



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

Wednesday, December 20, 2023
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for Dakota Unit 1H
47-017-06967-00-00

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: Dakota 1H
Farm Name: Susan Haught Gido, et al
U.S. WELL NUMBER: 47-017-06967-00-00
Horizontal 6A New Drill
Date Modification Issued: 12/20/2023

Promoting a healthy environment.

12/22/2023

AK# 4026472
10/12/23
\$ 7,500.00

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

1) Well Operator: Antero Resources Corporation 494507062 017-Doddridge New Milton New Milton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Dakota Unit 1H MOD Well Pad Name: Haught Pad

3) Farm Name/Surface Owner: Susan Haught Gido, et al Public Road Access: Brushy Fork Road

4) Elevation, current ground: _____ Elevation, proposed post-construction: 1194'

5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____
(b) If Gas Shallow Deep _____
Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 7700' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 7700' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 23900' MD

11) Proposed Horizontal Leg Length: 14687.1'

12) Approximate Fresh Water Strata Depths: 271'

13) Method to Determine Fresh Water Depths: 47-017-01798

14) Approximate Saltwater Depths: 2406'

15) Approximate Coal Seam Depths: None Anticipated

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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WW-6B
(04/15)

API NO. 47- 017 - 06967
 OPERATOR WELL NO. Dakota Unit 1H MOD
 Well Pad Name: Haught 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-55	54.5#	321	321 /	CTS, 334 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#	23900	23900 /	5095 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

Edward L. Stoyold 12-14-23

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 /	~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							

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

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12/22/2023

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.

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): 33.94 acres

22) Area to be disturbed for well pad only, less access road (acres): 11.40 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 400 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.

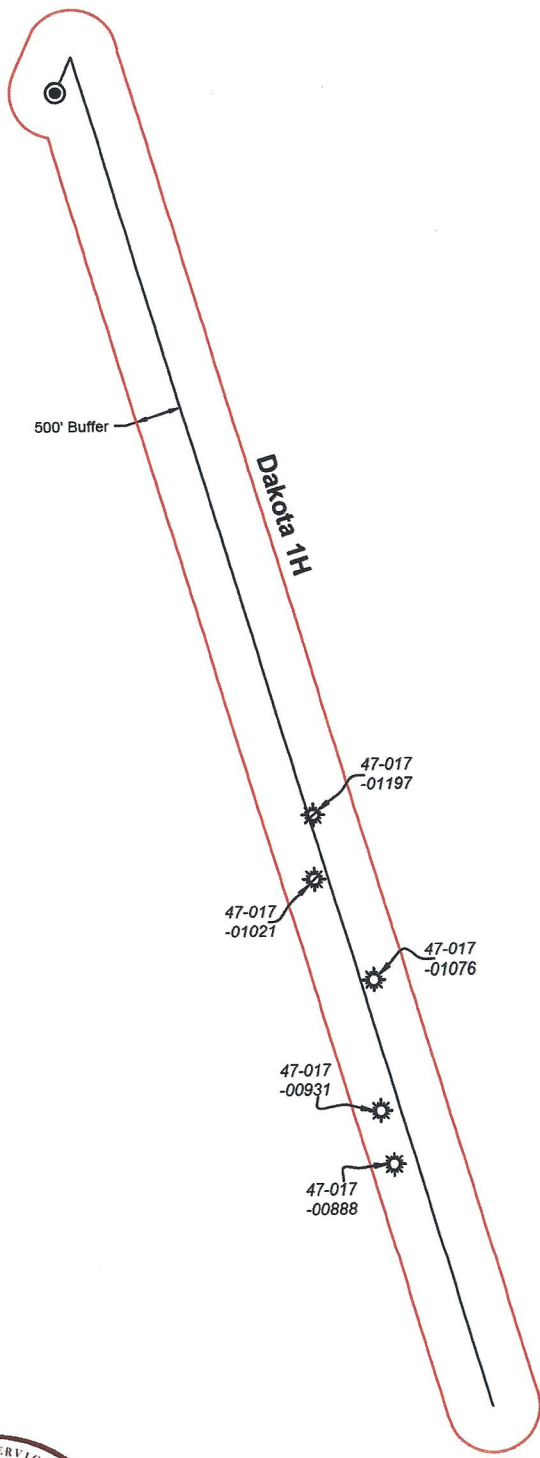
*Note: Attach additional sheets as needed.

