

METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER & LIGHT COMPANY

AND

PENNSYLVANIA ELECTRIC COMPANY
THREE MILE ISLAND NUCLEAR STATION UNIT 1

Operating License No. DPR-50
Docket No. 50-289
Technical Specification Change Request No. 43

This Technical Specification Change Request is submitted in support of Licensee's request to change Appendix A to Operating License No. DPR-50 for Three Mile Island Nuclear Station Unit 1. As a part of this request, proposed replacement pages for Appendix A are also included.

METROPOLITAN EDISON COMPANY

By *R. A. Rudd*
Vice President-Generation

Sworn and subscribed to me this _____ day of _____, 1976.

Notary Public

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Three Mile Island Nuclear Station Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289

Technical Specification Change Request No. 43

The licensee requests that the attached pages be added to Appendix A of the TMI-1 Technical Specifications.

Reason For Proposed Change

To incorporate steam generators inservice inspection into the TMI-1 Technical Specifications as requested by the USNRC in their letter of September 14, 1976, to Mr. R. C. Arnold.

Safety Analysis Justifying Change

This proposed Technical Specification Change does not involve any unreviewed safety questions in that it only incorporates additional inspection restrictions to ensure the continued integrity of the tube portion of the TMI-1 Once-Through Steam Generators.

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4.18 OTSG TUBE INSERVICE INSPECTION

Applicability

This Technical Specification applies to the inservice inspection of the OTSG tube portion of the reactor coolant pressure boundary.

Objective

The objective of this inservice inspection program is to provide assurance of continued integrity of the tube portion of the Once-Through Steam Generators, while at the same time minimizing radiation exposure to personnel in the performance of the inspection.

Specification

Each steam generator shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program and the requirements of Specification 3.13.

4.18.1 Steam Generator Sample Selection and Inspection

Each steam generator shall be determined OPERABLE during shutdown by selecting and inspecting at least the minimum number of steam generators specified in Table 4.18.1.

4.18.2 Steam Generator Tube Sample Selection and Inspection

The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 4.18.2. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 4.18.3 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.18.4. The tubes selected for

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each inservice inspection shall include at least 1½% of the total number of tubes in all steam generators:

- a. The first inservice inspection of each steam generator included a random sampling of greater than 3% of the tubes in each steam generator.
- b. The second and subsequent inservice inspection may be from one steam generator and shall include 1½% of the total installed steam generator heat transfer surface. All tubes to be examined in the second and subsequent intervals shall be from previously examined tubes. All unplugged tubes with indications greater than 20% of the nominal wall thickness shall be included in those tubes selected for reexamination.

The results of each sample inspection shall be classified into one of the following two categories:

<u>Category</u>	<u>Inspection Results</u>
C-1	Less than 10% of the total tubes inspected in a steam generator are degraded tubes exhibiting indications in excess of 20% of the wall thickness.
C-2	10% or more of the total tubes inspected in a steam generator are degraded tubes exhibiting indications in excess of 20% of the wall thickness.

NOTE: In all inspections, previously degraded tubes must exhibit significant (> 10%) further wall penetrations to be included in the above percentage calculations.

4.18.3 Inspection Frequencies

The required inservice inspections of steam generator tubes shall be performed at the following frequencies:

- a. The first (baseline) inspection was performed after 6 effective full power months but within 24 calendar months of initial criticality. The second inservice inspection shall be performed not less than 9 nor more than 24 calendar months after the previous inspection. The third and subsequent inspections shall be performed within additional periods of 3-1/3 years.
- b. If, in any inspection, an excess of 10% of the tubes examined exhibit indications in excess of 20% of the wall thickness, the next two inspections shall be performed at one to two year intervals. If, in these examinations, no more than 10% of the tubes examined exhibit either (a) additional degradation (greater than 10% of wall thickness) of previously degraded tubes, (b) tubes with new indications in excess of 20% wall thickness, or (c) a combination of both, the inspection intervals may continue at 3-1/3 years.
- c. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 4.18.2 during the shutdown subsequent to any of the following conditions:
 1. Primary-to-secondary leaks which exceed the limits of Specification 3.13.
 2. A seismic occurrence greater than the Operating Basis Earthquake.

