



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

Tuesday, November 3, 2020
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit Modification Approval for LEMON UNIT 1H
47-095-02703-00-00

Extend Lateral from 0' to 21900'. Updated 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.

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

James A. Martin
Chief

Operator's Well Number: LEMON UNIT 1H
Farm Name: KAYLA LEEK
U.S. WELL NUMBER: 47-095-02703-00-00
Horizontal 6A New Drill
Date Modification Issued: 11/03/2020

Promoting a healthy environment.

WW-6B
(04/15)

API NO. 47-095 - 02703
OPERATOR WELL NO. Lemon Unit 1H
Well Pad Name: Margery Pad

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Ellsworth Porter Falls 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Lemon Unit 1H Well Pad Name: Margery Pad

3) Farm Name/Surface Owner: Kayla Leek Public Road Access: CR 11

4) Elevation, current ground: 1070' Elevation, proposed post-construction: ~1042'

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: 7000' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#
JCB
10/28/2020

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 21900' MD Vertical to Horizontal ✓

11) Proposed Horizontal Leg Length: 11702'

12) Approximate Fresh Water Strata Depths: 102'

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13) Method to Determine Fresh Water Depths: 47-095-01958

NOV 02 2020

14) Approximate Saltwater Depths: 1998'

Enviro

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: _____

WW-6B
(04/15)

API NO. 47-095 - 02703
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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#	300	300	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	21900	21900	CTS, 5614 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	Class H-POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

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PACKERS

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

WW-6B
(10/14)

API NO. 47-095 - 02703
OPERATOR WELL NO. Lemon Unit 1H
Well Pad Name: Margery 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.

JCB
10/28/2020

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 51.65 acres

22) Area to be disturbed for well pad only, less access road (acres): Existing 13.44 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.



PERMIT MODIFICATION API # 47-095-02703

Lemon Unit 1H

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Environmental Protection



Antero Resources Corporation

Lemon Unit 1H - AOR



No Wells of Interest REMARKS

August 13, 2020

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10/28/2020

WW-6A1

Operator's Well Number Lemon 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>Ridgetop Capital LP Lease</u>			
Ridgetop Capital LP	Petroedge Energy LLC	1/8	0420/0643
Petroedge Energy LLC	Statoil USA Onshore Properties Inc.	Assignment	0436/0001
Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001 ✓
<u>BRC Appalachian Minerals I LLC Lease (TM 16 PCL 21)</u>			
BRC Appalachian Minerals I LLC	Chesapeake Appalachia LLC	Assignment	0369/0784
Chesapeake Appalachia LLC	Statoil USA Onshore Properties	Assignment	0378/0764
Statoil USA Onshore Properties	EQT Production Company	Assignment	0539/0239 ✓
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001 ✓
<u>Douglas Scott Funk Sr. Lease</u>			
Douglas Scott Funk Sr.	Antero Resources Corporation	1/8+	0651/0792 ✓
<u>Ridgetop Capital IV LP Lease (TM 16 PCL 9)</u>			
Ridgetop Capital IV LP	Antero Resources Corporation	1/8+	0632/0442 ✓
<u>Ridgetop Capital IV LP Lease (TM 11 PCL 51)</u>			
Ridgetop Capital IV LP	Antero Resources Corporation	1/8+	0632/0442 ✓
<u>Gary A. Sole Lease (TM 11 PCL 26)</u>			
Gary A. Sole	Antero Resources Corporation	1/8+	0066/0150 ✓
<u>Gary A. Sole Lease (TM 11 PCL 27)</u>			
Gary A. Sole	Antero Resources Corporation	1/8+	0066/0150 ✓
<u>Judith A. Ash Lease</u>			
Judith A. Ash	Antero Resources Corporation	1/8+	0061/0183 ✓
<u>Gary A. Sole Lease (TM 11 PCL 28)</u>			
Gary A. Sole	Antero Resources Corporation	1/8+	0066/0150 ✓
<u>BRC Appalachian Minerals I LLC Lease (TM 11 PCL 7)</u>			
BRC Appalachian Minerals I LLC	Chesapeake Appalachia LLC	Assignment	0369/0784
Chesapeake Appalachia LLC	Statoil USA Onshore Properties	Assignment	0378/0764
Statoil USA Onshore Properties	EQT Production Company	Assignment	0539/0239 ✓
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001 ✓

