



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, January 18, 2023
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for Gothic Unit 1H
47-095-02824-00-00

Lateral Extension additional 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.

James A. Martin
Chief

Operator's Well Number: Gothic Unit 1H
Farm Name: CLARA SUZANNE WALLACE & RICKIE WALLACE
U.S. WELL NUMBER: 47-095-02824-00-00
Horizontal 6A New Drill
Date Modification Issued: 1/18/2023

Promoting a healthy environment.

CK# 4016099
\$5000

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: Gothic Unit 1H MOD Well Pad Name: Thin Air Pad

3) Farm Name/Surface Owner: Clara Suzanne Wallace & Rickie Wallace Public Road Access: CR 11

4) Elevation, current ground: 1200'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: 7400' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2950#

8) Proposed Total Vertical Depth: 7400' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18900' MD

11) Proposed Horizontal Leg Length: 7889'

12) Approximate Fresh Water Strata Depths: 328'

13) Method to Determine Fresh Water Depths: 47-095-02266

14) Approximate Saltwater Depths: 1660'

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 X

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

Depth: _____

Seam: _____

Owner: _____

DMG
11/12/23

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	X-60	78.67#	100	100	CTS, 96 Cu. Ft. ✓
Fresh Water	13-3/8"	New	J-55	54.5#	380	380	CTS, 396 Cu. Ft. ✓
Coal	9-5/8"	New	J-55	36#	3100	3100	CTS, 1262 Cu. Ft. ✓
Intermediate							
Production	5-1/2"	New	P-110HP	23#	18900	18900 ✓	3835 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	30"	24"	0.438"	1530	50	Class A/L	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	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"	0.361"	12,630 ✓	2500	Lead-HPOZ & 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			

Amley
 6/12/12

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 45.05 acres

22) Area to be disturbed for well pad only, less access road (acres): 17.67 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 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.

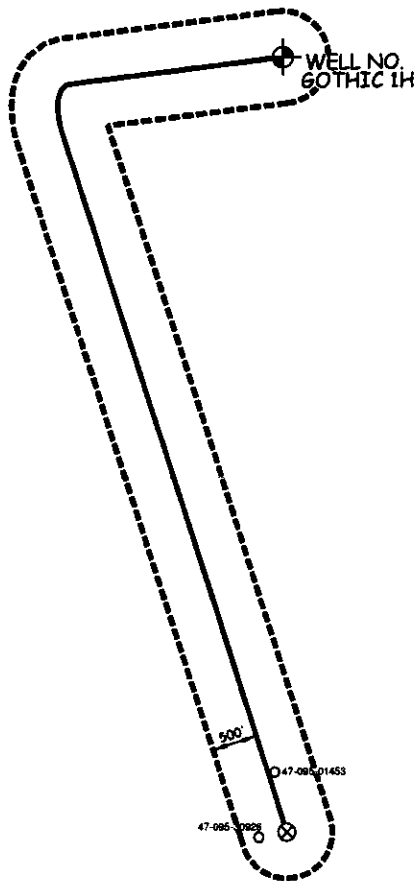
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

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.

THIN AIR PAD ANTERO RESOURCES CORPORATION



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

JOB #: 22-011WA

SCALE : 1-INCH = 2000-FEET

0' 2000' 4000' 6000'



DATE: 01/05/23

DRAWN BY: D.R.R.

FILE: GOTHIC1HFULLAOR.DWG

UWI (API Num)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47095014530000	C.A WADE/STEPHENS	1	CONLEY EDNA	CONLEY EDNA				Berea, Weir, Alexander
47095309260000	STEPHENSON HRS 7	1313	MANUFACT LIGHT & HEAT	MANUFACT LIGHT & HEAT				Berea, Weir, Alexander

LATITUDE 39°32'30" 317'

LATITUDE 39°32'30" 222' TO BOTTOM HOLE

4,852' TO BOTTOM HOLE

LONGITUDE 80°47'30"

WELL NO. 1H

LONGITUDE 80°47'30"

Antero Resources Corporation Well No. Gothic Unit 1H

NOTES:
WELL 1H TOP HOLE INFORMATION:
 N: 377,168ft E: 1,635,352ft
 LAT: 39°31'42.04" LON: 80°47'34.06"
BOTTOM HOLE INFORMATION:
 N: 368,786ft E: 1,635,327ft
 LAT: 39°30'19.20" LON: 80°47'32.84"
 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: 4,375,440m E: 517,823m
BOTTOM HOLE INFORMATION:
 N: 4,372,886m E: 517,858m

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
 N: 14,354,373ft E: 1,698,844ft
POINT OF ENTRY INFORMATION:
 N: 14,353,476ft E: 1,696,463ft
BOTTOM HOLE INFORMATION:
 N: 14,345,995ft E: 1,698,959ft

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.

