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west virginia department of environmental protection

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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, July 22, 2019  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / Horizontal 6A Well - 1

ANTERO RESOURCES CORPORATION  
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for PIPER UNIT 2H  
47-085-10292-00-00

**Modified Well Bore Design**

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 blue ink signature of James A. Martin, written in a cursive style.

James A. Martin  
Chief

Operator's Well Number: PIPER UNIT 2H  
Farm Name: DARRELL A. NOLAND ET AL  
U.S. WELL NUMBER: 47-085-10292-00-00  
Horizontal 6A Horizontal 6A Well - 1  
Date Modification Issued: July 22, 2019

Promoting a healthy environment.

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

1) Well Operator: Antero Resources Corporation 494507062 085 - Ritchie Clay Pennsboro 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Piper Unit 2H Well Pad Name: Noland Pad

3) Farm Name/Surface Owner: Darrell A. Noland, et al Public Road Access: CR 50/22

4) Elevation, current ground: 1143' Elevation, proposed post-construction: 1143'

5) Well Type (a) Gas  Oil  Underground Storage

Other

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale: 6425' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6425' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 15093' MD

11) Proposed Horizontal Leg Length: 8022'

12) Approximate Fresh Water Strata Depths: 54', 135', 227'

13) Method to Determine Fresh Water Depths: Fresh Water Depths from Penns Park Unit 1H (API# 47-085-10099) on same pad.

14) Approximate Saltwater Depths: 1658', 1705', 1747'

15) Approximate Coal Seam Depths: 798', 1225'

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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**API# 47-085-10292 PERMIT MODIFICATION**

18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<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#	300'	300'	CTS, 417 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#	15093'	15093'	3758 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

<b>TYPE</b>	<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-HPOZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

**PACKERS**

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

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**API# 47-085-10292 PERMIT MODIFICATION**

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

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

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."  
  
Anticipated Max Pressure - 9300 lbs  
Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 18.62 acres

22) Area to be disturbed for well pad only, less access road (acres): 8.85 acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers  
Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.  
Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.  
Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

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24) Describe all cement additives associated with each cement type:

Conductor: no additives, Class A cement.  
Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake  
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat  
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51  
Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

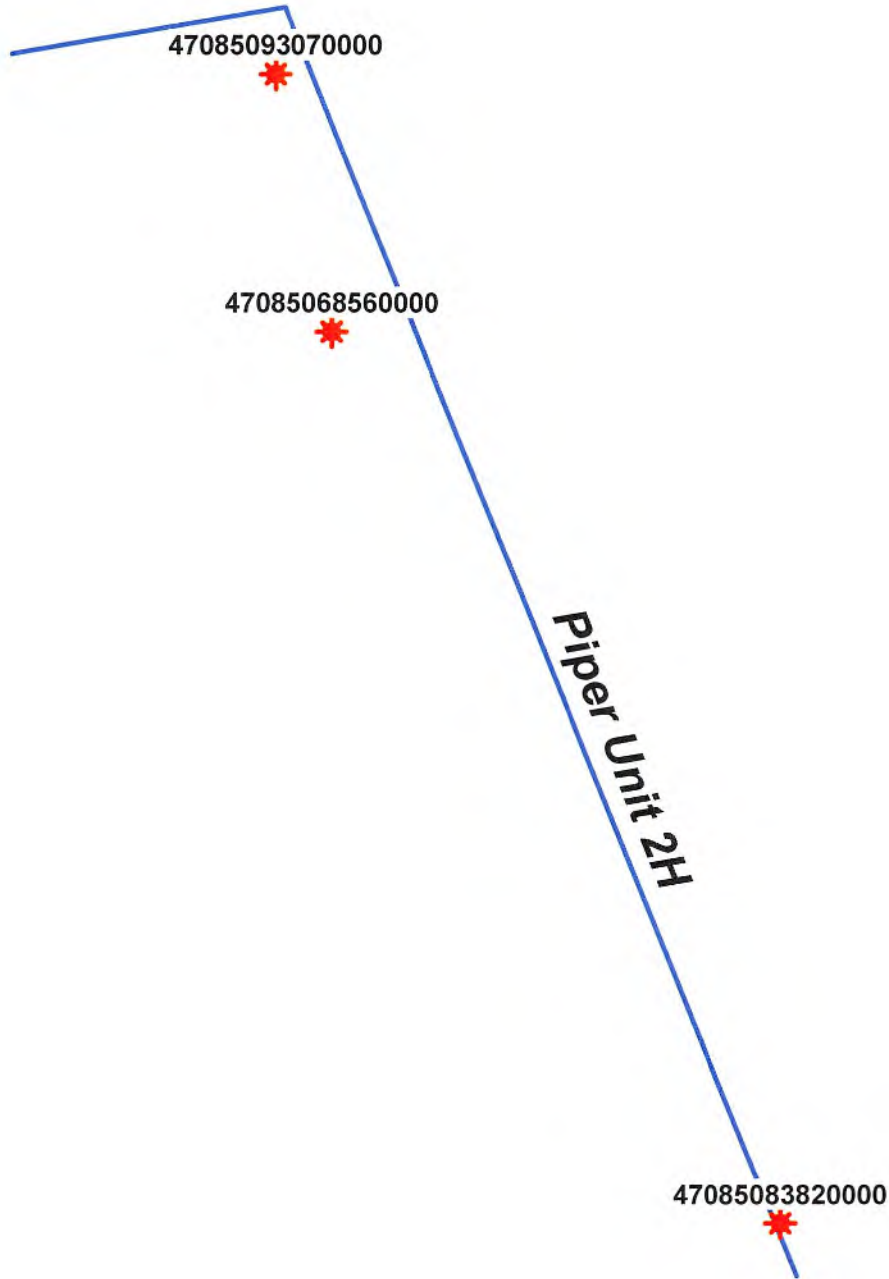
25) Proposed borehole conditioning procedures:

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.



# AOR Western-Piper Units



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PIPER UNIT 2H (NOLAND PAD) - AREA OF REVIEW 35-8-5.11 PAGE 2

**API# 47-085-10292 PERMIT MODIFICATION**

UWI (API#)	Well Name	Operator	TD	ELEV GR	TD (SSIVD)	Gross Perf Interval (ft)	Producing Formations	Producible formations not Perf'd
47085093070000	DULANEY R	KEY OIL COMPANY	5344	1030	-4314	4533-5170	Riley, Benson, Alexander	Keener, Big Injun, Weir, Berea, Gordon, Warren, Speechley, Baltman, Bradford
47085068560000	HUMPHREY R.A ET UX	LIPPIZAN PETRO INCOR	5300	1076	-4224	3462-5200	Lower Huron, Angola	Keener, Big Injun, Weir, Berea, Gordon, Warren, Speechley, Baltman, Bradford, Alexander, Riley, Benson
47085083820000	ITERRELL MICHAEL D & DEBRA K	ENERGY CORP OF AMER	5217	960	-4257	4433-5079	Riley, Benson, Alexander	Keener, Big Injun, Weir, Berea, Gordon, Warren, Speechley, Baltman, Bradford

\*All formations listed as "producible formations" have been filed out using data from the WISIS website near the area of interest.

