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Low Load Burner Operation Study – August 2010 – Texas

Nooter/Eriksen Aftermarket Services was approached by a newly commissioned combined cycle plant to investigate alternate modes of operation related to duct burner firing. The goal was to improve the response time to plant MW load change demands. Firing the duct burner at less than full load would allow the combustion turbine (CT) to quickly ramp up to accommodate increased demand.

The plant was comprised of **Nooter/Eriksen** HRSGs behind General Electric 7FA combustion turbines (CT). Initially, the HRSG specification included no thermal design cases with duct burner firing at part CT load cases. Since the ability to change load quickly provided a commercial benefit to the plant, the plant requested an engineering study to determine what level of duct burner firing could be achieved at part CT loads. The purpose of the engineering study was to evaluate the HRSG design and components in order to determine the maximum amount of firing possible at partial CT loads with no physical changes to the HRSG.

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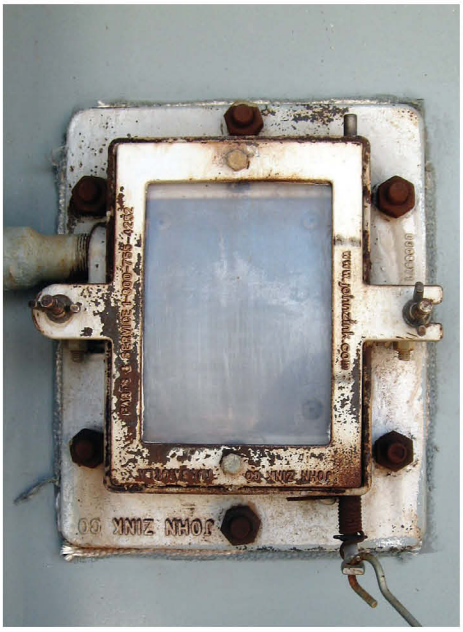

Part load combustion turbine data was used in conjunction with estimated balance of plant performance to evaluate the HRSG's performance at several part load cases. The duct burner firing rate was adjusted on all of the part load cases until the maximum amount of firing was determined for each without violating any of the original design constraints. Once the maximum amount of firing was determined at these cases, maximum firing curves and firing permissive curves were created for use with the DCS.

After the initial engineering was completed, site testing was performed in order to verify proper unit reaction to the part load firing and to monitor flame length to ensure no flame impingement on the tubes downstream of the burner elements. Site testing confirmed that supplemental firing limitations were required in some part load cases and that the firing basis needed to be adjusted to fall within actual plant operation. After site testing was completed and the firing rates had been verified, a report was created and given to the customer including the final firing and permissive curves.

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