



March 22, 2017

Dear Representative Foote:

Thank you for introducing House Bill 17-1256, to clarify that minimum distance setbacks from certain oil and gas facilities apply to school property lines, and not school buildings. The Natural Resources Defense Council supports this bill and believes it is essential to fulfill the spirit of the setback law in Colorado and to best protect children under the existing setbacks. Children playing on the playground or fields adjacent to school building must be protected from health threats such as leaks, equipment malfunctions, and toxic air emissions.

Oil and gas production has increased dramatically in Colorado in the past 15 years, and advanced technologies associated with hydraulic fracturing (“fracking”) have allowed oil and gas operations to expand into communities. Oil and natural gas facilities have been identified as potentially significant sources of environmental contaminants, noise, traffic accidents, and other threats to public health. Researchers at PSE Healthy Energy (Physicians Scientists & Engineers) conducted an analysis of more than thirty peer-reviewed health research publications. They found that 84% of these publications had findings that suggest that there are public health hazards, elevated risks, or adverse health outcomes associated with unconventional natural gas development.¹

The production, processing, storage and transmission of oil and natural gas can release pollutants into the air, creating health consequences at the local, regional and global level. At the local level, these pollutants include diesel particulate matter (PM) and volatile organic compounds (VOCs). Exposure to Diesel PM is a known health hazard, and the heavy use of diesel engines in trucks and other equipment in and around oil and gas sites (particularly where fracking is being deployed) raises legitimate concerns about unsafe exposures. The health impacts of diesel pollution are well characterized in the scientific literature and include cancer, respiratory and cardiovascular impacts, premature mortality and adverse birth outcomes. Adverse respiratory and cardiovascular impacts have been demonstrated as resulting from both acute and chronic exposures.² Diesel PM levels are known to decrease rapidly with distance from sources of diesel emissions,³ which is why safe setbacks are so critical.

¹ Hays and Shonkoff 2016. Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 2009-2015. PLoS ONE 11(4):e0154164.

² HEI Panel on the Health Effects of Traffic-Related Air Pollution, 2010. *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects*. HEI Special Report 17. Health Effects Institute, Boston, MA.; US EPA, Diesel Particulate Matter – Health Effects, available at: <http://www.epa.gov/region1/eco/airtox/diesel.html>.

³ California EPA 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*, available at:

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In addition to diesel, a suite of VOCs can be present in the gas and liquids brought to the surface during oil and natural gas development. Some of these VOCs, such as benzene, are known carcinogens and/or respiratory, neurological, developmental, and reproductive toxicants. These compounds are released to the air when the wells are drilled and fracked, through leaks or venting throughout the production and transmission system, and through evaporation from waste pits. Once released into the air, these compounds present a serious hazard to children in the vicinity of the facilities.

Peer-reviewed studies conducted in Colorado by Colorado scientists are at the forefront of the scientific literature documenting the contribution of oil and gas facilities to air contaminants and the associated health risks. USEPA's inventory of hazardous air pollutants released from oil and natural gas production and processing facilities includes eight carcinogens, seven pollutants which harm the respiratory system, eight pollutants which harm the nervous system, five reproductive/ developmental toxicants, and other pollutants toxic to the liver, kidney, cardiovascular and immune system. This list does not include emissions from oil or gas wells or wastewater pits.⁴

Clear and strong setbacks are essential because the risks of health impacts from these air pollutants are closely linked to proximity. A review of the available research on air pollution and health impacts at schools (not specific to oil and gas development) finds higher levels of pollutants and health risks at schools closer to pollutant sources. These studies include the following findings: impaired lung function in children attending schools and particulate levels increased with proximity to the pollution source;⁵ school performance declines with increasing air pollutant levels;⁶ and DNA damage and air pollutant levels increased with proximity to industrial and mobile pollution sources.⁷

Research has found that children are more vulnerable to air pollution for the following reasons: pound for pound children take in more air than adults and therefore get a higher dose of contaminants; children's bodies are still developing and contaminant exposures can disrupt normal development resulting in disability and disease; exposure to carcinogens early in life can result in an increased risk of developing cancer;⁸ and children's play activities bring them in contact with pollutants (i.e. more time outside).⁹ Underlying health problems, such as respiratory (including asthma) or cardiovascular disease, can make individuals more likely to experience health impacts from air pollution.¹⁰

<http://www.arb.ca.gov/ch/handbook.pdf>.

