

# **Raising a Stink: Air Emissions from Factory Farms**

## **Introduction**

Most of the meat and milk consumed by Americans comes from animals grown by large companies on industrial sized factory farms (concentrated animal feeding operations or CAFOs), housing tens of thousands of animals whose growth and slaughter or milk production is carefully controlled by corporate formulas. Such large concentrations of animals create vast amounts of manure in one location, which increases the potential for harm to the environment and to public health. Manure from industrial animal production chokes rivers and streams and also results in emissions of noxious air pollutants like ammonia, hydrogen sulfide and volatile organic compounds. These pollutants are generated by the animals themselves and by their decomposing manure. Public health experts have linked pollution emissions from CAFOs to a suite of illnesses including lung damage and even death.

EPA and States authorized to implement the Clean Air Act (CAA) have the authority to require that CAFOs measure and control their emissions. However, EPA and State regulators have exercised their authority in only a few instances, because industry lobbyists and the United States Department of Agriculture (USDA) have effectively undermined CAA enforcement of CAFOs.

Although CAFOs are required under the CAA to know their air emissions and comply with the law, EPA should require air emissions monitoring at the largest industrial-sized facilities that present the highest risk, and, if necessary, require them to install control technologies. At a minimum, EPA and the States should not continue to permit industrial-scale operations without knowing the environmental or public health consequences, particularly in light of the science documenting the grave health risks posed by these operations' emissions to workers and nearby residents.

## **Harmful Effects of Consolidation**

Due to ongoing consolidation in the animal production industry, the number of U.S. livestock and poultry operations is declining. Increasingly, larger, more industrialized and specialized operations account for a greater share of all market production. For example, in 1997, nearly 40% of hogs produced in the U.S. were owned by just ten companies, and that concentration has steadily increased.<sup>1</sup> Hog processing is even more concentrated than hog production. In 1998, the top four pork processors marketed 57% of all hogs in the country.<sup>2</sup> In the beef sector, 2% of the feedlots in 1997 with over a 1,000 head of cattle produced 80% of the beef sold in the U.S.. In the poultry sector, broiler operations that represented only 11% of the total number of operations accounted for nearly half of annual production.<sup>3</sup>

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<sup>1</sup> Successful Farming Magazine, *Largest Pork Producers 2001* (October 2001).

<sup>2</sup> Iowa State University and The University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study* (February 2002).

<sup>3</sup> EPA, *Emissions from Animal Feeding Operations (Draft)* (August 2001).

Larger and more industrialized operations produce enormous amounts of waste at single geographic locations, raising the potential for significant environmental damage. One factory farm in Northern Missouri generates more feces and urine than the entire St. Louis metropolitan area, but without the treatment that cities are required to provide. Primitive lagoons are used to “manage” the manure and wastewater. These “lagoons” or vast holding ponds often crack and leak nitrates and other contaminants into drinking water supplies, or overflow and contaminate surface water.<sup>4</sup> The lagoon levels are periodically reduced through land-application of the waste, sometimes through large spray guns that often saturate the land until manure runs into creeks and onto neighboring property.<sup>5</sup>

In addition to impairing water quality, concentrated animal feeding operations can be significant sources of harmful air emissions. Emissions are generated by the animals themselves and by their manure as it decomposes in lagoons, barns and as it is spread onto land. Emissions can be gases or particles. Gaseous emissions include ammonia, hydrogen sulfide, methane, carbon dioxide and volatile organic compounds, which contribute to odor. Some of these gases persist in the atmosphere for hours or days and may be transported hundreds of kilometers. Ammonia and sulfur compounds also participate in reactions that can form secondary particles (fine dust) and aerosols in the atmosphere. Particulate matter (PM) or dust emitted from CAFOs comes from feed and animal dander. Generally, PM is dispersed rapidly through the atmosphere and ultimately deposits on land.<sup>6</sup>

### **Health and Community Impacts**

Extensive occupational health studies since 1977 have documented acute and chronic respiratory diseases among CAFO workers, especially swine and poultry workers. CAFO workers commonly complain of sinusitis, acute and chronic bronchitis,<sup>7</sup> inflamed mucus membranes and irritation of the nose and throat, headaches, muscle aches and pains.<sup>8</sup> CAFO workers also experience asthma and acute and progressive decline in lung

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<sup>4</sup> EPA has issued several emergency orders to CAFOs whose leaking lagoons contaminated groundwater and in one case may have contributed to miscarriages.

