



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 SPECTER UNIT 1H
47-095-02705-00-00

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".

James A. Martin
Chief

Operator's Well Number: SPECTER UNIT 1H
Farm Name: KAYLA LEEK
U.S. WELL NUMBER: 47-095-02705-00-00
Horizontal 6A New Drill
Date Modification Issued: 11/24/2020

Promoting a healthy environment.

Ck # 223532
11/5/20
\$5000⁰⁰

WW-6B
(04/15)

API NO. 47-095 - 02705
OPERATOR WELL NO. Specter 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: Specter 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 No

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: 20100' MD

11) Proposed Horizontal Leg Length: 11629'

12) Approximate Fresh Water Strata Depths: 102' RECEIVED
Office of Oil and Gas

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

14) Approximate Saltwater Depths: 1998' NOV 23 2020

15) Approximate Coal Seam Depths: None Identified WV Department of
Environmental Protection

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: _____

John Cragin
Blevins

Digitally signed by John Cragin
Blevins
Date: 2020.11.23 13:59:29
-05'00'

JCB
11/23/2020

CASING AND TUBING PROGRAM

18)

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#	20100	20100	CTS, 5119 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

JCS
 11/23/2020

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	Lead+H ₂ O ₂ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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Kind:	Size:	Depths Set:
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

WV Department of Environmental Protection

WW-6B
(10/14)

API NO. 47-095 - 02705
OPERATOR WELL NO. Specter 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
11/23/2020

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:

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

NOV 23 2020

WV Department of
Environmental Protection

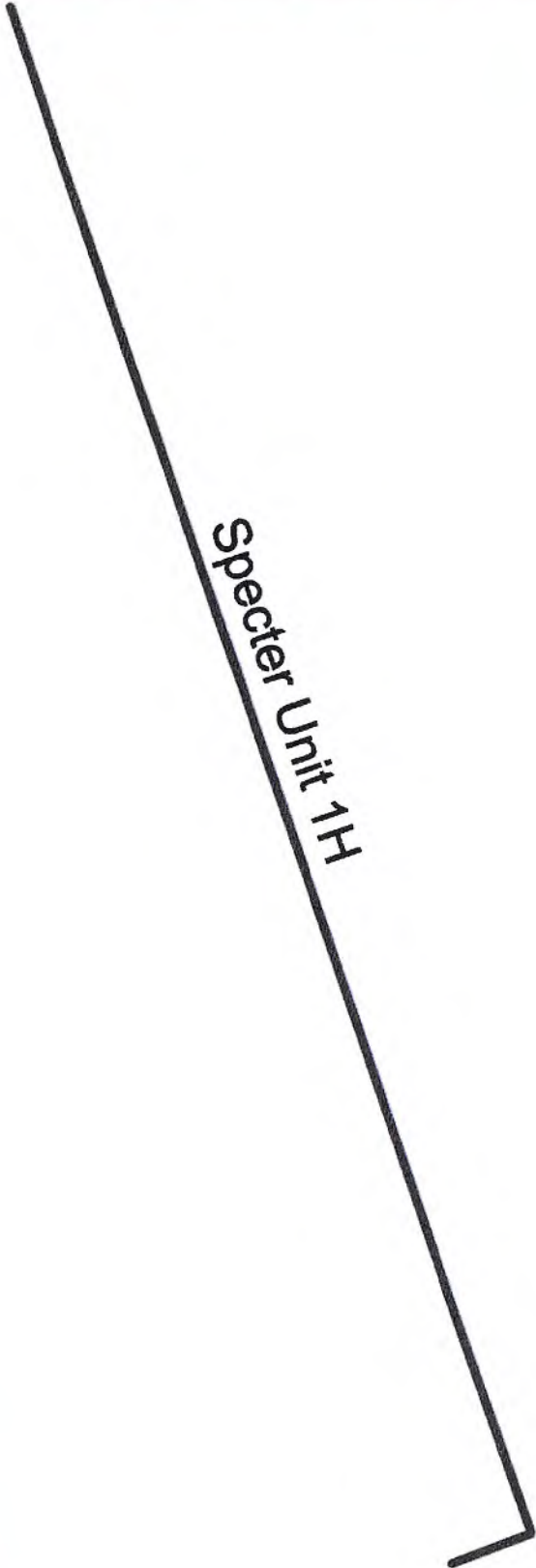
25) Proposed borehole conditioning procedures:

