



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, February 24, 2025
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for Duke Unit 1H
47-103-03694-00-00

Extended 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.

A handwritten signature in blue ink, appearing to read 'James A. Martin', is written over a faint circular stamp.

James A. Martin
Chief

Operator's Well Number: Duke Unit 1H
Farm Name: Dallison Lumber Company
U.S. WELL NUMBER: 47-103-03694-00-00
Horizontal 6A New Drill
Date Modification Issued: 2/24/2025

Promoting a healthy environment.

02/28/2025

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

1) Well Operator: Antero Resources Corporation 494507062 103 - Wetzel Green Pine Grove 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Duke Unit 1H MOD Well Pad Name: Cedar Pad

3) Farm Name/Surface Owner: Dallison Lumber Company Public Road Access: CR 52

4) Elevation, current ground: As-Built - 1248' Elevation, proposed post-construction: _____

5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____

(b) If Gas Shallow Deep _____
Horizontal _____

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 7200' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 7200' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 26500' MD

11) Proposed Horizontal Leg Length: 16723' *Open to modification at a later date

12) Approximate Fresh Water Strata Depths: 612'

13) Method to Determine Fresh Water Depths: 47103308970000 Offset well records. Depths have been adjusted according to surface elevations.

14) Approximate Saltwater Depths: 2193'

15) Approximate Coal Seam Depths: 1010'

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

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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Blue Ink
2/27/25

WW-6B
(04/15)

API NO. 47- 103 - 03694
 OPERATOR WELL NO. Duke Unit 1H MOD
 Well Pad Name: Cedar 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	J-55	94#	100'	100'	CTS, 96 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	662'	662'	CTS, 690 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	3200'	3200'	CTS, 1303 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P110-ICY	23#	26500'	26500'	CTS, 5750 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
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"	0.375"	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			
Depths Set:	N/A			

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Handwritten signature and date:
 [Signature] 2/28/25

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): 71.85 acres

22) Area to be disturbed for well pad only, less access road (acres): 18.45 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

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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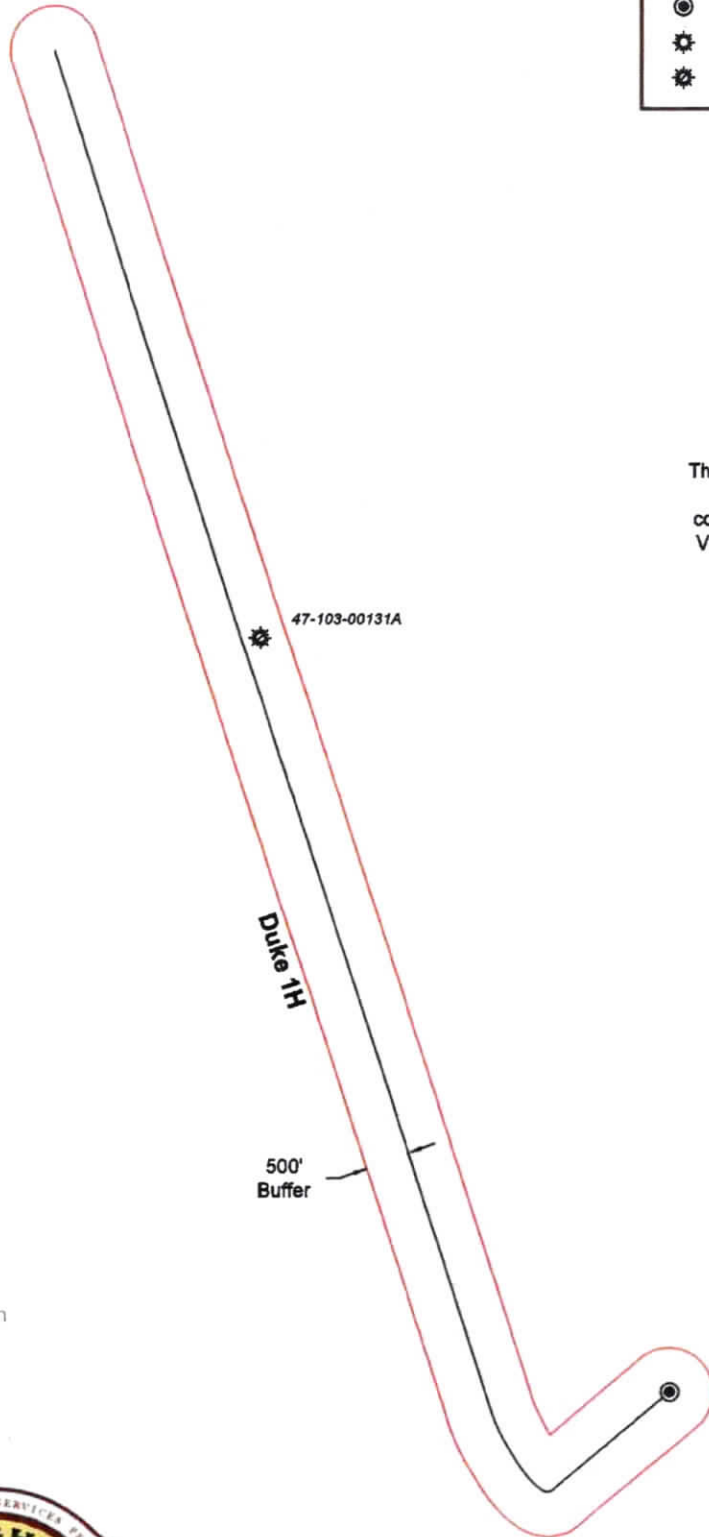
Handwritten signature and date:
JMB
2/28/25

