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

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL
Horizontal 6A / Horizontal 6A Well - 1

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for DUCHENE UNIT 1H
47-085-10161-00-00

Modified vertical depth, azimuth, lateral length.

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

Operator's Well Number: DUCHENE UNIT 1H
Farm Name: WOGGONER, EDDY D. ET AL
U.S. WELL NUMBER: 47-085-10161-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: October 26, 2016

PERMIT MODIFICATION API# 47-085-10161

WW-6B
(04/15)

API NO. 47- 085 - 10161 MOD
OPERATOR WELL NO. Duchene Unit 1H
Well Pad Name: Kelly Pad

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

1) Well Operator: Antero Resources Corp.

Operator ID	County	District	Quadrangle
494507062	085 - Ritchie	Clay	Pennsboro 7.5'

2) Operator's Well Number: Duchene Unit 1H Well Pad Name: Kelly Pad

3) Farm Name/Surface Owner: Eddy D. Waggoner, et al Public Road Access: CR 74

4) Elevation, current ground: 1127' Elevation, proposed post-construction: 1145'

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

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6800' TVD, Anticipated Thickness 75 feet, Associated Pressure 2800#

8) Proposed Total Vertical Depth: 6800'

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 17,600'

11) Proposed Horizontal Leg Length: 8817'

12) Approximate Fresh Water Strata Depths: 303', 380'

13) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations.

14) Approximate Saltwater Depths: 533', 1567', 1802'

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: _____

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#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	430' *see #19	430' *see #19	CTS, 597 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2455'	2455'	CTS, 1000 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	17,600'	17,600'	3896 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
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"/0.33"	2730/1730	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"	0.361"	12630	2500	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200			
Liners							

PACKERS

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

WW-6B
(10/14)

API NO. 47- 085 - 10161 MOD
OPERATOR WELL NO. Duchene Unit 1H
Well Pad Name: Kelly 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.

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

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

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

Max Pressure - 9300 lbs
Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 20.11 acres

22) Area to be disturbed for well pad only, less access road (acres): 5.57 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 + 0.5% C51.
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

