US EPA ARCHIVE DOCUMENT

Outer Loop Landfill, Louisville, KY Bioreactor Project

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Presentation Content

- Purpose and Objectives
- Experimental Design
- Interim Results
  - Gas
  - Leachate
  - Solids
- Next Steps

Project Objectives

- Quantify and evaluate the performance of Aerobic-Anaerobic and Facultative Landfill Bioreactors versus that of a conventional control landfill.
- Will be large enough and last long enough to evaluate economic and operational issues.
- Will generate credible data based on statistically designed studies.

Experimental Design

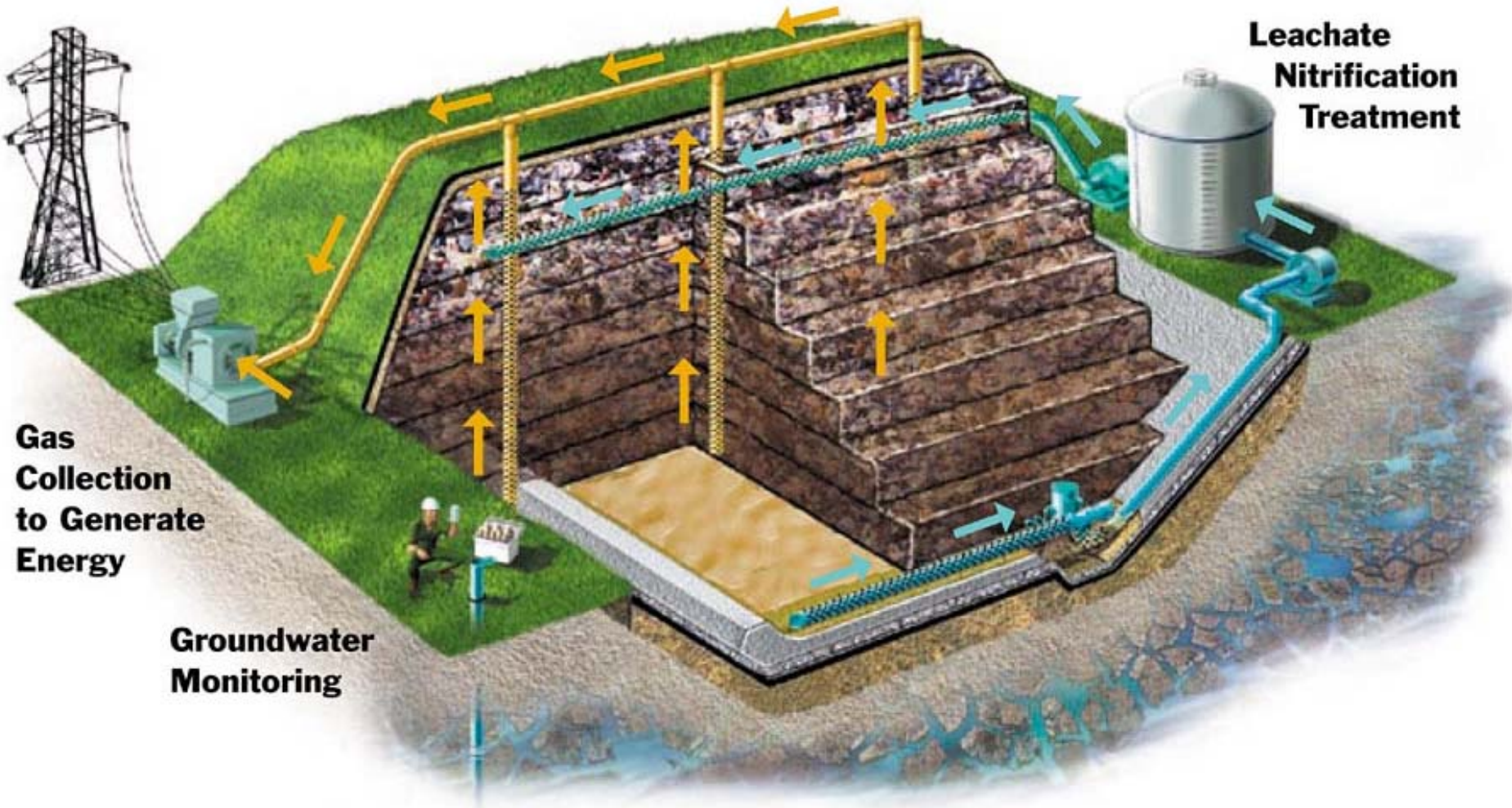
FLB 51A	FLB 52B	AALB 74A	AALB 74B	CTL 73A	CTL 73B
5-7 years old		2 years old		3-4 years old	

