



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

Thursday, April 2, 2020
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for PHAETON UNIT 2H
47-095-02683-00-00

Modified Lateral for a TMD of 21,300' with no additional wells within 500' per AOR

ANTERO RESOURCES CORPORATION

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

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

James A. Martin
Chief

A blue ink signature of James A. Martin, written in a cursive style, is positioned below the name and title.

Operator's Well Number: PHAETON UNIT 2H
Farm Name: ELDON J. & RUTH A. HELMAN
U.S. WELL NUMBER: 47-095-02683-00-00
Horizontal 6A New Drill
Date Modification Issued: April 2, 2020

Promoting a healthy environment.

WW-6B
(04/15)

PERMIT MODIFICATION API # 47-095-02883 MOD

API NO. 47-095 - 02883
OPERATOR WELL NO. Phaeton Unit 2H
Well Pad Name: Eldon Pad

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

1) Well Operator: Antero Resources Corpora 494507062 Tyler Ellsworth Middlebourne 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Phaeton Unit 2H Well Pad Name: Eldon Pad

3) Farm Name/Surface Owner: Eldon J. & Ruth A. Helman Public Road Access: CR 10/1

4) Elevation, current ground: 882' Elevation, proposed post-construction: ~880'

5) Well Type (a) Gas X Oil Underground Storage
Other
(b) If Gas Shallow X Deep
Horizontal X

6) Existing Pad: Yes or No No

JCB
3/23/2020

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6500' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 6500' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 21300' MD

11) Proposed Horizontal Leg Length: 10945'

12) Approximate Fresh Water Strata Depths: 156'

13) Method to Determine Fresh Water Depths: 47-095-00912

14) Approximate Saltwater Depths: 1676'

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: _____

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Office of Oil and Gas
MAR 27 2020
WV Department of
Environmental Protection
Page 1 of 3

WW-6B
(04/15)

API NO. 47- 095 - 02683
OPERATOR WELL NO. Phoston Unit 2H
Well Pad Name: Eldon 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#	21300	21300	CTS 5449 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

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3/23/2020

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	LMH-1/POZ & TH - 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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MAR 27 2020

WW-68
(10/14)

PERMIT MODIFICATION API # 47-095-02683 *mem*

API NO. 47-095 - 02683

OPERATOR WELL NO. Phaeton Unit 2H

Well Pad Name: Eldon 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
3/23/2020

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): 35.04 acres

22) Area to be disturbed for well pad only, less access road (acres): 12.65 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.

