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**west virginia** department of environmental protection

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

Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

July 23, 2015

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-9502276, issued to ANTERO RESOURCES CORPORATION, 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 all 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 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.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-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) 926-0499 ext. 1654.

  
James Martin  
Chief

Operator's Well No: LUCY UNIT 1H  
Farm Name: MONROE, EDNA

**API Well Number: 47-9502276**

**Permit Type: Horizontal 6A Well**

Date Issued: 07/23/2015

**Promoting a healthy environment.**

**07/24/2015**

# PERMIT CONDITIONS

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

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1. Gas Well API# 47-095-00700 currently owned by Sancho Oil and Gas, Corporation shall be permitted to plug and abandon per all WVDEP requirements prior to the construction of the well pad. The plugged well shall be monumented according to 35CSR4-5.5b or a variance will be required.
2. 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.
3. 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 fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.

07/24/2015

## PERMIT CONDITIONS

10. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to [DEPOOGNotify@wv.gov](mailto:DEPOOGNotify@wv.gov) within 30 days of commencement of drilling.

WW-6B  
(9/13)

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

1) Well Operator: Antero Resources Corporation | 494488557 | 095 - Tyler | Centerville | Middlebourne 7.5'  
Operator ID | County | District | Quadrangle

2) Operator's Well Number: Lucy Unit 1H | Well Pad Name: Estlack Pad

3) Farm Name/Surface Owner: Monroe, Edna | Public Road Access: CR 30/1

4) Elevation, current ground: 1160' | Elevation, proposed post-construction: 1141'

5) Well Type (a) Gas  Oil  Underground Storage   
Other

(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):  
Marcellus Shale: 6800' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6800' TVD

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 18100' MD

11) Proposed Horizontal Leg Length: 10472'

12) Approximate Fresh Water Strata Depths: 131', 161', 208'

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

14) Approximate Saltwater Depths: 772', 847', 1890', 1968'

15) Approximate Coal Seam Depths: 200'

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: \_\_\_\_\_

*Michael Hoff*  
*6-17-2015*

Received  
Office of Oil & Gas  
JUN 22 2015

WW-6B  
(9/13)

18)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	300'	300'	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18100'	18100'	4570 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7,100'	
Liners							

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6-17-2015

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	30"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

PACKERS

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

Received  
Office of Oil & Gas  
JUN 22 2015

WW-6B  
(9/13)

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

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

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 38.12 acres

22) Area to be disturbed for well pad only, less access road (acres): 13.58 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 40 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.

WW-9  
(2/15)

API Number 47 - 095 - \_\_\_\_\_  
Operator's Well No. Lucy 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 494488557

Watershed (HUC 10) Headwaters 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 \_\_\_\_\_ )
- 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 \_\_\_\_\_)

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Will closed loop system be used? If so, describe: Yes

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

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

Additives to be used in drilling medium? Please See Attachment

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. 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

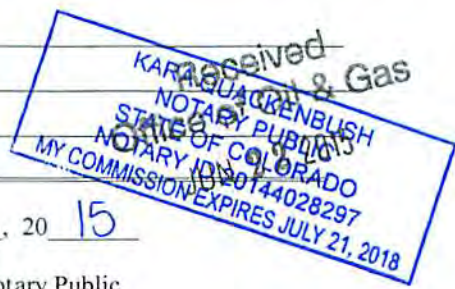
-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-1032-98)

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 [Signature]  
Company Official (Typed Name) Donald Gray  
Company Official Title Manager, Environmental & Regulatory



Subscribed and sworn before me this 12 day of June, 20 15  
[Signature] Notary Public

My commission expires July 21, 2018

**Antero Resources Corporation**

Proposed Revegetation Treatment: Acres Disturbed 38.12 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" (8.33) + Well Pad (13.58) + Water Containment Pad (2.90) + Excess/Topsoil Material Stockpiles (13.31) = 38.12 Acres

**Seed Mixtures**

**Temporary**

**Permanent**

Seed Type	lbs/acre
<u>Annual Ryegrass</u>	<u>40</u>

Seed Type	lbs/acre
<u>Crownvetch</u>	<u>10-15</u>

See attached Table IV-3 for additional seed type (Estlack Pad Design Page 26)

See attached Table IV-4a for additional seed type (Estlack Pad Design Page 26)

\*or type of grass seed requested by surface owner

\*or type of grass seed requested by surface owner

Attach:

Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Michael Hoff

Comments: Preseed & mulch any disturbed areas per WVDEP regs. Maintain & upgrade E-n-s as necessary.

Title: Oil & Gas Inspector Date: 6-17-2015

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

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



## Well Site Safety Plan

### Antero Resources

**Well Name:** Lucy Unit 1H, Lucy Unit 2H, Matthews Unit 2H, Hare Unit 2H, Hare Unit 1H, Matthews Unit 1H, Melvin Unit 2H, Melvin Unit 1H, Jujubee Unit 1H, Jujubee Unit 2H

**Pad Location:** ESTLACK PAD  
Tyler County/ Centerville District

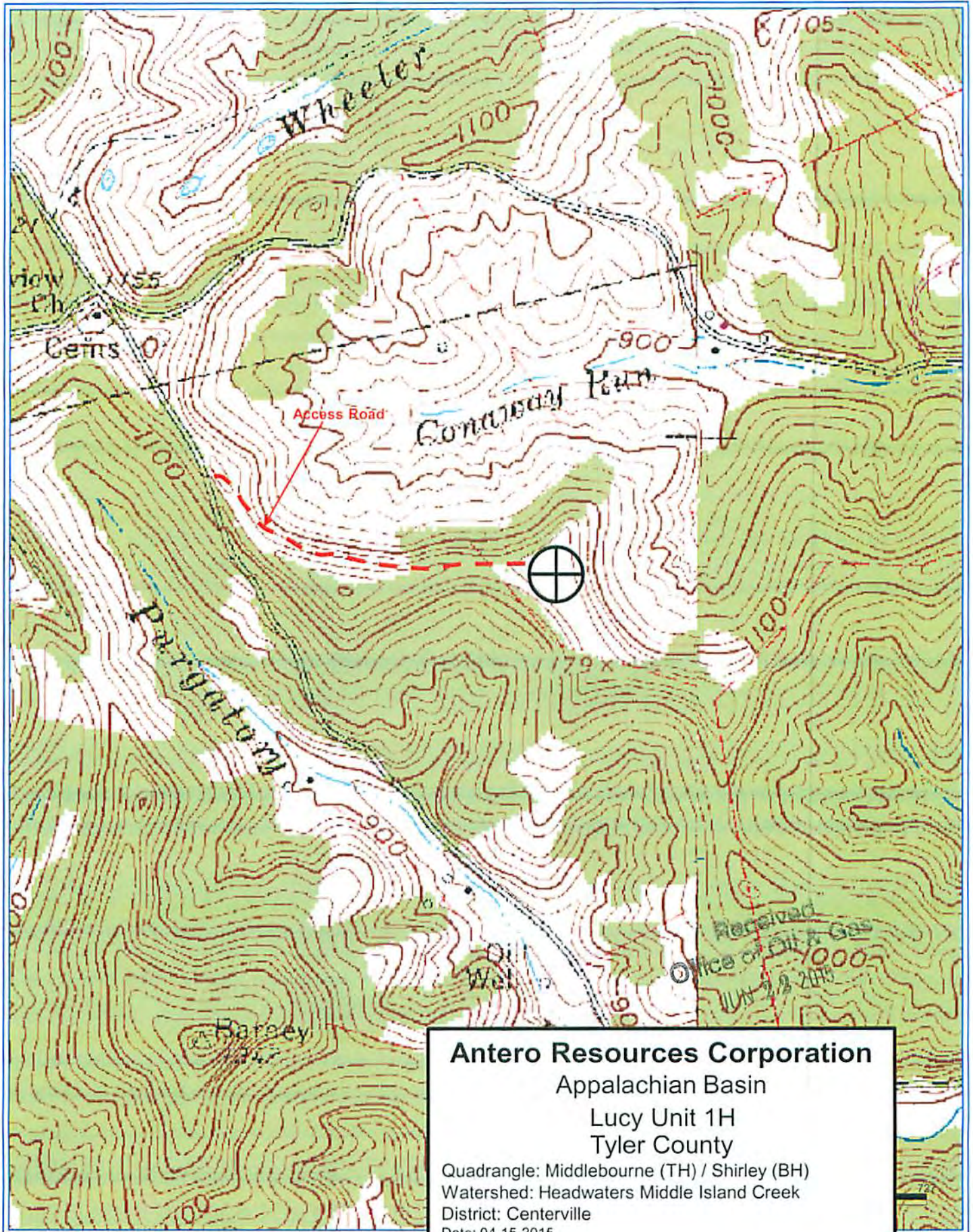
*Michael Doff*  
*5/13/2015*

**GPS Coordinates:** Lat 39°24'50.78"/Long 80°52'40.42" (NAD83)

#### Driving Directions:

From US 50 Near Parkersburg, WV. Head east on US 50 for 34 miles. Turn left onto Bunnell Run/CO Road 50/21 and continue for 0.5 miles. Continue straight onto CO Road 50/39/W Myles Ave/Old US 50 W and continue for 0.9 miles. Turn left onto Eagle Drive and continue for 500 feet. Turn right onto Collins Ave/CO Road 50/25 and continue for 240 feet. Take the first left onto Rose Hill/CO Road 50/22 and continue for 1.1 miles. Access road will be on the left. From US 50 Near Clarksburg, WV. Head west on US 50 for 36.5 miles. Turn right onto WV 74/Pullman Drive and continue for 0.4 miles. Turn left onto E Myles Avenue/Old US 50 E and continue for 0.9 miles. Turn right onto Eagle Drive and continue for 450 feet. Turn right onto Collins Avenue/CO Road 50/25 and continue for 240 feet. Take the first left onto Rose Hill/CO Road 50/22 and continue for 1.1 miles.

