

The 3rd Intercontinental Landfill Research Symposium

Session Title: “Bioreactors II: Developments in Measuring Techniques for Bioreactor Landfills”

Session Coordinators: Mark Milke and Paul Imhoff

(1) Topic Description:

Landfills operated as bioreactors are designed to enhance rates of waste decomposition and methane production. While the benefits of bioreactor landfills have been demonstrated in laboratory and field tests, as yet there is no agreed-upon set of operating conditions to achieve optimal performance. Specification of optimal operating conditions, e.g., methods for adding water, requires techniques to measure the moisture distribution and gas flow within bioreactor landfills. In this session we discuss recent developments in measurement techniques for bioreactor landfills, with a focus on moisture addition and gas injection/extraction.

(2) Key Questions:

a. Liquids distribution

- What measurements are needed for developing operational guidelines for bioreactor landfills, and what measurements are needed for full scale operation?
- What spatial and temporal resolution is needed/desired for moisture measurement?
- What current and emerging methods can be used to assess the distribution of moisture?
- How accurate are these measurement methods and what are their advantages/disadvantages?
- Given the state of the art, what plan should be followed to standardize moisture measurements for bioreactors?

b. Air injection/extraction

- What measurements are needed for developing operational guidelines for bioreactor landfills, and what measurements are needed for full scale operation?
- What spatial and temporal resolution is needed/desired for gas permeability and/or gas pressure in order to quantify gas flow in an aerobic bioreactor?
- What current and emerging methods can be used to assess gas generation and gas permeability, particularly during periods of liquid addition?
- How accurate are these measurement methods and what are their advantages/disadvantages?
- Given the state of the art, what plan should be followed to standardize gas permeability and gas pressure measurements for bioreactors?

(3) Session Organization:

Total Time: **3.0 hours**

Six presentations – 15 minutes each

Each topic will have two presentations each lasting 15 minutes. A large group discussion (5 minutes) will follow each presentation. At the conclusion of each topic, a 20 minute open discussion will follow that is focused on each topic, using the questions listed above as a guide. The session coordinators will lead these open discussions. All attendees will be encouraged to participate in the discussions.

Proposed Session Schedule

Time	Presentation Title¹	Speaker
14:00	Opening remarks and introduction of session	Imhoff/Milke
Topic: Liquids Distribution		
14:10	“Evaluation of water infiltration and operation of bioreactor landfills” ABSTRACT #72	Vesa/Markku
14:30	“Field Test of Partitioning Tracers for Measuring Water in Landfills” ABSTRACT #28	Imhoff et al.
14:50	<i>Break</i>	
15:00	“Instrumentation of landfill by fibre optic monitoring system” ABSTRACT #61	Englund
15:20	“In situ moisture measurement at the new river regional landfill bioreactor demonstration project” ABSTRACT #54	Reinhart
15:40	Topic Discussion	Panel/Audience
Topic: Air Injection/Extraction		
16:00	“Air Permeability Estimation at a Full-Scale Bioreactor Landfill” ABSTRACT #52	Powell, et al.
16:20	“Baro-pneumatic Estimation of Landfill Gas Generation Rates at Four Operating Landfills” ABSTRACT #10	Bentley
16:40	Topic Discussion	Panel/Audience
17:00	End of Session	

¹ Presentation title based on submitted abstract. Title may change according to focus of session.