



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

Tuesday, June 8, 2021
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit Modification Approval for PATTY 1H
47-095-02732-00-00

Extend Lateral from 2201' to 12853' with updated leases.

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 blue ink signature of James A. Martin, Chief. The signature is stylized and written in cursive. Below the signature, the name and title are printed.

James A. Martin
Chief

Operator's Well Number: PATTY 1H
Farm Name: ANTERO RESOURCES CORP.
U.S. WELL NUMBER: 47-095-02732-00-00
Horizontal 6A New Drill
Date Modification Issued: 06/08/2021

Promoting a healthy environment.

06/11/2021

WW-6B
(04/15)

PERMIT MODIFICATION API # 47-095-02732

API NO. 47- 095 - 02732

OPERATOR WELL NO. Patty Unit 1H

Well Pad Name: Roma Lou Pad

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

1) Well Operator: Antero Resources Corporation 494507062 095 - Tyler Ellsworth Middlebourne 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Patty Unit 1H Well Pad Name: Roma Lou Pad

3) Farm Name/Surface Owner: Antero Resources Corp. Public Road Access: Pleasant Ridge Road

4) Elevation, current ground: 883' 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

*DMH
6-4-21*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6500' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 6500' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 22,400' MD ✓

11) Proposed Horizontal Leg Length: 12,853'

12) Approximate Fresh Water Strata Depths: 158'

13) Method to Determine Fresh Water Depths: 47-095-00912-0000

14) Approximate Saltwater Depths: 1678'

15) Approximate Coal Seam Depths: 483'

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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WV Department of
Environmental Protection
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06/11/2021

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#	300	300	CTS, 574 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#	22400	22400 ✓	3058 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

*DmH
6-4-21*

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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06/11/2021

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.

DmH
6-4-21

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): 21.14 acres

22) Area to be disturbed for well pad only, less access road (acres): 12.19 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

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.

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*Note: Attach additional sheets as needed.



PERMIT MODIFICATION API # 47-095-02732

Patty Unit 1H

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MAY 28 2021

WV Department of
Environmental Protection



Antero Resources Corporation

Patty Unit 1H - AOR



May 26, 2021

06/11/2021

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.	<u>Berna J. Hammel Lease</u> Berna J. Hammel	Antero Resources Corporation	1/8+	0392/0778
D.	<u>J & N Management Enterprises LLC Lease</u> J & N Management Enterprises	Antero Resources Corporation	1/8+	591/235
E.	<u>H3 LLC Lease</u> H3 LLC	Antero Resources Corporation	1/8+	612/750
F.	<u>Leslie W Potts Lease</u> Leslie W Potts	Antero Resources Corporation	1/8+	585/556
G.	<u>Lora Keller Thomas Lease</u> Lora Keller Thomas	Antero Resources Corporation	1/8+	626/599
H.	<u>WVDNR Lease</u> WVDNR	Antero Resources Corporation	1/8+	
K.	<u>Antero Mineral LLC Lease</u> Antero Mineral LLC	Antero Resources Corporation	1/8+	67/470
J.	<u>Jay Edward Smith Lease</u> Jay Edward Smith Montani Energy LLC Antero Resources Appalachian Corporation	Montani Energy LLC Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Assignment Name Change	404/1 404/754 557/430
L.	<u>Norma R Spencer Lease</u> Norma R Spencer	Antero Resources Corporation	1/8+	564/428
N.	<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/150
O.	<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/156
P.	<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/154
Q.	<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/148
R.	<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/152

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 MAY 28 2021
 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.

