "	Book/Page_
	Grantee, lessee, etc.	Royalty	<u> </u>
AD: Evelyn Hayhurst Lease Evelyn Hayhurst	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0260/0279 0015/0705
Al: James E. Raines Et Al Lease	Antero Resources Corporation	1/8+	0287/0001
James E. Raines AG: James Mercer Lease	Antero Resources Corporation	1/8+	0310/0926
James Mercer Al: James E. Raines Et Al Lease James E. Raines	Antero Resources Corporation	1/8+	0287/0001
AH: Rex Freeland Et Al Lease Rex Freeland	Antero Resources Corporation	1/8+	0311/0046
Al: James E. Raines Et Al Lease James E. Raines	Antero Resources Corporation	1/8+	0287/0001
A: WV Division of Multimodal Transport ation Facilities Lease West Virginia Division of Multimodal Transportation Facilities	Antero Resources Corporation	1/8+	0336/0335
B: Charles W. Anderson Lease Charles W. Anderson	Antero Resources Corporation	1/8+	0338/0531
C: Donna M. Cain Lease Donna M. Cain	Antero Resources Corporation	1/8+	0332/0437
E: Scott Gregory Lambert Lease Scott Gregory Lambert	Antero Resources Corporation	1/8+	0318/0327
F: The Carl G. Nielson Family Trust Lease The Carl G. Nielson Family Trust	Antero Resources Corporation	1/8+	0332/0224
G: Eleanor D. Maple Lease Eleanor D. Maple	Antero Resources Corporation	1/8+	0339/0331
/ <u>I: Fred B. Busch and Clara V. Busch Lea :e</u> Fred B. Busch and Clara V. Busch	Antero Resources Corporation	1/8 RECEIVE	0339/0331 ED nd Gas
M: Alice D. Zegrea Lease Alice D. Zegrea Lease	Antero Resources Corporation	1/8+ MAY 13	0340/0454
O: Ridgetop Appalachia, LLC. Lease Ridgetop Appalachia, LLC.	Antero Resources Corporation	1/8+ WV Departm Environmental P	ent of 0336/0879 rotection
P: Ridgetop Appalachia, LLC. Lease Ridgetop Appalachia, LLC.	Antero Resources Corporation	1/8+ 05/3	1/2024 0336/0879

Operator's Well Number

Boxcar Unit 1H MOD

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	Applicant claims the right		Dovolty	Book/Page_
	Grantor, lessor, etc	Grantee, lessee, etc.	Royalty	
1	Q: SW2 Minerals, LLC. Lease SW2 Minerals, LLC.	Antero Resources Corporation	1/8+	0333/0034
1	T: Judith A. Beary Lease Judith A. Beary	Antero Resources Corporation	1/8+	0337/0312
,	S: Greenbrier Royalty Fund II, LLC. Lease Greenbrier Royalty Fund II, LLC. SEP Exploration, LLC	SEP Exploration, LLC Antero Resources Corporation	1/8+ Agreement	0344/0437 0345/0547
	/ <u>U: Greenbrier Royalty Fund II, LLC. Lease</u> Greenbrier Royalty Fund II, LLC. SEP Exploration, LLC	SEP Exploration, LLC Antero Resources Corporation	1/8+ Agreement	0344/0437 0345/0547
,	X: Haught Family Trust Lease Haught Family Trust	Antero Resources Corporation	1/8+	0343/0502
	Z: Chad William Johnson Lease Chad William Johnson	Antero Resources Corporation	1/8+	0346/0132
i	AB: Orville R. Bonnell, Et Al Lease Orville R. Bonnell, Et Al Dennis D. Blauser Blauser Energy Corporation	Dennis Blauser Blauser Energy Corporation Antero Resources Corporation	1/8 Assignment Assignment	0118/0426 0204/0795 0265/0648

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Office of Oil and Gas

MAY 13 2024

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.

*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.

**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.

WW-6A1 (5/13)

Operator's Well No.	Boxcar Unit 1H MOD
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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
AC: Burl Dodd, Et Al Lease	Burl Dodd, Et Al Dennis D. Blauser Thomas H. Burrows Cedar Petroleum Donald V. Belatini Blauser Energy Corporation	Dennis D. Blauser Thomas H. Burrows Cedar Petroleum Donald V. Belatini Blauser Energy Corporation Antero Resources Corporation	1/8 Assignment Assignment Affidavit Assignment Assignment	0118/0318 0118/0792 0118/0790 0265/0645 0169/0352 0265/0648

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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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Office of Oil and Gas

MAY 13 2024

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	(m) ledy	
Its:	Senior Vice President of Land		