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NL-17-019

February 8, 2017

U.S. Nuclear Regulatory Commission
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SUBJECT: Amendment to License Renewal Application – Reflecting Shortened License
Renewal Terms for Units 2 and 3
Indian Point Nuclear Generating Unit Nos. 2 and 3
Docket Nos. 50-247 and 50-286
License Nos. DPR-26 and DPR-64

REFERENCES: See Attachment 1 to this letter.

Dear Sir or Madam:

By letter dated April 23, 2007, and as later supplemented, Entergy Nuclear Operations, Inc. (Entergy) submitted a license renewal application (LRA) in accordance with 10 CFR Part 54 of the Nuclear Regulatory Commission's (NRC) regulations (Reference 1). The LRA seeks renewal of the facility operating licenses for Indian Point Energy Center (IPEC) Unit 2 (IP2) and Unit 3 (IP3) – License Numbers DPR-26 and DPR-64, respectively – for a period of 20 years beyond the expirations of the initial operating licenses on September 28, 2013, for Unit 2, and on December 12, 2015, for Unit 3.

The NRC Staff's safety and environmental reviews of the IPEC LRA, while still pending, are mostly complete. The Staff published its safety evaluation report (SER) in NUREG-1930 in November 2009 (Reference 2). The SER summarizes the results of its safety review of the LRA for compliance with the requirements of 10 CFR Part 54. The Staff issued Supplements 1 and 2 to the SER in August 2011 and November 2014, respectively, to document the Staff's reviews of supplemental information provided by Entergy subsequent to the issuance of the SER (References 3 and 4). The Staff issued its final supplemental environmental impact statement (FSEIS) for the LRA in December 2010 (Reference 5), and Supplement 1 (Volume 4) to the FSEIS in June 2013 (Reference 6). In December 2015, the Staff issued draft Supplement 2 (Volume 5) to the FSEIS (Reference 7). The final version of that document is forthcoming.

On January 9, 2017, Entergy, the Attorney General of the State of New York, and Riverkeeper, Inc. (among other related corporate and governmental entities) entered into a settlement agreement regarding the continued operation of IP2 and IP3 (Reference 8). Under the agreement, IP2 will shut down by April 30, 2020, and IP3 will shut down by April 30, 2021, subject to operating extensions through, but not beyond, 2024 and 2025, respectively, under circumstances specified in the agreement. As part of the settlement agreement, Entergy further agreed to file, by February 8, 2017, an amendment to the IPEC LRA, modifying the proposed terms of the renewed licenses

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from 20 years for each unit to the periods ending April 30, 2024 for Unit 2 and April 30, 2025 for Unit 3.

For the reasons explained below, Entergy views the instant LRA amendment request as a ministerial action that does not require renoticing or re-docketing of the IPEC LRA by the NRC. Entergy filed the IPEC LRA in accordance with 10 CFR 54.19, which states, in part, that “[e]ach application must provide the information specified in 10 CFR 50.33(a) through (e), (h), and (i).” 10 CFR 50.33(e) requires the applicant to identify, among other things, “the period of time for which the [renewed] license is sought.” As reflected in Sections 1.0 and 1.1.5 of the IPEC LRA (Reference 1), Entergy requested that the IP2 and IP3 facility operating licenses (as well as any NRC source materials, special nuclear material, and by-product material licenses that are subsumed in or combined with the facility operating licenses) each be extended for a period of 20 years; i.e., to midnight September 28, 2033 for IP2 and to midnight December 12, 2035 for IP3.

Although Entergy requested that the IP2 and IP3 operating licenses be renewed for additional 20-year terms, there is no requirement that it seek a term of that duration. The text of 10 CFR 54.31(b) states that the requested renewal term is “not to exceed 20 years.” NRC guidance similarly states that “NRC regulations allow the renewal of these licenses for up to an additional 20 years,” and that “[t]he decision whether to seek license renewal rests entirely with nuclear power reactor owners, and typically is based on the plant’s economic viability and whether it can continue to meet NRC safety and environmental requirements.”¹ Thus, implicit in NRC regulations and guidance is the fact an applicant may seek renewal of a facility operating license for a period less than 20 years.

