

Docket No. 50-336

Attachment 1
Millstone Nuclear Power Station, Unit No. 2
Proposed Rewording of Technical
Specification Change Request

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February, 1985

TABLE 4.4-5

MINIMUM NUMBER OF STEAM GENERATORS TO BE
INSPECTED DURING INSERVICE INSPECTION

Preservice Inspection	Yes
No. of Steam Generators per Unit	Two
First Inservice Inspection	One
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 N % of the tubes (where N is the number of steam generators in the plant) if the results of the first or previous inspections indicate that all steam generators are performing in a like manner. Note that under some circumstances, the operating conditions in one or more steam generators may be found to be more severe than those in other steam generators. Under such circumstances the sample sequence shall be modified to inspect the most severe conditions.

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TABLE 4.4 G

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 5 tubes per S.G.	C-1	None	N/A	N/A	N/A	N/A
	C-2	Repair defective tubes and inspect additional 25 tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Repair defective tubes and inspect additional 45 tubes in this S.G.	C-1	None
			C-3	Perform action for C-3 result of first sample	C-2	Repair defective tubes
			C-3	Perform action for C-3 result of first sample	C-3	Perform action for C-3 result of first sample
	C-3	Inspect all tubes in this S.G., repair defective tubes and inspect 25 tubes in each other S.G.* See Note 1. Prompt notification to NRC pursuant to specification 6.9.1	All other S.G.s are C-1	None	N/A	N/A
			Some S.G.s C-2 but no additional S.G. are C-3	Perform action for C-2 result of second sample	N/A	N/A
			Additional S.G. is C-3	Inspect all tubes in each S.G. and repair defective tubes*. Prompt notification to NRC pursuant to Specification 6.9.1. See Note 1.	N/A	N/A

* $S = 3 \cdot \frac{N}{n} \%$ Where N is the number of steam generators in the unit, and n is the number of steam generators inspected during an inspection

*Repair of defective tubes shall be limited to plugging with the exception of those tubes which may be sleeved. Tubes with defective sleeves shall be plugged.

Table 4.4-6
Table Notation

1. Tubes required to be inspected pursuant to Action C-3 which are blocked by the remote inspection equipment may be excluded from the inspection pattern performed pursuant to Action C-3 provided that no tube within 5 lines or 8 rows is degraded. No more than ten tubes in the steam generator shall fall into this category.

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Attachment 2

Millstone Nuclear Power Station, Unit No. 2

Additional Information

Steam Generator Tube Inspection Requirements

February, 1985

Steam Generator Tube Inspection Requirements Additional Information

Personnel Radiation Exposure

Northeast Nuclear Energy Company recognizes that tubes blocked to the automatic test equipment can typically be inspected manually. Equipment was developed to automatically and remotely perform the inspections of steam generator tubes to avoid the personnel radiation exposure involved with the inspections. The radiation levels present in the steam generators at Millstone Unit No. 2 typically result in an exposure of 0.3 - 0.5 person-rem for each steam generator tube end (i.e. 0.6 to 1.0 person-rem per tube) which is manually inspected. Exclusion of only ten tubes from manual inspection can therefore save as many as 10 person-rem. The requirements of 10CFR20.1 specify that every reasonable effort must be expended to maintain personal radiation exposures "as low as reasonably achievable". NNECO considers it reasonable to save exposure at this magnitude from inspection of tubes for which a high level of confidence exists regarding their integrity.

Criteria to Assure Low Likelihood of Defect

The only tubes to be excluded from inspection shall be those tubes that are located more than five (5) lines and eight (8) rows from any degraded tube. This criterion assures that as many as 92 tubes free of flaws will surround a tube proposed to be deleted from the inspection pattern. Experience at Millstone Unit No. 2 has demonstrated that steam generator tube defects tend to be localized and readily grouped into patterns. As such, the criterion outlined above provides an appropriate basis on which to draw conclusions regarding the integrity of an uninspected steam generator tube.

Practices to Assure Excluded Tubes are Later Inspected

Steam generator tubes which are scheduled for inspection but are deleted from the inspection pattern are listed. The record of these tubes is then introduced into the plant inspection and work control system. This system has been utilized in the past to ensure a followup inspection of steam generator tubes. Specifically, during the Cycle 5 refueling outage, steam generator tube degradation was identified which required a 100% inspection in accordance with Category C-3 of Technical Specification 4.4.5.1.2.c. During the inspection, 54 tubes in an area of the tube bundle scheduled for inspection were inaccessible to the automatic testing equipment without extensive modifications to the equipment which would have necessitated additional personnel radiation exposure.⁽¹⁾ It was mutually agreed to by our staffs that NNECO would inspect 22 of these tubes during the next outage.⁽²⁾ These tubes were entered into the plant inspection and work control system which ensured that appropriate personnel responsible for inspection remained cognizant of the need to inspect these specific tubes during the subsequent outage.

(1) W. G. Council letter to R. A. Clark, dated February 12, 1982.

(2) E. L. Connor letter to W. G. Council, dated March 5, 1982.

Practices to Facilitate Tube Identification

Steam generator tube inspections are planned in advance in accordance with the requirements of the Technical Specifications. The specific tubes to be inspected are chosen from areas of the tube bundle where defects have historically been identified and include the tubes which had reportable wall penetration and were not plugged. This is required by Technical Specification 4.4.5.1.2.b.

As part of the inspection process, a full size, numbered template is fabricated. The template is installed on the tube sheet face prior to beginning the inspection. The template defines the tubes to be inspected. It is secured in place with plugs which are installed into certain steam generator tubes. Proper positioning of the template is verified by identification of specific 'landmarks' on the tubesheet.

The examiner or equipment technician who positions the inspection probe carrier views the position on closed circuit television. The line and row numbers on the template identify the tube end being entered. This individual initials the data sheet indicating that the location of the tube inspection has been verified.

Each location of a defect is independently verified by a second examination of the suspect tube. This verification establishes that the flaw "signature" seen on the original examination is, in fact, present at the line/row originally identified. Discrepancies, if any, are resolved by identifying the extent of the inspection which is suspect and reexamining all tubes suspected of improper identification.

Future advances in automated tooling hold the promise of eliminating the need for the tubesheet templates. Micro-processor controlled positioners should result in reduced personnel radiation exposure and increased assurance of accurate inspection location.

QA Requirements Applicable to Inspection Work

All inspection work is performed in accordance with station procedures for Quality Assurance (QA) work and is subject to audit, surveillance and monitoring by QA personnel.