



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

Friday, October 11, 2019
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for CORTINA UNIT 2H
47-017-06890-00-00

Lateral Extension to 21,000' TMD

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: CORTINA UNIT 2H
Farm Name: GEORGE S. WYCKOFF
U.S. WELL NUMBER: 47-017-06890-00-00
Horizontal 6A New Drill
Date Modification Issued: October 11, 2019

Promoting a healthy environment.

WW-6B
(04/15)

PERMIT MODIFICATION API # 47-017-06890 *mod*
API NO. 47-017 - 06890 *mod*
OPERATOR WELL NO. Cortina Unit 2H
Well Pad Name: George Scott 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 017 - Doddri West Uni Smithburg 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Cortina Unit 2H Well Pad Name: George Scott Pad

3) Farm Name/Surface Owner: George S. Wyckoff Public Road Access: Smithton Rd (Old US-50)

4) Elevation, current ground: 1283' Elevation, proposed post-construction: _____

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):
Marcellus Shale: 7500' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2950#

8) Proposed Total Vertical Depth: 7500' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 21000' MD

11) Proposed Horizontal Leg Length: 11702'

12) Approximate Fresh Water Strata Depths: 128', 328', 433'

13) Method to Determine Fresh Water Depths: 47-017-02402, 047-017-04853, 047-017-01782

14) Approximate Saltwater Depths: 596', 1504', 1750'

15) Approximate Coal Seam Depths: 450'

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: _____

RECEIVED
Office of Oil and Gas

DAC
8/23/19

SEP 26
WV Department of
Environmental Protection
Page 1 of 3

WW-6B
(04/15)

PERMIT MODIFICATION API # 47-017-06890 *mod*
 API NO. 47- 017 - 06890 *mod*
 OPERATOR WELL NO. Cortina Unit 2H
 Well Pad Name: George Scott 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/H-40	54.5#/48#	485' *see #19	485' *see #19	CTS, 674 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	21000'	21000'	5367 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"	0.438"	1530	50	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	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"	0.361"	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			

PAF
9/23/19

WW-6B
(10/14)

API NO. 47- 017 - 06890 *med*
 OPERATOR WELL NO. Cortina Unit 2H
 Well Pad Name: George Scott 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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 31.57 Acres

22) Area to be disturbed for well pad only, less access road (acres): 6.05 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.

DAE
9/23/19

CORTINA UNIT 2H (GEORGE SCOTT PAD)- AREA OF REVIEW 35-8-5.11

PERMIT MODIFICATION API # 47-017-06890

17-06890 map



47017063740000
47017063730000

47017023660000

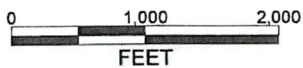
Cortina Unit 2H

47017060110000



Antero Resources Corporation

Cortina Unit 2H - AOR



WELL SYMBOLS
Gas Well

May 9, 2019

DAF
9/23/19

CORTINA UNIT 2H (GEORGE SCOTT PAD)- AREA OF REVIEW 35-8-5.11

PERMIT MODIFICATION API # 47-017-06890

17-06890mod



47017063740000
47017063730000

47017023660000

Cortina Unit 2H

47017060110000



Antero Resources Corporation

Cortina Unit 2H - AOR



WELL SYMBOLS
Gas Well

May 9, 2019

RECEIVED
Office of Oil and Gas

SEP 13 2019

WV Department of
Environmental Protection

17-6890mod

UWI (API Num)	Well Name	Well Number	Operator	Historical Operator	ID	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Produced Formation(s) not perf'd
47017063740000	ANNE UNIT	2H	Antero Resources Corporation		14,600	6966 - 14528	Marcellus	N/A
47017063730000	ANNE UNIT	1H	Antero Resources Corporation		15,042	7096 - 14967	Marcellus	N/A
47017023660000	DAVIDSON E ET AL	3	PATCHWORK OIL & GAS	SMITH CARLE INC	5,876	4684 - 5470	Bradford, Riley, Benson, Alexander	Weir, Big Injun
47017060110000	COWMAN	4	KEY OIL COMPANY	KEY OIL COMPANY	5,790	3580 - 5530	Warren, Riley, Benson, Alexander	Weir, Big Injun

