Superheater Floor Tube Failures

Technical Service Bulletin

Purpose

This bulletin advises owners and operators of UP boilers to inspect for cracks in tube panel membranes and tubes located near the junction between boiler sidewalls and the pendant superheater floor.

Problem

Cracking has been found in the floor membrane near the boiler sidewalls. Figure 1 shows the general area where cracking has occurred. The construction of the floor-to-wall connection at the floor tube bends is relatively stiff. Therefore, the locations between the sidewall tubes and the superheater floor are the most prone to membrane cracking (shown in Figure 2). During rapid unit start-up and shutdown (see PSB-20), the thermal gradients generate sufficient stresses to form cracks in the floor membrane near the sidewalls, and high stresses in the side walltubes. These cracks can propagate into the tube wall, resulting in leaks.

Recommendations

Closely examine the floor tubes and membrane near the floor-to-wall junction for cracks. If membrane cracking is found, repair or replace the membrane. If cracking has propagated into the tube metal, replace the affected tube(s). The floor tube membrane should be slotted at the location shown on Figure 3 for a distance of approximately four feet centered on the tube bend (see Figure 2, Locations 1 and 2). All slots should start and

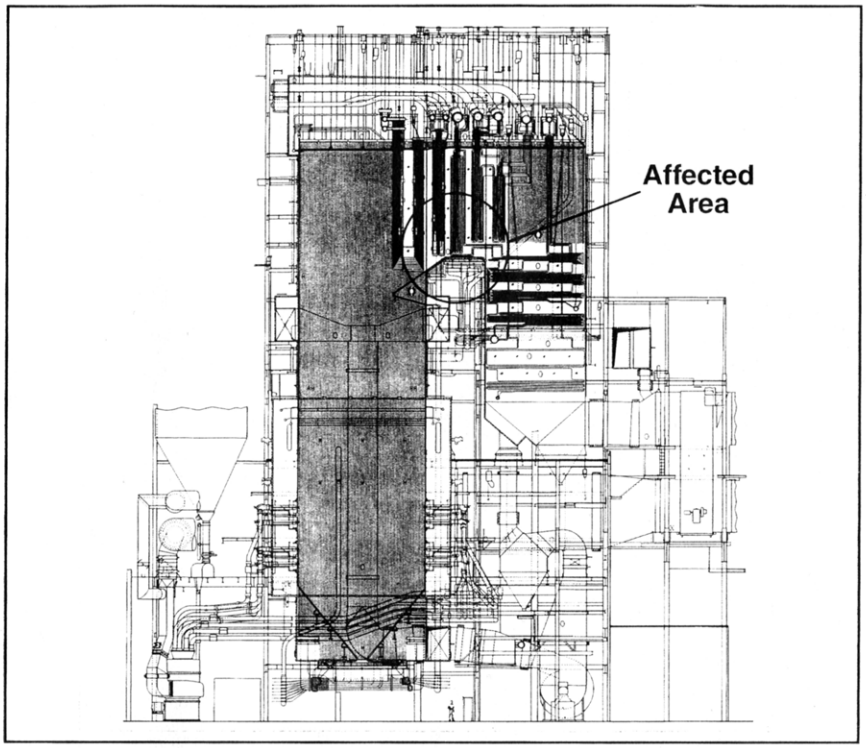

