

**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD**

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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, DPR-26, DPR-64
Entergy Nuclear Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc. February 13, 2015
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**STATE OF NEW YORK'S
MOTION FOR LEAVE TO
SUPPLEMENT PREVIOUSLY-ADMITTED
CONTENTION NYS-25**

Office of the Attorney General
for the State of New York
The Capitol
State Street
Albany, New York 12224

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The State of New York submits this motion for leave to supplement previously-admitted Contention 25 (NYS-25), pursuant to former 10 C.F.R. § 2.309(f),¹ the Scheduling Order of the Atomic Safety and Licensing Board (the Board) dated July 1, 2010 (ML101820387), and the subsequent Orders and instructions of the Board. The accompanying supplement addresses Supplement 2 to NUREG-1930, “Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3” (SSER2), which evaluated and approved Entergy’s February 2012 “Revised Reactor Vessel Internals Program and Inspection Plan” (NL-12-037) (ML12060A312), as developed and modified over 32 months of communications between Entergy and NRC Staff and Entergy’s responses to various requests for additional information (RAIs) from NRC Staff (collectively, “the Amended and Revised RVI Plan”). Entergy developed and submitted the Amended and Revised RVI Plan for NRC Staff review and approval as a plan for managing the effects of aging on reactor vessel internals (RVIs) at Entergy’s two operating nuclear facilities at Indian Point (IP2 and IP3) during their requested additional 20-year periods of extended operation.

The State of New York has consulted with the parties concerning this motion. Entergy and NRC Staff do not oppose the State’s ability to present this motion and reserve their ability to respond to the substance of the proffered supplemental bases. Clearwater does not oppose the motion.

¹ Although motions to amend or submit new contentions are now governed by 10 C.F.R. § 2.309(c), the Board has ordered that its July 1, 2010 scheduling order, which referenced 10 C.F.R. § 2.309(f), as modified by subsequent orders, should continue to apply in this proceeding notwithstanding the subsequent promulgation of a revised version of 10 C.F.R. Part 2. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Order (Aug. 8, 2012). The substantive requirements of current subsection (c) and former subsection (f) are essentially the same. This motion for leave to supplement is also appropriate under current 10 C.F.R. § 2.309(c).

I. BACKGROUND

In its initial April 2007 License Renewal Application (LRA), Entergy proposed an assortment of existing facility programs for managing the effects of aging upon its reactor pressure vessels, reactor vessel internals and reactor coolant systems for IP2 and IP3. *See*, LRA §§ 2.1.2.1, 3.1.2.1. Significantly, Entergy did not propose a dedicated aging management program (AMP) for reactor vessel internals; nor did it propose to address the synergistic effects of irradiation embrittlement and other aging degradation mechanisms as part of its overall aging management approach for IP2 and IP3. Instead, the LRA discussed Entergy's proposal to participate in industry programs for investigating and managing aging effects, evaluate the results of such programs and defer submission of an actual AMP plan for reactor vessel internals until sometime before the period of extended operation. *See*, LRA, Updated Final Safety Analysis Report Supplement, Appendix A, §§ A.2.1.41, A.3.1.41.

Based on the apparent deficiency of Entergy's AMP for reactor vessel internals, the State of New York asserted as Contention 25 in this proceeding:

Entergy's License Renewal Application Does Not Include An
Adequate Plan To Monitor And Manage The Effects Of Aging
Due To Embrittlement Of The Reactor Pressure Vessels ("RPVs")
And The Associated Internals

By Memorandum and Order dated July 31, 2008, the Board admitted contention NYS-25, finding that the issue of "whether an AMP is necessary to manage the cumulative effects of embrittlement of the RPVs and associated internals" is within the scope of this proceeding. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Memorandum and Order Ruling on Petitions to Intervene and Requests for Hearing (July 31, 2008), LBP-08-13 slip op. at 104 (ML082130436).