RECEIVED
Office of Oil and Gas

SEP 13 2019

WV Department of
Environmental Protection

WW-6A1
(5/13)

Operator's Well No. Cortina Unit 2H *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:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>C. Howard Knight et al Lease</u>	C. Howard Knight et al	Ferrell L. Prior	1/8	0066/0235
	Ferrell L. Prior	B&C Oil Company	Assignment	0090/0263
	B&C Oil Company	Associated Minerals Inc	Assignment	0099/0328
	Associated Minerals Inc	John Underwood	Writ of Execution	0158/0350
	John Underwood	Drilling Appalachian Corporation	Assignment	0173/0557
	Drilling Appalachian Corporation	Knight Gas & Oil Well Enterprises Inc	Assignment	0176/0477
	Knight Gas & Oil Well Enterprises Inc	Antero Resources Corporation	Assignment	0338/0018

*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: Diana Hoff *Diana Hoff* **RECEIVED**
Office of Oil and Gas
 Its: VP of Operations

SEP 13 2019

WW-6A1

Operator's Well Number Cortina Unit 2H

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>V.B. Chapman et ux Lease</u>			
V.B. Chapman et ux	J.L. Mann	1/8	0020/0162
J.L. Mann	W.S. Hoskins, Trustee for Rock Run Oil and Gas Company	Assignment	0024/0003
W.S. Hoskins, Trustee for Rock Run Oil and Gas Company	Columbian Carbon Company	Assignment	0027/0470
Columbian Carbon Company	Columbian Fuel Corporation	Assignment	0079/0202
Columbian Fuel Corporation	Cities Service Oil Company	Merged	0153/0742
Cities Service Oil Company	Cities Service Company	Conveyed	0103/0328
Cities Service Company	Cities Service Oil and Gas Corporation	Assignment	0132/0177
Cities Service Oil and Gas Corporation	OXY USA Inc.	Name Change	0205/0614
OXY USA Inc.	Ashland Exploration, Inc.	Assignment	0160/0679
Ashland Exploration, Inc.	Ashland Exploration Holdings, Inc.	Name Change	Exhibit 2
Ashland Exploration Holdings, Inc.	Blazer Energy Corp.	Assignment	0181/0421
Blazer Energy Corp.	Eastern States Oil & Gas, Inc.	Name Change	0153/0742
Eastern States Oil & Gas, Inc.	Equitable Production-Eastern States, Inc.	Name Change	Exhibit 3
Equitable Production-Eastern States, Inc.	Equitable Production Company	Merged	Exhibit 4
Equitable Production Company	EQT Production Company	Name Change	0281/0346
EQT Production Company	Antero Resources Corporation	Assignment	0325/0539
<u>Johnson B. Smith et ux Lease</u>			
Johnson B. Smith et ux	Eastern Oil Company	1/8	0022/0231
Eastern Oil Company	A. W. Stevenson	Assignment	0042/0328
A. W. Stevenson	Eastern Union Gas Company	Assignment	0042/0330
Eastern Union Gas Company	Pittsburgh and West Virginia Gas Company	Assignment	0085/0334
Pittsburgh and West Virginia Gas Company	Equitable Gas Company	Assignment	0121/0257
Equitable Gas Company	Equitrans, Inc.	Assignment	0154/0475
Equitrans, Inc.	EQT Capital Corporation	Name Change	Exhibit 5
EQT Capital Corporation	Antero Resources Corporation	Assignment	0325/0528
<u>P.S. Cowman, et ux Lease</u>			
P.S. Cowman, et ux	W. D. Gribble	1/8	0051/0364
W.D. Gribble	Nell Gribble	Appraisalment Book	0003/0055
Nell Gribble	Marian Goodwin	Appraisalment Book	0006/0157
Marian Goodwin	Carolyn Farr	Assignment	0126/0065
Carolyn Farr	Clarence Sigley	Will RECEIVED	0025/0024
Clarence Sigley	Antero Resources Appalachian Corporation	Assignment	0271/0551
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

