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Response to Public Comment

R13-3260

Antero Treatment LLC

Antero Clearwater Facility

Date: December 7, 2015

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BACKGROUND INFORMATION

Antero Resources Corporation (Antero) submitted an air quality permit application to construct and operate a water treatment facility that was designed to treat wastewater associated with shale development to an effluent water purity suitable for surface discharge or reuse with future oil and gas operations on July 22, 2015. During the week of October 20, 2015, pursuant to §45-13-8, the West Virginia Division of Air Quality (DAQ) provided notice to the public of a preliminary determination to issue Permit R13-3260. The Class I legal advertisements published in *The Herald Record* on October 20, 2015 and the *Ritchie Gazette* on October 21, 2015. At that time, the draft permit and Engineering Evaluation/Fact Sheet were made available to the public for review.

The public notice was followed by a public comment period (required to be a minimum of 30 days under §45-13-8) scheduled to end at 5:00 P.M. on November 20, 2015. During the public comment period, the DAQ accepted comments on our preliminary determination to issue Permit R13-3260 and on all documents related thereto. To provide information on the permitting action and to facilitate the submission of comments, the DAQ held, on November 5, 2015, pursuant to §45-13-9, a public meeting concerning Permit R13-3260 at the Greenwood Volunteer Fire Department in Greenwood, WV.

Antero Resources Corporation changed the name of the company and facility with the DAQ on November 25, 2015. The name of the company is now Antero Treatment LLC and the facility is now called Antero Clearwater Facility.

OVERVIEW OF COMMENTS RECEIVED

The DAQ received written comments during the public comment period. Comments were received by and/or on behalf of the following individuals, groups, and organizations:

- Mirijana Beram
- Susan Cleaver
- Howard Sitler
- Tina Del Prete
- T. Stumpf
- Duane G. Nichols, Ph.D.
- S. Tom Bond, Ph.D.
- Vickie Nutter
- Charles and Jane Hearne
- James D. Friend
- Don Jackson
- James Shreves
- Eva Shreves
- Bill and Gayle Clark
- Julie Archer (West Virginia Surface Owners' Rights Organization)
- Robin Blakeman (Ohio Valley Environmental Coalition)
- Gary Zuckett (West Virginia Citizen Action Group)
- Cynthia Ellis (WV Highlands Conservancy)
- Linda Ireland

- Jody Mohr
- David M. Scott
- Eric Bernhardt

Pursuant to §45-13-8.8, all submitted comments received during the public comment period have been reviewed and are appropriately addressed in this document.

ORGANIZATION OF COMMENT RESPONSE

The DAQ's response to the submitted comments includes both a general and specific response section. The general response defines issues over which the DAQ has authority and by contrast, identifies those issues that are beyond the purview of the DAQ. The general response also describes the statutory basis for the issuance/denial of a permit, discusses the role of the pre-construction permitting process in the larger divisional goal of maintaining air quality in WV.

The specific response summarizes each relevant non-general comment that falls within the purview of the DAQ and provides a response to it. This document does not reproduce all the comments here (they are available for review in the R13-3260 file). Instead, each comment is summarized and key points are listed. The DAQ makes no claim that the summaries are complete; they are provided only to place the responses in a proper context. For a complete understanding of submitted comments, please see the original documents in the file. The DAQ responses, however, are directed to the entire comments and not just to what is summarized. Comments that are not directly identified and responded to in the specific response section of this document are assumed to be answered under the general response section.

GENERAL RESPONSE TO COMMENTS

Statutory Authority of the DAQ

The statutory authority of the DAQ is given under the Air Pollution Control Act (APCA) - West Virginia Code §22-5-1, *et. seq.* - which states, under §22-5-1 ("Declaration of policy and purpose"), that:

> It is hereby declared the public policy of this state and the purpose of this article to achieve and maintain such levels of air quality as will protect human health and safety, and to the greatest degree practicable, prevent injury to plant and animal life and property, foster the comfort and convenience of the people, promote the economic and social development of this state and facilitate the enjoyment of the natural attractions of this state.

In regards to the questions that surround a possible landfill and water discharge (NPDES) permit associated with this permitting action, Antero has not made an application to date for either with WVDEP. Any landfill approval would be done by Division of Water and Waste Management (DWWM). Waste Management – DWWM contact information is 304-926-0465. Any water discharge approval would be done by Division of Water and Waste Management (DWWM). Water Resources – DWWM contact information is 304-926-0495.

DAQ Permitting Process in Context

It is important to note that the DAQ permitting process is but one part of a system that works to meet the intent of the APCA in WV. The DAQ maintains a Compliance/Enforcement (C/E) Section, an Air Monitoring Section, a Planning Section, *etc.* to effect this. Most pertinent to the permitting process, the C/E Section regularly inspects permitted sources to determine the compliance status of the facility including compliance with all testing, monitoring, record-keeping, and reporting requirements.

General Response Conclusion

In conclusion, in response to all commenters who referenced substantive non-air quality issues, the APCA and 45CSR13 does not grant the DAQ the authority to take into consideration such issues in determining to issue or deny the permit. Further, the requirements of 45CSR13 require the DAQ to, when denying a permit, explicitly state the reason pursuant to §45-13-5.7. Additionally, the permit is but the beginning of the involvement of the DAQ with a source. After issuance, the facility will receive regular inspections to determine compliance with the requirements as outlined in the applicable permit.

SPECIFIC RESPONSES TO COMMENTS

COMMENT #1

I want to respectfully request that a public meeting be held to discuss this permit application.

My concerns related to this are many. Among them are the following:

a. The nature of the public notice is deceptive in that no mention is made of the nature of the "water" being treated. One of my local officials, Commissioner Greg Robinson, stated that he was told this once the water is "treated" it will be drinkable.

b. I am concerned the permit may not be taking into consideration the air pollution that will may result from the increased truck traffic that will be entering the proposed treatment facility.

c. the proximity to a low lying community that is in close proximity to the site

d. the possibility of the radioactive nature of the "water" being processed

e. adding this pollution to an area that already has numerous air pollution sources related to the drilling boom will only increase the health risks to the people living in this region.

f. #15 of the permit application states that this facility will be operational 24 hours per day, 7 days per week, and 52 weeks per year.

My concern here is that additional factors will include light, noise, traffic, smell & dust pollution 24 hours per day, 7 days per week, and 52 weeks per year...

All of these can have detrimental effects on the population living in the region.

g. #29 of the application states that there will be a "flare" present.
I am unclear as to what this means exactly...What gases are going to be burned off by the flare? Will the flare be running 24 hours per day, 7 days per week, and 52 weeks per year?

Aren't flares typically present when gases are being burned off? If this is a "water" treatment facility, what is the flammable gas source? Is there "flammable gas" in the "water" being treated?

h. I also find it distressing that only "ONE Class I Legal Advertisement is required in a newspaper of general circulation in the area where the source is or will be located".

The location of this site is very close to the County line...The circulation of the Herald Record is small and does not reflect the population that will be affected by this facility.

i. It is also my understanding that a permit has been applied for a Class F Landfill on this same property. Will the air quality permit, if one is required for the landfill, be aggregated with the one under current consideration (017-00157)?

Am I correct in thinking that this would be considered contiguous as far as the air quality permits are concerned?

j. the location is close to headwaters of a couple of streams.

Any air pollution in these streams will be concentrated due to small volume of waters that are present.

k. I also find it disturbing that Antero has held no PUBLIC meetings to notify my community of what is being planned.

Once again, I respectfully request that a public meeting be held to discuss this.
I would also request that this meeting be held in close proximity of the proposed site. The old Greenwood Grade School may be a possibility. I think that it is currently being used by the Greenwood Volunteer Fire Department.
Received From: Mirijana Beram

DAQ Response
The initial public notice Antero published met the Notice Level A requirements of 45CSR13 Section 8.3. Additionally, the public notice provided WVDEP contact information for additional information and the permit application was available for review on the WVDEP DAQ website. The DAQ met the provisions of Notice Level B and published the notice of intent to issue in The *Herald Record* on October 20, 2015 and the *Ritchie Gazette* on October 21, 2015.

The permit application does take into account the fugitive dust haulroad emissions associated with this operation, which includes influent water trucks, delivery trucks, sludge/wetcake trucks and worker vehicles. As stated at the public meeting at the Greenwood Volunteer Fire Department on November 5, 2015, the DAQ does not have regulatory authority of mobile sources. This authority rests with the United States Environmental Protection Agency (USEPA).

It is the public policy of this state, and the purpose of Article 5 (Air Pollution Control Act) of the West Virginia Code, to achieve and maintain such levels of air quality as will protect human health and safety, and to the greatest degree practicable, prevent injury to plant and animal life and property, foster the comfort and convenience of the people, promote the economic and social development of this state and facilitate the enjoyment of the natural attractions of this state.

Antero has proposed air pollution control devices on their process tanks and truck unloading bay. Additionally, the proposed boilers are equipped with Continuous Emission Monitors (CEMs). As stated previously above, pursuant to §45-13-5.7, the DAQ shall issue a permit unless a determination is made that the proposed construction, modification, registration or relocation will violate applicable emission standards, will interfere with attainment or maintenance of an applicable ambient air quality standard, cause or contribute to a violation of an applicable air quality increment, or be inconsistent with the intent and purpose of this rule or W. Va. Code §22-5-1 et seq., in which case an order denying such construction, modification, relocation and operation shall be issued. Therefore, all air permit applications must be reviewed to determine if all applicable standards are met.

As stated at the public meeting, there are no federal or state air rules specific to oil and gas activities that regulate radionuclides. WV State Code prevents WVDAQ from being more stringent than the Federal Clean Air Act and the Federal Clean Air Act prevents WVDAQ from being less stringent than the Federal Clean Air Act. Even if WVDAQ could set an emission limit, there is no state or federal emission standard to compare such a limit to for compliance.

There is a thermal oxidizer that will be present to control the Volatile Organic Compounds (VOC) and Hazardous Air Pollutant (HAP) emissions associated with the process tanks and truck unloading bay. These units are covered and any off-gases generated from the process vent to the thermal oxidizer which has a destruction efficiency of 98% for VOCs and HAPs.

