



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

August 25, 2009

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 – APPROVAL
OF REVISED EXTENSION REQUEST FOR CORRECTIVE ACTIONS
REQUIRED BY GENERIC LETTER 2004-02 (TAC NOS. MC4689 AND MC4690)

Dear Sir or Madam:

By letter dated July 29, 2009, Entergy Nuclear Operations, Inc. (the licensee), requested an extension to the Nuclear Regulatory Commission (NRC) Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," corrective action due date for the Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3). The stated intent of this extension is to allow additional time to complete modifications on two motor-operated valves at IP2, and installation of vortex suppressors in both units. The licensee requested an extension for IP2 until restart from refueling outage (RFO) 2R19 (currently scheduled to begin March 10, 2010), and an extension for IP3 until restart from RFO 3R16 (currently scheduled to begin March 11, 2011). The current extension for IP2 and IP3 expires on August 31, 2009.

The NRC staff has evaluated the information in your revised request and determined that it is acceptable to extend the completion date for IP2 until restart from RFO 2R19. For IP3, an extension is granted until May 31, 2010. The results of the NRC staff's evaluation of this request are enclosed.

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

Sincerely,

A handwritten signature in cursive script that reads "John P. Boska".

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:
As stated

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EVALUATION OF EXTENSION REQUEST FOR CONTAINMENT SUMP

CORRECTIVE ACTIONS ASSOCIATED WITH

GENERIC LETTER 2004-02

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3

DOCKET NOS. 50-247 AND 50-286

By letter dated July 29, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML092190310), Entergy Nuclear Operations, Inc. (Entergy or the licensee), requested an extension to the Nuclear Regulatory Commission (NRC) Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," corrective action due date for the Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3). The stated intent of this extension is to allow additional time to complete modifications on two motor-operated valves at IP2, and installation of vortex suppressors in both units. The licensee requested an extension for IP2 until restart from refueling outage (RFO) 2R19 (currently scheduled to begin March 10, 2010), and an extension for IP3 until restart from RFO 3R16 (currently scheduled to begin March 11, 2011). The current extension for IP2 and IP3 expires on August 31, 2009.

The licensee previously requested an extension to the corrective action due date until restart from RFO 2R19 for IP2 and until August 31, 2009, for IP3. See Entergy's letter dated October 17, 2008, ADAMS Accession No. ML083010239. The NRC granted an extension to August 31, 2009, for both units (NRC letter dated October 30, 2008, ADAMS Accession No. ML083010366), to support the licensee's plans, but recognized that the IP2 extension would have to be reevaluated based on work needed during an RFO. In addition, debris and chemical head loss testing was being conducted during the first half of 2009 to demonstrate that the final sump strainer configuration achieves the required performance. The licensee has completed testing and it has been determined that additional plant modifications are required. The licensee has determined that in order to eliminate the potential for vortex formation, vortex suppressors need to be installed above the internal recirculation sump strainers and the containment sump strainers. The licensee has begun the design and procurement of these vortex suppressors and plans to install them during the next refueling outages for the respective units.

In addition, the licensee stated in its July 29, 2009, letter, that after April 30, 2010, it would include installation of the IP3 vortex suppressors on the forced outage planning list and would install the associated modification during any forced outage requiring entry into Mode 5, of a long enough duration in that mode, to install the suppressors. The licensee considers that online installation of the suppressors is not feasible as any construction activity in the area of the sumps would necessarily render them inoperable. In addition, construction activities would be precluded in certain areas due to dose consideration, particularly for the containment sump that lies within the shield wall.

Enclosure

The NRC staff uses the criteria stated in SECY-06-007 to evaluate requests for extending the due date for completion of GL 2004-02 corrective actions. Specifically, an extension may be granted if:

- the licensee has a plant-specific technical/experimental plan with milestones and schedule to address outstanding technical issues with enough margin to account for uncertainties, and
- the licensee identifies mitigative measures to be put in place prior to December 31, 2007, and adequately describes how these mitigative measures will minimize the risk of degraded emergency core cooling system (ECCS) and containment spray system (CSS) functions during the extension period.

The SECY also states that for proposed extensions beyond several months, a licensee's request will more likely be accepted if the proposed mitigative measures include temporary physical improvements to the ECCS sump or materials inside containment to better ensure a high level of ECCS sump performance.

With regard to the first extension criterion, the licensee's July 29, 2009, letter provides the licensee's plans for addressing a plant-specific technical/experimental plan, with milestones and schedules, to complete the GL 2004-02 corrective actions. As described in the letter, the licensee is pursuing a plan that involves a debris and chemical head loss "test for success" methodology based on the NRC "March 2008 protocol" (NRC letter to Nuclear Energy Institute dated March 28, 2008, ADAMS Accession No. ML080230112). The plan involved the development of a test protocol, NRC review of the protocol, "test for success" testing, preparation of the test report, and completion of analyses including strainer qualification. These actions are complete with the exception of the analyses that support strainer qualification. Strainer qualification is scheduled for completion by August 31, 2009. During a conference call between the NRC and the licensee, the licensee stated that preliminary evaluations of the test data demonstrate that the current ECCS sump configuration, with the addition of vortex suppressors, will provide the required function under post loss-of-coolant-accident (LOCA) conditions.

In addition, the licensee's letter dated October 17, 2008, discussed the following plans or contingencies:

- Installation of an IP2 modification, following approval of a license amendment, which would negate the need to assume the spurious closure of two motor-operated valves (MOVs) within the ECCS. The license amendment is currently under NRC review.
- Replacement of the IP2 internal recirculation pump bearings during RFO 2R19 (spring 2010) and the IP3 pump bearings during RFO 3R15 (spring 2009).
- Strainer structural enhancements should they be determined necessary.
- Insulation replacements should they be determined necessary.