<sup>5</sup> The USDA estimates that the cropland controlled by operations with confined animals has the capacity to absorb only about 40% of the nutrients generated by these operations. Kellog, R.L., Lander, C.H., Moffit, D. and Gollehon, N., *Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilative Nutrients: Spatial and Temporal Trends for the U.S.* (2000) U.S.D.A. Natural Resources Conservation Service, Washington, D.C.. As a result, EPA has identified agriculture as the number one remaining cause of water quality impairment for rivers and lakes. EPA 3-5(b) Report (2000).

<sup>6</sup> Iowa State University and The University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study* (February 2002).

<sup>7</sup> *Id.* Chronic bronchitis affects about 25 percent of CAFO workers while acute bronchitis affects as many as 70% of CAFO workers exposed.

<sup>8</sup> Cole D, Todd L, Wing S, *Concentrated swine feeding operations and public health: a review of occupational and community health effects*, Environ Health Perspect 108:685-699 (2000).

function over time.<sup>9</sup> CAFO workers have died from very high emissions of hydrogen sulfide which can occur from the agitation of manure in lagoons, and others have developed severe respiratory impairment.

Although occupational health risks cannot be directly extrapolated to community health risks, those in the general community, including children, the elderly and those with preexisting respiratory problems, can be much more susceptible to CAFO emissions. Many experimental and epidemiological studies of non-CAFO populations have documented adverse health effects among community residents exposed to low levels of ammonia and hydrogen sulfide. Based on these non-CAFO studies, both the EPA and the Agency for Toxic Substances and Disease Registry have recommended ambient exposure limits for ammonia and hydrogen sulfide.<sup>10</sup> These studies have revealed the following health problems associated with the individual chemical components of CAFO emissions:

**Particulates:** The air in and around CAFOs is contaminated with high concentrations of particulates or suspended dust, about one-third of which is respirable (PM10).<sup>11</sup> In addition, particles that settle in the upper airways have been linked to asthma and bronchitis. Studies have also associated smaller particles, which may be absorbed and have systemic effects, to a wide range of adverse health effects, including cardiac death.<sup>12</sup> Further, a number of both occupational and nonoccupational studies have revealed that long-term, cumulative exposure to particulates results in persistent respiratory symptoms and a progressive decline in lung function.<sup>13</sup>

**Ammonia:** Agricultural operations are the largest source of ammonia emissions in the U.S.<sup>14</sup> Ammonia is a component of animal waste and is released from barns, lagoons and from spray-field applications. Ammonia is rapidly absorbed in the upper airways of the human respiratory system. Moderate concentrations (50-150ppm) can lead to a severe cough and mucous production; higher concentrations (>150ppm) may cause scarring of the upper airways.<sup>15</sup> Just two minutes of exposure to high concentrations of ammonia may result in chronic lung disease, and massive exposure to ammonia can be fatal.<sup>16</sup> In

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<sup>9</sup> E.g., Bongers P et. al., *Lung function and respiratory function in pig farmers*. Br J Ind Med 44:819-823 (1987); Donham K et. al., *Acute effects of the work environment on pulmonary functions of swine confinement workers*. Am J Ind Med 5:367-375 (1984).

<sup>10</sup> Agency for Toxic Substances and Disease Registry, Minimal Risk Levels for Hazardous Substances, <http://www.atsdr.cdc.gov/mrls.html>; EPA, Integrated Risk Information System, [www.epa.gov/iris/subst.html](http://www.epa.gov/iris/subst.html). For ammonia, the EPA lists 144 ppb for lifetime exposures and the ATSDR lists 500 ppb for acute and 300 ppb for chronic exposure. For hydrogen sulfide, the EPA lists 0.7 ppb for lifetime exposures and the ATSDR lists 70 ppb for acute and 30 ppb for intermediate exposures.