LEGEND

- ⊙ Proposed gas well
- ⊛ Existing Well, as noted
- ⊛ Digitized Well, as noted



The orientation of this survey is Grid North, and its coordinate base is the West Virginia Coordinate System of 1927, North Zone



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Bridgeport Office Phone: (304) 848-5035 Fax: (304) 848-5037		172 Thompson Drive Bridgeport, WV 26330	
PARTY CHIEF: C. Lynch		DRAWN BY: C. Robinson	
RESEARCH: J. Miller		PREPARED: December 4, 2024	
SURVEYED: Dec. 2016		PROJECT NO: 118-34-G-18	
FIELD CREW: C.L., K.M.	Sheet 1 of 1	DRAWING NO: Duke 1HAOR	



Scale: 1 inch = 2000 feet

02/28/2025

UWI (APNNum)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producing Formation(s) not perf'd
47109001910000	HOSTUTLER J	1	PILLAR ENERGY LLC					

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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
<u>R: Jenkins Miller Lease</u>			
Jenkins Miller	Hope Natural Gas Company	1/8	0107/0056
Hope Natural Gas Company	Consolidated Gas Supply Corporation	Assignment	0233/0387
Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	066A/0069
Consolidated Gas Transmission Corporation	Eastern States Oil & Gas Inc	Assignment	076A/0232
Eastern States Oil & Gas Inc	Blazer Energy Corp	Merger	0012/0253
Blazer Energy Corp	Eastern States Oil & Gas Inc	Name Change	0012/0259
Eastern States Oil & Gas Inc	Equitable Production- Eastern States INC	Name Change	WVSOS
Equitable Production- Eastern States INC	Appalachian Natural Gas Trust	Assignment	079A/0244
Appalachian Natural Gas Trust	EQT Production Company	Merger	0096/0505
EQT Production Company	Antero Resources Corporation	Assignment	230A/0801
<u>P: Antero Minerals, LLC Lease</u>			
Antero Minerals, LLC	Antero Resources Corporation	1/8+	250A/0847
<u>Q: Antero Minerals, LLC Lease</u>			
Antero Minerals, LLC	Antero Resources Corporation	1/8+	250A/0847
<u>P: Antero Minerals, LLC Lease</u>			
Antero Minerals, LLC	Antero Resources Corporation	1/8+	250A/0847
<u>N: Antero Minerals, LLC Lease</u>			
Antero Minerals, LLC	Antero Resources Corporation	1/8+	250A/0847
<u>O: Antero Minerals, LLC Lease</u>			
Antero Minerals, LLC	Antero Resources Corporation	1/8+	250A/0847
<u>J: Thelma Nell Palmer Lease</u>			
Thelma Nell Palmer	Antero Resources Corporation	1/8+	331A/0142
<u>G: Russell T. Powell Lease</u>			
Russell T. Powell	Antero Resources Corporation	1/8+	331A/0172
<u>D: Shiben Estates, Inc. Lease</u>			
Shiben Estates, Inc.	Antero Resources Corporation	1/8+	312A/0021
<u>C: Elizabeth P. Orner Lease</u>			
Elizabeth P. Orner	Pikewood Energy Corporation	1/8+	270A/0565
Pikewood Energy Corporation	Antero Resources Corporation	Assignment	276A/0939

