



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, January 3, 2024
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for Coldwater Unit 1H
47-017-06966-00-00

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: Coldwater Unit 1H
Farm Name: Susan Haught Gido, et al
U.S. WELL NUMBER: 47-017-06966-00-00
Horizontal 6A New Drill
Date Modification Issued: 01/03/2024

Promoting a healthy environment.

01/05/2024

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: Coldwater 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: 1190' 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: 24700' MD

11) Proposed Horizontal Leg Length: 14787.1'

12) Approximate Fresh Water Strata Depths: 271'

13) Method to Determine Fresh Water Depths: 47017017980000 Offset well records. Depths have been adjusted according to surface elevations.

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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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#	24700	24700 ✓	5296 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"	0.438"	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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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.

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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

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.

UWI (API Num)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47017050340000	HAUGHT ROBERT J ET AL	E-270	DIVERSIFIED PRODUCTION LLC	EXCEL ENERGY INC	3,502	2400 - 3295	Little Lime, Fifth, Bayard	Weir, Benson, Alexander
47017010460000	E O NICHOLSON	1	PETROLEUM PROMOTIONS	PETROLEUM PROMOTIONS	2,489		Big Injun	Weir, Benson, Alexander
47017009460000	ED H & ZELLA DAVIS	1	PETROLEUM PROMOTIONS	PETROLEUM PROMOTIONS	2,291		Big Injun	Weir, Benson, Alexander
47017012580000	HENRY GUM	2	CHRISTENSON R W	CHRISTENSON R W	2,391		Keener, Big Injun	Weir, Benson, Alexander

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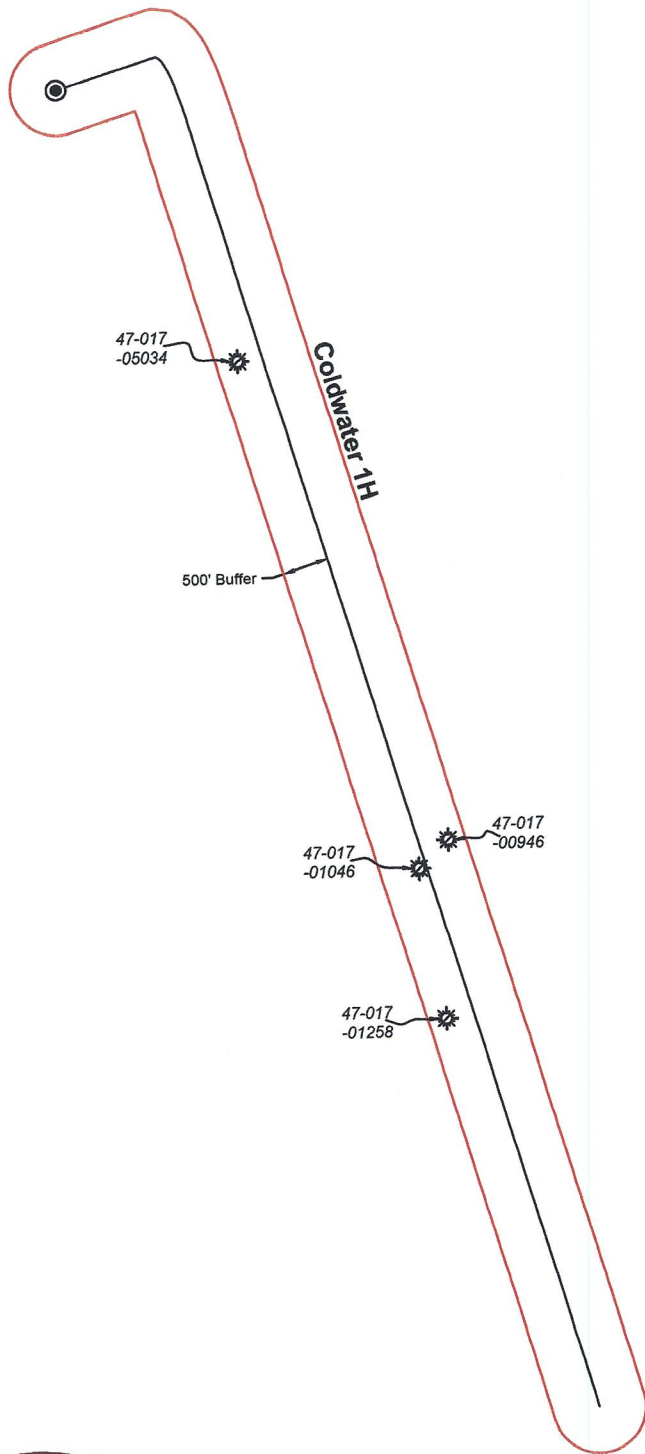
01/05/2024

