



west virginia department of environmental protection

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

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

Monday, December 3, 2018
WELL WORK PERMIT
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit approval for AVALANCHE UNIT 2H
47-095-02525-00-00

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: AVALANCHE UNIT 2H
Farm Name: LLOYD TALKINGTON
U.S. WELL NUMBER: 47-095-02525-00-00
Horizontal 6A New Drill
Date Issued: 12/3/2018

Promoting a healthy environment.

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

1) Well Operator: Antero Resources Corporation 494507062 Tyler McElroy Shirley 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Avalanche Unit 2H Well Pad Name: Colorado Pad

3) Farm Name/Surface Owner: Lloyd Talkington Public Road Access: CR 23

4) Elevation, current ground: 751' Elevation, proposed post-construction: 743'

5) Well Type (a) Gas X Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow X Deep _____

Horizontal X

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6900' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2950#

8) Proposed Total Vertical Depth: 6900' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19400' MD^d

11) Proposed Horizontal Leg Length: 11348'

12) Approximate Fresh Water Strata Depths: 235', 241', 298'

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

14) Approximate Saltwater Depths: 970'

15) Approximate Coal Seam Depths: None Identified

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

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

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

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18)

CASING AND TUBING PROGRAM

TYPE	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	348	348	CTS, 483 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19400	19400	CTS, 4927 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

*DAH
7-30-18*

*QJB
7/30/2018*

TYPE	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	1000	Class A	~1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	~1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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

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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 fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

DH
7-30-18
JEB
7/30/2018

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 18.24 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.67 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.

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*Note: Attach additional sheets as needed.

AVALANCHE UNIT 2H (COLORADO PAD) - AREA OF REVIEW 35-8-5.11
PAGE 2

UWI (API Num)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Productible Formation(s) not perf'd
47095014220000	SANDY WILLIAM	9	CONSOL GAS COMPANY	STONEWALL GAS	5,150	4540 - 4988	Riley, Benson	Weir, Fifth, Warren, Alexander
47095013590000	SANDY WILLIAM	1	CONSOL GAS COMPANY	STONEWALL GAS	5,000	1760 - 4805	Benson	Weir, Fifth, Warren, Alexander
47017065340000	BRADFORD UNIT	1H	ANTERO RESOURCES CORPORATION		14,161	7501 - 14041	Marcellus	

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OCT 10 2018

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Environmental Protection



Avalanche Unit 2H

47095014220000



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47095013590000

47017065340000



Antero Resources Corporation

Avalanche Unit 2H - AOR



WELL SYMBOLS
Gas Well

July 16, 2018

WW-9
(4/16)

API Number 47 - 095 - _____
Operator's Well No. Avalanche 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) McElroy Creek Quadrangle Shirley 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 binned 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)

*Drill
7-30-18 JEP 7/30/2018*

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

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc.

Surface - Air/Freshwater, Intermediate - Dust/Silt Foam, Production - Water Based Mud

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

Additives to be used in drilling medium? Please See Attachment

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

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

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

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

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

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

Company Official Signature *Gretchen Kohler*
Company Official (Typed Name) Gretchen Kohler
Company Official Title Senior Environmental & Regulatory Manager

AUG 2 2018

Office of Oil and Gas
WV Dept. of Environmental Protection

Subscribed and sworn before me this 20th day of JULY, 2018

[Signature]

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

My commission expires MARCH 13, 2022

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Antero Resources Corporation

Proposed Revegetation Treatment: Acres Disturbed 18.24 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" (0.62 acres) + Access Road "B" (0.12 acres) + Access Road "C" (0.16 acres) + Access Road "D" (0.08 acres) + County Route 60 upgrade (1.17 acres) + Staging Area (1.27 acres) + Well Pad (4.67 acres) + Water Containment Pad (4.97 acres) + Excess/Topsoil Material Stockpiles (5.18 acres) = 18.24 Total Affected Acres

Temporary

Permanent

Seed Type	lbs/acre
Annual Ryegrass	40
Field Bromegrass	40

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

See attached Table IV-3 for additional seed type (Page 20 Colorado East Pad Design)

See attached Table IV-4A for additional seed type (Page 20 Colorado East Pad Design)

*or type of grass seed requested by surface owner

*or type of grass seed requested by surface owner

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [Signature]

Comments: _____

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Office of Oil and Gas
WV Dept. of Environmental Protection

Title: Oil & Gas Inspector Date: 7/30/2018

Field Reviewed? Yes No

Form WW-9 Additives Attachment

SURFACE INTERVAL

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

INTERMEDIATE INTERVAL

STIFF FOAM RECIPE:

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

PRODUCTION INTERVAL

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

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

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911 Address
61 Pratts Run Road, Alma
WV 26320

Well Site Safety Plan

Antero Resources

Well Name: Avalanche Unit 1H-3H, Mammoth Unit 1H-3H & Stampede Unit 1H-2H

Pad Location: COLORADO EAST PAD
Tyler County/McElroy District

GPS Coordinates:

Entrance - Lat 39°40'38.04"/Long -80°78'79.87" (NAD83)

Pad Center - Lat 39°40'29.33"/Long -80°78'79.61" (NAD83)

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Office of Oil and Gas
WV Dept. of Environmental Protection

Driving Directions:

From the intersection of HWY 50 & WV-18 N: Head west on WV-18 N for 0.6 miles - turn right onto Davis St./Smithton Rd. - continue to follow Smithton Rd. for 1.0 miles - turn left onto Rock Run Rd. for 5.3 miles - turn left onto Big Flint Rd. for 4.2 miles - turn left onto Pratts Run - access road will be on the left.

Alternate Route:

From Centerville, WV: Head south on Klondike Ridge for 0.2 miles - turn left onto WV-18 N for 0.6 miles - turn right onto WV-23 W/McElroy Creek Rd. for 4.3 miles - turn right onto Pratts Run - access road will be on the left.

Dmt
7/30/18

JOB
7/30/2018

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



911 Address
61 Pratts Run Road, Alma
WV 26320

Well Site Safety Plan

Antero Resources

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



WELL SITE SAFETY PLAN

Owner:	Health and Safety Director	Document ID:	HS-Well Site Safety Plan-C-V1.0
Revision No.:	V2.0	Date of last revision:	November 9, 2016
Revision Status:	Draft		

Approval Sheet

The West Virginia Department of Environmental Protection Office of Oil and Gas has set forth minimum requirements for a Well Site Safety Plan which shall be submitted with each horizontal well application. A horizontal well shall be any well which meets the definition as provided for in Title 35, Series 8, Section 2.2 of the West Virginia Department of Environmental Protection Office of Oil and Gas.

Approved Safety Plans should be maintained and available at the drilling rig at all times and provided to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land.

The Safety Plan, once approved, may only be modified upon approval by the West Virginia Department of Environmental Protection Office of Oil and Gas ("Office").

This plan has met the requirements of the West Virginia Department of Environmental Protection Office of Oil and Gas Well Site Safety Plan Standards.

Approved this day _____ of month _____, 20__ by

_____ Date: _____

Plan Modification*

Revision No.	Description of Revision	Antero Preparer	Antero Reviewer/Approver	Agency Approval	Date

*The Office of Oil and Gas must approve all changes and modifications to previously approved plans.

WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS	PAGE NUMBERS
1. Contacts, Schedules, and Meetings	PG. 7-18
A. Method of notification of public of H2S gas presence and how access will be controlled.	PG 7-8
B. Emergency point of contact for the well operator covering all phases of activities and including 24 hour contact information	<u>Supplement A</u> PG. 9
C. List of telephone numbers for: <ul style="list-style-type: none"> • Operator • Contractors • DEP office and oil/gas inspector • Local Emergency Response Units • Local ER personnel 	<u>Supplement A</u> PG. 9-13
• All schools and public facilities within a one mile radius of proposed well site	<u>PG 14</u> <u>Exhibit 3</u>
D. Pre-spud meeting held prior to drilling operations, including: <ul style="list-style-type: none"> • Personnel to be employed and involved in the drilling operations • County oil and gas inspector or other designated Office of Oil and Gas representative • List of all persons involved in pre-spud meeting 	PG. 15
E. Describe schedule for conducting regular well site safety meetings. Log all attendance at all meeting and also initiate check in check out during drilling, completion, and work over phases.	<u>Supplement B & C</u> PG. 16-17
2. Maps and Diagrams	PG. 18-23
A. Evacuation plan for the removal of personnel from the drilling location and residents in the surrounding area should the need arise	PG. 18
B. Plan view map of location, access road, pit(s), flare lines, nearby dwellings, note the north and prevailing wind direction	PG. 19-21 <u>Exhibit 1</u>
C. Topographic Map of well location including: <ul style="list-style-type: none"> • 1 mile radius of well location • UTM NAD 83 Coordinates of well site entrance • UTM NAD 83 coordinate of the point the access road intersects the public route • Identify public route number and/or route name 	PG. 22-23 <u>Exhibit 2</u>
3. Well Work	PG. 24-28
A. Detailed written descriptions of well work and procedure to be used during the drilling, completion and production phases, including schematic plan views of each	PG. 24-27 <u>EXHIBITS 4 & 5</u>
B. Statement detailing how a copy of the plan will be provided to the local emergency planning committee or county emergency services within at least 7 days from land disturbance or well work.	<u>PG. 27-28</u>

WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS	PAGE NUMBERS
4. Chemical Inventory & SDS	PG. 29-31
A. Safety Data Sheets for all chemicals anticipated to be used in all aspects of the operation (can be provided on CD or USB drive)	PROVIDED ON CD
B. Statement that all SDS are to be readily available at the well site and their location indicated in the site safety plan including contact information for person(s) responsible maintaining them on site.	PG. 29
C. Inventory of all materials on site for mixing of mud including numbers and type of mixing units—mixed mud amount and weight, amount of weighting material and volume of mixing fluid	<u>Supplement D</u> PG. 30-31
5. BOP Requirements and Well Control	PG. 32-38
A. BOP equipment and casing heads with types, sizes and rating to be utilized and available during the drilling for both intermediate and lateral drilling phases	PG. 32-34
B. Procedure and schedule for testing the BOP stack for intermediate drilling phase the BOP tested upon initial set up and the annular tested to 70% of capacity and the ram preventers tested to 80%. Same testing % for the bottom and horizontal phase except testing to be done upon initial installation, weekly and after each bit trip.	PG. 36
C. BOP equipment and assembly installation schedule	PG. 36
D. List and names of all personnel with well control training	PG. 37
E. Description of system of maintaining detailed records of and for immediate notification to OOG inspector for all significant drilling issues, including but not limited to: <ul style="list-style-type: none"> • Lost circulation • Hydrogen sulfide gas • Fluid entry • Abnormal pressures 	PG. 37-38
F. Notification of the oil and gas inspector or designated representative as soon as possible of any unusual drilling events, hydrogen sulfide gas or large kicks that occur during drilling	PG. 38
G. Schematic and detailed written description of the well head assembly to be placed on the well upon completion	PG. 38
6. Well Killing Operations	PG. 39-40
A. Method and type of kill procedures	PG. 39-40
7. Hydrogen Sulfide Operations (H2S)	PG. 41-42
A. Detection, monitoring and warning equipment including location of the monitoring detection equipment on the site	PG. 41
B. Statement of H2S personnel training provided	PG. 41
C. List of personal protective equipment (PPE) and the amount of each piece of PPE that will be maintained and available on site.	PG. 41

WVDEP OOG Site Safety Plan-- TABLE OF CONTENTS	PAGE NUMBERS
D. Method to notify the OOG of H2S presence	PG. 41
E. Establish and maintain Protection Zones. Describe detailed written general procedures proposed in drilling phases.	PG. 42
8. Well Flaring Operations	PG. 43
A. Proposed written description and plan including schematic of installation for the duration of flaring activities.	PG. 43
9. Collision Avoidance Safeguards, Practices and Standards Plan	PG. 44-51
A. Established Definitions	PG. 44
B. Established descriptions of Risk	PG. 44
C. Plan Components	PG. 45-49 EXHIBITS 6 & 7

Site Specific Safety Plan

Antero Resources

1.0 Contacts, Schedules and Meetings

1.1 Emergency Response Personnel

Requesting public emergency response assistance for this location would be accomplished by the Antero Representative via telephone to Local County Dispatch. From there, they will dispatch the appropriate and available emergency response agencies depending on the nature, location and extent of the emergency. Upon approval, Antero encourages anyone on the site to summon outside assistance as they deem necessary based on the emergency.

A list of Emergency Contacts, including Antero's 24 hour emergency contact telephone number, any contractors of the operator, the Department, the local oil and gas inspector, and local emergency response units are found in Supplement A. This list will be posted at the well site.

1.2 Local Schools and Public Facilities

In the event of an emergency requiring the evacuation of schools and public facilities the Antero Representative will make the required notifications unless the local public emergency responders take on this responsibility. Generally, local emergency responders have stated that they will assume this responsibility. Exhibit 3 lists all schools and public facilities, with their contact information, within a one-mile radius of the horizontal well location.

1.3 Method of Notification of Public

In an emergency which requires the notification of residents and emergency personnel that may be affected during drilling such as release of H₂S, flaring, etc., the emergency response plan will be immediately implemented. This plan specifies the roles and responsibilities of on-site personnel in case of emergency and addresses emergency notification of potentially affected residents and public emergency response personnel.

In general under the situation presently described, after the activation of the emergency alarm, the on-site personnel will muster for a headcount by the On-Scene Incident Commander which is usually the Antero Representative. After initial assessment of the situation, the OSIC will notify the public emergency response agency from which direction will be taken. If the agency directs, on-site personnel will notify all local impacted residents of the incident by dispatching a worker by truck to each potentially affected residence. If the public emergency responder does not direct this notification to be made by the operator, then the public response agency will be

responsible for this notification. The local emergency responders have, in general, stated that emergency notification of local residents will be accomplished by their means including television and radio announcement as well as public address systems on patrol vehicles. Antero safety representatives who are located in the field may assist with the notification of local residents.

1.4 Established Protection Zones

Protection zones will be established and maintained based on the nature, extent and severity of the event. These protection zones will be based on those safe distances outlined in the applicable portions of the DOT Emergency Response Guidebook.

SUPPLEMENT A

EMERGENCY CONTACT LIST AND PHONE NUMBERS

Contact	Phone Number
Designated Person and Incident Commander:	
Joe Honeycutt – Drilling Manager Production Control Room Robert Krcek – Director of Midstream Operations Jon McEvers – Operations Manager	740-624-3873 Joe 304-842-4810 Control Room 304-641-1544 Robert 303-808-2423 Jon
Antero Resources Emergency (24 Hour) Contact	1.800.878.1373
Designated Backup Person Response Coordinator:	
Ben Lofthouse Steve Durment	304-960-0043 361-318-3235
Drilling Engineers	
Jola Switter Chad Daves Jonah Fryman	740-629-7279 304-871-1442 740-656-6397
Drilling Rigs	
Hall 3 Patterson 342 Patterson 343 Precision 525	713-758-0881 832-408-8282 832-531-7355 713-758-0730
Antero Resources Denver Office 1615 Wynkoop Street Denver, CO 80202	Office: 303.357.7310 Fax: 303.357.7315
Senior Environmental Manager	
Donald Gray	Direct: 303.357.6730 Cell: 303.408.9630 24hr
Health & Safety Director	
Ronnie Roberts	Direct: 303.357.7174 Cell: 720.990.4399 24hr
Emergency Response Coordinator – WV	
Eli Waggoner	Direct: 304-842-4068 Cell: 304-476-9770

Contact	Phone Number
Senior Vice President Production Kevin Kilstrom	Direct: 303.357.7335 Cell: 303.808.0254 24hr
Regional Senior Vice President Al Schopp	Direct: 303.357.7325 Cell: 303.809.5522
Vice President Health Safety & Environment Troy Roach	Direct: 303.357.7261 Cell: 713.449.5522
Federal and State Agencies	
National Response Center	(800) 424-8802
West Virginia Office of Water Resources' Emergency Notification Number, Oil Spill Response	1.800.642.3074
West Virginia Office of Oil and Gas Sam Ward, WVDEP – Harrison County Justin Snyder, WVDEP Inspector – Tyler County Mike Goff, WVDEP Inspector – Ritchie County Daniel Flack, WVDEP Inspector – Doddridge County	304.389.7583 cell Sam Ward 681.313.6995 cell Justin Snyder 304.549.9823 cell Mike Goff 304.545.0109 cell Daniel Flack
Environmental Protection Agency (EPA) Region 3	Phone: 215.814.3231 Fax: 215.814.3163
West Virginia Worker's Compensation	1-888-4WVCOMP 1.304.926.3400
West Virginia Fish and Wildlife Service, Field Office, Elkins, WV	Phone: 304.636.6586 Fax: 304.636.7824
US OSHA Charles Green	1-800-321-OSHA (1.800.321.6742) 304.347.5937
Local Agencies and Responders	
Sheriff/Police/Fire Department	911
Hospital- United Hospital Center--Clarksburg	304.624.2121
Harrison County Emergency and Dispatch Business Office	911 304.623.6559
Harrison County LEPC	304.624.9700 John Keeling

Contact	Phone Number
Doddridge County Emergency and Dispatch Business Office	911 304.873.3253
Doddridge County LEPC	304.782.2124 Roland W. Kniceley
Ritchie County Emergency and Dispatch Business Office	911 304.659.3770
Ritchie County LEPC	304.869.3231 Bill Bayless
Tyler County Emergency and Dispatch Business Office	911 or 304.758.2911 304.758.4275
Tyler County LEPC	304.652.6932 Pat Walsh
WV Highway Patrol	304.782.2124 doddridgeoes@dishmail.net
Public Water Intakes (see Water Management Plan for add'l points)	to be determined
Waste Removal	
Stallion	330.760.4248
Waste Management	
Contractors	
Hall Drilling Services MT Hall	304.588.3368
Cleanup Crews	
Ryan Environmental	304.641.0244
Water Haulers	
Hall Drilling	304.483.8125
Frac Tank Suppliers	
Stallion	330.760.4248

Contact	Phone Number
Water Moving/Pumping	
TK Stanley	304.476.0396
Pumping Services—Kill Fluids	
Halliburton—Jane Lew	724.743.6601 Central Dispatch
Light Plants	254.434.1469 Hot Lights- Josh
Wolfpack	304.623.1199
BOPs	
Snubbing Services	Basic Energy- 724.825.2548 Bryan Berlison
Cudd Well Control	713.849.2769 Houston
Wild Well Control	281.353.5481
Roustabout Crews	740.473.1305 Hall Drilling Office 304.588.6474 Hall Drilling- Jack

WV Emergency Reporting

In the event of a hazardous waste or hazardous material release or emergency, please contact:
1-800-642-3074.

