Pennsylvania's 2018 Annual Ambient Air Monitoring Network Plan

Comment/Response Document

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Tom Wolf, Governor
Commonwealth of Pennsylvania

Patrick McDonnell, Secretary
Department of Environmental Protection

www.dep.pa.gov

Overview

Pennsylvania's 2018 Annual Ambient Air Monitoring Network Plan (Network Plan or Plan) outlines the air monitoring program history, provides an overview of the air monitoring network and discusses in detail monitoring sites, methods and equipment. In addition, past and anticipated monitoring activities for a period of 18 months are addressed.

The Network Plan outlines several planned changes to the Department of Environmental Protection's (Deparment or PA DEP) ambient air monitoring network:

1) An increase in monitoring in response to the Marcellus Shale activity in Pennsylvania, including the expansion of the $PM_{2.5}$ monitoring network;

2) The establishment of new SLAMS monitoring sites in four counties;

3) The installation of one $PM_{2.5}$ speciation monitor and the discontinuation of one $PM_{2.5}$ speciation monitor, one $PM_{2.5}$ monitor and a mercury monitor; and

4) The relocation of two monitors to other locations in their respective counties, with the addition of Carbonyl monitors at each of these locations.

Specific Monitoring Information

In the 2018 Network Plan, the Department outlines the agency's continued commitment to conduct ambient air monitoring as well as to assess air quality impacts related to shale gas activities in Pennsylvania, in both the southwestern and Northern Tier regions of Pennsylvania. Over the next 18 months, the Department plans to establish new State or Local Air Monitoring Stations (SLAMS) in Fayette, Lycoming, Susquehanna and Wyoming Counties; install a $PM_{2.5}$ speciation monitor at the Lebanon (Lebanon County) site; discontinue $PM_{2.5}$ and $PM_{2.5}$ speciation monitoring at the Chester (Delaware County) site; discontinue the mercury monitor at the Lancaster (Lancaster County) site; and relocate VOC sampling from the Springville (Susquehanna County) and Mehoopany (Wyoming County) sites to New Milford (Susquehanna County) and Tunkhannock (Wyoming County), respectively, and add Carbonyl sampling to each of these sites.

Over the past 12 months, PA DEP discontinued SO_2 monitoring at the Chester (Delaware County) and New Castle (Lawrence County) sites; discontinued CO at the York (York County) site; discontinued $PM_{2.5}$ at the Swiftwater (Monroe County) site; discontinued PM_{10} at the Altoona (Blair County) and the Montoursville (Lycoming County) sites; and installed an SO_2 monitor at the Freemansburg (Northampton County) site. In addition, the Department relocated the ozone and $PM_{2.5}$ monitors from the discontinued Washington (Washington County) site to the Houston monitoring site, also in Washington County. Modifications to the Air Toxics Network included discontinuation of the Swarthmore (Delaware County) site; replacement of the TSP samplers used for metals monitoring with PM_{10} samplers; and reestablishment of the Glasgow monitoring site.

Public Comment

In assembling this document, the Department has responded to all comments related to Pennsylvania's 2018 Annual Ambient Air Monitoring Network Plan.

Notice of the availability of the proposed Network Plan for public review and comment was published in the *Pennsylvania Bulletin* on June 16, 2018 (48 Pa.B. 3643). The public comment period on the proposed Network Plan closed on July 16, 2018. Comments were received from 32 commentators, 16 of whom individually submitted the same standardized comments. Most of the comments demonstrated concern about the effects of natural gas drilling and/or power plant emissions on air quality and public health. The following table lists these commentators. The Commentator ID number is found in parenthesis following the comments in the Comment and Response document. For the purposes of this document, comments of similar subject have been grouped together and responded to accordingly.

Table of Commentators

Commentator ID #	Name	Affililation
1	Joseph Otis Minott, Esq, Christopher D. Ahlers, Esq.	Clean Air Council
2	Leann Leiter	Earthworks
3	Kevin J. Moody. Esq.	PIOGA (Pennsylvania Independent Oil & Gas Association)
4	Ann LeCuyer	Protect PT (Penn Township)
5	Ralph Kisberg; Robert Cross, et al. (7 signatories)	Responsible Drilling Alliance
6	Raina Rippel	Southwest Pennsylvania Environmental Health Project (EHP)
7	John Michael Atherton	
8	Oliver and Lois Drumheller	
9	Andrea Honigmann, et al. (16 signatories)	
10	Larry Irr, Ph.D.	
11	Emily Krafjack	
12	Vickie Oles	
13	Mike Pastorkovich	
14	Rosalyn Robitaille	
15	Stephanie Ulmer	
16	Cynthia Walter, Ph.D.	

COMMENTS AND RESPONSES

Support for Monitoring in Areas of Shale Gas Operations

1. **Comment:** The Council appreciates the Department's inclusion of new monitors, apparently in response to previous comments regarding the need for more monitoring of natural gas infrastructure in the Marcellus Shale region. Monitoring the impacts of fine particulate matter, volatile organic compounds, carbonyls, ozone, and NO2 is an important step in quantifying the impacts of this infrastructure. Although more data and monitoring sites would be ideal, this is a step forward. (1)

   Response: The Department appreciates the commentators' support and remains committed to ensuring the protection of public health through its air quality monitoring efforts in regions of shale gas operations.

2. **Comment:** We support this plan's emphasis on monitoring the pollution associated with shale gas development, including the decision to relocate--rather than decommission--the Washington monitor to the Houston site, where it will be better positioned to monitor emissions from nearby compressor stations and the continually expanding MarkWest cryogenic facility. Installation of a monitor in this location is particularly important considering the US EPA and PA DEP Clean Air Act Settlement with MarkWest, which covers numerous compressor stations and pigging operations in western Pennsylvania and eastern Ohio. We also identify areas of concern within this plan regarding monitoring methods and remaining areas of gas development that lack monitors.

   We support the DEP's stated intention to modify the air monitoring network to better monitor pollution in areas of shale gas activity and to expand the network to areas of previously unmonitored gas activity. We appreciate the DEP's acknowledgment that public comments--including by Earthworks and others on DEP's 2017 Ambient Air Monitoring Plan—and complaints by affected residents prompted these decisions.

   Through Earthworks' OGI program, we can affirm a growing and warranted public concern over diminishing air quality in shale gas development areas. We respond to resident requests to reveal the emissions associated with gas wells, compressor stations, processing facilities, and other gas infrastructure throughout Pennsylvania, and our infrared footage frequently demonstrates significant emissions near residences, schools, and other occupied structures. (2)

   Response: See response to comment 1.

3. **Comment:** In general, we commend the Department for focusing on the air quality impacts of shale gas development in the Commonwealth. We encourage vigorous monitoring efforts wherever shale gas is being produced, but especially in the most productive shale gas areas of Southwestern PA where the combination of historic regional poor air quality and the relatively new increases in the production of wet gases and resultant large scale gas processing facilities combine to pose health threats to many who may have invested in more rural areas for health and quality of life reasons as well as nearby urban dwellers. So too, we are encouraged to see more monitoring in the most

productive dry gas areas like Susquehanna and Wyoming counties where many have also chosen to live for health and clear air benefits.

In our home county of Lycoming, we are now seeing the construction of our 20th compressor station. We appreciate the department adding a monitoring station near the playing fields of the Salladasburg elementary school that is in close proximity to the recently increased in capacity Williams compressor station. (5)

Response: See response to comment 1.

4. **Comment:** Overall, EHP commends the PA DEP on improvements to the existing network of air monitoring sites across PA. We are specifically encouraged to see new or improved existing monitoring sites focused on areas downwind or in the vicinity of shale gas development (including well pads, compressor stations, processing plants, and other related infrastructure). In particular, we are in favor of the new (relocated) sites in Tunkhannock, New Milford, and the site installation in Houston to replace the monitor in Washington.

   EHP is also encouraged to see new ambient air monitoring sites in four additional shale gas producing counties in PA (Fayette, Lycoming, Susquehanna, and Wyoming). As noted on page 17, "Each of these sites….will have…data collected and reported to the public by the end of 2018." EHP will look forward to accessing this public data, and requests this data be made easily available at the end of 2018. We will follow up directly with the PA DEP to obtain and review this data later in 2018. (6)

   Response: See response to comment 1.