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OCT 28 2020

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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)
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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Bounty Minerals LLC Lease</u> Bounty Minerals LLC	Antero Resources Corporation	1/8+	0055/0306 ✓
<u>Bounty Minerals LLC Lease</u> Bounty Minerals LLC	Antero Resources Corporation	1/8+	0055/0306 ✓
<u>Ryan Greenlee et ux Lease</u> Ryan Greenlee et ux	Antero Resources Corporation	1/8+	0058/0764 ✓
<u>Linda K. Loehr Lease</u> Linda K. Loehr	Antero Resources Corporation	1/8+	0494/0518 ✓

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WW-6A1
(5/13)

Operator's Well No. Lemon Unit 1H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
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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:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
REOP LLC Lease	REOP LLC	Antero Resources Corporation	1/8+	0059/0089 ✓

*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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Office of Oil and Gas
OCT 28 2020
WV Department of
Environmental Protection

**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.

*Co-tenancy utilization – At least 7 mineral owners in tract. At least 75% of the royalty owners have executed a lease on the tract. The interests of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act

Well Operator: Antero Resources Corporation
By: Tim Rady
Its: VP of Land

LATITUDE 39°32'30"

10,717'

LATITUDE 39°35'00"

477' TO BOTTOM HOLE

Antero Resources Corporation Well No. Lemon Unit 1H

NOTES: WELL 1H TOP HOLE INFORMATION: N: 373,277ft E: 1,324,896ft LAT: 39°31'02.07" LON: 80°49'46.76" BOTTOM HOLE INFORMATION: N: 385,147ft E: 1,323,556ft LAT: 39°32'59.19" LON: 80°50'06.09" 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: 4,374,201m E: 514,657m BOTTOM HOLE INFORMATION: N: 4,377,810m E: 514,189m

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 1H TOP HOLE INFORMATION: N: 14,350,309ft E: 1,688,458ft POINT OF ENTRY INFORMATION: N: 14,351,081ft E: 1,690,702ft BOTTOM HOLE INFORMATION: N: 14,362,151ft E: 1,686,921ft

Table with 3 columns: LINE, BEARING, DISTANCE. Rows L1 through L12.

PAD LAYOUT

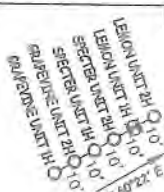
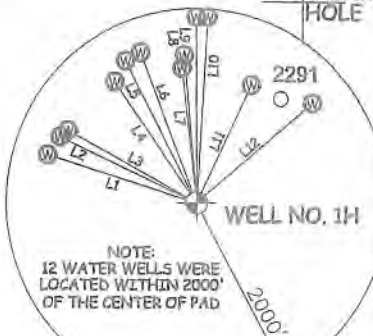


Table listing landowners and acreage for various tracts (B through Z).



WV NORTH ZONE GRID NORTH

12,223' TO BOTTOM HOLE

8,897'

LONGITUDE 80°47'30"

LONGITUDE 80°50'00"

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.



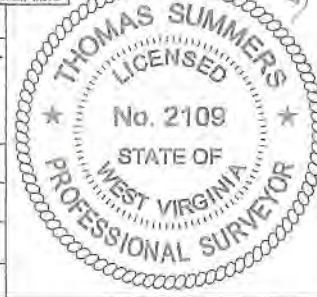
STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

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

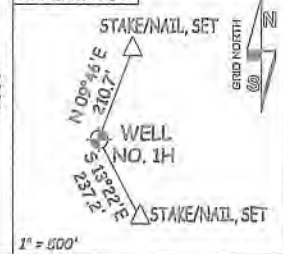
Small text block containing additional surveying details and references.

