



---

west virginia department of environmental protection

---

Office of Oil and Gas  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304  
(304) 926-0450  
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Monday, October 29, 2018  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / Horizontal 6A Well - 1

ANTERO RESOURCES CORPORATION  
1615 WYNKOOP STREET  
DENVER, CO 80202

Re: Permit Modification Approval for KAREN UNIT 1H  
47-085-10215-00-00

**Bottom Hole Extension with Lease update(s)**

ANTERO RESOURCES CORPORATION

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

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

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

James A. Martin  
Chief

Operator's Well Number: KAREN UNIT 1H  
Farm Name: LYNWOOD IRELAND  
U.S. WELL NUMBER: 47-085-10215-00-00  
Horizontal 6A Horizontal 6A Well - 1  
Date Modification Issued: 10/28/2018

Promoting a healthy environment.

WW-6B  
(04/15)

**API# 47-085-10215 PERMIT MODIFICATION**

API NO. 47-085 - 10215

OPERATOR WELL NO. Karen Unit 1H

Well Pad Name: Ireland North 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>Union</u>	<u>Pullman 7.5'</u>
------------------	---------------------	--------------	---------------------

  
Operator ID County District Quadrangle

2) Operator's Well Number: Karen Unit 1H Well Pad Name: Ireland North Pad

3) Farm Name/Surface Owner: Ireland, Lynwood et al Public Road Access: CR 9

4) Elevation, current ground: 945.5' Elevation, proposed post-construction: \_\_\_\_\_

5) Well Type (a) Gas  Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_

Other \_\_\_\_\_

(b) If Gas Shallow  Deep \_\_\_\_\_

Horizontal  \_\_\_\_\_

*Michael Hoff  
8-16-18*

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 50 feet, Associated Pressure 3000#

8) Proposed Total Vertical Depth: 6800' TVD

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 23300' MD

11) Proposed Horizontal Leg Length: 13282'

12) Approximate Fresh Water Strata Depths: 69', 279', 359'

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

14) Approximate Saltwater Depths: 1451', 1807'

15) Approximate Coal Seam Depths: 343'

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: \_\_\_\_\_

WW-6B  
(04/15)

**API# 47-085-10215 PERMIT MODIFICATION**

API NO. 47- 085 - 10215

OPERATOR WELL NO. Karan Unit 1H

Well Pad Name: Ireland North 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#	410'	410' *See #19	CTS, 570 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	23300'	23300'	5999 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			

MAG  
8-16-19

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 air drills 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."

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 28.70 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.09 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

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.



**API# 47-085-10215 PERMIT MODIFICATION**

47085086810000

47085073310000

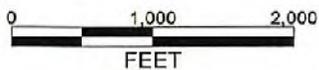
47085071500000

RECEIVED  
Office of Oil and Gas  
JUL 10 2018  
WV Department of  
Environmental Protection



Antero Resources Corporation

Karen West Unit 1H



WELL SYMBOLS  
Gas Well

July 5, 2018

UWI (APINum)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perforated
47085071500000	IRELAND HEIRS	3	HARPER CROSBY HOLDNG	RARE EARTH ENERGY	5,150	3252 - 5063	Warren, Lower Huron, Angola Fm	Big Injun, Weir, Alexander
47085073310000	IRELAND HEIRS	7	HARPER CROSBY HOLDNG	RARE EARTH ENERGY	5000	3084 - 4890	Big Lime, Udev undf:Ber/LoHURN, Speechley, Bradford, Riley, Alexander	Benson, Big Injun, Weir
47085086810000	IRELAND W	1	KEY OIL COMPANY	KEY OIL COMPANY	5305	3300 - 5149	Warren, Speechely, Balltown, Riley, Benson, Misc Sands - BSN/BRLR, Alexander	Bradford, Big Injun, Weir