5. **Comment:** DEP BAQ plans to close the temporary limited "Mehoopany" site in Wyoming County and establish the new and expanded permanent "Tunkhannock" site in Wyoming County. The new siting as proposed will add monitoring for both $PM_{2.5}$ and Carbonyls in addition to the VOC monitoring that was previously accomplished at the Mehoopany site. The purpose of this site is to more effectively monitor air changes in Pennsylvania's unconventional gas drilling region. This is one of several proposed unconventional natural gas drilling sitings for this purpose.

   The new Wyoming County site is expected to provide more and better information than the previous location. It is within the boundaries of extraction and processing activities having several well pads, a compressor and a dehydration stations within a few miles or closer. Having data collected and reported to the public by the end of the 2018 year is greatly appreciated. While the placement of monitors has missed the "boom" of the Marcellus "advent" years in an area where extractions has been occurring for a decade, it is not lost on the writer the difficulties the Bureau of Air Quality continues to endure to this day. The BAQ deals with huge amounts of data and regulations necessary to ensure that our air quality meets minimum established standards with a staff size that is too small to effectively handle all monitoring and enforcement of existing air quality regulations. They do the best they can and unfortunately for the public this is a very slow moving process. Hopefully, this monitoring location will provide the BAQ and the public

with information to gauge how healthy the air actually is in the rural unconventional gas drilling fields.

Annually, the Department issues data based on the air emissions inventory. The air emissions inventory has shown a continual increase of $PM_{2.5}$, VOCs and Carbonyls in the unconventional fields. The new monitoring locations will provide a balance of reliable data to show whether the industry self-reported, non-audited emissions inventory is accurate as submitted or whether as EDF and other NGOs have shown that the industry is in fact substantially understating air emissions (5x) at the expense of public health and safety. (https://www.edf.org/media/report-estimates-pennsylvania-oil-and-gas-methane-emissions-nearly-five-times-higher-states) While this article is referring to methane and methane leaks, it is well known that where methane is leaking so are VOCs and other pollutants. VOCs are actually able to attach themselves to $PM_{2.5}$ and thus, the recipe for nasty health consequences such as a potential increase in cancers and respiratory issues emanating from a new industrial source in the rural regions. A review of Pennsylvania's natural gas emissions inventory indicates that emissions continue to be on the rise in the rural previously unmonitored unconventional natural gas region.

The addition of a permanent air quality monitoring site within the Wyoming County natural gas extraction area is one that has been advocated by residents since at least 2011. The selected site is appropriate in that it is in the midst of an area of natural gas infrastructure including well pads, compressor station, and dehydration station. We hope the BAQ will maintain this permanent site in Wyoming County many years to come collecting data that will benefit the health and safety of gas field dwelling residents.

Thank you for proposing to site this monitoring station within the Wyoming County unconventional natural gas fields. (11)

Response: See response to comment 1.

Increase or Relocate Monitoring in Areas of Shale Gas Operations – Southwestern Pennsylvania

6. **Comment:** Westmoreland County is experiencing tremendous growth in new unconventional gas development, in addition to the significant existing natural gas infrastructure. Peer-reviewed scientific studies show that people living within a half-mile circumference of shale gas development have an increased rate of asthma and asthma-related hospitalizations, low birth weights, and cardiac events. The stated mission of the Department of Environmental Protection is "to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment", and the intention of the air monitoring network is to "improve public health protection and better inform the public about air quality in their communities." The current DEP Air Monitoring Network Plan is insufficient to accomplish this mission.

Unconventional well pads that have been drilled before August 2018 are not required to obtain air permits and are only accountable through a yearly self-reported inventory of

emission sources. This does not provide an accurate assessment of the pollution being released near these sites. Furthermore, this year the Pennsylvania Department of Environmental Protection discovered that twenty operators, statewide, had failed to submit their yearly air emissions inventory report in 2015 alone, so this data is inaccurate and cannot be relied upon for a true account of the impact on local air quality.

Currently, in Westmoreland County, there is one monitor placed near the city of Greensburg. While this location might be acceptable to review ambient air quality near an urban center, it does not fulfill the purpose of assessing emissions from unconventional natural gas development. This monitor is over a mile and a half from the nearest site and approximately eight miles upwind of the majority of the currently active well sites in Westmoreland County. Changing the protocol for this air monitoring plan to include one or more air monitors in close proximity to the most polluting of infrastructure (taking into account normal weather and wind patterns) would ensure the most accurate representation of local air quality from this industrial source.

In addition to the 134 and counting unconventional well pads in Westmoreland County, there are 22 compressor stations, extensive pipelines, and pigging stations at the beginning and end of each line that emit constituents harmful to the human body. A suitable monitoring protocol would consider the aggregate effect of having this large amount of oil and gas infrastructure being built increasingly close to homes, schools, and businesses. Relying on the practice of industry to self-report calculations based on speculation is a failure of the DEP to fulfill its mission, especially when there is no penalty for non-compliance.

Within Westmoreland County, some municipalities are facing zoning changes that allow for more gas development than other areas. In Penn Township, there are currently 11 active and approved unconventional well sites. Four of these well sites surround the Level Green community and will be within one mile of Level Green Elementary School. The children in this area will not only live near all four well sites but also attend school within their range. This will mean these children, who are the most vulnerable to pollution, will spend the majority of their days exposed to aggregate pollution from ongoing well construction, drilling, hydraulic fracturing, and production. An additional monitor should be placed in Penn Township and other municipalities with a similar concentration of wells and associated infrastructure.

The draft for this plan shows monitors currently being added for oil and gas infrastructure in 2018, with maps accounting for well pads and compressor stations that were producing in 2017. The placement of these monitors is a step in the right direction. However, it would be prudent to take into account that the majority of the emissions from a well site come from the thousands of truck trips to and from the site, hydraulic fracturing, flaring and other fugitive emissions associated with this process, all occurring before the well is in production. Additionally, pigging stations and pipelines are sources of fugitive emissions that add to the degradation of air quality and the health of citizens.

Protect PT feels the current draft falls short of sufficiently monitoring air in Westmoreland County for the protection of residents facing current and future

unconventional gas development. We ask that the PA DEP, while amending their 2018 Annual Ambient Air Monitoring Network Plan, take into consideration the facts presented and include additional, suitably-located air monitors that are capable of capturing and identifying emission components associated with this expanding oil and gas industry. (4)

Response: The Department appreciates the comments and concerns of citizens living in areas of Pennsylvania being impacted by shale gas extraction activities. In the past few years, the Department has made a significant investment in ambient air quality monitoring in areas of Pennsylvania being impacted by shale gas operations, and remains committed to ensuring the protection of public health through its air quality monitoring efforts.

The Department understands that public concerns regarding air quality impacts from shale gas operations encompass all aspects of natural gas processing, from drilling to processing to transportation of product or materials. The Department also understands that this industry is active over a large geographical region of Pennsylvania, including rural areas, which may not have historical air monitoring sites. In response, over the past few years, the Department has undertaken several targeted projects to better quantify the types of pollutants being emitted by shale gas operations. Additionally, the Department has installed additional monitors, and established several monitoring sites, with the intent of specifically capturing ambient air impacts from shale gas-related industries. The planned 2018-2019 ambient air monitoring network includes monitoring locations in twenty-three active Marcellus Shale counties. Many of these locations may provide useful information on shale gas-related air quality impacts, and several are sited specifically to do so.

Several of the commentators above refer to siting monitoring locations to capture emissions. It should be noted that measurement data from ambient air monitors in the Commonwealth's ambient air monitoring network are generally not intended or sited to quantify actual emissions from local sources. Monitoring locations in the Commonwealth's ambient air monitoring network are predominately sited to measure data representative of area-wide characterizations. These monitoring sites may be located in areas influenced by pollutant sources, or in areas not significantly impacted by pollutant sources (background sites). Where monitoring locations are sited near air pollutant sources, concentration and meteorological data from these ambient air monitors may be used to characterize specific or general source impacts on area-wide populations.

The Commonwealth's ambient air monitoring network, maintained by the Division of Air Quality Monitoring, is only one part of the Bureau of Air Quality's effort to safeguard the health of Pennsylvanians and their environment. Other Bureau functions, such as facility permitting, continuous emissions monitoring, and emissions inventory reporting are also part of that effort. While specific facility permitted emissions and associated emissions reporting requirements are not within the scope of the Commonwealth's ambient air monitoring network or this

document, links to the Bureau of Air Quality's information on permits, the permitting process, emissions reporting and monitoring are provided in the table below.