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	Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
S.	<u>David S Clough Lease</u> David S Clough Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	421/490 557/430
T.	<u>Greenbrier Royalty Fund II LLC Lease</u> Greenbrier Royalty Fun II LLC	Antero Resources Corporation	1/8	108/295
W.	<u>Linda P & Roy Henriksen Lease</u> Linda P & Roy Henriksen	Antero Resources Corporation	1/8+	671/593
Y.	<u>Dena Raye Grimes Lease</u> Dena Raye Grimes	Antero Resources Corporation	1/8+	670/158

***Co-tenancy utilization – At least 7 mineral owners in tract. At least 75% of the royalty owners have executed a lease on the tract. The interests of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act**

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WV Department of
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WW-6A1
(5/13)

Operator's Well No. Patty Unit 1H

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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>Margaret Conaway-Torok Lease</u>	Margaret Conaway-Torok	Antero Resources Corporation	1/8+	595/622

*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

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.

*Co-tenancy utilization – At least 7 mineral owners in tract. At least 75% of the royalty owners have executed a lease on the tract. The interests of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act

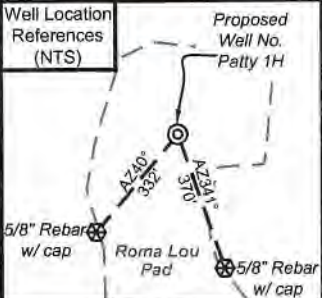
Well Operator: Antero Resources Corporation
By: Tim Rady
Its: VP of Land

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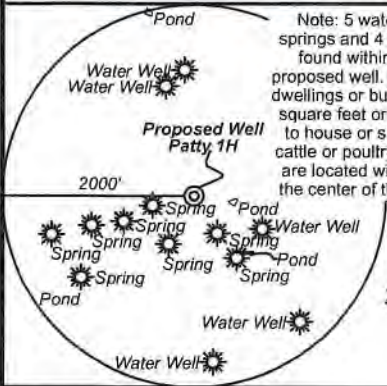
Page 1 of 1

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



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



FILE NO: 197-54-M-18
 DRAWING NO: Patty Unit 1H
 SCALE: 1" = 1500'
 MINIMUM DEGREE OF ACCURACY: Submeter
 PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

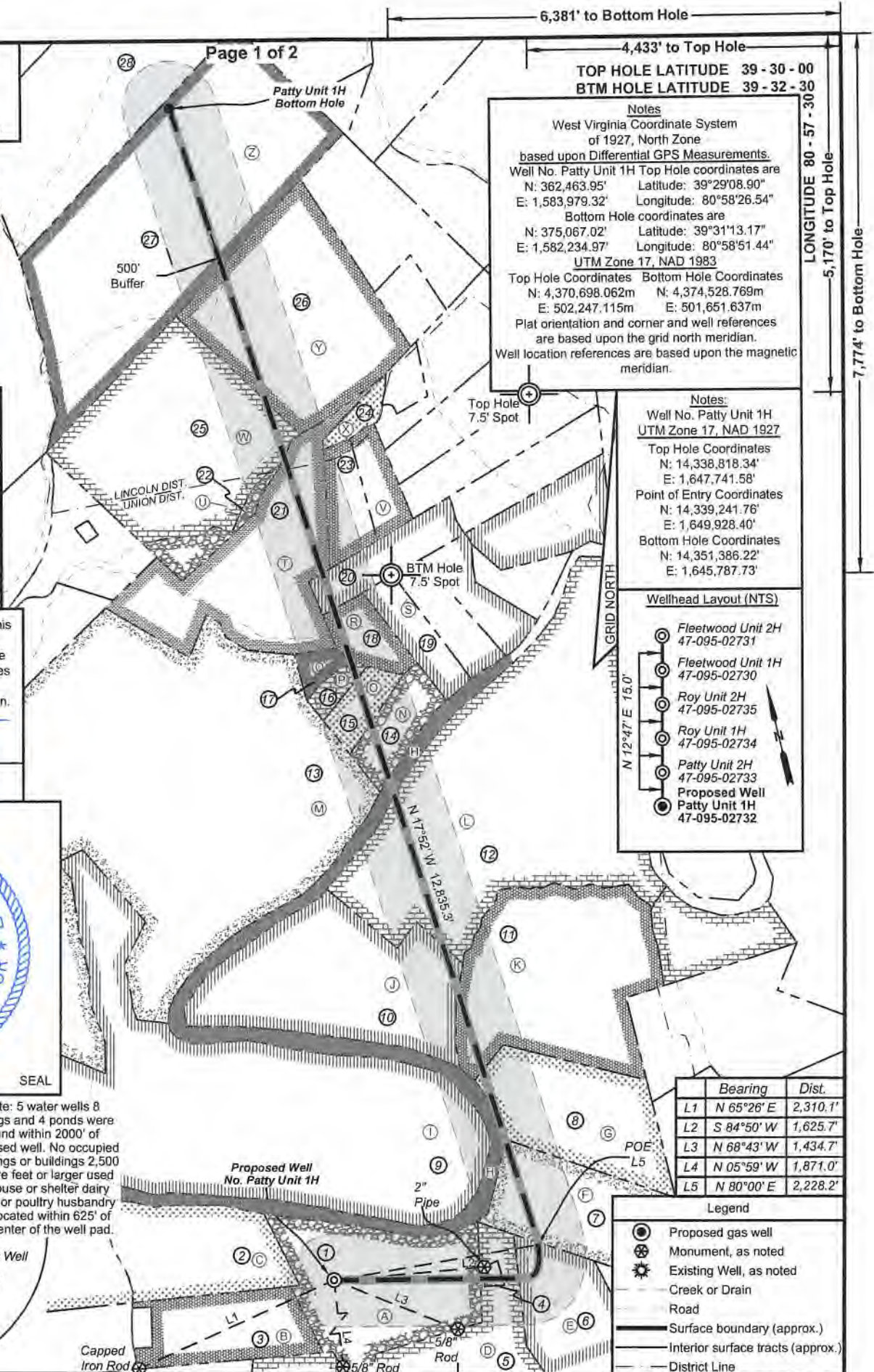
STATE OF WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS DIVISION

