



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

Harold D. Ward, Cabinet Secretary
www.dep.wv.gov

Monday, March 11, 2024
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for GIRARDI UNIT 2H
47-103-03635-00-00

Extended Lateral Length

ANTERO RESOURCES CORPORATION

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

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

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

James A. Martin
Chief

Operator's Well Number: GIRARDI UNIT 1H
Farm Name: ANTERO RESOURCES CORPORATION
U.S. WELL NUMBER: 47-103-03635-00-00
Horizontal 6A New Drill
Date Modification Issued: 3/11/2024

Promoting a healthy environment.

03/15/2024

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

1) Well Operator: Antero Resources Corporation 494507062 103 - Wetzel Green Porter Falls 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Girardi Unit 2H MOD Well Pad Name: Fluharty Pad

3) Farm Name/Surface Owner: David L. Smith Public Road Access: Co Rd 28

4) Elevation, current ground: 1214' Elevation, proposed post-construction: 1181' - PROPOSED

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: 7300' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 7300' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 26000' MD

11) Proposed Horizontal Leg Length: 16428' *Open to modification at a later date

12) Approximate Fresh Water Strata Depths: 307'

13) Method to Determine Fresh Water Depths: 47103012450000 Offset well records. Depths have been adjusted according to surface elevations.

14) Approximate Saltwater Depths: 2289'

15) Approximate Coal Seam Depths: N/A

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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JM
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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 | J-55 | 94# | 100' | 100' | CTS, 96 Cu. Ft. |
| Fresh Water | 13-3/8" | New | J-55 | 54.5# | 357' | 357' | CTS, 372 Cu. Ft. |
| Coal | 9-5/8" | New | J-55 | 36# | 2900' | 2900' | CTS, 1181 Cu. Ft. |
| Intermediate | | | | | | | |
| Production | 5-1/2" | New | P110-ICY | 23# | 26000' | 26000' | CTS, 5624 Cu. Ft. |
| Tubing | 2-3/8" | New | N-80 | 4.7# | | | |
| Liners | | | | | | | |

| TYPE | Size (in) | Wellbore Diameter (in) | Wall Thickness (in) | Burst Pressure (psi) | Anticipated Max. Internal Pressure (psi) | Cement Type | Cement Yield (cu. ft./k) |
|--------------|-----------|------------------------|---------------------|----------------------|--|-------------|--------------------------|
| Conductor | 20" | 24" | 0.375" | 2250 | 50 | Class A/L | ~1.18 |
| Fresh Water | 13-3/8" | 17-1/2" | 0.38" | 2730 | 1000 | Class A/L | ~1.18 |
| Coal | 9-5/8" | 12-1/4" | 0.352" | 3520 | 1500 | Class A/L | ~1.18 |
| Intermediate | | | | | | | |
| Production | 5-1/2" | 8-3/4" & 8-1/2" | 0.415" | 14,360 | 2500 | Class G/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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SMG
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 3-7-24

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

Drill a new horizontal shallow well into the 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): 45.48 acres

22) Area to be disturbed for well pad only, less access road (acres): 11.67 acres

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23) Describe centralizer placement for each casing string:

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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/L cement.

Surface: Class A/L cement with 2-3% calcium chloride and 1/4 lb of flake

Intermediate: Class A/L 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 G/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,