No landfill application has been received by WVDEP. Any landfill approval would be done by Division of Water and Waste Management (DWWM). Waste Management – DWWM contact information is 304-926-0465.

DAQ Action
None.

COMMENT #2
We are quite concerned here in Doddridge County to hear about the sitting of a fracking water treatment plant and a Class F industrial storage facility for fracking sludge/solids/radioactive materials(?)

Since they seem to be on the same or adjacent sites, will the air pollution parameters be combined, as we feel they should be?

We would like to request a public meeting to discuss this and other concerns about the air quality permitting process for this venture.
Received From: Susan Cleaver and Howard Sitler

DAQ Response
There has been no application made for a landfill at this site. Any landfill approval would be done by Division of Water and Waste Management (DWWM). Waste Management – DWWM contact information is 304-926-0465. According to Antero, they are exploring this option, but no decision has been made yet. If Antero decides to permit air pollution equipment for a landfill at this site, the Division of Air Quality will perform a source aggregation analysis and if it is determined these sites meet the criteria, all air emissions will be aggregated.

A public meeting was held on November 5, 2015 at the Greenwood Volunteer Fire Department.

DAQ Action
None.

COMMENT #3
I am totally against having this facility in our county. We already have tons of pollutants is our air, our water and our land because of the drilling industry without adding one more. When will enough be enough for the people of my county? Now I realize that a few folks will make some money from this and that the industry will make a lot of money and a few folks will have a job. But what about the rest of us? Doesn't anyone care about us that have to live with the consequences of all this industrialization of our county? All of this pollution? Doesn't anyone in you agency have an ounce of humanity in them to understand what all this means to the folks that are going to be stuck here? I do realize you are only doing your job and have to follow the rules as written. But have any of you said that the rules need to be changed to take into consideration everyone involved? If so, thank you. If not, why not? Folks are being sold a bill of goods that does not live up to expectations. And once the damage is done, it's too late. I am hoping you will hold a public meeting in Doddridge County for this proposed site. As a matter of fact, I feel that public meetings should be mandatory instead of us having to ask for them. just so you know, there are folks in this county that ARE paying attention.
Received From: Tina Del Prete and T. Stumpf

DAQ Response
It is the public policy of this state, and the purpose of Article 5 (Air Pollution Control Act) of the West Virginia Code, to achieve and maintain such levels of air quality as will protect human health and safety, and to the greatest degree practicable, prevent injury to plant and animal life and property, foster the comfort and convenience of the people, promote the economic and social development of this state and facilitate the enjoyment of the natural attractions of this state.

As stated previously above, pursuant to §45-13-5.7, the DAQ shall issue a permit unless a determination is made that the proposed construction, modification, registration or relocation will violate applicable emission standards, will interfere with attainment or maintenance of an applicable ambient air quality standard, cause or contribute to a violation of an applicable air quality increment, or be inconsistent with the intent and purpose of this rule or W. Va. Code §22-5-1 et seq., in which case an order denying such construction, modification, relocation and operation shall be issued. Therefore, all air permit applications must be reviewed to determine if all applicable standards are met. The proposed facility meets all applicable state and federal air quality regulations. An in-depth regulatory review is provided in the R13-3260 Engineering Evaluation.

A public meeting was held on November 5, 2015 at the Greenwood Volunteer Fire Department.

DAQ Action
None.

COMMENT #4
Because this is a very significant addition to our State, because the technology is new, because it will be working with toxic and hazardous materials, because there will be emissions in the form of solid waste, water and air pollution, for all these reasons and others, we herewith strongly request that:

1. a thirty or sixty day extension be provided for a deadline on this permit comment period,

and

2. a public hearing be schedule thereafter so as to inform the general public and collect additional comments.

Note: Because this is new and unproven technology, because it is new in WV, because it involves a new approach to the treatment of wastewaters, waste streams and liquids containing toxic chemicals; and, because proven quantities and compositions of waste streams are unknown, the above two requests are fully justified. The advertising of this permit was of a limited nature, inadequate to its importance and impacts.
Received From: Duane G. Nichols, Ph.D.

DAQ Response
This comment was received on August 27, 2015 during the initial public comment period. Antero is required to publish a legal ad notifying the public of their application. On August 28, 2015, the DAQ informed Mr. Nichols that once the DAQ has completed the application review – assuming the DAQ finds the source should meet all applicable rules and regulations – the DAQ will then publish a legal ad notifying the public of an intent to issue. This would be a 30 day public comment period. Therefore, there was no need to extend the public comment period at that time, as the application review was still ongoing. During the week of October 20, 2015, pursuant to §45-13-8, the West Virginia Division of Air Quality (DAQ) provided notice to the public of a preliminary determination to issue Permit R13-3260. The Class I legal advertisements published in *The Herald Record* on October 20, 2015 and the *Ritchie Gazette* on October 21, 2015. At that time, the draft permit and Engineering Evaluation/Fact Sheet were made available to the public for review.

The public notice was followed by a public comment period (required to be a minimum of 30 days under §45-13-8) scheduled to end at 5:00 P.M. on November 20, 2015. During the public comment period, the DAQ accepted comments on our preliminary determination to issue Permit R13-3260 and on all documents related thereto. To provide information on the permitting action and to facilitate the submission of comments, the DAQ held, on November 5, 2015, pursuant to §45-13-9, a public meeting concerning Permit R13-3260 at the Greenwood Volunteer Fire Department in Greenwood, WV.

DAQ Action
None.

COMMENT #5
"Wastewater treatment" does not mean a plant will take everything out of the water sent through it. A plan must be carefully designed to remove harmful substances from the water sent through such a facility. The Sandstrom facility proposed for Doddridge county uses a relatively new technology called moving bed biofilm reactor (MBBR) to treat fracking waste water. It has been used primarily for municipal waste, effecting oxidation of some of the water contents and by the effect of microorganisms.

Early in the fracking boom it was common to send flowback and produced water through municipal wastewater plants, designed to treat sewage water. Such treatment removes biological waste also by use of oxidation and microorganisms. However, industries like Pratt and Whitney in Bridgeport, for example, and many others in West Virginia and nationwide which have waste water flows containing heavy metals, inorganic compounds or organic compounds resistant to biological decomposition must employ other specialized treatment depending on the kind and quantity of pollutants. Such waters can be cleaned up effectively, but careful consideration of the chemistry must be involved. In fact, it is customary to keep sewage containing wastewater to itself and use separate onsite treatment for these industrial wastes, because it is expensive.

It is well known that fracking waste water contains biocides, and biological materials are at a minimum in it. Moving bed biofilm reactors are quite effective for sewage-type waste streams. They have been used for paper mill waste water treatment, poultry, cheese factories, slaughterhouses, phenolic wastewater, and the dairy industry, all involving bioorganic materials. Their principal advantage is occupying less space and less initial cost. They are also good at removing ammonia and carbon dioxide, which are not a problem in chemical waste streams. They leave a sludge which must be further processed and in some way sent to disposal.

Fracking waste includes formaldehyde, which is known to interfere with MBBR. Also, fracking wastewaters contain bromide ions, which result in trihalomethanes when they react with the chlorine used to purify drinking water down stream, which in turn causes cancer. Other chemicals unlikely to be removed are BTEX, lead and other heavy metals including arsenic, boric acid, diesel fuel, hydrofluoric acid, NORM and proprietary chemicals which include unknown components. There is no indication of what happens to these. Will this residue be buried?

A full and complete component and element material balance will help to show the extent of air quality concerns and information on trial operations with Doddridge county wastewaters with material balances are essential.

The air emissions from dissolved gases must also be given careful consideration. Time has been short, realizing the extensive nature of this application.

For these and other reasons, an extension of the comment period is herewith requested. For these and other reasons, a public hearing on an air permit for this facility is herewith requested.
Received From: S. Tom Bond, Ph.D.

DAQ Response
This comment was received on August 27, 2015 during the initial public comment period. Antero is required to publish a legal ad notifying the public of their application. On August 28, 2015, the DAQ informed Mr. Bond that once the DAQ has completed the application review – assuming the DAQ finds the source should meet all applicable rules and regulations – the DAQ will then publish a legal ad notifying the public of the intent to issue. This would be a 30 day public comment period. Therefore, there was no need to extend the public comment period at that time, as the application review was still ongoing. During the week of October 20, 2015, pursuant to §45-13-8, the West Virginia Division of Air Quality (DAQ) provided notice to the public of a preliminary determination to issue Permit R13-3260. The Class I legal advertisements published in *The Herald Record* on October 20, 2015 and the *Ritchie Gazette* on October 21, 2015. At that time, the draft permit and Engineering Evaluation/Fact Sheet were made available to the public for review.

The public notice was followed by a public comment period (required to be a minimum of 30 days under §45-13-8) scheduled to end at 5:00 P.M. on November 20, 2015. During the public comment period, the DAQ accepted comments on our preliminary determination to issue Permit R13-3260 and on all documents related thereto. To provide information on the permitting action and to facilitate the submission of comments, the DAQ held, on November 5, 2015, pursuant to §45-13-9, a public meeting concerning Permit R13-3260 at the Greenwood Volunteer Fire Department in Greenwood, WV.

The purpose of the air quality permit application review process is to make a determination of whether or not all applicable state and federal air regulations will be met. The proposed facility meets all applicable state and federal air quality regulations. An in-depth regulatory review is provided in the R13-3260 Engineering Evaluation and Permit R13-3260 contains all applicable air regulations.

DAQ Action
None.

COMMENT #6
The Sandstrom Facility will be located on a property approximately 950 yards from the Alvadore Pad (G70-A086) that is also a property of Antero Resources. The finding of contiguous or adjacent is made on a case by case basis. With that determination being left up to Air Quality permitting, I would hope that the emissions emitted from the Alvadore Pad be included in the emissions of the Sandstrom Facility.

With the addition of the Alvadore Pad, which is approximately 950 yards away, the total Carbon Monoxide emissions would total 123.74 TPY and the Nitrogen Oxides would total 100.54 TPY, which would make this facility a major source of pollution. This Alvadore Pad cannot be ignored in the equation of Antero total pollutants. There are other well pads and 2 compressor stations belonging to Antero close by, but not within yards of the Sandstrom facility.