SEP 13 2019

WV Department of
Environmental Protection

*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
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
Johnson Williams Lease			
Johnson Williams	West Union Gas Company	1/8	0023/0477
West Union Gas Company	Eastern Oil Company	Assignment	0023/0479
Eastern Oil Company	A.W. Stevenson	Assignment	0042/0328
A.W. Stevenson	Eastern Union Gas Company	Assignment	0042/0328
Eastern Union Gas Company	Pittsburgh & West Virginia Gas Company	Assignment	0085/0334
Pittsburgh & West Virginia Gas Company	Equitable Gas Company	Assignment	0121/0303
Equitable Gas Company	Equitrans, Inc.	Assignment	0154/0475
Equitrans, Inc.	Equitrans, L.P.	Name Change	0302/0123
Equitrans, L.P.	Equitable Production-Eastern States, Inc.	Assignment	0192/0019
Equitable Production-Eastern States, Inc.	Equitable Production Company	Merged	Exhibit 4
Equitable Production Company	EQT Production Company	Name Change	0281/0346
EQT Production Company	Antero Resources Corporation	Assignment	0325/0539
Edgar Davisson et ux Lease			
Edgar Davisson et ux	The Carter Oil Company	1/8	0020/0050
The Carter Oil Company	Hope Natural Gas Company	Assignment	0042/0041
Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger	0143/0345
Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	0135/0583
Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Merger	0051/0795
CNG Transmission Corporation	Dominion Transmission Incorporated	Merger	WVSOS
Dominion Transmission Incorporated	Consol Energy Holdings LLC	Assignment	0245/0001
Consol Energy Holdings LLC	CNX Gas Company LLC	Merger	0292/0469
CNX Gas Company LLC	Noble Energy Inc	Assignment	0260/0039
Noble Energy Inc	Antero Resources Corporation	Assignment	0317/0379
George Benton White Lease			
George Benton White	Antero Resources Corporation	1/8	0343/0594
Gore Corporation Lease			
Gore Corporation	Antero Resources Corporation	1/8+	0357/0081
RB White Heirs et al Lease			
RB White Heirs et al	Stanley N. Vaughan	1/8	0065/0254
Stanley N. Vaughan	Ferrell L. Prior	Assignment	0065/0337
Ferrell L. Prior	WC Blewster	Assignment	0065/0335
WC Blewster	Jack Johnson	Assignment	0094/0430
Jack Johnson	Drummond Lee Scott	Assignment	0094/0450
Drummond Lee Scott	Ida May Prior	Assignment	0174/0614
Ida May Prior	John H. Underwood	Assignment	0178/0431
John H. Underwood	Sheriff WC Underwood	Record of Death	0007/0622
Sheriff WC Underwood	Charles E. Nesler	Assignment	0216/0272
Charles E. Nesler	Targa Development Inc	Assignment	0246/0459
Targa Development Inc	Antero Resources Corporation	Assignment	0323/0170

RECEIVED
Office of Oil and Gas

SEP 13 2019

WV Department of
Environmental Protection

FORM WV-6A1
EXHIBIT 1

FILED

JUN 10 2013

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



Fenney Barker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvscd.com
E-mail: business@wvscd.com

APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY

Office Hours: Monday - Friday
8:30 a.m. - 5:00 p.m. ET

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

*** In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby ***
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 Appalachia Corporation
- 2. Date Certificate of Authority was issued in West Virginia: 6/26/2008
- 3. Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of incorporation.)
- 4. Name the corporation elects to use in WV: Antero Resources Corporation
(due to home state name not being available)
- 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.)

Alvyn A. Schopp (303) 357-7310
Contact Name Phone Number

7. Signature information (See below *Important Legal Notice Regarding Signatures*):

Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person

Signature: [Handwritten Signature] Date: June 10, 2013

Important Legal Notice Regarding Signatures For West Virginia Code §11D-1-129, 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.

