



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, October 4, 2023
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for SPROUSE UNIT 1H
47-103-03601-00-00

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: SPROUSE UNIT 1H
Farm Name: HAROLD S & CALANTHA A YOST
U.S. WELL NUMBER: 47-103-03601-00-00
Horizontal 6A New Drill
Date Modification Issued: 10/04/2023

Promoting a healthy environment.

10/06/2023

4710303601

WW-6B
(04/15)

API NO. 47-103 - 03601
OPERATOR WELL NO. Sprouse Unit 1H MOD
Well Pad Name: Big Run Pad

CK# 4024090
\$1 7500⁰⁰

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

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

2) Operator's Well Number: Sprouse Unit 1H MOD Well Pad Name: Big Run Pad

3) Farm Name/Surface Owner: Harold S. & Calantha A. Yost Public Road Access: Wetzel Tyler Ridge Road

4) Elevation, current ground: 1250' - AS BUILT Elevation, proposed post-construction: _____

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

(b) If Gas Shallow X Deep _____
Horizontal X

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 7270' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 7270' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 31270' MD

11) Proposed Horizontal Leg Length: 19766'

12) Approximate Fresh Water Strata Depths: 31'

13) Method to Determine Fresh Water Depths: 47095027130000 Offset well records

14) Approximate Saltwater Depths: 2311'

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 X

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

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Smf
10/06/2023
9-28-23

WW-6B
(04/15)

API NO. 47- 103 - 03601
 OPERATOR WELL NO. Sprouse Unit 1H MOD
 Well Pad Name: Big Run Pad

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	J-55	94#	100'	100' ✓	CTS, 96 Cu. Ft. ✓
Fresh Water	13-3/8"	New	J-55	54.5#	300'	300' ✓	CTS, 313 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	3350'	3350' ✓	CTS, 1364 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110 ICY	23#	31270'	31270' ✓	CTS, 6952 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.375"	2250	50	Class A/L ✓	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	1000	Class A/L	~1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A/L	~1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.415"	14,360	✓ 2500	Class G/H	~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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

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Page 2 of 3

SMG
10/06/2023
9-20-23

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

Drill a new horizontal shallow well into the Marcellus Shale.

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

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

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

Anticipated Max Pressure - 9300 lbs
Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 15.91 acres

22) Area to be disturbed for well pad only, less access road (acres): 9.35 acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers
Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.
Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.
Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

24) Describe all cement additives associated with each cement type:

Conductor: no additives, Class A/L cement.
Surface: Class A/L cement with 2-3% calcium chloride and 1/4 lb of flake
Intermediate: Class A/L cement with 1/4 lb of flake, 5 gallons of clay treat
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51
Production: Tail cement- Class G/H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

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25) Proposed borehole conditioning procedures:

