



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 24, 2020
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit Modification Approval for GRAPEVINE UNIT 2H
47-095-02708-00-00

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 handwritten signature in blue ink, appearing to read 'James A. Martin', is positioned above the printed name and title.

James A. Martin
Chief

Operator's Well Number: GRAPEVINE UNIT 2H
Farm Name: KAYLA LEEK
U.S. WELL NUMBER: 47-095-02708-00-00
Horizontal 6A New Drill
Date Modification Issued: 11/24/2020

Promoting a healthy environment.

Ck# 223024

\$ 5000⁰⁰

10/15/20

PERMIT MODIFICATION API # 47-095-02708

WW-6B
(04/15)

API NO. 47-095 - 02708
OPERATOR WELL NO. Grapevine Unit 2H
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: Grapevine Unit 2H 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#

8) Proposed Total Vertical Depth: 7000' TVD ✓

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19300' MD

11) Proposed Horizontal Leg Length: 12612' ✓

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Office of Oil and Gas

12) Approximate Fresh Water Strata Depths: 102' ✓

NOV 23 2020

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

14) Approximate Saltwater Depths: 1998' ✓

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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: _____

John Cragin
Blevins

Digitally signed by John Cragin
Blevins
Date: 2020.11.23 14:08:30
-05'00'

JCB
11/23/2020

WW-6B
(04/15)

API NO. 47-095 - 02708
 OPERATOR WELL NO. Grapevine Unit 2H
 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#	19300	19300	CTS, 4899 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

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10/23/2020

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	Load-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

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

WW-6B
(10/14)

API NO. 47-095 - 02708
OPERATOR WELL NO. Grapevine Unit 2H
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
10/23/2020

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): 51.65 acres

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

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

NOV 23 2020

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

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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 # 47-095-02708



Grapevine Unit 2H

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NOV 23 2020

WV Department of
Environmental Protection



Antero Resources Corporation

Grapevine Unit 2H - AOR



REMARKS
No Wells of Interest

August 13, 2020

JCB
11/23/2020

LATITUDE 39°32'30"

10,756'

LATITUDE 39°35'00"

2,848' TO BOTTOM HOLE

Antero Resources Corporation Well No. Grapevine Unit 2H

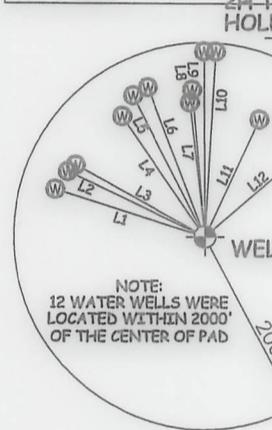
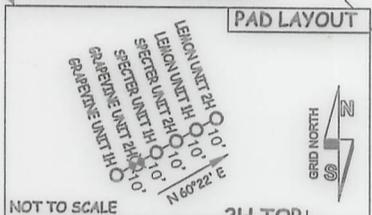
(NAD) 83 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 4,374,194m E: 514,646m BOTTOM HOLE INFORMATION: N: 4,377,573m E: 513,467m

NOTES: WELL 2H TOP HOLE INFORMATION: N: 373,254ft E: 1,624,856ft LAT: 39°31'01.84" LON: 80°49'47.25" BOTTOM HOLE INFORMATION: N: 384,408ft E: 1,621,175ft LAT: 39°32'51.54" LON: 80°50'36.36" 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) 27 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 14,350,286ft E: 1,688,419ft POINT OF ENTRY INFORMATION: N: 14,350,388ft E: 1,688,304ft BOTTOM HOLE INFORMATION: N: 14,361,373ft E: 1,684,553ft

Table with 3 columns: LINE, BEARING, DISTANCE. Lists 12 lines (L1-L12) with bearings and distances.

WW NORTH ZONE GRID NORTH

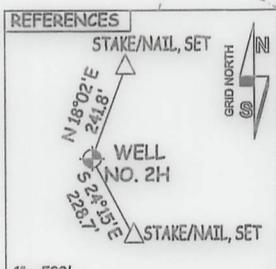
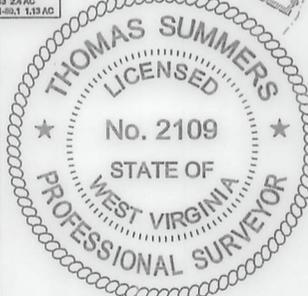


I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



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

- Legend: Surface Owner Boundary Lines +/-, Adjoining Surface Tracts +/-, Found monument, as noted.