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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>The Haught Family Trust Lease</u></b>			
The Haught Family Trust, Ira M. Haught, Trustee	Antero Resources Corporation	1/8+	0272/0974
<b><u>Mary V. Wedekamm Lease</u></b>			
Mary V. Wedekamm	Kepeco, Inc.	1/8	0161/0687
Kepeco, Inc.	Union Drilling, Inc.	Merger	Corporation Record 0004/0322
Union Drilling, Inc.	Equitable Resources Exploration, Inc.	Merger	Corporation Record 0004/0673
Equitable Resources Exploration, Inc.	Equitable Resources Energy Company	Confirmatory Deed & Assignment	0230/0047
Equitable Resources Energy Company	Mike Ross, Inc.	Assignment	0223/0575
Mike Ross, Inc.	Antero Resources Appalachian Corporation	Assignment	0262/0164
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>C.E. Giebell Lease</u></b>			
C.E. Giebell	Gene Stalnaker	1/8	0161/0644
Gene Stalnaker	Angus Energy, Inc.	Assignment	0212/0137
Angus Energy, Inc.	Stalnaker Energy, Inc.	Merger/Name Change	0006/0225
Stalnaker Energy, Inc.	Antero Resources Appalachian Corporation	Assignment	0263/1065
Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation	Name Change	Exhibit 1
<b><u>David L. Maple Lease</u></b>			
David L. Maple	Key Oil Company	1/8	0237/0176
Key Oil Company	Antero Resources Appalachian Corporation	*Partial Assignment	253/747
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>Steven Edge Lease</u></b>			
Steven Edge	Antero Resources Corporation	1/8+	0278/0790
<b><u>Byron Taylor, et al Lease</u></b>			
Byron Taylor, et al	Key Oil Company	1/8	0239/0402
Key Oil Company	Antero Resources Appalachian Corporation	*Partial Assignment	0253/0747
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<b><u>James E. Vogt, et ux Lease</u></b>			
James Vogt, et ux	Antero Resources Corporation	1/8+	0276/0421
<b><u>Hummer Properties, LLC Lease</u></b>			
Hummer Properties, LLC	Antero Resources Corporation	1/8+	0267/0662

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\*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.

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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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Cinda Fleming Lease</u> Cinda Fleming	Antero Resources Corporation	1/8+	0290/0708
<u>Fondella Beachler Lease</u> Fondella Beachler	Antero Resources Corporation	1/8+	0280/0498
<u>Charity Gas, Inc. Lease</u> Charity Gas, Inc.	Antero Resources Corporation	1/8+	0301/0306
<u>Charity Gas, Inc. Lease</u> Charity Gas, Inc.	Antero Resources Corporation	1/8+	0300/0306
<u>Stephen Brookover Lease</u> Stephen Brookover	Antero Resources Corporation	1/8+	0272/1081
<u>David R. Hogue Lease (8-2-105)</u> David R. Hogue	Antero Resources Corporation	1/8+	0270/0860
<u>Olin F. Ingram Lease</u> Olin F. Ingram, LE and Megan Ingram, Remainderman	Antero Resources Corporation	1/8+	0281/0737
<u>Wm. H. Ingram, Sr. Lease</u> William H. Ingram, Sr.	Antero Resources Corporation	1/8+	0269/0603
<u>Stephen G. Doak Lease</u> Stephen G. Doak	Antero Resources Corporation	1/8+	0275/0954
<u>Wm. H. Ingram, Jr. Lease</u> William H. Ingram, Jr.	Antero Resources Corporation	1/8+	0270/0332
<u>Michael Nichols Lease</u> Michael Nichols	Antero Resources Corporation	1/8+	0270/0631
<u>S &amp; H Properties, LLC Lease</u> S & H Properties, LLC	Antero Resources Corporation	1/8+	0270/1028

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Rebecca J. Lanham Lease</u> Rebecca J. Lanham	Antero Resources Corporation	1/8+	0271/0611
<u>Lawrence E. George Lease</u> Lawrence E. George	Antero Resources Corporation	1/8+	0269/0340
<u>Nancy H. Hoffman Lease</u> Nancy H. Hoffman	Antero Resources Corporation	1/8+	0275/0024
<u>Margaret G. Lemasters Lease</u> Margaret G. Lemasters	Antero Resources Corporation	1/8+	0272/0198
<u>Gary W. McCloy Lease</u> Gary W. McCloy	Antero Resources Corporation	1/8+	0299/0977
<u>Lawrence J. Manning Lease</u> Lawrence J. Manning	Antero Resources Corporation	1/8+	0271/0248
<u>Pennsboro Church of Christ Lease</u> Pennsboro Church of Christ	Antero Resources Corporation	1/8+	0274/0151
<u>William J. Britton, et al Lease</u> William J. Britton & Renee Britton	Antero Resources Corporation	1/8+	0302/0214
<u>Scott A. Hammond Lease</u> Scott A. Hammond	Antero Resources Corporation	1/8+	0299/0573
<u>Steven D. Davis, et ux Lease</u> Steven D. Davis, et ux	Antero Resources Corporation	1/8+	0273/0312
<u>Meghan A. Clovis Lease</u> Meghan A. Clovis	Antero Resources Corporation	1/8+	0300/0224
<u>Kathryn E. Summers Lease</u> Kathryn E. Summers	Antero Resources Corporation	1/8+	0278/0750
<u>Pamela J. Yeater Lease</u> Pamela J. Yeater	Antero Resources Corporation	1/8+	0300/0164
<u>Trustees of the Pennsboro United Methodist Church of Christ Lease</u> Trustees of the Pennsboro United Methodist Church	Antero Resources Corporation	1/8+	0300/0889

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Virgil H. Wilson Lease</u> Virgil H. Wilson	Antero Resources Corporation	1/8+	0270/0326
<u>Ronald Miracle Lease</u> Ronald Miracle	Antero Resources Corporation	1/8+	0268/0389
<u>Jerry A. Donely Lease (8-5-87.1)</u> Jerry A. Donely	Antero Resources Corporation	1/8+	0270/0153
<u>Jerry A. Donely Lease (8-5-88)</u> Jerry A. Donely	Antero Resources Corporation	1/8+	0299/0332
<u>Bradley Bailey, et al Lease</u> Bradley Bailey, et al	Antero Resources Corporation	1/8+	0270/0367
<u>WVSRA Lease</u> West Virginia State Rail Authority	Antero Resources Corporation	1/8+	0253/0409
<u>Waco Oil &amp; Gas Lease</u> Waco Oil & Gas	Antero Resources Corporation	1/8+	0299/0172
<u>Jesse Lee Jones, et al Lease</u> Jesse Lee Jones, et al	Antero Resources Corporation	1/8+	0300/0105
<u>Judy Richards Lease</u> Judy Richards	Antero Resources Corporation	1/8+	0270/0806
<u>Leon Utter, Jr., et al Lease</u> Leon Utter, Jr., et al	Antero Resources Corporation	1/8+	0270/0655

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WW-6A1  
(5/13)

Operator's Well No. Piper Unit 2H  
**API# 47-085-10292 PERMIT MODIFICATION**

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Michael Terrell, et ux Lease</u>	Michael Terrell, et ux	Eastern American Energy Corporation	1/8	0220/0038
	Eastern American Energy Corporation	Energy Corporation of America	Merger	0006/0450
	Energy Corporation of America	Antero Resources Appalachian Corporation	Assignment	0257/0377
	Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

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

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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 Vice President, Production

85-10292 MOD

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

- 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) 357-7310  
Contact Name Phone Number

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JUN 10 2013

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- Signature information (See below *\*Important Legal Notice Regarding Signature\**):  
Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person  
Signature: [Handwritten Signature] 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.

