BC·MAC
Beaver County Marcellus Awareness Community

ENVIRONMENTAL HEALTH PROJECT
DEFENDING PUBLIC HEALTH SINCE 2012

AirSense: Stationary Air Monitoring

What is AirSense?

AirSense is a Beaver County Marcellus Awareness Community (BCMAC) project comprised of three actions:

- Real-time air quality data shared with the public from five stationary air monitors placed throughout Beaver County
- A mobile air monitor that measures 1,3 butadiene and benzene and provides real-time data results
- A biostudy that will shape a risk assessment for the area.

All of these actions will inform and empower community members.

What equipment is being used for air monitoring in this project?

Five stationary Aeroqual-brand AQM 65 Monitors (Spec Sheet) have been strategically installed throughout the county to continuously measure four chosen air pollutants. These monitors are of similar quality to those used by federal and state regulatory agencies. Data from the monitoring units is uploaded almost instantaneously into the Aeroqual Cloud. the Environmental Health Project (EHP) then analyzes the data and makes it accessible to the public via BCMAC's website.

What emissions/pollutants are being monitored?

The Aeroqual AQM-65 monitors have sensors measuring and reporting four pollutants in the following units:

- Particulate matter ($PM_{2.5}$) in micrograms per cubic meter ($\mu g/m^3$)
- Nitrogen dioxide (NO_2) in parts per million (ppm)
- Total volatile organic compounds (tVOC) in parts per billion (ppb)
- Ozone (O_3) in parts per million (ppm)

Why are these pollutants being monitored?

Each of these pollutants were chosen for monitoring because they are common substances that contribute to air pollution and are associated with negative health impacts. Some of the pollutants, such as $PM_{2.5}$ and ozone, are also monitored by regulatory monitors. These additional monitoring points will provide a more precise picture of how pollutants are moving through the region.

What health concerns are associated with these pollutants?

- **Particulate matter ($PM_{2.5}$)** is a mix of solid particles and liquids found in the air, such as dust, soot, and smoke. The levels of $PM_{2.5}$ are monitored because these fine particles can enter the deep lung and make their way into the bloodstream. Exposure to PM may impair lung function, aggravate asthma symptoms, cause irregular heartbeat and heart attacks, and lead to premature death in those with heart and lung diseases, such as chronic obstructive pulmonary disease (COPD).
- **Nitrogen dioxide (NO_2)** is a part of a group of highly reactive gases known as nitrogen oxides, or NO_x, and is a major component of smog. NO_2 is used as an indicator for all nitrogen oxides and is a common emission from the burning of fossil fuels and comes from vehicles, power plants, industrial emissions, and off-road sources such as construction, lawn, and gardening equipment. NO_x emissions can react with other chemicals in the air to form particulate matter and ozone. Exposure to NO_2 can cause irritation to eyes, nose, throat, and lungs. High levels of exposure over short periods of time can aggravate respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD), leading to respiratory symptoms such as coughing, wheezing, or difficulty breathing.

- **Volatile organic compounds (VOCs)** are substances that evaporate at room temperature and are found in industrial emissions, household products, and building materials. The health effects of VOCs can vary greatly according to the compound and can range from being highly toxic to having no known effects. The health impacts of VOCs will depend on the compound as well as the level and length of exposure. Long-term exposure to some VOCs can cause damage to the liver, kidneys, and central nervous system. Short term exposure can cause eye and respiratory tract irritation, headaches, dizziness, fatigue, allergic skin reactions, nausea, and memory impairment.
- **Ozone (O_3)** is a gas made up of three oxygen atoms. Ground level ozone is a contributor of air pollution and a main component of smog. Ozone is not a primary emission from usual contributors to air pollution (e.g., cars, power plants, chemical plants, industrial boilers) but is formed secondarily through a process of chemical reactions from emissions (e.g., NO_2, VOCs, $PM_{2.5}$) and sunlight. Health effects from ozone can be seen even at low levels including. coughing and sore or scratchy throats, increased difficulty breathing, inflame or damage airways, and aggravate lung diseases (i.e., asthma, emphysema, and chronic bronchitis). Long-term exposure is linked to aggravation of asthma and is likely to be one of many causes of asthma development. Hot and sunny days can trigger ozone formation and cause elevated levels of ozone that impact health.

How do I protect myself and my household from air pollution?

- Pay attention to your weather–air pollutants tend to hang around on still, overcast days.
- Stay informed about wind direction and avoid downwind areas during unfavorable conditions.
- Use an air purifier; EHP recommends the Austin Air Healthmate.
- Reducing Outdoor Contaminants in Indoor Spaces (ROCIS) offers a DIY low-cost fan/filter that can help to remove particles in the air.
- Remove avoidable indoor air pollutants (see full list of recommendations here).
- Vacuum instead of sweep to reduce airborne particles; vacuum at least once a week and use a HEPA filter.
- Seal windows and doors to reduce infiltration of odors and particulates.
- Use resources like AirNow.gov to know air quality–good, moderate, or poor–for upcoming days.
- Limit outdoor activities near sources of pollution during high emission periods.

Above: A Corsi-Rosenthal Box air filter, an inexpensive DIY unit, to improve ventilation in indoor spaces. Credit: Creative Commons Attribution-Share Alike 4.0

Who should I contact if I have questions about the project or data?

Hilary O'Toole - Executive Director, BCMAC
hilary.bcmac@gmail.com or info@marcellusawareness.org
(570) 543-5181

Environmental Health Project
info@environmentalhealthproject.org
(724) 260-5504

What should I do if I have an environmental or air quality concern?

If you observe an environmental concern that requires an immediate emergency response, please call 911 or 724-775-1700.

If the concern is not an emergency, you should submit an environmental complaint to the Pennsylvania Department of Environmental Protection (PA DEP) using their Online Complaint Form or by calling 866-255-5158.

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