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: J. Smith
RESEARCH: J. Miller	PREPARED: October 25, 2023
SURVEYED: Dec. 2016	PROJECT NO: 262-30-N-22
FIELD CREW: C.L., K.M.	DRAWING NO: Dakota 1H AOR

Sheet 1 of 1



Scale: 1 inch = 2000 feet

12/22/2023

UWI (API Num)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47017011970000	AHOUSE HENRY	2	BECHECK OIL INC	PETROLEUM RESOURCES	2,449	2421 - 2449	Big Injun	Weir, Benson, Alexander
47017010210000	HENRY A HOUSE HEIRS	1	P & R RESOURCES	P & R RESOURCES	2,435		Big Injun	Weir, Benson, Alexander
470170102760000	F M HINTER F ERWIN	1	BERRY ENERGY INC	DEVONIAN GRD CO	2,375		Keener	Weir
47017009310000	JOHN IRONS	1	PROFESSIONAL OILFIELD SERVICES INC	SOUTHRN TRIANGLE OIL	2,467		Greenbrier Group	Weir, Benson, Alexander
47017008980000			SOUTHRN TRIANGLE OIL	SOUTHRN TRIANGLE OIL	2,760		Big Lime, Big Injun	Weir, Benson, Alexander

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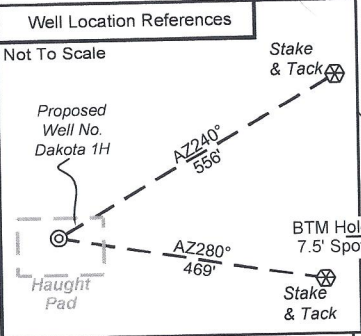
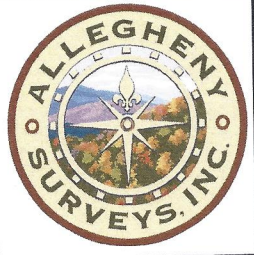
12/22/2023