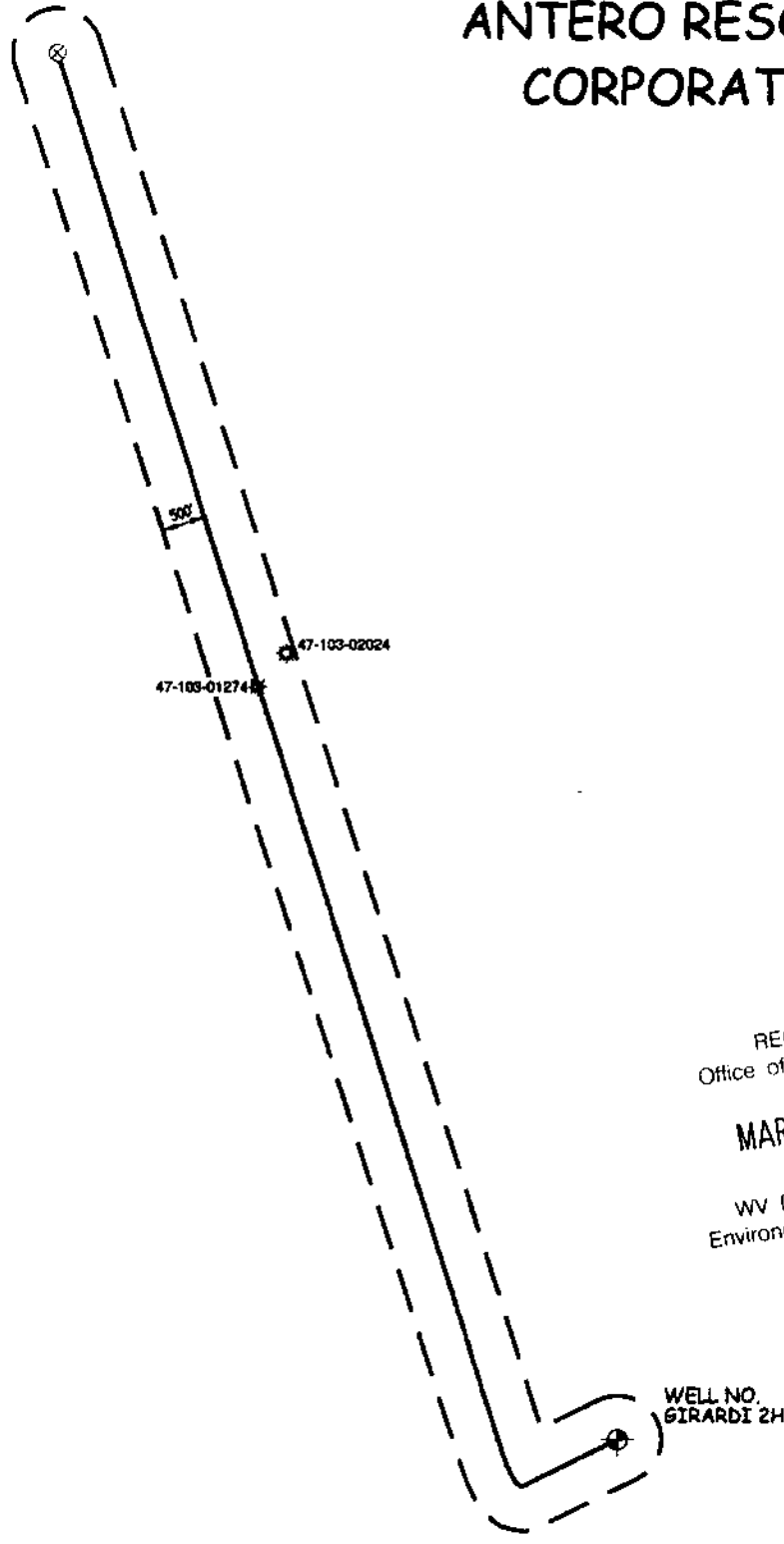
pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate

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.

47 10 30 36 35

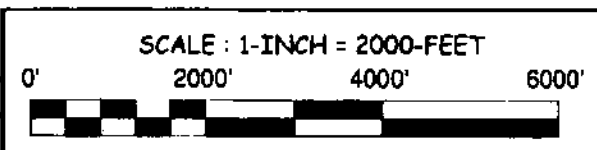
FLUHARTY PAD ANTERO RESOURCES CORPORATION



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WILLOW LAND SURVEYING, PLLC
P.O. BOX 17, PENNSBORO, WV 26415
(304) 659-1717

JOB #: 23-011WA
FILE: 61RARDI 2H-AOR.DWG



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| UWI (API#) | Well Name | Well Number | Operator | Historical Operator | TD | Perforated Interval (shallowest, deepest) | Perforated Formation(s) | Producible Formation(s) not perf'd |
|----------------|----------------|-------------|-----------------------|----------------------|-------|---|--|------------------------------------|
| 47103020240000 | YQHO | 1 | ESPERADA EN PART LLC | ESPERADA EN PART LLC | 1,900 | | | |
| 47109012740000 | THOMAS ESTELLA | 1 | PARDEE EXPLORATION CO | COASTAL CORP THE | 3,605 | | Big Injun, Weir, Beres, Fifty Foot, Warren | Weir, Benson, Alexander |

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4710303635

LATITUDE 39°35'00"

6,462'

LATITUDE 39°37'30"

1,287' TO BOTTOM HOLE

Antero Resources Corporation Well No. Girardi #2H

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.

