



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

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Friday, January 25, 2019
WELL WORK PERMIT
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit approval for DUTY UNIT 1H
47-095-02564-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless 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: DUTY UNIT 1H
Farm Name: ANTERO MIDSTREAM, LLC
U.S. WELL NUMBER: 47-095-02564-00-00
Horizontal 6A New Drill
Date Issued: 1/25/2019

PERMIT CONDITIONS 4709502564

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
10. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

API Number: 4709502564

PERMIT CONDITIONS

11. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.

4709502564

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

1) Well Operator: Antero Resources Corporation 494507062 095-Tyler Ellsworth Middlebourne 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Duty Unit 1H Well Pad Name: Ferrell Pad

3) Farm Name/Surface Owner: Glenn Austin Ferrell Public Road Access: CR 7

4) Elevation, current ground: 732' Elevation, proposed post-construction: ~731'

5) Well Type (a) Gas Oil Underground Storage
Other
(b) If Gas Shallow Deep
Horizontal

JCB
11/28/2018

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6600' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 6600' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 22100' MD

11) Proposed Horizontal Leg Length: 13070'

12) Approximate Fresh Water Strata Depths: 194', 222', 243'

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

14) Approximate Saltwater Depths: 1224', 1347'

15) Approximate Coal Seam Depths: None Identified

16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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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#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	300	300	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	22100	22100	CTS, 5669 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

JUB
11/28/2018

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	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	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			

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.

*QEB
11/23/2018*

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): 38.20 acres

22) Area to be disturbed for well pad only, less access road (acres): 10.78 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.

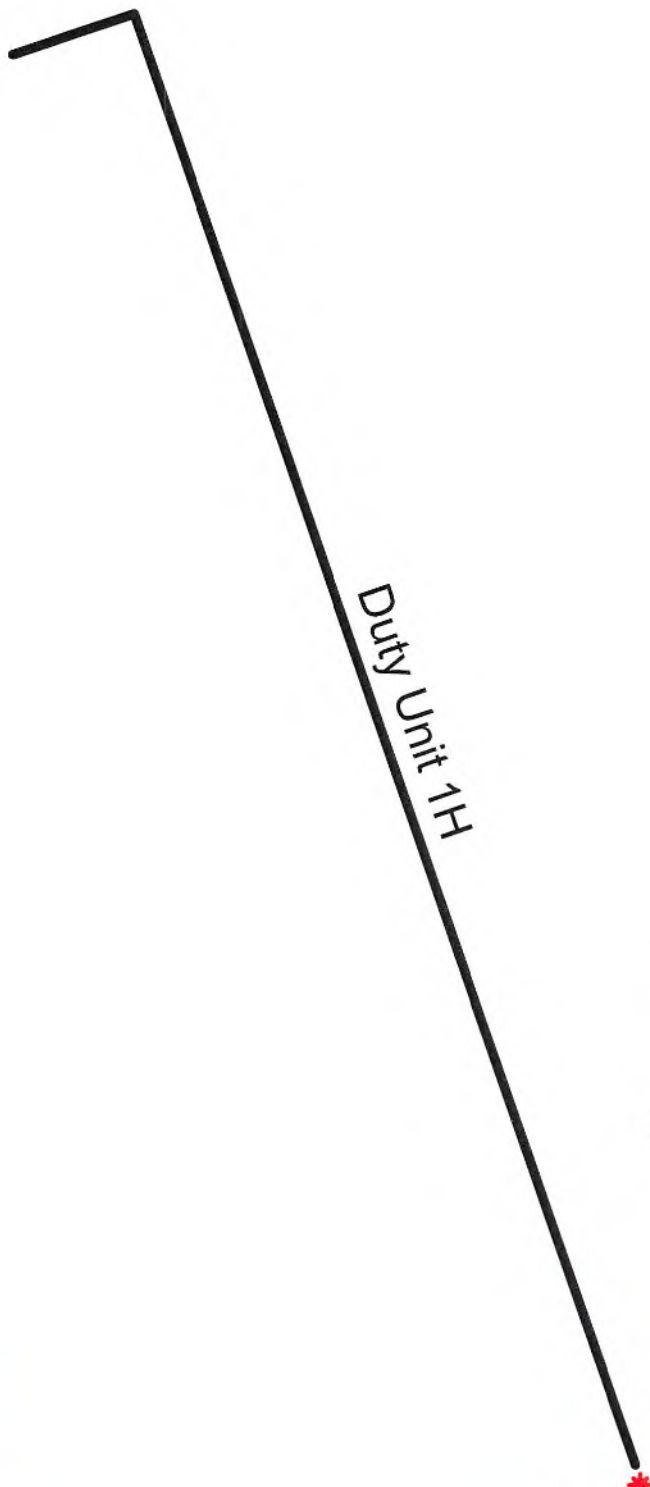
24) Describe all cement additives associated with each cement type:

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

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.



Duty Unit 1H

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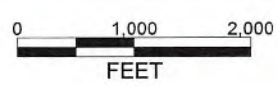
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47095023380000



Antero Resources Corporation

Duty Unit 1H



WELL SYMBOLS
Gas Well

October 17, 2018

UWI (APINum)	Well Name	Well Number	Operator	Hist Oper	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47095023380000	MELVIN UNIT	2H	ANTERO RESOURCES CORPORATION		17,387	7030 - 17285	Marcellus	N/A

4709502564

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WW-9
(4/16)

4709502564

API Number 47 - 095 - _____
Operator's Well No. Duty Unit 1H

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

Watershed (HUC 10) Outlet Middle Island Creek Quadrangle Middlebourne 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes No

Will a pit be used? Yes No

If so, please describe anticipated pit waste: No pit will be used at this site (Drilling and Flowback Fluids will be stored in tanks. Cuttings will be tanked and hauled off site.)

Will a synthetic liner be used in the pit? Yes No If so, what ml.? N/A

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number _____ *UIC Permit # will be provided on Form WR-34)
- Reuse (at API Number _____ Future permitted well locations when applicable. API# will be provided on Form WR-34)
- Off Site Disposal (Supply form WW-9 for disposal location) (Meadowfill Landfill Permit #SWF-1032-98)
- Other (Explain Northwestern Landfill Permit #SWF-1025/WV0109410)

*908
11/28/2018*

Will closed loop system be used? If so, describe: Yes, fluids stored in tanks, cuttings removed offsite and taken to landfill.

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Surface - Air/Freshwater, Intermediate - Dust/Mud Foam, Proccolator - Water Based Mud or Synthetic Based Mud

-If oil based, what type? Synthetic, petroleum, etc. Synthetic

Additives to be used in drilling medium? Please See Attachment

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Drill cuttings stored in tanks, removed offsite and taken to landfill.

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-1032-98), Northwestern Landfill (Permit # SWF-1025/WV0109410)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature *Gretchen Kohler*

Company Official (Typed Name) Gretchen Kohler

Company Official Title Sr. Environmental & Regulatory Manager

Subscribed and sworn before me this 23rd day of October, 2018

Chaegeh Notary Public

My commission expires MARCH 13, 2022

MEGAN GRIFFITH
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20184011666
MY COMMISSION EXPIRES MARCH 13, 2022

Antero Resources Corporation

Proposed Revegetation Treatment: Acres Disturbed 38.20 acres Prevegetation pH _____

Lime 2-4 Tons/acre or to correct to pH 6.5

Fertilizer type Hay or straw or Wood Fiber (will be used where needed)

Fertilizer amount 500 lbs/acre

Mulch 2-3 Tons/acre

Access Road "A" (9.68 acres) + Access Road "B" (0.34 acres) + Access Road "C" (1.10) + Well Pad (10.78 acres) + Water Containment Pad (2.96 acres) + Production Equipment Pad (5.55 acres) + Excess/Topsoil Material Stockpiles (7.79 acres) = 38.20 Acres

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Annual Ryegrass	40
Field Bromegrass	40

Seed Type	lbs/acre
Crownvetch	10-15
Tall Fescue	30

See attached Table IV-3 for additional seed type (Ferrell Pad Design)

See attached Table IV-4A for additional seed type (Ferrell Pad Design)

*or type of grass seed requested by surface owner

*or type of grass seed requested by surface owner

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by:

J. Craig Blum

Comments:

Title:

Oil & Gas Inspector

Date:

11/26/2016

Field Reviewed?

Yes

No

Form WW-9 Additives Attachment**SURFACE INTERVAL**

1. Fresh Water
2. Soap –Foamer AC
3. Air

INTERMEDIATE INTERVAL***STIFF FOAM RECIPE:***

- 1) 1 ppb Soda Ash / Sodium Carbonate-Alkalinity Control Agent
- 2) 1 ppb Conqor 404 (11.76 ppg) / Corrosion Inhibitor
- 3) 4 ppb KLA-Gard (9.17 ppg) / Amine Acid Complex-Shale Stabilizer
- 4) 1ppb Mil Pac R / Sodium Carboxymethylcellulose-Filtration Control Agent
- 5) 12 ppb KCL / Potassium Chloride-inorganic Salt
- 6) Fresh Water 80 bbls
- 7) Air

PRODUCTION INTERVAL

1. Alpha 1655
Salt Inhibitor
2. Mil-Carb
Calcium Carbonate
3. Cottonseed Hulls
Cellulose-Cottonseed Pellets – LCM
4. Mil-Seal
Vegetable, Cotton & Cellulose-Based Fiber Blend – LCM
5. Clay-Trol
Amine Acid Complex – Shale Stabilizer
6. Xan-Plex
Viscosifier For Water Based Muds
7. Mil-Pac (All Grades)
Sodium Carboxymethylcellulose – Filtration Control Agent
8. New Drill
Anionic Polyacrylamide Copolymer Emulsion – Shale Stabilizer
9. Caustic Soda
Sodium Hydroxide – Alkalinity Control
10. Mil-Lime
Calcium Hydroxide – Lime
11. LD-9
Polyether Polyol – Drilling Fluid Defoamer
12. Mil Mica
Hydro-Biotite Mica – LCM