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 # 47-095-02705



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Antero Resources Corporation

Specter Unit 1H - AOR



REMARKS

No Wells of Interest

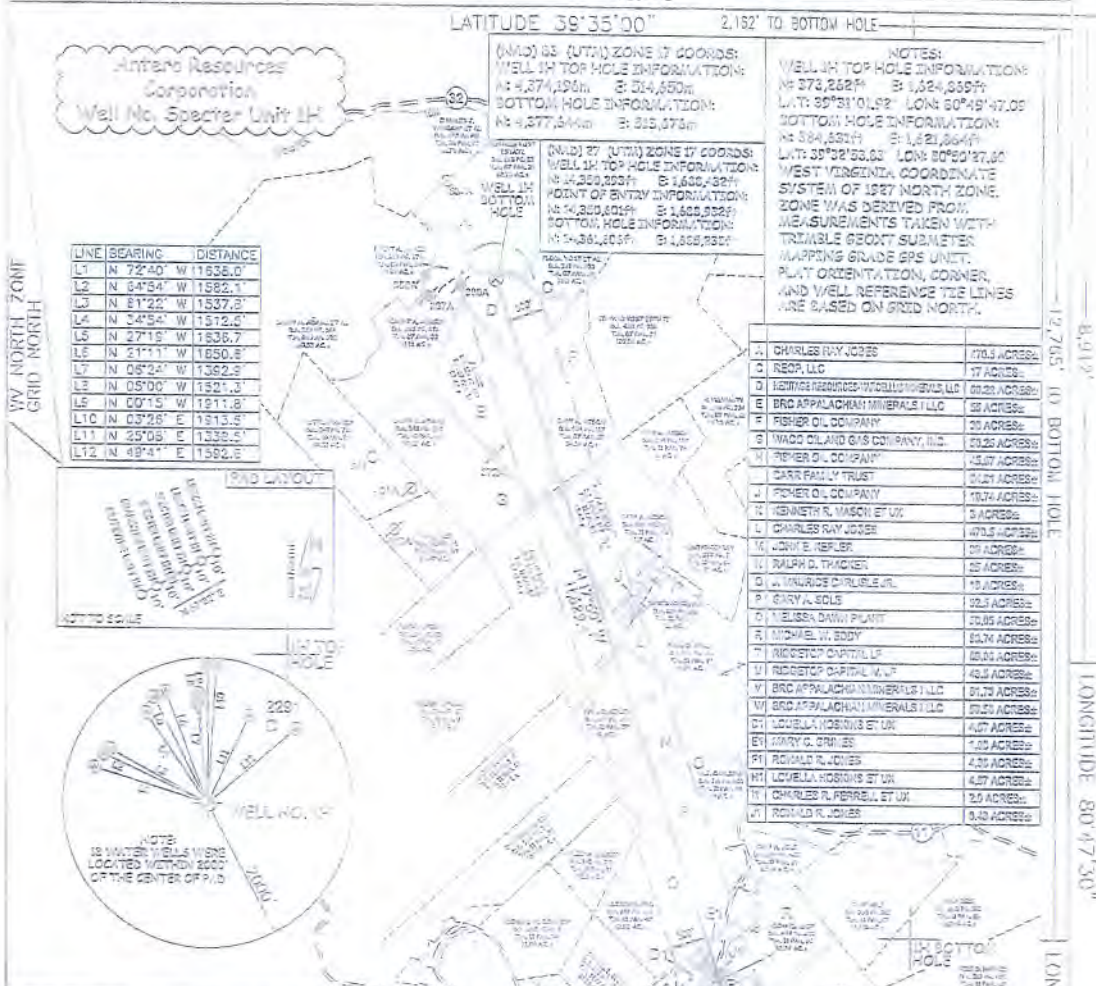
August 13, 2020

JCB
11/23/2020

LATITUDE 39°32'30"