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47-085-10292 County Ritchie District Clay  
Quad Pennsboro 7.5' Pad Name Noland Pad Field/Pool Name ----  
Farm name Darrell A. Noland et al Well Number Piper Unit 2H  
Operator (as registered with the OOG) Antero Resources Corporation  
Address 1615 Wynkoop Street City Denver State CO Zip 80202

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As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4349943m Easting 501905m  
Landing Point of Curve Northing 4349943m Easting 502410m  
Bottom Hole Northing 4347767m Easting 503307m

APR 5 2018  
WV Department of Environmental Protection

Elevation (ft) 1143' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine  
Mud Type(s) and Additive(s)  
Air - Foam & 4% KCL  
Mud - Polymer

Date permit issued 08/31/2016 Date drilling commenced 10/20/2016 Date drilling ceased 4/14/2017  
Date completion activities began 08/14/2017 Date completion activities ceased 11/14/2017  
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 43', 124', 216' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 1112' Void(s) encountered (Y/N) depths No  
Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths No  
Is coal being mined in area (Y/N) No

Reviewed by: \_\_\_\_\_

Reviewed

MBC 5-9-2018

API 47-085 - 10292 Farm name Darrell A. Noland et al Well number Piper Unit 2H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	65'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	365'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2532'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	15093'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6845'		4.7#, N-80		
Packer type and depth set		N/A					

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	102 sx	15.6	1.18	120	0'	8 Hrs.
Surface	Class A	430sx	15.6	1.19	512	0'	8 Hrs.
Coal							
Intermediate 1	Class A	1010sx	15.6	1.18	1192	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	838 sx (Lead) 1172 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.44 (Lead), 1.87 (Tail)	3398	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15093' MD, 6425' TVD (BHL), 12142' (Deepest Point Drilled) Loggers TD (ft) 15093' MD  
 Deepest formation penetrated Marcellus Plug back to (ft) Office of Oil and Gas  
 Plug back procedure N/A

APR 25 2018

Kick off depth (ft) 6018' WV Department of Environmental Protection

Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

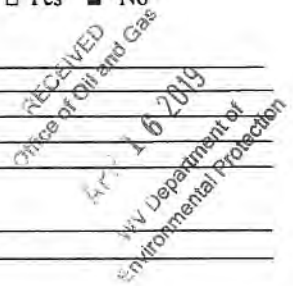
Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING \_\_\_\_\_  
 Conductor - 0  
 Surface - 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface  
 Intermediate - 1 above float joint, 1 above float collar, 1 every 4th joint to surface  
 Production - 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED N/A



LATITUDE 39°20'00"

5,588'

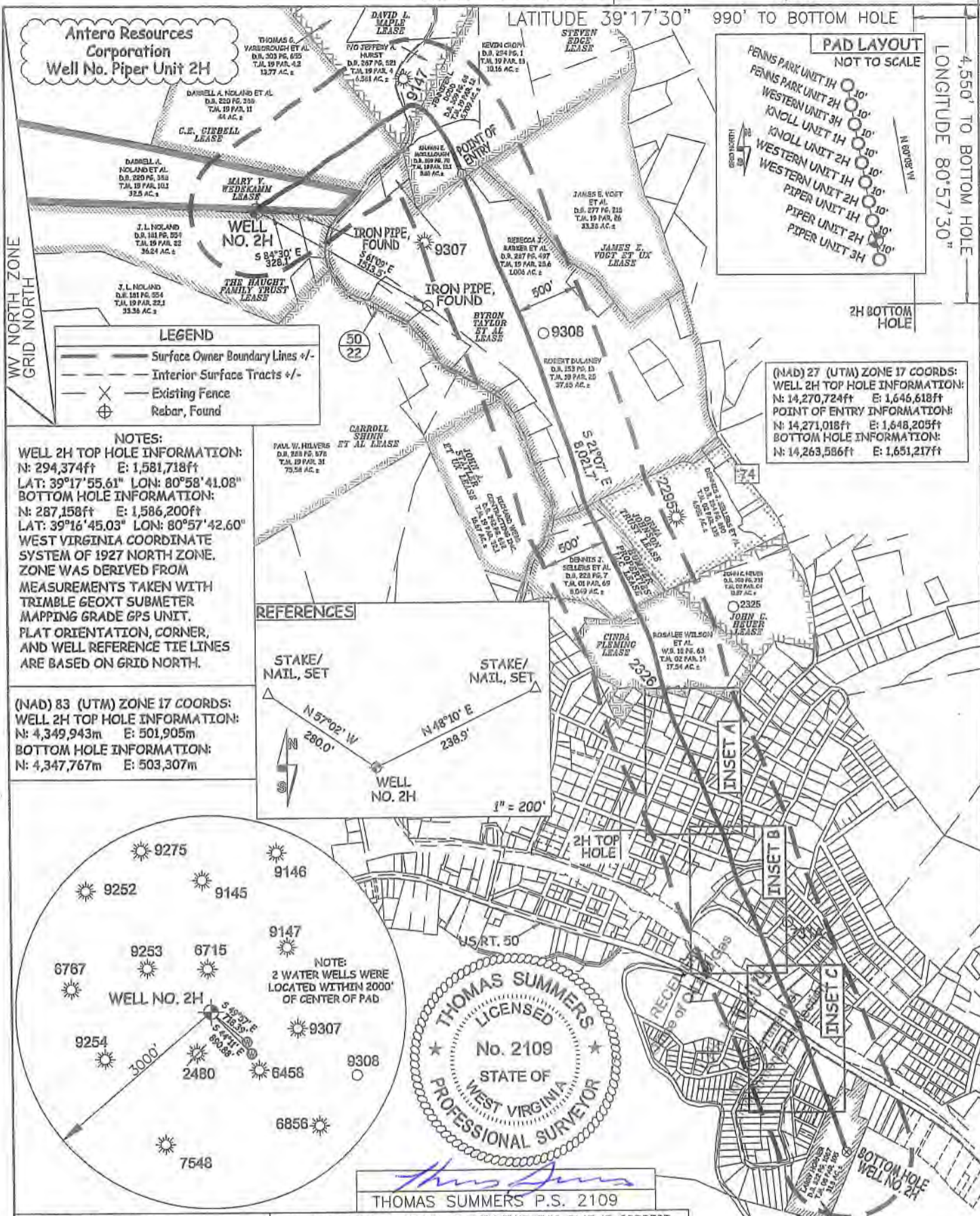
LATITUDE 39°17'30"

990' TO BOTTOM HOLE

LONGITUDE 80°57'30"

12,585'

LONGITUDE 80°57'30"

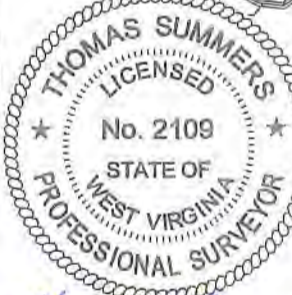
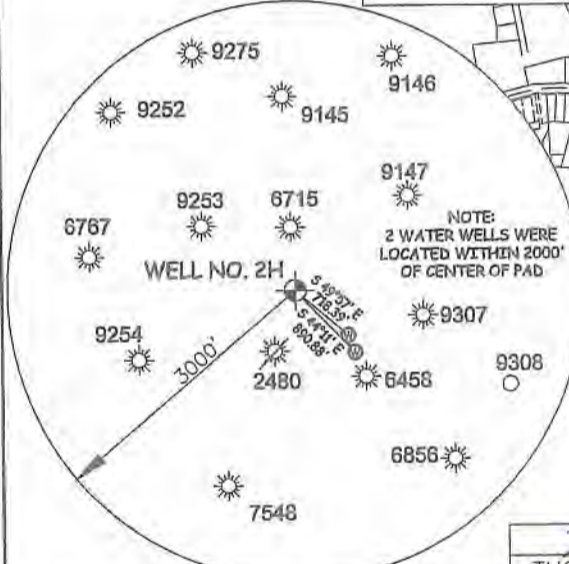
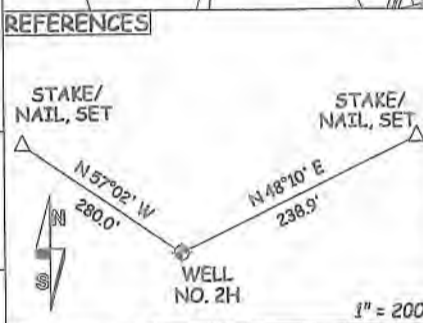