JOB # 20-006WA, DRAWING # GRAPEVINE2HR2, 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

DATE 11/03/20, OPERATOR'S WELL # GRAPEVINE UNIT #2H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 095 02708 MOD1. 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 +/- LEASE ACREAGE 69.06 AC. +/-; 61.73 AC. +/-; 15.08 AC. +/-; 1.13 AC. +/-; 2.71 AC. +/-; 51.49 AC. +/-; 22.5 AC. +/-; 60.66 AC. +/-; 70 AC. +/-; 38 AC. +/-; 5 AC. +/-; 64.81 AC. +/-; 50.25 AC. +/-; 55 AC. +/-; 61.52 AC. +/-

12,998' TO BOTTOM HOLE

LONGITUDE 80°47'30"

LONGITUDE 80°50'00"

COUNTY NAME

PERMIT

LATITUDE 39°32'30"

10,756'

LATITUDE 39°35'00"

2,848' TO BOTTOM HOLE

Antero Resources Corporation
Well No. Grapevine Unit 2H

(NAD 83 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
N: 4,374,194m E: 514,646m
BOTTOM HOLE INFORMATION:
N: 4,377,573m E: 513,467m

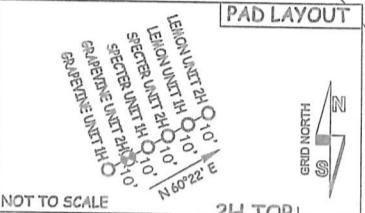
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WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.
ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

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POINT OF ENTRY INFORMATION:
N: 14,350,388ft E: 1,688,304ft
BOTTOM HOLE INFORMATION:
N: 14,361,373ft E: 1,684,553ft

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	1911.8'
L10	N 03°26' E	1913.5'
L11	N 25°08' E	1338.5'
L12	N 49°41' E	1592.6'

WELL 2H BOTTOM HOLE

PAD LAYOUT



2H TOP HOLE

WELL NO. 2H

NOTE:
12 WATER WELLS WERE LOCATED WITHIN 2000' OF THE CENTER OF PAD

2H BOTTOM HOLE

A1	LEE ROY HOWELL ET UX	1.83 ACRES±
B1	ROBERT D. MILLER ET UX	2.71 ACRES±
D1	LOUELLA HOSKINS ET UX	4.67 ACRES±
E1	MARY C. GRIMES	1.08 ACRES±
F1	ROBERT R. JONES	4.38 ACRES±
G1	CHARLES R. FERRELL ET UX	0.5 ACRES±
H1	LOUELLA HOSKINS ET UX	4.67 ACRES±
I1	CHARLES R. FERRELL ET UX	2.0 ACRES±
K1	ROBERT PITTMAN ET UX	2.4 ACRES±
L1	LOUELLA HOSKINS ET UX	1.13 ACRES±
B	JERRY R. BROWN	5.0 ACRES±
C	ROSE ENTERPRISES, LLC	19.84 ACRES±
D	CHARLES RAY JOBES	470.5 ACRES±
F	HERITAGE RESOURCES-MARCELLUS MINERALS, LLC	61.52 ACRES±
G	BRC APPALACHIAN MINERALS I LLC	55 ACRES±
H	WACO OIL & GAS COMPANY, INC.	50.25 ACRES±
I	FISHER OIL COMPANY	38 ACRES±
J	HELEN M. KARCINSKI ET AL	50.5 ACRES±
K	CARR FAMILY TRUST	64.81 ACRES±
L	FISHER OIL COMPANY	45.87 ACRES±
M	HELEN M. KARCINSKI ET AL	59.9 ACRES±
N	RIDGETOP CAPITAL II, LP	70 ACRES±
O	JOHN E. KEPLER	38 ACRES±
P	DARWIN MARTIN ET UX	60.66 ACRES±
Q	RALPH D. THACKER	64.29 ACRES±
R	PATHFINDER RESOURCES II, LLC	22.5 ACRES±
S	GARY A. SOLE	92.5 ACRES±
T	MELISSA DAWN PILANT	51.49 ACRES±
U	REITA JANE HALL	21.39 ACRES±
V	RICHARD J. FERRELL, ET UX	15.06 ACRES±
W	DAVID LEEK	34.38 ACRES±
X	RIDGETOP CAPITAL LP	69.06 ACRES±
Y	BRC APPALACHIAN MINERALS I LLC	61.73 ACRES±
Z	BRC APPALACHIAN MINERALS I LLC	55.56 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 PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



