

N75. AIMING FOR IMPROVED STEAM GENERATOR RELIABILITY IN JAPAN

Japan is tackling the problem of degradation of steam generator tubes in its PWRs with extensive inspection, maintenance, and repair programs.

At present, 17 PWRs are operating in Japan and 6 others are under construction. Steam generator tubes in the operating reactors have experienced a great deal of degradation. In Japan, a nuclear plant must be shutdown immediately if any small leakage is detected in steam generator tubes. Such a forced outage increases the cost of inspection and repair, lowers availability, and contributes to a loss of public confidence. Thus, great efforts are made to prevent leakage by carrying out strict inspection, repair, and preventative maintenance.

The rules for inspecting steam generator tubes are:

- Inspect all tubes full-length during each periodic inspection.
- Use the appropriate probe for eddy current testing according to the tube location and degradation history.
- For plants with the potential for tight cracks, such as intergranular attack, open up the cracks by applying a pressure of 140.7 kg/cm² to the primary side before carrying out eddy current testing, thus improving detectability.
- Utility representatives are to witness inspections by inspection companies and confirm the results. Japan Power Engineering and Inspection Corporation, an independent company, is also to witness the inspections to confirm the results to the Ministry of International Trade and Industry.

Criteria for judging a tube to be degraded are: wastage (thinning) of 20% wall thickness by observation of significant signals from the inspection equipment.

For more, see Takamatsu, H., "Aiming for Improved SG Reliability in Japan," Nuclear Engineering International, pp. 26-27, January 1991.