

SUPERHEATER LIFE WITH STAINLESS, INCONEL, AND CARBON STEEL ALLOYS AT THE MAINE ENERGY RECOVERY COMPANY

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Abstract

The Maine Energy Recovery Company is a refuse derived fuel (RDF) waste to energy facility that began commercial operation in 1987. The facility consists of an RDF production operation, two B&W boilers (A and B Boilers) which produce a total of 210,000 lb/hr of steam at 650 psig/750°F with a design Furnace Exit Gas Temperature of 1700 °F, and a 22 MW steam turbine generator.

Since startup, the facility has suffered fireside erosion/corrosion of the waterwalls, superheater, and generator bank hot side sections.

Through the years, Maine Energy has made various operational and design changes in order to improve combustion and overall boiler availability. While combustion has improved as evidenced by improved emissions, reduced supplemental fuel usage, and lower ash production, superheater availability has suffered. At the same time reliability of the waterwall and generating bank components have improved.

This paper will present a history of Maine Energy's efforts to improve its superheater availability including a summary of the tube wastage rates for various superheater alloys, as well as Maine Energy's plans for its superheaters.

Background

The Maine Energy Recovery facility processes approximately 285,000 tons per year of MSW, producing approximately 8,000 tons per year of recyclable ferrous and nonferrous metals and about 165,000 MWhr per year of power.

Significant Historical Events

Over the years, several operational changes have taken place that may have contributed to reduced superheater life expectancy.

Fuel Mix Change

From 1987 to 1995, the fuel usage consisted of approximately 86% RDF, 9% demolition debris woodchips, and 5% natural gas/oil. During this period of time, gas or oil was used to supplement combustion during periods of poor quality fuel thereby maximizing power generation.

In 1996, the facility negotiated a new power purchase contract with the local utility which altered the economics such that it was no longer economical to pay for supplemental fuels such as woodchips or natural gas. As a result, poor quality fuel will reduce steam production. Since 1996, Maine Energy's fuel mix consists of 98% RDF and 2% natural gas.