Additional Contact Information

1-800-424-8802 National Response Center

1-304-558-5938 DEP Elkview Emergency Response Unit

Email Contacts:

Mike Dorsey Mike.H.Dorsey@wv.gov

Rusty Joins Rusty.T.Joins@wv.gov

WHERE TO FIND HELP

Tyler County:

Ambulance, Fire, Law Enforcement Emergencies Call 911
Poison Control Center....1-304-388-4211 or 1-800-222-1222
Emergency Alert System Radio WFBY-FM 106.5

FIRE:	
Tyler County Dispatch Center	304-758-4275
Tyler County Office of Emergency Service	304-758-5155
EMS:	
Ritchie County Ambulance Authority	304-643-2369
Ritchie County Office of Emergency Services	304-659-3334
LAW ENFORCEMENT:	
WV State Police, Paden City	304-455-0913
Tyler County Sheriff	304-758-4229
OTHER IMPORTANT NUMBERS:	
W.V. Dept. of Health & Human Resources	304-627-2295
National Response Center (Chemical, Oil Spills & Chemical/Biological Terrorism) (State Emergency Spill Notification)	1-800-424-8802
Allegheny Power	1-800-255-3443
WV State Fire Marshal (Arson Hotline)	304-588-2191 1-800-233-3473
Dominion Hope Gas	1-800-688-4673

**MEREDITH PAD - EXHIBIT 3
LIST OF ALL SCHOOLS & PUBLIC FACILITIES WITHIN A
ONE- MILE RADIUS OF PROPOSED WELL SITE**

Facility Name	Telephone Number
None identified within a 1-mile radius	

1.5 Safety Meeting

Safety meetings will be conducted as follows:

- Pre-Drilling,
- Pre-Completion,
- Pre-Workover
- Post Accident/Near Miss, and
- As-Needed.

Safety meetings should be held on-site weekly, at a minimum, prior to the beginning of operations, and:

- Includes personnel employed and involved in the operations, and
- Includes the District Oil and Gas Inspector (or other designated Office of Oil and Gas representative, for the pre-spud meeting only).

Typically, contractor of the operator will conduct these safety meetings with Antero Resources personnel participating as needed. Please list the above personnel as a record of attendance using the form found in Supplement B, or one similar. These records may be maintained separate from this plan.

1.6 Personnel and Visitor Log

This log is intended to provide a current headcount of all persons present at the site at any given time. All personnel and visitors must sign in upon entering the site and sign out upon departure. This log, or one similar, is provided in Supplement C and will be maintained at all times by the Antero Representative or his designate.

SUPPLEMENT B

Safety Meeting Log, Personnel and Visitor Log & Emergency Contacts

Safety Meeting Log

Date: _____ Location(Pad): _____ Well Name: _____

	<u>Name</u>	<u>Organization</u>	<u>Job Title</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____
11.	_____	_____	_____
12.	_____	_____	_____
13.	_____	_____	_____
14.	_____	_____	_____
15.	_____	_____	_____
16.	_____	_____	_____
18.	_____	_____	_____
19.	_____	_____	_____
20.	_____	_____	_____
21.	_____	_____	_____
22.	_____	_____	_____
23.	_____	_____	_____
24.	_____	_____	_____
25.	_____	_____	_____

SUPPLEMENT C

Daily Personnel and Visitor Log

DATE	TIME IN	TIME OUT	NAME	ORGANIZATION

Site Specific Safety Plan

Antero Resources

2.0 Maps and Diagrams

2.1 Plan View Map

Exhibit 1 provides a plan view map showing the well location, access road, pits, flare lines, dwellings, and noting the north and prevailing wind directions.

2.2 Topographic Map

Exhibit 2 shown on also provides an area topographical map showing the well site location

2.3 Evacuation Plan

The Antero Representative will establish a muster point at which all persons on site will assemble for personnel safety and verification of headcount. This point will be located at the entrance to the site. Alternative muster points may be established based on the hazards and operational needs.

In the event of an emergency requiring the evacuation of personnel, an audible or visual alarm will be sounded. The Antero Representative will determine if local residents should be evacuated at this time depending on the outcome of his assessment of the situation.

If local resident evacuation is indicated, the Antero Representative will be responsible for notifying the local impacted residents, or the local authorities will take this responsibility depending on the urgency, availability and direction of the local authorities. Local authorities have indicated that they will take this responsibility typically and will notify of evacuation mandates via television and radio media announcements in addition to public address units on patrol vehicles. In the event that Antero is directed to take this responsibility, notification will be by dispatching a worker to each affected residence to inform them of evacuation requirements and procedures. See section 8.1 for additional information.

Evacuated local residents may be temporarily housed in local hotels depending on the severity and duration of the emergency. Included in Exhibits 1 & 2 are maps and drawings that may assist in the emergency response and evacuation process.

The Antero Representative will secure the Personnel and Visitor log before evacuating the site in order to perform a headcount at the muster point.

DATE	REVISION



WELL PAD & WATER CONTAINMENT PAD PLAN
 COLORADO EAST
 McELROY DISTRICT
 TYLER COUNTY, WEST VIRGINIA

GA CONSULTANTS, INC.
 RETAIL DISTRIBUTION
 DATE: 06/09/2018
 SHEET 7 OF 21
 SCALE: 1" = 50'
 04/27/2018

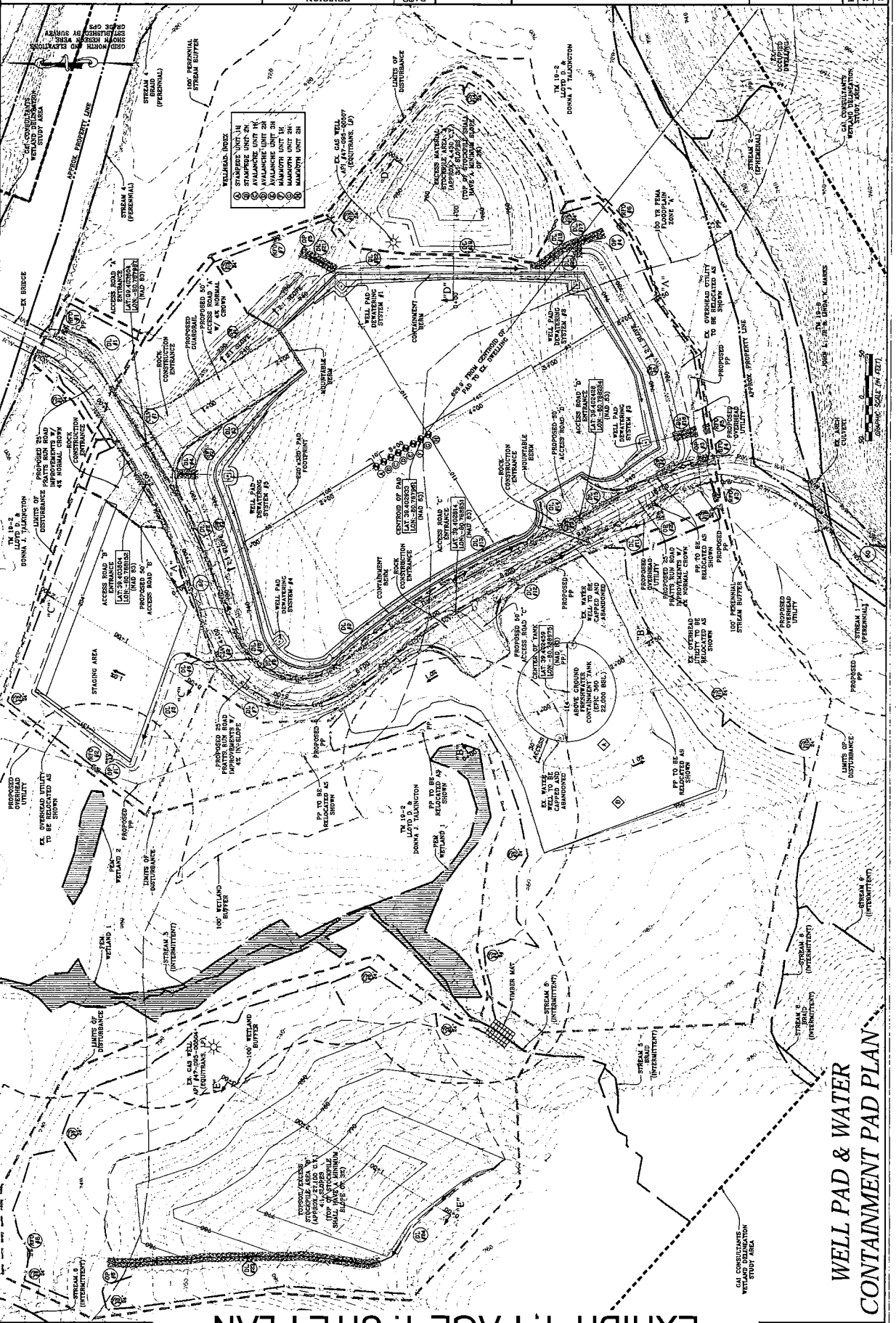
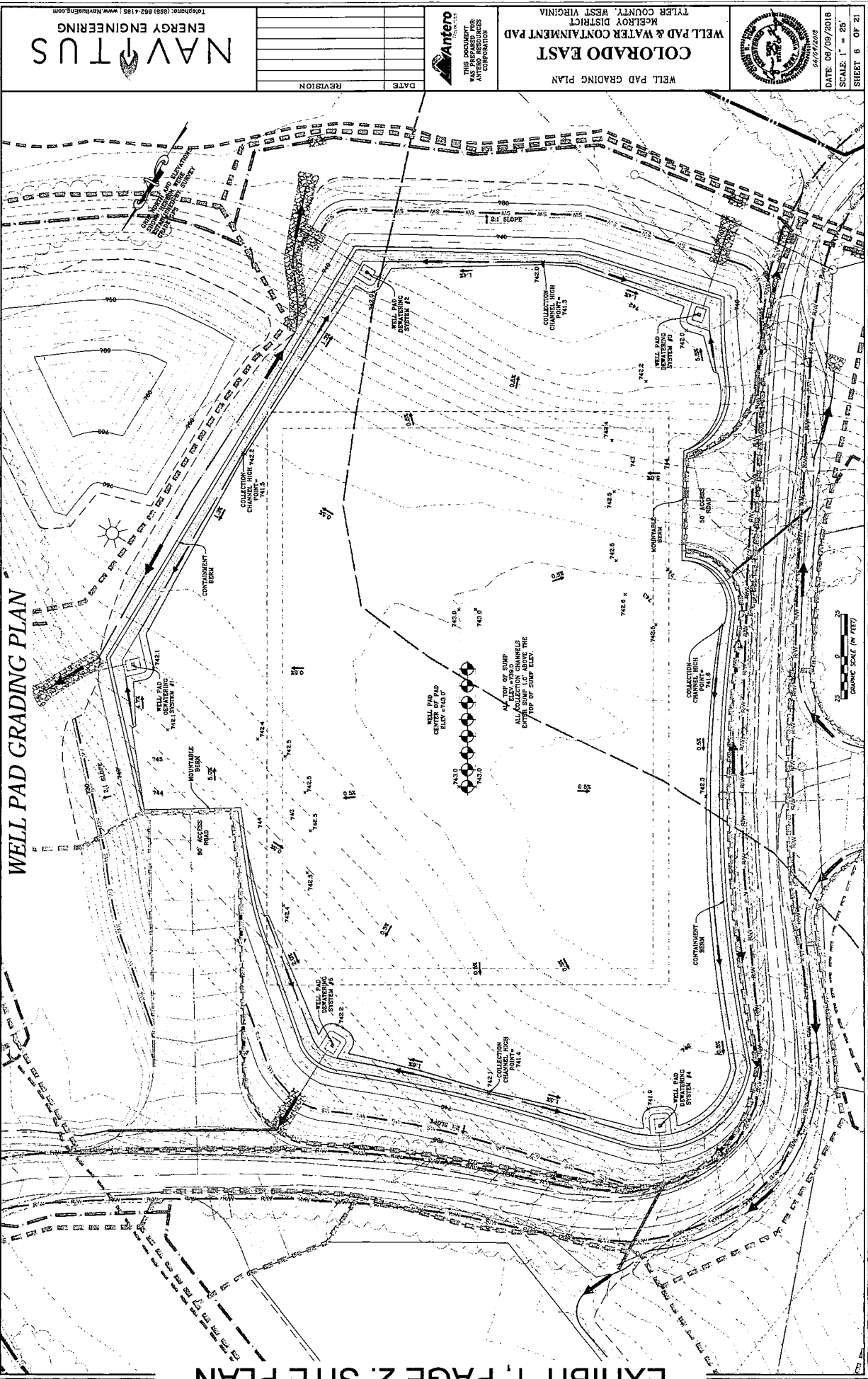


EXHIBIT 1, PAGE 1: SITE PLAN

WELL PAD & WATER CONTAINMENT PAD PLAN



WELL PAD GRADING PLAN

EXHIBIT 1, PAGE 2: SITE PLAN

NAVITUS
ENERGY ENGINEERING

Telephone: (809) 602-1185 | www.NavitusEng.com

REVISION	DATE



WELL PAD GRADING PLAN
COLORADO EAST
MCLEOD DISTRICT
TYLER COUNTY, WEST VIRGINIA



DATE: 09/09/2018
09/07/2009
SCALE: 1" = 20'
SHEET 6 OF 21

PREVAILING WIND DIRECTION NNE



NORTH

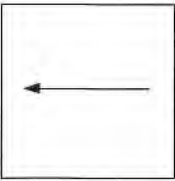
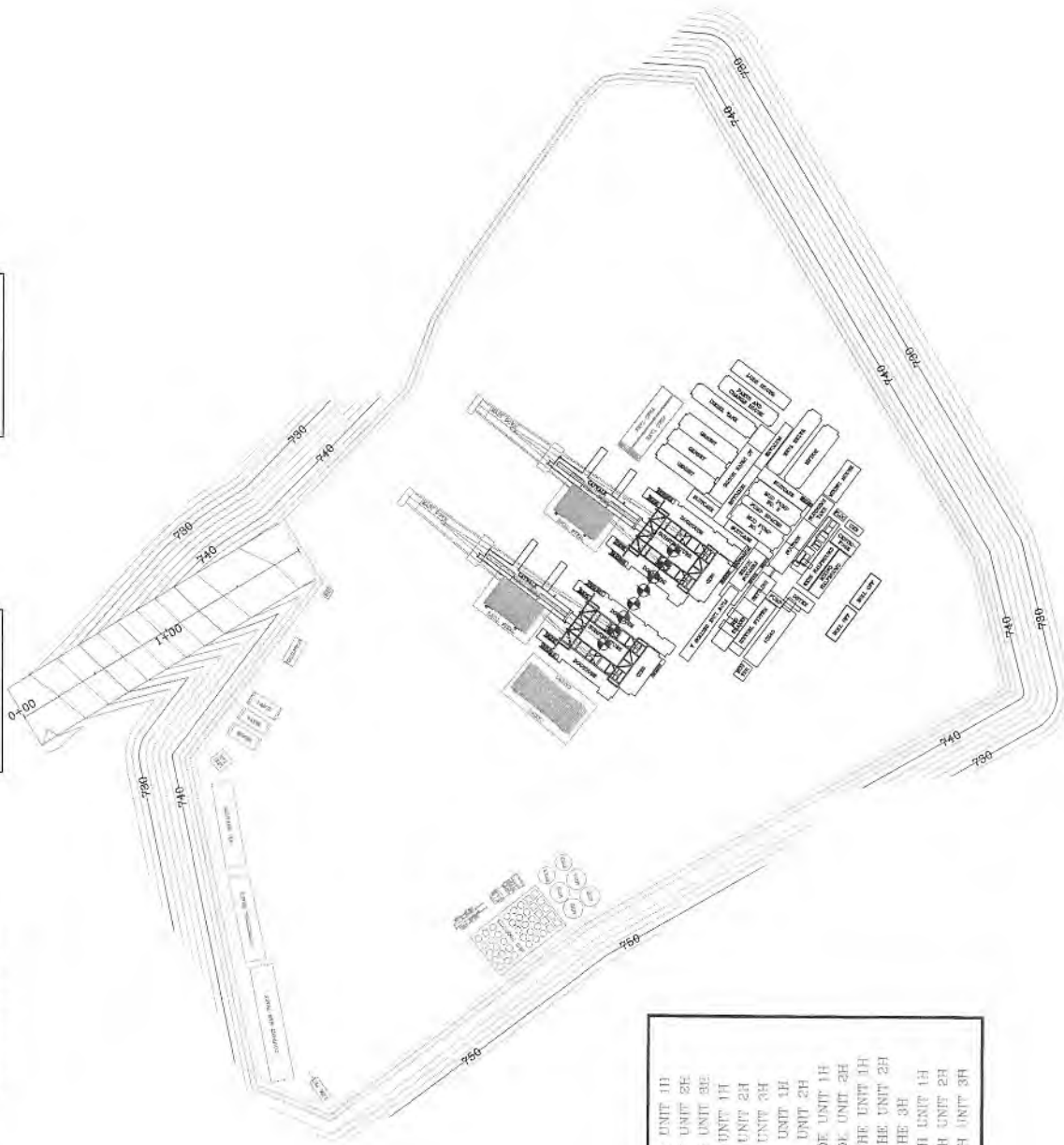
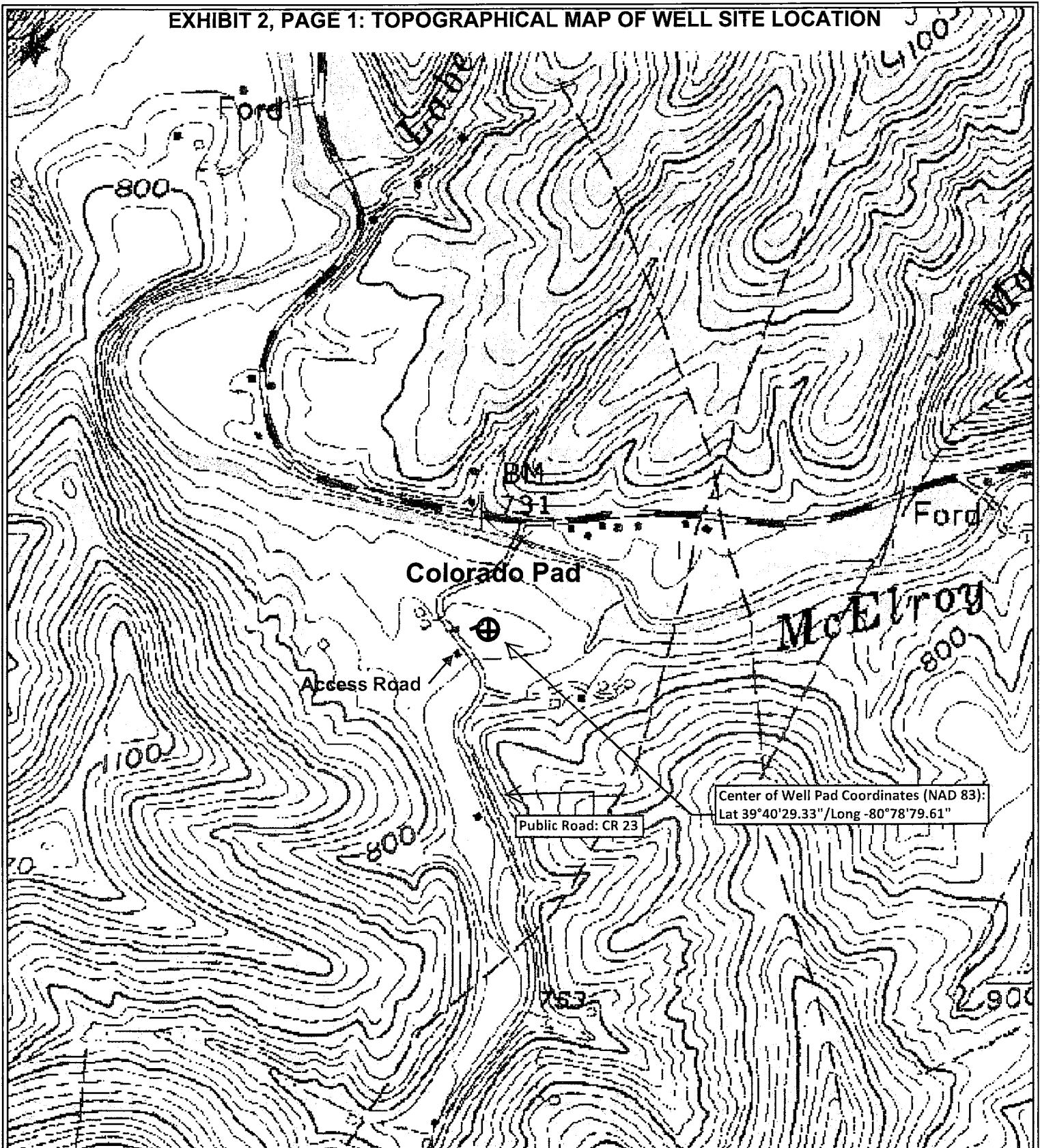


