

EHP recommends increased setback distances from shale gas operations to protect public health and safety

SUMMARY STATEMENT

The current setback distances from shale gas operations are too close to protect the health and safety of residents living or working in proximity to them. They are also too close to safeguard the health of vulnerable populations like children, senior citizens, and people who have pre-existing health conditions.

DEFINITIONS

In this context, a *setback* is the minimum distance an operator may legally site any shale gas facility from an occupied building, such as a residence, school, workplace, or hospital. These shale gas facilities include wells, compressor stations (used to enable the flow of gas through pipelines), and gas processing plants. Note that pipelines, which are proven explosion risks, are not currently subject to any setback distances from an occupied building in Pennsylvania.

RECOMMENDATIONS

EHP recommends increasing existing setback distances in Pennsylvania to:

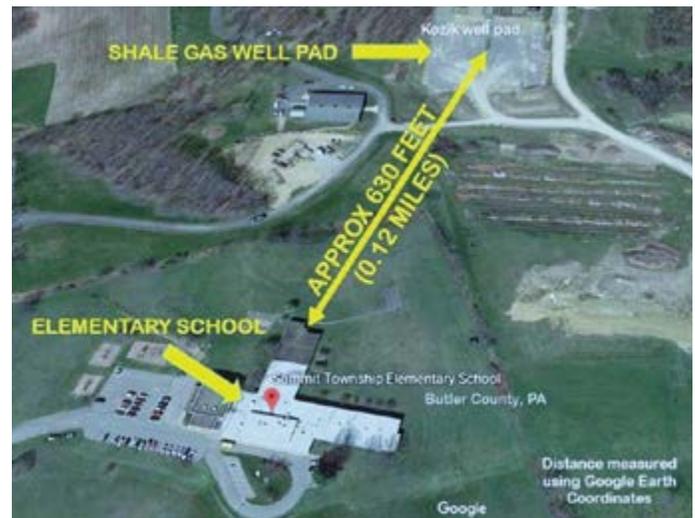
- At least **0.6 miles (3,281 feet or 1 km)** for smaller shale gas facilities, such as wells and small compressor stations
- At least **1.25 miles (6,600 feet or 2 km)** for larger compressor stations and processing plants
- At least **1.25 miles (6,600 feet or 2 km)** from schools, day care centers, nursing homes, health care facilities, and other buildings that house vulnerable populations or are difficult to evacuate, regardless of facility type
- Setbacks for other infrastructure also should be considered
- Greater setback distances would protect more people from health impacts

BACKGROUND

Setback distances are regulated by Pennsylvania law (PA Title 58, Section 3304). Currently, a well head can be sited as close as 500 feet from a building, 750 feet for compressor stations and processing plants. Allowances for the distance to be as little as 300 feet for well pads apply in residential districts if the 500 feet restriction cannot be met. Municipalities have limited ability to regulate shale gas activities within their boundaries, which is why we need commonsense state-wide regulations created at the legislative or agency level to protect the health of residents.

IMPACTS

Research increasingly shows the human health impacts from shale gas facilities, which release dangerous emissions into the environment. Air emissions contain methane as well as toxic substances, including formaldehyde, and other volatile organic compounds (VOCs), such as benzene and toluene. Recent studies have shown that the radioactivity of airborne particles increases significantly downwind of shale gas sites.¹

