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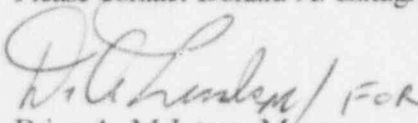
ATTENTION: T. R. QUAY

SUBJECT: RESPONSES TO OPEN ITEMS ON AP600 CONTAINMENT BUILDING
LOADS AND ANALYSIS METHODS

Dear Mr. Quay:

Attached is the responses to AP600 DSER open item 3.8.2.3-1 for your review. Item 3.8.2.3-1 addresses the load combinations used in the analysis of the AP600 containment. This items was discussed during the NRC design review meetings on structural items during the week of December 9, 1996.

Please contact Donald A. Lindgren at (412) 374-4856 if you have any questions.


Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

/jml

attachment

cc: D. Jackson, NRC, (attachment)
T. Cheng, NRC, (attachment)

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DSER Open Item 3.8.2.3-1

NRC letter dated July 15, 1996

Revision 7 of SSAR Section 3.8.2.3 summarizes the design loads and load combinations considered in the design of the AP600 steel containment. In comparing the SSAR with the guidelines of Section 3.8.2 of the standard review plan (SRP), the staff found that the load combinations documented in the SSAR are acceptable. However, Westinghouse did not provide a justification, in Revision 7 of the SSAR, for not considering the other load combinations documented in the DSER in the design of the containment vessel.

NRC letter dated April 5, 1996

3.8.2.3-1 Loads and Load Combinations

In Table 3.8.2-1 of the SSAR, Westinghouse summarizes the design loads, load combinations and the ASME service limits for the containment vessel design. Based on the guidelines of Section 3.8.2 of the SRP and the load combinations recommended in Section 3.8.2.II.3.b of the SRP, the load combinations listed in Table 3.8.2-1 of early SSAR amendments for the containment vessel design are acceptable, except the following issues need to be resolved by Westinghouse:

- (1) For the load combination corresponding to design conditions, the design external pressure was not included.
- (2) For Level A Service Limits:
 - The load case of multiple safety relief valve (SRV) actuation was not considered.
 - The external pressure was not included in the LOCA (loss of coolant accident) case.
 - The multiple SRV loads with a small intermediate pipe break accident case was not considered.
 - For the load combination indicated in the second to last column of Table 3.8.2-1 of the SSAR, the external pressure of 2.5 psi is combined with "To" and "Ro." Westinghouse should clarify whether the 2.5 psi external pressure is in combination with the normal operating plant condition or LOCA accident condition.
- (3) The load combinations for Level B Service Limits were not considered in the design.
- (4) For Level C Service Limits:
 - The external pressure was not considered in the case of a LOCA in combination with the SSE.
 - For the case of an operating plant condition in combination with the SSE, it is not clear that operating pressure associated with To and Ro were considered.
 - The load combination related to multiple SRV actuation, in combination with a small or intermediate pipe break accident and SSE, was not considered.

- For the load combination indicated in the last column of Table 3.8.2-1 of the SSAR, the external pressure of 3.0 psi is combined with "To" and "Ro." Westinghouse should clarify if this was in combination with load combinations (iii)(c)(1) or (iii)(c)(2) of Section 3.8.2.II of the SRP.

(5) For Level D Service Limits:

- The external pressure was not considered for the case of a LOCA in combination with the SSE and local dynamic loadings.
- The load combination related to multiple SRV actuation in combination with a small or intermediate pipe break accident and SSE and local dynamic loadings was not considered.

Response

A response is given for each of the above items, and subitems, below. The design load combinations have been included in the SSAR. Justification for loads and load combinations that are not applicable to the AP600 does not belong in the SSAR but is provided in this response. These include:

- there are no loads on the containment vessel due to actuation of the safety relief valves
 - the event leading to external pressure is independent from other accidents. The loading is conservatively taken concurrent with SSE as requested by NRC staff.
- (1) The design external pressure has been included in the design condition load combination in Table 3.8.2-1 of the SSAR.
- (2) Level A Service Limits
- (a) Multiple safety relief valve discharge is not a load case for a PWR containment vessel. The AP600 includes an automatic depressurization system (ADS) which discharges into the in-containment refueling water storage tank (IRWST). The IRWST is an independent structure that is not part of the containment vessel, and transient load conditions associated with the ADS do not apply load to the containment vessel.
 - (b) External pressure results from an independent event from the LOCA. Therefore, external pressure is not included with the LOCA case. A positive external pressure would reduce the pressure difference across the vessel. The negative external pressure associated with the tornado is not postulated concurrent with the LOCA in accordance with Reg. Guide 1.117. See also (2)(d) below.
 - (c) Multiple safety relief valve discharge is not a load case for a PWR plant. See (2)(a) above. A small or intermediate pipe break alone is bounded by the large LOCA.
 - (d) The external pressure case occurs in combination with a normal operating plant condition as defined by the To and Ro loads. The external pressure results from a loss of containment heating in extremely cold weather. This is described in SSAR section 6.2.1.1.2. It is a separate event from the LOCA.

(3) Level B Service Limits

For the AP600 nuclear plant there are no load combinations to be evaluated against Level B Service limits.

(4) Level C Limits

- (a) Consistent with (2)(b) above, external pressure is not included with the LOCA case. External pressure is combined with SSE.
- (b) Operating pressure associated with To and Ro has been included with the SSE in the SSAR for the operating plant condition load combination given in Table 3.8.2-1.
- (c) Multiple safety relief valve discharge is not a load case for a PWR plant. See (2)(a) above.
- (d) See (2)(d) and 4(a) above.

(5) Level D Service Limits

- (a) See (2)(b) and (3)(a) above.
- (b) Multiple safety relief valve discharge is not a load case for a PWR plant. See (2)(a) above.