It should be Air Quality's discretion on deciding these sources of pollutants, not the definition of a word, and I would ask that you consider the health of the residents in close proximity to the both the Alvadore pad and the Sandstrom Facility, in determining the combination of these 2 facilities.

Due to the fact the emissions listed on the Sandstrom Air Quality permit are in many cases, estimated, and subject to increase when the actual production activities begin, I would request that a PSD Model be required before issuing an Air Quality Permit and construction is allowed to begin.

Low estimates cannot be ruled out. The height and diameter of the "stack" is TBD. Is this not necessary information when determining emissions? Low estimates of truck traffic, and times of idle waiting to unload, and the emissions of the Dewatered Sludge and Wet Cake that is stored in dumpsters until moved to a landfill, are all sources of emission that need further evaluation. The emissions have to vary depending on the area the produced water is originating, since no 2 samples are the same on the water they are planning on recycling. I have several different Antero Injection Water analysis, and no 2 are the same.

Considering the close proximity of several families downwind and in low lying areas, should there be a study on ultra fine particulate matter? Should there not be a study by a qualified non biased researcher? The health of the residents of the surrounding area depend on Air Quality to have their health and best interest in mind concerning the issuance of this Air Quality Permit.

Again, I will plead with Air Quality to declare the Sandstrom Facility a major source of pollutants. Air Quality does have the power to do so on a case by case basis.

One comment made last night was of the piecing together of the Mark West Plant, which at one time was a fairly small facility, and is now still growing. With the option to continue to add modifications to their facility permits, it appears that now is the time to declare the need for a PSD Modeling permit, since standing alone, the facility is near the limits required to do so. A play on one word should not exempt them from a PSD.

Also, with 3 completed wells on the Alvadore Pad, it is quite obvious they will be expanding on that facility also. It seems the norm for this type of well pad is 5 to 9 wells, which will require more engines also.

The determination of 950 yards is a Google Earth determination. In all reality, the 2 facilities are closer, properties being separated only by a row of houses on lots.

It is in the best interest of the citizens of this state to require the utmost caution in issuing an Air Quality permit. The PSD modeling permit is a tool designed for the protection of our citizens. Our rural based population has the right to the best protection the WVDEP Air Quality office can require. The people in the area chose a rural life with the expectation of fairly clean air, dark skies, and peace of mind. As you seen at the meeting conducted last night, there is no peace of mind.

At the least, there should be baseline Air Quality tests at and around the facility locations, before any type of construction begins, which will allow determinations in the future of the actual impacts of the operation of this facility. Regretfully, in the beginning stages of the Marcellus Shale industry, no baselines were obtained. The lack of baseline testing has left the populations impacted by this industry with no defenses when there is an indication of impact, be it Air Quality or Water.

Received From: Vickie Nutter

DAQ Response

As provided in the R13-3260 Engineering Evaluation, classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

The Sandstrom Facility shares the same SIC code as several other well pads owned by Antero in the area. Therefore, the potential classification of the Sandstrom Facility as one stationary source with any other facility depends on the determination if these stations are considered "contiguous or adjacent properties." "Contiguous or Adjacent" determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; or having a common endpoint or border. The closest Antero property (Alvadore Pad) to the Sandstrom facility is 0.65 miles northeast of this facility. These properties are not contiguous or adjacent.

Because the facilities are not considered to be on contiguous or adjacent properties, the emissions from the Sandstrom Facility should not be aggregated with other facilities in determining major source or Prevention of Significant Deterioration (PSD) status.

Emissions associated with this application consist of the combustion emissions from one (1) diesel-fired emergency generator (1E), two (2) natural gas-fired boilers (2E, 3E), one (1) thermal oxidizer (4E), multiple tanks controlled by a thermal oxidizer and fugitive emissions. Fugitive emissions from the facility are negligible due to the fact that most processes are in the liquid phase or are less than 1% VOC. Once the process moves to the vapor phase, the volatiles and oils have been removed, are adsorbed by the solids or otherwise consumed in the process. The following table indicates which methodology was used in the emissions determination:

Emission Point ID#	Process Equipment	Calculation Methodology
1E	1,194 HP Diesel-Fired Emergency Generator	Manufacturer's Data, EPA AP-42 Emission Factors
2E	276.5 MMBTU/hr NG-Fired Boiler	Manufacturer's Data, EPA AP-42 Emission Factors
3E	276.5 MMBTU/hr NG-Fired Boiler	Manufacturer's Data, EPA AP-42 Emission Factors
4E	Thermal Oxidizer	EPA AP-42 Emission Factors
TL	Truck Unloading Influent Water	EPA AP-42 Emission Factors
28E	Cooling Tower	EPA AP-42 Emission Factors
Waste Gas	TK-1055A/B, TK-1060A/B, TK-1070, TK-2010,	WATER9, TANKS 4.09d,

Header (4E)	TK-2015, TK-2040, TK-1065, TK-2020, TK-2030, TK-2160, E-2076, TK-2130, TK-2140	Material Balance
Post Treatment System	TK-2500, TK-2550, TK-2555, CF-2510, TK-2520, TK-2515	Material Balance, WATER9
Sludge and Wetcake Disposal	DISP1, DISP2	Material Balance, EPA Emission Factors
Storage Tank W&B Losses	TK-2120, TK-4115, TK-4180	EPA Tanks 4.09d
Sodium Sulfate Feeder	TK-4036, U-4037, U-4038	EPA AP-42 Emission Factors
Bulk Lime Feeder A	TK-4046A, U-4047A, U-4048A	EPA AP-42 Emission Factors
Bulk Lime Feeder B	TK-4046B, U-4047B, U-4048B	EPA AP-42 Emission Factors
Sodium Bicarbonate Feeder	TK-4011, U-4012, U-4013	EPA AP-42 Emission Factors
Fugitive Dust	Vehicle Travel on Facility Roads	EPA AP-42 Emission Factors

Antero is subject to performance testing for the emergency generator, boilers and thermal oxidizer which controls the process tanks and truck unloading bay. In addition, the boilers are required to have Continuous Emission Monitors (CEMs) installed. Therefore, these emissions must be validated. PSD modeling is not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) or 45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment) as shown in the table listed in the Regulatory Discussion section under 45CSR14/45CSR19 of the Engineering Evaluation.

The permit application indicates that the stack height of both boilers would be 50 feet and these are the largest sources of emissions at the facility.

The permit application does take into account the fugitive dust haulroad emissions associated with this operation, which includes influent water trucks, delivery trucks, sludge/wetcake trucks and worker vehicles based on maximum operating capacity at the facility. As stated at the public meeting, the DAQ does not have regulatory authority of mobile sources. This authority rests with the United States Environmental Protection Agency (USEPA).

The emissions associated with the Dewatered Sludge and Wetcake Disposal emissions are based on material balance of the influent to the dewatering system and effluent from the dewatering system.

In regards to the influent water composition being different, Antero used a molecular weight of the influent water based on the composition of averaging wells in the area and adding a 20% safety factor to account for increased variability.

The DAQ Air Monitoring Section, with ambient air quality sampling sites located throughout West Virginia, monitors air pollutants on either a continuous or periodic basis. The sampling sites are located to assess air quality levels based on population exposure, industry emissions, determine compliance with the National Ambient Air Quality Standards (NAAQS), background levels and other special purposes.

The monitoring network is reviewed annually and revised as necessary to accommodate changing Federal requirements. The data collected is used by the DAQ to implement programs to ensure attainment of NAAQS for criteria pollutants. The purpose of the network monitoring plan is to enhance ambient air quality monitoring to better serve current and future air quality management and research needs. USEPA reviews and approves the network monitoring plans annually. The general monitoring network design requires ambient air monitors to focus on populated areas with air quality problems and to reduce monitors in areas that have measured ambient air concentrations well below the applicable NAAQS.

The closest air monitoring sites are in Harrison County ($PM_{2.5}$), Marion County ($PM_{2.5}$), Wood County ($PM_{2.5}$, SO_2, ozone), Marshall County ($PM_{2.5}$, $PM_{2.5}$ speciation, and SO_2), and Monongalia County ($PM_{2.5}$, SO_2, ozone).

The 2014 State of West Virginia Air Quality Annual Report which includes information on the NAAQS in regards to all regulated air pollutants, the air quality index from around the state, and detailed technical information on how the monitoring program works in making these determinations can be downloaded from the following website:

http://www.dep.wv.gov/daq/Documents/2014%20Annual%20Report%208-25-15.pdf

As stated above, the DAQ does have several monitors in this area of the state and $PM_{2.5}$ concentrations in this area have declined significantly, as shown in the most recent State of West Virginia Air Quality Annual Report. The DAQ is aware of the recent increased activity in the oil and gas industry as it pertains to horizontal drilling in the Marcellus Shale. The increase in drilling activity has created new challenges with maintaining healthy air, water, and land usage. Air quality issues associated with the oil and gas sector are an expanding aspect of the DAQ's regulatory responsibilities.

"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants.

DAQ Action

None.

COMMENT #7
Since figures for the facility's potential for emitting Nitrous Oxides and Carbon Monoxides are very close to the 100 tons/year threshold for a 'major source' and close to needing a Title V operating permit, this should be taken into consideration. These emissions are mostly from the natural gas boilers. Also, Antero may not be taking into account times of start-up, shut-down and malfunction, perhaps worsening total emissions by a lot, and even closer to the 'major source threshold'. (Application and Fact Sheet 8). The same concerns apply to the emergency generator.

There will be less obvious VOC emissions, especially whenever the waste water is not covered, with evaporation varying; and even more VOC's emitted with any problems in the process. Since combustion units/flaring is used to control VOCs, they must be at the right temperature, working properly and monitored frequently. The document says the minimum unit temperature have 6 months to be established, but 3 months would be much better. If the facility has 6 months for this, then these emissions should be incorporated into permit itself. And monthly reporting to the DEP is far more acceptable than quarterly reporting.

(See condition 10.2 of permit) Antero says it will be checking the thermal oxidizer tanks' closed vent systems by sight, smell and sound and it can designate certain equipment as 'unsafe' or 'difficult' to inspect, this is very unacceptable for such a large system. We want it to use actual equipment for inspections such as EPA Method 21, sniffer device or optical imaging such as FLIR cameras, for equipment tanks with large surface areas and with a large potential for leaks.

