



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, May 3, 2023
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for SHOTTER 1H
47-017-06945-00-00

LATERAL EXTENSION

ANTERO RESOURCES CORPORATION

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

A blue ink signature of James A. Martin, written in a cursive style.

James A. Martin
Chief

Operator's Well Number: SHOTTER 1H
Farm Name: ANTERO RESOURCES CORPORATION
U.S. WELL NUMBER: 47-017-06945-00-00
Horizontal 6A New Drill
Date Modification Issued: 05/03/2023

Promoting a healthy environment.

12/08/2023

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 - Dodd Southwest Oxford 7.5'
Operator ID County District Quadrangle
- 2) Operator's Well Number: Shotter Unit 1H MOD Well Pad Name: Locke Pad
- 3) Farm Name/Surface Owner: Antero Resources Corporation Public Road Access: Taylor Drain Road
- 4) Elevation, current ground: 1100.5' - AS BUILT 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: 7000' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#
- 8) Proposed Total Vertical Depth: 7000' TVD
- 9) Formation at Total Vertical Depth: Marcellus
- 10) Proposed Total Measured Depth: 20000' MD
- 11) Proposed Horizontal Leg Length: 10781' *Open to modification at a later date
- 12) Approximate Fresh Water Strata Depths: 236', 260', 320', 326'
- 13) Method to Determine Fresh Water Depths: 47017033900000, 47017000980000 Offset well records. Depths have been adjusted according to surface elevations.
- 14) Approximate Saltwater Depths: 1733', 1750'
- 15) Approximate Coal Seam Depths: None Anticipated
- 16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated
- 17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No
- (a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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12/08/2023

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	79#	100'	100'	CTS, 96 Cu. Ft.
Fresh Water	13-3/8"	New	J/K-55	54.5#	376'	376'	CTS, 392 Cu. Ft.
Coal	9-5/8"	New	J-/K55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110CY	20#	20000'	20000'	CTS, 4112 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

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

PACKERS

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

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

Drill a new horizontal shallow well into the Marcellus Shale.

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

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 27.54 acres

22) Area to be disturbed for well pad only, less access road (acres): 13.31 acres

23) Describe centralizer placement for each casing string:

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


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

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

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.

 04/25/2023

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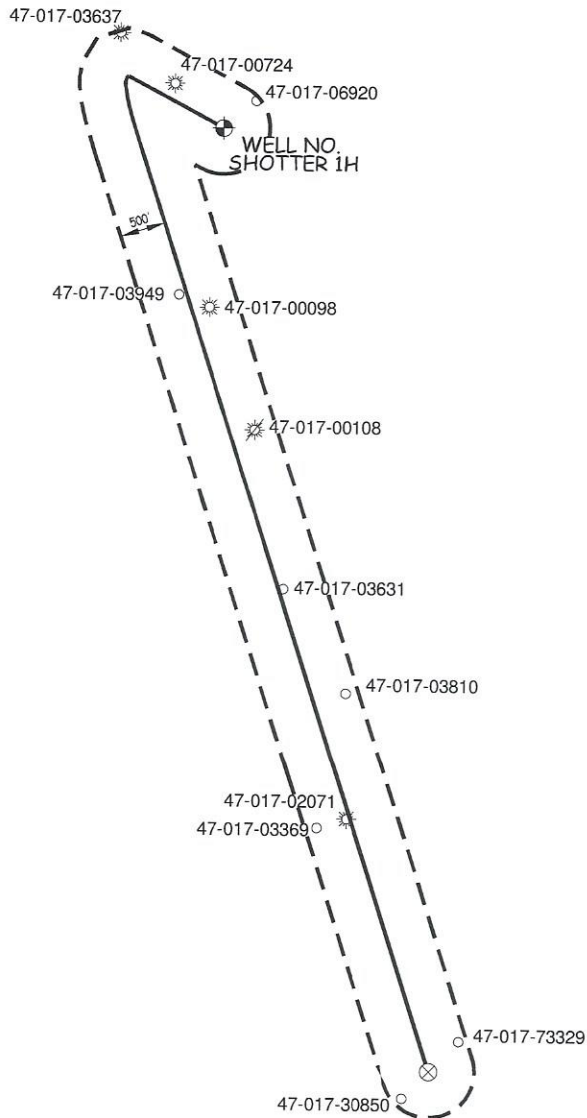
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LOCKE PAD ANTERO RESOURCES CORPORATION



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WILLOW LAND SURVEYING, PLLC P.O. BOX 17, PENNSBORO, WV 26415 (304) 659-1717		SCALE : 1-INCH = 2000-FEET 0' 2000' 4000' 6000'
DATE: 03/03/23	DRAWN BY: D.R.R.	JOB #: 22-005WA FILE: SHOTTER1HAOR.DWG