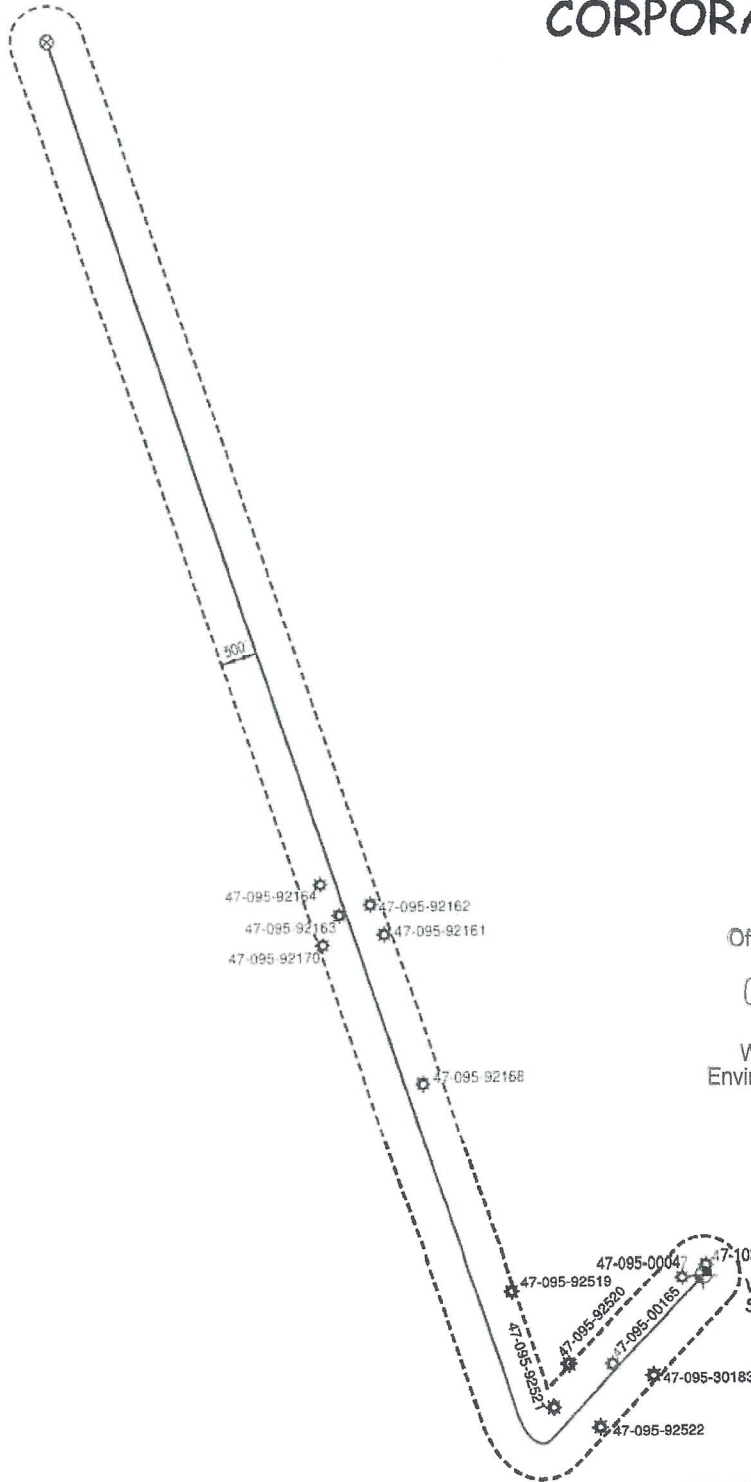
Conductor: blowhole clean with air, run casing, 10 bbls fresh water.
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 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.

WV Department of
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*Note: Attach additional sheets as needed.

4710303601

BIG RUN PAD ANTERO RESOURCES CORPORATION



47-095-92164
 47-095-92165
 47-095-92170

47-095-92162
 47-095-92161

47-095-92158

47-095-00047
 47-095-92519
 47-095-92520
 47-095-00185
 47-095-30183
 47-095-92522

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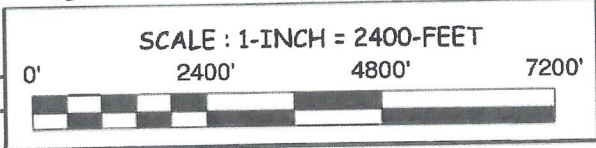
WELL NO.
 SPROUSE 1H

WILLOW LAND SURVEYING, PLLC
 P.O. BOX 17, PENNSBORO, WV 26415
 (304) 659-1717

JOB #: 23-011WA
 FILE: SPROUSE1HAOR.DWG

DATE: 08/23/23

DRAWN BY: D.R.R.



10/06/2023

UWI (API/Num)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producing Formation(s) not perf'd
47095925210000								
47095925220000								
47095901830000	A G BRIDGEMAN	2	UNKNOWN	UNKNOWN				
47095925200000								
47095001650000	WILEY MIDCAP	1	METZ OIL CO	METZ OIL CO	2,070			Salt Sands Keener
47095000470000	WILEY MIDCAP	1	UNKNOWN	UNKNOWN	3,027			
47108035420000	BIG RUN UNIT	5V	ANTERO RESOURCES CORP	ANTERO RESOURCES CORP				
47095925190000								
47095921680000								
47095921610000								
47095921620000								
47095921700000								
47095921630000								
47095921640000								

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LATITUDE 39°35'00" 7,709'

LATITUDE 39°37'30" 4,937' TO BOTTOM HOLE

Antero Resources Corporation Well No. Sprouse #1H

NOTE: NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.

