



west virginia department of environmental protection

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

Jim Justice , Governor
Austin Caperton , Cabinet Secretary
www.dep.wv.gov

Tuesday, May 09, 2017
WELL WORK PERMIT
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION (A)
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit approval for SPOCK UNIT 2H
47-095-02427-00-00

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

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

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: SPOCK UNIT 2H
Farm Name: TYRONE L. BEEM ET AL
U.S. WELL NUMBER: 47-095-02427-00-00
Horizontal 6A / New Drill
Date Issued: 5/9/2017

Promoting a healthy environment.

05/12/2017

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

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

PERMIT CONDITIONS

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

WW-6B
(04/15)

API NO. 47-095 - 02427
OPERATOR WELL NO. Spock Unit 2H
Well Pad Name: Pyle Run Pad

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

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

2) Operator's Well Number: Spock Unit 2H Well Pad Name: Pyle Run Pad

3) Farm Name/Surface Owner: Tyrone L Beem et al Public Road Access: Bearsville-Mole Hole

4) Elevation, current ground: 1142' Elevation, proposed post-construction: 1115'

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 Expected 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

10) Proposed Total Measured Depth: 18300' MD

11) Proposed Horizontal Leg Length: 10326'

12) Approximate Fresh Water Strata Depths: 301', 332'

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

14) Approximate Saltwater Depths: 674', 1584'

15) Approximate Coal Seam Depths: 811'

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

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

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

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WW-6B
(04/15)

API NO. 47- 095 - 02427
 OPERATOR WELL NO. Spock Unit 2H
 Well Pad Name: Pyle Run Pad

18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	H-40	94#	80'	80'	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	385' *see #19	385' *see #19	CTS, 535 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#	18300'	18300'	4625 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

*Dmit
3-30-17*

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	24"	0.438"	1530	50	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	1000	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12,630	2500	Leac-HPOZ & Tall - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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

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WW-6B
(10/14)

API NO. 47-095 - 02427
OPERATOR WELL NO. Spock Unit 2H
Well Pad Name: Pyle Run Pad

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

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

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

Dmit
3-30-17

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): 29.70 acres

22) Area to be disturbed for well pad only, less access road (acres): 10.67 acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

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

Conductor: no additives, Class A cement.

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

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

25) Proposed borehole conditioning procedures:

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

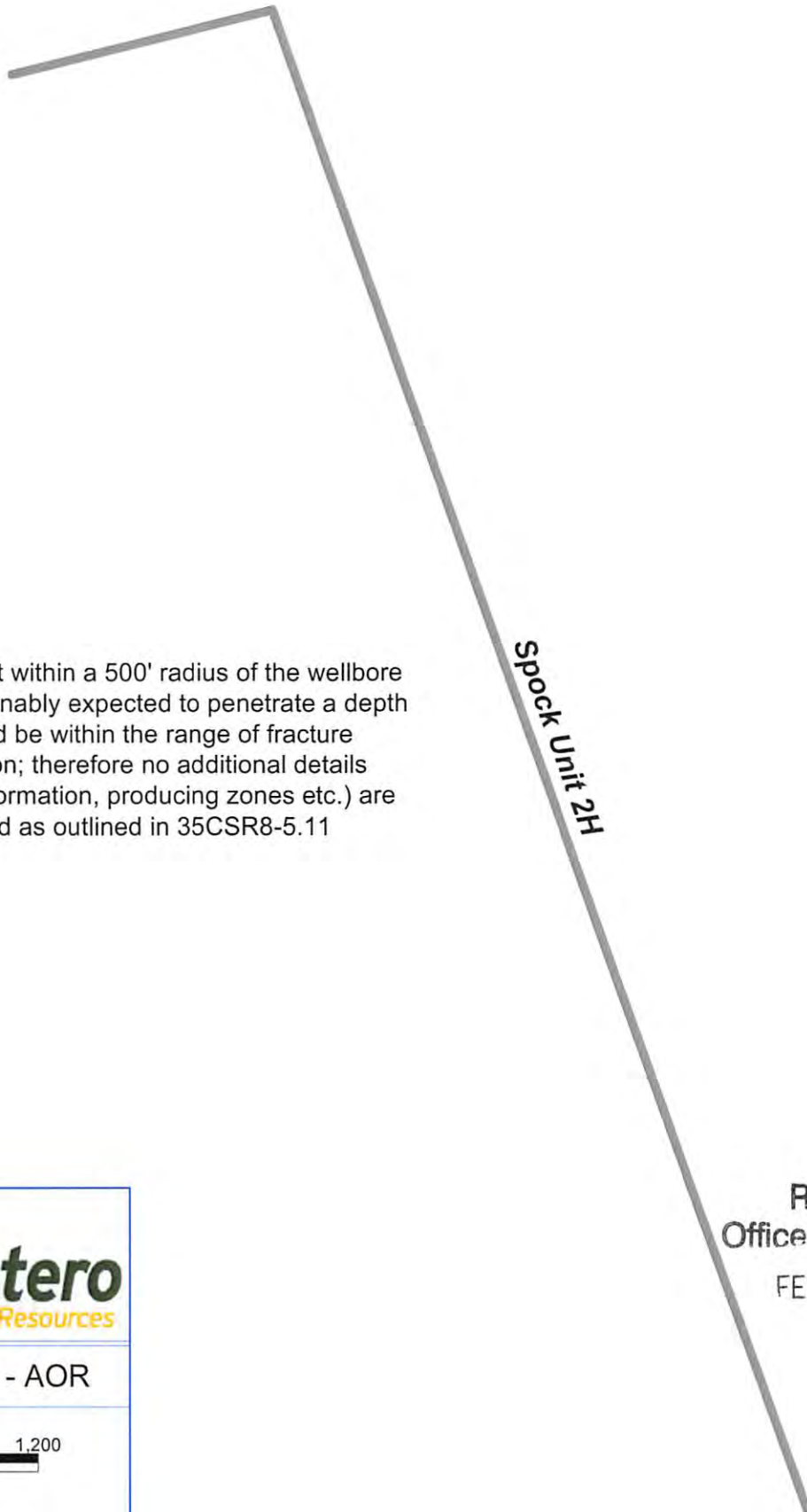
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.

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95-02427



No wells exist within a 500' radius of the wellbore that are reasonably expected to penetrate a depth that could be within the range of fracture propagation; therefore no additional details (perforated formation, producing zones etc.) are required as outlined in 35CSR8-5.11

Spock Unit 2H

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Spock Unit 2H - AOR



REMARKS
There are no wells of interest within the AOR.