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

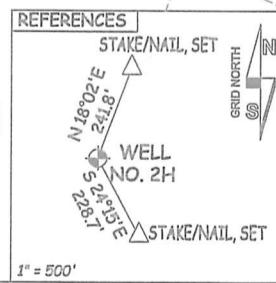
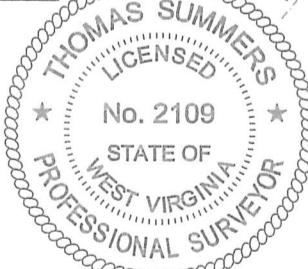
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

A1-LEE ROY HOWELL D.B. 170408 TH 11-41 1.87 AC
B1-ROBERT D. MILLER D.B. 200401 TH 11-42 2.71 AC
D1-LEE ROY HOWELL D.B. 200401 TH 11-41 4.67 AC
E1-ROBERT D. MILLER D.B. 200401 TH 11-42 1.08 AC
F1-ROBERT R. JONES D.B. 200401 TH 11-43 4.38 AC
G1-CHARLES R. FERRELL D.B. 210408 TH 11-44 0.5 AC
H1-LOUELLA HOSKINS D.B. 200401 TH 11-42 4.67 AC
I1-CHARLES R. FERRELL D.B. 200401 TH 11-43 2.0 AC
K1-ROBERT PITTMAN D.B. 200401 TH 11-43 2.4 AC
L1-LOUELLA HOSKINS D.B. 200401 TH 11-43 1.13 AC
B-JERRY R. BROWN D.B. 200401 TH 11-43 5.0 AC
C-ROSE ENTERPRISES D.B. 200401 TH 11-43 19.84 AC
D-CHARLES RAY JOBES D.B. 200401 TH 11-43 470.5 AC
F-HERITAGE RESOURCES-MARCELLUS MINERALS D.B. 200401 TH 11-43 61.52 AC
G-BRC APPALACHIAN MINERALS I D.B. 200401 TH 11-43 55 AC
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P-DARWIN MARTIN D.B. 200401 TH 11-43 60.66 AC
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X-RIDGETOP CAPITAL LP D.B. 200401 TH 11-43 69.06 AC
Y-BRC APPALACHIAN MINERALS I D.B. 200401 TH 11-43 61.73 AC
Z-BRC APPALACHIAN MINERALS I D.B. 200401 TH 11-43 55.56 AC

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.

JOB # 20-006WA
DRAWING # GRAPEVINE2HR2
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
THOMAS SUMMERS P.S. 2109



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

DATE 11/03/20
OPERATOR'S WELL# GRAPEVINE UNIT #2H

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ 47 - 095 - 02708 MOD1
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
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 I, L.L.C.; LEASE ACREAGE 69.06 AC.±; 61.73 AC.±;
RICHARD J. FERRELL, ET UX; LOUELLA HOSKINS ET UX; ROBERT D. MILLER ET UX; MELISSA DAWN PILANT; 15.06 AC.±; 1.13 AC.±; 2.71 AC.±; 51.49 AC.±;
PATHFINDER RESOURCES II, LLC; DARWIN MARTIN ET UX; RIDGETOP CAPITAL II, LP; JOHN E. KEPLER; JERRY R. BROWN; 22.5 AC.±; 60.66 AC.±; 70 AC.±; 38 AC.±; 5 AC.±;
CARR FAMILY TRUST; WACO OIL & GAS COMPANY, INC.; BRC APPALACHIAN MINERALS I LLC; HERITAGE RESOURCES-MARCELLUS MINERALS, LLC 64.81 AC.±; 50.25 AC.±; 55 AC.±; 61.52 AC.±

PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER X REDRILL ___ FRACTURE OR STIMULATE X
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) MOD-BHL
TARGET FORMATION MARCELLUS PLUG & ABANDON CLEAN OUT & REPLUG
WELL OPERATOR ANTERO RESOURCES CORP. ESTIMATED DEPTH 7,000' TVD 19,300' MD
DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

FORM WW-6

12,998' TO BOTTOM HOLE
8,919'
LONGITUDE 80°47'30"
LONGITUDE 80°50'00"

LATITUDE 39°32'30"

10,756

LATITUDE 39°35'00"