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



**Antero Resources Corporation**  
 Appalachian Basin  
 Lucy Unit 1H  
 Tyler County

Quadrangle: Middlebourne (TH) / Shirley (BH)  
 Watershed: Headwaters Middle Island Creek  
 District: Centerville  
 Date: 04-15-2015

MAG  
 6-17-2015  
 07/24/2015

LATITUDE 39°25'00" -937'

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

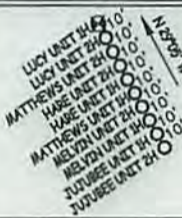
LONGITUDE 80°52'30"

Antero Resources Corporation Well No. Lucy Unit 1H

NOTES: WELL 1H TOP HOLE INFORMATION: N: 336,056ft E: 1,610,595ft LAT: 39°24'52.09" LON: 80°52'41.94" BOTTOM HOLE INFORMATION: N: 346,162ft E: 1,607,654ft LAT: 39°26'31.52" LON: 80°53'21.39" WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS: WELL 1H TOP HOLE INFORMATION: N: 4,362,788m E: 510,490m BOTTOM HOLE INFORMATION: N: 4,365,852m E: 509,543m

PAD LAYOUT NOT TO SCALE



WV NORTH ZONE GRID NORTH

4,032' TO BOTTOM HOLE

LATITUDE 39°27'30"

1H TOP HOLE

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

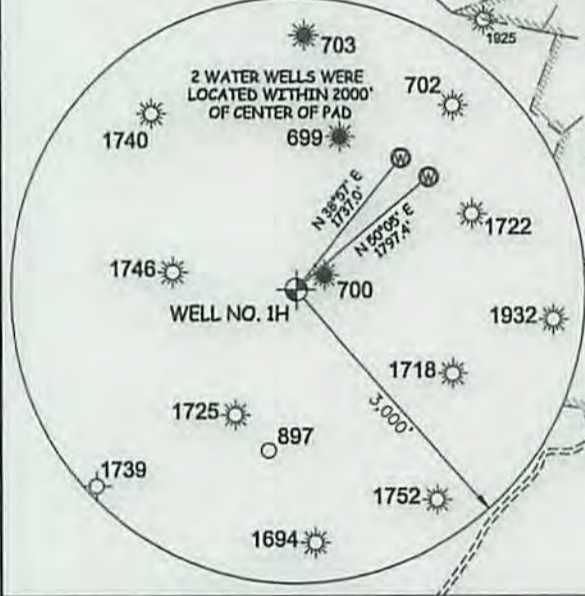
800' TO BOTTOM HOLE

5,921' TO BOTTOM HOLE

5,921' TO BOTTOM HOLE

5,921' TO BOTTOM HOLE

5,921' TO BOTTOM HOLE



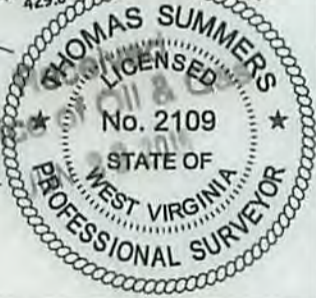
I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



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

WILLOW LAND SURVEYING PLLC 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

NOTE NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.



JOB # 15-008WA DRAWING # LUCY1H SCALE 1" = 2000' MINIMUM DEGREE OF ACCURACY SUBMETER PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND - - - Surface Owner Boundary Lines +/- - - - Interior Surface Tracts +/- X Existing Fence Found monument, as noted THOMAS SUMMERS P.S. 2109 DATE 04/01/15 OPERATOR'S WELL# LUCY UNIT #1H

REFERENCES WELL NO. 1H N: 336234 E: 1610986 STAKE/NAIL, SET DATE 04/01/15 OPERATOR'S WELL# LUCY UNIT #1H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 095 02276404 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT LOCATION: ELEVATION 1,160' - ORIGINAL 1,141' - PROPOSED WATERSHED HEADWATERS MIDDLE ISLAND CREEK QUADRANGLE MIDDLEBOURNE 7.5' DISTRICT CENTERVILLE COUNTY TYLER SURFACE OWNER EDNA MONROE ACREAGE 110.32 ACRES +/- OIL & GAS ROYALTY OWNER CARL W. NOLAN; STEPHANIE MCGOWEN; STATE OF WEST VIRGINIA; LEASE ACREAGE 116 AC +/- 170 AC +/- 234.91 AC +/- MELVIN WILEY ET UX; REGINA M. BUCK; JANICE B. WHITE 378 AC +/- 309.55 AC +/- 133 AC +/- PROPOSED WORK: DRILL X CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) PLUG & ABANDON CLEAN OUT & REPLUG TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,800' TVD 18,100' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM ADDRESS 1615 WYNKOOP ST. DENVER, CO 80202 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

WW-6A1

Operator's Well Number Lucy Unit 1H

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

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

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

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<b><u>Carl W. Nolan Lease</u></b>			
Carl W. Nolan	Warren R. Haught	1/8	0214/0578
Warren R. Haught, as an individual	Sancho Oil and Gas Corporation	Assignment	0376/0182
Sancho Oil and Gas Corporation	Antero Resources Corporation	Assignment	0436/0177
<b><u>Stephanie McGowan, et al Lease</u></b>			
Stephanie McGowan, et al	Dominion Appalachian Development, Inc.	1/8	0330/0454
Dominion Appalachian Development, Inc.	Dominion Appalachian Development, LLC	Name Change	Exhibit 2
Dominion Appalachian Development, LLC	CONSOL Gas Appalachian Development, LLC	Certificate of Amendment	COI 0009/0131
CONSOL Gas Appalachian Development, LLC	CONSOL Gas Reserves, Inc.	Certificate of Amendment	COI 0009/0144
CONSOL Gas Reserves, Inc.	CONSOL Gas Company	Certificate of Amendment	COI 0009/0156
CONSOL Gas Company	CNX Gas Company, LLC	Name Change & Merger	0384/0191
CNX Gas Company, LLC	Antero Resources Corporation	Notice of Agreement	0487/0048
<b><u>State of West Virginia Lease</u></b>			
West Virginia Division of Natural Resources	Antero Resources Corporation	1/8+	0467/0249
<b><u>Melvin Wiley, et ux Lease</u></b>			
Melvin Wiley, et ux	Sancho Oil and Gas Corporation	1/8	0337/0078
Sancho Oil and Gas Corporation	Antero Resources Corporation	Assignment	0436/0177
<b><u>Regina M. Buck Lease</u></b>			
Regina M. Buck	Antero Resources Appalachian Corporation	1/8+	0416/0430
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

Received  
Office of Oil & Gas  
JUN 22 2015

\*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\*\*

07/24/2015

WW-6A1  
(5/13)

Operator's Well No. Lucy 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>Janice B. White Lease</u>	Janice B. White	Antero Resources Corporation	1/8+	0422/0320

\*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

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, 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: Ward McNeilly  
 Its: VP, Reserves Planning & Midstream

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



Penney Barker, Manager  
Corporations Division  
Tel: (304)558-8000  
Fax: (304)558-8381  
Website: [www.wvsos.com](http://www.wvsos.com)  
E-mail: [business@wvsos.com](mailto:business@wvsos.com)

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: 6/25/2008
- 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.)  
Alvyn A. Schopp (303) 367-7310  
Contact Name Phone Number

7. Signature Information (See below \*Important Legal Notice Regarding Signature):

Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person

Signature: [Handwritten Signature] Date: June 10, 2013

Received  
Office of Oil & Gas

\*Important Legal Notice Regarding Signature: For West Virginia Code §311-1-129. Penalty for signing false documents. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.



FORM WW-6A1  
EXHIBIT 2

AC  
**State of West Virginia**



**Certificate**

*I, Betty Ireland, Secretary of State of the State of West Virginia, hereby certify that*

DOMINION APPALACHIAN DEVELOPMENT, INC.  
*(a Virginia corporation)*

*filed an application for Conversion in my office as required by the provisions of the West Virginia Code and was found to conform to law.*

*Therefore, I issue this*

**CERTIFICATE OF CONVERSION**

*converting the corporation to*

DOMINION APPALACHIAN DEVELOPMENT, LLC  
*(a Virginia Limited Liability Company)*



*Given under my hand and the Great Seal of the State of West Virginia on*  
Office of Oil & Gas  
February 23, 2006  
JUN 2 2 2015

*Betty Ireland*

*Secretary of State*  
07/24/2015

4709502276



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

June 12, 2015


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

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

Mr. Martin:

Antero Resources Corporation (Antero) is submitting the following application for a new well work permit for the Lucy 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 Lucy Unit 1H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,

  
Spenceer Booth  
Senior Landman

Received  
Office of Oil & Gas  
JUN 22 2015

07/24/2015

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

Date of Notice Certification: 06/15/2015

API No. 47- 095 -

Operator's Well No. Lucy Unit 1H

Well Pad Name: Eslack 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>510490m</u>
County:	<u>Tyler</u>		Northing:	<u>4362788m</u>
District:	<u>Centerville</u>	Public Road Access:		<u>CR 30/1</u>
Quadrangle:	<u>Middlebourne 7.5'</u>	Generally used farm name:		<u>Monroe, Edna</u>
Watershed:	<u>Headwaters 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.

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:  *PLEASE CHECK ALL THAT APPLY  <input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED  <input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED  <input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or  <input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)  <input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION  <input checked="" type="checkbox"/> 5. PUBLIC NOTICE  <input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION		<b>OOG OFFICE USE ONLY</b>  <input checked="" type="checkbox"/> RECEIVED/ NOT REQUIRED  <input checked="" type="checkbox"/> RECEIVED  <input checked="" type="checkbox"/> RECEIVED/ NOT REQUIRED   <input checked="" type="checkbox"/> RECEIVED  <input checked="" type="checkbox"/> RECEIVED  <input checked="" type="checkbox"/> RECEIVED
--	--	--

**Required Attachments:**

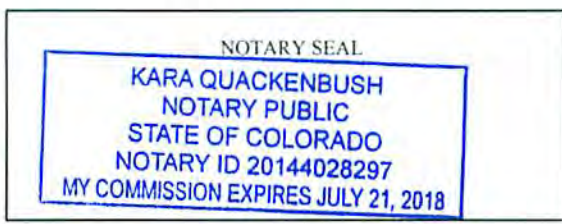
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication 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.

