



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

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

Thursday, March 12, 2020
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for FENDER 1H
47-095-02670-00-00

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.

James A. Martin
Chief

A handwritten signature in blue ink, appearing to read 'James A. Martin', is written over the typed name and title.

Operator's Well Number: FENDER 1H
Farm Name: MICHAEL J. & MELINDA R. HOGUE
U.S. WELL NUMBER: 47-095-02670-00-00
Horizontal 6A New Drill
Date Modification Issued: 3/12/2020

Promoting a healthy environment.

WW-6B
(04/15)

API NO. 47-095 - 02670
OPERATOR WELL NO. Fender Unit 1H
Well Pad Name: Hogue 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: Fender Unit 1H Well Pad Name: Hogue Pad

3) Farm Name/Surface Owner: Michael J. & Melinda R. Hogue Public Road Access: Klondike Acres Road

4) Elevation, current ground: 1033' Elevation, proposed post-construction: ~1014.5

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: 6900' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

JEB
2/21/2020

8) Proposed Total Vertical Depth: 6900' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18400' MD

11) Proposed Horizontal Leg Length: 8388'

12) Approximate Fresh Water Strata Depths: 456'

13) Method to Determine Fresh Water Depths: 47-095-00704

14) Approximate Saltwater Depths: 1581'

15) Approximate Coal Seam Depths: 740'

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: _____

SEARCHED
INDEXED
SERIALIZED
FILED
MAR 2 2020
WEST VIRGINIA
ENVIRONMENTAL PROTECTION

WW-6B
(04/15)

API NO. 47- 095 - 02670
OPERATOR WELL NO. Fender Unit 1H
Well Pad Name: Hogue 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	16"	New	H-40	94#	80	80	CTS, 63 Cu. Ft.
Fresh Water	10 3/4"	New	J-55	40.5#	506 *see # 19	506 *see # 19	CTS, 368 Cu. Ft.
Coal	7 5/8"	New	K-55	26.4#	2500	2500	CTS, 698Cu. Ft.
Intermediate							
Production	5"	New	P-110	18#	18400	18400	4652 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

*gcb
2/27/2020*

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	16"	20"	0.438"	2630	50	Class A	~1.2
Fresh Water	10 3/4"	13 1/2"	0.35"	2730	1000	Class A	~1.2
Coal	7 5/8"	9 7/8"	0.328"	4140	1500	Class A	~1.2
Intermediate							
Production	5"	6 3/4"	0.362"	15840	2500	Class H	~1.26
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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

*STEWART
ENVIRONMENTAL SERVICES
2020*

WW-6B
(10/14)

API NO. 47-095 - 02670
OPERATOR WELL NO. Fender Unit 1H
Well Pad Name: Hogue Pad

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

JCB
2/27/2020

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 28.10 acres

22) Area to be disturbed for well pad only, less access road (acres): 12.79 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.