- FLB: Facultative Landfill Bioreactor and
- AALB: Aerobic- Anaerobic Landfill Bioreactor treatments
- CTL: Control (no liquid addition) conventional landfill
- Units composed of independent, paired cells

Anaerobic
Unit 7.4
New
Aerobic/Anaerobic Sequence
Unit 7.3
Control

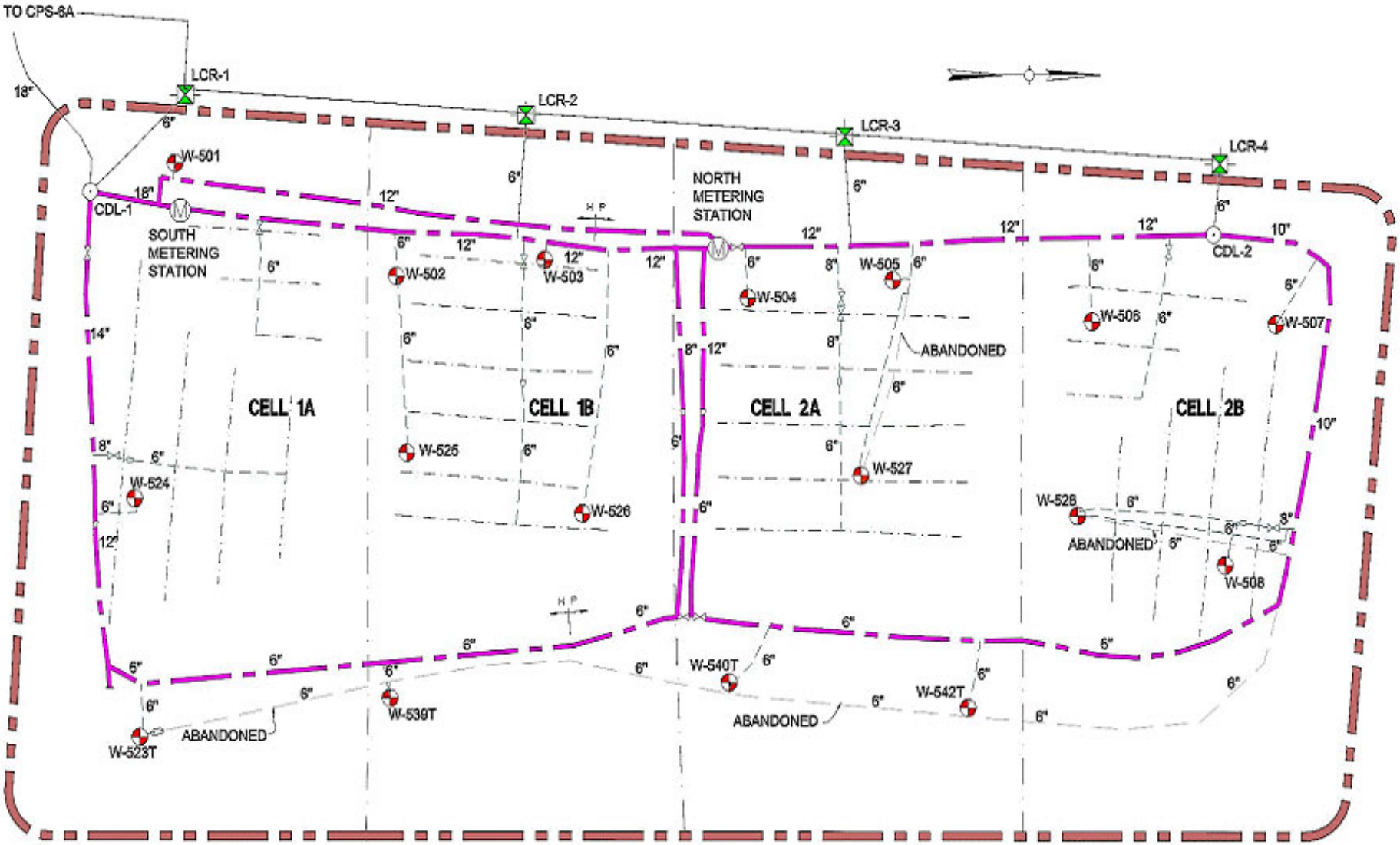
FLB: Facultative Landfill Bioreactor

Facultative Bioreactor