**LEGEND**

- Surface Owner Boundary Lines +/-
- Interior Surface Tracts +/-
- Existing Fence
- Rebar, Found

**NOTES:**  
 WELL 2H TOP HOLE INFORMATION:  
 N: 294,374ft E: 1,581,718ft  
 LAT: 39°17'55.61" LON: 80°58'41.08"  
 BOTTOM HOLE INFORMATION:  
 N: 287,158ft E: 1,586,200ft  
 LAT: 39°16'45.03" LON: 80°57'42.60"  
 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 2H TOP HOLE INFORMATION:  
 N: 4,349,943m E: 501,905m  
 BOTTOM HOLE INFORMATION:  
 N: 4,347,767m E: 503,307m



THOMAS SUMMERS P.S. 2109

JOB # 16-005WA  
 DRAWING # PIPER2HAD  
 SCALE 1" = 1000'  
 MINIMUM DEGREE OF ACCURACY SUBMETER  
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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  
 266 HUSHERS RUN RD PENNSBORO WEST VIRGINIA 26415

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS  
 WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL  
 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X  
 LOCATION: ELEVATION 1,143' AS DRILLED WATERSHED NORTH FORK HUGHES RIVER  
 QUADRANGLE PENNSBORO 7.5 DISTRICT CLAY COUNTY RITCHIE  
 SURFACE OWNER DARRELL A. NOLAND ET AL ACREAGE 32.5 ACRES +/-  
 OIL & GAS ROYALTY OWNER SEE ATTACHED PAGES FOR LEASE INFORMATION LEASE ACREAGE SEE ATTACHED PAGES

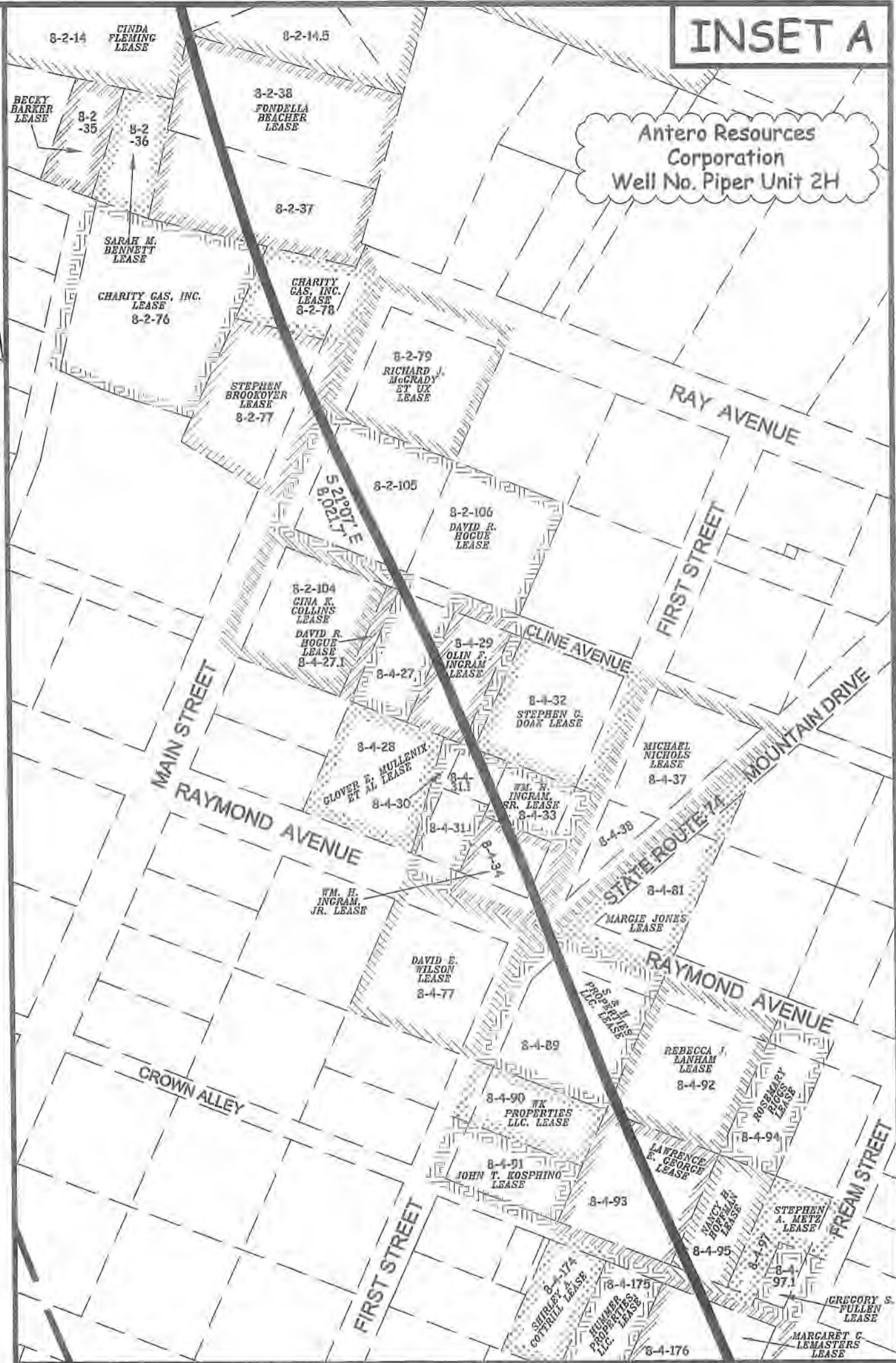
DATE 01/18/18  
 OPERATOR'S WELL # PIPER UNIT 2H  
 API WELL # 47 - 085 - 10292  
 STATE COUNTY PERMIT

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  
 TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,425' TVD 15,093 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