EXHIBIT 1

COLORADO EAST PAD



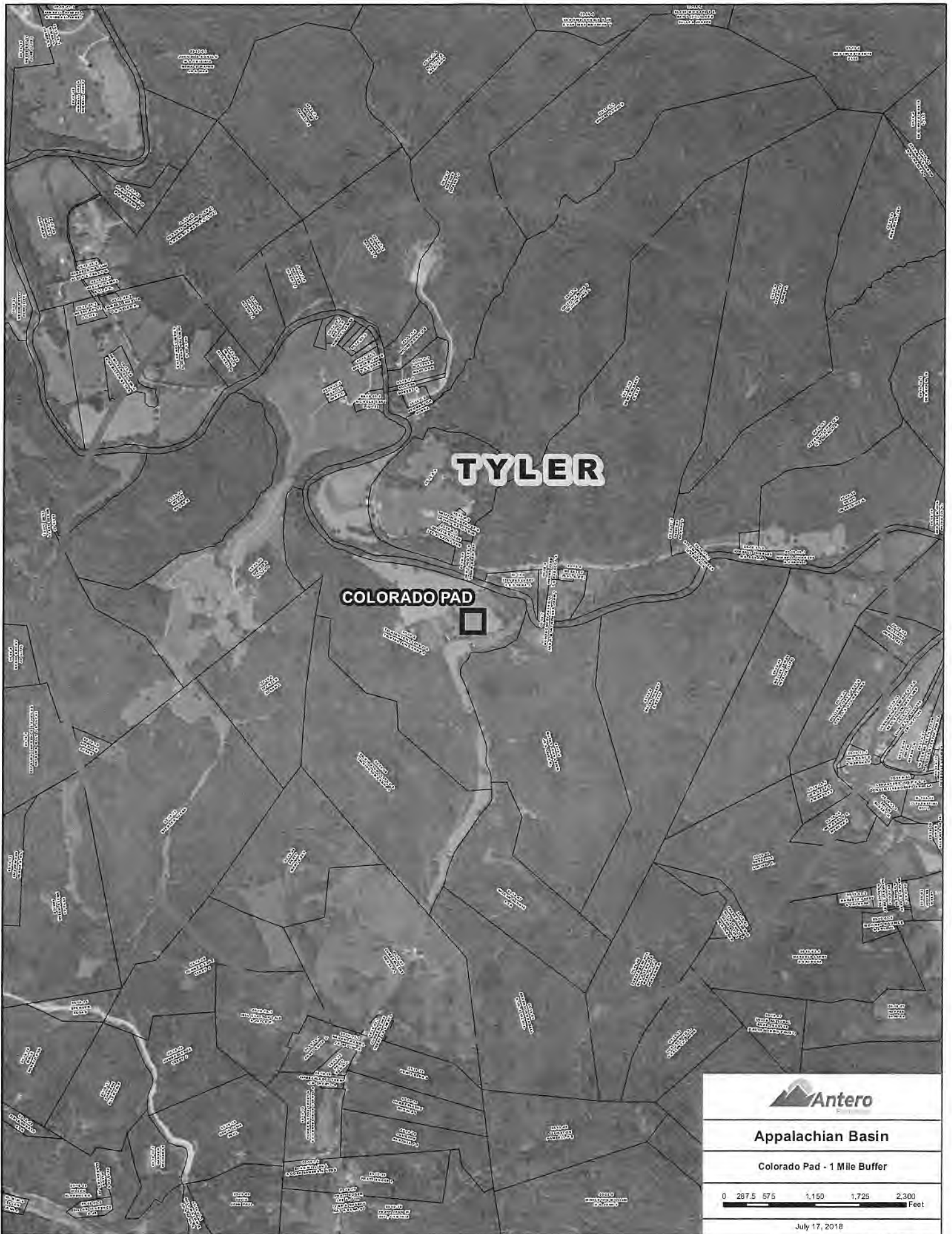
- | | |
|-----|-------------------|
| (A) | ROCKIES UNIT 1D |
| (B) | ROCKIES UNIT 2E |
| (C) | ROCKIES UNIT 3E |
| (D) | FLAMES UNIT 1H |
| (E) | FLAMES UNIT 2H |
| (F) | FLAMES UNIT 3H |
| (G) | BRONCO UNIT 1H |
| (H) | BRONCO UNIT 2H |
| (I) | STAMPEDE UNIT 1H |
| (J) | STAMPEDE UNIT 2H |
| (K) | AVALANCHE UNIT 1H |
| (L) | AVALANCHE UNIT 2H |
| (M) | AVALANCHE 3H |
| (N) | MAMMOTH UNIT 1H |
| (O) | MAMMOTH UNIT 2H |
| (P) | MAMMOTH UNIT 3H |



Center of Well Pad Coordinates (NAD 83):
Lat 39°40'29.33"/Long -80°78'79.61"

Antero Resources Corporation
Appalachian Basin
Avalanche Unit
Tyler County

Quadrangle: Shirley
Watershed: McElroy Creek
District: McElroy
Date: 7-16-2018
07/20/18



Site Specific Safety Plan

Antero Resources

3.0 Well Work

3.1 Written Description of Well Work and Schematic

Antero plans to drill, perforate, fracture multiple horizontal shallow wells and complete the Marcellus Shale. A schematic plan view is attached to this plan in Exhibit 5.

3.2 Geologic Prognosis

A list of anticipated freshwater, saltwater, oil and gas, hydrogen sulfide, thief zones, and high pressure and high volume zones, including their expected depth are attached to this plan in Exhibit 4, WW-6B.

3.3 Casing and Cementing Program

Exhibit 4 shows the detailed casing and cementing program, which meets the standards of the American Petroleum Institute (API) and employs a minimum of three strings of casing which are of sufficient weight, quantity and quality for the anticipated conditions to be encountered. This casing and cementing program is designed to maintain well control and integrity. The casing setting depths are sufficient to cover and seal off those zones as identified in Exhibit 4.

3.4 Plan Provided to Local or County Emergency Services

Approved Safety Plans should be maintained and available at the drilling rig at all times and provided to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land.

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

1) Well Operator: Antero Resources Corporation 494507062 Tyler McElroy Shirley 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Avalanche Unit 2H Well Pad Name: Colorado Pad

3) Farm Name/Surface Owner: Lloyd Talkington Public Road Access: CR 23

4) Elevation, current ground: 751' Elevation, proposed post-construction: 743'

5) Well Type (a) Gas X Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow X Deep _____

Horizontal X

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 6900' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2950#

8) Proposed Total Vertical Depth: 6900' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19400' MD

11) Proposed Horizontal Leg Length: 11348'

12) Approximate Fresh Water Strata Depths: 235', 241', 298'

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

14) Approximate Saltwater Depths: 970'

15) Approximate Coal Seam Depths: None Identified

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

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

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

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	54.5#	348	348	CTS, 483 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19400	19400	CTS, 4927 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	1000	Class A	~1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	~1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.415"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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

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

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

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

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

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

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

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 18.24 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.67 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:

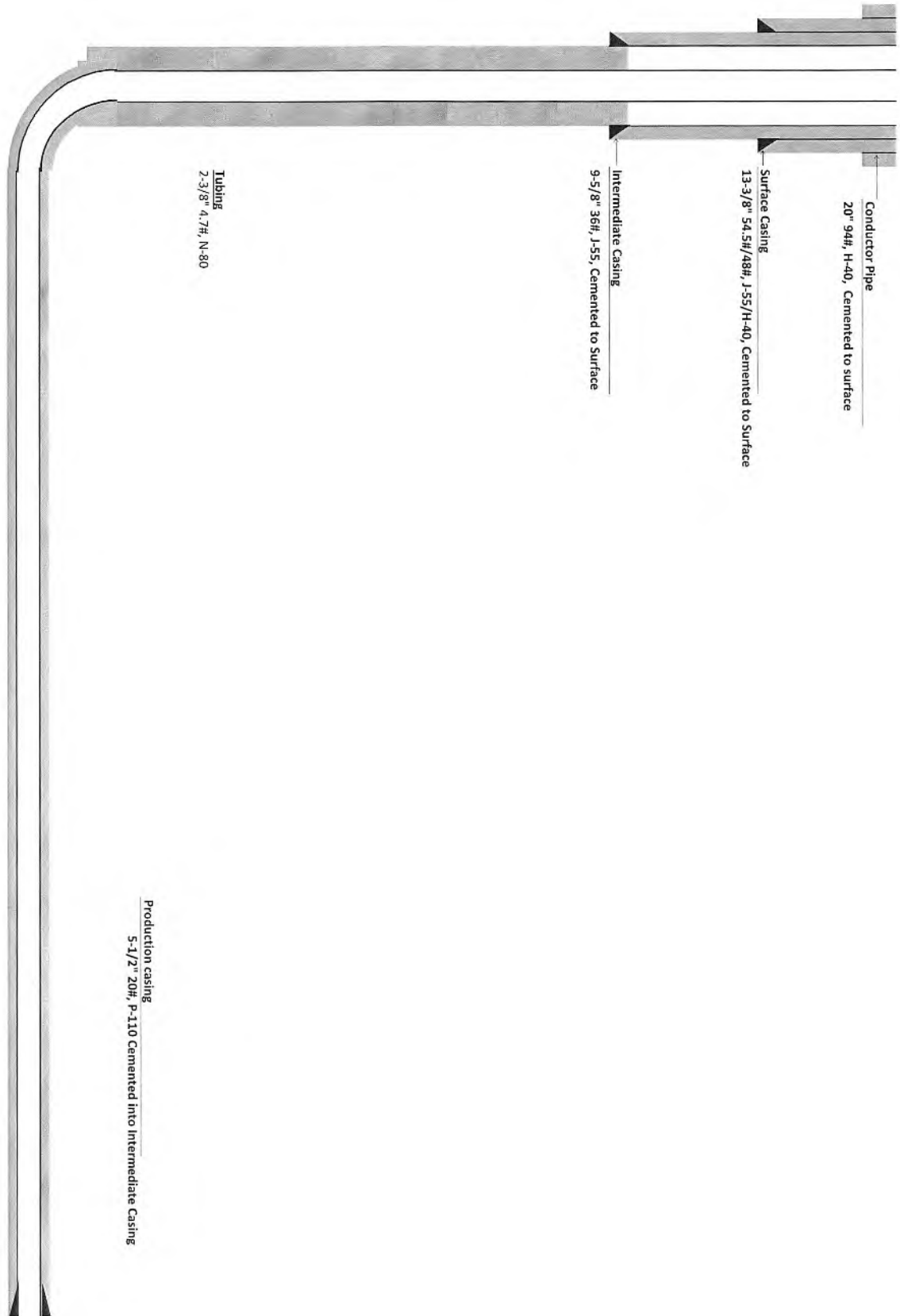
Conductor: no additives, Class A cement.
Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51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

EXHIBIT 5: WELLBORE SCHEMATIC



Site Specific Safety Plan

Antero Resources

4.0 Chemical Inventory & SDS

4.1 Safety Data Sheets

The Drilling Supervisor or Contractor of the Operator will maintain Data Safety Sheets (SDS) for all materials and chemicals used on the well site. The SDS sheets should be located in the Company Representatives Office on-site. Copies of the SDS sheets may also be obtained from the area Safety Representative, the operator contact for maintaining SDSs, by calling the local Antero Resource Office at 304-842-4100 for West Virginia or 740-760-1000 for Ohio. See Supplement D for a list of hazardous chemicals used during phases of operation.

As requested by the Office of Oil & Gas, copies of SDS have been provided on a CD submitted with each individual well work permit application.

SUPPLEMENT D

Anticipated List of Hazardous Chemicals used during Phases of Operation:

<u>Chemical Name</u>	<u>Daily Qty. on Location</u>	<u>Storage Container</u>
	<u>Construction</u>	
Diesel Fuel Oil	2000 Gallons	Double Walled Tank
	<u>Drilling</u>	
Airfoam HD	275 gallons	Drum
Aluminum Stearate	150 lbs.	Bag
Caustic Soda	1500 lbs.	Bag
Chek-Loss	1250 lbs.	Bag
Claytrol	440 gallons	Drum
Conqor 404	55 gallons	Drum
Diesel Fuel Oil	8000 gallons	Double Walled Tank
Gear Oil	250 gallons	Double Walled Tank
Hydraulic Fluid	250 gallons	Double Walled Tank
LD-9	100 gallons	Bucket
Mil-Bar	80000 lbs.	Super Sack
Mil-Bar 410	10000 lbs.	Bag
Mil-Carb	5000 lbs.	Bag
Mil-Carb 150	2500 lbs.	Bag
Mil-Graphite	5000 lbs.	Bag
Mil-Lime	10000 lbs.	Bag
Mil-Lube	220 gallons	Drum
Milmica	2500 lbs.	Bag
Mil-Pac LV	2500 lbs.	Bag
Mil-Pac LV Plus	2500 lbs.	Bag
Mil-Pac R	2500 lbs.	Bag
Mil-Plug (Pecan Shells)	5000 lbs.	Bag
Mil-Seal	5000 lbs.	Bag
Mil-Sorb	5000 lbs.	Bag
Milstarch	10000 lbs.	Bag
New-Drill	160 gallons	Bucket
Potassium Chloride	15000 lbs.	Bag
Perma-Lose HT	10000 lbs.	Bag
Soda Ash	1000 lbs.	Bag
Sodium Chloride	30000 lbs.	Bag
SWF (Salt Water Foamer)	265 gallons	Drum
Walnut Shells	2500 lbs.	Bag
W.O. Defoam	160 gallons	Bucket
Xan-Plex D	1200 lbs.	Bag
X-Cide 102	160 gallons	Bucket
	<u>Completions</u>	
AI-300 (Corrosion Inhibitor)	1 gallon	Tote
AP-One	25 lbs	Tote
Bio Clear	22 gallons	Tote

Frac Sand	174,450 lbs	Sand Truck
LGC-15	137 gallons	Tote
Mineral Oil Flush	10 gallons	Tote
Off Road Diesel	8000 gallons	Fuel Truck
SI-1000 (Scale Inhibitor)	34 gallons	Tote
WFRA-405	184 gallons	Tote
09-HCI All Grades	500 gallons	Acid Tanker
<u>Service/Work over</u>		
Antifreeze (NAPA)	2 gallons	Jug
Antifreeze/Coolant (Prestone)	30 gallons	Jug
Conoco Honey Oil	11000 gallons	Drum
DEF Fluid	75 gallons	Jug
Detcord	360 feet	Spool
Detonators	180 each	Box
Diesel	7200 gallons	Aux Tank
Diesel	290 gallons	Tanks
Dry Moly	60 oz.	Can
FR-1205(Pipe on Pipe)	270	Tote
FR-1405 (Gel Sweep)	270	Tote
FR-1400(Gel Sweep/Friction Reducer)	540	Tote
Lithium Grease	8 oz.	Can
LOCTITE	12 oz.	Tube
Lubriplate	72 oz.	Tube
Motor Oil 15w-40	5 gallons	Jug
Premium Hydraulic Oil	30 gallons	Bucket
Power Charge Ignitors	180 each	Box
Power Charge Cartridges	20 each	Box
Shaped Charge	1200 each	Box
Transmission fluid	20 gallons	Bucket
WD-40	36 oz.	Can
ZEP 45	25 gallons	Jug
ZEP Brake Flush	25 gallons	Jug
ZEP Dry Molly	10 gallons	Jug
ZEP REDI-GREASE	16 oz.	Tube
<u>Reclamation</u>		
Diesel Fuel Oil	2000 gallons	Double Walled Bulk Tank

Note: The attached list represents anticipated materials used for planned operations on the well site. In the event of an unplanned event on the well site, additional materials may be required. Additional SDS for any unplanned events will be maintained on the well site in accordance with OSHA CFR 1910.1200 standards.