Leachate / Liquids Addition
Gas Collection

WASTE MANAGEMENT
Bioreactor Program



LEGEND

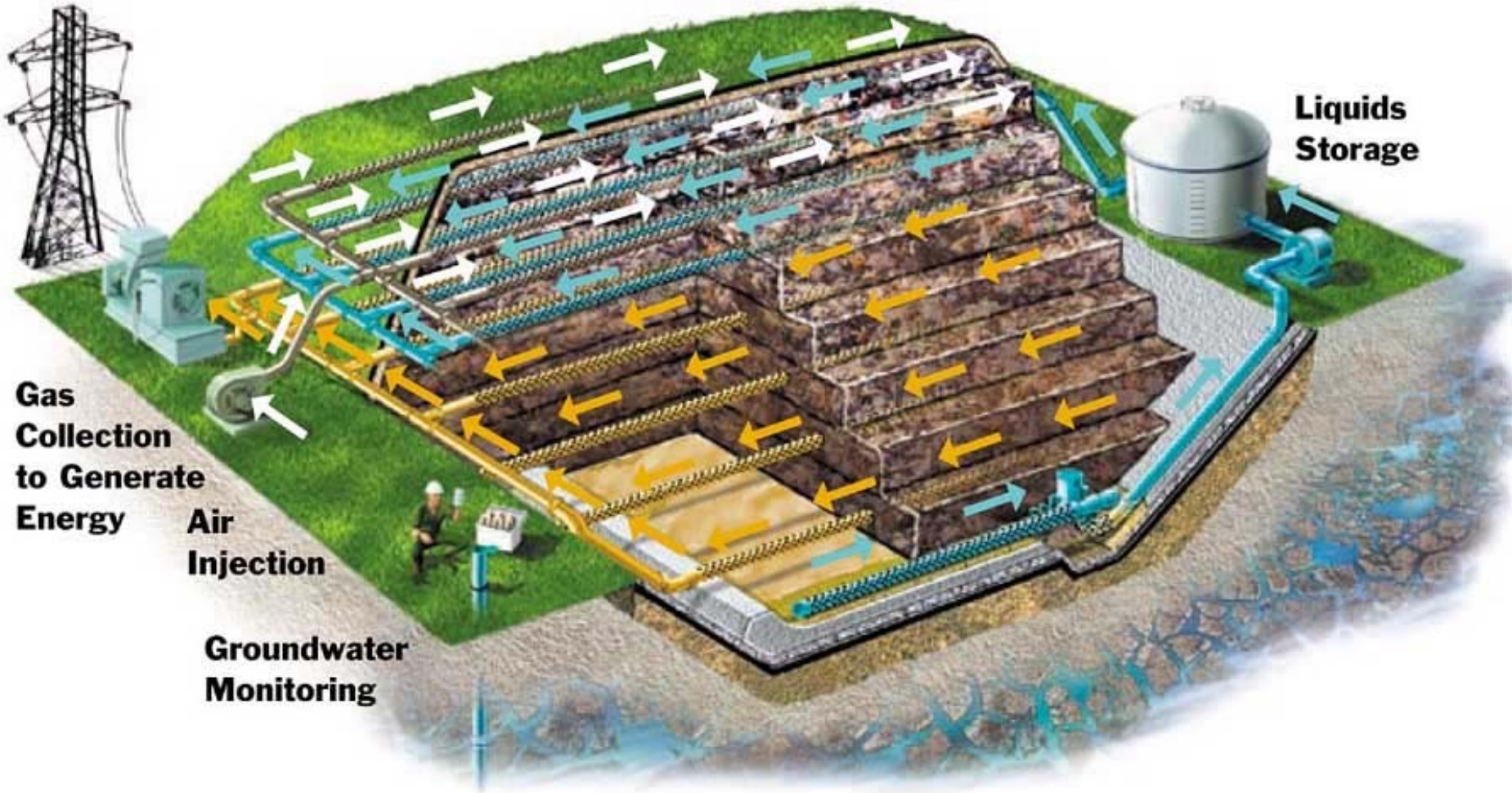
LCR-4	LEACHATE COLLECTION RISER		CONSTRCUTED UNIT LIMITS
W-542T	GAS WELL		CELL LIMITS
CDL-1	CONDENSATION DRIP LEG		ABANDONED GAS LINE
	CONTROL VALVE		GAS HEADER
	REDUCER		GAS LATERALS
6"	PIPE DIAMETER		GAS COLLECTION PIPES
M	METERING STATION		