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Office of Oil and Gas

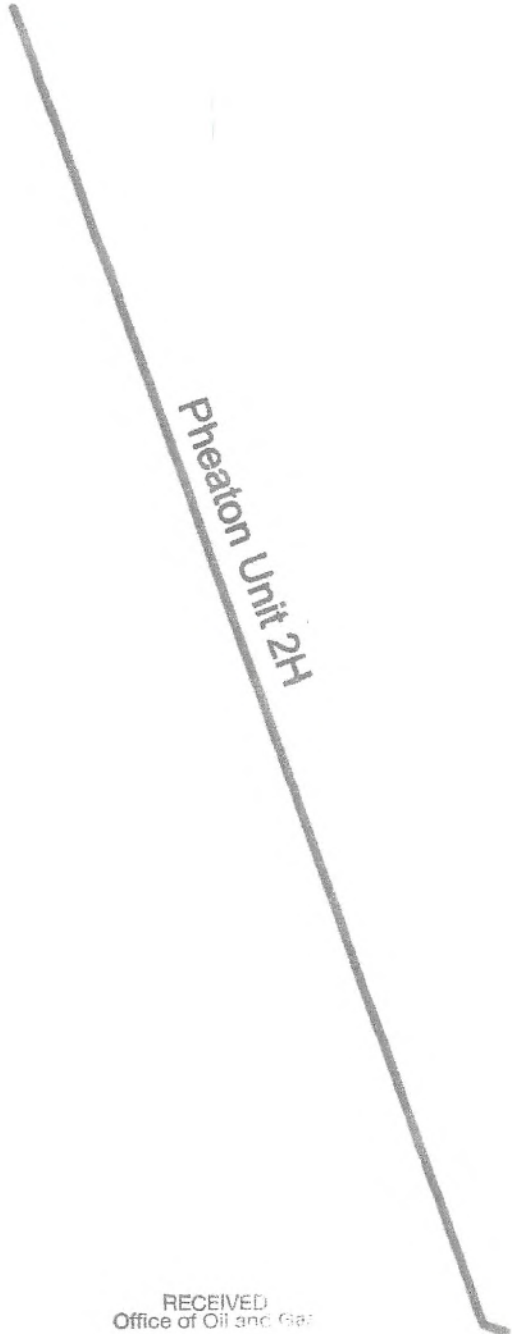
Page 3 of 3

MAR 27 2020

WV Department of
Environmental Protection

PERMIT MODIFICATION APT# 47-095-02683

MOD



Phaeton Unit 2H



Antero Resources Corporation
Phaeton Unit 2H - AOR

0 1,000 2,000
FEET

REMARKS
No Wells of Interest

December 18, 2019

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Office of Oil and Gas

MAR 27 2020

WV Department of
Environmental Protection

JCB
3/23/2020

WW-6A1

Operator's Well Number Phaeton Unit 2H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Eldon J. & Ruth A. Helman Lease</u> Eldon J. & Ruth A. Helman	Antero Resources Corporation	1/8+	0427/0610
<u>Ruth H. Wells Lease</u> Ruth H. Wells Antero Resources Appalachian Corporation	Antero Resources Appalachia Corporation Antero Resources Corporation	1/8+ Name Change	0417/0706 Exhibit 1
<u>Donna Jean Ice Lease</u> Donna Jean Ice	Antero Resources Corporation	1/8+	0424/0370
<u>Debra Lynn Warner Lease</u> Debra Lynn Warner	Antero Resources Corporation	1/8+	0016/0009
<u>Norma Jean Elder Eaton Lease (TM 15 PCL 2)</u> Norma Jean Elder Eaton Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0421/0492 Exhibit 1
<u>Ridgetop Capital LP Lease</u> Ridgetop Capital LP	Antero Resources Corporation	1/8+	0567/0332
<u>Norma Jean Elder Eaton Lease (TM 15 PCL 4)</u> Norma Jean Elder Eaton Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0421/0492 Exhibit 1
<u>William P. Ingram et ux Lease</u> William P. Ingram et ux Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0404/0707 Exhibit 1
<u>Timothy B. Ingram Lease</u> Timothy B. Ingram Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0417/0751 Exhibit 1

*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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WW-6A1
(5/13)

Operator's Well No. Phaeton 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:

<u>Lease Name or Number</u>	<u>Grantor, Lessor, etc.</u>	<u>Grantee, Lessee, etc.</u>	<u>Royalty</u>	<u>Book/Page</u>
<u>Timothy B. Ingram Lease</u>	Timothy B. Ingram Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0417/0751 Exhibit 1

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

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

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

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Office of Oil and Gas
 Page 1 of 1
 MAR 24 2020
 WV Department of
Environmental Protection

02683 HEP

FORM WV-6A1
EXHIBIT 1

FILED

JUN 10 2013

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



POSSY BAKER, Manager
IN THE OFFICE OF
SECRETARY OF STATE
Corporations Division
Tel: (606)338-3000
Fax: (606)338-0381
Website: www.wv.gov
E-mail: business@wv.gov

APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY

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

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

*** In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby ***
applies for an Amended Certificate of Authority and submits the following statement:

- 1. Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachia Corporation
- 2. Date Certificate of Authority was issued in West Virginia: 6/28/2008
- 3. Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of incorporation.)
- 4. Name the corporation elects to use in WV: Antero Resources Corporation
(do not have state name not being available)
- 5. Other amendments: _____
(attach additional pages if necessary)

6. Name and phone number of contact person. (This is optional, however, if there is a problem with the filing, having a contact person and phone number may avoid having to return or reject the document.)