11,363' to Bottom Hole

4,199' to Top Hole
 TOP HOLE LATITUDE 39 - 12 - 30
 BTM HOLE LATITUDE 39 - 10 - 00

Antero Resources
Well No. Dakota 1H
BHL MOD
Antero Resources Corporation

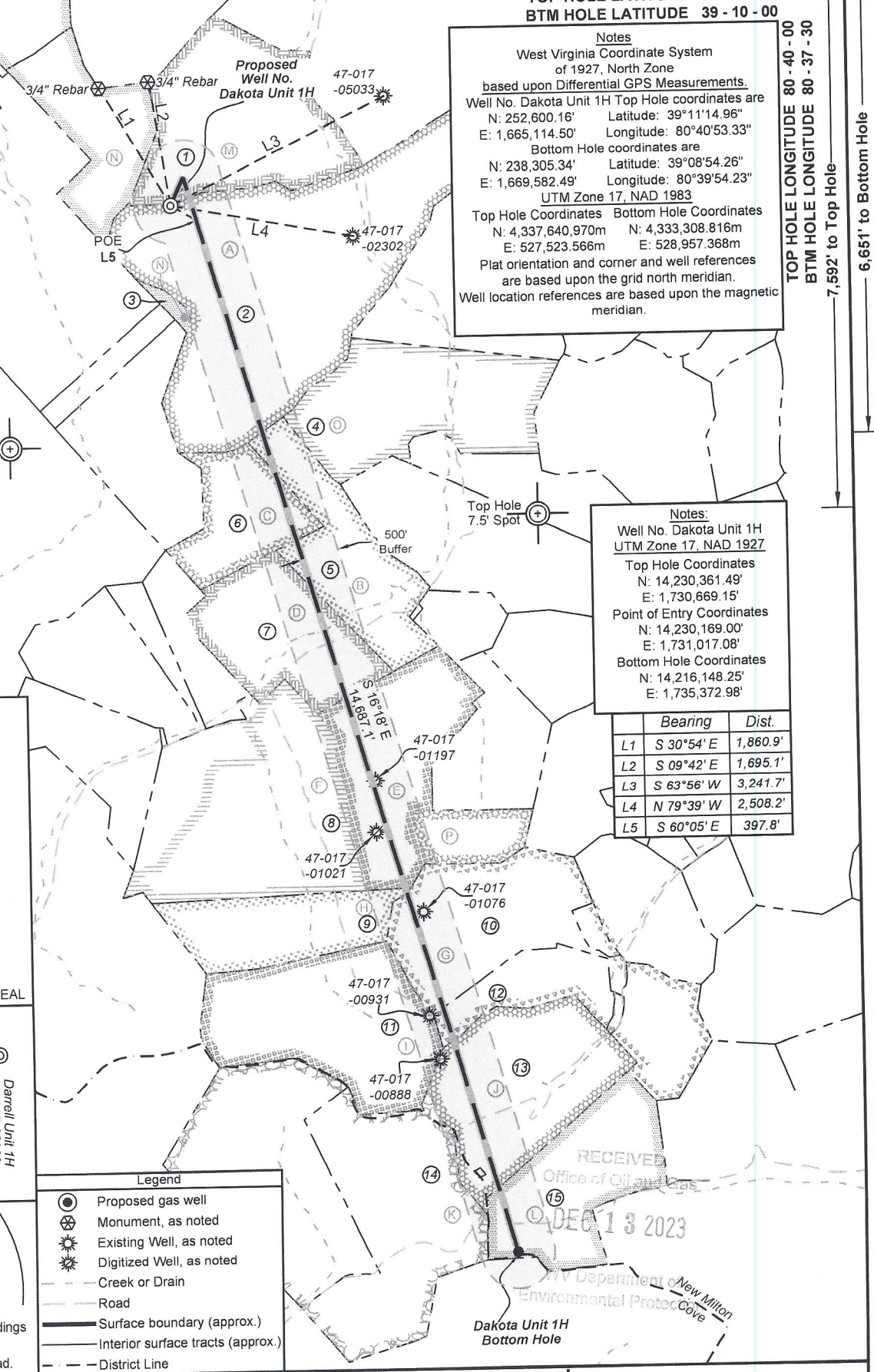
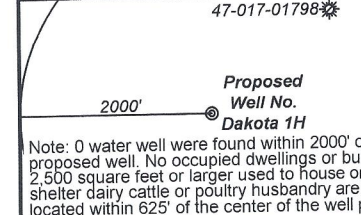
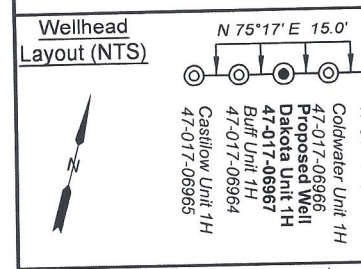
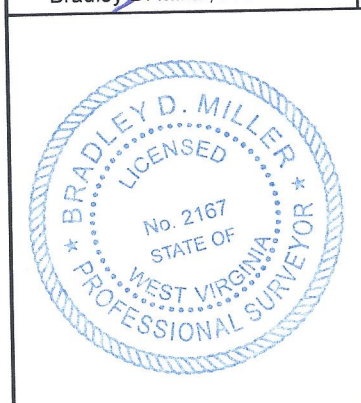
Page 1 of 2