**API# 47-085-10215 PERMIT MODIFICATION**

RECEIVED  
Office of Oil and Gas

JUL 10 2018

WV Department of  
Environmental Protection

WW-6A1  
(5/13)

Operator's Well No. Karen Unit 1H

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

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

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

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>The Winston Love Family Trust Lease</u>	The Winston Love Family Trust	Antero Resources Corporation	1/8+	0312/0665

\*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  
  
JUL 10 2018  
  
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 VP - Production

WW-6A1

Operator's Well Number Karen 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:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>Belle Pritchard Lease</u></b>			
Belle Pritchard	Ritchie A. Ireland	1/8	0077/0019
Ritchie A. Ireland	S.M.Vokel, H.R. Jackson, Sam T. Mallison, & Charles E. Young	Assignment	0080/0386
S.M. Vokel, H.R. Jackson, Sam T. Mallison, & Charles E. Young	Warren Associates, Inc.	Assignment	0126/0464
Warren Associates, Inc.	Haught, Inc.	Affidavit	0170/0461
Haught, Inc.	Haught Oil Producing Corporation	Merger	Exhibit 2
Haught Oil Producing Corporation	710 Corporation	Assignment	0180/0791
710 Corporation	Lynwood K. Ireland	Assignment	0204/0553
Lynwood K. Ireland	Antero Resources Appalachian Corporation	Partial Assignment of Oil & Gas Leases	0255/0652
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>W. P. Ireland, et ux Lease</u></b>			
W.P. Ireland & L.M. Ireland	M.G. Taylor	1/8	0032/0016
M.G. Taylor	Carnegie Natural Gas Company	Assignment	Recited in 0068/0188
Carnegie Natural Gas Company	Coffman Oil & Gas Company	Assignment	0068/0188
Coffman Oil & Gas Company	United Operating Company, Inc.	Assignment	0117/0660
United Operating Company, Inc.	Buttes Resources Company	Assignment	0117/0738
Buttes Resources Company	Earl Stewart	Assignment	0128/0286
Earl Stewart	JCC	Assignment	0205/0483
JCC	Key Oil Company	Assignment	0229/0019
Key Oil Company	Antero Resources Appalachian Corporation	Partial Assignment of Oil & Gas Leases	0253/0747
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Joyce E. Webber Lease</u></b>			
Joyce E. Webber	Antero Resources Appalachian Corporation	1/8+	0254/0999
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Phyllis Jean Knight Lease</u></b>			
Phyllis Jean Knight	Antero Resources Corporation	1/8+	0279/0197

RECEIVED  
Office of Oil and Gas  
JUL 10 2018  
WV Department of  
Environmental Protection

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

\*\*CONTINUED ON NEXT PAGE\*\*

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
<b>Zimry Flanagan, et ux Lease</b>			
Zimry Flanagan, et ux	Carter Oil Company	1/8	10/457
Carter Oil Company	Hope Construction and Refining Company	Assignment	52/194
Hope Construction and Refining Company	Hope Natural Gas Company	Conveyence	111/520
Hope Natural Gas Company	Consolidated Gas Supply Corporation	Conveyence	151/436
Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	169/756
Consolidated Gas Transmission Corporation	CNG Development Company	Assignment	176/601
CNG Development Company	CNG Producing Company	Merger	211/100
CNG Producing Company	CNX Gas Company, LLC	Merger	Exhibit 3
CNX Gas Company, LLC	Antero Resources Corporation	Assignment	284/168
<b>Earl E. Flesher, et al Lease</b>			
Earl E. Flesher, et al	Antero Resources Appalachian Corporation	1/8+	0254/0385
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b>Donald C. Morris, et al Lease</b>			
Donald C. Morris, et al	Chesapeake Appalachia, LLC	1/8	249/678
Chesapeake Appalachia, LLC	Statoil USA Onshore Properties, Inc	Assignment	252/1036
Statoil USA Onshore Properties, Inc	Antero Resources Corporation	Assignment	301/194
<b>Earl E. Flesher Lease</b>			
Earl E. Flesher	Antero Resources Appalachian Corporation	1/8+	0254/0383
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b>Lynwood Ireland, et ux Lease</b>			
Lynwood Ireland, et ux	Antero Resources Corporation	1/8+	304/938
<b>Elsie O. Bonnell, et al Lease</b>			
Elsie O. Bonnell, et al	Petroleum Services, Inc	1/8	128/134
Petroleum Services, Inc	J & J Enterprises	Agreement	132/572
J & J Enterprises	Eastern American Energy Corporation	Assignment	231/732
Eastern American Energy Corporation	Energy Corporation of America	Assignment	250/393
Energy Corporation of America	Antero Resources Corporation	Agreement	313/252
<b>Carolyn Ercanbrack Lease</b>			
Carolyn Ercanbrack	Antero Resources Appalachian Corporation	1/8+	0255/0170
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

