



### Filtering Feed Water Reduces Boiler Tube Failures

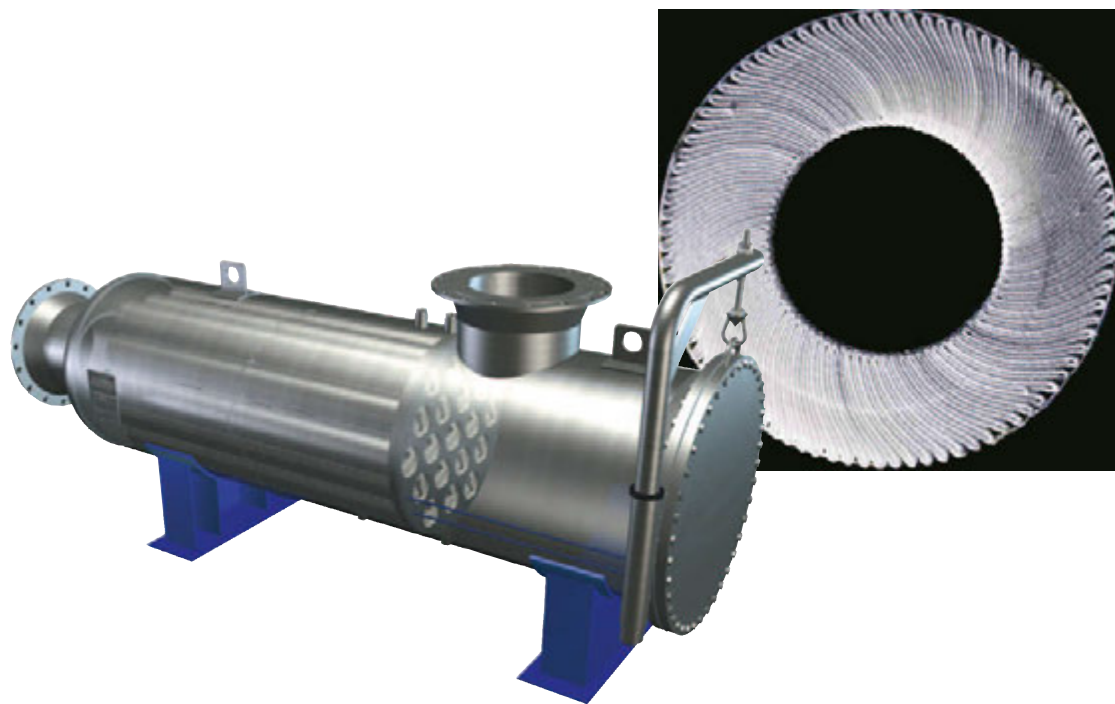
#### The Problem

During the 1990s, one unit of a two-unit drum type power plant in Colorado began suffering increased boiler water- wall tube failures due to hydrogen damage and under deposit corrosion from iron and copper components in the system. Under deposit corrosion is caused by concentrated contaminants building up on the boiler tube surface and eventually corroding and weakening the tube. This in turn results in large gouges, thinning of the tube, and eventual failure which can cause unplanned plant outages.

In 1996 the unit experienced ten tube failures. The ten unscheduled outages resulted in twenty days of lost generation revenue plus the expenses to repair the failed tubes. The station estimated total lost revenue of \$3.5 million in 1996.

A systematic investigation of all parameters contributing to the tube failures was initiated. The results of the investigation identified condenser and economizer makeup to the boiler as the primary source of metallic contaminants contributing to under deposit corrosion.

The greatest amount of particulate metal oxide is transported to the boiler during unit startup. By reducing the metal transport to the boiler, the committee expected to reduce deposits, and subsequently reduce boiler related forced outages.



Pall Ultipleat® High Flow (UHF) filters control iron, silica, and copper in a small footprint designed for partial to full-flow filtration (up to 30,000 GPM).

## The Solution

Pall Corporation supplied an Ultipleat High Flow filtration system to remove metals and other particulate from the water before they can be transported to the boiler during startup.

The solution was an assembly consisting of a 38" diameter filter housing containing 19 Ultipleat High Flow filter cartridges. The system filters 100% of startup flow and provides  $\beta_6=5,000$  removal efficiency for particulates 6 microns and larger. High efficiency filtration is the key for the near total elimination of metal transport to the boiler.

Based on the success the plant had with the Pall Ultipleat High Flow installation, the plant installed an identical system in its other unit.

## The Benefits

- No forced outages caused by boiler water wall tube failures since March of 2001
- Reduced boiler blow down
- Faster return to the grid after scheduled outages
- Increase in revenue generation for the plant
- Minimized copper deposition on turbine blades
- Reduced operating cost of makeup water system
- Reduced phosphate hideout, resulting in decreased chemical treatment costs



## Power Generation

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