

Monitoring Issues for Bioreactors

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ABSTRACT

Bioreactor technology has been practiced at municipal solid waste (MSW) landfills in the United States for more than 20 years. Its benefits have been well publicized in recent years and have prompted many landfill operators to consider its appropriateness for their facility. The result of employing bioreactor technology is the promotion of decomposition of the organic fraction of the waste in order to stabilize the landfill as quickly and thoroughly as possible. Some of the advantages include:

- *Decreased risk to the environment* - Leachate concentrations are highest during the active decomposition period and decrease dramatically once the landfill waste has stabilized. Accelerated decomposition shortens the timeframe that high strength leachate is generated and decreases the risk of contamination occurring in the post closure period when there is a greater potential for liner failure.
- *Increased capacity* - Rapid settlement results from accelerated decomposition and provides additional capacity while the landfill is in operation and a more stable foundation for the capping system at the time of closure. Leachate recirculation also provides the option of additional capacity recovery through landfill reclamation.
- *Increased potential for energy production* - Methane is generated at a higher rate and over a shorter period of time than in conventional landfills. The benefit is that energy output is higher for gas-to-energy projects and

the time period required for the operation of the gas collection system is reduced.

- *Leachate Management* – Recirculation is a low cost means of managing leachate. Using the field capacity of the waste to retain water in the landfill can greatly reduce offsite hauling to a treatment plant or the need of other forms of onsite treatment.

Yet, none of the advantages can be fully realized without proper monitoring of the bioreactor operation. This presentation outlines the process of selecting monitoring criteria in light of the goals established for a specific bioreactor project and determining the best method of gathering data. The discussion will review the current methods of monitoring being used and emphasize the need to prioritize monitoring criteria in order to balance system optimization with practical concerns such as staff expertise, staff availability and monetary limitations. The presentation will also provide a discussion of the critical monitoring issues from a solid waste regulator's perspective based on input from regulators across the country.