Under conditions 10.2.1(d) & (e) Antero can say certain equipment is 'unsafe' or 'difficult' to inspect, therefore it can inspect it every 5 years; or 'as frequently as practicable'. This is way too vague, needs to be more often and more certain with methods such as optical gas imaging.

Inspections need to be monthly, not annually which is way too infrequent.
Received From: Charles and Jane Hearne

DAQ Response
"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants. The natural gas fired boilers which account for 92% of the facility-wide nitrogen oxides emissions and 94% of the facility-wide carbon monoxide emissions are required to install Continuous Emission Monitors (CEMs) for nitrogen oxides. Therefore, all startup, shutdown and malfunction emissions are accounted for.

All process tanks that may emit VOCs during the process are covered and part of a closed system that it routed to the thermal oxidizer for 98% destruction efficiency of VOCs and HAPs. The thermal oxidizer is required to be designed with a minimum residence time of 0.50 seconds and a minimum combustion chamber temperature of 1,500^{o} F on a three (3) hour rolling average. The monitored compliance minimum combustion chamber temperature will be established during the initial compliance testing in accordance with the permit. The permit does contain language to allow the permittee to develop an alternative minimum combustion chamber temperature if necessary. This is routine language for thermal oxidizers. The permit does not allow six months

for a minimum temperature to be established as your comment indicates. The potential emissions for the thermal oxidizer are based on the terms in the permit.

Permit condition 7.5.1 requires Antero to report quarterly any thermal oxidizer deviations. DAQ agrees that this reporting be changed to monthly.

The closed vent system language that exists in permit condition 10.2 is federal regulatory language that is utilized for this industry in other regulations.

Permit condition 4.1.6 requires Antero to monitor and maintain quarterly records (calendar year) for each facility component that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. You must complete repair of such equipment by the end of the next shutdown.

The DAQ regularly utilizes a FLIR camera to inspect facilities.

DAQ Action

Permit condition 7.5.1 changed the thermal oxidizer deviation reporting from quarterly to monthly.

COMMENT #8

The Sandstrom facility permit shows Antero emissions estimates of Nitrogen Oxides and Carbon Monoxide that are very close to the threshold level that would determine the facility as a major source. Relying on estimates to make the important decision of minor or major source should tilt the scales towards major. Once it is determined the facility is indeed actually a major source contributor, it would be too late to enforce many of the regulations that a major source permit requires. Improper equipment operation, malfunctions (SSM), start ups, shut downs, and allowing a 6 month period to establish a minimum combustion chamber temperature in the thermal oxidizer, should all be added emission factors on this permit. These factors could very well place the facility over threshold limits. This is in addition to the close proximity of the

Alvadore well pad. The emissions from the Alvadore pad would also place the Sandstrom Facility well over the threshold limit NOx and CO. WV DEP has the authority to decide on a case by case basis, whether to group these emissions, and it is requested that the Division of Air Quality do so.

The permit also has many reporting and inspection conditions which should be reconsidered. Condition 7.5.1 requires Antero to report any deviation from the thermal oxidizer's design or performance on a quarterly basis. This device's optimal operation is an integral part of emission control at the facility, and should be reported monthly.

Condition 10.2 The closed vent system inspection, insuring it is working properly, is not sufficient. "Visual, olfactory, and auditory inspection", leaves too much room for error. EPA Method 21 would be a more accurate procedure for inspection. Optical imaging (FLIR cameras) has also been proven to be effective in detecting possible VOC leaks.

Condition 10.2.1(d) allows Antero to designate certain equipment as "unsafe" or "difficult" to inspect. This condition allows for this type of equipment to be inspected once every 5 years. If the equipment is noted as unsafe to inspect, this would reinforce the need for optical gas imaging.

All inspections should be required on a monthly basis. The release of hazardous emissions from the facility from leaks and fugitive emissions should not have the potential to continue on a year by year basis, month by month inspections are reasonable when protecting the quality of the air for West Virginia citizens.

It would also be requested that a fence line monitoring system be required. There will always be a potential issue concerning leaks and fugitive emissions, and this request would insure quicker detection.
Received From: James D. Friend

DAQ Response
"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants. The natural gas fired boilers which account for 92% of the facility-wide nitrogen oxides emissions and 94% of the facility-wide carbon monoxide emissions are required to install Continuous Emission Monitors (CEMs) for nitrogen oxides. Therefore, all startup, shutdown and malfunction emissions are accounted for.

If it was determined that the two (2) natural gas fired boilers exceed 100 tons per year of nitrogen oxides or carbon monoxide emissions (via performance testing or CEMs) or facility-wide regulated pollutant emissions exceeding 250 tons per year, Antero would be required to undergo Prevention of Significant Deterioration (PSD) permitting. If it was determined that the facility-wide emissions of regulated pollutant emissions exceed 100 tons per year, Antero would be required to undergo Title V (45CSR30) permitting. Title V permitting would not add additional regulatory requirements.

All process tanks that may emit VOCs during the process are covered and part of a closed system that it routed to the thermal oxidizer for 98% destruction efficiency of VOCs and HAPs. The thermal oxidizer is required to be designed with a minimum residence time of 0.50 seconds and a minimum combustion chamber temperature of 1,500o F on a three (3) hour rolling average. The monitored compliance minimum combustion chamber temperature will be established during the initial compliance testing in accordance with the permit. The permit does contain language to allow the permittee to develop an alternative minimum combustion chamber temperature if necessary. This is routine language for thermal oxidizers. The permit does not allow six months for a minimum temperature to be established as your comment indicates. The potential emissions for the thermal oxidizer are based on the terms in the permit.

As provided in the R13-3260 Engineering Evaluation, classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

The Sandstrom Facility shares the same SIC code as several other well pads owned by Antero in the area. Therefore, the potential classification of the Sandstrom Facility as one stationary source with any other facility depends on the determination if these stations are considered "contiguous or adjacent properties." "Contiguous or Adjacent" determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; or having a common endpoint or border. The closest Antero property (Alvadore Pad) to the Sandstrom facility is 0.65 miles northeast of this facility. These properties are not contiguous or adjacent.

Because the facilities are not considered to be on contiguous or adjacent properties, the emissions from the Sandstrom Facility should not be aggregated with other facilities in determining major source or Prevention of Significant Deterioration (PSD) status.

Permit condition 7.5.1 requires Antero to report quarterly any thermal oxidizer deviations. DAQ agrees that this reporting be changed to monthly.

The closed vent system language that exists in permit condition 10.2 is federal regulatory language that is utilized for this industry in other regulations.

Permit condition 4.1.6 requires Antero to monitor and maintain quarterly records (calendar year) for each facility component that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to

detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. You must complete repair of such equipment by the end of the next shutdown.

The DAQ regularly utilizes a FLIR camera to inspect facilities.

DAQ Action
Permit condition 7.5.1 changed the thermal oxidizer deviation reporting from quarterly to monthly.

COMMENT #9
Emission estimates appear to be too low, in an effort to avoid the 'major' source of pollution label. Since much of the processed fluid is of a proprietary nature, predicting the quantity of pollutants to be treated is guesswork at best.

The heavy truck traffic must be included as an air quality issue, whether or not it falls within your jurisdiction. Idling diesel vehicles will become a concern to the residents down-wind of the staging area.

When evaluating the predicted emissions from the manufacturer's specs, there is always a lag in what efficiency is achieved and the reality of such under ideal conditions. The gas fired boilers will, in turn, be subject to any large equipment variation due to operational experience.

Keeping in mind the experimental nature of this process, and the wide variation of the substrate to be handled, frequent inspections and a system of responders that complainants can access 24/7. Considering the past violations which the designers and operators have already on the books with WVDEP, extra vigilance is required.

The main control for VOCs is that all the tanks will be routing their emissions to a "thermal oxidizer" (effectively a flare or combustion unit). If you look at the fact sheet, you can see how many tanks' emissions are meant to be handled by the thermal oxidizer. A vast amount of their VOC emissions is dependent on the proper operation of the thermal oxidizer.

For this reason, it's vitally important that the thermal oxidizer continue to operate properly and achieve the expected 98-percent control efficiency (i.e., destroying 98 percent of VOCs routed to the oxidizer). This depends on temperature of the oxidizer and frequent monitoring to ensure it is working properly.

First, the only means by which Antero must ensure that the closed vent system is working properly is through "visual, olfactory, and auditory inspection." . In other words, Antero just has to use sight, smell, and sound. For a facility with a vast amount of potential VOC emissions and over a dozen tanks, this is pretty unsophisticated. Instead, I would recommend that Antero use actual equipment for inspections, such as EPA Method 21, which uses a "sniffer" device operated by a staff member. Alternatively, optical imaging has been proven to be effective (such as FLIR cameras), particularly for equipment like tanks with large surface areas and large potential for leaks.

Second, Antero can designate certain equipment as "unsafe" or "difficult" to inspect. If a piece of equipment is difficult to inspect, Antero need only inspect it once every five years. If equipment is noted as unsafe to inspect, Antero must inspect it "as frequently as practicable." If they can't access an area easily or safely, then all the more argument for optical gas imaging.

Third, inspection requirements are only annual. This is way too infrequent. Monthly would certainly be better.

Finally, since leaks and fugitive emissions seem to be such a potential issue for this facility, I don't think it would be out of bounds to ask for a fenceline monitoring system.
Received From: Don Jackson

DAQ Response
"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants.

Permit condition 7.5.1 requires Antero to report quarterly any thermal oxidizer deviations. DAQ agrees that this reporting be changed to monthly.

The permit application does take into account the fugitive dust haulroad emissions associated with this operation, which includes influent water trucks, delivery trucks, sludge/wetcake trucks and worker vehicles. As stated at the public meeting at the Greenwood Volunteer Fire Department on November 5, 2015, the DAQ does not have regulatory authority of mobile sources. This authority rests with the United States Environmental Protection Agency (USEPA).

Antero is subject to performance testing for the emergency generator, boilers and thermal oxidizer which controls the process tanks and truck unloading bay. In addition, the boilers are required to have Continuous Emission Monitors (CEMs) installed. Therefore, these emissions must be validated.