The Drilling Supervisor or Contractor of the Operator will maintain Safety Data Sheets (SDS) for all materials and chemicals used on the well site in accordance with OSHA CFR 1910.1200 standards. The SDS should be located in the Company Representative's Office on-site. Copies of the SDS may also be obtained from the area Safety Coordinator, the operator contact for maintaining SDS, by calling the local Antero Resource Office at 304-842-4100 or 800-878-1373.

Site Specific Safety Plan

Antero Resources

5.0 BOP Requirements and Well Control

5.1 BOP Equipment

The following is a list of all BOP equipment with types, sizes and ratings to be utilized and available during the drilling, completion and work-over of the well.

5M system:

- Annular preventer*
- Pipe ram, blind ram, and, if conditions warrant, as specified by the authorized officer, another pipe ram shall also be required*
- A second pipe ram preventer shall be used with a tapered drill string
- Drilling spool, or blowout preventer with 2 side outlets (choke side shall be a 3-inch minimum diameter, kill side shall be at least 2-inch diameter)*
- 3 inch diameter choke line
- 2 choke line valves (3 inch minimum)*
- Kill line (2 inch minimum)
- 2 chokes with 1 remotely controlled from rig floor
- 2 kill line valves and a check valve (2 inch minimum)*
- Upper kelly cock valve with handle available
- When the expected pressures approach working pressure of the system, 1 remote kill line tested to stack pressure (which shall run to the outer edge of the substructure and be unobstructed)
- Lower kelly cock valve with handle available
- Safety valve(s) and subs to fit all drill string connections in use
- Inside BOP or float sub available
- Pressure gauge on choke manifold
- All BOPE connections subjected to well pressure shall be flanged, welded, or clamped*

- Fill-up line above the uppermost preventer.

If repair or replacement of the BOPE is required after testing, this work shall be performed prior to drilling out the casing shoe.

When the BOPE cannot function to secure the hole, the hole shall be secured using cement, retrievable packer or a bridge plug packer, bridge plug, or other acceptable approved method to assure safe well conditions.

Minimum standards for choke manifold equipment.

- i. All choke lines shall be straight lines unless turns use tee blocks or are targeted
- ii. Running tees, and shall be anchored to prevent whip and reduce vibration.
- iii. ii. Choke manifold equipment configuration shall be functionally equivalent to the appropriate example diagram shown in Supplement E. The actual configuration of the chokes may vary.

All valves (except chokes) in the kill line choke manifold, and choke line shall be a type that does not restrict the flow (full opening) and that allows a straight through flow).

Pressure gauges in the well control system shall be a type designed for drilling fluid service

5M and higher system accumulator shall have sufficient capacity to open the hydraulically-controlled gate valve (if so equipped) and close all rams plus the annular preventer (for 3 ram systems add a 50 percent safety factor to compensate for any fluid loss in the control system or preventers) and retain a minimum pressure of 200 psi above precharge on the closing manifold without use of the closing unit pumps. The fluid reservoir capacity shall be double the usable fluid volume of the accumulator system capacity and the fluid level of the reservoir shall be maintained at the manufacturer's recommendations. Two independent sources of power shall be available for powering the closing unit pumps. Sufficient nitrogen bottles are suitable as a backup power source only, and shall be recharged when the pressure falls below manufacturer's specifications.

Accumulator Pre-charge Pressure Test

This test shall be conducted prior to connecting the closing unit to the BOP stack and at least once every 6 months. The accumulator pressure shall be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limit specified below (only nitrogen gas may be used to pre-charge):

Power Availability

Power for the closing unit pumps shall be available to the unit at all times so that the pumps shall automatically start when the closing valve manifold pressure has decreased to the pre-set level.

Accumulator Pump Capacity

Each BOP closing unit shall be equipped with sufficient number and sizes of pumps so that, with the accumulator system isolated from service, the pumps shall be capable of opening the hydraulically-operated gate valve (if so equipped), plus closing the annular preventer on the smallest size drill pipe to be used within 2 minutes, and obtain a minimum of 200 psi above specified accumulator pre-charge pressure.

Locking Devices

A manual locking device (i.e., hand wheels) or automatic locking devices shall be installed on all systems of 2M or greater. A valve shall be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative.

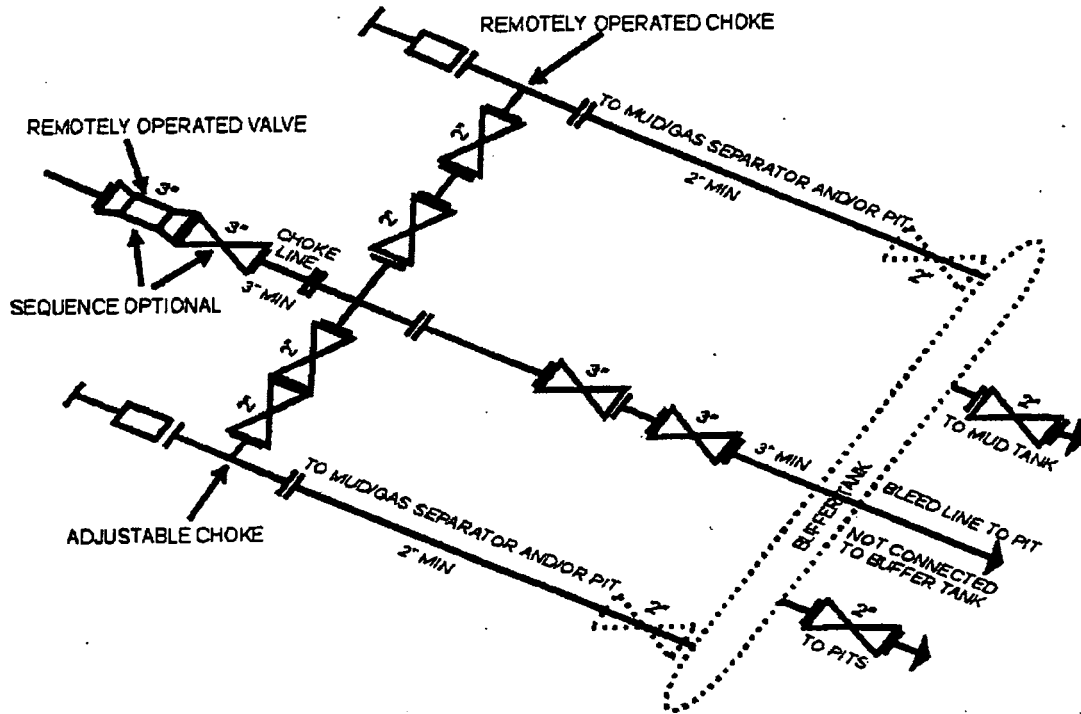
Remote Controls

Accumulator working pressure rating	Minimum acceptable operating pressure	Desired precharge pressure	Maximum acceptable precharge pressure	Minimum acceptable precharge pressure
1,500 psi	1,500 psi	750 psi	800 psi	700 psi
2,000 psi	2,000 psi	1,000 psi	1,100 psi	900 psi
3,000 psi	3,000 psi	1,000 psi	1,100 psi	900 psi

Remote controls shall be readily accessible to the driller. Remote controls for all 3M or greater systems shall be capable of closing all preventers. Remote controls for 5M or greater systems shall be capable of both opening and closing all preventers. Master controls shall be at the accumulator and shall be capable of opening and closing all preventers and the choke line valve (if so equipped). No remote control for a 2M system is required.

SUPPLEMENT E

Choke Manifold Schematic



SM CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY

Although not required for any of the choke manifold systems, buffer tanks are sometimes installed downstream of the choke assemblies for the purpose of manifolding the bleed lines together. When buffer tanks are employed, valves shall be installed upstream to isolate a failure or malfunction without interrupting flow control. Though not shown on 2M, 3M, 10M, OR 15M drawings, it would also be applicable to those situations.

[54 FR 39528, Sept. 27, 1989]

5.2 Procedure and Schedule for Testing BOP Equipment

Well Control Equipment Testing

- i. Perform all tests described below using clear water or an air.
- ii. Ram type preventers and associated equipment shall be tested to an approved stack working pressure if isolated by test plug or to 80 percent of internal yield pressure of casing if BOP stack is not isolated from casing. Pressure shall be maintained for at least 10 minutes or until requirements of test are met, whichever is longer. If a test plug is utilized, no bleed-off of pressure is acceptable. For a test not utilizing a test plug, if a decline in pressure of more than 10 percent in 30 minutes occurs, the test shall be considered to have failed. Valve on casing head below test plug shall be open during test of BOP stack.
- iii. Annular type preventers shall be tested to 70 percent of rated working pressure. Pressure shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer.
- iv. As a minimum, the above test shall be performed:
 - a. when initially installed:
 - b. whenever any seal subject to test pressure is broken:
 - c. following related repairs: and
 - d. 30-day intervals.
- v. Valves shall be tested from working pressure side during BOPE tests with all downstream valves open.
- vi. When testing the kill line valve(s), the check valve shall be held open or the ball removed.
- vii. Annular preventers shall be functionally operated at least weekly.
- viii. Pipe and blind rams shall be activated each trip, however, this function need not be performed more than once a day.
- ix. A BOPE pit level drill shall be conducted weekly for each drilling crew.
- x. Pressure tests shall apply to all related well control equipment.
- xi. All of the above described tests and/or drills shall be recorded in the drilling log.
- xii. For intermediate wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation.
- xiii. For the bottom and horizontal wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation, weekly, and after each bit trip.

5.3 BOP Installation Schedule

The BOP will be installed after running surface casing as well as after running intermediate casing. BOP equipment shall be installed on the innermost string of casing after the surface casing.

5.4 Well Control Training

All Drilling Supervisors, Completion Supervisors, Antero Representatives and Toolpushers used on this well will be IADC Well Control trained and certified. A trained person will be present during the drilling and completion operations. Training certificates will be available for review on the location. The list of personnel with said training is provided below

List of Well Control Trained Personnel

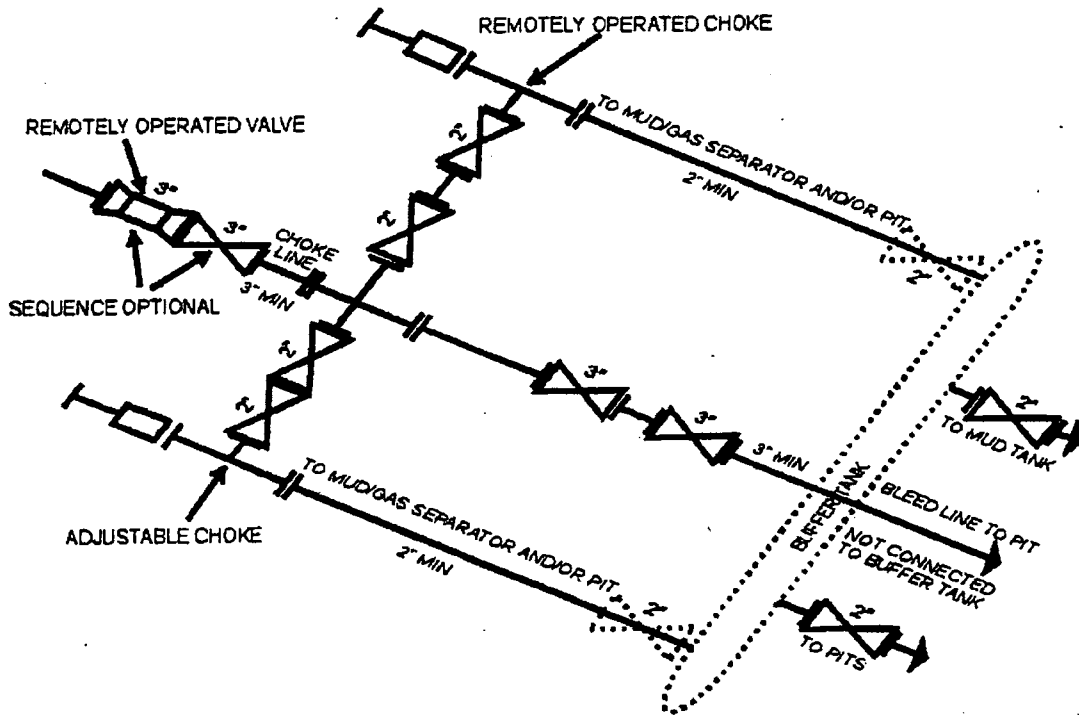
1. Joe Honeycutt - Antero
2. Ben Lofthouse – Antero
3. Steve Durment – Antero
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13. Josh Allred – Consultant Drilling Supervisor
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18. Hayes Lajeunse – Consultant Drilling Supervisor
19. Frank Doherty – Consultant Drilling Supervisor
20. Chad Daves – Antero
21. Jonah Fryman – Antero

5.5 Drilling Record

The Drilling Supervisor will maintain detailed records of significant drilling events such as lost circulation, hydrogen sulfide gas, fluid entry, kicks and abnormal pressures through the electronic data entry and recording system, Wellview. This system allows the Drilling Supervisor to enter daily reports containing the specified information. The records are then retained electronically at Antero Resources' Main Office in Denver, CO.

SUPPLEMENT E

Choke Manifold Schematic



5M CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY

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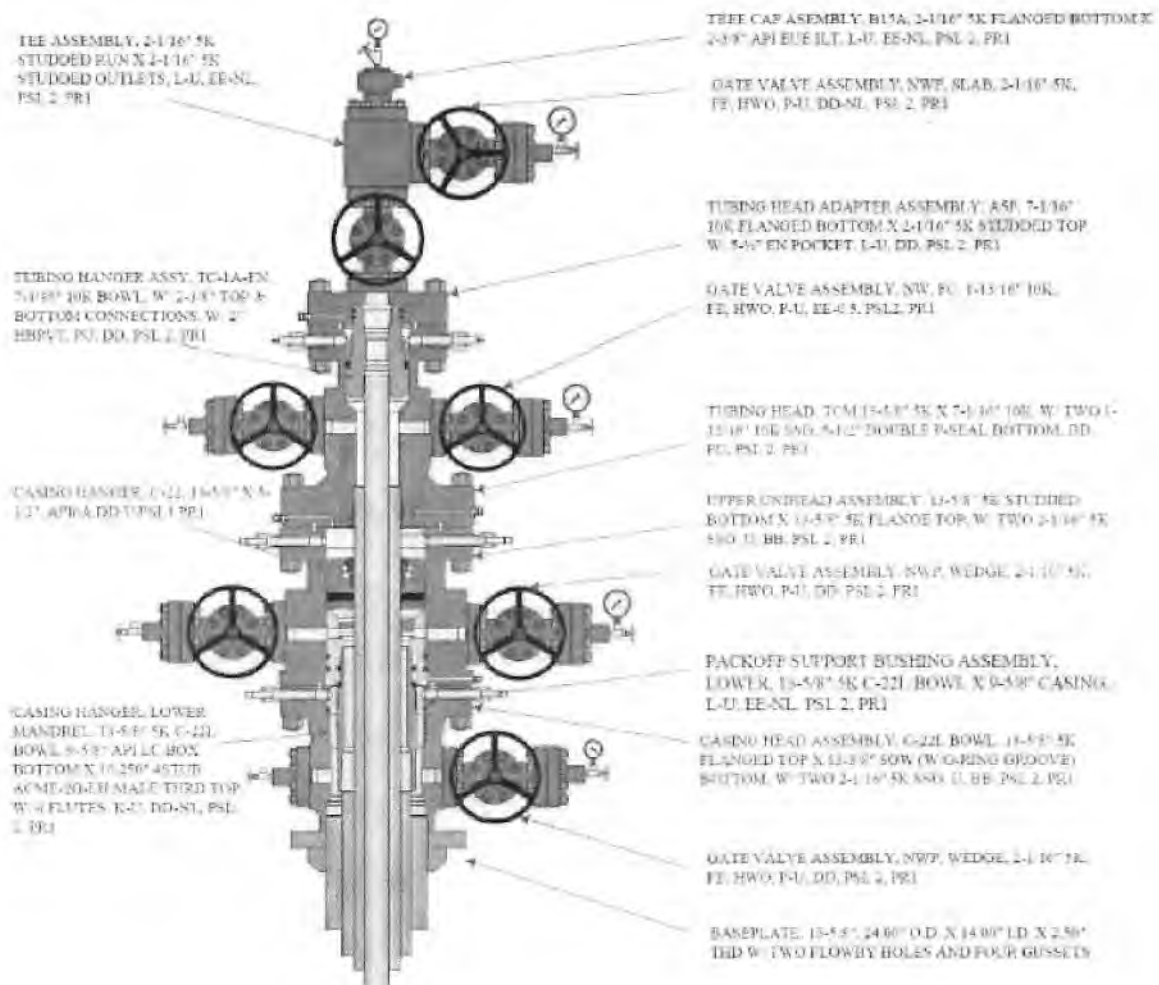
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5.6 Notification

The Emergency Response Plan for this operating area requires the Drilling Supervisor to notify the county oil and gas inspector or the designated Office of Oil and Gas representative any unusual drilling events such as hydrogen sulfide gas or significant kicks that occur during drilling operations. Any encounter of hydrogen sulfide gas requires immediate notification of the Office of Oil and Gas.

