

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

Austin Caperton, Cabinet Secretary www.dep.wv.gov

Friday, March 1, 2019 PERMIT MODIFICATION APPROVAL Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for LINDSEY UNIT 1H

47-095-02547-00-00

Modified Well Bore Point of Entry and Lateral Length

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: LINDSEY UNIT 1H

Farm Name: STEPHEN GRIMM

U.S. WELL NUMBER: 47-095-02547-00-00

Horizontal 6A New Drill

Date Modification Issued: March 1, 2019

Promoting a healthy environment.

WW-6B (04/15)

Permit Modification API# 47-095-02547 Mod API NO. 47-095 - 02547 03/01/2019

OPERATOR WELL NO. Lindsey Unit 1H
Well Pad Name: Alta Pad

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

1) Well Operator	Antero Res	sources Corpora	494507062	095 - Tyler	McElroy	Centerpoint 7.5'
3 7 10 15			Operator ID	County	District	Quadrangle
2) Operator's We	ell Number: Lir	ndsey Unit 1H	Well P	ad Name: Alta I	Pad	
3) Farm Name/S	urface Owner:	Stephen Grimm	Public Ro	oad Access: CR	23	
4) Elevation, cur	rent ground:	848' El	evation, proposed	d post-constructi	on: ~827'	
	(a) Gas X Other	Oil	Un	derground Stora	ge	
(CAMP CLEAN AND	allow X rizontal X	Deep	A.		0
6) Existing Pad:	Yes or No No					
		s), Depth(s), Antic Anticipated Thickne				
8) Proposed Tota	al Vertical Dept	th: 7100' TVD				
9) Formation at 7	Γotal Vertical Γ	Depth: Marcellus	S			
10) Proposed Tot	tal Measured D	epth: 19900' M	D			
11) Proposed Ho	rizontal Leg Le	ength: 9654'				
12) Approximate	Fresh Water S	trata Depths:	29', 369'			
13) Method to De	etermine Fresh	Water Depths: (Offset well records. D	epths have been ac	ljusted accord	ling to surface elevations.
14) Approximate	Saltwater Dep	ths: 1093', 1159	', 1260'			
15) Approximate	Coal Seam De	epths: None Iden	tified			RECEIVED
16) Approximate	Depth to Poss	ible Void (coal mi	ine, karst, other):	None Anticipa	ted	Office of Oil and Gas
17) Does Propose directly overlying		n contain coal sear an active mine?	ms Yes	No.	X	UEU 7 ZU18 WV Department of Environmental Protection
(a) If Yes, prov	ide Mine Info:	Name:				
		Depth:				
		Seam:				
		Owner:				

Permit Modifica	tion API#	47-095-0	02547 MOY
API NO. 47- 095	_ 02547	03/01	/2019

OPERATOR WELL NO. Lindsey Unit 1H
Well Pad Name: Alta Pad

18)

CASING AND TUBING PROGRAM

ТҮРЕ	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-55	54.5#	420' *see #19	420' *see #19	CTS, 583 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19900'	19900'	5064 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#		7100'	
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"	0.438"	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"	0.415"	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							

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Kind:	T	Wy Department of Environmental Protect
Tenia.	N/A	
Sizes:	N/A	
Depths Set:	N/A	

Permit Modification	on API#	47-095-02547 M60 03/01/2019
API NO. 47- 095	- 02547	<u>03/01/201</u> 9
ODEDATOR WE	III NO	Lindsov Linit 1H

Well Pad Name: Alta 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): 17.43 acres
- 22) Area to be disturbed for well pad only, less access road (acres): 7.28 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:

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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.

95-02547 HOD

LINDSEY UNIT 1H (ALTA PAD) - AREA OF REVIEW 35-8-5.11 PAGE 2

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WV Department of Environmental Protection Dopey Hoskins Unit Historical Operator
Jay-Bee Oil & Gas
Antero Resources Corporation 15,482 16,996 Perforated Formation(s)
Waiting on Completion
Marcellus Shale Producible Formation(s) not perf d
Waiting on Completion
Big injun, Weir, Alexander

Operator's Well No. Lindsey Unit 1H

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:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Donald Lee Sweeney Lease				
	Donald Lee Sweeney	Four Leaf Land Company	1/8	0370/0605
	Four Leaf Land Company	Antero Resources Appalachian Corporation	Assignment	0403/0561
	Antero Resources Appalachian Corp.	Antero Resources Corporation	Name Change	Exhibit 1

*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

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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: Kevin Kilstrom

