

Aerobic vs Anaerobic Bioreactor Landfill Case Study – The New River Regional Landfill

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The New River Regional Landfill (NRRL) in north Florida is hosting a Florida Bioreactor demonstration project. The primary goal of the landfill bioreactor demonstration project is to design, construct, operate, and monitor a full-scale landfill bioreactor in Florida in a manner that permits a complete and fair evaluation of this technology as a method of solid waste management in Florida, with appropriate consideration of science, engineering, environmental and economic issues.

The demonstration will include recirculation of leachate, injection of air into portions of the landfill, and the ability to monitor gaseous emissions from the bioreactor. The landfill bioreactor will be instrumented for the purpose of collecting *in-situ* measurements of such parameters as leachate head on the liner, and moisture content and temperature of the waste.

The landfill bioreactor at the NRRL is designed to allow operation and testing of both aerobic and anaerobic waste treatment regimes. The landfill bioreactor will be divided into two overall zones, a dedicated aerobic zone and a dedicated anaerobic zone. An area between the aerobic and anaerobic zones will serve as a transition zone. A second transition zone will be located between the anaerobic zone and the open working face of the landfill.

Solid waste sample collection will commence during the construction of the injection wells. When the construction of the bioreactor is completed, the first period of operation will consist of baseline data collection involving monitoring gas generation and composition, landfill temperature, and leachate quality. The startup of the anaerobic zone will consist of the controlled recirculation of leachate and/or other fluids (groundwater or wastewater treatment plant effluent and biosolids). Aerobic treatment will begin with controlled air injection into a small area of the aerobic zone. During startup phase, the aerobic zone will be very carefully monitored for temperature, off gas composition, and moisture content. The purpose of the start-up phase is to assess responses in landfill conditions as a function of limited air or leachate injection. Following the startup period, the routine operation phase will begin, consisting of the normal planned operation of the bioreactor. Activities during this phase will depend on the results gathered in the startup phase, but in general will consist of a targeted strategy of injecting leachate and/or air into appropriate areas of the landfill.

Construction of bioreactor components is expected to begin in summer 2000 with operation commencing in fall 2000. This presentation will contrast design/control aspects of operating the landfill in an aerobic vs. anaerobic regime. In particular, the following will be addressed:

- projected construction and operating costs required to support each regime

- moisture balance issues
- flammability issues related to gas composition
- expected leachate and gas quality
- process control approaches

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