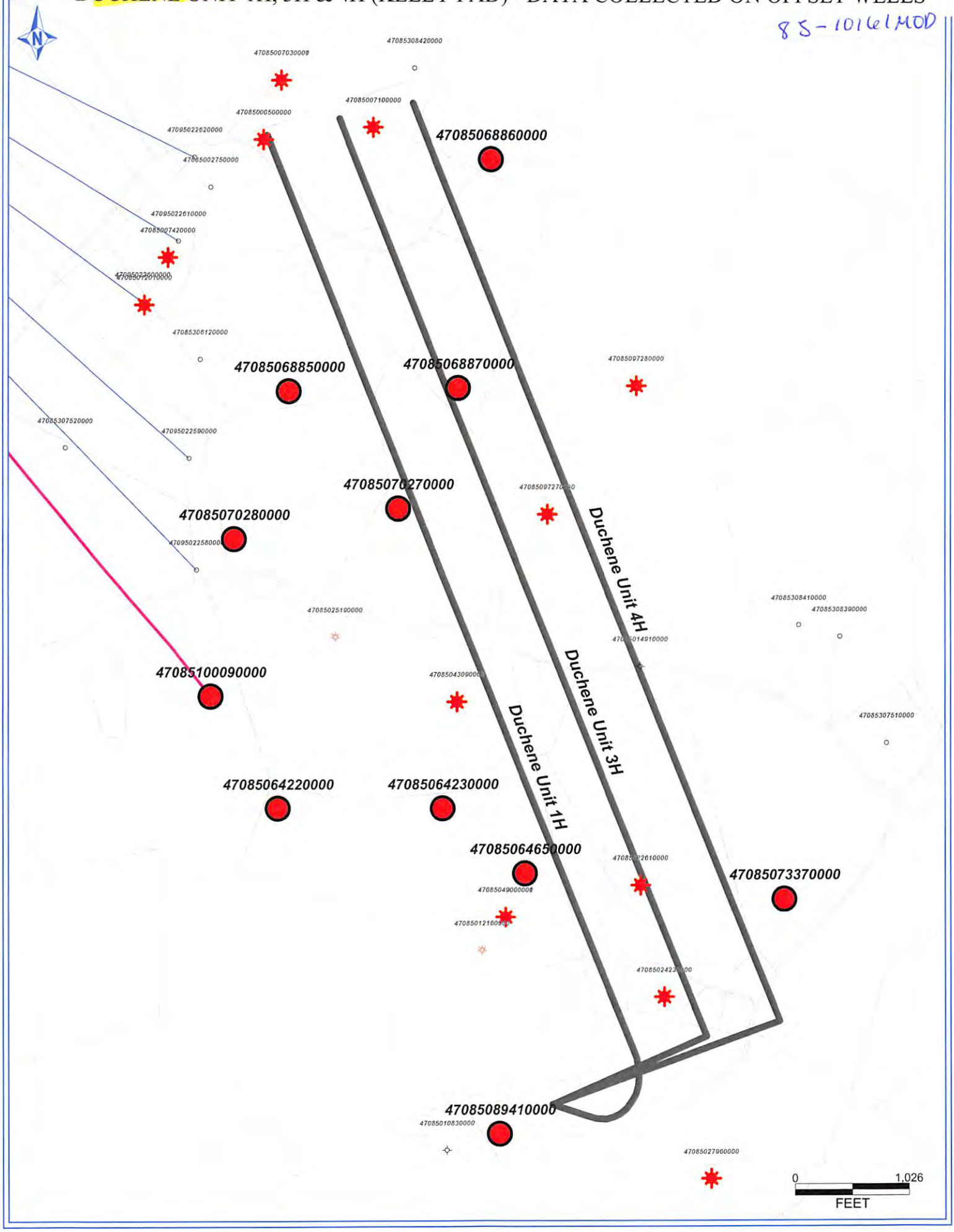
25) Proposed borehole conditioning procedures:

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.

