

October 25, 2005

Mr. Joseph E. Venable
Vice President Operations
Entergy Operations, Inc.
17265 River Road
Killona, LA 70066-0751

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 (WATERFORD 3) -
REQUEST FOR ADDITIONAL INFORMATION RELATED TO PROPOSED
TECHNICAL SPECIFICATION CHANGE REGARDING TUBE SHEET
INSPECTION DEPTH FOR STEAM GENERATOR TUBE INSPECTIONS
(TAC NO. MC6421)

Dear Mr. Venable:

By application dated March 15, 2005, Entergy Operations, Inc., requested changes to the Technical Specifications related to steam generator tube inspection at Waterford Steam Electric Station, Unit 3.

After reviewing your request, the Nuclear Regulatory Commission staff has determined that additional information is required in the area of transient testing to complete the review. We discussed this information with your staff by telephone and they agreed to provide the additional information requested in the enclosure within 90 days of receipt of this letter.

If you have any questions, please call me at (301) 415-1480.

Sincerely,

/RA

N. Kalyanam, Project Manager, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure: Request for Additional Information

cc w/encl: See next page

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Accession No.: **ML053080136**

* RAI input from the staff without any major change

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REQUEST FOR ADDITIONAL INFORMATION
LICENSE AMENDMENT REQUEST FOR PROPOSED TECHNICAL SPECIFICATION
CHANGE REGARDING TUBESHEET INSPECTION DEPTH FOR STEAM GENERATOR
TUBE INSPECTIONS
ENTERGY NUCLEAR SOUTH
WATERFORD STEAM ELECTRIC STATION, UNIT 3
DOCKET NO. 50-382

Background

By letter dated March 15, 2005 (ML050770200), Entergy Operations, Inc. submitted an application to change Waterford Steam Electric Station, Unit 3 (Waterford 3) technical specifications (TS) related to steam generator (SG) tube inspection. The changes would define the depth of the required tube inspections and plugging criteria within the tubesheet, with the depth of inspection defined as "C*" ("C-star"). The technical basis for these changes was initially documented in Westinghouse topical report WCAP-16208-P, Revision 0, "NDE [Non-destructive Examination] Inspection Length for CE [Combustion Engineering] Steam Generator Tubesheet Region Explosive Expansions," dated October 2004. In a letter dated December 16, 2004 (ML043510406), the U.S. Nuclear Regulatory Commission (NRC) staff requested additional information from Florida Power and Light (FPL) about their C* amendment application for St. Lucie Plant, Unit 2. FPL's response to this request was issued March 31, 2005 (ML050960517), and Revision 1 of WCAP-16208-P was subsequently issued in May 2005 (ML051520420).

Questions

In order to complete its review of the license amendment for Waterford 3, the staff needs the additional information requested below.

1. Throughout the submittal, WCAP-16391-P is referenced. To the staff's knowledge, this was never formally submitted to the NRC. Please confirm that the information in WCAP-16391-P is fully consistent with WCAP-16208-P, Revision 1, or with WCAP-16208-P, Revision 0, as supplemented by the FPL letter dated March 31, 2005. Alternatively, please provide a copy of WCAP-16391-P for the staff's review.

In the following questions, the staff assumes your proposed TS changes, which are based on WCAP-16208-P, Revision 0, and WCAP-16391-P, are fully consistent with WCAP-16208-P, Revision 1.

2. Please confirm that your operating parameters will always be bounded by the conditions for which the C* distance was determined in WCAP-16208-P, Revision 1 (e.g. temperature, pressure, etc.). If the conditions will not always be bounded, what controls are in place to ensure an adequate depth of inspection in the tubesheet?

3. Please discuss the expected condition of the tube-to-tubesheet joint. For example, discuss the amount of corrosion expected at the top of the tubesheet (similar to what may have been present in some of the test specimens) and whether there is sludge buildup at the top of the tubesheet.
4. The letter dated March 15, 2005, compares the Nuclear Energy Institute (NEI) report 97-06 primary-to-secondary accident-induced leakage limit to the 720 gallon per day (gpd) operational leakage limit in TS 3.4.5.2. Since you are comparing the NEI accident-induced leakage limit to your TS operational leakage limit, the staff assumes that, at the time this application was submitted, your operational leakage limit was the same as your accident-induced leakage limit. Please confirm the staff's understanding.