LEGEND

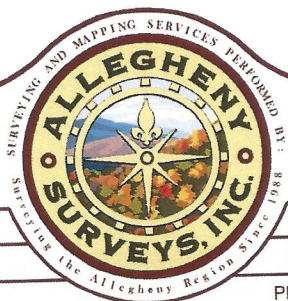
- ⊙ Proposed gas well
- ⊛ Existing Well, as noted
- ⊛ Digitized Well, as noted



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: 264-30-N-22
FIELD CREW: C.L., K.M.	DRAWING NO: Coldwater 1H AOR

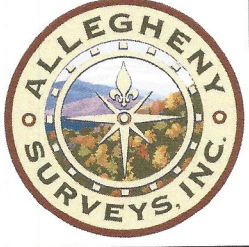
Sheet 1 of 1



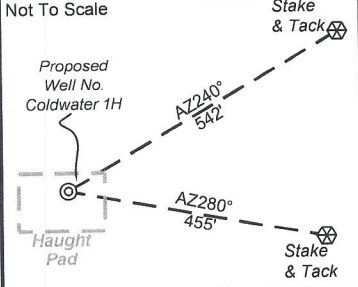
Scale: 1 inch = 2000 feet

01/05/2024

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

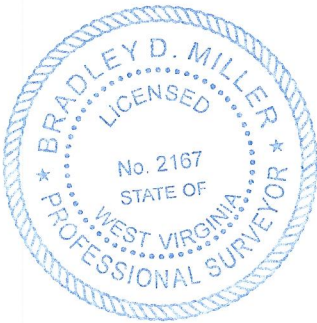


Well Location References



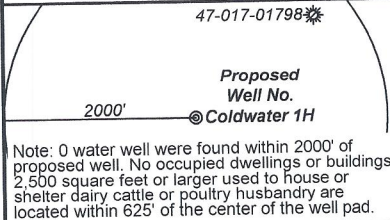
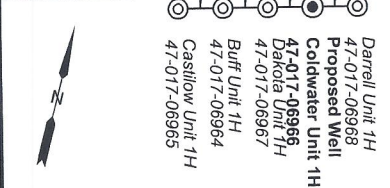
I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the rules issued and prescribed by the Department of Environmental Protection.

Bradley D. Miller
 Bradley D. Miller, P.S. 2167



SEAL

Wellhead Layout (NTS)