Selected PA DEP Bureau of Air Quality Links

Subject	Web Link
Division of Permits	https://www.dep.pa.gov/Business/Air/BAQ/Permits/Pages/default.aspx
Division of Source Testing and Monitoring	
Continuous Emissions Monitoring (CEM)	https://www.dep.pa.gov/Business/Air/BAQ/BusinessTopics/ContinuousEmissionMonitoring/Pages/default.aspx
Source Testing	https://www.dep.pa.gov/Business/Air/BAQ/BusinessTopics/SourceTesting/Pages/default.aspx
Pennsylvania's Environment Facility Application Compliance Tracking System (eFACTS)	https://www.ahs.dep.pa.gov/eFACTSWeb/default.aspx

The Department appreciates the commentators' feedback about monitoring needs in specific areas throughout southwestern Pennsylvania, as well as the concerns over specific local and regional pollutant sources, primarily associated with shale gas operations. These concerns have been noted. At this time, the Department does not plan to move its Greensburg or Charleroi monitors from their current siting, nor are additional sites currently planned for southwestern Pennsylvania. Establishing a new monitoring site may take many months or years to complete, and represents a significant investment of Department resources. As the Department is still in the process of expanding its air monitoring network as outlined in the current and previous network plans, monitoring data from these newly-established and currently-planned sites are only now starting to become available. The Department will continue to evaluate the data coming in from existing, newly-established and currently-planned sites, and will use this data to make informed decisions on whether additional expansion of its monitoring network is needed, as they relate to federal requirements and Department initiatives. The Department will also consider the information provided in these public comments as part of its ongoing annual network plan process, to continue to evaluate potential changes to the network in southwestern Pennsylvania.

7. **Comment:** We note that key areas of shale gas development are not included in the proposed modification or expansion. As we commented on the 2017 plan, the region designated as the Metropolitan Statistical Area (MSA) for Pittsburgh contains Butler County, home to 522 active unconventional wells, numerous compressor stations, and a major gas processing facility, the Bluestone Gas Processing Plant. Yet, no monitors are currently located in this county and the draft Network Plan does not propose any new monitors to be sited here. Figure 3, Map of PA DEP Air Monitoring Network, when overlaid with a map of oil and gas facilities throughout the state, shows a density of

development in several additional areas with few or no monitors. These include underserved Washington County and Greene County. The high amount of development in these counties warrants a commensurate level monitoring. Establishing new monitoring sites in shale gas counties such as Jefferson is an important step, but the ratio of one monitor to the 44 active unconventional wells in that county appears out of balance with the ratios in Washington (3:1,627) or Greene County (1: 1,244).

We recognize that the monitoring network is not intended to be comprehensive, but rather representative of regional trends in air pollution. However, the current nature of the shale gas industry in Pennsylvania renders representative sampling impossible with the low number of monitors in areas of dense shale gas development. For example, a plethora of different gas companies operate in counties like Washington and Greene, and operator compliance with air emissions regulations may vary. Within a given county, one operator may operate large clusters of facilities. If that operator is a "bad actor" in terms of compliance but is sited far from monitoring locations, data will not indicate an accurate picture of the broader area's air quality. Operators could use their knowledge of the sparsely placed air monitors to run any facilities near monitors to stricter standards, and be laxer with those at a distance.

Furthermore, we note that the pace of shale gas permitting by DEP exceeds the ability of the DEP to update the Air Monitoring Network plan and, more importantly, to make necessary on-the-ground changes. Therefore, we suggest that the counties with the highest level of shale gas activity receive additional monitors immediately to adequately assess the public health impact, and that these monitors be dispersed to facilitate a more complete assessment of shale gas air quality impacts now and in the future. (2)

Response: See response to comment 6.

8. **Comment:** We encourage the PA DEP to consider adding sites, or consulting with EHP, on site locations in Westmoreland County, Indiana County, and an additional site in Washington County. Our public health outreach and data collection has led us to an understanding of particularly high impacts in West Pike Run Township, Washington County, and due to numerous high production wells, planned and existing compressor stations, and other infrastructure, we will be doing extensive data collection for this Township, starting this fall.

The monitoring site in Charleroi, Washington County is an example of potential improvements to localized, rural monitoring. While there is currently one monitoring site, EHP recommends additional, or alternatively placed monitors. As indicated by the "Monitoring Scale" on page D-11, the Charleroi monitor is meant for neighborhood scale monitoring. Air emissions in the neighborhood of Charleroi are not representative of the more rural communities in surrounding areas, which make up a greater proportion of this region. To meet this request, DEP should add an additional site to monitor Ozone, NO_2, $PM_{2.5}$, VOC, and carbonyls in either Bentleyville, PA or California, PA. If another monitoring site cannot be added, EHP recommends that the Charleroi monitoring site be re-located to one of these locations. EHP believes that these sites will better encompass

local air emissions from shale gas development based on air weather modeling, historical $PM_{2.5}$ emissions data, and concentration of development in these areas.

EHP recommends […] relocating the Greensburg site to an area with more shale gas development in Westmoreland County. The Greensburg site, like Charleroi, does not accurately gauge air emissions for the region. (6)

Response: See response to comment 6.

9. **Comment:** I urge you to increase air monitoring throughout Westmoreland County as soon as possible to protect the citizens from the industrial invasion of fracking.

I do not trust fossil fuels corporations. I have heard of miners who lost their lives due to corporate arrogance. I have heard of Donegal houses that will never be sold because corporate frackers ruined their water supply. I have heard that 1000 Murrysville people were seen by emergency health care workers because of a gas leak from a compressor plant. This gas leak sent 49 children to an emergency ward. All this damage, and more, serves one group and one group alone: heavy industry.

Heavy industrial fracking wants to invade Westmoreland County. Frackers have already threatened to sue Penn Township for $37,000,000 if this bedroom community does not zone itself exactly the way frackers demand. This is no mom and pop drilling company. It is a multinational corporation with deep pockets willing to ruin the lives of anyone who gets in their way.

In opposition to such corporate threats our state constitution guaranties its citizens the right to clean air and water. This guarantee is a constitutional mandate that all elected officials are required by law to enforce. It is not an optional choice: it's our state constitution. In contrast, there is no requirement to support frackers: none. Your task as DEP officials is clear: protect citizens, not frackers. Frackers have no standing in our constitution.

We must monitor to detect fracking violators. As with all threats to our health, we must first detect the problem before we can fix it. The standard form of protection throughout Europe is called the Precautionary Principle. This means when something is dangerous we must err on the side of safety. Dangerous things, such as fracking, must be considered guilty until proven innocent. The alternative is to let the frackers do whatever they want and only after they have taken their profits will we discover that they have poisoned our water, air, and people. The Precautionary Principle is the only way to protect people and property. To enforce this principle we need monitoring.

Given the Precautionary Principle it is mandatory that we monitor the air around every step of the fracking process: drill pads, compressor stations, pipelines, the whole thing. Only in this way can the DEP protect citizens from the documented damage that fracking does to our people and property. (7)

Response: See response to comment 6.

10. **Comment:** I am writing to request that the Pennsylvania Department of Environmental Protection increase the number and type of air monitors in Westmoreland County to account for the pollution from unconventional natural gas development.

Westmoreland County is currently facing large growth in the development of natural gas resources. Gas operators have moved into our communities at an alarming rate and there are more permits on the way. In addition to oil and gas well pads, there are also compressor stations, and numerous pipelines. Our family resides in Monroeville, PA, which is in Allegheny County, but we border Westmoreland County are in a radius of many well pads, some recently permitted, some pending - ALL within a radius between 0.2 and 1.2 miles of nearby townships in like Penn Trafford.

As we are all aware, air pollution knows no county boundaries.

Residents in municipalities all over the county have raised concerns about the negative health impacts associated with this industrial process. Several reports have come out recently that show there are negative health impacts to people living near these shale gas development processes. The 2018 Air Monitoring Network Plan only shows one air monitor in Westmoreland County, located in Greensburg, and it does not appear to be near the majority of the unconventional well sites and other gas related infrastructure.

Please uphold the stated mission of this air monitoring network to "improve public health protection and better inform the public about air quality in their communities" and place air monitors that will accurately account for the air quality in our rural areas near fracking, and not just the urban pollution gathered at the Greensburg air monitoring site. (8, 9)

Response: See response to comment 6.

