



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

Jim Justice, Governor
Austin Caperton, Cabinet Secretary
www.dep.wv.gov

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

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

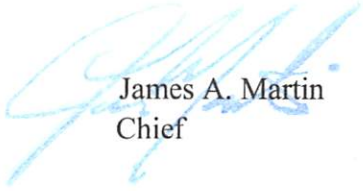
Re: Permit Modification Approval for EARNEST UNIT 1H
47-085-10273-00-00

Modifying Lateral Length to 8135.3'

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: EARNEST UNIT 1H
Farm Name: ZINN, ERNEST E.
U.S. WELL NUMBER: 47-085-10273-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: October 31, 2017

Promoting a healthy environment.

11/03/2017

WW-6B
(04/15)

API NO. 47- 085 - 10273 MOD
OPERATOR WELL NO. Earnest Unit 1H
Well Pad Name: Zinn Pad

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

1) Well Operator: Antero Resources Corporation 494488557 085 - Ritchie Clay Pennsboro 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Earnest Unit 1H Well Pad Name: Zinn Pad

3) Farm Name/Surface Owner: Earnest E. Zinn, et al Public Road Access: CR 74/9

4) Elevation, current ground: 1135' Elevation, proposed post-construction: 1119'

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: 6700' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6700' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 14825' MD

11) Proposed Horizontal Leg Length: 8135'

12) Approximate Fresh Water Strata Depths: 107', 431', 497'

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

14) Approximate Saltwater Depths: 1141', 1567'

15) Approximate Coal Seam Depths: 412', 741'

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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Office of Oil and Gas

OCT 05 2017

WV Department of
Environmental Protection

WW-6B
(04/15)

API NO. 47- 085 - _____
 OPERATOR WELL NO. Earnest Unit 1H
 Well Pad Name: Zinn Pad

18) **CASING AND TUBING PROGRAM**

TYPE	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
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#	550' *see #19	550' *see #19	CTS, 764 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2450'	2450'	CTS, 998 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	14825'	14825'	CTS, 3684 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

TYPE	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	30"	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"	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			RECEIVED Office of Oil and Gas
Sizes:	N/A			OCT 05 2017
Depths Set:	N/A			WV Department of Environmental Protection

WW-6B
(10/14)

API NO. 47- 085 - _____
 OPERATOR WELL NO. Earnest Unit 1H
 Well Pad Name: Zinn 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 fresh water 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."

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 27.20 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.27 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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 Office of Oil and Gas
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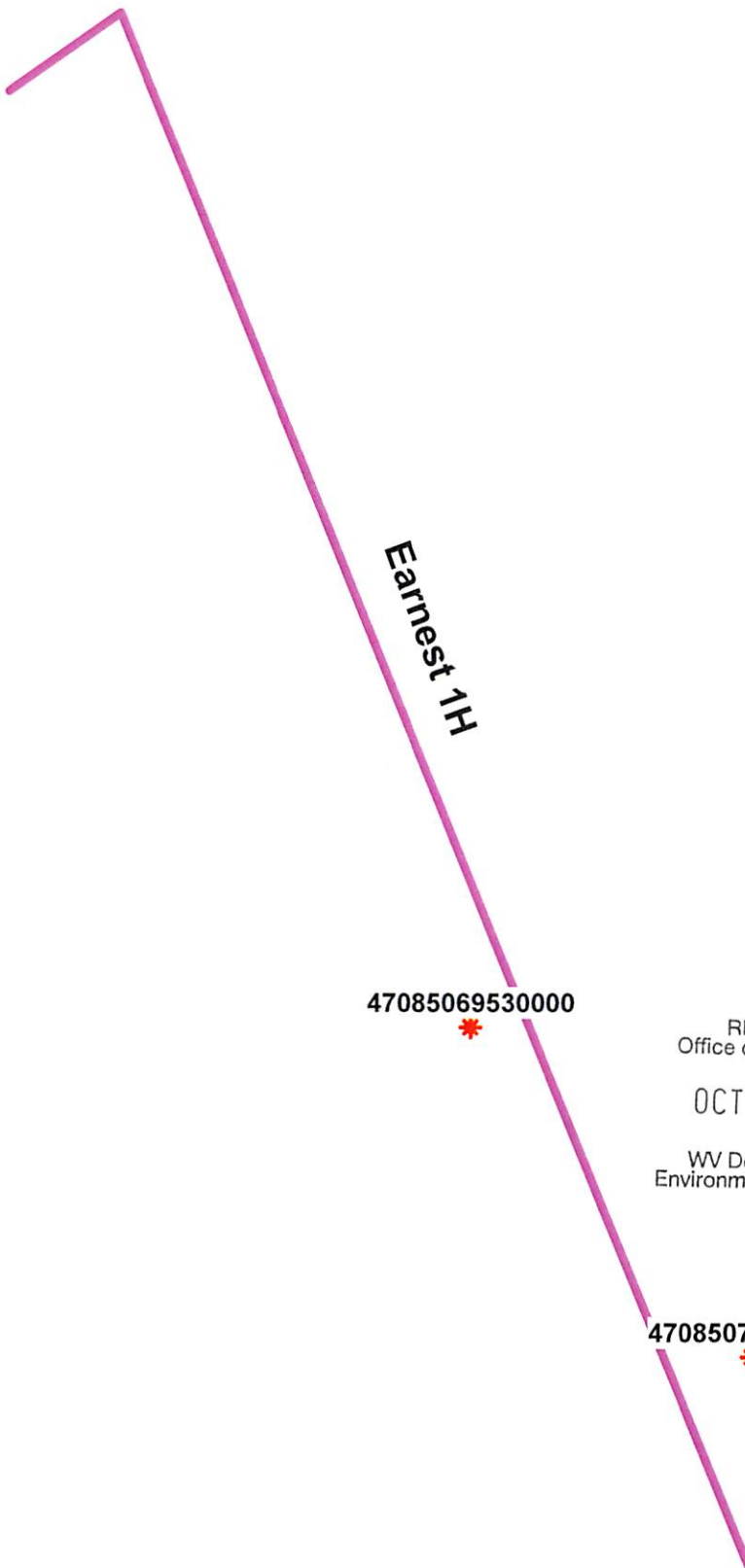
WV Department of
 Environmental Protection

