Environmental Quality Incentives Program

Air Quality Initiative

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Particulate Matter (PM) and Ozone Precursors and Animal Operations

What is Particulate Matter (PM)?

Particulate matter (PM) is currently a “criteria air pollutant” which means that the US Environmental Protection Agency (EPA) has identified PM as a pollutant that causes significant health (heart and lung) and environmental (deposition, visibility) effects. PM can be either solid particles or liquid droplets and can occur in a variety of sizes, shapes, and chemical compositions. PM can be emitted directly (primary PM - dust, pollen, soot, etc.) or can be formed in the atmosphere (secondary PM – formed from the reactions and condensation of sulfates, nitrates, volatile organic compounds [VOCs], and ammonia). The EPA has currently established National Ambient Air Quality Standards (NAAQS) for two forms of PM:

- Fine PM – currently regulated as PM2.5 (aerodynamic diameter less than or equal to 2.5 micrometers) Note: The diameter of the average human hair is 70 micrometers.
- Coarse PM – currently regulated as PM10 (aerodynamic diameter less than or equal to 10 micrometers)

In Illinois, the Air Quality Initiative focuses on fine PM.

What is Ozone?

Ozone is a gas composed of three oxygen atoms and is the primary component of smog. Although ozone found in the upper atmosphere forms a layer that provides protection from ultraviolet radiation, ozone found in the lower atmosphere and at ground level can be harmful to human health and vegetation.

Like Particulate Matter, ground-level ozone is also currently considered a “criteria air pollutant.” The U.S. Environmental Protection Agency (EPA) has identified ozone as a pollutant that causes significant health (respiratory) and environmental (visibility and vegetation damage) effects. The EPA has currently established NAAQS for ozone.

While ozone is not typically emitted directly from agricultural operations, it is formed in the lower atmosphere through the chemical reactions of nitrogen oxides (NOx) and volatile organic compounds (VOCs) which are regulated as ozone precursors. NOx and VOCs are known as ozone precursors because they are identified as pollutants that drive chemical reactions in the atmosphere to form ozone. NRCS views ozone precursors as an aspect of Air Quality resource concerns because of associated health effects, visibility problems, and damage to vegetation that can result from high ground-level ozone levels.

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Animal operations can influence ozone concentrations in a variety of ways, including:

- Biological organisms (including animals) which emit VOCs naturally.
- The breakdown or decomposition of biological materials such as manure, feed, or mortalities which can produce VOCs (through incomplete breakdown/decomposition) and NO\textsubscript{x} (mainly from the nitrification/denitrification processes).
- Combustion in on-farm equipment or the burning of biological material can produce NO\textsubscript{x} and VOCs.

**What can you do?**

Many common practices and management activities on the farm can help reduce the likelihood of ozone and particulate matter impacts from animal operations. The following suggestions are not all-inclusive but offer options available for managing emissions of ozone precursors. Many practices that serve to reduce ozone precursors will also serve to reduce fine PM. Talk with your NRCS conservation professional about what specifically will work best on your land.

**Confinement Operations**

- Maintain appropriate cleaning techniques for spilled feed, bedding, etc.
- Maintain appropriate moisture content in and on open-lot surfaces.
- Use a solid manure management system instead of a liquid manure management system.
- Cover the surface of storage piles of manure, bedding, feed, etc.
- Utilize feed management or feed additives to minimize intestinal and manure VOC production.

**Miscellaneous**

- Avoid spilling feed or manure and clean materials up quickly when spills do occur.
- Replace older, less efficient combustion sources or engines with more efficient or alternative fuel combustion equipment or electric heating/power sources.

For more information on the Air Quality Initiative contact your local USDA Service Center or visit the USDA NRCS website at: [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/air/?&cid=nrcs143_008546](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/air/?&cid=nrcs143_008546)

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