Office of Oil and Gas

SEP 10 2013

LATITUDE 39°20'00"

7,079'

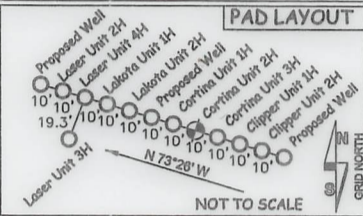
9,302' TO BOTTOM HOLE

LATITUDE 39°22'30"

Antero Resources Corporation Well No. Cortina Unit 2H

NOTES: WELL 2H TOP HOLE INFORMATION: N: 296,518ft E: 1,651,013ft LAT: 39°18'27.14" LON: 80°44'00.06" BOTTOM HOLE INFORMATION: N: 308,154ft E: 1,648,946ft LAT: 39°20'21.86" LON: 80°44'28.40" 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 2H TOP HOLE INFORMATION: N: 4,350,949m E: 523,004m BOTTOM HOLE INFORMATION: N: 4,354,483m E: 522,316m



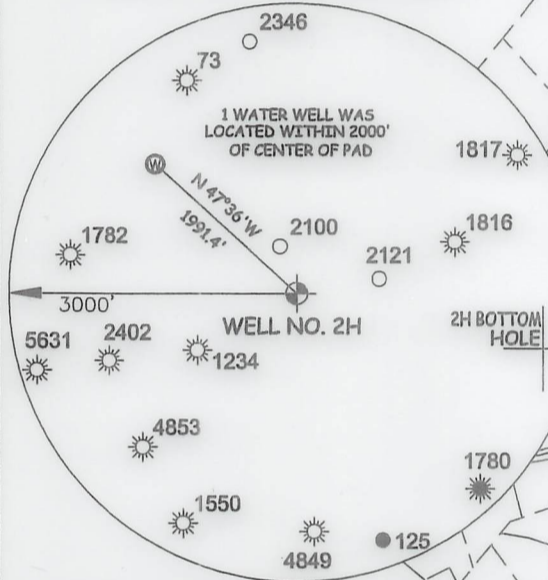
WV NORTH ZONE GRID NORTH

LONGITUDE 80°42'30" 12,964' TO BOTTOM HOLE

9,395'

LONGITUDE 80°42'30"

Table listing landowners and lease information for various parcels, including names like Samuel Hammett, Larry Williams, and Lorelei Phillips.



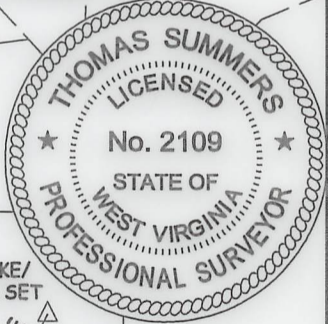
I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

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.



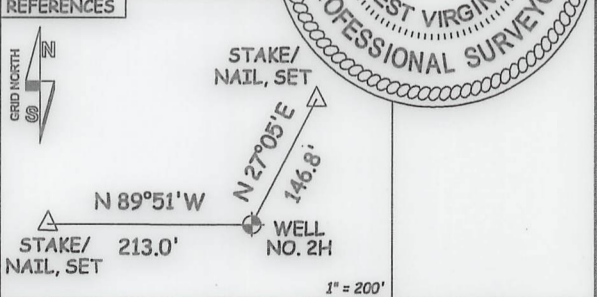
STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS. WILLOW LAND SURVEYING PLLC, 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 14,274,022ft E: 1,715,843ft POINT OF ENTRY INFORMATION: N: 14,274,462ft E: 1,717,100ft BOTTOM HOLE INFORMATION: N: 14,285,618ft E: 1,713,583ft



JOB # 18-033WA DRAWING # CORTINA2HR3 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. THOMAS SUMMERS P.S. 2109 DATE 09/09/19 OPERATOR'S WELL # CORTINA UNIT #2H



WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 - 017 - 06890 MOD (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT LOCATION: ELEVATION 1,283'-AS-BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK QUADRANGLE SMITHBURG 7.5' DISTRICT WEST UNION COUNTY DODDRIDGE SURFACE OWNER GEORGE S. WYCKOFF ACREAGE 104.27 ACRES +/- LEASE ACREAGE 156 ACRES +/-; 180 ACRES +/-; 105.93 ACRES +/-; 230 ACRES +/-; 75 ACRES +/-; 53 ACRES +/-; 54 ACRES +/- 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 7,500' TVD 21,000' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM ADDRESS 1615 WYNKOOP ST. DENVER, CO 80202 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

LATITUDE 39°20'00" 7,079'

LATITUDE 39°22'30"

LONGITUDE 80°42'30"

9,395'

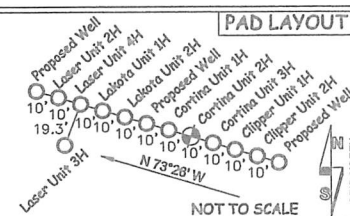
12,964' TO BOTTOM HOLE

LONGITUDE 80°42'30"