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.

Earnest Unit 1H - AOR



47085069530000



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Office of Oil and Gas

OCT 05 2017

WV Department of
Environmental Protection

47085077310000



0 915
FEET

11/03/2017

85-10273 MOD

PERMIT MODIFICATION (API# 47-085-10273)

UWI (API Num)	Well Name	Well Number	Operator	Hist Oper	TD
47085069530000	DOTSON LEAMON ET AL	JK-948	ENERGY CORP OF AMER	J & J ENTERPRISES	969
47085077310000	GARNER F	1	KEY OIL COMPANY	KEY OIL INCORPORATED	1100
311	ELEV. GR	TD (BSTVD)	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
420	5995	5995	-5026	Riley/Bradford, Benson, Alexander, Rhinestreet	None
	5400	5400	-4300	Riley, Benson, Alexander	Rhinestreet

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Environmental Protection

11/03/2017

LATITUDE 39°20'00"

6,100'

LATITUDE 39°20'00" 2,334' TO BOTTOM HOLE

LONGITUDE 80°55'00" 12,363' TO BOTTOM HOLE

4,828' LONGITUDE 80°55'00"

Antero Resources Corporation
Well No. Earnest Unit 1H
47-085-10273 (AS DRILLED)

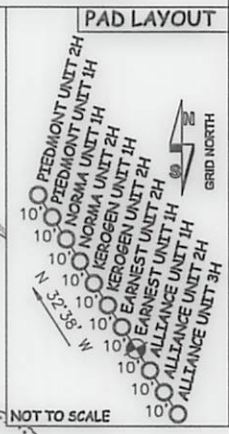
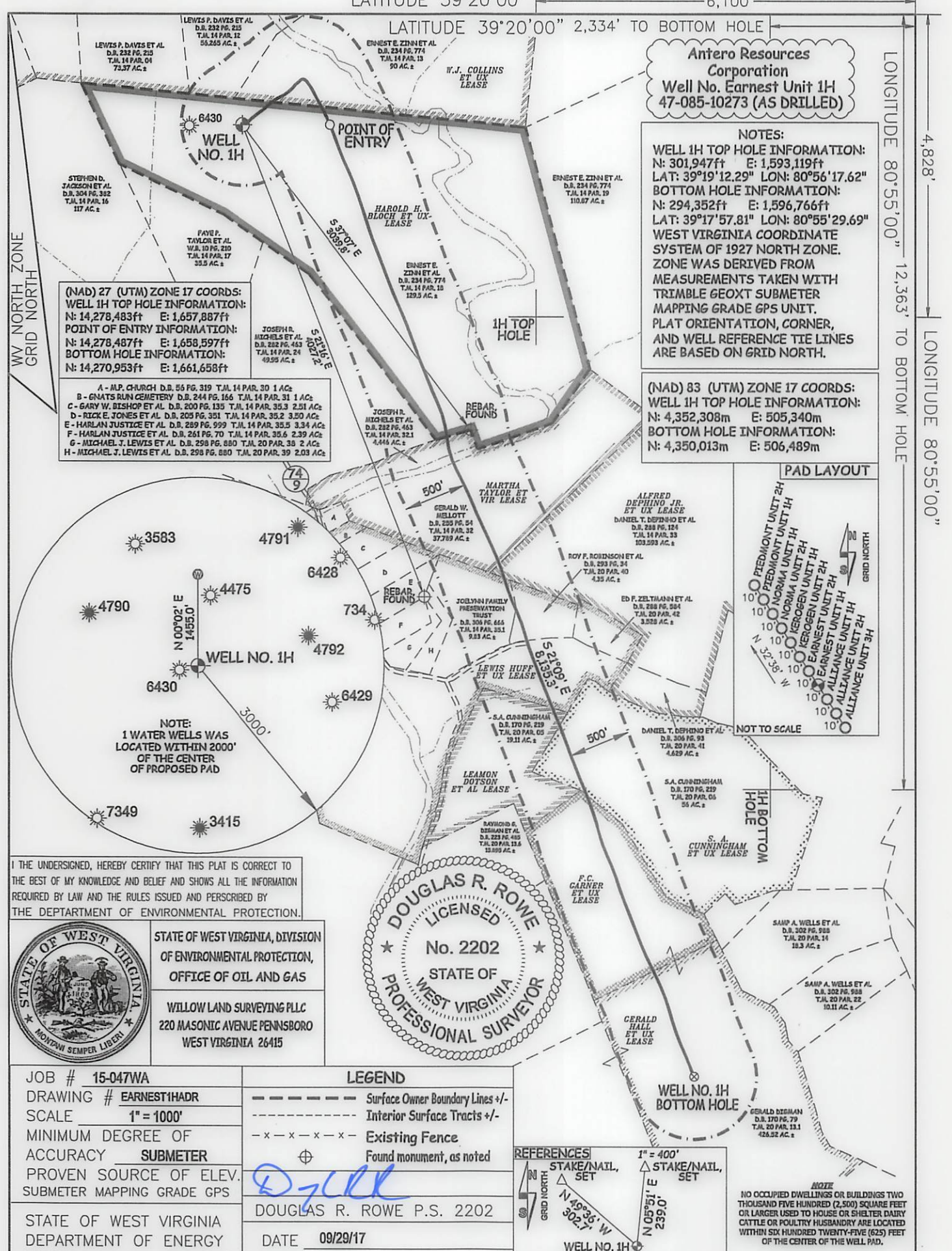
NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 301,947ft E: 1,593,119ft
LAT: 39°19'12.29" LON: 80°56'17.62"
BOTTOM HOLE INFORMATION:
N: 294,352ft E: 1,596,766ft
LAT: 39°17'57.81" LON: 80°55'29.69"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT 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: 4,352,308m E: 505,340m
