

Case History

Detroit® Stoker Retrofit at Massachusetts Renewable Energy Plant Reduces Downtime and Maintenance costs for Fitchburg Power Station



Tractebel Power, Inc. owns and operates the Fitchburg Power Station located in Westminster, Massachusetts. Commissioned in 1992, the facility burns wood-waste and methane to produce 17 MWe net capacity that is delivered to Fitchburg Gas and Electric. The plant, which is the only renewable biomass facility in the State, provides an environmentally sophisticated and economically sound way of producing electrical energy. The facility burns virgin forest tree chips derived locally from forest management and land clearing operations, recycled pallet wood, community brush, and landfill gas generated from the city of Fitchburg's landfill that would otherwise be flared into the atmosphere.

The unit was originally equipped with a traveling grate stoker designed to fire the boiler at 170,000-lb./hr. steam at 1250 psig operating at 955°F. Stoker reliability had become a problem causing unplanned outages for repair of

seals, chains, grate bars and grate clips. In addition to expensive maintenance and repair, down time frequency and lost electrical revenue were unacceptable to the plant's managers.

In search of a solution, plant personnel visited three Northeast facilities where Detroit water-cooled Hydrograte® stokers are in operation. The excellent operating experience at these plants, including one with over ten years of operating history, convinced management to make the boiler retrofit incorporating a Detroit Hydrograte for the Fitchburg plant. The schedule was fast-tracked commencing on 3/2/99, with the modular stoker being shipped complete on 9/17/99. The modular design supported a 14-day outage coincident to the plants annual scheduled maintenance outage.



**The Detroit Hydrograte® Stoker
is an advanced spreader stoker
that features automatic ash dis-
charge and water-cooled grates.**



Detroit Stoker Company



Upon completion, favorable operating results were immediate. The Hydrograte[®] improved airflow and the unit was able to operate at lower excess air. This resulted in combustion efficiency improvements and optimum emission control. These improvements in operating stability and emission control resulted in fewer CO excursions. The load following characteristics of the boiler were improved as the Hydrograte[®]'s design lends itself to rapid load response. The stoker combines advanced spreader stoker technology with automatic ash discharge. Its unique design handles a variety of

high moisture, low ash fuels over a broad range of steaming capacities. Since the stoker is water-cooled, its firing can be based on combustion conditions rather than cooling air requirements. Water-cooling also makes it possible to maintain higher combustion air temperatures necessary for burning high-moisture biomass fuels without damage to the grates.

Another unique retrofit design at this plant is the utilization of landfill gas burned in a 60mm Btu/hr. auxiliary burner. The waste gas is a less expensive opportunity fuel and provides staged combustion co-firing that also contributes to lower emissions. Together, along with the stoker retrofit, the boiler operates substantially below Massachusetts regulations for emissions and the original installed SNCR system is relegated to standby mode which results in additional savings for the Fitchburg Power Station.

After one year of operation, the Fitchburg Power Station unit has had 100% availability. There have been no operating drawbacks. Steam pressure control has leveled and the MWe output has been constant.

"The stoker maintenance costs have decreased to zero, resulting in substantial savings for the plant. The return on investment/payback is quite good and easily justified this retrofit investment. The plant is expected to save hundreds of man hours per year and allowed a full-time maintenance position to remain unfilled for almost a year."

**Fitchburg Power Station Plant
Manager, Jonathan Clapp**

*For more information on Detroit Hydrograte[®]
Stokers, contact Detroit Stoker Company at
1-800-Stoker4 or visit our web site at
www.detroitstoker.com*



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