Antero Resources Corporation
Well No. Cortina Unit 2H

NOTES:
WELL 2H TOP HOLE INFORMATION:
N: 296,518ft E: 1,651,013ft
LAT: 39°18'27.14" LON: 80°44'00.06"
BOTTOM HOLE INFORMATION:
N: 308,154ft E: 1,648,946ft
LAT: 39°20'21.86" LON: 80°44'28.40"
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 2H TOP HOLE INFORMATION:
N: 4,350,949m E: 523,004m
BOTTOM HOLE INFORMATION:
N: 4,354,483m E: 522,316m

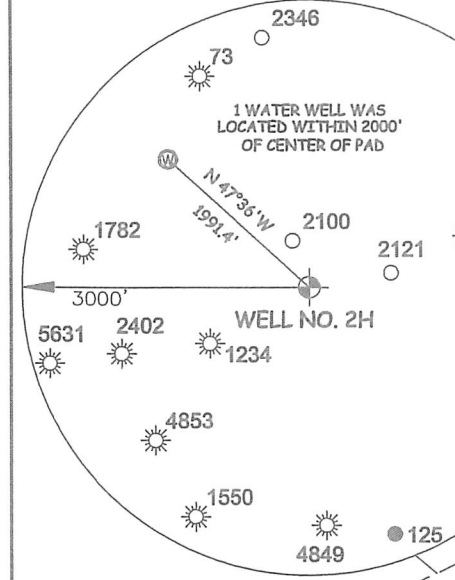


Grant District - Doddridge County	
08-2.1	Samuel Hammett
West Union District - Doddridge County	
05-04	Larry Williams
05-06	Kinney Cemetery
05-07	Diana Knight
05-7.1	Worthy Underwood Jr.
05-7.2	
05-7.3	Lisa Nicholson
05-7.4	Roger Beacot
05-7.5	Diana Knight
05-08	Emeneo Sanchez
05-8.1	Charles Henderson
05-09	Lois Murphy
05-11	Larry Williams
05-12	Kelli Jett
05-13	Philip Williams
05-14	Lois Murphy
05-15	Jerry Chlo
05-15.1	Red Oak Grove Church Trustees
05-16	Lorelei Phillips
05-17	Red Oak Grove Church Trustees
05-18	Steven Chipps
05-20	Steven Chipps
05-21	Steven Chipps
05-22	Diana Knight
08-03	Seth Everly
08-04	Lorelei Phillips
08-4.1	Lorelei Phillips
08-05	Lorelei Phillips
08-5.1	Antero Resources Corporation
08-06	Antero Resources Corporation
08-09	Klever Family Trust
08-10	Diana Bonnell
08-11	Michael O'Brien
08-12	Antero Resources Corporation
08-13	Steven Chipps
08-14	Lisa Daro
08-20	Michael O'Brien
08-21	John Davis
08-22	Michael O'Brien
08-23	Sheila Haught
08-23.1	Brian Daro
08-35	Michael O'Brien
08-35.1	Michael O'Brien
08-36	Paul Smith
08-36.1	George Wyckoff
08-51	Robert Holland
08-52	John Smith
12-11	John Smith
12-12	John Smith
12-13.1	George Wyckoff

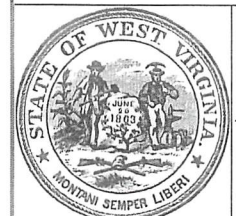
WV NORTH ZONE
GRID NORTH

WELL NO. 2H
BOTTOM HOLE

WELL NO. 2H
TOP HOLE



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.