The letter dated March 15, 2005, discusses a change in the assumed accident-induced leakage rate from 720 gpd to 540 gpd. The staff understands this to mean that, although the accident-induced leakage rate in the licensing basis was 720 gpd at the time the C* amendment was submitted, the accident analyses was in the process of being revised in support of your extended power uprate and alternative source term amendments. This revised analyses would require that you limit the amount of accident-induced leakage to 540 gpd. Please confirm the staff's understanding.

The staff notes that your current TS operational leakage limit is 75 gpd. Assuming 540 gpd (0.375 gallons per minute (gpm)) is your current accident-induced leakage limit, it is the staff's understanding that no more than 0.275 gpm could come from sources other than implementation of C* (since implementation of C* assumes that accident-induced leakage is 0.1 gpm). Other sources could include sleeves, plugs, and other flaws in the SG. Please confirm the staff's understanding.

Assuming (1) you were to operate at your TS operational leakage limit of 75 gpd (0.05 gpm), (2) that none of the operational leakage was a result of implementation of C*, and (3) that there was no accident-induced leakage expected from other sources, it is the staff's understanding that you would continue to have margin to your accident-induced leakage limit even after accounting for the increase in the amount of operational leakage, as a result of the higher differential pressures associated with various postulated accident conditions. Please confirm the staff's understanding.

5. Please clarify whether the load at first slip was reported and plotted in Figures 5-1 through 5-3 of WCAP-16208-P, Revision 1, or whether the maximum load was plotted. If the load at first slip was not used in all cases, please discuss the effect on the required inspection distance if the load at first slip was used. In addition, if the load at first slip was not used in Table 6-8 of WCAP-16208-P, Revision 1 ("Burst Based Inspection Length"), please provide Table 6-8 values to confirm that the 10.4 inch proposed inspection distance is still bounded when the most limiting specimen is evaluated using load at first slip.

6. Please discuss your plans to revise your TS to include the reporting requirements listed below.

(a) Number of total indications, location of each indication, orientation of each indication, severity of each indication, and whether the indications initiated from the inside or outside surface.

(b) The cumulative number of indications detected in the tubesheet region as a function of elevation within the tubesheet.

(c) Projected end-of-cycle (EOC) accident-induced leakage from tubesheet indications. This leakage shall be combined with the postulated EOC accident-induced leakage from all other sources. If the preliminary estimated total projected EOC accident-induced leakage from all sources exceeds the leakage limit, the NRC staff shall be notified prior to unit restart.

7. In WCAP-16208-P, Revision 1, it is not clear whether all of the available data were used to support the analytical adjustment to account for the axial load resistance provided by internal pressure. For example, specimens 8 and 12 from the Task 1154 program were run at room temperature with internal pressure; however, an analysis of this data (similar to what was done for the elevated temperature data point) was not provided. Please evaluate all data in which internal pressure (above ambient pressure) was applied to support the basis for the analytical adjustments to account for the internal pressure. With respect to the analysis of the pressure effects, please provide additional details on how the axial force resistance due to the internal pressure of 1435 pounds per square inch was calculated and discuss how the effect of the residual contact pressure was taken into account in your analysis. (The actual pullout force was nearly the same as the pullout resistance expected analytically from the internal pressure effects. As a result, if the residual contact pressure was not included in this assessment, it would appear that the analytical adjustments for internal pressure are too high.)
8. It is the NRC staff's understanding that not all data was included in Appendix B of WCAP-16208-P, Revision 1 (i.e., some data was not included since it was well outside the targeted temperatures and pressures). It is also the staff's understanding that some data in Appendix B was not included in Table 4-1 of WCAP-16208-P, Revision 1 (which was used in determining the leak rate as a function of joint length). Please confirm the staff's understanding and discuss the basis for not including all of the Appendix B data in Table 4-1. For example, was data from Appendix B not included in Table 4-1 when steady state was never reached although the temperatures and pressures were within the desired range?
9. The Waterford 3 TS (4.4.4.4.b) currently allow installation of leak-tight sleeves according to CENS Report CEN-605-P. Since sleeves could extend into the tubesheet below the C* distance, the proposed TS would not require an inspection of this portion of the sleeve (including the lower sleeve joint). Sleeves were not addressed in the testing and analysis used to justify excluding part of the tube from inspection (WCAP-16208-P, Revision 1). What plans do you have to ensure the lower ends of sleeves (i.e., those within the tubesheet below the C* distance) will be inspected?

Waterford Steam Electric Station, Unit 3

cc:

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May 2005