Received  
Office of Oil & Gas  
June 17, 2015

**Certification of Notice is hereby given:**

THEREFORE, I Ward McNeilly *W. McNeilly*, 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>Ward McNeilly</u>		<u>Denver, CO 80202</u>
Its:	<u>VP, Reserves Planning &amp; Midstream</u>	Facsimile:	<u>303-357-7315</u>
Telephone:	<u>303-357-7310</u>	Email:	<u>asteele@anteroresources.com</u>



Subscribed and sworn before me this 15 day of June 2015.  
*Kara Quackenbush* Notary Public  
 My Commission Expires July 21, 2018

**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 [deprivacyofficer@wv.gov](mailto:deprivacyofficer@wv.gov).

Received  
Office of Oil & Gas  
JUN 22 2015

WW-6A  
(9-13)

API NO. 47- 095 -  
OPERATOR WELL NO. Lucy Unit 1H  
Well Pad Name: Estlack Pad

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: 6/16/2015 Date Permit Application Filed: 6/16/2015

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: Edna Monroe  
Address: 2543 Conaway Run Rd.  
Alma, WV 26320

Name: Thomas E. and Crystalee Estlack  
Address: 1054 Chestnut Ridge Rd.  
Morgantown, WV 26505

SURFACE OWNER(s) (Road and/or Other Disturbance)  
Name: Edna Monroe  
Address: 2543 Conaway Run Rd.  
Alma, WV 26320

\*PLEASE NOTE THE ADDITIONAL SURFACE TRACTS WITH DISTURBANCE SHOWN ON PAD DESIGN ARE NOT OVERLYING THE OIL & GAS LEASEHOLD BEING DEVELOPED BY THE PROPOSED WELL. THEREFORE, ARE NOT REQUIRED TO BE NOTIFIED PER WV CODE 22-6A-10. ANTERO HAS SECURED A SIGNED AGREEMENT WITH THE RELATED PARTIES

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: NONE IDENTIFIED WITHIN 1500'  
Address:   
\* 2 water wells were identified but are located greater than 1500' from subject pad location

OPERATOR OF ANY NATURAL GAS STORAGE FIELD  
Name:  
Address:

Received  
Office of Oil & Gas

JUN 22 2015

\*Please attach additional forms if necessary

WW-6A  
(8-13)

API NO. 47- 095 -  
OPERATOR WELL NO. Lucy Unit 1H  
Well Pad Name: Estlack Pad

**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 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://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 of which 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

07/24/2015

WW-6A  
(8-13)

API NO. 47-095 - \_\_\_\_\_  
OPERATOR WELL NO. Lucy Unit 1H  
Well Pad Name: Estack 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 57<sup>th</sup> St. SE  
Charleston, WV 25304  
(304) 926-0450

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.**

Received  
Office of Oil & Gas

JUN 22 2015

07/24/2015

WW-6A  
(8-13)

API NO. 47-095 - \_\_\_\_\_  
OPERATOR WELL NO. Lucy Unit 1H  
Well Pad Name: Estlack Pad

### **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.

Received  
Office of Oil & Gas  
JUN 22 2015

07/24/2015



WW-6A  
(8-13)

API NO. 47-095 - \_\_\_\_\_  
OPERATOR WELL NO. Lucy Unit 1H  
Well Pad Name: Estlack Pad

**Notice is hereby given by:**

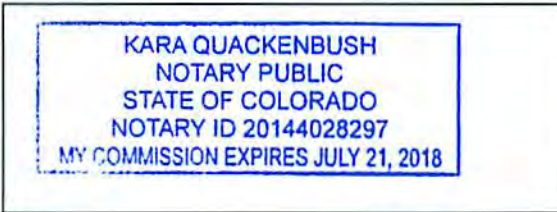
Well Operator: Antero Resources Corporation  
Telephone: (303) 357-7310  
Email: asteele@anteroresources.com



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](mailto:depprivacyofficer@wv.gov).



Subscribed and sworn before me this 16 day of June 2015.  
Kara Quackenbush Notary Public  
My Commission Expires July 21, 2018

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JUN 22 2015

WW-6A3  
(1/12)

Operator Well No. Lucy Unit 1H  
Multiple Wells on the Estlack Pad

**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF ENTRY FOR PLAT SURVEY**

**Notice Time Requirement:** Notice shall be provided at least **SEVEN (7)** days but no more than **FORTY-FIVE (45)** days prior to entry

**Date of Notice:** 11/13/2014      **Date of Planned Entry:** 11/24/2014

\*Please note that this is an estimated date. Antero may begin surveying seven (7) days but no more than forty-five (45) after your receipt of this notice (whichever comes first)

**Delivery method pursuant to West Virginia Code § 22-6A-10a**

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

Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry on to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary.

**Notice is hereby provided to:**

SURFACE OWNER(s)

Name: Edna Monroe  
Address: 2543 Conaway Run Rd.  
Alma, WV 26320

Name: E. Thomas Estlack & Crystalee Estlack  
Address: 1054 Chestnut Ridge Road  
Morgantown, WV 26505

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

COAL OWNER OR LESSEE

Name: NO DECLARATIONS ON RECORD WITH COUNTY  
Address: \_\_\_\_\_

MINERAL OWNER(s)

Name: PLEASE SEE ATTACHMENT  
Address: \_\_\_\_\_

\*please attach additional forms if necessary

**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

State: <u>West Virginia</u>	Approx. Latitude & Longitude: <u>Approx. 39.413599, -80.877396</u>
County: <u>Tyler</u>	Public Road Access: <u>CR 30/1</u>
District: <u>Centerville</u>	Watershed: <u>Headwaters Middle Island Creek</u>
Quadrangle: <u>Middlebourne</u>	Generally used farm name: <u>Monroe, Edna</u>

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

**Notice is hereby given by:**

Well Operator: Antero Resources Corporation  
Telephone: (303) 357-7310  
Email: asteelle@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](mailto:depprivacyofficer@wv.gov).

Tax Map 8 Parcel 5

Tax Map 07/24/2015

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JUN 22 2015

**WW-6A3 Notice of Entry For Plat Survey Attachment:**

**Mineral Owners:**

Tax ID: 8-5

**Owner:** Edna Monroe  
**Address:** 2543 Conaway Run Rd.  
Alma, WV 26320

Tax ID: 8-24.3

**Owner:** E. Thomas Estlack & Crystalee Estlack  
**Address:** 1054 Chestnut Ridge Rd.  
Morgantown, WV 26505

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JUN 22 2015

WW-6A5  
(1/12)

Operator Well No. Lucy Unit 1H

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

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

**Date of Notice:** 06/16/2015      **Date Permit Application Filed:** 06/16/2015

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

CERTIFIED MAIL                       HAND  
RETURN RECEIPT REQUESTED              DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

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

(at the address listed in the records of the sheriff at the time of notice):

Name: Edna Monroe  
Address: 2543 Conaway Run Rd.  
Alma, WV 26320

Name: Thomas E. and Crystalee Estlack  
Address: 1054 Chestnut Ridge Rd.  
Morgantown, WV 26505

**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on 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>510490m</u>
County: <u>Tyler</u>	Northing: <u>4362788m</u>
District: <u>Centerville</u>	Public Road Access: <u>CR 30/1</u>
Quadrangle: <u>Middlebourne 7.5'</u>	Generally used farm name: <u>Monroe, Edna</u>
Watershed: <u>Headwaters Middle Island Creek</u>	

**This Notice Shall Include:**

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by W. Va. Code § 22-6A-10(b) to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

Well Operator: Antero Resources Corporation  
Telephone: (303) 357-7310  
Email: asteele@anteroresources.com

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

**Oil and Gas Privacy Notice:**

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## WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

**Division of Highways**

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

Earl Ray Tomblin  
 Governor

Paul A. Mattox, Jr., P. E.  
 Secretary of Transportation/  
 Commissioner of Highways

April 30, 2015

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

Subject: DOH Permit for the Estlack Pad, Tyler County  
 Lucy Unit 1H Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2014-0751 which has been applied for by Antero Resources Corporation. The well site is located off of Tyler County Route 30/1 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

Cc: Ashlie Steele  
 Antero Resources Corporation  
 CH, OM, D-6  
 File

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**List of Anticipated Additives Used for Fracturing or  
Stimulating Well**

<b>Additives</b>	<b>Chemical Abstract Service Number (CAS #)</b>
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

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## Antero Resources Corporation Site Construction Plan for Estlack Well Pad & Water Containment Pad

*Antero Resources Corporation (Antero) is submitting the following Site Construction Plan in compliance with §35-8-5.5. This plan is submitted in conjunction with the Estlack Well Pad & Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection and Office of Oil and Gas, and certified by Navitus Engineering Inc., a West Virginia registered professional engineer.*

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**Requirement §5.5.a.** *The plan should describe the nature and purpose of the construction project and identify the procedures for construction that will be used to achieve site stability. The plan shall be considered conditions of the permit and be enforceable as such.*

### **Antero Response**

The nature and purpose of the subject project is to perforate, fracture, and complete one or more horizontal shallow wells. Procedures to achieve site stability include seeding and mulching of earth disturbed areas and implementation of erosion and sediment best management practices (BMPs). Details of seeding and mulching rates as well as procedures for installation and maintenance of erosion and sediment BMPs are outlined on page 2 of "Estlack Well Pad & Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans" (Site Design) prepared and certified by Navitus Engineering Inc. of West Virginia.

These procedures will be considered as conditions of the permit and shall be inspected and maintained for continual compliance measures outlined in §35-8-5.5.

**Requirement §5.5.b.1.** *A vicinity map location the site in relation to the surrounding area and roads;*

### **Antero Response**

Please refer to the vicinity map on page 1 for the location the site in relation to the surrounding area and roads.

**Requirement §5.5.b.2.** *A plan view site map at a scale of one inch equal to one hundred feet (1"=100') or greater that shows appropriate detail of all site features and:*

**Requirement §5.5.b.A.** *Clearly identifies the limit of disturbance for the project;*

### **Antero Response**

The limit of disturbance for the Estlack Well Pad & Water Containment Pad can be found on "Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," "Access Road & Well Pad Plan" and "Stockpile Plan" maps on pages 8-12 of the Site Design.

**Requirement §5.5.b.2.B.** *Provides existing topographic information on a contour interval that affords sufficient detail to illustrate site terrain conditions*

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**Antero Response**

Please refer to the "Existing Conditions" maps on page 5 of the Site Design for the current topographic conditions for the constructed pad on a contour interval that affords sufficient detail to illustrate site terrain conditions.

*Requirement §5.5.b.2.C. Identifies proposed cut and fill areas with grading contours at an interval that provides sufficient detail to accurately depict slope ratios, indicating top and bottom of slopes; and*

**Antero Response**

Please refer to the "Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," "Access Road & Well Pad Plan" and "Stockpile Plan" maps on pages 8-12 as well as the "Water Containment Pad Grading Plan," "Well Pad Grading Plan," "Access Road Profiles," "Access Road Sections," "Well Pad & Water Containment Pad Sections," and "Well Pad Sections" on pages 13-26 of the Site Design for proposed cut and fill areas with grading contours.

*Requirement §5.5.b.2.D. Identifies any existing structures, roads, water bodies, and other critical areas within the area that would most likely be affected by the construction.*

**Antero Response**

Please refer to "Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," "Access Road & Well Pad Plan" and "Stockpile Plan" maps on pages 8-12 for the map identifying any structures, roads, water bodies, and other critical areas within the area of interest that would be most likely affected by construction.

