

**From:** Mahesh Chawla  
**To:** Dale.Vincent@nmcco.com  
**Date:** 08/29/2006 1:08:30 PM  
**Subject:** Request for Additional Information - SG Tube Integrity - TSTF 449 - MD0209/MD0210

By letter dated February 16, 2006, (ML060480440), Nuclear Management Company (the licensee) submitted a license amendment request regarding Prairie Island Nuclear Generating Plant Units 1 and 2 steam generator (SG) tube integrity technical specifications (TS).

The proposed amendment would revise the SG tube integrity TSs to be consistent with the Nuclear Regulatory Commission approved Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, "Steam Generator Tube Integrity," Revision 4 (ML051090200). Additional information was provided by the licensee in letter dated July 21, 2006 (ADAMS Accession No. ML062370052).

The staff has reviewed the information the licensee provided and determined that additional information is required in order to complete the evaluation. The additional information being requested is enclosed. **Let me know if you need a teleconference to discuss the questions listed below:**

1. In your proposed Structural Integrity Performance Criteria (SIPC) in Technical Specification (TS) 5.5.8.b.1, you stated the following: "For Unit 2, when tubes are left in service with predominantly axially oriented stress corrosion cracking at the tube support plate (TSP) elevations, the probability of burst (POB) under main steam line break conditions shall be maintained below  $1E-02$  in accordance with the requirements of NRC Generic Letter (GL) 95-05." As currently proposed, once tubes are left in service with predominantly axially oriented stress corrosion cracking at the tube support plate elevations, the probability of burst for all indications (even those that are not axially oriented stress corrosion cracking at TSP locations) is limited to  $1 \times 10^{-2}$ . In addition, since NRC GL 95-05 does not contain any "requirements," the last portion of this statement is not accurate. If it was not your intent to have the  $1 \times 10^{-2}$  criteria apply to all forms of degradation, please discuss your plans to modify your submittal.

Please discuss your plans to address the above. The proposed TS may be modified by using something similar to the following:

For Unit 2, when alternate repair criteria discussed in Specification 5.5.8.c.2(c) are applied to axially oriented outside diameter stress corrosion cracking indications at tube support plate locations, the probability that one or more of these indications in a SG will burst under postulated main steam line break conditions shall be less than  $1 \times 10^{-2}$ .

Please note that your Bases may also need to be revised to clarify this issue.

2.A safety factor of 1.4 against burst applied to the design basis accident primary-to-secondary pressure differentials was indicated in TS Section 5.5.8.b.1. GL 95-05 indicated that there is a possibility that a tube may have a burst pressure less than 1.4 times the steam line break pressure differential (given the uncertainties associated with the various correlations), therefore, the GL 95-05 alternate repair criteria (ARC) imposed a limit on the POB of  $1 \times 10^{-2}$ . As currently proposed, the flaws to which the voltage-based ARC is applied must maintain a safety factor of 1.4 against burst during design basis accidents. Since this is inconsistent with the staff's original approval (as evidenced by the probability of burst criteria), please verify that this was your intent. If this was not your intent, please discuss your plans to modify your submittal to address this issue. Discuss your plans to clarify your proposal, for example: "This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary to secondary pressure differential and, except for flaws addressed through application of the alternate repair criteria discussed in Specification 5.5.8.c.2(c), a safety factor of 1.4 against burst applied to the design basis accident primary to secondary pressure differentials."

3. Regarding TS 5.5.8.b.2, you reference the “voltage-based repair criteria.” Since this reference isn’t specific, it could be misinterpreted to apply to any flaws to which a voltage-based sizing method is applied. As a result, discuss your plans to clarify your proposed TS to indicate that the “voltage-based repair criteria” that you are referring to is the one in TS 5.5.8.c.2(c).

4. As currently written, it is not clear whether all of the criteria listed under TS 5.5.8.c.2 must be met in order to require plugging or repair. In addition, the criteria under TS 5.5.8.c.2 not only discuss the criteria for plugging and repair, but also criteria for leaving flaws in service. As a result, please discuss your plans to modify your submittal to address this issue. For example: “Unit 2 steam generator tubes found by inservice inspection to contain flaws shall be dispositioned as follows:”

5. It appears that TS 5.5.8.c.2(a)(1) and TS 5.5.8.c.2(a)(2) are intended to address the repair criteria for the non-sleeved and sleeved region of the tube, respectively. In your current proposal (and TSTF-449), a “tube” is considered to include the tube wall and any repairs to it. As a result, it would appear that there are two different set of repair limits for the sleeves (since TS 5.5.8.c.2(a)(1) and TS 5.5.8.c.2(a)(2) apply to the sleeve). Please discuss your plans to clarify that TS 5.5.8.c.2(a)(1) addresses the non-sleeved region of the tube and TS 5.5.8.c.2(a)(2) addresses the sleeved region of the tube.

6. In proposed TS 5.5.8.c.2(a)(2), you indicated that the repair criteria for the original tube wall in the sleeve to tube joint is 25-percent of the nominal sleeve wall thickness. This does not appear to be consistent with your current technical specifications (and it probably is not consistent with the design and licensing basis for the sleeves). The staff believes that you intended to indicate that the repair criteria for the sleeve is 25-percent of the sleeve wall thickness and that the repair criteria for the parent tube at the sleeve-to-tube joint is to plug on detection. Please discuss your plans to modify your proposal to address this issue.

In addition, as currently written, proposed TS 5.5.8.c.2(a)(2) would permit tubes to be either plugged or repaired in the event that flaws exceeded the repair criteria. Please discuss your plans to indicate that flaws that exceed these repair limits must be plugged.

