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west virginia department of environmental protection

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

Harold D. Ward, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Monday, March 15, 2021  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION  
1615 WYNKOOP STREET  
DENVER, CO 80202

Re: Permit Modification Approval for TAPEATS UNIT 3H  
47-095-02715-00-00

**Lateral Extension. Updated Total Measured Depth 7300' to 27800' and Horizontal Leg Length 0' to 16194.**

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 handwritten signature in blue ink, appearing to read 'James A. Martin', is positioned above the printed name and title.

James A. Martin  
Chief

Operator's Well Number: TAPEATS UNIT 3H  
Farm Name: KENNETH TOMBLIN ET AL  
U.S. WELL NUMBER: 47-095-02715-00-00  
Horizontal 6A New Drill  
Date Modification Issued: 03/16/2021

Promoting a healthy environment.

03/19/2021

WW-6B  
(04/15)

API NO. 47-095 - 02715  
 OPERATOR WELL NO. Tapeats Unit 3H  
 Well Pad Name: Grand 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 Porter Falls 7.5'  
 Operator ID County District Quadrangle
- 2) Operator's Well Number: Tapeats Unit 3H Well Pad Name: Grand Pad
- 3) Farm Name/Surface Owner: Kenneth Tomblin et al Public Road Access: Gorrells Run Road
- 4) Elevation, current ground: 1268' Elevation, proposed post-construction: ~1243'
- 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): DMH  
Marcellus Shale: 7300' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2800# 3-15-20
- 8) Proposed Total Vertical Depth: 7300' TVD
- 9) Formation at Total Vertical Depth: Marcellus
- 10) Proposed Total Measured Depth: 27800' MD
- 11) Proposed Horizontal Leg Length: 16194'
- 12) Approximate Fresh Water Strata Depths: 25'
- 13) Method to Determine Fresh Water Depths: 47-095-02267
- 14) Approximate Saltwater Depths: 2305'
- 15) Approximate Coal Seam Depths: 431'
- 16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated
- 17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes  No

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

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WW-6B  
(04/15)

API NO. 47- 095 - 02715  
OPERATOR WELL NO. Tapeats Unit 3H  
Well Pad Name: Grand Pad

18)

**CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	H-40	94#	80	80	CTS, 218 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	300	300	CTS, 417 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#	27800	27800	7236 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

*Dm 14  
715-21*

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	LandHPOZ & T&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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WW-6B  
(10/14)

API NO. 47-095 - 02715

OPERATOR WELL NO. Tapeats Unit 3H

Well Pad Name: Grand 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.

DmH  
3-15-21

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): Existing 44.34 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 13.72 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% ACG8-47 + 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.

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03/19/2021

PERMIT MODIFICATION API # 47-095-02715



Tapeats Unit 3H



Antero Resources Corporation

Tapeats Unit 3H - AOR



September 28, 2020

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03/19/2021

LATITUDE 39°32'30"

5,340'

LATITUDE 39°35'00" 7,274' TO BOTTOM HOLE

Antero Resources Corporation Well No. Tapeats Unit 3H

NOTES: WELL 3H TOP HOLE INFORMATION: N: 369,474ft E: 1,630,218ft LAT: 39°30'25.26" LON: 80°48'38.13" BOTTOM HOLE INFORMATION: N: 386,013ft E: 1,628,522ft LAT: 39°33'08.47" LON: 80°49'02.86" 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.

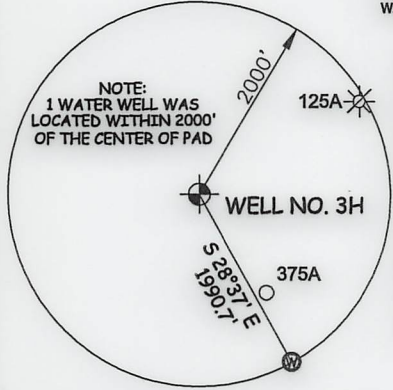
(NAD) 83 (UTM) ZONE 17 COORDS: WELL 3H TOP HOLE INFORMATION: N: 4,373,069m E: 516,298m BOTTOM HOLE INFORMATION: N: 4,378,099m E: 515,698m

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 3H TOP HOLE INFORMATION: N: 14,346,596ft E: 1,693,842ft POINT OF ENTRY INFORMATION: N: 14,347,777ft E: 1,697,092ft BOTTOM HOLE INFORMATION: N: 14,363,099ft E: 1,691,870ft

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.

Table listing landowners in Ellsworth District - Tyler County, including names like Michael Martin, Darrell Sole, Jean Neel Et Al, Richard Neff, Gail Neff, James Barnhart, Harvey Miller Et Al, etc.

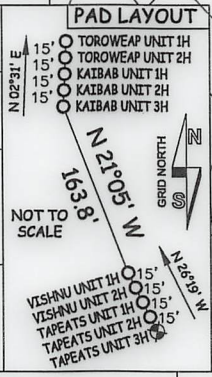
Table listing landowners in Ellsworth District - Tyler County, including names like Josh Ames, Albert Rice Est., Wash Beatty Et Al, Gladys Conley, Glenn Simmons, Charles Gump, Harold Yost, BB Farm Investments LLC, etc.



