

Optimizing Boiler Generating Bank Tube Reliability Through the use of IRIS Non Destructive Testing

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Abstract

The boilers' generating bank (convective) section began suffering repeated random failures at the Miami-Dade County Resources Recovery Facility. The plant embarked on an optimization program to better identify and target the failures using non destructive ultrasonic Internal Rotary Inspection Services (IRIS) testing.

Through the use of the IRIS non-destructive testing method, the plant was able to identify 3 major contributors to tube failures by mapping out the locations of the tube wastage across all 4 boilers at the facility. The testing allowed optimizing the use of resources allocated to this area of the boiler and resulted in a considerable drop of unscheduled downtime and increase in generating bank tube reliability.

The IRIS testing method involves an ultrasonic probe that is lowered down the inside of the tubes. The tubes are flooded with water in order to get a full 360-degree thickness survey of the tubes from top to bottom, (steam drum to mud drum). The data for over 4.7 miles (7.5

Km) of linear tube per boiler is recorded digitally and presented on a CD.

By pinpointing the location and severity of tube wastage across the entire generating bank section, the root cause of the failures could be identified. An integrated solution was developed involving a combination of tube replacements, shielding, tube plugging, and soot blower optimization.

This paper summarizes the results of the testing and optimization program.

Background

The Miami-Dade County Resources Recovery Facility is 4,200 tons (3,810 tonnes) per day combined waste to energy and waste processing plant. The plant services the greater Miami – Dade County Florida area by processing approximately one third of the 3.5 million tons (3.2 million tonnes) of waste generated.

The 40-acre (16.2 hectares) site began operations in 1979 and has been retrofitted three times. The first retrofit