RECEIVED  
Office of Oil and Gas  
JUL 10 2018  
WV Department of Environmental Protection

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

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](http://www.wvsof.com)  
E-mail: [business@wvsof.com](mailto: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

RECEIVED  
Office of Oil and Gas

JUL 10 2013

WV Department of  
Environmental Protection

**\*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.



*I, Ken Heckler, Secretary of State of the  
State of West Virginia, hereby certify that*  
THE FOLLOWING IS A TRUE AND CORRECT COPY OF THE ARTICLES OF MERGER  
OF:

HAUGHT, INC., A WEST VIRGINIA CORPORATION AND HAUGHT OIL  
PRODUCING CORP., A UTAH CORPORATION DULY SIGNED AND VERIFIED  
PURSUANT TO THE PROVISIONS OF SECTION 36, ARTICLE 1, CHAPTER  
31 OF THE CODE OF WEST VIRGINIA, 1931, AS AMENDED, HAVE  
BEEN RECEIVED AND ARE FOUND TO CONFORM TO LAW.

ACCORDINGLY, I HEREBY ISSUE THIS CERTIFICATE OF MERGER, MERGING  
HAUGHT, INC., WITH AND INTO HAUGHT OIL PRODUCING CORP., THE  
SURVIVOR AND ATTACH A DUPLICATE ORIGINAL OF SAID ARTICLES  
OF MERGER AS APPEARS FROM THE RECORDS OF MY SAID OFFICE.

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



TWELFTH \_\_\_\_\_ day of  
JANUARY 19 87

*Ken Heckler*  
Secretary of State.

RECEIVED  
Office of Oil and Gas  
JUL 10 2018  
WV Department of Environmental Protection

FORM WW-6A1  
EXHIBIT 3

# State of West Virginia



## Certificate

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

by the provisions of the West Virginia Code, Articles of Merger were received and filed,  
MERGING CONSOL GAS COMPANY, A QUALIFIED DE ORGANIZATION, WITH AND INTO CNX GAS COMPANY L.L.C. A  
QUALIFIED VA ORGANIZATION.

Therefore, I hereby issue this

### CERTIFICATE OF MERGER

RECEIVED  
Office of Oil and Gas

JUL 10 2018

WV Department of  
Environmental Protection



*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
January 5, 2011*

*Natalie E. Tennant*

Secretary of State

LATITUDE 39°12'30"

6,908'

LATITUDE 39°10'00"

5,306' TO BOTTOM HOLE

LONGITUDE 80°52'30"

11,190' TO BOTTOM HOLE

12,963'

LONGITUDE 80°52'30"