5.7 Schematic and Description of the Wellhead Assembly



Site Specific Safety Plan

Antero Resources

6.0 Well Killing Operations

6.1 Mud Mixing Inventory

The following shows the inventory of all materials that will be on-site for the mixing of mud:

- 20 sack of Soda Ash
- 480 sacks of KCL
- 200 sacks of Biolose
- 40 sack of Xan-Plex
- 20 buckets of X-Cide 102
- 3 Drums of KD-40
- 5 Buckets of LD-S
- 15 super sack of MIL Bar
- 100 sacks of Soletex
- 40 Sacks of Graphite
- 300 Sack of Salt

Volume of mixed mud = pit volume + equivalent volume in tanks
= 500 bbls + 500 bbls
= 1000 bbls total

Mixed Mud Weight The mixed mud weight will vary depending on the bottom hole pressures and will be calculated and adjusted as we gather more information; we intend to use 12.8 lb – 13.0 lb mud but will adjust the mud weight as information becomes available

Volume of Add'l

Weighting Mat'l Antero will have the necessary materials available to mix up enough mud to weight the mud up 1 lb more than the mud used for drilling; as an estimate, we expect to have 10 pallets of barite on site and 12 pallets of bentonite

Volume Water for Mixing The rig has a 400 bbl rig water tank and the location will have 800 bbls additional in separate tanks.

6.2 Mud Mixing Units

The drilling rig is equipped with 2 mud tanks with agitators and jets such that it can make two pills.

6.3 Kill Procedures

The following paragraph describes the methodology and type of kill procedures that will be used if needed. These procedures are recognized by the IADC.

Once a Kick is detected a prompt shut in of the well is essential. The exact shut in method will be dictated by the operation being performed at the time of the kick, available equipment, plus other extenuating circumstance. The following types of kill operations may be performed to bring the well back under control. The different methods listed below to be used will be determined by the operation being performed at the time of the kick.

Kill Procedures

- 1.) Drillers Method
- 2.) Wait and Weight Method
- 3.) Circulate and Weight Method
- 4.) Concurrent Method
- 5.) Reverse Circulation Method
- 6.) Dynamic Kill Method
- 7.) Bullheading Method
- 8.) Volumetric Method

Site Specific Safety Plan

Antero Resources

7.0 Hydrogen Sulfide Operations (H2S)

7.1 H2S Monitoring

The equipment and method used for the monitoring, detection and warning of the presence of hydrogen sulfide gas during drilling, completions and work-over operations will be portable electronic gas detection such as BW gas detectors or equivalent. These detectors will be typically located near the well bore on the drilling rig, outside the data van or on the drillers stand. Additionally, if H2S is expected, a fixed gas detection system will be employed which will have audible and visual alarming capabilities.

7.2 H2S Training

All personnel that will be involved in the drilling operations will be trained in H2S in drilling operations to a minimum of the awareness level. Additional training will be given to the Drilling Supervisors both in H2S and emergency response duties related specifically to air toxins. All of the aforementioned training will be completed prior to spudding the well. These records may be kept separate from this plan.

7.3 Personal Protection Equipment

The following personal protection equipment will be available and in use as needed on location:

- Flame-Resistant Clothing (FRC),
- Hardhats,
- safety shoes,
- safety glasses and/or safety goggles/face shields,
- hearing protection earplugs,
- cotton and chemical resistant work gloves, and
- dust mask respirators.

In the event that other hazards are identified or presented during the drilling operation, we will attempt to eliminate the hazard, and if not practical, additional PPE will be provided to mitigate the risk to the worker. In the event that H2S is detected, a hazard assessment will be performed for this exposure along with risk mitigation.

7.4 H2S Notification and Control

The emergency alarm will be audible or visual type which will be detectable by all personnel on location. If dangerous levels of H2S are detected, we will immediately implement our Emergency Response Plan which will provide for site control and evacuation as needed. Generally, the site will be secured such that access is allowed only for trained emergency response personnel. Site security will be accomplished by trained workers stationed at safe points on the perimeter and access road to the site.

If H2S is detected and confirmed, a telephonic notification will be made to the local oil and gas inspector.

Site Specific Safety Plan

Antero Resources

8.0 Well Flaring Operations

8.1 Size, Construction and Length of Flare Line

The flare line will be a 4" diameter, steel line that extends 50' from the well. The line will be anchored to the surface of the ground by cross pinning it in place using metal staking at multiple points along the line.

The choke assembly is described in previous section of this document and in drawing "5M Choke Manifold Equipment" BLM drawing Onshore Oil and Gas Order Number 2, Supplement E.

We do not anticipate flaring since we would first attempt to route the flow to the Gas Buster and work the gas kick off from there. Flaring would occur as a last resort or if needed.

8.2 Flare Lighting System

The system for lighting the flare will be an automatic flare igniter using a solar collector panel and battery charger system. A second igniter will be installed as a backup. Should flaring be required or needed.

The Drilling Supervisor will give notification to the local fire department prior to lighting the flare, if practicable, or as soon as possible thereafter.

8.3 Flare Safe Distances

The flare line(s) discharge shall be located not less than 50 feet from the well head, having straight lines unless turns are targeted with running tees, and shall be positioned downwind of rig and trailers. The flare system shall have an effective method for ignition. All flammable material beyond the end of the flare line will be cleared to a minimum distance of 50feet.

8.4 Flare Duration

The flare duration should not exceed the maximum time requirements needed to complete the operation.

Site Specific Safety Plan

Antero Resources

9.0 Collision Avoidance Safeguards, Practices & Standards Plans

9.1. Established Definitions

- 1.) Proposed Wellbore – Involves sections of the vertical top-hole, the KOP, the lateral landing and the lateral drilling to the total measured depth TMD.
- 2.) Nuge – Technique generally used in the vertical top-hole section. The well path is nudged from vertical to pass areas of possible magnetic interferences and to reduce the risk of collision by maintaining separation with other wellbores.
- 3.) KOP – Kick Off Point. Diverting a well path from one trajectory to another.
- 4.) MWD – Measurement while Drilling
- 5.) LWD – Logging while Drilling
- 6.) SF – Separation Factor or Clearance Factor:
$$SF^* = CC \div [UR_{ref} + UR_{off}]$$

CC – well separation distance (center to center of wellbores)
UR_{ref} - radius ellipse of uncertainty on reference well
UR_{off} - radius ellipse of uncertainty on offset well

NOTE: ellipses are half-axes or radii.
*Calculation options may be considered
- 7.) TMD – Total Measured Depth
- 8.) Gyro – High accuracy well bore survey instrument unaffected by magnetic interference.
- 9.) QC/QA – Quality Control and Quality Assurance
- 10.) HSE – Health Safety and the Environment

9.2. Established Descriptions of Risk

- | | | |
|---------------------|---------|--------------------------|
| 1.) SF ≤ 1.0 | Level 1 | Extreme collision risk |
| 2.) SF = 1.0 to 1.5 | Level 2 | High collision risk |
| 3.) SF = 1.5 to 2.0 | Level 3 | Moderate collision risk |
| 4.) SF > 2.0 | Level 4 | Low to no collision risk |

9.3. Scope of Work

The scope of this protocol pertains to all Antero Resources drilling operations in West Virginia. This protocol represents Antero Resources efforts to eliminate potential wellbore collisions resulting from directional drilling.

9.4. Survey Techniques

Gyro Survey – High accuracy wellbore survey instrumentation that is unaffected by magnetic interference; gyro tools are not run in the drillstring.

MWD – Measurement While Drilling; wellbore survey instrumentation (primarily mud-pulse telemetry) located in the bottom-hole assembly of the drillstring.

9.5. Survey Intervals and Frequency

To avoid collision with other wells within the vicinity of the proposed well, gyro surveying instrumentation will be used at 30' intervals until a separation factor of 1.5 (Level 3) or greater is achieved. These surveys are within +- .5 degrees of accuracy. Antero Resources calculates the separation factor in accordance with the West Virginia DEP Separation Factor definition, as stated in the permit application guidelines. No well will be allowed to cross under a separation factor of 1.0 (Level 1, Extreme Collision Risk). If a Level 2 separation factor well approaches a separation factor of 1.0, corrective action will be taken to increase the distance between the two imposing wellbores by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 1.5 or greater. When the separation factor exceeds 1.5 and remains greater than 1.5, survey intervals will increase to 250'.

9.6. Tool/Muleshoe Alignment in Critical Areas, Nudge Process

The following steps reflect the general alignment procedures for Antero Resources directional drilling operations in critical areas covering the vertical top-hole sections of the proposed wellbore. These steps are subject to extenuating circumstances and may vary based on differences in instrumentation, wellbore conditions, safety concerns or environmental effects.

- Well site supervisor, gyro surveyor and/or directional driller will all confirm scribe line and UBHO alignment at surface.
- Complete witness verification form and keep in well folder.
- Verify the correct well plan.

- Tool face orientations will be always be confirmed by a second survey at the same depth. For example: pump up survey, turn pipe to move tool face to the desired heading and work out torque, take another survey to confirm the tool face is at the correct heading. Repeat as necessary.
- Supervisor should witness orientations until the separation factor exceeds 1.5 and wells are diverging.
- When in close proximity to adjacent wells, survey intervals will not be greater than 30' until the separation factor exceeds 1.5 and well paths are diverging.
- Run the gyro in the hole and establish the tool face.
- Lay down gyro and screw back on to the pipe.
- Rotate the string to the desired direction.
- Work the pipe, set the slips and run another gyro to verify toolface.

If the separation factor is less than 1.5, the next joint of pipe shall be a 15' pup joint. Drill the joint down, run thru the aforementioned survey steps and confirm well divergence. Lay down pup joint, pick up full joint of drill pipe and drill down. Repeat process until separation factor returns to 1.5 or greater and well divergence is confirmed.

9.7. Survey Tools: Kick-off Point to Lateral Landing (Curve Assembly)

When drilling the Curve portion of the wellbore (drilling from the end of the "top-hole" to the beginning of the lateral), Measurement While Drilling (MWD) tools will provide the wellbore surveys. The MWD equipment supplied to Antero is mud-pulse telemetry equipment with a gamma ray module for detecting formation-specific data which assists wellbore placement.

9.8. Well Planning and Anti-collision software

Antero Resources uses software for wellbore placement and anti-collision planning:

- COMPASS Version EDM 5000.1.12.0 (09.06.00.068) Build 5000.1.12.0.73
- Mapping Ref: UTM NAD 27 Zone 17N
- Mag Ref used on most recent Antero Resources wells: BGGM2014
- -8.53 Declination Referenced to Grid North
- Mag and Map reference info is included on each drawing

9.9. Minimum Top Hole Separation Factor Standards

a) Top Hole Separation Factor \geq 1.5 Requirement

A separation factor of at least 1.5 (Level 2) shall be obtained as early as practical and maintained. If a Level 2 separation factor well approaches a separation factor of 1.0, corrective action will be taken to increase the distance between the two imposing wellbores

by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 1.5 or greater. When the separation factor exceeds 1.5 and remains greater than 1.5, survey intervals will increase to 250'.

b) Top Hole Separation Factor \geq 2.0 Requirement

A separation factor of at least 2.0 (Level 4) shall be obtained as early as practical and maintained **when proposed wellbore is in proximity to any fractured or any producing well that exists on the well pad**. If a Level 4 separation factor well approaches a separation factor of 1.5, corrective action will be taken to increase the distance between the two imposing wellbores by utilizing a steerable directional assembly to direct the permitted wellbore away from the adjacent wellbore and regain a separation factor of 2.0 or greater. When the separation factor exceeds 2.0 and remains greater than 2.0, survey intervals will increase to 250'.

9.10. Lateral Spacing, Spacing Safeguards, Declination/Grid/Magnetic Interference Correction

Wellbore trajectories are computed from survey measurements acquired by Measurement While Drilling (MWD) tools. MWD tools are instruments mounted inside the bottom-hole assembly (BHA) and use an accelerometer and magnetometer sensor package to determine the inclination and magnetic azimuth while drilling. The magnetic azimuth is used to calculate a true (geographic) azimuth by adding the declination angle from a geomagnetic reference model, or a grid azimuth by subtracting the grid convergence angle from the true azimuth. The largest sources of error in standard MWD surveying are inaccuracies in the global geomagnetic reference model and magnetic interference from the BHA. These error sources can be reduced significantly by using a local geomagnetic In-Field Referencing (IFR) model and by subsequently applying multi-station analysis (MSA) corrections to the raw survey measurements. IFR reduces declination error by using local magnetic data to account for crustal anomalies not expressed in standard definition geomagnetic models. MSA further reduces azimuth error by using mathematical methods to correct for magnetic drill string interference and sensor biases and scale factors. Antero Resources employs a third-party survey monitoring company to correct surveys and ensure the most accurate wellbore placement.

Antero Resources defines lateral spacing according to geologic, regulatory and land requirements. Antero uses the aforementioned means to protect and achieve the desired lateral spacing.

9.11. Notifications and Response Procedure

Upon discovery that the separation factor has fallen below 1.0, Antero representatives will immediately notify the WV DEP with an appropriate corrective action plan, taking into account the circumstances of the situation.

In the event that a collision is suspected, Antero will immediately notify the WV DEP of the situation and will attempt to kill the well and maintain its status. Taking into account the factors at the time of the collision, Antero will do whatever is necessary to isolate the breach and secure both wells. Once the wells are secure, Antero will convene with the WV DEP and determine the most appropriate course of action to remedy the situation. If the collision involves a fractured or producing well, potential remediation steps could involve moving the drilling rig away from the well and employing a workover rig to pull tubing and repair casing. Antero EHS will immediately notify nearby water well owners and landowners of the breach, provide them with contact information to notify Antero of any adverse effects, and implement water well monitoring to detect any gas seepage.

If the collision involves a well not yet fractured or producing, then remedial steps would most likely include plugging back to an acceptable depth and using a directional assembly to re-route the wellbore on an acceptable path with a separation factor of greater than 1.5.

Muleshoe High Side Verification

This form is to provide verification on multiple levels for Muleshoe High Side and azimuthal direction to slide when in critical areas. The standard practice of verification should be a visual check of the high side mark and alignment of Muleshoe inside the hang-off sub. Azimuthal direction that the slide will occur toward.

