**Addressing Risks from Bioaerosols Generated at Land Application Sites**
Several researchers at the University of Arizona, including Dr. Charles Gerba, a leading expert on the microbiology of sewage, sewage sludge, and biosolids, have published a correction to a paper that caused considerable public concern regarding the potential for human health impacts from bioaerosols from land application of B biosolids.

In 2000, the *Journal of Environmental Quality* included a technical paper by Dowd, Gerba, Pepper, and Pillai entitled "Bioaerosol transport modeling and risk assessment in relation to biosolid placement" (vol. 29, no. 1, pp. 343-348). In that paper, mathematical models were used to calculate the potential risk of infection by viral particles was 100%(1.00) when the exposure was postulated to be for 24 hours at 100 meters downwind with a windspeed of 20 meters per second (m/s). The paper stressed that this ws based on conservative assumptions specific to the site in the southwestern U.S. for which the modeling was done.

The finding of the Dowd et al. paper surprised biosolids managers and policy people, who have noted a large incidence of infection amongst those working around or exposed to biosolids bioaerosols. The paper was widely cited as an indication of significant risk by those voicing opposition to the land application of biolosids.

Earlier this year, in the *Journal of Residuals Science & Technology* (vol. 1, no.1, January 2004), John Brooks, Dr. Gerba, and dr. Ian Pepper corrected the calculations used in the Dowd et al. paper. They used more accurate, up-to-date reported values for the concentrations of viruses in Class B biosolids. And they corrected the value for r, the "virus ability to infect and overcome host defenses," The Dowd et al. paper used an incorrect r value, they stated.

Brooks, Gerba, and Pepper recalculated predicted downwind concentrations of viruses per cubic meter of air and found them to be 250 times less. The results they report are that the "risk of infection from a 24-hour exposure to land application of biosolids under a constant 20 m/s wind speed would yield a 1.51 x 10-5 risk of infection. Compared to previous calculations, as calculated by Dowd et al., this infectious risk is 5 orders of magnitude lower than the reported value (1.00) in the dowd et al. paper.

regarding the r value used in the dowd et al. paper, dr. Gerba said: "The value that was published was 39.5 - in checking with the author we found out that this was a miss-print [sic] in the original work and should have been 1/39.5 - that makes a big difference. The recalculated data shows the risk to be 5 times less than calculated in the Dowd paper."

Because of increased attention paid in recent years to the possibility of bioaerosol transmission of infection from biosolids land application, Dr. gerba says he and his colleagues have completed "a very careful review of the literature" and "we could find no evidence for the aerosol transmission by inhalation of enteric bacteria in humans-some evidence that it occurs in animals (but I dont hink that data is weak)....Based on aerosol data from sewage treatment plants, risk of viral infection are orders of magnitude less to workers at biosolids operations than at sewage treatment plants. All of the recent results

are suggesting that a 100-200 foot buffer is all that is needed under most conditions (i.e. less than gale force winds) to protect the public from any significant risk."

This issue continues to be studied by several researchers, including the University of Arizona team, a U.S. EPA-Cincinatti/USDA project that has been developed over the past two years and is expected to do some field study in September, and a study at the University of Tennessee (http://apha.confex.com/apha/132am/techprogram/paper_82525.htm).

For further information and regulatory requirements regarding pathogens, see EPA's "Control of Pathogens and Vector Attraction in Sewage Sludge," which was most recently updated and reprinted in July, 2003 (copies available from the NEBRA office).

*New England Water Wastewater News*, Issue 88 July/August 2004, p. 8.