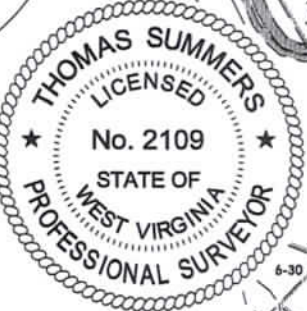
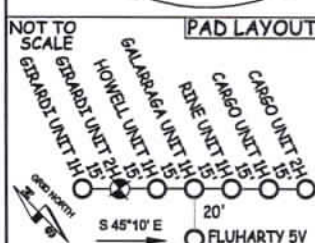
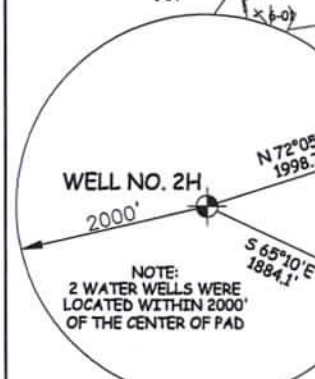
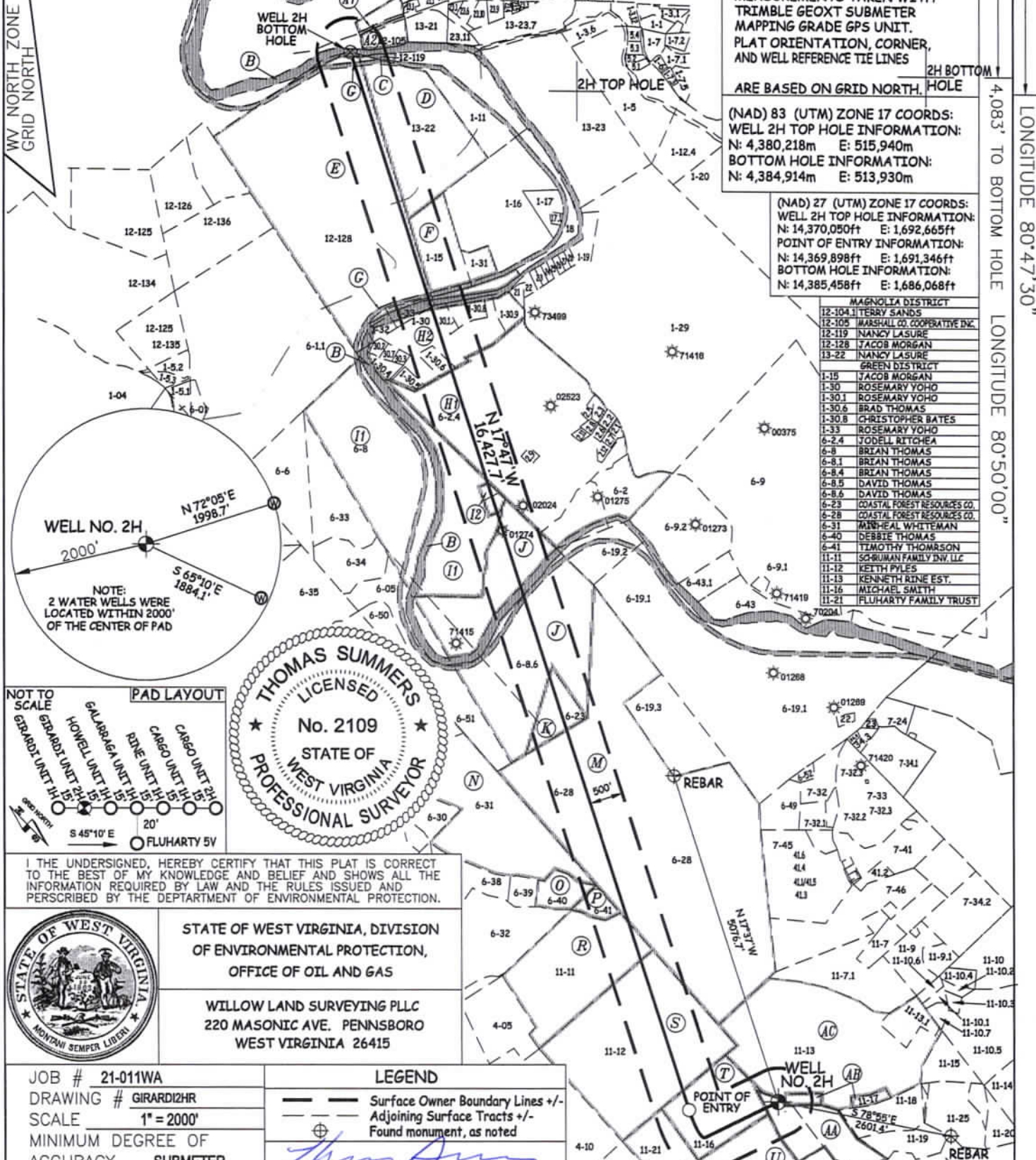
Table listing adjacent landowners and their well identifiers (e.g., A1 PATRICIA HADDIX, J DAVID R. THOMAS BY UX).