7. In proposed TS 5.5.8.c.2(b), it would appear that the following phrase is not needed since it is also contained in proposed TS 5.5.8.c.2(b)(1) and (2): “Flaws may be left in service when they are located below F\* or EF\* [region] defined below:.” Please discuss your plans to remove this phrase.

8. In several instances, the term “defect” is used in your proposed TS (e.g., 5.5.8.c.2(b)(1), proposed TS 5.5.8.c.2(b)(2), and proposed TS 5.6.7.a.10). Since a “defect” is not defined in your proposed TS, please discuss your plans to replace this term with “flaw” which is the term used in TSTF-449. In addition, the term “degradation” is used in your proposed TS (e.g., 5.5.8.c.2(c)(1) and 5.5.8.c.2(c)(2)). Since “degradation” is not defined in your proposed TS, please discuss your plans to replace this term with “flaw” which is the term used in TSTF-449.

9. Please discuss your plans to indicate in TS 5.5.8.d that: “In tubes repaired by sleeving, the portion of the original tube wall between the sleeve’s joints is not an area requiring re-inspection.”

10. In proposed TS 5.5.8.d.3(a), you indicate that the region of the tube below the F\* and EF\* regions may be excluded from the inspection requirements. In addition, in your response to question 4c in your July 21, 2006 letter (MLXXXX), you indicate that full depth tubesheet sleeves are installed at the lower end of the parent tube (presumably this is near the tube-to-tubesheet weld). Since this latter region is below the F\* and EF\* region, it would appear that a tube in which a full depth tubesheet sleeve is installed may not require an inspection near the lower end of the sleeve (depending on exactly where the sleeve is installed with respect to the F\* and EF\* region). As a result, please discuss your plans to modify your proposal to ensure that full depth tubesheet sleeves require an inspection.

11. In proposed TS 5.5.8.d.3(a), you reference a “refueling outage inspection.” Under the proposed TS, inspections need not be performed during a refueling outage. They only need to be performed at intervals not to exceed 24 effective full power months or one operating interval between refueling outages (whichever is less). As a result, if you were to elect to perform inspections at times other than refueling outages, the F\* and EF\* region may not be inspected for multiple cycles. Since this is inconsistent with your current requirements (and the design/licensing basis), discuss your plans to modify your submittal to indicate that the “F\* and EF\* tubes” will be inspected in the F\* and EF\* regions every 24 effective full power months or one refueling outage (whichever is less). A similar comment applies to proposed TS 5.5.8.d.3(c) which references inspections during refueling outages.

12. In proposed TS 5.5.8.d.3(b) and (c), you refer to the repair criteria discussed in proposed TS 5.5.8.c.2(c) using different terminology. This can cause confusion on what is being referred to (since neither of these sections match the “title” in 5.5.8.c.2(c)). As a result, please discuss your plans to modify these two sections to simply reference the “alternate repair criteria discussed in TS 5.5.8.c.2(c).” A similar comment applies to proposed TS 5.6.7.b.

13. In proposed TS 5.5.8.f.2, you indicate that hardroll expanding portions of tubes in the tubesheet is an acceptable tube repair method. Since a tube may include a sleeve, please discuss your plans to clarify that this repair criteria is only applicable to tubes that do not have sleeves installed in the tubesheet region. For example, “Hardroll expanding non-sleeved portions of tubes in the tubesheet in order to apply the F\* and EF\* criteria.”

14. Regarding proposed TS 5.6.7.b.4, you indicated that removing this reporting requirement would constitute a change in your licensing basis (refer to your response to question 2 in the July 21, 2006 letter). The staff notes that by incorporating the  $1 \times 10^{-2}$  probability of burst criteria into TS 5.5.8.b.1, you will not be able to operate under the condition where the burst probability exceeds  $10^{-2}$ . As a result, providing a safety assessment is not needed. As a result, the reporting requirement is not needed. The staff also notes that you are required per 10 CFR 50.73 to report if the performance criteria are not maintained. As a result of the above, discuss your plans to remove the subject reporting requirement.

15. In your July 21, 2006 response to question 3, you stated (see item 2) that the F\* and EF\* criteria could be applied to the cold-leg side of the tubesheet. At the time the F\* and EF\* criteria were approved, your technical specification only addressed the hot-leg portion of the tubesheet (i.e., no inspections were required by the technical specifications in the cold-leg). At the time of these F\* and EF\* proposals, no modifications were made to the technical specifications to require cold-leg inspections. As a result, the staff reviewed your proposal to incorporate technical specification inspection and repair criteria for the hot-leg. As a result of the above, discuss your plans to submit for review and approval, the structural and leakage integrity analysis for application of the F\* and EF\* criteria to the cold-leg or alternatively discuss your plans to clarify that the F\* and EF\* criteria apply to the hot-leg.

16. In the Limiting Condition for Operation section of B 3.4.19, you indicate that the F\* and EF\* distances are not considered part of the tube. Since these distances are no longer defined in your proposed TS, please discuss your plans to modify this phrase to indicate that the region of tube below the F\* and EF\* regions is not considered part of the tube. In addition, discuss your plans to indicate that the parent tube (original tube wall) between sleeve joints is also not considered part of the tube.

17. Observation - In the second part of your July 21, 2006 response to question 8, you imply that the reporting guidance in Section 6b of Attachment 1 of GL 95-05 is not performance based. The staff disagrees with this assessment. The staff believes that this reporting guidance is, in fact, performance based. That is, the purpose of the report is to monitor the performance of the empirical approach discussed in GL 95-05.

**CC:** Kenneth Karwoski; Martin Murphy; Yamir Diaz-Castillo

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