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13. Escaid 110
Drilling Fluid Solvent – Aliphatic Hydrocarbon
14. Ligco
Highly Oxidized Leonardite – Filtration Control Agent
15. Super Sweep
Polypropylene – Hole Cleaning Agent
16. Sulfatrol K
Drilling Fluid Additive – Sulfonated Asphalt Residuum
17. Sodium Chloride, Anhydrous
Inorganic Salt
18. D-D
Drilling Detergent – Surfactant
19. Terra-Rate
Organic Surfactant Blend
20. W.O. Defoam
Alcohol-Based Defoamer
21. Perma-Lose HT
Fluid Loss Reducer For Water-Based Muds
22. Xan-Plex D
Polysaccharide Polymer – Drilling Fluid Viscosifier
23. Walnut Shells
Ground Cellulosic Material – Ground Walnut Shells – LCM
24. Mil-Graphite
Natural Graphite – LCM
25. Mil Bar
Barite – Weighting Agent
26. X-Cide 102
Biocide
27. Soda Ash
Sodium Carbonate – Alkalinity Control Agent
28. Clay Trol
Amine Acid complex – Shale Stabilizer
29. Sulfatrol
Sulfonated Asphalt – Shale Control Additive
30. Xanvis
Viscosifier For Water-Based Muds
31. Milstarch
Starch – Fluid Loss Reducer For Water Based Muds
32. Mil-Lube
Drilling Fluid Lubricant

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4709502564

911 Address
1476 Wick Rd.
Middlebourne, WV 26149

Well Site Safety Plan

Antero Resources

Well Name: Daniels Unit 1H-3H, Galt Unit 1H-3H,
Guild Unit 1H-4H, Hennessy Unit 1H &
2H, Remo Unit 1H & 2H

Pad Location: FERRELL PAD
Tyler County/Ellsworth District

GPS Coordinates:

Entrance - Lat 39°28'23.51"/Long -80°54'24.45" (NAD83)

Pad Center - Lat 39°28'19.84"/Long -80°55'3.60" (NAD83)

Driving Directions:

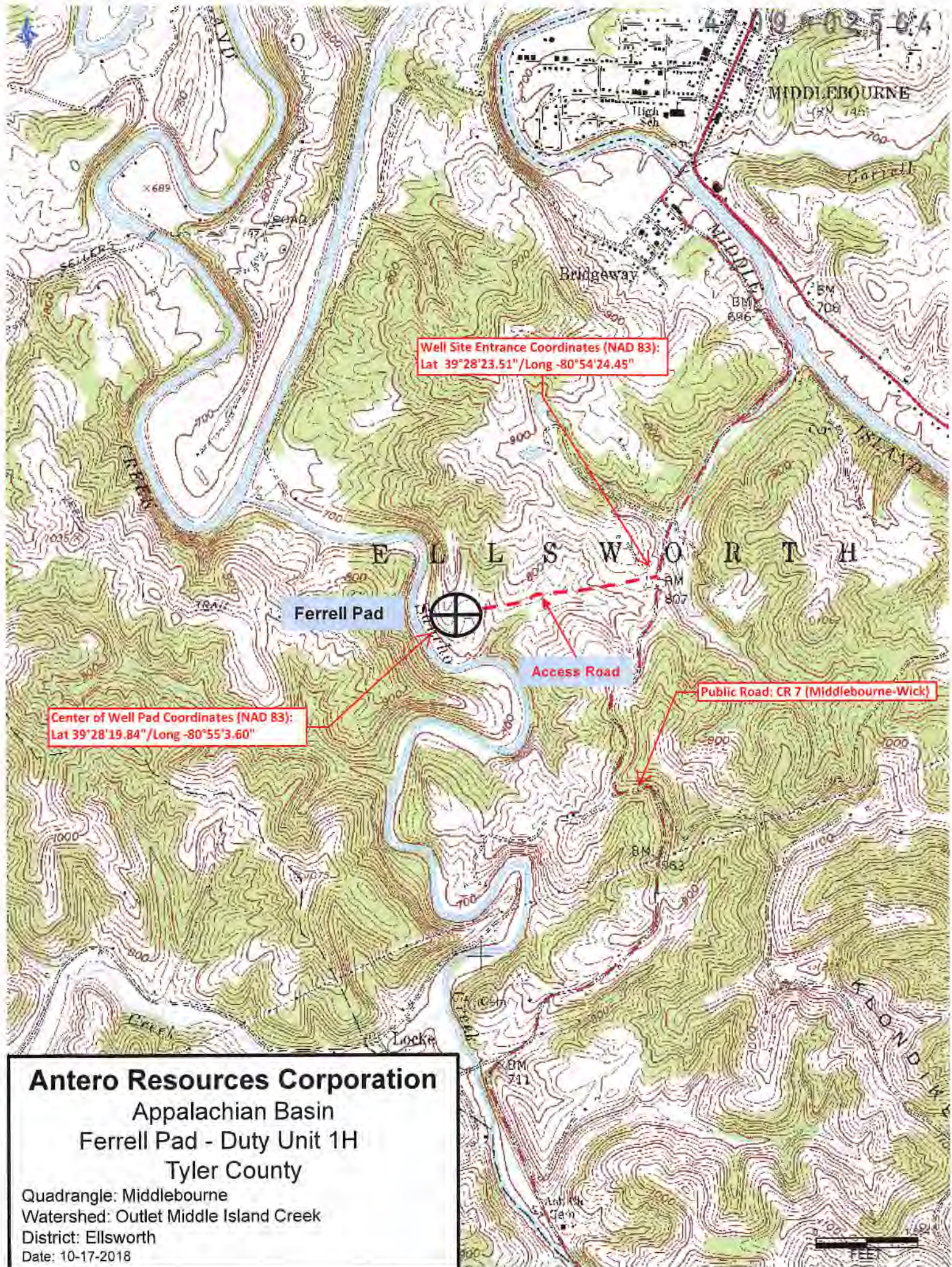
From the intersection of Broad St and Main St in the town of Middlebourne: Head southwest on WV-18 S/Main St toward Wilcox Ave for 0.3 miles. Turn right onto Bridgeway Rd for 0.1 miles. Turn left onto Middlebourne-Wick/Wick Rd for 1.3 miles. Access road will be on your right.

Alternate Route:

From the intersection of Highway 50 and WV-18 in West Union: Head west on WV-18 N for 0.6 miles. Turn left onto Davis St/Old U.S. 50 W for 0.4 miles. Turn right onto WV-18/Sisterville Pike for 25.4 miles. Turn left onto Bridgeway Rd for 0.1 miles. Turn left onto Middlebourne-Wick/Wick Rd for 1.3 miles. Access road will be on your right.

EMERGENCY (24 HOUR) CONTACT 1-800-878-1373

*Jobs
11/29/2018*



Well Site Entrance Coordinates (NAD 83):
Lat 39°28'23.51"/Long -80°54'24.45"

Center of Well Pad Coordinates (NAD 83):
Lat 39°28'19.84"/Long -80°55'3.60"

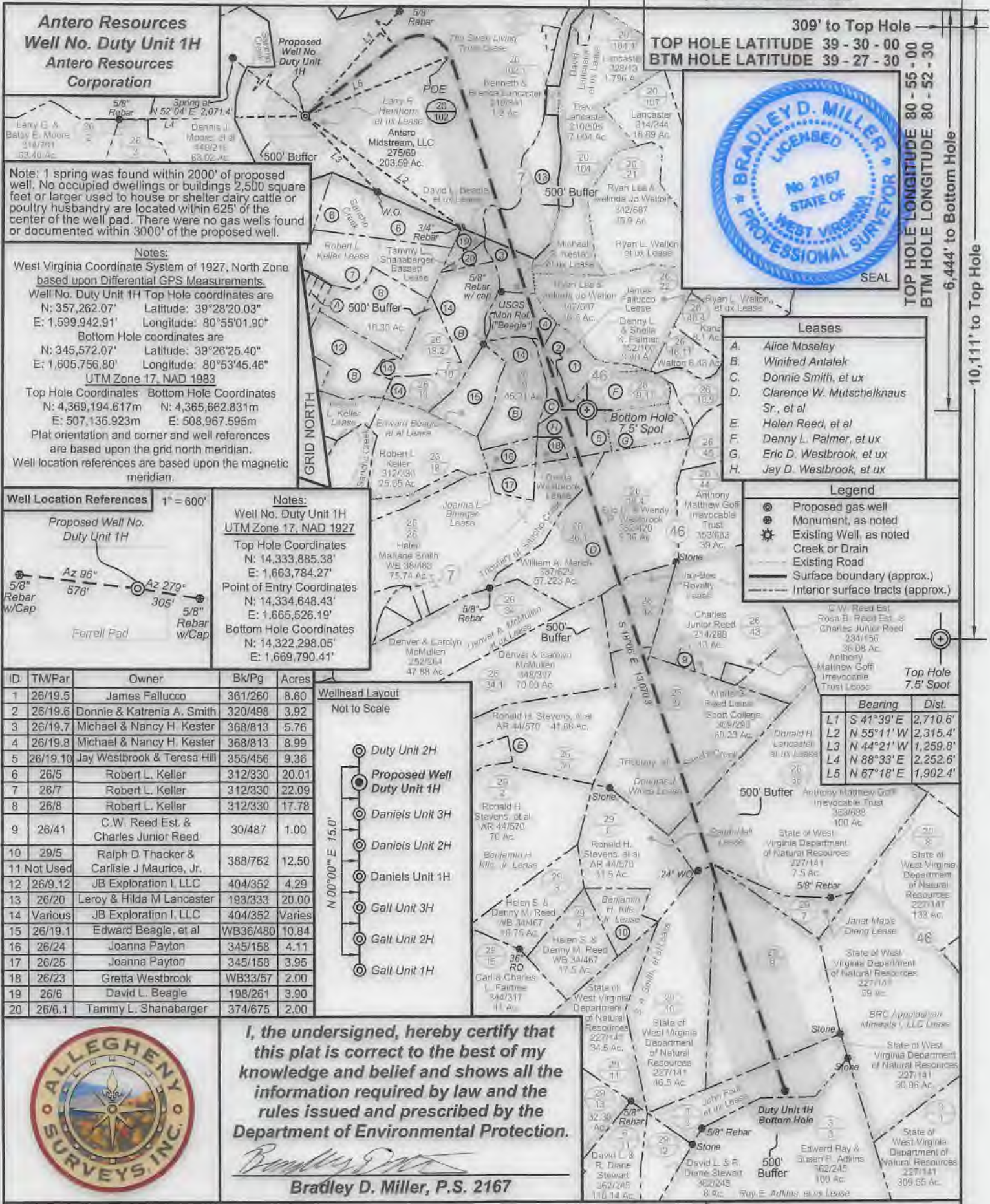
Public Road: CR 7 (Middlebourne-Wick)

Ferrell Pad

Access Road

Antero Resources Corporation
Appalachian Basin
Ferrell Pad - Duty Unit 1H
Tyler County

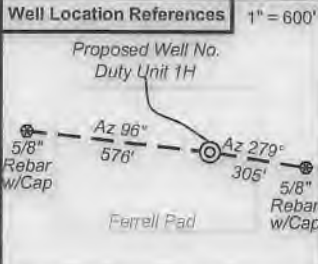
Quadrangle: Middlebourne
Watershed: Outlet Middle Island Creek
District: Ellsworth
Date: 10-17-2018



Antero Resources
Well No. Duty Unit 1H
Antero Resources
Corporation

Note: 1 spring was found within 2000' of proposed well. No occupied dwellings or buildings 2,500 square feet or larger used to house or shelter dairy cattle or poultry husbandry are located within 625' of the center of the well pad. There were no gas wells found or documented within 3000' of the proposed well.