12/08/2023

UWI (API Num)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Productible Formation(s) not perf'd
47017007240000	E W OSBURN	1	TRIO O&G CO INC	TRIO PETROLEUM INC	1,880			
47017036370000	WEST HAZEL	1	TERM ENERGY	TERM ENERGY	5,139	4286 - 4997	Gordon, Riley, Alexander	Weir, Berea
47017039490000	PARKS ANGL ET AL	1	TERM ENERGY	TERM ENERGY	5,031	4206 - 4913	Bradford, Benson, Alexander	Weir, Berea
47017000980000	ANNA E PARKS ET AL	6114	DIVERSIFIED PROD LLC	PITTSBURGH&W VA GAS	1,885		Big Injun	Weir, Berea
47017001080000	M J MCMILLAN	2862	DIVERSIFIED PROD LLC	HOPE NATURAL GAS	2,161		Big Injun, Gordon	Weir, Berea
47017036310000	LOWTHER GEORGIA	D-12	RED GAS CO	SHELDON & ASSOC	3,270	1767 - 3168	Big Injun, Weir, Balltown	Weir, Berea
47017038100000	TRENT LORRAINE	89-1	GASSEARCH CORP	GASSEARCH CORP				
47017020710000	DOSIA E HICKMAN	4759	EQUITABLE GAS CO	EQUITABLE GAS CO	1,710			Weir, Berea
47017033690000	DENNISON CHARLES J ET AL	JK-1058	J & J ENTERPRISES	J & J ENTERPRISES				
47017733290000	EDNA M BROWN		UNKNOWN	UNKNOWN				
47017308500000	W R BROWN	1	KOKEN JAMES R	KOKEN JAMES R				Weir, Berea
47017069200000	LOCKE UNIT	5V	ANTERO RESOURCES CORP					Weir, Berea

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LATITUDE 39°12'30" 59'

LATITUDE 39°10'00" 9,442' TO BOTTOM HOLE

6,276' TO BOTTOM HOLE

LONGITUDE 80°47'30"

LONGITUDE 80°50'00"

Antero Resources Corporation Well No. Shoter #1H

NOTES:

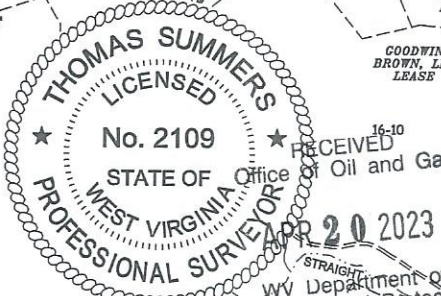
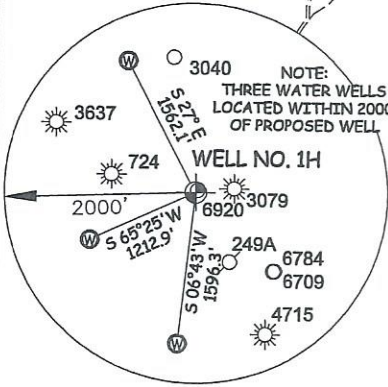
WELL 1H TOP HOLE INFORMATION: N: 249,558ft E: 1,621,913ft LAT: 39°10'38.92" LON: 80°50'01.37" BOTTOM HOLE INFORMATION: N: 239,310ft E: 1,624,245ft LAT: 39°08'57.98" LON: 80°49'29.85" WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER 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: 4,336,494m E: 514,378m BOTTOM HOLE INFORMATION: N: 4,333,384m E: 515,140m

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 1H TOP HOLE INFORMATION: N: 14,226,601ft E: 1,687,540ft POINT OF ENTRY INFORMATION: N: 14,226,600ft E: 1,686,571ft BOTTOM HOLE INFORMATION: N: 14,216,397ft E: 1,690,041ft

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.

NOTE: THREE WATER WELLS LOCATED WITHIN 2000' OF PROPOSED WELL



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.



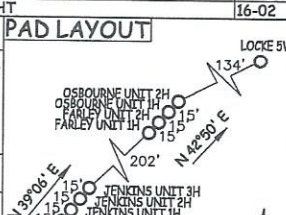
STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

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

Table listing landowners and leaseholders in the southwest district of Doddridge County, including names like Larry Gander, John Waitkus, Brian Prim, etc.

JOB # 21-005WA DRAWING # SHOTTER1H 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



REFERENCES STAKE/NAIL, SET N 01°50' W 273.0' S 69°19' E 216.4'

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

DATE 04/10/23 OPERATOR'S WELL# SHOTTER UNIT #1H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X LOCATION: ELEVATION 1,100.5' - AS BUILT QUADRANGLE OXFORD 7.5' WATERSHED SOUTH FORK HUGHES RIVER

SURFACE OWNER ANTERO RESOURCES CORPORATION ACREAGE 59.74 ACRES +/- DISTRICT SOUTHWEST COUNTY DODDRIDGE

OIL & GAS ROYALTY OWNER E. W. OSBORNE ET AL; ANNA E. PARKS ET AL; W. FRANK OSBORNE; GEORGIA LOWTHER; WILLARD H. MCCLOY ET AL; JUDITH ANN MORAN; BOARD OF EDUCATION OF DODDRIDGE COUNTY; JAMES M. LAWRENTZ; CLAUDE A. HICKMAN; ED BROOME INC.; GOODWIN BROWN, LLC