UNIT 5 LANDFILL GAS COLLECTION SYSTEM

NO SCALE

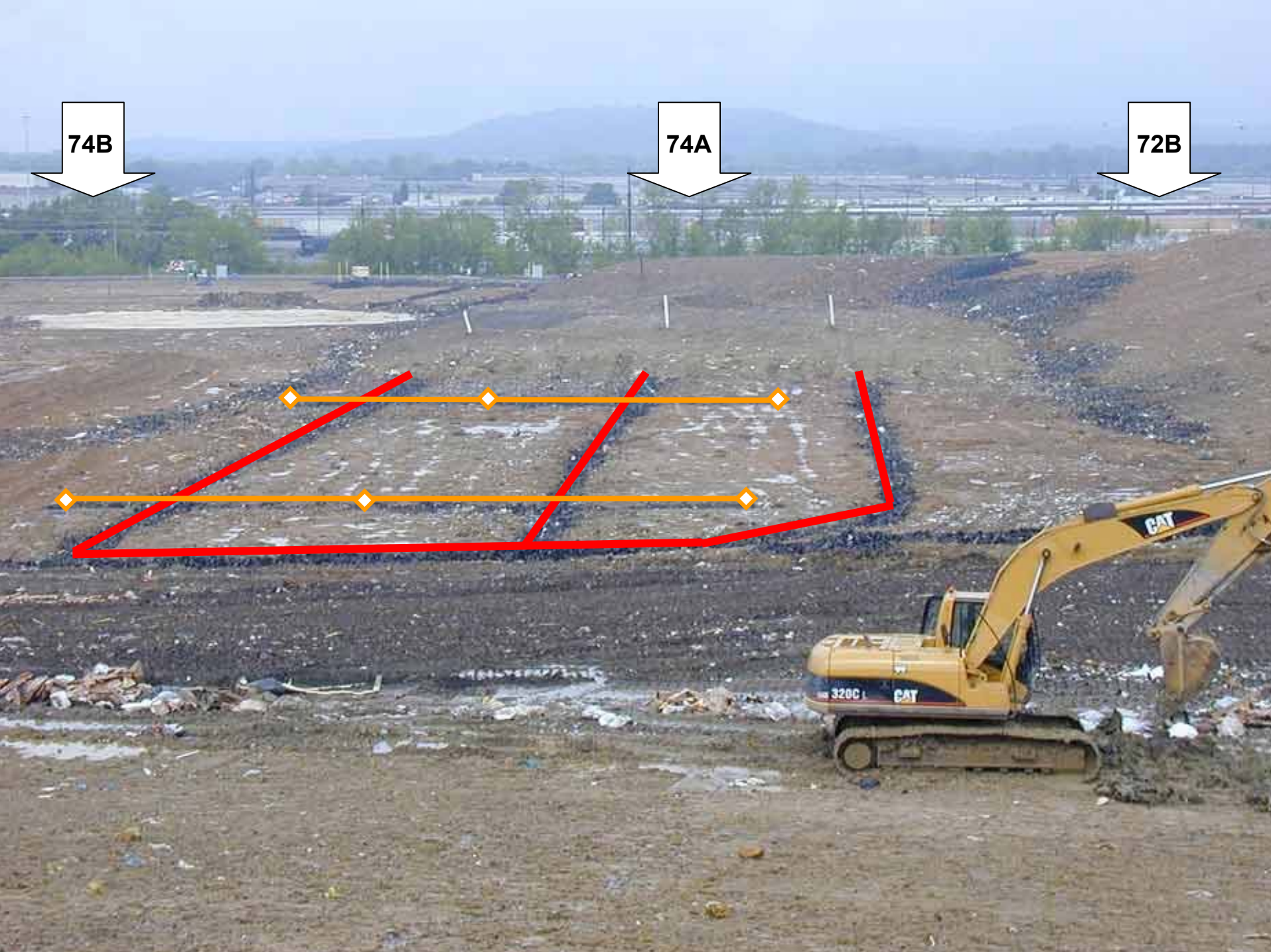
AALB: Aerobic-Anaerobic Landfill Bioreactor and Control