⁴ USEPA 2012 National Emission Standards for Hazardous Air Pollutants (NESHAP): Oil and Natural Gas Sector.

⁵ Spektor DM, Hofmeister VA, Artaxo P, et al. Effects of heavy industrial pollution on respiratory function in the children of Cubatao, Brazil: a preliminary report. *Environ Health Perspect* 1991;94:51-4.

⁶ Mohai P, Kweon BS, Lee S, Ard K. Air pollution around schools is linked to poorer student health and academic performance. *Health Aff (Millwood)* 2011;30(5):852-62.

⁷ Sanchez-Guerra M, Pelallo-Martinez N, Diaz-Barriga F, et al. Environmental polycyclic aromatic hydrocarbon (PAH) exposure and DNA damage in Mexican children. *Mutat Res* 2012;742(1-2):66-71.

⁸ US EPA. 2005. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. EPA/630/R-03/003F.

⁹ US EPA. 2012. Office of Children's Health Protection, available at:

<http://yosemite.epa.gov/ochp/ochpweb.nsf/content/homepage.htm>.

¹⁰ California EPA 2005. Air Quality and Land Use Handbook: A Community Health Perspective, available at:

As an example, the California Environmental Protection Agency (CalEPA) has defined children as a population that needs extra protection from air pollution.¹¹ To protect children, CalEPA and local air pollution control agencies have published guidelines which recommend 1,000 ft to ¼ mile setbacks from sources of toxic air pollution, such as benzene and other VOCs, for schools, schoolyards, and playgrounds, as well as other sites.¹² The California Department of Education has also reviewed the science and made recommendations for school locations to be located at least ¼ mile or 1,430 ft from sources of toxic air pollution.¹³ Colorado should also be doing more to protect its children.

In addition to air pollution, oil and gas operations can cause significant noise pollution. There is scientific evidence that natural gas operations produce noise at levels that may increase the risk of adverse health outcomes.¹⁴ The evidence also suggests that noise can impact children's cognitive function, including comprehension, memory, and attention/perception.¹⁵

There is ample evidence from Colorado, as well as other states, to justify action by policy makers to protect Colorado's children from adverse health impacts and reduce the dangers of living, playing, and going to school in proximity to oil and gas operations. Scientific research provides evidence that this important bill is warranted and that Colorado setbacks should be stronger.

Thank you for introducing this important legislation.

Sincerely yours,

Amy Mall
Senior Policy Analyst

<http://www.arb.ca.gov/ch/handbook.pdf>.

¹¹ Ibid.

¹² Ibid., South Coast Air Quality Management District. 2007. Air Quality Issues in School Site Selection Guidance, available at: Document. http://www.aqmd.gov/prdas/aqguide/doc/School_Guidance.pdf

¹³ California Department of Education, School Site Selection and Approval Guide, available at: <http://www.cde.ca.gov/ls/fa/sf/schoolsiteguide.asp>

¹⁴ Hays J, McCawley M, Shonkoff SBC. Public health implications of environmental noise associated with unconventional oil and gas development. *Science of The Total Environment* Published Online First: 2017. doi:10.1016/j.scitotenv.2016.11.118.

¹⁵ Haines MM, Stansfeld SA, Brentnall S, et al. The West London Schools Study: the effects of chronic aircraft noise exposure on child health. *Psychol Med* 2001;31:1385–96; Haines MM, Stansfeld SA, Job RF, et al. Chronic aircraft noise exposure, stress responses, mental health and cognitive performance in school children. *Psychol Med* 2001;31:265–77.