PROPOSED WORK: DRILL CONVERT DRILL DEEPER X REDRILL 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 7,000' TVD 20,000' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT KEVIN ELLIS ADDRESS 1615 WYNKOOP ST. DENVER, CO 80202 ADDRESS 535 WHITE OAKS BLVD 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>E.W. Osborne et al Lease</u>			
E.W. Osborne, et al Hope Natural Gas Trio Oil and Gas Company	Hope Natural Gas Trio Oil and Gas Company	1/8 Assignment	0057/0132 0072/0496
Charter D. Stinespring, Paul B. Davis, and G.W. Hill	Charter D. Stinespring, Paul B. Davis, and G.W. Hill	Assignment	0131/0687
J&J Enterprises, Inc.	J&J Enterprises, Inc.	Assignment	0131/0762
J&J Enterprises, Inc. Eastern American Energy Corp. Energy Corporation of America Antero Resources Appalachian Corporation	Eastern American Energy Corp. Energy Corporation of America Antero Resources Appalachian Corporation Antero Resources Corporation	Assignment Merger Assignment Name Change	0159/0139 0006/0450 0272/0307 0046/0523
<u>Anna E. Parks et al Lease</u>			
Anna E. Parks, et al Pittsburgh & WV Gas Company Equitable Gas Company Equitrans, Inc. Equitrans, LP Equitable Production-Eastern States Inc. Equitable Production Company EQT Production Company	Pittsburgh & WV Gas Company Equitable Gas Company Equitrans, Inc. Equitrans, LP Equitable Production-Eastern States Inc. Equitable Production Company EQT Production Company Antero Resources Corporation	1/8 Assignment Assignment Deed Assignment Merge Name Change Assignment	0051/0454 0121/0257 0155/0634 0302/0123 0192/0019 0281/0346 0281/0346 0487/0641
<u>W. Frank Osborne Lease</u>			
W. Frank Osborne Pittsburgh & West Virginia Gas Company Equitable Gas Company Equitrans Inc. Equitrans LP Equitable Production – Eastern States Inc. Equitable Production Company EQT Production Company	Pittsburgh & West Virginia Gas Company Equitable Gas Company Equitrans Inc. Equitrans LP Equitable Production – Eastern States Inc. Equitable Production Company EQT Production Company Antero Resources Corporation	1/8 Assignment Assignment Deed Assignment Merge Name Change Assignment	0045/0301 0121/0303 0154/0475 0302/0123 0192/0019 0281/0346 0281/0346 0487/0641
<u>Willard H. McCloy et al Lease</u>			
Willard H. McCloy et al Beckler Energy Inc. Sheldon Associates Inc. Diversified Resources Inc. DRI Oil and Gas Inc.	Beckler Energy Inc. Sheldon Associates Inc. Diversified Resources Inc. DRI Oil and Gas Inc. Antero Resources Corporation	1/8 Assignment Name Change Name Change Assignment	0151/0011 0152/0063 0054/0987 WV SOS 0514/0419
<u>Georgia Lowther Lease</u>			
Georgia Lowther Key Oil Company Antero Resources Appalachian Corporation	Key Oil Company Antero Resources Appalachian Corporation Antero Resources Corporation	1/8 Assignment Name Change	0188/0063 0256/0305 0046/0523

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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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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Judith Ann Moran Lease</u> Judith Ann Moran	Antero Resources Corporation	1/8	0503/0711
<u>Board of Education of Doddridge Co. Lease</u> Board of Education of Doddridge Co.	Antero Resources Corporation	1/8+	0513/0039
<u>James M. Lawrentz Lease</u> James M. Lawrentz	Antero Resources Corporation	1/8+	0507/0275
<u>Claude A. Hickman Lease</u> Claude A. Hickman	Antero Resources Corporation	1/8+	0502/0182
<u>Ed Broome Inc. Lease</u> Ed Broome Inc.	Antero Resources Corporation	1/8+	0471/0328

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*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

**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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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Goodwin Brown, LLC Lease</u>	Goodwin Brown, LLC	Antero Resources Corporation	1/8+	499/719

*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.

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**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: Max Green 
 Its: Vice President - Land

CK# 4618443
CK\$ 5,000.00



April 19, 2023

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: Mr. Taylor Brewer
601 57th Street
Charleston, WV 25304

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

Mr. Brewer:

Antero Resources Corporation (Antero) would like to submit the following permit modifications for approved well on the existing Locke Pad: Shotter Unit 1H (47-017-06945) Expedited.

Attached you will find the following:

- Revised Form WW-6B
- Revised Form WW-6A1
- Revised Mylar Plat
- AOR

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If you have any questions please feel free to contact me at (303) 357-7182.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "S Gaspar".

Stefan Gaspar
Permitting Agent
Antero Resources Corporation

Enclosures

12/08/2023