Entergy has reviewed the IPEC LRA, as revised and updated since its initial submittal, and identified those sections of the text that are affected by Entergy’s decision to seek shorter license renewal terms for IP2 and IP3. Attachment 1 contains the necessary conforming revisions to the affected LRA sections.²

Given that the requested LRA amendment will shorten the periods for which IP2 and IP3 will be authorized to operate if license renewal is granted, it will have no material adverse impact on the NRC Staff’s safety and environmental evaluations for IPEC license renewal, including the safety and environmental impact findings made by the Staff to date. Both the Staff’s safety and environmental evaluations of the IPEC LRA have been predicated on the assumption that IP2 and IP3 would operate for another 20 years beyond the 2013 and 2015 expiration dates of their initial operating licenses – i.e., until 2033 and 2035. The Staff’s SER (NUREG-1930) states that it “summarizes the results of the staff’s safety review of the LRA and describes the technical details considered in evaluating the safety aspects of the units’ proposed operation for an additional 20 years beyond the term of the current operating licenses” (Reference 2). Supplements 1 and 2 also reflect the 20-year license renewal term initially sought by Entergy (References 3 and 4). The Staff’s 2010 FSEIS explicitly states that “the NRC staff has assessed and disclosed the impacts of extending the operation of IP2 and IP3 for an additional 20 years beyond their present license terms in accordance with the National Environmental Policy Act (NEPA) and NRC’s regulations”

¹ NUREG-1850, “Frequently Asked Questions on License Renewal of Nuclear Power Reactors,” at 1-1, 1-2 (Mar. 2006) (ML061110022).

² Entergy also has revised certain statements in related sections of the LRA to indicate that IP2 and IP3 continue to operate under their original licenses in accordance with the NRC’s timely renewal regulation at 10 CFR 2.109 pending the NRC’s final determination on the IPEC LRA.

(Reference 5). Accordingly, the Staff's safety and environmental evaluations bound the shortened license renewal terms for IP2 and IP3 that Entergy seeks via the instant LRA amendment.

With regard to the Staff's safety evaluation, the key findings required by 10 CFR 54.21 and 54.29 are unaffected by Entergy's decision to seek shortened renewal terms. Specifically, with regard to 10 CFR 54.21, this LRA amendment has no effect on Entergy's (1) identification of the structures, systems, and components (SSCs) within the scope of the license renewal rule, as defined in 10 CFR 54.4 (i.e., the scoping process); or (2) identification of the in-scope structures and components that are subject to aging management review (AMR) (i.e., the screening process done as part of Entergy's integrated plant assessment, as defined in 10 CFR 54.21).

10 CFR 54.29 states that a renewed license may be issued by the Commission up to the full term authorized by § 54.31 (i.e., 20 additional years) if the Commission finds that:

(a) Actions have been identified and have been or will be taken with respect to the matters identified in Paragraphs (a)(1) and (a)(2) of this section, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are in accord with the Act and the Commission's regulations. These matters are:

(1) managing the effects of aging during the period of extended operation [(PEO)] on the functionality of structures and components that have been identified to require review under § 54.21(a)(1); and

(2) time-limited aging analyses [(TLAAs)] that have been identified to require review under § 54.21(c).

(b) Any applicable requirements of Subpart A of 10 CFR Part 51 have been satisfied.

(c) Any matters raised under § 2.335 have been addressed.³

Amending the LRA to reflect the shorter license renewal terms for IP2 and IP3 does not affect the substantive content of the numerous aging management programs (AMPs) that the Staff has reviewed and approved in accordance with Staff guidance. The Staff's review and approval are documented in its SER and two supplements thereto (and, in some very limited instances, the review is ongoing). It also does not affect the Staff's findings with respect to any TLAAs, namely that: (1) the analyses remain valid for the PEO; (2) the analyses have been projected to the end of the PEO; or (3) the effects of aging on the intended function(s) will be adequately managed for the PEO. As noted above, in making its reasonable assurance findings relative to specific AMPs and TLAAs, the Staff has done so on the basis that IP2 and IP3 would be operating for an additional 20 years beyond their initial license expiration dates of September 28, 2013 and December 12, 2015, respectively. See References 2-4.

