United States
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SUPERFUND INNOVATIVE TECHNOLOGY EVALUATION

# Demonstration Bulletin

## *Slurry Biodegradation*

### *International Technology Corporation*

**Technology Description:** This technology uses a slurry-phase bioreactor in which the soil is mixed with water to form a slurry. Microorganisms and nutrients are added to the slurry to enhance the biodegradation process, which converts organic wastes into relatively harmless byproducts of microbial metabolism and inorganic salts. Figure 1 is a schematic of a slurry biodegradation process.

After the contaminated waste material is collected and screened to remove oversized material, it is mixed with water to form a slurry. The slurry is then passed through a milling process to achieve a slurry with a grain size distribution suitable for charging to the reactors. The slurry is fed to a continuously stirred tank reactor which is supplemented with oxygen (air), nutrients, and when necessary, a specific inoculum of microorganisms to enhance the biodegradation process. The residence time in the bioreactor varies with the soil or sludge matrix; physical/chemical nature of the contaminant, including concentration; and the biodegradability of the contaminants. Once biodegradation of the contaminants is completed, the treated slurry is sent to a separation/dewatering system.

The solids may be further treated if they still contain organic contaminants. The process water can be treated in an onsite treatment system prior to discharge or it can be recycled to the front end of the system for slurrying. Air emissions are possible during operation of the system; hence, depending on the waste characteristics, air pollution control, such as activated carbon, may be necessary.

The reactor selected for the SITE Demonstration was a 60-liter EIMCO Biolift™ reactor. These reactors are made of stainless steel and equipped with agitation, aeration, and temperature controls. These reactors can be sampled from the three sampling ports located along the side of the reactor at three vertical penetrations through the reactor wall.

**Waste Applicability:** Slurry biodegradation has been shown to be effective in treating highly contaminated soils and sludges that have contaminant concentrations ranging from 2,500 mg/kg to 250,000 mg/kg. It has the potential to treat a wide range of organic contaminants such as pesticides, fuels, creosote, pentachlorophenol, and polychlorinated biphenyls (PCBs). It has been used to treat coal tars, refinery wastes, hydrocarbons, and wood-preserving wastes. Slurry biodegradation is not effective in treating inorganics, including heavy metals.

**Demonstration Results:** The pilot-scale demonstration of slurry biodegradation technology was conducted at the U.S. EPA Test

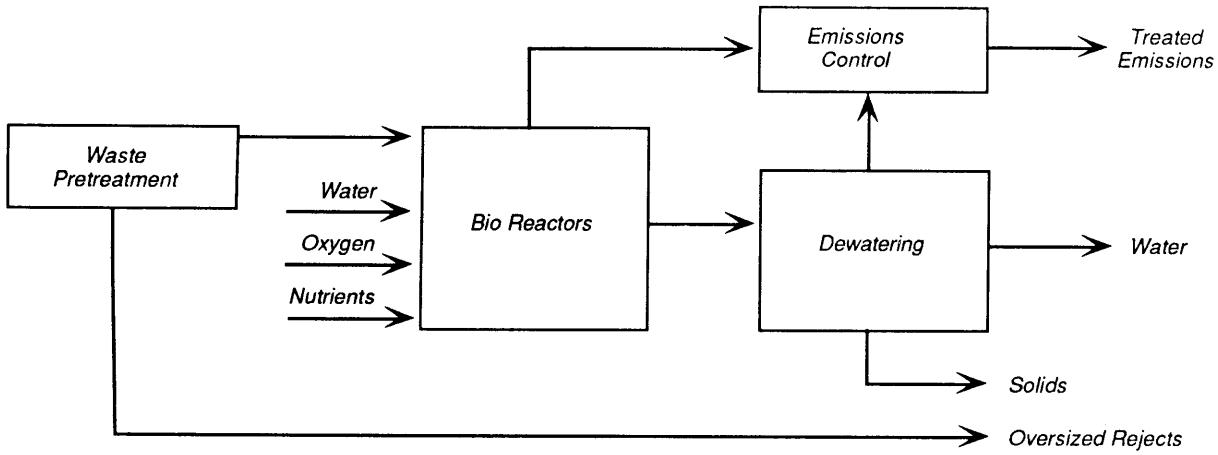


***Figure 1.*** *Slurry Biodegradation Process.*

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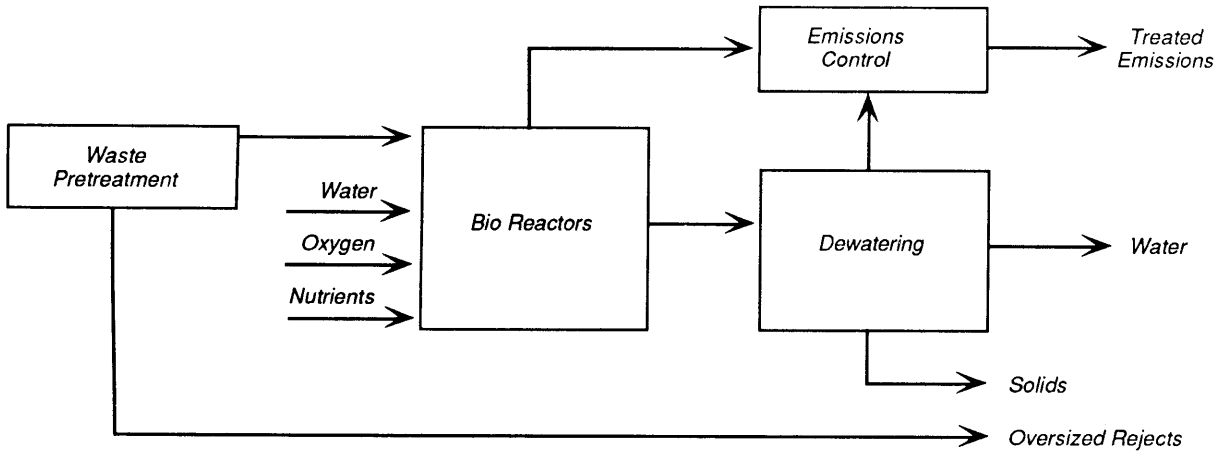


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