11. **Comment:** There should be a monitoring station set up in Penn Township that monitors the same pollutants as the Greensburg site.

The pollutants in Penn Township should be monitored as frequently as possible because of the advent of fracking to protect our citizens especially our beautiful children. attention needs to be given to Spikes. I am very concerned about the health and safety of our community as a PhD industrial chemist with 40 years experience with 25 of those years as the chemistry advisor to the Bettis HAZMAT team. (10)

Response: See response to comment 6.

12. **Comment:** We are writing to ask the DEP to increase the number of air monitoring sites in Westmoreland County.

The American Lung Association gives the Pittsburgh area an F in air quality and Westmoreland County a D! Cracker plants and gas wells are adding to the air pollution in SW Pennsylvania. Every part of the unconventional gas drilling industry creates serious air pollutants under normal operating conditions as well as from leaks, spills and blow outs that might occur. (12)

Response: See response to comment 6.

13. **Comment:** Pennsylvanians need more air quality monitoring stations, not less and not the same as before. The health of Pennsylvanians in Westmoreland county and throughout the state deserve more! (13)

Response: See response to comment 6.

14. **Comment:** I am a Westmoreland County citizen who is very concerned with the air quality in the County. I am requesting increased and improved air quality monitoring in the public health of my family and all residents of the County. We need an increase in the number of stations for monitoring.

This is due to the serious air quality problems, which have become worse in recent times. The PA DEP has to be concerned with the adverse effects of various pollutants which cause harm especially to a vulnerable population, e.g., the elderly, children, and those with health conditions which make breathing the air harmful.

We have increased truck traffic due to increased industrial activity, such as unconventional drilling, in addition to the poisonous gases which accompany all the stages of gas drilling.

The cancer rates of the County have increased in the last twenty years. This should be cause for concern to the Department which is charged with maintaining the health of our environment.

I sincerely hope you will give serious consideration to increasing your ability to monitor our air. We have no other recourse than breathing it. (14)

Response: See response to comment 6.

15. **Comment:** Westmoreland County has only a single air monitor, located in Greensburg. It's location is not close enough to the 134 gas well pads in the county to sufficiently monitor emissions from these sites.

Additional monitors placed specifically to account for pollutants from the current and increasing number of unconventional gas wells, natural gas compressor stations, pipelines, and other oil and gas infrastructure in Westmoreland County are needed if the Air Monitoring Plan is to succeed in its intended goal to "improve public health protection and better inform the public about air quality in their communities." (15)

Response: See response to comment 6.

16. **Comment:** I am a scientist with a doctorate in biology and over 30 years of experience teaching in environmental sciences including toxicology. My comments are based on the following personal background components: I have studied pollution in our region, especially Westmoreland County where I am a resident; I have long been concerned about the limited air monitoring in Westmoreland County, because I know the elevated

pollution levels in this region overall and the science of how air pollution harms health; My family members experience health problems that our physicians have specifically associated with our local air pollutants; Air quality health problems are an important reason for us to consider moving from this area.

I strongly encourage the DEP to increase air monitoring in Westmoreland County and improve public education on air quality in the following ways:

Increase the number of stations in Westmoreland County. Our large population of 360,000 is distributed across the county and all citizens need data relevant to their locality. Also, county topography is varied with valleys that easily trap pollutants from local sources; thus air quality differs within the county. The cost of increased stations is worthwhile because it helps scientists track air pollution in order to propose solutions. Also, if citizens know their local air quality they can avoid exposure on bad days.

Westmoreland County is the site of a major new source of air pollutants. The Tenaska power plant near Smithton will be in full production soon, with the planned annual release of hundreds of tons of serious air pollutants including PM-2.5, Carbon Monoxide, Nitrous Oxide, Sulfur Dioxide, and VOC's all of which trigger ozone formation. The company is paying for air pollution credits to reduce air pollution somewhere in PA as compensation for the degradation of air quality in our county, but I know of no plans to measure the air quality near the facility itself.

The shale gas industry is rapidly developing in Westmoreland County and is expected to continue increasing. Many components of shale gas operations are close to housing and schools because many municipalities only slightly increase set-backs from the 500 foot guideline established by the DEP. For example, one residential community recently allowed wells within 600 feet of elderly care facilities, schools and homes. Increasing air monitors in the county will not help citizens track emissions from a single well site, but a network of air monitoring stations will help citizens estimate their own air quality between stations as they compare pollution amounts and types at different stations.

Every component of the shale gas industry produces serious air pollutants under normal operating conditions, and leaks, spills or blow outs add to problems. There are over 200 wells in our county alone and each well is associated with one or more condensor units, compressor stations, and other gas transport components that must operate continuously with associated emissions. Each well also produces waste that is transported most often by trucks. Each new well requires millions of gallons of water also usually transported by trucks, requiring over 200 truck deliveries per well. Consequently the amount of large truck diesel emission has dramatically increased in this area and will keep increasing. Well pad construction in our hilly landscape is problematic and requires extra construction efforts and emissions. Fracking requires constant diesel emissions for many weeks, and many wells sites are fracked more than once. Shale gas releases of methane and many more toxic components are common with flaring lasting for days or even weeks on some sites recently, even though flaring is allowed only if no other gas control mechanism is possible. The shale gas industry is highly complex and has a high rate of leaks, spills and accidents. Air monitoring data is essential to document

background air quality before a well starts or problems occur. Then, citizens can be informed if air quality is impacted downwind from regular operations or an incident.

Public health in Westmoreland County shows serious problems. For example, rates for all cancers have steadily been increasing in Westmoreland County over the last 20 years, until rates now match those of nearby Allegheny County, a county known for its poor air quality. Westmoreland County is at the nexus of many past and present industries many of which produce pollutants associated with cancer. Many of those pollutants are in the air, but we have limited records of air pollution because of limited monitoring in our county.

Westmoreland County has substantial traffic. We are a thoroughfare for car and truck traffic to and from Pittsburgh, with many major highway axes that bring traffic across the county and often right through town centers, neighborhoods, etc.

Westmoreland County has almost 500 facilities that handle hazardous materials, according to a 2014 country emergency planning report. Some of these facilities regularly emit air pollutants, and others are at risk to accidentally emit substances. Almost none of these facilities monitor their air quality. (16)

Response: See response to comment 6.

17. **Comment:** The Greensburg site should add Sulfur Dioxide and Hydrogen Sulfide to their pollutants monitored with the advent of fracking in Westmoreland County. Hydrogen Sulfide can occur with oil and natural gas…look at the hydrogen sulfide problems in the town of Versailles Pa. Sulfur Dioxide can be a product of fracking flaring operations. They should also add methane a potent green house gas that is a many times better infrared absorbing gas than our infamous carbon dioxide. (10)

Response: Emissions inventories indicate that sulfur dioxide is not a major constituent from shale gas; however, the Department will reevaluate the feasibility of installing sulfur dioxide and hydrogen sulfide sensors in the Uniontown site. The Department is evaluating the use of methane monitoring devices and based on that evaluation will determine if adding this parameter is feasible.

Increase or Relocate Monitoring in Areas of Shale Gas Operations – Northern Tier

18. **Comment:** We are pleased to see that the Montoursville monitoring site was not on the chopping block this year as there was some talk about it being removed. We do think monitoring for Ozone somewhere near the county's populated river valley is important for the health of residents, but we would like to see a site closer to a cluster of shale gas facilities like the Quaker State compressor station which happens to be closer to a number of gas facilities including a metering station, a CNG tank truck filling station and a well pad with active wells and on site gas processing dehydrators and separators tanks. None of these sites are particularly productive gas sites at the moment, but the valley at that point is close to the large 2018 PA DCNR River of the Year, the 58-mile long Loyalsock Creek. The compressor station is unfortunately sited low on a hill near the creek bottom that, like the river valley, is subject to frequent inversions at certain times of the year. It is

all much closer the interstate Highway 180, which carries a lot of shale gas related diesel traffic, perhaps an unfortunate combination for those who live in that area, but who also deserve good air quality. In addition to continuing to monitor for ozone, again we would like to see VOC's and other air toxics included at a relocated Montoursville monitoring site. (5)

Response: The Department appreciates the commentator's concerns regarding monitoring in Lycoming County. The Department maintains two ambient air monitoring sites in Lycoming County, the Montoursville site for ozone, and the Salladasburg site for $PM_{2.5}$. Although the Department does not plan to establish a third monitoring site in Lycoming County at this time, the Department regularly reviews its ambient air monitoring network to determine the efficacy of its monitoring locations, including whether new sites are needed, or existing sites relocated. The Department will consider the commentator's suggestions for monitoring in the Loyalsock Creek river valley in future reviews.