5 WATER WELLS WERE LOCATED WITHIN 2000' OF THE CENTER OF PAD



NOTES: WELL 1H TOP HOLE INFORMATION: N: 386,952ft E: 1,628,100ft LAT: 39°33'17.68" LON: 80°49'08.43" BOTTOM HOLE INFORMATION: N: 403,910ft E: 1,619,325ft LAT: 39°36'03.99" LON: 80°51'03.71" WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS: WELL 1H TOP HOLE INFORMATION: N: 4,378,383m E: 515,564m BOTTOM HOLE INFORMATION: N: 4,383,505m E: 512,805m

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 1H TOP HOLE INFORMATION: N: 14,364,030ft E: 1,691,433ft POINT OF ENTRY INFORMATION: N: 14,362,171ft E: 1,688,867ft BOTTOM HOLE INFORMATION: N: 14,380,834ft E: 1,682,378ft

WV NORTH ZONE GRID NORTH

9,674' TO BOTTOM HOLE

10,352'

LONGITUDE 80°50'00"

LONGITUDE 80°47'30"

Table listing landowners in Magnolia District - Wetzel County and Green District - Wetzel County.



Table listing landowners in Ellsworth District - Tyler County.

Table listing landowners in Tyler County.

REFERENCES

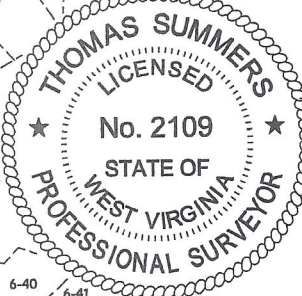
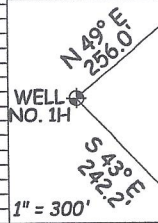


Table listing mineral interests and owners for various tracts.

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 PERSCIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

JOB # 21-011WA DRAWING # SPROUSE1H SCALE 1" = 2000' MINIMUM DEGREE OF ACCURACY SUBMETER PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND: Surface Owner Boundary Lines +/- Adjoining Surface Tracts +/- Found monument, as noted. THOMAS SUMMERS P.S. 2109 DATE 9/05/23 OPERATOR'S WELL # SPROUSE UNIT #1H 47 - 103 - 03601 STATE COUNTY PERMIT

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X LOCATION: ELEVATION AS BUILT - 1250.0' WATERSHED FISHING CREEK QUADRANGLE PORTER FALLS 7.5' DISTRICT GREEN COUNTY WETZEL SURFACE OWNER HAROLD S. & CALANTHA A. YOST - ACREAGE 50 ACRES +/- OIL & GAS ROYALTY OWNER MARY E. MIDCAP LEASE ACREAGE 50 ACRES +/- PROPOSED WORK: DRILL CONVERT DRILL DEEPER X REDRILL FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) MOD-BHL PLUG & ABANDON CLEAN OUT & REPLUG TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,270' TVD 31,270' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT KEVIN ELLIS ADDRESS 1615 WYNKOOP ST. ADDRESS 535 WHITE OAK BLVD. DENVER, CO 80202 BRIDGEPORT, WV 26330