10.743

LATITUDE 39°35'00" 2,182' TO BOTTOM HOLE



NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 373,828.9' E: 1,624,869.9'
LAT: 39°31'01.92" LONG: 80°49'47.09"
BOTTOM HOLE INFORMATION:
N: 384,833.1' E: 1,621,864.9'
LAT: 39°32'33.63" LONG: 80°49'47.60"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GROUND SUBMETER MAPPING GRADE EPS UNIT, PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

A	CHARLES RAY JOHNS	470.5 ACRES
C	REOP, LLC	17 ACRES
D	HERITAGE RESOURCES CORPORATION	102.2 ACRES
E	BRC APPALACHIAN MINERALS, LLC	26 ACRES
F	FISHER OIL COMPANY	25 ACRES
G	WAGG OIL AND GAS COMPANY, LLC	20.25 ACRES
H	FISHER OIL COMPANY	15.17 ACRES
I	CARR FAMILY TRUST	21.21 ACRES
J	FISHER OIL COMPANY	10.74 ACRES
K	KENNETH R. WATSON ET UX	5 ACRES
L	CHARLES RAY JOHNS	470.5 ACRES
M	JOHN E. KEPLER	21 ACRES
N	RALPH D. THACKER	25 ACRES
O	W. MARCE CHARLES JR.	15 ACRES
P	GARY A. SOLE	20.5 ACRES
Q	MELISSA DAWN PLANT	20.8 ACRES
R	MICHAEL W. EDDY	28.14 ACRES
T	RIDGETOP CAPITAL LP	48.5 ACRES
V	RIDGETOP CAPITAL LP	48.5 ACRES
V	BRC APPALACHIAN MINERALS, LLC	21.75 ACRES
VI	BRC APPALACHIAN MINERALS, LLC	20.25 ACRES
W	LOVELL ROSSIGNO ET UX	4.67 ACRES
X	JERRY C. SPRUE	1.25 ACRES
Y	RONALD R. JONES	4.25 ACRES
Y	LOVELL ROSSIGNO ET UX	4.67 ACRES
Y	CHARLES R. FERRELL ET UX	2.5 ACRES
Y	RONALD R. JONES	9.45 ACRES

I, THE UNDERIGNED, HEREBY CERTIFY THAT THIS PLAN 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
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS

WELLS LOCATED WITHIN 2000' OF THE CENTER OF P.O.D.

JOB # 20-0071A
DRAWING # SPECTER1HRS
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 (dashed line)
- Adjoining Surface Tract (solid line)
- Point of Entry (circle)

THOMAS SUMMERS
LICENSED PROFESSIONAL SURVEYOR
No. 2108
STATE OF WEST VIRGINIA

DATE 10/22/20
OPERATOR'S WELL # SPECTER UNIT 1H

REFERENCES

STWIS/ML, SET
STWIS/ML, SET

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL API WELL # _____

(IF "GAS") PRODUCTION STORAGE DEEP SHALLOW

LOCATION: ELEVATION ORIGINAL - 1,073' PROPOSED - 1,042' WATERSHED OUTLET MIDDLE ISLAND CREEK STATE COUNTY PERMIT _____

QUADRANGLE PORTER FALLS 7.2 DISTRICT ELSWORTH COUNTY TYLER

SURFACE OWNER: KAYLA LEEK ACREAGE 89.08 ACRES +/-

OIL & GAS ROYALTY OWNER RIDGETOP CAPITAL LP: BRC APPALACHIAN MINERALS, LLC LEASE ACREAGE 89.08 ACRES +/-

OWNER: CHARLES R. JOHNS, CHARLES R. FERRELL ET UX, RONALD R. JONES, MICHAEL W. EDDY, MELISSA DAWN PLANT, GARY A. SOLE, RALPH D. THACKER, JOHN E. KEPLER, CARR FAMILY TRUST, FISHER OIL COMPANY, FISHER OIL COMPANY, BRC APPALACHIAN MINERALS, LLC, HERITAGE RESOURCES, MARCELLUS MINERALS, LLC