DATE: May 26 2021
 OPERATOR'S WELL NO. Patty 1H
 API WELL NO MOD
 47 - 095 - 02732
 STATE COUNTY PERMIT

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

LOCATION: ELEVATION: As-Built 883' WATERSHED: Outlet Middle Island Creek QUADRANGLE: Middlebourne
 DISTRICT: Union/Lincoln Dena Raye Grimes; J&N Management Enterprises, LLC; WVDNR; Greenbrier Royalty Fund II, LLC; Arlen G. Jr., & Marsha A. Wells (5); COUNTY: Tyler 06/11/2021
 SURFACE OWNER: Antero Resources Corp. Linda P. & Roy Henriksen; Margaret Conaway-Torok; ACREAGE: 60.38 78.49; 65.4620; 83.61; Jay Edward Smith; Norma R. Spencer; Davis S. Clough; 83.13; 72.58; 190.
 ROYALTY OWNER: Berna J. Hammel; H3, LLC; Leslie W. Potts; Lora Keller Thomas; Gary C. & Maryjane Richards; LEASE NO: ACREAGE: 3.68; 8.3; 10.85; 15.0
 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: 22,400' MD 6,500' TVD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
 ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
 Denver, CO 80202 Charleston, WV 25313



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



Leases	
A	Berna J. Hammel
B	Sally & Mitchell Dunn
C	Maurice C. Grove
D	J&N Management Enterprises, LLC
E	H3 LLC
F	Leslie W. Potts
G	Lora Keller Thomas
H	WVDNR
I	OPEN
J	Jay Edward Smith
K	Antero Minerals, LLC
L	Norma R. Spencer
M	B. Douglas Haught
N	Arlen G., Jr. & Marsha A. Wells
O	Arlen G., Jr. & Marsha A. Wells
P	Arlen G., Jr. & Marsha A. Wells
Q	Arlen G., Jr. & Marsha A. Wells
R	Arlen G., Jr. & Marsha A. Wells
S	David S. Clough
T	Greenbrier Royalty Fund II, LLC
U	Julia Fetty Carolus
V	Everett E. Higgins, et ux
W	Linda P. & Roy Henriksen
X	Brian E. Higgins, et ux
Y	Dena Raye Grimes
Z	Margaret Conaway-Torok