NOTES: WELL 2H TOP HOLE INFORMATION: N: 392,951ft E: 1,629,434ft... BOTTOM HOLE INFORMATION: N: 408,473ft E: 1,623,093ft...

(NAD) 83 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 4,380,218m E: 515,940m...

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 14,370,050ft E: 1,692,665ft...

Table listing landowners in the Magnolia District and Green District (e.g., 12-104.1 TERRY SANDS, 1-15 JACOB MORGAN).



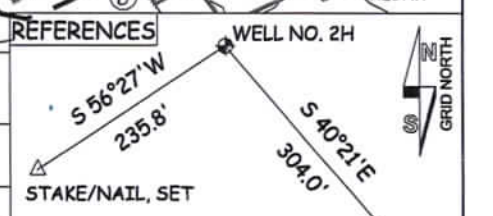
I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



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

JOB # 21-011WA, DRAWING # GIRARDI2HR, SCALE 1" = 2000', MINIMUM DEGREE OF ACCURACY SUBMETER, PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS.

LEGEND: Surface Owner Boundary Lines +/-, Adjoining Surface Tracts +/-, Found monument, as noted. THOMAS SUMMERS P.S. 2109, DATE 02/21/24, OPERATOR'S WELL # GIRARDI UNIT #2H, STATE 47, COUNTY 103, PERMIT 03635.



WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ (IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X. LOCATION: ELEVATION PROPOSED -1,181' WATERSHED FISHING CREEK QUADRANGLE PORTER FALLS 7.5' DISTRICT GREEN COUNTY WETZEL. SURFACE OWNER ANTERO RESOURCES CORPORATION ACREAGE 46.95 ACRES±. OIL & GAS ROYALTY OWNER DAVID L. SMITH LEASE ACREAGE 67 ACRES±. 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 7,300' TVD 26,000' MD. WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT KEVIN ELLIS. ADDRESS 1615 WYNKOOP ST. DENVER, CO 80202 ADDRESS 535 WHITE OAK BLVD. BRIDGEPORT, WV 26330.