February 15, 2017

05/12/2017

WW-9
(4/16)

API Number 47 - 095 - 02427
Operator's Well No. Spock Unit 2H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

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

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

Will a pit be used? Yes No

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

*DMH
3-30-17*

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/Stiff 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), Northwestern Landfill (Permit # SWF-1025/WV0109410)

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

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

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

Company Official Signature [Signature]

Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental & Regulatory Manager

Subscribed and sworn before me this 17th day of February, 20 17

[Signature]

Notary Public

My commission expires 7/8/2020

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SHELBY MARIE JOHNSON
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20164026080
MY COMMISSION EXPIRES JUL 8 2020
Department of Environmental Protection

05/12/2017

Antero Resources Corporation

Proposed Revegetation Treatment: Acres Disturbed 29.70 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 -2178' (10.94 acres) + Access Road B- 54' (0.09 acres) + Access Road C - 92' (0.15 acres) + Staging Area (1.77 acres) + Well Pad (10.67 acres) + Excess/Topsoil Material Stockpiles (6.08 acres) = 29.70 Total Affected Acres

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	KY Bluegrass	20
Field Bromegrass	40	Redtop	3

See attached Table IV-3 for additional seed type (Pyle Run Pad Design Pg 23)

See attached Table IV-3 for additional seed type (Pyle Run Pad Design Pg 23)


*or type of grass seed requested by surface owner

*or type of grass seed requested by surface owner

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: 

Comments: _____

Title: Oil + Gas Inspector

Date: 3-30-17

Field Reviewed? Yes No

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Environmental Protection
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911 Address
785 Stull Hill Rd
Alma, WV 26320

Well Site Safety Plan

Antero Resources

Well Name: Heintzman Unit 1H – 3H, Beem Unit 1H – 3H,
Spock Unit 1H – 3H

Pad Location: PYLE RUN PAD
Tyler County/Centerville District

GPS Coordinates:

Entrance - Lat 39°23'51.4968"/Long -80°54'27.3882" (NAD83)

Pad Center - Lat 39°24'0.0036"/Long -80°54'14.5614" (NAD83)

*DMH
3-30-17*

Driving Directions:

From the Intersection of I79 and HWY 50 near Bridgeport: Head west on US-50W for 28.7 miles. Turn right onto WV-18N for 0.6 miles. Turn left onto Davis St/Old U.S. 50 for 0.4 miles. Turn right onto WV18N/Sistersville Pike for 12.2 miles. Turn left onto WV-74 for 3.7 miles. Turn right onto Stull Hill Rd for 1.0 miles. Continue onto Big Shank Rd for 0.8 miles. Continue onto Big Sanka Rd for 0.9 miles. The access road will be on your right.

Alternate Route:

From the Middlebourne Volunteer Fire department: Head SW on WV-18 S/Main St towards Wilcox Ave for 0.3 miles. Turn right onto Bridgeway Rd for 0.1 miles. Turn left onto Middlebourne-Wick/Wick Rd for 2.0 miles. Turn left onto Middlebourne-Wick for 4.1 miles. Turn left onto Bearsville Rd for 1.8 miles. Continue onto Big Sanka Rd for 0.8 miles. The access road will be on the left.

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

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Form WW-9 Additives Attachment

SURFACE INTERVAL

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

INTERMEDIATE INTERVAL

STIFF FOAM RECIPE:

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

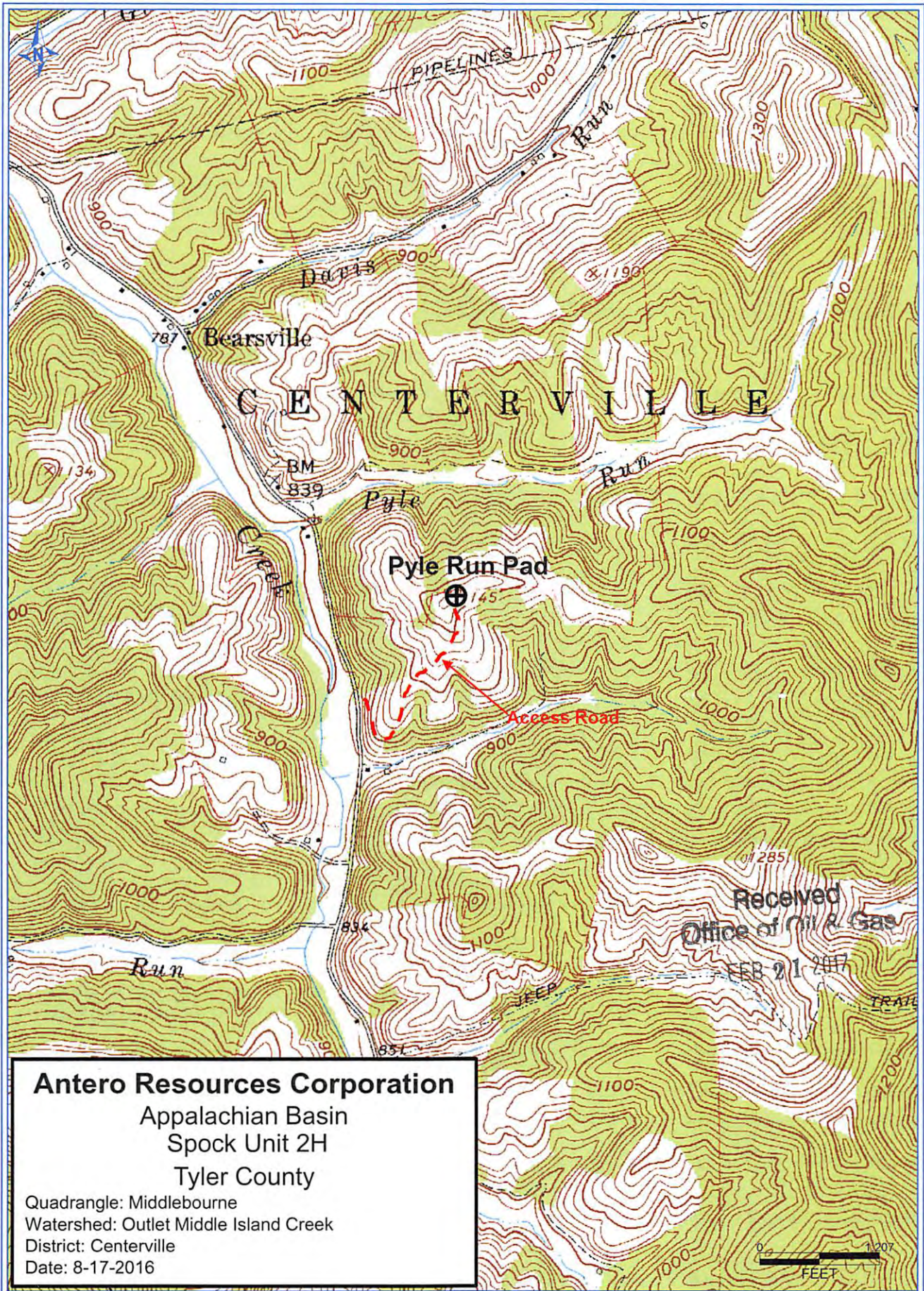
PRODUCTION INTERVAL

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

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

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Antero Resources Corporation
Appalachian Basin
Spock Unit 2H
Tyler County