All process tanks that may emit VOCs during the process are covered and part of a closed system that it routed to the thermal oxidizer for 98% destruction efficiency of VOCs and HAPs. The thermal oxidizer is required to be designed with a minimum residence time of 0.50 seconds and a

minimum combustion chamber temperature of 1,500° F on a three (3) hour rolling average. The potential emissions for the thermal oxidizer are based on the terms in the permit.

As provided in the R13-3260 Engineering Evaluation, classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

The closed vent system language that exists in permit condition 10.2 is federal regulatory language that is utilized for this industry in other regulations.

Permit condition 4.1.6 requires Antero to monitor and maintain quarterly records (calendar year) for each facility component that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. You must complete repair of such equipment by the end of the next shutdown.

The DAQ regularly utilizes a FLIR camera to inspect facilities.

DAQ Action

Permit condition 7.5.1 changed the thermal oxidizer deviation reporting from quarterly to monthly.

COMMENT #10
What is the acreage of the property tract where the water treatment facility will be located?
Received From: Ronald McClain

DAQ Response
According to Antero, the water treatment facility area is 11.35 acres.

DAQ Action
None.

COMMENT #11
I am writing to express my concerns regarding the Air Quality Permit for the Sandstrom Waste Water Facility. I have read the permit, and I see that many of the emissions listed are listed as estimates. Other emission numbers are manufacturer estimates, and not operator estimates. Manufacturer estimates can vary greatly from operator's actual emissions, due to the manner in which the equipment is operated and maintained. There is also no mention of emissions that would raise limits concerning starting up equipment, shutting down equipment, and malfunctions (SSM), which would and could contribute to higher emissions, putting them closer or over the major source threshold. All VOC emissions will be routed to a thermal oxidizer. Again, the 98 % control of VOCs is dependent on correct operating temperature and constant monitoring to make sure it is at optimal efficiency. The permit allows Antero 6 months to establish a minimum combustion chamber temperature of 1500 degrees Fahrenheit. For the six months the facility will be operating at unknown thermal efficiency of the thermal oxidizer, higher emissions than that listed on the permit could be the result. The risk of possible higher emissions, should be included in the Air Quality Permit. For a period of 6 months, Antero will be allowed to emit unknown emissions before a required compliance test. What happens if the compliance test fails? Will they be allowed to continue to operate at a higher emission level than they were permitted for? I see no backup plan in the case of failure, which would allow large quantities of VOCs to be released into the air. Claiming there would be 98% efficiency on the Air Quality Permit does not appear to include any operational problems of the one emission control device on the facility. Estimated emissions on every operation of the Sandstrom Facility is cause for great concern. The facility is close to major source thresholds, using only estimates as a basis for an Air Quality Permit. There is also the addition of the Alvadore Wellpad, which is also operating under an Air Quality Permit. The distance between the two facilities depends on points of measurement. Measured edge to edge, the distance is much closer than measuring from center to center. With the combination of the two emissions sources, the Sandstrom facility would exceed major source thresholds by a significant amount. The Division of Air Quality has the authority to decide on a case by case basis if the Alvadore wellpad and Sandstrom Facility can be combined in determining major source contamination, and I would ask that you do so. Relying on estimates is not good enough when a proposed facility is so close to major source contamination levels.
Received From: Jim Shreves

DAQ Response
"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants. The natural gas

fired boilers which account for 92% of the facility-wide nitrogen oxides emissions and 94% of the facility-wide carbon monoxide emissions are required to install Continuous Emission Monitors (CEMs) for nitrogen oxides. Therefore, all startup, shutdown and malfunction emissions are accounted for.

Antero is subject to performance testing for the emergency generator, boilers and thermal oxidizer which controls the process tanks and truck unloading bay. In addition, the boilers are required to have Continuous Emission Monitors (CEMs) installed. Therefore, these emissions must be validated.

All process tanks that may emit VOCs during the process are covered and part of a closed system that it routed to the thermal oxidizer for 98% destruction efficiency of VOCs and HAPs. The thermal oxidizer is required to be designed with a minimum residence time of 0.50 seconds and a minimum combustion chamber temperature of 1,500^{0} F on a three (3) hour rolling average. The potential emissions for the thermal oxidizer are based on the terms in the permit.

As provided in the R13-3260 Engineering Evaluation, classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

The Sandstrom Facility shares the same SIC code as several other well pads owned by Antero in the area. Therefore, the potential classification of the Sandstrom Facility as one stationary source with any other facility depends on the determination if these stations are considered "contiguous or adjacent properties." "Contiguous or Adjacent" determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; or having a common endpoint or border. The closest Antero property (Alvadore Pad) to the Sandstrom facility is 0.65 miles northeast of this facility. These properties are not contiguous or adjacent.

Because the facilities are not considered to be on contiguous or adjacent properties, the emissions from the Sandstrom Facility should not be aggregated with other facilities in determining major source or Prevention of Significant Deterioration (PSD) status.

If it was determined that the two (2) natural gas fired boilers exceed 100 tons per year of nitrogen oxides or carbon monoxide emissions (via performance testing or CEMs) or facility-wide regulated pollutant emissions exceeding 250 tons per year, Antero would be required to undergo Prevention of Significant Deterioration (PSD) permitting. If it was determined that the facility-wide emissions of regulated pollutant emissions exceed 100 tons per year, Antero would be

required to undergo Title V (45CSR30) permitting. Title V permitting would not add additional regulatory requirements.

DAQ Action
None.

COMMENT #12
The Sandstrom facility permit shows Antero emissions estimates of Nitrogen Oxides and Carbon Monoxide that are very close to the threshold level that would determine the facility as a major source. Relying on estimates to make the important decision of minor or major source should tilt the scales towards major. Once it is determined the facility is indeed actually a major source contributor, it would be too late to enforce many of the regulations that a major source permit requires. Improper equipment operation, malfunctions (SSM), start ups, shut downs, and allowing a 6 month period to establish a minimum combustion chamber temperature in the thermal oxidizer, should all be added emission factors on this permit. These factors could very well place the facility over threshold limits. This is in addition to the close proximity of the Alvadore well pad. The emissions from the Alvadore pad would also place the Sandstrom Facility well over the threshold limit NOx and CO. WV DEP has the authority to decide on a case by case basis, whether to group these emissions, and it is requested that the Division of Air Quality do so. The permit also has many reporting and inspection conditions which should be reconsidered.

Condition 7.5.1 requires Antero to report any deviation from the thermal oxidizer's design or performance on a quarterly basis. This device's optimal operation is an integral part of emission control at the facility, and should be reported monthly.

Condition 10.2 The closed vent system inspection, insuring it is working properly, is not sufficient. "Visual, olfactory, and auditory inspection", leaves too much room for error. EPA Method 21 would be a more accurate procedure for inspection. Optical imaging (FLIR cameras) has also been proven to be effective in detecting possible VOC leaks.

Condition 10.2.1(d) allows Antero to designate certain equipment as "unsafe" or "difficult" to inspect. This condition allows for this type of equipment to be inspected once every 5 years. If the equipment is noted as unsafe to inspect, this would reinforce the need for optical gas imaging. All inspections should be required on a monthly basis. The release of hazardous emissions from the facility from leaks and fugitive emissions should not have the potential to continue on a year by year basis, month by month inspections are reasonable when protecting the quality of the air for West Virginia citizens. It would also be requested that a fence line monitoring system be required. There will always be a potential issue concerning leaks and fugitive emissions, and this request would insure quicker detection.
Received From: Eva Shreves

DAQ Response
"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants. The natural gas fired boilers which account for 92% of the facility-wide nitrogen oxides emissions and 94% of

the facility-wide carbon monoxide emissions are required to install Continuous Emission Monitors (CEMs) for nitrogen oxides. Therefore, all startup, shutdown and malfunction emissions are accounted for.

Antero is subject to performance testing for the emergency generator, boilers and thermal oxidizer which controls the process tanks and truck unloading bay. In addition, the boilers are required to have Continuous Emission Monitors (CEMs) installed. Therefore, these emissions must be validated.

If it was determined that the two (2) natural gas fired boilers exceed 100 tons per year of nitrogen oxides or carbon monoxide emissions (via performance testing or CEMs) or facility-wide regulated pollutant emissions exceeding 250 tons per year, Antero would be required to undergo Prevention of Significant Deterioration (PSD) permitting. If it was determined that the facility-wide emissions of regulated pollutant emissions exceed 100 tons per year, Antero would be required to undergo Title V (45CSR30) permitting. Title V permitting would not add additional regulatory requirements.

All process tanks that may emit VOCs during the process are covered and part of a closed system that it routed to the thermal oxidizer for 98% destruction efficiency of VOCs and HAPs. The thermal oxidizer is required to be designed with a minimum residence time of 0.50 seconds and a minimum combustion chamber temperature of 1,500° F on a three (3) hour rolling average. The potential emissions for the thermal oxidizer are based on the terms in the permit.

As provided in the R13-3260 Engineering Evaluation, classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

The Sandstrom Facility shares the same SIC code as several other well pads owned by Antero in the area. Therefore, the potential classification of the Sandstrom Facility as one stationary source with any other facility depends on the determination if these stations are considered "contiguous or adjacent properties." "Contiguous or Adjacent" determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; or having a common endpoint or border. The closest Antero property (Alvadore Pad) to the Sandstrom facility is 0.65 miles northeast of this facility. These properties are not contiguous or adjacent.

Because the facilities are not considered to be on contiguous or adjacent properties, the emissions from the Sandstrom Facility should not be aggregated with other facilities in determining major source or Prevention of Significant Deterioration (PSD) status.

Permit condition 7.5.1 requires Antero to report quarterly any thermal oxidizer deviations. DAQ agrees that this reporting be changed to monthly.

The closed vent system language that exists in permit condition 10.2 is federal regulatory language that is utilized for this industry in other regulations.

Permit condition 4.1.6 requires Antero to monitor and maintain quarterly records (calendar year) for each facility component that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. You must complete repair of such equipment by the end of the next shutdown.

The DAQ regularly utilizes a FLIR camera to inspect facilities.

DAQ Action

Permit condition 7.5.1 changed the thermal oxidizer deviation reporting from quarterly to monthly.