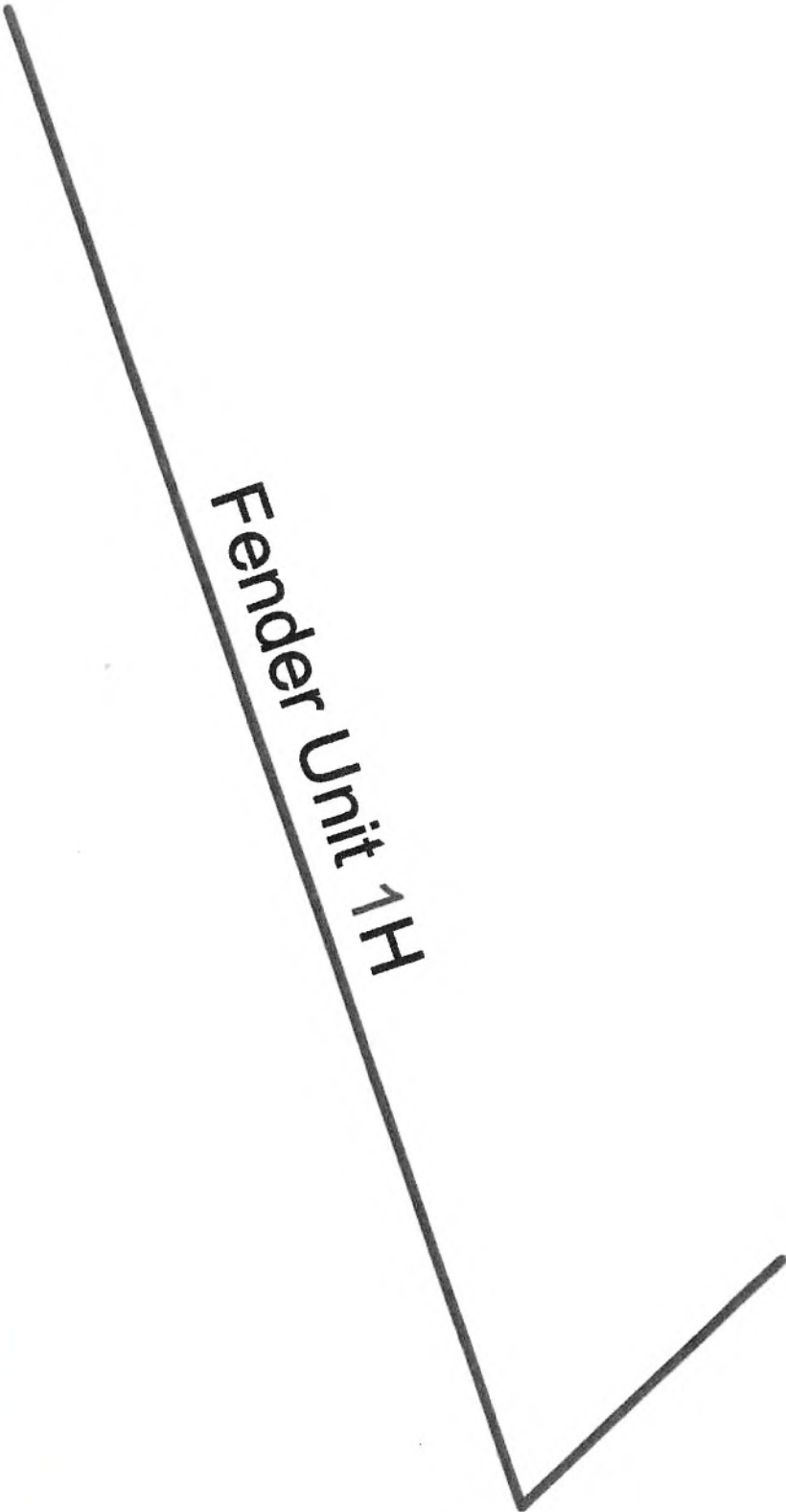
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.



FENDER UNIT 1H (HOGUE PAD)- AREA OF REVIEW 35-8-5.11

PERMIT MODIFICATION API # 47-095-02670



Fender Unit 1H

RECEIVED
Office of Oil and Gas
FEB 23 2020
WV Department of
Environmental Protection

gcb
2/27/2020



Antero Resources Corporation

Fender Unit 2H - AOR



REMARKS
No Wells of Interest

October 30, 2019

Antero Resources
Well No. Fender Unit 1H
BHL MOD
Antero Resources Corporation



Leases	
A	Michael J. & Melinda R. Hogue
B	James F. Doan, et ux
C	Ryan L. Walton, et ux
D	The Swan Living Trust
E	David L. Lancaster, et ux
F	Ryan L. Walton, et ux
G	David L. Lancaster, et ux
H	Kenneth W. Lancaster
I	Terry Lee Fiber
J	Joe & Shirley Varese
K	Leeman W. Mason, et ux
L	Peter W. & Irmagard Guenter Joint Living Trust
M	Thomas & Cynthia H. Hall
N	BRC Appalachian Minerals I, LLC
O	Robert C. Kramer
P	Charles E. Anderson, et ux
Q	Ruth E. Blake
R	Earnestine Pelikan & David Leasure
S	Betty Lou Hadley
T	Sam Maxson
U	Larry K. Spencer
V	Tustin Family Trust
W	Tustin Family Trust
X	BRC Appalachian Minerals I, LLC
Y	Nellie M. Wilson, et al
Z	Arthur D. Haught
AA	Mary Frances Carpenter
AB	Larry K. Spencer
AC	Larry K. Spencer
AD	Harold L. Holloway, Jr., et ux
AE	Michael H. Glover, et ux
AF	Betty Lou Hadley
AG	Jordan L. & Michael P. Haught
AH	James M. Glover, et ux
AI	James M. Glover, et ux
AJ	April N. DeLong
AK	Ruth Blake
AL	Ruth Blake
AM	Betty Lou Hadley
AN	James D. Anderson & Tracy A. Doll
AO	Betty Lou Hadley
AP	Bessie L. Matthews, et vir
AQ	Betty Lou Hadley
AR	Betty Lou Hadley
AS	Betty Lou Hadley
AT	Stephen D. Ashley, et ux
AU	James M. Glover, et ux
AV	Martha J. Hayes, et vir
AW	Betty Lou Hadley
AX	Betty Lou Hadley
AY	Betty Lou Smith
AZ	Betty Hadley
BA	Laura June Smith
BB	Kathryn Knowlton
BC	Crystal Christophel
BD	Timothy Stanley, et ux
BE	Donald E. Huffman
BF	Betty Lou Hadley
BG	Betty Lou Hadley
BH	Nancy Glover
BI	William H. Eddy
BJ	WV DNR

