Emissions of hydrogen sulfide (H2S) from construction and demolition (C&D) landfills can result in odors that are a significant nuisance to nearby neighborhoods and businesses. As Florida’s population continues to grow and create development pressures, housing is built closer to existing landfills. Additionally, new landfills will be created in the future. This research project was undertaken to develop a detailed modeling methodology for use by counties and other landfill owners to provide them with an objective and scientifically defensible means to establish odor buffer zones around C&D landfills.

A technique for estimating methane (and odorous gas) emissions from municipal solid waste (MSW) landfills was recently developed by researchers at the University of Central Florida; this project extends that methodology. In this work the author measured ambient H2S concentrations at various locations in a C&D landfill, and applied those techniques to determine the H2S emission rates from the landfill. The emission rates were then input into the dispersion model AERMOD to determine H2S odor buffer distances around the landfill.

The graphical tool developed in this work shows isopleths of H2S concentrations at various distances, and color codes the isopleths into a green-yellow-red scheme (analogous to a traffic signal) that depicts zones where private landowners likely will not detect odors, where they may experience some odors, or where they likely will experience odors. The likelihood can be quantified by selecting the Nth highest hourly concentrations in one year to form the plot. In this study, N was conservatively selected as 8. Requiring that concentrations be at or below the 8th highest concentration in a year corresponds to a 99.9% probability of not exceeding that concentration at that distance in any future year.

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Approved for distribution by Dr. C. David Cooper, Committee Chair, on February 22, 2012.

The public is welcome to attend.