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



Notes
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
 Well No. Dakota Unit 1H Top Hole coordinates are
 N: 252,600.16' Latitude: 39°11'14.96"
 E: 1,665,114.50' Longitude: 80°40'53.33"
 Bottom Hole coordinates are
 N: 238,305.34' Latitude: 39°08'54.26"
 E: 1,669,582.49' Longitude: 80°39'54.23"
 UTM Zone 17, NAD 1983
 Top Hole Coordinates Bottom Hole Coordinates
 N: 4,337,640.970m N: 4,333,308.816m
 E: 527,523.566m E: 528,957.368m
 Plat orientation and corner and well references are based upon the grid north meridian.
 Well location references are based upon the magnetic meridian.

Notes:
 Well No. Dakota Unit 1H UTM Zone 17, NAD 1927
 Top Hole Coordinates
 N: 14,230,361.49'
 E: 1,730,669.15'
 Point of Entry Coordinates
 N: 14,230,169.00'
 E: 1,731,017.08'
 Bottom Hole Coordinates
 N: 14,216,148.25'
 E: 1,735,372.98'

	Bearing	Dist.
L1	S 30°54' E	1,860.9'
L2	S 09°42' E	1,695.1'
L3	S 63°56' W	3,241.7'
L4	N 79°39' W	2,508.2'
L5	S 60°05' E	397.8'

- 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.)
 - - - District Line

FILE NO: 262-30-N-22
 DRAWING NO: Dakota 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: November 16 2023
 OPERATOR'S WELL NO. Dakota 1H
 API WELL NO
 47 - 017 - 06967
 STATE COUNTY PERMIT

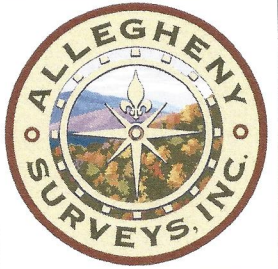
WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW

LOCATION: ELEVATION: Proposed 1,194' WATERSHED: Headwaters Middle Island Creek QUADRANGLE: New Milton
 DISTRICT: New Milton Susan Haught COUNTY: Doddridge
 SURFACE OWNER: Gido, et al ACREAGE: 264
 ROYALTY OWNER: O.C. Haught, et ux LEASE NO: ACREAGE: 264

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: 7,700' TVD 23,900' 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	O.C.Haught, et ux
B	Michael B. Duffelmeyer
C	Mary K. Post Revocable Trust - 2017, et al
D	Mary K. Post Revocable Trust - 2017, et al
E	O.C.Haught, et al
F	O.C.Haught, et al
G	HG Energy II Appalachia, LLC
H	Embra D. White
I	AMP IV, LP
J	Trever S. Gum
K	H.B. Gum, et ux
L	Michael Dale & Janet L. Nicholson
M	Haught Family Trust
N	Franklin Maxwell Heirs, LP
O	Haught Family Trust, et al
P	HG Energy II Appalachia, LLC

ID	TM-Par	Owner	Bk/Pg	Acres
1	15-6	Susan Haught Gido, et al	WB62/407	119.23
2	15-15	Susan Haught Gido, et al	WB62/407	264.00
3	15-5	David E. Bowyer, et al	389/715	64.00
4	16-14	Melvin L. & Misty D. Davis	445/159	104.13
5	19-6	Garry R. Norton	176/265	68.49
6	15-18	Susan Haught Gido, et al	WB62/407	37.39
7	19-5	Susan Haught Gido, et al	WB62/407	86.26
8	19-7	Susan Haught Gido, et al	WB62/407	269.50
9	19-19	Rezall M. Crislip, et al	349/484	63.20
10	20-20.1	Harvey C. Woodruff, III	252/715	92.69
11	19-15	AMP IV LP	444/354	108.56
12	20-20.2	Harvey C. Woodruff, III	257/292	33.73
13	20-21	Trever S. Gum	364/471	100.28
14	7-1	Mary Ann Gum	WB30/102	130.00
15	24-1	Michael & Janet Nicholson	472/87	83.74