JOB # 20-008WA DRAWING # LEMON1HR2 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. Signature of Thomas Summers.



REFERENCES



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

DATE 10/21/20 OPERATOR'S WELL # LEMON UNIT #1H

Well information form including: WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL API WELL # 47-095-02703; LOCATION: ELEVATION ORIGINAL -1,070' PROPOSED -1,042' WATERSHED OUTLET MIDDLE STATE CREEK; SURFACE OWNER KAYLA LEEK; OIL & GAS ROYALTY OWNER RIDGETOP CAPITAL LP; BRC APPALACHIAN MINERALS I LLC; PROPOSED WORK: DRILL CONVERT DRILL DEEPER X REDRILL; TARGET FORMATION MARCELLUS; WELL OPERATOR ANTERO RESOURCES CORP.; ADDRESS 1615 WYNKOOP ST. DENVER, CO 80202

COUNTY NAME TYLER PERMIT

LATITUDE 39°32'30"

10,717'

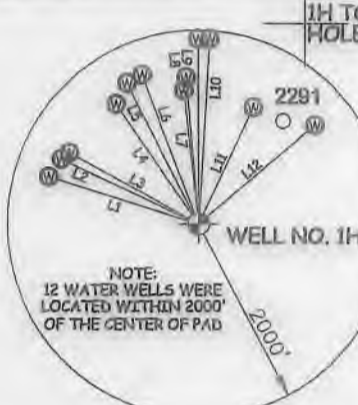
LATITUDE 39°35'00"

477' TO BOTTOM HOLE

Antero Resources Corporation Well No. Lemon Unit 1H

LINE	BEARING	DISTANCE
L1	N 72°40' W	1638.0'
L2	N 64°54' W	1582.1'
L3	N 61°22' W	1537.8'
L4	N 34°54' W	1512.5'
L5	N 27°19' W	1636.7'
L6	N 21°11' W	1650.6'
L7	N 06°24' W	1392.9'
L8	N 05°00' W	1521.3'
L9	N 00°15' W	1811.8'
L10	N 03°26' E	1913.5'
L11	N 25°08' E	1338.5'
L12	N 49°41' E	1592.6'

PAD LAYOUT



B	REOP, LLC	17 ACRES±
C	LINDA K. LOEHR	82 ACRES±
D	RYAN GREENLEE ET UX	15 ACRES±
E	RYAN GREENLEE ET UX	27.49 ACRES±
F	FISHER OIL COMPANY	45.67 ACRES±
G	BOUNTY MINERALS, LLC	25.47 ACRES±
H	RICHARD MOORE	111.52 ACRES±
I	BOUNTY MINERALS, LLC	38.5 ACRES±
J	CHARLES RAY JOBE	40.74 ACRES±
K	BRC APPALACHIAN MINERALS I LLC	39.23 ACRES±
L	RALPH D. THACKER	25 ACRES±
M	GARY A. SOLE	92.5 ACRES±
N	JUDITH A. ASH	59.69 ACRES±
O	J. MAURICE CARLISLE JR.	19 ACRES±
P	GARY A. SOLE	80 ACRES±
Q	MICHAEL W. EDDY	33.74 ACRES±
R	GARY A. SOLE	45.34 ACRES±
S	RIDGETOP CAPITAL IV, LP	43.5 ACRES±
T	MILE DEAN HARRIS	53.75 ACRES±
U	RIDGETOP CAPITAL LP	69.06 ACRES±
V	BRC APPALACHIAN MINERALS I LLC	58.56 ACRES±
W	RIDGETOP CAPITAL IV, LP	16.5 ACRES±
X	DOUGLAS SCOTT FUNK SR.	11.5 ACRES±
Y	ANTERO RESOURCES CORP.	40 ACRES±
Z	BRC APPALACHIAN MINERALS I LLC	61.73 ACRES±