*Requirement §5.5.b.3. A cross-section of the length and width of the location, providing cut and fill volumes; and*

**Antero Response**

Please refer to "Access Road Profiles," "Access Road Sections," "Well Pad & Water Containment Pad Sections," and "Well Pad Sections" on pages 15-26 for a cross-section of the location. The cut and fill volumes can be found in "Material Quantities" on page 4.

*Requirement §5.5.b.4. Any other engineering designs or drawings necessary to construct the project.*

**Antero Response**

All other engineering designs and drawings necessary to construct this project are included in the Site Design.

*Requirement §5.5.c. At a minimum, site construction shall be conducted in accordance with the following criteria:*

**Antero Response**

All Antero contractors shall be notified of and comply with the measures outlined in Section 5.5.c of §35-8.

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**Requirement §5.5.c.1.** All woody material, brush, and trees shall be cleared from the site area and kept to the minimum necessary for proper construction, including the installation of necessary sediment controls. Trees six inches in diameter and larger shall be cut and logs stacked;

**Antero Response**

The Site Design outlines measures to maintain compliance with Section 201 of the WVDOH Specifications which outlines clearing and grubbing measures. Please refer to Construction and E&S Control Notes on page 2 of the Site Design.

**Requirement §5.5.c.2.** Topsoil shall be removed from construction areas and stockpiled for reuse during reclamation. In woodland areas, tree stumps, large roots, large rocks, tree and leaf debris, and ground vegetation shall be removed prior to actual site constructions;

**Antero Response**

The Site Design outlines procedures for stripping and stocking topsoil. Please refer to Construction and E&S Control Notes on page 2 of the Site Design. In addition, soil for stockpiling and use as fill shall be further compliant with measures outlined in Section 5.5.c.2. of §35-8-5.5.

**Requirement §5.5.c.3.** No embankment fill shall be placed on frozen material;

**Antero Response**

All Antero contractors shall be notified of and comply with measures outlined in Section 5.5.c.3. of §35-8-5.5.

**Requirement §5.5.c.4.** The fill material shall be clean mineral soil, free of roots, woody vegetation, stumps, sod, large rocks, frozen soil or other objectionable material;

**Antero Response**

The Site Design outlines procedures for stripping and stocking topsoil. Please refer to Construction and E&S Control Notes on page 2 of the Site Design. In addition, soil shall be further defined to the measures outlined in Section 5.5.c.4. of §35-8-5.5.

**Requirement §3.2.b.5.** Embankment material shall exhibit adequate soil strength and contain the proper amount of moisture to ensure that compaction will be achieved;

**Antero Response**

All Antero contractors shall be notified of and comply with measures outlined in Section 5.5.c.5. of §35-8-5.5.

**Requirement §5.5.c.6** Earthen fill slopes should be constructed with slopes no steeper than a ratio of two to one (2:1);

**Antero Response**

The Site Design outlines all earthen fill slopes to be constructed with slopes no steeper than two to one (2:1).

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**Requirement §5.5.c.7.** *Fill material will be placed in lifts or layers over the length of the fill. Lift thickness of soil shall be as thin as the suitable random excavated material will permit, typically from six to twelve (12) inches; and*

**Antero Response**

Please refer to the Construction and E&S Control Notes on page 2 of the Site Design. Fill shall be placed in horizontal lifts of maximum loose depth of 12 inches. Compaction will be performed with a compactor with a minimum of five ton static drum weight vibratory roller or five ton static drum weight sheeps footed compactor as appropriate for the type of soil material at the site or other compactor approved by the Engineer.

**Requirement §5.5.c.8.** *The size of rock lifts shall not exceed thirty-six (36) inches. The rock shall not be greater in any dimension than thirty-six (36) inches;*

**Antero Response**

All Antero contractors shall be notified of and comply with measures outlined in Section 5.5.c.8. of §35-8-5.5.

**Requirement §5.5.c.9.** *Compaction shall be obtained by compaction equipment or by routing the hauling equipment over the fill so that the entire surface of each fill lift is compacted by at least one wheel or tread track of equipment or by a compactor. Each lift shall be compacted before beginning the next lift;*

**Antero Response**

Compaction compliance measures are outlined in the Construction and E&S Notes on page 2. Compaction is required with a compactor with a minimum of five ton static drum weight vibratory roller or five ton static drum weight sheeps footed compactor as appropriate for the type of soil material at the site or other compactor approved by the Engineer.

**Requirement §5.5.c.10.** *Surface water diversion ditches shall be constructed above the disturbed area to intercept water and to divert surface water runoff around the site; and*

**Antero Response**

Construction and E&S Control Notes on page 2 of the Site Design identifies the surface diversions used to prevent surface water and subsurface water from flowing on to the well pad and coming into contact with the stormwater associated with the well pad. Additional Erosion & Sediment BMPs will be used to prevent sediment discharges from the project.

**Requirement §5.5.c.11.** *In areas of steep terrain, a terraced bench shall be constructed at the base of the slope where fill is to be placed, creating a toe foundation and aid in holding fill material. Additional terracing shall be constructed from each additional fifty (50) vertical feet of slope and shall be a minimum of ten (10) feet wide.*

**Antero Response**

All Antero contractors shall be notified of and comply with the measures outlined in Section 5.5.c.11. of §35-8-5.5.

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## Antero Resources Corporation Erosion and Sediment Control Plan for Estlack Well Pad & Water Containment Pad

*Antero Resources Corporation (Antero) is submitting the following narrative and set of drawings in compliance with §35-8-5.4. This plan is submitted in conjunction with the Estlack Well Pad & Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection and Office of Oil and Gas, and certified by Navitus Engineering Inc., a West Virginia registered professional engineer.*

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**Requirement §5.4.b.1.** *A general sequence of events that describe in relative terms how and when each construction phase (i.e. clearing and grubbing, mass grading, stabilization) will occur and when each erosion and sediment control best management practice ("BMP") will be installed;*

### **Antero Response:**

The following includes a general sequence of events that describe in relative terms how and when each construction phase is anticipated to occur and erosion and sediment control BMPs to be installed. Please refer to the Estlack Well Pad & Water Containment Pad Site Design & Construction Plan, Erosion & Sediment Control Plans (Site Design) prepared and certified by Navitus Engineering Inc. for specific construction measures. Compliance with the measures outlined in the Site Construction Plan (§35-8-5.4) submitted in conjunction with this plan will also be maintained.

1. A pre-construction conference with the contactor and the appropriate erosion and sediment control inspector 48 hours prior to beginning work to review the construction drawings and provide any requested guidance.
2. Stake the limits of construction and mark all identified wetlands, streams, and other areas of concern for construction activities. Install signs to designate the areas and orange safety fence to identify important project attributes such as approved access roads, no refueling zones, wetlands/steam bounds, Etc.
3. Construct the rock construction entrance. All vehicles entering and exiting the site shall do so via the rock construction entrance.
4. Construction all BMP's as soon as clearing and grubbing operations allow. Diversions and sediment trap(s)/basin(s) shall be seeded and mulched immediately.
5. If applicable, convey upslope drainage around the access road, well pad, and water containment pad areas by constructing all diversion berm(s) and/or compost filter sock diversion(s) as shown on the plans.
6. Clear and grub the site. All woody material, brush, trees, stumps, large roots, boulders, and debris shall be cleared from the site area and kept to the minimum necessary for proper construction, including the installation of necessary sediment controls. Trees six inches in diameter and larger shall be cut and logs stacked. Smaller trees, brush, and stumps shall be cut and/or grubbed and windrowed in appropriate areas for use as sediment barriers at water drainage outlets (as shown on the plans), windrowed below the well site, used for wildlife habitat, burned (as per WV forest fire laws), removed from site, or disposed of by other methods approved by WV DEP.

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7. If applicable, install all wetland or stream crossings as shown on the plans.
8. Strip the topsoil from the access road. Prior to placing any fill, the exposed subgrade shall be compacted and proof rolled to produce a stable and unyielding site. All stripped topsoil shall be stockpiled in areas shown in the plans, or re-spread at an approximate depth of 2-4 inches on all proposed 2:1 or flatter slopes, and immediately stabilized. Additional BMP measures shall be constructed around topsoil stockpiles, if necessary.
9. Construct the access road. All fill areas, including excess material stockpiles, shall be "keyed in" and compacted in horizontal lifts with a maximum loose lift thickness of 12" and maximum particle size as outlined in the geotechnical report. All fill shall be compacted by a vibrating sheepsfoot roller to 95% per the standard proctor test (ASTM-D698). Moisture content will be controlled in accordance with the standard proctor test (ASTM – D698) results. It is also recommended that each lift be proof rolled with a loaded haul truck where applicable. Ditch relief culverts shall be installed at a grade of 1-8% to minimize outlet velocities to the extent possible. Install outlet protection once ditch relief culverts are installed, as shown on plans. Stabilize the road with geotextile fabric & stone and side slopes as specified with permanent seeding. Excess material shall be stockpiled (if necessary) in areas shown in the plans and immediately stabilized. Topsoil shall be stripped from all stockpile areas prior to construction of stockpiles. After stockpiles are constructed, topsoil is to be reapplied at a depth of 6". Slopes shall be tracked by running tracked machinery up and down the slope, leaving tread marks parallel to the contour. All ditch lines shall be cleaned prior to installation of lined protection.
10. Strip the topsoil from the well pad and water containment pad. Prior to placing any fill, the exposed subgrade shall be compacted and proof rolled to produce a stable and unyielding site. All stripped topsoil shall be stockpiled in areas shown in the plans, or re-spread at an approximate depth of 2-4 inches on all proposed 2:1 or flatter slopes, and immediately stabilized. Additional BMP measures shall be constructed around topsoil stockpiles, if necessary.
11. Grade the well pad and water containment pad areas as shown on the plans. Install pad sumps (with 4" PVC drain pipe and outlet protection) and containment berm liner system. Immediately stabilize the outer areas of the well pad and water containment pad. The well pad and water containment pad areas shall be stabilized with geotextile fabric & stone and the side slopes with seed and mulch. Apply seed and mulch to all disturbed areas. This shall include all areas that will not be subject to regular traffic activity (to be stabilized with stone), or any disturbed area that will not be re-disturbed before site reclamation begins.
12. Commence well drilling activity.
13. All BMP's must remain in place and functional until all areas within the limit of disturbance are complete and permanently stabilized. Maintenance must include inspection of all erosion and sediment controls after each runoff event in excess of 0.5" and on a biweekly basis.
14. The construction site should be stabilized as soon as possible after completion. Establishment of final stabilization must be initiated no later than 7 days after reaching final grade. Final stabilization means that all soil-disturbing activities are completed, and that either a permanent vegetative cover with a density of 70% or greater has been established or that the surface has been stabilized by hard cover such as pavement or buildings. It should be noted that the 70% requirement refers to the total area vegetated and not just a percent of the site.
15. All permanent sediment control measures can be removed after the site is permanently stabilized and approval is received from the WVDEP
16. And areas disturbed by removal of controls shall be repaired, stabilized, and permanently seeded.