Figure 1 *Area affected by superheater floor tube cracking and failures.*

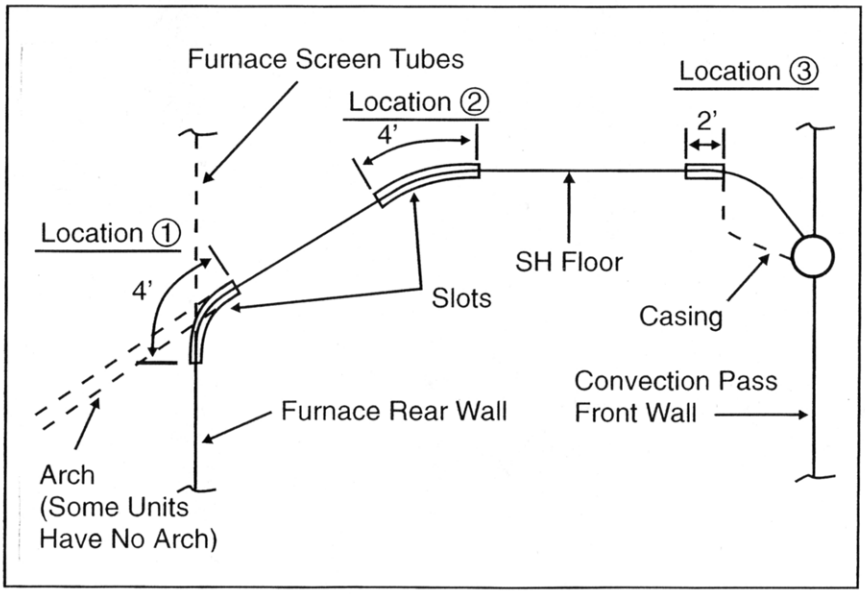

Figure 2 *Stiff construction locations are prone to membrane cracking.*

(Continued on reverse side)

stop in 1/4" diameter drilled holes. At Location 3 in Figure 2, the membrane should only be slotted toward the furnace from the bend, since the floor is not attached to the sidewalls in the cased areas near the convection pass intermediate header. In accordance with Figure 3, install a gas-tight seal over the slots using 10- or 12-gauge carbon steel plate and filler bars. This modification increases the flexibility of the connection at the tube bends. It also provides more flexibility between the superheater floor and pendant side walls, which lowers the stress when temperature gradients occur during startups and shutdowns.

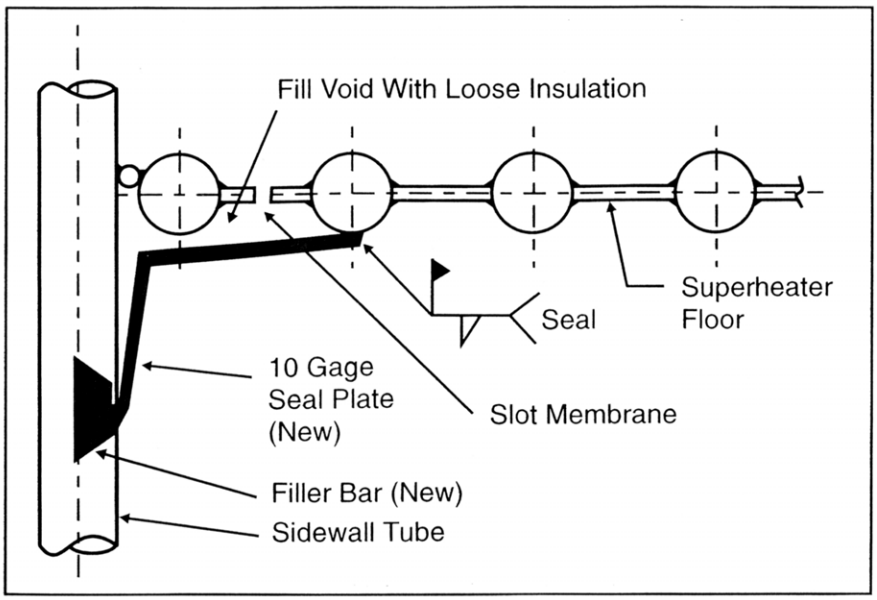

Figure 3 *Installation of a gas-tight seal over the slots increases the flexibility of the connection.*

Support

Contact B&W Field Service Engineering through your local District Service Office to assist with the inspection and modifications. A Field Service Engineer can assist in reviewing your operational practices to determine if temperature gradients during startup and shutdown need to be reduced. If required, modified operating procedures can be developed to extend component life and reduce maintenance.

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