NOTES:
 WELL 1H TOP HOLE INFORMATION:
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 LAT: 39°31'02.07" LON: 80°49'46.76"
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STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

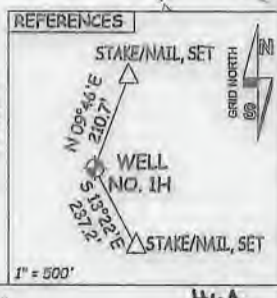
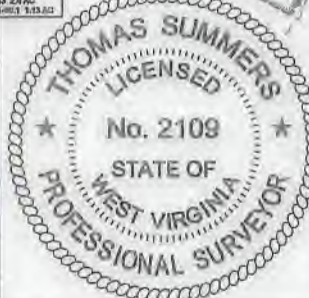
WILLOW LAND SURVEYING PLLC
 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

- A-LEE RYD SCHWEL D.R. 10/18/11 TH 1141 197 AC
- B-HENRY D. MILLER D.R. 20/08/11 TH 1142 221 AC
- C-LEE RYD SCHWEL D.R. 20/08/11 TH 1142 221 AC
- D-ROBERT H. MILLER D.R. 20/08/11 TH 1142 221 AC
- E-JOHN E. CRIBBE D.R. 20/02/11 TH 1149 120 AC
- F-ROBERT H. MILLER D.R. 20/08/11 TH 1142 221 AC
- G-CHARLES R. FOSSELL D.R. 21/08/11 TH 1141 181 AC
- H-RICHARD J. FOSSELL D.R. 20/08/11 TH 1141 181 AC
- I-CHARLES J. FOSSELL D.R. 21/08/11 TH 1141 181 AC
- J-ROBERT H. MILLER D.R. 20/08/11 TH 1142 221 AC
- K-ROBERT H. MILLER D.R. 20/08/11 TH 1142 221 AC
- L-ROBERT H. MILLER D.R. 20/08/11 TH 1142 221 AC

JOB # 20-008WA
 DRAWING # LEMON1HR2
 SCALE 1" = 2000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS
 STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

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

Thomas Summers
 THOMAS SUMMERS P.S. 2109
 DATE 10/21/20
 OPERATOR'S WELL# LEMON UNIT #1H

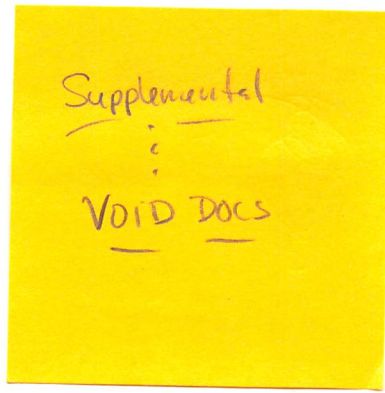


WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL 47 - 095 - 02703 MOD
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW STATE COUNTY PERMIT
 LOCATION: ELEVATION ORIGINAL - 1,070' PROPOSED - 1,042' WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE PORTER FALLS 7.5' DISTRICT ELLSWORTH COUNTY TYLER

SURFACE OWNER KAYLA LEEK ACREAGE 69.06 ACRES +/-
 OIL & GAS ROYALTY OWNER RIDGETOP CAPITAL LP; BRC APPALACHIAN MINERALS I LLC LEASE ACREAGE 69.06 AC.; 58.56 AC.;
 DOUGLAS SCOTT FUNK SR.; RIDGETOP CAPITAL IV LP; RIDGETOP CAPITAL IV LP; GARY A. SOLE; GARY A. SOLE; JUDITH A. ASH; 11.5 AC.; 16.5 AC.; 43.5 AC.; 80 AC.; 92.5 AC.; 59.69 AC.;
 BRC APPALACHIAN MINERALS I LLC; BOUNTY MINERALS, LLC; BOUNTY MINERALS, LLC; RYAN GREENLEE ET UX; 39.23 AC.; 28.47 AC.; 38.5 AC.; 15 AC.;
 LINDA K. LOEHR; REOP, LLC 82 AC.; 17 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 7,000' TVD 21,900' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD
 FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT



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

October 27, 2020

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: Ms. Laura Adkins
601 57th Street
Charleston, WV 25304

Ms. Laura Adkins:

Antero Resources Corporation (Antero) would like to submit the following permit modification for the following expedited approved well on the existing Margery Pad: Lemon Unit 1H (API # 47-095-02703).

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the updated POE & Measured Depth
- REVISED Form WW-6A1, which shows the new leases we will be drilling into
- REVISED Mylar Plat, which shows the new Lateral Length & Estimated Measured Depth
- AOR & As-Built Design

If you have any questions please feel free to contact me at (303) 357-7223.

Thank you in advance for your consideration.

Sincerely,

Megan Griffith
Permitting Agent
Antero Resources Corporation

Enclosures

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Office of Oil and Gas
OCT 28 2020
WV Department of
Environmental Protection

95-02703

MOD



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

October 27, 2020

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: Ms. Laura Adkins
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Sincerely,

A handwritten signature in black ink, appearing to read "MGriffith", written over a white background.

Megan Griffith
Permitting Agent
Antero Resources Corporation

Enclosures

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WV Department of Environmental Protection

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WW-6B
(04/15)

API NO. 47-095 - 02703
OPERATOR WELL NO. Lemon Unit 1H
Well Pad Name: Margery Pad

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Ellsworth Porter Falls 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Lemon Unit 1H Well Pad Name: Margery Pad

3) Farm Name/Surface Owner: Kayla Leek Public Road Access: CR 11

4) Elevation, current ground: 1070' Elevation, proposed post-construction: ~1042'

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: 21900' MD

11) Proposed Horizontal Leg Length: 11702'

12) Approximate Fresh Water Strata Depths: 102'

13) Method to Determine Fresh Water Depths: 47-095-01958

14) Approximate Saltwater Depths: 1998'

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 - 02703

OPERATOR WELL NO. Lemon Unit 1H

Well Pad Name: Margery 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#	300	300	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	21900	21900	CTS, 5614 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"	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	Lead-H/POZ & 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			

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WW-6B
(10/14)

API NO. 47- 095 - 02703

OPERATOR WELL NO. Lemon Unit 1H

Well Pad Name: Margery 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.

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): Existing 51.65 acres

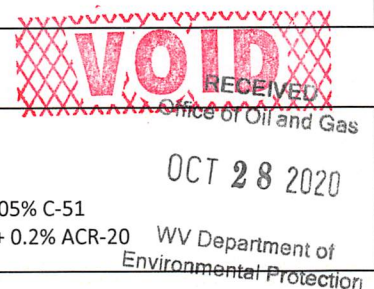
22) Area to be disturbed for well pad only, less access road (acres): Existing 13.44 acres

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.

PERMIT MODIFICATION API # 47-095-02703



Lemon Unit 1H

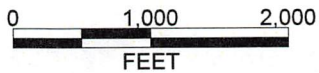
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Antero Resources Corporation

