Working Towards Field Implementation of LF Bioreactors

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Regulatory Drivers

- RD&D rule, proposed June 2002
  40 CFR part 258.
Transition of Policy Impacting the Research

Presently few operating sites with outside liquid addition.

Agency focus on Biosolids Safety in land spreading and landfills.

Need for green energy in the United States.

Trading of greenhouse gas emission credits, establishment of CCX.
USEPA/WM CRADA

- 5 year Cooperative Research & Development Agreement.
- Rigid QA/QC procedures through a QAPP.
- Designed for Statistical Interpretation.
- Four LF Bioreactors, Two Control Subtitle D Cells.
CRADA Project Objectives

- To determine the parameters and trends that should be monitored to assess the performance of and control a bioreactor landfill.
  - Leachate
  - Gas Management/Fugitive Emissions
  - Solids Decomposition
- Two primary sites
  - Area 7 – New fill
  - Area 5 – Existing fill to be retrofitted, and will use nitrified leachate to control ammonia levels
  - Shared experimental control area
### The Site

**General Information**
- The site contains 782.15 acres
- Number of trucks delivering waste: 360
- Number of visitors weekly: 800
- Number of miles of internal roads: 11.87
- Number of trees planted: 430
- Counties permitted in Kentucky to dispose of MSW: 18
- Counties permitted in Indiana to dispose of MSW: 4

**Material Accepted for Disposal in 2001**
- Tons of C&D: 1,049,000
- Tons of non-hazardous liquid/sludge solidified: 19,783
- Tons of compost processed: 34,993
- Tons of petroleum contaminated soil bioremediated: 56,955

**Methane Gas - 2001**
- Total number of gas wells: 127
- Number of gas wells in operation: 2
- Cubic feet of gas generated daily: 6,480,000
- Million cubic feet sold to general electric: 1,122,808

**Leachate - 2001**
- Gallons of leachate pretreated and discharged to MSD: 36,842,124 gallons
- Gallons of non-hazardous liquid commercial waste: 1,946,528 gallons

**Flooding - 2001**
- Flooding area: 1,458,381 acres

**Monitoring - 2001**
- Number of permitted thus points of discharge: 23
- Total number of groundwater wells monitored: 45
- Total number of underdrains: 8

**Wetlands - 2001**
- On-site wetlands permitted to MAP: 180 acres
- Off-site wetlands permitted: 38 acres
- Off-site wetlands mitigation: 20.4 acres
- Off-site wetlands mitigation: 20.5 acres

**Easements**
- Louisville Gas & Electric Co. (LGE): 27.8 acres
- Texas Gas Transmission Co.: 14.8 acres
- Louisville Water Co.: 2.5 acres
- Metropolitan Sewer District: 0.32 acres
- Industrial pipelines: 0.68 acres

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**Map of Site**

- Groundwater Monitoring Wells
- Easement Lines
- Wetlands Mitigation Area
- Bioreactor Research & Development Project(s)
- Vegetation Map
- Soil Bioremediation Area
- Sedimentation Basins
- Petroleum Contaminated Soil Bioremediation Area

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**Map Details**

- **Unit 1** (closed)
- **Unit 2** (closed)
- **Unit 3** (closed)
- **Unit 4**
- **Unit 5** (permitted contained landfill)
- **Unit 6** (closed)
- **Unit 7**

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**SWANA Bioreactor Tour Itinerary**
1. SBR Building and Wetlands
2. Unit 5 Retrofit Bioreactor
3. Compost Station and Gas Flare
4. Bio Cover Study
5. Unit 7 As-Built Bioreactor and Odor Control
6. Hospitality and Data Review Center

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**Site Details**

- **Waste Management of Kentucky, LLC**
- Outer Loop Recycling and Disposal Facility
- 2675 Outer Loop
- Louisville, Kentucky 40219
- (502) 886-0372

**May 2002**

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USEPA/WM CRADA

- Progress Report is Due out in 2003.
- Conference Publish Rate is >4/year.
- Additional Sites to be Added in Future.

Unique Features:
- Air Emissions Monitoring.
- Outside Liquid Addition.
- Compost Cover Study.
- High Biosolids Rate.

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US EPA Office of Research and Development
What Designs to Study?

- As Built vs. Retrofit
- Anaerobic
- Facultative
- Aerobic-Anaerobic
- Aerobic
Surface Application of Liquids in a “as built” System.