AEROBIC LANDFILL TECHNOLOGIES

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Site Experience: Williamson County Landfill, Tennessee

Site Description

A pilot study was conducted on a 2 HA (5 acre) section of a closed landfill cell with a depth of 12 m. At the start of testing, the landfill was shipping 600m^3 (160 000 gallons) per month of leachate for treatment from the entire 165 HA (400 acre) landfill.

Technology Application

The aerobic system consisted of air injection, without gas extraction. The operation of the system was optimized for the removal of leachate as vapour in the produced aerobic landfill gas. Air was injected at a rate of 1000 scfm and leachate was collected from other areas of the landfill and injected at an average rate of 450 m^3 (120 000 gallon) per month.
This study attempted to reduce the overall volumes of leachate produced at the site while also achieving aerobic degradation of the waste, resulting in faster waste stabilization.

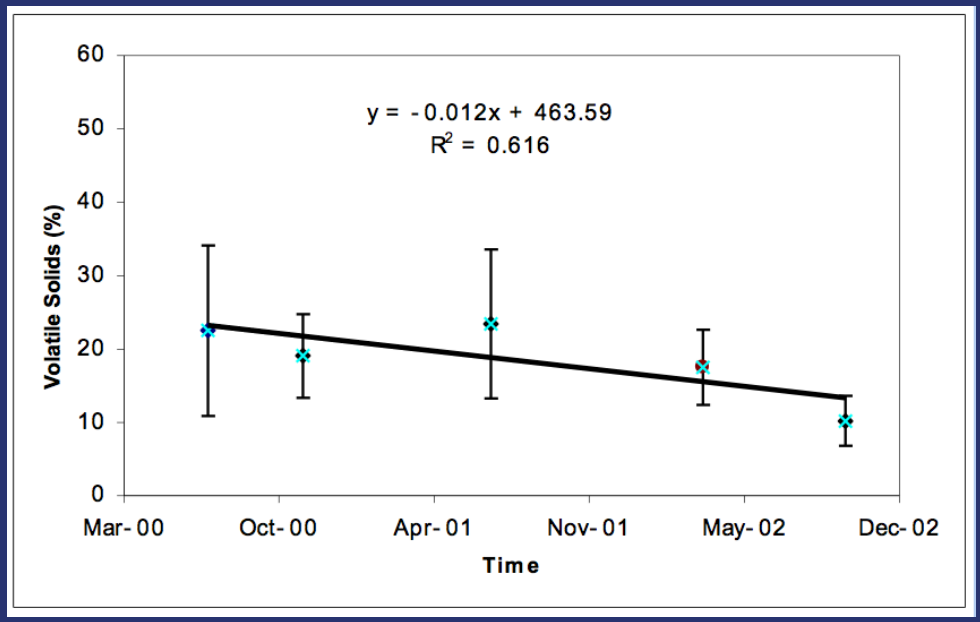

Figure 1 volatile solids concentrations in the waste samples

Results

WASTE DEGRADATION

The system was being optimized for the removal of leachate, however testing was conducted to determine the extent of waste degradation in the landfill. Biological methane potential testing was not conducted using a consistent method or a consistent lab; therefore the data was too variable to be considered statistically reliable. The volatile solids concentration, an amalgam measurement of the organic content of the solids, was reduced by 37% over the two years of the study (2000-2002). Cellulose content, long chain organic material that is degraded the in organic process, of the waste was also reduced by 33% over the two-year study.

MOISTURE REMOVAL

The site was injected with 450 m^3 (120 000 gallons) of leachate monthly. It was determined that only 30% of the injected water was exiting the landfill site as leachate, 320 m^3 (84 000 gallons) of excess moisture was being removed from the landfill as water vapour in the extracted landfill gas. This moisture removal was in addition to the removal of moisture produced during the aerobic degradation of the landfill waste.