Quadrangle: Middlebourne
Watershed: Outlet Middle Island Creek
District: Centerville
Date: 8-17-2016

LATITUDE 39°25'00"

8,174'

3,006' TO BOTTOM HOLE

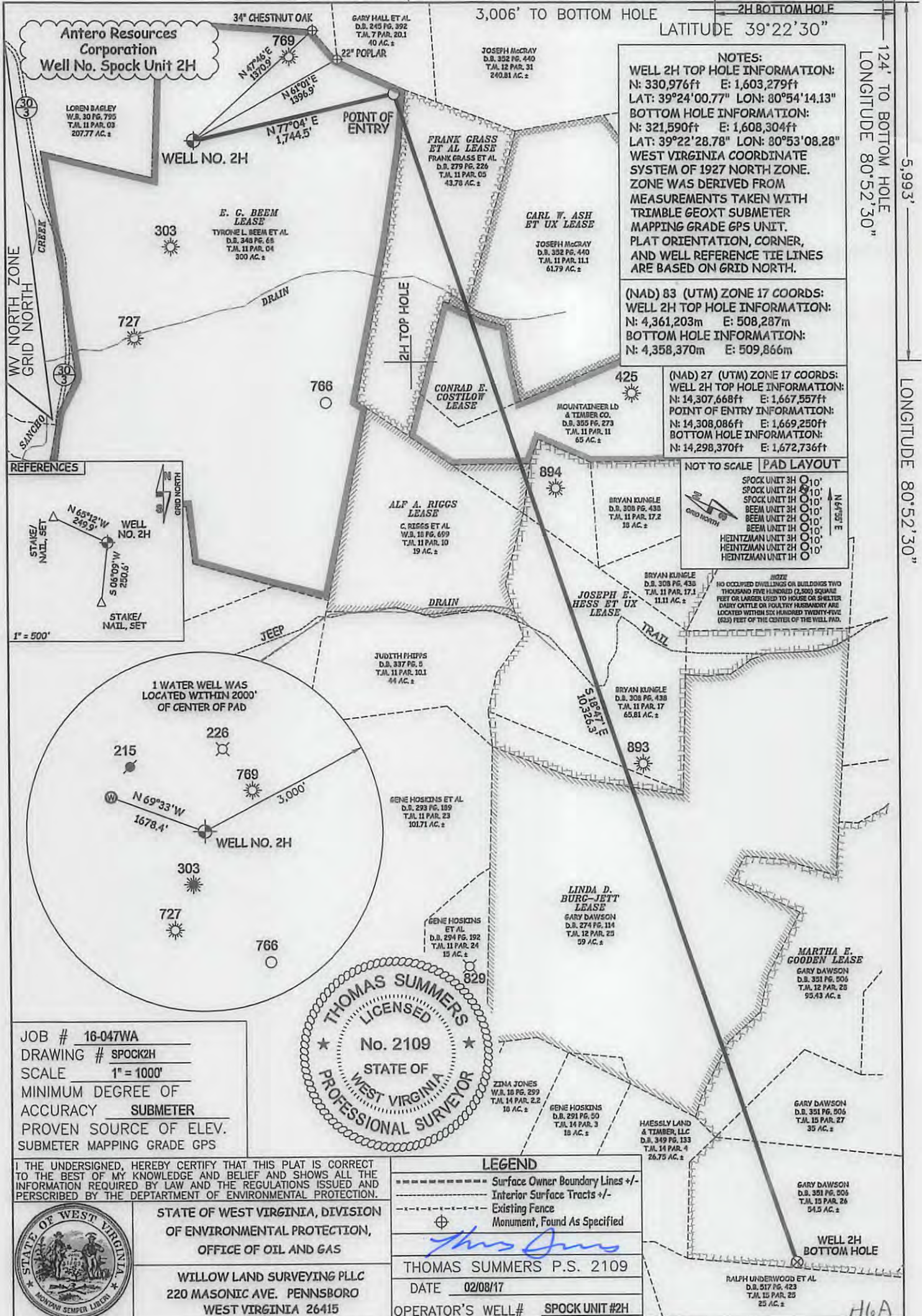
2H BOTTOM HOLE

LATITUDE 39°22'30"

124' TO BOTTOM HOLE

5,993'

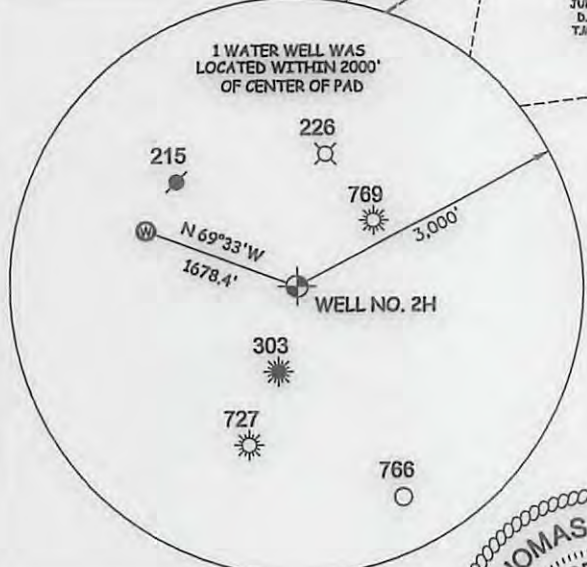
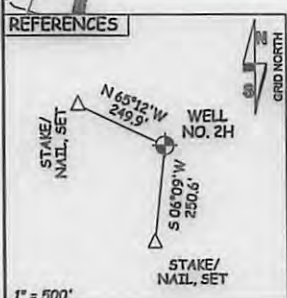
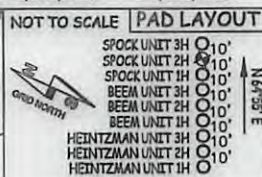
LONGITUDE 80°52'30"