Notes:
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
 Well No. Duty Unit 1H Top Hole coordinates are
 N: 357,262.07' Latitude: 39°28'20.03"
 E: 1,599,942.91' Longitude: 80°55'01.90"
 Bottom Hole coordinates are
 N: 345,572.07' Latitude: 39°26'25.40"
 E: 1,605,756.80' Longitude: 80°53'45.46"
 UTM Zone 17, NAD 1983
 Top Hole Coordinates Bottom Hole Coordinates
 N: 4,369,194.617m E: 4,365,662.831m
 E: 507,136.923m E: 508,967.595m
 Plat orientation and corner and well references are based upon the grid north meridian.
 Well location references are based upon the magnetic meridian.



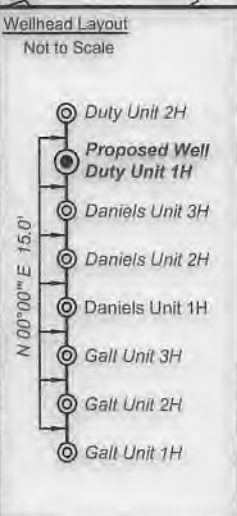
Notes:
 Well No. Duty Unit 1H
 UTM Zone 17, NAD 1927

Top Hole Coordinates
 N: 14,333,885.38'
 E: 1,663,784.27'

Point of Entry Coordinates
 N: 14,334,648.43'
 E: 1,665,526.19'

Bottom Hole Coordinates
 N: 14,322,298.05'
 E: 1,669,790.41'

ID	TM/Par	Owner	Bk/Pg	Acres
1	26/19.5	James Fallucco	361/260	8.60
2	26/19.6	Donnie & Katrina A. Smith	320/498	3.92
3	26/19.7	Michael & Nancy H. Kester	368/813	5.76
4	26/19.8	Michael & Nancy H. Kester	368/813	8.99
5	26/19.10	Jay Westbrook & Teresa Hill	355/456	9.36
6	26/5	Robert L. Keller	312/330	20.01
7	26/7	Robert L. Keller	312/330	22.09
8	26/8	Robert L. Keller	312/330	17.78
9	26/41	C.W. Reed Est. & Charles Junior Reed	30/487	1.00
10	29/5	Ralph D Thacker & Carlisle J Maurice, Jr.	388/762	12.50
11	Not Used			
12	26/9.12	JB Exploration I, LLC	404/352	4.29
13	26/20	Leroy & Hilda M Lancaster	193/333	20.00
14	Various	JB Exploration I, LLC	404/352	Varies
15	26/19.1	Edward Beagle, et al	WB36/480	10.84
16	26/24	Joanna Payton	345/158	4.11
17	26/25	Joanna Payton	345/158	3.95
18	26/23	Gretta Westbrook	WB33/57	2.00
19	26/6	David L. Beagle	198/261	3.90
20	26/6.1	Tammy L. Shanabarger	374/675	2.00



- Leases**
- A. Alice Moseley
 - B. Winifred Antalek
 - C. Donnie Smith, et ux
 - D. Clarence W. Mutschelknaus Sr., et al
 - E. Helen Reed, et al
 - F. Denny L. Palmer, et ux
 - G. Eric D. Westbrook, et ux
 - H. Jay D. Westbrook, et ux

- Legend**
- ⊙ Proposed gas well
 - ⊙ Monument, as noted
 - ⊙ Existing Well, as noted
 - Creek or Drain
 - Existing Road
 - Surface boundary (approx.)
 - - - Interior surface tracts (approx.)

	Bearing	Dist.
L1	S 41°39' E	2,710.6'
L2	N 55°11' W	2,315.4'
L3	N 44°21' W	1,259.8'
L4	N 88°33' E	2,252.6'
L5	N 67°18' E	1,902.4'

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 prescribed by the Department of Environmental Protection.

Bradley D. Miller

Bradley D. Miller, P.S. 2167

FILE NO: 216-54-E-18
 DRAWING NO: Duty Unit 1H Well Plat
 SCALE: 1" = 1500'
 MINIMUM DEGREE OF ACCURACY: Submeter
 PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

STATE OF WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS DIVISION

DATE: October 22 2018
 OPERATOR'S WELL NO. Duty Unit 1H
 API WELL NO
 47 - 095 - 02564
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
 LOCATION: ELEVATION: Existing 732' WATERSHED: Outlet Middle Island Creek QUADRANGLE: Middlebourne
 DISTRICT: Ellsworth COUNTY: Tyler
 SURFACE OWNER: Antero Midstream, LLC Douglas J. Winco; Donald H. Lancaster, et ux; S.A. Smith, et al; ACREAGE: 203.59
 ROYALTY OWNER: Larry R. Henthorn, et ux; The Swan Living Trust; Michael S. Kester, et ux; James Fallucco LEASE NO: ACREAGE: 61.71875; 14.754
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) _____ 6,600' TVD
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 22,100' MD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
 ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
 Denver, CO 80202 Charleston, WV 25313

WW-6A1

Operator's Well Number Duty 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
<u>Larry R. Henthorn, et ux Lease</u> Larry R. Henthorn, et ux	Antero Resources Corporation	1/8+	0579/0847
<u>The Swan Living Trust Lease</u> The Swan Living Trust	Antero Resources Corporation	1/8+	0594/0285
<u>Michael S. Kester, et ux Lease</u> Michael S. Kester, et ux	Antero Resources Corporation	1/8+	0574/0509
<u>James Fallucco Lease</u> James Fallucco	Antero Resources Corporation	1/8+	0493/0353
<u>Donnie Smith et ux Lease</u> Donnie Smith et ux	Antero Resources Corporation	1/8+	0602/0319
<u>Jay D. Westbrook, et ux Lease</u> Jay D. Westbrook et ux	TNG LLC	1/8	0384/0166
TNG LLC	JB Exploration I, LLC	Assignment	0398/0506
JB Exploration, LLC	Jay-Bee Oil & Gas Company	Agreement	0439/0586
Jay-Bee Oil & Gas Company	Chesapeake Appalachia, LLC	Assignment	0416/0656
Chesapeake Appalachia, LLC	SWN Production Company, LLC	Assignment	0465/0463
SWN Production Company, LLC	Antero Exchange Properties, LLC	Assignment	0544/0242
Antero Exchange Properties, LLC	Antero Resources Corporation	Merger	0552/0315
<u>Clarence W. Mutschelknaus Sr. et al Lease</u> Clarence W. Mutschelknaus Sr. et al	Antero Resources Corporation	1/8+	0503/0802
<u>Jay-Bee Royalty Lease</u> Jay-Bee Royalty	Antero Resources Corporation	1/8+	0575/0217
<u>Helen Reed, et al Lease</u> Helen Reed, et al	TNG LLC	1/8	0389/0770
TNG LLC	JB Exploration I, LLC	Assignment	0398/0506
JB Exploration I, LLC	Jay-Bee Oil & Gas Company	Agreement	0349/0586
Jay-Bee Oil & Gas Company	Chesapeake Appalachia, LLC	Assignment	0416/0656
Chesapeake Appalachia, LLC	SWN Production Company LLC	Assignment	0465/0463
SWN Production Company LLC	Antero Exchange Properties, LLC	Assignment	0544/0242
Antero Exchange Properties, LLC	Antero Resources Corporation	Merger	0552/0315

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

CONTINUED ON NEXT PAGE

WW-6A1

Operator's Well Number Duty 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
<u>Douglas J. Wince Lease</u>			
Douglas J. Wince	Antero Resources Corporation	1/8+	0476/0335
<u>Donald H. Lancaster, et ux Lease</u>			
Donald H. Lancaster, et ux	Antero Resources Appalachian Corporation	1/8+	0402/0671
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>SA Smith et al Lease</u>			
SA Smith et al	Antero Resources Corporation	1/8+	0547/0347
<u>BRC Appalachian Minerals Inc Lease</u>			
BRC Appalachian Minerals Inc	BRC Working Interest Company LLC	1/8	0369/0648
BRC Working Interest Company LLC	Chesapeake Appalachia, LLC	Assignment	0369/0784
Chesapeake Appalachia, LLC	SWN Production Company	Assignment	0465/0463
SWN Production Company	Antero Exchange Properties LLC	Assignment	0544/0242
Antero Exchange Properties LLC	Antero Resources Corporation	Merger	0552/0315

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OCT 25 2013

WV Department of
Environmental Protection

WW-6A1
(5/13)

Operator's Well No. Duty 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>John Fout, et ux Lease</u>	John Fout, et ux Antero Resources Appalachian Corporation	Antero Resources Appalachian Corporation Antero Resources Corporation	1/8+ Name Change	0417/0253 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.

**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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OCT 25 2018
WV Department of
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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: Kevin Kilstrom

Its: Senior Vice President - Production

FORM WV-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



IN THE OFFICE OF
SECRETARY OF STATE

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

- 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, listing a contact person and phone number may avoid having to return or reject the document.)

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

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

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

Important Legal Notice Regarding Signatures For West Virginia Code §11D-1-12b. 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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WV Department of
Environmental Protection



Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

October 23, 2018

West Virginia Department of Environmental Protection
Chief, Office of Oil and Gas
Attn: Mr. James Martin
601 57th Street SE
Charleston, WV 25304

RE: Duty Unit 1H
Quadrangle: Middlebourne 7.5'
Tyler County/Ellsworth District, West Virginia

Mr. Martin:

Antero Resources Corporation (Antero) is submitting the following application for a new well work permit for the Duty Unit 1H horizontal shallow well. As an authorized representative, I certify that Antero has the right to extract, produce or market the oil or gas for all leases through which the Duty Unit 1H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,

A handwritten signature in blue ink that reads "H West".