ID	TM/Par	Owner	Bk/Pg	Acres
1	10-4.1	Antero Resources Corporation	OR12/739	60.38
2	9-9.1	Jennifer K. & Diane M. Thomas	AR 6/754	40.00
3	10-4	Kevin L. & Tammy J. Thomas	OR7/290	32.22
4	10-5.2	Rainelle M. Pratt, et al	WB56/619	1.01
5	10-5	Timothy Brian Bowen, et al	WB56/619	48.36
6	10-3	Joseph B. & Melanie Thomas	173/503	39.00
7	10-2	Mary Elizabeth Potts, et al	126/444	50.00
8	10-1	Lora K. Thomas	175/19	53.00
9	9-4	Steven D. Zechman & Linda M. Jensen	348/422	250.00
10	6-3	Eldon J. & Ruth A. Helman	383/761	72.88
11	6-2	Eldon J. & Ruth A. Helman	383/761	83.13
12	6-1	Eldon J. & Ruth A. Helman	383/761	169.00
13	5-16	Charity Gas Inc.	358/516	393.00
14	6-6.14	Arlen G. Wells, Jr.	339/611	15.00
15	6-6.15	Arlen G. Wells, Jr.	339/611	8.30
16	6-6.16	Arlen G. & Marsha A. Wells	357/380	3.68
17	6-6.17	Arlen G. & Marsha A. Wells	357/380	3.98
18	6-6.18	Arlen G. & Marsha A. Wells	357/382	10.85
19	6-6.13	David S. Clough	351/752	12.25
20	6-6.7	David S. Clough	351/752	16.35
21	6-4	Kathryn S. Lehman	379/562	67.00
22	6-5.3	Julia Fetty Carolus	323/587	2.50
23	6-6.2	Eathan P. Wells	445/727	11.85
24	6-6.1	Charles Young Jr. & Crystal Young	461/81	4.30
25	5-26	Paul R. Fetty	288/126	82.22
26	6-5	Linda Pryor & Roy Henriksen	637/558	83.60
27	14-1	Edward E. & Connie Howell	361/829	158.74
28	11-11	Thomas E. Bowen	374/636	119.75

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DATE: May 26 2021
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 API WELL NO **Mod**
 47 - 095 - 02732
 STATE COUNTY PERMIT

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 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW

LOCATION: ELEVATION: As-Built 883' WATERSHED: Outlet Middle Island Creek QUADRANGLE: Middlebourne 57.23; 107.929;
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 ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
 Denver, CO 80202 Charleston, WV 25313

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

6,381' to Bottom Hole

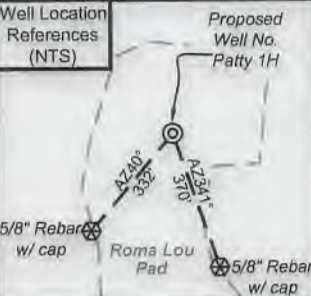
4,433' to Top Hole

TOP HOLE LATITUDE 39 - 30 - 00
 BTM HOLE LATITUDE 39 - 32 - 30

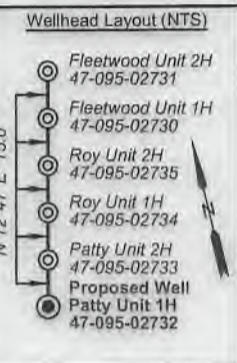


Notes
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements. Well No. Patty Unit 1H Top Hole coordinates are N: 362,463.95' Latitude: 39°29'08.90" E: 1,583,979.32' Longitude: 80°58'26.54" Bottom Hole coordinates are N: 375,067.02' Latitude: 39°31'13.17" E: 1,582,234.97' Longitude: 80°58'51.44" UTM Zone 17, NAD 1983
 Top Hole Coordinates Bottom Hole Coordinates
 N: 4,370,698.062m N: 4,374,528.769m
 E: 502,247.115m E: 501,651.637m
 Plat orientation and corner and well references are based upon the grid north meridian. Well location references are based upon the magnetic meridian.