Received  
Office of Oil & Gas  
JUN 22 2015

07/24/2015

**Requirement §5.4.b.2.** *A description of the stabilization methods to be used, including the application rates for temporary and permanent seeding and mulching, and provide the timeframes for establishing stabilization*

**Antero Response:**

Stabilization methods used include seeding and mulching of disturbed areas as well as the implementation of erosion and sediment control BMPs. Please refer to Construction and E&S Control Notes on page 2 as well as "Construction Details" on page 21-26 for detailed descriptions of the different stabilization methods to be used. Seeding and mulching is to be in accordance with the WVDOT Standard Specifications unless specified otherwise in the plans or unless specified otherwise by the construction engineer or Antero representative. Please refer to Erosion and Sediment Control Narrative under Construction and E&S Control Notes on page 2 of the Site Design for more specific information regarding application, liming, and mulching rates.

Erosion and sediment BMPs will be constructed, stabilized, and functional before site disturbance begins within the tributary areas of those BMPs. In a timely manner after earth disturbance activities cease, Antero shall stabilize any areas disturbed by the activities. During non-germination periods, mulch must be applied at the specified rates. Disturbed areas which are not at finish grade and which will be re-disturbed within 1 year will be stabilized in accordance with the temporary vegetative stabilization and specifications. Disturbed areas which are finished grade or which will not be re-disturbed within 1 year will be stabilized in accordance with the permanent vegetative stabilization specification. Please refer to "Construction and E&S Control Notes" on page 2 for more information regarding timeframes for establishing stabilization and erosion and sediment BMPs.

The site shall be considered to have achieved full stabilization when it has a minimum uniform 70% perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics to resist sliding and other movements. Until the site achieves final stabilization, Antero will assure that the best management practices (BMPs) are implemented, inspected, operated, and maintained. As such, Antero will maintain written inspection logs. All maintenance work, including cleaning, repair, replacement, regarding, and re-stabilization shall be performed immediately upon discovery of deficiency. After final stabilization has been achieved, temporary erosion and sediment BMPs controls will be removed. Areas disturbed during removal of the BMPs will be stabilized immediately.

**Requirement §5.4.b.3.** *Details of specifications for the erosion and sediment control BMPs employed on the project.*

**Antero Response:**

Please refer to the "Construction and E&S Control Notes" on page 2 and "Construction Details" on pages 21-26 in the Site Design for specifications including instructions for installation, inspection, and maintenance for erosion and sediment control BMPs employed at this site.

**Requirement §5.4.b.3.** *A vicinity map locating the site in relation to the surrounding area and roads;*

**Antero Response:**

A "Vicinity Map" locating the site in relation to the surrounding area and roads is included on page 1 the Site Design.

Utric  
JUN 22 2015

07/24/2015

**Requirement §5.4.c.2** *A plan view site map at a scale of one inch equal to one hundred feet (1"=100') or greater, showing appropriate detail of all site features, including the identification of site access that provides for a stabilized construction entrance and exit to reduce tracking of sediment onto public or private roads; and*

**Antero Response:**

"Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," "Access Road & Well Pad Plan" and "Stockpile Plan" maps on pages 8-12 of the Site Design. Specific design and layout and inspection and maintenance notes for a stabilized construction entrance are included in the "Construction and E&S Control Notes" verbiage on page 2.

**Requirement §5.4.c.3.** *The location of all proposed erosion and sediment control BMPs*

**Antero Response:**

"Overall Plan Sheet Index & Volumes," "Access Road Plan," "Access Road & Water Containment Pad Plan," "Access Road & Well Pad Plan" and "Stockpile Plan" maps on pages 8-12 of the Site Design locate all proposed erosion and sediment control BMPs.

Received  
Office of Oil & Gas  
JUN 22 2015

07/24/2015

# ESTLACK WELL PAD & WATER CONTAINMENT PAD

## SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

API# 9502254

**LOCATION COORDINATES:**

ACCESS ROAD ENTRANCE  
LATITUDE: 39.416251 LONGITUDE: -80.905664 (NAD 83)  
N 4342974.84 E 509835.77 (UTM ZONE 17 METERS)

EX ACCESS ROAD ENTRANCE  
LATITUDE: 39.416994 LONGITUDE: -80.906979 (NAD 83)  
N 4343056.66 E 509790.64 (UTM ZONE 17 METERS)

CENTER OF TANK  
LATITUDE: 39.414024 LONGITUDE: -80.902446 (NAD 83)  
N 4342736.41 E 510119.66 (UTM ZONE 17 METERS)

CENTROID OF PAD  
LATITUDE: 39.414106 LONGITUDE: -80.907783 (NAD 83)  
N 4342739.15 E 510011.50 (UTM ZONE 17 METERS)

**APPROVED  
WVDEP OOG**

3/2/2015 5/15/2015

**GENERAL DESCRIPTION:**

THE ACCESS ROADS, WATER CONTAINMENT PAD AND WELL PAD ARE BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL UTICA AND MARCELLUS SHALE GAS WELLS.

**FLOODPLAIN NOTES:**

THE PROPOSED SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FLOOD MAP #54096C0100.

**MISS UTILITY STATEMENT:**

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. TICKET #142907121 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 MW-100) 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 AUGUST, SEPTEMBER, 2014 & FEBRUARY, 2015 BY SWCA ENVIRONMENTAL CONSULTANTS, INC. TO REVIEW 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 FEBRUARY 16, 2015 WETLAND DELINEATION MAP WAS PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC. AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THIS 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 OBTAIN 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.

**GEOTECHNICAL NOTES:**

A SURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. ON DATED 2-14, 2014, & MARCH 6-11, 2015. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED OCTOBER 31, 2014 AND REVISED APRIL 3, 2015, REFLECTS THE RESULTS OF THE SURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

**PROJECT CONTACTS:**

**OPERATOR:**  
ANTERO RESOURCES CORPORATION  
510 WHITE OAKS BLVD.  
BRIDGETOWN, WV 26030  
PHONE: (304) 842-4190  
FAX: (304) 842-4102

MARK JOHNSON - SURVEYING COORDINATOR  
OFFICE: (304) 842-4182 CELL: (304) 719-5449

RICHARD LYLES - LAND AGENT  
CELL: (770) 378-8933

ENGINEER/SURVEYOR:  
NAVITUS ENGINEERING, INC.  
CYNTHIA S. KEMP, PE - PROJECT MANAGER/ENGINEER  
OFFICE: (998) 862-4185 CELL: (340) 686-6747

EJL WAGNER - ENVIRONMENTAL ENGINEER  
OFFICE: (304) 842-4268 CELL: (304) 478-9770

JOHN KAWKAC - OPERATIONS SUPERINTENDENT  
CELL: (617) 368-1553

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

ANTHONY SMITH - FIELD ENGINEER  
OFFICE: (304) 842-4268 CELL: (304) 673-8198

ENVIRONMENTAL:  
PENNSYLVANIA SOIL & ROCK, INC.  
CHRISTOPHER W. SANDOS - PROJECT ENGINEER  
OFFICE: (412) 372-4000 CELL: (412) 588-0562

**RESTRICTIONS NOTES:**

1. THERE ARE NO PERSONAL STRAKEY, LAKES, POND, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOG THERE IS A WETLAND ADJACENT TO ACCESS ROAD "A" THAT WILL REMAIN UNDISTURBED
2. THERE ARE NO NATURALLY FLOWING TRIBUTARY STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOG
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOG
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 625 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.

**REPRODUCTION NOTE**

THESE PLANS WERE CREATED TO BE PLOTTED ON 24"x36" (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.

CENTERVILLE DISTRICT, TYLER COUNTY, WEST VIRGINIA  
CONAWAY RUN-MIDDLE ISLAND CREEK WATERSHED  
USGS 7.5 MIDDLEGOURNE & SHIRLEY QUAD MAPS

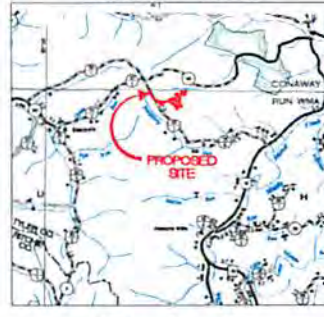


WEST VIRGINIA STATE PLANE COORDINATE SYSTEM  
NORTH ZONE, NAD83  
ESTABLISHED BY SURVEY GRADE GPS & OFFICE  
POST-PROCESSING

WEST VIRGINIA COUNTY MAP



WYDOH COUNTY ROAD 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 CDS 35-8.

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!!**

**SHEET INDEX**

- 1 - COVER SHEET
- 2 - CONSTRUCTION AND E&S CONTROL NOTES
- 3 - LEGEND
- 4 - QUANTITIES
- 5 - STORM DRAINAGE 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 - STOCKPILE PLAN
- 13 - WATER CONTAINMENT PAD GRADING PLAN
- 14 - WELL PAD GRADING PLAN
- 15 - ACCESS ROAD PROFILES
- 16 - ACCESS ROAD SECTIONS
- 17 - WELL PAD & WATER CONTAINMENT PAD SECTIONS
- 18-20 - WELL PAD SECTIONS
- 21-26 - CONSTRUCTION DETAILS
- 27 - ACCESS ROAD RECLAMATION PLAN
- 28 - ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
- 29 - ACCESS ROAD & WELL PAD RECLAMATION PLAN
- 30 - STOCKPILE RECLAMATION PLAN
- GE500-GE208 - GEOTECHNICAL DETAILS

ESTLACK LIMITS OF DISTURBANCE AREA (AC)		
Subtotal	Total	Acres
Access Road "A" (2.244)		8.33
Well Pad		13.58
Water Containment Pad		2.90
Excavated/Topsoil Material Stockpiles		8.34
<b>Total Affected Area</b>		<b>33.12</b>
Total Wooded Acres Disturbed		29.59
Impacts to Joseph E. & Eam M. Kinney and Larry G. Wain TM 1-19		
Access Road "A" (2.3)		0.88
Water Containment Pad		0.79
<b>Total Affected Area</b>		<b>1.67</b>
Total Wooded Acres Disturbed		1.53
Impacts to Edna M. Monroe TM B-4		
Access Road "A" (2.094)		8.53
Water Containment Pad		0.79
Excavated/Topsoil Material Stockpiles		4.24
<b>Total Affected Area</b>		<b>13.56</b>
Total Wooded Acres Disturbed		10.14
Impacts to E. Thomas & Crystalne Estack TM B-24.3		
Access Road "A" (4.2)		0.83
Well Pad		3.49
Water Containment Pad		1.32
<b>Total Affected Area</b>		<b>5.63</b>
Total Wooded Acres Disturbed		5.63
Impacts to Edna M. Monroe TM B-5		
Access Road "A" (8.5)		0.10
Well Pad		10.09
Excavated/Topsoil Material Stockpiles		9.27
<b>Total Affected Area</b>		<b>19.46</b>
Total Wooded Acres Disturbed		12.29

