

Steam Generator Chemical Cleaning

Background

The accumulation of deposits in the secondary side of pressurized water reactor steam generators (SGs) increases the potential for thermal performance degradation, water level oscillations, as well as accelerated tube degradation. As these deposits harden and form crevices, they can cause conditions that can lead to tube corrosion or operational concerns. There are a number of different mechanical and chemical cleaning methods available to remove SG deposits. One of these methods, steam generator chemical cleaning (SGCC), involves the introduction of chemicals to dissolve deposits. SGCC is best suited for plants with significant deposit accumulation (an estimated 3,000 pounds or more per SG). Westinghouse offers a variety of SGCC methods.



Example of chemical cleaning setup

Description

In the early 1980s, Westinghouse participated in an Electric Power Research Institute (EPRI) project to develop a solvent and application method to remove iron oxide and copper corrosion products without compromising SG integrity. The resulting EPRI/Steam Generator Owners Group (SGOG) process has been used to perform successful SGCC in the United States and worldwide. Westinghouse can provide a wide variety of SGCC cleaning processes that meet the utilities' specific needs. These methods include a low-temperature process combined with pressure pulsing and a high-pressure process with or without venting. SGCC processes are applied using Westinghouse-designed dedicated external equipment, which meets all cleaning application needs for heating, pumping, chemical analysis, chemical batching, process control and ion exchange. Westinghouse offers three EPRI/SGOG-approved solvents:

- Magnetite solvent for iron oxide removal (EDTA-based)
- Copper solvent for copper metal removing (EDTA,-EDA,-H₂O₂-based)
- Crevice cleaning solvent for removing deposits in tube support plates crevices (EDTA-based)

These performance-proven solvents and field-demonstrated equipment are used by experienced Westinghouse personnel to provide customer-specific SGCC processes to meet and exceed the desired outcome.

Benefits

Performance of an SGCC process provides several benefits to the plant:

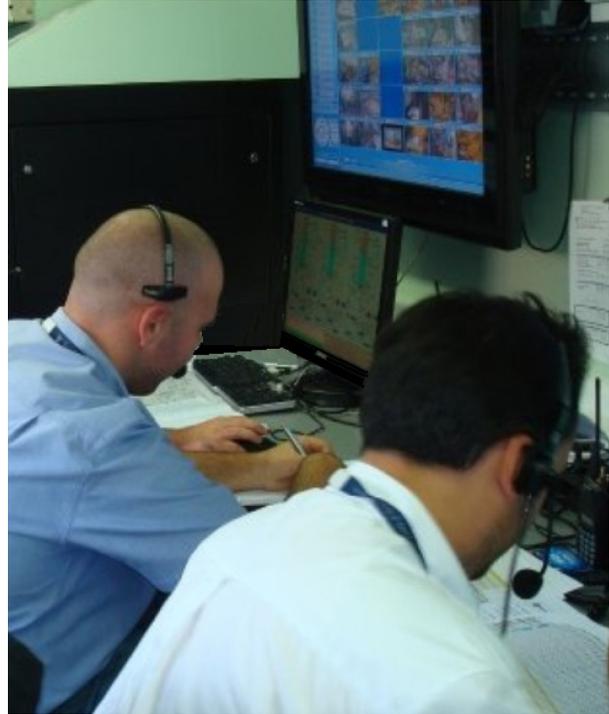
- Removes large amounts of deposits from the SG without excessive corrosion of surface materials
- Helps extend SG operation
- Helps prevent plant capacity loss
- Enhances steam generator and plant performance
- Helps prevent costly steam generator replacement
- Can be customized to meet plant-specific needs

There are also several benefits of utilizing the Westinghouse equipment, processes and personnel:

- Westinghouse has state of the art equipment to perform SGCC operations
- Westinghouse personnel have a great deal of experience performing SGCC projects in the United States and worldwide
- Online, real-time chemistry and corrosion monitoring allows for tight control of chemical process
- Process monitoring and operational systems allow for dynamic and solid control of the operating system

Experience

Westinghouse's field experience includes more than 30 successful chemical cleanings worldwide.



Westinghouse SGCC control room



Westinghouse SGCC equipment

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