*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.

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**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
A: Sylvia Jean Highley Lease				
	Sylvia Jean Highley	Antero Resources Corporation	1/8+	296A/0604

*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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**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.

**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
 By: Tim Rady 
 Its: Senior Vice President of Land

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8,515' to Bottom Hole

1,318' to Top Hole

TOP HOLE LATITUDE 39 - 35 - 00
BTM HOLE LATITUDE 39 - 37 - 30

LONGITUDE 80 - 42 - 30

5,686' to Top Hole
5,837' to Bottom Hole

Antero Resources
Well No. Duke 1H
BHL MOD

Page
1 of 2

Antero Resources Corporation



Legend

- Proposed gas well
- Monument, as noted
- Existing Well, as noted
- Digitized Well, as noted
- Creek or Drain
- Road
- Surface boundary (approx.)
- Interior surface tracts (approx.)

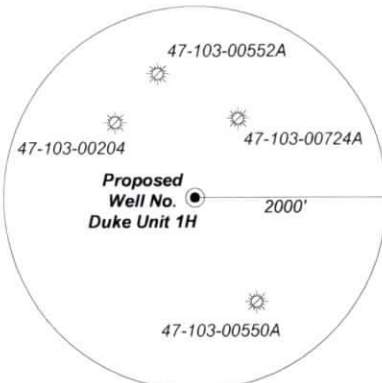
I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the rules issued and prescribed by the Department of Environmental Protection.