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 PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

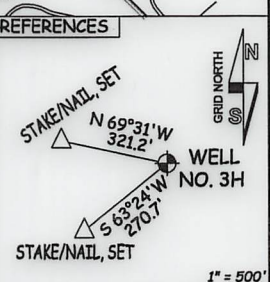
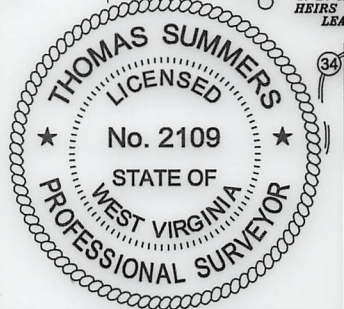


STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS. WILLOW LAND SURVEYING PLLC 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415



JOB # 20-009WA DRAWING # TAPEATS3H 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 02/18/21 OPERATOR'S WELL# TAPEATS UNIT #3H



WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ 47 - 095 - 02715 Mod (IF "GAS") PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X STATE COUNTY PERMIT LOCATION: ELEVATION 1,268' - ORIGINAL 1,243' - PROPOSED WATERSHED OUTLET MIDDLE ISLAND CREEK QUADRANGLE PORTER FALLS 7.5' DISTRICT ELLSWORTH COUNTY TYLER SURFACE OWNER KENNETH TOMBLIN ET AL ACREAGE 290.32 ACRES +/- 05/19/2021 OIL & GAS ROYALTY OWNER S. A. SMITH AND C. B. MORRIS HEIRS TRUST; MICHAEL LEE TOMBLIN; WALTER R. MYERS; LEASE ACREAGE 290.32 AC.±; 55 AC±; 40 AC±; PATRICIA M. MOYERS; VIRGIL STEVENS; RICHARD NEFF ET UX; BOUNTY MINERALS LLC; KERRY L. LEMASTERS; SHIBEN ESTATES; NILE DEAN HARRIS; MERCER MINERALS LLC; 167.61 AC±; 57.47 AC±; 40 AC±; 32 AC±; 100 AC±; 41 AC±; 99.88 AC±; 158 AC±; DONNA D. REYNOLDS; MERCER MINERALS LLC; MERCER MINERALS LLC; MERCER MINERALS LLC; MERCER MINERALS LLC; HAROLD S. YOST ET UX 33.34 AC±; 22.77 AC±; 131.98 AC±; 106.5 AC±; 106 AC±; 55.25 AC± 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 7,300' TVD 27,800' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

WW-6A1

Operator's Well Number           Tapeats Unit 3H          

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
16-28	<b>S.A. Smith &amp; C. B. Morris Heirs Trust Lease</b> S.A. Smith & C. B. Morris Trust Heirs	Antero Resources Corporation	1/8+	0022/0268 ✓
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16-29	<b>Michael Lee Tomblin Lease</b> Michael Lee Tomblin Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Assignment	0420/0497 Exhibit 1
WV Department of Environmental Protection				
17-58	<b>Walter R. Myers Lease</b> Walter R. Myers Statoil USA Onshore Properties EQT Production Company	Statoil USA Onshore Properties EQT Production Company Antero Resources Corporation	1/8+ Assignment Assignment	0411/0351 0436/0001 0663/0001
17-63	<b>Patricia M. Moyers Lease</b> Patricia M. Moyers Statoil USA Onshore Properties EQT Production Company	Statoil USA Onshore Properties EQT Production Company Antero Resources Corporation	1/8+ Assignment Assignment	0419/0305 0539/0239 0663/0001
	<b>Virgil Stevens Lease (TM 16 PCL 13)</b> Virgil Stevens	Antero Resources Corporation	1/8+	0624/0048
17-1	<b>Richard Neff et ux Lease</b> Richard Neff et ux Statoil USA Onshore Properties EQT Production Company	Statoil USA Onshore Properties EQT Production Company Antero Resources Corporation	1/8+ Assignment Assignment	0392/0655 0539/0239 0663/0001
	<b>Virgil Stevens Lease (TM 16 PCL 13.1)</b> Virgil Stevens	Antero Resources Corporation	1/8+	0624/0048
11-58	<b>Bounty Minerals LLC Lease</b> Bounty Minerals LLC	Antero Resources Corporation	1/8+	0508/0268
11-60	<b>Kerry L. Lemasters Lease</b> Kerry L. Lemasters Statoil USA Onshore Properties EQT Production Company	Statoil USA Onshore Properties EQT Production Company Antero Resources Corporation	1/8+ Assignment Assignment	0391/0734 0539/0239 0663/0001
11-59	<b>Shiben Estates Lease</b> Shiben Estates Statoil USA Onshore Properties EQT Production Company	Statoil USA Onshore Properties EQT Production Company Antero Resources Corporation	1/8+ Assignment Assignment	0387/0471 0539/0239 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.

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
 Chapter 22, Article 6A, Section 5(a)(5)  
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	Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
11-22	<b>Nile Dean Harris Lease</b> Nile Dean Harris Statoil USA Onshore Properties EQT Production Company	Statoil USA Onshore Properties EQT Production Company Antero Resources Corporation	1/8+ Assignment Assignment	0449/0154 0539/0239 0663/0001
11-19	<b>Donna D. Reynolds Lease</b> Donna D. Reynolds	Antero Resources Corporation	1/8+	0612/0169

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Mercer Minerals Lease (TM 7 PCL 24)</u> Mercer Minerals	Antero Resources Corporation	1/8+	0628/0396
<u>Mercer Minerals Lease (TM 7 PCL 25)</u> Mercer Minerals	Antero Resources Corporation	1/8+	0628/0396
<u>Mercer Minerals Lease (TM 11 PCL 14)</u> Mercer Minerals	Antero Resources Corporation	1/8+	0628/0396
<u>Mercer Minerals Lease (TM 11 PCL 15)</u> Mercer Minerals	Antero Resources Corporation	1/8+	0628/0396

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WW-6A1  
(5/13)

Operator's Well No. Tapeats Unit 3H

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
7-23 <u>Harold S. Yost et ux Lease</u>	Harold S. Yost et ux Harrison Energy Services LLC	Harrison Energy Services LLC Antero Resources Corporation	1/8+ Assignment	0569/0426 0584/0437

\*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

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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: VP of Land

**\*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**