

Improving Plant Operations

Retrofit of Waste-to-Energy Stoker Controls to Improve Combustion and Availability

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ABSTRACT

This paper discusses the retrofit of the stoker grate hydraulic system and controls at Montenay's Montgomery County Pennsylvania Waste-to Energy Facility. Since commencing operations in 1991, the stoker grate system was plagued with operational disruptions caused by fusion of its moving grates. The existing hydraulic system was designed to control the movement of waste on the grate sections by maintaining constant velocity stoker grate movement and varying the length of time the grates were dormant between cycles of grate movement. The purpose of the retrofit was to improve grate operations by replacing the existing hydraulic system with a system capable of providing continuous stoker movement at variable velocities, eliminating the dormant cycle of the grate movement.

Background

Montenay Energy Resources of Montgomery County operates a modern mass-burn waste-to-energy facility located in Pennsylvania. The Facility was constructed in 1991 with two 608 ton per day boilers manufactured by Steinmuller, GmbH..

The Steinmuller design incorporates 10 independently controlled, stoker type, moving grates which control the rate of flow and combustion of municipal solid waste. The original stoker grate control system utilized a series of fixed displacement pump-sets that moved the individual grate hydraulic cylinders at a constant rate of speed. The movement of waste was controlled by varying a standby timer at the end of each grate stroke (**Table 1**). This control resulted in an inconsistent movement of fuel in the furnace. This type of control also caused the grate sections to remain dormant for standby periods up to 5 min., which in turn caused the grates to become susceptible to fusing in place due to weldments (**Fig. 1**). Weldments frequently occurred when small quantities of iron-core material, such as the steel belt in a tire, were exposed to excessive temperatures resulting from the combustion of high heating value waste. The iron material would melt and fuse/embed to the surface of the grate casting, thus obstructing the movement of the opposing bar. A small weldment of approximately ½ in. in diameter was capable of seizing a grate section 10 ft. by 10 ft. in size, which would force a shutdown of the affected boiler.