VISUAL INSPECTION X

AZMUTHUAL DIRECTION TO SLIDE 320azm

DIRECTIONAL DRILLER: _____

DATE: _____

MWD EMPLOYEE OR GYRO HAND: _____

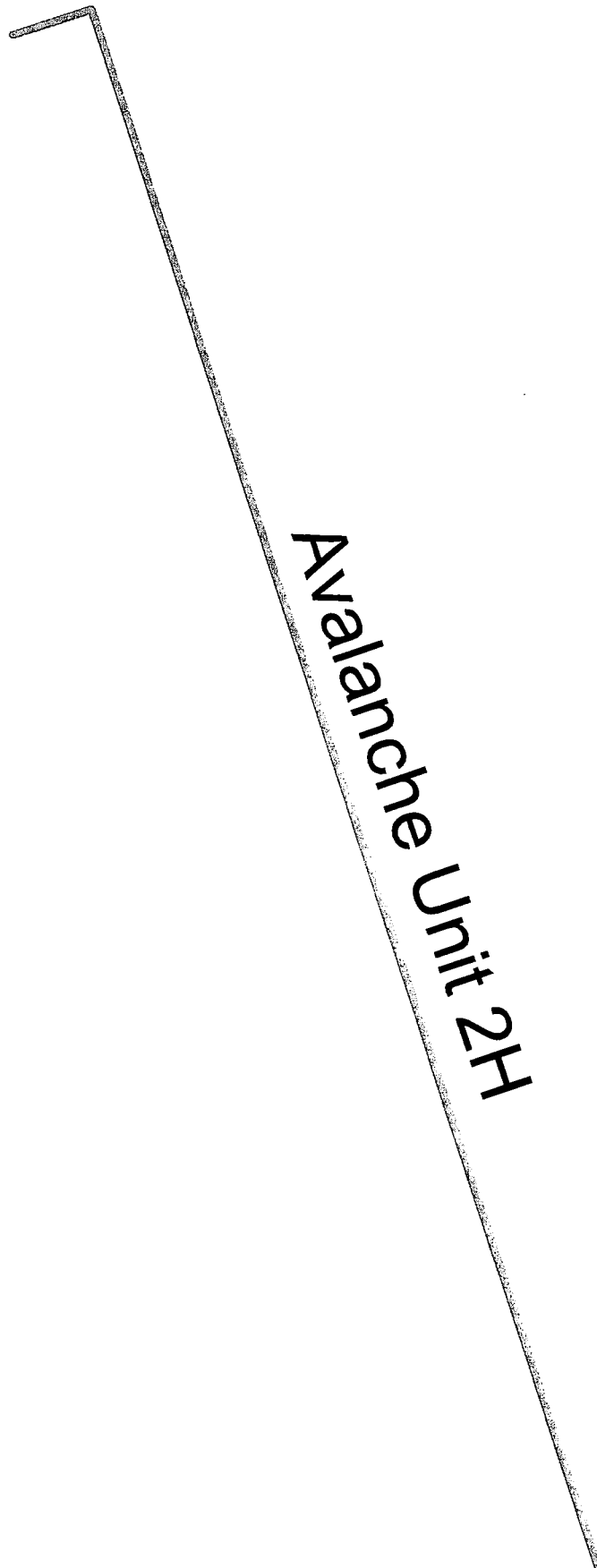
DATE: _____

COMPANY MAN: _____

DATE: _____

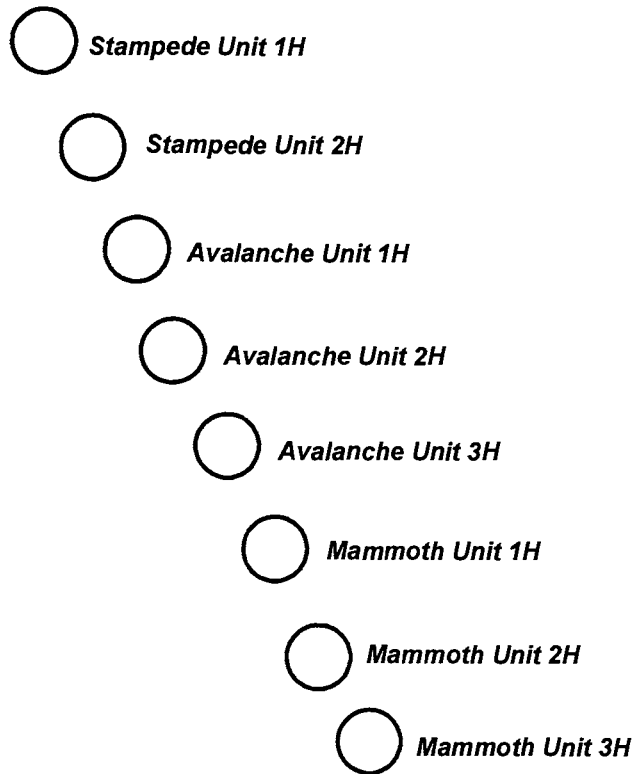


Avalanche Unit - Lateral Diagram

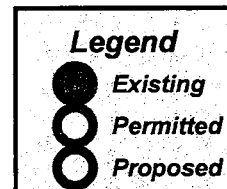




Colorado Pad



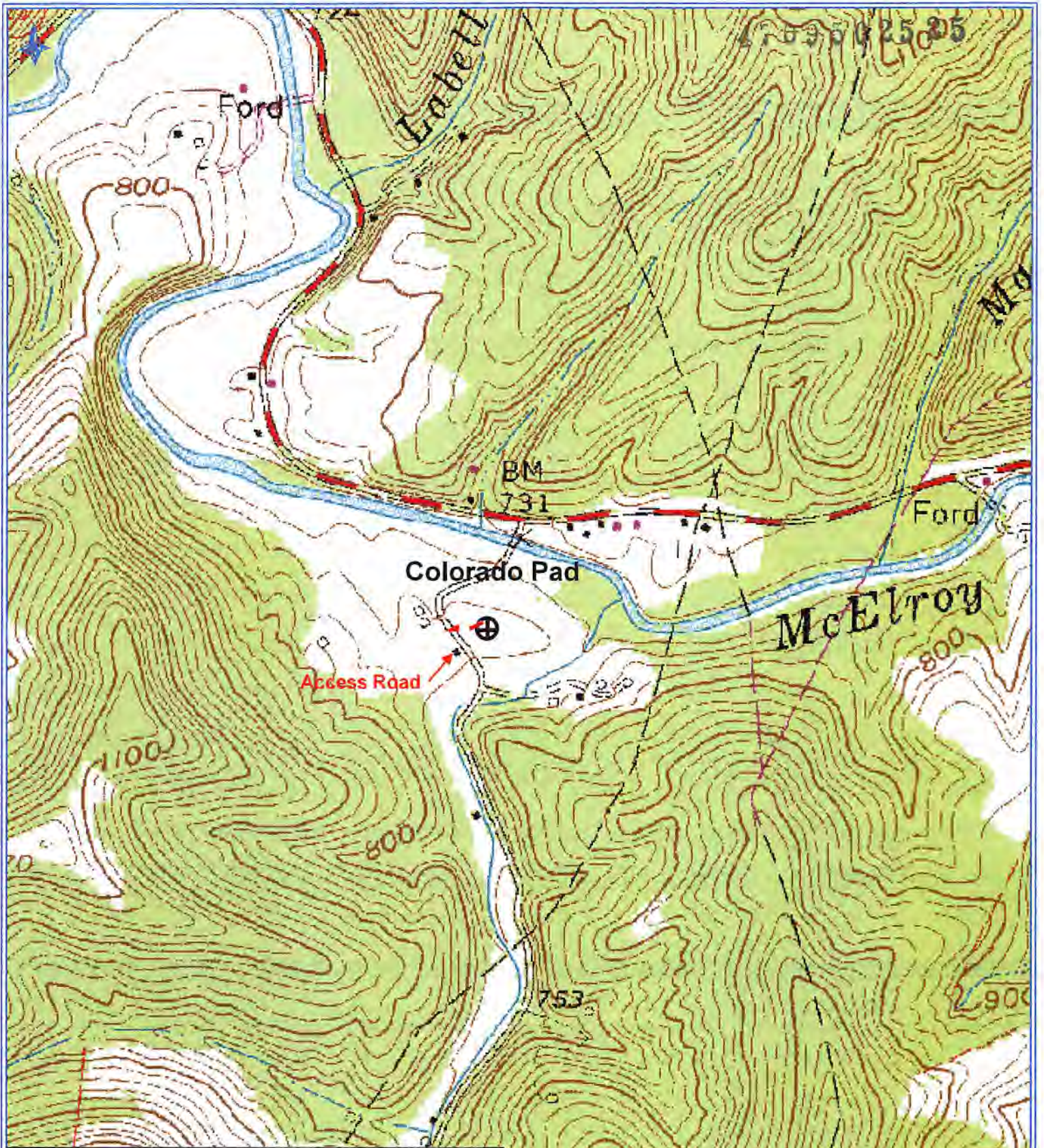
<u>WELL NAME</u>	<u>API NUMBER</u>	<u>WELL STATUS</u>
Stampede Unit 1H	Proposed Well	Future Well
Stampede Unit 2H	Proposed Well	Future Well
Avalanche Unit 1H	Proposed Well	Future Well
Avalanche Unit 2H	Proposed Well	New Well
Avalanche Unit 3H	Proposed Well	Future Well
Mammoth Unit 1H	Proposed Well	Future Well
Mammoth Unit 2H	Proposed Well	Future Well
Mammoth Unit 3H	Proposed Well	Future Well



7/17/18

Not to Scale





Antero Resources Corporation

Appalachian Basin
Avalanche Unit
Tyler County

Quadrangle: Shirley
Watershed: McElroy Creek
District: McElroy
Date: 7-16-2018

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Office of Oil and Gas

JUL 23 2018

WV Department of
Environmental Protection



LATITUDE 39°25'00"

10,790'

LATITUDE 39°22'30"

373' TO BOTTOM HOLE

5,007'

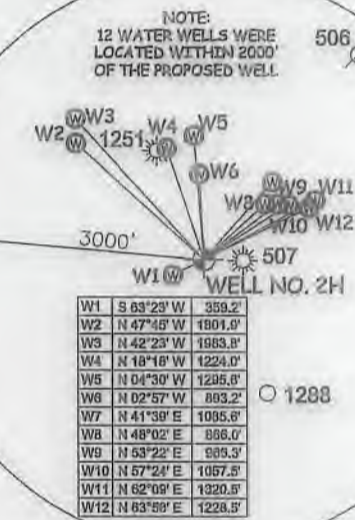
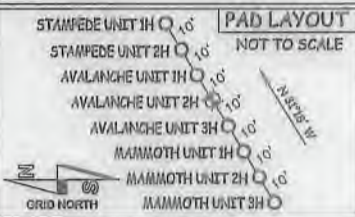
LONGITUDE 80°45'00"

LONGITUDE 80°45'00"

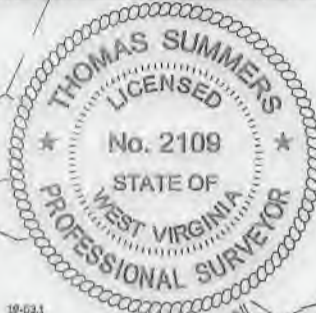
Antero Resources Corporation
Well No. Avalanche Unit 2H

NOTES:
WELL 2H TOP HOLE INFORMATION:
N: 331,472ft E: 1,635,997ft
LAT: 39°24'10.51" LON: 80°47'17.46"
BOTTOM HOLE INFORMATION:
N: 320,873ft E: 1,639,929ft
LAT: 39°22'26.32" LON: 80°46'25.46"
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: 4,361,521m E: 518,252m
BOTTOM HOLE INFORMATION:
N: 4,358,312m E: 519,504m



TM-Par	Surface Owner	Book/Pg	Acres
16-07	Robert Kocher	432/591	97.659 AC
16-7-2	Danna Drumbaugh	360/71	1.86 AC
16-7-3	Mary Blafner	WB46/477	4.47 AC
16-7-4	Donald Moore	387/168	6.974 AC
16-7-5	Robert Kocher	432/591	63.066 AC
16-06	Jane Griffin	231/41	233.49 AC
16-8-1	Roger Griffin	219/484	1.45 AC
16-8-2	Roger Griffin	352/609	0.481 AC
16-15	Albert Babee	292/450	208.66 AC
16-19	Todd Orr	205/175	2 AC
19-02	Lloyd Talkington	326/774	127.86 AC
19-03	Larry Stevens	344/431	2.98 AC
19-04	John Owens	296/279	1.08 AC
19-05	Paul Weckley	419/401	0.21 AC
19-05	Paul Weckley	419/401	0.866 AC
19-07	Patricia Montgomery	381/300	5.59 AC
19-08	John Lewis Jr.	336/631	116.5 AC
19-09	Robert Walsh	339/839	140 AC
19-15	Terrence Fraser	252/430	7.16 AC
19-16	Terrence Fraser	252/450	59.62 AC
19-17	Ronnie Wilson Jr.	358/414	50 AC
19-22	Harold Vest	344/242	32 AC
19-33-1	Larry Marable	368/722	66.38 AC
19-66	Matthew March	415/642	73,952 AC
19-67	Smith Morris Trust	149/274	18 AC
19-68	Randall Gugston	458/665	35.53 AC
19-69	Randall Gugston	458/666	38.5 AC
22-00	William Hidelston	353/471	102.29 AC
22-06	Thomas Allen	269/448	53 AC
22-07	Thomas Allen	125/425	50 AC
22-10	Thomas Allen	269/448	23 AC
22-12	Terry Detson	544/784	48,754 AC
22-12-1	Morgan Detson	415/599	2,996 AC
01-01	Steven Reed	WB54/21	158 AC



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

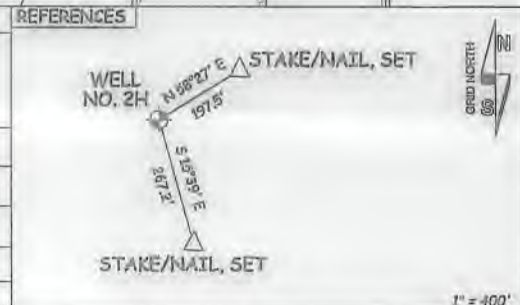
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
N: 14,308,709ft E: 1,700,251ft
POINT OF ENTRY INFORMATION:
N: 14,308,955ft E: 1,700,806ft
BOTTOM HOLE INFORMATION:
N: 14,298,181ft E: 1,704,358ft

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 # 17-038WA
DRAWING # AVALANCHE 2HR1
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 +/-
--- Existing Fence
--- Found monument, as noted
THOMAS SUMMERS P.S. 2109
DATE 06/26/18
OPERATOR'S WELL# AVALANCHE UNIT #2H



WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 095 02525
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT
LOCATION: ELEVATION 751'-ORIGINAL 743'-PROPOSED WATERSHED McELROY CREEK
QUADRANGLE TH - SHIRLEY 7.5' BH - WEST UNION 7.5' DISTRICT McELROY COUNTY TYLER
SURFACE OWNER LLOYD TALKINGTON ACREAGE 127.86 ACRES +/-
LEASE ACREAGE 130 AC.±; 219.39 AC.±; 256 AC.±;
OIL & GAS ROYALTY OWNER B.F. REED ET UX; K & D HOLDINGS, LLC; MARK A. BURNETT; R.E. SMITH ET UX; GLENN D. SMITH; FANNY D. DAVIS ET AL; UNION NATIONAL BANK OF W.V.; EDWARD LEWIS CASE; LINDA J. DESCHER; EQT; W.S. WRIGHT ET AL. 50.5 AC.±; 32 AC.±; 74 AC.±; 25.5 AC.±; 50 AC.±; 76 AC.±; 48,754 AC.±; 2,996 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 6,900' TVD 19,400' MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

WW-6A1

Operator's Well Number Avalanche Unit 2H

OCT 10 2018

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)

WV Department of
Environmental Protection

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>B.F. Reed & M.J. Reed Lease</u>			
B.F. Reed & M. J. Reed	F.H. Morse	1/8	0069/0004
F.H Morse	The Philadelphia Company of WV	Assignment	0101/0036
The Philadelphia Company of WV	Pittsburgh & West Virginia Gas Company	Assignment	0132/0445
Pittsburgh & West Virginia Gas Company	Equitable Gas Company LLC	Assignment	0132/0445
Equitable Gas Company LLC	Equitrans Inc	Assignment	0274/0471
Equitrans Inc	EQT Capital Corporation	Merger	0433/0738
EQT Capital Corporation	Equitable Resources Inc	Merger	0433/0738
Equitable Resources Inc	Equitable Gas Company LLC	Merger	0433/0738
Equitable Gas Company LLC	Equitrans LP	Assignment	0433/0777
Equitrans LP	EQT Production Company	Agreement	0440/0107
EQT Production Company	Antero Resources Corporation	Agreement	0598/0058
<u>K&D Holdings, LLC</u>			
K&D Holdings, LLC	Equitrans Inc	1/8	0283/0338
Equitrans Inc	EQT Capital Corporation	Merger	0433/0738
EQT Capital Corporation	Equitable Resources Inc	Merger	0433/0738
Equitable Resources Inc	Equitable Gas Company LLC	Merger	0433/0738
Equitable Gas Company	Equitrans LP	Assignment	0433/0777
Equitrans LP	EQT Production Company	Agreement	0396/0640
EQT Production Company	Antero Resources Corporation	Agreement	0598/0058
<u>Mark A. Burnette Lease</u>			
Mark A. Burnette	Antero Resources Corporation	1/8+	0501/0539
<u>R.E. Smith, et ux Lease</u>			
R.E. Smith	Stonewall Gas Company	1/8	0278/0483
Stonewall Gas Company	Domimion Appalachian Development Inc	Merger	0009/0412
Domimion Appalachian Development inc	Domimion Appalachian Development LLC	Name Change	WVSOS
Domimion Appalachian Development	Consol Gas Appalachian Development LLC	Name Change	0009/0131
Consol Gas Appalachian Development LLC	Consol Gas Reserves Inc	Name Change	0009/0206
Consol Gas Reserves Inc	Consol Gas Company	Name Change	0009/0156
Consol Gas Company	CNX Gas Company LLC	Name Change	0384/0191
CNX Gas Company LLC	Noble Energy Inc	Assignment	0388/0286
Noble Energy Inc	Antero Resources Corporation	Assignment	0453/0139
<u>Glen D. Smith Lease</u>			
Glen D. Smith	Equitable Gas Company	1/8	0207/0268
Equitable Gas Company	Equitrans INC	Merger	0433/0738
Equitrans INC	EQT Capitol Corporation	Merger	0433/0738
EQT Capitol Corporation	Equitable Resources Inc	Merger	0433/0738
Equitable Resources Inc	Equitrans LP	Assignment	0433/0777
Equitrans LP	EQT Production Company	Agreement	0396/0640
EQT Production Company	Antero Resources Corporation	Agreement	0598/0058

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

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

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- (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>Fanny Davis, et al Lease</u>			
Fanny Davis, et al	Equitable Gas Company	1/8	0193/0068
Equitable Gas Company	Equitrans, Inc	Assignment	0274/0471
Equitrans, Inc	Equitable Resources, Inc	Merger	0433/0738
Equitable Resources, Inc	EQT Corporation	Name Change	0433/0755
EQT Corporation	Equitrans LP	Assignment	0433/0777
Equitrans LP	EQT Production Company	Agreement	0396/0640
EQT Production Company	Antero Resources Corporation	Agreement	0598/0058
<u>Union National Bank of WV Lease</u>			
Union National Bank of WV	Stonewall Gas Company	1/8	0285/0285
Stonewall Gas Company	Domimion Appalachian Development Inc	Merger	0009/0412
Domimion Appalachian Development Inc	Domimion Appalachian Development LLC	Name Change	WVSOS
Domimion Appalachian Development LLC	Consol Gas Appalachian Development LLC	Name Change	0009/0131
Consol Gas Appalachian Development LLC	Consol Gas Reserves Inc	Name Change	0009/0206
Consol Gas Reserves Inc	Consol Gas Company	Name Change	0009/0156
Consol Gas Company	CNX Gas Company LLC	Name Change	0384/0191
CNX Gas Company LLC	Noble Energy Inc	Assignment	0388/0286
Noble Energy Inc	Antero Resources Corporation	Assignment	0453/0139
<u>Edward Lewis Case Lease</u>			
Edward Lewis Case	Antero Resources Corporation	1/8+	0532/0270
<u>Linda J. Descher, heir of Jerry Roberts Lease</u>			
Linda J. Descher, heir of Jerry Roberts	Antero Resources Corporation	1/8+	0532/0270
<u>W.S. Wright, et al Lease</u>			
W.S. Wright, et al	Equitable Gas Company	1/8	0196/0132
Equitable Gas Company	Equitrans, Inc	Assignment	0274/0471
Equitrans, Inc	Equitable Resources, Inc	Merger	0433/0738
Equitable Resources, Inc	EQT Corporation	Name Change	0433/0755
EQT Corporation	Equitrans LP	Assignment	0433/0777
Equitrans LP	EQT Production Company	Agreement	0396/0640
EQT Production Company	Antero Resources Corporation	Agreement	0598/0058

*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.

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Office of Oil and Gas

OCT 10 2018

WV Department of
Environmental Protection

WW-6A1
(5/13)

Operator's Well No. Avalanche 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)**

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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Dorthea I. Morgan, et vir Lease</u>	Dorthea I. Morgan, et vir	Bojacque Incorporated	1/8	0153/0223
	Bojacque Incorporated	Stonewall Gas Co.	Assignment	0155/0192
	Stonewall Gas Co.	Mountain Gas Drilling	Assignment	0176/0190
	Mountain Gas Drilling	Dominion Appalachian Development	Assignment	0177/0559
	Dominion Appalachian Development	Antero Resources Appalachian Corporation	Partial Assignment	0230/0113

*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.

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WV Department of
Environmental Protection

**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 needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Antero Resources Corporation

By: Kevin Kilstrom

Its: Senior VP of Production

FORM WV-6A1
EXHIBIT 1

FILED

JUN 10 2013

Natalie E. Tomart
Secretary of State
1900 Kanawha Blvd E
Bldg 1, Suite 157-K
Charleston, WV 25305



IN THE OFFICE OF
SECRETARY OF STATE

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

FILE ONE ORIGINAL
(Two if you want a filed
stamped copy returned to you)
FEE: \$25.00

**APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY**

Office Hours: Monday - Friday
8:30 a.m. - 5:00 p.m. ET

***** In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby ***
applies for an Amended Certificate of Authority and submits the following statement:**

1. Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachia Corporation
2. Date Certificate of Authority was issued in West Virginia: 6/28/2008
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 Signatures***):
Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person
Signatures: *Alvyn A. Schopp* Date: June 10, 2013

Important Legal Notice Regarding Signatures For West Virginia Code §31D-1-12b. Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.