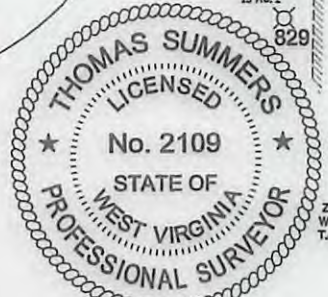
NOTES:
WELL 2H TOP HOLE INFORMATION:
 N: 330,976ft E: 1,603,279ft
 LAT: 39°24'00.77" LON: 80°54'14.13"
BOTTOM HOLE INFORMATION:
 N: 321,590ft E: 1,608,304ft
 LAT: 39°22'28.78" LON: 80°53'08.28"
 WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.
 ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT.
 PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
 N: 4,361,203m E: 508,287m
BOTTOM HOLE INFORMATION:
 N: 4,358,370m E: 509,866m

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
 N: 14,307,668ft E: 1,667,557ft
POINT OF ENTRY INFORMATION:
 N: 14,308,086ft E: 1,669,250ft
BOTTOM HOLE INFORMATION:
 N: 14,298,370ft E: 1,672,736ft



JOB # 16-047WA
 DRAWING # SPOCK2H
 SCALE 1" = 1000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS



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



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

LEGEND
 - - - - - Surface Owner Boundary Lines +/-
 - - - - - Interior Surface Tracts +/-
 - - - - - Existing Fence
 ⊕ Monument, Found As Specified

THOMAS SUMMERS P.S. 2109
 DATE 02/08/17
 OPERATOR'S WELL# SPOCK UNIT #2H

STATE OF WEST VIRGINIA DEPT. OF ENERGY DIVISION OF OIL AND GAS
 WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
 LOCATION: ELEVATION 1,142' ORIGINAL 1,115' PROPOSED WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE TH - MIDDLEBOURNE 7.5' BH - PENNSBORO 7.5' DISTRICT CENTERVILLE COUNTY TYLER
 SURFACE OWNER TYRONEL BEEM ET AL ACREAGE 300 ACRES +/-
 OIL & GAS ROYALTY OWNER E. G. BEEM; FRANK GRASS ET AL; CARL W. ASH ET UX; LEASE ACREAGE 317 AC±; 43.78 AC±; 61.26 AC±;
 CONRAD E. COSTILOW; ALF A. RIGGS; JOSEPH E. HESS ET UX; LINDA D. BURG-JETT; MARTHA E. GOODEN 64.42 AC±; 19.4 AC±; 94.92 AC±; 178 AC±; 184.95 AC±
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
 PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL
 (SPECIFY) PLUG & ABANDON CLEAN OUT & REPLUG
 TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,800' TVD 18,300' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
 ADDRESS 1815 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
 FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

05/12/2017

H6A

COUNTY NAME PERMIT

WW-6A1

Operator's Well Number Spock Unit 2H

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

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

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

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>E.G. Beem Lease</u>			
E.G. Beem	Warren R. Haught	1/8	213/662
Warren R. Haught	Sancho Oil and Gas Corporation	Assignment	369/506
Sancho Oil and Gas Corporation	Antero Resources Corporation	Assignment	436/177
<u>Frank Grass et al Lease</u>			
Frank Grass et al	Sancho Oil and Gas Corporation	1/8	335/601
Sancho Oil and Gas Corporation	Antero Resources Corporation	Assignment	436/216
<u>Carl W. Ash et ux Lease</u>			
Carl W. Ash and Judith Ash	Chesapeake Appalachia LLC	1/8	368/641
Chesapeake Appalachia LLC	SWN Production Co. LLC	Assignment	465/463
SWN Production Co. LLC	Antero Resources Corporation	Assignment	544/242
<u>Conrad E. Costilow Lease</u>			
Conrad E. Costilow	Antero Resources Corporation	1/8+	500/645
<u>Alf A. Riggs Lease</u>			
Alf A. Riggs	Antero Resources Appalachian Corporation	1/8+	408/615
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	EXHIBIT 1
<u>Joseph E. Hess et ux Lease</u>			
Joseph E. Hess aka Joseph Elden Hess and Judith C. Hess	Antero Resources Corporation	1/8+	447/625
<u>Linda D. Burg-Jett Lease</u>			
Linda D. Burg-Jett	Antero Resources Appalachian Corporation	1/8+	400/324
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	EXHIBIT 1

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

05/12/2017

95-02427

WW-6A1
(5/13)

Operator's Well No. Spock Unit 2H

**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>Martha E. Gooden Lease</u>	Martha E. Gooden	Chesapeake Appalachia LLC	1/8	369/622
	Chesapeake Appalachia LLC	SWN Production Company LLC	Assignment	465/463
	SWN Production Company LLC	Antero Resources Corporation	Assignment	544/242

*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, or nullifies the need for other permits/approvals that may be necessary and further affirms that all permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

**Received
Office of Oil & Gas**

Well Operator: Antero Resources Corporation

By: Kevin Kilstrom *[Signature]*

Its: SR Vice President - Production

FEB 21 2017

**FORM WW-6A1
EXHIBIT 1**

95-02427

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
E-mail: 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

**Important Legal Notice Regarding Signature:* Per West Virginia Code §31D-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.

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Office of Oil & Gas
FEB 21 2017



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

February 17, 2017

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

RE: Spock Unit 2H
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 Spock Unit 2H horizontal shallow well. As an authorized representative, I certify that Antero has the right to extract, produce or market the oil or gas from all leases through which the Spock Unit 2H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,

A handwritten signature in blue ink that reads "Kenneth Vaughn".

Kenneth Vaughn
Senior Landman

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Office of Oil & Gas
FEB 21 2017

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

Date of Notice Certification: 02/16/2017

API No. 47- 095 - _____

Operator's Well No. Spock Unit 2H

Well Pad Name: Pyle Run 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: West Virginia
County: Tyler
District: Centerville
Quadrangle: Middlebourne 7.5'
Watershed: Outlet Middle Island Creek

UTM NAD 83 Easting: 508287m
Northing: 4361203m
Public Road Access: Bearsville-Mole Hole
Generally used farm name: Tyrone L Beem et al

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

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><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</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
--	---

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, service, the return receipt card or other postal receipt for certified mailing.

