INTRODUCTION

- Water resource recovery facilities (WRRFs) producing Class A biosolids face growing challenges that may limit the sustainable reuse of biosolids.
- Unfortunately, many WRRFs lack the resources to apply conventional energy-intensive Class A treatment processes, or negotiate the PFPR equivalency process.
- Increased use of low-cost, low-tech (LCLT) treatment options (e.g., lagoon storage or air drying) for Class A production may be more appropriate for these WRRFs.
- However, widespread adoption of LCLT methods is currently limited by the lack of information on pathogen and indicator organism (PIO) inactivation under ambient conditions.

OBJECTIVE 1

Pilot Scale Test Beds

Test beds (4’ high, 4’ wide, and 8’ long) designed to:
1. Maintain structural integrity through freeze/thaw cycles of the biosolids.
2. Allow drainage water from the biosolids to be collected and disposed of properly.
3. Withstand ambient temperatures.

Seeding Biosolids

Biosolids typically do not have sufficient levels of helminth ova and enteric viruses to observe:
1. ≥3 log reduction of total enteric viruses
2. ≥2 log reduction of viable helminth ova
3. ≥1 log reduction of fecal coliforms

Therefore, biosolids were spiked and placed in sentinel chambers attached to sampling stacks:

STUDY SITES

- Gogebic-Iron Wastewater Authority
  (GIWA, Ironwood, MI)
  - Design Wastewater Flow: 3.4 mgd
  - 2nd Treatment: Oxidation ditch activated sludge
- Portage Lake and Water and Sewage Authority (PLWSA, Houghton, MI)
  - Design Wastewater Flow: 3.1 mgd
  - 2nd Treatment: Conventional activated sludge
- Class B Biosolids Treatment
  - Mesophilic anaerobic digestion (MAD) of 1” and 2” solids.
  - Conditioned with cationic polymer.
  - Dewatered by belt filter press (GIWA: 25% TS, PLWSA: 16% TS).
  - Stored in closed shed during winter.

OBJECTIVE 2

Methods

- Three test beds are located indoors (boxes 4, 5, and 6), and three are located outdoors (boxes 1, 2, and 3).
- Environmental Conditions
  - Davis Vantage Pro2 Plus Weather Stations used to monitor ambient conditions.
  - In situ biosolids temperature monitored using iButtons (Embedded Data Systems) in 3 ft. high biosolids pile at depths of 0.5’, 1.5’, and 2.5’ from the top.

Example Results

Environmental Conditions

- Physical/Chemical Parameters
  - Biocarbonate at (A) PWSA and (B) GIWA, and VFA (C) PWSA and (D) GIWA. Each data point represents the average of duplicate analyses.
  - pH at (A) PWSA and (B) GIWA. Each data point represents the average of duplicate analyses.
  - Ammonia at (A) PWSA and (B) GIWA. Each data point represents an individual measurement.