COMMENT #13

Thanks for giving the public an opportunity for input. I just learned about this comment period last night and so have been spending time studying the DEP application for this facility. Having lived here for more than 25 years and as very "local" residents (our residence on Cabin Run Rd. borders part of the additional 500 acres Antero has purchased) My wife and I have several concerns related to air quality. First, we are concerned with the aggregate accumulation of air pollution from not only this facility but also the rock quarry they have purchased in addition to the landfill for which they have applied. Secondly, the "post treatment" of the both gases and solids seems a little vague in what they don't say as well as what they do say. Why do they need

to have a flare burning 24/7? How does this affect our air quality? We live (as do most of the area residents) down in the valleys where air pollutants not only settle but can concentrate. Thirdly, little is said about the air pollution from 600 trucks a day servicing the facility. Antero has widened Cabin Run Rd. and is planning on paving it for one access to this facility. Finally, we are surrounded by wells that also produce their own air pollutants. How will this total accumulation affect our health as local residents? This is an especially pertinent question for me as I have CLL (cancer in my immune system) and am very much affected by any toxins in air, water, food, or the environment.
Received From: Bill and Gayle Clark

DAQ Response
The emissions associated with the temporary operation of the proposed Kanawha Stone rock crushing facility are secondary emissions as defined in 45CSR13 Section 2.23.

> *"Secondary emissions" means emissions which would occur as a result of the construction or operation of a stationary source or modification, but do not come from the stationary source or modification itself. For the purpose of this rule, secondary emissions must be specific, well defined, quantifiable, and impact the same general area as the stationary source or modification which causes the secondary emissions. Secondary emissions include, but are not limited to, emissions from any off-site support facility which would not otherwise be constructed or increase its emissions except as a result of the construction or operation of the stationary source or modification.*

45CSR13 Section 2.19 defines "Potential to Emit" which states that "secondary emissions" shall not be included in any determination of a stationary sources potential to emit. Therefore, these emissions are temporary and not additive in making a source determination.

There has been no application made for a landfill at this site. Any landfill approval would be done by Division of Water and Waste Management (DWWM). Waste Management – DWWM contact information is 304-926-0465. According to Antero, they are exploring this option, but no decision has been made yet. If Antero decides to permit air pollution equipment for a landfill at this site, the Division of Air Quality will perform a source aggregation analysis and if it is determined these sites meet the criteria, all air emissions will be aggregated.

The purpose of the thermal oxidizer is to control (reduce) volatile organic compounds and hazardous air pollutants from the process tanks and truck unloading bay. The thermal oxidizer has a destruction efficiency of 98% for these pollutants.

The permit application does take into account the fugitive dust haulroad emissions associated with this operation, which includes influent water trucks, delivery trucks, sludge/wetcake trucks and worker vehicles. As stated at the public meeting at the Greenwood Volunteer Fire Department on November 5, 2015, the DAQ does not have regulatory authority of mobile sources. This authority rests with the United States Environmental Protection Agency (USEPA).

It is the public policy of this state, and the purpose of Article 5 (Air Pollution Control Act) of the West Virginia Code, to achieve and maintain such levels of air quality as will protect human health and safety, and to the greatest degree practicable, prevent injury to plant and animal life and property, foster the comfort and convenience of the people, promote the economic and social development of this state and facilitate the enjoyment of the natural attractions of this state.

Antero has proposed air pollution control devices on their process tanks and truck unloading bay. Additionally, the proposed boilers are equipped with Continuous Emission Monitors (CEMs). As stated previously above, pursuant to §45-13-5.7, the DAQ shall issue a permit unless a determination is made that the proposed construction, modification, registration or relocation will violate applicable emission standards, will interfere with attainment or maintenance of an applicable ambient air quality standard, cause or contribute to a violation of an applicable air quality increment, or be inconsistent with the intent and purpose of this rule or W. Va. Code §22-5-1 et seq., in which case an order denying such construction, modification, relocation and operation shall be issued. Therefore, all air permit applications must be reviewed to determine if all applicable standards are met.

DAQ Action

Permit condition 7.5.1 changed the thermal oxidizer deviation reporting from quarterly to monthly.

COMMENT #14

Please accept the following comments regarding Draft Permit R13-3260 for Antero Resources' Sandstrom Water Treatment Facility on behalf of the West Virginia Surface Owner's Rights Organization, WV Citizen Action Group, the West Virginia
Highlands Conservancy, and
the Ohio Valley Environmental Coalition.

1. Aggregation with nearby sources should not be rejected based on the dictionary definition of "adjacent."

While the Division was right to reject Antero's argument regarding the SIC codes for nearby facilities, DAQ has noted that the nearest Antero facility is a well that's 0.65 miles northeast of the facility and has concluded that "[t]hese properties are not contiguous or adjacent." We believe this latter determination is wrong. First, it's a case-by-case determination, and DAQ did not attempt any sort of analysis in making this determination. It simply noted the dictionary definition of "adjacent" and stated that 0.65 miles away does not meet the definition. However, it is almost certain that the well will use the wastewater treatment facility, and there's a possibility that it will send its water by pipeline (instead of truck, as Antero states in the application). Second, DAQ is misstating the distance between the well(s) and the wastewater treatment facility. The Leason Run Unit 2H and Hudkins Unit 2H, which are on the same pad are much closer. Instead of 0.65 miles away, these wells appear to be 0.42 miles away if measured cleared property edge to pad edge, rather than from center to center. (See attached a map demonstrating this.) These wells may be even closer if one were to measure from the Antero Sandstrom property line, as opposed to the cleared edge.

2. The facility is very close to being a major source of Nitrogen Oxides (NOx) and Carbon Monoxide (CO), without taking into account emissions during shutdown, startup or malfunctions (MSS).

According to the application and fact sheet, the facility has the total potential to emit 94.86 tons per year of Nitrogen Oxides (NOx) and 95.41 tons per year of Carbon Monoxide (CO). These amounts are very close to the 100 ton per year threshold for a major source.

The vast majority of these NOx and CO emissions comes from the facility's two natural gas boilers. Each boiler has the potential to emit (and is permitted to emit) 43.60 tons per year of NOx and 44.81 tons per year of CO. According to Antero, this emissions data comes from the manufacturer's data and EPA's emissions factors. The manufacturer has estimated that each boiler's emissions will be 43.48 tons of NOx and 44.69 tons of CO, based on 8,736 hours of operation per year. It appears Antero has attempted to account for the additional 24 hours (to bring the boilers' operation to the full 8,760 hours for the year) in bringing each boiler's emission slightly higher. However, it does not appear that Antero has taken into account the periods when the boilers are starting up, shutting down, or malfunctioning (SSM), which can release large volumes of emissions in a short time. This leaves out a significant amount of potential emissions and could put the facility over the major source threshold. SSM should also be taken into account for the emergency diesel generator.

3. The facility will emit a large amount of volatile organic compounds (VOCs), the total amount of which is subject to variation and highly dependent on proper operation of the "thermal oxidizer."

In addition to the NOx and CO emissions, the facility will emit a large amount of volatile organic compounds (VOCs), primarily from the wastewater that the facility will be handling and processing. Antero and DEP estimate that the facility has the potential to emit 66.54 tons per year of VOCs. While this amount is below the major source threshold of 100 tons per year, it is also based on assumptions and potential uncertainties.

First, the majority of VOC emissions come from less-tangible emissions, such as truck unloading of the wastewater (16.86 tons per year), evaporation from process tanks (7.90 tons per year), and "sludge and wetcake disposal" (21.60 tons per year). Any time the wastewater isn't covered and controlled, it will be releasing VOC emissions. There's a lot of variation in this, and if the process doesn't go as planned the result will be more emissions. And the permit appears to contain some discrepancies with regard to these emissions relative to the application. The permit states that truck unloading will emit 16.86 tons per year of VOCs, but Attachment K of the application states that the fugitive emissions from loading/unloading will be 28.58 tons per year. We assume the 28.58 tons per year is an engineering estimate, but we don't understand how or why this was reduced to 16.86 tons per year in the permit. Perhaps the 28.58 estimate is meant to capture truck unloading, process tanks, storage tanks, and the thermal oxidizer, as adding all those numbers up in the fact sheet (page 9) gets to 28.50 tons per year. However, the point is that these are flexible estimates, subject to variations that aren't taken into account.

Second, the main control for VOCs is that all the tanks will be routing their emissions to a "thermal oxidizer." For this reason, it's vitally important that the thermal oxidizer continue to operate properly and achieve the expected 98-percent control efficiency (i.e., destroying 98 percent of VOCs routed to the oxidizer). This depends on temperature of the oxidizer's temperature and frequent monitoring to ensure it's working properly. The permit requires a minimum combustion chamber temperature of 1,500 degrees Fahrenheit, which Antero will establish within six months of the facility's startup (condition 7.1.3) and continue to monitor every 15 minutes or so (condition 7.4.2). We request that the facility be required to come into compliance three months, rather than six. If the facility is allowed to function for half a year without ensuring it can meet the minimum temperature of the main VOC control device, those emissions should be incorporated into the permit and very likely could push the facility into the

major source threshold. Additionally, we request that Antero be required to report and deviations from the thermal oxidizer's design or performance reporting to DAQ on a monthly rather than quarterly basis.

4. Inspection and monitoring requirements for leaks are insufficient and infrequent.

In combination with routing emissions to the thermal oxidizer, the tanks must use a "closed vent system" to ensure that VOCs don't escape as leaks. However, the only means by which Antero must ensure that the closed vent system is working properly is through "visual, olfactory, and auditory inspection" (condition 10.2). For a facility with a vast amount of potential VOC emissions and over a dozen tanks, this is extremely unsophisticated. Instead, we recommend that Antero use actual equipment for inspections, such as EPA Method 21. Alternatively, optical imaging (such as FLIR cameras) has proven to be effective, particularly for equipment like tanks with large surface areas and large potential for leaks.

Additionally, under conditions 10.2.1(d) and (e), Antero can designate certain equipment as "unsafe" or "difficult" to inspect. If a piece of equipment is difficult to inspect, Antero need only inspect it once every five years. That is extremely lax. If equipment is noted as unsafe to inspect, Antero must inspect it "as frequently as practicable." Again, this is lax and "practicable" is an open-ended term. If the operator can't access an area easily or safely, optical imaging offers a practical and effective way to check for and identify leaks.