Aerobic-Anaerobic Bioreactor

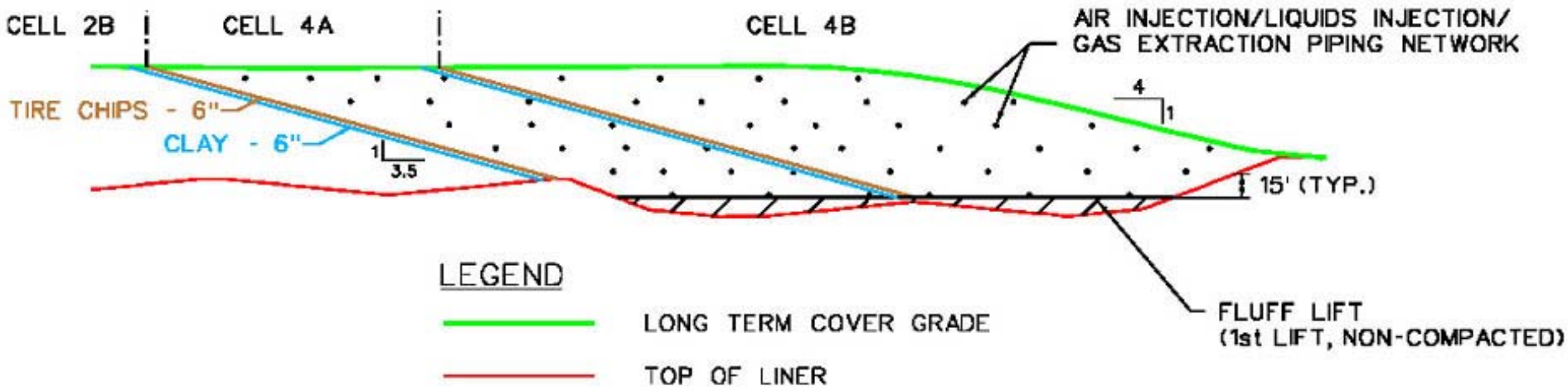


Leachate / Liquids Addition
Gas Collection
Air Injection

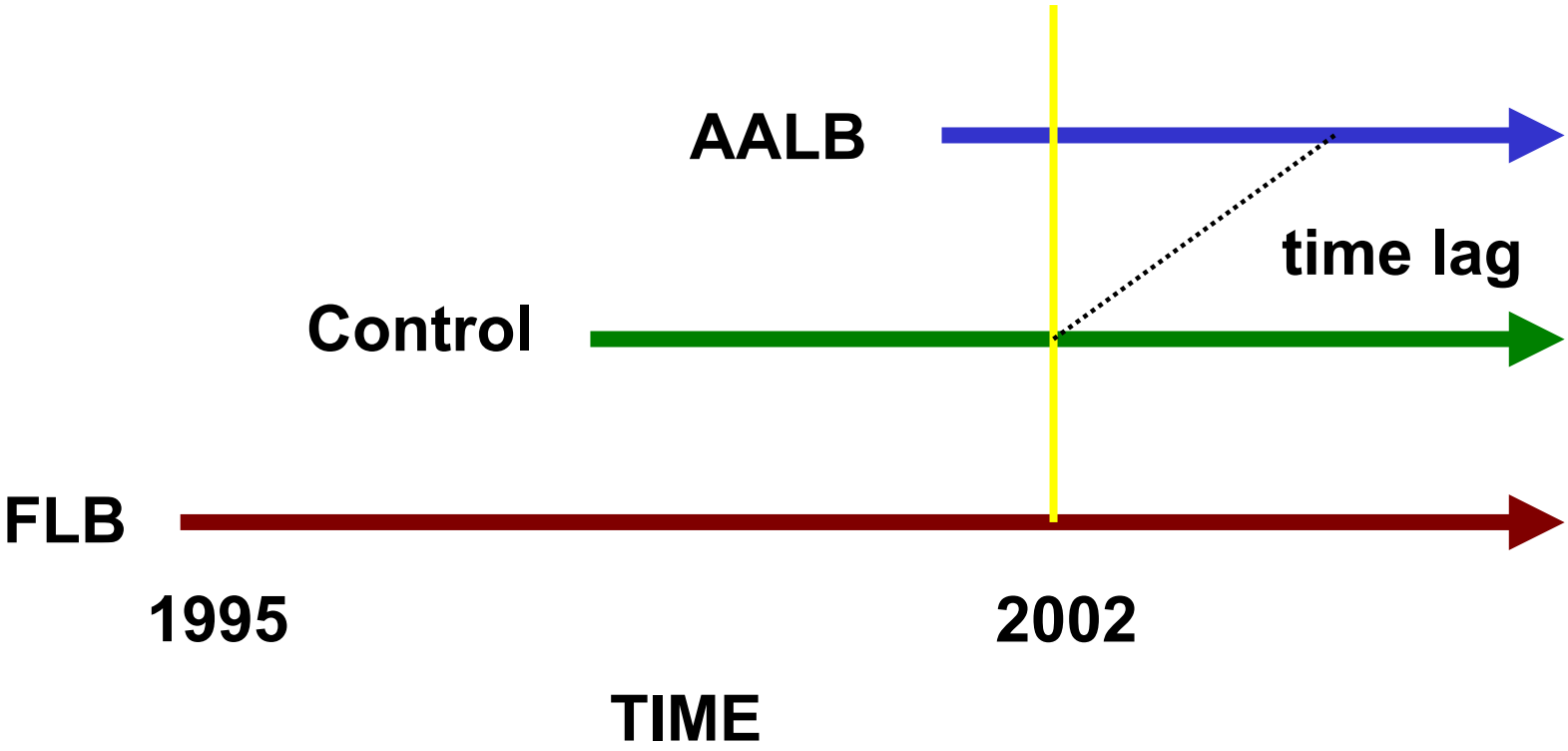
WASTE MANAGEMENT
Bioreactor Program