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WW-6AC
(1/12)

Certification of Notice is hereby given:

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

Well Operator: Antero Resources Corporation
By: Kevin Kilstrom
Its: SR Vice President - Production
Telephone: 303-357-7310

Address: 1615 Wynkoop Street
Denver, CO 80202
Facsimile: 303-357-7315
Email: shjohnson@anteroresources.com



Subscribed and sworn before me this 16th day of February 2017
[Signature] Notary Public
My Commission Expires 7/8/2020

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.

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FEB 21 2017

05/12/2017

**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: 2/17/2017 **Date Permit Application Filed:** 2/17/2017

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: PLEASE SEE ATTACHMENT
Address: _____

Name: _____
Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)
Name: PLEASE SEE ATTACHMENT
Address: _____

Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)
Name: _____
Address: _____

COAL OWNER OR LESSEE
Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address: _____

COAL OPERATOR
Name: NO DECLARATIONS ON RECORD WITH COUNTY
Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
Name: NONE IDENTIFIED WITHIN 1500'
Address: _____

Please note there is 1 water source identified, however it is located greater than 1500' from the proposed well location.

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name: _____
Address: _____

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Office of Oil & Gas**

*Please attach additional forms if necessary FEB 21 2017

Notice is hereby given:

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

This Notice Shall Include:

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

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

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

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

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

Well Location Restrictions

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

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

Water Well Testing:

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

Water Testing Laboratories:

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

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

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

Written Comment:

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

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

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Office of Oil & Gas

FEB 21 2017

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.**

05/12/2017

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
FEB 21 2017

05/12/2017

WW-6A
(8-13)

API NO. 47-095 - 02427
OPERATOR WELL NO. Spock Unit 2H
Well Pad Name: Pyle Run Pad

Notice is hereby given by:

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

Address: 1615 Wynkoop St
Denver, CO 80202
Facsimile: (303) 357-7315

Oil and Gas Privacy Notice:

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



Subscribed and sworn before me this 17th day of February 2017
[Signature] Notary Public
My Commission Expires 7/8/2020

Received
Office of Oil & Gas
FEB 21 2017

05/12/2017

WW-6A Notice of Application Attachment (Pyle Run Pad):

List of Owners with Proposed Disturbance associated with Pyle Run Pad:

95-02427

SURFACE OWNERS –

Owner: Loren Bagley
Address: 2543 Conaway Run Road
Alma, WV 26320

Owner: David I. Beem and Bonita Beem
Address: 924 Tremont St
Dover, OH 44622

Owner: Tyrone L. Beem and Diane J. Beem
Address: P.O. Box 152
Tuscarawas, OH 44682

SURFACE OWNERS (Road and/or Other Disturbance) –

Owner: Loren Bagley (Off-lease)
Address: 2543 Conaway Run Road
Alma, WV 26320

Owner: David I. Beem and Bonita Beem (On-lease)
Address: 924 Tremont St
Dover, OH 44622

Owner: Tyrone L. Beem and Diane J. Beem (On-lease)
Address: P.O. Box 152
Tuscarawas, OH 44682

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05/12/2017

**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: 11/17/2015 **Date of Planned Entry:** *11/27/2015

*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: PLEASE SEE ATTACHMENT
 Address: _____

 Name: _____
 Address: _____

 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. 39.400078, -80.904044</u>
County: <u>Tyler</u>	Public Road Access: <u>Bearsville-Mole Hole</u>
District: <u>Centerville</u>	Watershed: <u>Outlet Middle Island Creek</u>
Quadrangle: <u>Middlebourne 7.5'</u>	Generally used farm name: <u>Tyrone L Beem et al</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 57th 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.

Notice is hereby given by:

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

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

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Office of Oil & Gas
FEB 21 2017

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.

95-0242j

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

Surface Owners:

Tax Parcel ID: 11-3

Owner: Loren Bagley ✓
Address: 2543 Conaway Run Rd.
Alma, WV 26320

Surface Owners:

Tax Parcel ID: 11-4

Owner: Tyrone L. Beem & Diane J. Beem ✓
Address: PO Box 152
Tuscarawas, OH 44682

Owner: Tyrone L. Beem & Diane J. Beem ✓
(2ND Address)
Address: 229 Hammersly Dr.
Tuscarawas, OH 44682

Owner: David I. Beem & Bonita Beem ✓
c/o David Beem
Address: 924 Tremont St.
Dover, OH 44622

Mineral Owners:

Tax Parcel ID: 11-4

Owner: David I. Beem & Bonita Beem ✓
c/o David Beem
Address: 924 Tremont St.
Dover, OH 44622

Owner: Tyrone L. Beem & Diane J. Beem ✓
Address: PO Box 152
Tuscarawas, OH 44682

Owner: Tyrone L. Beem & Diane J. Beem ✓
(2ND Address)
Address: 229 Hammersly Dr.
Tuscarawas, OH 44682

Mineral Owners:

Tax Parcel ID: 11-3

Owner: Loren Bagley ✓
Address: 2543 Conaway Run Rd.
Alma, WV 26320

Owner: The Heirs, Successors & Assigns of ✓
Mabel R. Pyle
c/o Paul Pyle
Address: 83 Pointe South Ter.
Bluffton, SC 29910

Owner: Charles R. Wince ✓
Address: 1406 Capetown Dr.
Grand Prairie, TX 75050

Owner: Mary K. Wince Pickard ✓
Address: 116 McCoy Place
Sewickley, PA 15143

Owner: Howard L. Pyle ✓
Address: 728 Tarklin Rd.
Salem, WV 26426

Received
Office of Oil & Gas
FEB 21 2017

05/12/2017

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: 02/17/2017 **Date Permit Application Filed:** 02/17/2017

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: <u>PLEASE SEE ATTACHMENT</u>	Name: _____
Address: _____	Address: _____
_____	_____

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>508287m</u>
County: <u>Tyler</u>		Northing: <u>4361203m</u>
District: <u>Centerville</u>	Public Road Access: <u>Bearsville-Mole Hole</u>	
Quadrangle: <u>Middlebourne 7.5'</u>	Generally used farm name: <u>Tyrone L Beem et al</u>	
Watershed: <u>Outlet 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 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Operator: <u>Antero Resources Corporation</u>	Address: <u>1615 Wynkoop Street</u>
Telephone: <u>(303) 357-7310</u>	<u>Denver, CO 80202</u>
Email: <u>shjohnson@anteroresources.com</u>	Facsimile: <u>303-357-7315</u>

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.