BOTTOM HOLE INFORMATION:
N: 4,350,013m E: 506,489m

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 14,278,483ft E: 1,657,887ft
POINT OF ENTRY INFORMATION:
N: 14,278,487ft E: 1,658,597ft
BOTTOM HOLE INFORMATION:
N: 14,270,953ft E: 1,661,658ft

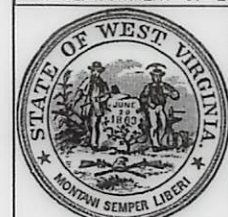
- A - M.P. CHURCH D.B. 56 PG. 319 T.J.L. 14 PAR. 30 1 AC±
- B - GNATS RUN CEMETERY D.B. 244 PG. 166 T.J.L. 14 PAR. 31 1 AC±
- C - GARY W. BISHOP ET AL D.B. 200 PG. 135 T.J.L. 14 PAR. 35.3 2.51 AC±
- D - RICK E. JONES ET AL D.B. 205 PG. 351 T.J.L. 14 PAR. 35.2 3.50 AC±
- E - HARLAN JUSTICE ET AL D.B. 289 PG. 999 T.J.L. 14 PAR. 35.5 3.34 AC±
- F - HARLAN JUSTICE ET AL D.B. 251 PG. 70 T.J.L. 14 PAR. 35.6 2.39 AC±
- G - MICHAEL T. LEWIS ET AL D.B. 298 PG. 880 T.J.L. 20 PAR. 38 2 AC±
- H - MICHAEL T. LEWIS ET AL D.B. 298 PG. 880 T.J.L. 20 PAR. 39 2.03 AC±

WV NORTH ZONE GRID NORTH

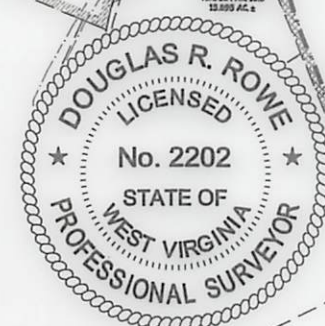


NOTE:
1 WATER WELLS WAS LOCATED WITHIN 2000' OF THE CENTER OF PROPOSED PAD

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 AVENUE PENNSBORO WEST VIRGINIA 26415



JOB # 15-047WA
DRAWING # EARNEST1HADR
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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

DOUGLAS R. ROWE P.S. 2202
DATE 09/29/17



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.