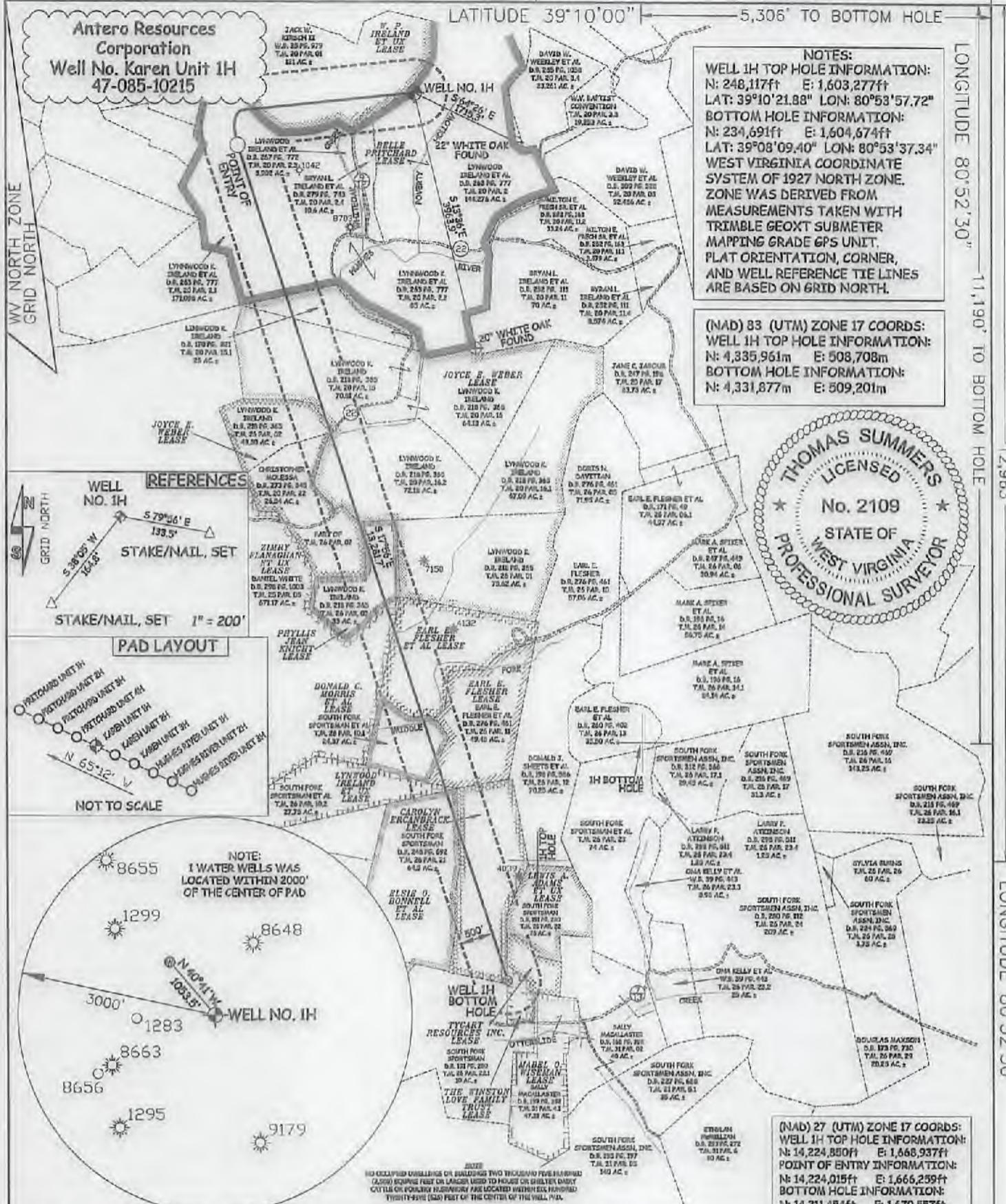
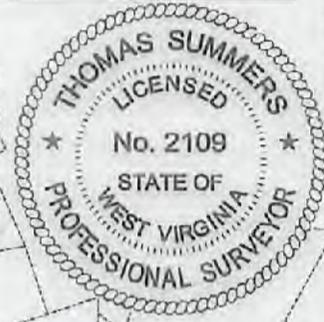
COUNTY NAME