# INSET A

Antero Resources Corporation  
Well No. Piper Unit 2H

WV NORTH ZONE  
GRID NORTH



F.O. BOX 17  
PENNSBORO, WV 26415  
304-659-1717

SCALE: 1-INCH = 100-FEET



FILE: 16-005WA  
JOB: PIPER2H INSETA MOD  
DRAFTED BY: T.B.S. 02/01/18

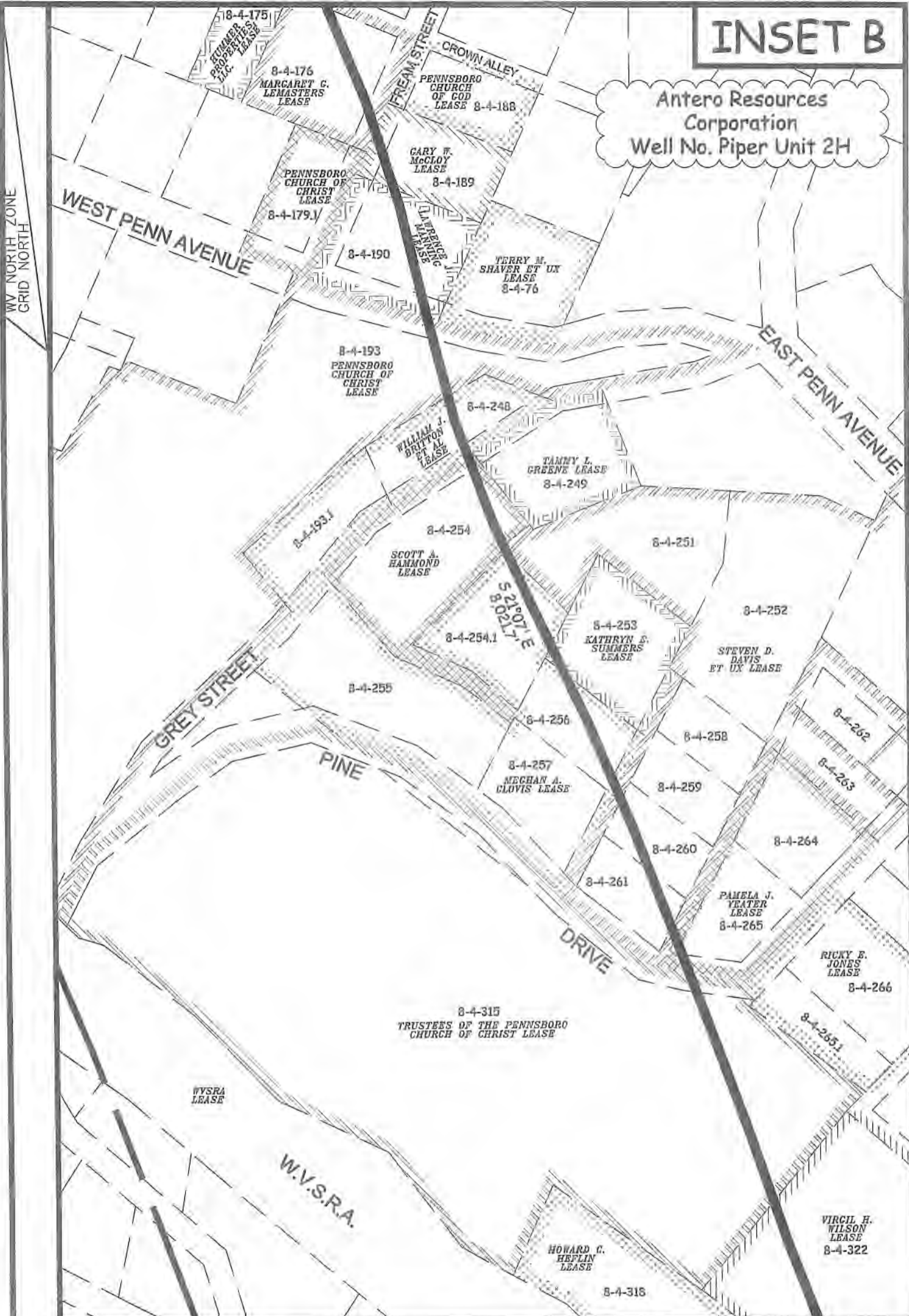
### LEGEND

- Piper 2H Lateral
- Interior Surface Tracts +/-



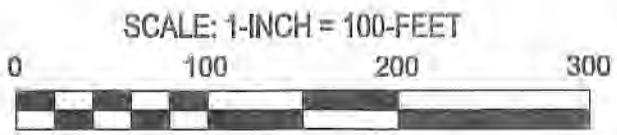
# INSET B

Antero Resources Corporation  
Well No. Piper Unit 2H



**WILLOW**  
LAND SURVEYING PLLC

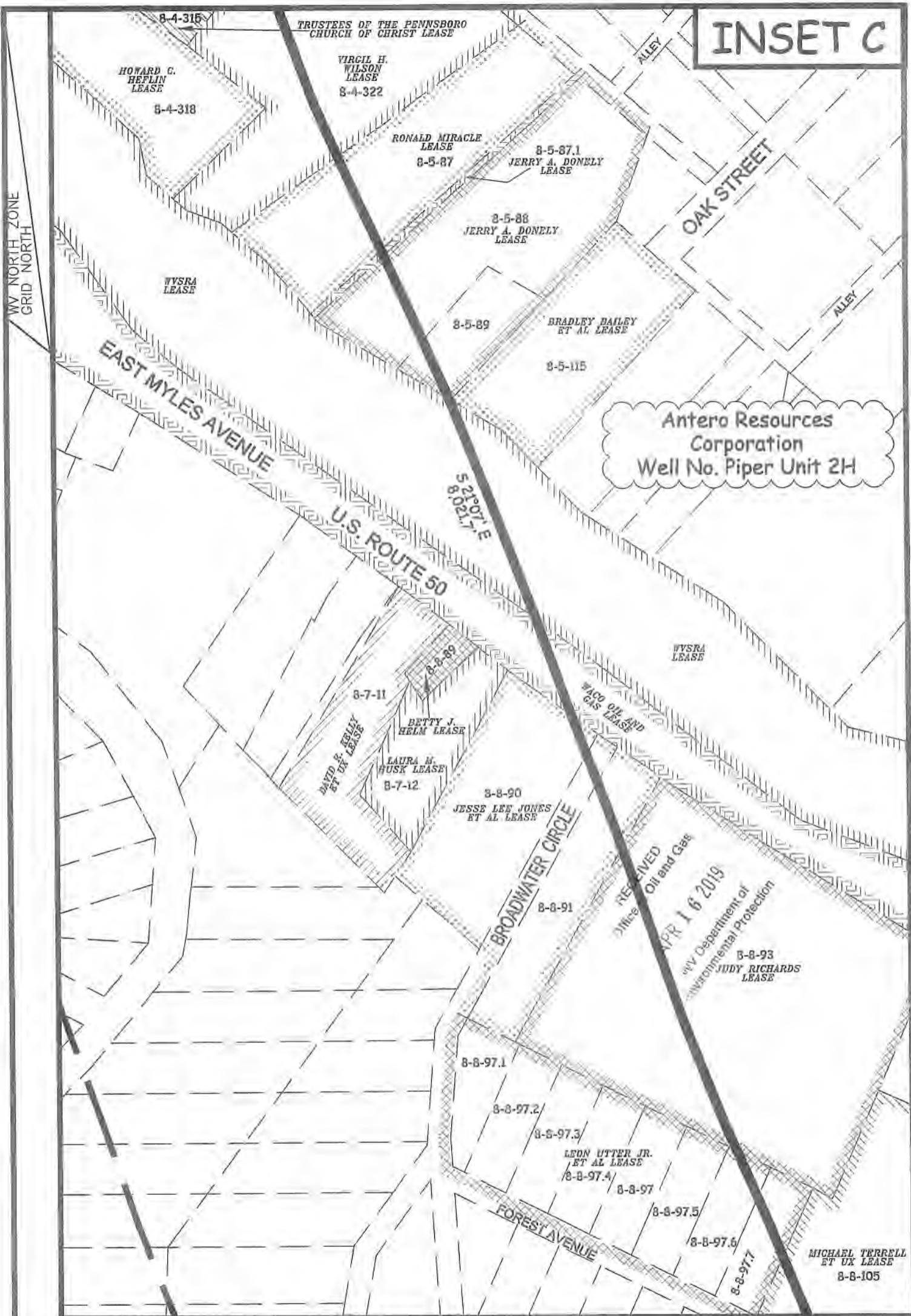
P.O. BOX 17  
PENNSBORO, WY 26415  
304-659-1717