LONGITUDE 80 - 57 - 30
 5,170' to Top Hole
 7,774' to Bottom Hole



Notes:
 Well No. Patty Unit 1H UTM Zone 17, NAD 1927
 Top Hole Coordinates
 N: 14,338,818.34' E: 1,647,741.58'
 Point of Entry Coordinates
 N: 14,339,241.76' E: 1,649,928.40'
 Bottom Hole Coordinates
 N: 14,351,386.22' E: 1,645,787.73'



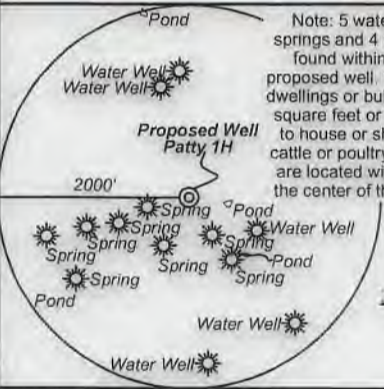
I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the rules issued and prescribed by the Department of Environmental Protection.

Bradley D. Miller

Bradley D. Miller, P.S. 2167



SEAL



Note: 5 water wells 8 springs and 4 ponds 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.
L1	N 65°26' E	2,310.1'
L2	S 84°50' W	1,625.7'
L3	N 68°43' W	1,434.7'
L4	N 05°59' W	1,871.0'
L5	N 80°00' E	2,228.2'

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

FILE NO: 197-54-M-18
 DRAWING NO: Patty Unit 1H
 SCALE: 1" = 1500'
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 STATE COUNTY PERMIT

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

LOCATION: ELEVATION: As-Built 883' WATERSHED: Outlet Middle Island Creek QUADRANGLE: Middlebourne
 DISTRICT: Union/Lincoln Dena Raye Grimes; J&N Management Enterprises, LLC; WVDNR; Greenbrier Royalty Fund II, LLC; Arlen G. Jr., & Marsha A. Wells (5); COUNTY: Tyler
 SURFACE OWNER: Antero Resources Corp. Linda P. & Roy Henriksen; Margaret Conway-Torok; ACREAGE: 60.38
 ROYALTY OWNER: Berna J. Hammel; H3, LLC; Leslie W. Potts; Lora Keller Thomas; Gary C. & Maryjane Richards; LEASE NO: ACREAGE: 3.68; 8.3; 10.85; 15.0
 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: 22,400' MD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
 ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
 Denver, CO 80202 Charleston, WV 25313

06/11/2021



Leases	
✓ A	Berna J. Hammel
B	Sally & Mitchell Dunn
C	Maurice C. Grove
✓ D	J&N Management Enterprises, LLC
✓ E	H3 LLC
✓ F	Leslie W. Potts
✓ G	Lora Keller Thomas
✓ H	WVDNR
I	OPEN
✓ J	Jay Edward Smith
✓ K	Antero Minerals, LLC
✓ L	Norma R. Spencer
M	B. Douglas Haught
✓ N	Arlen G., Jr. & Marsha A. Wells
✓ O	Arlen G., Jr. & Marsha A. Wells
✓ P	Arlen G., Jr. & Marsha A. Wells
✓ Q	Arlen G., Jr. & Marsha A. Wells
✓ R	Arlen G., Jr. & Marsha A. Wells
✓ S	David S. Clough
✓ T	Greenbrier Royalty Fund II, LLC
U	Julia Fetty Carolus
V	Everett E. Higgins, et ux
✓ W	Linda P. & Roy Henriksen
X	Brian E. Higgins, et ux
✓ Y	Dena Raye Grimes
✓ Z	Margaret Conaway-Torok

