A Modified Technique for Crack Formation on Nuclear Steam Generator Tubing

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Abstract

For the safety and life assurance of nuclear power plants, the management of steam generator (SG) tube integrity receives increasing attention. Non-destructive examination, leak rate measurement and burst pressure evaluation constitute key elements in the effort. SG tubes containing environment assisted cracks with physical and microstructural characteristics similar to those of actual cracked tubes in SG's are needed for the effect. In the paper, a radial dent loading method has been explored to produce axial intergranular cracks using sensitized alloy 600 tubes. We showed based on three-dimensional finite element analysis and preliminary experimental work that the method can be more useful than the internal pressurization method for the production of cracks with high aspect ratio, provided that alloy 600 tubes are severely sensitized. In addition, direct current potential drop (DCPD) method has been implemented for the more accurate control of produced crack size.