FILE: 16-005WA  
JOB: PIPER2H INSETB MOD  
DRAFTED BY: T.B.S. 02/01/18

LEGEND	
	Piper 2H Lateral
	Interior Surface Tracts +/-

# INSET C



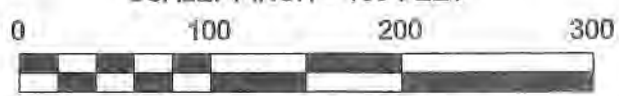
Antero Resources Corporation  
Well No. Piper Unit 2H

APR 16 2019  
Office Oil and Gas  
U.S. Department of  
Environmental Protection



P.O. BOX 17  
PENNSBORO, WV 26415  
304-659-1717

SCALE: 1-INCH = 100-FEET



FILE: 16-005WA  
JOB: PIPER2H INSETC MOD  
DRAFTED BY: T.B.S. 02/01/18

### LEGEND

- Piper 2H Lateral
- Interior Surface Tracts +/-

LATITUDE 39°20'00"

5,588'

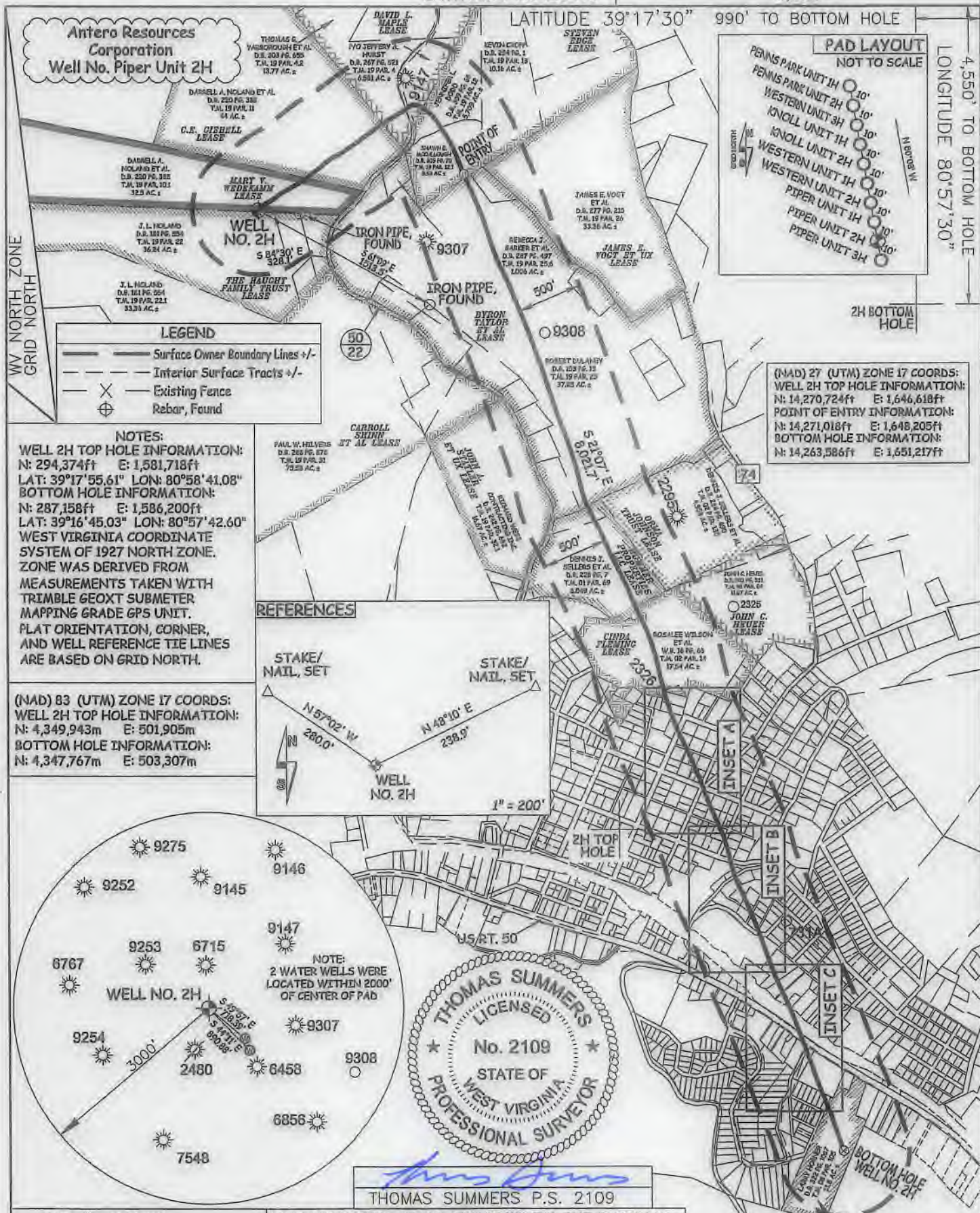
LATITUDE 39°17'30"

990' TO BOTTOM HOLE

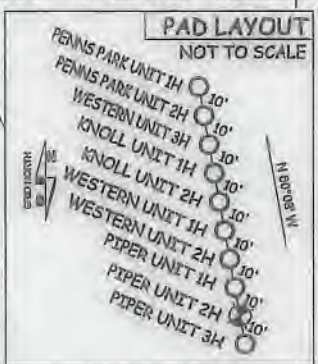
LONGITUDE 80°57'30"

12,585'

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**Antero Resources Corporation**  
Well No. Piper Unit 2H



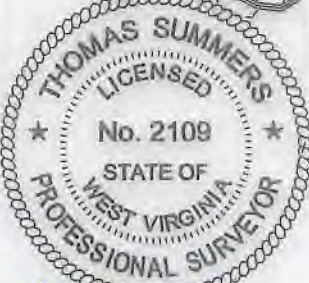
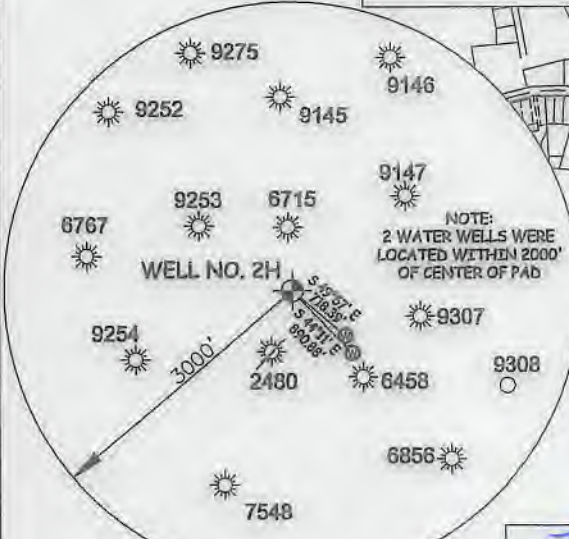
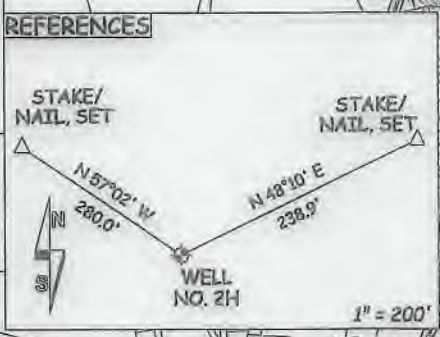
**LEGEND**

