

August 27, 2007

Mr. Biff Bradley, Director
Risk Assessment
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING NUCLEAR ENERGY INSTITUTE TOPICAL REPORT (TR) WCAP-16308-NP, "PRESSURIZED WATER REACTOR OWNERS GROUP 10 CFR 50.69 PILOT PROGRAM - CATEGORIZATION PROCESS - WOLF CREEK GENERATING STATION" (TAC NO. MD4429)

Dear Mr. Bradley:

By letter dated September 25, 2006, the Nuclear Energy Institute (NEI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report (TR) WCAP-16308-NP, "10 CFR 50.69 Pilot Program - Categorization Process - Wolf Creek Generating Station." TR WCAP-16308-NP is available in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML062770354.

Upon review of the information provided, the NRC staff has determined that additional information is needed to complete the review. Specifically, Table A-2 in TR WCAP-16308-NP, purported to identify "those differences [between American Society of Mechanical Engineers (ASME) Code Case N-660 and the categorization process used at Wolf Creek Generating Station] that could impact the categorization." The NRC staff noted that Table A-2 was incomplete.

Westinghouse provided a supplemental table to the NRC staff at the July 11, 2007, public meeting. As discussed in the enclosed RAI questions, this supplemental Table A-2 is still incomplete. RAI question #8 requests a complete and accurate Table A-2, identifying all the differences between ASME Code Case N-660, Revision 0, and the methodology being proposed in TR WCAP-16308-NP. Failure to provide a complete table to support the NRC staff's review increases the likelihood of additional RAI questions and schedule delays or that the submittal is rejected.

On March 21, 2007, you and I agreed that the NRC staff will receive your response to the enclosed RAI questions by October 18, 2007. In addition, a public meeting is tentatively planned for September 25, 2007, so that the NEI may discuss its proposed RAI responses with the NRC staff.

B. Bradley

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The NEI should notify the NRC, in writing, if it requires additional time beyond October 18, 2007, to provide a response to this request. If a complete RAI response is not received by October 18, 2007, and NEI does not request an extension, the NRC will have a basis to terminate its review of TR WCAP-16308-NP, Revision 0. If you have any questions regarding the enclosed RAI questions, please contact me at 301-415-3610.

Sincerely,

/RA/

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

Project Nos. 689 and 700

Enclosure: RAI questions

cc w/encl: See next page

B. Bradley

-2-

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REQUEST FOR ADDITIONAL INFORMATION
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
TOPICAL REPORT (TR) WCAP-16308-NP, "PRESSURIZED WATER REACTOR OWNERS
GROUP 10 CFR 50.69 PILOT PROGRAM - CATEGORIZATION PROCESS -
WOLF CREEK GENERATING STATION"
NUCLEAR ENERGY INSTITUTE
PROJECT NO. 689

By letter dated September 25, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No.ML062770354), the Nuclear Energy Institute (NEI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report (TR) WCAP-16308-NP, "10 CFR 50.69 Pilot Program - Categorization Process - Wolf Creek Generating Station." Upon review of the information provided, the NRC staff has determined that additional information is needed to complete the review.

To facilitate an efficient and expeditious review, the NRC staff requests responses to the following questions in order to continue the review of TR WCAP-16308-NP. All section, paragraph, page, table, or figure numbers in the questions below refer to items in TR WCAP-16308-NP, Revision 0, unless specified otherwise. All references to the endorsed American Society of Mechanical Engineers (ASME) Code Case N-660, Revision 0, "Risk-Informed Safety Classification for Use in Risk-Informed Repair/Replacement Activities," are denoted as "ASME Code Case N-660, Rev. 0" or the "Code Case."

1. Section I-3.0 of the ASME Code Case N-660, Rev. 0, refers to shutdown, fires, flooding and seismic (hereafter referred to as "external events") as providing information relevant to classification. Although external events are often not modeled in a probabilistic risk assessment (PRA), Tables I-1 to I-4 in ASME Code Case N-660, Rev. 0, may be used to classify structures, systems, and components (SSCs) needed to respond to these external events.

The proposed methodology¹ retains the original discussion and again mentions external events in a new section (Section I-3.1.2), but provides no additional guidance. The pilot plant did not have an external event PRA and did not use Tables I-1 to I-4.

¹ Table A-2 of TR WCAP-16308-NP identifies a number of differences between the process described in ASME Code Case N-660 and that applied by Wolf Creek Generating Station (WCGS) and other differences have been identified that are not included in Table A-2. The body of TR WCAP-16308-NP also provides some limited guidance as illustrated here. The process applied by WCGS (including any revision that may be made during NRC staff review of TR WCAP-16308-NP) is referred to as the proposed methodology.

ENCLOSURE

TR WCAP-16308-NP provides some discussion about external initiating events in the last paragraph on page 4-3 which states:

"Also, only qualitative risk assessments exist for fire, seismic, external events and shutdown at WCGS. Therefore, to capture the risk importance of piping segments from the fire, seismic, external events and shutdown qualitative risk assessments, any piping segment supporting a high risk significant safe shutdown pathway would be a candidate medium safety significant pipe segment. This is equivalent to the active component classification process where active SSCs that support safe shutdown pathways are not automatically classified as high safety significant, but rather are left to the IDP for a final classification."

The NRC staff believes that the last sentence above is incorrect. As stated at the bottom of page 5, and in the third bullet on the top of page 6, in NEI 00-04, "10 CFR 50.69 SSC Categorization Guideline," an SSC identified as high safety significant (HSS) by a non-PRA method must remain HSS and may not be reclassified by the Integrated Decision-Making Panel (IDP). The paragraph in TR WCAP-16308-NP places these SSCs into a medium safety significant classification which does allow the IDP to reclassify the SSC as a low safety significant (LSS) SSC.

Please provide a description of how piping segments supporting a safe shutdown pathway that is obtained from a non-PRA analysis of external events should be identified and classified. If the proposed method differs from the method described in NEI 00-04 for active SSCs, please justify this difference.

2. On July 11, 2007, a Category 2 public meeting was held between the NRC staff and industry representatives at NRC headquarters. During the meeting, industry representatives provided a supplemental Table A-2 (that added a large number of entries) to discuss its draft comments in response to the NRC staff's comments on the 50.69 pilot documentation guidance (ADAMS Accession No. ML071930260). As described under the entry for I-3.1.1(a) in the supplemental Table A-2 (but not included in Table A-2 of TR WCAP-16308-NP), the proposed methodology modifies the Section I-3.1.1(a) of ASME Code Case N-660, Rev. 0, to expand the available alternatives to analyzing less than a large pressure boundary failure. The new alternative permitting the analysis of a smaller pressure boundary failure is:

(4) when design insights do not support a large break based on pressure/temperature/flow in the pipe segment.

This guidance provides no predictability about which segments will be assigned a small leakage and which segments would not. Please provide additional guidance that clearly defines the "design insights" and identify criteria that would be used to conclude that the insight does not support a large break. Justify how these insights and criteria provide confidence that a large break is not a credible failure mode.

3. As described under the entry for Section I-3.1.2(b) in Table A-2 of TR WCAP-16308-NP, the NEI proposed new text to be used instead of the text in ASME Code Case N-660, Rev. 0. The single sentence in Section I-3.1.2(a) of ASME Code Case N-660, Rev. 0, is to be expanded into four bullets. It is not clear that the proposed text does not change the original process.

- a) Please identify the Risk-Informed Inservice Inspection (RI-ISI) program criteria (i.e., document and page number) referred to in the explanatory note in this entry in Table A-2.
- b) Please describe each of the proposed changes and provide examples illustrating the differences and similarities between the endorsed ASME Code Case N-660, Rev. 0, text and the proposed text of Section I-3.1.2(b).

4. During the May 17, 2007, audit of the WCGS IDP documentation, the NRC staff noted that the piping attached to the reactor sump screens was classified as LSS while the screens themselves had been categorized HSS during the active SSC classification phase. After several discussions with industry representatives, it appears that the reactor coolant recirculation function of these screens was not included in the passive classification process because the passive categorization only included the containment spray system functions. At WCGS, failure of the containment spray system does not affect core damage or large early release. Page 27 of NEI 00-04 states, "there may be circumstances where the categorization of a candidate low safety-significant SSC within the scope of the system being considered cannot be completed because it also supports an interfacing system." This caution is not included in the proposed passive categorization methodology.

- a) Please provide additional guidance that provides confidence that piping segments that support two or more systems' functions will be classified based on the highest safety significance function being supported.
- b) The proposed method does not appear to require identification and resolution of differences between the safety significance classification between an active SSC and the piping attached to the SSC. Under what conditions is it reasonable for the safety significance of the pressure boundary function of a piping segment to be classified lower than the SSCs to which it is attached?

5. As described in the entry under Section I-3.1.3(a)(3) in Table A-2 of TR WCAP-16308-NP, the NEI proposed to use new text instead of the text in the endorsed version of N-660. ASME Code Case N-660, Rev. 0 states,

"Even when considering operator actions used to mitigate an accident, failure of the piping segment will fail a high-safety-significant function."

This text has been moved to Section I-3.2.2(b)(1) and modified to now state,

"Even when taking credit for plant features and operator actions, failure of the piping segment will not² directly fail another high-safety-significant function."

The introduction of the word "another" in the proposed version significantly alters when the response to this question would be "True" and "False" in a manner which requires further explanation. The original text ensures that a piping segment that would disable any single HSS

²The negative in the proposed methodology is a natural consequence of changing the way "true" and "false" responses are used in the IDP classification.

function would be classified HSS. In the proposed revision, a second (i.e., “another”) HSS function would have to be failed in addition to whatever function that the piping segment being classified would directly degrade or fail. Is the intent of this proposed text to require that a second HSS function be consequently failed? If so, please justify not assigning a HSS classification to an SSC whose failure could consequently fail an HSS function.

6. As described in the entry under Section I-3.1.3(b)(2) in Table A-2 of TR WCAP-16308-NP, you have proposed to use new text instead of the text in ASME Code Case N-660, Rev. 0. The endorsed version of ASME Code Case N-660 states,

“The piping segment supports a significant mitigating or diagnosis function addressed in the Emergency Operating Procedures or the Severe Accident Management Guidelines.”

This text has been moved to Section I-3.2.2(b)(4) and modified to now state,

“The piping segment does not³ individually support a significant mitigating or diagnosis function addressed in the Emergency Operating Procedures or the Severe Accident Management Guidelines, with no redundancy or alternate means of support.”

The introduction of the phrase “with no redundancy or alternative means of support” in the proposed version significantly alters when the response to this question would be “True” and “False” in a manner which requires further explanation. The original question addressed two issues, a particularly important aspect of defense-in-depth and the complexity of modeling human errors. One of the defense-in-depth considerations is to avoid over-reliance on programmatic activities to compensate for weakness in plant design. In this case, relying on the operators to overcome failures which reduce diagnosis information relied upon to mitigate accidents. Quantitative evaluation of the impact of these failures may provide additional information about the impact of these failures on risk and how that impact compares to the acceptance guidelines, but such calculations are very resource intensive and of limited accuracy.

The NRC staff has not yet concluded whether the original statement was too limiting, as argued in TR WCAP-16308-NP, but considers that the introduction of the “individually supports” may provide reasonable flexibility commensurate with the safety significance of the piping. However, because of the pervasive inclusion of instrumentation throughout the plant that normally includes measurements of many related parameters, it would appear that there would never be a piping segment failure for which the response to the proposed question would be “False.”

- a) Please explain the difference between “individually support” and “no redundancy.”
- b) Please define “alternative means of support” and justify that full loss of a diagnoses function would not be expected to be safety significant unless these alternative means are also lost. For example, upon loss of the reference leg for level measurement in a refueling water storage tank, would low pressure in the

³The negative in the proposed methodology is a natural consequence of changing the way “true” and “false” responses are used in the IDP classification.

high-pressure safety injection pump inlet (or some other indication) provide an acceptable alternative means for determining when to switch over from injection to recirculation?

7. The proposed methodology proposes to address the safety significant implication of known active degradation mechanisms using a new question described in the entry under Section I-3.2.2(b)(5) in the supplemental Table A-2 (ADAMS Accession No. ML071930260). The proposed question states that "the plant condition monitoring program would identify any known active degradation mechanism in the pipe segment prior to its failure in test or actual demand event." The second sentence in Section I-3.2.2(b) in Code Case N-660, stated, "Any piping segment initially determined to be a Medium consequence category and that is subject to a known active degradation mechanism shall be classified HSS." Evidently, the proposed method replaced the guidance in ASME Code Case N-660, Rev. 0, with the guidance under the new Section I-3.2.2(b)(5). This change to ASME Code Case N-660, Rev. 0, will almost certainly result in a number of segments that would have been classified HSS, according to the Code Case, to be classified LSS according to the proposed method.

As written in the proposed methodology, the simple existence of a degradation monitoring program at a plant would seem to result in a "True" designation for every location in the plant that may be susceptible to that degradation mechanism, regardless of whether there are any inspections in the segment being classified. This interpretation is supported by the observation during the NRC staff audit of the WCGS IDP documentation, that the WCGS IDP used the phrase, "[a] plant conditioning monitoring program exists" in a number of places. No other discussions about degradation mechanisms were identified during the audit.

The generic disposition of all known, active degradation mechanisms is contradictory to ASME Code Case N-660, Rev. 0. Please provide additional description about how active degradation mechanisms should be incorporated into the safety-significance classification for a segment. The discussion should describe the relationship between the plant's degradation monitoring programs, the inspection locations within the programs, and the inspection locations within the segment being classified. Please describe the differences between the results that would be obtained using the endorsed code case and the results that will be obtained using the proposed method, and explain why these differences are acceptable.

8. Table A-2 provided in TR WCAP-16308-NP is incomplete. Page A-5 states that, "[n]ot all modifications to the code case are reported. Only those differences that could impact the categorization process used a WCGS are shown in Table A-2." The Table did not include a number of differences that have a major impact on the process. During a July 11, 2007, NRC public meeting, Westinghouse representatives provided a supplemental Table A-2 that added a large number of entries. The supplemental Table still does not identify all of the differences between the proposed method and ASME Code Case N-660, Rev. 0.

For example, the new question listed under Section I-3.2.2(b)(5) in RAI question #7 was not included in Table A-2 in Revision 0 of TR WCAP-16308-NP. The question was included in the supplemental Table A-2. However, in this supplemental table, the entry under "Endorsed Revision 0" was N/A while, in practice, this question replaced the guidance on the same subject that was in Section I-3.2.2(b) of Code Case N-660. There was an entry under I-3.2.2(b) in Table A-2 of TR WCAP-16308-NP but the entry only refers to the first sentence in Section 3.2.2(b) in the Code Case and stated that "new considerations have been provided."

Not included in either table, nor the TR WCAP-16308-NP, is the deletion of the Code Case's guidance on how degradation mechanisms are to be incorporated into the categorization process.

Please submit a table that includes all differences between the endorsed ASME Code Case N-660, Rev. 0, and the proposed method for which approval is being requested. Based on the problems associated with only identifying important differences in the previous tables, please include all differences in the table.

9. When used in support of the implementation of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.69, a categorization process must include an evaluation that provides reasonable confidence that sufficient safety margins are maintained and that any potential increases in core damage frequency (CDF) and large early release frequency (LERF) are small. Please explain how a licensee applying this methodology to categorize the passive SSCs can satisfy 10 CFR 50.69(c)(1)(iv) and provide reasonable confidence that sufficient safety margins are maintained and that any potential increases in CDF and LERF are small.

10. Section 7.3, "Monitoring of RISC-3 SSCs," discusses the review of failures of low-risk safety-related (RISC-3) SSCs as part of the monitoring process under 10 CFR 50.69 of the NRC regulations. Discuss plans to monitor corrective action for degradation of RISC-3 SSCs.

11. Section 8, "Application of RISC-3 Treatment Requirements," states that the Wolf Creek Nuclear Operating Corporation (WCNOC) will develop and implement documented processes to control the design, procurement, inspection, and maintenance to ensure, with reasonable confidence, that RISC-3 SSCs remain capable of performing their safety-related functions under design-basis conditions. Section 8 also states that the WCNOC approach to inspection, testing, and corrective actions is described in Section 7 of the TR. However, Section 7 discusses monitoring of failure rates. Discuss the plans for inspection, testing, and corrective actions for RISC-3 SSCs that satisfy 10 CFR 50.69(c)(1)(iv), (d)(2), and (e). For example, the South Texas Project nuclear power plant is implementing a specific plan for treatment of low-risk safety-related SSCs as part of an exemption received from special treatment requirements in 10 CFR Part 50.

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