Increase Monitoring in Areas of Shale Gas Operations – Rural Areas

19. **Comment:** A general comment on shale gas development and the Plan is that, as stated on Page 5, "PA DEP's monitoring strategy generally requires the installation of monitors in areas….having high population density and/or high levels of contaminants." EHP would encourage the PA DEP to consider that rural populations bear a disproportionate burden of air pollution from shale gas. This makes key monitoring site locations crucial, as the far-flung network of industry impacts often have very localized air pollution impacts, which may not be adequately captured by anything other than a fence-line, industry-wide, continuous monitoring network. As PA does not currently require such industry standard practices, the PA DEP must strive to inform as many residents of the Commonwealth as possible of their real-time risk from shale gas industry air pollution.

Using Micropolitan Statistical Areas in addition to Metropolitan Statistical Areas is an appropriate way to address rural concerns. We encourage siting of air monitoring units in areas heavily impacted by shale gas development industry as much as possible, given this is one of the largest, and growing industrial sources of contamination in PA. Moreover, the lack of a specific point-source of contamination as found in more traditional industrial pollutants makes the ambient air monitoring crucial in safeguarding the health of both rural and suburban Pennsylvanians. Instead, EHP has observed that there are multiple, time-variable point sources associated with shale gas infrastructure. (6)

Response: The Department appreciates the commentator's concerns and suggestions regarding additional monitoring sites in rural areas. U.S. EPA has set network design criteria, including monitoring requirements, based on population and/or historical measured pollutant concentrations. The Department understands that as shale gas operations are typically located well outside of major population areas, without historical monitoring data records, populations which may be impacted by the large-scale increase in shale gas operations often reside in areas not covered by ambient monitoring sites of appropriate monitoring scale. Over the past several years, the Department has been expanding its monitoring network into rural

areas, particularly in regions of shale gas activity. The planned 2018-2019 ambient air monitoring network includes rural monitors in Bradford, Clarion, Greene, Indiana, Jefferson, Lycoming, McKean, Susquehanna, Tioga and Wyoming Counties. The Department will continue to evaluate data from these rural monitoring sites to help determine if and where additional monitoring is needed.

Inclusion of Air Toxics Monitoring at Monitoring Sites in Shale Gas Regions

20. **Comment:** The absence of air pollution sensors (particularly VOCs and carbonyls) is especially evident at the Salladasburg site, which only contains one $PM_{2.5}$ monitor. This is particularly puzzling as it seems to have more well activity than the Uniontown area, which would lead one to expect increased VOC and carbonyl emissions. If the Department is trying to measure the impacts of Marcellus Shale development, at a minimum, the Department should have a way of sensing PM and VOC emissions, and a way of speciating VOCs/HAPs. In its current form, the Salladasburg site will not effectively measure shale gas impacts in Lycoming County. Labeling the Salladasburg site as a shale gas monitor is disingenuous and troubling. (1)

Response: The Department appreciates the commentators' concerns and suggestions for air toxics monitoring in shale gas regions. As stated in the network plan, although there is no federal standard or regulatory requirement to perform ambient air monitoring for air toxics, the Department does maintain several air toxics monitoring sites throughout the state, several of which are focused on capturing ambient air impacts from shale gas operations. At this time, the Department does not have resources to establish air toxics monitoring at all sites. However, the Department agrees that air toxics monitoring in areas of shale gas operations may provide information useful to characterize health risks for impacted populations, and has committed previously to this monitoring effort. In its 2015 Annual Ambient Air Monitoring Network Plan, the Department committed to establish a multi-pollutant site, including air toxics monitoring, near regions of high Marcellus Shale gas activity within Fayette County. The Uniontown monitoring site represents the fulfilment of this commitment. In its 2016 Annual Ambient Air Monitoring Network Plan, the Department committed to an expansion of it $PM_{2.5}$ network into regions with high Marcellus Shale gas activities. Specifically, the Department identified ten counties containing a high frequency of compressor stations, but without a $PM_{2.5}$ monitoring site: Bradford, Clarion, Greene, Fayette, Indiana, Jefferson, Lycoming, McKean, Susquehanna and Wyoming. As VOC monitoring was already being performed in Susquehanna and Wyoming Counties, the Department decided to relocate these sites to accommodate additional air toxics monitoring (carbonyls), as well as $PM_{2.5}$ monitoring, while retaining VOC monitoring in these counties. The New Milford (Susquehanna County) and Tunkhannock (Wyoming County) monitoring sites represent a fulfillment of the commitment made in these counties. Although the Department's $PM_{2.5}$ expansion originally emphasized monitoring near compressor station operations, as the Department's understanding of gas extraction and processing activities along with possible associated impacts has increased, the $PM_{2.5}$ impacts from other types of shale gas activities are being considered in the identification of new $PM_{2.5}$

monitoring sites. In addition, the Department will continue to review its monitoring network, as well as data obtained at monitoring sites near shale gas operations, to help determine if additional monitoring is needed, including air toxics.

21. **Comment:** We recognize the importance of $PM_{2.5}$ as a pollutant of concern associated with shale gas drilling and as both a carrier and a proxy for other pollutants associated with shale gas development, as demonstrated by recent scientific research. However, this measurement on its own is insufficient to assess potential harm to public health.

As currently written, the plan's section Modifications to Air Monitoring Network: Shale Gas Development refers only to installing new $PM_{2.5}$ monitors. This is a concern because along with $PM_{2.5}$, all stages of gas production, development, processing, and transmission emit volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) with a range of scientifically established environmental and health impacts and should be monitored near oil and gas operations.

Notably, the DEP's new General Permits for Unconventional Natural Gas Well Site Operations and Remote Pigging Stations (GP-5A) and for Natural Gas Compressor Stations, Processing Plants, and Transmission Stations (GP-5) recognizes the inadequacy of $PM_{2.5}$ as an air quality measurement, particularly for combustion sources. The June 2018 Technical Support Document for the GP-5 and GP-5A (pg. 25) states, in regard to particulate matter, that "the primary particle emissions from combustion sources are of minor significance, and the primary precursor emissions are either of minor significance or well controlled."

All counties specified for the intended modification or expansion of the network for shale gas monitoring have multiple compressors (as noted in the current air monitoring plan) which generally feature combustive equipment, and additional combustion sources such as elevated flares can be found at active well sites such as those the new monitors are intended to study. All of these are sources of VOCs and HAPs.

Of the four new sites, Fayette, Susquehanna, and Wyoming Counties will all be equipped to monitor a suite of pollutants associated with shale gas development: ozone, NO_2, $PM_{2.5}$, carbonyls, and VOCs. Yet, the fourth, a new site in Lycoming County, will only have equipment for monitoring $PM_{2.5}$. Furthermore, the four proposed sites in Clarion, Indiana, Jefferson, and McKean Counties only call for $PM_{2.5}$ monitors. We recommend that DEP standardize monitoring capabilities at all new shale gas monitoring sites to, at minimum, include the pollutants monitored for in Fayette, Susquehanna, and Wyoming Counties.

We suggest that DEP re-evaluate the over-reliance on $PM_{2.5}$ monitoring in areas of shale gas activity, and include VOC and HAP monitoring at all new shale gas monitoring sites. (2)

Response: See response to comment 20.

22. **Comment:** We are not engineers or chemists, but are a bit puzzled why the criteria monitored at the [Salladasburg] site is listed only as $PM_{2.5}$. Perhaps we are incorrect, but

with the new gas turbines at the Williams facility, we don't expect to see much in the way of particulate matter. There are not a lot of particularly productive wells nearby, State Highway 287, though subject to much gas related traffic at times, is a 2 lane road with relatively little regular traffic and the borough of Salladasburg is small with little to no other industrial activity.