In November 2009, NRC Staff issued its initial “Safety Evaluation Report Related to the License Renewal of Indian Point Generating Units Nos. 2 and 3” (NUREG-1930, Vols. 1 and 2) which summarized the results of its safety review of Entergy’s LRA for compliance with the requirements of 10 C.F.R. Part 54. Following this review, Entergy amended its LRA on July 14, 2010 to include what it described as a new plant specific program to manage aging effects of reactor vessel internals using guidance from the Electric Power Research Institute (EPRI) Materials Reliability Program (MRP). NL-10-063 (ML102030120). Entergy’s new RVI Plan referred to EPRI’s Pressurized Water Reactor Internals Inspection and Evaluation Guidelines, MRP-227. *Id.* Under this program, Entergy would “monitor the effects of aging degradation mechanisms on the intended function of the internals through periodic and conditional examinations.” *Id.*, Attachment 1, pp. 7, 82-90.

In response to Entergy’s LRA amendment, on September 15, 2010, the State of New York sought leave pursuant to 10 C.F.R. § 2.309(f)(2) to file additional bases for contention NYS-25. *See* State of New York’s Motion for Leave to File Additional Bases for Previously-Admitted Contention NYS-25 (September 15, 2010) (ML103050402). These additional bases identified specific deficiencies in Entergy’s newly-proposed RVI program, such as the lack of specificity in Entergy’s inspection plans, and also addressed Entergy’s continued failure to consider the synergistic effects of irradiation-induced embrittlement and fatigue on RPVs and their associated internals. *Id.* By Memorandum and Order dated July 6, 2011, the Board admitted the State of New York’s additional bases to contention NYS-25. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Memorandum and Order Ruling on Pending Motions for Leave to File New and Amended Contentions (July 6, 2011) at 28 (ML111870344).

On August 31, 2011, NRC Staff issued Supplement 1 to the November 2009 Safety Evaluation Report (NUREG-1930 Supplement 1), which summarized NRC Staff's review of supplemental information provided by Entergy in response to RAIs addressing various issues.² Thereafter, in December 2011, the State of New York submitted its Statement of Position, pre-filed testimony and other evidence relating to contention NYS-25.

On January 27, 2012, NRC Staff informed the Board, the State of New York, and other participants in the proceeding that Entergy planned to submit additional information regarding its RVI Program, that the Staff also expected that it would need to ask questions about the proposal, and that Staff's review of this matter may be the subject of a second Supplement to the Safety Evaluation Report for the Indian Point license renewal application. NRC Staff letter to ASLB from Sherwin Turk, Staff Counsel (Jan. 27, 2012) (ML12027A115). On February 8, 2012 NRC Staff informed the Board and parties that it may not be able to state a position on Contention NYS-25 until it received and reviewed the additional information that Entergy planned to submit concerning Entergy's proposed RVI Program and Inspection Plan. NRC Staff's Statement in Response to the ALSB's Order of February 3, 2012 (Feb. 8, 2012)(ML12039A298). On February 16, 2012, based on NRC Staff's reporting of "unresolved safety issues" relating to contention NYS-25 and the "dynamic nature of the NRC Staff's uncompleted safety reviews," the Board placed contention NYS-25 onto the second hearing track that already included NYS-38/RK-TC-5 and RK-EC-8, which had been placed in abeyance. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Order Granting NRC Staff's Unopposed

² The State of New York and Riverkeeper requested leave to file a new contention, Joint Contention NYS-38/RK-TC-5, addressing various gaps and inadequacies in Entergy's modified approach. The procedural history of NYS-38/RK-TC-5 is set out in intervenors' motion for leave to supplement that contention (also filed today). *See*, State of New York and Riverkeeper's Joint Motion for Leave to Supplement Previously-Admitted Joint Contention NYS-38/RK-TC-5, at 2-4.

Time Extension Motion and Directing Filing of Status Updates (February 16, 2012) at 2 (ML12047A308).

On February 17, 2012, Entergy once again amended its LRA to include a “Revised RVI Program and Inspection Plan” based on EPRI’s newly revised MRP-227-A: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines, which incorporated changes to MRP-227 based on NRC Staff comments. NL-12-037 (ML12060A312). Over the next 32 months, Entergy and NRC Staff engaged in a series of communications regarding Entergy’s revised RVI Program and Inspection Plan. In November 2014, NRC Staff released Supplement 2 to its 2009 Safety Evaluation Report (NUREG-1930 Supplement 2), which discussed Staff’s updated review and acceptance of Entergy’s amended and modified aging management plan for IP2 and IP3.

