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U. S. Nuclear Regulatory Commission
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Subject: Docket No. 50-362
Special Report
Inservice Inspection of Steam Generator Tubes
San Onofre Nuclear Generating Station, Unit 3

References: A. PWR Steam Generator Examination Guidelines, Revision 2, Electric Power Research Institute (EPRI) Report Number NP-6201, dated December 1988.

B. Letter from M. O. Medford (SCE) to Mr. G. W. Knighton (USNRC) dated April 5, 1985.

Pursuant to Surveillance Requirement 4.4.4.5(a) of Appendix A, Technical Specifications to Facility Operating License NPF-15, this report is being submitted to the Commission following the completion of an inservice inspection of steam generator tubes at San Onofre Unit 3.

Eddy current inspection of the steam generator tubing was completed on February 20, 1992. A total of 4308 tubes (23.7% of the tubes in service) in two steam generators were inspected full length and 29 tubes were removed from service by mechanical plugging. This inspection significantly exceeded the amount of tubing required to be inspected per Surveillance Requirements 4.4.4.0 through 4.4.4.2, including all prospective C-2 expansions [i.e., a 3% sample plus a 6% (2S) and a 12% (4S) expansion in each steam generator].

The planned inspection programs for both steam generators were fully consistent with recent industry recommendations in the "PWR Steam Generator Examination Guidelines" (Reference A). The programs included inspection of the full length of 100% of the tubing in the central cavity region of the tube bundle where the batwing wear mechanism previously described in Reference B is active, and tubes adjacent to tie-rods.

In Steam Generator E-088, 2168 tubes were inspected. One tube was found to be defective (48% throughwall) due to the batwing wear mechanism previously described in Reference B and was plugged. One additional tube, located outside the central cavity region, was found to be defective (46% throughwall) at its intersection with a batwing support and was plugged. This additional tube was last inspected in 1985 because it is not in the region of the tube bundle where the batwing wear mechanism previously described in Reference B is

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active. Eight tubes were preventively plugged due to the batwing wear mechanism previously described in Reference B. Three tubes were preventively plugged due to tie-rod denting. Two tubes were preventively plugged due to degradation at a vertical strap support. One tube located outside the central cavity region was preventively plugged due to degradation at a batwing support.

One tube in E-088 was preventively plugged due to a non-quantifiable motorized rotating pancake coil (MRPC) probe indication at the top of the region of the tube which is explosively expanded within the tubesheet. The single volumetric indication was on the inner tube wall. This indication appears associated with the expansion process, rather than inservice conditions, because it is volumetric, rather than crack-like, and is unchanged from the previous inspection approximately two years ago. In that inspection, it was apparently considered to be a geometrical variation at the expansion transition. Identifying this tube as having a non-quantifiable indication is conservative, but is not inconsistent with previous inspection results. Preventively plugging this tube is, therefore, also conservative.

One additional tube in E-088 was preventively plugged due to a distorted bobbin probe indication at the top of the tubesheet on the inlet end of the tube. Inspection of this distorted indication by the MRPC probe indicated a single axial indication that is non-quantifiable, but appeared to have a depth less than the plugging criteria of 44% throughwall.

In Steam Generator E-089, 2140 tubes were inspected. One tube was found defective, due to a 60% throughwall indication located 16.1 inches above the tubesheet on the outlet end of the tube, and was plugged. This indication initiated on the outer tube wall. Inspection by the MRPC probe revealed a single volumetric indication with no specific axial or circumferential aspect. This indication was similar to the response of the flat-bottom drilled hole in the calibration standard which is 7/64 inch in diameter and extends 60% throughwall from the outer tube wall surface. Five tubes were preventively plugged due to the batwing wear mechanism previously described in Reference B. Three tubes were preventively plugged due to degradation at a vertical strap support. Two tubes were preventively plugged due to tie-rod denting.

As required by Surveillance Requirement 4.4.4.5(b), complete results of the recently completed inservice inspection will be submitted to the Commission by February 20, 1993.

If you require any additional information, please so advise.

Sincerely,

RMKrieger

AHGershkoff

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