DUCHENE UNIT 1H, 3H & 4H (KELLY PAD) - DATA COLLECTED ON OFFSET WELLS

85-10161MOD



DUCHENE UNIT 1H, 3H & 4H (KELLY PAD) - DATA COLLECTED FROM OFFSET WELLS

UWI (APINum)	Well Name	Well Numbe	Operator	Hist Oper	TD	ELEV_GR	TD (SSTVD)	Perfs (shallowest, deepest)
47085100090000	CNX GAS COMPANY LLC	PENS1AHS	NOBLE ENERGY INC	NOBLE ENERGY INC	12955	1137	-5250	Marcellus Sh (7125-7327), Marcellus Sh (12808-12810)
47085070280000	FREELAND E G ET AL	JK-1012	ALLIANCE PETR CORP	KEPCO INCORPORATED	5995	1021	-4974	Benson (4886-4888), Rhinestreet Sh (5725-5834)
47085070270000	FREELAND E G ET AL	JK-1020	ALLIANCE PETR CORP	KEPCO INCORPORATED	5995	1182	-4813	Benson (5009-5011)
47085068850000	UTT JAMES W	JK-904	ALLIANCE PETR CORP	J & J ENTERPRISES	5995	1110	-4885	Riley (4830-4833), Rhinestreet Sh (5730-5975)
47085068870000	UTT JAMES W	JK-906	ALLIANCE PETR CORP	J & J ENTERPRISES	5995	990	-5005	Riley (4465-4475), Rhinestreet Sh (5683-5844)
47085068860000	UTT JAMES W	JK-905	ALLIANCE PETR CORP	J & J ENTERPRISES	5995	996	-4999	Warren (3371-3393), Rhinestreet Sh (5678-5776)
47085064650000	DENNING W F HEIRS	1-C	NASHVILLE ASSOC	STALNAKER GENE INC	5990	1070	-4920	Production data present, (cancelled?)
47085073370000	SPENCER RUTH & HARLEY E	WK-342	ALLIANCE PETR CORP	KEPCO INCORPORATED	5835	855	-4980	Riley (4377-4400), Rhinestreet Sh (5611-5714)
47085064220000	DENNING W F HEIRS	1-A	ZICKEFOOSE W F & R L	STALNAKER GENE INC	5450	1195	-4255	Gordon (3492-3863), Balltown (4591-5277)
47085064230000	DENNING W F HEIRS	1-B	ZICKEFOOSE W F & R L	STALNAKER GENE INC	5450	1145	-4305	Lower Huron (3492-3857), Lower Huron (4591-4941)
47085089410000	JOHNSON	1	KEY OIL COMPANY	KEY OIL COMPANY	5310	1035	-4275	Riley (4532-4551), Benson (4892-4895)
47085049000001	DENNING	1	PERKINS PROD CO	PERKINS PROD CO	2990	1018	-1972	
47085049000000	DENNING W F	1	PERKINS PROD CO	DENNING G&O	2990	1018	-1972	
47085097280000	THOMAS DOLLY	7	PERKINS OIL & GAS	PERKINS OIL & GAS	2550	1282	-1268	
47085097270000	THOMAS DOLLY	6	PERKINS OIL & GAS	PERKINS OIL & GAS	2380	1175	-1205	
47085007030001	FARLEY	2	PERKINS OIL & GAS	PERKINS OIL & GAS	2308	940	-1368	
47085007030000	NOAH FARLEY HRS	1	PERKINS OIL & GAS	MCBURNEY GLEN F	2308	940	-1368	
47085010830000	G A SMITH & J W WHALEY	1	COLLINS C I	COLLINS C I	2295	1085	-1210	
47085308420000	J L HOGUE	1	MILLIKEN H E	MILLIKEN H E	2272	1052	-1220	
47085027960000	DORIS L WESTFALL	1	PERKINS PROD CO	STONE F C OIL & GAS	2222	998	-1224	
47085307520000	W F FARLEY	7091	HOPE NATURAL GAS	HOPE NATURAL GAS	2140	1127	-1013	
47085007420000	J A & R E MARKLE	1	FINDLEY FRANK	FINDLEY FRANK	2125	1038	-1087	
47085306120000	DENNIS MCCULLOUGH 1	4590	PITTSBURGH&W VA GAS	PITTSBURGH&W VA GAS	2105	1027	-1078	
47085022610000	W & D BRADFORD	1	PERKINS PROD CO	L & M PETROLEUM	2069	933	-1136	
47085000500000	MARY FARLEY	1	MAHANEY & LUCAS	MAHANEY & LUCAS	2051	980	-1071	
47085007100000	NOAH FARLEY HEIRS	2	PERKINS OIL & GAS	PERKINS CARL D	2010	1098	-912	
47085025190000	CREED COLLINS	2	HALLAS GEORGE S	HALLAS GEORGE S	2006	1015	-991	
47085043090000	CREED COLLINS	1	PERKINS PROD CO	PERKINS CARL D	2002	958	-1044	
47085043090001	CREED COLLINS	1	PERKINS PROD CO	PERKINS OIL & GAS	2002	958	-1044	
47085043090002	LOCOCO EST ATTA J	1	PERKINS PROD CO	PERKINS OIL & GAS	2002	958	-1044	
47085024230000	W H & D M BRAFORD	2	PERKINS PROD CO	L & M OIL & GAS	1996	879	-1117	
47085012160000	J W WHALEY & G A SMITH	1	MILLER GUS	MILLER GUS	1990	903	-1087	
47085012010000	R E MARKLE	1	MOSSOR OIL & GAS	MOSSOR OIL & GAS	1982	907	-1075	
47085308410000	DOLLIE THOMAS	5	MILLIKEN H E	MILLIKEN H E	1980	896	-1084	
47085307510000	WILLIAM COLLINS	1	SOUTH PENN OIL	SOUTH PENN OIL	1970	935	-1035	
47085308390000	DOLLIE THOMAS	2	MILLIKEN H E	MILLIKEN H E	1958	907	-1051	
47085014910000	RAY HALL	1	BACHELOR CHOGUILL &R	BACHELOR CHOGUILL &R	1941	912	-1029	
47085002750000	NOAH FARLEY	1968	UNKNOWN	UNKNOWN	1939	907	-1032	
47095022610000	NOBLE ENERGY INC	PEN31E	NOBLE ENERGY INC	NOBLE ENERGY INC		1116	1116	PERMIT
47095022620000	NOBLE ENERGY INC	PEN31F	NOBLE ENERGY INC	NOBLE ENERGY INC		1115	1115	PERMIT
47095022600000	NOBLE ENERGY INC	PEN31D	NOBLE ENERGY INC	NOBLE ENERGY INC		1118	1118	PERMIT
47095022590000	NOBLE ENERGY INC	PEN31C	NOBLE ENERGY INC	NOBLE ENERGY INC		1117	1117	PERMIT
47095022580000	NOBLE ENERGY INC	PEN31B	NOBLE ENERGY INC	NOBLE ENERGY INC		1114	1114	PERMIT

