

April 29, 2021

Dear Ms. Damico,

I am writing in my role as Research & Policy Director at the Southwest Pennsylvania Environmental Health Project, a public health organization based in the Pennsylvania-Ohio-West Virginia region. We would like to register our opposition to the request by the Ohio EPA (OEPA) to modify its State Implementation Plan (SIP) of the Clean Air Act (CAA), Docket Number: EPA-R05-OAR-2020-0559.

We use the SIP modification's impact on the proposed petrochemical complex in Belmont County as our example. Permitting PTTG to develop its facility, at all, poses health threats to the communities surrounding it. But at least there are rules and procedures in place to better balance consideration of industry developers against the health of residents who fall under the broad reach of the plant. Removing protections to the community—by extending the time between assessing baseline air quality and construction—only helps industrial actors (in this case PTTG) at the expense of the public. The problem is three-fold: it allows increases in area air toxics to be disregarded; it can result in using recently out-of-date emissions controls; and, at the extreme, it can result in noncompliance with regulations that were established in the intervening period.

The CAA and Ohio's SIP are responsible for protecting the air that Ohioans breathe. If other polluters come in, if existing polluters increase emissions, or if regulations of emissions change, the public surely continues to need protections based on recent levels of pollution and regulations. When the clock stops because of an appeal, we do not believe the clock also stops the responsibility to protect public health.

The proposed SIP revision diminishes the OEPA's responsibility to consider actual community exposure. The mission of the OEPA's Division of Environmental Services is to "Protect human health and monitor the environment to ensure a high quality of life in Ohio by analyzing samples, producing quality data and providing technical assistance." It's hard to see how lowering the bar for major source permitting is in keeping with that mission. Most importantly, the revision would open the door to poorer air quality, which would increase health risks in the community. The health risks from the PTTG site would increase even if the primary pollutants were below regulatory standards.

According to the EPA Region 6 Center for Combustion Science and Engineering, characterizing an exposure setting includes accounting for multiple sources of emissions as well as terrain both inside and outside the facility boundary. The center notes, "Experience has shown us that most significant deposition occurs within a 10 km radius, as measured from the centroid of a polygon centered on the

stacks of the facility being assessed.”¹ Using PTTG as an example, within ten kilometers of the site are the towns of Moundsville, McMechen, and Glendale, West Virginia, and Shadyside, Powhatan Point, and Dilles Bottom, Ohio. Existing industry in Ohio includes approximately 10 unconventional oil and gas development (UOGD) well pads; and the number of UOGD sites may grow and should be considered emission sources in the region. Existing industry in West Virginia includes: Michel Co., Inc; two small airports; two gas processing plants; the William Co., Inc plant; the Mitchell coal-fired power plant; and approximately 15 UOGD well pads. The town of Powhatan Point is situated between the Mitchell Power Plant and the proposed PTTG complex.

What Are the Risks?

Increases in PM2.5

Most strikingly, small increases in PM2.5 can produce an increase in health effects. That means, should increases in PM2.5 emissions occur after the clock stops because of an appeal, that increase could have real impacts on the health of residents in the area.

PM2.5 exposure results in a number of serious health effects:

- Cardiovascular effects—including hospitalization for cardiovascular disease, heart attack, and congestive heart failure, just to name a few—can occur following small increases of exposure.
- Small increases in PM exposure, even over a short term, can cause respiratory effects that require hospitalization.
- According to the American Heart Association, exposure to PM2.5 over as little as a few hours can trigger cardiovascular disease-related mortality and nonfatal events.
- A mere 10 ug/m³ increase in 24-hour PM increases the relative risk for daily cardiovascular mortality.
- As slight as 10ug/m³ increase in PM2.5 exposure increased PM-related mortality by 2.8%.² That small elevation increased mortality risk relative to all cardiovascular disease events, acute myocardial infarction, and stroke.³
- Amiri et al. find “strong associations between PM2.5 and prevalence of asthma and mortality due to COPD, even at relatively small increases in ambient exposure (<1 ug/m³).”⁴

¹ U.S. EPA Region 6. Human Health Risk Assessment Protocol (HHRAP) for Hazardous Waste Combustion Facilities, Final

² Kloog, I., Ridgway, B., Koutrakis, P., Coull, B. A., & Schwartz, J. D. (2013). Long-and short-term exposure to PM2. 5 and mortality: using novel exposure models. *Epidemiology (Cambridge, Mass.)*, 24(4), 555.

³ Qiu, X., Wei, Y., Wang, Y., Di, Q., Sofer, T., Awad, Y. A., & Schwartz, J. (2020). Inverse probability weighted distributed lag effects of short-term exposure to PM2. 5 and ozone on CVD hospitalizations in New England Medicare participants—Exploring the causal effects. *Environmental Research*, 182, 109095.

- In one recent review article, Alexeeff et al. conducted a meta-analysis of 42 studies and found that a 10ug/m³ increase in long-term PM_{2.5} exposure was associated with substantially increased risk of ischemic heart disease mortality, cerebrovascular mortality, incident stroke, and incident myocardial infarction (Alexeeff 2021).⁵

The National Ambient Air Quality Standards are not even altogether health protective, highlighting the risk posed by the proposed Ohio SIP revision. For instance, for PM_{2.5}, NAAQS's annual average limits are 12.0 ug/m³ and the 24-hour average PM_{2.5} limit is 35 ug/m³. The World Health Organization (WHO), by comparison, is more protective with an annual level of 10.0 ug/m³ and a 24-hour average level of 25 ug/m³. WHO's annual standard was derived from two important studies: An American Cancer Society study and the Harvard Six-Cities study. The Cancer Society's study observed health effects from as little as 9 ug/m³, and the Harvard study observed health effects at as low as 11 ug/m³.⁶

Increases in Sulphur Dioxide

Looking at sulphur dioxide (SO₂), researchers have found that both the time and amount of an exposure needed to prompt a health effect was below the safety level provided by NAAQS.