Received
Office of Oil & Gas
FEB 21 2017

05/12/2017

WW-6A5 Notice of Planned Operation Attachment (Pyle Run Pad):**List of Owners with Proposed Disturbance associated with Pyle Run Pad:****SURFACE OWNERS –**

Owner: Loren Bagley
Address: 2543 Conaway Run Road
Alma, WV 26320

Owner: David I. Beem and Bonita Beem
Address: 924 Tremont St
Dover, OH 44622

Owner: Tyrone L. Beem and Diane J. Beem
Address: P.O. Box 152
Tuscarawas, OH 44682

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Office of Oil & Gas

FEB 21 2017

05/12/2017

95-02427



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

Jim Justice
Governor

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

February 14, 2017

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

Subject: DOH Permit for the Pyle Run Pad, Tyler County
Spock Unit 2H Well Site 47-095-02427

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2014-0700 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off of Tyler County 30/3 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

Received
Office of Oil & Gas

Cc: Kara Quackenbush
Antero Resources Corporation
CH, OM, D-6
File

FEB 21 2017

List of Anticipated Additives Used for Fracturing or Stimulating Well

Additives	Chemical Abstract Service Number (CAS #)
Fresh Water	7732-18-5
2 Phosphobutane 1,2,4 tricarboxylic acid	37971-36-1
Ammonium Persulfate	7727-54-0
Anionic copolymer	proprietary
Anionic polymer	proprietary
BTEX Free Hydrotreated Heavy Naphtha	64742-48-9
Cellulase enzyme	(Proprietary)
Demulsifier Base	(Proprietary)
Ethoxylated alcohol blend	Mixture
Ethoxylated Nonylphenol	68412-54-4
Ethoxylated oleylamine	26635-93-8
Ethylene Glycol	107-21-1
Glycol Ethers	111-76-2
guar gum	9000-30-0
Hydrogen Chloride	7647-01-0
Hydrotreated light distillates, non-aromatic, BTEX free	64742-47-8
Isopropyl alcohol	67-63-0
liquid, 2,2-dibromo-3-nitropropionamide	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
Silica, 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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Office of Oil & Gas
FEB 21 2017

05/12/2017

LOCATION COORDINATES:
 ACCESS ROAD "A" ENTRANCE
 LATITUDE: 39.397638 LONGITUDE: -80.907608 (NAD 83)
 N 4360908.49 E 507955.43 (UTM ZONE 17 METERS)
 ACCESS ROAD "B" ENTRANCE
 LATITUDE: 39.397703 LONGITUDE: -80.907680 (NAD 83)
 N 4360915.65 E 507949.25 (UTM ZONE 17 METERS)
 CENTER OF TANK
 LATITUDE: 39.399613 LONGITUDE: -80.904556 (NAD 83)
 N 4361150.16 E 506218.00 (UTM ZONE 17 METERS)
 CENTROID OF PAD
 LATITUDE: 39.400007 LONGITUDE: -80.904045 (NAD 83)
 N 4361179.53 E 506261.93 (UTM ZONE 17 METERS)

APPROVED
WVDEP OOG
 3/17/2017

PLYLE RUN WELL PAD & WATER CONTAINMENT PAD

SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

CENTERVILLE DISTRICT, TYLER COUNTY, WEST VIRGINIA
 SANCHO CREEK WATERSHED
 USGS 7.5 MIDDLEBOURNE QUAD MAP

GENERAL DESCRIPTION:
 THE ACCESS ROAD(S), WATER CONTAINMENT PAD, AND WELL PAD ARE BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL 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 #1424864763. 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 BETWEEN AUGUST 2014 & JULY 2015 BY ALLSTAR ECOLOGY, LLC 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 JULY 2, 2015 JURISDICTIONAL STREAMS & WETLANDS MAP WAS PREPARED BY ALLSTAR ECOLOGY, LLC 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:
 THE PROPOSED ACCESS ROAD CUT SLOPE (1.5:1) SHALL BE FIELD VERIFIED BY A CERTIFIED GEOTECHNICAL ENGINEER TO ENSURE THE PROPOSED SLOPES ARE ADEQUATE PRIOR TO CONSTRUCTION. ACCESS ROAD CONSTRUCTION SHALL BE MONITORED BY A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER OR PROJECT DESIGN ENGINEER DURING CONSTRUCTION.

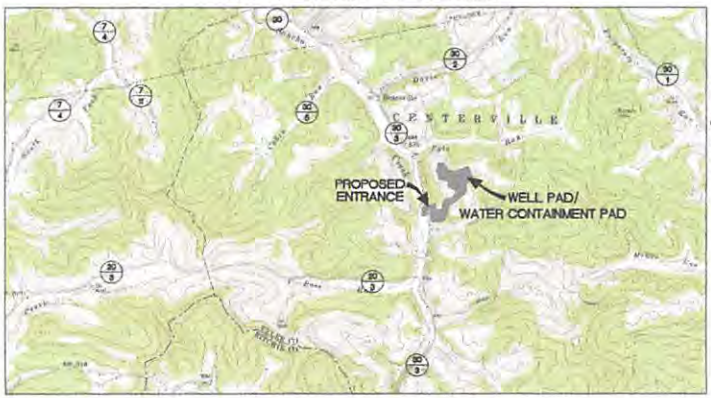
A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. BETWEEN SEPTEMBER 16, 2014 & SEPTEMBER 23, 2014. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED OCTOBER 24, 2014, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

PROJECT CONTACTS:
OPERATOR:
 ANTERO RESOURCES CORPORATION
 235 WHITE OAK BLVD.
 BRIDGEPORT, WV 26203
 PHONE: (304) 842-4100
 FAX: (304) 842-4102
ELI WAGNER - ENVIRONMENTAL ENGINEER
 OFFICE: (304) 842-4068 CELL: (304) 476-9770
JON MCEYERS - OPERATIONS SUPERINTENDENT
 OFFICE: (303) 357-8759 CELL: (303) 808-2423
AARON KUNZLER - CONSTRUCTION SUPERVISOR
 CELL: (405) 227-8344
ROBERT B. WIRKS - FIELD ENGINEER
 OFFICE: (304) 842-4100 CELL: (304) 627-7405

MARK JOHNSON - SURVEYING COORDINATOR
 OFFICE: (304) 842-4162 CELL: (304) 719-6449
RICHARD LYLES - LAND AGENT
 CELL: (770) 378-6653
ENGINEER/SURVEYOR:
 NAVITUS ENGINEERING, INC.
 CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
 OFFICE: (888) 662-4185 CELL: (540) 686-6747
ENVIRONMENTAL:
 ALLSTAR ECOLOGY, LLC
 RYAN L. WARD - ENVIRONMENTAL SCIENTIST
 OFFICE: (666) 213-2656 CELL: (304) 692-7477
GEOTECHNICAL:
 PENNSYLVANIA SOIL & ROCK, INC.
 CHRISTOPHER W. SAMOS - PROJECT ENGINEER
 OFFICE: (412) 372-6000 CELL: (412) 958-0662

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 IMPACT THAT WILL NEED TO BE PERMITTED BY THE APPROPRIATE AGENCIES.
 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.