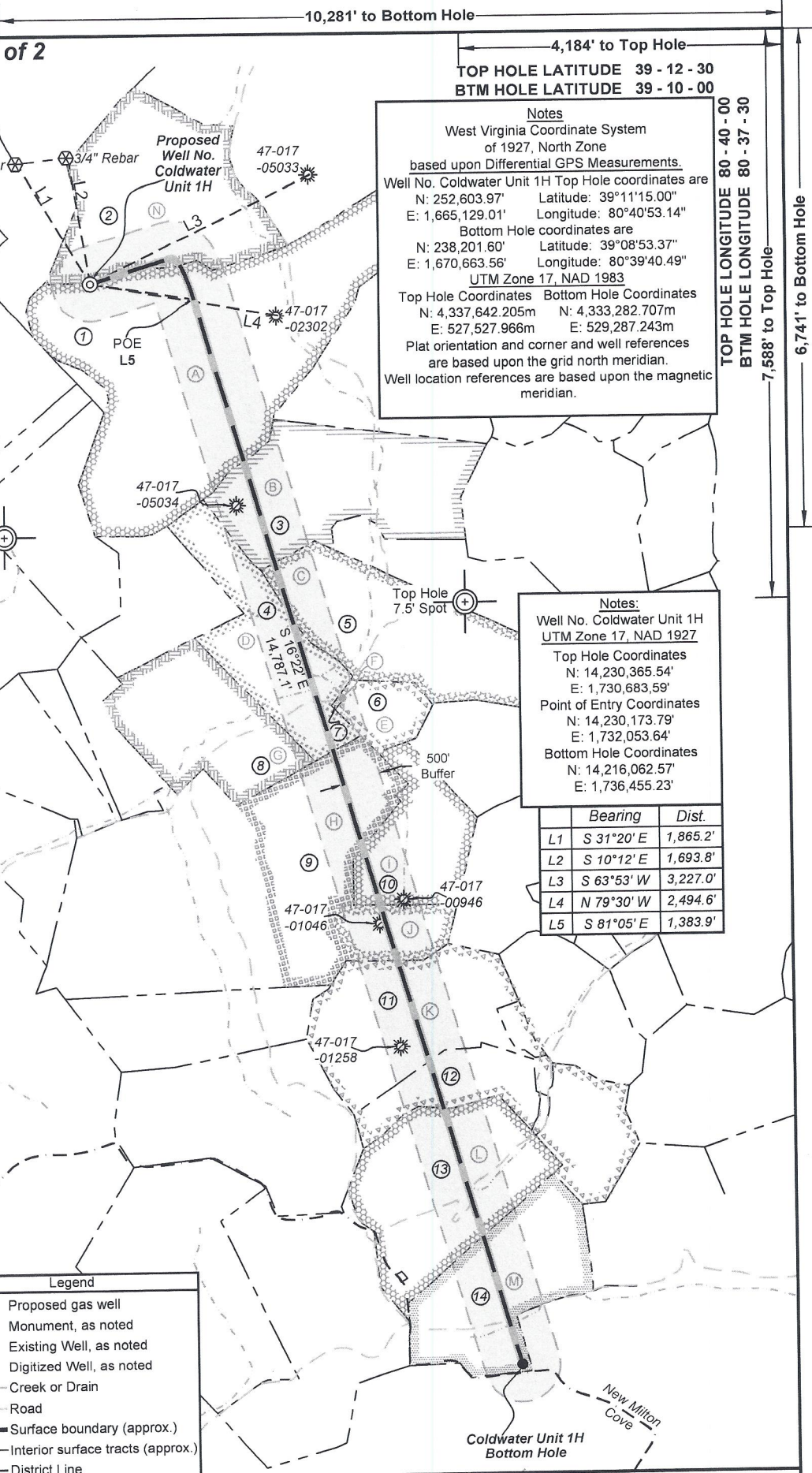
- Legend**
- Proposed gas well
 - ⊗ Monument, as noted
 - ☼ Existing Well, as noted
 - ☼ Digitized Well, as noted
 - Creek or Drain
 - Road
 - Surface boundary (approx.)
 - Interior surface tracts (approx.)
 - District Line

10,281' to Bottom Hole
 4,184' to Top Hole
 TOP HOLE LATITUDE 39 - 12 - 30
 BTM HOLE LATITUDE 39 - 10 - 00

Notes
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
 Well No. Coldwater Unit 1H Top Hole coordinates are
 N: 252,603.97' Latitude: 39°11'15.00"
 E: 1,665,129.01' Longitude: 80°40'53.14"
 Bottom Hole coordinates are
 N: 238,201.60' Latitude: 39°08'53.37"
 E: 1,670,663.56' Longitude: 80°39'40.49"
 UTM Zone 17, NAD 1983
 Top Hole Coordinates Bottom Hole Coordinates
 N: 4,337,642.205m N: 4,333,282.707m
 E: 527,527.966m E: 529,287.243m
 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. Coldwater Unit 1H UTM Zone 17, NAD 1927
 Top Hole Coordinates
 N: 14,230,365.54'
 E: 1,730,683.59'
 Point of Entry Coordinates
 N: 14,230,173.79'
 E: 1,732,053.64'
 Bottom Hole Coordinates
 N: 14,216,062.57'
 E: 1,736,455.23'

	Bearing	Dist.
L1	S 31°20' E	1,865.2'
L2	S 10°12' E	1,693.8'
L3	S 63°53' W	3,227.0'
L4	N 79°30' W	2,494.6'
L5	S 81°05' E	1,383.9'



TOP HOLE LONGITUDE 80 - 40 - 00
 BTM HOLE LONGITUDE 80 - 37 - 30
 7,588' to Top Hole
 6,741' to Bottom Hole

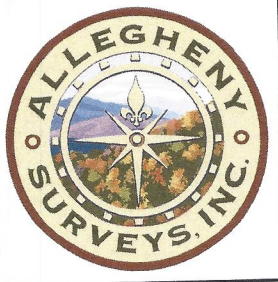
FILE NO: 264-30-N-22
 DRAWING NO: Coldwater 1H Well Plat
 SCALE: 1" = 2000'
 MINIMUM DEGREE OF ACCURACY: Submeter
 PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