RECEIVED
Office of Oil & Gas
WV Department of
Environmental Protection

SS-10161

WW-6A1

Operator's Well Number Duchene Unit 1H
PERMIT MODIFICATION API# 47-085-10161 MOD

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
Betty Johnson Lease			
Betty Johnson	Key Oil Company	1/8	0233/0947
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0253/0758
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
Lando Glenn Robinson, Jr. Lease			
Lando Glenn Robinson, Jr., a widower	Antero Resources Appalachian Corporation	Memorandum of Oil & Gas Lease	0263/0351
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
Alta Harper, et al Lease			
Alta Lewis Harper and Billy Harper, Mother and Son	JARCO, Inc.	1/8	0211/0727
JARCO, Inc.	Perkins Oil & Gas	Assignment	0212/0050
Perkins Oil & Gas	Clay M. Perkins	Assignment	0232/0115
Clay M. Perkins	Perkins Production Company, LLC	Assignment	0232/0213
Perkins Production Company, LLC	**Antero Resources Corporation**	**Assignment**	**0264/1045**
Emma Smith, et al Lease			
Emma Smith, et al	Palmer Hill	1/8	0129/0747
Palmer Hill	Clyde Kelly	Assignment	0131/0225
Clyde Kelly	Ira M. Jones and Clyde Kelly	Assignment	0132/0311
Ira M. Jones and Clyde Kelly	Big A. Oil Company	Assignment	0132/0492
Big A. Oil Company	Lamar Oil & Gas Company	Assignment	0196/0320
Lamar Oil & Gas Company	Perkins Production Company LLC	Assignment	0233/0618
Perkins Production Company LLC	**Antero Resources Corporation**	**Assignment**	**0264/1045**
Creed Collins, et ux Lease			
Creed Collins, et ux	J.F. Donaldson	1/8	0024/0313
J.F. Donaldson	The Philadelphia Company of West Virginia	Assignment	0026/0342
The Philadelphia Company of West Virginia	Pittsburgh & West Virginia Gas Company	Assignment	0058/0359
Pittsburgh & West Virginia Gas Company	Equitable Gas Company	Assignment	0126/0515
Equitable Gas Company	Carl D. Perkins, et ux	Assignment	0222/0433
Carl D. Perkins, et ux	Perkins Oil & Gas, Inc.	Assignment	0222/0438
Perkins Oil & Gas, Inc.	Perkins Production Company, LLC	Assignment	0241/0319
Perkins Production Company, LLC	**Antero Resources Corporation**	**Assignment**	**0264/1045**

