

Steam Generator Asset Management Program

Background

Westinghouse offers the Steam Generator Asset Management Program (SGAMP) to help improve the performance and reliability of steam generators by working with customers in Steam Generator Management Teams (SGMT).

Description

The Steam Generator Asset Management Program focuses on plant-specific conditions; therefore, it is applicable to the original or the replacement steam generators. We recommend that the utility and Westinghouse form a combined SGMT to develop, monitor and implement a long-term plan to address steam generator operation, maintenance and life-extension efforts. The SGMT will consist of representatives from maintenance, operations, field services, chemistry, and engineering, and will be responsible for making decisions related to the steam generators.

Benefits

The charter of the SGMT is to:

- Develop a steam generator strategic plan that will cost-effectively manage steam generator options. This plan is a living document and is revised periodically to incorporate inspection results, new technology developments, lessons learned and industry experience.
- Develop a detailed near-term plan for the next three outages (fuel cycles) that is consistent with the strategic, long-term plan.
- Perform technical assessments and proactive planning to optimize steam generator performance and reliability in the short and long term as follows:

- Perform cost-benefit analyses of actions to prolong steam generator operability through steam generator performance modeling (tube degradation, fouling, etc.), diagnostic tools, regulatory strategy, condition monitoring and operational assessment strategy, and maintenance strategy.
- Develop techniques and determine frequency for secondary-side inspection and cleaning strategy to minimize cost and maximize performance.
- Evaluate steam generator replacement strategies such as timing and cost-effectiveness, if appropriate.
- Plan proactive steam generator outage, including contingency planning.
- Monitor steam generator parameters including chemistry, leakage, steam pressure, etc.
- Recommend changes to operational or plant conditions in order to optimize steam generator performance and electric power output.
- Integrate industry operating experience to optimize and improve the steam generator program.
- Apply information on technical developments and licensing issues as well as their impact on the steam generator program.

Deliverables

The SGMT will prepare a steam generator program in accordance with NEI 97-06, Steam Generator Program Guidelines. The program will be supplemented with a strategic plan to meet steam generator performance and reliability goals, including those pertaining to developing a steam generator maintenance plan for the life of

the unit. The SGMAT will provide input regarding potential maintenance of the steam generators with schedule and cost impacts for each outage. It will also recommend engineering tasks to be performed in support of program goals and will develop short- and long-term recommendations. These recommendations will address action plans, performance measures and results.

Experience

The following are examples of past experience:

- Developed and periodically updated the steam generator strategic plan leading to optimum steam generator replacement timing. The structured process resulted in prompt decision making and implementation, thereby saving \$9 million (present value).
- Performed a cost-benefit evaluation for a proposed steam generator modification to alleviate tube degradation. Implemented the decision to reject the modification, resulting in a cost saving of over \$3 million.
- Implemented a Westinghouse proprietary crack-sizing method that resulted in the operational assessment supporting full-cycle operation of a plant. This could not be justified using the standard Electric Power Research Institute examination technique specification sheet-sizing methodology. Preventing the mid-cycle outage was worth over \$12 million.
- Evaluated and approved a fast cool-down transient for the steam generator ahead of a planned outage, saving 12 hours of critical path time during the outage.
- Performed engineering evaluations and prepared a drawing package showing machining tolerances of the pads and covers of steam generator penetrations. This was used in the subsequent outage to support machining several secondary side flanges, thereby expediting engineering justification and minimizing outage impact.
- Reviewed eddy current data from prior inspections for all steam generator tubes in operation for a plant using Westinghouse proprietary analysis guidelines. The results, in conjunction with newly developed assessment

criteria, led to the identification of specific tubes with potentially higher residual stress and the inspection recommendations. Implementation of the proactive actions led to a robust steam generator program that can withstand regulatory and peer reviews.

- Provided a convenient platform to rapidly address emergent issues without delay from normal commercial processes.