NRCS
Natural Resources
Conservation Service

United States Department of Agriculture
Natural Resources Conservation Service

Air Quality and Atmospheric
Change National Technology
Development Team

Fact Sheet -- Air Quality and Atmospheric Change

Particulate Matter 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 come in a variety of sizes, shapes, and chemical composition. PM can be emitted directly (primary PM - dust, pollen, soot, etc.) or 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)

Larger size fractions of PM such as total suspended particulate (TSP) are also currently regulated by state or local regulatory agencies.

Where is PM a Concern?

PM can be a local (deposition or transport), regional (formation and transport), and global (transport) concern. Greater emphasis on addressing PM concerns is likely to occur in areas that do not meet the PM NAAQS or have other PM issues such as regional haze or local deposition and visibility effects.

How Do Animal Operations Affect PM?

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

- Animal activity can produce dust emissions which can be carried by wind or building ventilation.
- Feed, material, and manure storage and handling can produce dust emissions.
- Combustion in on-farm equipment can produce fine PM and other by-products that lead to PM formation.
- Manure decomposition and land application can produce emissions of ammonia and VOCs.

What Can I Do?

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

Concentrated Operations

- Maintain appropriate housecleaning techniques (clean up spilled feed, bedding, etc.)
- Maintain appropriate housing ventilation
- Maintain appropriate moisture content in open lot surface (use sprinklers, etc.)
- Periodically remove manure
- Use a liquid manure management system as opposed to a solid manure management system
- Cover the surface of storage piles of manure, bedding, feed, etc.
- Remove feed and manure from storage piles in a manner that minimizes surface disturbance

Pasture or Range Operations

- Use prescribed grazing and/or range management to maintain adequate vegetative cover, minimize manure accumulation, and reduce burning requirements; or minimize residual biomass
- Implement alternatives to rangeland burning, such as removing biomass via grazing or developing biofuels
- When rangeland burning is necessary, promote an efficient burn and develop and implement prescribed burn and smoke management plans

Miscellaneous

- Install windbreaks or shelterbelts to intercept or disperse PM
- Avoid spilling feed and other materials
- Implement speed restrictions or access barriers on roads

For More Information

NRCS is currently developing guidance and conservation practice standards for addressing PM at animal operations. For more information, contact the Air Quality and Atmospheric Change National Technology Development Team (http://www.airquality.nrcs.usda.gov/) at the West National Technology Support Center in Portland, Oregon. (Primary contact: Greg Zwicke, 503-273-2434, greg.zwicke@por.usda.gov)

USDA NRCS is an equal opportunity provider and employer.

3/08