ID	TM/Par	Owner	Bk/Pg	Acres
✓ 1	10-4.1	Antero Resources Corporation	OR12/739	60.38
2	9-9.1	Jennifer K. & Diane M. Thomas	AR 6/754	40.00
3	10-4	Kevin L. & Tammy J. Thomas	OR7/290	32.22
✓ 4	10-5.2	Rainelle M. Pratt, et al	WB56/619	1.01
5	10-5	Timothy Brian Bowen, et al	WB56/619	48.36
✓ 6	10-3	Joseph B. & Melanie Thomas	173/503	39.00
7	10-2	Mary Elizabeth Potts, et al	126/444	50.00
8	10-1	Lora K. Thomas	175/19	53.00
9	9-4	Steven D. Zechman & Linda M. Jensen	348/422	250.00
✓ 10	6-3	Eldon J. & Ruth A. Helman	383/761	72.88
✓ 11	6-2	Eldon J. & Ruth A. Helman	383/761	83.13
✓ 12	6-1	Eldon J. & Ruth A. Helman	383/761	169.00
13	5-16	Charity Gas Inc.	358/516	393.00
✓ 14	6-6.14	Arlen G. Wells, Jr.	339/611	15.00
✓ 15	6-6.15	Arlen G. Wells, Jr.	339/611	8.30
✓ 16	6-6.16	Arlen G. & Marsha A. Wells	357/380	3.68
✓ 17	6-6.17	Arlen G. & Marsha A. Wells	357/380	3.98
✓ 18	6-6.18	Arlen G. & Marsha A. Wells	357/382	10.85
✓ 19	6-6.13	David S. Clough	351/752	12.25
✓ 20	6-6.7	David S. Clough	351/752	16.35
✓ 21	6-4	Kathryn S. Lehman	379/562	67.00
✓ 22	6-5.3	Julia Fetty Carolus	323/587	2.50
✓ 23	6-6.2	Eathan P. Wells	445/727	11.85
✓ 24	6-6.1	Charles Young Jr. & Crystal Young	461/81	4.30
✓ 25	5-26	Paul R. Fetty	288/126	82.22
✓ 26	6-5	Linda Pryor & Roy Henriksen	637/558	83.60
✓ 27	14-1	Edward E. & Connie Howell	361/829	158.74
✓ 28	11-11	Thomas E. Bowen	374/636	119.75

FILE NO: 197-54-M-18
DRAWING NO: Patty Unit 1H
SCALE: 1" = 1500'
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: May 26 2021
OPERATOR'S WELL NO. Patty 1H
API WELL NO. ~~NOB~~
47 - 095 - 02732
STATE COUNTY PERMIT

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

LOCATION: ELEVATION: As-Built 883' WATERSHED: Outlet Middle Island Creek QUADRANGLE: Middlebourne
DISTRICT: Union/Lincoln Dena Raye Grimes; J&N Management Enterprises, LLC; WVDNR; Greenbrier Royalty Fund II, LLC; Arlen G. Jr., & Marsha A. Wells (5); COUNTY: Tyler 57.23; 107.929; 80.38; 62.42; 83.13; 72.88; 190;
SURFACE OWNER: Antero Resources Corp. Linda P. & Roy Henriksen; Margaret Conaway-Torok; ACREAGE: 60.38 78.49; 65.4620; 83.61; 83.61; 158.74; 3.98;
ROYALTY OWNER: Berna J. Hammel; H3, LLC; Leslie W. Potts; Lora Keller Thomas; Gary C. & Marjane Richards; LEASE NO: ACREAGE: 3.68; 8.3; 10.85; 15.0
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: 22,400' MD 6,500' TVD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
Denver, CO 80202 Charleston, WV 25313



May 27, 2021

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

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

EXPEDITED

Mr. Brewer:

Antero Resources Corporation (Antero) would like to submit the following permit modification for approved well on the Roma Lou Pad. We are requesting to extend the wellbore for the Patty Unit 1H (API# 47-095-02732).

check# 229827
5/25/21 \$5,000

Attached you will find the following documents:

- REVISED Form WW-6B
- REVISED Form WW-6A1, which shows the new leases we will be drilling into
- REVISED Mylar Plat

If you have any questions please feel free to contact me at (303) 357-7182.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in black ink that appears to read "Mallory Stanton".