Lemon Unit 1H - AOR



REMARKS
No Wells of Interest

August 13, 2020

WW-6A1

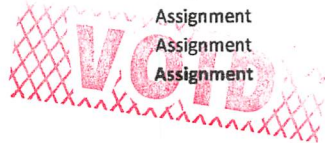
Operator's Well Number Lemon Unit 1H

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>Ridgetop Capital LP Lease</u>			
Ridgetop Capital LP	Petroedge Energy LLC	1/8	0420/0643
Petroedge Energy LLC	Statoil USA Onshore Properties Inc.	Assignment	0436/0001
Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>BRC Appalachian Minerals I LLC Lease (TM 16 PCL 21)</u>			
BRC Appalachian Minerals I LLC	Chesapeake Appalachia LLC	Assignment	0369/0784
Chesapeake Appalachia LLC	Statoil USA Onshore Properties	Assignment	0378/0764
Statoil USA Onshore Properties	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>Douglas Scott Funk Sr. Lease</u>			
Douglas Scott Funk Sr.	Antero Resources Corporation	1/8+	0651/0792
<u>Ridgetop Capital IV LP Lease (TM 16 PCL 9)</u>			
Ridgetop Capital IV LP	Antero Resources Corporation	1/8+	0632/0442
<u>Ridgetop Capital IV LP Lease (TM 11 PCL 51)</u>			
Ridgetop Capital IV LP	Antero Resources Corporation	1/8+	0632/0442
<u>Gary A. Sole Lease (TM 11 PCL 26)</u>			
Gary A. Sole	Antero Resources Corporation	1/8+	0066/0150
<u>Gary A. Sole Lease (TM 11 PCL 27)</u>			
Gary A. Sole	Antero Resources Corporation	1/8+	0066/0150
<u>Judith A. Ash Lease</u>			
Judith A. Ash	Antero Resources Corporation	1/8+	0061/0183
<u>Gary A. Sole Lease (TM 11 PCL 28)</u>			
Gary A. Sole	Antero Resources Corporation	1/8+	0066/0150
<u>BRC Appalachian Minerals I LLC Lease (TM 11 PCL 7)</u>			
BRC Appalachian Minerals I LLC	Chesapeake Appalachia LLC	Assignment	0369/0784
Chesapeake Appalachia LLC	Statoil USA Onshore Properties	Assignment	0378/0764
Statoil USA Onshore Properties	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001



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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.

CONTINUED ON NEXT PAGE

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Bounty Minerals LLC Lease</u> Bounty Minerals LLC	Antero Resources Corporation	1/8+	0055/0306
<u>Bounty Minerals LLC Lease</u> Bounty Minerals LLC	Antero Resources Corporation	1/8+	0055/0306
<u>Ryan Greenlee et ux Lease</u> Ryan Greenlee et ux	Antero Resources Corporation	1/8+	0058/0764
<u>Linda K. Loehr Lease</u> Linda K. Loehr	Antero Resources Corporation	1/8+	0494/0518

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WV Department of
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WW-6A1
(5/13)

Operator's Well No. Lemon Unit 1H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
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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:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
REOP LLC Lease	REOP LLC	Antero Resources Corporation	1/8+	0059/0089

