WASTE TO ENERGY PLANT ENGINEERED SOLUTIONS

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ABSTRACT

This paper has been prepared to encourage communication between plant operators who have developed "in plant' solutions to various problems encountered in waste-to-energy plants. Solutions presented include reciprocating grate designs, dry ash chute designs, ash water reuse clarification system, ash extractor level controls, easy access doors, and water clarification systems. Each problem is presented with solution(s) for each of the problems. A contact is provided for each solution for additional information.

I. RECIPROCATING GRATE MODIFICATIONS

PROBLEM: Our Detroit Stoker reciprocating grate carriages were frequently stalling due to aluminum slag and ash building up on the rails which prevented movement of the wheels. We also had numerous failures of the wheels on the carriages.

SOLUTION #1: The basic idea of this modification (Figure 1 and 2) was to reverse the wheel on rail design so that the rail (an upside down channel) protected the wheels from buildup of ash and aluminum slag. We also moved the drive cylinders to the outside of the stoker siftings hoppers away from the high heat areas, moved the shaft bearings outside of the unit, and used a very strong drive beam for moving the carriages. Since installing this design on two units, there has been no forced outages, no stalls, and no maintenance requirements on these sections.

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SOLUTION #2: The design in Solution #1 could not be easily installed in our first and second section grates due to significant displacement of equipment that would have been required The solution (Figure 3 and 4) developed was to use the reversal of the wheel on rail modification with internal high temperature carbon bearings supporting shafts inside the units. These have worked successfully to date.

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II. WATER FILTER ROLLOFFS

PROBLEM: Water is used to quench our bottom ash and to wash down various areas of the plant. Because this water comes in contact with the ash, it must be collected and treated before metered discharge to the city sewer system. This resulted in substantial costs to operation.

SOLUTION: While installing our air pollution retrofit, we needed to furnish a water supply to the scrubber for dilution water, water for the ash ram extractors for cooling, and to the fly ash pug mill. We also realized that our high sewer costs would go higher after the retrofit was completed if we could not eliminate the water discharge. At the same time, the ash landfill operator notified us that we could no longer bring liquid sludge to the landfill that we had been removing from the settling basin of the ash water system. We experimented with plate filters, cyclones, and various other methods to remove the solids and get them in a dry form. None of these proved to be both efficient and economical. We noticed an advertisement in a magazine for a filtration rolloff that had been used in the oil drilling industry. With significant doubts about the chances for success, we rented one box for a trial. The trial was so successful that we have purchased two of the rolloffs. The rolloff box is basically a standard rolloff container with filtering media installed inside. We add a small amount of polymer flocculent to assist in clarification. The water pumped into the box is a very heavy ash laden water. The box settles out the particulate material and returns a clear reusable water. The settled particulate is allowed to dewater and the rolloff hauled to the landfill for disposal. By