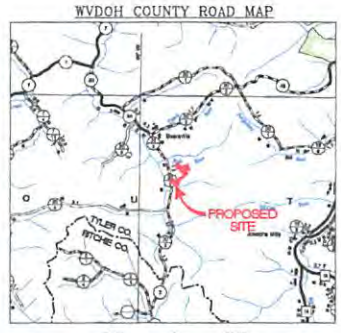
REPRODUCTION NOTE
 THESE PLANS WERE CREATED TO BE PLOTTED ON 24"x36" (ANSI D) PAPER. HALF SCALE DRAWINGS ARE ON 11"x17" (ANSI B) PAPER.
 THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.



SCALE: 1" = 2000'



(NOT TO SCALE)



SCALE: 1" = 5000'

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.

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!!

WEST VIRGINIA STATE PLANK COORDINATE SYSTEM
 NORTH ZONE, NAD83
 NAVITUS ENGINEERING, INC.
 ESTABLISHED BY JOHN WATKINS, CHAIR, GPS & DPIC
 POST-PROCESSING

SHEET INDEX:

- 1 - COVER SHEET
- 2 - CONSTRUCTION AND EAS 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 & STAGING AREA PLAN
- 10 - WELL PAD & WATER CONTAINMENT PAD PLAN
- 11 - WELL PAD GRADING PLAN
- 12 - ACCESS ROAD PROFILES
- 13 - ACCESS ROAD SECTIONS
- 14 - WELL PAD, WATER CONTAINMENT PAD & STOCKPILE SECTION
- 15 - WELL PAD & WATER CONTAINMENT PAD SECTIONS
- 16-23 - CONSTRUCTION DETAILS
- 24 - ACCESS ROAD & STAGING AREA RECLAMATION PLAN
- 25 - WELL PAD & WATER CONTAINMENT PAD RECLAMATION PLAN

GE500-GE504 - GEOTECHNICAL DETAILS

PLYLE RUN LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (2.178')	10.04
Access Road "B" (54')	0.09
Access Road "C" (92')	0.15
Staging Area	1.77
Well Pad	10.67
Excess/Topsoil Material Stockpiles	6.08
Total Affected Area	29.70
Total Wooded Acres Disturbed	
Impacts to Liberty Run TM 11-3	23.65
Access Road "B" (54')	0.08
Staging Area	1.74
Well Pad	1.48
Excess/Topsoil Material Stockpiles	5.01
Total Affected Area	8.31
Total Wooded Acres Disturbed	
Impacts to Tyrone L. & Diane J. Beam TM 11-4	5.85
Access Road "A" (2.178')	10.04
Access Road "B" (0')	0.01
Access Road "C" (92')	0.15
Staging Area	0.03
Well Pad	0.19
Excess/Topsoil Material Stockpiles	1.07
Total Affected Area	21.39
Total Wooded Acres Disturbed	
	17.50

Proposed Well Name	WV North	WV North	UTM (METERS)	NAD 83 Lat & Long
	NAD 83	NAD 83	Zone 17	
Heintzman Unit 1H	N 33949.25	N 32003.78	N 401104.09	LAT 39.24.00 7509
Heintzman Unit 2H	E 1030215.42	E 1011774.33	E 80207.74	LONG 80.54.14 3178
Heintzman Unit 3H	N 33860.50	N 33008.03	N 401185.43	LAT 39.24.00 7542
Heintzman Unit 4H	E 103224.47	E 1011783.39	E 80270.48	LONG 80.54.14 2033
Heintzman Unit 5H	N 33004.75	N 32009.24	N 401178.78	LAT 39.24.00 8335
Beam Unit 1H	E 103223.53	E 1011792.44	E 80273.22	LONG 80.54.14 2088
Beam Unit 2H	N 33005.98	N 33003.48	N 401198.70	LAT 39.24.00 8809
Beam Unit 3H	E 103224.56	E 1011801.80	E 80275.96	LONG 80.54.13 8743
Beam Unit 4H	N 33063.22	N 32009.72	N 401192.44	LAT 39.24.00 9242
Beam Unit 5H	E 103221.84	E 1011810.58	E 80278.67	LONG 80.54.13 9597
Speck Unit 1H	N 33067.47	N 32010.95	N 401210.78	LAT 39.24.00 9575
Speck Unit 2H	E 103230.70	E 1011819.61	E 80281.43	LONG 80.54.13 7453
Speck Unit 3H	N 33071.71	N 32008.26	N 401212.12	LAT 39.24.01 0108
Speck Unit 4H	E 103209.78	E 1011839.67	E 80284.17	LONG 80.54.13 8307
Speck Unit 5H	N 33075.98	N 32010.44	N 401210.48	LAT 39.24.01 0547
Speck Unit 6H	E 103227.81	E 1011837.73	E 80286.20	LONG 80.54.13 8163
Speck Unit 7H	N 33080.19	N 32010.48	N 401210.79	LAT 39.24.01 0574
Speck Unit 8H	E 103227.67	E 1011846.76	E 80289.54	LONG 80.54.13 8017
Well Pad Elevation				1115.0

PLYLE RUN WETLAND IMPACT (SQUARE FEET)			
Wetland and Impact Cause	Fil (SF)	Total Impact (SF)	Total Impact (AC)
PEM Wetland 2 (Staging Area)	161	161	0.00

PLYLE RUN EPHEMERAL STREAM IMPACT (LINEAR FEET)					
Stream and Impact Cause	Ephemeral Impacts		Temp. Impacts		Total Distance (LF)
	Culvert / Filt. (LF)	Inlets/Outlets Structures (LF)	Cofferdams (LF)	Temp. Disturb. Distance to EAS (LF)	
Stream 13 (Well Pad)	0	0	33	44	77
Stream 10 (Stockpile Area "B")	0	0	0	42	42

NAVITUS
 ENERGY ENGINEERING

DATE	REVISION
10/20/2015	REVISED PER STREAMS & WETLANDS
11/24/2015	REVISED PER DESIGN UPDATES
04/14/2016	REVISED PER CONSTRUCTION
01/16/2017	REVISED PER CONSTRUCTION
01/25/2017	REVISED WELL NAMES
01/29/2017	REVISED WELL LOCATIONS
01/15/2017	REVISION PER WVDEP COMMENTS

