

IPRenewal NPEmails

From: Kimberly Green
Sent: Tuesday, March 17, 2009 4:52 PM
To: STROUD, MICHAEL D; Tyner, Donna
Cc: IPRenewal NPEmails; Bryce Lehman; George Thomas; Hansraj Ashar; Rajender Auluck
Subject: revised draft RAIs regarding Open Items
Attachments: Revised Followup DRAIs Structures 3-17-09.doc

Mike and Donna,

Attached are revised draft RAIs regarding the open items related to five of the open items. I previously transmitted follow-up draft RAIs to you via email dated February 24, 2009. This was followed by a telecon on March 2, 2009 to discuss the draft RAIs. Since that time, the staff has revised a couple of the draft RAIs. The staff's revisions are reflected in the attached. The main revisions affect the following draft RAIs:

Follow-up D-RAI 1: part a is new

Follow-up D-RAI 3: last line of part b is new

Follow-up D-RAI 4: parts a and b were combined along with minor wording changes

Follow-up D-RAI 5: part a is new, but covers the request the staff mentioned during the March 2nd phone call about the role of air-to-air heat exchangers and the normal operating temperature of the concrete near the penetrations.

I will be out the office the rest of this week. If Entergy needs a phone call to discuss the revisions, please let me know and I'll set one up for next week.

Thanks,
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Subject: revised draft RAIs regarding Open Items
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From: Kimberly Green

Created By: Kimberly.Green@nrc.gov

Recipients:

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Tracking Status: None
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**INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3
LICENSE RENEWAL APPLICATION
DRAFT REQUEST FOR ADDITIONAL INFORMATION (D-RAI)**

Follow-up D-RAI 1: Question 359 – Open Item 3.0.3.2.15-1

In Entergy Letter NL-08-169, dated November 6, 2008, “Additional Information Regarding License Renewal Application- Operating Experience Clarification,” the applicant submitted a supplemental “clarification”, describing its plan for implementing a permanent remediation of the Indian Point Nuclear Generating Unit No. 2 (IP2) refueling cavity leakage over the next three scheduled IP2 re-fueling outages (2010, 2012, 2014). In order to complete its review, the staff requests the following information:

- a. In order for the staff to address the adequacy of the applicant’s proposed monitoring method, the applicant is requested to provide additional information on the leakage path from the refueling cavity to the collection point lower in containment, as well as the leak flow-rate. In this regard, describe the leakage path and chemical composition of the leaking fluid, provide historical flow-rate values, and confirm whether or not any leakage enters the reactor cavity inside the primary shield wall. Provide the technical basis as to how the leakage path was determined, with a focus on water entering the reactor cavity. Provide a sketch of containment and the refueling cavity which highlights the leakage path.
- b. The transmittal letter NL-08-169, dated November 6, 2008, states: “There are no new commitments identified in this submittal.” The applicant has previously taken a bore sample in the region of the leak, and has committed to take another sample prior to entering the period of extended operation. In absence of a formal commitment to remedy the source of leakage, the applicant’s AMP should include a method to monitor for a degrading condition in the refueling cavity, and other structures and components that would be affected by the leakage, during the period of extended operation, or the applicant should explain how the Structural Monitoring Program will adequately manage potential aging of this region during the period of extended operation.

Follow-up D-RAI 2: Question 360 – Open Item 3.0.3.2.15-2

In Entergy Letter NL-08-169, dated November 6, 2008, the applicant submitted a supplemental “clarification” for the IP2 spent fuel pool pit walls, which provides a detailed description of (1) the design margins for the spent fuel pool concrete walls; and (2) the results of prior concrete core sample testing and rebar corrosion testing.

- a. In Commitment 25, the applicant commits to sample for tritium in groundwater wells in close proximity to the IP2 spent fuel pool at least every three months to assess for potential indications of spent fuel pool leakage. This commitment does not describe what actions will be taken if leakage continues. If sampling indicates continued leakage, the applicant’s AMP should include a method to determine if a degraded condition exists during the period of extended operation, or the applicant should explain how the Structural Monitoring Program will adequately manage potential aging of the

inaccessible concrete of the IP2 spent fuel pool due to borated water leakage during the period of extended operation.

- b. The second paragraph on page 2 of Attachment 1 of the clarification letter dated November 6, 2008, states in part: “[L]ittle or no corrosion was observed in the rebar except at a location in the wall where spalling had occurred exposing rebar to the elements. Analysis of the rust particles showed high chloride content and low boron concentration indicating that rainwater was the primary cause of the observed corrosion.” The staff requests the applicant to identify any Unit 2 and Unit 3 operating experience related to rebar corrosion, in light of the chloride content in rainwater, and identify the likely source for the high chloride content in the rainwater. Additionally, the applicant is requested to explain whether and how the AMP is adequate to address this environment and the related potential aging effects to ensure there is no loss of intended function during the period of extended operation.

Follow-up D-RAI 3: Question 361 - Open Item 3.0.3.3.2-1

In Entergy Letter NL-08-169, dated November 6, 2008, the applicant submitted a supplemental “clarification” for IP containment spalling, describing the design margins for the Indian Point (IP) containment structures at the locations of existing concrete degradation. Based on its review of the information, the staff identified areas that need further clarification and/or additional information to complete its review as described below:

- a. The clarification for the IP containment spalling states: “As the surface concrete is not credited for tensile strength of the structure, the spalling has no impact on the available margins.” The strength margins identified appear to be based on the nominal rebar dimensions, without any consideration for rebar degradation due to exposure and potential loss of bond between the concrete and the rebar. Explain how the existing degradation and design margin will be considered in performing periodic inspections to monitor degradation that would ensure that there is no loss of containment intended function during the period of extended operation.
- b. In the spent fuel pool discussion, in the letter dated November 6, 2008, the applicant stated: “Little or no corrosion was observed in the rebar except at a location in the wall where spalling had occurred exposing rebar to the elements. Analysis of the rust particles showed high chloride content and low boron concentration indicating that rainwater was the primary cause of the observed corrosion.” The applicant is requested to provide the technical basis for the adequacy of the 5-year IWL frequency of inspection of the degraded areas of the IP containments during the period of extended operation, considering the possibility of an increased site-specific corrosion rate of the exposed rebar on the containments. This should include results of prior inspections, including any available comparative photos showing the progression of degradation.

Follow-up D-RAI 4: Open Item 3.5-1

In Entergy Letter NL-08-169, dated November 6, 2008, the applicant submitted a supplemental “clarification” to LRA Section 3.5.2.2 related to the concrete mix design method and the durability of concrete used at IP. In the LRA the applicant claimed that concrete meets the specifications of ACI 318-63 and the intent of ACI 201.2R-77, Guide to Durable Concrete. As a result the applicant claimed that several aging effects were not applicable to concrete. Based on its review of the information, the staff identified areas that need further clarification and/or

additional information to determine that the applicant meets the cited ACI specifications such that further evaluation is not necessary as recommended by the GALL Report.

- a. In the clarification to LRA Section 3.5.2.2 (Part 1) on page 6 of Attachment 1 to letter NL-08-169, the applicant stated that it used Method 2 of Section 502 of ACI 318-63 by testing trial mixes to determine the water-cement ratios for the concrete mix design of the IP containments and other structures. In order for the staff to evaluate the quality and durability of concrete in IP structures that may be subject to degradation during the period of extended operation, the staff requests the applicant to define the water-cement ratio that was used at the time of construction. Additionally, to assist the staff in understanding the parameters related to concrete strength and durability during the period of extended operation, the applicant is requested to describe the methodology used to establish the required concrete compressive strength of 3000 psi for the containment and other safety-related concrete structures, in accordance with ACI 318-63, Method 2. The applicant is requested to provide a summary of the results of statistical analyses performed, if any, of the original concrete strength tests, including number of samples, raw strength values from the test, the mean, the standard deviation, and the original criterion (e.g., mean minus 1 standard deviation, coefficient of variation) used to confirm that the required compressive strength was achieved. The applicant is requested to provide this information for the IP containments and other safety-related IP Unit 2 and 3 concrete structures, including the refueling cavities and the spent fuel pools, to support the applicant's view that IP concrete meets the requirements of Method 2 in Section 502 of ACI 318-63 and the intent of ACI 201.2R-77.

- b. If the applicant is unable to provide the information requested in part (a) above, the applicant is requested to explain how the aging effects on concrete will be adequately managed and safety margins will be determined during the period of extended operation.

Follow-up D-RAI 5: Open Item 3.5-2

In Entergy Letter NL-08-169, dated November 6, 2008, "Additional Information Regarding License Renewal Application- Operating Experience Clarification," the applicant submitted a supplemental "clarification" to LRA Section 3.5.2.2 (Part 3) for IP2 containment concrete and its ability to withstand local area temperatures up to 250°F. The staff has identified areas that need further clarification and/or additional information as discussed below:

- a. Clearly explain the role of the air-to-air heat exchangers in cooling the concrete around the hot piping penetrations. Include the normal operating temperature of the concrete as well as the maximum concrete temperature assuming failure of the heat exchangers.

- b. In the clarification to LRA Section 3.5.2.2 (Part 3) on page 7 of Attachment 1 to letter NL-08-169, the applicant stated that a 15% reduction of concrete strength could be expected when reaching temperatures of 250°F and that concrete compressive strength tests showed an actual strength more than 15% higher than design strength. Please provide the methodology used to arrive at the conclusion that the actual concrete strength is more than 15% greater than 3000 psi, (i.e., greater than 3450 psi). Provide a summary of the results, including number of samples, raw strength values from the test, the mean, the standard deviation, and the original criterion (e.g., mean minus 1 standard deviation) used to confirm that the claimed strength was achieved. Explain

how consideration was given to the reduction in modulus of elasticity in the high temperature concrete evaluation.

- c. If the applicant is unable to provide the information requested above, the applicant is requested to explain how the aging effects on concrete, due to high temperatures, will be adequately managed during the period of extended operation.