FILE NO: 262-30-N-22
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 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

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DATE: November 16, 2023
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 API WELL NO
47 - 017 - 06967
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
 LOCATION: ELEVATION: Proposed 1,194' WATERSHED: Headwaters Middle Island Creek QUADRANGLE: New Milton
 DISTRICT: New Milton Susan Haught
 SURFACE OWNER: Gido, et al COUNTY: Doddridge
 ROYALTY OWNER: O.C. Haught, et ux LEASE NO: _____ ACREAGE: 264
 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: 23,900' 7,700' TVD

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

DEC 13 2023
 12/22/2023

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>A: O.C. Haught, et ux Lease</u> O.C. Haught, et ux Rockwell Petroleum Company Rockwell Resources LLC Antero Resources Appalachian Corporation	Rockwell Petroleum Company Rockwell Resources LLC Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Successor of Interest Assignment Name Change	103/367 260/429 267/244 46/523
<u>M: Haught Family Trust Lease</u> Haught Family Trust Bluestone Energy Partners Antero Resources Bluestone, LLC	Bluestone Energy Partners Antero Resources Bluestone, LLC Antero Resources Corporation	1/8 Merge Merged	244/298 288/1 WVSOS
<u>A: O.C. Haught, et ux Lease</u> O.C. Haught, et ux Rockwell Petroleum Company Rockwell Resources LLC Antero Resources Appalachian Corporation	Rockwell Petroleum Company Rockwell Resources LLC Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Successor of Interest Assignment Name Change	103/367 260/429 267/244 46/523
<u>B: Michael B. Duffelmeyer Lease</u> Michael B. Duffelmeyer	Antero Resources Corporation	1/8+	511/444
<u>C: Mary K. Post Revocable Trust – 2017, et al Lease</u> Mary K. Post Revocable Trust – 2017, et al	Antero Resources Corporation	1/8+	512/685
<u>B: Michael B. Duffelmeyer Lease</u> Michael B. Duffelmeyer	Antero Resources Corporation	1/8+	511/444
<u>D: Mary K. Post Revocable Trust – 2017, et al Lease</u> Mary K. Post Revocable Trust – 2017, et al	Antero Resources Corporation	1/8+	512/685
<u>E: O.C. Haught, et al Lease</u> O. C. Haught, et al A.T. Carr Petroleum Promotions Inc Russell & Scott Inc William A. Scott & Yvonne B. Scott William A. Scott Antero Resources Appalachian Corporation	A.T. Carr Petroleum Promotions Inc Russell & Scott Inc William A. Scott & Yvonne B. Scott William A. Scott Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Assignment Name Change Assignment Verification of Death Assignment Name Change	72/87 72/87 285/1 280/277 280/277 280/277 46/253
<u>H: Embra D. White Lease</u> Embra D. White Floyd A. Gearhart Homer Robinson & Phil Shipp R. Wayne Christenson Hobson Petroleum Corporation Hobson Energy Corporation	Floyd A. Gearhart Homer Robinson & Phil Shipp R. Wayne Christenson Hobson Petroleum Corporation Hobson Energy Corporation Antero Resources Corporation	1/8 Assignment Assignment Assignment Assignment Assignment	77/346 77/499 77/500 126/226 141/725 280/52

12/22/2023

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>G: HG Energy II Appalachia, LLC Lease</u> HG Energy II Appalachia, LLC	Antero Resources Corporation	1/8+	512/384
<u>J: Trever S. Gum Lease</u> Trever S. Gum	Antero Resources Corporation	1/8+	

*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.

***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

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>L: Michael Dale & Janet L. Nicholson Lease:</u>	Michael Dale & Janet L. Nicholson	Antero Resources Corporation	1/8+	515/330

**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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