- Surface Owner Boundary Lines +/-
- - - Interior Surface Tracts +/-
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- ⊕ Rebar, Found

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(NAD) 27 (UTM) ZONE 17 COORDS:  
WELL 2H TOP HOLE INFORMATION:  
N: 14,270,724ft E: 1,646,618ft  
POINT OF ENTRY INFORMATION:  
N: 14,271,018ft E: 1,648,205ft  
BOTTOM HOLE INFORMATION:  
N: 14,263,586ft E: 1,651,217ft

(NAD) 83 (UTM) ZONE 17 COORDS:  
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N: 4,349,943m E: 501,905m  
BOTTOM HOLE INFORMATION:  
N: 4,347,767m E: 503,307m



THOMAS SUMMERS P.S. 2109

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

WILLOW LAND SURVEYING PLLC  
266 HUSHERS RUN RD PENNSBORO WEST VIRGINIA 26415

DATE 01/18/18  
OPERATOR'S WELL # PIPER UNIT 2H

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 1,143' AS DRILLED WATERSHED NORTH FORK HUGHES RIVER  
QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE  
SURFACE OWNER DARRELL A. NOLAND ET AL ACREAGE 32.5 ACRES +/-  
OIL & GAS ROYALTY OWNER SEE ATTACHED PAGES FOR LEASE INFORMATION LEASE ACREAGE SEE ATTACHED PAGES

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   
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,425' TVD 15,093 MD

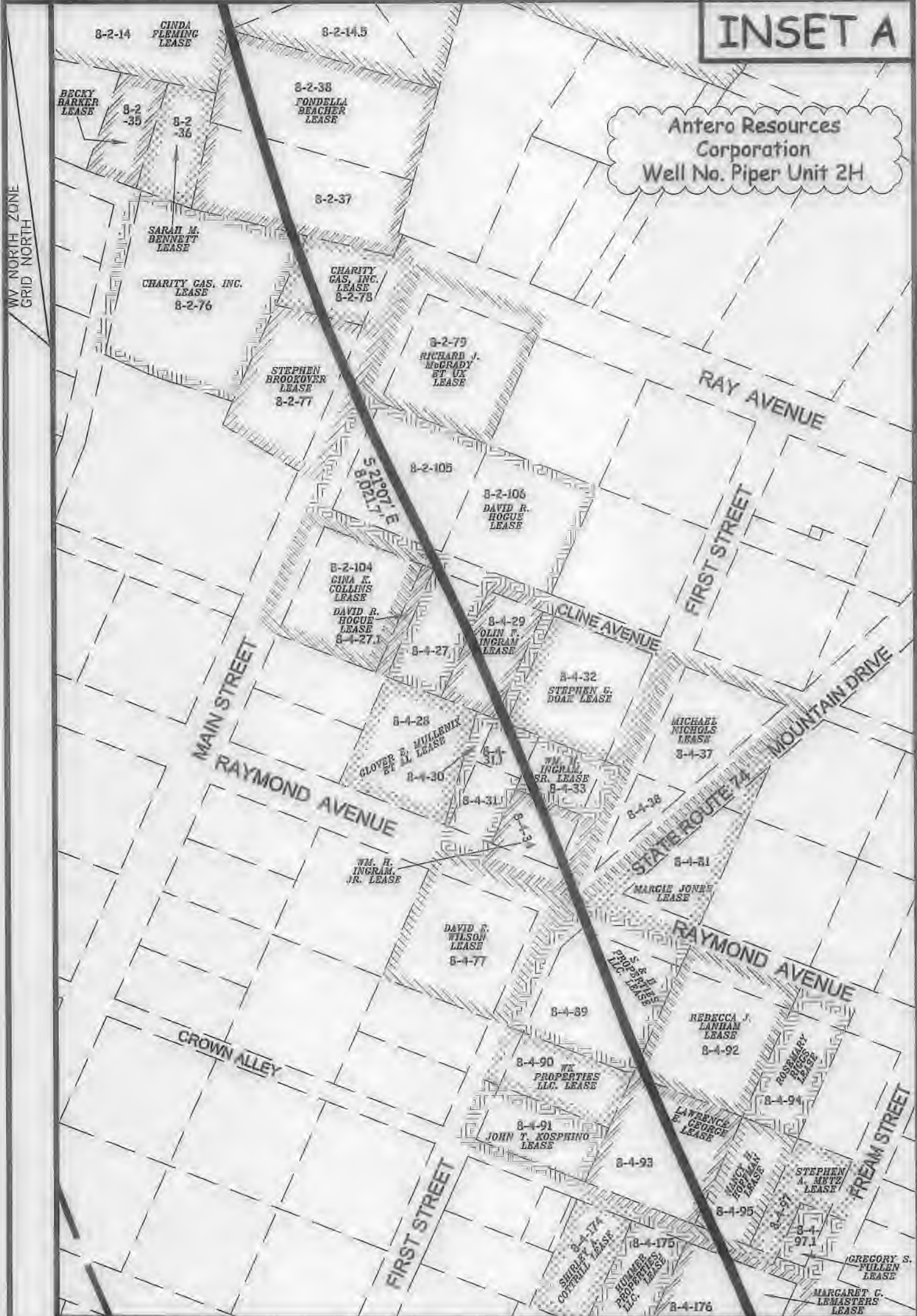
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM  
DENVER, CO 80202 ADDRESS 5400 D BIG TYLER ROAD  
FORM WW-6 CHARLESTON, WV 25313

**NOTE:**  
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER CATTLE OR FEEDLINGS HEREBY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.  
2. THIS WELL PAD IS SUBJECT TO TRACT 5752 OF RECORD KNOWN AS THE OLD NORTHWESTERN TRACT.