*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

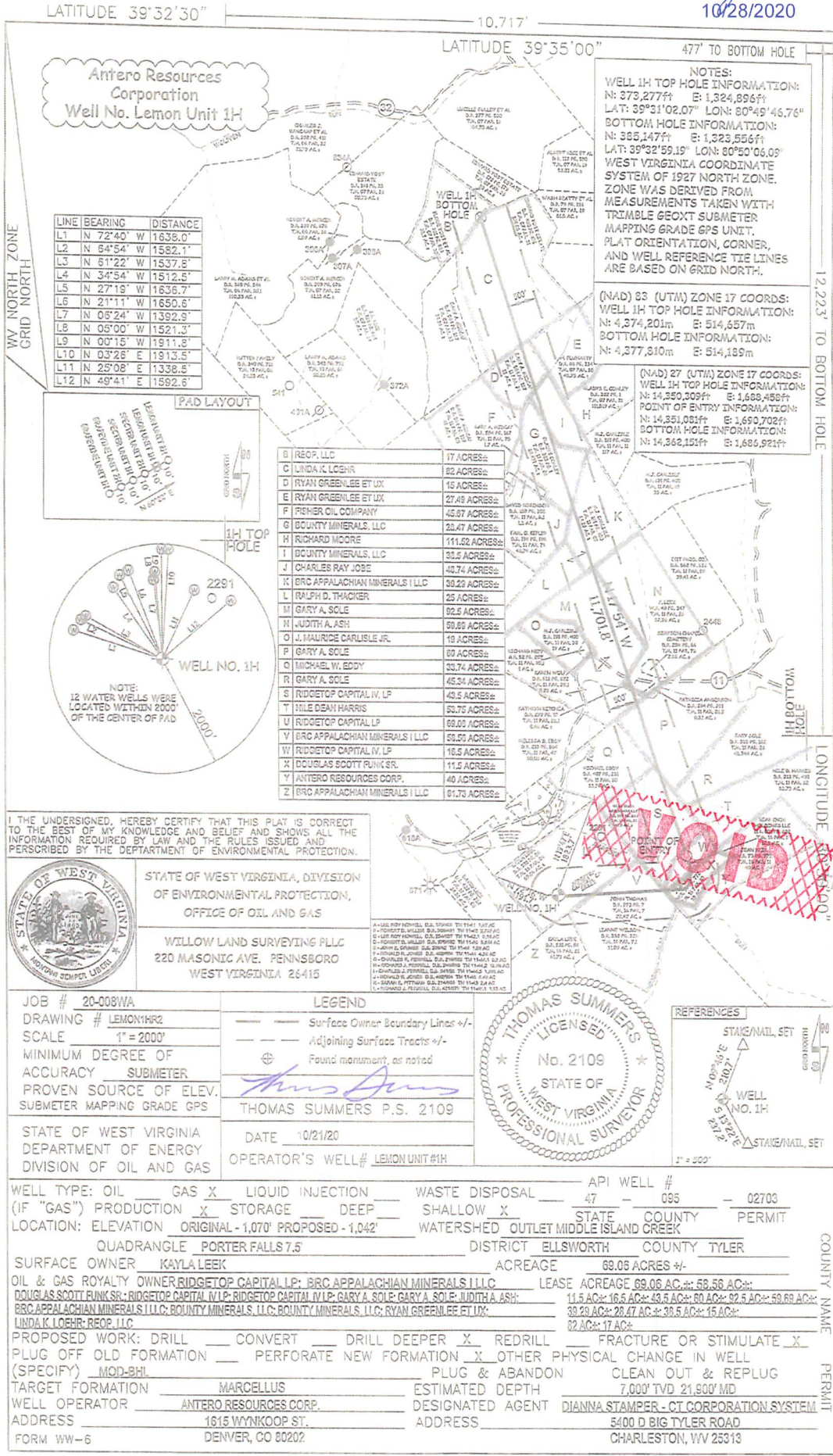
VOID

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.

*Co-tenancy utilization – At least 7 mineral owners in tract. At least 75% of the royalty owners have executed a lease on the tract. The interests of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act

Well Operator: Antero Resources Corporation
By: Tim Rady
Its: VP of Land

QC3
10/28/2020



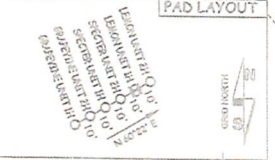
Antero Resources Corporation
Well No. Lemon Unit 1H

NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 373,277ft E: 1,324,896ft
LAT: 39°31'02.07" LON: 80°49'46.76"
BOTTOM HOLE INFORMATION:
N: 385,147ft E: 1,323,556ft
LAT: 39°32'59.19" LON: 80°50'06.09"
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: 4,374,201m E: 514,657m
BOTTOM HOLE INFORMATION:
N: 4,377,810m E: 514,189m

(NAD 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 14,350,099ft E: 1,688,486ft
POINT OF ENTRY INFORMATION:
N: 14,351,031ft E: 1,690,702ft
BOTTOM HOLE INFORMATION:
N: 14,362,151ft E: 1,686,921ft