II. THIS MOTION IS TIMELY UNDER FORMER 10 C.F.R. § 2.309(f)(2)

The supplemental bases in support of contention NYS-25 proposed by the State of New York, as well as the supporting evidence and declarations of Dr. Richard Lahey dated February 12, 2015 and Assistant Attorney General Lisa S. Kwong dated February 13, 2015 that accompany the new bases, address Entergy’s Amended and Revised RVI Plan, as developed and modified by Entergy in 2012 to 2014, and as approved by NRC Staff in the November 2014 SSER2. As discussed above, contention NYS-25, together with portions of NYS-38/RK-TC-5, have been held in abeyance in “hearing track 2” pending the release of SSER2. The Board specifically contemplated that the parties would wait until the release of SSER2 before filing new or amended contentions based on that document or underlying submissions from Entergy, at which point the parties would have a reasonable amount of time to develop and prepare responses. The SSER2 was made publicly available on November 10, 2014 and the Board set a deadline of February 9, 2015 for “new or amended contention arising from the publication of

SSER 2.” *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Revised Scheduling Order for Indian Point, Units 2 and 3 (Dec. 9, 2014), at 2 (ML14343A757). The Board later extended this deadline to February 14, 2015. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Order Granting the State of New York’s and Riverkeeper’s Motion for a Four-Day Extension of Time to File New or Amended Contentions (Feb. 6, 2015) (ML15037A328). The proposed additional bases are being submitted in accordance with the schedule set forth in the Board’s scheduling orders, and accordingly are timely.

III. THE ADDITIONAL BASES MEET ALL THE REQUIREMENTS OF FORMER 10 C.F.R. § 2.309(f)(2)

The contention, as supplemented by the State of New York’s proposed additional bases, meets the requirements of former 10 C.F.R. § 2.309(f)(2) inasmuch as it is (1) based on information that was not previously available, (2) based on information that is materially different than information previously available, and (3) has been submitted in a timely fashion based on the availability of the subsequent information.³ As previously discussed, the additional bases are being submitted in accordance with the schedule established by the Board, and are therefore timely. The additional bases also meet the other requirements of the regulation and the Board’s July 1, 2010 Scheduling Order.

The additional bases relate to the contents and conclusions of Entergy’s Amended and Revised RVI Plan, as well as the contents and conclusions of the SSER2, which approved Entergy’s Amended and Revised RVI Plan. The Amended and Revised RVI Plan substantially modified and replaced Entergy’s 2010 RVI Plan. Moreover, the SSER2 revealed that NRC Staff would accept Entergy’s current proposal regarding the effects of aging degradation on RVIs,

³ These requirements are substantially identical to the requirements of current 10 C.F.R. § 2.309(c).

including potentially synergistic effects of various aging mechanisms, through a program of inspections, rather than preventative actions. Additionally, the release of the SSER2 revealed that NRC would accept Entergy's continued reliance on NUREG/CR-5704 and NUREG/CR-6909 (Rev. 0) to calculate Cumulative Usage Factors adjusted for Environmental Fatigue (CUF_{en}) for various components, without accounting for the effects of neutron embrittlement on other important degradation mechanisms and without conducting an error analysis on the CUF_{en} values. Finally, the release of the SSER2 revealed that NRC would not require Entergy to complete its CUF_{en} analysis of IP3 components until IP3 begins its period of extended operation or develop inspection acceptance criteria for important components at IP2 and IP3, such as baffle former bolts, until after IP2 and IP3 were well into extended operation. The SSER2 signaled that NRC Staff would not require additional detail or different aging management methods other than what Entergy had proposed. In short, the information upon which the additional bases rely was not previously available, and is materially different from previously available information.

IV. THE NEW BASES MEET THE RELEVANT REQUIREMENTS OF 10 C.F.R. § 2.309(f)(1)⁴

1. The Bases Are Within the Scope of License Renewal – 10 C.F.R. § 2.309(f)(1)(iii)

Contention NYS-25 relates to whether Entergy's application to renew the operating licenses for the Indian Point reactors and its proposed approach to various aging degradation forces comply with the regulations and statutes that apply to a license renewal application. More specifically, it addresses whether Entergy's AMP adequately considers the synergistic effects of embrittlement and other degradation forces on aging reactor pressure vessels and their associated