Proposed Well Name	WV South WAD 27	WV North WAD 31	UTM (METERS) Zone 17	NAD 83 Lat. & Long
Lacy	N 32698.62	N 29020.72	N 4302799.37	LAT 39.24 52.3823
Log 14	E 181054.81	E 157913.81	E 51008.81	LONG 80.52 41.5213
Lacy	N 32697.28	N 29021.08	N 4302799.74	LAT 39.24 52.2577
Log 20	E 181058.28	E 157918.21	E 51049.74	LONG 80.52 41.2577
Matthew	N 32698.84	N 29023.24	N 4302793.35	LAT 39.24 52.2302
Log 24	E 181064.24	E 157913.13	E 51042.86	LONG 80.52 41.1940
Yane	N 32692.81	N 29024.51	N 4302795.96	LAT 39.24 52.1244
Log 29	E 181068.28	E 157919.86	E 51044.38	LONG 80.52 41.1304
Hare	N 32697.08	N 29025.18	N 4302777.82	LAT 39.24 52.0377
Log 34	E 181073.81	E 157922.84	E 51048.81	LONG 80.52 41.0988
Matthew	N 32697.32	N 29024.32	N 4302775.78	LAT 39.24 51.9571
Log 39	E 181081.81	E 157917.18	E 51048.81	LONG 80.52 41.0512
Melvin	N 32693.58	N 29026.28	N 4302777.55	LAT 39.24 51.8685
Log 26	E 181023.87	E 157913.58	E 51048.96	LONG 80.52 40.9396
Melvin	N 32694.84	N 29029.24	N 4302768.51	LAT 39.24 51.7608
Log 59	E 181028.81	E 157917.42	E 51049.48	LONG 80.52 40.8798
Jacob	N 32696.12	N 29022.92	N 4302767.27	LAT 39.24 51.6623
Log 19	E 181063.35	E 157919.28	E 51052.01	LONG 80.52 40.8123
Jacob	N 32697.28	N 29021.08	N 4302764.83	LAT 39.24 51.5009
Log 29	E 181048.23	E 157917.44	E 51053.53	LONG 80.52 40.7447
Futura	N 32698.81	N 29023.32	N 4302761.90	LAT 39.24 51.5239
Well	E 181044.11	E 157622.46	E 51048.98	LONG 80.52 40.6981
Futura	N 32693.87	N 29024.58	N 4302759.38	LAT 39.24 51.4383
Well	E 181067.87	E 157838.98	E 51038.58	LONG 80.52 40.6233
Futura	N 32697.13	N 29025.84	N 4302756.72	LAT 39.24 51.3678
Well	E 181064.81	E 157617.72	E 51038.11	LONG 80.52 40.6478
Futura	N 32692.28	N 29027.19	N 4302754.08	LAT 39.24 51.2670
Well	E 181067.87	E 157617.42	E 51048.43	LONG 80.52 40.4943
Futura	N 32693.85	N 29028.28	N 4302751.44	LAT 39.24 51.1834
Well	E 181064.84	E 157623.43	E 51049.58	LONG 80.52 40.4398
Futura	N 32694.81	N 29029.84	N 4302749.81	LAT 39.24 51.0823
Well	E 181069.43	E 157628.28	E 51051.68	LONG 80.52 40.3870
Well Pad Elevation				1,341.6

NAVITUS  
ENERGY ENGINEERING

REVISION	DATE



THIS DOCUMENT  
WAS PREPARED FOR  
ANTERO RESOURCES  
CORPORATION

COVER SHEET  
ESTLACK  
WELL PAD & WATER CONTAINMENT PAD  
CENTERVILLE DISTRICT  
TYLER COUNTY, WEST VIRGINIA

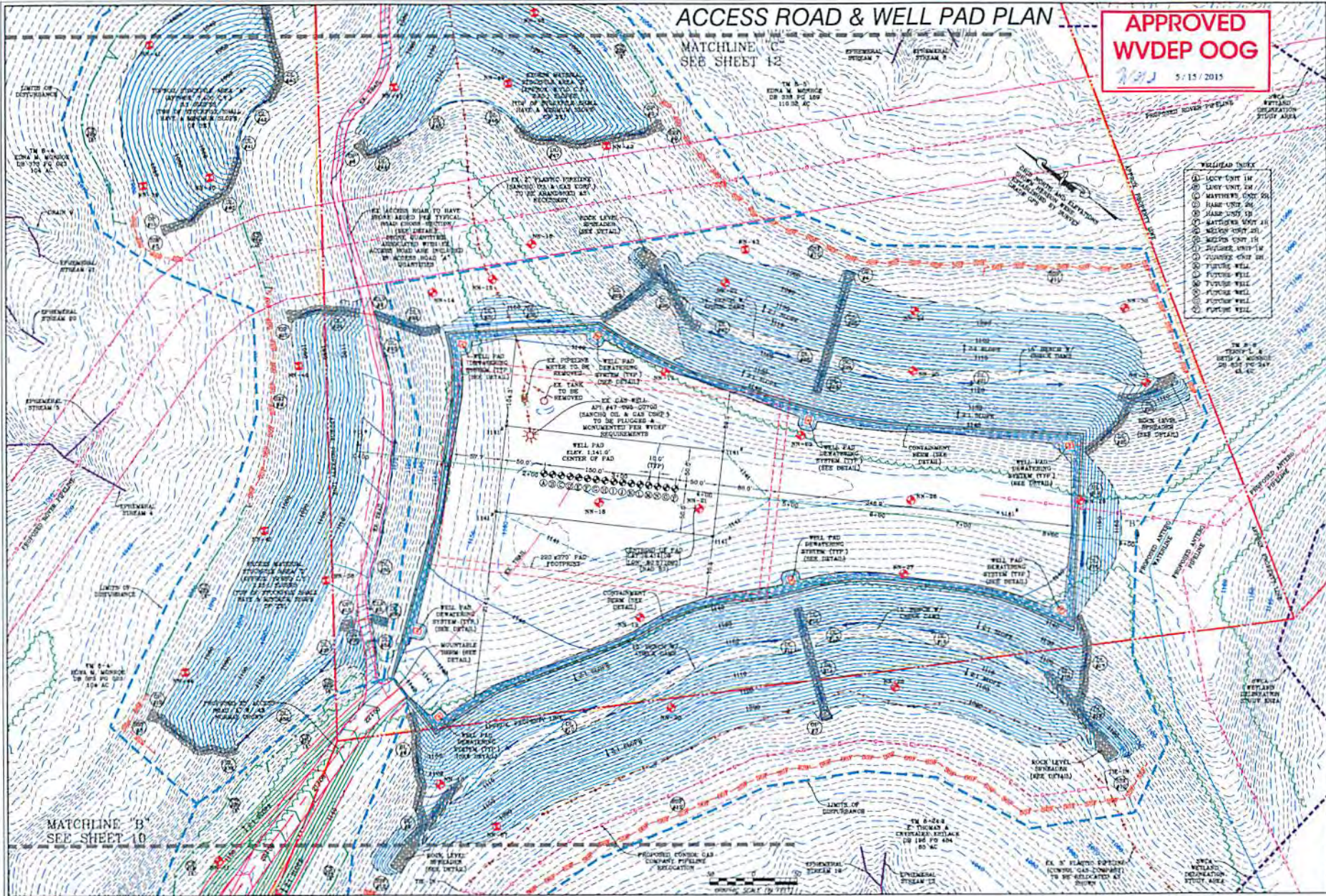


DATE: 04/05/2015  
SCALE: AS SHOWN  
SHEET 1 OF 30

# ACCESS ROAD & WELL PAD PLAN

MATCHLINE 'C'  
SEE SHEET 12

**APPROVED**  
**WVDEP OOG**  
5/15/2015



- WELLHEAD INDEX**
- ① LOCAL UNIT 1W
  - ② LOCAL UNIT 2W
  - ③ MATTHEWS COSE 2W
  - ④ HARB UNIT 2W
  - ⑤ HARB UNIT 2W
  - ⑥ MATTHEWS UNIT 2W
  - ⑦ MESSING UNIT 2W
  - ⑧ MESSING UNIT 1W
  - ⑨ MESSING UNIT 2W
  - ⑩ FUTURE WELL
  - ⑪ FUTURE WELL
  - ⑫ FUTURE WELL
  - ⑬ FUTURE WELL

**NAVITUS**  
ENERGY ENGINEERING

REVISION	DATE



THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

ACCESS ROAD & WELL PAD PLAN  
**ESTLACK**  
WELL PAD & WATER CONTAINMENT PAD  
CENTREVILLE DISTRICT  
TYLER COUNTY, WEST VIRGINIA



DATE 04/05/2015  
SCALE 1" = 50'  
SHEET 11 OF 30

MATCHLINE 'B'  
SEE SHEET 10



# ESTLACK WELL PAD & WATER CONTAINMENT PAD SITE DESIGN & CONSTRUCTION EROSION & SEDIMENT CONTROL

CENTERVILLE DISTRICT, TYLER COUNTY  
CONAWAY RUN-MIDDLE ISLAND CREEK

USGS 7.5 MIDDLEBOURNE & SHILOH

## LOCATION COORDINATES:

ACCESS ROAD ENTRANCE  
LATITUDE: 39.416238 LONGITUDE: -80.885656 (NAD 83)  
N 4362974.84 E 509825.77 (UTM ZONE 17 METERS)

EX. ACCESS ROAD ENTRANCE  
LATITUDE: 39.416994 LONGITUDE: -80.886379 (NAD 83)  
N 4363058.66 E 509780.64 (UTM ZONE 17 METERS)

CENTER OF TANK  
LATITUDE: 39.414014 LONGITUDE: -80.882446 (NAD 83)  
N 4362728.41 E 510119.66 (UTM ZONE 17 METERS)

CENTROID OF PAD  
LATITUDE: 39.414106 LONGITUDE: -80.877893 (NAD 83)  
N 4362739.15 E 510511.52 (UTM ZONE 17 METERS)

**APPROVED  
WVDEP OOG**

WJS 5/15/2015

## GENERAL DESCRIPTION:

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

## FLOODPLAIN NOTES:

THE PROPOSED SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54095C0150C.

## MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. TICKET #1426671027. 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 AUGUST, SEPTEMBER, 2014 & FEBRUARY, 2015 BY SWCA ENVIRONMENTAL CONSULTANTS, INC. 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 FEBRUARY 18, 2015 WETLAND DELINEATION MAP WAS PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC. 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 OBTAIN 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.

## GEOTECHNICAL NOTES:

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. ON OCTOBER 2-14, 2014, & MARCH 6-11, 2015. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED OCTOBER 31, 2014 AND REVISED APRIL 3, 2015, 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:

MARK JOHNSON - SURVEYING COORDINATOR  
OFFICE: (304) 842-4162 CELL: (304) 719-6449

RICHARD LYLES - LAND AGENT  
CELL: (770) 378-8833

ENGINEER/SURVEYOR:  
NAVITUS ENGINEERING, INC.  
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER  
OFFICE: (888) 662-4165 CELL: (540) 686-6747

ENVIRONMENTAL:  
SWCA ENVIRONMENTAL CONSULTANTS, INC.  
IVAN J. MALDONADO - ENVIRONMENTAL SPECIALIST  
OFFICE: (412) 839-1001 CELL: (570) 778-5768

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

## 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) 842-4068 CELL: (304) 476-9770

JOHN KAWCAK - OPERATIONS SUPERINTENDENT  
CELL: (817) 368-1553

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

ANTHONY SMITH - FIELD ENGINEER  
OFFICE: (304) 842-4206 CELL: (304) 673-6196

## RESTRICTIONS NOTES:

1. THERE ARE NO PERENNIAL STREAMS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE IS A WETLAND ADJACENT TO ACCESS ROAD "A" THAT 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 625 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.

## REPRODUCTION NOTE

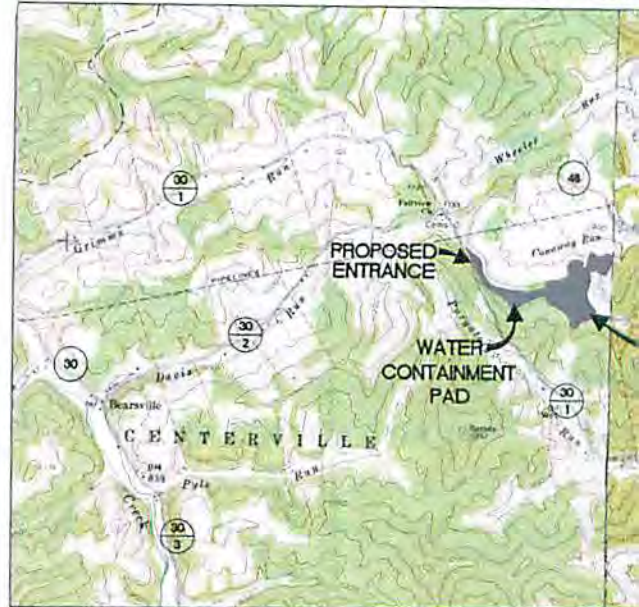
THESE PLANS WERE CREATED TO BE PLOTTED ON 22"X34" (ANSI D) PAPER. HALF SCALE DRAWINGS ARE ON 11"X17" (ANSI B) PAPER.

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.

MAG  
6-17-2015

## 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.



2000 0 2000  
SCALE: 1" = 2000'

## WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

07/24/2015

# R CONTAINMENT PAD CONSTRUCTION PLAN, CONTROL PLANS

API# 9502254

## SHEET INDEX:

- 1 - COVER SHEET
- 2 - CONSTRUCTION AND E&S CONTROL NOTES
- 3 - LEGEND
- 4 - MATERIAL QUANTITIES
- 5 - STORM DRAINAGE 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 - STOCKPILE PLAN
- 13 - WATER CONTAINMENT PAD GRADING PLAN
- 14 - WELL PAD GRADING PLAN
- 15 - ACCESS ROAD PROFILES
- 16 - ACCESS ROAD SECTIONS
- 17 - WELL PAD & WATER CONTAINMENT PAD SECTIONS
- 18-20 - WELL PAD SECTIONS
- 21-26 - CONSTRUCTION DETAILS
- 27 - ACCESS ROAD RECLAMATION PLAN
- 28 - ACCESS ROAD & WATER CONTAINMENT PAD RECLAMATION PLAN
- 29 - ACCESS ROAD & WELL PAD RECLAMATION PLAN
- 30 - STOCKPILE RECLAMATION PLAN
- GE500-GE508 - GEOTECHNICAL DETAILS

TY, WEST VIRGINIA  
EEK WATERSHED  
EY QUAD MAPS



WEST VIRGINIA STATE PLANE COORDINATE SYSTEM  
NORTH ZONE, NAD83  
ELEVATION BASED ON NAVD83  
ESTABLISHED BY SURVEY GRADE GPS & OPUS  
POST-PROCESSING

**NAVITUS**  
ENERGY ENGINEERING  
Telephone: (888) 662-4185 | www.NavitusEng.com

4709502276

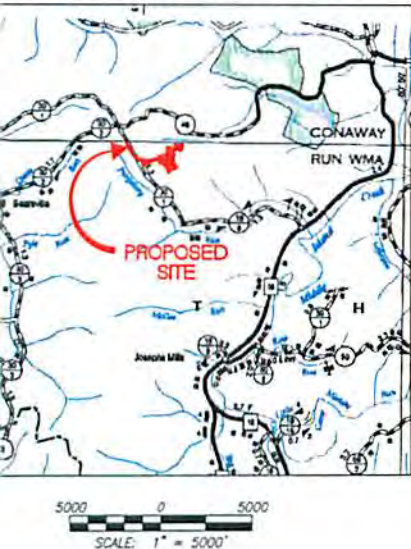
ESTLACK LIMITS OF DISTURBANCE AREA (AC)	
<b>Total Site</b>	
Access Road "A" (2,244')	8.33
Well Pad	13.58
Water Containment Pad	2.90
Excess/Topsoil Material Stockpiles	13.31
<b>Total Affected Area</b>	<b>38.12</b>
<b>Total Wooded Acres Disturbed</b>	
	29.59
<b>Impacts to Joseph F. &amp; Elam M. Kinglarry and Larry G. Wells TM 7-19</b>	
Access Road "A" (23')	0.88
Water Containment Pad	0.79
<b>Total Affected Area</b>	<b>1.67</b>
<b>Total Wooded Acres Disturbed</b>	
	1.53
<b>Impacts to Edna M. Monroe TM 8-4</b>	
Access Road "A" (2,094')	6.53
Water Containment Pad	0.79
Excess/Topsoil Material Stockpiles	4.04
<b>Total Affected Area</b>	<b>11.36</b>
<b>Total Wooded Acres Disturbed</b>	
	10.14
<b>Impacts to E. Thomas &amp; Crystalee Estlack TM 8-24.3</b>	
Access Road "A" (42')	0.82
Well Pad	3.49
Water Containment Pad	1.32
<b>Total Affected Area</b>	<b>5.63</b>
<b>Total Wooded Acres Disturbed</b>	
	5.63
<b>Impacts to Edna M. Monroe TM 8-5</b>	
Access Road "A" (85')	0.10
Well Pad	10.09
Excess/Topsoil Material Stockpiles	9.27
<b>Total Affected Area</b>	<b>19.46</b>
<b>Total Wooded Acres Disturbed</b>	
	12.29

DATE	REVISION

**Antero**  
Resources  
THIS DOCUMENT  
WAS PREPARED FOR:  
ANTERO RESOURCES  
CORPORATION

COVER SHEET  
**ESTLACK**  
WELL PAD & WATER CONTAINMENT PAD  
CENTERVILLE, DISTRICT  
TYLER COUNTY, WEST VIRGINIA

WVDOH COUNTY ROAD MAP



Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Lucy Unit 1H	N 336056.02 E 1510594.52	N 336090.72 E 1579153.41	N 4362788.37 E 510489.81	LAT 39-24-52.3803 LONG -80-52-41.3213
Lucy Unit 2H	N 336047.28 E 1510599.38	N 336081.98 E 1579158.27	N 4362785.74 E 510491.33	LAT 39-24-52.2947 LONG -80-52-41.2577
Matthews Unit 2H	N 336038.54 E 1610604.24	N 336073.24 E 1579163.13	N 4362783.10 E 510492.86	LAT 39-24-52.2090 LONG -80-52-41.1940
Hare Unit 2H	N 336029.80 E 1610609.09	N 336064.50 E 1579167.98	N 4362780.46 E 510494.38	LAT 39-24-52.1234 LONG -80-52-41.1304
Hare Unit 1H	N 336021.08 E 1610613.95	N 336055.76 E 1579172.84	N 4362777.82 E 510495.91	LAT 39-24-52.0377 LONG -80-52-41.0668
Matthews Unit 1H	N 336012.32 E 1610618.81	N 336047.02 E 1579177.70	N 4362775.18 E 510497.43	LAT 39-24-51.9521 LONG -80-52-41.0032
Melvin Unit 2H	N 336003.58 E 1610623.67	N 336038.28 E 1579182.56	N 4362772.55 E 510498.96	LAT 39-24-51.8665 LONG -80-52-40.9396
Melvin Unit 1H	N 335994.84 E 1610628.53	N 336029.54 E 1579187.42	N 4362769.91 E 510500.48	LAT 39-24-51.7808 LONG -80-52-40.8760
Jujube Unit 1H	N 335996.10 E 1610633.39	N 336020.80 E 1579192.28	N 4362767.27 E 510502.01	LAT 39-24-51.6952 LONG -80-52-40.8123
Jujube Unit 2H	N 335977.35 E 1610638.25	N 336012.06 E 1579197.14	N 4362764.63 E 510503.53	LAT 39-24-51.6095 LONG -80-52-40.7487
Future Well	N 335968.61 E 1610643.11	N 336003.32 E 1579202.00	N 4362761.99 E 510505.06	LAT 39-24-51.5239 LONG -80-52-40.6843
Future Well	N 335959.87 E 1610647.97	N 335994.58 E 1579206.86	N 4362759.36 E 510506.58	LAT 39-24-51.4383 LONG -80-52-40.6185
Future Well	N 335951.13 E 1610652.83	N 335985.84 E 1579211.72	N 4362756.72 E 510508.11	LAT 39-24-51.3528 LONG -80-52-40.5579
Future Well	N 335942.39 E 1610657.68	N 335977.10 E 1579216.57	N 4362754.08 E 510509.63	LAT 39-24-51.2670 LONG -80-52-40.4943
Future Well	N 335933.53 E 1610662.54	N 335968.30 E 1579221.43	N 4362751.44 E 510511.16	LAT 39-24-51.1814 LONG -80-52-40.4306
Future Well	N 335924.91 E 1610667.40	N 335959.62 E 1579226.29	N 4362748.80 E 510512.68	LAT 39-24-51.0957 LONG -80-52-40.3670
Well Pad Elevation	1,141.0			

