INORTH CAROLINA INTERAGENCY NUTRIENT MANAGEMENT COMMITTEE (INMC)

- North Carolina Cooperative Extension Service (NC CES)
- North Carolina Department of Environment & Natural Resources - Division of Soil and Water Conservation (DENR-DSWC)
- North Carolina Department of Agriculture and Consumer Services – Agronomic Division (NCDACS)
- North Carolina State University – Soils Department, Crop Science Department (NCSU)
- United State Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS)

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SUBJECT: Request for Modification of Nitrogen Coefficients with Aerway Applicators

TO: Carroll Pierce, Chair, 1217 Committee

FROM: Lane Price, USDA-NRCS (on behalf of the INMC)

Background: Use of the Aerway applicator to apply lagoon effluent is being promoted as a technology that can reduce odor and increase application efficiency (less labor and time) compared with waste application through high pressure gun type sprinkler systems. There is a potential that Aerway applications will result in reduced NH_3 volatilization losses. The 1217 Committee requested that the NC Interagency Nutrient Management Committee evaluate the potential for modifying nitrogen coefficients used in determining nutrient application rates for nutrient management plans.

Response: On May 14, 2004, staff from the NCSU Departments of Soils and Biological and Agricultural Engineering, NRCS, DENR-DWQ, DENR-DSWQ, NCDA&CS, and several private sector consultants attended a demonstration of this technology in Duplin County. Based on observations during this demonstration, as well as a formal discussion at the INMC meeting on July 30, the INMC provides the following response:

1. It is the opinion of the INMC that surface effluent application with the Aerway system likely reduces NH_3 volatilization losses, in comparison to gun type sprinklers that exhibit volatilization of NH_3-N in the range of 30 to 50%.
2. Some of the applied effluent will flow into the spike tooth depressions in the soil surface, which could subsequently increase NH_4^+ adsorption and further reduce potential volatilzation loss. The extent of adsorption reactions would likely be minimal in coarse textured soils. In the recent field demonstration, it appeared that less than 5 to 10 % of the effluent moved into these depressions; therefore, the effect on reducing volatilization due to increased adsorption would probably be small.
3. Another consideration that could partially offset any decrease in potential NH_3 volatilization loss would be potential increase in denitrification associated with increased surface soil wetting.
4. The above observations are not supported by actual field measurements, and we are not aware of any scientific studies that quantify reductions in NH_3 volatilization losses on similar sites or conditions. As a result, the INMC does not support any modification to the N coefficients used for effluent applications with gun type sprinkler systems until actual field measurements can be made comparing volatilization losses under both systems.