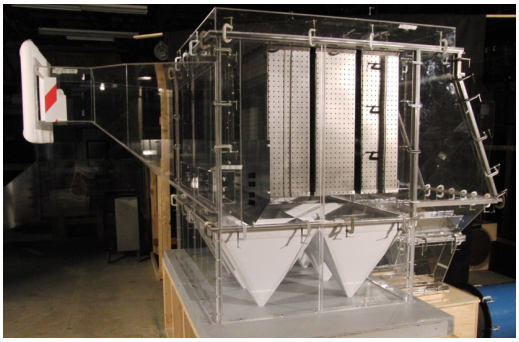
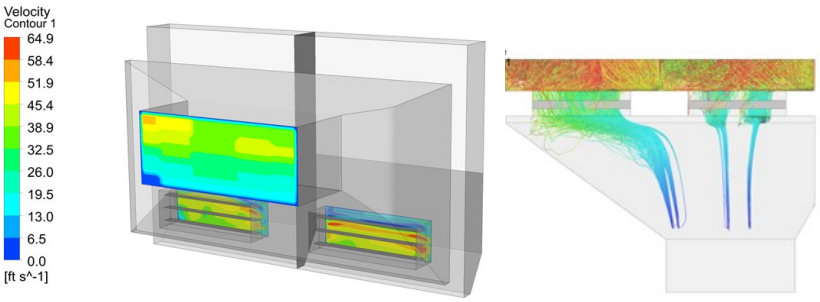
Electrostatic Precipitator to Baghouse Conversion





Project Summary

ALDEN used CFD and scaled physical modeling to evaluate the particulate collection performance of the planned ESP to PJFF conversion by simulating the gas and particulate flow distributions through the collection systems, and designed an injection grid for the PAC to balance the distribution to each compartment to optimize mercury removal.

Plant

City Utilities of Springfield
John Twitty Energy Center
5100 W Farm Rd 164
Springfield, MO 65807

Year

2013

Project Overview

John Twitty Energy Center is a coal fired station owned by City Utilities of Springfield MO. The existing electrostatic precipitator (ESP), which removes flyash particulate entrained in the flue gas stream, is planned for conversion to a pulse jet fabric filter system (PJFF). They are also installing a powder activated carbon (PAC) injection system for mercury capture. The approach of this study was to optimize the particulate collection efficiency by improving the gas flow splits and velocity distributions to the new PJFF compartments, and to design a PAC injection grid to supply even PAC to each compartment to optimize mercury removal.

Work Performed

Alden developed computational fluid dynamic (CFD) and scaled physical models of the planned PJFF system. The models used velocity inlet profiles based on field data to provide better accuracy of the simulations. Modifications to the ductwork and PJFF compartment inlets were made to improve the gas flow and particulate distributions entering the compartments. The CFD model was also used to design and optimize the PAC injection grid while the physical model evaluated the potential for dust deposition in the system. The results of the study provided flow controls and a PAC injection grid design to balance the gas and particulate distributions to each compartment, which is necessary to optimize particulate collection efficiency and mercury removal.

Project Highlights

- ALDEN used both CFD and scaled physical modeling to simulate various performance characteristics of the system, using each modeling technique where it was best suited
- ALDEN's approach streamlined the modeling process, reducing both cost and time to achieve an optimized design solution
- ALDEN designed a cost-effective design for both the PJFF and the PAC injection systems

FOR MORE INFORMATION,

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