Results from A Large-Scale Aerobic Landfill System

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Abstract

Under anaerobic conditions, slow stabilization of the waste in a landfill produces methane, (an explosive, "green house" gas) and contaminated leachate over long periods of time. Moreover, many of the compounds found in landfill gas (LFG) are considered "green house" gases which may contribute to global warming. In attempts to reduce the production of this leachate, composite soil cap systems are constructed over landfilled waste. Additionally, many landfills use sophisticated subsurface liner and leachate collection systems to reduce the release of leachate into the environment. However, these cap, liner, and collection systems ultimately fail, potentially releasing methane gas and leachate to air and groundwater. As a result, this design approach only postpones the inevitable risks associated with landfills.

Building on the results of recent field-scale aerobic landfill projects, a 7-acre aerobic landfill is currently operating in Tennessee (USA). Although the benefits of aerobic degradation of MSW within a landfill include 1) an increased rate of waste decomposition and settlement, 2) reduced levels of contaminants in the leachate, and 3) decreased production of methane (over 90%), the primary goal of this project is to eliminate the offiste disposal of leachate, currently at a rate of over 160,000 gallons per month, via the evaporative effects created in the landfill. This paper presents the results of this project to date and future application at this landfill.

Further, combining these benefits with the possibility of landfill reuse (via landfill mining) could increase the potential for a sustainable landfill strategy to lower overall landfill operating costs, reduce environmental risks, and significantly extend the life of landfills worldwide.