During the Staff's review of the IPEC LRA, Entergy has made commitments related to AMPs to manage the aging effects for certain structures and components during the PEO. The latest version of the IPEC License Renewal Commitment List (Revision 30) was submitted to the NRC on

³ There are no pending petitions for waiver of an NRC regulation or rule in this proceeding.

January 17, 2017 as Attachment 2 to Entergy Letter NL-17-005 (Reference 9).⁴ As shown in that list, Entergy has implemented the majority of the commitments for IP2 and IP3. Moreover, the Staff has confirmed through applicable inspection processes that Entergy is implementing its license renewal commitments in an acceptable manner.⁵ Specifically, the NRC inspected the implementation of these commitments at IP2 during inspections completed on March 8, 2012; May 23, 2013; and September 12, 2013 (References 10-12). The Staff completed a similar IP3 inspection on October 9, 2015 (Reference 13).

For those license renewal commitments requiring further implementation actions, Entergy is maintaining those commitments in the current form, notwithstanding its decision to cease operations at IP2 and IP3 no later than April 30, 2024 for IP2 and April 30, 2025 for IP3. Thus, insofar as any pending commitments require Entergy to take certain actions by a date certain (e.g., by December 31, 2019) or within a specific timeframe within the PEO (e.g., “[a]pproximately 6 years after entering the PEO”), Entergy plans to complete those actions consistent with the operational status of the plants. To the extent that Entergy finds it appropriate to modify any license renewal commitment subsequent to issuance of the renewed licenses, it will do so in accordance with its established commitment change processes and procedures.

With regard to the Staff’s environmental review of the LRA, none of the findings required by NEPA and the NRC Staff’s environmental review regulations in 10 CFR Part 51 will be rendered invalid or inadequate by Entergy’s decision to amend the LRA to seek shortened renewal terms for IP2 and IP3. The Staff’s FSEIS for IPEC license renewal is a plant-specific supplement to NUREG-1437, the Staff’s Generic Environmental Impact Statement (GEIS) for license renewal, which contains the results of the NRC’s systematic evaluation of the consequences of renewing an operating license and operating a nuclear power plant for an additional 20 years (Reference 14). Therefore, like the GEIS, the FSEIS must – and does – consider the environmental impacts of operating IP2 and IP3 for an additional 20 years beyond the terms of the original licenses.

The 2010 FSEIS documents the Staff’s analysis of the environmental effects of the proposed action (including cumulative impacts), the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse effects. It also includes the Staff’s conclusion regarding the proposed action – renewal of the IP2 and IP3 operating licenses for additional 20-year periods. The Staff concluded that:

Based on (1) the analysis and findings in the [1996] GEIS, (2) the ER and other information submitted by Entergy, (3) consultation with Federal, State, Tribal, and local agencies, (4) the NRC staff’s consideration of public scoping comments received, and comments on the draft SEIS, and (5) the NRC staff’s independent

⁴ In NL-17-005, Entergy notified the Staff that it has determined that the industry analyses referenced in LR-ISG-2016-01, “Changes to Aging Management Guidance for Various Steam Generator Components” (Dec. 2016) are bounding for the IP2 and IP3 steam generator divider plate assemblies and tube-to-tubesheet welds, such that Entergy may manage the aging effect of primary water stress corrosion cracking (PWSCC) in those steam generator components in accordance with the new guidance contained in LR-ISG-2016-01. Accordingly, as explained in NL-17-005, Entergy has eliminated License Renewal Commitment 41 because it is no longer necessary, and has closed License Renewal Commitment 42 by virtue of having satisfied Option 1 (Analysis) of that commitment.