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE

PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL _____

(SPECIFY) SHUT-IN PLUG & ABANDON CLEAN OUT & REPLUG

TARGET FORMATION _____ ESTIMATED DEPTH 7,000 TO 20,100 MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT QUINCY STAMPER - CT CORPORATION SYSTEM

ADDRESS 1515 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD

FORM WW-6 DENVER, CO 80212 CHARLESTON, WV 25312

RECEIVED
Office of Oil and Gas

NOV 23 2020

WV Department of
Environmental Protection

JCB
10/23/2020

LATITUDE 39°32'30"

10,743'

LATITUDE 39°35'00"

2,162' TO BOTTOM HOLE

Antero Resources Corporation
Well No. Specter Unit 1H

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 4,374,196m E: 514,650m
BOTTOM HOLE INFORMATION:
N: 4,377,644m E: 513,676m

NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 373,262ft E: 1,624,869ft
LAT: 39°31'01.92" LON: 80°49'47.09"
BOTTOM HOLE INFORMATION:
N: 384,631ft E: 1,621,864ft
LAT: 39°32'53.83" LON: 80°50'27.60"
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.

LINE	BEARING	DISTANCE
L1	N 72°40' W	1638.0'
L2	N 64°54' W	1582.1'
L3	N 81°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'

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 14,350,293ft E: 1,688,432ft
POINT OF ENTRY INFORMATION:
N: 14,350,601ft E: 1,688,982ft
BOTTOM HOLE INFORMATION:
N: 14,361,606ft E: 1,685,238ft

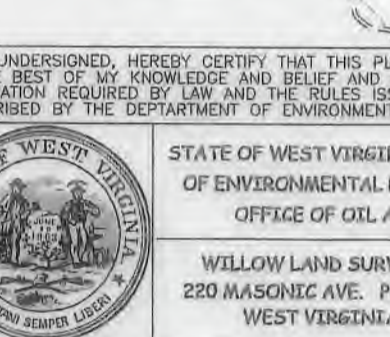
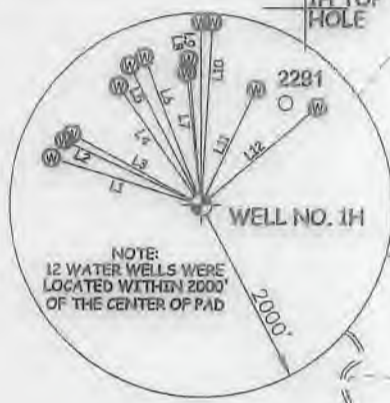
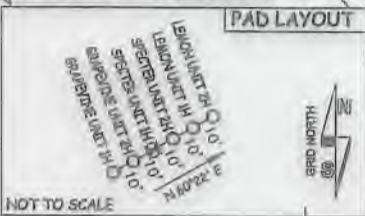
WV NORTH ZONE
GRID NORTH

12,765' TO BOTTOM HOLE

8,912'

LONGITUDE 80°47'30"

LONGITUDE 80°50'00"