74B
74A
72B
CAT
320C
CAT

AALB Cross-Section



Experimental Design: Treatment-Control Comparisons

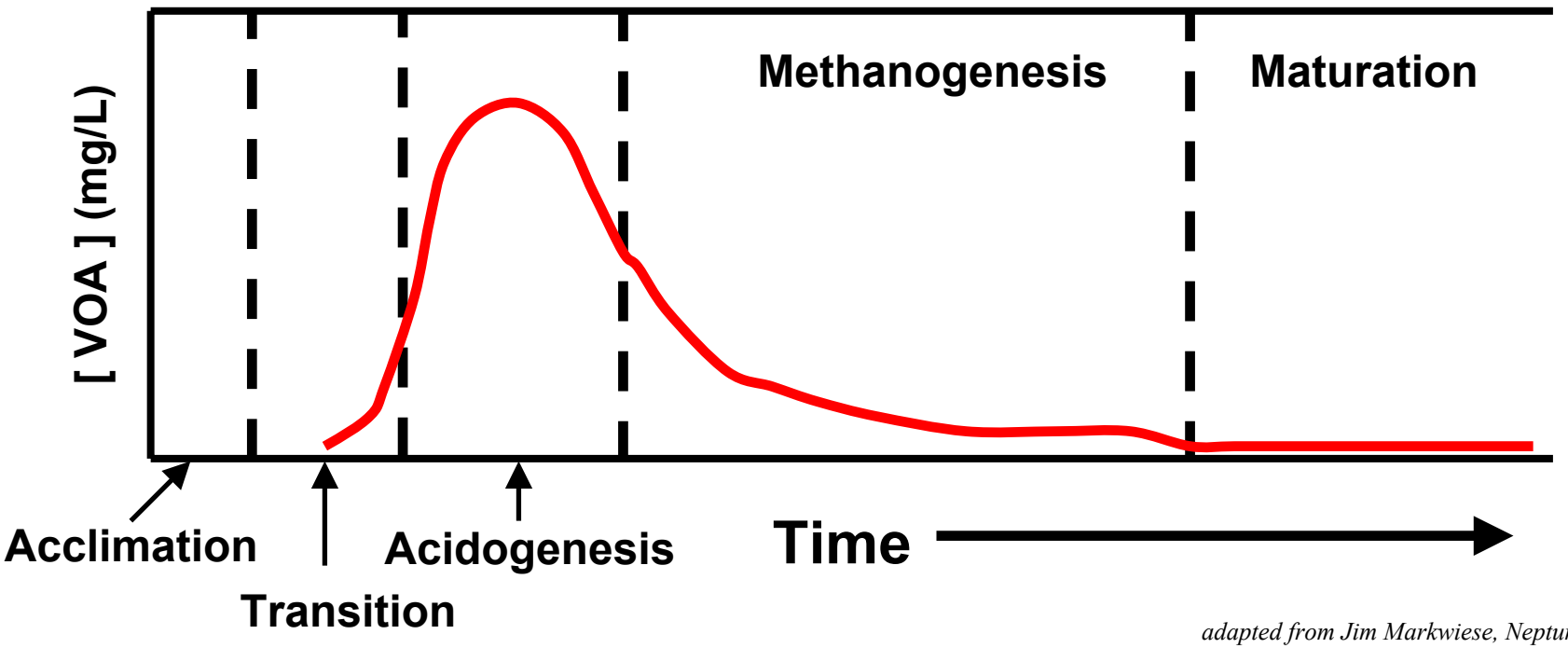


adapted from Jim Markwiese, Neptune and Co., Inc.

