Maximum Allowable Gasket Seating Surface Degradation

Overview
Westinghouse applies a conservative approach when evaluating degradation on a gasket seating surface, because Westinghouse does not have any quantitative data to support a more realistic evaluation. The team was tasked with collecting this data to determine when degradation endangers the pressure seal.

Objectives
The team’s objectives were to determine the maximum degradation which the gasket seating surface can withstand before the pressure seal between the hand hole cover and steam generator fails. This degradation was limited to two specific cases.

- Pitting, which is a type of degradation associated with corrosion
- Scratching, which is a type of degradation associated with maintenance error

Approach
- The team developed customer needs for the project.
- The team separated into design and test subgroups to do parallel work.
- The design team developed a testing apparatus to simulate power plant conditions
- The design team analyzed the structural integrity of its design.
- The test team developed methods to simulate degradation on the gasket seating surface.
- The test team wrote a plan to optimize the number of conditions which could be tested.
- The team constructed the design team’s testing apparatus.
- Baseline control tests were conducted on the testing apparatus to ensure accuracy
- Simulated pitting was incrementally added to the surface and tested until failure was reached.
- The testing apparatus was repaired to a degradation free state.
- Simulated scratching was incrementally added to the surface and tested until failure was reached.
- The team documented all tests and drew conclusions based on the results.

Outcomes
- The team’s test results provide conclusive evidence that Westinghouse’s maintenance routines are conservative.
- The sponsor will likely be able to extend the time between repairs and reduce downtime in nuclear power plants.
- Cost savings on the order of $1,000,000 per instance of lifetime extension.
- Evaluation occurs at every plant at least once every 18 months