⁴ As the State noted when it moved for leave to file additional bases for Contention NYS-25, it is not clear that the requirements of 10 C.F.R. § 2.309(f)(1) should apply to a request to add additional bases, and in fact some of the requirements do not seem to be relevant to such a request. *See* Motion for Leave to File Additional Bases for Previously-Admitted NYS-25 (Sept. 15, 2010), at 3 n.2. This Motion addresses the requirements of subsection (f)(1) that would arguably apply to new bases.

internals. That contention and its bases have already been admitted by the Board. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Memorandum and Orders (July 31, 2008 and July 6, 2011). In light of Entergy's substantial 2012-2014 amendments and modifications to its RVI Plan, which NRC Staff approved in the SSER2, the State of New York is supplementing the original bases for the contention to address specific deficiencies in the current version of Entergy's Amended and Revised RVI Plan. Entergy's revised Plan concerns RVI systems, structures, and components subject to aging management review and are within the scope of 10 C.F.R. Part 54. See 10 C.F.R. §§ 54.4, 54.21(a)(1)(i), 54.21(c)(1)(iii). The State of New York's proposed additional bases challenge this Plan as inadequate for managing the full range of aging effects at IP2 and IP3. Accordingly, the additional bases, which address the deficiencies of Entergy's current proposal to manage aging effects for the RPV and internals, are within the scope of this license renewal proceeding and Part 54 and thereby satisfy 10 C.F.R. § 2.309(f)(1) (iii).

2. The Issues Raised Are Material to the Findings that the NRC Must Make to Grant Entergy's Request for a License Renewal – 10 C.F.R. § 2.309(f)(1)(iv)

The adequacy of Entergy's Amended and Revised RVI Plan is an essential issue in this proceeding. Under 10 C.F.R. § 54.21(c)(1)(iii), Entergy is required to show that "[t]he effects of aging on the intended function(s)" of the RVIs "will be adequately managed for the period of extended operation." The additional bases proposed by the State, supported by the declarations of Dr. Lahey and AAG Kwong, supplement the State's existing contention that Entergy's AMP for its reactor pressure vessels and associated internals is inadequate to manage the effects of embrittlement due to neutron irradiation, and particularly the potential synergistic effects of embrittlement and other aging mechanisms, including, but not limited to, fatigue. If the State is correct in its assertions, then NRC cannot grant Entergy's license renewal application as it

currently stands. *See* 10 C.F.R. § 54.29(a). These questions are material to NRC’s decision whether to grant the application to renew the operating licenses, and thus satisfy 10 C.F.R. § 2.309(f)(1)(iv).

3. Adequate Bases Have Been Provided for the Contention – 10 C.F.R. § 2.309(f)(1)(ii)

The State is seeking leave to supplement its previously-admitted contention NYS-25. The existing bases for NYS-25 remain valid, and the new bases provide additional grounds to support its overall contention that, despite its Amended and Revised RIV Plan, Entergy has failed to present an aging management program to adequately manage the synergistic effects of embrittlement in Entergy’s reactor vessels and associated internals. The additional bases describe in more detail than the “brief explanation” required by 10 C.F.R. § 2.309(f)(1)(ii), and are supported by specific supporting evidence as well as a declaration of the State of New York’s expert.

4. Concise Statement of Facts and Expert Opinion Supporting the Contention – 10 C.F.R. § 2.309(f)(1)(v)

The proposed additional bases are supported by the declaration of Dr. Richard Lahey which discusses the reasons why, contrary to the conclusions of the NRC Staff in the SSER2, Entergy’s Amended and Revised RVI Plan fails to adequately manage aging effects during IP2 and IP3’s periods of extended operation as required by applicable statutes and regulations. Dr. Lahey observes that Entergy’s Amended and Revised Plan continues to ignore the potentially synergistic effects of irradiation-induced embrittlement and other aging mechanisms on reactor vessel internals. Lahey Decl., *passim*. In this regard, Dr. Lahey notes the regulatory and scientific communities’ growing recognition of the interactive nature of aging mechanisms in the reactor coolant environment, and the on-going efforts to better understand and resolve the range

of issues posed by the synergism of degradation phenomena. *Id.*, ¶¶ 11-17. As an example, Dr. Lahey refers to U.S. Department of Energy's (DOE) Light Water Reactor Sustainability Program (*Id.*, ¶ 11), for which DOE has devoted considerable money in recent years. Indeed, DOE recently requested over \$30 million in funding as part of its Fiscal Year 2015 Congressional Budget Request (*see*, USDOE FY 2015 Congressional Budget Request, DOE/CF-0098, Vol. 3, March 2014, at 425-426, 430).