With the nearby compressor station expansion, we understand the new gas fired engines will be far less polluting than what was previously in place, but as, as far as we know, the older compressor engines are still operating. We are concerned about even a small increase in VOC emissions when the station is operating at its new full capacity as the older engines were close to a concerning level of formaldehyde emissions. For that reason we'd like to see VOC monitoring, as well as Ozone monitoring included at the site. We realize the DEP budget is limited and plans are in place, so for now, we ask that the Department considers adding a relatively inexpensive Organic Vapor Analyzer (OVA) to the monitoring site if you will not already be doing so. (5)

Response: See response to comment 20.

23. **Comment:** EHP recommends that the Holbrook monitoring site include VOC and carbonyl monitoring in addition to Ozone and $PM_{2.5}$. These parameters are necessary to monitor emissions from nearby shale gas development and to protect public health. VOC and carbonyl monitoring is particularly prudent at the Holbrook site as there are no other monitoring sites within the county, and the next closest VOC monitoring sites are 38 miles away in Houston, PA and Uniontown, PA. (6)

Response: See response to comment 20.

Clarification of Monitoring Site Location Decision Criteria for Planned Monitoring

24. **Comment:** The Department Should Justify its Siting Locations and Monitoring Decisions at the Uniontown, Salladasburg, and Other Monitoring Sites.

While monitoring Marcellus Shale impacts is a step in the right direction, there is currently not enough information provided by the Department to determine if the monitors are placed in areas that will effectively measure impacts.

Wind speed and direction provided by wind roses is one way to add information, but that is only one of many important steps that must be taken.

Currently there is little detail or narrative description as to why specific sites or areas were chosen. There is no legal authority or siting criteria cited by the Department when discussing these locations. The Department should provide some reasoning as to why each site was chosen, and it should include the criteria for siting that were used to determine why these areas were appropriate. Without knowing the criteria for a site, it is impossible to assess the Department's objectives and how it will be effective in meeting those objectives.

While compressor stations are mapped alongside well sites, the size of these stations is unclear, which in turn makes it hard to assess if a monitor should be closer to other stations, closer to other wells, or is already sited appropriately. The Department has not made it clear if it has prioritized larger compressor stations, or has favored larger well production sites. In addition, it has not shown how it weighs these factors when determining station siting. With the small number of monitors made available for these purposes, siting is particularly important to make sure that impacts are actually being measured effectively. By not making its criteria available, the Department makes it impossible to assess whether or not these stations will effectively measure pollutants from these sites in the regions and locations where they are placed. The Department must provide some explanation as to why a monitoring site will be representative of pollutant concentrations in an area. (1)

Response: The Department appreciates the commentator's suggestions regarding the site selection information provided in the network plan for monitoring sites within areas of shale gas operations. The Department is looking to establish representative sites downwind of source-dense areas, or near vulnerable populations, to determine area-wide impacts on ambient air in these regions. The Department considers multiple factors to locate representative monitoring sites. These factors include, but are not limited to the amount and location of activity in the region, the type of activity, reported emissions, area topography, meteorology and the presence of susceptible or vulnerable populations. Additionally, site logistics must be considered, such as the feasibility of establishing power and site access, as well as the ability to secure property lease agreements. See response to comments 20 – 23 above for additional information.

25. **Comment:** From the limited information the Council does have available, the Council questions whether the Uniontown and Salladasburg sites are appropriately sited to measure heavier gas extraction.

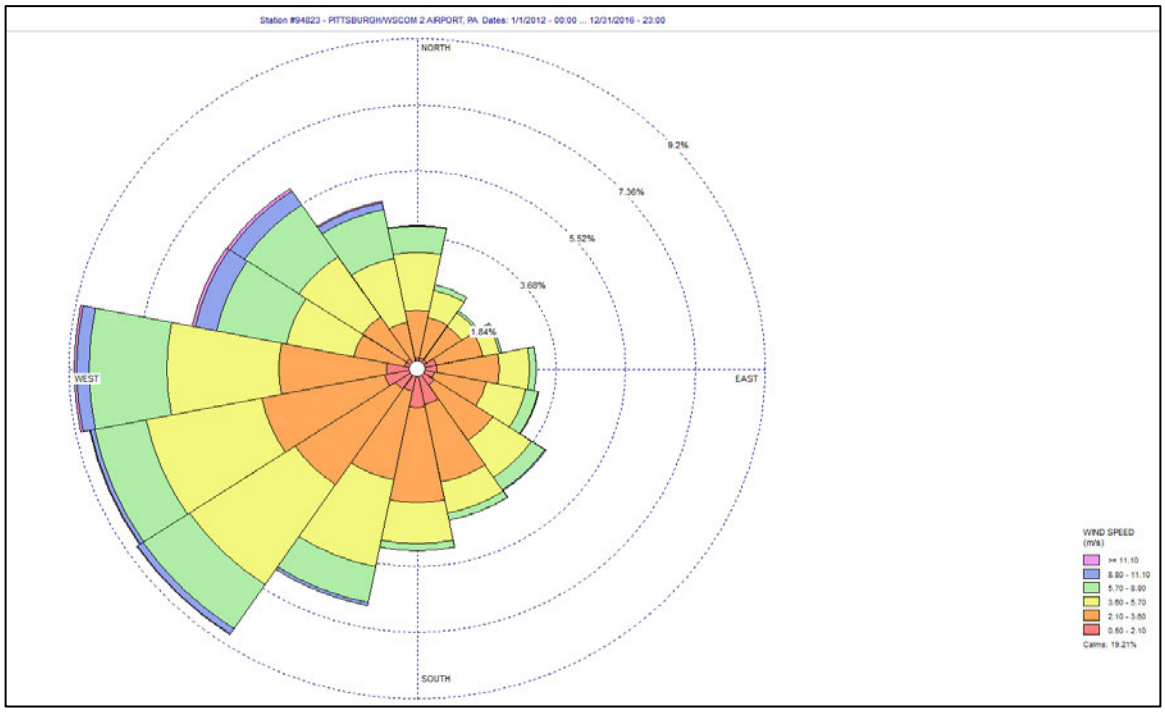
The Uniontown map seems to indicate there are larger clusters of compressor stations to the northeast of the current monitoring site. The Uniontown site is located to the south of most gas extraction sites, it does not seem to be downwind of these sites or compressor stations. The Uniontown site also contains the most comprehensive suite of air pollution sensors, capable of measuring ozone, NO_2, $PM_{2.5}$, carbonyls, and VOCs, while having a seemingly smaller amount of gas production and compressor stations than other counties identified in the Department's maps. While all of these air pollution sensors do not have to be present at every Marcellus shale site, there is no explanation given as to why certain pollutants were selected for one site, but neglected for others.

The New Milford and Tunkhannock sites seem to be more appropriately sited than the other stations. However, more narrative description and reasoning is still needed before any definitive determination can be made. (1)

Response: See response to comments 20 – 23 above.

In addition, the Department disagrees with the commentator's assertion that, based on the wind roses presented in the commentator's Appendix A, the Uniontown and Salladasburg sites are not sited appropriately. The wind roses provided by the commentator suggest that the wind meteorological data measured at the Williamsport Regional Airport (KIPT) is representative of all wind flow in Lycoming County. Due to its proximity, KIPT's wind sensor is influenced by the elevated terrain to its south, thus yielding a wind rose illustrating primarily easterly and westerly wind flow. Considering the complex terrain throughout Lycoming County, the Department does not agree with the assessment that it should be siting a monitor downwind of the natural gas inventory solely based on the use of KIPT meteorological data. Likewise, in Appendix A of its comment, the commentator provided a wind rose illustrating the wind meteorological data at the Washington County Airport (KAFJ) as being representative of wind flow near Uniontown, PA. While KAFJ is the closest airport in proximity to the Uniontown, PA area, it is not necessarily the most representative. KAFJ is an AWOS site. An AWOS site does not adhere to the lower wind thresholds as an ASOS site. Therefore, there is likely to be a greater distribution of calm winds at an AWOS site (in the data provided in Appendix A, 30.6% of the winds as KAFJ were calm) as opposed to an ASOS site. A more representative meteorological dataset would be found at the Pittsburgh International Airport (KPIT). The wind rose for KPIT (using the 2012-2016 period) illustrates a 19.2% occurrence of calm winds. In addition, the distribution of winds is more variable, leading to a better characterization of downwind conditions across western Fayette County. A wind rose diagram is provided in Figure 1.

