GPU Nuclear

GPU Nuclear Corporation
Post Office Box 480
Route 441 South
Middletown, Pennsylvania 17057-0191
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number

July 31, 1985
5211-85-2116

Office of Nuclear Reactor Regulation
Attn: Mr. Hugh L. Thompson, Jr., Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Thompson:

Three Mile Island Nuclear Station Unit 1 (TMI-1)
Operating License No DPR-50
Docket No. 50-289
GPUN Response to Generic Letter 85-02
(Category C-2 Steam Generator Inspections)

Generic Letter 85-02 dated April 17, 1985 requested plant specific information from all licensees for plants utilizing steam generators.

Our letter of June 20, 1985 (5211-85-2101) provided information which addressed the staff recommended actions and review guidelines stemming from the NRC integrated program for the resolution of unresolved safety issues regarding steam generator tube integrity as requested. Our response concerning Category C-2 steam generator tube inspections is attached. This completes GPUN's response to Generic Letter 85-02.

Sincerely,

H. D. Hukill
Director, TMI-1

HDH/MRK/spb:0303A

cc: J. Thoma
R. Conte

Attachments

A058
1/1

ATTACHMENT

GPUN RESPONSE TO NRC
REQUEST FOR INFORMATION CONCERNING CATEGORY C-2
STEAM GENERATOR TUBE INSPECTIONS

Information Requested

The enclosed draft NUREG-0844, Section 2.2.1.2 describes certain limitations which the staff believes to be inherent in the present Technical Specification steam generator ISI requirements pertaining to Category C-2 inspection results. Licensees and applicants are requested to provide a description of their current policy and actions relative to this issue and any recommendations they have concerning how existing Technical Specification steam generator ISI requirements pertaining to Category C-2 inspection results could be improved to better ensure that adequate inspections will be performed. This description should include a response to the following questions:

1. What factors do, or would, the licensee or applicant consider in determining (a) whether additional tubes should be inspected beyond what is required the Technical Specifications, (b) whether all steam generators should be included in the inspection program, and (c) when the steam generators should be reinspected.

2. To what extent do these factors include consideration of the degradation mechanism itself and its potential for causing a tube to be vulnerable to rupture during severe transients or postulated accident before rupture or leakage of the tube occurs during normal operation.

Reference

Section 2.2 of NUREG-0844.

GPUN Response

The GPU Nuclear Corporation Technical Specifications for steam generator tubing inservice inspection (ISI) for Three Mile Island Unit 1 are consistent with Standard Technical Specification (STS) requirements. The Technical Specification requirements are used to establish minimum inspection samples, extent of tube length inspected, reporting requirements, additional inspections required, etc. Inspections are handled on a case basis to determine the correct course of action while using the technical specifications to define minimum requirements.

GPUN considers this approach appropriate since it allows sufficient flexibility to adequately address a wide variety of potential circumstances. No single policy, other than one which generally states that the steam generator tube integrity should be maintained, can cover all the possibilities which could arise.

The TMI-1 Technical Specifications call for disposition of C-2 inspection results in a manner identical to the STS. GPUN considers these criteria appropriate for the reasons discussed below.

1. As written, the STS require the initial sample of tubes selected for each inservice inspection to include at least 3% of the total number of tubes in all steam generators with tubes selected on a random basis, with exceptions including:

   (a) The sample shall include all nonplugged tubes that previously had detectable wall penetrations; i.e., degraded tubes.

   (b) At least 50% of the tubes inspected shall be in those areas where experience has indicated potential problems (either plant specific or industry wide).

   This minimum 3% criterion requires GPUN to inspect at least 3% of approximately 30,000 tubes, which is about 900 tubes. We consider this adequate in that if should there be extensive damage in the steam generator, it would be discovered in one or more areas.

2. Category C-2 inspection results are defined as inspection results in which:

   (a) One or more tubes, but not more than 1% of the total tubes inspected in a steam generator, are defective; or

   (b) between 5% and 10% of the total tubes inspected are degraded tubes.

