UNITED STATES
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In re:	Docket Nos. 50-247-LR; 50-286-LR
License Renewal Application Submitted by	ASLBP No. 07-858-03-LR-BD01
Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc.	DPR-26, DPR-64 February 13, 2015

NEW YORK STATE AND RIVERKEEPER
FEBRUARY 2015 SUPPLEMENT TO
PREVIOUSLY-ADMITTED CONTENTION NYS-38/RK-TC-5

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ADDITIONAL BASES FOR PREVIOUSLY-ADMITTED JOINT CONTENTION NYS-38/RK-TC-5

For addition after NYS-38/RK-TC-5 existing paragraph ¶ 2(d):

e. Entergy's subsequent "Revised Reactor Vessel Internals Program and Inspection Plan," as described in the applicant's February 17, 2012 submission to the NRC (NL-12-037), developed in subsequent communications between Entergy and NRC Staff over the ensuing two and a half years, and approved by NRC Staff in the Supplement 2 to the Safety Evaluation Report (SSER2), continues to rely on commitments to develop aging management plans sometime in the future, rather than prior to license renewal. For example, Entergy agreed, in Commitment 49, to calculate CUF_{en} values for RVI components in IP2 and IP3, but has not yet completed the calculations for IP3 and may not complete them prior to the end of IP3's initial 40-year license term. SSER2, at A-15. Furthermore, Entergy has not developed examination acceptance criteria for baffle-former bolt inspections in either IP2 or IP3. SSER2, at 3-20. Rather, Entergy has stated that it will develop a technical justification (TJ) including acceptance criteria for baffle-former bolts at least six months prior to the first inspections of baffle-former bolts, which might not occur until 2019 for IP2 and 2021 for IP3. SSER2, at 3-20; Response to RAI 5, Attachment 1 to NL-12-089, at 11. Entergy's failure to develop acceptance criteria for this component in a manner that permits public review and comment is particularly concerning, as Entergy concedes that "cracking of baffle former bolts is recognized as a potential issue for the IPEC units." Revised Reactor Vessel Internals Program, Attachment 1 to NL-12-037, at 8. In short, Entergy's currently proposed AMP for RVI components fails to assure that the "effects of aging on the intended function(s) will be adequately managed for the period of extended operation" as required by 10 CFR § 54.21(c)(1)(iii).

For addition after NYS-38/RK-TC-5 existing paragraph ¶ 5:

5.1. As developed and modified between 2012 and 2014, Entergy's "Revised Reactor Vessel Internals Program and Inspection Plan" is inadequate because it fails to adequately consider and address the full array of aging degradation mechanisms affecting the IP2 and IP3 RVI components. Specifically, Entergy has proposed an aging management plan that fails to adequately consider the combined and possibly synergistic effects of multiple age-related degradation mechanisms, such as fatigue, thermal embrittlement, irradiation-induced embrittlement, corrosion, neutron irradiation, among others.

5.2 Entergy's methodology for the calculation of CUF_{en} values relies on inadequate assumptions and fails to consider the effects of radiation on metal fatigue and other critical parameters affecting component life and functionality. Furthermore, Entergy has not conducted an "error analysis" reflecting the calculation's degree of accuracy. Additionally, a CUF_{en} value below 1.0 does not guarantee that a component will not degrade – or has not yet already degraded – to the point where the component can no longer perform its intended function. Accordingly, the CUF_{en} values that have been calculated do not reflect an adequate safety margin, especially in light of the suite of synergistic aging degradation mechanisms. Indeed, when the CUF_{en} values were initially calculated, several exceeded the 1.0 threshold. Even after re-calculation, the CUF_{en} values for various IP2 and IP3 components were very close to 1.0 or would reach unity if properly rounded.

5.3 Moreover, Entergy's aging management program for RVI components relies on detection of fatigued or fractured components during periodic inspections, rather than pre-emptive part replacement. This inspection-based aging management regime assumes that the core will operate within normal parameters and will not experience a sudden and unexpected shock load. The effects of such an unexpected shock load on highly fatigued and embrittled RVI components has not been considered, but could result in a change to a reactor's core geometry that could render the reactor uncoolable. In short, Entergy's updated AMP for RVI components fails to assure that the "effects of aging on the intended function(s) will be adequately managed for the period of extended operation" as required by 10 CFR § 54.21(c)(1)(iii).