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

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
 LOCATION: ELEVATION AS DRILLED - 1,120' WATERSHED NORTH FORK HUGHES RIVER STATE COUNTY PERMIT
 QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE

SURFACE OWNER ERNEST E. ZINN ET AL ACREAGE 129.5 ACRES +/-
 OIL & GAS ROYALTY OWNER HAROLD H. BLOCH ET UX; W. J. COLLINS ET UX; MARTHA TAYLOR ET VIR; LEASE ACREAGE 131.5 AC±; 575 AC±; 44.46 AC±;
 ALFRED DEPHINO JR. ET UX; LEWIS HUFF ET UX; LEAMON DOTSON ET AL; S.A. CUNNINGHAM ET UX; F.C. GARNER ET UX; GERALD HALL ET UX 112 AC±; 164 AC±; 20 AC±; 56 AC±; 30.5 AC±; 76 AC±

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION
 OTHER PHYSICAL CHANGE IN WELL (SPECIFY) MOD POE
 PLUG & ABANDON CLEAN OUT & REPLUG ESTIMATED DEPTH 6,444' TVD 14,825' MD
 TARGET FORMATION MARCELLUS

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
 ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM
 DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT

11/06/2017

FORM MW-9

DEWEY CO 80305

CHARLESTON, WV 25313

ADDRESS 1012 MAINCOOP STREET
MATT OBERATOR ANTEKO RESOURCES CORP

ADDRESS 2400 D BIG TIGER ROAD
DESIGNATED AGENCY CT CORPORATION SYSTEM
DINIA STAMPER

TARGET FORMATION MARGELLITE
TYPE & ABANDON OPEN ONI & BEYOND

ESTIMATED DEPTH 6'44.9'

OTHER PHYSICAL CHANGE IN MATT (SPECIFY) MUD BOE

2-DIMENSIONAL X TYPE OF OLD FORMATION BEFORE/DATE NEW FORMATION X

PROPOSED WORK: DRILL COMPLET DRILL DEEPEX X REDRILL

LOCATION: ELEVATION AS DRILLED - 1150, WATERSHED NORTH FORK HUGHES RIVER

(IF "CAS") PRODUCTION X STORAGE DEEP SHALLOM X

MATT TYPE: OIL GAS X FLUID INJECTION WASTE DISPOSAL

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

DATE 08/25/17

DONALD B. BOME P.S. 5505

FOUND MONUMENT, AS NOTED

EXISTING FENCE

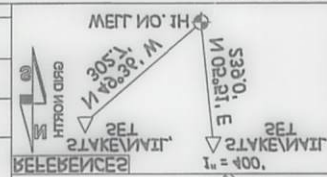
INTERIOR SURFACE TRACTS

INTERIOR SURFACE BOUNDARIES

SCALE 1" = 1000'

