

## Evaluation of Chloride Corrosion Reduction With Chemical Additives at Maine Energy Recovery

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### Introduction

Over the last several years it has been reported extensively in the literature that chloride induced corrosion of high temperature surfaces in Waste to Energy (WTE) boilers is one of the most costly problems in the industry. This problem can result in replacement of superheater pendants as often as annually in some units or the costly use of higher alloyed materials to either shield the metal surfaces or serve as replacement tube material. The cost-effectiveness of the replacement alloys has not been proven in many cases and therefore the industry has been looking for alternative solutions to evaluate. This paper will address the evaluation of chemical solutions to the problem and also a novel method for measurement of corrosion rates in the high temperature flue gas near WTE superheater pendants.

### Background

In February, 2005 Maine Energy Recovery Company (MERC) of Biddeford, ME and Fuel Tech Inc. of Batavia, IL entered into an agreement to evaluate a corrosion measurement tool and select chemical corrosion inhibitors at MERC's Biddeford facility. The Biddeford facility consists of two 300 ton/day WTE units burning refuse derived fuel (RDF) that have experienced a long term problem with chloride induced corrosion that has led to increased replacement costs over the last several years for the superheaters in these units. A more complete history of MERC's problems and previously evaluated solutions can be found in Ken Robbins paper delivered at NAWTEC 2004. In this paper, Ken detailed their attempts to use shielding, alternate metallurgies, and various sootblowing strategies to mitigate the corrosion found in the unit. Ken also detailed their experience with Fuel Tech Inc.'s chemical Slag Control program over the last several years and their conclusion that this program did help control slag and minimize cleaning outages, but had no discernable effect on the corrosion problems they had experienced.

The corrosion problem at MERC currently can be described as isolated to about 5% of the superheater pendant surfaces which experience corrosion rates ranging from 0.020 to 0.050 inches per month and that this results in tube failures

as early as 7 months into a run and the need for replacement of the entire pendant annually. A photo of a recently removed tube with a failure is shown in Figure 1. The pattern of metal loss is illustrated in Figure 2 where severe metal loss is shown on opposite sides of the tube. An observation of the plant is that this thinning which is on the sides tangential to flue gas flow occurs on opposing tubes and these tubes show similar metal loss.

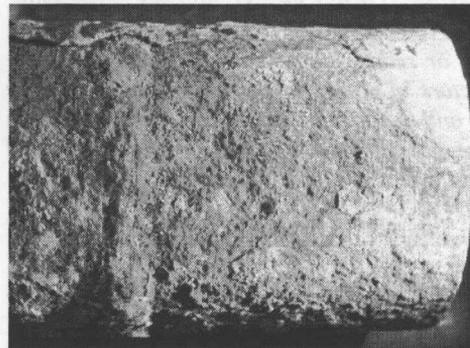


FIGURE 1 - Close-up of rough, wasted surface covered with friable corrosion product layers.

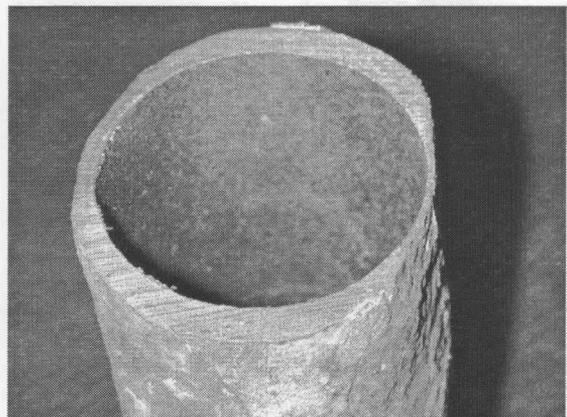


FIGURE 2 - Deep, general metal loss along opposite sides