



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 19, 2008

Vice President, Operations  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
450 Broadway, GSB  
P.O. Box 249  
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3 - REQUEST  
FOR ADDITIONAL INFORMATION REGARDING GENERIC LETTER 2004-02  
(TAC NOS. MC4689 AND MC4690)

Dear Sir or Madam:

By letter dated February 28, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080670135), Entergy (the licensee) submitted a supplemental response to Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors," for Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3).

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal. The process involved detailed review by a team of approximately 10 subject matter experts, with a focus on the review areas described in the NRC's "Content Guide for Generic Letter 2004-02 Supplemental Responses" (ADAMS Accession No. ML073110389). Based on these reviews, the NRC staff has determined that additional information is needed in order to conclude there is reasonable assurance that GL 2004-02 has been satisfactorily addressed for IP2 and IP3. The specific questions are found in the enclosed request for additional information (RAI).

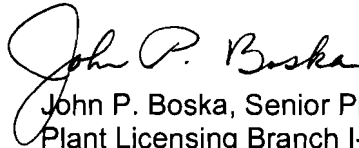
The NRC requests that the licensee respond to this RAI within 90 days of the date of this letter. However, the NRC would like to receive only one response letter for all questions. If the licensee concludes that more than 90 days are required to respond to the RAI, the licensee should request additional time, including a basis for why the extension is needed.

If the licensee concludes, based on its review of the RAI, that additional corrective actions are needed for GL 2004-02, the licensee should request additional time to complete such corrective actions as needed. Criteria for such extension requests are contained in SECY-06-0078 (ADAMS Accession No. ML053620174), and examples of previous requests and approvals can be found on the NRC's sump performance website, located at:  
<http://www.nrc.gov/reactors/operating/ops-experience/pwr-sump-performance.html>.

Any extension request should also include results of contingency planning that will result in near term identification and implementation of any and all modifications needed to fully address GL 2004-02. The NRC strongly suggests that the licensee discuss such plans with the NRC staff before formally transmitting an extension request.

Please contact me at (301) 415-2901 if you have any questions on this issue.

Sincerely,

A handwritten signature in black ink that reads "John P. Boska". The signature is written in a cursive style with a large initial "J".

John P. Boska, Senior Project Manager  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-247 and 50-286

Enclosure:  
RAI

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING GENERIC LETTER 2004-02

ENTERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3

DOCKET NOS. 50-247 AND 50-286

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1. An adequate technical basis was not provided to support the assumption that 40 percent of small pieces of fibrous debris will be captured on gratings in the upper containment. Please provide a justification for this assumption or revise it as determined appropriate. (Audit Open Item)
2. An adequate technical basis (e.g., test data) was not provided to support the assumption of 10 percent fibrous debris erosion in the containment pool over a 30-day period. Please provide a justification for this assumption or revise it as determined appropriate. (Audit Open Item)
3. The testing performed for IP2 calcium silicate with asbestos, that is also being applied to IP3, was not performed for a sufficiently long period to give high confidence of no erosion of the material, as opposed to a small erosion rate that could lead to a significant fraction of erosion over a 30-day period (the post-loss-of-coolant-accident (LOCA) mission time of the containment sumps). Please provide justification for its conclusions about erosion of this material. (Audit Open Item)
4. Please provide a justification for the use of erosion data from the IP2 calcium silicate tests with asbestos for the IP3 calcium silicate material without asbestos. (Audit Open Item)
5. The licensee plans to credit time-dependent debris transport for qualification of the vapor containment (VC) sump. The licensee should provide adequate technical justification to demonstrate that the time-dependent model is conservative, considering the issues raised in Section 3.5.4.6 of the audit report (ADAMS Accession No. ML082050446). The

Enclosure

areas that require justification in connection with the time-dependent debris transport for qualification of the VC sump are blowdown, pool fill, and washdown transport directly to the VC sump, erosion of debris, internal recirculation (IR) strainer filtering efficiency, potential release of material from the IR strainer when the pumps are secured, potential delay of transport to the VC sump strainer due to flotation, and the formation of chemical precipitates. (Audit Open Item)

6. The amounts of LOCA generated debris listed in the debris generation section of the supplemental response (Table 3b.4-10) differed from the debris generation amounts listed in the transport section (Tables 3e.6-9 and 3e6-10). Please provide an explanation for the differences between the values in the tables.
7. The analysis techniques used in the strainer certification calculation for IP2 used the NUREG-6224 head loss correlation to adjust the test data. Please demonstrate that a test was conducted that bounds applicable scenarios, or should justify its present approach of extrapolating head loss data based on a correlation. The main area of concern for this issue is extrapolation of test data to different debris loads or different flow velocities. Please provide the raw test data and any extrapolation methodology should be clearly explained and shown to be conservative. (Audit Open Item)
8. Please show that testing was conducted using a debris mix that matches its transport calculation or should show its existing method is conservative. The main points of this issue are to ensure that testing is conducted with the amounts of fine (suspendable) fiber predicted to reach the strainer, and to ensure that the fiber is prepared as true fines. In addition, the introduction of the debris should allow prototypical or conservative transport to the strainer (e.g., agglomeration should be avoided). For thin bed testing, only fine fibers should be introduced until the entire fine fiber load has been added incrementally. For example, supplemental response 3f.6 concludes that no thin bed will result. However, the testing that justifies this conclusion should be shown to be appropriately conducted with fine fiber. (Audit Open Item)
9. Test procedures and test results concentrated on the VC sump and did not provide clear traceability to show that these tests bounded the internal recirculation sump conditions. Please provide a summary of the testing and analysis results applicable to the internal recirculation sump. (Audit Open Item)
10. The methodology used to qualify the IP2 VC sump strainers for vortex formation/air ingestion was not clear. The supplemental response stated that a vortex evaluation using the submergence Froude number, and consideration of design limits recommended in Regulatory Guide (RG) 1.82, was completed. Please provide the methodology, assumptions, and the bases for the assumptions in this evaluation.
11. It was not clear that the debris loading for the IP2 VC sump strainer for a small-break LOCA with partial submergence was adequately considered. With partial submergence, less strainer area is available to collect debris and the velocity through the submerged portion of the strainer is higher. The methodology for evaluation of this condition was not provided. The supplemental response states that the VC sump strainer can sustain 1688 gpm flow while only 1350 gpm is required for the small-break case. Please provide the methodology, assumptions, and bases for the assumptions for this analysis.

12. The test results presented in tables 3f.10-1 and 2 could not be traced by the NRC staff to head-loss testing results. Please provide the raw test data and test conditions, and please show how the head-loss results were derived from the test data. Please include any assumptions used for this analysis. Please ensure that a clear explanation of how the strainer head-loss was determined for each net positive suction head (NPSH) margin case is provided.
13. The supplemental response did not include information on a test case for time-delayed transport to the VC sump strainer. Note that this strategy has been proposed, and the NRC has received a license amendment request to revise the Updated Final Safety Analysis Report to change the assumptions regarding failures of the IR sump. Please provide the results of the analysis that calculates the VC sump strainer head loss considering delayed transport of debris to the sump. Please include the methodology used, any assumptions made, and the bases for the assumptions in the response to this issue.
14. The basis for the minimum sump level inputs to the void fraction calculation could not be determined. The flood levels in the void fraction calculation did not appear to match the minimum flood levels provided in the supplemental response. Please provide information that justifies the use of the levels that were included in the void fraction calculation.
15. The licensee's original plan was to use separate chemical effects testing to extrapolate the test results to the emergency core cooling system (ECCS) mission time. It is currently unclear how chemical effects will be addressed by the licensee. Please include information that shows that the test termination criteria and extrapolation of the data to the ECCS mission time were conducted to result in prototypical or conservative results.
16. Please provide a justification for the application of data from single-stage testing to the three-stage IP3 internal recirculation pumps (Audit Open Item 3.7-1).
17. Please provide the NPSH margin for a single IP3 IR pump at full recirculation flow (4124 gallons per minute).
18. Please provide information that shows that the small-break LOCA NPSH margins are bounded by the large-break cases. Alternatively, please provide the NPSH margins for the small-break LOCA cases.
19. Please provide an NPSH margin evaluation for the hot-leg recirculation case, or show this case to be bounded by other cases that were evaluated.
20. The latest NRC review guidance for coatings (ADAMS Accession No. ML080230112, Enclosure 2) references WCAP-16568-P, "Jet Impingement Testing to Determine the Zone of Influence (ZOI) for DBA-Qualified/Acceptable Coatings," that recommends using a 5D ZOI for un-topcoated in-organic zinc (IOZ) paint. Please provide the rationale for using a 4.28D ZOI for un-topcoated IOZ paint. This question was also listed as Open Item 3.8-1 in the audit report (ADAMS Accession No. ML080870246).
21. Please provide the results of the wear analyses for the IR pumps, residual heat removal pumps, and high-head safety injection pumps, when completed.

22. Please confirm that that calculated fuel cladding temperature will not exceed 800 °F when calculating cladding temperature in accordance with the guidance in WCAP-16793-NP and as qualified by the conditions and limitations of the draft NRC safety evaluation of WCAP-16793-NP.
23. The NRC staff understands that Indian Point has changed their test approach to evaluate chemical effects. Please submit the revised chemical effects test results and analyses to the NRC when they become available.

Please contact me at (301) 415-2901 if you have any questions on this issue.

Sincerely,

/RA/

John P. Boska, Senior Project Manager  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-247 and 50-286

Enclosure:

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