Figure 1. KPIT Windrose, 2012-2016



26. **Comment:** Page 17 of the Plan specifies that PADEP has begun to establish new monitoring sites because of *"…multiple public comments on its annual air monitoring network plans, expressing concern over short-term exposure to pollutants in relation to shale gas activities and the effect on susceptible populations including children, or those with respiratory difficulties"*. While PIOGA understands that PADEP is obligated to respond to public comments submitted regarding such Plans, justifying the installation of multiple new and redundant ambient pollutant monitoring sites (e.g., four under construction in 2018 and four more planned in 2019) across eight counties in the shale gas region of Pennsylvania solely as a response to public comments and complaints is an overreach without supporting scientific data and facts as well as identified resulting benefits, and an inefficient use of scarce PADEP resources. If there is additional site-specific public health, technical, or regulatory justification for the installation of multiple new and redundant ambient monitoring locations in the shale gas region, such justification should be included in the Plan as part of the public record. (3)

Response: The Department appreciates the commentator's concerns regarding justification of additional monitoring sites in regions of shale gas operations. U.S. EPA has set network design criteria, including monitoring requirements, based on population and/or historical measured pollutant concentrations. As shale gas operations are typically located well outside of major population areas, without historical monitoring data records, populations which may be impacted by the large-scale increase in shale gas operations often reside in areas not covered by ambient monitoring sites of appropriate monitoring scale. In July 2018, the Department released the findings from its long-term monitoring project near Marcellus Shale gas facilities in Washington County. This report is available at the following website: http://files.dep.state.pa.us/Air/AirQuality/AQPortalFiles/Monitoring%20Topics/Toxic%20Pollutants/Docs/FINAL_Long-Term_Marcellus_Project_Report_071018.pdf. In addition, a public health evaluation, using monitoring data from the long-term project, was performed by the Pennsylvania Department of Health and is available at the following website: https://www.atsdr.cdc.gov/HAC/pha/marcellusShale/Air_Marcellus_Shale_HC-508.pdf. As stated in the recommendations of both reports, results from the project revealed a need for additional monitoring to better determine ambient air impacts associated with the shale gas industry. The Department remains committed to ensuring the protection of public health through its air quality monitoring efforts in regions of shale gas operations.

27. **Comment:** Operations associated with the development of oil and gas resources in the Pennsylvania shale gas region are relatively consistent from operator to operator as evidenced by the recent finalization of General Permit (GP) 5A and revised GP-5. Emissions of air contaminants from such regulated activities are also consistent and known, albeit somewhat dependent on the volume of natural gas and related natural gas liquids (i.e., condensate) produced or handled. Rather than installing multiple and redundant ambient air quality monitoring locations across eight counties in the shale gas region, PIOGA suggests that fewer ambient air quality monitoring locations be selectively and appropriately sited in locations with the largest concentrations of oil and

gas development and compressor station activity. Several appropriately sited ambient air quality monitoring sites would provide representative shale gas region ambient air quality data for the PADEP to use for air quality planning purposes. (3)

Response: The Department appreciates the commentator's concern regarding redundant monitoring sites. The Department evaluates its ambient air monitoring network on an annual and 5-year basis, in part to determine redundant sites, and will include any proposed changes to its ambient monitoring network in future network plans. The Department disagrees with the commentator that the facility emissions alone should be the criteria for determining redundancy of monitoring locations. The Department considers multiple factors to locate representative monitoring sites. These factors include, but are not limited to, the amount and location of activity in the region, the type of activity, reported emissions, area topography, meteorology and the presence of susceptible or vulnerable populations. Pennsylvania's topography makes it difficult to appropriately site only a few ambient air quality monitoring sites that would be representative of shale gas activity, and associated impacts, in all regions of shale gas operations throughout the state.

Use of Metropolitan Statistical Areas in Network Design

28. **Comment:** As in Earthworks' comments on the 2017 air monitoring plan, we object to DEP's continued inclusion of seven counties in one very large air quality region, the Pittsburgh-Beaver Valley Area (Allegheny, Armstrong, Beaver, Butler, Fayette, Washington and Westmoreland Counties). This approach rolls together many disparate sources of emissions spread out over a large geographical region, making it much more difficult to pinpoint and reduce the specific causes of pollution. In addition, a broad regional approach cannot reflect pollution in areas where oil and gas wells and infrastructure have been more prevalent and may be a significant local source of emissions. (2)

Response: The Department appreciates the concerns of the commentator. U.S. EPA has set network design criteria, including monitoring requirements, in 40 C.F.R. Part 58, Appendix D. For most criteria pollutants, network design criteria are partially based on population statistics. For each criteria pollutant, U.S. EPA specifically references and requires the use of either Metropolitan Statistical Areas (MSAs) or Core-Based Statistical Areas (CBSAs) population statistics, as delineated by the federal Office of Management and Budget, in its network design requirements. Accordingly, the Department utilizes either a MSA or CBSA-based approach to determine network design compliance. The Department recognizes the expansive area encompassed by the Pittsburgh MSA, including varying topographies and concentrations of sources, and understands the need to monitor ambient air impacts due to shale gas activities within the MSA. For these reasons and as noted in the plan, the number of monitors being operated within the Pittsburgh MSA is substantially greater than required by minimum monitoring requirements set forth by U.S. EPA in 40 C.F.R. Part 58, Appendix D. These include

monitors being operated within Allegheny County by the ACHD, as well as in the surrounding counties by PA DEP.

29. **Comment:** This is particularly concerning considering DEP's April 2017 recommendation to the EPA that the Pittsburgh-Beaver Valley Area be designated as in attainment for the 2015 ozone National Ambient Air Quality Standards (NAAQS). That position directly contradicts the recommendation that DEP made to the EPA just six months earlier, in October 2016, that the Pittsburgh-Beaver Valley Area was still in nonattainment for ozone. If anything, the surge in drilling and processing, and transmission facilities will exacerbate the ozone problem, not improve it. (2)

Response: The revision for the ozone designation recommendation was based on the availability of a more recent monitoring data set. On October 3, 2016, the Department provided an ozone designation recommendation of "nonattainment" to U.S. EPA for the Pittsburgh-Beaver Valley Area. This recommendation was based upon ambient monitoring data from 2013 through 2015, the most current certified monitoring data available at that time. On February 28, 2017, the Department certified its ambient air monitoring data for 2016. The updated monitoring data for the 2014 through 2016 period demonstrated that all monitors in the Pittsburgh-Beaver Valley area measured attainment for the 2015 ozone NAAQS of 70 ppb. Using this updated monitoring data, considering the implementation of state, regional and national control measures that reduced volatile organic compounds and oxides of nitrogen (ozone precursor), as well as the downward trend in the ozone design values over the years, the Department revised its ozone designation recommendation to "attainment" on April 11, 2017.

Data Assessment, Use, and Availability

30. **Comment:** Enable air quality data to detect pollution spikes. New computer capacity allows us to upgrade the frequency of data collection and reporting to enable people to detect spikes in air pollution, as well as the usual hourly and daily averages. The human body responds to spikes in air pollutants as well as prolonged air pollution. Studies have shown that industries such as shale gas well operations often produce spikes as short as 5-15 minutes of serious air pollutants that would be missed in hourly or daily averages. Also, wind rose data in our region show wind directions can change frequently within a day, thus moving pollution quickly from one location to another. (16)

Response: The Department appreciates the commentators' concerns regarding short-term monitoring data. As stated in the network plan, the Department operates an extensive air quality monitoring program that monitors not only for criteria pollutants but also for Volatile Organic Compounds (VOCs) and toxic metals. The majority of criteria pollutant monitoring in the Department's ambient air monitoring network is performed using automated continuous methods. These methods provide short-term (hourly) data, on a continuous basis. All criteria pollutant monitoring performed at locations sited in regions of shale gas operations, including $PM_{2.5}$ monitoring, utilize continuous methods. Hourly data is publicly available on the Bureau of Air Quality's website at the following link:

https://www.dep.pa.gov/Business/Air/BAQ/MonitoringTopics/Pages/default.aspx. The Department evaluates criteria pollutant monitoring data in accordance with the National Ambient Air Quality Standards (NAAQS), established by the U.S. EPA. U.S. EPA sets both the threshold concentration and form of the NAAQS based on quantitative characterizations of exposures and associated health risks, using health-based studies that compare air quality data and health statistics throughout the country.

