

Power Generation and Superheater Upgrade Project at the Burnaby MSW Plant

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1. Abstract

Montenay Inc. operates a municipal solid waste (MSW) incinerator plant located in Burnaby, British Columbia. The facility operates three essentially identical boilers that were designed to generate slightly superheated steam at 248°C (478°F) and 3,140 kPa (455 psig).

The plant was originally sized to supply process steam for export to an adjacent industrial plant. The fraction of steam that was exported decreased in recent years to about 35% of the production with the remainder being condensed. This has caused Montenay Inc. to initiate a power generation project with the goal to improve the plants energy efficiency and generate additional revenues by purchasing and operating a steam turbine generator.

A superheater upgrade was required to raise the final steam temperature to a level that was suitable for use in an efficient steam turbine-generator. Jansen Combustion and Boiler Technologies Inc. (JANSEN) was contracted to perform the process and design engineering for the required boiler modifications.

The project work included defining target process conditions, deriving conceptual design options, sizing the new superheater, deciding on material selection, preparing equipment specifications, and supplying the fabrication and installation drawings.

The boiler modifications has been implemented in all three units in spring 2003. Power production will start in early summer 2003.

2. Background

The Greater Vancouver Regional District (GVRD) is a partnership of all municipalities in the Vancouver area. The GVRD owns a MSW incinerator plant located in South Burnaby, British Columbia, that is operated and maintained by Montenay Inc. (a CGEA/Onyx company). The facility burns about 17% of the district's garbage [1, 2], and produces steam that is used internally as well as exported to an adjacent industrial plant.

The facility consists of three essentially identical Babcock & Wilcox (B&W) boilers that were commissioned in 1987 (Fig. 1). The original B&W design was to process 242 metric tons/day (267 tons/day) of MSW each, and generate 36,300 kg/hr (79,900 lb/hr) of slightly superheated steam at 248°C (478°F) and 3,140 kPa (455 psig).

The units are balanced draft boilers equipped with a reciprocating grate that was supplied by Martin GmbH, Munich. The boilers consist of a two-pass water wall furnace, a two-pass evaporator or generating bank, and a small superheater in the 5th pass followed by a multi stage economizer. The cleanup equipment includes a spray cooling conditioning tower, a scrubber with carbon and lime injection, and a fabric filter.

3. Overall Project Goals

The incinerator and its boilers were originally sized and designed to supply suitable steam to an adjacent paper mill. The overall size of the plant was consistent with the ability to provide the adjacent paper mill with 100% of their required capacity, with two out of three boiler lines