

CAHTS (Class A Heat Treatment System), a Simple and Effective System for Generating Quality Class A Biosolids

by

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The Problem

The need to produce Class A Biosolids is driven by the environmentally conscious public, the need for energy conservation, and the need to be cost effective with public money, but current technology does not offer a reliable and cost effective approach to creating quality Class A biosolids. Class B biosolids must be land applied only for non-food-source product, buried, composted or incinerated. These resources for disposal of Class B biosolids are quickly falling under heavier regulations or becoming unavailable altogether.

Goals and Objectives

The primary goal was to develop a simple yet reliable system for creating Class A biosolids within the footprint of an existing anaerobic mesophilic process, so as to not only eliminate external requirements beyond the standard process, but also generate a monetary payback from the system. The design simply introduced a pasteurization process to occur between the primary mesophilic digester and the secondary mesophilic digester. The heat treatment was to meet the time/temperature requirements of EPA 40 CFR part 503, by utilizing the boiler to heat treat the sludge prior to the secondary mesophilic digester, so as to allow further stabilization within the digester, thus enhancing the process of volatile solids reduction while generating additional methane gas to be used to heat the boiler.

System Description

The system consists basically of a progressive cavity pump, heat exchanger, a serpentine detention vessel, and all necessary valving, sensors and programmable logic controls. The progressive cavity pump performs the primary function of metering biosolids from digester A to digester B, and is sized according to the volatile solids loading of the plant. A variable speed drive is utilized to adjust the pump volume according to current digester levels. The heat exchanger takes hot water from the boiler and heats the biosolids flow to the required time/temperature to meet EPA 40 CFR part 503 regulations. Biosolids are then sent into the serpentine detention vessel where the heat treatment process continues for the prescribed time interval before leaving the vessel as Class A biosolids and entering the secondary digester. Enhanced mesophilic digestion occurs in the secondary digester due to lysing of the cells, allowing further volatile solids reduction than previously achieved, as well as further associated methane gas production. The system was installed at the Karcher Creek WWTP in Port Orchard, WA in March of 2005.

Benefits

The benefits experienced to-date at the Karcher Creek facility are as follows:

- Reduced commercial gas bill from \$2500 per month to just the minimum connection fee of \$45 per month, since no more purchases of gas have been required.
- Less biosolids to dispose due to enhanced volatile solids destruction (lysing).
- Able to dispose of biosolids now for food related applications.
- Plant odors virtually eliminated since all of the process is internal.
- Polymer requirements for centrifugal dewatering has decreased by 10%.
- Total solids content of the dewatered Class A biosolids has increased from 21% TS to 24%TS on an average basis.
- Total cost savings realized at the Karcher Creek plant has exceeded \$100,000 per year since the system installation.

Bibliographies

John Hayes has 23 years experience as a manufacturer of pumps and mixing systems in the wastewater industry, and is a graduate Mechanical Engineer from Clemson University. John is currently the General Manager of Richmond Engineering, licensed manufacturer of the CAHTS system, in Olympia, WA.

John Poppe has 33 years wastewater experience, including 3 years as a consultant with CH2M Hill, project manager for a contract operations company and is degreed in wastewater technology. John is currently the Plant Manager at Karcher Creek WWTP in Port Orchard, WA.