<sup>11</sup> *Id.* PM10 refers to particles that are 10 microns in diameter or smaller.

<sup>12</sup> *Id.*

<sup>13</sup> Healy J, et. al., *Inhalation Exposure in secondary aluminum smelting*. Ann Occup Hyg 45:217-225 (2001); Dockery DW, Pope CA, *Acute respiratory effects of particulate pollution*. Annu Rev Public Health 15:107-132 (1994).

<sup>14</sup> Abt Associates, *Air Quality Impacts of Livestock Waste* (September 2000).

<sup>15</sup> Close LG, et. al., *Acute and Chronic Effects of ammonia burns of the respiratory tract*. Arch Otolaryngol 106:151-158 (1980); Leduc D, et. al., *Acute and long-term respiratory damage following inhalation of ammonia*. Thorax 46:755-757 (1992).

<sup>16</sup> Sobonya R., *Fatal anhydrous ammonia inhalation*, Hum Pathol 8:293-299 (1977).

addition to pulmonary disease, exposure to ammonia leads to irritation of the eyes, sinuses, and skin.<sup>17</sup>

Ammonia from livestock and dairy waste may also contribute to significant health problems since it is a precursor for fine particulate matter (ammonium nitrate). Decomposing waste at dairies in the San Joaquin Valley accounted for 44% of the total ammonia emissions in 2000.<sup>18</sup> In the Valley, ammonium nitrate represents between 30-50% of the total PM10 concentration during winter when PM10 levels are at the highest.<sup>19</sup> In the eight-county San Joaquin air basin in California, 1,292 deaths occur annually as a result of current PM 2.5 levels.<sup>20</sup>

**Hydrogen Sulfide:** Hydrogen sulfide is a gas that arises from the storage, handling and decomposition of animal waste. Levels greater than 100ppm are considered immediately hazardous to life and health and levels as high as 1,000 ppm have been reported following the agitation of manure lagoons.<sup>21</sup> Epidemiological studies of pulp mill workers exposed to hydrogen sulfide have included reports of increased respiratory symptoms (irritation and cough) as well as increased headaches and migraines.<sup>22</sup> Epidemiological studies of communities exposed to hydrogen sulfide reported symptoms such as asthma, chronic bronchitis, shortness of breath, eye irritation, nausea, headaches and loss of sleep.<sup>23</sup> High exposures of hydrogen sulfide, an asphyxiate, cause loss of consciousness, shock, pulmonary edema, coma and death. In Iowa alone, there have been at least 19 deaths of CAFO workers resulting from sudden hydrogen sulfide exposure from liquid manure agitation.<sup>24</sup>

**Odor:** In addition to epidemiological studies relating to specific chemical emissions, there are three published, peer-reviewed studies of odors experienced by community residents living in close proximity to CAFOs. The first of two North Carolina studies focused on mood states and found that community members exposed to odors from hog facilities experienced more tension, depression, anger, fatigue and confusion than the control group.<sup>25</sup> The second North Carolina study was a population-based survey of three

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<sup>17</sup> McLean JA, et. al., *Effects of ammonia on nasal resistance in atopic and non-atopic subjects*. Ann Otol Rhinol Laryngol 88:228-234 (1979); Latenser BA, Loucktong TA, *Anhydrous ammonia burns: case presentation and literature review*. J Burn Care Rehabil 21:40-42 (2000).

<sup>18</sup> California Air Resource Board, *A Preliminary Assessment of Air Emissions from Dairy Operations in the San Joaquin Valley* (November 15, 2000).

<sup>19</sup> Karen L. Magliano, et. al., *Spatial and Temporal Variations in PM10 and PM2.5 Source Contributions and Comparison to Emissions During the 1995 Integrated Monitoring Study*, Atmospheric Environment 33 (1999).

