

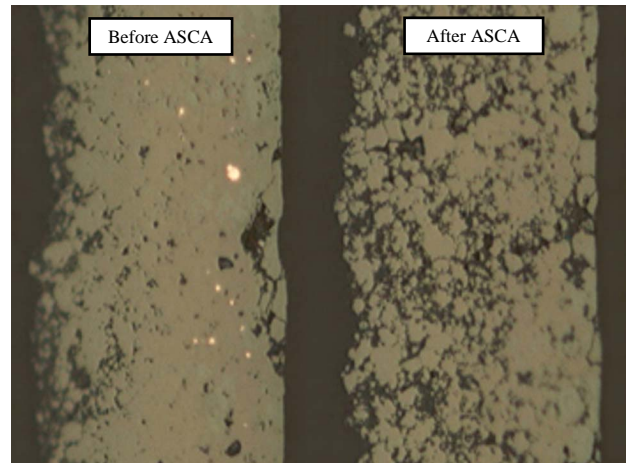
## ASCA Steam Generator Chemical Treatment

### Background

During normal operation of a PWR, impurities accumulate in the secondary side of the steam generators (SGs), leading to tube damage and decreased heat transfer efficiency, among other performance and integrity issues. As discussed in EPRI 3002005090, chemical and hydraulic cleaning are commonly used to remove SG deposits. While generally effective, these processes are time consuming, expensive to implement, and require careful planning to manage corrosion and waste streams.

### Description

ASCA is a “soft” or simplified chemical cleaning process that facilitates many of the same benefits as traditional chemical cleaning, but with much lower cost, complexity and schedule impact. ASCA treatments result in partial removal and structural modification of SG deposits, leading to significant recovery in heat transfer efficiency and reductions in tube support plate blockages, with minimal corrosion, waste or environmental impact. Compared to more aggressive maintenance techniques and SG replacement, periodic ASCA treatments provide a very cost effective way to maintain the performance and integrity of SGs over their operating life.



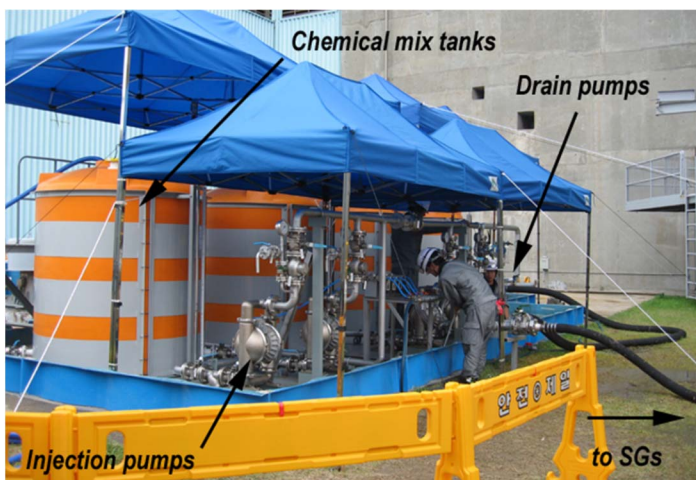
Heat transfer enhancement of SG tube scale

### Features and Benefits

- Typically applied in parallel with forced oxidation at the start of a refueling outage, with little or no critical path schedule impact
- Enhances heat transfer properties of SG tube scale, achieving a steam pressure recovery of up to 15 psi (1 bar)
- Significantly reduces blockage of tube support plate flow passages
- Successful in arresting high cycle fatigue failures and level oscillations at several units
- Typically removes 1000-2000 lbs (450-900 kg) of deposits per SG
- Removes harmful deposit species such as copper

### Industry Experience

- Successfully applied at more than 50 PWRs worldwide, with no corrosion, waste or environmental issues
- Cost-effective approach for maintaining SG performance and integrity over the operating life of the SGs



ASCA equipment setup