ID	TM/Par	Owner	Bk/Pg	Acres
1	20/108	Michael J. & Melinda R. Hogue	348/404	192.00
2	26/46.10	Leon & Drema Gallison	359/311	4.98
3	26/46.5	Richard Doly	493/673	13.14
4	26/46.4	Timothy F. & Jasmine Y. Kantz	415/716	8.10
5	26/22	Ryan Lee & Melinda Jo Walton	342/687	36.50
6	26/21	Ryan Lee & Melinda Jo Walton	342/687	35.90
7	26/20	Kenneth & Brenda Lancaster	210/502	20.00
8	20/102	Antero Midstream LLC	575/69	203.59
9	20/103	Kenneth & Brenda Lancaster	210/341	1.20
10	20/104	David Lancaster	210/505	57.00
11	20/107	David L. & Kathy A. Lancaster	314/344	18.89
12	20/102.1	Terrell Lee Henderson	445/302	0.951
13	20/104.1	Kenneth & Brenda Lancaster	328/13	1.796
14	20/105.1	Terry Lee Fiber	335/682	6.06
15	20/105	Joe & Shirley Varese	352/736	11.322
16	20/105.2	Terry Lee Fiber	336/480	0.098
17	20/106	Eugene F. & Phyllis A. Howell	223/371	19.76
18	20/106.1	Lee Ann Hall	486/806	5.493
19	20/99	Pioneer Land Company LLC	431/414	10.00
20	20/85	Pioneer Land Company LLC	431/414	83.10
21	20/83.5	Thomas & Cynthia Hall	392/229	6.416
22	20/93.1	Vernon Stevens	423/703	2.14
23	20/93.5	Nina Smith & Mary Bennett	308/115	2.88
24	20/106.2	Nancy Forester	328/633	5.429
25	20/93	Robert C. Kramer	547/650	23.964
26	20/92	Charles & Doris Anderson	210/359	27.00
27	20/94	Charles & Doris Anderson	217/398	2.806
28	20/86	Ruth E. Blake	317/103	23.75
29	20/44.1	Ruth E. Blake	317/103	10.17
30	20/44.2	Roy D. Hadley & Betty L. Gully	295/375	11.27
31	20/43	Janet Neff, et al	429/173	35.00
32	20A/1	William G. & Larry K. Spencer	296/368	1.71
33	20/42	Janet Neff, et al	429/173	20.23
34	20/42.1	Kenneth & Mary Ashley	351/771	1.889
35	20/41	Kenneth & Mary Ashley	194/365	15.79
36	20/41.1	Janet Neff, et al	429/173	2.218
37	20/46.1	Betty Tustin	WB45/156	2.476
38	20/47	Betty Tustin	WB45/156	1.00
39	20/46	Betty Tustin	WB45/156	29.66

ID	TM/Par	Owner	Bk/Pg	Acres
40	20/45	Nellie M. Wilson	337/462	8.00
41	20/40.1	Gary & Margaret Rymer	232/12	7.07
42	20/40	William H. & Judy M. White	352/566	9.31
43	20A/6	Roy D. & Betty Lou Hadley	353/558	0.53
44	20A/3.1	Larry K. Spencer	425/56	0.524
45	20A/2	Wanda M. Spencer, et al	AR50/170	0.45
46	20A/3	Harold L. & Debra C. Holloway	225/51	0.366
47	20A/5	Michael H. & Vola J. Glover	208/103	1.38
48	20A/7	Jordan L. & Michael P. Haught	522/391	1.66
49	20A/8	James M. & Sara K. Glover	434/163	0.44
50	20A/9	James M. & Sarah M. Glover	578/622	0.17
51	20A/10	April N. DeLong	437/806	0.11
52	20A/10.1	Ruth E. Blake	348/604	0.16
53	20A/11	Ruth E. Blake	343/574	0.14
54	20A/12	Roy D. & Betty Lou Hadley	304/366	0.25
55	20A/13	James D. Anderson & Tracy A. Doll	400/425	0.33
56	20A/55	Roy D. & Betty Lou Hadley	350/341	0.17
57	20A/54	Bessie L. Matthews, et vir	521/634	0.46
58	20A/52	Betty Lou Hadley	579/652	0.24
59	20A/53	Deloris Gully	AR40/97	0.33
60	20A/14	Roy D. Hadley	332/696	0.17
61	20A/15	Stephen D. & Brenda J. Ashley	317/183	0.50
62	20A/16	James M. Glover	330/197	0.50
63	20/46.2	James & Sara Glover	350/386	0.386
64	20A/17	Chris L. Hayes & Martha J. Tennant	343/212	0.17
65	20A/18	Roy D. Hadley	WB23/305	0.66
66	20A/19	Roy D. Hadley	WB23/305	0.17
67	20A/20	Betty Hadley	470/683	0.17
68	20A/50	Betty Lou Hadley	579/652	0.17
69	20A/51	Shirl A. Henderson	WB19/379	0.17
70	20A/51.1	Crystal Christophel	WB19/379	0.16
71	20/86.1	Earnest Leasure, et al	321/160	0.37
72	20A/21	Roy D. Hadley	317/674	3.00
73	20A/22	Roy Hadley	WB23/305	0.17
74	20A/23	Connie Sue Tanner	327/883	0.33
75	20A/24	Timothy & Tonya Stanley	581/792	0.33
76	20A/26.1	Evelyn S. Smith	328/95	0.165
77	20A/25	Nancy Glover	147/104	0.33
78	20A/26	Evelyn S. Smith	332/681	0.165

