

April 17, 2001

Mr. Alex Marion, Director  
Engineering  
Nuclear Energy Institute  
1776 I Street, N.W., Suite 400  
Washington, D.C. 20006-3708

SUBJECT: ISSUES TO BE ADDRESSED IN A GENERIC JUSTIFICATION FOR  
CONTINUED OPERATION OF PWRs

Dear Mr. Marion:

The NRC staff met with the EPRI Materials Reliability Program (MRP) on Thursday, April 12, 2001, to discuss the generic implications of circumferential cracking found on the pressurized water reactor (PWR) upper head control rod drive mechanism (CRDM) penetrations at the Oconee Nuclear Station, Unit 3. The staff had requested, by letter dated April 5, 2001, that the MRP include in this presentation, among other items, a discussion of proposed industry actions to address the generic aspects of the CRDM nozzle circumferential cracking issue.

During this meeting, the staff raised several concerns (e.g., need for expanded inspections for plants presently in refueling or maintenance outages, industry assessment of risk involved in not immediately inspecting, and others to be detailed in the staff's meeting summary) regarding the initiation and growth of significant circumferential cracks in PWR Alloy 600 weldments, apparently at growth rates that are faster than previously modeled. The staff requested that the MRP address the questions raised both in the staff's letter dated April 5, 2001, and during the April 12, 2001, public meeting, in its preliminary safety assessment of the generic implications of this cracking issue. The MRP stated that this assessment will be submitted to the staff by April 27, 2001.

The staff is primarily concerned with those plants that have either never inspected or have not recently inspected their CRDM penetrations. In order to ensure that the staff's concerns related to this potentially significant safety concern are addressed, we request that the MRP's assessment answer the following questions related to a generic justification for continued operation (JCO) for PWRs. If you can not provide responses to these questions by April 27, 2001, we request that you immediately notify the staff of the date by which you can provide responses.

1. The MRP stated during the April 12, 2001, meeting that they are conducting a survey of the PWR plants to determine the scope and extent, to date, of the under-insulation visual inspections used by PWR licensees to detect boron deposits on the upper reactor pressure vessel (RPV) head. The preliminary results presented indicate that licensees of CE and Westinghouse PWR-designed plants may not be capable of performing comprehensive VT-2 leakage examinations of the upper vessel heads without having to remove the existing vessel head insulation materials. Based on this, provide a technical justification, supported by appropriate deterministic and/or risk-informed assessments, as to why it is safe, for each of the various PWR vessel designs, to continue to operate, or for those in or entering outages to restart, until such time that appropriate inspections of all of the RPV upper head penetrations have been performed. This discussion should include, but not be limited to:
  - a. description of inspections of the upper RPV head penetrations that have been performed to date, and their applicability to plants that have not yet inspected;
  - b. an assessment of the probability for circumferential flaw(s) to exist in the upper RPV head penetrations, with lengths and depths, on the order of or greater than that found at Oconee for those plants that have not yet performed comprehensive leakage examinations of all of the upper RPV head penetrations;
  - c. means utilized to detect and characterize through-wall cracks in the upper RPV head penetrations;
  - d. MRP recommendations regarding any expanded operator actions/training on beyond design basis accident (DBA) scenarios involving rod ejection(s), small-, medium- and large-break loss of coolant accidents (LOCA), rod insertion failure(s), etc.; and,
  - e. MRP recommendations regarding increased operator actions during periods of highest rod worth (e.g., Startup, Cool-down and Hot Standby periods).
2. Postulated crack growth rates (CGR) were discussed during the April 12, 2001, meeting. Based on the staff's comments regarding the likelihood for an exceptionally aggressive operating environment in the CRDM housing annulus, where potentially highly concentrated borated primary water could become oxygenated, discuss the acceptability of your CGR model, and conditions under which the model was developed consistent with the conditions to which it is being applied. Include a technical basis for this CGR, including postulated times it will take to initiate and grow a through-wall crack, and the environmental factors (e.g., temperature, boron concentrations, oxygen levels, etc.) that will effect this CGR. Based on this proposed CGR, identify the frequency and scope of inspections that would be necessary to detect a circumferential flaw before it could exceed the critical size for failure of the CRDM penetration.

Mr. Alex Marion

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If you have any question regarding this letter, please contact Mr. Jack Strosnider of my staff at 301-415-3298.

Sincerely,

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Brian W. Sheron, Associate Director  
For Project Licensing and Technical Analysis  
Office of Nuclear Reactor Regulation

Project No. 689

cc: See next page

Mr. Alex Marion

- 3 of 3 -

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