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3. A loss of coolant accident requiring actuation of the engineering safeguards, or
4. A major main steam line or feedwater line break.

4.18.4 Acceptance Criteria

a. As used in this Specification:

1. Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.
2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.
3. Degraded Tube means a tube containing imperfections < 20% of the nominal wall thickness caused by degradation.
4. % Degradation means the percentage of the tube wall thickness affected or removed by degradation.
5. Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.
6. Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness, unless higher limits are shown to be acceptable by analysis.
7. Tube Inspection means an inspection of that portion of the steam generator tube from the bottom of the upper tubesheet completely to the top of the lower tubesheet.

- b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plugging including all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 4.18.2.

4.18.5 Reports

- a. Following each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission within 30 days.
- b. The complete results of the steam generator tube inservice inspection shall be included in the Annual Operating Report for the period in which this inspection was completed. This report shall include:
 - 1. Number and extent of tubes inspected.
 - 2. Location and percent of wall-thickness penetration for each indication of an imperfection.
 - 3. Identification of tubes plugged.
- c. Results of steam generator tube inspections which require prompt notification of the Commission shall be reported pursuant to Specification 6.9.2 prior to resumption of plant operation. The written followup of this report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.

Bases

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained.

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The program for inservice inspection of steam generator tubes is based on ASME Code Section XI, Winter 1975 Addenda. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

The unit is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these chemistry limits, localized corrosion may likely result in stress corrosion cracking.

The extent of steam generator tube leakage due to cracking would be limited by the secondary coolant activity, Specification 3.13. Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents.

Operating plants have demonstrated that monitoring of secondary coolant can readily detect activity in the range of the Specification 3.13 limit. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged.

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Wastage-type defects are unlikely with proper chemistry treatment of the secondary coolant. However, even if a defect would develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging will be required for 40% of the tube nominal wall thickness, unless higher limits are shown to be acceptable by analysis. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

Whenever the results of any steam generator tubing inservice inspection fall into category C-2 on the 3rd sample inspection, (See Table 4.18.2), these results will be promptly reported to the Commission pursuant to Specification 6.9.2 prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

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TABLE 4.18.1
 MINIMUM NUMBER OF STEAM GENERATORS TO BE
 INSPECTED DURING INSERVICE INSPECTION

Preservice Inspection	None
No. of Steam Generators per unit	Two
First Inservice Inspection	Two
Second & Subsequent Inservice Inspections	One ¹

TABLE NOTATION:

1. The Inservice Inspection may be limited to one steam generator on a rotating schedule encompassing 3% of the tubes in that steam generator if the results of the first and subsequent inspections indicate that both steam generators are performing in a like manner. Note that under some circumstances, the operating conditions in one steam generator may be found to be more severe than those in the other steam generator. Under such circumstances the sample sequence shall be modified to inspect the most severe conditions.

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TABLE 4.18.2

STEAM GENERATOR TUBE INSPECTION

1st SAMPLE INSPECTION			2nd SAMPLE INSPECTION		3rd SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action required	Result	Action Required
A minimum of 1½% of total SG Tubes (If both SG's inspected, inspect 1½% of each SG's Tubes If only one SG inspected, inspect 3% of that SG's Tubes)	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug defective tubes. Inspect additional 3% of tubes in each SG	C-1	None	N/A	N/A
			C-2	Plug defective tubes. Inspect additional 3% of tubes in each SG	C-1	None
					C-2	Plug defective tubes. Notify NRC pursuant to Specification 6.9.2

NOTE: 1st Sample Inspection as used in this table refers to the required inspections at the frequencies listed in Specification 4.18.13.

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