<sup>20</sup> Renee Sharp and Bill Walker, Environmental Working Group, *Particle Civics: How Cleaner Air in California Will Save Lives and Save Money* (2002).

<sup>21</sup> Donham KJ, Gustafson KE, *Human occupational hazards from swine confinement*. Annals of the American Conference of Governmental Industrial Hyg. 2:137-142 (1982).

<sup>22</sup> Partti-Pellinen K, et. al., *Air Pollution Study: Effects of low level exposure to malodorous sulfur compounds on symptoms*. Arch Environ Health 51(4):315-320 (1996).

<sup>23</sup> United States Public Health Service (1964).

<sup>24</sup> Iowa State University and The University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study* (February 2002).

<sup>25</sup> Schiffman SS, Miller EA, Suggs MS, Graham BG, *The effect of environmental odors emanating from commercial swine operations on the mood of nearby residents*. Brain Res Bull 37:369-375 (1989).

rural communities, two that were located near livestock operations and a third that was not. Residents living near a 6,000 head hog operation experienced increased headaches, runny noses, sore throats, excessive coughing, diarrhea, burning eyes and reduced quality of life compared to residents not living near a livestock operation.<sup>26</sup> In addition, an Iowa study found that communities living within two-miles of a 4,000 hog operation experienced increased eye and upper respiratory symptoms.<sup>27</sup>

The following table lists examples of the odor qualities of gases and vapors released from CAFOs<sup>28</sup>:

**Examples of Odor Qualities**

<b>Chemical Name</b>	<b>Smell</b>
Hydrogen Sulfide	Rotten eggs
Dimethyl sulfide	Rotting vegetables
Butyric, isobutyric acid	Rancid butter
Valeric acid	Putrid, fecal smell
Isovaleric acid	Stinky feet
Skatole	Fecal, nauseating
Indole	Intense fecal

Odorous chemicals released from CAFOs include ammonia and hydrogen sulfide as well as volatile organic compounds (VOCs).

Due to intolerable CAFO odors, residents who live near CAFOs have experienced a diminished quality of life because they cannot open their windows or go outside.<sup>29</sup> CAFOs can also shatter rural communities and their economies by destroying the regional tax base and lowering property values.<sup>30</sup>

**State Regulation of CAFO Air Emissions**

Several states have recognized the need to regulate air emissions from CAFOs. The Minnesota Pollution Control Agency has established an ambient air quality standard for hydrogen sulfide at the property line of operations larger than 1000 animal units.<sup>31</sup>

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<sup>26</sup> Wing S., Wolf S., *Intensive livestock operations, health and quality of life among eastern North Carolina residents*. Environmental Health Perspective 108:223-238 (2000).

<sup>27</sup> Thu K, et. al., *A control study of the physical and mental health of residents living near a large-scale swine operation*. J Agric Saf Health 3:13-26 (1997).

<sup>28</sup> Iowa State University and The University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study* (February 2002) citing Cheremisinoff PN and Young RA, *Industrial Odor Technology Assessment*, Ann Arbor Science, Ann Arbor, MI (1975).

<sup>29</sup> Wing & Wolf (2000).

<sup>30</sup> Time Magazine, *The Empire of Pigs; A Little-Known Company is Master at Milking Governments for Welfare* (November 1998).

<sup>31</sup> Minnesota Environmental Quality Board, *Final technical work paper for air quality and odor impacts*. (2001).

Minnesota also requires these facilities to include an Air Emission Plan in their water quality permit. The Nebraska Department of Environmental Quality has implemented an ambient air quality standard for total reduced sulfur, which includes hydrogen sulfide, for CAFOs. Although they are not CAFO specific, at least 27 other states have also established standards for hydrogen sulfide or total reduced sulfur.<sup>32</sup>

In addition to air emissions, several states have also recognized the need to regulate odor from CAFOs. Colorado has established a dilution standard of 7:1, meaning that an air sample collected at the CAFO's property line is diluted with seven parts air. If odor can still be detected after dilution by an olfactometer and a panel of smellers, there is a violation.