Bradley D. Miller

Bradley D. Miller, P.S. 2167

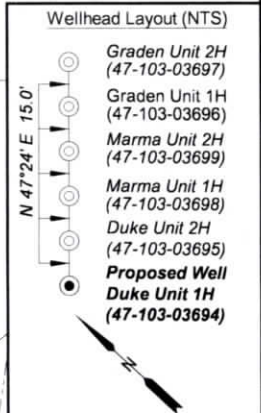
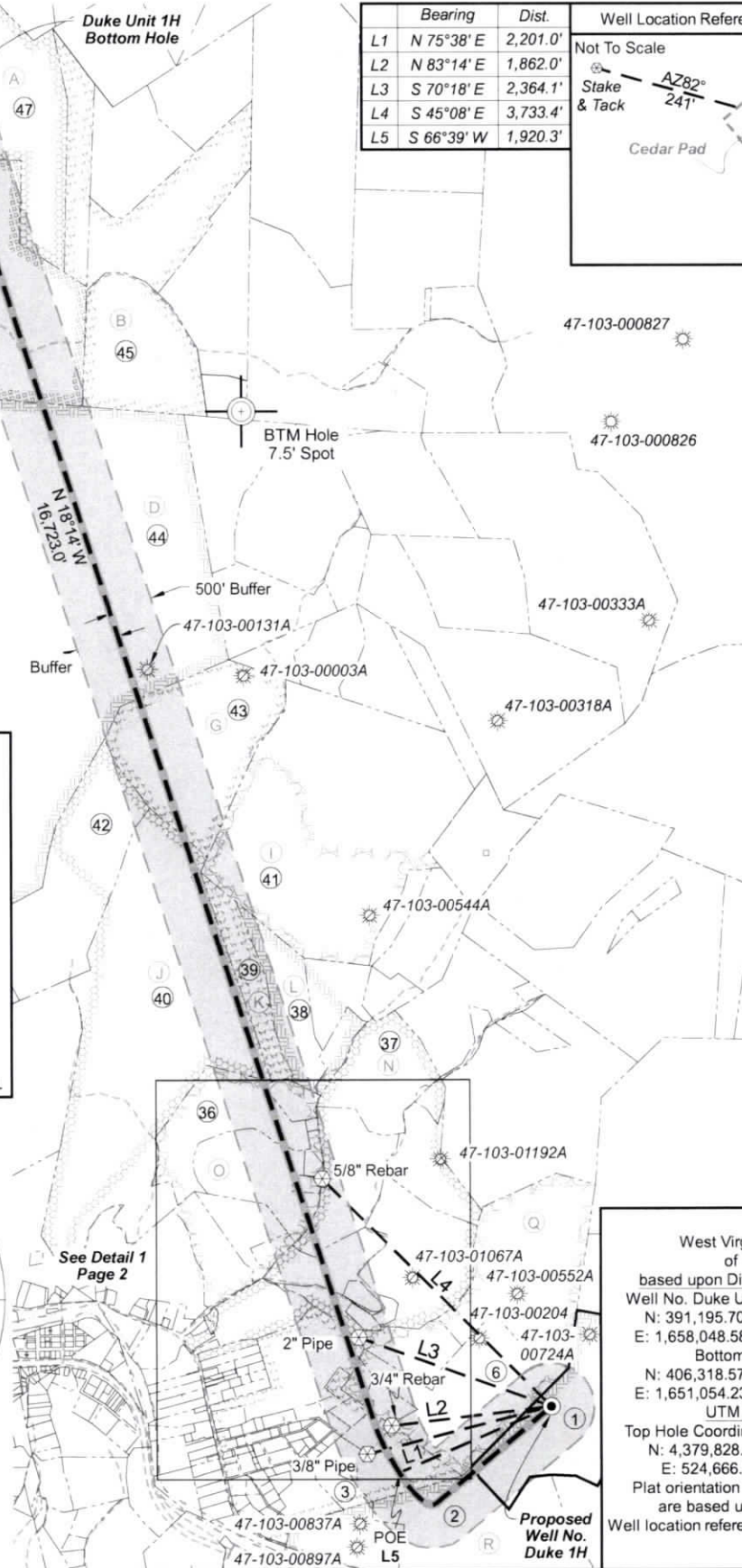
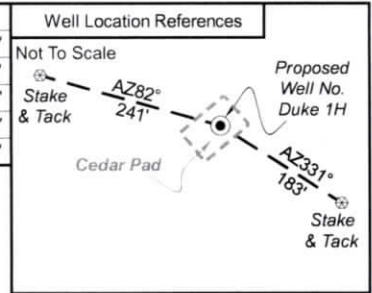


SEAL



Note: No water wells were found within 2000' of proposed well. No occupied dwellings or buildings 2,500 square feet or larger used to house or shelter dairy cattle or poultry husbandry are located within 625' of the center of the well pad.

Bearing	Dist.	Well Location References
L1 N 75°38' E	2,201.0'	
L2 N 83°14' E	1,862.0'	
L3 S 70°18' E	2,364.1'	
L4 S 45°08' E	3,733.4'	
L5 S 66°39' W	1,920.3'	



Notes:
Well No. Duke Unit 1H
UTM Zone 17, NAD 1927
Top Hole Coordinates
N: 14,368,772.34'
E: 1,721,295.92'
Point of Entry Coordinates
N: 14,367,982.37'
E: 1,719,546.32'
Bottom Hole Coordinates
N: 14,383,771.32'
E: 1,714,052.51'

Notes
West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
Well No. Duke Unit 1H Top Hole coordinates are
N: 391,195.70' Latitude: 39°34'03.80"
E: 1,658,048.58' Longitude: 80°42'46.83"
Bottom Hole coordinates are
N: 406,318.57' Latitude: 39°36'32.31"
E: 1,651,054.23' Longitude: 80°44'18.80"
UTM Zone 17, NAD 1983
Top Hole Coordinates Bottom Hole Coordinates
N: 4,379,828.708m N: 4,384,400.390m
E: 524,666.840m E: 522,459.186m
Plat orientation and corner and well references are based upon the grid north meridian.
Well location references are based upon the magnetic meridian.