For air toxics, the Department's current monitoring methods allow for 24-hour sampling. However, the Department will explore the feasibility of sub-daily monitoring in the future. Monitoring results for air toxics monitoring sites are available on the Bureau of Air Quality's website at the following link: https://www.dep.pa.gov/Business/Air/BAQ/MonitoringTopics/ToxicPollutants/Pages/Toxic-Monitoring-Sites-in-Pennsylvania.aspx. The Department evaluates air toxics monitoring data for elevated values that may suggest a health risk.

The Department is aware of the recent development of multiple low-cost air quality sensors and is exploring ways to evaluate their accuracy. Efforts are underway at multiple locations to evaluate these sensors, specifically the South Coast Air Monitoring District in California - http://www.aqmd.gov/aq-spec and by the US EPA - https://www.epa.gov/air-sensor-toolbox/evaluation-emerging-air-pollution-sensor-performance. As the reliability and accuracy of these sensors becomes better known, the Department will look to incorporate these types of sensors into our larger network.

31. **Comment:** The description of continuous monitoring methods on page 9 shows that hourly data is collected for criteria pollutants. The "raw data [is]used to calculate the various pollutant averages needed for NAAQS comparisons." EHP strongly recommends also analyzing the data to show the range of peak exposures over short time periods (hours rather than daily or yearly) for residents within ½ mile, as these are likely to cause health impacts. Peer–reviewed literature shows that both low-concentration chronic exposures and acute short-term increases in $PM_{2.5}$, for example, can increase health risks. (6)

Response: See response to comment 30.

32. **Comment:** Additionally, it is recommended that the BAQ provide the collected data in an easily obtained format and user friendly site on the Department's web site. (11)

Response: The Department appreciates the commentator's concerns regarding the availability of ambient monitoring data. Currently, monitoring data is available on the Bureau of Air Quality's website for both criteria and air toxics pollutants. For criteria pollutants, monitoring results are available on the website at the following link: https://www.dep.pa.gov/Business/Air/BAQ/MonitoringTopics/Pages/default.aspx. Continuous data is updated in real-time, on an hourly basis, while discrete method results are updated on a quarterly basis. Air toxics results are available on the

website at the following link: https://www.dep.pa.gov/Business/Air/BAQ/MonitoringTopics/ToxicPollutants/Pages/Toxic-Monitoring-Sites-in-Pennsylvania.aspx**. The Department agrees that improvements can be made in this area, however, and plans to improve the content, function and usability of its website in the near future.**

33. **Comment:** Improve public education about how to use information from the monitoring network. The purpose of the monitoring is to improve public health. Researchers on public health certainly will benefit from more monitoring, but citizens can also benefit with improved education. This can be accomplished many ways, such as improving the web site for general use, and adding ways for people to get air quality alerts on their phones for high ozone, for example. Also, teachers are ready and willing to add air pollution monitoring data analysis to their curriculum as students apply science and math skills. For example, I have taught pre-college teachers and their students using web site data on water quality; air monitoring can be added to these lessons. (16)

Response: The Department appreciates the commentator's concerns regarding public information and education. The Department agrees with the commentator regarding the importance of citizens' understanding of monitoring data. The Department agrees that improvements can be made communicating ambient monitoring data to the public, and plans to improve the content, function and usability of its website in the near future. In addition to the availability of monitoring data on the Bureau of Air Quality's website (included in response to comment 32), Air Quality Index (AQI) information, including air quality forecasting and alerts, are available through the AirNow website at the following link: http://www.airnow.gov. Currently, the Department generates air quality forecasting information and alerts for thirteen regions in Pennsylvania, ranging from single-city to large multiple-county regions.

34. **Comment:** Citizens do not know the air pollution amounts or sources near them. For example, the Toxic Release Inventory (TRI) does not fully document sources of regular air pollutants. It lists only a few facilities in our county, and yet sources of substantial emissions, such as the Hermine compressor station, a facility that annually emits hundreds of tons of air pollution, is not on the TRI list. (16)

Response: The Department appreciates the commentator's concerns regarding source locations and emission data. Source emission data is beyond the scope of this network plan. Citizens can access facility emission data through Pennsylvania's Environment Facility Application Compliance Tracking System (eFACTS) website at the following link: https://www.ahs.dep.pa.gov/eFACTSWeb/default.aspx dd.

Meteorological Monitoring

35. **Comment:** The Plan does not discuss the placement and operation of meteorological monitoring equipment at the new and proposed ambient air quality monitoring locations in the shale gas region of Pennsylvania. If meteorological monitoring equipment is proposed or is present at existing monitoring locations, the Plan should include a

description of the meteorological variables monitored and the monitoring frequency. If meteorological monitoring equipment is not planned or does not exist at the new and proposed locations, PIOGA suggests that meteorological monitoring equipment be included at each new and planned ambient air quality sampling location in the shale gas region of Pennsylvania so that the collected ambient pollutant data can be spatially and temporally evaluated regarding upwind sources of measured concentrations. (3)

Response: The Department appreciates the commentator's suggestion regarding the inclusion of meteorological monitoring equipment at monitoring sites located within areas of shale gas operations. The majority of the ambient air monitoring network sites are equipped with a meteorological monitoring suite consisting of wind speed, wind direction, solar radiation and ambient temperature mounted on a 10-meter tower. Exceptions include areas where installation of the tower would be unsafe or the site is not equipped with the infrastructure required to support meteorological monitoring, such as single parameter discrete sampling locations.

Inclusion of Wind Roses in the Network Plan

36. **Comment:** The Council appreciates the inclusion of gas production and compressor station maps alongside monitoring site locations. A helpful addition to these maps would be the inclusion of wind roses, similar to those included on the Marcus Hook map at Figure 18 Page 31 of the draft network plan. The Council has attached examples of the Department's maps using wind roses sourced from the closest available airport data. Other data may be available to the Department that are more representative of actual site conditions. If so, these data should be used to generate wind roses. (1)

Response: The Department appreciates the commentator's suggestions regarding the inclusion of wind roses. The Department agrees with the commentator that the inclusion of wind roses may help inform the public and will therefore include this information, where useful, in future network plans.

General Increase in Monitoring

37. **Comment:** Monitor for all air pollutants possible at each station. New technology makes detection of all standard air pollutants more affordable. Once a station is installed, it is cost efficient to have it contain all detectors, not just some. (16)

Response: The Department appreciates the commentator's suggestion to include multiple pollutant monitoring equipment at more monitoring sites. The Department regularly reviews its ambient air monitoring network to determine whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The Department understands the desire to obtain as much monitoring data as possible at all monitoring stations. However, although installing monitors at existing sites is less costly than establishing new monitoring sites, it is not a low-cost endeavor. The costs of purchasing, installing and maintaining monitoring equipment, as well as the staffing resources required to maintain

equipment and review data, need to be thoroughly evaluated in relation to the usefulness of the data that would be generated.

38. **Comment:** Cancer incidence for our state is consistently, substantially higher than national averages. The DEP must do all it can to monitor pollution, help reduce it and improve public health. (16)

Response: The Department appreciates the commentator's concern for public health. The Department remains committed to ensuring the protection of public health through its air quality monitoring efforts.

Miscellaneous Comments

39. **Comment:** The VOC method TO-15 on Page D-2 is a good method. The BETX compounds which include Benzene will be monitored by that method TO-15. The American Petroleum Institute, a large energy trade association, said way back in 1948 that no safe exposure level can be established for Benzene. (10)

Response: The Department appreciates the commentators' support for PA DEP's ambient air monitoring efforts.

40. **Comment:** On Page C-17, the language of 40 CFR Part 58, Appendix D, Section 4.7.2 states that, "...local agencies must operate continuous $PM_{2.5}$ analyzers equal to at least one-half (rounded up) the minimum required sites...". EHP recognizes continuous $PM_{2.5}$ as essential to collecting quality air emissions data, and acknowledges PA DEP's efforts to place more than the recommended number of continuous $PM_{2.5}$ monitors in the Pittsburgh MSA. (6)

Response: See response to comment 39.

41. **Comment:** As Pennsylvanians, we all have a constitutional right to clean air. In closing we'd like to add that the Department needs more staff and more money to adequately protect all Pennsylvanians air quality. (5)

Response: See response to comment 39.

42. **Comment:** Finally, the BAQ would be much benefited by increased staffing levels that would enable the Department to better monitor and enforce our air quality regulations. (11)

Response: See response to comment 39.