

**East Bay Municipal Utility District
Technological Achievement Award Application**

**Title: NEW (FIRST EVER) PSRP-EQUIVALENT ANAEROBIC DIGESTION PROCESS
INCREASES DIGESTION CAPACITY BY FIFTY PERCENT**

1. Describe Project: The U.S. Environmental Protection Agency (EPA) promulgated its “Sewage Sludge” regulations (40 Code of Federal Regulations 503) on February 19, 1993. Per these regulations, meeting the EPA’s Class B standards (as well as meeting EPA’s vector attraction reduction requirements and pollutant limits) allows wastewater treatment agencies to land apply their biosolids on agricultural fields, as long as specified site restrictions are met. In these regulations, EPA identified and defined five municipal wastewater sludge treatment processes that meet Class B pathogen standards for the resulting treated biosolids. Since 1994, East Bay Municipal Utility District (EBMUD) has land applied its biosolids and met Class B requirements by operating its anaerobic digesters according to EPA’s PSRP (Process to Significantly Reduce Pathogens) regulations, which includes maintaining a 15-day minimum mean cell residence time (MCRT) and digester temperature between 35 and 55 °C. Nonetheless, EBMUD has come close to the 15-day MCRT limit at times when digesters are down--due to construction, cleaning, and other reasons—and higher than normal sludge flows are fed to the in-service digesters.

EPA’s regulations also allow for use of PSRP-equivalent processes, other than the five listed in the regulations, that are approved by the permitting agency. Prior to approval, the proposed equivalent treatment process is highly scrutinized by U.S. EPA’s Pathogen Equivalency Committee (PEC), a group of EPA’s noted experts selected for the committee based on their demonstrated expertise. Results from EBMUD’s previous work with thermophilic anaerobic digestion studies suggested that Class B requirements could easily and consistently be met at MCRTs lower than 15 days if digester temperatures were maintained at 50 °C. The project tested a full-scale digester operated at MCRT’s between 10 and 14 days, and about 50 °C to meet EPA’s Class B and vector attraction reduction requirements. If successful,

the process would be submitted to EPA for possible PSRP-equivalent approval.

2. Time Frame: The full-scale study began in April 2008, and was completed in June 2009. EBMUD received site-specific EPA approval for their Low MCRT anaerobic digestion process on November 29, 2010.

3. Project Goals: To meet Class B standards with an MCRT less than 15 days and obtain PSRP equivalency.

4. Project Results: The EBMUD Low MCRT Process exceeded the required fecal coliform and volatile solids reductions standards, while maintaining stable operation. The Process provided over 4-log (base 10) fecal coliform reduction (Figure 2) and fecal coliform density in the digested sludge was about 3-log below the 2 million MPN/g dry TS requirement for Class B biosolids.

- Volatile solids reduction averaged 57% or higher, consistently higher than EPA's requirement of 38% or more.
- More than three times the biogas was produced with 10–15 days MCRT operation compared to baseline data. Biogas yield was also higher than that of baseline.
- The Low MCRT Process allowed a significantly higher organic loading rate than that for the baseline period as well as typically seen for municipal wastewater solids at mesophilic temperatures.

Based on the results of this study, after intensive EPA/PEC review and satisfying all PEC requirements, EBMUD's low MCRT thermophilic anaerobic digestion process was approved as a site-specific PSRP-equivalent process on November 29, 2010. **This is the first ever PSRP-equivalency process granted by EPA since the 40 CFR Part 503 rule was promulgated in 1993. EPA's approval allows EBMUD to operate its digesters down to a 10-day sludge residence time instead of the previous 15-day minimum, thus effectively increasing the digester capacity by 50%.** EBMUD estimates that the capacity increase is equivalent to 4 new 2-MG (million gallon) digesters from its existing 8 digesters that

can be operated under the PSRP-equivalent process. It could potentially save EBMUD up to \$60 million or more (4 new digesters at \$15 million each) in new digester construction that would no longer be needed.

5. Participation: All work presented in this application was performed solely by EBMUD staff.

6. Applicability to Others: This work has very broad application to all wastewater treatment plants that operate anaerobic digesters to meet 40 CFR 503 pathogen standards, and could provide other agencies with significant increases in digester capacity at no cost, if similarly successful.

7. Sustainability: The work can increase digester capacity by 50%, which could eliminate the need for constructing new digesters. The carbon footprint to build a new digester could be very large considering the production of materials needed (metal rebar, concrete, steel roof, etc.), fuel required to build a digester (workers commuting back and forth, large crane operation, concrete mixing, etc.), etc. The amount of energy needed to operate an unnecessary full-scale digester can also increase carbon footprint.

8. Award Criteria: EBMUD's project is extremely innovative (no one has previously considered obtaining a PSRP equivalency to increase treatment capacity), promotes sustainability, and has broad application in our industry (our abstract submitted to WEFTEC 2011 was ranked highest among 80 other abstracts chosen).

9. Additional Information: See PSRP-equivalency approval letter attached, and graphs below:

FIGURE 1

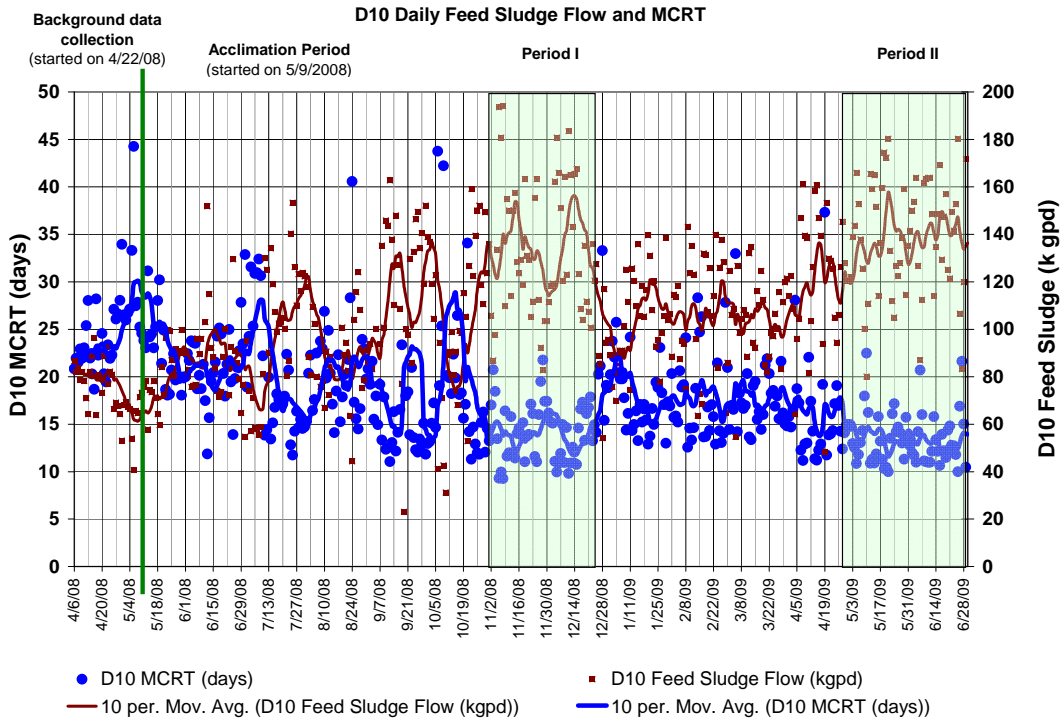


FIGURE 2

