CORNELL WASTE MANAGEMENT INSTITUTE - Sewage Biosolids Land Application: Reported Health Incidents

CWMI has compiled a matrix that includes information on the reported health incidents that citizens associate with the application of sewage sludges to land. The matrix includes the locations, the number of persons and the symptoms reported. A wide array of sources provided the information contained in this matrix including newspaper articles, government reports and other sources. It has not been confirmed by scientific investigation that these persons became ill due to land application of sludges. We hope that the information may be useful to the full range of stakeholders concerned about the reported illnesses. CWMI invites those with additional information on these or other incidents to send it to us at cwmi@cornell.edu

The National Research Council (NRC) report ("Biosolids Applied to Land," July 2002) notes the absence of scientific investigations of reported health incidents. It calls for their investigation and for a system to keep track of them. No such system is in place. This matrix is provided as a first step in tracking reported health incidents. It was compiled as part of a research project gathering information on what governmental investigations were undertaken of the reported incidents (Harrison and Oakes, 2002).

To date there is only one study that has been published that examines any of these cases (Lewis et al, 2002). In that study, interviews were conducted at 10 of the sites where neighbors reported symptoms. Land application data and medical records were reviewed. Approximately half of the 48 residents surveyed at those sites reported symptoms consistent with endotoxin exposure and half reported infections. At one site, symptoms decreased linearly with distance from the treated field and increased linearly with duration of exposure to winds blowing from the field. That study also suggests that chemical contaminants in sludges may be responsible for an increased host susceptibility to infection.

The National Research Council of the National Academy of Sciences conducted a review of land application of sewage sludges (NRC, 2002). The charge to the committee was to review the current standards and the risk-assessment upon which the rules are based. The committee did not review the reported health incidents such as those included in Lewis et al. (2002). It did, however, review the epidemiologic literature which was very sparse (see Chapter 3, NRC, 2002). At the time the report was drafted, the Lewis article had not yet been published.

Only one published prospective epidemiological study of health effects of land application (Dorn, et al., 1985) was found. A number of factors made the authors of that study urge that their finding not be generalized. The study did not use sludges associated with health complaints, sludges were applied at a low application rate, any odorous sludge was eliminated from the study, and only a small percentage of persons remained in the study over the course of the work.

Based on this limited information the NRC report stated that "there is no documented scientific evidence that the Part 503 rule has failed to protect public health." This statement has been construed by some to infer that there is evidence that the land application of sewage sludges does not cause any adverse health effects. In fact, the report recognized the lack of studies and "concludes that because of the lack of epidemiological study and the need to address the public's concerns about potential adverse health effects, EPA should conduct studies that examine exposure and potential health risks to works and community populations." The committee recognized that the absence of evidence was not evidence of the absence of an effect.

It has been suggested that sludge is unlikely to cause illness in individuals adjacent to land application sites because it has been reported that workers handling sludges, who therefore have high levels of exposure, do not get sick. The NRC report states the fallacy of this assertion. The report says that "Studies of wastewater treatment workers should not be used as substitutes for studies of actual biosolids exposure." "Some have contended that there is evidence of lack of health hazard from occupational exposure in wastewater treatment plants and that by extrapolation, risk from biosolids must be negligible. This reasoning is problematic for several reasons. First, as described earlier in this chapter [Chapter 3], the knowledge base regarding wastewater treatment workers is thin and contradictory. Second, the exposure characteristics will be quite different in the wastewater treatment industry compared with biosolids land-application. For example, potential exposure to airborne contaminants from wet sewage sludge are quite different from those of dried biosolids. Third, the routes of exposure may be different. Fourth, the populations exposed to biosolids may not be equivalent…community residents will include subpopulations unlikely to be found in the work place, such as children and individuals with respiratory diseases. Thus, the lack of compelling evidence of adverse health effects among wastewater treatment workers should not be used to infer that there will be a lack of adverse health effects from exposure to biosolids" (NRC, 2002, p. 120).

The risk assessment performed by EPA in support of the Part 503 rules addressed a range of chemical contaminants and a number of exposure pathways. It is important to recognize that the EPA sludge rules (40 CFR Part 503) are not based on an assessment of risks posed by pathogens or biological agents such as endotoxins. Nor are the risks posed by airborne or water runoff transport of sludge constituents or those resulting from any combination of pollutants or of biological and chemical contaminants addressed. Thus, as the NRC has stated, there is a need for research to address these and related issues and for a revised risk assessment.

Dorn, R. C., C. S. Reddy, D. N. Lamphere, J. V. Gaeuman, and R. Lanese. 1985. Environmental Research. V. 38, 332-359.

Harrison, E. Z. and S. R. Oakes. 2002. Investigation of Alleged Health Incidents Associated with Land Application of Sewage Sludges. New Solutions, v. 12, 387-408.

Lewis, D. L., D. K. Gattie, M. E. Novak, S. Sanchez, and C. Pumphrey. 2002. Interactions of Pathogens and Irritant Chemicals in Land-Applied Sewage Sludges (biosolids). BMC Public Health. 2:11.

National Research Council. 2002. Biosolids Applied to Land. National Academies Press. (read it free on-line at: http://www.nap.edu/books/0309084865/html/)