Critical Measures

Critical measures were selected to capture waste stabilization.

Example: Volatile Organic Acids



adapted from Jim Markwiese, Neptune and Co., Inc.

Critical Measures: Gas and Leachate

Gas

- Gas production rate, CH_4, CO_2, O_2, and balance

Leachate

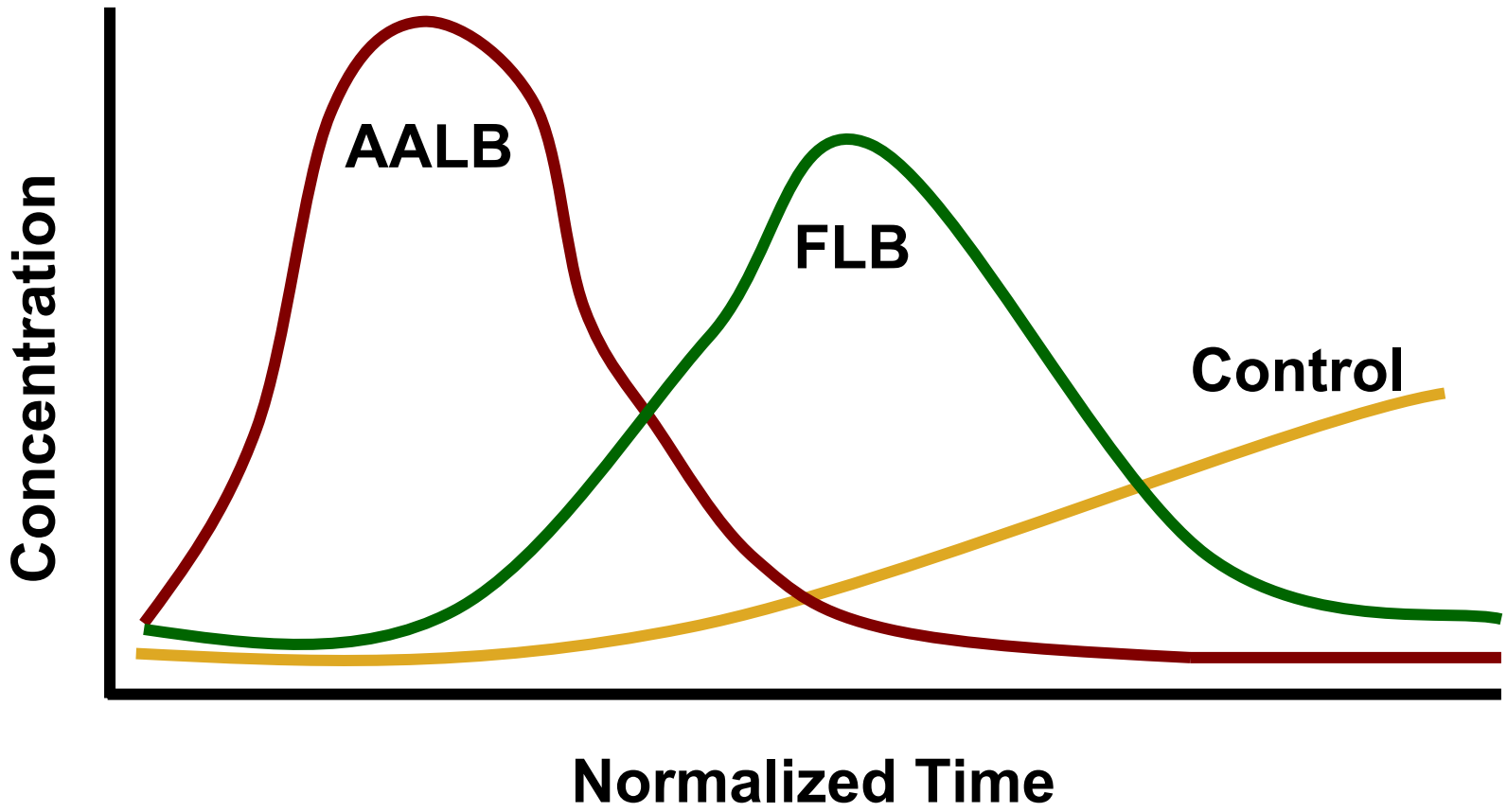