-2,848' TO BOTTOM HOLE

Arturo Resources Corporation
Well No. Grapevine Unit 2H

(NAD) 83 (UTM) ZONE 17 COORDS:
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BOTTOM HOLE INFORMATION:
N: 4,377,573m E: 518,407m

NOTES:
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LAT: 39°32'01.54" LONG: 80°45'47.22"
BOTTOM HOLE INFORMATION:
N: 384,408ft E: 1,021,179ft
LAT: 39°32'51.54" LONG: 80°30'36.33"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEMINI SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE THE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 27 TOP HOLE INFORMATION:
N: 4,380,226ft E: 1,028,457ft
POINT OF ENTRY INFORMATION:
N: 4,380,226ft E: 1,028,457ft
BOTTOM HOLE INFORMATION:
N: 4,381,770ft E: 1,028,457ft

WV NORTH ZONE GRID NORTH

LINE	BEARING	DISTANCE
L1	N 7°40' W	1638.0'
L2	N 6°54' W	1582.1'
L3	N 5°22' W	1537.8'
L4	N 3°54' W	1512.5'
L5	N 2°19' W	1638.7'
L6	N 2°11' W	1650.9'
L7	N 0°24' W	1382.8'
L8	N 0°00' W	1521.3'
L9	N 0°15' W	1911.2'
L10	N 0°22' E	1913.5'
L11	N 2°08' E	1338.5'
L12	N 4°41' E	1562.8'



- A1 LEE ROY HOWELL ET UX 1.25 ACRES
- B1 ROBERT D. MILLER ET UX 2.74 ACRES
- C1 LOUELLA HOSKINS ET UX 4.07 ACRES
- E1 MARY C. GRIMES 1.07 ACRES
- F1 ROBERT R. JONES 1.20 ACRES
- G1 CHARLES R. FERRELL ET UX 0.5 ACRES
- H1 LOUELLA HOSKINS ET UX 4.07 ACRES
- I1 CHARLES R. FERRELL ET UX 2.0 ACRES
- J1 ROBERT PITTMAN ET UX 2.4 ACRES
- K1 LOUELLA HOSKINS ET UX 1.15 ACRES
- L1 JERRY R. BROWN 5.0 ACRES
- M1 ROSS ENTERPRISES, LLC 10.24 ACRES
- N1 CHARLES RAY JONES 47.05 ACRES
- O1 ARTURO RESOURCES CORPORATION 61.32 ACRES
- P1 BRC APPALACHIAN MINERALS I LLC 55 ACRES
- Q1 WAGO OIL & GAS COMPANY, INC. 59.25 ACRES
- R1 FISHER OIL COMPANY 28 ACRES
- S1 HELEN M. MARCINSKI ET AL. 59.3 ACRES
- T1 CARR FAMILY TRUST 31.51 ACRES
- U1 FISHER OIL COMPANY 4.77 ACRES
- V1 HELEN M. MARCINSKI ET AL. 3.07 ACRES
- W1 RIDGETOP CAPITAL II, LP 71 ACRES
- X1 JOHNIE KEPLER 11 ACRES
- Y1 DARWIN MARTIN ET UX 10.15 ACRES
- Z1 RALPH D. THACKER 34.10 ACRES
- AA1 PATHFINDER RESOURCES II, LLC 22.4 ACRES
- AB1 GARY A. SOLE 25.4 ACRES
- AC1 MELISSA DAWN PILANT 31.05 ACRES
- AD1 REITA JANE HALL 21.25 ACRES
- AE1 RICHARD J. FERRELL ET UX 15.05 ACRES
- AF1 DAVID LEBY 10.10 ACRES
- AG1 RIDGETOP CAPITAL II, LP 30.10 ACRES
- AH1 BRC APPALACHIAN MINERALS I LLC 34.75 ACRES
- AI1 BRC APPALACHIAN MINERALS I LLC 32.25 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 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

JOB # 20-003WA
DRAWING # GRAPEVINE2H
SCALE 1" = 2000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND
--- 5' Year Owner Boundary Lines +/-
--- Adjoining Surface Tracts +/-
⊙ Found monument, no record
THOMAS SUMMERS P.S. 2109