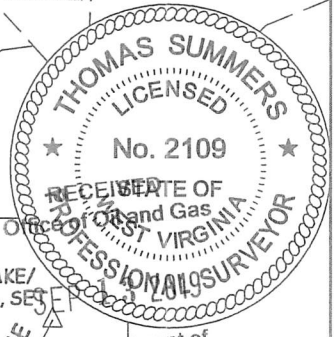


STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

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

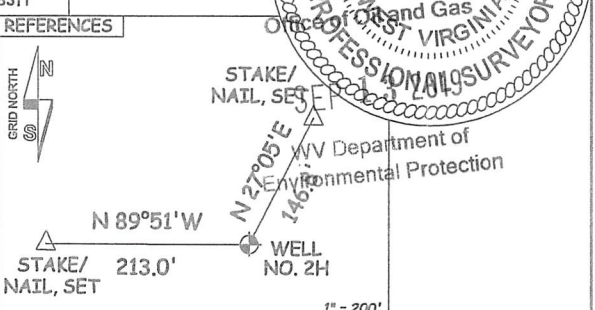
NOTE
NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
N: 14,274,022ft E: 1,715,843ft
POINT OF ENTRY INFORMATION:
N: 14,274,462ft E: 1,717,100ft
BOTTOM HOLE INFORMATION:
N: 14,285,618ft E: 1,713,583ft



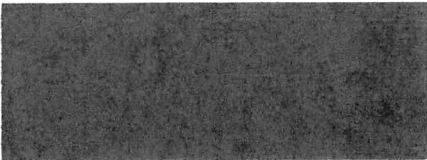
JOB # 18-033WA
DRAWING # CORTINA2HR3
SCALE 1" = 200'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND
--- Surface Owner Boundary Lines +/-
--- Interior Surface Tracts +/-
--- Existing Fence
--- Found monument, as noted
THOMAS SUMMERS P.S. 2109
DATE 09/09/19
OPERATOR'S WELL# CORTINA UNIT #2H



WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ 47 ___ 017 ___ 06890 MOD
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X STATE COUNTY PERMIT
LOCATION: ELEVATION 1,283' -AS-BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK
QUADRANGLE SMITHBURG 7.5' DISTRICT WEST UNION COUNTY DODDRIDGE
SURFACE OWNER GEORGE S. WYCKOFF ACREAGE 104.27 ACRES +/-
OIL & GAS ROYALTY OWNER V.B. CHAPMAN ET UX; JOHNSON B. SMITH ET UX; LEASE ACREAGE 156 ACRES±; 180 ACRES±;
P.S. COWMAN ET UX; JOHNSON WILLIAMS; EDGAR DAVISSON ET UX; 105.93 ACRES±; 105.5 ACRES±; 230 ACRES±;
GEORGE BENTON WHITE; R. B. WHITE HEIRS; C. HOWARD KNIGHT ET AL 75 ACRES±; 53 ACRES±; 54 ACRES±;
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
TARGET FORMATION MARCELLUS PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
WELL OPERATOR ANTERO RESOURCES CORP. ESTIMATED DEPTH 7,500' TVD 21,000' MD
ADDRESS 1615 WYNKOOP ST. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
FORM WW-6 DENVER, CO 80202 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