A	CHARLES RAY JOBES	470.5 ACRES±
C	REOP, LLC	17 ACRES±
D	HERITAGE RESOURCES-MARCELLUS MINERALS, LLC	69.22 ACRES±
E	BRC APPALACHIAN MINERALS I LLC	55 ACRES±
F	FISHER OIL COMPANY	39 ACRES±
G	WAGO OIL AND GAS COMPANY, INC.	50.25 ACRES±
H	FISHER OIL COMPANY	45.67 ACRES±
I	CARR FAMILY TRUST	64.81 ACRES±
J	FISHER OIL COMPANY	10.74 ACRES±
K	KENNETH R. MASON ET UX	3 ACRES±
L	CHARLES RAY JOBES	470.5 ACRES±
M	JOHN E. KEPLER	39 ACRES±
N	RALPH D. THACKER	25 ACRES±
O	J. MAURICE CARLISLE JR.	19 ACRES±
P	GARY A. SOLE	92.5 ACRES±
Q	MELISSA DAWN PILANT	50.05 ACRES±
R	MICHAEL W. EDDY	33.74 ACRES±
T	RIDGETOP CAPITAL LP	69.05 ACRES±
U	RIDGETOP CAPITAL IV, LP	43.5 ACRES±
V	BRC APPALACHIAN MINERALS I LLC	61.73 ACRES±
W	BRC APPALACHIAN MINERALS I LLC	59.59 ACRES±
D1	LOUELLA HOSKINS ET UX	4.67 ACRES±
E1	MARY C. GRIMES	1.05 ACRES±
F1	RONALD R. JONES	4.38 ACRES±
H1	LOUELLA HOSKINS ET UX	4.67 ACRES±
I1	CHARLES R. FERRELL ET UX	2.0 ACRES±
J1	RONALD R. JONES	0.49 ACRES±

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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.



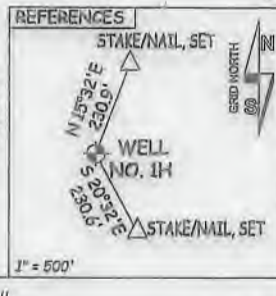
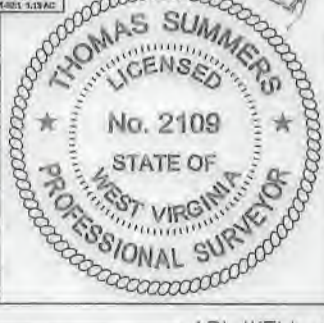
STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

- A-LEE ROY HOWELL D.S. 11841 TO 11841 1.07AC
- B-FORREST O. MILLER D.S. 20891 TO 11-41-21 2.07AC
- C-LEE ROY HOWELL D.S. 20891 TO 11-41-21 2.07AC
- D-FORREST O. MILLER D.S. 20891 TO 11-41-21 2.07AC
- E-LEE ROY HOWELL D.S. 20891 TO 11-41-21 2.07AC
- F-NICHOLAS J. FERRELL D.S. 11841 TO 11-41-21 2.07AC
- G-CHARLES R. FERRELL D.S. 21413 TO 11-41-21 2.07AC
- H-ROBERT J. FERRELL D.S. 20891 TO 11-41-21 2.07AC
- I-CHARLES R. FERRELL D.S. 21413 TO 11-41-21 2.07AC
- J-ROBERT J. FERRELL D.S. 20891 TO 11-41-21 2.07AC
- K-ROBERT J. FERRELL D.S. 20891 TO 11-41-21 2.07AC
- L-RICHARD J. FERRELL D.S. 20891 TO 11-41-21 2.07AC

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 # 20-007WA
DRAWING # SPECTER1HR3
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 P.S. 2109
DATE 10/29/20
OPERATOR'S WELL# SPECTER UNIT #1H



WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL API WELL #
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X 47 095 02705 MOD I
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; BRC APPALACHIAN MINERALS I LLC LEASE ACREAGE 69.06 AC.±; 58.56 AC.±;
RONALD R. JONES; CHARLES R. FERRELL ET UX; RONALD R. JONES; MICHAEL W. EDDY; MELISSA DAWN PILANT; GARY A. SOLE 4.38 AC.±; 2.0 AC.±; 0.49 AC.±; 33.74 AC.±; 50.05 AC.±; 92.5 AC.±;
RALPH D. THACKER; JOHN E. KEPLER; CARR FAMILY TRUST; FISHER OIL COMPANY; 25 AC.±; 39 AC.±; 64.81 AC.±; 45.67 AC.±;
FISHER OIL COMPANY; BRC APPALACHIAN MINERALS I LLC; HERITAGE RESOURCES-MARCELLUS MINERALS, LLC 38 AC.±; 55 AC.±; 69.22 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) BHL-MOD PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,000' TVD 20,100' 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

LATITUDE 39°32'30"

10,743'

LATITUDE 39°35'00"