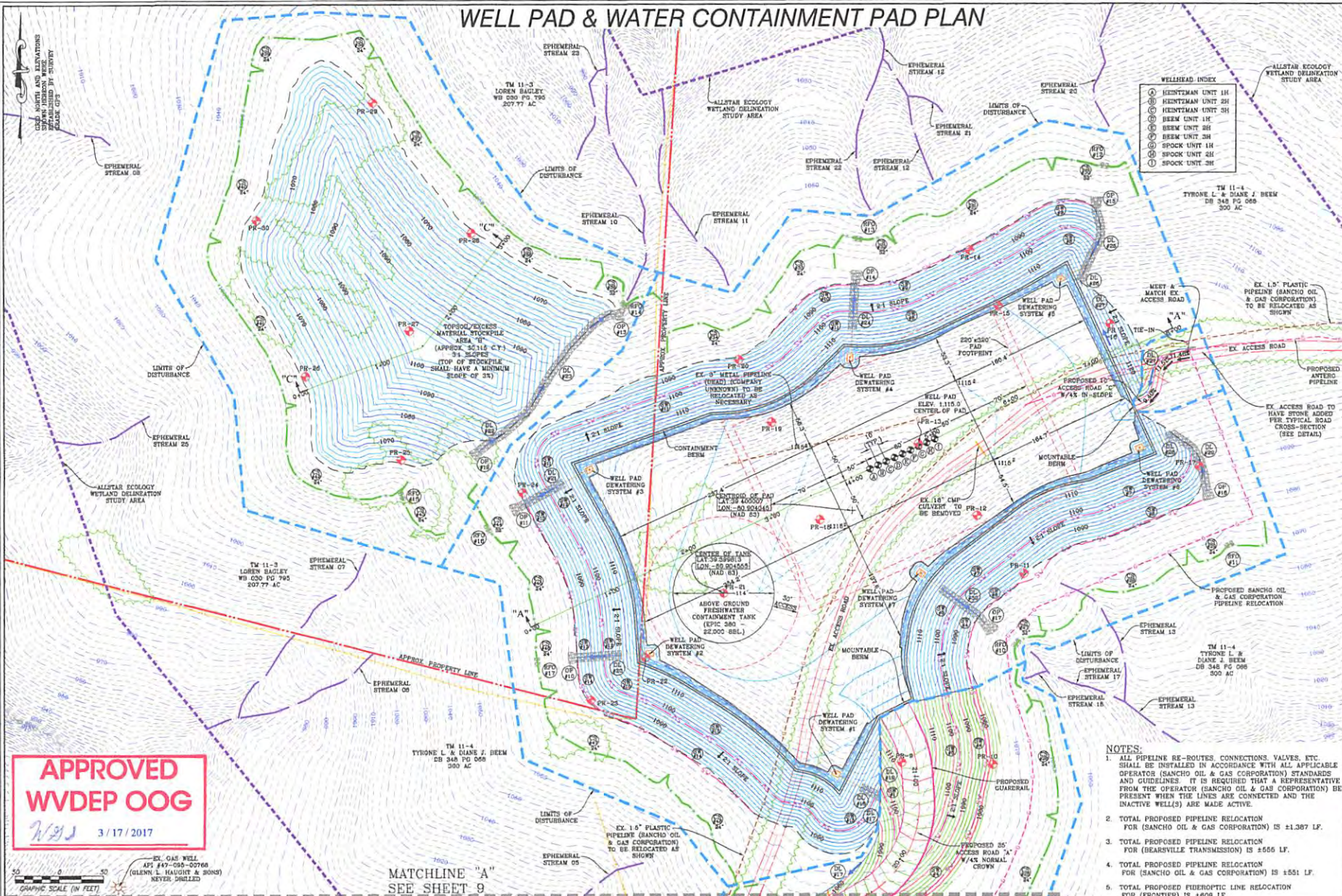
Antero
 THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

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



DATE: 02/19/2015
 SCALE: AS SHOWN
 SHEET 1 OF 25

WELL PAD & WATER CONTAINMENT PAD PLAN



WELLHEAD INDEX

- ⊙ HENTZMAN UNIT 1H
- ⊙ HENTZMAN UNIT 2H
- ⊙ HENTZMAN UNIT 3H
- ⊙ BEEM UNIT 1H
- ⊙ BEEM UNIT 2H
- ⊙ BEEM UNIT 3H
- ⊙ SPOCK UNIT 1H
- ⊙ SPOCK UNIT 2H
- ⊙ SPOCK UNIT 3H

NAVITUS
ENERGY ENGINEERING

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DATE	REVISION
10/20/2015	REVISED PER STREAMS & WETLANDS
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04/14/2016	REVISED PER CONSTRUCTION
01/08/2017	REVISED PER CONSTRUCTION
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03/15/2017	REVISION PER WDEP COMMENTS



THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

WELL PAD & WATER CONTAINMENT PAD PLAN

PYLE RUN

WELL PAD & WATER CONTAINMENT PAD

CENTREVILLE DISTRICT
TYLER COUNTY, WEST VIRGINIA

APPROVED
WDEP OOG

3/17/2017

- NOTES:**
- ALL PIPELINE RE-ROUTES, CONNECTIONS, VALVES, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE OPERATOR (SANCHO OIL & GAS CORPORATION) STANDARDS AND GUIDELINES. IT IS REQUIRED THAT A REPRESENTATIVE FROM THE OPERATOR (SANCHO OIL & GAS CORPORATION) BE PRESENT WHEN THE LINES ARE CONNECTED AND THE INACTIVE WELL(S) ARE MADE ACTIVE.
 - TOTAL PROPOSED PIPELINE RELOCATION FOR (SANCHO OIL & GAS CORPORATION) IS 11,367 LF.
 - TOTAL PROPOSED PIPELINE RELOCATION FOR (BEARSVILLE TRANSMISSION) IS 1566 LF.
 - TOTAL PROPOSED PIPELINE RELOCATION FOR (SANCHO OIL & GAS CORPORATION) IS 1551 LF.
 - TOTAL PROPOSED FIBEROPTIC LINE RELOCATION FOR (FRONTIER) IS 1608 LF.



DATE: 02/19/2015
SCALE: 1" = 50'
SHEET 10 OF 25



EX. GAS WELL
API #40-098-007660
(GLENN L. HAUGHT & SONS)
NEVER DRILLED

MATCHLINE "A"
SEE SHEET 9