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To: David Lew, Wayne Schmidt
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Subject: Denting

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The following words were taken from NUREG/CR-6365 which borrowed them from an EPRI report:

What causes denting?

Answer:

Chlorides in the secondary side feed water resulting from condenser leaks or other chemistry excursions are concentrated by local boiling in the tube to tube support plate crevice. The chlorides result in an acidic environment, which causes rapid corrosion of the carbon steel support plate when sufficient oxygen is present (e.g., from oxygen in-leakage), forming a non-protective magnetite corrosion product more than twice the volume of the original base metal. Growth of the corrosion product is linear with time because it is non-protective and it gradually fills the annulus. Subsequent growth constricts the tube and can cause deformation of the support plate. The primary factors influencing corrosion rate are the degree of superheat in the crevice and bulk water chloride and oxygen concentration. Copper oxide or ions may also play an important role as a supplier of oxygen to the carbon steel support plates.

CC: Edmund Sullivan

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