***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****

WW-6A1

Operator's Well Number Duchene Unit 1H
PERMIT MODIFICATION API# 47-085-10161 MOD

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
Cliff Wilson, et ux Lease			
Cliff Wilson, et ux	Carl D. Perkins, et ux	1/8	0114/0272
Carl D. Perkins, et ux	Perkins Oil & Gas, Inc.	Assignment	0131/0680
Perkins Oil & Gas, Inc.	**Antero Resources Corporation**	**Assignment**	**0264/1045**
Eldon G. Freeland, et al Lease (TM 13-4.1)			
Eldon J. Freeland, et al	J & J Enterprises, Inc.	1/8	0168/0687
J & J Enterprises, Inc.	Equitable Resources, Eastern Pennsylvania, New Jersey Natural	Stipulation of Interest and Assignment	0208/0132
Equitable Resources, Eastern Pennsylvania, New Jersey Natural	Enervest East Limited Partnership	Assignment	0222/0273
Enervest East Limited Partnership	The Houston Exploration Company	Assignment	0234/0890
The Houston Exploration Company	Seneca-Upshur Petroleum, Inc.	Assignment and Assumption Agreement	0236/0650
Seneca-Upshur Petroleum, Inc.	Seneca-Upshur Petroleum, LLC	Assignment	0311/0863
Seneca-Upshur Petroleum, LLC	Antero Resources Appalachian Corporation	Memorandum of Joint Use Agreement	0258/0932
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
Eldon G. Freeland, et al Lease (TM 13-4)			
Eldon G. Freeland and wife, Goldie E. Freeland	J & J Enterprises, Inc.	1/8	0168/0683
J & J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0250/0393
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
James W. Utt Lease			
James W. Utt	J & J Enterprises, Inc.	1/8	0165/0539
J & J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0250/0393
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	**Antero Resources Corporation**	**Name Change**	**Exhibit 1**
The Joelynn Family Trust Lease (TM 7-3.3)			
The Joelynn Family Preservation Trust	**Antero Resources Corporation**	**1/8+**	**0283/0145**

***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****

WW-6A1
(5/13)

Operator's Well No. Duchene 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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(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
The Joelynn Family Trust Lease (TM 7-3.6)				
	The Joelynn Family Preservation Trust	Antero Resources Corporation	1/8+	0283/0145

*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.

