

BIOSOLIDS COMPOSTING IN DAVENPORT, IOWA

R. Allen Boyette, P.E.,
E&A Environmental Consultants, Inc.
Cary, North Carolina

Todd Williams, P.E.
E&A Environmental Consultants, Inc.

Scott Plett
City of Davenport

ABSTRACT

The City of Davenport, Iowa constructed an aerated static pile composting facility to process 28 dry tons per day of dewatered biosolids and 25,000 cubic yards per year of yard wastes. This is the first large totally enclosed aerated static pile biosolids composting facility to be built in several years in the United States. Design of the facility was completed in March 1994, construction began in July 1994, with substantial completion of the facility in August 1995. This paper outlines the major operating systems and describes the major components of the facility.

The facility processes all of the City's anaerobically digested biosolids which is currently dewatered by belt filter presses to 20% solids. Yard wastes are used as the primary bulking agent supplemented by wood chips and shredded rubber tires to minimize O&M costs. A mechanized continuous feed mixing system consisting of hoppers, conveyors, and pugmill mixers is used to combine bulking agents with the dewatered biosolids to the desired ratio for composting. Composting and drying of these materials occurs in a totally enclosed pre-fabricated metal building for maximum environmental control and odor control. Multiple aeration stations provide both positive and negative aeration through pre-cast aeration trenches beneath compost piles. This aeration design eliminates the labor and material costs associated with using above ground perforated piping for aeration. An engineered trench cover was designed to optimize airflow and distribution beneath compost piles. A centralized temperature feedback control system monitors the composting process for optimal process performance through aeration control. After composting, material is screened and further stabilized using aerated curing prior to product marketing. Odor control at the facility for the totally enclosed mixing, composting, and drying areas is accomplished by treating offgases from these processes using state-of-the-art biofiltration. Screening, curing, and storage areas are covered but not totally enclosed.

INTRODUCTION

The City of Davenport, Iowa operates a 1.14 cubic meters per second (26 MGD) capacity secondary wastewater treatment plant which serves approximately 150,000 persons. Thickened sludge from the treatment plant is anaerobically digested prior to dewatering. The resultant biosolids are dewatered using three two-meter belt filter presses to approximately 20%TS. Historically, dewatered biosolids have been landfilled at the Scott County landfill. Increasing costs and environmental concern over this practice prompted the City to consider alternative biosolids management techniques. After a cursory evaluation of all existing management options, lime stabilization, and composting were evaluated fully. The City visited numerous operating facilities in early 1993 to gather first-hand information about operating performance, costs, and operator friendliness of these operations. It was after this evaluation that the City chose aerated static pile composting as the preferred management method. The design of this facility was initiated in May 1993 with conceptual design completed by August. Final design was begun in October 1993 and completed in March 1994. After receipt of bids and contractor selection, construction began in June 1994. Construction of the facility was completed in August 1995 and is currently composting the biosolids generated at the treatment plant.

The following sections provide a description of the facility, and overview of the major operation system, and the economics of the facility.

FACILITY DESCRIPTION

The facility utilizes aerated static pile composting technology to process dewatered biosolids from the treatment plant. The composting facility is designed to process 25.4 dry metric tons (28 dry tons) per day of 20% total solids digested biosolids cake on a five-day per week operating basis. In addition to managing biosolids, the facility is designed to manage up to 19,115 cubic meters (25,000 cubic yards)