Furthermore, the requirement for annual inspections is too infrequent. We recommend and request that monthly inspections be required.

Finally, because leaks and fugitive emissions seem to be such a potential issue for this facility, we recommend and request that fenceline monitoring be required.
Received From: WV Surface Owner's Rights Organization, Ohio Valley Environmental Coalition, WV Citizen Action Group, WV Highlands Conservancy

DAQ Response

1. As provided in the R13-3260 Engineering Evaluation, classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

   "Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

   The map that was included with your submittal underestimates the distance of where the actual facility will be. Furthermore, the DAQ did perform the proper source aggregation analysis. As you can see from your map, there is a main road that separates these facilities in addition to the distance stated in the DAQ's aggregation analysis. The facilities in question are not located on contiguous or adjacent properties.

2. "Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants. The natural gas fired boilers which account for 92% of the facility-wide nitrogen oxides emissions and 94% of the facility-wide carbon monoxide emissions are required to install Continuous Emission Monitors (CEMs) for nitrogen oxides. Therefore, all startup, shutdown and malfunction emissions are accounted for.

   Antero is subject to performance testing for the emergency generator, boilers and thermal oxidizer which controls the process tanks and truck unloading bay. In addition, the boilers are required to have Continuous Emission Monitors (CEMs) installed. Therefore, these emissions must be validated.

   If it was determined that the two (2) natural gas fired boilers exceed 100 tons per year of nitrogen oxides or carbon monoxide emissions (via performance testing or CEMs) or facility-wide regulated pollutant emissions exceeding 250 tons per year, Antero would be required to undergo Prevention of Significant Deterioration (PSD) permitting. If it was determined that the facility-wide emissions of regulated pollutant emissions exceed 100 tons per year, Antero would be required to undergo Title V (45CSR30) permitting. Title V permitting would not add additional regulatory requirements.

3. The truck unloading emissions are based on an USEPA calculation method. This method utilizes the saturation factor of the liquid loaded, true vapor pressure of liquid loaded, molecular weight and temperature. The controlled VOC emission rate of 16.86 tons per year can be found in the September 23, 2015 email from Barry Schatz of Antero to Jerry Williams of DAQ. Antero conservatively estimated the molecular weight of the influent water used in this formula by applying a factor of 20% to the molecular weight of the liquids from wells in this area to account for variability.

   All process tanks that may emit VOCs during the process are covered and part of a closed system that it routed to the thermal oxidizer for 98% destruction efficiency of VOCs and HAPs. The thermal oxidizer is required to be designed with a minimum residence time of 0.50 seconds and a minimum combustion chamber temperature of 1,500° F on a three (3) hour rolling average. The potential emissions for the thermal oxidizer are based on the terms in the permit. This facility is expected to be in compliance with the terms of this permit upon startup. The alternative language only applies if Antero chooses to pursue that option.

   Permit condition 7.5.1 requires Antero to report quarterly any thermal oxidizer deviations. DAQ agrees that this reporting be changed to monthly.

4. The closed vent system language that exists in permit condition 10.2 is federal regulatory language that is utilized for this industry in other regulations.

   Permit condition 4.1.6 requires Antero to monitor and maintain quarterly records (calendar year) for each facility component that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as

determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. You must complete repair of such equipment by the end of the next shutdown.

The DAQ regularly utilizes a FLIR camera to inspect facilities.

DAQ Action

Permit condition 7.5.1 changed the thermal oxidizer deviation reporting from quarterly to monthly.

COMMENT #15

As a resident of Doddridge County, I appeal to you to decline the above-referenced application.

I know it's your job to consider technical matters of compliance, but I also ask you to consider the people who live near the proposed facility. They have created and enjoy a rural lifestyle that will be utterly destroyed by the proposed facility. They are citizens of West Virginia and the United States and own property which they have every right to enjoy, without the threats to their health and well-being that this facility presents. Please decline the permit.

Our county is already besieged by the gas industry—well pads, diesel truck traffic, compressor stations, pipelines, and major processing facilities such as Central Station and Mark West Sherwood Plant already emit toxic substances into our air. We who chose the fresh air, clean water, and quiet of country life find these destroyed.

Who is monitoring the air quality in Doddridge County? Who is tracking the aggregate emissions of all the gas industry activities? What are we to do when we live near a facility such as the proposed water treatment plant, and have to breathe known carcinogens and other harmful substances? Please decline the permit.

On technical matters, the facility is very close to being a major source of NOx and carbon monoxide. Is it not possible that calculations were manipulated to bring these numbers under the threshold? How will compliance be monitored and enforced? Given your agency's responsibility to protect the air quality, monitoring must be frequent and continuous. It may make more sense to consider this a major source of NOx and carbon monoxide, and require the facility to comply with major source requirements.

I know others have submitted lists of technical matters and I hope you will consider them. But most of all I hope you consider the lives of the local residents. Thank you for your consideration.
Received From: Linda Ireland

DAQ Response
It is the public policy of this state, and the purpose of Article 5 (Air Pollution Control Act) of the West Virginia Code, to achieve and maintain such levels of air quality as will protect human health and safety, and to the greatest degree practicable, prevent injury to plant and animal life and property, foster the comfort and convenience of the people, promote the economic and social development of this state and facilitate the enjoyment of the natural attractions of this state.

Antero has proposed air pollution control devices on their process tanks and truck unloading bay. Additionally, the proposed boilers are equipped with Continuous Emission Monitors (CEMs). As stated previously above, pursuant to §45-13-5.7, the DAQ shall issue a permit unless a determination is made that the proposed construction, modification, registration or relocation will violate applicable emission standards, will interfere with attainment or maintenance of an applicable ambient air quality standard, cause or contribute to a violation of an applicable air quality increment, or be inconsistent with the intent and purpose of this rule or W. Va. Code §22-5-1 et seq., in which case an order denying such construction, modification, relocation and operation shall be issued. Therefore, all air permit applications must be reviewed to determine if all applicable standards are met.

The DAQ Air Monitoring Section, with ambient air quality sampling sites located throughout West Virginia, monitors air pollutants on either a continuous or periodic basis. The sampling sites are located to assess air quality levels based on population exposure, industry emissions, determine compliance with the National Ambient Air Quality Standards (NAAQS), background levels and other special purposes.

The monitoring network is reviewed annually and revised as necessary to accommodate changing Federal requirements. The data collected is used by the DAQ to implement programs to ensure attainment of NAAQS for criteria pollutants. The purpose of the network monitoring plan is to enhance ambient air quality monitoring to better serve current and future air quality management and research needs. USEPA reviews and approves the network monitoring plans annually. The general monitoring network design requires ambient air monitors to focus on populated areas with air quality problems and to reduce monitors in areas that have measured ambient air concentrations well below the applicable NAAQS.

The closest air monitoring sites are in Harrison County ($PM_{2.5}$), Marion County ($PM_{2.5}$), Wood County ($PM_{2.5}$, SO_2, ozone), Marshall County ($PM_{2.5}$, $PM_{2.5}$ speciation, and SO_2), and Monongalia County ($PM_{2.5}$, SO_2, ozone).

The 2014 State of West Virginia Air Quality Annual Report which includes information on the NAAQS in regards to all regulated air pollutants, the air quality index from around the state, and detailed technical information on how the monitoring program works in making these determinations can be downloaded from the following website:

http://www.dep.wv.gov/daq/Documents/2014%20Annual%20Report%208-25-15.pdf

The DAQ is aware of the recent increased activity in the oil and gas industry as it pertains to horizontal drilling in the Marcellus Shale. The increase in drilling activity has created new challenges with maintaining healthy air, water, and land usage. Air quality issues associated with the oil and gas sector are an expanding aspect of the DAQ's regulatory responsibilities.

"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants. The natural gas fired boilers which account for 92% of the facility-wide nitrogen oxides emissions and 94% of the facility-wide carbon monoxide emissions are required to install Continuous Emission Monitors (CEMs) for nitrogen oxides. Therefore, all startup, shutdown and malfunction emissions are accounted for.

Antero is subject to performance testing for the emergency generator, boilers and thermal oxidizer which controls the process tanks and truck unloading bay. In addition, the boilers are required to have Continuous Emission Monitors (CEMs) installed. Therefore, these emissions must be validated.

If it was determined that the two (2) natural gas fired boilers exceed 100 tons per year of nitrogen oxides or carbon monoxide emissions (via performance testing or CEMs) or facility-wide regulated pollutant emissions exceeding 250 tons per year, Antero would be required to undergo Prevention of Significant Deterioration (PSD) permitting. If it was determined that the facility-wide emissions of regulated pollutant emissions exceed 100 tons per year, Antero would be required to undergo Title V (45CSR30) permitting. Title V permitting would not add additional regulatory requirements.

DAQ Action

Permit condition 7.5.1 changed the thermal oxidizer deviation reporting from quarterly to monthly.

The following comments were received after the public comment period ended at 5:00 P.M. on November 20, 2015. However, responses to the comments are provided.

COMMENT #16

• The Sandstrom Waste Water Treatment Plant is projecting emissions of NOX and Carbon Monoxide emissions that come very close to the maximum threshold level that would designate this facility as a major source of air bourn pollutants. The ability of the WV DEP to identify and consider the aggregation of adjacent facilities such as the Alvadore well pad; can be made on a case by case basis. Due to variants such as projected efficiency factors as well as the close proximity of the plant to achieving major source criteria; it would seem prudent for the WV DEP to provide some type of analysis as to how the determination is being made nearby well pads are not contiguous or adjacent.

• Publically, the Sandstrom facility has been presented as new technology. Relying solely upon projected manufacturer estimates without considering improper equipment operation, failures, malfunctions as well as startups and shutdowns while allowing 6 months to achieve minimum combustion chamber temperature in the thermal oxidizer should all realistically be factored into the permit. Relying upon a projection of 98% efficiency and in light of these variable; 6 months is a prolonged period of time in which less than 98% efficiency can be expected. If the facility is permitted to function for 6 months without ensuring it can meet the necessary temperature of the VOC control device, these emissions should be required to be included in the permit. Consideration should be given to requiring a shorter period of time to reach compliance; 3 months is more protective than 6.

