

An Assessment of the Capabilities of the Munters Zeolite Rotor Concentrator to Reduce VOC and Odor Emissions from a Municipal Waste Combustion Facility

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Abstract

Maine Energy Recovery Company is a waste-to-energy facility, firing refuse-derived fuel (RDF) in two B&W boilers to produce steam which is used to generate 22MW of electricity. As part of its on-going effort to study odor generation and enhance their odor control system, Maine Energy discovered that a greater quantity of volatile organic compounds (VOC) are generated by the waste itself than had previously been estimated.

The VOCs that were found are primarily light alcohols, such as methanol, ethanol, and butanol, along with compounds such as acetone, methyl ethyl ketone (MEK), benzene, toluene, xylene, and others. These compounds are generated from the operation of diesel-fueled equipment in the facility's tipping building, and from the decomposition of the waste itself. The VOC generation also has a strong seasonal component, where generation is highest in the warmer summer weather, and lowest in the depths of winter.

In the summer of 2005, Maine Energy undertook a pilot scale study of VOC control using a proprietary concentrator technology from Munters Corporation, Zeol Division of Amesbury, Massachusetts. A scaled-down version of their rotary zeolite concentrator was employed at Maine Energy over a six week period from July to September 2005. Numerous samples were taken at the inlet and outlet of the device, and several extended tests were conducted using Fourier-Transform Infrared (FTIR) technology to search for specific organic compounds.

The results showed that the device reduced VOC, as well as odors, by approximately 85%, without the benefit of extensive fine-tuning of the device or the process during this limited run. The testing also revealed the need for extensive particulate removal at the inlet to the device, which would have a significant effect on cost efficiency.

Introduction

Maine Energy Recovery Company is a waste-to-energy facility located in Biddeford, Maine, approximately 30 minutes south of Portland, and 1.5 hours north of Boston, MA. Maine Energy receives 1100-1500 tons of municipal solid waste (MSW) per day, which it processes through several steps to produce refuse-derived fuel (RDF). The RDF is used to fire two B&W boilers, which produce steam to drive a 22 MW

turbine/generator. The facility employs 85 people, and operates 365 days a year.

The facility was opened in 1987, and is located in the heart of downtown Biddeford, in a densely populated and developed area. While the immediate neighbors are mostly commercial and industrial properties, high-density residential areas are only a short walk away.