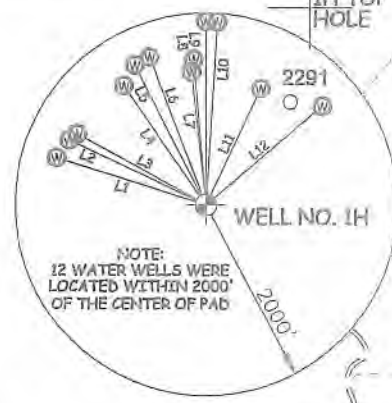
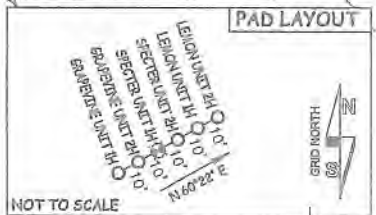
2,162' TO BOTTOM HOLE

Antero Resources Corporation
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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'



A	CHARLES RAY JOBS	470.5 ACRES±
C	REOP, LLC	17 ACRES±
D	HERITAGE RESOURCES-MARCELLUS MINERALS, LLC	69.22 ACRES±
E	BRC APPALACHIAN MINERALS I LLC	55 ACRES±
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H	FISHER OIL COMPANY	45.67 ACRES±
I	CARR FAMILY TRUST	64.81 ACRES±
J	FISHER OIL COMPANY	10.74 ACRES±
K	KENNETH R. MASON ET UX	3 ACRES±
L	CHARLES RAY JOBS	470.5 ACRES±
M	JOHN E. KEPLER	39 ACRES±
N	RALPH D. THACKER	25 ACRES±
O	J. MAURICE CARLISLE JR.	19 ACRES±
P	GARY A. SOLE	92.5 ACRES±
Q	MELISSA DAWN PILANT	70.05 ACRES±
R	MICHAEL W. EDDY	33.74 ACRES±
T	RIDGETOP CAPITAL LP	69.06 ACRES±
U	RIDGETOP CAPITAL IV, LP	43.5 ACRES±
V	BRC APPALACHIAN MINERALS I LLC	61.73 ACRES±
W	BRC APPALACHIAN MINERALS I LLC	58.56 ACRES±
D1	LOUELLA HOSKINS ET UX	4.67 ACRES±
E1	MARY C. GRIMES	1.09 ACRES±
F1	RONALD R. JONES	4.39 ACRES±
H1	LOUELLA HOSKINS ET UX	4.67 ACRES±
I1	CHARLES R. FERRELL ET UX	2.0 ACRES±
J1	RONALD R. JONES	0.40 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.



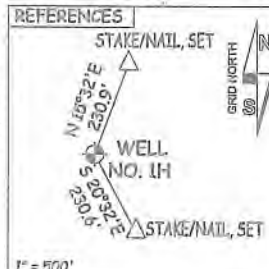
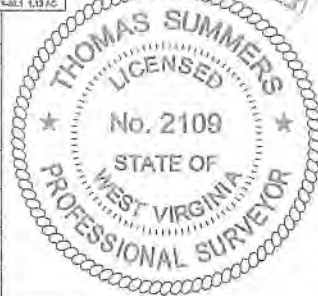
STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

- A-LEE RAY MOWELL, D.B. 10/28/88 T11-41 1.87 AC
- B-ROBERT D. MILLER, D.B. 10/28/88 T11-42 2.07 AC
- C-LEE RAY MOWELL, D.B. 10/28/88 T11-43 1.83 AC
- D-ROBERT D. MILLER, D.B. 10/28/88 T11-44 2.51 AC
- E-JOHN E. KEPLER, D.B. 10/28/88 T11-45 1.83 AC
- F-ROBERT D. MILLER, D.B. 10/28/88 T11-46 1.83 AC
- G-CHARLES R. FERRELL, D.B. 10/28/88 T11-47 1.83 AC
- H-ROBERT D. MILLER, D.B. 10/28/88 T11-48 1.83 AC
- I-CHARLES R. FERRELL, D.B. 10/28/88 T11-49 1.83 AC
- J-ROBERT D. MILLER, D.B. 10/28/88 T11-50 1.83 AC
- K-ROBERT D. MILLER, D.B. 10/28/88 T11-51 1.83 AC
- L-ROBERT D. MILLER, D.B. 10/28/88 T11-52 1.83 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 # 20-007WA
DRAWING # SPECTER1HR3
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 10/29/20
OPERATOR'S WELL # SPECTER UNIT #1H