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!!**

received  
Office of Oil & Gas  
2015

DATE: 04/05/2015  
SCALE: AS SHOWN  
SHEET 1 OF 30

07/24/2015

# ACCESS ROAD & WELL PAD PLAN

APPROVED  
WVDEP OOG

*WWS* 5/15/2015

LINE "C"  
SHEET 12

TM 8-5  
EDNA M. MONROE  
DB 338 PG 189  
110.32 AC

EPHEMERAL STREAM 7  
EPHEMERAL STREAM 8

GRID NORTH AND ELEVATIONS  
SHOWN HEREON WERE  
ESTABLISHED BY SURVEY

- WELLHEAD INDEX**
- (A) LUCY UNIT 1H
  - (B) LUCY UNIT 2H
  - (C) MATTHEWS UNIT 2H
  - (D) HARE UNIT 2H
  - (E) HARE UNIT 1H
  - (F) MATTHEWS UNIT 1H
  - (G) MELVIN UNIT 2H
  - (H) MELVIN UNIT 1H
  - (I) JUJUBEE UNIT 1H
  - (J) JUJUBEE UNIT 2H
  - (K) FUTURE WELL
  - (L) FUTURE WELL
  - (M) FUTURE WELL
  - (N) FUTURE WELL
  - (O) FUTURE WELL
  - (P) FUTURE WELL

TM 8-0  
TERRY L. &  
BETH A. MONROE  
DB 330 PG 247  
45 AC

NAVITUS

ENERGY ENGINEERING

Telephone: (888) 662-4185 | www.NavitusEng.com

DATE	REVISION

**Antero**  
Resources

THIS DOCUMENT  
WAS PREPARED FOR:  
ANTERO RESOURCES  
CORPORATION

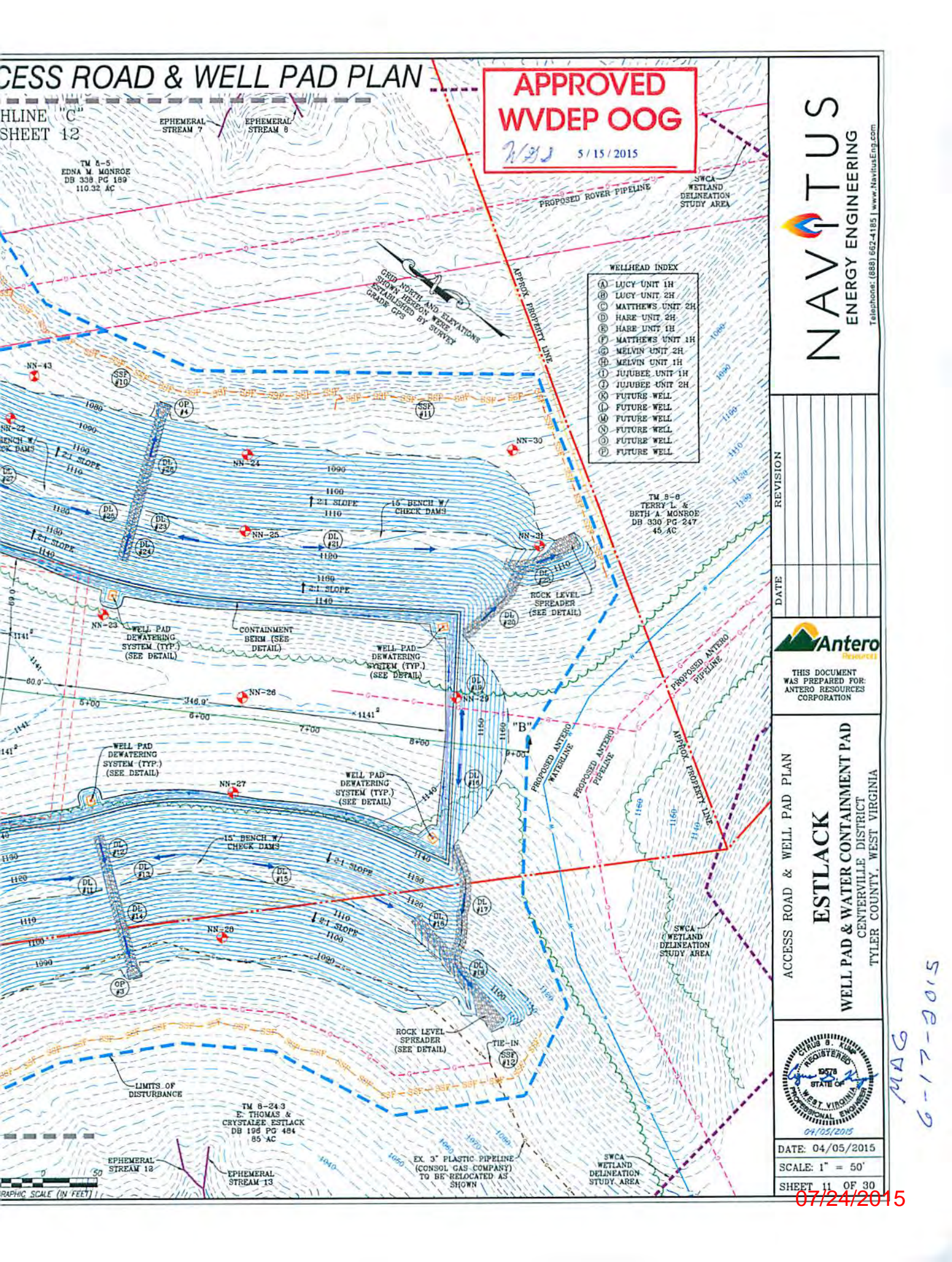
**ESTLACK**

WELL PAD & WATER CONTAINMENT PAD  
CENTERVILLE DISTRICT  
TYLER COUNTY, WEST VIRGINIA

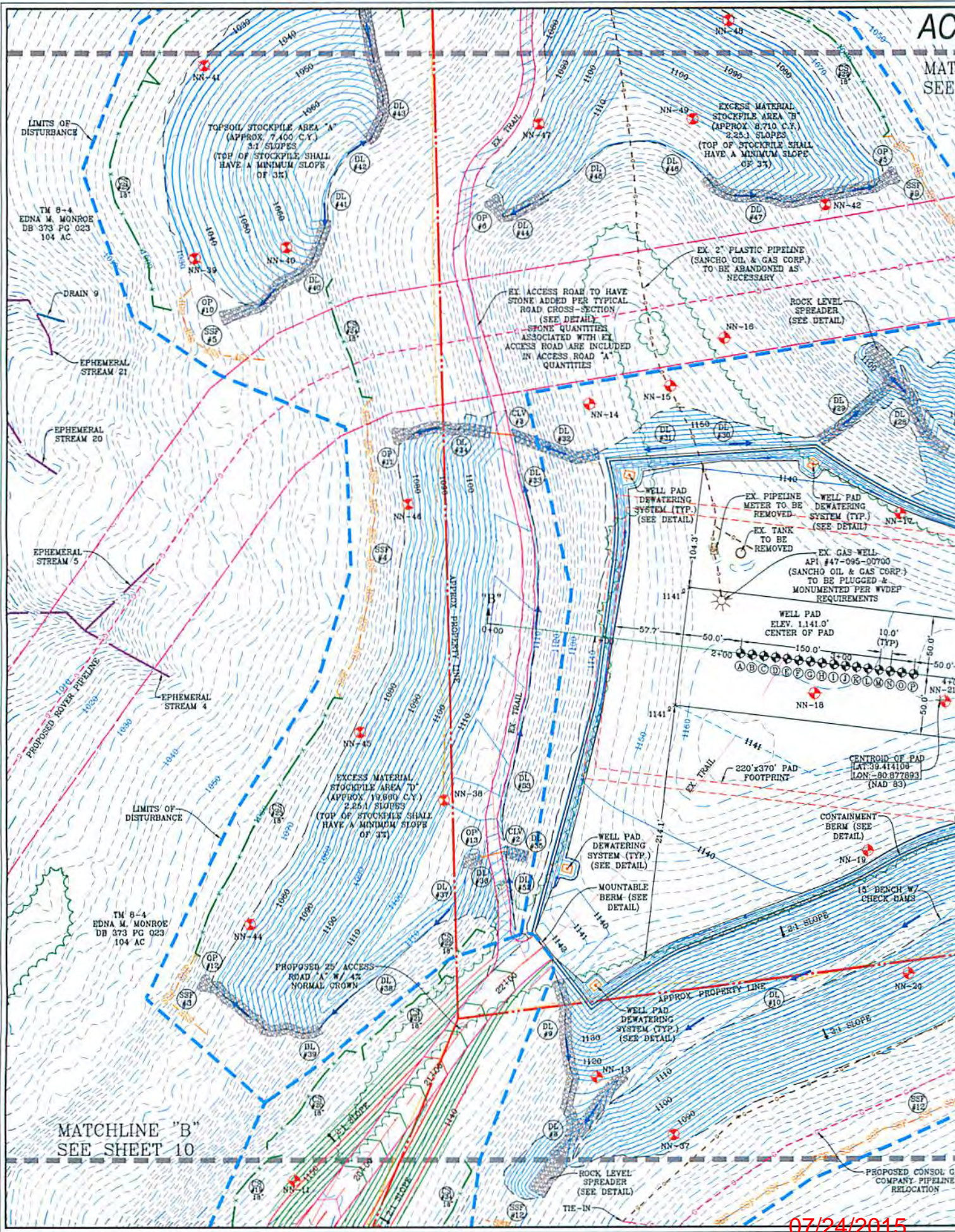
DATE: 04/05/2015  
SCALE: 1" = 50'  
SHEET 11 OF 30

MAG  
6-17-2015

GRAPHIC SCALE (IN FEET)



07/24/2015



TM 8-4  
EDNA M. MONROE  
DB 373 PG 023  
104 AC

TM 8-4  
EDNA M. MONROE  
DB 373 PG 023  
104 AC

MATCHLINE "B"  
SEE SHEET 10