- Decreased lung function and increased respiratory symptoms can occur in asthma patients exposed to SO₂ for only 5-10 minutes.
- Increased incidence and severity of respiratory symptoms such as cough, chest tightness, and throat irritations can occur after 5-10 minutes of exposure to 0.2 to 0.6 ppm SO₂ during exercise for those with asthma.
- Increases in respiratory symptoms can occur after exposure to 0.2 ppm with increasing symptoms at higher concentrations.
- Many studies found respiratory symptoms in under 10 minutes at levels far below the NAAQS at 0.5 ppm.
- The respiratory system reacts to relatively small changes in exposure.
- Reflecting an increase in ER visits for pediatric populations, a 40 ppb increase in short-term, 1-hour maximum SO₂ was associated with 4.1% and 5.7% increases in ER visits for children aged 0 to 4 and 5 to 18 respectively.

Increases in VOCs

⁴ Amiri, A., Mahalingam, B., Derbes, A., Haney, J., Alexander, S., & Orman, W. H. (2020). The impact of chronic ambient exposure to PM_{2.5} and ozone on asthma prevalence and COPD mortality rates in the southeastern United States. *Annual Review of Nursing Research*, 38(1), 15-34.

⁵ Alexeeff, S. E., Liao, N. S., Liu, X., Van Den Eeden, S. K., & Sidney, S. (2021). Long-Term PM_{2.5} Exposure and Risks of Ischemic Heart Disease and Stroke Events: Review and Meta-Analysis. *Journal of the American Heart Association*, 10(1), e016890.

⁶ World Health Organization. 2006. WHO air quality guidelines for particulate matter, ozone, nitrogen dioxide, and sulfur dioxide.

VOCs are a varied group of compounds, which can range from having no known health effects to being highly toxic. Some, including benzene, ethyl benzene, and formaldehyde, are carcinogenic. Short-term exposure can cause eye and respiratory tract irritation, headaches, dizziness, visual disorders, fatigue, loss of coordination, allergic skin reaction, nausea, and memory impairment. Long-term effects include loss of coordination and damage to the liver, kidney, and central nervous system. Additionally, some common VOCs released by industrial activity are known or expected to cause cancer.

VOCs include many compounds, such as toluene and xylenes, that are identified as endocrine disrupting chemicals (EDCs), that is, chemicals that interfere with the body's endocrine system. There is a burgeoning body of literature providing evidence indicating that EDCs impact hormone production, mimic hormones, or inhibit hormone signaling. Bolden et al. argue that "there is evidence that individual air pollutants associated with UOG activity are endocrine active. Endocrine disruptors can have actions at low exposure concentrations, and exposures can lead to aberrant trajectories resulting in suboptimal developmental, behavioral, reproductive, and metabolic conditions."⁷

Increases in Ozone

Ozone exposure is associated with increased risk of respiratory and cardiovascular conditions and with increased mortality rates. It causes shortness of breath and pain in breathing deeply; inflames and damages airways; aggravates lung diseases such as asthma, emphysema, and chronic bronchitis; and makes the lungs more susceptible to infection. Studies in locations with elevated concentrations also report associations of ozone with deaths from respiratory causes. Given the increases in VOCs and NOx from the proposed PTTG site, increases in ozone should be expected. These emissions will add to the ozone already emitted from the UOGD extraction and processing sites in the region.

Risks to Children

As you consider weakening the protective structure of recent assessment of air quality, keep in mind that the increased risk will affect some groups more than others, and that these are sizable groups. Vulnerable groups include those with underlying health conditions such as heart and lung disease, older adults, and children. In Belmont County, vulnerable groups account for 40% of the resident population. 2019 population estimates for Belmont County place 18.8% of the county's population under 18 years old and 21.4% at 65 years and older.

A Closer Look at Children and Industrial Exposure

⁷ Bolden, A. L., Schultz, K., Pelch, K. E., & Kwiatkowski, C. F. (2018). Exploring the endocrine activity of air pollutants associated with unconventional oil and gas extraction. *Environmental Health*, 17(1), 1-17.

Allowing increases in emissions to go unchecked, as the proposed SIP lays out, will have a particularly concerning impact on children. Children do not respond to emissions as though they are little adults, and safety levels are typically based on occupational research. Instead:

- Children have higher respiratory rates and, as a result, when they are exposed to air contaminants, they breathe in more toxics per pound of body weight than adults.
- Children accumulate more toxics in their bodies than adults. Their bodies are still maturing, and they cannot metabolize some toxicants as well as adults. They don't detoxify as efficiently.
- Children spend more time engaged in vigorous activity outside, increasing their air and soil exposures.
- Children's brains are still developing. Many toxic agents are known to interfere with developmental processes within the brain.
- Fetal development, early childhood, and puberty are critical periods of exposure to EDCs because the body is undergoing rapid growth and development controlled by hormones. Even small exposures to EDCs can affect body function, growth, and development.

These characteristics make children especially vulnerable.

Summing Up Our Concerns

Both the Federal and Ohio EPA have the authority and responsibility to protect the environment and the health of its residents. The proposal submitted to the Federal EPA by OEPA takes a step back from those protections, with no clear benefit except to the permit applicant. It even limits public input after an appeal has ended months or years later. In those intervening months or years, circumstances may have changed, air quality may have declined, and public health research may have produced new data on risk. By all measures, we at the Environmental Health Project, urge rejection of the revision.

Sincerely,

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