ELLSWORTH DISTRICT - TYLER COUNTY

11-20	EDWARD QUIRK
11-21	EDWARD QUIRK
11-22	INILE HARRIS
11-99	EDWARD QUIRK
11-60	MICHAEL MARTIN
12-5	ROSALIE HENRY
12-7	COASTAL FOREST RESOURCES CO.
12-8	SHIRLEY CARROLL
12-9	COASTAL FOREST RESOURCES CO.
12-10	MICHAEL MARTIN
12-11	CLARA WALLACE
12-12	ROCKFORD ENERGY LLC
12-13	ERIC FISHER
12-14	ANTERO MIDSTREAM LLC
12-15	PATRICIA NYE
12-16	PATRICIA NYE
12-17	ANTERO MIDSTREAM LLC
12-18	ANTERO MIDSTREAM LLC
12-19	JON DUMARS
12-23	ROBERT BARD
12-32	CARL WILCOX

12-33	RICHARD NEFF
16-13	GAIL NEFF
16-31	CHRISTOPHER INVESTMENTS INC.
17-1	RICHARD NEFF
17-2	EDWARD WARF
17-3	FLOYD EDDY
17-3.1	FLORA ROBERTS
17-4	ERWAIN PECK
17-5	DOUG SMITH
17-6	ERWAIN PECK
17-7	GILBERT EDDY
17-8	RICHARD NAPORKOWSKI
17-9	ERWAIN PECK
17-10	THOMAS JOBES
17-10.1	CHARLES EASTHAM
17-10.2	THOMAS JOBES
17-11	ELIZABETH RICHIE
17-23	MARJORIE STALEY
17-24.1	DAWN HADLEY
17-25	ELIZABETH MENGES
17-26	RICHARD NEFF
17-27	HAMMETT LAND & MINERALS LLC
17-28	ARTHUR PECK
17-29	HAMMETT LAND & MINERALS LLC
17-32	SHALYN MCGRAW
17-33	HAMMETT LAND & MINERALS LLC
17-34	SAMUEL HAMMETT
17-34.1	MANUFACTURERS LIGHT & HEAT CO.
17-34.2	HAMMETT LAND & MINERALS LLC
17-35	SAMUEL HAMMETT
17-36	SAMUEL HAMMETT
17-37	BONNIE HENTHORN
17-37.1	JOHN COOPER
17-49	MARTHA MENGES
17-50	MARTHA MENGES
17-51	JONATHAN COOPER
17-52	ANTERO RESOURCES CORP.
17-53	WILLIAM JAMES
17-54	WANDA PARR
17-57.1	RICHARD WILLIAMS
17-57.2	RICHARD WILLIAMS
17-58	CHRISTOPHER INVESTMENTS INC.
17-59	MICHAEL BEEGLE
17-60	JOHN REAL
17-61	T. E. CUNNINGHAM
17-62	EDNA EDDY
17-63	EDNA ROBERTS
17-64	ANGELA SMITH
17-65	GILBERT EDDY
17-65.1	CHRISTIAN CHURCH
17-66	FLOYD EDDY
17-67	JEREMY NEFF
17-67.1	CYNTHIA EDDY
17-68	JEREMY NEFF
17-69	LARRY HENTHORN
17-70	DALE RICHMOND
17-71	LARRY HENTHORN
17-72	LARRY HENTHORN
23-6	DALE PARR
23-7	DALE PARR
23-9	DALE PARR
23-10	DALE PARR
23-11	JENNIFER WILLIAMS
23-12	TERRY JOY

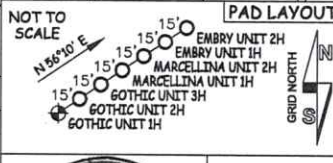


I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

JOB # 20-011WA
 DRAWING # GOTHC1H
 SCALE 1" = 2000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND
 - - - - - Surface Owner Boundary Lines +/-
 - - - - - Adjoining Surface Tracts +/-
 ⊕ Found monument, as noted