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

DATE 1/03/20
OPERATOR'S WELL # GRAPEVINE UNIT 2H



WELL TYPE: OIL ___ GAS LIQUID INJECTION ___ WASTE DISPOSAL ___ API WELL # ___ 02706
 (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 88.05 ACRES +/-
 OIL & GAS ROYALTY OWNER RIDGETOP CAPITAL II, BRC APPALACHIAN I, LLC LEASE ACREAGE 88.05 AC +/- 81.73 AC +/-
 RICHARD J. FERRELL ET UX; LOUELLA HOSKINS ET UX; ROBERT D. MILLER ET UX; MELISSA DAWN PILANT 15.05 AC +/- 13 AC +/- 2.71 AC +/- 51.49 AC +/-
 PATHFINDER RESOURCES II, LLC; DARWIN MARTIN ET UX; RIDGETOP CAPITAL II, LP; JOHNIE KEPLER; JERRY R. BROWN 22.5 AC +/- 10.65 AC +/- 70 AC +/- 25 AC +/- 5 AC +/-
 CARR FAMILY TRUST; WAGO OIL & GAS COMPANY, INC.; BRC APPALACHIAN MINERALS I, LLC; ARTURO RESOURCES CORPORATION; MIDDLEBURY MINERALS, LLC 24.21 AC +/- 50.25 AC +/- 55 AC +/- 61.32 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 13,300' MD
 WELL OPERATOR ARTURO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPPER - OCT CORPORATION SYSTEM
 ADDRESS 1815 WYMKOP ST. ADDRESS 5400 D BIG TYLER ROAD
 FORM WW-8 DENVER, CO 80202 CHARLESTON, WV 26318

12,998' TO BOTTOM HOLE

80°47'30"

LONGITUDE 80°50'00"

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NOV 23 2020

WV Department of Environmental Protection

JCB
4/12/2020

WW-6A1

Operator's Well Number

Grapevine Unit 2H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
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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
Y <u>BRC Appalachian Minerals I LLC Lease</u>			
BRC Appalachian Minerals I LLC	Chesapeake Appalachia LLC	Assignment	0369/0784
Chesapeake Appalachia LLC	Statoil USA Onshore Properties	Assignment	0378/0764
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Richard J. Ferrell et ux	Antero Resources Corporation	1/8+	0431/0457
H <u>Louella Hoskins et ux Lease</u>			
Louella Hoskins et ux	Stone Energy Corporation	1/8+	0402/0579
Stone Energy Corporation	EQT Production Company	Assignment	0556/0132
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
BI <u>Robert D. Miller et ux Lease</u>			
Robert D. Miller et ux	Antero Resources Corporation	1/8+	0069/0585
T <u>Melissa Dawn Pilant Lease</u>			
Melissa Dawn Pilant	Antero Resources Corporation	Assignment	0052/0053
R <u>Pathfinder Resources II LLC Lease</u>			
Pathfinder Resources II LLC	EQT Production Company	1/8	0630/0788
EQT Production Company	Antero Resources Corporation	Assignment	0060/0120
P <u>Darwin Martin et ux Lease</u>			
Darwin Martin et ux	Antero Resources Corporation	1/8+	0428/0474

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Operator's Well Number Grapevine Unit 2H

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	EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
O	<u>John E. Kepler Lease</u>			
	John E. Kepler	Antero Resources Corporation	1/8+	0422/0438
B	<u>Jerry R. Brown Lease</u>			
	Jerry R. Brown	Antero Resources Corporation	1/8+	0553/0699
K	<u>Carr Family Trust Lease</u>			
	Carr Family Trust	Antero Resources Corporaiton	1/8+	0526/0197
H	<u>Waco Oil & Gas Company Lease</u>			
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	EQT Production Company	Antero Resources Corporation	Assignment	0663/0001

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WW-6A1
(5/13)

Operator's Well No. Grapevine Unit 2H

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
F <u>Heritage Resources Marcellus Minerals LLC Lease</u>	Heritage Resources Marcellus Minerals LLC	Antero Resources Corporation	1/8+	0065/0018

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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

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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



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

November 5, 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 2H (API # 47-095-02704), Grapevine Unit 2H (API # 47-095-02708), Specter Unit 1H (API # 47-095-02705) & Specter Unit 2H (API # 47-095-02706).

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,

A handwritten signature in black ink, appearing to read "Megan Griffith", with a long horizontal flourish extending to the right.