Its: Senior Vice President - Production

Lindsey Unit 1H
Permit Modification API# 47-095-02547 M00

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
M.V. B. George Lease			
M. V. B. George	IM Underwood	1/8	0066/0621
IM Underwood	Hope Natural Gas Company	Assignment	0071/0610
Hope Natural Gas Company	Consolidated Gas Supply Corp	Assignment	0169/0026
Consolidated Gas Supply Corp	Consolidated Gas Transmission Corp	Assignment	0249/0287
Consolidated Gas Transmission Corp	CNG Transmission Corp	Name Change	Exhibit 2
CNG Transmission Corp	Dominion Transmission, Inc	Name Change	Exhibit 3
Dominion Transmission, Inc	CONSOL Energy Holding LLC	Assignment	0374/0187
CONSOL Energy Holdings, LLC	CNX Gas Company	Name Change	0293/0252
CNX Gas Company	Antero Resources Appalachian Corp	Assignment	0425/0725
Antero Resources Appalachian Corp	Antero Resources Corp	Name Change	Exhibit 1
Mary Jo Foster Living Trust Lease			
Mary Jo Foster Living Trust	Antero Resources Appalachian Corporation	1/8+	0406/0215
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
L. Brooks Coffman et ux Lease			
L. Brooks Coffman et ux	Drilling Appalachian Corporation	1/8	0276/0010
Drilling Appalachian Corporation	Antero Resources Appalachian Corporation	Assignment	0401/0499
Antero Resources Appalachian Corp	Antero Resources Corporation	Name Change	Exhibit 1
Edgar B. Hartley, heir of Heather Hartley Lease			
Edgar B. Hartley, heir of Heather Hartley	Antero Resources Corporation	1/8+	0498/0326
		-7-	
John B. Shepherd et ux Lease 🗸		RECEIVED 1/8+ Office of Oil and Ga	The state of the s
John B. Shepherd et ux	Antero Resources Appalachian Corporation		
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
		DEC 7 2018	
Nelda June Stubbs Lease	\$14.00 40.00 ACM \$20.00 ACM \$5		
Nelda June Stubbs	Antero Resources Corporation	1/8+ WV Department o Environmental Protec	0459/0108
Randi Michael Lease		Littlioniditalitation	
Randi Michael	Antero Resources Corporation	1/8+	0474/0777
Perry W. Duckworth Lease			
Perry W. Duckworth	Antero Resources Corporation	1/8+	0481/0652
Richard Gatrell et ux Lease			
Richard Gatrell et ux	Drilling Appalachian Corporation	1/8	0316/0150
Drilling Appalachian Corporation	Antero Resources Appalachian Corporation	Assignment	0391/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

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Operator's Well Number

Lindsey Unit 1H
Permit Modification API# 47-095-02547

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
Donald Lee Sweeney Lease			
Donald Lee Sweeney	Four Leaf Land Company	1/8	0370/0605
Four Leaf Land Company	Antero Resources Appalachian Corporation	Assignment	0403/0561
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
Rebecca L. Williams Lease			
Rebecca L. Williams	Drilling Appalachian Corporation	1/8	0311/0344
Drilling Appalachian Corporation	Antero Resources Appalachian Corporation	Assignment	0391/0416
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
K & D Holdings Lease			
K & D Holdings	Antero Resources Corporation	1/8	0623/0791

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FORM WW-6A1 **EXHIBIT 1**

FILED

Natalje E. Temant. Scoretary of State 1900 Kapayche Bivd E Bidg 1, Suite 157-E Charleston, WV 25305

FILE ONE ORIGINAL (Two if you want a Bled ctamped easy returned to you) FEE: \$25:00

Pennsy Barkur, Ma IN THE OFFICE OF Corporations Division SECRETARY OF STATE Part (304)558-8000
Website: www.uvsot.com
E-mail: husiness@wvsot.com

APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY

Office Hours: Monday -- Friday 8:30 e.m. -- 5:00 p.m. BT

and in accordance with the provisions of the West Virginia Code, the undersigned corporation hereby was applies for an Amended Cartificate of Authority and submits the following statement:

1.	Name under which the corporation was authorized to transact business in WV:	Antero Resources Appelechien Corporation	-		
2.	Data Cartificate of Authority was issued in West Virginia:	6/25/2008			
3,	Corporate name has been changed to: (Attach one <u>Cartified Conv of Name Change</u> as filed in home State of incorporation.)	Antero Respurosa Corporatión	_		;
4.	Name the corporation elects to use in WV; (due to home state name not being available)	Artiero Resources Corporation	-	279	i
5.	Other amendments: (attach additional pages if aspessary)		-	•	
	***				10
6.	Name and phone number of connect person. (the filing, listing a contact person and phone num document.)	This is optional, however, if there is a problem with abor may avoid having to return or reject the	Š.		
	Alvyn A. Schopp	(303) 367-7310			
	Contact Name	Phono Number	REC	CEIVED Oil and	Gas
7.	Signature information (See below **Linearism!). Print Name of Signer: Align A. Schapp	Title/Capacity: Authorized Person	DEC	7 20	318
	Rignatures Az Hackip		WV De Environme	partme ental Pr	nt of otection
ARY to th	nariant Lead Natice Renarities Statutour For West Virgin param who signs a document his or she knows in fishe in any e samplary of state the filling is guilty of a salademounce and, and dollars or southerd in the county or regional juli not man	material respect and known that the document is to be deliver woon conviction thereof, shall be fined not come than one	od :		
Pont.	CP-4 Linux Significance Signifi	of the Newsony of Sinte - Novine 6 (18	,	

EXHIBIT 2



I. Hen Hechler, - Secretary of State of the State of West Virginia, hereby certify that

originals of an application by

CONSOLIDATED GAS TRANSMISSION CORPORATION

for an amended certificate of authority to transact business in West Virginia are filed in my office, as required by the provisions of Chapter 31, Article 1, Sections 57 and 59 of the West Virginia Code and conform to law. Therefore, I issue this

AMENDED CERTIFICATE OF AUTHORITY

to transact business in West Virginia under the name of

CNG TRANSMISSION CORPORATION

and I attach to this certificate a duplicate original of the application.

Given under my hand and the

Great Scal of the State of

West Virginia, on this

_day of

Kan: Thekler

RM WW-6A1 EXHIBIT 3



Certificate

I, Ken Hechler, Secretary of State of the State of West Virginia, hereby certify that

riginals of an application by

CNG TRANSMISSION CORPORATION

for an amended certificate of authority to transact business in West Virginia are filed in my office, as required by the provisions of Chapter 31, Article 1, Sections 57 and 59 of the West Virginia Code and conform to law. Therefore, I issue this

AMENDED CERTIFICATE OF AUTHORITY

to transact business in West Virginia under the name of

DOMINION TRANSMISSION, INC.

and I attach to this certificate a duplicate original of the application.

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WV Department of Environmental Protection

Given under my hand and the Great Seal of the State of West Virginia on

May 10, 2000

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