ADDITIONAL SUPPORTING EVIDENCE FOR PREVIOUSLY-ADMITTED JOINT CONTENTION NYS-38/RK-TC-5

For addition after NYS-38/RK-TC-5, existing paragraph ¶ 12:

12.1 On February 17, 2012, Entergy submitted a "Revised Reactor Vessel Internals Program and Inspection Plan" to NRC. NL-12-037. In the Revised Plan, Entergy acknowledges various "material degradation concerns" for reactors operating beyond 40 years, and concedes that "cracking of baffle former bolts is recognized as a potential issue for the IPEC units." Revised Reactor Vessel Internals Program, Attachment 1 to NL-12-037, at 8. The Revised Inspection Plan, which purports to comply with EPRI's MRP-227-A guidelines, proposes to manage these aging effects through periodic inspections, and manifestly "does not include preventive actions." Attachment 1 to NL-12-037, at 5. The scope and details of the Revised Plan were developed and clarified through numerous bi-lateral meetings between Entergy and Staff and a series of NRC Staff Requests for Additional Information (RAIs) and Entergy responses, including, but not limited to, responses dated June 14, 2012 (NL-12-089), September 28, 2012 (NL-12-134), October 17, 2012 (NL-12-140), November 20, 2012 (NL-12-166), May 7, 2013 (NL-13-052), September 27, 2013 (NL-13-122), January 28, 2014 (NL-14-013), June 9, 2014 (NL-14-067), and August 5, 2014 (NL14-093). NRC Staff approved the "Revised RVI Program and Inspection Plan," as modified or clarified through Entergy's responses to RAIs, in November 2014 through Supplement 2 to the Safety Evaluation Report (SSER2).

12.2. The revised plan includes a new Commitment 49, in which Entergy agreed to "[r]ecalculate each of the limiting CUFs" for certain RVI components "to include the reactor coolant environment effects (F_{en})" using NUREG/CR-5704 or NUREG/CR-6909. The results of these tests were reported in a series of proprietary documents – although it is not clear whether those output results have been reported yet to NRC. Entergy, through contractor Westinghouse,

calculated CUF_{en} values for IP2 using a methodology that does not adequately account for all relevant factors affecting component life and functionality. For example, the calculations employ the guidance set forth in NUREG/CR-5704 or NUREG/CR-6909, which does not adequately account for all parameters and stresses relevant to evaluating metal fatigue, including, though not limited to, the effects of neutron irradiation on metal fatigue, and irradiation-induced embrittlement on the RVI components. Furthermore, Entergy never conducted an "error analysis" to quantify the accuracy of the CUF_{en} values, some of which were very close to the threshold value of 1.0. Entergy has not completed the commitment to calculate CUF_{en} values for IP3, and has not agreed to complete those calculations before the expiration of Unit 3's 40-year operating term, on or about December 2015, and the facility enters a period of extended operations. SSER2, at A-15.

12.3 The Revised Plan does not include acceptance criteria for use when evaluating inspection results for all components. For example, Entergy has merely committed to develop acceptance criteria for baffle former bolts sometime prior to 2019 for IP2 and 2021 for IP3, Response to RAI 5, Attachment 1 to NL-12-089, at 11. NRC Staff has approved this approach, SSER, at 3-20, even though cracking of baffle former bolts has been observed at European PWRs and Entergy acknowledges that it could be a problem at Indian Point. Attachment 1 to NL-12-037, at 8.

12.4 For most other components, the Revised Plan reflects a "wait-and-see" approach, in which Entergy proposes to wait for cracks or other visible wear to develop in RVI components before deciding whether preventative steps are necessary. Attachment 2 to NL-12-037. Indeed, for clevis insert bolts, Entergy accepts that crack detection before bolt failure is probably not possible, but proposes to wait for bolt failure to occur during the period of extended operation,

under the assumption that bolt failures will not affect the safe operation of the IP facilities. SSER2, at 3-24 to 3-25; Response to RAI 17, Attachment 1 to NL-13-122, at 8. Entergy did not evaluate how the failure of highly fatigued and embrittled components – some of which may have failed entirely – would respond to an unexpected shock load, or whether the core would maintain a coolable geometry in the event that such a shock load caused multiple components or populations of components to fail.

For addition after NYS-38/RK-TC-5, existing paragraph ¶ 22:

22.1 This contention, as amended, is also supported by the accompanying February 2015 supplemental declarations of the State and Riverkeeper's experts, Dr. Richard T. Lahey, Jr. and Dr. Joram Hopenfeld, and the documents cited therein.

Respectfully submitted,

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February 13, 2015