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL API WELL # 47 - 095 - 02705 MOD1
(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±;
RONALD R. JONES; CHARLES R. FERRELL ET UX; RONALD R. JONES; MICHAEL W. EDDY; MELISSA DAWN PILANT; GARY A. SOLE. 4.38 AC±; 2.0 AC±; 0.49 AC±; 33.74 AC±; 50.05 AC±; 92.5 AC±;
RALPH D. THACKER; JOHN E. KEPLER; CARR FAMILY TRUST; FISHER OIL COMPANY; 25 AC±; 38 AC±; 64.81 AC±; 45.67 AC±;
FISHER OIL COMPANY; BRC APPALACHIAN MINERALS I LLC; HERITAGE RESOURCES-MARCELLUS MINERALS, LLC. 38 AC±; 55 AC±; 68.22 AC±
PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL
(SPECIFY) BHL-MOD PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,000' TVD 20,100' 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

8,912'

LONGITUDE 80°47'30"

LONGITUDE 80°50'00"

COUNTY NAME

PERMIT

Operator's Well Number Specter 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)**

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	<u>Grantor, lessor, etc.</u>	<u>Grantee, lessee, etc.</u>	<u>Royalty</u>	<u>Book/Page</u>
T	<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
v/w	<u>BRC Appalachia Minerals I LLC Lease (TM 16 PCL 21)</u>			
	BRC Appalachia Minerals I LLC	BRC Working Interest Company	1/8	0369/0300
	BRC Working Interest Company	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
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	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
5/1	<u>Ronald R. Jones Lease (TM 11 PCL 44)</u>			
	Ronald R. Jones	Antero Resources Corporation	1/8+	0002/0001
1/1	<u>Charles R. Ferrell et ux Lease</u>			
	Charles R. Ferrell et ux	Antero Exchange Properties LLC	Assignment	0544/0242
	Antero Exchange Properties LLC	Antero Resources Corporation	Merger	0552/0315
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	Ronald R. Jones	Antero Resources Corporation	1/8+	0002/0001
R	<u>Michael W. Eddy Lease</u>			
	Michael W. Eddy	Stone Energy Corporation	1/8	0397/0691
	Stone Energy Corporation	EQT Production Company	Assignment	0556/0132
	EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
F/1	<u>Mary C. Grimes Lease</u>			
	Mary C. Grimes	Antero Resources Corporation	1/8+	0058/0243
	<u>Melissa Dawn Pilant Lease</u>			
	Melissa Dawn Pilant	TH Exploration LLC	1/8	0562/0305
	TH Exploration LLC	Antero Resources Corporation	Assignment	0052/0053

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Office of Oil and Gas

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WV Department of
Environmental Protection

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

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P	<u>Gary L. Sole Lease</u> Gary L. Sole	Antero Resources Corporation	1/8+	0066/0147
N	<u>Ralph D. Thacker Lease</u> Ralph D. Thacker	Antero Resources Corporation	1/8+	0032/0432
M	<u>John E. Kepler Lease</u> John E. Kepler	Antero Resources Corporation	1/8+	0422/0438
G	<u>Waco Oil & Gas Company Lease</u> Waco Oil & Gas Company	Antero Resources Corporation	1/8+	0032/0442
F	<u>Fisher Oil Company Lease (TM 11 PCL 5)</u> Fisher Oil Company	Antero Resources Corporation	1/8+	0019/0535
4	<u>Fisher Oil Company Lease (TM 7 PCL 33)</u> Fisher Oil Company	Antero Resources Corporation	1/8+	0019/0535
E	<u>BRC Appalachia Minerals I LLC Lease (TM 7 PCL 34)</u> BRC Appalachia Minerals I LLC BRC Working Interest Company Chesapeake Appalachia LLC Statoil USA Onshore Properties EQT Production Company	BRC Working Interest Company Chesapeake Appalachia LLC Statoil USA Onshore Properties EQT Production Company Antero Resources Corporation	1/8 Assignment Assignment Assignment Assignment	0369/0300 0369/0784 0378/0764 0539/0239 0663/0001

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WV Department of Environmental Protection

WW-6A1
(5/13)

Operator's Well No. Specter Unit 1H

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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.