Abyn A. Schopp (800) 867-9310
Contact Name Phone Number

7. Signature Information (See below "Important Legal Notice Regarding Signatures")

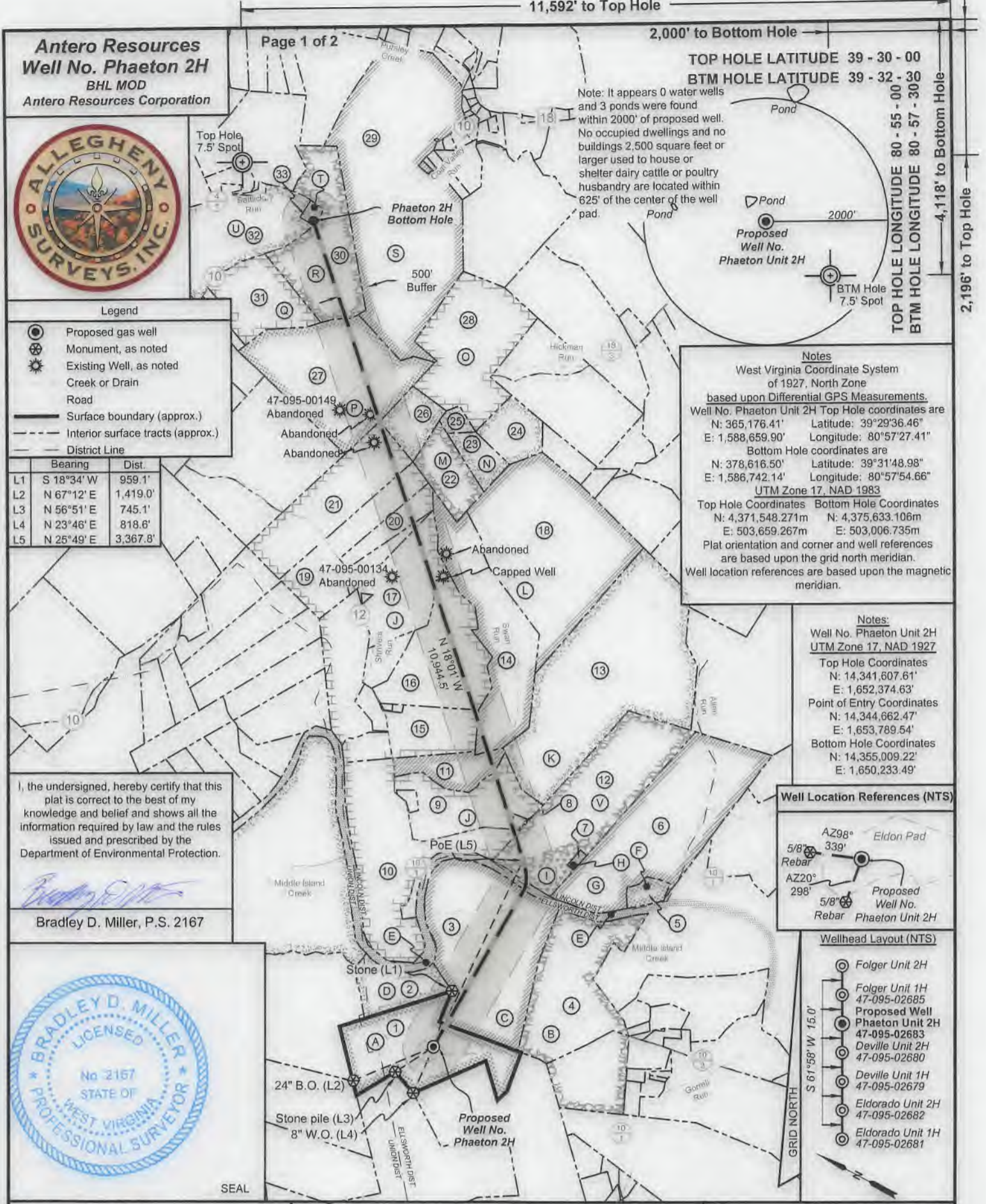
Print Name of Signer: Abyn A. Schopp Title/Capacity: Authorized Person
Signature: [Handwritten Signature] Date: June 10, 2013

Important Legal Notice Regarding Signatures Per West Virginia Code §22B-1-12, Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the custody of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.