⁵ See NRC Inspection Manual, Temporary Instruction 2516/001 (Mar. 30, 2011) (ML110620255); NRC Inspection Procedure 71013, “Site Inspection for Plants with a Timely Renewal Application” (Sept. 25, 2013) (ML13032A102).

review, the recommendation of the NRC staff is that the Commission determine that the adverse environmental impacts of license renewal for IP2 and IP3 are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable (Reference 5).

The Staff's supplemental analyses in its June 2013 final first supplement to the 2010 FSEIS did not alter its conclusion in the 2010 FSEIS regarding the proposed action (i.e., renewal of the IP2 and IP3 licenses for additional 20-year terms). Similarly, the Staff's December 2015 draft second supplement to the FSEIS reaffirms the Staff's conclusion that the adverse environmental impacts of license renewal for IP2 and IP3 are not so great that preserving the option of license renewal for energy planning decision makers would be unreasonable (Reference 7).

The closure of IP2 and IP3 sooner than originally requested in the LRA will reduce the overall environmental impacts and resource commitments associated with extended plant operation. For example, once both plants cease operations, they will no longer need to withdraw large volumes of water from the Hudson River for cooling water system operation, thereby averting related impacts to aquatic species. The early cessation of plant operations also will reduce radioactive and non-radioactive waste streams associated with plant operation. Additionally, early plant shutdown will reduce the commitment of certain resources related to continued plant operation (e.g., additional fuel procurement, the additional spent fuel storage space needed for a full 20 years of extended operation, the need to replace the reactor vessel heads).

Entergy recognizes that the early shutdown of IP2 and IP3 may reduce certain benefits of plant operation (e.g., socioeconomic benefits and air quality benefits resulting from the plants' low greenhouse gas emissions). Again, Staff analyses documented in the FSEIS and supplements thereto are bounding. In Section 8.2 of the FSEIS, the Staff specifically evaluated the no-action alternative, i.e., analyzed what would be reasonably likely to happen – in terms of both positive and adverse environmental impacts – were the Commission to deny IPEC license renewal. Importantly, to the extent that early plant shutdown (i.e., shutdown before 20 more years of operation) will necessitate replacement power, the Staff considered, in FSEIS Section 8.3, the impacts resulting from replacing the electric generation capacity of both units with alternative electric generation sources or energy conservation, importing electric power from other sources to replace power generated by IP2 and IP3, and combinations of generation and conservation measures to replace power generated by IP2 and IP3 (References 5, 7).

The early shutdown of IP2 and IP3 can also expedite certain post-operation actions and processes. Any associated impacts also are bounded by Staff analyses contained or referenced in the FSEIS and supplements thereto. In the FSEIS (Reference 5), the Staff concluded that environmental impacts associated with decommissioning, following a license renewal period of up to 20 years or following the no-action alternative, would be bounded by the discussion of impacts in Chapter 7 of the GEIS, Chapter 7 of the FSEIS, and NUREG-0586, "Final Environmental Impact Statement on Decommissioning of Nuclear Facilities" (2002) (Reference 15). The environmental impacts associated with spent fuel storage both during and following the shortened license renewal term for IP2 and IP3 also are bounded by NRC generic evaluations of such impacts contained in (1) the NRC's GEIS for license renewal (Reference 14) and (2) the Continued Storage Rule and its supporting GEIS (References 16 and 17), respectively.

In summary, Entergy is amending the IPEC LRA to reflect shortened license renewal terms for IP2 and IP3, consistent with the terms of the above-described settlement agreement. For the reasons explained above, Entergy concludes that the Staff's current safety and environmental evaluations

bound the shortened license renewal terms for IP2 and IP3 requested herein by Entergy. Although Entergy expects that the NRC Staff will reflect the shortened license renewal terms in any planned future supplements to its SER and FSEIS (including the forthcoming final version of Volume 5 of the FSEIS), Entergy views this LRA amendment as administrative in nature and not requiring renoticing or re-docketing of the LRA.