Haley West
Landman

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Office of Oil and Gas
OCT 25 2018
WV Department of
Environmental Protection

**STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE CERTIFICATION**

Date of Notice Certification: 10/19/2018

API No. 47- 095 -

Operator's Well No. Duty Unit 1H

Well Pad Name: Ferrell Pad

Notice has been given:

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83	Easting: <u>507136.923m</u>
County: <u>Tyler</u>		Northing: <u>4369194.617m</u>
District: <u>Ellsworth</u>	Public Road Access: <u>CR 7</u>	
Quadrangle: <u>Middlebourne 7.5'</u>	Generally used farm name: <u>Glenn Austin Ferrell</u>	
Watershed: <u>Outlet Middle Island Creek</u>		

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input checked="" type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH) RECEIVED Office of Oil and Gas</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p>
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Required Attachments:

The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

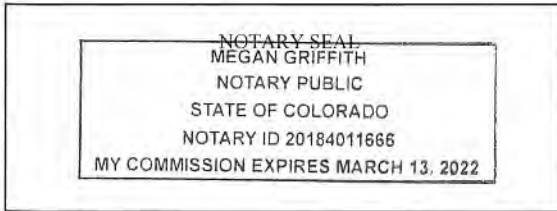
47 09 502564

WW-6AC
(1/12)

Certification of Notice is hereby given:

THEREFORE, I Kevin Kilstrom, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	<u>Antero Resources Corporation</u>	Address:	<u>1615 Wynkoop Street</u>
By:	<u>Kevin Kilstrom</u> <i>[Signature]</i>		<u>Denver, CO 80202</u>
Its:	<u>Senior Vice President - Production</u>	Facsimile:	<u>303-357-7315</u>
Telephone:	<u>303-357-7310</u>	Email:	<u>mgriffith@anteroresources.com</u>



Subscribed and sworn before me this 23rd day of October 2018
[Signature] Notary Public
 My Commission Expires MARCH 13, 2022

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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 OCT 25 2018
 WV Department of
 Environmental Protection

**STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION**

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 10/23/2018 **Date Permit Application Filed:** 10/23/2018

Notice of:

- PERMIT FOR ANY WELL WORK
- CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to:

SURFACE OWNER(s)

Name: Antero Resources Midstream
Address: 1615 Wynkoop Street
Denver, CO 80202

Name: _____
Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)

Name: Antero Resources Midstream
Address: 1615 Wynkoop Street
Denver, CO 80202

Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)

Name: _____
Address: _____

COAL OWNER OR LESSEE

Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address: _____

COAL OPERATOR

Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address: _____

WATER PURVEYOR(s)/OWNER(s) OF WATER WELL,
SPRING OR OTHER WATER SUPPLY SOURCE

Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: _____
Address: _____

*Please attach additional forms if necessary

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WV Department of
Environmental Protection

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

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WV Department of
Environmental Protection

WW-6A
(8-13)

API NO. 47-095 - _____
OPERATOR WELL NO. Duty Unit 1H
Well Pad Name: Ferrell Pad

examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

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OCT 25 2018

WV Department of
Environmental Protection

Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

Time Limits and Methods for Filing Comments.

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

Permit Denial or Condition

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

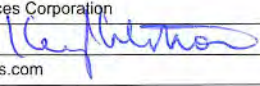
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Office of Oil and Gas
OCT 25 2013
WV Department of Environmental Protection

WW-6A
(8-13)

API NO. 47-095 -
OPERATOR WELL NO. Duty Unit 1H
Well Pad Name: Ferrell Pad

Notice is hereby given by:

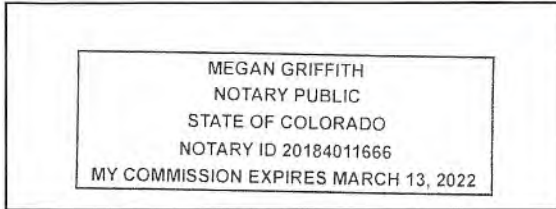
Well Operator: Antero Resources Corporation
Telephone: (303) 357-7223
Email: mgriffith@anteroresources.com



Address: 1615 Wynkoop Street
Denver, CO 80202
Facsimile: 303-357-7315

Oil and Gas Privacy Notice:

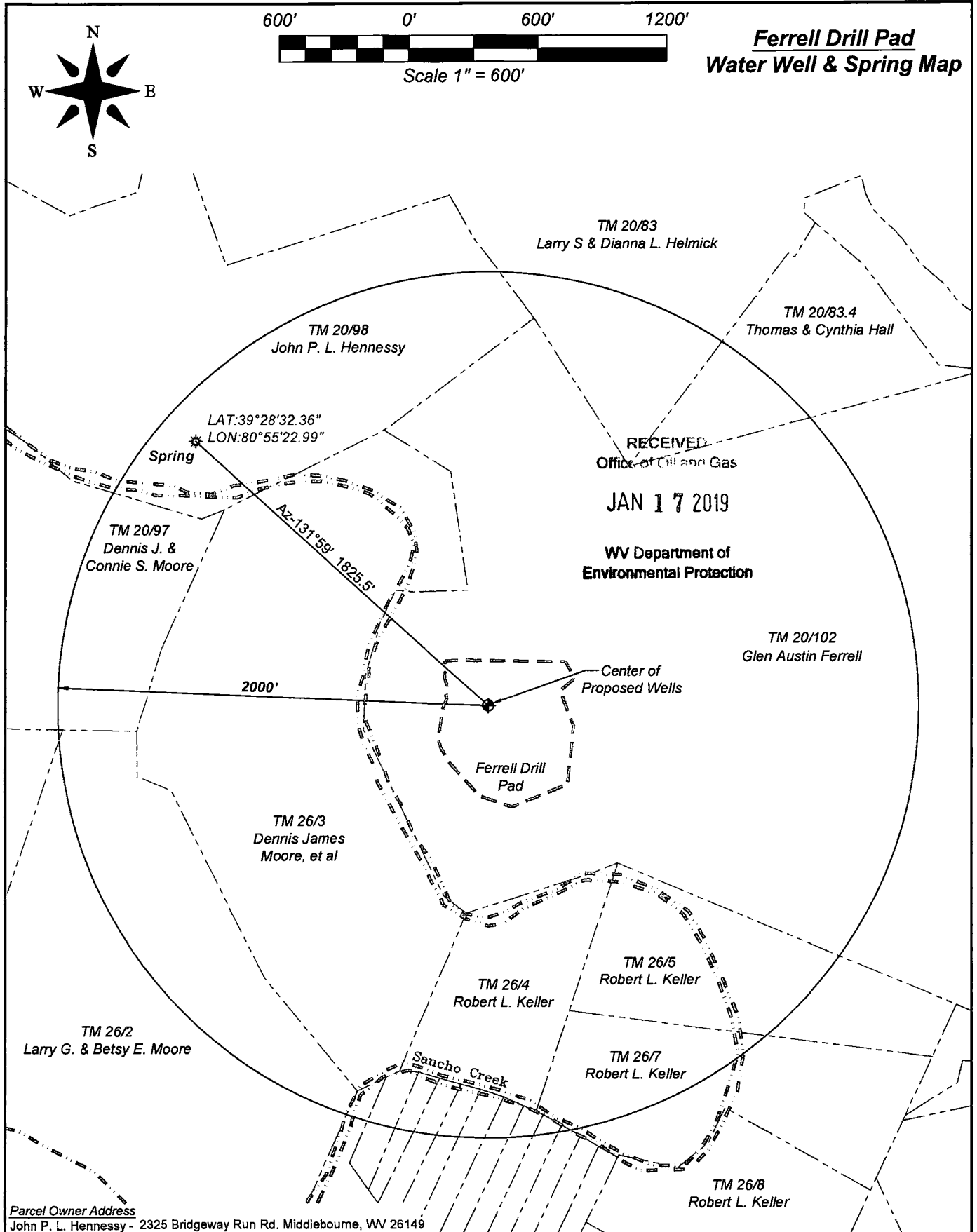
The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



Subscribed and sworn before me this 23rd day of October 2018
[Signature] Notary Public
My Commission Expires March 13, 2022

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OCT 25 2018
WV Department of
Environmental Protection

4709502564



STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF INTENT TO DRILL

Pursuant to W. Va. Code § 22-6A-16(b), the Notice of Intent to Drill is only required if the notice requirements of W. Va. Code § 22-6A-10(a) have NOT been met or if the Notice of Intent to Drill requirement has NOT been waived in writing by the surface owner.

Notice Time Requirement: Notice shall be provided at least **TEN (10)** days prior to filing a permit application.

Date of Notice: 08/30/2018 **Date Permit Application Filed:** 10/23/2018

Delivery method pursuant to West Virginia Code § 22-6A-16(b)

- HAND DELIVERY CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Pursuant to W. Va. Code § 22-6A-16(b), at least ten days prior to filing a permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner notice of its intent to enter upon the surface owner's land for the purpose of drilling a horizontal well: *Provided*, That notice given pursuant to subsection (a), section ten of this article satisfies the requirements of this subsection as of the date the notice was provided to the surface owner: *Provided, however*, That the notice requirements of this subsection may be waived in writing by the surface owner. The notice, if required, shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative.

Notice is hereby provided to the SURFACE OWNER(s):

Name: Antero Resources Midstream
Address: 1615 Wynkoop Street
Denver, CO 80202

Name: _____
Address: _____

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(b), notice is hereby given that the undersigned well operator has an intent to enter upon the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>507136.923m</u>
County:	<u>Tyler</u>		Northing:	<u>4369194.617m</u>
District:	<u>Ellsworth</u>	Public Road Access:		<u>CR 7</u>
Quadrangle:	<u>Middlebourne 7.5'</u>	Generally used farm name:		<u>Glenn Austin Ferrell</u>
Watershed:	<u>Outlet Middle Island Creek</u>			

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

Well Operator: Antero Resources Corporation
Address: 1615 Wynkoop St.
Denver, CO 80202
Telephone: 303-357-7223
Email: mgriffith@anteroresources.com
Facsimile: 303-357-7315

Authorized Representative: Megan Griffith
Address: 1615 Wynkoop St.
Denver, CO 80202
Telephone: 303-357-7223
Email: mgriffith@anteroresources.com
Facsimile: 303-357-7315

Office of Oil and Gas
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OCT 25 2018
WV DEPARTMENT OF ENVIRONMENTAL PROTECTION

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

4709502564

WW-6AW
(1-12)

API NO. 47- 095
OPERATOR WELL NO. Duty Unit 1H
Well Pad Name: Ferrell Pad

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
VOLUNTARY STATEMENT OF NO OBJECTION

Instructions to Persons Named on Page WW-6A

The well operator named on page WW-6A is applying for a permit from the State of West Virginia to conduct oil or gas well work. Well work permits are valid for twenty-four (24) months. Please contact the listed well operator and the Office of Oil and Gas if you do not own any interest in the listed surface tract.

Comment and Waiver Provisions

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary.

