

# Boiler Maintenance and Upgrades

## Attacking Tube Failures

BY DOUGLAS J. SMITH IENG, SENIOR EDITOR

**R**EDUCING BOILER DOWNTIME — PARTICULARLY FROM TUBE FAILURES — DEMANDS CONSTANT VIGILANCE.

**B**oiler tube failures, especially in coal-fired power plants, continue to be the major cause of boiler forced outages. However, if a tube leak is detected early more severe damage to surrounding tubes and tube banks can be prevented. Common methods for determining tube leaks in their early stage are on-line acoustic monitoring and off-line non-destructive testing. Software is also available for documenting and analyzing the problem of premature tube leaks.

### TRACKING AND DOCUMENTING TUBE LEAKS

In many cases records of boiler tube leaks and how they were rectified are kept at individual plants and not always shared with other plants in a utility's fleet. As a result, individual plants tend to only analyze the root cause of the tube leaks at their particular plant. Unfortunately, where electric utilities have no standard procedures for analyzing, trending and reviewing prior maintenance, they cannot generate integrated reports showing the history of failures and repairs carried out on multiple boilers.

To tackle this problem Automation Technology, Inc. (ATI), San Jose, CA. has developed a boiler tube failure software program called "Aware Boiler Module." The program enables plant engineers and a utility's central engineering group to constantly monitor and analyze boiler tube leaks at all of a utility's power plants. A common database for all of the plants is accessible from any web browser within the utility's intranet. There is no need to install the software on individual plant computers.

Standard tube failure and inspection reports are provided for all of the boiler pressure parts. The data includes a record of all tube failures and repairs, ultrasonic test readings, their location and cause of the failure. According to ATI, the benefits from installing the boiler software program include:

- A 50% reduction in forced outages caused by tube failures
- A reduction in the time to manually analyze and search for data
- A 50% reduction in the time to write reports
- Less time spent justifying repairs and replacements to upper management
- The potential to save \$5,000/plant/year in the cost of collecting historical data for condition assessment studies.

A graphical interface can be used to superimpose the data on component specific AutoCAD drawings. The graphical display tends to give a better perspective of boiler tube failures. Figure 4 is a typical superheater tube failure screen.

Dominion Generation has installed the web-based Aware software and graphical interface in its corporate office. Access to the program through the company's intranet is available to all of their power plants. According to the utility all forced outages due to boiler tube failures that occur in their plants are now documented in the system. The ability to centralize boiler tube problems throughout their fleet has allowed the utility to streamline and standardize boiler tube failure internal reporting and analysis from one central location.

Onsite and central office boiler engineers can also share information on boiler tube failures for all the utility's boilers. Using this information the engineers are able to trend tube failures for boilers of the same design and with the same operating conditions. Results from analyzing the data are also used by Dominion to determine the scope of work for outage planning and management.

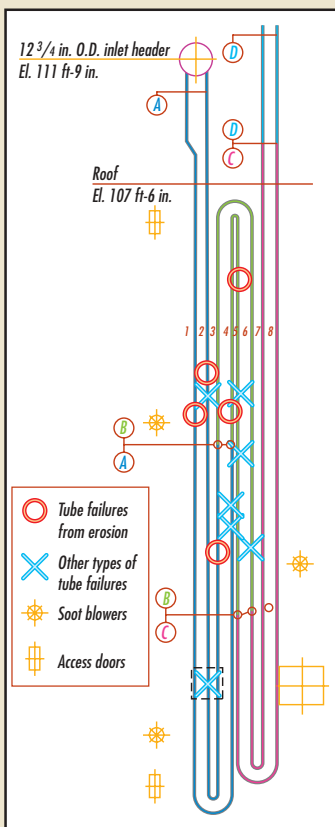
According to Frank Timmons, boiler engineer, Dominion Generation, the graphical interface has been used to develop CAD drawings showing dimensions, tube counts and elevations. This information is passed on to the outage planner who is then able to have a

## BOILERS

replacement panel or pendant loop pre-fabricated.

Another advantage of the program is for budgeting. There is no longer the need to make assumptions. It is now possible to prepare, recommend and justify maintenance requirements and expenses to upper management, says Timmons.

**FIGURE 4**  
**TYPICAL SUPERHEATER**  
**TUBE FAILURE SCREEN**



Note: Colored lines represent different tube materials and/or dimensions.

Source: Automation Technology, Inc.

Each Dominion plant has a boiler tube failure coordinator who is responsible for identifying the tube failure and inputting all of the data into the historical database. This individual also makes sure the plant is in compliance with all ASME and National Board code requirements.

Utilizing this program Dominion anticipates reducing forced outages by at least one per year while improving the reliability of electricity supply during the summer peak months. Long term, Timmons believes that the program will allow Dominion to reduce downtime and maintenance costs. **PE**

# Tube failures got you down?



▶ Record ▶ Analyze ▶ Plan  
... and increase pressure part reliability

The AWARE Boiler Module provides a web-based environment to record, view, analyze, and report tube failures, inspections, and UT measurements for a single boiler or across an entire fleet of boilers. Failures and measurements are displayed on plant specific interactive drawings, which combine with the powerful reporting and trending capabilities to help increase your boiler reliability. Along with the AWARE Boiler Module, other available equipment modules can be added including pulverizers, high energy piping, environmental systems, steam turbines and gas turbines.

**AWARE™**

**The most widely used software for tracking tube failures, boiler inspections, and general boiler conditions.**

**ati** automation technology, inc.

2001 Gateway Place, Suite 100, San Jose CA 95110

AWARE Boiler Module jointly developed by Alstom Power and Automation Technology, Inc.

**We're Hiring**

For more information call 408.350.7020  
sales@atinet.com www.equiphealth.com