10/06/2023

COUNTY NAME PERMIT

WW-6A1

Operator's Well Number Sprouse Unit 1H MOD

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>AJ: Mary E. Midcap Lease</u> Mary E. Midcap	Antero Resources Corporation	1/8+	0555/0175
<u>AI: Charles E. Gump Et Ux Lease</u> Charles E. Gump Et Ux	Antero Resources Corporation	1/8+	0626/0333
<u>AH: BRC Appalachian Minerals I, LLC Lease</u> BRC Appalachian Minerals I, LLC BRC Working Interest Company LLC Chesapeake Appalachia LLC Statoil USA Onshore Properties Inc. SWN Exchange Titleholder LLC SWN Production Company LLC Antero Exchange Properties	BRC Working Interest Company LLC Chesapeake Appalachia LLC Statoil USA Onshore Properties Inc. SWN Exchange Titleholder LLC SWN Production Company LLC Antero Exchange Properties	1/8+ Assignment Assignment Assignment Merger Assignment Merger	0369/0300 0369/0784 0378/0764 0470/0668 0009/0404 0544/0242 0525/0315
<u>AG: AMP Fund III, LP Lease</u> AMP Fund III, LP	Antero Resources Corporation	1/8+	0087/0284
<u>AF: Star Furniture Company of West Union, Inc. Lease</u> Star Furniture Company of West Union, Inc.	Antero Resources Corporation	1/8+	0531/0806
<u>AC: William D. Lemon Lease</u> William D. Lemon Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0420/0439 0557/0430
<u>AD: Gail G. Oestreich Lease</u> Gail D. Oestreich	Antero Resources Corporation	1/8+	0483/0844
<u>AA: Bounty Minerals, LLC Lease</u> Bounty Minerals, LLC	Antero Resources Corporation	1/8+	0177/0025
<u>Z: Bounty Minerals, LLC Lease</u> Bounty Minerals, LLC	Antero Resources Corporation	1/8+	0177/0022
<u>X: Jeffery N. Sprouse Et Ux Lease</u> Jeffery N. Sprouse Et Ux	Antero Resources Corporation	1/8+	0614/0220
<u>V: BRC Appalachian Minerals I, LLC Lease</u> BRC Appalachian Minerals I, LLC BRC Working Interest Company LLC Chesapeake Appalachia LLC Statoil USA Onshore Properties Inc. EQT Production Company	BRC Working Interest Company LLC Chesapeake Appalachia LLC Statoil USA Onshore Properties Inc. EQT Production Company Antero Resources Corporation	1/8 Assignment Assignment Assignment Assignment	0369/0300 0369/0784 0378/0764 0539/0239 0663/0001
<u>T: Garry L. Law Lease</u> Garry L. Law	Antero Resources Corporation	1/8+	0559/0107
<u>R: Garry L. Law Lease</u> Garry L. Law	Antero Resources Corporation	1/8+	0026/0346

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Environment and Natural Resources

10/06/2023

WW-6A1

Operator's Well Number Sprouse Unit 1H MOD

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Q: Fisher Oil Company Lease</u> Fisher Oil Company	Antero Resources Corporation	1/8+	0012/0164
<u>P: Diane Dunn Winningham Lease</u> Diane Dunn Winningham	Antero Resources Corporation	1/8+	0217/0180
<u>O: BRC Minerals LP and BRC Appalachian Minerals LLC Lease</u> BRC Minerals LP and BRC Appalachian Minerals LLC BRC Working Interest Company LLC Chesapeake Appalachia LLC SWN Production Company Antero Exchange Properties LLC	BRC Working Interest Company LLC Chesapeake Appalachia LLC SWN Production Company Antero Exchange Properties LLC Antero Resources Corporation	1/8+ Assignment Assignment Assignment Merger	102A/0505 103A/0470 157A/0540 177A/0533 0009/0404
<u>I: Witscheys Realty, Inc. Lease</u> Witscheys Realty, Inc.	Antero Resources Corporation	1/8+	0177/0193
<u>M: Country Roads Minerals, LLC Lease</u> Country Roads Minerals, LLC	Antero Resources Corporation	1/8+	0232/0707
<u>G: R&M Trust Lease</u> R&M Trust TH Exploration LLC	TH Exploration LLC Antero Resources Corporation	1/8+ Assignment	202A/0810 254A/0933
<u>E: John C. Steele and Christel R. Steele Lease</u> John C. Steele and Christel R. Steele	Antero Resources Corporation ³	1/8+	0177/0198
<u>C: Marcella Sarson Mineral Trust Lease</u> Marcella Sarson Mineral Trust	Antero Resources Corporation	1/8+	287A/0206
<u>D: Marcella Sarson Mineral Trust Lease</u> Marcella Sarson Mineral Trust	Antero Resources Corporation	1/8+	287A/0206
<u>B: Cider Run Mineral Holdings LLC Lease</u> Cider Run Mineral Holdings LLC	Antero Resources Corporation	1/8+	0177/0165

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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.

*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

10/06/2023

WW-6A1
(5/13)

Operator's Well No. Sprouse Unit 1H MOD

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
A: BRC Appalachian Minerals I, LLC Lease				
	BRC Appalachian Minerals I, LLC	BRC Working Interest Company LLC	1/8	0369/0300
	BRC Working Interest Company LLC	Chesapeake Appalachia LLC	Assignment	0369/0784
	Chesapeake Appalachia LLC	Statoil USA Onshore Properties Inc.	Assignment	0378/0764
	Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	0539/0239
	EQT Production Company	Antero Resources Corporation	Assignment	0663/0001

*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: Senior Vice President of Land

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