THOMAS SUMMERS P.S. 2109
 DATE 01/05/23
 OPERATOR'S WELL# GOTHC UNIT #1H



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

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

WELL TYPE: OIL ___ GAS LIQUID INJECTION ___ WASTE DISPOSAL ___ 47 - 095 - 02824
 (IF "GAS") PRODUCTION STORAGE ___ DEEP ___ SHALLOW STATE COUNTY PERMIT
 LOCATION: ELEVATION 1,200' - AS BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE PORTER FALLS 7.5' DISTRICT ELLSWORTH COUNTY TYLER
 SURFACE OWNER CLARA SUZANNE WALLACE & RICKIE WALLACE ACREAGE 60 ACRES +/-
 OIL & GAS ROYALTY OWNER PHILLIP K. GEORGE; SAMUEL K. STONEKING JR.; LEASE ACREAGE 60 AC ±; 76.88 AC ±;
 SHIBEN ESTATES INC.; KERRY L. LEMASTERS; RICHARD NEFF ET UX; ANTERO MINERALS LLC; 41 AC ±; 100 AC ±; 40 AC ±; 118 AC ±;
 PATRICIA M. MYERS; WILLIAM M. BAKER ET AL.; SHELDON FERRELL 56 AC ±; 58.5 AC ±; 61.66 AC ±

PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER REDRILL ___ FRACTURE OR STIMULATE
 PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL
 (SPECIFY) MOD-BHL PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
 TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,400' TVD 18,900' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT KEVIN ELLIS
 ADDRESS 1615 WYNKOOP ST. ADDRESS 535 WHITE OAKS BLVD
 FORM WW-6 DENVER, CO 80202 BRIDGEPORT, WV 26330

COUNTY NAME

PERMIT

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>Philip K. George Lease</u>			
Philip K. George	Statoil USA Onshore Properties	1/8+	0466/0193
Statoil USA Onshore Properties	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>Samuel K. Stoneking Jr. Lease</u>			
Samuel K. Stoneking Jr.	Statoil USA Onshore Properties Inc	1/8	456/688
Statoil USA Onshore Properties Inc	EQT Production Company	Assignment	539/239
EQT Production Company	Antero Resources Corporation	Assignment	663/1
<u>Shiben Estates Inc Lease</u>			
Shiben Estates Inc	Petroedge Energy LLC	1/8+	387/471
Petroedge Energy LLC	Statoil USA Onshore Properties Inc	Assignment	436/1
Statoil USA Onshore Properties Inc	EQT Production Company	Assignment	539/239
EQT Production Company	Antero Resources Corporation	Assignment	663/1
<u>Kerry L. Lemasters Lease</u>			
Kerry L. Lemasters	Petroedge Energy LLC	1/8+	391/734
Petroedge Energy LLC	Statoil USA Onshore Properties Inc	Assignment	436/1
Statoil USA Onshore Properties Inc	EQT Production Company	Assignment	539/239
EQT Production Company	Antero Resources Corporation	Assignment	663/1
<u>Richard Neff et ux Lease</u>			
Richard Neff et ux	Petroedge Energy LLC	1/8+	392/655
Petroedge Energy LLC	Statoil USA Onshore Properties Inc	Assignment	436/1
Statoil USA Onshore Properties Inc	EQT Production Company	Assignment	539/239
EQT Production Company	Antero Resources Corporation	Assignment	663/1
<u>Antero Minerals LLC Lease</u>			
Antero Minerals LLC	Antero Resources Corporation	1/8+	624/48
<u>Patricia M. Moyers Lease</u>			
Patricia M. Moyers	Petroedge Energy LLC	1/8+	419/305
Petroedge Energy LLC	Statoil USA Onshore Properties Inc	Assignment	436/1
Statoil USA Onshore Properties Inc	EQT Production Company	Assignment	539/239
EQT Production Company	Antero Resources Corporation	Assignment	663/1
<u>William M Baker et al Lease</u>			
William M Baker et al	Petroedge Energy Company	1/8	384/722
Petroedge Energy LLC	Statoil USA Onshore Properties	Assignment	406/147
Statoil USA Onshore Properties Inc	EQT Production Company	Assignment	539/239
EQT Production Company	Antero Resources Corporation	Assignment	663/1

*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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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>/ Sheldon A Ferrell Lease</u>	Sheldon A Ferrell	Petroedge Energy LLC	1/8	384/728
	Petroedge Energy LLC	Statoil USA Onshore Properties Inc	Assignment	406/147
	Statoil USA Onshore Properties	EQT Production Company	Assignment	539/239
	EQT Production Company	Antero Resources Corporation	Assignment	663/1

*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