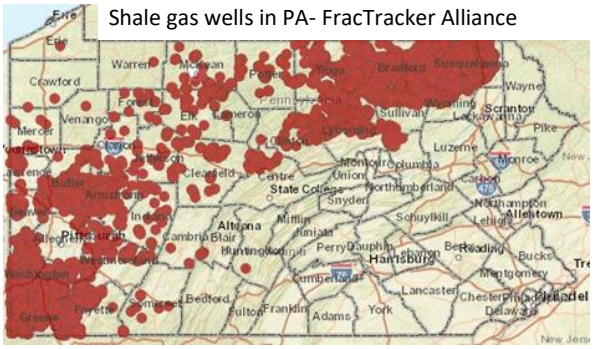
Emissions Control and Regulation with Shale Gas Development

Emissions from shale gas infrastructure are of concern to public health. It is vital to public health that they be monitored, regulated and controlled in an appropriate way.

There are currently 20 toxic monitoring sites in PA. Most are located in urban environments and do not capture emissions where shale gas development is occurring. They do not reflect the level of toxics that people living, working, learning and playing near shale gas development are breathing.

Accurate prediction of exposures to hazardous air pollutants in shale gas emissions depends on time and location, variations in intensity and frequency of emissions, and weather conditions.

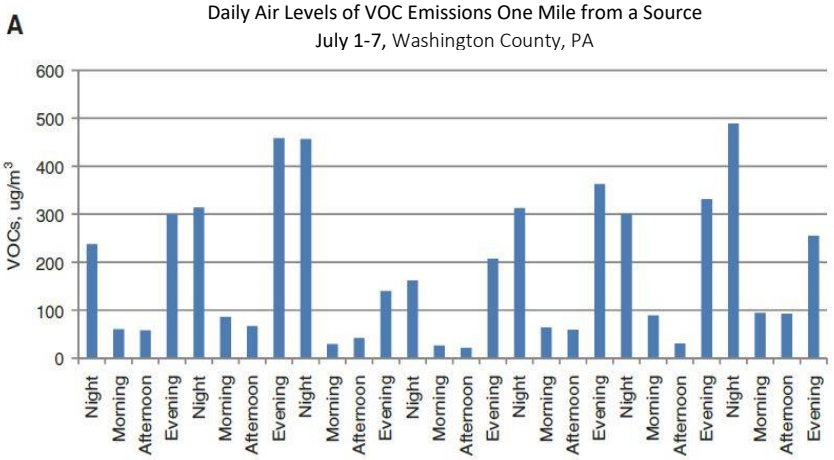


Shale gas wells in PA- FracTracker Alliance

There are over 11,000 shale gas wells drilled in PA, and the number is growing. Additional infrastructure involved in the production, processing and transmission of shale gas also vents emissions into the surrounding air. Volatile chemicals that convert easily from a liquid to a gas – like toluene – are released in the process of extracting the gas from the ground. **As a result, the gas and related liquids brought to the surface contain many contaminants and hazardous air pollutants (HAPs). As part of the emissions from shale gas infrastructure, these are of concern to public health. It is vital to public health that they be monitored, regulated and controlled in an appropriate way.**

Toxic emissions or airborne pollution from shale gas facilities are:

- released in spurts or episodes - not at a constant rate;
- released from rooftop height or less into the surrounding air;
- invisible to the naked eye; and
- may contain potentially toxic substances like:
  - methane
  - nitrogen oxides (NOx)
  - volatile organic compounds (VOCS)
  - polycyclic aromatic hydrocarbons (PAHs)
  - particulate matter (PM)
  - hazardous air pollutants (HAPs), and
  - endocrine disruptors (EDCs) to name a few.



Understanding exposure from shale gas drilling puts current air standards to the test, https://www.ncbi.nlm.nih.gov/pubmed/24690938

In order to accurately characterize the air that residents are breathing in regions of shale gas development, air monitoring must be conducted on a continuous basis. Hourly weather patterns must be taken into account. Using this information, EHP's air monitoring and data analysis has determined that:

- **toxic air emissions data should be evaluated over 15-minute periods for several days to capture the length and volume of dangerous peaks in emissions that may produce short term health impacts;** and
- **weather patterns determine where emissions go - if they settle in place or travel in a particular direction.**

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Particulate matter (PM) can be monitored continuously, and thus can be used as a tool for viewing fluctuations (or changes) in emissions. This is important because $PM_{2.5}$ (fine particles with a diameter of 2.5 µm or less), which is very toxic on its own, may be inhaled deep into the lungs and carry other airborne toxic substances with it.

Addressing air quality by controlling and regulating shale gas emissions is important for everyone's health, but it is vital near facilities such as hospitals, schools and day care centers, assisted living and nursing homes that house vulnerable populations. People located nearby and downwind from gas facilities often breathe toxic emissions at unhealthy doses.

1. **Emissions from shale gas infrastructure are invisible** unless viewing FLIR (Forward Looking Infrared) camera footage, shown in the photo at left. Invisibility of emissions does not lessen their toxicity or health impact.
2. **Emissions contain methane which is a potent greenhouse gas**. Methane is never released on its own. It is released in combination with other toxic substances. Efforts should be taken to capture methane emissions from all gas infrastructure, which will also help capture other hazardous air toxics, such as VOCs.
3. **Ground-level ozone, which is a consequence of shale gas emissions combined with sunlight, is a serious problem in regions of shale gas development**. It affects lung health, aggravates asthma and potentially causes damage to lung tissue.

Recommendations to Industry to Control Emissions from Shale Gas Activities

- Use of vapor recovery units on condensate tanks.
- Use electricity rather than unprocessed shale gas to power equipment to help partially reduce methane, VOCs and polycyclic aromatic hydrocarbon (PAH) emissions.
- Remove waste water with pipe networks instead of with trucks to reduce diesel exhaust.

Recommendations to Regulatory Agencies to Better Protect Residents from Shale Gas Emissions

- Greatly expand toxic monitoring in PA to shale gas regions to capture information on toxic emissions taking into account weather patterns and lay of the land.
- Since emissions are episodic rather than continuous, analyze them over 15-minute periods rather than a 24-hour period to capture length and volume of peaks in emissions to best assess health risks.
- Enforce the new methane capture rules on new shale gas infrastructure and expand to include existing shale gas infrastructure.
- Require storage tanks (for anything other than fresh water) and other shale gas infrastructure to meet EPA emission standards to minimize VOC emissions.
- Enforce the use of diesel particulate filters (required by EPA, 2006) and promote further diesel emissions reduction through exhaust control devices.
- Enforce the use of a tarp to cover drill cuttings, dirt, and other solid waste being transported by vehicles.

Resources:
https://www.ncbi.nlm.nih.gov/books/NBK201897
https://www.ncbi.nlm.nih.gov/pubmed/24690938
https://www.epa.gov/clean-air-act-overview
http://www.dep.pa.gov/business/air/baq/businesstopics/emission/pages/marcellus-inventory.aspx
http://www.marcellushealth.org/final-report.html
http://dx.doi.org/10.1080/10934529.2015.992663
https://earthworks.org/stories/citizens_empowerment_project/

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