April 26, 2019




RE: **Permission to Permit and Drill on XTO Leasehold**

Doddridge County, West Virginia

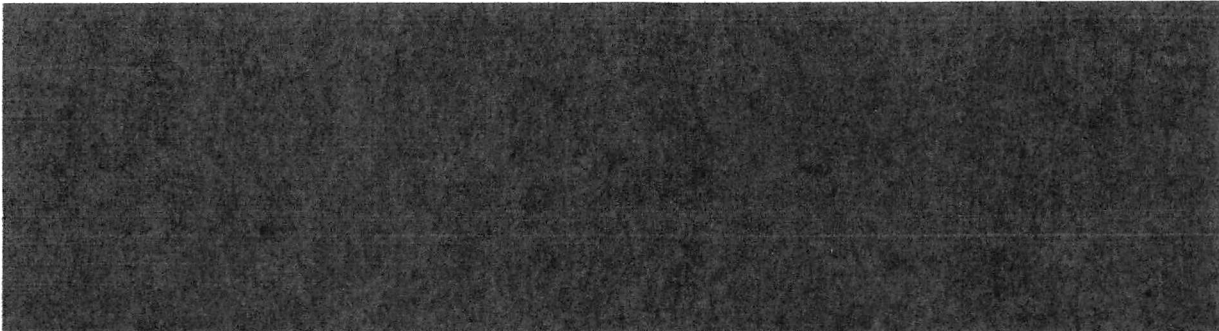
Dear 

Antero Resources Corporation ("**Antero**") hereby requests permission of XTO Energy Inc. ("**XTO**") to proceed with its plans to drill one or more horizontal wells in, under, and through certain properties subject to oil and gas interests in the Target Depths owned or controlled by XTO located in Doddridge County, West Virginia (as more particularly described on Exhibit A to this letter agreement, and insofar as located within the Units (as defined below), the "**Properties**"), pursuant to the terms and conditions of this letter agreement. Antero and XTO are currently negotiating an acreage trade agreement for the exchange and/or granting of certain oil and gas interests in Doddridge County, West Virginia (the "**Potential Trade**"). Antero and XTO anticipate that the Potential Trade will include the Properties and Antero desires to commence drilling the Properties for the initial development of Antero's Clipper and Lakota Units (as more particularly described on Exhibit B to this letter agreement, the "**Units**") during the pendency of negotiations and in advance of the closing of the Potential Trade. As used herein, "**Target Depths**" means those depths from the top of the Rhinestreet formation, at a depth of 5,827 feet, as seen by the Antero Resources Corporation Rymer 4H pilot hole, API 47095022730000, Doddridge County, West Virginia, to the center of the earth.

In order to generate mutual goodwill between Antero and XTO, and for one hundred dollars (\$100.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, XTO hereby grants Antero the rights to apply for and obtain all applicable governmental permits for the drilling of one or more wellbore laterals in, under, and through the Properties (collectively, "**Wells**") and to drill such Wells; *provided*, that XTO expressly withholds and does not grant Antero the right to complete or produce the Wells on or under the Properties or to access or conduct surface operations on the Properties.

In the event that Antero and XTO do not finalize, execute and close the Potential Trade within one hundred and eighty (180) days after the date of this letter agreement (the "**Trade Deadline**"), then within ten (10) days after the Trade Deadline, (a) Antero will pay XTO a purchase price of \$ per net mineral acre for the Properties, and (b) XTO will concurrently transfer and convey the Properties to Antero pursuant to a mutually agreeable form of assignment, which will contain a special warranty of title by, through, and under XTO, but not otherwise and which, for the avoidance of doubt, will (unless otherwise agreed to by XTO and Antero in writing) reserve to XTO all of XTO's right, title, and interest in formations other than the Target Depths. If

Antero and XTO do not finalize, execute, and close the Potential Trade on or prior to or on date that is one hundred and fifty (150) days after the date of this letter agreement, either of Antero or XTO may elect to extend the Trade Deadline for an additional thirty (30) days (*provided* that the electing party must then be continuing to negotiate in good faith in order to continue to pursue the transactions contemplated by the Potential Trade) while reasonably accommodating Antero's ongoing development needs and requests for the Units.



Nothing in this letter agreement will diminish any current or future rights of XTO in the Properties or other properties. This letter agreement and the rights and obligations of the Antero and XTO hereunder will terminate upon the earlier of (i) the assignment of the Properties to Antero pursuant to the third paragraph above, or (ii) if and when Antero and XTO consummate the closing of the Potential Trade with respect to the Properties. This letter agreement will be binding upon XTO and Antero and their respective successors and assigns. In the event of any assignment or transfer of this letter agreement, the assigning or transferring party shall require such assignee or transferee to expressly assume and be bound by the terms of this letter agreement.

If the above meets your approval, please execute in the space provided below and return one signed copy to the letterhead address. Should you have any questions, please contact Tyler Adams at (303) 357-7249.

[Signature Page Follows.]

EXHIBIT B

UNITS

Unit Name(s)
Clipper
Lakota

Sincerely,

Antero Resources Corporation


By: **Tim Rady**
Title: **Vice President – Land**

Agreed to and accepted this 3RD day of JUNE, 2019.

XTO Energy Inc.

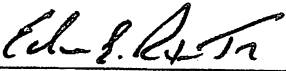

By: **Edwin S. Ryan, Jr.**
Title: **Agent and Attorney-in-Fact**
Date:

EXHIBIT A
PROPERTIES

County	District	Lessor	Lease Date	Book	Page
Doddridge	New Milton	Hugh "Bud" Spencer and Earldeen Spencer, his wife	11/14/1996	178	717
Doddridge	New Milton	Neva A. Ritter, widow	11/14/1996	179	45