

Consolidated Deposit Extraction Technology

Background

Available cleaning technologies such as steam generator chemical cleaning (SGCC) and advanced scale conditioning agents (ASCA) are effective in removing bulk steam generator (SG) secondary side deposits (e.g., tube scale). This is achieved via dissolution of magnetite (Fe_3O_4), copper (Cu) and other primary deposit constituents.

However, these technologies are not wholly effective in removing consolidated top of tubesheet (TTS) deposits or “collars.” This is primarily due to lack of effectiveness in dissolving “binding species” such as those containing aluminum (Al) and silicon (Si). Consolidated deposit extraction (CODE) technology was developed through extensive laboratory testing in order to address this need.

Description

CODE is a chemical treatment technology that effectively targets and dissolves “binding species” such as Al and Si from SG deposits. CODE can be applied:

- As a stand-alone process
- After SGCC has been applied in order to remove primary deposit constituents such as Fe_3O_4 , Cu, etc.
- As periodic maintenance with ASCA solutions in order to promote removal of both primary deposit constituents (Fe_3O_4 , Cu, etc.) and binding species (Al, Si, etc.)

Actual Plant TTS Collar



Before exposure to simulated SGCC process



After exposure to simulated SGCC process*

* Accessible Fe_3O_4 , Cu, etc. removed, but AlOOH / SiO_2 “skeleton” remains

Benefits

- Significant advancement in binding-species removal relative to available cleaning technologies
- Removal of 50 to 90 percent of binding species achieved in CODE testing with plant TTS collars
- Essentially non-corrosive to SG materials
- Easily applied using simple equipment and easily integrated with other outage activities, including other SG cleaning processes
- No special safety, flammability, toxicity, environmental or waste disposal considerations
- Adaptable to individual plant needs
- Low-cost chemical treatment



Typical inside TTS ASCA/CODE equipment setup



Typical outside TTS ASCA/CODE equipment setup

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