   Since the initial inspection includes all previously discovered degraded tubes, and 50% of the inspected tubes are to be in potential problem areas, the results of the initial inspection could be reasonably expected to find problems should any exist.

3. Inservice inspection requirements are part of an overall defense in depth approach to monitoring steam generator integrity. This program includes primary to secondary leakrate monitoring during operation.

   Primary to secondary leakrate measurements are made periodically for all operating PWRs in the U.S. The STS require plant shutdown upon experiencing a primary to secondary leakage rate of 1.0 gpm or greater. (TMI-1 also requires shutdown upon reaching 0.1 gpm above an established baseline leakrate. At TMI-1, primary to secondary leakrate is measured daily at stable power conditions when sufficient RCS gaseous activity permits.)

4. GPUN has completed analyses which demonstrate that tubes which would be considered degraded per current Tech. Spec. could remain in service without the defects propagating to the point of tube failure under the most severe postulated loading conditions; i.e., those associated with the postulated steamline break accident. This analysis was based on multiple levels of conservatism. For these reasons, GPUN considers the presently existing criteria for disposition of degraded tubes in Category C-2 to be more than adequate.

Specific responses to questions 1 and 2 above follow:

1.(a) What factors do or would the licensee consider in determining whether additional tubes should be inspected beyond what is required by the Technical Specifications.

Response: GPUN considers the need for supplemental inspections to be plant specific. The need for supplemental inspections should be set forth on a case-by-case basis rather than as a generic requirement by Technical Specification. Supplemental inspections are appropriate if it is shown from previous inspection results or from unique design aspects or from operating circumstances that degradation might be reasonably expected to have occurred. This practice assures that the potential problem area would be examined and dispositioned.

1.(b) What factors do or would the licensee consider in determining whether all steam generators should be included in the inspection program.

Response: This concern may be directed more toward PWRs with three or four steam generators, whereas the determination of whether all steam generators are to be inspected at TMI-1 involves only two OTSGs.

The Babcock and Wilcox Standard Technical Specifications and the TMI-1 Technical Specifications specify that other than for the first inservice inspection, inspections may be limited to one steam generator, on a rotating basis, if the results of previous inservice inspections indicate that both steam generators are performing in a like manner. If the results of the two or more inspections fall into Category C-1 and our analysis shows that the OTSGs are performing in a like manner, the Technical Specifications could permit inspection of a single steam generator. However, inspection of only one OTSG would not result in considerably less outage time since Technical Specifications require that 6% of the tubes be inspected rather than 3% of the tubes of both OTSGs if both were inspected. Therefore, GPUN would need to see a clear advantage in inspecting only one OTSG to offset the expense of analysis to show that the OTSGs have experienced essentially the same operating conditions.

1.(c) What factors do or would the licensee consider in determining when the steam generators should be reinspected.

Response: GPUN performs ISI in accordance with the frequency required by the TMI-1 Technical Specifications. Unscheduled inspections are called for in the event of primary-to-secondary leakage beyond the specified limits, seismic events over the Operating Basis Earthquake level, loss of coolant accident or a major main steamline break or main feedwater line break. The initial sample at each ISI includes all tubes determined to be degraded during previous inspections to monitor any potential change in degradation.

GPUN considers appropriate the inservice eddy current inspection at the frequency specified by Technical Specifications. Special reinspections may be appropriate on a case by case basis as determined by evaluation of previous failure mechanisms, defect characterization, or abnormal occurences that would be considered to have a real potential to affect steam generator integrity.

2. To what extent do these factors include consideration of the degradation mechanism itself and its potential for causing a tube to be vulnerable to rupture during severe transients or postulated accidents before rupture or leakage of that tube occurs during normal operation.

Response: As discussed above, GPUN has evaluated tube degradation with the potential for propagating to tube rupture or leakage during normal operation, during severe transients, or during postulated accident conditions.

Also, as described above, GPUN considers additional inspections beyond what is required by Technical Specifications based on understanding of the tube degradation mechanism and those conditions that might contribute to tube failure.