There are no new commitments being made in this submittal.

Should you have any questions concerning this report, please contact Mr. Robert W. Walpole, Licensing Manager, at (914) 254-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on
Feb 8, 2017.

Sincerely,



AJV/rl

- Attachments:
1. List of References for Entergy Letter NL-17-019
 2. License Renewal Application Revisions Reflecting Shortened License Renewal Terms for Indian Point Units 2 and 3

cc: Mr. Daniel H. Dorman, Regional Administrator, NRC Region I
Mr. Sherwin E. Turk, NRC Office of General Counsel, Special Counsel
Mr. William Burton, NRC Senior Project Manager, Division of License Renewal
Mr. Douglas Pickett, NRR Senior Project Manager
Ms. Bridget Frymire, New York State Department of Public Service
Mr. John B. Rhodes, President and CEO NYSERDA
NRC Resident Inspector's Office

ATTACHMENT 1 TO NL-17-019

LIST OF REFERENCES FOR ENTERGY LETTER NL-17-019

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3
DOCKET NOS. 50-247 AND 50-286

LIST OF REFERENCES FOR ENTERGY LETTER NL-17-019

- 1) Entergy Letter NL-07-039, "Indian Point Energy Center License Renewal Application" (Apr. 23, 2007) (ML071210507)
- 2) NUREG-1930, "Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3," Vols. 1 and 2 (Nov. 2009)
- 3) NUREG-1930, Supp. 1, "Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Units 2 and 3" (Aug. 2011)
- 4) NUREG-1930, Supp. 2, "Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3" (Nov. 2014) (ML15188A383)
- 5) NUREG-1437, Supp. 38, Vols. 1-3, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3 - Final Report" (Dec. 2010)
- 6) NUREG-1437, Supp. 38, Vol. 4, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Indian Point Nuclear Generating Units Nos. 2 and 3, Final Report – Supplemental Report and Comment Responses" (June 2013)
- 7) NUREG-1437, Supp. 38, Vol. 5, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3 – Draft Report for Comment" (Dec. 2015)
- 8) Settlement Agreement by Entergy Nuclear Operations, Inc, the State of New York, and Riverkeeper, Inc. concerning Indian Point Energy Center (Jan. 9. 2017) (available at <http://www.riverkeeper.org/wp-content/uploads/2017/01/Indian-Point-Closure-Agreement-January-8-2017.pdf>)
- 9) Entergy Letter NL-17-005, "Entergy Actions Concerning License Renewal Commitments 41 and 42 in Response to LR-ISG-2016-01, Changes to Aging Management Guidance for Various Steam Generator Components," Attachment 2 (Indian Point Units 2 and 3 License Renewal Application, List of Regulatory Commitments, Revision 30) (Jan. 17, 2017)
- 10) Letter from J. Conte, NRC, to J. Ventosa, Site Vice President, Indian Point Energy Center, "Indian Point Nuclear Generating Unit 2 – NRC Inspection Report 05000247/2012008" (Apr. 19, 2012) (ML12110A315)
- 11) Letter from J. Trapp, NRC, to J. Ventosa, Site Vice President, Indian Point Energy Center, "Indian Point Nuclear Generating Unit 2 – NRC License Renewal Team Inspection Report 05000247/2013009" (July 5, 2013) (ML13186A179)
- 12) Letter from J. Trapp, NRC, to J. Ventosa, Site Vice President, Indian Point Energy Center, "Indian Point Nuclear Generating Unit 2 – NRC License Renewal Team Inspection Report 05000247/2013010" (Sept. 19, 2013) (ML13263A020).
- 13) Letter from M. Gray, NRC, to L. Coyle, Site Vice President, Indian Point Energy Center,

Indian Point Nuclear Generating Unit 3 – NRC License Renewal Inspection Report
05000286/ 2015011 (Nov. 19, 2015) (ML15323A026)

