

Docket No. 50-336

Millstone Nuclear Power Station, Unit No. 2

Supplmentary Steam Generator

Inspection Program - Cycle 5 Reload

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OUTLINE OF SUPPLEMENTARY INSPECTION PROGRAM FOR STEAM  
GENERATOR TUBE DENTING ASSESSMENT

A. STEAM GENERATOR SAMPLE SELECTION

Either steam generator shall be inspected, subject to the requirements defined in Tables 1 and 2.

B. STEAM GENERATOR TUBE SAMPLE SELECTION AND TESTING

Minimum sample size, sample location, test result classification, and action requirements shall be as specified in Table 1. Percentages in this table refer to unplugged tubes. These samples shall include regions where denting effects were greatest in previous inspections.

C. DEFINITIONS

Tube Support Plate Tubes: Tubes that pass through a partial tube support plate.

Accessible Tube: A tube that is accessible to remote, manipulator type of devices used for conducting eddy current examinations.

Egg Crate Tubes: Tubes that pass through "egg-crate" supports.

Blockage: Tube condition that prevents passage of a probe of the nominal diameter indicated.

Denting: Constriction of the Inconel tubing that occurs at tube/tube support junctions as a result of magnetite build-up in these regions.

D. TUBE TESTING, TUBE SUPPORT PLATE TUBES

Inspection of the steam generator tube from the point of entry hot leg side, through the lower tube support plate on the cold leg side, per requirements of Table 1.

E. TUBE TESTING, EGG CRATE TUBE

Inspection of the steam generator tube from the point of entry, hot leg side through the uppermost egg crate, hot leg side.

F. TUBE TESTING, PERIPHERAL TUBE

Inspection of the steam generator tube from the point of entry, hot leg side through first egg crate, hot leg side.

G. TUBE RETEST, COLD LEG ENTRY

Inspection of the steam generator tube from the point of entry, cold leg side through the upper support plate, cold leg side.

H. PROFILOMETER

Device for measuring eight or more internal tube radii as a function of axial position.

TABLE 1 - SUPPLEMENTARY STEAM GENERATOR TESTING PROGRAM [EDDY CURRENT TESTS EXCEPT AS NOTED]

| Sample Size/Location  | Result  | Action Requirements  |
|---|---|--|
| 1.0 10% of tube support plate tubes of either steam generator | 1.1 Blockage of .540 diameter probe at support elevation, HL side | 1.1.1 Perform profilometer test and determine maximum tube hoop strain, or plug tube.*<br><br>1.1.1.1 If maximum strain is less than 14%, no action is required.<br><br>1.1.1.2 If maximum strain is greater than or equal to 14%, plug tube, and test 10% sample of 2nd steam generator (hot leg entry) and implement corresponding action requirements.                      |
|   | 1.2 Blockage of .540 inch diameter probe at cold leg side         | 1.2.1 None, provided that no blockage is found on hot leg side in 10% sample population.<br><br>1.2.2 Retest from cold leg side if blockage on hot leg side was encountered.<br><br>1.2.2.1 If blocked in retest, perform profilometer test and determine maximum tube hoop strain, or plug tube.*<br><br>1.2.2.1.1 If maximum strain is less than 14%, no action is required. |

\*If tube is plugged at this point, test 10% sample of 2nd steam generator (hot leg entry) and implement corresponding action requirements.

TABLE 1 (Continued)

| <u>Sample Size/Location</u>   | <u>Result</u>   | <u>Action Requirements</u>   |
|---|---|--|
| 1.0 Continued   | 1.2 Continued   | 1.2.2.1.2 If maximum strain is greater than or equal to 14% plug tube, and test 10% sample of 2nd steam generator (hot leg entry) and implement corresponding action requirements. |
|   | 1.3 Nonblockage of .540 inch diameter probe at support elevations, hot leg and cold leg sides | 1.3.1 None   |
| 2.0 3% of egg-crate tubes (optional, if profilometer program, Table 2, conducted) | 2.1 Dent indication at tube support elevations  | 2.1.1 Determine radial dent magnitude<br><br>2.1.2 Determine degree of progression, if any   |
| 3.0 50% of outer peripheral, accessible tubes located in rows 1-90                | 3.1 Tube Defect   | 3.1.1 Plug tube<br>3.1.2 Increase sample size to 100%<br>3.1.3 Test 100% sample from corresponding area of second steam generator and implement corresponding action requirements  |

TABLE 2 - SUPPLEMENTARY STEAM GENERATOR TESTING PROGRAM\* (PROFILOMETER TESTS)

| <u>Sample Size/Location</u>                            | <u>Result</u> | <u>Action Requirements</u>   |
|--|---------------|--|
| 4.0 100 egg crate tubes from<br>either steam generator | 4.1 Denting   | 4.1.1 Determine minimum diameter<br>4.1.2 Determine maximum tube, hoop<br>strain |

\*In view of the developmental nature of profilometer testing, the program described in this table is to be conducted, if possible, on a best effort basis.