DRAWING # EMBR171142R

JOB # 12-0174

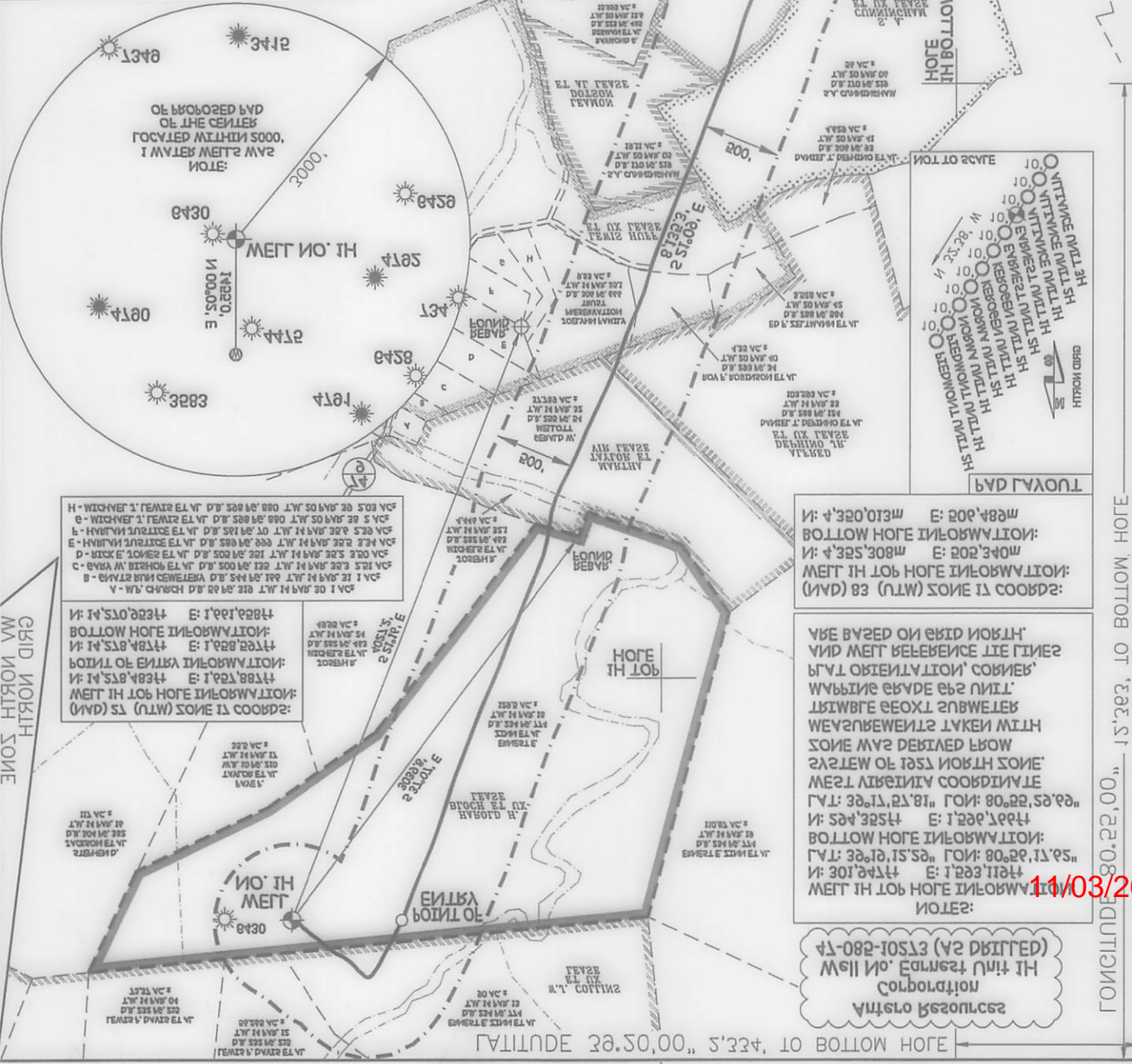
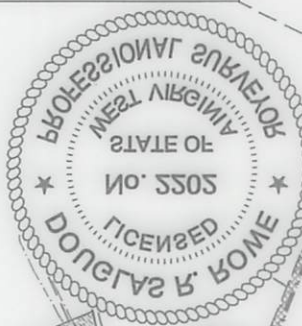


OF THE CENTER OF THE WELL NO. 1H WITHIN 200 HORIZONTAL FEET... WITHIN 200 HORIZONTAL FEET... WITHIN 200 HORIZONTAL FEET...



WEST VIRGINIA STATE
550 WASHINGTON AVENUE, BIRMINGHAM
MOUNTAIN VIEW SUBDIVISION
OFFICE OF OIL AND GAS
OF ENVIRONMENTAL PROTECTION
STATE OF WEST VIRGINIA DIVISION

THE DEPARTMENT OF ENVIRONMENTAL PROTECTION
REQUIRES BY LAW AND THE RULES ISSUED AND DESCRIBED BY
THE BEST OF ITS KNOWLEDGE AND BELIEF AND SHOWS THAT THE INFORMATION
I THE UNDERSIGNED HEREBY CERTIFY THAT THIS PLAN IS CORRECT TO



GRID NORTH
MOUNTAIN VIEW
ZONE

WELL NO. 1H
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WELL NO. 99H
WELL NO. 100H

