Airflow Sciences Corporation

SCR Tuning

Case Study

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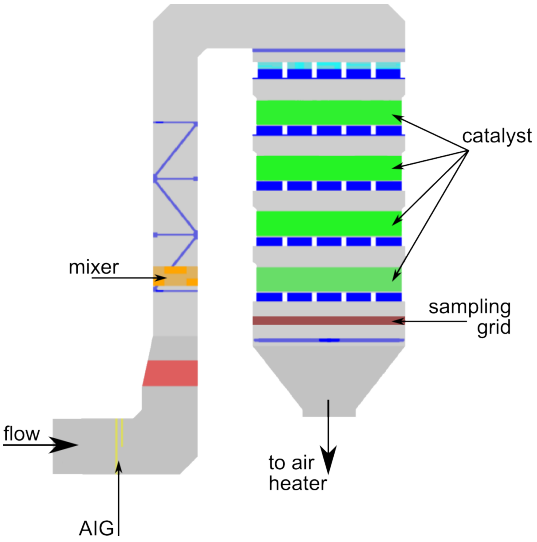

Figure 1 – SCR schematic

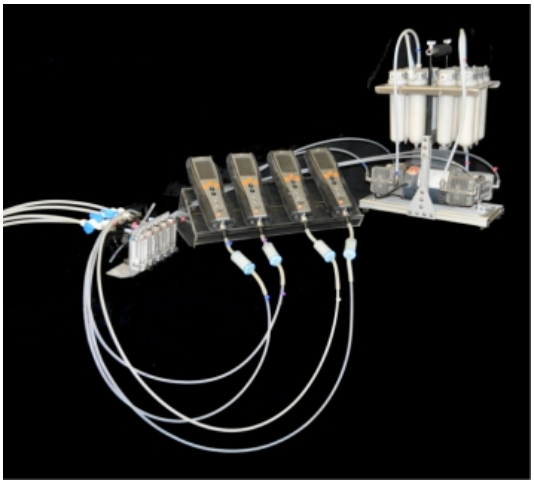

Figure 2 – DENOX Testing Kit

Improperly tuned SCR systems can prove costly to utilities both in excessive ammonia consumption as well as in increased maintenance costs. As a poorly operating SCR increases ammonia flow to achieve the necessary de-NO_x rate, excess ammonia is blown through portions of the catalyst, while other areas struggle to receive enough for proper conversion. The excess NH_3 blown through the fully-reacted regions then passes out of the SCR as ammonia slip, costing the plant in wasted ammonia and fouling the air heater and other downstream equipment. For these reasons, an annual SCR tuning program is critical to overall plant efficiency.

Airflow Sciences measures the SCR performance by utilizing the ASE DENOX Testing Kit (Figure 2). This mobile kit contains all gas analyzers, conditioners, pumps, and tubing to quickly and easily integrate with the existing SCR gas sampling grid. The heart of the system is a ruggedized computer with custom software for analyzing and visualizing the NO_x profile in the SCR. Tuning is accomplished by manipulating the valves at the ammonia injection grid (AIG) header to change the relative amount of ammonia that is provided to each section of the SCR reactor.

The plots (Figure 3) demonstrate the "as found" and "as left" NO_x profiles for a recent tuning project. The red areas show regions of very high local NO_x concentration while the dark blue areas show very low levels of NO_x, which correspond to areas of ammonia slip. It can be seen that through careful manipulation of the AIG, the NO_x uniformity was improved significantly, from an RMS of 41% to an RMS of 13%, minimizing both the total ammonia required to meet the de-NO_x goals as well as the amount of ammonia slip.

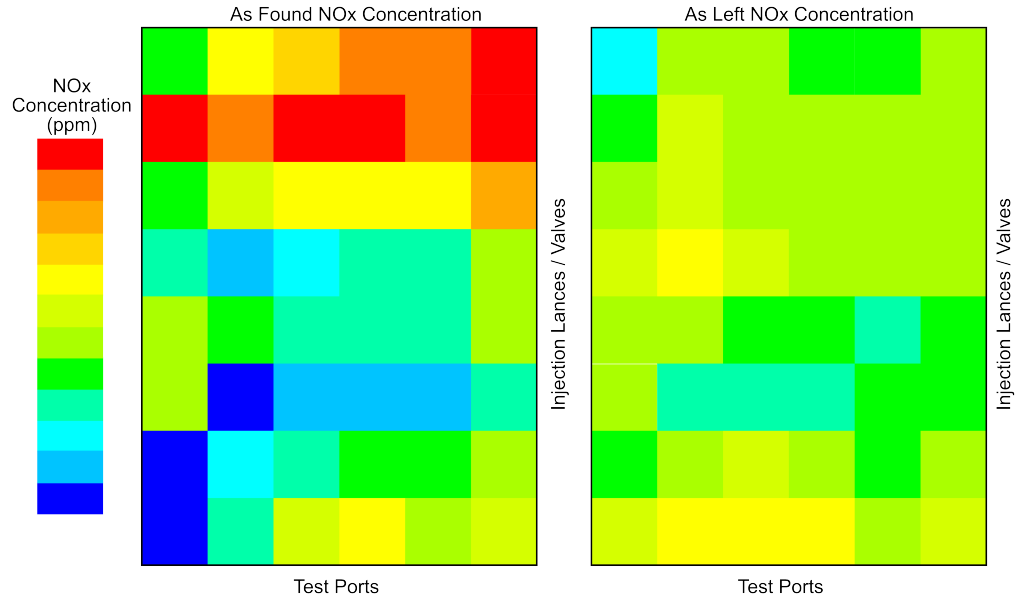

Figure 3 – Test results show a more uniform NO_x profile at the SCR outlet after tuning.

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