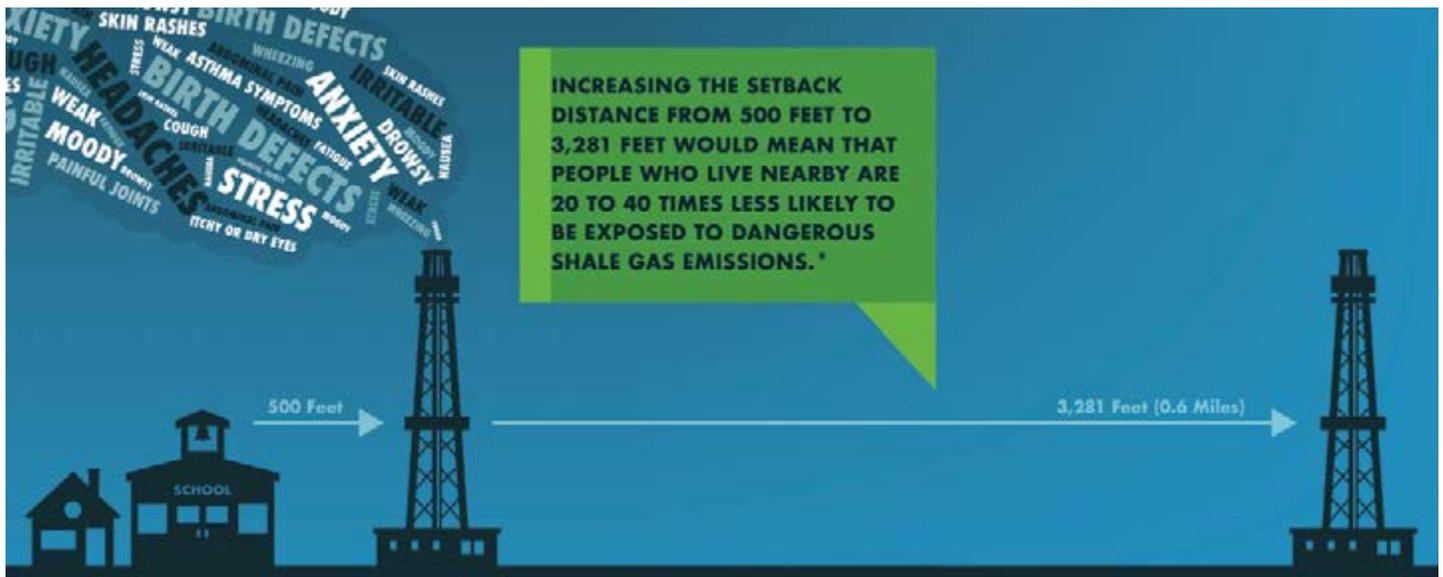


Air currents carry the emissions away from facilities into surrounding homes and communities. In addition, methane is explosive. Toxic substances from shale gas operations can also enter water sources and settle in the soil.

Peer-reviewed studies indicate that health impacts increase the closer one is to shale gas facilities. These studies show:

- **Worsening asthma symptoms** are linked to nearness of shale gas facilities²
- Symptoms including **headaches, fatigue, upper and lower respiratory complaints, and skin rashes** have been reported near well pads^{3,4}
- Babies born to mothers living less than a mile from wells were **25% more likely to be born with low birth weights**,⁵ which may lead to serious future consequences in growth and development, including asthma, intellectual and developmental disabilities, obesity, and infant mortality
- An increasing number of babies have been born with **congenital heart defects and possibly neural tube defects**, impacts dependent on both the number of wells nearby and the distance from the wells to mothers' homes
- **Stress, anxiety, depression, and other mental health symptoms** increase the closer one is to shale gas development⁶

Greater setback distances would be expected to reduce health impacts.



RATIONALE

There is no bright line denoting a safe distance from a shale gas development site—a **setback distance is a political construct formalizing “acceptable risk.”** But increasing setback distances for smaller infrastructure from 500 feet to 3,281 feet (0.6 miles), for example, would mean that people who live nearby are 20 to 40 times less likely to be exposed to dangerous levels of shale gas emissions.⁷ Setback distances larger than our minimum recommendations would be even more protective.

It’s important to note that proximity to a house or school is only one layer in the exposure scenario. **Setbacks can make an important difference in health risks.** However, it also should be noted that many other factors contribute to this risk, including rate and type of emissions from other sites in the area, the density of those sites, and the health vulnerability of those potentially impacted.

EHP’s setback recommendations draw on eight years of critical assessment of reported shale gas emissions, input from subject matter experts, and collecting and interpreting our own environmental and health data.⁸ Our recommendations also draw on the growing academic literature on water and air contaminants from shale gas development and associated health impacts.

EHP recommends setback distances within both scientific and public policy frameworks. **Our recommendations do not leave residents risk-free, but they do reflect distances that would help to keep residents significantly safer**—from environmental exposure to emissions from well pads, compressor stations, and processing plants—than they are under current regulations.

¹ Li, L., Blomberg, A.J., Spengler, J.D. *et al.* Unconventional oil and gas development and ambient particle radioactivity. *Nat Commun* 11, 5002 (2020). <https://doi.org/10.1038/s41467-020-18226-w>

² Southwest Pennsylvania Environmental Health Project (2020). Health Outcomes Associated with Exposure to Shale Gas Development from Peer-Reviewed Epidemiological Literature. <https://www.environmentalhealthproject.org/sites/default/files/assets/resources/health-outcomes-associated-with-exposure-to-shale-gas-development.pdf>

³ Weinberger, B., Greiner, L., Walleigh, L., Brown, D. (2017). Health symptoms in residents living near shale gas activity: A retrospective record review from the Environmental Health Project. *Preventive Medicine Reports*, Volume 8, December 2017, pages 112-115. <https://doi.org/10.1016/j.pmedr.2017.09.002>

⁴ Rabinowitz, P.M., Slizovskiy, I.B., Lamers, V., Trufan, S.J., Holford, T.R., Dziura, J.D.,...Stowe, M.H. (2015). Proximity to natural gas wells and reported health status: results of a household survey in Washington County, Pennsylvania. *Environmental Health Perspectives*, 123(1), 21-26. <https://ehp.niehs.nih.gov/doi/10.1289/ehp.1307732>

⁵ Currie, J., Greenstone, M., Meckel, K. (2017). Hydraulic fracturing and infant health: New evidence from Pennsylvania. *Science Advances*, 3, e1603021. <https://advances.sciencemag.org/content/advances/3/12/e1603021.full.pdf>

⁶ Ferrar, K. J., Kriesky, J., Christen, C. L., Marshall, L. P., Malone, S. L., Sharma, R. K., Goldstein, B. D. (2013b). Assessment and longitudinal analysis of health impacts and stressors perceived to result from unconventional shale gas development in the Marcellus Shale region. *International Journal of Occupational and Environmental Health*, 19(2), 104–112. <https://doi.org/10.1179/2049396713Y.0000000024>

⁷ Based on inventory from Pennsylvania Department of Environmental Protection and the EHP air exposure model

⁸ Lewis, C., Greiner, L., Brown, D. (2018). Setback distances for unconventional oil and gas development: Delphi Study results. *PLOS-One*. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0202462>

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