

**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL AIR QUALITY TASK FORCE
RESEARCH COMMITTEE**

AGRICULTURAL AIR QUALITY RESEARCH PRIORITIES

Background

At the June meeting of the in Amarillo, the AAQTF recommended a comprehensive, eight point agricultural air quality research program that included:

- Developing PM_{2.5}, PM₁₀, NH₃, H₂S, Odor, and Reactive VOC's Emission Inventories/Emission Factors/Process-Based Modeling for High-Priority, Targeted Agricultural Practices.
- Establishing the Appropriateness of Utilizing PM Samplers Designed for Urban Environments in a Rural Setting.
- Developing Accurate Dispersion Models.
- Developing Management Plans and Control Technologies.
- Evaluating the Impact of New Diesel Rules on Agricultural Operations.
- Evaluating Agricultural Contributions to National Air Quality Initiatives.
- Assessing the Role of Agricultural NH₃ Emissions in the Formation of Ammonium Nitrate Particulate Matter.
- Evaluating Pathogens and Other Constituents from AFO/CAFOs.

All of these recommendations remain a priority; however, since the meeting in Amarillo, the EPA has proceeded with the standards on particulate and other legal/regulatory actions require some immediate research attention.

National Ambient Air Quality Standards for PM

PM_{2.5} Implementation:

EPA signed a proposed rule on September 8, 2005 which appeared in the Federal Register on November 1, 2005 (70 FR 65984) to implement the air quality standards for fine particulate (PM_{2.5}) which were promulgated in 1997. The implementation rule will establish procedures states may use to reduce emissions that elevate the level of fine particles. The comment period ends on January 3, 2006 (sixty days) and most likely will be finalized in late 2006. For precursors of PM_{2.5}, EPA proposes that SO₂ and NO_x be considered precursors that have to be considered in State Implementation Plans. For VOC's and ammonia, EPA is proposing that these pollutants will be presumed not to be precursors unless they are determined to be significant contributors to PM_{2.5} formation in the particular area. According to EPA condensable

emissions commonly make up a significant component of PM_{2.5} emissions for certain sources using high temperature processes. About 78 percent of the total direct PM_{2.5} emissions are estimated by EPA to be condensable PM_{2.5} emissions. The EPA is proposing to regulate a source's total direct PM emissions (filterable and condensable emissions) in the implementation of key CAA requirements. As currently proposed by EPA, the inclusion of each source's condensable emissions would be necessary for all areas where additional local control of primary PM emissions are required as part of the attainment demonstration. These implementation issues as well as the sampler bias issue means that this could significantly affect agriculture.

PM NAAQS Review

EPA has proceeded with recommending a revised National Ambient Air Quality Standard (NAAQS) for PM. This will include both PM_{2.5} and a new NAAQS for PM Coarse (PM_{10-2.5}). By court order, the proposal to revise the PM NAAQS will be released on December 20, 2005 and is expected to also have a sixty-day comment period. The final standard is due September 20, 2006. EPA recommends that the indicator for PM Coarse should be urban PM Coarse, but this may difficult to do because these are NAAQS. For PM For PM Coarse, the EPA Staff Paper recommends (and is likely to be proposed) no annual standard and a 24 hour standard of 50-70 µg/m³ (98th percentile) and 60-85 µg/m³ (99th percentile). According to EPA, the upper part of the range is equivalent to current standards. However, according to research by Texas A&M and others, the equivalent to the current 150 µg/m³, would 148-149 µg/m³. For PM_{2.5}, EPA wants to retain PM_{2.5} as the indicator for PM Fine, but is considering lowering the current annual standard of 15µg/m³ to as low as 12 µg/m³ together with a revised 24 hour in the range of 25-40 µg/m³. Because of the FRM sampler bias issue, the lower PM_{2.5} could also significantly affect agriculture. Although not part of this discussion the Ozone NAAQS review will follow next year.