PERMIT

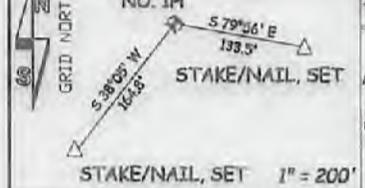
Antero Resources Corporation  
Well No. Karen Unit 1H  
47-085-10215

NOTES:  
WELL 1H TOP HOLE INFORMATION:  
N: 248,117ft E: 1,603,277ft  
LAT: 39°10'21.88" LON: 80°53'57.72"  
BOTTOM HOLE INFORMATION:  
N: 234,691ft E: 1,604,674ft  
LAT: 39°08'09.40" LON: 80°53'37.34"  
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE 6PS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

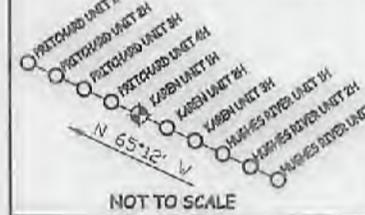
(NAD) 83 (UTM) ZONE 17 COORDS:  
WELL 1H TOP HOLE INFORMATION:  
N: 4,335,961m E: 508,708m  
BOTTOM HOLE INFORMATION:  
N: 4,331,877m E: 509,201m



REFERENCES



PAD LAYOUT



NOT TO SCALE



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

NO OCCUPIED CHALLENGE OR SURVEYING TWO THOUSAND FEET SURROUND (2,000) SURROUND FEET OR LARGER LEASE TO HOUSE OR SHEDS OR OTHER BUILT COTTAGE OR FURNITURE OR OTHERWISE ARE LOCATED WITHIN SIX HUNDRED THIRTY-THREE (633) FEET OF THE CENTER OF THE WELL PAD.

(NAD) 27 (UTM) ZONE 17 COORDS:  
WELL 1H TOP HOLE INFORMATION:  
N: 14,224,850ft E: 1,668,937ft  
POINT OF ENTRY INFORMATION:  
N: 14,224,015ft E: 1,666,259ft  
BOTTOM HOLE INFORMATION:  
N: 14,211,454ft E: 1,670,557ft

JOB # 14-127WA  
DRAWING # KAREN1HRS  
SCALE 1" = 2000'  
MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS  
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

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



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

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

THOMAS SUMMERS P.S. 2109  
DATE 06/26/18  
OPERATOR'S WELL# KAREN UNIT #1H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL  
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X  
LOCATION: ELEVATION 945.5' AS BUILT WATERSHED SOUTH FORK HUGHES RIVER  
QUADRANGLE PULLMAN 7.5' DISTRICT UNION COUNTY RITCHIE  
SURFACE OWNER LYNWOOD IRELAND ET AL ACREAGE 144.276 ACRES +/-  
OIL & GAS ROYALTY OWNER BELLE PRITCHARD; W. P. IRELAND ET UX; JOYCE E. WEBER; JOYCE E. WEBER; PHYLLIS JEAN KNIGHT; ZIMRY FLANAGHAN ET UX; EARL E. FLESHER ET AL; DONALD C. MORRIS ET AL LEASE ACREAGE 415 AC +/- 272 AC +/- 445.67 AC +/- 69.84 AC +/- 33 AC +/- 671.17 AC +/- 57 AC +/- 24.37 AC +/- 82 AC +/- 27.75 AC +/- 84.25 AC +/- 84.5 AC +/- 7.25 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 23,300' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD  
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

LATITUDE 39°12'30"

6,908'

LATITUDE 39°10'00"

5,306' TO BOTTOM HOLE

LONGITUDE 80°52'30"

