

# Flow-Accelerated Corrosion (FAC) in Conventional Plants

## Overview

Flow-accelerated corrosion (FAC) is a major safety issue in the feedwater system of every fossil plant. A successful approach to minimizing FAC damage requires a comprehensive corporate/plant supported program consisting of an ongoing assessment, inspection and component replacement, and cycle chemistry optimization. It requires an individual unit assessment at every plant because of the unique materials, cycle chemistry monitoring and control, flow/temperature regimes, and operating characteristics. It also requires a multi-disciplinary approach that provides clear direction to all the disciplines. Are you confident as a manager, engineer or chemist or chemical engineer, metallurgist, or FAC program manager that your FAC program is rugged enough to avoid having a serious failure in a high energy line?

## Cycle chemistry

- SI will evaluate the cycle chemistry program for consistency with feedwater heater metallurgy and appraise both oxidizing and reducing treatments. SI will review the online instrumentation to ensure it is in agreement with the current chemical treatment program.

## SI's Level 1 FAC Program Assessment

- SI will use an experienced based analysis to predict susceptible locations that can be confirmed with level two techniques such as pulsed eddy current, digital radiography or guided wave.

## Screening Level 2 Inspection

- Use pulsed eddy current (PEC) to evaluate susceptible locations while the unit is in service and insulation removal is not required.

## Inspection Level 3 Thickness

- Determination of pipe thickness to calculate metal loss typically using ultrasonic testing (UT).

## Remaining Life

- Estimation of average wear rate and comparison of thickness to applicable standards for minimum wall. Calculate remaining life using average wear rate and allowable minimum pipe thickness.

## SI Services

- Development of a comprehensive FAC program which will provide safety to plant personnel.
- FAC program assessment to evaluate the management program to ensure it covers all the aspects necessary for a successful approach.
- FAC damage screening using pulsed eddy current and pipe thickness measurements using ultrasonic testing.



- Provide an on-site piping assessment which will include a review of the heat balance, review of system metallurgy and areas identified on previous assessments with previous damage, comprehensive walkdown of the feedwater system, review of the cycle chemistry including FAC benchmarking, chemical treatment program and instrumentation, color of key components (deaerator, boiler feed pumps, and feedwater heater shell/tubesheet), and review of previous inspections and damage/failure reports.
- A written report will document the findings including prioritizing susceptible single and two-phase locations using an experienced based approach for FAC and recommendations to improve the chemistry program and minimize transport of iron and copper to the boiler.
- Evaluating remaining life and replacement recommendations based on applicable standards for minimum wall thickness.
- Laboratory analysis for failed or damaged pressure part, piping, or component for the presence of FAC. Alloy analysis to determine chromium content in carbon steel components.
- Technical training and FAC workshops at the corporate and/or plant level.

## SI Publications on FAC

*Flow-Accelerated Corrosion in Fossil and Combined Cycle/HRSG Plants*

<http://www.structint.com/FACReview.pdf>

*Flow-Accelerated Corrosion (FAC) in Conventional Fossil Units: Cycle Chemistry Influences & Management Approach*

<http://www.structint.com/FACExperience.pdf>

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