Pursuant to West Virginia Code § 22-6A-8(b) No permit may be issued less than thirty days after the filing date of the application for any well work except plugging or replugging; and no permit for plugging or replugging may be issued less than five days after the filing date of the application except a permit for plugging or replugging a dry hole: *Provided*, That if the applicant certifies that all persons entitled to notice of the application under the provisions of subsection (b), section ten of this article have been served in person or by certified mail, return receipt requested, with a copy of the well work application, including the erosion and sediment control plan, if required, and the well plat, and further files written statements of no objection by all such persons, the secretary may issue the well work permit at any time.

VOLUNTARY STATEMENT OF NO OBJECTION

I, _____, hereby state that I have read the Instructions to Persons Named on Page WW-6A and the associated provisions listed above, and that I have received copies of a Notice of Application, an Application for a Well Work Permit on Form WW-6A and attachments consisting of pages one (1) through _____, including the erosion and sediment control plan, if required, and the well plat, all for proposed well work on the tract of land as follows:

State: West Virginia UTM NAD 83 Easting: 507136.923m
County: Tyler Northing: 4369194.617m
District: Ellsworth Public Road Access: CR 7
Quadrangle: Middlebourne 7.5' Generally used farm name: Glenn Austin Ferrell
Watershed: Outlet Middle Island Creek

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials.

<p>*Please check the box that applies</p> <p><input type="checkbox"/> SURFACE OWNER</p> <p><input type="checkbox"/> SURFACE OWNER (Road and/or Other Disturbance)</p> <p><input type="checkbox"/> SURFACE OWNER (Impoundments/Pits)</p> <p><input type="checkbox"/> COAL OWNER OR LESSEE</p> <p><input type="checkbox"/> COAL OPERATOR</p> <p><input type="checkbox"/> WATER PURVEYOR</p> <p><input type="checkbox"/> OPERATOR OF ANY NATURAL GAS STORAGE FIELD</p>	<p>FOR EXECUTION BY A NATURAL PERSON</p> <p>Signature: _____</p> <p>Print Name: _____</p> <p>Date: _____</p> <p>FOR EXECUTION BY A CORPORATION, ETC.</p> <p>Company: <u>Anderson Midstream</u></p> <p>By: <u>[Signature]</u> RECEIVED</p> <p>Its: _____ Office of Oil and Gas</p> <p>Signature: _____</p> <p>Date: _____</p> <p>JAN 17 2019</p> <p>WV Department of Environmental Protection</p>
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Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyoffice@wv.gov.



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

Thomas J. Smith, P. E.
Secretary of Transportation/
Commissioner of Highways

October 17, 2018

Jill M. Newman
Deputy Commissioner

James A. Martin, Chief
Office of Oil and Gas
Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Subject: DOH Permit for the Ferrell Pad, Tyler County
Duty Unit 1H Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2017-0072 which has been issued to Antero Resources Corporation for access to the State Road for a site located off of Tyler County Route 7 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

Gary K. Clayton, P.E.
Regional Maintenance Engineer
Central Office O&G Coordinator

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Office of Oil and Gas

OCT 25 2018

WV Department of
Environmental Protection

Cc: Megan Griffith
Antero Resources Corporation
CH, OM, D-6
File

List of Anticipated Additives Used for Fracturing or Stimulating Well

Additives	Chemical Abstract Service Number (CAS #)
Fresh Water	7732-18-5
2 Phosphobutane 1,2,4 tricarboxylic acid	37971-36-1
Ammonium Persulfate	7727-54-0
Anionic copolymer	Proprietary
Anionic polymer	Proprietary
BTEX Free Hydrotreated Heavy Naphtha	64742-48-9
Cellulase enzyme	Proprietary
Demulsifier Base	Proprietary
Ethoxylated alcohol blend	Mixture
Ethoxylated Nonylphenol	68412-54-4
Ethoxylated oleylamine	26635-93-8
Ethylene Glycol	107-21-1
Glycol Ethers	111-76-2
Guar gum	9000-30-0
Hydrogen Chloride	7647-01-0
Hydrotreated light distillates, non-aromatic, BTEX free	64742-47-8
Isopropyl alcohol	67-63-0
liquid, 2,2-dibromo-3-nitrilopropionamide	10222-01-2
Microparticle	Proprietary
Petroleum Distillates (BTEX Below Detect)	64742-47-8
Polyacrylamide	57-55-6
Propargyl Alcohol	107-19-7
Propylene Glycol	57-55-6
Quartz	14808-60-7
Sillica, crystalline quartz	7631-86-9
Sodium Chloride	7647-14-5
Sodium Hydroxide	1310-73-2
Sugar	57-50-1
Surfactant	68439-51-0
Suspending agent (solid)	14808-60-7
Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7
Solvent Naphtha, petroleum, heavy aliph	64742-96-7
Soybean Oil, Me ester	67784-80-9
Copolymer of Maleic and Acrylic Acid	52255-49-9
DETA phosphonate	15827-60-8
Hexamethylene Triamine Penta	34690-00-1
Phosphino Carboxylic acid polymer	71050-62-9
Hexamethylene Diamine Tetra	23605-75-5
2-Propenoic acid, polymer with 2 propenamide	9003-06-9
Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5
Diethylene Glycol	111-46-6
Methenamine	100-97-0
Polyethylene polyamine	68603-67-8
Coco amine	61791-14-8
2-Propyn-1-olcompound with methyloxirane	38172-91-7

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11/25/2018

WV Department of
Environmental Protection

LOCATION COORDINATES:
ACCESS ROAD "A" ENTRANCE
 LATITUDE: 39.473196 LONGITUDE: -80.908782 (NAD 83)
 LATITUDE: 39.473116 LONGITUDE: -80.909662 (NAD 27)
 N 4386283.92 E 508017.64 (UTM ZONE 17 METERS)
CENTER OF TANK
 LATITUDE: 39.472914 LONGITUDE: -80.914093 (NAD 83)
 LATITUDE: 39.472936 LONGITUDE: -80.914665 (NAD 27)
 N 4386281.98 E 507037.49 (UTM ZONE 17 METERS)
CENTER OF PAD "A"
 LATITUDE: 39.472446 LONGITUDE: -80.918134 (NAD 83)
 LATITUDE: 39.472370 LONGITUDE: -80.919206 (NAD 27)
 N 4386260.84 E 507041.52 (UTM ZONE 17 METERS)
CENTER OF PAD "B"
 LATITUDE: 39.472386 LONGITUDE: -80.919882 (NAD 83)
 LATITUDE: 39.472309 LONGITUDE: -80.920762 (NAD 27)
 N 4386149.94 E 507140.63 (UTM ZONE 17 METERS)

APPROVED WVDEP OOG
 8/21/17 1/18/2019

FERRELL WELL PAD & WATER CONTAINMENT PAD

SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

ELLSWORTH DISTRICT, TYLER COUNTY, WEST VIRGINIA
 SANCHO CREEK WATERSHED

GENERAL DESCRIPTION:

THE ACCESS ROAD(S), WATER CONTAINMENT PAD, AND WELL PADS ARE BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

FLOODPLAIN NOTES:

THIS PROPOSED SITE IS LOCATED IN FLOOD ZONES "X" PER FEMA MAP NUMBERS #51695C013C.

MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

ENTRANCE PERMIT:

ANTERO RESOURCES CORPORATION WILL OBTAIN AN ENCROACHMENT PERMIT (FORM MM-1029) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

ENVIRONMENTAL NOTES:

STREAM AND WETLAND DELINEATIONS WERE PERFORMED IN SEPTEMBER & NOVEMBER 2016 BY ALLSTAR ECOLOGY TO REVEAL THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY JURISDICTION OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE NOVEMBER 15, 2016 STREAM AND WETLAND DELINEATION MAP WAS PREPARED BY ALLSTAR ECOLOGY AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THIS MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LATERAL LIMITS OF WATERS AND WETLANDS THAT MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS STRONGLY RECOMMENDED THAT THE APPROPRIATE AGENCIES BE CONSULTED IN AN EFFORT TO OBTAIN WRITTEN CONFIRMATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION OF THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

FERRELL EPHEMERAL STREAM IMPACT (LINEAR FEET)					
Stream and Impact Cause	Permanent Impacts		Temp. Impacts		Total Impact (LF)
	Culvert Fill (LF)	Inlets/Outlets Structures (LF)	Cofferdam/E&S Controls (LF)	Temp. Disturb. Distance to L.O.D. (LF)	
S2 (Access Road "A")	0	0	14	0	14

FERRELL INTERMITTENT STREAM IMPACT (LINEAR FEET)					
Stream and Impact Cause	Permanent Impacts		Temp. Impacts		Total Impact (LF)
	Culvert Fill (LF)	Inlets/Outlets Structures (LF)	Cofferdam/E&S Controls (LF)	Temp. Disturb. Distance to L.O.D. (LF)	
S8 (Access Road "A")	80	27	0	26	112
S15 (Access Road "A")	53	26	0	5	79
S20 (Access Road "A")	78	27	0	10	106

GEOTECHNICAL NOTES:

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. ON JANUARY 31 & FEBRUARY 1-2, 2017. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED MARCH 21, 2017, REVISED MARCH 28, 2018 REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THE REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

PROJECT CONTACTS:

CHARLES E. COMPTON, III - SURVEYING COORDINATOR
 CELL: (304) 716-6449

OPERATOR:
 ANTERO RESOURCES CORPORATION
 535 WHITE OAKS BLVD.
 BRIDGEPORT, WV 26335
 PHONE: (304) 642-4100
 FAX: (304) 642-4132

JIM WILSON - LAND AGENT
 OFFICE: (304) 642-4418 CELL: (304) 671-2708

ENGINEER/SURVEYOR:
 SAVITUS ENGINEERING, INC.
 CYRUS S. KEMP, PE - PROJECT MANAGER/ENGINEER
 OFFICE: (888) 682-4185 CELL: (540) 688-9747

ELLI WAGNER - ENVIRONMENTAL ENGINEER
 OFFICE: (304) 642-4088 CELL: (304) 476-9770

JON McVERBS - OPERATIONS SUPERINTENDENT
 OFFICE: (304) 367-9789 CELL: (304) 808-2423

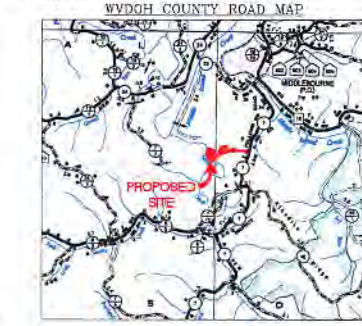
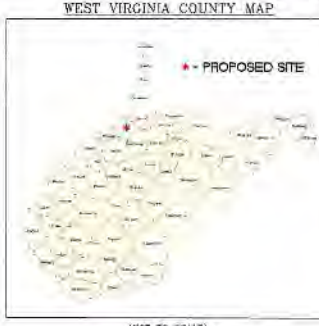
ENVIRONMENTAL:
 ALLSTAR ECOLOGY, LLC
 EYAN E. WARD - ENVIRONMENTAL SCIENTIST
 (686) 213-2686 CELL: (304) 692-7477

AARON KUNDLER - CONSTRUCTION SUPERVISOR
 CELL: (405) 227-8344

GEOTECHNICAL:
 PENNSYLVANIA SOIL & ROCK, INC.
 CHRISTOPHER W. SAMOIS - PROJECT ENGINEER
 OFFICE: (412) 372-4800 CELL: (412) 589-0882

RESTRICTIONS NOTES:

1. THERE ARE NO PERENNIAL STREAM, LAKES, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LEO. THERE IS A WETLAND AND A POND ADJACENT TO ACCESS ROAD "A" WHICH WILL REMAIN UNDISTURBED.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LEO.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LEO.
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 500 FEET OF THE WELLS(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 825 FEET OF THE CENTER OF THE WELL PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 825 FEET OF THE CENTER OF THE WELL PAD.