WELL NO. 1H TOP HOGE INFORMATION:
N: 11.14, E: 11.14, ZONE 12 COORDS:
(NAD) 75 (NAD) 83 (NAD) 83

WELL NO. 2H TOP HOGE INFORMATION:
N: 11.14, E: 11.14, ZONE 12 COORDS:
(NAD) 75 (NAD) 83 (NAD) 83

WELL NO. 3H TOP HOGE INFORMATION:
N: 11.14, E: 11.14, ZONE 12 COORDS:
(NAD) 75 (NAD) 83 (NAD) 83

PERMIT NAME
COUNTY NAME

LONGITUDE 80.22,00, 15.23, 10 BOTTOM HOGE
LONGITUDE 80.22,00, 45.8,

LATITUDE 38.50,00, 5.23, 10 BOTTOM HOGE
e'100,

11/03/2017

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>Harold H. Bloch et ux Lease</u>			
Harold H. Bloch et ux	Harvey K. Haymond	1/8	0138/0632
Harvey K. Haymond	J & J Enterprises, Inc.	Assignment	0156/0715
J & J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0306/0836
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>W. J. Collins et ux Lease</u>			
William J. Collins and Sarah Collins	E. D. Willis	1/8	42/55
E. D. Willis	E.M.Treat Oil and Gas Compnay, a co-partnership composed of E.M. Treat, E.D. Willis, Gaily Myers, H.M. Myers and W.W. Dunbar	Assignment	42/58
E.M.Treat Oil and Gas Compnay, a co-partnership composed of E.M. Treat, E.D. Willis, Gaily Myers, H.M. Myers and W.W. Dunbar	Consumers Gas Utility Company	Assignment	58/450
Consumers Gas Utility Company	Charles Michael Long, Melvin R. Usmiller, and P.D. Farr II, as W. C. P. Partnership	Assignment	148/522
Charles Michael Long, Melvin R. Usmiller, and P.D. Farr II, as W. C. P. Partnership	Crude Oil and Gas, Inc.	Assignment	169/509
Crude Oil and Gas, Inc.	Clarence E. Sigley, Sr.	Assignment	260/232
Clarence E. Sigley, Sr.	Antero Resources Appalachian Corporation	Assignment	262/486
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Martha Taylor et vir Lease</u>			
Martha F. Taylor	Antero Resources Corporation	1/8+	0270/0156
<u>Alfred DePhino Jr. et ux Lease</u>			
Alfred DePhino Jr. et ux	J & J Enterprises, Inc.	1/8	0172/0327
J & J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0306/0836
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	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

Operator's Well Number

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:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Lewis Huff et ux Lease</u>			
Lewis Huff et ux	Robert P. Jackson	1/8	0155/0442
Robert P. Jackson	Kepeco, Inc.	Assignment	0168/0595
Kepeco, Inc.	Eastern Kentucky Production Company	Name Change	Exhibit 2
Eastern Kentucky Production Company	Kepeco Resources, Inc.	Assignment	0188/0061
Kepeco Resources, Inc.	Union Drilling, Inc.	Merger	CRB 0004/0322
Union Drilling, Inc.	Equitable Resources Exploration, Inc.	Merger	DB 0227/0201
Equitable Resources Exploration, Inc.	Equitable Resources Energy Company	Merger	DB 0230/0047
Equitable Resources Energy Company	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	0236/0650
Seneca-Upshur Petroleum, Inc.	Seneca-Upshur Petroleum, L.L.C.	Assignment	DB 0311/0863
Seneca-Upshur Petroleum, L.L.C.	Alliance Petroleum Corporation	Assignment	0269/0062
Alliance Petroleum Corporation	Antero Resources Appalachian Corporation	*Partial Assignment	0256/0001
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Leamon Dotson et al Lease</u>			
Leamon Dotson et al	J & J Enterprises, Inc.	1/8	0168/0677
J & J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0306/0836
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>S.A. Cunningham et ux Lease</u>			
S.A. Cunningham et ux Lease	Key Oil Company	1/8	0204/128
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0253/0747
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>F.C. Garner et ux Lease</u>			
F. C. Garner et ux	B. C. Hammond	1/8	0041/0081
B. C. Hammond	Carnegie Natural Gas	Assignment	0041/0081
Carnegie Natural Gas	Carnegie Production Company	Assignment	0228/0859
Carnegie Production Company	EQT Production Company	Certificate of Registration of Trade Name	Exhibit 3
EQT Production Company	Antero Resources Corporation	*Partial Assignment	0277/0836

*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.

WW-6A1
(5/13)

Operator's Well No. Earnest 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
Gerald Hall et ux Lease	Gerald S. Hall	Antero Resources Corporation	1/8+	0280/1004

*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

RECEIVED
Office of Oil and Gas
OCT 05 2017
WV Department of
Environmental Protection

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

Well Operator: Antero Resources Corporation
 By: Kevin Kilstrom
 Its: Senior Vice President - Production

FORM WW-6A1
EXHIBIT 1

FILED

JUN 10 2013

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.wvsof.com
E-mail: business@wvsof.com

APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY

Office Hours: Monday - Friday
8:30 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:

- Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
- Date Certificate of Authority was issued in West Virginia: 6/25/2008
- Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of incorporation.)
- Name the corporation elects to use in WV: Antero Resources Corporation
(due to home state name not being available)
- Other amendments: (attach additional pages if necessary)

- 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) 367-7310
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: *Alvyn A. Schopp* Date: June 10, 2013

**Important Legal Notice Regarding Signature:* For 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.

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Office of Oil and Gas

OCT 05 2017

WV Department of
Environmental Protection

FORM WW-6A1
EXHIBIT 2

Commonwealth of Kentucky

OFFICE OF
SECRETARY OF STATE

DREXELL R. DAVIS
Secretary



FRANKFORT,
KENTUCKY

CERTIFICATE OF AMENDMENT TO ARTICLES OF INCORPORATION

I, DREXELL R. DAVIS, Secretary of State of the Commonwealth of Kentucky, do hereby certify that Amended Articles of Incorporation of

KEPCO, INC.