Form 6A-1 Made by the Office of the Secretary of State

WV-6A1 - 06/2012/17 Update Microfilm

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Office of Oil and Gas
MAR 27 2020
WV Department of
Environmental Protection



Antero Resources
Well No. Phaeton 2H
 BHL MOD
 Antero Resources Corporation



Page 1 of 2

11,592' to Top Hole

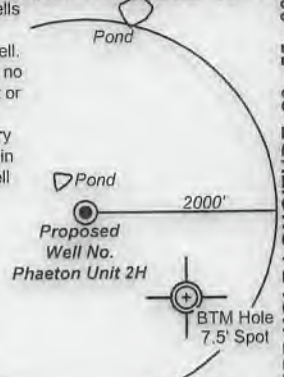
2,000' to Bottom Hole

TOP HOLE LATITUDE 39 - 30 - 00
 BTM HOLE LATITUDE 39 - 32 - 30

TOP HOLE LONGITUDE 80 - 55 - 00
 BTM HOLE LONGITUDE 80 - 57 - 30

2,196' to Top Hole

Note: It appears 0 water wells and 3 ponds were found within 2000' of proposed well. No occupied dwellings and no buildings 2,500 square feet or larger used to house or shelter dairy cattle or poultry husbandry are located within 625' of the center of the well pad.



Legend

- Proposed gas well
- Monument, as noted
- Existing Well, as noted
- Creek or Drain
- Road
- Surface boundary (approx.)
- Interior surface tracts (approx.)
- District Line

	Bearing	Dist.
L1	S 18°34' W	959.1'
L2	N 67°12' E	1,419.0'
L3	N 56°51' E	745.1'
L4	N 23°46' E	818.6'
L5	N 25°49' E	3,367.8'

Notes

West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
 Well No. Phaeton Unit 2H Top Hole coordinates are
 N: 365,176.41' Latitude: 39°29'36.46"
 E: 1,588,659.90' Longitude: 80°57'27.41"
 Bottom Hole coordinates are
 N: 378,616.50' Latitude: 39°31'48.98"
 E: 1,586,742.14' Longitude: 80°57'54.66"
 UTM Zone 17, NAD 1983
 Top Hole Coordinates Bottom Hole Coordinates
 N: 4,371,548.271m N: 4,375,633.106m
 E: 503,659.267m E: 503,006.735m
 Plat orientation and corner and well references are based upon the grid north meridian.
 Well location references are based upon the magnetic meridian.

Notes:

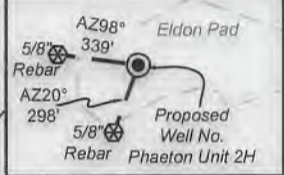
Well No. Phaeton Unit 2H UTM Zone 17, NAD 1927
 Top Hole Coordinates
 N: 14,341,607.61'
 E: 1,652,374.63'
 Point of Entry Coordinates
 N: 14,344,662.47'
 E: 1,653,789.54'
 Bottom Hole Coordinates
 N: 14,355,009.22'
 E: 1,650,233.49'

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.

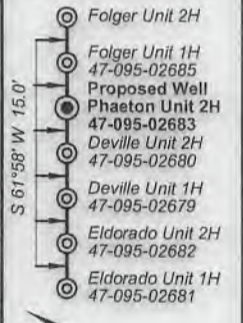
Bradley D. Miller
 Bradley D. Miller, P.S. 2167



Well Location References (NTS)



Wellhead Layout (NTS)



FILE NO: 294-54-U-18
 DRAWING NO: Phaeton 2H Well Plat
 SCALE: 1" = 2000'
 MINIMUM DEGREE OF ACCURACY: Submeter
 PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

STATE OF WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS DIVISION

DATE: March 2 20 20
 OPERATOR'S WELL NO. Phaeton Unit 2H
 API WELL NO
 47 - 095 - 02683
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
 Proposed Elev. 880'
 LOCATION: ELEVATION: Existing Elev. 882' WATERSHED: Outlet Middle Island Creek QUADRANGLE: Middlebourne Paden City
 DISTRICT: Ellsworth/Lincoln COUNTY: Tyler 9.73027; 61.83; 88.18; 97.5; 34.3; 127.39; 71.93152;
 SURFACE OWNER: Eldon J. & Ruth A. Helman Doris Ellen Haught; Ridgetop Capital, LP; Debra Lynn Warner Gerald C. Clutter, et ux; William P. Ingram; Larry Folger, et ux; ACREAGE: 61.83 140.0; 205.862; 49.66; 61.225;
 ROYALTY OWNER: Eldon J. & Ruth A. Helman; Ruth H. Wells; WV Division of Natural Resources; LEASE NO: ACREAGE: 181.99625;
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) BHL MOD 6,500' TVD
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 21,300' MD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
 ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
 Denver, CO 80202 Charleston, WV 25313