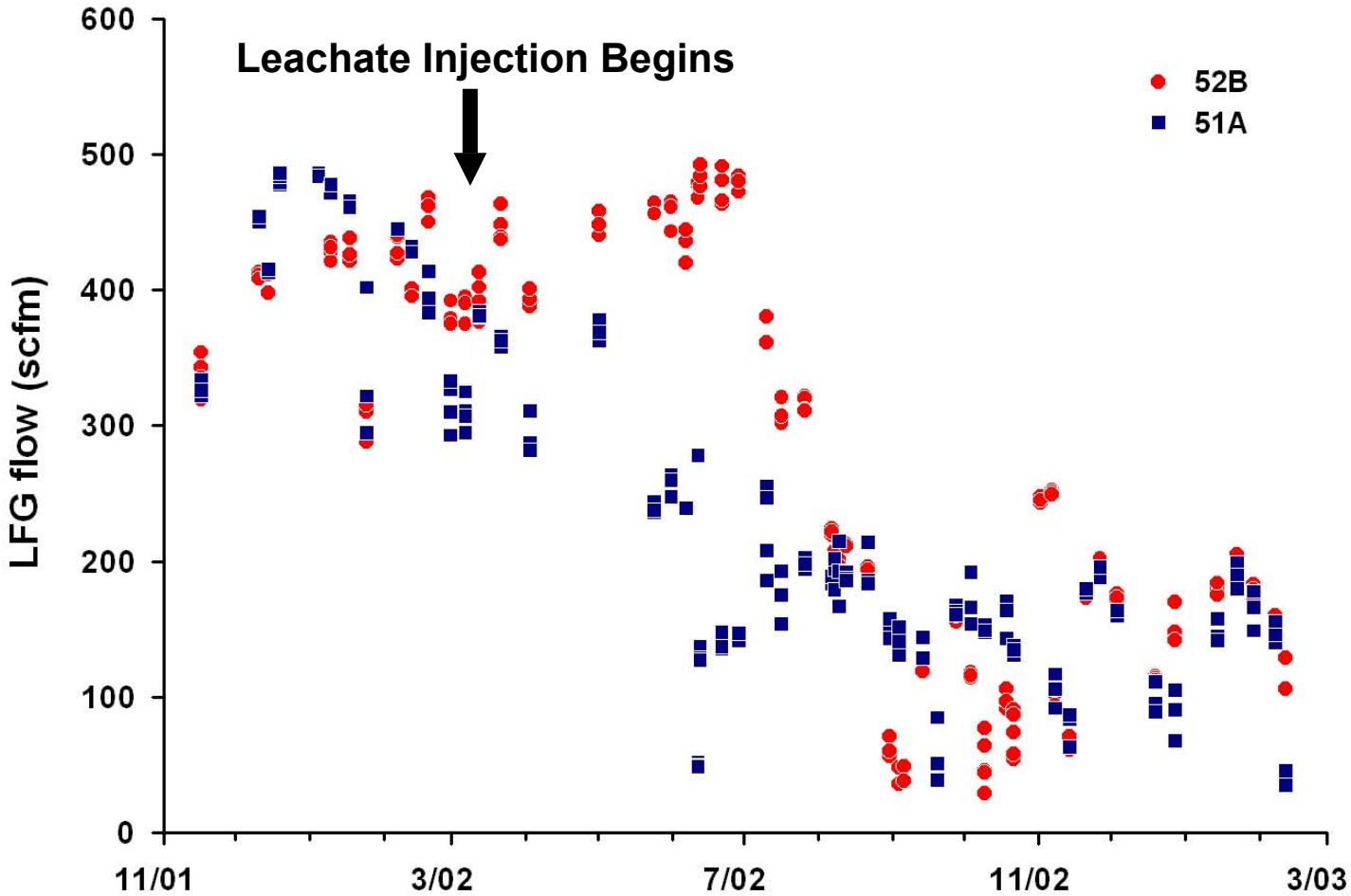
- Head on liner
- Leachate production
- COD, BOD, Temperature, pH, VOA

Critical Measures: Solids

Solid Waste

- Temperature
- Settlement
- Density
- Volatile solids, BMP, moisture content, pH

Statistical Analyses:
Visualizing Critical Measures



Unit 5 FLB Landfill Gas Flow