COUNTY NAME PERMIT

# INSET A

Antero Resources Corporation  
Well No. Piper Unit 2H



47-085-10292 MOD



P.O. BOX 17  
PENNINGTON, WV 26415  
304-659-1717

SCALE: 1-INCH = 100-FEET

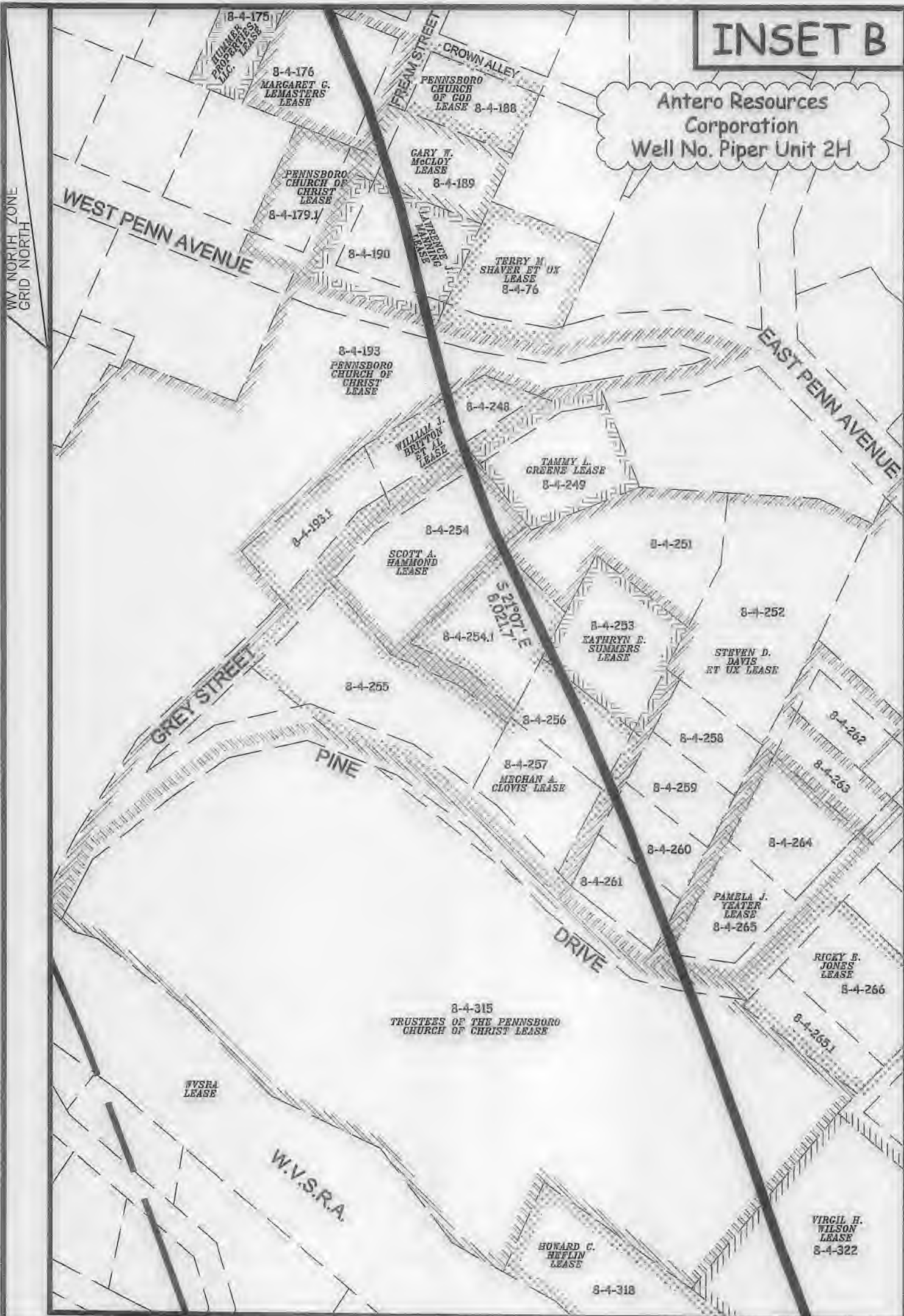


FILE: 16-005WA  
JOB: PIPER2H INSETA MOD  
DRAFTED BY: T.B.S. 02/01/18

LEGEND	
	Piper 2H Lateral
	Interior Surface Tracts +/-

# INSET B

Antero Resources Corporation  
Well No. Piper Unit 2H



47-085-10292 MOD



P.O. BOX 17  
PENNSBORO, WV 26415  
304-659-1717

SCALE: 1-INCH = 100-FEET

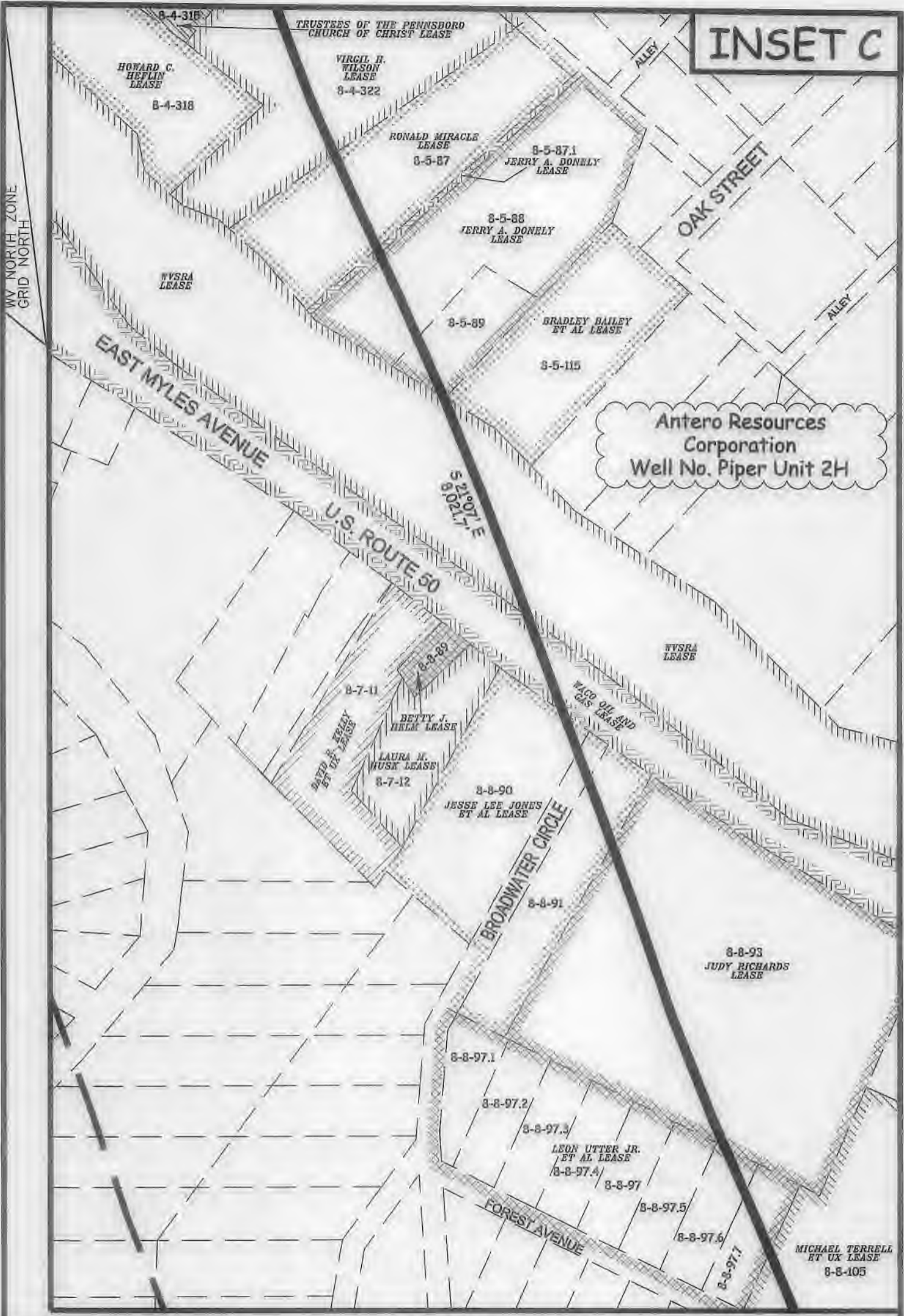


FILE: 16-005WA  
JOB: PIPER2H INSETB MOD  
DRAFTED BY: T.B.S., 02/01/18

### LEGEND

- Piper 2H Lateral
- Interior Surface Tracts +/-

# INSET C



Antero Resources Corporation  
Well No. Piper Unit 2H

47-085-10292 MOD



P.O. BOX 17  
PENNSBORO, WV 26415  
804-859-1217

SCALE: 1-INCH = 100-FEET



FILE: 16-005WA  
JOB: PIPER2H INSETC MOD  
DRAFTED BY: T.B.S. 02/01/18

LEGEND	
	Piper 2H Lateral
	Interior Surface Tracts +/-