



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0456
fax: (304) 926-0452

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

Thursday, March 26, 2020
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for NUGGETS UNIT 1H
47-095-02656-00-00

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: NUGGETS UNIT 1H
Farm Name: ANTERO RESOURCES CORPORATION
U.S. WELL NUMBER: 47-095-02656-00-00
Horizontal 6A New Drill
Date Modification Issued: 3/26/2020

Promoting a healthy environment.

WW-6B
(04/15)

API NO. 47-095 - 02656
 OPERATOR WELL NO. Nuggets Unit 1H
 Well Pad Name: Colorado West 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 McElroy Shirley 7.5'
 Operator ID County District Quadrangle

2) Operator's Well Number: Nuggets Unit 1H Well Pad Name: Colorado West Pad

3) Farm Name/Surface Owner: Antero Resources Corporation Public Road Access: CR 60

4) Elevation, current ground: 754' Elevation, proposed post-construction: ~748.5'

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: 6800' TVD, Anticipated Thickness- 40 feet, Associated Pressure- 2900#

JCB
2/11/2020

8) Proposed Total Vertical Depth: 6800' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18000' MD

11) Proposed Horizontal Leg Length: 8042'

12) Approximate Fresh Water Strata Depths: 235', 241', 298'

13) Method to Determine Fresh Water Depths: 47-095-01251, 47-095-00507, 47-095-01643

14) Approximate Saltwater Depths: 970'

15) Approximate Coal Seam Depths: None Identified

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 - 02656
OPERATOR WELL NO. Nuggets Unit 1H
Well Pad Name: Colorado West 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, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	348 *see # 19	348 *see # 19	CTS, 483 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#	18000	18000	4542 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

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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	LABS-H/POZ & TST-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 - 02656

OPERATOR WELL NO. Nuggets Unit 1H

Well Pad Name: Colorado West 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."

Max Pressure - 9300 lbs

Max Rate - 80 bpm

JCB
2/11/2020

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 18.15 acres

22) Area to be disturbed for well pad only, less access road (acres): 7.16 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.

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PERMIT MODIFICATION API # 47-095-02656



47095020270000

Nuggets Unit 1H



Antero Resources Corporation

Nuggets Unit 1H - AOR



WELL SYMBOLS
Gas Well

September 23, 2019

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Handwritten signature and date: JCB 2/11/2020

UWI (AP#thum)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Productive Formation(s) not perf'd
47095020270000	WEESE HUNTER	1110	TRIAD HUNTER LLC	TRIAD HUNTER LLC	11,060	6,744 - 10,981	Marcellus	

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WW-6A1

Operator's Well Number Nuggets 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>BF Reed et ux Lease</u>			
BF Reed et ux	FH Morse	1/8	0069/0004
FH Morse	The Philadelphia Company of WV	Assignment	0101/0036
The Philadelphia Company of WV	Pittsburgh & West Virginia Gas Company	Assignment	0101/0031
Pittsburgh & West Virginia Gas Company	Equitable Gas Company LLC	Assignment	0132/0445
Equitable Gas Company LLC	Equitrans Inc	Assignment	0274/0471
Equitrans Inc	EQT Capital Corporation	Merger	0433/0738
EQT Capital Corporation	Equitable Resources Inc	Merger	0433/0738
Equitable Resources Inc	Equitable Gas Company LLC	Merger	0433/0755
Equitable Gas Company LLC	Equitrans LP	Assignment	0433/0777
Equitrans LP	EQT Production Company	Agreement	0440/0107
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>Kenneth C. Orr et al Lease</u>			
Kenneth C. Orr et al	Equitable Gas Company LLC	1/8	0172/0012
Equitable Gas Company LLC	Equitrans Inc	Assignment	0274/0471
Equitrans Inc	EQT Capital Corporation	Merger	0433/0738
EQT Capital Corporation	Equitable Resources Inc	Merger	0433/0738
Equitable Resources Inc	Equitable Gas Company LLC	Merger	0433/0755
Equitable Gas Company LLC	Equitrans LP	Assignment	0433/0777
Equitrans LP	EQT Production Company	Agreement	0440/0107
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>Susan L. Spencer et vir Lease</u>			
Susan L. Spencer et vir	Equitrans LP	1/8	0404/0653
Equitrans LP	EQT Production Company	Assignment	0467/0694
EQT Production Company	Antero Resources Corporation	Assignment	0662/0224
<u>Joanna Lynn Hernandez Lease</u>			
Joanna Lynn Hernandez	Antero Resources Corporation	1/8+	0596/0203
<u>William H. Underwood Lease</u>			
William H. Underwood	Joseph Schlesinger	1/8	0023/0426
Joseph Schlesinger	B. Forst	Assignment	0028/0269
B. Forst	Pittsburgh & West Virginia Gas Company	Assignment	0101/0036
Pittsburgh & West Virginia Gas Company	Equitable Gas Company	Assignment	0132/0445
Equitable Gas Company	Equitrans Inc.	Assignment	0274/0471
Equitrans Inc.	Equitrans LP	Assignment	0433/0777
Equitrans LP	EQT Production Company	Assignment	0467/0694
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.