- 14) NUREG-1437, Rev. 1, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants—Final Report" (June 2013)
- 15) NUREG-0586, "Final Environmental Impact Statement on Decommissioning of Nuclear Facilities" (2002)
- 16) Final Rule, Continued Storage of Spent Nuclear Fuel, 79 Fed. Reg. 56,238 (Sept. 19, 2014)
- 17) NUREG-2157, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel, Final Report," Vols. 1 and 2 (Sept. 2014) (ML14196A105 and ML14196A107)

ATTACHMENT 2 TO NL-17-019

**LICENSE RENEWAL APPLICATION REVISIONS REFLECTING SHORTENED
LICENSE RENEWAL TERMS FOR INDIAN POINT UNITS 2 AND 3**

Additions Underlined
Deletions Lined Out

ENERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3
DOCKET NOS. 50-247 AND 50-286

1.0 ADMINISTRATIVE INFORMATION

Pursuant to Part 54 of Title 10 of the Code of Federal Regulations (10 CFR 54), this application seeks renewal for an additional 20-year term of the facility operating licenses (FOL) for Indian Point Energy Center (IPEC), Units 2 and 3, which are operating in accordance with the U.S. Nuclear Regulatory Commission's (NRC) "timely renewal" regulation in 10 CFR 2.109. For Indian Point Energy Center Unit 2 (IP2), the facility operating license (DPR-26) was set to expires at midnight September 28, 2013. For Indian Point Energy Center Unit 3 (IP3), the facility operating license (DPR-64) was set to expires at midnight December 12, 2015. These applications apply to renewal of the source, special nuclear, and by-product materials licenses that are combined in the facility operating licenses.

The application is based on guidance provided by the ~~U.S. Nuclear Regulatory Commission~~ NRC in NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Revision 1, September 2005, and Regulatory Guide 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," Revision 1, September 2005, and guidance provided by NEI 95-10, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule*, Revision 6, June 2005.

The license renewal application is intended to provide sufficient information for the NRC to complete its technical and environmental reviews pursuant to 10 CFR Parts 54 and 51, respectively. The license renewal application is designed to allow the NRC to make the findings required by 10 CFR 54.29 in support of the issuance of renewed facility operating licenses for IPEC.

1.1.5 Class and Period of License Sought

The applicants request renewal of the facility operating licenses for Unit 2 and Unit 3 (DPR-26 and DPR-64, respectively) for a period of less than 20 years. The licenses were issued under Section 104b of the Atomic Energy Act of 1954 as amended. License renewal would extend the facility operating license for Unit 2 from midnight September 28, 2013, to midnight ~~September 28, 2033~~ April 30, 2024, and the facility operating license for Unit 3 from midnight December 12, 2015, to midnight ~~December 12, 2035~~ April 30, 2025.

This application also applies to renewal of those NRC source materials, special nuclear material, and by-product material licenses that are subsumed or combined with the facility operating licenses or provisional operating license.

1.2 PLANT DESCRIPTION

Indian Point Energy Center Units 2 and 3 are located on approximately 239 acres of land on the east bank of the Hudson River at Indian Point, Village of Buchanan in upper Westchester County, New York. The site is about 24 miles north of the New York City boundary line. The nearest city is Peekskill, 2.5 miles northeast of Indian Point. Both units employ a pressurized water reactor (PWR) and nuclear steam supply system (NSSS) furnished by Westinghouse Electric Corporation. The facility operating license for Unit 2 (DPR-26) was set to expires at midnight September 28, 2013. The facility operating license for Unit 3 (DPR-64) was set to expires at midnight December 12, 2015. Units 2 and 3 continue to operate under their original licenses in accordance with the U.S. Nuclear Regulatory Commission's (NRC) "timely renewal" regulation in 10 CFR 2.109 pending the NRC's decision on the license renewal application.

4.7.3 Steam Generator Flow Induced Vibration and Tube Wear

Unit 2

Summary Description

The IPEC Unit 2 steam generators were evaluated with respect to flow induced vibration (tube wear) for the power increase. The analysis of the effects of steam generator flow induced vibration on tube wear assumed 40 years of operation.

