CO Boiler Economizer Coil – CFD Study of Tube Failure Analysis

A CO boiler was originally designed and built in 1985 to generate super heated steam at 685°F / 700 psig. The CO boiler is equipped with the following heater recovery sections a) super heater b) evaporator and c) economizer.

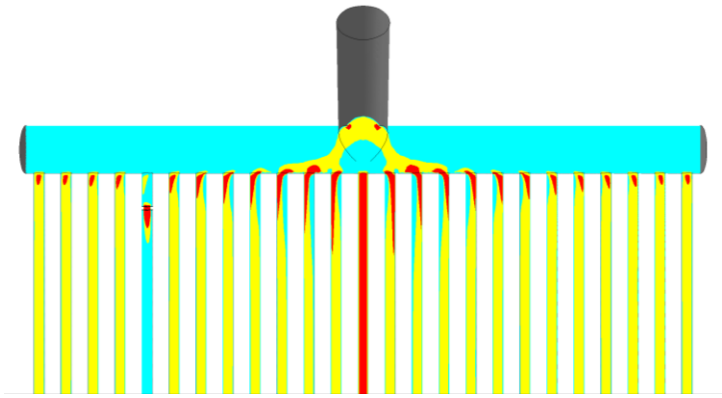
The client was experiencing tube failure in the economizer section of the boiler. Furnace Improvements (FIS) was contracted to solve the flow maldistribution problem.

Computational fluid dynamics (CFD) was used to investigate the problem and to redesign the economizer coil. The inlet manifold, which was more prone to flow maldistribution, was analyzed using CFD.

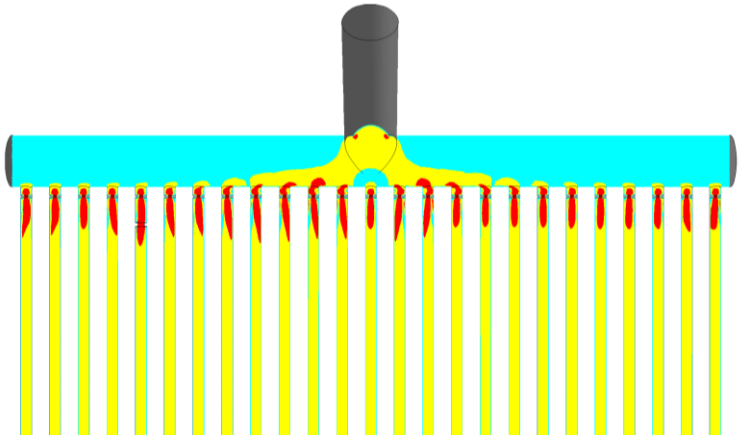
FIS proposed a new design to counter maldistribution and the proposed new design was also analyzed by CFD. The following observations were made for the existing and the proposed designs:

- Maldistribution existed in the old configuration. The center tube received the maximum economizer water.
- FIS proposed modifications to the economizer coil. The predicted results using CFD show that even with simulated steaming, the flow maldistribution in the proposed setup is only around ±1.5%.

Case Studies (FIS-243)



Contours of Velocity in Old Setup



Contours of Velocity in Proposed Setup