FILE NO: 118-34-G-18
DRAWING NO: Duke Unit 1H Well Plat
SCALE: 1" = 2000'
MINIMUM DEGREE OF ACCURACY: Submeter
PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS DIVISION

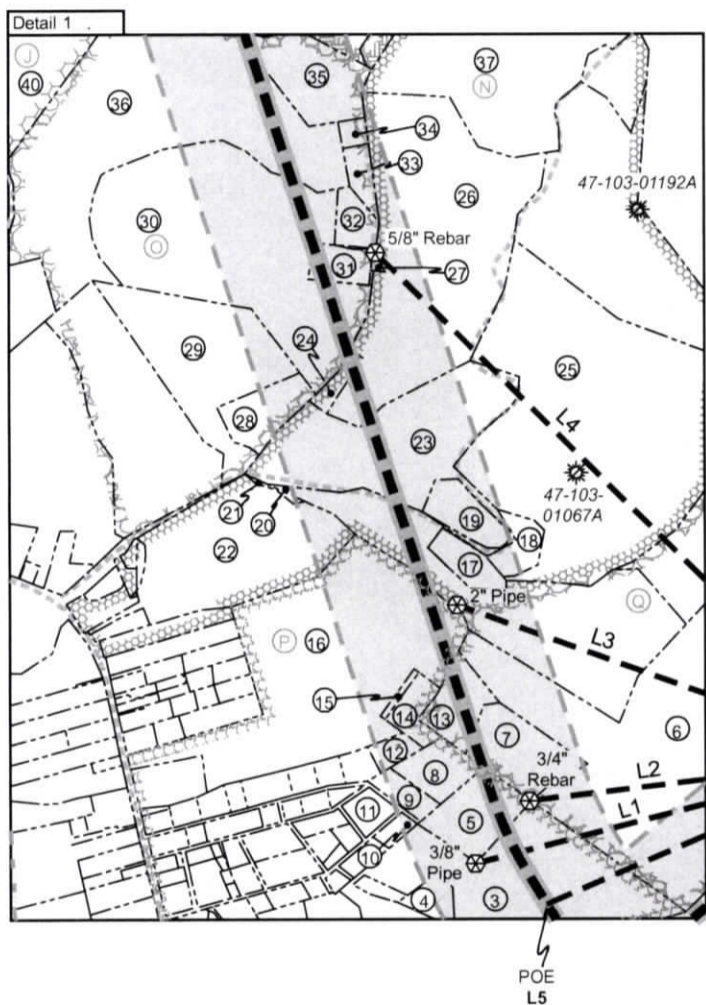
DATE: December 19 2024
OPERATOR'S WELL NO. Duke Unit 1H
API WELL NO
47 - 103 - 03694
STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
LOCATION: ELEVATION: As-Built 1,248 WATERSHED: Fishing Creek QUADRANGLE: Pine Grove
DISTRICT: Green COUNTY: Wetzel 02/28/2025
SURFACE OWNER: Dallison Lumber Company ACREAGE: 51.50
ROYALTY OWNER: Jenkins Miller LEASE NO: ACREAGE: 200
PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) BHL MOD
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 7,200' TVD
26,500' MD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Kevin Ellis
ADDRESS: 1615 Wynkoop Street ADDRESS: 535 White Oaks Blvd.
Denver, CO 80202 Bridgeport, WV 26330



Leases	
A	Sylvia Jean Highley
B	Belinda K. Harrison
C	Elizabeth P. Orner
D	Shiben Estates, Inc.
G	Russell T. Powell
I	Acropolis, Inc.
J	Thelma Nell Palmer
K	WSD Properties
L	Antero Minerals, LLC
N	Antero Minerals, LLC
O	Antero Minerals, LLC
P	Antero Minerals, LLC
Q	Antero Minerals, LLC
R	Jenkins Miller