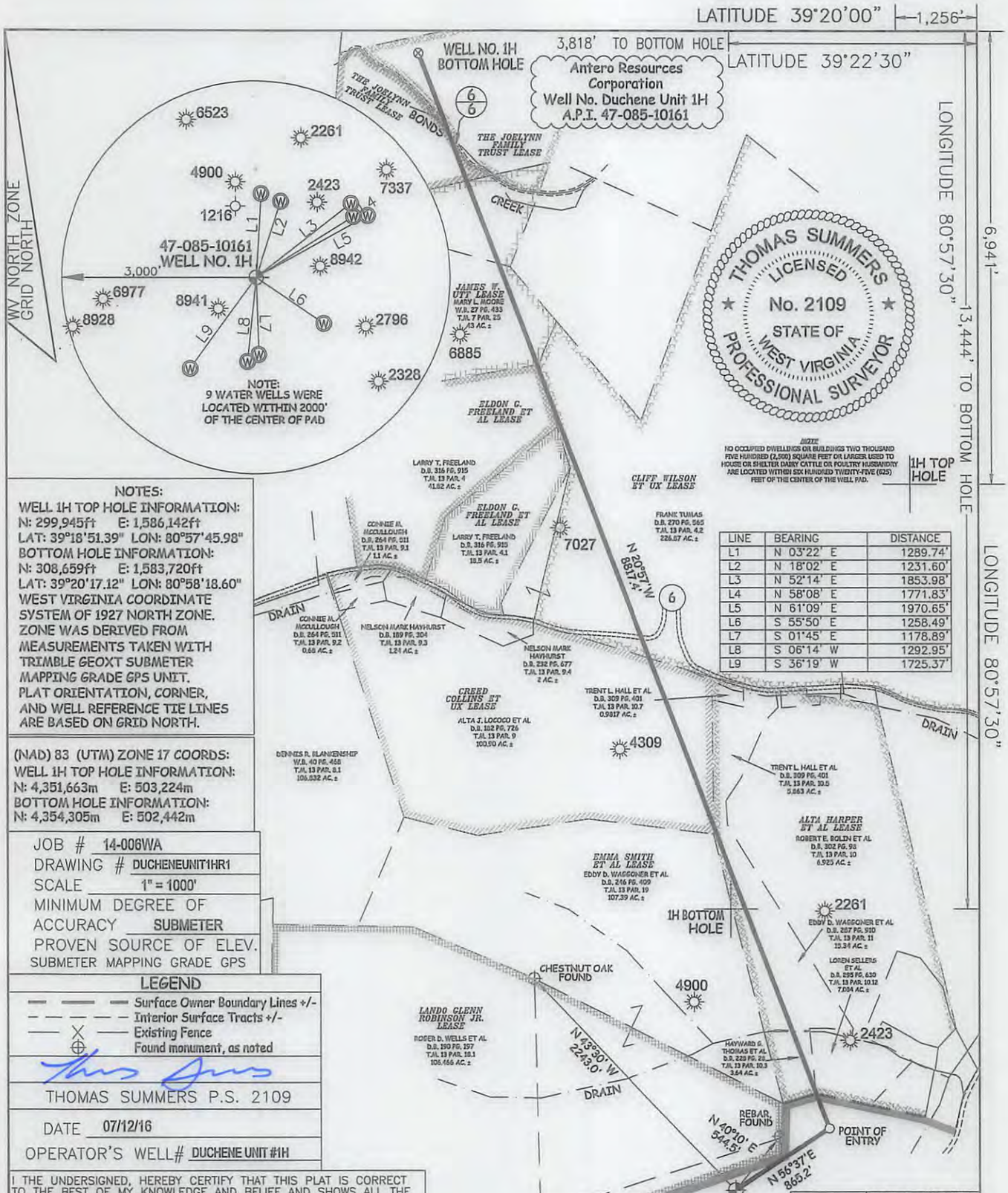
Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas

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: Kevin Kilstrom
Its: Senior VP of Production



LINE	BEARING	DISTANCE
L1	N 03°22' E	1289.74'
L2	N 18°02' E	1231.60'
L3	N 52°14' E	1853.98'
L4	N 58°08' E	1771.83'
L5	N 61°09' E	1970.65'
L6	S 55°50' E	1258.49'
L7	S 01°45' E	1178.89'
L8	S 06°14' W	1292.95'
L9	S 36°19' W	1725.37'

NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 299,945ft E: 1,586,142ft
LAT: 39°18'51.39" LON: 80°57'45.98"
BOTTOM HOLE INFORMATION:
N: 308,659ft E: 1,583,720ft
LAT: 39°20'17.12" LON: 80°58'18.60"
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.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 4,351,663m E: 503,224m
BOTTOM HOLE INFORMATION:
N: 4,354,305m E: 502,442m

JOB # 14-006WA
DRAWING # DUCHENEUNIT1HR1
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND
Surface Owner Boundary Lines +/-
Interior Surface Tracts +/-
Existing Fence
Found monument, as noted