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

DATE: November 16 2023
 OPERATOR'S WELL NO. Coldwater 1H
 API WELL NO
 47 - 017 - 06966
 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
 24,700' 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

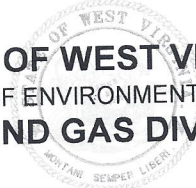


Leases	
A	O.C.Haught, et ux
B	Haught Family Trust, et al
C	Susan B. Gum
D	Michael B. Duffelmeyer
E	Mary K. Post Revocable Trust - 2017, et al
F	Michael Brent Duffelmeyer
G	Mary K. Post Revocable Trust - 2017, et al
H	O.C.Haught, et al
I	Warren Bee, et ux
J	HG Energy II Appalachia, LLC
K	HG Energy II Appalachia, LLC
L	Trever S. Gum
M	Michael Dale & Janet L. Nicholson
N	Haught Family Trust

ID	TM-Par	Owner	Bk/Pg	Acres
1	15-15	Susan Haught Gido, et al	WB62/407	264.00
2	15-6	Susan Haught Gido, et al	WB62/407	119.23
3	16-14	Melvin L. & Misty D. Davis	445/159	104.13
4	19-6	Garry R. Norton	176/265	68.49
5	16-15	Garry R. Norton	176/265	104.40
6	20-1	Leonard Gandy	193/66	21.25
7	20-2	BOE	15/216	0.38
8	19-5	Susan Haught Gido, et al	WB62/407	86.26
9	19-7	Susan Haught Gido, et al	WB62/407	269.50
10	20-3	Warren & Judy Bee	218/585	56.00
11	20-20.1	Harvey C. Woodruff, III	252/715	92.69
12	20-20.2	Harvey C. Woodruff, III	257/292	33.73
13	20-21	Trever S. Gum	364/471	100.28
14	24-1	Michael & Janet Nicholson	472/87	83.74

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FILE NO: 264-30-N-22
DRAWING NO: Coldwater 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. Coldwater 1H
API WELL NO
47 - 017 - 06966
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 SURFACE OWNER: Susan Haught Gido, et al COUNTY: Dodridge
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: 24,700' 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

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
A: O.C. Haught, et ux Lease 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
N: Haught Family Trust Lease 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
A: O.C. Haught, et ux Lease 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
B: Haught Family Trust, et al Lease Haught Family Trust, et al Bluestone Energy Partners Antero Resources Bluestone LLC	Bluestone Energy Partners Antero Resources Bluestone LLC Antero Resources Corporation	1/8 Merge Merged	244/312 28/1 WVSOS
C: Susan B. Gum Lease Susan B. Gum Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	264/725 46/253
D: Michael B. Duffelmeyer Lease Michael B. Duffelmeyer	Antero Resources Corporation	1/8+	511/444
H: O.C. Haught, et al Lease 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
I: Warren Bee, et ux Lease Warren Bee, et ux	Antero Resources Corporation	1/8+	448/147
J: HG Energy II Appalachia, LLC Lease HG Energy II Appalachia, LLC	Antero Resources Corporation	1/8+	512/384
K: HG Energy II Appalachia, LLC Lease HG Energy II Appalachian, LLC	Antero Resources Corporation	1/8+	512/384
L: Trever S. Gum Lease Trever S. Gum	Antero Resources Corporation	1/8+	505/378

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01/05/2024

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
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- (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
<u>M: 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

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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
 Its: Senior Vice President of Land

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)

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
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***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

*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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Environmental Protection



December 19th, 2023

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: Mr. Taylor Brewer
601 57th Street
Charleston, WV 25304

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

CK# 4026831
CK# 7,500.00

Mr. Brewer:

Antero Resources Corporation (Antero) would like to submit the following permit modification for an approved well on the Haught Pad. We are requesting to extend the horizontal lateral length which will change the bottom hole location of the Coldwater Unit 1H well.

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the revised MD and Production Casing/Cement program
- REVISED Form WW-6A1, which shows the leases we will be drilling into
- REVISED Mylar Plat, which shows the new bottom hole location

If you have any questions please feel free to contact me at (303) 357-7373.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Carly Marvel".

Carly Marvel
Permitting Agent
Antero Resources Corporation

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Environmental Protection

Enclosures

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