03/15/2024

LONGITUDE 80°47'30" LONGITUDE 80°50'00" COUNTY NAME PERMIT

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>AA: David Lee Smith Lease</u> David L. Smith | Antero Resources Corporation | 1/8+ | 273A/0442 |
| <u>T: David Lee Smith Lease</u> David Lee Smith | Antero Resources Corporation | 1/8+ | 273A/0442 |
| <u>S: Abram C. Gawthrop and Nancy K. Gawthrop Lease</u> Abram C. Gawthrop and Nancy K. Gawthrop | Antero Resources Corporation | 1/8+ | 188A/0349 |
| <u>R: WVMC, LLC Lease</u> WVMC, LLC | Antero Resources Corporation | 1/8+ | 288A/0455 |
| <u>M: Coastal Forest Resources Company Lease</u> Coastal Forest Resources Company Drilling Appalachian Corporation | Drilling Appalachian Corporation Antero Resources Corporation | 1/8+ Assignment | 092A/0906 177A/0451 |
| <u>K: Coastal Forest Resources Company Lease</u> Coastal Forest Resources Company | Antero Resources Corporation | 1/8+ | 273A/0764 |
| <u>J: David R. Thomas Et Ux Lease</u> David R. Thomas Et Ux | Antero Resources Corporation | 1/8+ | 335A/0920 |
| <u>G: CSX Transportation, Inc. Lease</u> CSX Transportation, Inc. | Antero Resources Corporation | 1/8+ | 275A/0895 |
| <u>B: WVDNR Lease</u> WVDNR | Antero Resources Corporation | 1/8+ | 323A/0531 |
| <u>J: David R. Thomas Et Ux Lease</u> David R. Thomas Et Ux | Antero Resources Corporation | 1/8+ | 335A/0920 |
| <u>I1: Brian L. Thomas and Tracey L. Thomas Lease</u> Brian L. Thomas and Tracey L. Thomas | Antero Resources Corporation | 1/8+ | 335A/0918 |
| <u>I2: Brian L. Thomas and Tracey L. Thomas Lease</u> Brian L. Thomas and Tracey L. Thomas | Antero Resources Corporation | 1/8+ | 335A/0918 |
| <u>I1: Brian L. Thomas and Tracey L. Thomas Lease</u> Brian L. Thomas and Tracey L. Thomas | Antero Resources Corporation | 1/8+ | 335A/0918 |
| <u>H1: J. Wells Eakin, Et Al Lease</u> J. Wells Eakin, Et Al Sutton's Exploration & Production Company, LLC Gastar Exploration USA, Inc. Gastar Exploration Inc. TH Exploration II, LLC | Sutton Exploration & Production Company, LLC Gastar Exploration USA, Inc. Gastar Exploration Inc. TH Exploration II, LLC Antero Resources Corporation | 1/8 Assignment Merger Assignment Assignment | 090A/0234 102A/0524 0013/0270 173A/0431 270A/0067 |

WW-6A1

Operator's Well Number Girardi Unit 2H MOD

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
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| Grantor, lessor, etc. | Grantee, lessee, etc. | Royalty | Book/Page |
|--|--|-------------------|------------------|
| H2: J. Wells Eakin, Et Al Lease | | | |
| J. Wells Eakin, Et Al | Sutton Exploration & Production Company, LLC | 1/8 | 090A/0234 |
| Sutton's Exploration & Production Company, LLC | Gastar Exploration USA, Inc. | Assignment | 102A/0524 |
| Gastar Exploration USA, Inc. | Gastar Exploration Inc. | Merger | 0013/0270 |
| Gastar Exploration Inc. | TH Exploration II, LLC | Assignment | 173A/0431 |
| TH Exploration II, LLC | Antero Resources Corporation | Assignment | 270A/0067 |
| B: WVDNR Lease | | | |
| WVDNR | Antero Resources Corporation | 1/8+ | 323A/0531 |
| G: CSX Transportation, Inc. Lease | | | |
| CSX Transportation, Inc. | Antero Resources Corporation | 1/8+ | 275A/0895 |
| E: Chesapeake Appalachia LLC. Lease | | | |
| Chesapeake Appalachia LLC. | SWN Production Company LLC. | 1/8 | 157A/0640 |
| SWN Production Company LLC. | Antero Exchange Properties LLC. | Assignment | 177A/0533 |
| Antero Exchange Properties LLC. | Antero Resources Corporation | Merger | 0013/0311 |
| G: CSX Transportation, Inc. Lease | | | |
| CSX Transportation, Inc. | Antero Resources Corporation | 1/8+ | 275A/0895 |
| E: Chesapeake Appalachia LLC. Lease | | | |
| Chesapeake Appalachia LLC. | SWN Production Company LLC. | 1/8 | 157A/0640 |
| SWN Production Company LLC. | Antero Exchange Properties LLC. | Assignment | 177A/0533 |
| Antero Exchange Properties LLC. | Antero Resources Corporation | Merger | 0013/0311 |

*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.

*Co-tenancy utilization – Antero is utilizing the Co-tenancy Modernization and Majority Protection Act to proceed with development of certain royalty owners' interests in this tract.

**Pooling/Unitization – Antero has filed a horizontal well unitization application with the West Virginia Oil and Gas Conservation Commission that seeks to pool certain owners in this tract.

03/15/2024

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| Lease Name or Number | Grantor, Lessor, etc. | Grantee, Lessee, etc. | Royalty | Book/Page |
|-----------------------|-----------------------|------------------------------|---------|-----------|
| B: WVDNR Lease | | | | |
| | WVDNR | Antero Resources Corporation | 1/8+ | 323A/0531 |

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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

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

Well Operator: Antero Resources Corporation
 By: Tim Rady
 Its: Senior Vice President of Land