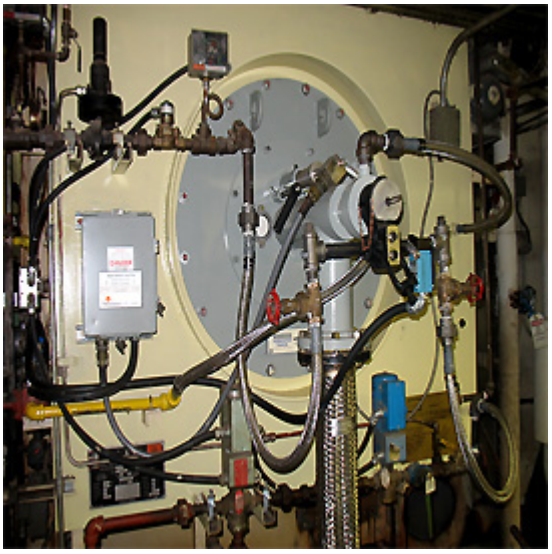
London District Energy

Project: NOx Reduction through the use of Low NOx Burners

Challenge: London District Energy (LDE), a central heating plant located in London, Ontario and has 3 boilers providing steam to the downtown core of London. The plant was restricted on steam output due to a total plant NOx discharge limit. LDE is the oldest district heating plant in North America. The current burners in the boilers were designed for low NOx using Flue Gas Recirculation (FGR); however, they were not capable of reaching the new limit required by the plant.

As well, due to the FGR, the plant had lost approximately 17% of steam load capacity, necessitating the rental of an auxiliary boiler. This project was triggered by the plant's installation of a 15 MW co-generation facility, the requirement to reduce total plant NOx levels to 30 ppm per boiler, which is below the Ontario limit of 49.6 ppm, and to restore boiler capacity.



Solution: Arctic Combustion was approached to provide a solution. Several items were discovered during the investigation that would affect the application. These included the use of hot flue gas for the FGR and air flow concerns through the Windbox and burner. Arctic Combustion, after evaluating different burner solutions, recommended a total solution covering combustion air flow and a new low NOx burner capable of 30 ppm or less using FGR.

The burners are also required to operate on natural gas and fuel oil. Arctic Combustion used Hamworthy Peabody as the source for the new burner, guarantying a NOx level of 30 ppm. As well, Hamworthy Peabody was able to provide an air flow study to determine the air flow pattern through the windbox and the effect on the burner flame pattern.

The results of the air flow study indicated that baffle plates installed in the Windbox would provide the correct air flow and produce a stable, proper flame pattern. A new FD fan was also recommended to meet the needs of the new burner. These recommendations were accepted by LDE and the project was given the go ahead.

Client Quote (Bob MacLean): Arctic Combustion met the challenges of the burner installation with a well-defined, systematic approach. Not only was a new burner installed, but the old FD fan was replaced. The installation challenges were significant as space was at a premium. The installation was carried out without disruption to the operation of the other boilers, allowing LDE to meet their customer's needs. Following the installation of the new burners, Arctic Combustion completed tuning the burner and conducted load test, measuring NOx levels and boiler output.

Boiler load was restored to 100% of design, restoring the lost 17% of capacity. During testing, the boiler NOx level was recorded at full, restored load as being 28 ppm, bettering the guarantee of 30 ppm. The baffles plates and burner produced a very stable flame pattern and any boiler rumble heard before had been virtually eliminated. Not only was the plant able to meet the NOx limit moving forward with the co-gen project, but the restored capacity meant the plant did not have to install an auxiliary boiler to meet commitments during the heating season.

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