Mallory Stanton
Permitting Supervisor
Antero Resources Corporation

Enclosures

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Office of Oil and Gas

MAY 28 2021

WV Department of
Environmental Protection

06/11/2021



May 27, 2021

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

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

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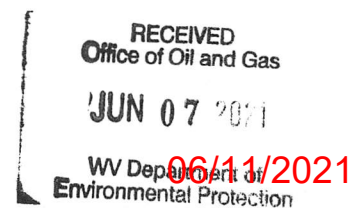
Thank you in advance for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Mallory Stanton", is written over a faint, illegible stamp.

Mallory Stanton
Permitting Supervisor
Antero Resources Corporation

Enclosures



WW-6B
(04/15)

API NO. 47-095 - 02732
OPERATOR WELL NO. Patty Unit 1H
Well Pad Name: Roma Lou Pad

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

1) Well Operator: Antero Resources Corporation 494507062 095 - Tyler Ellsworth Middlebourne 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Patty Unit 1H Well Pad Name: Roma Lou Pad

3) Farm Name/Surface Owner: Antero Resources Corp. Public Road Access: Pleasant Ridge Road

4) Elevation, current ground: 883' 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: 6500' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 6500' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 22,400' MD

11) Proposed Horizontal Leg Length: 12,853'

12) Approximate Fresh Water Strata Depths: 158'

13) Method to Determine Fresh Water Depths: 47-095-00912-0000

14) Approximate Saltwater Depths: 1678'

15) Approximate Coal Seam Depths: 483'

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

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

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18)

CASING AND TUBING PROGRAM

TYPE	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	300	300	CTS, 574 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#	22400	22400	3058 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

TYPE	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
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.

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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): 21.14 acres

22) Area to be disturbed for well pad only, less access road (acres): 12.19 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

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.

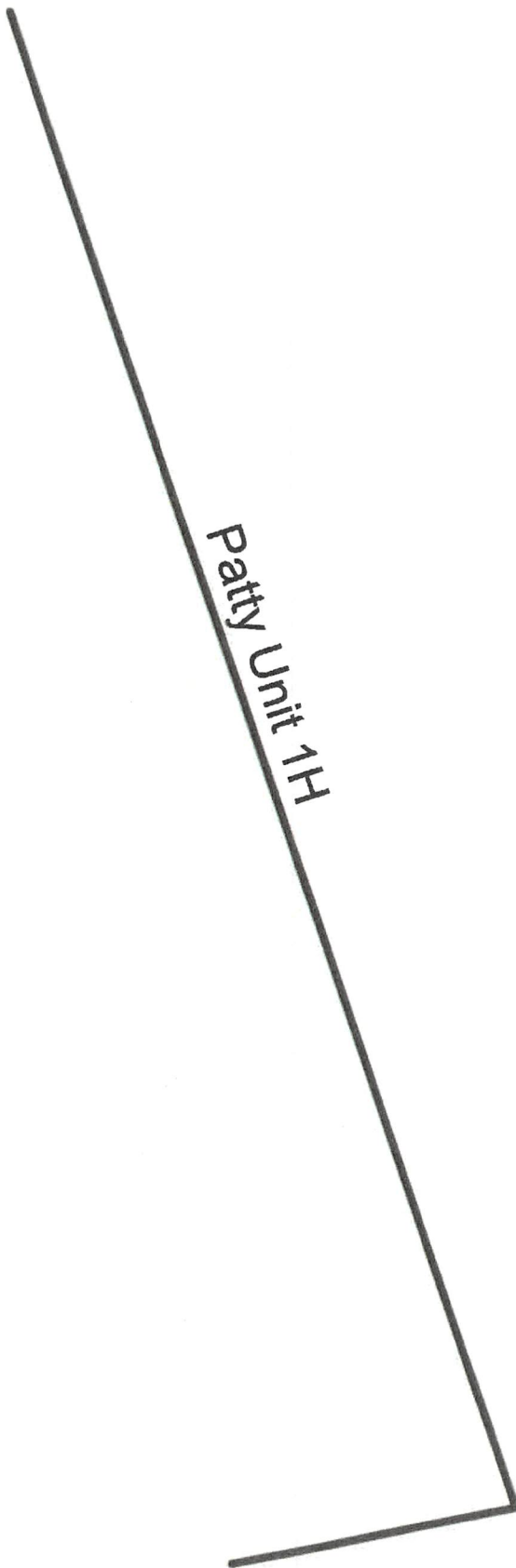
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