ID	TM-Par	Owner	Bk/Pg	Acres
1	14-19	Dallson Lumber Company	357/267	51.50
2	13-83	Michelle L. Igleheart	493/370	58.00
3	13-54	Kenneth & Loraine Highley	230/93	20.17
4	13-54.1	Cshawn L. & Donald L. Smith	506/932	1.05
5	13-54.2	Ronald M. & Pamela Ann Jackson	315/524	3.35
6	13-40	Kenneth E. & Vicky A. VanDyne	357/204	42.33
7	13-39	Ruth E. Staley	512/286	3.13
8	13-37	Helen, Chad, Cathy Jo & Jeffrey D. Brown	398/447	2.00
9	13-37.1	Jeffrey D. Brown	394/491	1.00
10	13-53.3	Deborah Fluharty & Kimberly Henderson	453/149	0.46
11	13-52	Jaysha S. Thomson	509/56	0.92
12	13-33.5	Terrell K. Haught & Lula D. Love	370/320	0.72
13	13-38	Elizabeth K. Jackson	512/476	2.55
14	13-33.4	Francis Lee & Mary F. Arnolds	379/187	1.29
15	13-33.2	Francis Lee & Mary F. Arnolds	379/187	0.21
16	13-33.11	Richard D. & Jacqueline M. Bucher	372/601	24.00
17	13-34.1	John Michael & Stanley Dale Pittman	458/837	1.50
18	13-26.1	John Michael & Stanley Dale Pittman	458/837	1.50
19	13-26.8	Robert N. & Joyce E. C. Edgell	312/523	2.01
20	13-34	Kenneth E. & Vicky A. VanDyne	357/204	14.50
21	13-26.4	Tyler C. & Lily M. Williams	504/645	0.30
22	13-32.3	Wetzel County Board of Education	282/414	12.39
23	13-26.5	Stanley D. & Mary Jo Pittman	284/657	14.72
24	13-26.3	Chad Andrew Pittman & Andrea Danielle Highley	395/636	0.68
25	13-26	John M. & Stanley D. Pittman	458/837	30.52
26	13-26.6	Stanley & Mary Jo Pittman	284/657	27.38
27	13-26.9	James Daniel & Virginia C. Streets	387/583	0.10
28	13-25.1	Derris & Diane Howell	289/271	2.37
29	13-25.2	Diane K. Howell	416/682	10.21
30	13-14.6	Ronald Scott Anderson	393/630	21.00
31	13-14.1	Geoffrey Scott & Misty Richmond	514/323	1.40
32	13-14.5	Donald L. & Ellen H. Anderson	335/203	1.50
33	13-14.4	Jack & Neal A. Cain	401/433	0.62
34	13-14.2	Jack & Neal A. Cain	401/433	0.42
35	13-15	Blue Racer Midstream, LLC	452/542	22.59
36	13-14.3	Robert & Thomas Adams	W116/19	4.88
37	13-14	Ronald Scott Anderson	399/387	32.80
38	13-8	Richard W. Roberts & Justin W. Roberts	394/526	22.00
39	9-51	WSD Properties LLC	441/770	13.50
40	13-7	WSD Properties LLC	441/793	162.00
41	9-42	WSD Properties LLC	441/793	149.00
42	8-41	Nancy B. Hatfield	267/370	60.00
43	9-41	WSD Properties LLC	441/793	48.00
44	8-28	Teresa Ann Ice	494/650	449.48
45	8-8	Belinda Harrison	493/544	38.75
46	3-37	Richard D. Hornbeck	483/191	118.00
47	3-28	Richard D. Hornbeck	483/191	120.00

FILE NO: 118-34-G-18
DRAWING NO: Duke Unit 1H Well Plat
SCALE: 1" = 2000'
MINIMUM DEGREE OF ACCURACY:
Submeter
PROVEN SOURCE OF ELEVATION:
WV DOT, Harrisville, WV

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS DIVISION

DATE: December 19 2024
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DISTRICT: Green COUNTY: Wetzel 02/28/2025

SURFACE OWNER: Dallison Lumber Company ACREAGE: 51.50

ROYALTY OWNER: Jenkins Miller LEASE NO: ACREAGE: 200

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Denver, CO 80202 Bridgeport, WV 26330