Missouri uses a dilution standard of 5.4:1 at the property line. As of January 1, 2002, all class 1A (very large) CAFOs in Missouri must have odor control plans that describe their emission control measures.<sup>33</sup> So far, Missouri has approved only one CAFO plan out of 21 plans that have been submitted.

The North Carolina Division of Air Quality uses a complaint response system that requires formal investigation of odor complaints. If a determination of an "Objectionable Odor" is made, then management practices have to be approved and installed. If management practices fail, then the facility must install add-on control technology.

Many states also have nuisance laws that allow citizens to sue for nuisance violations, including objectionable odor.<sup>34</sup> State Attorneys General have also sued CAFO operations for violations of State laws.<sup>35</sup>

### **EPA Regulation of CAFOs**

EPA has the authority to address CAFO air emissions through several federal environmental laws, including the Clean Air Act (CAA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Emergency Planning and Community Right-to-Know Act (EPCRA).

The principal regulatory program established under the Clean Air Act has two basic elements: nationwide air quality goals and individual state plans designed to meet those goals. EPA is required to promulgate health-based national ambient air quality standards (NAAQS) for "criteria pollutants." So far EPA has promulgated NAAQS for sulfur dioxide, particulate matter, nitrogen dioxide, carbon monoxide, ozone and lead. Clean Air Act section 110(a) requires each state to submit for EPA approval a state implementation plan (SIP) for the implementation, maintenance, and enforcement of the NAAQS. The

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<sup>32</sup> Iowa State University and The University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study* (February 2002).

<sup>33</sup> Code of State Regulations, 10 CSR 10-3.090.

<sup>34</sup> On September 9, 2001, citizens won a judgment of \$19.2 million against Buckeye Egg Farm for nuisance violations including fly infestations and odor. Dispatch Environment Reporter, *State Fighting Egg Farm Again* (November 2001).

<sup>35</sup> *State ex rel. Nixon v. Premium Standard Farms, Inc.*, (Cir.Ct. Mo., Jackson County, No. CV99-0745).

Administrator retains the power to enforce any applicable standard of performance or requirement set forth in the SIP. The SIP includes the mix of regulatory requirements the State thinks it needs to meet the NAAQS, identifies which sources are regulated, and who must monitor them.

CAFOs fall within the definition of stationary source under the CAA. These sources are subject to the Clean Air Act's New Source Review permit (NSR) program and the Title V operating permit program if they are major stationary sources. A source is a major stationary source depending on how much tonnage of criteria air pollutants it emits and whether or not the agricultural operation is located in an area that is in compliance with the NAAQS.

Section 114 of the CAA authorizes EPA to require any owner or operator of an emissions source to keep records, to report, to monitor, test or sample, and to provide any other information that EPA may require to determine whether a source is violating CAA requirements.

Section 103(a) of CERCLA, establishes a substantive reporting requirement for releases of hazardous substances from sources that emit pollutants above certain thresholds.<sup>36</sup> Section 304(a) (1) of EPCRA, requires reporting of all emissions of an extremely hazardous substances from facilities where hazardous chemicals are produced, used, or stored.<sup>37</sup>

Historically, EPA has only permitted and initiated enforcement actions against CAFOs under the Clean Water Act (CWA), primarily because CWA regulations have been in place since the early 1970s. Even so, noncompliance with the CAFO regulations remains widespread. EPA estimates that at least 13,000 livestock operations require permits, yet EPA and States authorized to administer CWA programs have only issued permits to an estimated 2,520 of these operations.<sup>38</sup> More recently, EPA has recognized that CAFOs do not just threaten surface waters and has issued emergency orders to several livestock operations under the Safe Drinking Water Act (SDWA) and the Resource Recovery and Conservation Act (RCRA) for nitrate contamination of underground sources of drinking water.

### **Undermining of CAA CAFO Enforcement**

With few exceptions, EPA has been unsuccessful in regulating air emissions from CAFOs. The livestock industry has sought to emasculate EPA's enforcement and regulatory efforts by manipulating the image of the small family farm in the media and

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<sup>36</sup> The reporting threshold for ammonia is 100 lbs/day.