CONTINUED ON NEXT PAGE

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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:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
Four Leaf Land Company Lease			
Four Leaf Land Company	Antero Resources Appalachian Corporation	1/8+	0403/0561
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
William O. Roberts et al Lease			
William O. Roberts et al	Statoil USA Onshore Properties Inc.	1/8	0463/0563
Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0654/0196
Rosemary Haught Lease			
Rosemary Haught	Antero Resources Corporation	1/8+	0011/0262

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WW-6A1
(5/13)

Operator's Well No. Nuggets 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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- (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:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Kenneth R. Kline et ux Lease</u>	Kenneth R. Kline et ux EQT Production Company	EQT Production Company Antero Resources Corporation	1/8 Assignment	0618/0487 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: VP of Land

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FILED

JUN 10 2013

Natalie E. Tennant,
Secretary of State
1900 Kanawha Blvd E
Bldg 1, Suite 157-E
Charleston, WV 25305



IN THE OFFICE OF
SECRETARY OF STATE
Fanny Baker, Manager
Corporations Division
Tel: (800)558-8000
Fax: (804)558-4381
Website: www.wvscod.com
E-mail: business@wvscod.com

FILE ONE ORIGINAL
(Two if you want a filed
stamped copy returned to you)
FEE: \$25.00

**APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY**

Office Hours: Monday - Friday
8:00 a.m. - 5:00 p.m. ET

In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby ~~also~~ applies for an Amended Certificate of Authority and submits the following statement:

1. Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
2. Date Certificate of Authority was issued in West Virginia: 6/25/2008
3. Corporate name has been changed lot (Attach one Certified Copy of Name Change as filed in home State of Incorporation.) Antero Resources Corporation
4. Name the corporation elects to use in WV: (due to home state name not being available) Antero Resources Corporation
5. Other amendments: (attach additional pages if necessary) _____
6. Name and phone number of contact person. (This is optional; however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)

<u>Alwyn A. Schopp</u>	<u>(800) 367-7910</u>
Contact Name	Phone Number
7. Signature information (See below *Important Local Notice Regarding Signatures):

Print Name of Signer: <u>Alwyn A. Schopp</u>	Title/Capacity: <u>Authorized Person</u>
Signature: <u><i>Alwyn A. Schopp</i></u>	Date: <u>June 10, 2013</u>

**Important Local Notice Regarding Signatures:* For West Virginia Code §31D-1-12b. Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.

Form CW-1

Issued by the Office of the Secretary of State

Revised 4/03

WV06 - 006A001 Update Name Office

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LATITUDE 39°25'00"

11,268'

4,777' TO BOTTOM HOLE

LATITUDE 39°27'30"

Antero Resources Corporation Well No. Nuggets Unit 1H

NOTES: WELL 1H TOP HOLE INFORMATION: N: 331,272ft E: 1,635,516ft ... BOTTOM HOLE INFORMATION: N: 338,304ft E: 1,630,333ft ... 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: 4,361,458m E: 518,107m ... BOTTOM HOLE INFORMATION: N: 4,363,574m E: 516,492m

Table with 5 columns: TM-Par, Surface Owner, and three columns of well numbers and names. Lists various landowners and well identifiers.

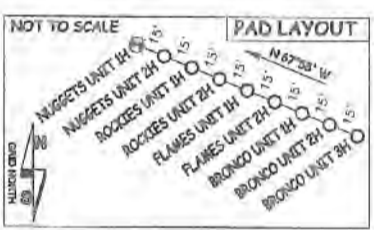
Table with 2 columns: Well ID (W1-W12) and coordinates (N, E). Lists coordinates for 12 water wells.

NOTE: 12 WATER WELLS WERE LOCATED WITHIN 2000' OF THE PROPOSED WELL.



(NAD) 27 (UTM) ZONE 17 COORDS: WELL 1H TOP HOLE INFORMATION: N: 14,308,501ft E: 1,699,774ft ... POINT OF ENTRY INFORMATION: N: 14,307,793ft E: 1,696,947ft ... BOTTOM HOLE INFORMATION: N: 14,315,443ft E: 1,694,476ft

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.



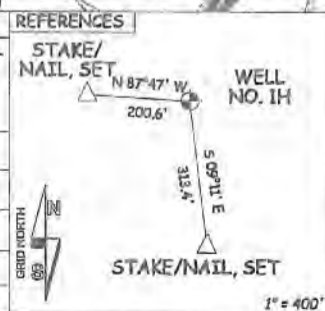
I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



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

JOB # 19-023WA, DRAWING # NUGGETS 1HR, 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 +/-, Interior Surface Tracts +/-, Existing Fence, Found monument, as noted. DATE 02/04/20, OPERATOR'S WELL# NUGGETS UNIT 1H



WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 095 02656 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT. LOCATION: ELEVATION 754' - ORIGINAL 748.5' - PROPOSED WATERSHED McELROY CREEK QUADRANGLE SHIRLEY 7.5' DISTRICT McELROY COUNTY TYLER. SURFACE OWNER ANTERO RESOURCES CORPORATION ACREAGE 127.86 ACRES +/- LEASE ACREAGE 130 AC +/-; 85 AC +/-; 53 AC +/-; 99.5 AC +/-; 81 AC +/-; 150 AC +/-; 30 AC +/-; 300 AC +/-.