11,190' TO BOTTOM HOLE

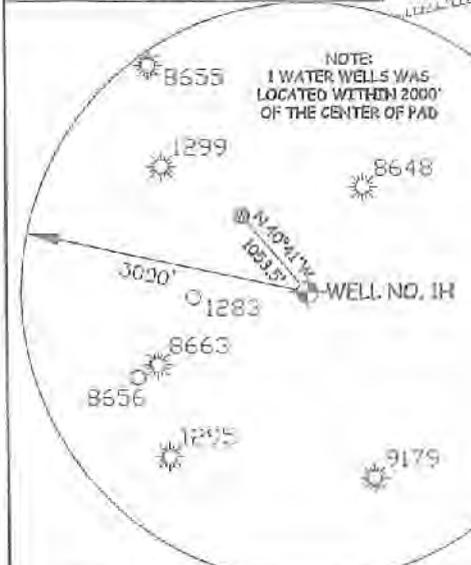
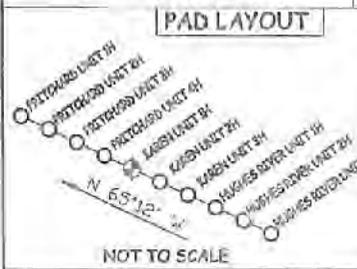
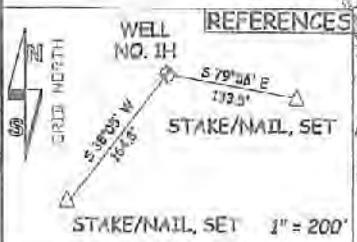
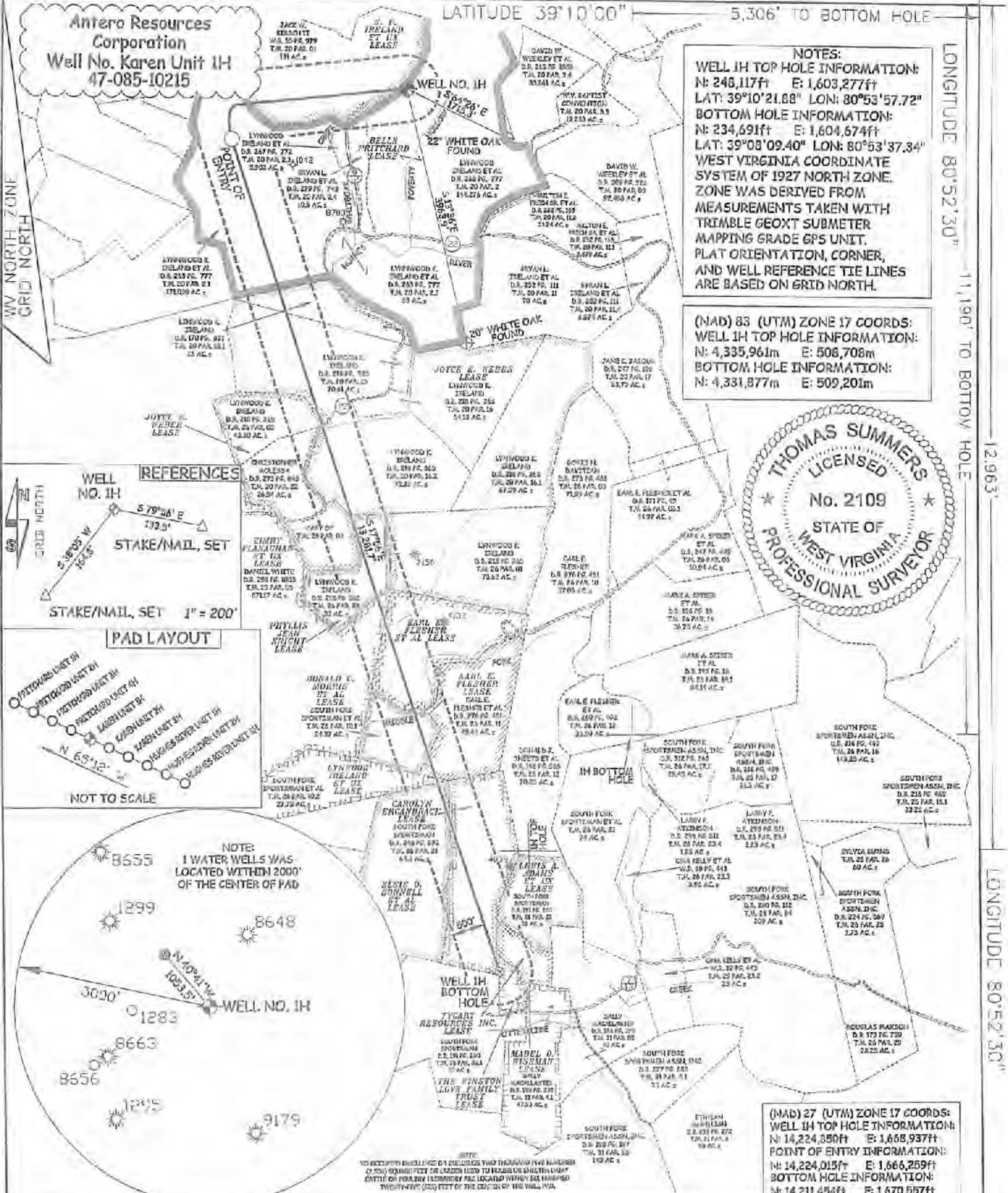
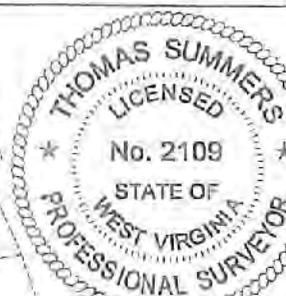
12,963'