Megan Griffith
Permitting Agent
Antero Resources Corporation

Enclosures

WW-6B
(04/15)

Check # 223024
1000 10/15/2020
\$5,000.00

PERMIT MODIFICATION API # 47-095-02708

API NO. 47-095 - 02708
OPERATOR WELL NO. Grapevine Unit 2H
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 Operator ID: 494507062 County: 095-Tyler District: Ellsworth Quadrangle: Porter Falls 7.5'

2) Operator's Well Number: Grapevine Unit 2H 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#

8) Proposed Total Vertical Depth: 7000' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19300' MD

11) Proposed Horizontal Leg Length: 12612'

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 X

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Environmental Protection

(a) If Yes, provide Mine Info: Name: Depth: Seam: Owner:

WW-6B
(04/15)

API NO. 47- 095 - 02708

OPERATOR WELL NO. Grapevine Unit 2H

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#	19300	19300	CTS, 4899 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

VOID

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 - 02708
OPERATOR WELL NO. Grapevine Unit 2H
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

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

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

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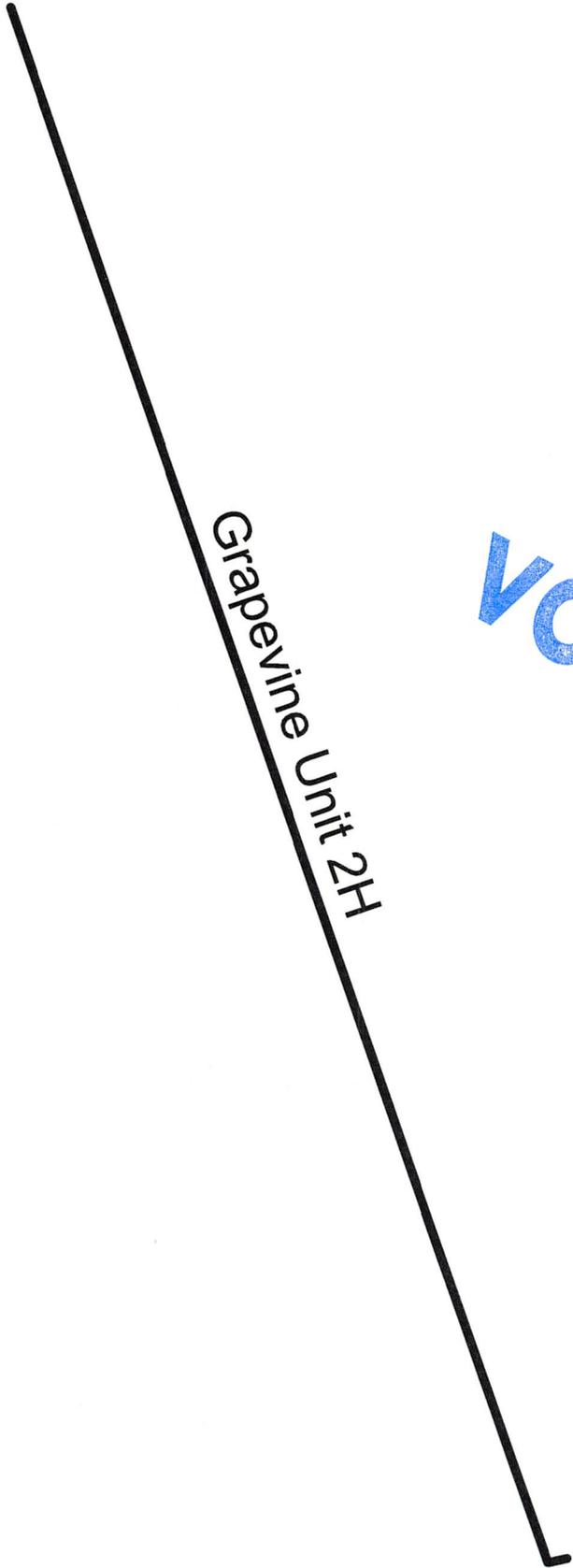
25) Proposed borehole conditioning procedures:

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 # 47-095-02708



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 Antero Resources Corporation
Grapevine Unit 2H - AOR
0 1,000 2,000 FEET
REMARKS No Wells of Interest
August 13, 2020

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Operator's Well Number

Grapevine Unit 2H

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 Environmental Protection

WW-6A1
(5/13)

Operator's Well No. Grapevine 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:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Heritage Resources Marcellus Minerals LLC</u>	Heritage Resources Marcellus Minerals LLC	Antero Resources Corporation	1/8+	0065/0018

*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.

VOID

**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

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Office of Oil and Gas

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WV Department of
Environmental Protection

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