Dr. Lahey opines that Entergy's reliance on industry guidance and an inspection-based program for the management of aging effects is inadequate to address the uncertainties and technical challenges posed by RVI degradation, particularly given the known limitations of Entergy's proposed examination techniques and the possibility that a shock load can cause one or more embrittled components to fail prior to the detection of cracks or other visual signs of wear. *Id.*, ¶¶ 17-20. In addition, Dr. Lahey notes that Entergy has yet to develop inspection acceptance criteria for baffle former bolts, and that it may not do so until 2019 for IP2 and 2021 for IP3. *Id.*, ¶ 27.

With respect to Entergy's CUF_{en} analysis, Dr. Lahey calls into question the reliability of Entergy's fatigue analysis given Entergy's failure to perform an error-analysis. Lahey Decl., ¶ 21. He nonetheless notes that a number of components exhibited CUF_{en} values extremely close to unity, and that Entergy had not considered the effect of design-basis accident shock loads (LOCA or SCRAM) on the integrity of such severely fatigue-weakened and highly-embrittled structures, nor the potential threat to core geometry posed by a reactor coolant system component failure. *Id.*, ¶¶ 21-22. Finally, Dr. Lahey discusses the need to preserve, rather than erode, safety margins for aging reactors and their components. *Id.*, ¶ 33. He recommends repair or replacement of aging parts prior to the end of a plant's design life as a means to restore safety

margins and guard against accidents or unexpected non-conservatism in flawed safety evaluations. *Id.* For example, NRC and industry have recently recognized that Branch Technical Position 5-3 (NUREG-0800), widely relied upon by plants that received construction permits before 1973 to estimate initial reference temperatures (RT_{NDT}) for purposes of developing reactor vessel pressure/temperature (P/T) curves, may have produced non-conservative results. *Id.*; *see also*, AAG Kwong Decl., Attachments 1 - 3.

The opinion of Dr. Lahey is based on his review of the SSER2, the underlying submissions from Entergy that the NRC Staff approved in the SSER2, various technical studies and reports, and his extensive professional experience. Specific references to the “sources and documents” that support the State of New York’s position, as required by 10 C.F.R.

§ 2.309(f)(1)(v), may be found in Dr. Lahey’s declaration, as well as the accompanying declaration of AAG Kwong.

5. A Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact Contention – 10 C.F.R. § 2.309(f)(1)(vi)

The State of New York has provided sufficient information to establish a genuine dispute with Entergy on several material issues of fact relating to whether Entergy has submitted a plan for managing aging effects on the RVIs during the period of extended operation that meets the requirements of 10 C.F.R. § 54.21(c)(1)(iii). In particular, the State of New York has shown that a genuine dispute exists as to whether Entergy’s Amended and Revised RVI Plan adequately addresses embrittlement of reactor vessel internals insofar as it (1) does not consider all aging-related degradation mechanisms or their synergistic effects, (2) is based on incomplete assumptions relating to the fatigue life of RVI components, and (3) relies on the inspection of fatigued and embrittled components and does not consider the possibility that degraded components will fail prior to the appearance of detectable cracks or other wear. Entergy believes

such a plan fulfills its legal obligations under 10 C.F.R. Part 54 and, in the SSER2, NRC Staff agreed. The State believes that more is required under the applicable statute and regulations.

V. CONCLUSION

For the reasons described above, the State of New York respectfully requests that the Atomic Safety and Licensing Board grant leave to supplement already-admitted contention NYS-25 with the accompanying additional bases.

Respectfully submitted,

Signed (electronically) by

Lisa S. Kwong
Brian Lusignan
John J. Sipos
Assistant Attorneys General
Office of the Attorney General
for the State of New York
The Capitol
Albany, New York 12224
(518) 776-2380
brian.lusignan@ag.ny.gov
lisa.kwong@ag.ny.gov
john.sipos@ag.ny.gov

February 13, 2015