LONGITUDE 80°52'30"

Antero Resources Corporation  
Well No. Karen Unit 1H  
47-085-10215

NOTES:  
WELL 1H TOP HOLE INFORMATION:  
N: 248,117ft E: 1,603,277ft  
LAT: 39°10'21.88" LON: 80°53'57.72"  
BOTTOM HOLE INFORMATION:  
N: 234,691ft E: 1,604,674ft  
LAT: 39°08'09.40" LON: 80°53'37.34"  
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: 4,335,961m E: 508,708m  
BOTTOM HOLE INFORMATION:  
N: 4,331,877m E: 509,201m



JOB # 14-127WA  
DRAWING # KAREN1HR3  
SCALE 1" = 2000'  
MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS  
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

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



LEGEND  
Surface Owner Boundary Lines +/-  
Interior Surface Tracts +/-  
Existing Fence  
Found monument, as noted  
THOMAS SUMMERS P.S. 2109  
DATE 08/28/18  
OPERATOR'S WELL # KAREN UNIT #1H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL  
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X  
LOCATION: ELEVATION 945.5' AS BUILT WATERSHED SOUTH FORK HUGHES RIVER  
QUADRANGLE PULLMAN 7.5' DISTRICT UNION COUNTY RITCHIE  
SURFACE OWNER LYNWOOD IRELAND ET AL ACREAGE 144.276 ACRES +/-  
OIL & GAS ROYALTY OWNER BELLE PRITCHARD; W. P. IRELAND ET UX; JOYCE E. WEBER; JOYCE E. WEBER; PHYLIS JEAN KNIGHT; ZIMRY FLANAGHAN ET UX; EARL E. FLESHER ET AL; DONALD C. MORRIS ET AL; EARL E. FLESHER; LYNWOOD IRELAND ET UX; ELSIE O. BONNELL; CAROLYN ERCAMBRACK; THE WINSTON LOVE FAMILY TRUST LEASE ACREAGE 415 AC; 222 AC; 445.67 AC; 69.84 AC; 33 AC; 671.17 AC; 57 AC; 24.37 AC; 82 AC; 27.75 AC; 84.25 AC; 64.5 AC; 7.25 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 23,300' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD  
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT



