

March 25, 2010

Mr. Neil Wilmshurst  
Vice President, Nuclear Power Sector & Chief Nuclear Officer  
Electric Power Research Institute  
1300 W. T. Harris Boulevard  
Charlotte, NC 28262

SUBJECT: SECOND REQUEST FOR ADDITIONAL INFORMATION RE: ELECTRIC  
POWER RESEARCH INSTITUTE TOPICAL REPORT 1018427,  
“NONDESTRUCTIVE EVALUATION: PROBABILISTIC RISK ASSESSMENT  
TECHNICAL ADEQUACY GUIDANCE FOR RISK-INFORMED IN-SERVICE  
INSPECTION PROGRAMS” (TAC NO. ME1057)

Dear Mr. Wilmshurst:

By letter dated February 18, 2009, Electric Power Research Institute (EPRI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report (TR) 1018427, “Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs.” In a letter dated December 15, 2009, EPRI responded to the NRC staff’s request for additional information dated October 20, 2009. Upon review of the information provided, the NRC staff has determined that additional information is needed to complete the review. On March 22, 2010, Patrick O’Regan, EPRI Project Manager, and I agreed that the NRC staff will receive your response to the enclosed Request for Additional Information (RAI) within 60 days of issuance of this letter. If you have any questions regarding this matter, please contact Tanya M. Mensah at (301) 415-3610.

Sincerely,

**/RA/**

Tanya M. Mensah, Senior Project Manager  
Licensing Processes Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Project No. 669

Enclosure:  
RAI questions

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION  
BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
TOPICAL REPORT 1018427, "NONDESTRUCTIVE EVALUATION: PROBABILISTIC RISK  
ASSESSMENT TECHNICAL ADEQUACY GUIDANCE FOR RISK-INFORMED IN-SERVICE  
INSPECTION PROGRAMS"

ELECTRIC POWER RESEARCH INSTITUTE

PROJECT NO. 669

The NRC staff has reviewed the Electric Power Research Institute (EPRI) Topical Report (TR) 1018427, "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs." The NRC staff has also reviewed EPRI's letter dated December 15, 2009 (ADAMS Accession No. ML093520080), which responded to the NRC staff's request for additional information (RAI), dated October 20, 2009 (ADAMS Accession No. ML092710067). Based on the review of EPRI TR 1018427, and the RAI responses, the NRC staff is requesting additional information to complete the review. EPRI TR 1018427 references the Probabilistic Risk Assessment (PRA) Standard (ASME RA-sb-2005)<sup>1</sup> that was prepared by the American Society of Mechanical Engineers (ASME) in 2005 as endorsed by Regulatory Guide 1.200<sup>2</sup>, Revision 1 in 2007, with respect to PRA technical adequacy.

1. By letter dated December 15, 2009, in EPRI's response to RAI 2, EPRI concluded that no changes were needed to the Table in Appendix A of EPRI TR 1018427 that provides an assessment (i.e., a justification) for assigning acceptable capabilities categories for individual supporting requirements. In support of EPRI's proposal to accept Category I or Category Not-Met as sufficient for risk-informed inservice inspection (RI-ISI), EPRI's assessment states that the proposed capability category "provides resolution and specificity to identify the relative importance of the contributors at the system or train level, including associated human action." The two RI-ISI methods discussed in EPRI TR 1018427, one described in EPRI TR-112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," (Traditional) and the other described in ASME Code Case N-716, "Alternative Piping Classification and Examination Requirements, Section XI Division 1," (Streamlined), are based on absolute risk results in which the quantitative results are directly compared to a guideline value. There is no relative measure involved. In contrast to the "relative importance" assessment, other assessments for other supporting requirements refer to the RI-ISI methods as "absolute

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<sup>1</sup> ASME RA-Sb-2005, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," Addendum B to ASME RA-S-2002, ASME, New York, New York, December 30, 2005.

<sup>2</sup> "An Approach for Determining The Technical Adequacy Of Probabilistic Risk Assessment Results For Risk-Informed Activities," Revision 1, January 2007.

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risk ranking and grouping approach” as justification for accepting conservative results (e.g., AS-A9). The reference to system and train levels also appears misplaced because RI-ISI is based on segments.

The NRC staff believes that the assessment category “provides resolution and specificity to identify the relative importance” is inconsistent with the methodologies and therefore provides no justification for the proposed capability categories. Please provide further explanations on the applicability of the relative and train level discussions to RI-ISI. Re-evaluate your table in Appendix A without this assessment.

2. By letter dated December 15, 2009, EPRI’s response to RAI 3b states that “*The PRA Technical Adequacy Guidelines contained in this report are the same whether the intended application is to develop a pre-service inspection (PSI) plan or an inservice inspection plan (ISI).*”

Describe in detail how the PRA is used to support PSI and explain how the design-specific PRA and plant-specific PRA (during Combined Operating License stage) are of sufficient quality to support the development of PSI plan.

3. EPRI has included proposed flooding supporting requirement capability categories (i.e., the IF supporting requirements) to support both the “Traditional” and the “Streamlined” methods. The Traditional and Streamlined methods are substantively different and it is unclear whether the screening approach as described in the ASME standard elements for flooding analysis (the IF elements) is acceptable when applied to the Traditional method. The Traditional method requires an estimated conditional core damage probability and conditional large early release probability of every segment within the scope of the proposed program, while the streamlined approach only relies on the flooding analysis to identify any high safety significant (HSS) segments beyond the generic set of HSS segments. The flooding analysis described in the ASME standard RA-Sb-2005 (particularly the screening and grouping steps) is applicable to the N-716 method but does not appear to be applicable to the Traditional method which evaluates every segment failure in the scope of the program (and excludes every segment failure outside of the scope). Please describe the flooding analysis that is done to support the Traditional method and use this description to explain how the ASME flooding analysis SRs represent a necessary and complete characterization of an acceptable analysis using the Traditional method. If this characterization is possible, then explain what capability categories are needed for the Traditional method.

Please clarify how EPRI envisions EPRI TR 1018427 to be referenced in a Traditional RI-ISI relief request.

4. Please confirm that the flooding analysis described in RA-Sa-2009 is unchanged from that described in RA-Sb-2005.
5. It appears that the proposed capability categories required to support the Traditional versus the Streamlined RI-ISI methods differ for only one SR, IE-A4 in the Table in Attachment A in EPRI TR 1018427. In addition, the justification given for both the

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Traditional and the Streamlined capability category in supporting requirement IE-A4 is identical to the justification given for IE-A4a, however; IE-A4a concludes that the same capability category is required for the Traditional and the Streamlined analyses whereas IE-A4 concludes that different categories are required. Please clarify why there is a difference in capability categories between the traditional and streamlined approaches for these supporting requirements.

6. By letter dated December 15, 2009, in EPRI's response to RAI 3b, the statement is made that the PRA Technical Adequacy Guidelines provided in EPRI TR 1018427 are the same whether the application is to develop a PSI plan or an inservice inspection (ISI) plan. EPRI proposed to modify Sections 1 and 3 of EPRI TR 1018427 to address this statement.

Please discuss why this statement is true since the statement appears to conflict with earlier statements in RAI response 3b. Earlier in the 3b response, the statement is made that some of the supporting requirements discussed in EPRI TR 1018427 cannot be met until the plant is operational. Pre-service inspection programs are performed before the plant is operating. Should EPRI TR 1018427 describe which supporting requirements are not required to be met for development of a pre-service inspection program? Also in response 3b, the living program component of a RI-ISI program is discussed. Could the living program component identify items that should have been part of the original PSI program that may not have been?