CHANGING NAME TO EASTERN KENTUCKY PRODUCTION COMPANY

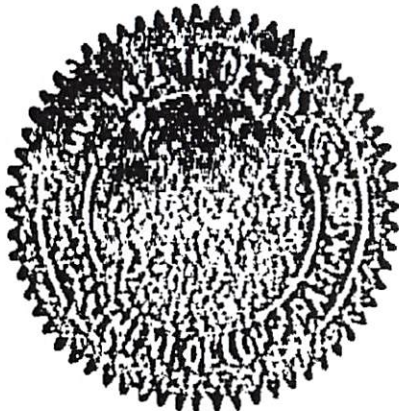
amended pursuant to Kentucky Revised Statutes, 271A, ~~(200)~~ duly signed and verified or acknowledged according to law, have been filed in my office by said corporation, and that all taxes, fees and charges payable upon the filing of said Articles of Amendment have been paid.

RECEIVED
Office of Oil and Gas

OCT 05 2017

WV Department of
Environmental Protection

Given under my hand and seal of Office as Secretary of State,
at Frankfort, Kentucky, this _____ 15TH
day of _____ AUGUST _____, 19__85__.



SECRETARY OF STATE

Drexell R. Davis
SECRETARY OF STATE

ASSISTANT SECRETARY OF STATE

11/03/2017

THE STATE OF TEXAS
COUNTY OF [illegible]

[illegible]
[illegible]

[illegible]
[illegible]

[illegible]

[illegible]

[illegible]
[illegible]

RECEIVED
OFFICE OF OIL AND GAS

OCT 10 2017

Environmental Protection
Agency Department of

[illegible]

[illegible]

[illegible]

11/03/2017

State of West Virginia



Certificate

*I, Natalie E. Tennant, Secretary of State of the
State of West Virginia, hereby certify that*

EQT PRODUCTION COMPANY

has filed a "Certificate of Registration of Trade Name" in my office according to the provisions of Chapter 47 of the West Virginia Code and was found to conform to law.

Therefore, I hereby issue this

CERTIFICATE OF REGISTRATION OF TRADE NAME

authorizing it to transact business in West Virginia under the assumed name of

CARNEGIE PRODUCTION COMPANY



*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
April 9, 2009*

Secretary of State



RECEIVED
Department of Oil and Gas

APR 05 2017

Department of
Environmental Protection



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

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

PERMIT MODIFICATION APPROVAL

March 31, 2016

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit Modification Approval for API Number 8510273, Well #: EARNEST UNIT 1H

Modified Lateral

Oil and Gas Operator:

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.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

Gene Smith
Assistant Chief of Permitting

Office of Oil and Gas

Promoting a healthy environment.

11/03/2017

WW-6B
(04/15)

API NO. 47-085 - 10273 MOD

OPERATOR WELL NO. Earnest Unit 1H

Well Pad Name: Zinn Pad

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

1) Well Operator: Antero Resources Corporat

<u>494488557</u>	<u>085 - Ritchie</u>	<u>Clay</u>	<u>Pennsboro 7.5'</u>
------------------	----------------------	-------------	-----------------------

Operator ID County District Quadrangle

2) Operator's Well Number: Earnest Unit 1H Well Pad Name: Zinn Pad

3) Farm Name/Surface Owner: Earnest E. Zinn, et al Public Road Access: CR 74/9

4) Elevation, current ground: 1135' Elevation, proposed post-construction: 1119'

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: 6700' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6700' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 15,700' MD

11) Proposed Horizontal Leg Length: 8120'

12) Approximate Fresh Water Strata Depths: 107', 431', 497'

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

14) Approximate Saltwater Depths: 1141', 1567'

15) Approximate Coal Seam Depths: 412', 741'

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: _____

Received
Office of Oil & Gas

FEB 08 2016

WW-6B
(04/15)

API NO. 47- 085 - 10273 MWD
OPERATOR WELL NO. Earnest Unit 1H
Well Pad Name: Zinn 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#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	550'	550' *see #19	CTS, 764 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2450'	2450'	CTS, 998 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	15,700'	15,700'	CTS, 3925 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	30"	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"	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			

Received
Office of Oil & Gas
FEB 08 2016

WW-6B
(10/14)

API NO. 47-085 - 10273 MOD

OPERATOR WELL NO. Earnest Unit 1H

Well Pad Name: Zinn 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 fresh water 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."

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 27.20 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.27 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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Office of Oil & Gas

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25) Proposed borehole conditioning procedures:

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.