(NOT TO SCALE)

SCALE: 1" = 500'

MISS Utility of West Virginia
 1-800-245-4848
 West Virginia State Law
 (Section XIV, Chapter 24-C)
 Requires that you call two
 business days before you dig in
 the state of West Virginia.
 IT'S THE LAW!

REPRODUCTION NOTE
 THESE PLANS WERE CREATED TO BE PLOTTED ON 24"X36" (ASST D) PAPER. HALF SCALE DRAWINGS ARE ON 11"X17" (ANSI B) PAPER.
 THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

SHEET INDEX:

- 1 - COVER SHEET
- 2 - CONSTRUCTION AND E&S CONTROL NOTES
- 3 - LEGEND
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- 5 - STORM DRAINAGE & E&S COMPUTATIONS
- 6 - EXISTING CONDITIONS
- 7 - EXISTING STRUCTURES & FEATURES
- 8 - OVERALL PLAN SHEET INDEX & VOLUMES
- 9 - ACCESS ROAD PLAN
- 10 - ACCESS ROAD & WATER CONTAINMENT PAD PLAN
- 11 - ACCESS ROAD & WELL PAD PLAN
- 12 - WELL PAD "A" GRADING PLAN
- 13 - WELL PAD "B" GRADING PLAN
- 14 - PRODUCTION EQUIPMENT PAD GRADING PLAN
- 15 - WATER CONTAINMENT PAD GRADING PLAN
- 16 - ACCESS ROAD PROFILES
- 17 - ACCESS ROAD SECTIONS
- 18 - WELL PAD SECTIONS
- 19 - WATER CONTAINMENT PAD & STOCKPILE SECTIONS
- 20 - STOCKPILE SECTIONS
- 21 - STREAM CROSSING "A" DETAILS
- 22 - STREAM CROSSING "B" DETAILS
- 23 - STREAM CROSSING "C" DETAILS
- 24 - STREAM CROSSING "D" DETAILS
- 25 - CONSTRUCTION DETAILS
- 26 - ACCESS ROAD EXPLANATION PLAN
- 27 - ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
- 28 - ACCESS ROAD & WELL PAD RECLAMATION PLAN
- 29 - GEOTECHNICAL DETAILS

FERRELL LIMITS OF DISTURBANCE AREA (AC)

Item	Area (Ac)
Access Road "A" (3,255.6')	9.68
Access Road "B" (167.9')	0.54
Access Road "C" (630.4')	1.10
Water Containment Pad	2.96
Production Equipment Pad	5.59
Excess/Topsoil Material Stockpiles	7.73
Total Affected Area	38.20
Total Wooded Acres Disurbed	10.71

WELL PAD "A"

Proposed Well Name	WN North NAD 27	WN North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Unit #41	N 357243.47	N 357283.92	N 436918.01	LAT 39-26-03 1059
Guid	E 1509175.82	E 1509138.83	E 507208.23	LONG -80-58-26 416*
Unit #42	E 1509115.82	E 1509138.83	E 507208.24	LONG -80-58-26 9192
Guid	N 357273.47	N 357310.82	N 436918.15	LAT 39-26-00 9074
Unit #21	E 1502678.92	E 1508138.83	E 507208.28	LONG -80-58-26 8222
Guid	N 357291.47	N 357295.92	N 436909.17	LAT 39-26-00 9434
Unit #15	E 1506561.82	E 1508138.83	E 507208.19	LONG -80-58-26 8282
Hennessy	N 357103.47	N 357345.92	N 4369205.29	LAT 39-26-00 8938
Unit #4	E 1506575.82	E 1508138.83	E 507208.11	LONG -80-58-26 9289
Hennessy	N 357251.47	N 357345.92	N 4369219.86	LAT 39-26-00 8421
Unit #11	E 1506561.82	E 1508138.83	E 507208.23	LONG -80-58-26 8912
Unit #16	E 1509128.47	E 1509138.83	E 507208.19	LONG -80-58-26 8282
Unit #24	E 1509175.82	E 1509138.83	E 507208.23	LONG -80-58-26 9343
Remo	N 357381.47	N 357385.92	N 4369222.00	LAT 39-26-01 1386
Unit #14	E 1506575.82	E 1508138.83	E 507208.18	LONG -80-58-26 9372
Well Pad Elevation	797.8			

WELL PAD "B"

Proposed Well Name	WN North NAD 27	WN North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Gal	N 357117.92	N 357206.83	N 4369197.20	LAT 39-25-18 4224
Unit #11	E 1506622.82	E 1506580.83	E 507137.29	LONG -80-58-21 2728
Gal	N 357187.92	N 357201.83	N 4369177.77	LAT 39-25-18 2766
Unit #24	E 1506642.82	E 1506580.83	E 507137.23	LONG -80-58-21 2756
Gal	N 357200.92	N 357206.83	N 4369198.34	LAT 39-25-18 7189
Unit #4	E 1506642.82	E 1506580.83	E 507137.23	LONG -80-58-21 2785
Daniela	N 357211.92	N 357216.83	N 4369198.31	LAT 39-25-18 8671
Unit #14	E 1506642.82	E 1506580.83	E 507137.18	LONG -80-58-21 2817
Daniela	N 357222.92	N 357226.83	N 4369198.48	LAT 39-26-00 2153
Unit #21	E 1506642.82	E 1506580.83	E 507137.07	LONG -80-58-21 2847
Daniela	N 357241.92	N 357241.83	N 4369198.05	LAT 39-26-00 1936
Unit #4	E 1506642.82	E 1506580.83	E 507137.03	LONG -80-58-21 2897
Duty	N 357252.92	N 357252.83	N 4369194.92	LAT 39-26-00 2118
Unit #14	E 1506642.82	E 1506580.83	E 507136.82	LONG -80-58-21 2909
Duty	N 357271.92	N 357271.83	N 4369198.16	LAT 39-26-00 4860
Unit #21	E 1506642.82	E 1506580.83	E 507136.85	LONG -80-58-21 2937
Well Pad Elevation	783.8			

NAVITUS
 ENERGY ENGINEERING

REVISION

DATE	DESCRIPTION
10/24/2017	REVISED PER UPDATED LANDOWNER
10/24/2017	REVISED PER WEST CONTRACTOR
07/17/2018	REVISED PER STORM
04/02/2018	REVISED PER SHOPS
04/16/2018	REVISED PER PAD OPERATING DESIGN
06/29/2018	REVISED PER PAD GRADING
07/23/2018	REVISED PER WELLS



THE DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION
FERRELL
 WELL PADS & WATER CONTAINMENT PAD
 ELLSWORTH DISTRICT
 TYLER COUNTY, WEST VIRGINIA



DATE: 04/04/2017
 SCALE: AS SHOWN
 SHEET 1 OF 41

WATER CONTAINMENT PAD CONSTRUCTION PLAN, E&S CONTROL PLANS

TYLER COUNTY, WEST VIRGINIA
UNAPPROVED

TOPOGRAPHIC MAP



WEST VIRGINIA STATE PLANE COORDINATE SYSTEM
NORTH ZONE, MANS
ELEVATION BASED ON NAVD83
ESTABLISHED BY SURVEY GRADE GPS & OPUS
POST-PROCESSING

REPRODUCTION NOTE
THESE PLANS WERE CREATED TO BE PLOTTED ON 22"x34" (ANSI D) PAPER. HALF SCALE DRAWINGS ARE ON 11"x17" (ANSI B) PAPER.
THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

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- 13 - WELL PAD "B" GRADING PLAN
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- 16-17 - ACCESS ROAD PROFILES
- 18-20 - ACCESS ROAD SECTIONS
- 21-25 - WELL PAD SECTIONS
- 26 - WATER CONTAINMENT PAD & STOCKPILE SECTIONS
- 27 - STOCKPILE SECTIONS
- 28 - STREAM CROSSING "A" DETAILS
- 29 - STREAM CROSSING "B" DETAILS
- 30 - STREAM CROSSING "C" DETAILS
- 31-38 - CONSTRUCTION DETAILS
- 39 - ACCESS ROAD RECLAMATION PLAN
- 40 - ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
- 41 - ACCESS ROAD & WELL PAD RECLAMATION PLAN
- GE500-GE508 - GEOTECHNICAL DETAILS

FERRELL LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Impacts to Antero Midstream, LLC TM 20-102	
Access Road "A" (3,255.6')	9.68
Access Road "B" (167.9')	0.34
Access Road "C" (630.4')	1.10
Well Pad	10.78
Water Containment Pad	2.96
Production Equipment Pad	5.55
Excess/Topsoil Material Stockpiles	7.79
Total Affected Area	38.20
Total Wooded Acres Disturbed	10.71

WVDOH COUNTY ROAD MAP



MISS Utility of West Virginia
1-800-245-4848
West Virginia State Law
(Section XIV: Chapter 24-C)
Requires that you call two
business days before you dig in
the state of West Virginia.
IT'S THE LAW!!

JEB
11/29/2018

WELL PAD "A"

Proposed Well Name	WV North NAD 83	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat. & Long
Guid	N 357246.47	N 357280.92	N 4369188.01	LAT 39-28-20.1009
Unit 4H	E 1599579.92	E 1598138.83	E 507028.42	LONG -80-55-05.0161
Guid	N 357261.47	N 357295.62	N 4369182.58	LAT 39-28-20.2491
Unit 3H	E 1599579.92	E 1568138.83	E 507028.34	LONG -80-55-05.0192
Guid	N 357276.47	N 357310.92	N 4369197.15	LAT 39-28-20.3674
Unit 2H	E 1599579.92	E 1568138.83	E 507026.26	LONG -80-55-05.9222
Guid	N 357291.47	N 357325.62	N 4369201.72	LAT 39-28-20.5459
Unit 1H	E 1599579.92	E 1568138.83	E 507026.19	LONG -80-55-05.9282
Hennessy Unit 2H	N 357306.47	N 357340.92	N 4369206.29	LAT 39-28-20.6938
Unit 1H	E 1599579.92	E 1568138.83	E 507026.11	LONG -80-55-05.9282
Hennessy Unit 1H	N 357321.47	N 357355.92	N 4369210.86	LAT 39-28-20.8421
Item	E 1599579.92	E 1568138.83	E 507026.03	LONG -80-55-05.9312
Unit 2H	N 357336.47	N 357370.92	N 4369215.43	LAT 39-28-20.9903
Unit 1H	E 1599579.92	E 1568138.83	E 507025.98	LONG -80-55-05.9343
Remo Unit 1H	N 357351.47	N 357385.92	N 4369220.00	LAT 39-28-21.1386
Unit 2H	E 1599579.92	E 1568138.84	E 507025.88	LONG -80-55-05.9372
Well Pad Elevation	757.0			

WELL PAD "B"

Proposed Well Name	WV North NAD 83	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat. & Long
Gal	N 357172.07	N 357206.53	N 4369167.20	LAT 39-28-19.4224
Unit 1H	E 1598942.91	E 1568501.83	E 507137.38	LONG -80-55-01.2728
Gal	N 357187.07	N 357221.53	N 4369171.77	LAT 39-28-19.5708
Unit 2H	E 1598942.91	E 1568501.83	E 507137.30	LONG -80-55-01.2756
Gal	N 357202.07	N 357236.53	N 4369176.34	LAT 39-28-19.7189
Unit 3H	E 1598942.91	E 1568501.83	E 507137.23	LONG -80-55-01.2786
Daniels Unit 1H	N 357217.07	N 357251.53	N 4369180.91	LAT 39-28-19.8671
Unit 2H	E 1598942.91	E 1568501.83	E 507137.15	LONG -80-55-01.2817
Daniels Unit 2H	N 357232.07	N 357266.53	N 4369185.48	LAT 39-28-20.0163
Unit 1H	E 1598942.91	E 1568501.83	E 507137.07	LONG -80-55-01.2847
Daniels Unit 3H	N 357247.07	N 357281.53	N 4369190.05	LAT 39-28-20.1636
Unit 1H	E 1598942.91	E 1568501.83	E 507137.00	LONG -80-55-01.2877
Duty Unit 1H	N 357262.07	N 357296.53	N 4369194.62	LAT 39-28-20.3118
Unit 2H	E 1598942.91	E 1568501.83	E 507136.92	LONG -80-55-01.2907
Duty Unit 1H	N 357277.07	N 357311.53	N 4369199.19	LAT 39-28-20.4600
Unit 2H	E 1598942.91	E 1568501.83	E 507136.85	LONG -80-55-01.2937
Well Pad Elevation	731.0			



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DATE	REVISION
10/24/2017	REVISED PER UPDATED LANDOWNER
12/04/2017	REVISED PER WDEP COMMENTS
01/17/2018	REVISED PER STORM
04/02/2018	REVISED PER SIMOFS
04/18/2018	REVISED PER PAD DEWATERING DESIGN
06/29/2018	REVISED WELL PAD GRADING
07/23/2018	REVISED PER WELLS



THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

COVER SHEET
FERRELL
WELL PADS & WATER CONTAINMENT PAD
TYLER COUNTY, WEST VIRGINIA



DATE: 04/04/2017
SCALE: AS SHOWN
SHEET 1 OF 41

LOCATION COORDINATES:

ACCESS ROAD "A" ENTRANCE
 LATITUDE: 39.473196 LONGITUDE: -80.908792 (NAD 83)
 LATITUDE: 39.473118 LONGITUDE: -80.908982 (NAD 27)
 N 4369293.92 E 508017.04 (UTM ZONE 17 METERS)

CENTER OF TANK
 LATITUDE: 39.472914 LONGITUDE: -80.914693 (NAD 83)
 LATITUDE: 39.472836 LONGITUDE: -80.914863 (NAD 27)
 N 4369281.98 E 507937.49 (UTM ZONE 17 METERS)

CENTROID OF PAD "A"
 LATITUDE: 39.472448 LONGITUDE: -80.916134 (NAD 83)
 LATITUDE: 39.472370 LONGITUDE: -80.918305 (NAD 27)
 N 4369209.94 E 507041.52 (UTM ZONE 17 METERS)

CENTROID OF PAD "B"
 LATITUDE: 39.472086 LONGITUDE: -80.916963 (NAD 83)
 LATITUDE: 39.472009 LONGITUDE: -80.917154 (NAD 27)
 N 4369189.94 E 507140.53 (UTM ZONE 17 METERS)

GENERAL DESCRIPTION:

THE ACCESS ROAD(S), WATER CONTAINMENT PAD, AND WELL PADS ARE BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

FLOODPLAIN NOTES:

THE PROPOSED SITE IS LOCATED IN FLOOD ZONES "X" PER FEMA MAP NUMBERS #54095C0131C.

MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1633538596. IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

ENTRANCE PERMIT:

ANTERO RESOURCES CORPORATION WILL OBTAIN AN ENCROACHMENT PERMIT (FORM MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

ENVIRONMENTAL NOTES:

STREAM AND WETLAND DELINEATIONS WERE PERFORMED IN SEPTEMBER & NOVEMBER, 2016 BY ALLSTAR ECOLOGY TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE NOVEMBER 15, 2016 STREAM AND WETLAND DELINEATION MAP WAS PREPARED BY ALLSTAR ECOLOGY AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS STRONGLY RECOMMENDED THAT THE AFOREMENTIONED AGENCIES BE CONSULTED IN AN EFFORT TO GAIN WRITTEN CONFIRMATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

FERRELL PERMANENT STREAM IMPACT (LINEAR FEET)

Stream and Impact Cause	Permanent Impacts		Temp. Impacts	Temp. Disturb.	Distance to L.O.D. (LF)	Total Impact (LF)
	Culvert / Fill (LF)	Inlets/Outlets Structures (LF)				
S2 (Access Road "A")	0	0	14	0	0	14

FERRELL INTERMITTENT STREAM IMPACT (LINEAR FEET)

Stream and Impact Cause	Permanent Impacts		Temp. Impacts	Temp. Disturb.	Distance to L.O.D. (LF)	Total Impact (LF)
	Culvert / Fill (LF)	Inlets/Outlets Structures (LF)				
S9 (Access Road "A")	86	27	0	26	112	
S15 (Access Road "A")	63	26	0	5	89	
S20 (Access Road "A")	79	27	0	18	106	

GEOTECHNICAL NOTES:

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. ON JANUARY 31, & FEBRUARY 1-2, 2017. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED MARCH 21, 2017, REVISED MARCH 28, 2018, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

PROJECT CONTACTS:

OPERATOR:

ANTERO RESOURCES CORPORATION
 535 WHITE OAKS BLVD.
 BRIDGEPORT, WV 26330
 PHONE: (304) 842-4100
 FAX: (304) 842-4102

ELI WAGONER - ENVIRONMENTAL ENGINEER
 OFFICE: (304) 842-4086 CELL: (304) 476-9770

JON McEVERS - OPERATIONS SUPERINTENDENT
 OFFICE: (303) 357-6798 CELL: (303) 808-2423

AARON KUNZLER - CONSTRUCTION SUPERVISOR
 CELL: (405) 227-8344

ROBERT B. WIRKS - FIELD ENGINEER
 OFFICE: (304) 842-4100 CELL: (304) 827-7405

CHARLES E. COMPTON, III - SURVEYING COORDINATOR
 CELL: (304) 719-6449

JIM WILSON - LAND AGENT
 OFFICE: (304) 842-4419 CELL: (304) 671-2708

ENGINEER/SURVEYOR:

NAVITUS ENGINEERING, INC.
 CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
 OFFICE: (888) 682-4185 CELL: (540) 686-8747

ENVIRONMENTAL:

ALLSTAR ECOLOGY, LLC
 RYAN L. WARD - ENVIRONMENTAL SCIENTIST
 (866) 213-2866 CELL: (304) 892-7477

GEOTECHNICAL:

PENNSYLVANIA SOIL & ROCK, INC.
 CHRISTOPHER W. SAMOS - PROJECT ENGINEER
 OFFICE: (412) 372-4000 CELL: (412) 589-0662

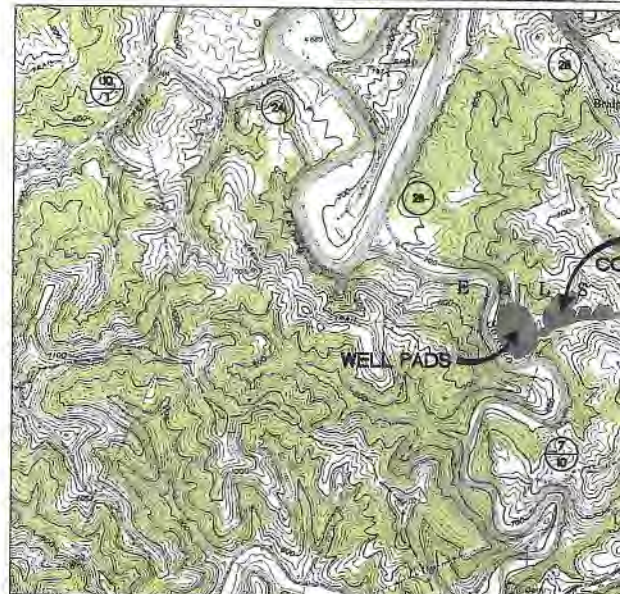
RESTRICTIONS NOTES:

1. THERE ARE NO PERENNIAL STREAM, LAKES, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE IS A WETLAND AND A POND ADJACENT TO ACCESS ROAD "A" WHICH WILL REMAIN UNDISTURBED.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 825 FEET OF THE CENTER OF THE WELL PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

FERRELL WELL PAD & WATER CONTAINMENT PAD SITE DESIGN & CONSTRUCTION EROSION & SEDIMENT CONTROL

ELLSWORTH DISTRICT, TYLER COUNTY
 SANCHO CREEK WATERSHED

USGS 7.5 MIDDLEBOURNE



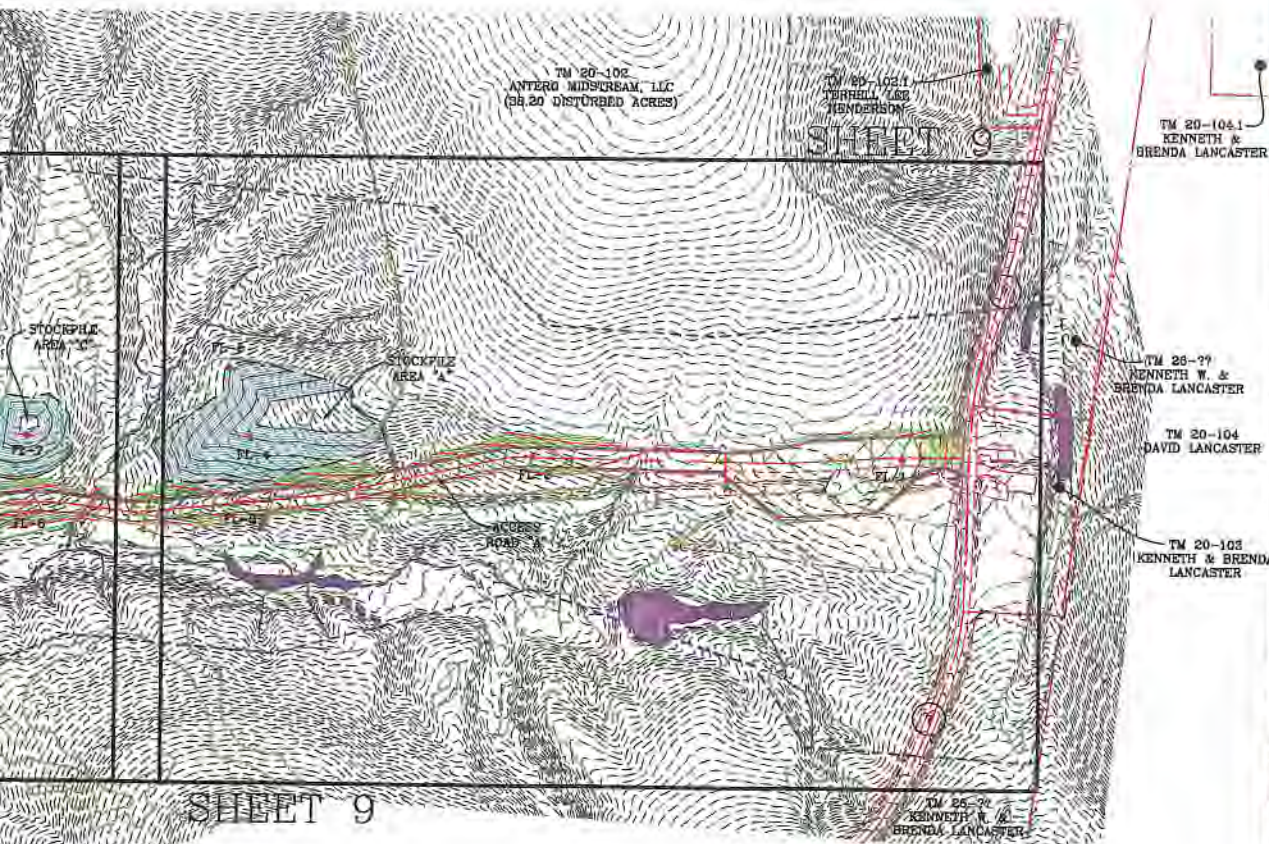
WEST VIRGINIA COUNTY MAP



DESIGN CERTIFICATION:

THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS CRS 35-8.

INDEX AND VOLUMES



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DATE	REVISION
10/24/2017	REVISED PER UPDATED LANDOWNER
12/04/2017	REVISED PER WDEP COMMENTS
01/17/2018	REVISED PER STORM
04/02/2018	REVISED PER SUDOPS
04/16/2018	REVISED PER PAD DRAINAGE DESIGN
06/29/2018	REVISED WELL PAD GRADING
07/26/2018	REVISED PER WELLS



OVERALL PLAN SHEET INDEX AND VOLUMES

FERRELL

WELL PADS & WATER CONTAINMENT PAD

ELLSWORTH DISTRICT

TYLER COUNTY, WEST VIRGINIA



DATE: 04/04/2017
 SCALE: 1" = 150'
 SHEET 8 OF 41

TM 20-102
 ANTERO MIDSTREAM, LLC
 (38.20 DISTURBED ACRES)

JOB 11/28/2015

Description	FERRELL (1) - BE - (2) (M) - (1)												Total
	Keyway #1A	Keyway #1B	Keyway #1C	Keyway #1D	Keyway #1E	Keyway #1F	Keyway #1G	Keyway #1H	Keyway #1I	Keyway #1J	Keyway #1K	Keyway #1L	
Topsoil													
Approximate Depth (LF)	11	9	7	10	6	5	3	5	9	5	4	N/A	
Approximate Volume (15 min. LF)	15	15	15	15	15	15	15	15	15	15	15	N/A	
Length (LF)	840	440	520	1,080	360	520	300	700	480	920	300	6,460	
Initial Drain (LF)	840	440	520	1,080	360	520	300	700	480	920	300	6,460	
ASHTO #57 Gravel (TONS)	127	67	79	164	55	705	336	949	877	1,247	371	4,976	
6 in. Non-Woven Geotextile (SF)	10,080	5,280	6,240	12,960	4,320	14,245	6,946	19,177	17,223	25,204	7,582	129,256	
Overlays (CY)	11,650	3,250	4,275	14,000	3,000	3,700	2,000	4,000	5,300	6,550	2,000	59,725	
The Bottom Outlet Drain													
Average Length of Outlet Drain Pipe (LF)	55	80	50	55	50	55	45	55	80	45	80	N/A	
Outlet Drain Pipe (LF)	585	400	380	935	200	330	135	385	300	450	240	4,320	
6 in. Non-Woven Geotextile (SF)	7,020	4,800	4,320	11,220	2,400	3,960	1,820	4,820	3,900	5,400	2,880	51,840	
ASHTO #57 Gravel (TONS)	65	44	40	104	22	37	15	43	33	50	27	450	
Spillway Basins													
Approximate Depth (LF)	0	0	0	0	0	0	0	0	0	0	0	N/A	
Approximate Width (LF)	0	0	0	0	0	10	0	10	10	0	0	N/A	
Number of Basins (Bn)	0	0	0	0	0	1	0	1	2	0	0	N/A	
Length (LF)	0	0	0	0	0	280	0	320	300	0	0	900	
Perimeter Drain (LF)	0	0	0	0	0	280	0	320	600	0	0	1,200	
ASHTO #57 Gravel (TONS)	0	0	0	0	0	191	0	219	499	0	0	909	
6 in. Non-Woven Geotextile (SF)	0	0	0	0	0	4,284	0	4,896	10,788	0	0	19,968	
Overlays (CY)	0	0	0	0	0	400	0	300	2,000	0	0	2,700	
Existing South Outlet Drains													
Average Length of Outlet Drain Pipe (LF)	0	0	0	0	0	50	0	50	55	0	0	N/A	
Outlet Drain Pipe (LF)	0	0	0	0	0	150	0	200	330	0	0	880	
6 in. Non-Woven Geotextile (SF)	0	0	0	0	0	1,800	0	2,400	3,960	0	0	8,160	
ASHTO #57 Gravel (TONS)	0	0	0	0	0	17	0	22	37	0	0	78	
ASBESTOS ENCLOSURE													
Approximate Volume (CY)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0

Total	2,270
	0
	31,450
	0
	5,000
	38,728

Volume of Slope	118.2
(FT)	26.4
	149.9
n/a	n/a
n/a	n/a
n/a	n/a
n/a	n/a
n/a	n/a

OVERALL PLAN SHEET IN

TM 26-3
DENNIS J. MOORE

GRID NORTH AND ELEVATIONS
SHOWN HEREON WERE
ESTABLISHED BY SURVEY
GRADE OPS

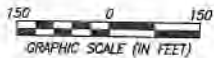
SHEET 10



SHEET 10

TM 26-3
DENNIS J. MOORE

TM 26-5
DAVID ALAN FLETCHER



MATERIAL STOCKPILE	
Name	Est.
Topsoil Respread	20
A	20
B	4
C	1
TOTAL	25

NOTES:

1. THE EARTHWORK QUANTITIES PROVIDED ARE AN ESTIMATE FOR CONSIDERATION. THE QUANTITIES SHOWN ARE CALCULATED USING A 1:1 CUT/SWELL & FILL SHRINK FACTOR. THE EXCESS MATERIAL & TOPSOIL STOCKPILES ARE SIZED TO ACCOMMODATE A CUT/SWELL FACTOR OF 1.1:1. THIS ADDITIONAL MATERIAL IS REFLECTED IN THE TOTAL SPOIL SHOWN ON THE MATERIAL QUANTITIES TABLE. IF THE CALCULATED SWELL IS LESS THAN 1.1:1, THE STOCKPILES SIZES CAN BE REDUCED DURING CONSTRUCTION. THE QUANTITIES SHOWN MAY BE GREATER OR LESSER THAN ACTUALLY EXCAVATED. THE ENGINEER IS NOT RESPONSIBLE FOR VARIANCES FROM THE ESTIMATED QUANTITIES AND DOES NOT CERTIFY THEIR ACCURACY.
2. THE TOE BENCH DEPTHS AND QUANTITIES PROVIDED IN THE TABLE ARE AN ESTIMATE, CALCULATED FROM THE RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. SEE PAGES GE500-GE608 & GEOTECHNICAL INVESTIGATION REPORT PROVIDED BY PENNSYLVANIA SOIL & ROCK, INC. FOR TOE BENCH DETAILS, VOLUMES, AND SPECIFICATIONS.

Description	CUT		FILL		Misc. Spoil (CY)
	CUY	ICY	CUY	ICY	
Access Road A	12,774.0	10,168.9	2,605.1	0.0	16.0
Access Road B	1,178.4	55.6	1,122.8	0.0	11.4
Access Road C	404.7	15,479.4	0.0	15,074.7	12.5
Well Pad A	82,361.6	5,938.5	76,423.1	0.0	n/a
Well Pad B	24,058.9	37,363.4	0.0	13,294.5	n/a
Water Containment Pad	20,792.9	8,493.9	14,299.0	0.0	n/a
Production Equipment Pad	3,122.9	78,401.1	0.0	75,276.2	n/a
Simplex Topsoil (CY)	32,790.9	0.0	32,790.9	0.0	n/a
Material Stockpiles (CY)	0.0	85,480.0	0.0	85,480.0	n/a
TOTAL	177,484.3	219,370.8	127,240.9	169,127.4	n/a
Total Spoil (CY)				-41,886.5	