In summary, depending on implementation policies, both could have significant adverse effects on all segments of agriculture including processing, production, and confined animal operations. The effect of the proposed standard on agricultural sectors has not been assessed, but could be draconian for certain operations in terms of control equipment capabilities, management plans, compliance, and economics.

Emission Inventories, Emission Factors, and Processed-based Modeling

Previously, the AAQTF identified a specific concern over the accurate assessment of particulate associated with agricultural operations and confined animal feeding operations. Specifically, emission inventories, emission factors, and processed-based modeling are grossly inadequate when anticipating the implementation of the proposed new particulate standards for agriculture. Science and engineering-based protocols are urgently needed; otherwise, regulators will be required to use default values and emissions determinations that may be too high or too low.

Federal Reference Sampler Bias for Agricultural Particulate

Previous presentations to the AAQTF documented inaccuracies with the Federal Reference Method Samplers for PM that resulted in a recommendation to technically address this concern through guidance from EPA. Specifically, coarse PM emitted in the rural environment whether by agricultural operations or natural sources is typically larger than PM₁₀ measured in an urban setting by the PM₁₀ Federal Reference Method (FRM) sampler. Likewise, bias is also evident in the PM_{2.5} FRM sampler. Under certain instances, the samplers can over-sample in agricultural settings. The development of appropriate monitoring protocols and sampler performance criteria is even more critical now in light of the anticipated standards. EPA has not yet issued guidance, nor has it acknowledged this concern.

Characterization of Stationary Agricultural Emission Points

The anticipated more stringent regulatory emphasis on PM could result in additional controls and compliance modeling of agricultural operations. Also, additional regulatory interest and litigation has resulted in the application of CERCLA and EPCRA to certain agricultural operations. Agricultural operations including field operations, processing, and animal operations tend to have emissions that can be characterized as follows:

- Numerous discrete emission points
- Widely varying processes with different emission types
- Operations spread out over large parcels of property
- Operations under the same ownership that may not be contiguous
- Emissions primarily composed of biological and crustal materials (except for stationary engines)

EPA has not adequately addressed how agriculture should be treated with respect to emissions from stationary sources within the context of the Clean Air Act and other related laws (CERCLA and EPCRA). Because agricultural activities are diverse, it is difficult to technically ascertain emission points for compliance. Air quality management jurisdictions approach characterization and aggregation of sources differently, and this often places agricultural operations in a difficult position. A technical analysis of agricultural emission points is needed to determine how agricultural emissions are defined for purposes calculating total emissions from a facility. Specifically, a comprehensive engineering systems analysis should be conducted to:

- Define significant emission points for sampling and control of agricultural emissions of criteria pollutants and other regulated air pollutants
- Characterize process streams related to criteria pollutants and other regulated air pollutants

- Model downwind concentrations of criteria pollutants and other regulated air pollutants based on the updated, peer-reviewed emission factors
- Compile results to assist in the development of a science-based protocol that defines agricultural emissions

Recommendations:

1. The USDA should immediately commission an in-house assessment of the implication on all appropriate sectors of agriculture from implementation of the PM Fine rule and the anticipated revised/new particulate NAAQS (PM_{2.5} and PM_{10-2.5}). External consultants should be acquired to provide necessary technical expertise. The timing of this assessment is urgent and must be completed no later than February 06 in order to respond in a timely fashion to the comment period for the revised/new NAAQS. After submission of comments, an interagency working group (USDA/EPA), also with external technical expertise, should be established to develop appropriate implementation strategies.
2. Expedite research on PM emission inventories, emission factors, and process-based modeling as recommended by the AAQTF Research Committee in June 05.
3. Communicate, again to EPA, that a technical fix for the PM sampler bias concern as recommended by the AAQTF Research Committee in June 05, is even more urgent now.
4. Fund an engineering systems analysis of agricultural emission points so that reasonable, uniform, engineering-based solutions can be identified for regulating agricultural stationary sources.

**Agricultural Air Quality Task Force
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