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:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
Harold H. Bloch, et ux Lease ✓			
Harold H. Bloch, et ux	Harvey K. Haymond	1/8	0131/0670
Harvey K. Haymond	J & J Enterprises, Inc.	Assignment	0156/0715
J & J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0231/0732
Eastern American Energy Corporation	Energy Corporation of America	Assignment	0306/0836
Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
Martha Taylor, et vir Lease ✓			
Martha F. Taylor	Antero Resources Corporation	1/8+	0270/0156
Alfred DePhino, Jr., et ux Lease ✓			
Alfred M. DePhino, Jr., et ux	J & J Enterprises, Inc.	1/8	0172/0327
J & J Enterprises, Inc.	Eastern American Energy Corporation	Assignment	0231/0732
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Received
Office of Oil & Gas
FEB 08 2016

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
 Chapter 22, Article 6A, Section 5(a)(5)
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S.A. Cunningham, et ux	Key Oil Company	1/8	0204/0128
Key Oil Company	Antero Resources Appalachian Corporation	Assignment	0253/0747
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
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F.C. Garner, et ux	B.C. Hammond	1/8	0041/0081
B.C. Hammond	Carnegie Natural Gas Company	Assignment	0041/0081
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Carnegie Production Company	EQT Production Company	Certificate of Registration of Trade Name	Exhibit 3
EQT Production Company	Antero Resources Corporation	*Partial Assignment	0277/0836

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CONTINUED ON NEXT PAGE

Received
 Office of Oil & Gas
 FEB 08 2016

WW-6A1
(5/13)

Operator's Well No. Earnest Unit 1H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
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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
<u>Gerald Hall Lease</u>	Gerald S. Hall	Antero Resources Corporation	1/8+	0280/1006

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

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

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

Received
Office of Oil & Gas
FEB 08 2016

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 *[Signature]*
Its: Senior VP of Production

FORM WW-6A1
EXHIBIT 1

FILED

JUN 10 2013

Fernoy Barker, Manager
IN THE OFFICE OF
SECRETARY OF STATE
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wv.gov
E-mail: business@wv.gov



APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY
Office Hours: Monday - Friday
8:30 a.m. - 5:00 p.m. ET

Natalie E. Tennant
Secretary of State
1900 Kanawha Blvd E
Bldg 1, Suite 157K
Charleston, WV 25305
FILE ONE ORIGINAL
(We'll 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 Appalachian Corporation

2. Date Certificate of Authority was issued in West Virginia: 6/26/2008

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, having a contact person and phone number may avoid having to return or reject the document.)
Alvyn A. Schopp (303) 367-7310

Contact Name: Alvyn A. Schopp
Phone Number: (303) 367-7310

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

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

Important Legal Notice Regarding Signatures For West Virginia Code §33B-1-122, 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.

Form CF-4

Issued by the Office of the Secretary of State

Revised 4/13

Received
Office of Oil & Gas
FEB 08 2016

85-610273 WAD

Commonwealth of Kentucky

OFFICE OF
SECRETARY OF STATE

DREXELL R. DAVIS
Secretary



FRANKFORT,
KENTUCKY

CERTIFICATE OF AMENDMENT TO ARTICLES OF INCORPORATION

I, DREXELL R. DAVIS, Secretary of State of the Commonwealth of Kentucky, do hereby certify that Amended Articles of Incorporation of

KEPCO, INC.

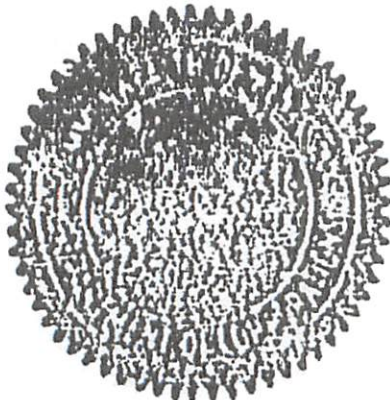
CHANGING NAME TO EASTERN KENTUCKY PRODUCTION COMPANY

amended pursuant to Kentucky Revised Statutes, 271A, ~~(273)~~ duly signed and verified or acknowledged according to law, have been filed in my office by said corporation, and that all taxes, fees and charges payable upon the filing of said Articles of Amendment have been paid.

Received
Office of Oil & Gas

FEB 08 2016

Given under my hand and seal of Office as Secretary of State,
at Frankfort, Kentucky, this _____ 15TH
day of _____ AUGUST _____, 19__05__.



SECRETARY OF STATE

Drexell R. Davis
SECRETARY OF STATE

ASSISTANT SECRETARY OF STATE

State of West Virginia



Certificate

*I, Natalie E. Tennant, Secretary of State of the
State of West Virginia, hereby certify that*

EQT PRODUCTION COMPANY

has filed a "Certificate of Registration of Trade Name" in my office according to the provisions of Chapter 47 of the West Virginia Code and was found to conform to law.

Therefore, I hereby issue this

CERTIFICATE OF REGISTRATION OF TRADE NAME

authorizing it to transact business in West Virginia under the assumed name of

CARNEGIE PRODUCTION COMPANY

Received
Office of Oil & Gas
FEB 08 2016



*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
April 9, 2009*

Natalie E. Tennant
Secretary of State