

More Than Putrid Odors Come From CAFO Air Pollution

The Scale of CAFO Air Pollution. CAFOs produce a plethora of dangerous air pollutants. The type and scale depend on the number of animals confined and their species:

Cattle Feedlots: Fecal dust and gaseous ammonia arise from feedlot surfaces. These contaminants are spread by strong winds into nearby communities and homes.¹

Poultry: Fecal dust and endotoxins* are blown outside by powerful fans from the end of CAFO barns hundreds of feet long and containing tens of thousands of birds, as well as gaseous ammonia from manure coated internal surfaces.²

Swine: Likewise fecal dust and endotoxins are blown outside from barns containing thousands of hogs, as well as ammonia from internal surfaces. Ammonia, hydrogen sulfide (H₂S) & VOC** gases are emitted from large wastewater impoundments (lagoons). H₂S is particularly dangerous emitted from deep pit wastewater located beneath the barns of some swine CAFOs;³

Confinement Dairies: Dairy CAFOs are a combination of confinement barns, with external lagoons, and cattle feedlots, thus emitting fecal dust, endotoxins, ammonia, H₂S & VOCs.

Dangerous air pollution may also be created when CAFO wastewater is applied to crop fields, a common disposal method employed by swine CAFOs and confinement dairies. In some states, swine wastewater can be sprayed fifty feet into the air by “end guns” affixed to huge, center pivot mechanisms or by “traveling manure guns.” The spraying of fine mists enables the escape of intensely odorous dissolved gases into the air where they float downwind to torment the neighbors.



Photo by permission of Sierra Club member

*Endotoxins are toxic components of the outer membrane of gram-negative bacteria, such as E. coli and Salmonella, which can induce inflammation and fever as an immune response in higher organisms.

** VOC, Volatile Organic Compounds, add to the formation of ground level ozone pollution.

In the last 20 years researchers have identified an even bigger threat from CAFO air pollution, the presence of antibiotic-resistant bacteria, even from cattle feedlots.⁴ This results from the heavy use of antibiotics by CAFO operators to counter disease among the animals, though antibiotics don't work on viruses that have also plagued CAFOs. In 2016, the FDA banned the use of medically important antibiotics intended to speed growth of livestock but allowed their continued use to "prevent disease." This resulted in a significant reduction in the use of antibiotics on poultry, but their use on cattle and hogs continues essentially unabated.⁵

Regional Impacts. Ammonia emissions from all types of CAFOs lead to the formation of Particulate Matter (PM)_{2.5} fine particulate in the atmosphere by reacting with compounds from other sources. These particles make a major contribution to PM_{2.5} pollution in distant urban areas. Inhaling PM_{2.5} can have a number of adverse health effects. In addition, both gaseous ammonia and ammonium particulate are removed through wet and dry deposition to the earth's surface, which may add to hazardous algae blooms in surface water.⁶

Lack of Adequate Regulation. None of these emissions are regulated at their source. For example, there is nothing in most state laws that require a CAFO to provide a wastewater retention structure designed to reduce odor emissions, such as with a plastic cover. CAFOs are generally not required to treat the animal waste with a properly diluted anaerobic treatment pond, as is done for human waste, which may also include aeration or stirring. Instead, a single-stage waste retention pit under the animals or a lagoon-pond, essentially a hole in the ground, may be used when it is large enough to prevent overflow except under exceptional weather conditions.

Air pollutants inside the buildings are potentially deadly to the workers and the animals inside, so huge fans are installed that blow the contaminated air out toward the neighbors. This air then wafts around the area carrying ammonia, particulate matter, hydrogen sulfide, and even chicken feathers and feces if it's a poultry CAFO. Thus, protecting the workers merely transfers the risk to the neighbors.⁷

Odor and other air pollution from CAFOs is regulated only by setback or separation distance requirements between a CAFO and neighboring habitable structures and to a state's streams and lakes. In 2014 researchers at Johns Hopkins' Center for a Livable Future interviewed staff at state agencies regulating CAFOs who admitted that these setbacks do not reflect the science on air pollution health impacts.⁸

These required separation distances are not generous, usually only 100-foot from property lines, on-site water wells, and public roadways or a few thousand feet from habitable structures. In 2015 the Kansas Health Institute studied the impacts of large swine and dairy CAFOs in Kansas and recommended a *three-mile* separation distance, in part due to the likely presence of antibiotic-resistant bacteria.⁹ Likewise, a study published in 2019 showed a large increase in allergies and doctor-diagnosed asthma in rural residents living three miles or less from CAFOs in Wisconsin, mostly dairies.¹⁰ Most people would understand that the larger the capacity of animals at a facility, the greater should be the required separation of the facility from homes and surface water. More animals in more

barns generate more excrement in bigger holding areas. However, states may not require greater setbacks of CAFOs from neighboring properties, and thus increase the odor and particulate matter impact upon neighbors.

Air Pollution from CAFOs is not effectively regulated under the U.S. Clean Air Act either.¹¹ The few attempts at assessing the risk have been misguided. That's because the air quality standards for particles are based almost entirely on research on emissions from vehicles and smoke stacks related to burning fossil fuel. The standard is primarily related to smaller particles, and the toxicity of adsorbed heavy metals and organic gases. All size particles from CAFOs are dangerous because they may contain pathogens, often antibiotic resistant, and endotoxins shed from the animals that aggravate respiratory conditions.

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1. <https://www.texastribune.org/2015/03/29/scientists-find-antibiotic-resistance-blowing-nort/>
 2. Kirychuk, S. P. et al. "Total dust and endotoxin in poultry operations: Comparison between cage and floor housing and respiratory effects in workers." *Journal of Occupational and Environmental Medicine*. Vol. 48, No. 7. July 2006 at 741 and 745
 3. [Great Plains Center for Agricultural Health](#).
 4. Op cit, Texas Tribune.
 5. https://usrtk.org/factory-farming/is-fda-winning-the-battle-to-cut-farm-antibiotics/?mc_cid=8b6cfe9026&mc_eid=52b936cdf
 6. USEPA, https://www.epa.gov/sites/default/files/2018-03/documents/final_eem_qapp_v0.0_for_web_0.pdf Pg. 10
 7. Ji Young Son, et al, *Exposure to concentrated animal feeding operations (CAFOs) and risk of mortality in North Carolina, USA*, *Science of the Total Environment*, Vol. 799, Dec. 2021, 149407.
 8. <https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.008870&type=printable>. See page 4.
 9. [Kansas Health Institute, 2015](#).
 10. Amy A. Shultz, et al, *Residential proximity to concentrated animal feeding operations and allergic and respiratory disease*, *Environment International*, 130(219) 104911.
 11. Op cit, USEPA. P. 10.