THOMAS SUMMERS P.S. 2109

DATE 07/12/16
OPERATOR'S WELL# DUCHENE UNIT #1H

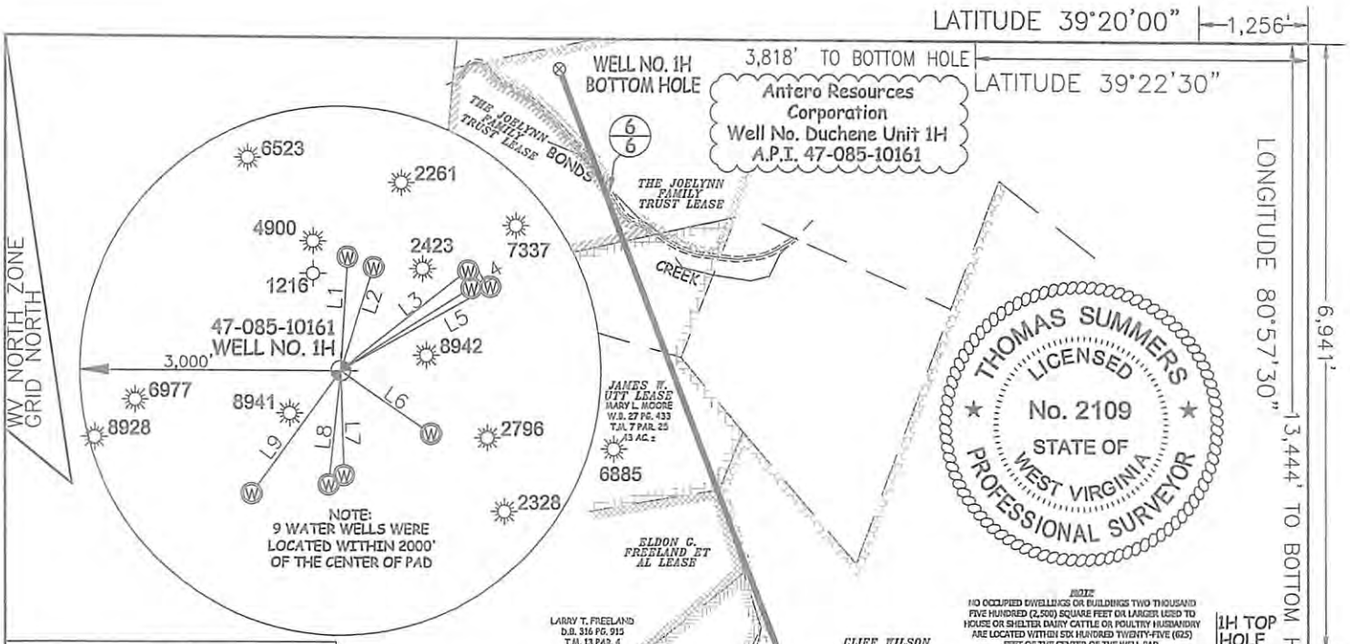
I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPTARTMENT OF ENVIRONMENTAL PROTECTION.

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

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

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 14,276,366ft E: 1,650,946ft
POINT OF ENTRY INFORMATION:
N: 14,276,858ft E: 1,651,670ft
BOTTOM HOLE INFORMATION:
N: 14,285,035ft E: 1,648,381ft

STATE OF WEST VIRGINIA API WELL #
DEPARTMENT OF ENERGY 47 – 085 – 10161 MOD
DIVISION OF OIL AND GAS STATE COUNTY PERMIT
WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,145' ORIGINAL - 1,127' PROPOSED WATERSHED NORTH FORK HUGHES RIVER
QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE
SURFACE OWNER EDDY D. WAGGONER ET AL ACREAGE 59.93 ACRES +/-
OIL & GAS ROYALTY OWNER BETTY JOHNSON; ALTA HARPER ET AL; CREED COLLINS ET UX; CLIFF WILSON ET UX; ELDON G. FREELAND ET AL ; JAMES W. UTT; THE JOELYNN FAMILY TRUST; THE JOELYNN FAMILY TRUST
LEASE ACREAGE 130 AC±; 112 AC±; 104 AC±; 413 AC±; 38 AC±; 56.5 AC±; 16 AC±; 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) MOD-BHL PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,800' TVD 17,600' MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT CT CORPORATION SYSTEM-DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313



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.