<sup>37</sup> EPA can only make a claim under Section 304(a) of EPCRA if a release requires notification under CERCLA section 103(a).

<sup>38</sup> EPA, *National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations*; Proposed Rule (January 2001).

on Capital Hill. Meanwhile, production capacity continually becomes more concentrated in a handful of large corporations.

USDA has played a role in lobbying EPA against permitting, regulation and enforcement of agricultural operations, particularly of air emissions. In 1996, Congress directed the Chief of the Natural Resources Conservation Service to establish the Agricultural Air Quality Task Force (AAQTF) to address air quality issues. The AAQTF was created to “advise the Secretary of Agriculture regarding the scientific basis of the impact of agriculture on air quality.”<sup>39</sup> Its governing regulations direct the task force to determine the extent to which agricultural operations impact air quality and to develop cost-effective ways for the agricultural community to improve air quality. Finally, the task force is charged with coordinating relevant research to insure data quality and sound interpretation of data. In 1998, EPA entered a memorandum of understanding with USDA which includes a USDA commitment to share information received from the AAQTF with EPA.

Despite the fact that the task force is supposed to be engaged in objective science, minutes from the task force meetings reveal other agendas. For example, the AAQTF asked the EPA Administrator to exempt CAFOs from CAA Title V<sup>40</sup> and CERCLA/EPCRA<sup>41</sup> requirements until EPA first develops emission factors.<sup>42</sup> The minutes also referred to ongoing enforcement actions and suggested EPA was acting inappropriately.<sup>43</sup>

While it is difficult to know exactly how much influence the AAQTF has had on EPA decisions, it is probably no coincidence that EPA recently approved a CAA Title V operating permit program in California with an agricultural exemption.<sup>44</sup> It is also not surprising that the regulated community supports AAQTF’s recommendation that EPA

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<sup>39</sup> All authorizing legislation, regulations and meeting minutes can be found at <http://fargo.nserl.purdue.edu/faca>.

<sup>40</sup> Title V permits are operating permits issued by permitting authorities to air pollution sources after the source has begun to operate. Title V permits record in one document all of the air pollution control requirements that apply to the source, and require the source to certify each year whether or not it has met the requirements of its permit.

<sup>41</sup> Section 103(a) of CERCLA, 42 U.S.C. § 9603(a), establishes a substantive reporting requirement for releases of hazardous substances from sources that emit more than 100 lb/day for ammonia and a number of other pollutants. Section 304(a)(1) of EPCRA, 42 U.S.C. § 11004(a)(1), requires, in part, reporting of a release of an extremely hazardous substance if it occurs from a facility at which a hazardous chemical is produced, used, or stored, and such release requires a notification under section 103(a) of CERCLA.

<sup>42</sup> March 27, 2001 AAQTF meeting minutes; Letter from Christine Todd Whitman to Honorable John Boehner dated November 9, 2001.

<sup>43</sup> July 19, 2001 AAQTF meeting minutes.

<sup>44</sup> On February 4, 2002, the Medical Alliance for Healthy Air, NRDC, Sierra Club, Association of Irrigated Residents and Communities for Land, Air & Water, Communities for a Better Environment and Our Children’s Earth Foundation petitioned EPA for review of the final rule approving the California program, challenging EPA’s approval of the program with an exemption for certain agricultural operations. On May 21, 2002, EPA published notice of a proposed settlement with Petitioners for public comment. The settlement requires, among other things, for state-exempt agricultural sources to apply for permits if required by the Clean Air Act.

delay CAA enforcement and permitting of CAFOs during the pendency of a National Academy of Sciences study focused on CAFO air quality issues, which will take a minimum of five years to complete.<sup>45</sup> According to industry lobbyists, the NAS study was proposed by meat production lobbyists as a direct result of a CAA enforcement action initiated by EPA against a large hog operation.