ID	TM/Par	Owner	Bk/Pg	Acres
1	19-1	Eldon J. & Ruth A. Helman	383/761	61.83
2	6-1.1	Eldon J. & Ruth A. Helman	383/761	21.0
3	13-10	Eldon J. & Ruth A. Helman	383/761	96.82
4	13-9	Chauncy P. & Ruth M. Archer	190/9	58.38
5	15-17.1	Lisa D. Beaver	327/758	6.35
6	15-17	Earl & Donna Smith	191/12	127.39
7	15-16.1	Richard G. Thomas	339/706	1.00
8	15-15.1	Bruce B. Seckman	348/100	0.99
9	15-15	Jack B. & Bennie H. Kile, Jr.	155/195	39.64
10	15-18	B.F. Kile	174/412	70.00
11	15-15.2	Ridgetop Capital, LP	375/206	17.54
12	15-16	Everett Glen Thomas	W30/1	81.67
13	15-13	B.F., Ben H. & Ida M. Kile	174/412	140.00
14	15-8	Ridgetop Capital LP	375/206	68.20
15	15-10	Doris E. Haught	364/544	55.09
16	15-7.1	John Preston Litten	391/769	56.00
17	15-7	Ivan W. & Karen L. Makely	281/498	35.10
18	15-9	Ridgetop Capital, LP	375/206	120.00
19	15-4	Ivan W. & Karen L. Makely	337/639	41.29
20	15-4.1	Neal W. & Daniel L. Makely	293/387	12.00
21	15-2	Stephen E. Surface, et al	365/302	54.00
22	12-58	John W. & Leah D. Starkey	373/699	19.25
23	12-59	Gerald C. & Mary Lou Clutter	286/350	11.00
24	12-60	Gerald C. & Mary Lou Clutter	286/350	17.50
25	12-57	Gerald C. & Mary Lou Clutter	247/307	3.78
26	12-56	Gerald C. & Mary Lou Clutter	247/307	17.88
27	12-50	William P. Ingram	605/159	88.00
28	12-51	Rickie Lee Littleton	281/193	61.23
29	12-27	William P. & Jo Anne Ingram	156/175	183.16
30	12-45	Timothy B. & Paula S. Ingram	322/828	56.35
31	12-48	William Michael & Mary Ann Wells	314/416	34.62
32	12-44	William P. Ingram	455/477	62.50
33	12-45.1	Timothy S. Ingram	326/353	1.98

Leases	
A	Eldon J. & Ruth A. Helman
B	Chauncey Paul Archer, et ux
C	Ruth H. Wells
D	Norma R Spencer, Trustee of the Allan P. Spencer Living Trust
E	WV Division of Natural Resources
F	Lisa D. Beaver
G	Donna Smith
H	Richard G. Thomas
I	Donna Jean Ice
J	Norma Jean Elder Eaton
K	Doris Ellen Haught
L	Ridgetop Capital LP
M	John W. Starkey, et ux
N	Gerald C. Clutter, et ux
O	Larry Folger, et ux
P	William P. Ingram, et ux
Q	William Michael Wells, et ux
R	Timothy B. Ingram
S	William P. Ingram
T	Timothy B. Ingram
U	Liva Tucker
V	Debra Lynn Warner

FILE NO: 294-54-U-18
 DRAWING NO: Phaeton 2H Well Plat
 SCALE: 1" = 2000'
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 PROVEN SOURCE OF ELEVATION:
 WVDOT, Harrisville, WV

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OIL AND GAS DIVISION

DATE: March 2 20 20
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 API WELL NO *MOD*
 47 - 095 - 02683
 STATE COUNTY PERMIT

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 Chauncy Paul Archer, et ux; Donna Jean Ice; Donna Smith; ACREAGE: 61.83 140.0; 205.862;
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