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Your ref: LTR-NRC-13-49
Our ref:

July 24, 2013

Subject: Closure of Westinghouse Interim Report Event No. 49083

Reference:

1. Letter from James A. Gresham to U.S. NRC Document Control Desk, LTR-NRC-13-35, "Interim Report of the Evaluation of a Deviation Pursuant to 10 CFR 21.21 (a)(2)"


Gentlemen:

Westinghouse submitted an Interim Report (Reference 1), pursuant to the requirements of 10 CFR Part 21, regarding the evaluation of the reportability which could not be completed in 60 days from the discovery of the deviation or failure to comply. The issue evaluated by Westinghouse concerns an identified inconsistency between the applied design loads for the AP1000^{®1} plant pressurizer support columns and embedments and the calculated actual loads. As a result, certified for construction drawings have been delivered to customers with an incorrect pressurizer support column embedment design configuration.

The purpose of this letter is to close Interim Report Event No. 49083.

If you have any questions regarding this matter, please contact me at (412) 374-4643.

Very truly yours,


James A Gresham, Manager
Regulatory Compliance

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IE19
MRR
MRO

Interim Report Event No. 49083 (Closeout)**SUBJECT:**

Closure of Interim Report Event No. 49083 regarding an evaluation of a Deviation or Failure to Comply Pursuant to 10 CFR 21.21 (a)(2)

TITLE:

10 CFR Part 21 Interim Report – Incorrect Pressurizer Support Loads for AP1000.

BASIC COMPONENT SUPPLIED BY:

Westinghouse Electric Company

NATURE OF DEVIATION:

Pursuant to the AP1000 plant Design Control Document (DCD), Revision 19, the embedded portions of the AP1000 plant pressurizer component supports are to be designed according to AISC N690 and ACI 349-01. The original embedment design configuration for the AP1000 plant pressurizer columns as reflected in the delivered certified for construction drawings does not meet the requirements of AISC N690 and ACI 349-01. As a result, certified for construction drawings have been delivered to the customer with an incorrect pressurizer support column embedment design configuration.

EVALUATION:

The AP1000 plant pressurizer is supported by struts at the upper and lower supports as well as four steel columns at the lower support. The steel columns are anchored to the mass concrete at the base using embedments that are designed according to ACI 349-01 and AISC N690. The pressurizer embedments provide for the integrity of the reactor coolant pressure boundary for normal, seismic, and accident conditions. The design is also required to maintain the piping stresses less than ASME Code limits and less than the limits required to support mechanistic pipe break.

The pressurizer embedments were originally designed to lower loads than the current actual loads. In addition, some errors were made in design calculations which further reduced the strength of the design. Due to these issues, an evaluation has been done to determine if the pressurizer embedments would have been able to perform their intended safety function had the full maximum loads been applied to the embedments before the issue was discovered and repaired.

The column embedments have been evaluated using the updated loads. Under the current actual loads each of the four columns experiences tension loads of up to 200 kip and moment loads of up to 450 kip-in. This analysis assumes that the southeast and southwest column embedments experience maximum tension and moment loads simultaneously. This is the worst case scenario because the area of the concrete breakout cones is reduced by the greatest amount for these two columns due to the pit opening in the southwest corner of room 11303 and the overlapping of breakout cones between the two columns. Under these loading conditions, the net tension on the anchor group is 389 kip.

Per ACI 349-01, the strength reduction factor for concrete breakout failure is 0.75. Additionally, since the failure is brittle, a 0.6 factor must be applied. With these two factors applied, the group tension breakout capacity of two adjacent columns under tension and moment is 186 kip, which is less than 389 kip and violates the requirements of ACI 349-01. The strength reduction factors are applied to provide a safety factor for the design and ensure a ductile failure mode. The purpose of this evaluation is to determine if a substantial safety hazard would result if the pressurizer embedment design had been left uncorrected. Removing the strength reduction factors of 0.75 and 0.6 yields a calculated capacity of 430 kip. Therefore, there is approximately a safety factor of 1.1 remaining against failure (430 kip/389 kip) that would allow the pressurizer embedments to continue to perform their intended safety function under maximum loading conditions.

Based on the above evaluation results, it has been determined that this issue does not represent a substantial safety hazard pursuant to the requirements delineated in 10 CFR Part 21 (or a non-compliance under 10 CFR 50.55(e) to the extent applicable). As discussed in Reference 1, the planned changes to the pressurizer support column embedments to correct this deviation will be reflected on revised certified construction drawings but do not require changes to the current licensing basis.

cc: E. Lenning (NRC MS O-11-F1)
B. Whitley (SNC)
A. Paglia (SCANA)