• Condition 7.5.1 requires the operator to report any deviations from the thermal oxidizer's design or performance to the DEP quarterly. Since this is such an essential element of the proper functioning of the plant to reduce hazardous emissions, monthly reporting should be required.

• Leaks in the closed vent system are to be monitored by 'visual, olfactory, and auditory inspection.' For such an advanced technology with the potential to emit vast amounts of VOCs to rely upon the subjective senses of individuals appears not only not protective but an insult to the technology itself. Actual equipment should be required to monitor for leaks with any detection reported either immediately or at a minimum monthly. Optical imaging via FLIR cameras and EPA method 21 should be required.

• Condition 10.2.1 (d) and (e) allows the operator to deem certain equipment as 'unsafe' and/or 'difficult' to inspect. Allowing the operator to make such a designation of 'difficult' allows inspection to take place only once in 5 years. An 'unsafe' designation carries with it the expectation of inspection 'as frequently as possible.' This appears very lax and certainly not protective. If the operator cannot access an area or piece of equipment easily or safely; this would seem to present a very strong argument for the requirement of visual/and emission detection equipment as a condition of this permit.

• Monthly inspections would also ensure that fugitive emissions from leaks or equipment malfunctions are not permitted to continue from month to month or year to year.

• The requirement of fence line monitoring should be a condition of this permit to ensure the quick detection of fugitive emissions and is a reasonable one in order to ensure the health and safety of the public.

Received From: Jody Mohr

DAQ Response

"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants. The natural gas fired boilers which account for 92% of the facility-wide nitrogen oxides emissions and 94% of the facility-wide carbon monoxide emissions are required to install Continuous Emission Monitors (CEMs) for nitrogen oxides. Therefore, all startup, shutdown and malfunction emissions are accounted for.

Antero is subject to performance testing for the emergency generator, boilers and thermal oxidizer which controls the process tanks and truck unloading bay. In addition, the boilers are required to have Continuous Emission Monitors (CEMs) installed. Therefore, these emissions must be validated.

If it was determined that the two (2) natural gas fired boilers exceed 100 tons per year of nitrogen oxides or carbon monoxide emissions (via performance testing or CEMs) or facility-wide regulated pollutant emissions exceeding 250 tons per year, Antero would be required to undergo Prevention of Significant Deterioration (PSD) permitting. If it was determined that the facility-wide emissions of regulated pollutant emissions exceed 100 tons per year, Antero would be required to undergo Title V (45CSR30) permitting. Title V permitting would not add additional regulatory requirements.

All process tanks that may emit VOCs during the process are covered and part of a closed system that it routed to the thermal oxidizer for 98% destruction efficiency of VOCs and HAPs. The thermal oxidizer is required to be designed with a minimum residence time of 0.50 seconds and a minimum combustion chamber temperature of 1,500^{o} F on a three (3) hour rolling average. The potential emissions for the thermal oxidizer are based on the terms in the permit. This facility is expected to be in compliance with the terms of this permit upon startup. The alternative language only applies if Antero chooses to pursue that option.

Permit condition 7.5.1 requires Antero to report quarterly any thermal oxidizer deviations. DAQ agrees that this reporting be changed to monthly.

The closed vent system language that exists in permit condition 10.2 is federal regulatory language that is utilized for this industry in other regulations.

Permit condition 4.1.6 requires Antero to monitor and maintain quarterly records (calendar year) for each facility component that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. You must complete repair of such equipment by the end of the next shutdown.

The DAQ regularly utilizes a FLIR camera to inspect facilities.

DAQ Action
Permit condition 7.5.1 changed the thermal oxidizer deviation reporting from quarterly to monthly.

COMMENT #17
I am writing to express my concerns regarding the Air Quality Permit for the Sandstrom Waste Water Facility.

I have read the permit, and I see that many of the emissions listed are listed as estimates. Other emission numbers are manufacturer estimates, and not operator estimates. Manufacturer estimates can vary greatly from operator's actual emissions, due to the manner in which the equipment is operated and maintained. There is also no mention of emissions that would raise limits concerning starting up equipment, shutting down equipment, and malfunctions (SSM), which would and could contribute to higher emissions, putting them closer or over the major source threshold.

All VOC emissions will be routed to a thermal oxidizer. Again, the 98 % control of VOCs is dependent on correct operating temperature and constant monitoring to make sure it is at optimal efficiency. The permit allows Antero six (6) months to establish a minimum combustion chamber temperature of 1500 degrees Fahrenheit. For the six (6) months the facility will be operating, at unknown thermal efficiency of the thermal oxidizer, higher emissions than that listed on the permit could be the result. The risk of possible higher emissions, should be included in the Air Quality Permit.

For a period of 6 months, Antero will be allowed to emit unknown emissions before a required compliance test. What happens if the compliance test fails? Will they be allowed to continue to operate at a higher emission level than they were permitted for?

I see no backup plan in the case of failure, which would allow large quantities of VOCs to be released into the air. Claiming there would be 98% efficiency on the Air Quality Permit does not appear to include any operational problems of the one emission control device on the facility.

Estimated emissions on every operation of the Sandstrom Facility is cause for great concern. The facility is close to major source thresholds, using only estimates as a basis for an Air Quality Permit. There is also the addition of the Alvadore Wellpad, which is also operating under an Air

Quality Permit. The distance between the two facilities depends on points of measurement. Measured edge to edge, the distance is much closer than measuring from center to center. With the combination of the two emissions sources, the Sandstrom facility would exceed major source thresholds by a significant amount. The Division of Air Quality has the authority to decide on a case by case basis if the Alvadore wellpad and Sandstrom Facility can be combined in determining major source contamination, and I would ask that you do so. Relying on estimates is not good enough when a proposed facility is so close to major source contamination levels.
Received From: David Scott

DAQ Response
"Major source" is defined under 45CSR30 which is the rule for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. These determinations are made based on permitted potential of the facility. In this case, the Sandstrom facility is not a major source of regulated air pollutants. The natural gas fired boilers which account for 92% of the facility-wide nitrogen oxides emissions and 94% of the facility-wide carbon monoxide emissions are required to install Continuous Emission Monitors (CEMs) for nitrogen oxides. Therefore, all startup, shutdown and malfunction emissions are accounted for.

Antero is subject to performance testing for the emergency generator, boilers and thermal oxidizer which controls the process tanks and truck unloading bay. In addition, the boilers are required to have Continuous Emission Monitors (CEMs) installed. Therefore, these emissions must be validated.

All process tanks that may emit VOCs during the process are covered and part of a closed system that it routed to the thermal oxidizer for 98% destruction efficiency of VOCs and HAPs. The thermal oxidizer is required to be designed with a minimum residence time of 0.50 seconds and a minimum combustion chamber temperature of 1,500o F on a three (3) hour rolling average. The potential emissions for the thermal oxidizer are based on the terms in the permit.

As provided in the R13-3260 Engineering Evaluation, classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

The Sandstrom Facility shares the same SIC code as several other well pads owned by Antero in the area. Therefore, the potential classification of the Sandstrom Facility as one stationary source with any other facility depends on the determination if these stations are considered "contiguous or adjacent properties." "Contiguous or Adjacent" determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a

dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; or having a common endpoint or border. The closest Antero property (Alvadore Pad) to the Sandstrom facility is 0.65 miles northeast of this facility. These properties are not contiguous or adjacent.

Because the facilities are not considered to be on contiguous or adjacent properties, the emissions from the Sandstrom Facility should not be aggregated with other facilities in determining major source or Prevention of Significant Deterioration (PSD) status.

If it was determined that the two (2) natural gas fired boilers exceed 100 tons per year of nitrogen oxides or carbon monoxide emissions (via performance testing or CEMs) or facility-wide regulated pollutant emissions exceeding 250 tons per year, Antero would be required to undergo Prevention of Significant Deterioration (PSD) permitting. If it was determined that the facility-wide emissions of regulated pollutant emissions exceed 100 tons per year, Antero would be required to undergo Title V (45CSR30) permitting. Title V permitting would not add additional regulatory requirements.

DAQ Action
None.

COMMENT #18
I urge you to deny the "permit to pollute" that has been applied for by Antero Resources et. al. in connection with the proposed Sandstrom Waste Water treatment facility. Here in Doddridge County we've seen permit after permit approved. Permits that allow pollution of the air we breathe with hazardous carcinogenic poisons. This proposed facility would add significantly to the burden of air pollution which we have to process through our lungs. This permit should take into account the high volume of diesel truck traffic and its attendant exhaust, a documented source of ultrafine particles known to cause a wide range of health problems. Clean air is a precious natural resource. I urge you to protect it by denying this permit.
Received From: Eric Bernhardt

DAQ Response
It is the public policy of this state, and the purpose of Article 5 (Air Pollution Control Act) of the West Virginia Code, to achieve and maintain such levels of air quality as will protect human health and safety, and to the greatest degree practicable, prevent injury to plant and animal life and property, foster the comfort and convenience of the people, promote the economic and social development of this state and facilitate the enjoyment of the natural attractions of this state.

As stated previously above, pursuant to §45-13-5.7, the DAQ shall issue a permit unless a determination is made that the proposed construction, modification, registration or relocation will violate applicable emission standards, will interfere with attainment or maintenance of an applicable ambient air quality standard, cause or contribute to a violation of an applicable air quality increment, or be inconsistent with the intent and purpose of this rule or W. Va. Code §22-5-1 et seq., in which case an order denying such construction, modification, relocation and operation shall be issued. Therefore, all air permit applications must be reviewed to determine if all applicable standards are met. The proposed facility meets all applicable state and federal air quality regulations. An in-depth regulatory review is provided in the R13-3260 Engineering Evaluation.

The permit application does take into account the fugitive dust haulroad emissions associated with this operation, which includes influent water trucks, delivery trucks, sludge/wetcake trucks and worker vehicles. As stated at the public meeting at the Greenwood Volunteer Fire Department on November 5, 2015, the DAQ does not have regulatory authority of mobile sources. This authority rests with the United States Environmental Protection Agency (USEPA).

DAQ Action

None.