LINE	BEARING	DISTANCE
L1	N 72°40' W	1635.0'
L2	N 64°54' W	1582.1'
L3	N 61°22' W	1537.8'
L4	N 34°54' W	1512.5'
L5	N 27°19' W	1636.7'
L6	N 21°11' W	1650.6'
L7	N 05°24' W	1392.9'
L8	N 05°00' W	1521.3'
L9	N 00°15' W	1911.8'
L10	N 03°26' E	1913.5'
L11	N 25°08' E	1338.5'
L12	N 49°41' E	1592.2'



B	REOP, LLC	17 ACRES±
C	LINDA K. LOEHR	82 ACRES±
D	RYAN GREENLEE ET UX	15 ACRES±
E	RYAN GREENLEE ET UX	27.49 ACRES±
F	FISHER OIL COMPANY	45.87 ACRES±
G	BOUNTY MINERALS, LLC	23.47 ACRES±
H	RICHARD MOORE	111.82 ACRES±
I	BOUNTY MINERALS, LLC	32.5 ACRES±
J	CHARLES RAY JOBE	42.74 ACRES±
K	ERC APPALACHIAN MINERALS I LLC	30.25 ACRES±
L	RALPH D. THACKER	25 ACRES±
M	GARY A. SOLE	52.5 ACRES±
N	JUDITH A. ASH	59.89 ACRES±
O	J. MAURICE CARLISLE JR.	19 ACRES±
P	GARY A. SOLE	60 ACRES±
Q	MICHAEL W. EDDY	33.74 ACRES±
R	GARY A. SOLE	45.34 ACRES±
S	RIDGETOP CAPITAL IV, LP	45.5 ACRES±
T	MILE DEAN HARRIS	52.75 ACRES±
U	RIDGETOP CAPITAL LP	69.09 ACRES±
V	ERC APPALACHIAN MINERALS I LLC	55.29 ACRES±
W	RIDGETOP CAPITAL IV, LP	16.5 ACRES±
X	DOUGLAS SCOTT FUNK SR.	11.5 ACRES±
Y	ANTERO RESOURCES CORP.	40 ACRES±
Z	ERC APPALACHIAN MINERALS I LLC	61.75 ACRES±

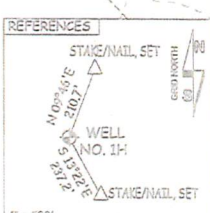
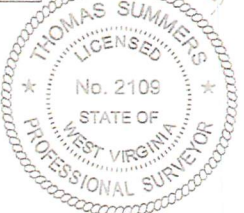
I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



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

JOB # 20-008WA
DRAWING # LEMON1HR2
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



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

DATE 10/21/20 OPERATOR'S WELL# LEMON UNIT #1H

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL 47 - 095 - 02703
(IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
LOCATION: ELEVATION ORIGINAL - 1,070' PROPOSED - 1,042' WATERSHED OUTLET MIDDLE ISLAND CREEK STATE COUNTY PERMIT
QUADRANGLE PORTER FALLS 7.5 DISTRICT ELLSWORTH COUNTY TYLER
SURFACE OWNER KAYLA LEEK ACREAGE 69.06 ACRES +/-
OIL & GAS ROYALTY OWNER RIDGETOP CAPITAL LP; ERC APPALACHIAN MINERALS I LLC LEASE ACREAGE 69.06 AC.±; 58.56 AC.±;
DOUGLAS SCOTT FUNK SR.; RIDGETOP CAPITAL IV LP; RIDGETOP CAPITAL IV LP; GARY A. SOLE; GARY A. SOLE; JUDITH A. ASH; 11.5 AC.±; 16.5 AC.±; 43.5 AC.±; 60 AC.±; 92.5 AC.±; 59.69 AC.±;
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WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

8397' 12,223' TO BOTTOM HOLE
LONGITUDE 80°47'30"
COUNTY NAME PERMIT

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Office of Oil and Gas
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WV Department of Environmental Protection