**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

Office of Oil and Gas
NOV 6 2013
WV
E...

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

Supplemental

95-02705



October 27, 2020

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

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,

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# 223532
11/5/2020
\$5,000.00

PERMIT MODIFICATION API # 47-095-02705

API NO. 47-095 - 02705
OPERATOR WELL NO. Specter 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: Specter 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

VOID

6) Existing Pad: Yes or No No

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: 20100' MD

11) Proposed Horizontal Leg Length: 11629'

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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WV Department of
Environmental Protection

WW-6B
(04/15)

API NO. 47- 095 - 02705

OPERATOR WELL NO. Specter 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#	20100	20100	CTS, 5119 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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WV Department of Environmental Protection

WW-6B
(10/14)

API NO. 47- 095 - 02705
OPERATOR WELL NO. Specter 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

VOID

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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WV Department of Environmental Protection

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.

WW-6A1

Operator's Well Number Specter Unit 1H

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Office of Oil and Gas

NOV 23 2020

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Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	0539/0239
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<u>Charles R. Ferrell et ux Lease</u>			
Charles R. Ferrell et ux	Antero Exchange Properties LLC	Assignment	0544/0242
Antero Exchange Properties LLC	Antero Resources Corporation	Merger	0552/0315
<u>Ronald R. Jones Lease (TM 11 PCL 45)</u>			
Ronald R. Jones	Antero Resources Corporation	1/8+	0002/0001
<u>Michael W. Eddy Lease</u>			
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Stone Energy Corporation	EQT Production Company	Assignment	0556/0132
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>Mary C. Grimes Lease</u>			
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<u>Melissa Dawn Pilant Lease</u>			
Melissa Dawn Pilant	TH Exploration LLC	1/8	0562/0305
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<u>Ralph D. Thacker Lease</u> Ralph D. Thacker	Antero Resources Corporation	1/8+	0032/0432
<u>John E. Kepler Lease</u> John E. Kepler	Antero Resources Corporation	1/8+	0422/0438
<u>Waco Oil & Gas Company Lease</u> Waco Oil & Gas Company	Antero Resources Corporation	1/8+	0032/0442
<u>Fisher Oil Company Lease (TM 11 PCL 5)</u> Fisher Oil Company	Antero Resources Corporation	1/8+	0019/0535
<u>Fisher Oil Company Lease (TM 7 PCL 33)</u> Fisher Oil Company	Antero Resources Corporation	1/8+	0019/0535
<u>BRC Appalachia Minerals I LLC Lease (TM 7 PCL 34)</u> BRC Appalachia Minerals I LLC BRC Working Interest Company Chesapeake Appalachia LLC Statoil USA Onshore Properties EQT Production Company	BRC Working Interest Company Chesapeake Appalachia LLC Statoil USA Onshore Properties EQT Production Company Antero Resources Corporation	1/8 Assignment Assignment Assignment Assignment	0369/0300 0369/0784 0378/0764 0539/0239 0663/0001

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WW-6A1
(5/13)

Operator's Well No. Specter 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:

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.

**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


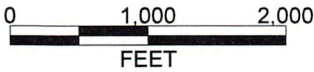


PERMIT MODIFICATION API # 47-095-02705

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Specter Unit 1H

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Environmental Protection

 <p>Antero Resources Corporation</p>	
Specter Unit 1H - AOR	
 <p>0 1,000 2,000 FEET</p>	
REMARKS	
No Wells of Interest	
August 13, 2020	