FILE NO: 17-54-E-19
 DRAWING NO: Fender Unit 1H Well Plat
 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: February 11 2020
 OPERATOR'S WELL NO. Fender 1H
 API WELL NO
 47 - 095 - 02670
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
 Proposed 1,014.5'
 LOCATION: ELEVATION: Existing 1,033' WATERSHED: Outlet Middle Island Creek QUADRANGLE: Middlebourne
 DISTRICT: Ellsworth COUNTY: Tyler
 SURFACE OWNER: Michael J. & Melinda R. Hogue; BRC Appalachian Minerals I, LLC; Nellie M. Wilson; Arthur D. Haught; Ruth E. Blake; Betty Lou Hadley; Sam Maxson; Larry K. Spencer; The Swan Living Trust; Peter W. & Irmagard E. Guenter, Joint Living Trust; ACREAGE: 192.0
 ROYALTY OWNER: Michael J. & Melinda R. Hogue; Ryan L. Walton, et ux (2); David L. Lancaster, et ux (2) LEASE NO: ACREAGE: 8.00; 8.38; 35; 1.6152; 40.625; 41.425; 11.26875; 166.09063; 93.1; 18.89; 58.27275; 191.5; 35.9; 36.5
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) BHL MOD 6,900' TVD
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 18,400' 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

WW-6A1

Operator's Well Number Fender Unit 1H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Michael J. & Melinda R. Hogue Lease</u>			
Michael J. & Melinda R. Hogue	Statoil USA Onshore Properties Inc.	1/8	0449/0283
Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>Ryan L. Walton et ux Lease (TM 26 PCL 22)</u>			
Ryan L. Walton et ux	Antero Resources Corporation	1/8+	0498/0445
<u>Ryan L. Walton et ux Lease (TM 26 PCL 21)</u>			
Ryan L. Walton et ux	Antero Resources Corporation	1/8+	0498/0445
<u>David L. Lancaster et ux Lease (TM 20 PCL 107)</u>			
David L. Lancaster et ux	Antero Resources Corporation	1/8+	0594/0713
<u>David L. Lancaster et ux Lease (TM 20 PCL 104)</u>			
David L. Lancaster et ux	Antero Resources Corporation	1/8+	0594/0713
<u>The Swan Living Trust Lease</u>			
The Swan Living Trust	Antero Resources Corporation	1/8+	0594/0285
<u>Peter W. Guenther & Irmgard E. Guenther Lease</u>			
Peter W. Guenther & Irmgard E. Guenther	Antero Resources Corporation	1/8+	0565/0545
<u>Ruth E. Blake Lease</u>			
Ruth E. Blake	Antero Resources Corporation	1/8+	0626/0575
<u>Betty Lou Hadley Lease</u>			
Betty Lou Hadley	Antero Resources Corporation	1/8+	0621/0059
<u>Sam Maxson Lease</u>			
Sam Maxson	Antero Resources Corporation	1/8+	0424/0833
<u>Larry K. Spencer Lease</u>			
Larry K. Spencer	Antero Resources Corporation	1/8+	0633/0526
<u>Sam Maxson Lease</u>			
Sam Maxson	Antero Resources Corporation	1/8+	0424/0833

*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

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
BRC Appalachian Minerals I LLC Lease			
BRC Appalachian Minerals I LLC	BRC Working Interest Company	1/8	0369/0300
BRC Working Interest Company	Chesapeake Appalachia LLC	Assignment	0369/0784
Chesapeake Appalachia LLC	SWN Production Company	Assignment	0465/0463
SWN Production Company	Antero Exchange Properties	Assignment	0544/0242
Antero Exchange Properties	Antero Resources Corporation	Name Change	Exhibit 1

RECEIVED
 Office of Oil and Gas
 FEB 28 2020
 WV Department of
 Environmental Protection

WW-6A1
(5/13)

Operator's Well No. Fender 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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- (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
Arthur D. Haught Lease	Arthur D. Haught	Antero Resources Corporation	1/8	0627/0572

*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.

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