EPA's Office of Air and Radiation not only supports amnesty for CAFO air emissions but also seeks to deregulate CAFOs. At the most recent AAQTF meeting on May 2, 2002, Sally Shaver, Director of the Emission Standards Division, announced that EPA is exploring ways to exempt CAFOs from CERCLA reporting requirements. This is particularly problematic in light of the fact that the Supreme Court recently decided unanimously to uphold tough new CAA standards for fine particulate matter. Studies have concluded that agricultural operations are the largest source of ammonia emissions in the United States and contribute to the formation of ammonium nitrate and ammonium sulfate, two prevalent forms of fine particulate matter. Failure to meet the recently upheld standards means that public health will continue to be at risk. It could also subject counties to sanctions under federal law (such as loss of highway funds). Since many counties are not expected to meet the new PM some may have to include controlling emissions from agricultural operations as part of a control strategy. Exempting CAFOs from reporting ammonia emissions under CERCLA will prevent counties from having information to develop such strategies.

### **EPA Enforcement Actions Against CAFOs**

In October 1999, the United States intervened in a citizen suit filed by Citizens Legal Environmental Action Network, Inc. (CLEAN) against Premium Standard Farms, Inc. (PSF), an industrial-sized hog operation in northern Missouri that produces 2.5 million hogs annually. PSF stores and applies more than 750 million gallons of animal waste annually and land applies it on more than 83,000 acres of land. In addition to alleging violations of the CWA, EPA issued Notices of Violation for CAA permit and emissions reporting requirements.<sup>46</sup> EPA also issued a Finding of Violation alleging violations of the emissions reporting obligations for ammonia set forth in CERCLA Section 103 and EPCRA Section 304.<sup>47</sup>

Despite political pressure, EPA and CLEAN successfully negotiated a settlement and moved to enter a Consent Decree on April 29, 2002 that included an unprecedented CAFO

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<sup>45</sup> EPA contracted with NAS to review the scientific basis for estimating air emissions from CAFOs so that it can develop emission factors. As recognized by AAQTF in its meeting minutes, emissions factors are industry wide averages, not source specific numbers, and they are intended only for State CAA planning purposes, not for CAA applicability determinations. While it may be easier or faster to determine who is regulated with emissions factors, the absence of an emissions factor does not mean that EPA can't or shouldn't enforce the law.

<sup>46</sup> EPA, *Notice of Violation* issued to Premium Standard Farms (April 2000); EPA, *Clarification of Notice of Violation* (September 2000).

<sup>47</sup> EPA, *Finding of Violation* issued to Premium Standard Farms (May 2000).

CAA component.<sup>48</sup> The Consent Decree requires PSF to conduct hydrogen sulfide, ammonia, volatile organic compounds (VOCs) and PM air emissions monitoring, both of baseline emissions and before and after implementation of all experimental technologies, at the barns and lagoons in order to obtain empirical data on air emissions at their facilities. Defendants are also required to continue to report ammonia emissions as required by CERCLA and EPCRA.

PSF is the first CAFO to agree to conduct source-specific emissions monitoring of its barns and lagoons. There was some pressure to do so in addition to the lawsuit since EPA may have ambient air monitoring data demonstrating that they are a public health threat. In September 1999, EPA and Missouri conducted 48 hours of continuous measurements of ammonia and hydrogen sulfide downwind of a PSF site selected to represent public exposure.<sup>49</sup> The Agency for Toxic Substances and Disease Registry, the Missouri Departments of Health and Natural Resources and EPA also conducted an ammonia exposure investigation in 2001. The results of the investigation have not been released yet.