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.



PERMIT MODIFICATION API # 47-095-02732



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WV Department of
Environmental Protection



Antero Resources Corporation

Patty Unit 1H - AOR



May 26, 2021

06/11/2021

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>Berna J. Hammel Lease</u> Berna J. Hammel	Antero Resources Corporation	1/8+	0392/0778
<u>J & N Management Enterprises LLC Lease</u> J & N Management Enterprises	Antero Resources Corporation	1/8+	591/235
<u>H3 LLC Lease</u> H3 LLC	Antero Resources Corporation	1/8+	612/750
<u>Leslie W Potts Lease</u> Leslie W Potts	Antero Resources Corporation	1/8+	585/556
<u>Lora Keller Thomas Lease</u> Lora Keller Thomas	Antero Resources Corporation	1/8+	626/599
<u>WVDNR Lease</u> WVDNR	Antero Resources Corporation	1/8+	
<u>Antero Mineral LLC Lease</u> Antero Mineral LLC	Antero Resources Corporation	1/8+	67/470
<u>Jay Edward Smith Lease</u> Jay Edward Smith Montani Energy LLC Antero Resources Appalachian Corporation	Montani Energy LLC Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Assignment Name Change	404/1 404/754 557/430
<u>Norma R Spencer Lease</u> Norma R Spencer	Antero Resources Corporation	1/8+	564/428
<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/150
<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/156
<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/154
<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/148
<u>Arlen G Jr & Marsha A Wells Lease</u> Arlen G Jr & Marsha A Wells	Antero Resources Corporation	1/8+	448/152

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*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.

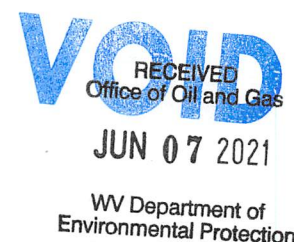
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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>David S Clough Lease</u>			
David S Clough	Antero Resources Appalachian Corporation	1/8+	421/490
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	557/430
<u>Greenbrier Royalty Fund II LLC Lease</u>			
Greenbrier Royalty Fun II LLC	Antero Resources Corporation	1/8	108/295
<u>Linda P & Roy Henriksen Lease</u>			
Linda P & Roy Henriksen	Antero Resources Corporation	1/8+	671/593
<u>Dena Rave Grimes Lease</u>			
Dena Rave Grimes	Antero Resources Corporation	1/8+	670/158

***Co-tenancy utilization – At least 7 mineral owners in tract. At least 75% of the royalty owners have executed a lease on the tract. The interests of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act**



*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.

****CONTINUED ON NEXT PAGE****

WW-6A1
(5/13)

Operator's Well No. Patty 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)**

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Margaret Conway-Torok Lease</u>	Margaret Conway-Torok	Antero Resources Corporation	1/8+	595/622

*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

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.

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Environmental Protection

Co-tenancy utilization - At least 7 mineral owners in tract. At least 75% of the royalty owners have executed a lease on the tract. The interests of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act

Well Operator: Antero Resources Corporation
By: Tim Rady
Its: VP of Land