Form CP-1

Issued by the Office of the Secretary of State

Revised 4/11



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

July 20, 2018

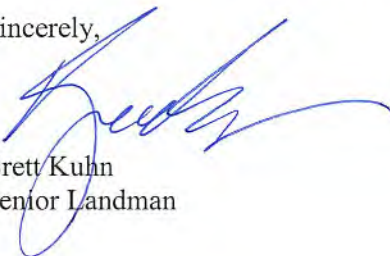
West Virginia Department of Environmental Protection
Chief, Office of Oil and Gas
Attn: Mr. James Martin
601 57th Street SE
Charleston, WV 25304

RE: Avalanche Unit 2H
Quadrangle: Shirley 7.5'
Tyler County/McElroy District, West Virginia

Mr. Martin:

Antero Resources Corporation (Antero) is submitting the following application for a new well work permit for the Avalanche 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 for all leases through which the Avalanche Unit 2H horizontal lateral will drill through including any and all roads crossed under as identified on the attached survey plat.

Sincerely,



Brett Kuhn
Senior Landman

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Office of Oil and Gas

JUL 23 2018

WV Department of
Environmental Protection

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

Date of Notice Certification: 07/19/2018

API No. 47- 095 - 02525
Operator's Well No. Avalanche Unit 2H
Well Pad Name: Colorado 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>518252m</u>
County: <u>Tyler</u>		Northing: <u>4361521m</u>
District: <u>McElroy</u>	Public Road Access: <u>CR 23</u>	
Quadrangle: <u>Shirley 7.5'</u>	Generally used farm name: <u>Lloyd Talkington</u>	
Watershed: <u>Outlet McElroy Creek</u>		

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

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input 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>
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RECEIVED
Office of Oil and Gas
JUL 23 2018
WV Department of
Environmental Protection

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.

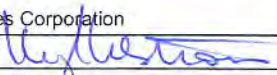
RECEIVED
Office of Oil and Gas

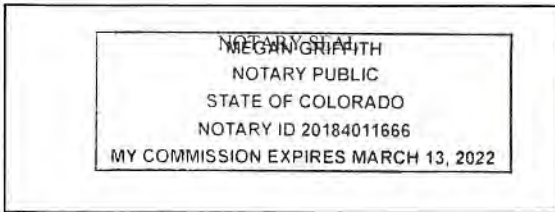
JUL 23 2018

WV Department of
Environmental Protection

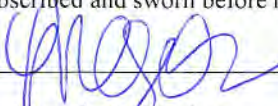
Certification of Notice is hereby given:

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

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



Subscribed and sworn before me this 20th day of July, 2018.

 Notary Public

My Commission Expires MARCH 13, 2022

Oil and Gas Privacy Notice:

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

RECEIVED
Office of Oil and Gas

JUL 23 2018

WV Department of
Environmental Protection

WW-6A
(8-13)

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Office of Oil and Gas

JUL 23 2018

WV Department of
Environmental Protection

API NO. 47- 095 -
OPERATOR WELL NO. Avalanche Unit 2H
Well Pad Name: Colorado 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 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Location Restrictions

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

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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WV Department of
Environmental Protection

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

Time Limits and Methods for Filing Comments.

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

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

Comment Requirements

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

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

Permit Denial or Condition

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

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

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

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

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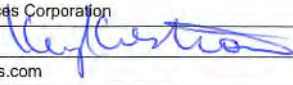
WV Department of
Environmental Protection

WW-6A
(8-13)

API NO. 47- 095 -
OPERATOR WELL NO. Avalanche Unit 2H
Well Pad Name: Colorado Pad

Notice is hereby given by:

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

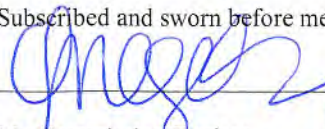


Address: 1615 Wynkoop Street
Denver, CO 80202
Facsimile: 303-357-7315

Oil and Gas Privacy Notice:

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

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

Subscribed and sworn before me this 20th day of July 2018.


Notary Public
My Commission Expires MARCH 13, 2022

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JUL 23 2018

WV Department of
Environmental Protection

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

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

Date of Notice: 7/20/2018 **Date Permit Application Filed:** _____

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: Lloyd D. & Donna J. Talkington
Address: 5812 Interboro Avenue
Pittsburg, PA 15207

Name: _____
Address: _____

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

Name: _____
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: _____

WATER PURVEYOR(s)/OWNER(s) OF WATER WELL,
_SPRING OR OTHER WATER SUPPLY SOURCE
Name: PLEASE SEE ATTACHMENT
Address: _____

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

*Please attach additional forms if necessary

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

WATER SOURCE OWNERS – Within 1500'

*NOTE: On attached water well map 2 other water sources are identified, but they are located greater than 1500' from the subject well pad location.

1 Water Source: 359'

Owner: Micheal D. Sloss
Address: PO Box 2, Indian Creek
Alma, WV 26320

2 Water Sources: 1224', 1295'

Owner: Roger Lee Griffin
Address: 4211 McElroy Creek Road
Alma, WV 26320

1 Water Source: 893'

Owner: Todd Orr
Address: 4279 McElroy Creek Road
Alma, WV 26320

4 Water Sources: (2) 866', (3) 1057', 1320', (4) 966'

Owner: Kes Investments
Address: 1225 Darlington Oak Circle NE
St. Petersburg, FL 33703

1 Water Source: 1228'

Owner: Moore Donald
Address: 770 Newell Street
Painsville, OH 44077

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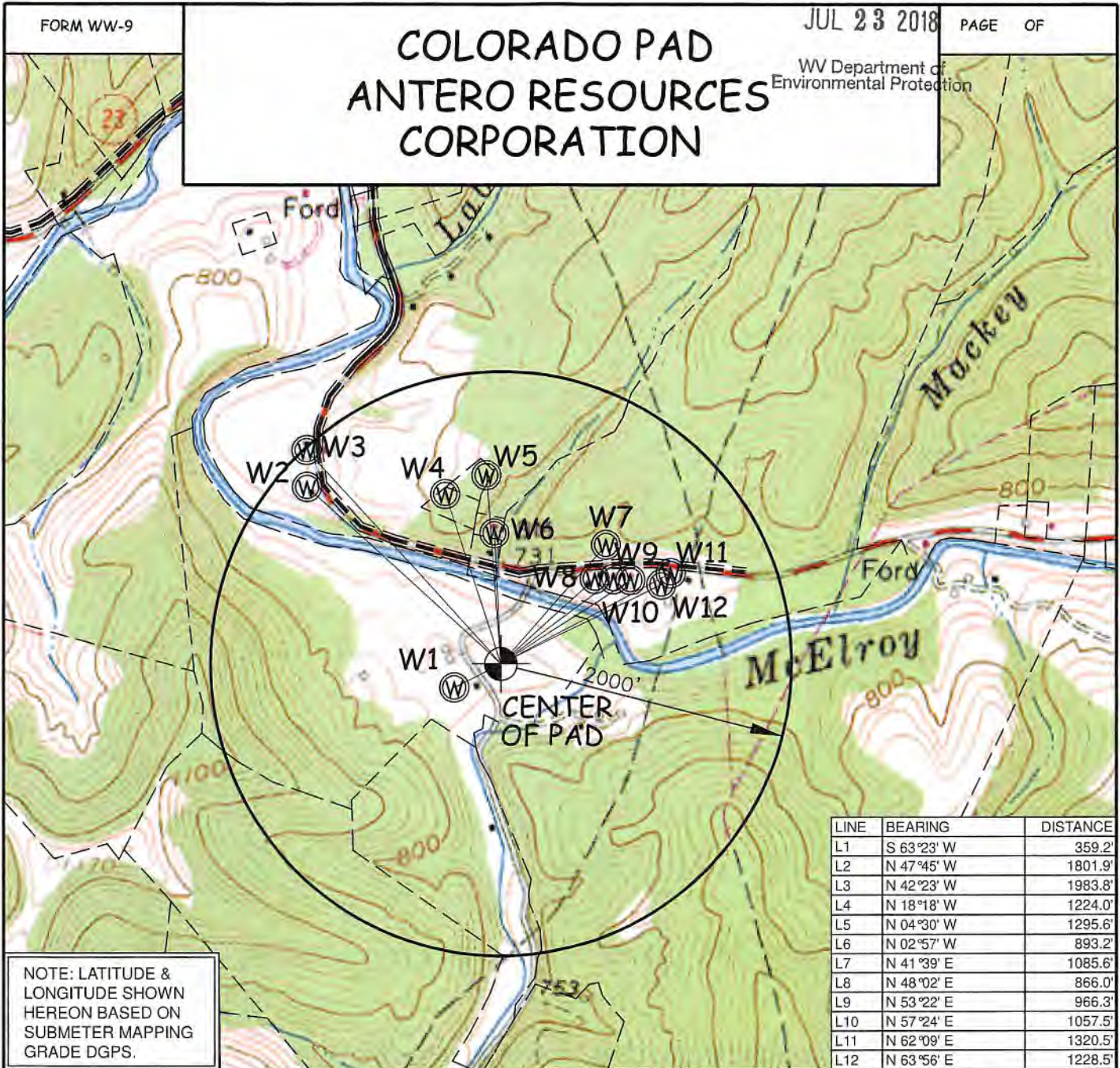
JUL 23 2018

WV Department of
Environmental Protection

FORM WW-9

COLORADO PAD ANTERO RESOURCES CORPORATION

WV Department of
Environmental Protection



LINE	BEARING	DISTANCE
L1	S 63°23' W	359.2'
L2	N 47°45' W	1801.9'
L3	N 42°23' W	1983.8'
L4	N 18°18' W	1224.0'
L5	N 04°30' W	1295.6'
L6	N 02°57' W	893.2'
L7	N 41°39' E	1085.6'
L8	N 48°02' E	866.0'
L9	N 53°22' E	966.3'
L10	N 57°24' E	1057.5'
L11	N 62°09' E	1320.5'
L12	N 63°56' E	1228.5'

NOTE: LATITUDE & LONGITUDE SHOWN HEREON BASED ON SUBMETER MAPPING GRADE DGPS.

WELL	SURFACE OWNER	ADDRESS	DIST-TAX MAP-PAR	WELL LATITUDE	WELL LONGITUDE
W1	MICHEAL D SLOSS	P.O. BOX 2 , INDIAN CREEK , ALMA , WV 26320	5-16-02	39°24'08.83"	80°47'21.48"
W2	JIMMIE F GRIFFIN	4028 McElroy Creek Road, Alma, WV 26320	5-16-08	39°24'22.26"	80°47'34.64"
W3	JIMMIE F GRIFFIN	4028 McElroy Creek Road, Alma, WV 26320	5-16-08	39°24'24.76"	80°47'34.73"
W4	ROGER LEE GRIFFIN	4211 McElroy Creek Road, Alma, WV 26320	5-16-08.1	39°24'21.90"	80°47'22.53"
W5	ROGER LEE GRIFFIN	4211 McElroy Creek Road, Alma, WV 26320	5-16-08.2	39°24'23.22"	80°47'18.95"
W6	TODD ORR	4279 McElroy Creek Road, Alma, WV 26320	5-16-19	39°24'19.28"	80°47'18.17"
W7	ALBERT BEBEE	HC 74 BOX 114A , ALMA , WV 26320	5-16-18	39°24'18.59"	80°47'08.38"
W8	KES INVESTMENTS 2	1225 DARLINGTON OAK CIR NE , ST. PETERSBURG, FL 33703	5-16-03	39°24'16.29"	80°47'09.33"
W9	KES INVESTMENTS 4	1225 DARLINGTON OAK CIR NE , ST. PETERSBURG, FL 33703	5-16-04	39°24'16.28"	80°47'07.65"
W10	KES INVESTMENTS 3	1225 DARLINGTON OAK CIR NE , ST. PETERSBURG, FL 33703	5-16-05	39°24'16.23"	80°47'06.18"
W11	KES INVESTMENTS 3	1225 DARLINGTON OAK CIR NE , ST. PETERSBURG, FL 33703	5-16-06	39°24'16.73"	80°47'15.96"
W12	MOORE E DONALD	770 NEWELL ST , PAINESVILLE , OH 44077	5-16-07	39°24'15.96"	80°47'03.46"

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

TOPO SECTION(S) OF :
SHIRLEY 7.5'

JOB #: 17-038WA

FILE: COLORADOWATERMAP

SCALE : 1-INCH = 1000-FEET

0' 1000' 2000' 3000'



DATE: 6/19/2018

DRAWN BY: D.J.H.

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: 6/29/2018 **Date of Planned Entry:** *7/9/2018

*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: Lloyd D. & Donna J. Talkington

Address: 5812 Interboro Ave
Pittsburgh, PA 15207

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

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Office of Oil and Gas
JUL 23 2018
WV Department of
Environmental Protection

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. 39.4029194, -80.7881833</u>
County: <u>Tyler</u>	Public Road Access: <u>Pratts Run Rd</u>
District: <u>McElroy</u>	Watershed: <u>McElroy Creek</u>
Quadrangle: <u>Shirley 7.5'</u>	Generally used farm name: <u>Lloyd Talkington</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: <u>Antero Resources Corporation</u>	Address: <u>1615 Wynkoop Street</u>
Telephone: <u>(303) 357-6820</u>	<u>Denver, CO 80202</u>
Email: <u>kcox@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 of your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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

Minerals Owners:

Tax Parcel ID: 5-19-2

Owner: Wil E. Morris Trust
c/o Industry Consulting Group, IN ✓
Address: PO Box 659
Wichita Falls, TX 76307-0659

Owner: Thomas E. Clutts,
heir of Claude and Ralph Reed
Address: 133 E. 16th St., Spc. 19 ✓
Costa Mesa, CA 92607

Owner: Shelia K. Watkins
Address: 270 Duerr Street
New Martinville, WV 26155 ✓

Owner: Marvin D. Reed,
heir of Claude and Ralph Reed
Address: 1840 Chamberlin ✓
Colorado Springs, CO 80906

Owner: Blackrock Enterprises, LLC
Address: P.O. Box 342
Salem, WV 26426-0342 ✓

Owner: Lloyd D. and Donna J. Talkington *Covered ✓*
Address: 5812 Interboro Ave.
Pittsburgh, PA 15207

Owner: Richard Bolton Reed,
heir of Claude and Ralph Reed ✓
Address: 7620 S. Lost Ranger Peak
Littleton, CO 80127

Owner: Sandra Gail Reed,
heir of Claude and Ralph Reed ✓
Address: 17625 N. 7th St. Apt. #1046
Phoenix, AZ 85022

Owner: Caroline Sue Perkins,
heir of Claude and Ralph Reed ✓
Address: 823 Yerrick Rd.
Akron, OH 44312

Owner: Troy T. Reed,
heir of Claude and Ralph Reed ✓
Address: 4041 Tamarack Ave.
Grove City, OH 43123

Owner: Ernest W. Heierle,
heir of Claude and Ralph Reed ✓
Address: 514 S. Campbell St.
Macomb, IL 61455

Owner: Eric Von Clutts,
heir of Claude and Ralph Reed ✓
Address: 14802 Leibacher Ave.
Norwalk, CA 90650

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Office of Oil and Gas
JUL 23 2018
WV Department of
Environmental Protection

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: 07/20/2018

Date Permit Application Filed: 07/20/2018

RECEIVED
Office of Oil and Gas

JUL 23 2018

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

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

HAND
DELIVERY

WV Department of
Environmental Protection

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: Lloyd D. & Donna J. Talkington

Name: _____

Address: 5812 Interboro Avenue

Address: _____

Pittsburg, PA 15207

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>518252m</u>
County:	<u>Tyler</u>		Northing:	<u>4361521m</u>
District:	<u>McElroy</u>	Public Road Access:	<u>CR 23</u>	
Quadrangle:	<u>Shirley 7.5'</u>	Generally used farm name:	<u>Lloyd Talkington</u>	
Watershed:	<u>Outlet McElroy 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: Antero Resources Corporation

Address: 1615 Wynkoop Street

Telephone: (303) 357-7223

Denver, CO 80202

Email: mgriffith@anteroresources.com

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.



Antero Resources
 535 White Oaks Blvd.
 Bridgeport, WV 26330
 Office 304.842.4100
 Fax 304.842.4102

November 2, 2018

Lloyd D. Talkington and Donna J. Talkington - **Certified Mail No. 7009 3410 0001 3100 9624**
 5812 Interboro Avenue
 Pittsburgh, PA 15207

And

Harlan W. Talkington and Chin Hue Talkington – **Certified Mail No. 7009 3410 0001 3100 9617**
 5806 Interboro Avenue
 Pittsburgh, PA 15207

NOTICE OF EXERCISE OF OPTION

THIS NOTICE OF EXERCISE OF OPTION is made this 2nd day of November, 2018, by **Antero Resources Corporation**, a Delaware corporation, party of the first part (the “Optionee”), to Lloyd D. Talkington, Donna J. Talkington, Harlan W. Talkington and Chin Hue Talkington, parties of the second part (the “Optionors”).

WHEREAS, the Optionee and the Optionors entered into an Option to Purchase Real Estate in May 2018 (the “Option Agreement”), whereby the Optionors granted Optionee an option to purchase certain property described therein; and

WHEREAS, the Optionee desires to exercise the option granted unto it by the Option Agreement to acquire the property described in said agreement.

NOW, THEREFORE, WITNESSETH, that for and in consideration of the foregoing premises, Optionee does hereby provide written notice of the exercise of the option to acquire the property described in the Option Agreement and granted unto it by the Option Agreement. Antero is prepared to close within the time period set forth in the Option Agreement and hereby requests to close on Tuesday, November 13, 2018, at 3:00 p.m. at Steptoe & Johnson PLLC at 400 White Oaks Boulevard, Bridgeport, WV 26330.

IN WITNESS WHEREOF, Optionee has signed its name hereto as of the day and year first hereinabove written.

ANTERO RESOURCES CORPORATION,
 a Delaware corporation

By: *Randall C. Johnson*
 Its: *attorney*

RECEIVED
 Office of Oil and Gas

NOV 14 2018

WV Department of
 Environmental Protection

7009 3410 0001 3100 9624

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com

OFFICIAL USE

Postage	\$
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.75
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	\$ 6.67



Lloyd D. Talkington and Donna J. Talkington
5812 Interboro Avenue
Pittsburgh, PA 15207

PS Form 3800, August 2006 See Reverse for Instructions

7009 3410 0001 3100 9617

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com

OFFICIAL USE

Postage	\$
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.75
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	\$ 6.67



Harlan W. Talkington and Chin Hue Talkington
5806 Interboro Avenue
Pittsburgh, PA 15207

PS Form 3800, August 2006 See Reverse for Instructions

RECEIVED
Office of Oil and Gas
NOV 14 2018
WV Department of
Environmental Protection

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL LOCATION RESTRICTION WAIVER

The well operator, Antero Resources Corporation is applying for a permit from the State of West Virginia to conduct oil or gas well work. Please be advised that well work permits are valid for twenty-four (24) months.