The licensee stated in its letter dated July 29, 2009, that it continues to plan the installation of the IP2 modification regarding the two MOVs. However, based on the "test for success" results and continued analysis, the licensee determined that insulation does not need to be removed or

replaced, and refined analyses showed that physical strainer structural enhancements are not required. In addition, based on testing and analysis of the internal recirculation pump bearings, the licensee determined that the internal recirculation pumps meet their required mission time in a debris laden fluid and, therefore, the bearings need not be replaced.

With regard to the second extension criterion, the licensee provided information on mitigative measures in its letter dated July 29, 2009. The mitigative measures described in previous extension requests remain in place and minimize the risk of degraded ECCS and CSS functions. These measures include installation of replacement internal recirculation and containment sump strainers (a 3200 sq. ft. strainer replaces a 50 sq. ft. recirculation sump screen and a 412 sq. ft. strainer replaces a 30 sq. ft. containment sump screen), installation of flow channeling measures, replacement of chemical buffers, implementation of mitigative measures in response to NRC Bulletin 2003-01, and procedural enhancements in the areas of containment cleanliness, foreign material exclusion and insulation control. The new strainer design also reduced the size of the flow openings from 0.125" to 0.094" diameter and greatly reduced the approach velocity of the openings to allow for increased settling of particulates and fiber.

In addition to the mitigative measures identified above, the basis for continued operation provided by GL 2004-02 includes a number of factors that the licensee believes are still applicable to IP2 and IP3 during the period of the proposed extension:

- There are two sumps in containment, the internal recirculation sump and the smaller containment sump. The internal recirculation sump is the primary sump used for accident mitigation and the containment sump provides backup capability for the internal recirculation system.
- There are four low head pumps available for accident mitigation, two internal recirculation pumps that draw from the internal recirculation sump and two residual heat removal (RHR) pumps that draw from the containment sump. Should an internal recirculation pump fail then the second recirculation pump would be available. Should both internal recirculation pumps fail then either of the two residual heat removal pumps would be available for accident mitigation.
- The downstream effects evaluation has shown that components are not subject to blockage and are expected to perform satisfactorily during their required mission time assuming a debris laden fluid.
- The replacement strainers consist of hollow concentric cylinders fitted with a bypass eliminator mesh. The bypass eliminator significantly reduces the total quantity of fiber that could bypass the strainer and, therefore, aids in mitigating downstream effects.
- The head loss across the strainers will be reduced due to a significant reduction in the amount of chemical precipitates generated as a result of the buffer replacement modifications.
- Testing has shown that a vortex does not form (with no vortex suppressor installed) when conducting debris-only testing (without the sump's chemical buffer) for both thin debris beds (using March 2008 Guidance) and thick debris beds (prior to March 2008 Guidance). However, it has also been shown that in the presence of chemical precipitate, a vortex suppressor is required for limiting conditions during cold leg recirculation. Entergy stated that, based on solubility testing in a high temperature

vertical loop, chemicals in the sump are not expected to precipitate out of solution above approximately 95 °F. Therefore, it is not anticipated that the function of the ECCS would be compromised by vortex formation during cold leg recirculation when the sump temperatures are the highest and core cooling requirements are the most demanding. At switchover to hot leg recirculation, the sump water level will be higher and the total sump flow rate will be lower, both of which reduce the likelihood of vortex formation.

With regard to the third extension criterion, the licensee has previously discussed the significant plant modifications that have been completed and programs that have been implemented (see Entergy's extension request letter dated October 17, 2008). In particular, the installation of large replacement strainers in both units satisfies this extension criterion. Additionally, the licensee's July 29, 2009, letter provides plant risk evaluations for IP2 and IP3. The NRC staff has not reviewed the risk analysis in detail; but agrees, based on the mitigative measures identified in this document, with the licensee's conclusion that there is no significant risk impact associated with the requested extension.

Based on the licensee having satisfactorily addressed the NRC GL 2004-02 due date extension criteria as discussed above, the NRC staff finds it acceptable to extend the completion date for IP2 until restart from RFO 2R19, which is currently scheduled to begin on March 10, 2010. This will allow time for the completion of the plant modifications on the MOVs, installation of the vortex suppressors, and completion of the licensing activities needed to achieve compliance with GL 2004-02. The NRC staff has also determined that it is acceptable to extend the completion date for IP3 to May 31, 2010. The licensee stated, in its July 29, 2009, letter, that the vortex suppressor modification would be ready for installation at IP3 by April 30, 2010; however, it would require a plant shutdown. Due to the length of time since the issuance of GL 2004-02, the NRC staff has determined that IP3 should achieve compliance with GL 2004-02 by May 31, 2010.

The NRC staff considers the granted extension period to be of low safety concern given the mitigation measures and plant improvements already in place, and expects the licensee to follow the corrective action plan as described in the licensee's letter dated July 29, 2009. The NRC expects Entergy to place a high priority on completing remaining actions and updating the plants' licensing bases as soon as possible. In addition, the NRC staff does not plan to grant any further extensions for the GL 2004-02 corrective actions due date for IP2 or IP3.

Principal Contributor: Roberto L. Torres

Date: August 25, 2009

August 25, 2009

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

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/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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ADAMS ACCESSION NUMBER: ML092330075

*See memo dated 8/20/09

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DATE	8/24/09	8/24/09	8/20/09	8/25/09

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DATED: August 25, 2009

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EXTENSION REQUEST FOR CORRECTIVE ACTIONS REQUIRED BY GENERIC LETTER
2004-02

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