RESEARCH ABSTRACT

ENVIRONMENT

Title: Particulates, Ammonium Nitrate, and Ammonium Sulfate: Effects on Air Quality in Rural Iowa
NPB #06-098

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Date Submitted: 12/26/07

Abstract: The study involved both ambient air sampling at two sites and wind tunnel measurements dealing with the affects of buildings and trees on air flow. The ambient air sampling included sampling for particulate matter (PM2.5, PM10 and TSP), three vapor phase species (ammonia, sulfur dioxide and nitric acid), and two aerosol species (nitrate and sulfate). Particulate matter values ranged from 10ug/m^3 to 130ug/m^3. The values for the vapor phase species ranged from 0.1ug/m^3 to 2.1ug/m^3 for nitric acid, 0.1ug/m^3 to 4.5ug/m^3 for sulfur dioxide, and 1.5ug/m^3 to 105.0ug/m^3 for ammonia, however the ammonia concentrations are underestimated at the swine site due to saturation of the denuders. Values for the aerosol species ranged from 0.1ug/m^3 to 9.0ug/m^3 for nitrate and 1.5ug/m^3 to10.0ug/m^3 for sulfate.

A 1:150 scale model of the swine facility was constructed for placement in a wind tunnel. Trees and the feed bins made to scale were also included. Significant changes in wind velocity and turbulence occurred due to the buildings and even a poorly defined tree area. These changes in velocity and turbulence can alter the movement of particulates and other chemical species. Failure to address these changes when measuring concentrations of chemical species moving from the site can lead to a significant under or over estimation of the concentrations of those species.

These research results were submitted in fulfillment of checkoff funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer reviewed

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