Evaluation

The IP2 replacement steam generators went into service in January 2000 and will thus have less than 40 years of service at the end of the period of extended operation. Therefore the analysis of flow induced vibration effects on tube wear will remain valid through the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

Unit 3

Summary Description

The IPEC Unit 3 steam generators were evaluated with respect to flow induced vibration (tube wear) for the power increase. The maximum pre-uprate predicted tube wear was 1.3 mils. As a result of the 4.8% uprate, the increase in tube wear is 87%. The post-uprate wear over 40 years is approximately 2.4 mils (~4.9% through-wall wear). This amount of wear will not significantly affect the tube integrity. As the IP3 replacement steam generators went into service in 1989, they will have reached 46.5 approximately 36 years of service at the end of the period of extended operation, 2035 April 30, 2025. ~~Therefore these analyses are considered TLAA. This analysis is treated as a TLAA.~~

Evaluation

~~As the tube wear is a function of time in service, it is appropriate to project the additional wear for the period of extended operation as 46.5/40 times the 40-year wear. Projected wear is 2.8 mils (~5.7% through-wall) by the end of the period of extended operation. This is still well below the allowable 40% through-wall wear depth (20 mils). Hence the period of extended operation will not result in unacceptably high tube wear. Thus, the TLAA associated with Unit 3 tube wear has been projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).~~

The IP3 replacement steam generators went into service in 1989 and will thus have less than 40 years of service at the end of the period of extended operation (April 30, 2025). Therefore, the analysis of flow induced vibration effects on tube wear will remain valid through the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

A.2.0 Supplement for Renewed Operating License

The Indian Point Energy Center license renewal application (Reference A.2-1) and information in subsequent related correspondence provided sufficient basis for the NRC to make the findings required by 10 CFR 54.29 (Final Safety Evaluation Report) (Reference A.2-2). As required by 10 CFR 54.21(d), this UFSAR supplement contains a summary description of the programs and activities for managing the effects of aging (Section A.2.1) and a description of the evaluation of time-limited aging analyses for the period of extended operation (Section A.2.2). The period of extended operation is the 20 years after from the expiration date of the original operating license (September 28, 2013) to the proposed end of the license renewal term (April 30, 2024).

A.2.2.6 Steam Generator Flow-Induced Vibration and Tube Wear

The steam generators were evaluated with respect to flow-induced vibration (tube wear). The replacement steam generators went into service in January 2000 and will have less than 40 years of service at the end of the period of extended operation (~~September 2033~~ April 30, 2024). Therefore, these TLAA will remain valid through the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

A.3.0 Supplement for Renewed Operating License

The Indian Point Energy Center license renewal application (Reference A.3-1) and information in subsequent related correspondence provided sufficient basis for the NRC to make the findings required by 10 CFR 54.29 (Final Safety Evaluation Report) (Reference A.3-2). As required by 10 CFR 54.21(d), this UFSAR supplement contains a summary description of the programs and activities for managing the effects of aging (Section A.3.1) and a description of the evaluation of time-limited aging analyses for the period of extended operation (Section A.3.2). The period of extended operation is the 20 years after from the expiration date of the original operating license (December 12, 2015) to the proposed end of the license renewal term (April 30, 2025).

A.3.2.6 Steam Generator Flow-Induced Vibration and Tube Wear

The steam generators were evaluated with respect to flow-induced vibration. ~~The projected tube wear is 2.8 mils (~5.7% through-wall wear) by the end of the period of extended operation. Therefore, the TLAA associated with tube wear has been projected to the end of the period of extended operation in accordance with 10 CFR 54(21)(c)(1)(ii). The post-uprate wear over 40 years will not significantly affect the tube integrity. The replacement steam generators went into service in 1989 and will have less than 40 years of service at the end of the period of extended operation (April 30, 2025). Therefore, the analysis of flow induced vibration effects on tube wear will remain valid through the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).~~