Well Location Restrictions

Pursuant to West Virginia Code § 22-6A-12(a), 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.

WAIVER

I, Ronald J. Lytle, hereby state that I have read the Instructions to Persons Named on Page WW-6A and the associated provisions listed above, and that I have received copies of a Notice of Application, an Application for a Well Work Permit on Form WW-6A and attachments consisting of pages one (1) through 9, including the erosion and sediment control plan, if required, and the well plat, all for proposed well work on the tract of land as follows:

State: West Virginia UTM NAD 83 Easting: 518258.28 (Zone 17 Meters)
County: Tyler UTM NAD 83 Northing: 4381513.53 (Zone 17 Meters)
District: McElroy Public Road Access: Pratts Run Road
Quadrangle: Shirley Generally used farm name: Talkington
Watershed: Outlet McElroy Creek

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials and I therefore waive all well site restrictions listed under West Virginia Code § 22-6A-12(a).

WELL SITE RESTRICTIONS BEING WAIVED

*Please check all that apply

- EXISTING WATER WELLS
- DEVELOPED SPRINGS
- DWELLINGS
- AGRICULTURAL BUILDINGS

Instrument No 119151
Date Recorded 11/26/2018
Amount Two 00
Pages Recorded 1
App-Pad 695-575
Encoding Fee \$5.00
Additional \$6.00

FOR EXECUTION BY A NATURAL PERSON

Signature: [Signature]
Print Name: Barbara Talkington
Date: 11-16-18
FOR EXECUTION BY A CORPORATION, ETC.
Company: _____
By: _____
Its: _____
Signature: _____
Date: _____

Well Operator: _____
By: _____
Its: _____

Signature: _____
Telephone: _____



Subscribed and sworn before me this 16th day of NOV. 2018

Timothy Raymond Rains Notary Public

My Commission Expires MARCH 11, 2019

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 of your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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

I, Richard J. Tyler, hereby state that I have read the Instructions to Persons Named on Page WW-6A and the associated provisions listed above, and that I have received copies of a Notice of Application, an Application for a Well Work Permit on Form WW-6A and attachments consisting of pages one (1) through 96, including the erosion and sediment control plan if required, and the well plat, all for proposed well work on the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83 Easting: <u>518256.28 (Zone 17)</u>	<u>TYLER County 03:50:55 PM</u>
County: <u>Tyler</u>	UTM NAD 83 Northing: <u>4361513.53 (Zone 17)</u>	<u>Instrument No 1191162</u>
District: <u>McElroy</u>	Public Road Access: <u>Pratts Run Road</u>	<u>Date Recorded 11/28/2018</u>
Quadrangle: <u>Shirley</u>	Generally used farm name: <u>Talkington</u>	<u>Document Type OG</u>
Watershed: <u>Outlet McElroy Creek</u>		<u>Pages Recorded 1</u>

I further state that I have no objection to the planned work described in these materials, and I have no objection to any restrictions issued on those materials and I therefore waive all well site restrictions listed under West Virginia Code § 22-6A-12(a).

WELL SITE RESTRICTIONS BEING WAIVED

*Please check all that apply

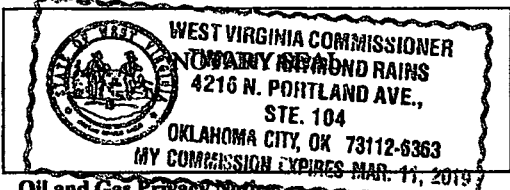
- EXISTING WATER WELLS
- DEVELOPED SPRINGS
- DWELLINGS
- AGRICULTURAL BUILDINGS

FOR EXECUTION BY A NATURAL PERSON
 Signature: [Signature]
 Print Name: Richard J. Tyler
 Date: 11-16-18

FOR EXECUTION BY A CORPORATION, ETC.
 Company: _____
 By: _____
 Its: _____
 Signature: _____
 Date: _____

Well Operator: _____
By: _____
Its: _____

Signature: _____
Telephone: _____



Subscribed and sworn before me this 16th day of NOV. 2018
Timothy Raymond Raines Notary Public
My Commission Expires MARCH 11, 2019

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ANTERO RESOURCES ATTN: LESLEY HINZMAN
535 WHITE OAKS BLVD
BOWLING GREEN, WV 26422

STATE OF WEST VIRGINIA
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ANTERO RESOURCES ATTN: LESLEY HINZMAN
535 WHITE OAKS BLVD
MARTINSBURG, WV 26151

WAIVER

I, Rico J. Lyles, hereby state that I have read the Instructions to Persons Named on Page WW-6A and the associated provisions listed above, and that I have received copies of a Notice of Application, an Application for a Well Work Permit on Form WW-6A and attachments consisting of pages one (1) through 9, including the erosion and sediment control plan, if required, and the well plat, all for proposed well work on the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83 Easting: <u>518256.28 (Zone 17)</u>	<u>Neil A Archer II</u>
County: <u>Tyler</u>	UTM NAD 83 Northing: <u>4381513.53 (Zone 17)</u>	<u>Meigs County 03:51:52 PM</u>
District: <u>McElroy</u>	Public Road Access: <u>Pratts Run Road</u>	<u>Instrument No 1191163</u>
Quadrangle: <u>Shirley</u>	Generally used farm name: <u>Talkington</u>	<u>Date Recorded 11/22/2018</u>
Watershed: <u>Outlet McElroy Creek</u>		<u>Document Type OG</u>

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials and I therefore waive all well site restrictions listed under West Virginia Code § 22-6A-12(a).

WELL SITE RESTRICTIONS BEING WAIVED

*Please check all that apply

- EXISTING WATER WELLS
- DEVELOPED SPRINGS
- DWELLINGS
- AGRICULTURAL BUILDINGS

FOR EXECUTION BY A NATURAL PERSON

Signature: Ch H. Talkington
 Print Name: CHIN H. TALKINGTON
 Date: 11/16/18
FOR EXECUTION BY A CORPORATION, ETC.
 Company: _____
 By: _____
 Its: _____
 Signature: _____
 Date: _____

Well Operator: _____
By: _____
Its: _____

Signature: _____
Telephone: _____



Subscribed and sworn before me this 16th day of NOV. 2018

Timothy Raymond Rains Notary Public

My Commission Expires MARCH 11, 2019

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DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
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WAIVER

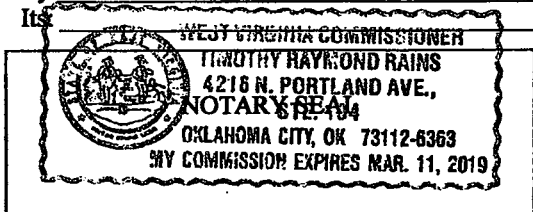
I, Richard J. Lytle, hereby state that I have read the Instructions to Persons Named on Page WW-6A and the associated provisions listed above, and that I have received copies of a Notice of Application, an Application for a Well Work Permit on Form WW-6A and attachments consisting of pages one (1) through 96, including the erosion and sediment control plan, if required, and the well plat, all for proposed well work on the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83 Easting: <u>518256.28 (Zone 17 West)</u>	Instrument No <u>1191164</u>
County: <u>Tyler</u>	UTM NAD 83 Northing: <u>4361513.53 (Zone 17 North)</u>	Date Recorded <u>11/28/2018</u>
District: <u>McElroy</u>	Public Road Access: <u>Pratts Run Road</u>	Document Type <u>OG</u>
Quadrangle: <u>Shirley</u>	Generally used farm name: <u>Talkington</u>	Pages Recorded <u>1</u>
Watershed: <u>Outlet McElroy Creek</u>		Book-Page <u>625-576</u>

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials and I therefore waive all well site restrictions listed under West Virginia Code § 22-6A-12(a).

WELL SITE RESTRICTIONS BEING WAIVED *Please check all that apply <input type="checkbox"/> EXISTING WATER WELLS <input type="checkbox"/> DEVELOPED SPRINGS <input checked="" type="checkbox"/> DWELLINGS <input type="checkbox"/> AGRICULTURAL BUILDINGS	FOR EXECUTION BY A NATURAL PERSON Signature: <u>Donna J. Lytle</u> Print Name: <u>DONNA J. LYTLE</u> Date: <u>11-16-18</u>
	FOR EXECUTION BY A CORPORATION, ETC. Company: _____ By: _____ Its: _____ Signature: _____ Date: _____

Well Operator: _____ Signature: _____
By: _____ Telephone: _____
Its: _____



Subscribed and sworn before me this 16th day of NOV. 2018
Timothy Raymond Rains Notary Public
My Commission Expires MARCH 11, 2019

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ANTERO RESOURCES ATTN: LESLEY HINZMAN
535 WHITE OAKS BLVD
BRIARCLIFF, WV 26034



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways

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

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

July 18, 2018

Jill M. Newman
 Deputy Commissioner

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

Subject: DOH Permit for the Neat Pad, Tyler County
 Avalanche Unit 2H Well Site

RECEIVED
 Office of Oil and Gas

JUL 23 2018

WV Department of
 Environmental Protection

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2015-0468 which has been issued to Antero Resources Corporation for access to the State Road for a well site located off of Tyler County Route 7 SLS.

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

Very Truly Yours,

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

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

List of Anticipated Additives Used for Fracturing or Stimulating Well

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

RECEIVED
Office of Oil and Gas

JUL 23 2018

WV Department of
Environmental Protection

COLORADO EAST WELL PAD & WATER CONTAINMENT PAD

RECEIVED
Office of Oil and Gas

JUL 23 2018

WV Department of
Environmental Protection

SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

McELROY DISTRICT, TYLER COUNTY, WEST VIRGINIA
OUTLET McELROY CREEK WATERSHED

LOCATION COORDINATES:

ACCESS ROAD "A" ENTRANCE
LATITUDE: 39.403204 LONGITUDE: -80.787987 (NAD 83)
LATITUDE: 39.403278 LONGITUDE: -80.787981 (NAD 27)
N 4381610.17 E 518253.74 (UTM ZONE 17 METERS)

ACCESS ROAD "B" ENTRANCE
LATITUDE: 39.403204 LONGITUDE: -80.788102 (NAD 83)
LATITUDE: 39.403278 LONGITUDE: -80.788099 (NAD 27)
N 4381610.41 E 518252.54 (UTM ZONE 17 METERS)

ACCESS ROAD "C" ENTRANCE
LATITUDE: 39.402614 LONGITUDE: -80.788801 (NAD 83)
LATITUDE: 39.402733 LONGITUDE: -80.788825 (NAD 27)
N 4381630.13 E 518195.95 (UTM ZONE 17 METERS)

ACCESS ROAD "D" ENTRANCE
LATITUDE: 39.402828 LONGITUDE: -80.788284 (NAD 83)
LATITUDE: 39.402347 LONGITUDE: -80.788437 (NAD 27)
N 4381457.41 E 518230.30 (UTM ZONE 17 METERS)

CENTER OF TANK
LATITUDE: 39.402859 LONGITUDE: -80.788975 (NAD 83)
LATITUDE: 39.402378 LONGITUDE: -80.788148 (NAD 27)
N 4381405.88 E 518169.10 (UTM ZONE 17 METERS)

CENTROID OF PAD
LATITUDE: 39.402933 LONGITUDE: -80.787991 (NAD 83)
LATITUDE: 39.402858 LONGITUDE: -80.788184 (NAD 27)
N 4381615.53 E 518256.28 (UTM ZONE 17 METERS)

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 IN FLOOD ZONE "A" PER FEMA MAP NUMBER #54095C01750. SEE FLOOD STUDY FOR ADDITIONAL INFORMATION.

MISS UTILITY STATEMENT:

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

ENTRANCE PERMIT:

ANTERO RESOURCES CORPORATION WILL OBTAIN AN ENCROACHMENT PERMIT (FORM 6M-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 MAY, 2018 BY GAI 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 MAY 22, 2018 STREAM AND WETLAND DELINEATION INDEX MAP WAS PREPARED BY GAI 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 APPLICANT/DEVELOPER CONSULT WITH AN EXPERT TO GAIN FURTHER CLARIFICATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHOULD 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.

PROJECT CONTACTS:

CHARLES E. COMPTON, III - SURVEYING COORDINATOR
CELL: (304) 719-8440

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

ENGINEER/SURVEYOR:
NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
OFFICE: (580) 822-4155 CELL: (540) 886-5747

ENVIRONMENTAL:
GAI CONSULTANTS, INC.
JASON A. COOK - SENIOR ENVIRONMENTAL
OFFICE: (304) 926-8100 CELL: (300) 382-8217

ELI WAGGONER - ENVIRONMENTAL ENGINEER
OFFICE: (304) 842-4068 CELL: (304) 478-9770

JON McEYERS - OPERATIONS SUPERINTENDENT
OFFICE: (202) 357-6769 CELL: (303) 900-8423

AARON KUNTZER - CONSTRUCTION SUPERVISOR
CELL: (405) 287-8344

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

RESTRICTIONS NOTES:

- THERE ARE NO PERSONAL STREAM, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE IS A WETLAND ADJACENT TO THE WATER CONTAINMENT PAD AND STOCKPILE WHICH WILL REMAIN UNDISTURBED.
- THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
- THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
- THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL PAD BEING DRILLED.
- THERE IS AN EXISTING HUNTING CABIN 485.6 FEET FROM THE CENTER OF THE WELL PAD.
- THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,000 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

APPROVED
WVDEP OOG

8/14/2018

USGS 7.5 SHIRLEY QUAD MAP



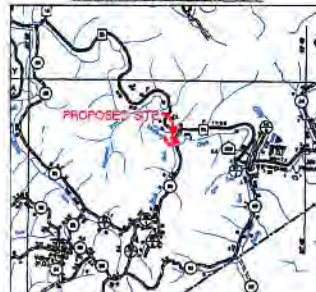
WEST VIRGINIA STATE PLANE COORDINATE SYSTEM
ELEVATION BASED ON NAVD83
PROJECTIONS BY SURVEYOR CHARLES E. COMPTON III

WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

WYDOH COUNTY ROAD MAP



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 36-6.

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.

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:

- COVER SHEET
- CONSTRUCTION AND E&S CONTROLS NOTES
- LEGEND
- MATERIAL QUANTITIES & VOLUMES
- STORM DRAINAGE & E&S COMPUTATIONS
- EXISTING CONDITIONS
- WELL PAD & WATER CONTAINMENT PAD PLAN
- WELL PAD GRADING PLAN
- ACCESS ROAD PROFILES
- WELL PAD, WATER CONTAINMENT PAD, STAGING AREA, & STOCKPILE SECTIONS
- WELL PAD SECTIONS
- ACCESS ROAD SECTIONS
- CONSTRUCTION DETAILS
- WELL PAD & WATER CONTAINMENT PAD RECLAMATION PLAN

COLORADO EAST LIMITS OF DISTURBANCE AREA (H.C.)

Impacts to Lloyd D. & Doreen J. Thibaulton TR 16-3	
Access Road "A" (214')	0.02
Access Road "B" (53')	0.12
Access Road "C" (89')	0.16
Access Road "D" (57')	0.28
County Route 80 Upgrade* (1,060')	1.17
Staging Area	1.27
Well Pad	4.67
Water Containment Pad	4.67
Excise/Topsoil Material Stockpiles	5.18
Total Affected Area	18.24
Total Wooded Acres Disturbed	1.57

Proposed Well Name	WV North NAD 83	WV North NAD 27	UTM (METERS) Zone 17	NAD 83 Lat & Long
Stratopde	N 331467.28	N 331522.72	N 4381629.85	LAT 39.24-11.0579
Unit 2H	E 182081.54	E 182045.25	E 112547.19	LONG 80-41-11.0285
Stratopde Unit 2H	N 331468.91	N 33124.18	N 4381629.85	LAT 39.24-10.9742
Unit 2H	E 182088.74	E 180445.64	E 112548.82	LONG 80-41-10.9689
Avaleynche	N 331463.27	N 331915.83	N 4381522.70	LAT 39.24-10.8925
Unit 1H	E 182081.59	E 180445.74	E 112548.44	LONG 80-41-10.8011
Avaleynche Unit 2H	N 331471.73	N 33207.28	N 4381521.72	LAT 39.24-10.8034
Unit 2H	E 182097.13	E 180456.84	E 112552.07	LONG 80-41-10.8324
Avaleynche Unit 2H	N 331463.18	N 331484.84	N 4381618.64	LAT 39.24-10.7201
Unit 2H	E 182082.32	E 180401.15	E 112525.75	LONG 80-41-10.7599
Marionch	N 331464.96	N 331492.03	N 4381510.87	LAT 39.24-10.6284
Unit 1H	E 182007.52	E 180468.33	E 112528.32	LONG 80-41-10.6978
Marionch Unit 2H	N 331465.09	N 331481.48	N 4381513.39	LAT 39.24-10.5927
Unit 2H	E 182012.72	E 180471.83	E 112526.90	LONG 80-41-10.6071
Marionch Unit 2H	N 331467.82	N 331472.81	N 4381510.91	LAT 39.24-10.4752
Unit 2H	E 182017.91	E 180472.72	E 112528.90	LONG 80-41-10.5024
Well Pad Elevation	763.8			

COLORADO EAST INTERMITTENT STREAM IMPACT (LINEAR FEET)

Stream and Impact Cause	Permanent Impacts		Temp. Impacts		Disturb. (LP)	Total Impact (LP)
	Coverd (LP)	Reflow/Outlets (LP)	Conductivity (CFS)	Temp. (CFS)		
Stream 5 (Timber-Mat)	0	0	0	72	0	0

NAVITUS
ENERGY ENGINEERING
Telephone: (888) 682-4486 | www.NavitusEng.com

REVISION	DATE

Antero
THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

COLORADO EAST
WELL PAD & WATER CONTAINMENT PAD
McELROY DISTRICT
TYLER COUNTY, WEST VIRGINIA



DATE 06/09/2018
SCALE AS SHOWN
SHEET 1 OF 21