LINE	BEARING	DISTANCE
L1	N 03°22' E	1289.74'
L2	N 18°02' E	1231.60'
L3	N 52°14' E	1853.98'
L4	N 58°08' E	1771.83'
L5	N 61°09' E	1970.65'
L6	S 55°50' E	1258.49'
L7	S 01°45' E	1178.89'
L8	S 06°14' W	1292.95'
L9	S 36°19' W	1725.37'

NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 299,945ft E: 1,586,142ft
LAT: 39°18'51.39" LON: 80°57'45.98"
BOTTOM HOLE INFORMATION:
N: 308,659ft E: 1,583,720ft
LAT: 39°20'17.12" LON: 80°58'18.60"
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.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 4,351,663m E: 503,224m
BOTTOM HOLE INFORMATION:
N: 4,354,305m E: 502,442m

JOB # 14-006WA
DRAWING # DUCHENEUNIT1HR1
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND
Surface Owner Boundary Lines +/-
Interior Surface Tracts +/-
Existing Fence
Found monument, as noted

THOMAS SUMMERS P.S. 2109

DATE 07/12/16
OPERATOR'S WELL# DUCHENE UNIT #1H

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 DEPTARTMENT 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

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 14,276,366ft E: 1,650,946ft
POINT OF ENTRY INFORMATION:
N: 14,276,858ft E: 1,651,670ft
BOTTOM HOLE INFORMATION:
N: 14,285,035ft E: 1,648,381ft

PAD LAYOUT
Duchene Unit 4H
Duchene Unit 3H
Duchene Unit 2H
Duchene Unit 1H
Aubie Unit 4H
Aubie Unit 3H
Aubie Unit 2H
Aubie Unit 1H
NAD27 GRID NORTH
N 65°51' E
NOT TO SCALE

REFERENCES
WELL NO. 1H
N 76°14' E 261.8'
S 12°06' E 164.5'
STAKE/ NAIL, SET
1" = 200'
N GRID NORTH

RECEIVED Office of Oil and Gas JUL 18 2016 WV Department of Environmental Protection

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS
API WELL # 47 — 085 — 10161 MOD
STATE COUNTY PERMIT
WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,145' ORIGINAL - 1,127' PROPOSED WATERSHED NORTH FORK HUGHES RIVER
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WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT CT CORPORATION SYSTEM-DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313
FORM WW-6

COUNTY NAME PERMIT

85-10141

FORM WW-6A1
EXHIBIT 1

FILED
JUN 10 2013
IN THE OFFICE OF SECRETARY OF STATE

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

Penney Barker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvsos.com
E-mail: business@wvsos.com

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

APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY

Office Hours: Monday – Friday
8:30 a.m. – 5:00 p.m. ET

**** 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 Appalachian Corporation
2. Date Certificate of Authority was issued in West Virginia: 6/25/2008
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
   (due to home 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, listing a contact person and phone number may avoid having to return or reject the document.)

   Alvyn A. Schopp — (303) 357-7310
   Contact Name — Phone Number

7. Signature information (See below *Important Legal Notice Regarding Signature):

   Print Name of Signer: Alvyn A. Schopp — Title/Capacity: Authorized Person

   Signature: [signature] — Date: June 10, 2013

*Important Legal Notice Regarding Signature: Per West Virginia Code §31D-1-129, 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 secretary 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.

WV/011 - 04/16/2013 Wolters Kluwer Online

85-10161 MOD

Antero Resources

July 25, 2016

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: Mr. Taylor Brewer
601 57th Street
Charleston, WV 25304

Mr. Brewer:

Antero Resources Corporation (Antero) would like to submit the following permit modifications for three approved wells on the Kelly Pad. We are requesting to revise the horizontal lateral length which will change the bottom hole location of the Duchene Unit 1H (API# 47-085-10161), Duchene Unit 3H (API# 47-085-10162), and Duchene Unit 4H (API# 47-085-10168). Please note, we will only be drilling through new leases on the Duchene Unit 1H. Therefore, a revised Form WW-6A1 has only been provided for that well.

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the revised TVDs, Measured Depths, lateral lengths, and Production Casing/Cement programs
- REVISED Mylar Plat, which shows the new bottom hole locations

If you have any questions please feel free to contact me at (303) 357-6820.

Thank you in advance for your consideration.

RECEIVED
Office of Oil and Gas
JUL 26 2016
WV Department of
Environmental Protection

Sincerely,

Natalie

Natalie Komp
Permitting Agent
Antero Resources Corporation

Enclosures