During the pendency of the PSF case, EPA issued a Notice of Violation to Buckeye Egg Farms and ordered Buckeye to test particulate matter emissions at several of its barns.<sup>50</sup> Buckeye Egg, located in Ohio, is one of the nation's largest egg producers. At one time, Buckeye housed 15 million chickens at its operations.<sup>51</sup> Buckeye's own contractor's measurements have demonstrated that the barns tested emit 325 tons of PM per year, exceeding CAA regulatory thresholds. EPA believes that the contractor made an obvious error in airflow calculation, however, so EPA estimates that Buckeye's barn emissions are nearly 770 tons per year.<sup>52</sup>

PSF and Buckeye's willingness to test their air emissions is at odds with industry lobbyist (and AAQTF) arguments that calculating CAFO source emissions is mysterious and technically difficult. According to EPA sources, however, political pressure to fight CAFO CAA enforcement has never been greater. On April 2, 2002, EPA ordered Seaboard Farms in Oklahoma to test its emissions of PM, hydrogen sulfide and VOCs.<sup>53</sup> Seaboard has refused, and EPA staff is uncertain whether EPA will have the political will to enforce its order.

### **Possible Emissions Controls**

There are a number of control technologies available to reduce CAFO air emissions. CAFO emissions from confinement buildings can be reduced either by minimizing the emissions generated in the building or treating them as they are emitted. Frequently

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<sup>48</sup> *CLEAN, Inc. and Untied States of America v. Premium Standard Farms, Inc.* (W.S. Mo.), Civil No. 97-6073-SJ-6.

<sup>49</sup> EPA/MDNR, *Premium Standard Farms Whitetail Concentrated Animal Feeding Operation Air Monitoring Report* (May 2000).

<sup>50</sup> EPA, *Notice and Finding of Violation*, EPA-5-OH-09 (January 2001); EPA, *Request to Provide Information Pursuant to the Clean Air Act*, (January 2001).

<sup>51</sup> The Columbia Dispatch, *Ohio EPA plans to revoke Buckeye Egg's State Permits* (April 2002).

<sup>52</sup> Letter to Bill Glass from Kevin Vuilleumier dated December 11, 2001.

<sup>53</sup> Letter from David Nielson to Rick Hoffman and Jean Tomaselli dated April 2002.

removing manure from the buildings is one of the most effective ways to reduce emissions. For example, frequent, short-term pressure washing of a feeding floor has been demonstrated to reduce dust and odor by up to 70%. In addition, sprinkling canola oil in swine buildings has been shown to control dust, odor and some gases by up to 60%, and is currently being tested by PSF. Treating the air as it leaves the building with biofilters can reduce dust and odors by 90%

For storage lagoons, air emission controls include both permeable and impermeable covers. As part of its settlement, PSF is required to test nitrification/denitrification technology similar to that used by municipal wastewater treatment plants. This technology is expected to not only reduce the nutrient levels of CAFO wastewater that is land-applied by at least 50% but also to substantially eliminate ammonia and hydrogen sulfide emissions. Direct injection of waste with full soil coverage may reduce odors from land application by 90%.

The attached table summarizes emission reducing strategies for CAFO emission sources and compares their effectiveness.<sup>54</sup>

### **Conclusion**

Corporate livestock operations have expanded immeasurably over the last ten years with very little forethought as to the environmental consequences. Moreover, state and federal regulators continue to permit these operations without requiring them to measure and manage their air emissions. While regulators have been lax in enforcing these requirements, the CAA is nonetheless a strict liability statute and it is well-settled that the burden is on the emissions source, not EPA, to know its emissions and comply with the law.

Industry lobbyists have been able to effectively undermine enforcement of the CAA, jeopardizing public health and the environment. If their corporate mantra is that it is not yet possible to estimate emissions, then regulators should not allow new construction of industrial-sized factory farms. This is particularly true considering the ever-growing body of science documenting the grave health threats industrial-scale livestock operations pose to both workers and nearby residents. For existing CAFOs, it is no longer possible to argue that it is technically infeasible to source-test emissions, particularly from barns and lagoons where emissions are capable of being captured and measured. So far, at least two operations, PSF and Buckeye, have managed to do what their political allies claim is impossible.

The Department of Agriculture should not be the gatekeeper of EPA's enforcement and permitting decisions. At a minimum, EPA needs to investigate air emissions at the largest industrial-sized facilities that present the highest risk, seek monitoring, and, if necessary, require them to install control technologies.

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<sup>54</sup> Iowa State University and The University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study* (February 2002).

