

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of)	
Exelon Generation Company, LLC)	Docket Nos. 50-277/278 SLR
Peach Bottom Atomic Power Station,)	May 1, 2019
Units 2 & 3)	
)	

**BEYOND NUCLEAR, INC.’S AMENDED HEARING REQUEST AND
PETITION TO INTERVENE**

I. INTRODUCTION

Pursuant to 10 C.F.R. § 2.309(c), Beyond Nuclear, Inc. (“Beyond Nuclear”) hereby moves to amend the basis statements of the contentions it has submitted in this U.S. Nuclear Regulatory Commission (“NRC” or “Commission”) proceeding for consideration of Exelon Generation Co., L.L.C.’s (“Exelon’s”) application for subsequent license renewal (“SLR”) of its operating license for the Peach Bottom Units 2 and 3 nuclear power plant. *See* Beyond Nuclear’s Hearing Request and Petition to Intervene (Nov. 19, 2019) (“Hearing Request”). The purpose of the amended contentions is to address a recently-published revision to a Pacific Northwest National Laboratory (“PNNL”) technical report that was cited by Beyond Nuclear in support of its contentions.

II. BACKGROUND

A. Beyond Nuclear’s Hearing Request

On November 19, 2018, Beyond Nuclear submitted its Hearing Request, seeking admission of two contentions challenging Exelon’s SLR application. In Contention 1, Beyond Nuclear asserted that Exelon has failed to satisfy NRC license renewal regulations because its SLR application does not address the degree to which Exelon’s aging management programs

(“AMPs”) depend on external operating experience, how Exelon will determine what amount of operating experience information is sufficient, and how operating experience from current sources will be augmented if it is deemed insufficient. Hearing Request at 4. In Contention 2, Beyond Nuclear charged that Exelon’s Environmental Report violates the National Environmental Policy Act (“NEPA”) and NRC implementing regulations by failing to address the environmental impacts of operating aging reactor equipment during second license renewal term. In support of both contentions, Beyond Nuclear relied on the expert report of David A. Lochbaum: Proposed Subsequent License Renewal of Peach Bottom Units 2 and 3: Exelon’s Aging Management Programs Fail to Provide Adequate Measures for Consideration of Operating Experience Throughout the Period of Extended Operation (Nov. 16, 2018) (“Lochbaum Expert Report”).

In his Expert Report, Mr. Lochbaum discussed the “vital role played by operating experience in shaping, and re-shaping, aging management programs for operation of reactors during license renewal terms.” Lochbaum Expert Report at 3-4. He also noted that “[a]bundant evidence also speaks to gaps, deficiencies, and uncertainties in present understanding of aging degradation mechanisms.” *Id.* And he concluded that “[l]earning from operating experience is key to enabling the changes that will ensure the effectiveness of aging management programs throughout reactor operating lifetimes.” *Id.* However, as Mr. Lochbaum also observed, the amount of available operating experience available to Exelon for the Peach Bottom SLR term could be reduced during the SLR term as a result of reactor closures, including closures in recent years and likely closures in the future. *Id.* Therefore, he called upon Exelon to address, in its AMPs, the degree to which Exelon depends on external operating experience, how Exelon will determine what amount of operating experience information is sufficient to ensure the

effectiveness of the programs, and how operating experience from current sources will be augmented if it is deemed insufficient. *Id.*

B. Ramuhalli 2017

In support of his observations and conclusions, Mr. Lochbaum relied in part on a technical report prepared by PNNL: Ramuhalli, et al., PNNL-27120: “Criteria and Planning Guidance for Ex-Plant Harvesting to Support Subsequent License Renewal.” (December 2017) (“Ramuhalli 2017”).¹ Mr. Lochbaum cited Ramuhalli 2017 for the proposition that aging management of electrical cables is “complicated by the wide range of insulating materials used for the cables as well as limitations in the applicability and reliability of accelerated-aging testing in laboratories.” *Id.* at 17-18 (citing Ramuhalli 2017 at 7-8). He also cited Ramuhalli 2017 for the proposition that removal of cables from operating nuclear plants shows “how these components can yield valuable insights about aging management.” *Id.* at 35 (citing Ramuhalli

¹ Ramuhalli et al. 2017 initially was posted on the websites of PNNL (https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-27120.pdf), the U.S. Department of Energy’s Office of Scientific and Technical Information (“OSTI”) (<https://www.osti.gov/biblio/1413395-criteria-planning-guidance-ex-plant-harvesting-support-subsequent-license-renewal>), and the International Atomic Energy Agency’s International Nuclear Information System (“IAEA INIS”) (https://inis.iaea.org/search/search.aspx?orig_q=RN:49074900); but subsequently was removed from all three. In the oral argument before the Atomic Safety and Licensing Board (“ASLB”) on March 27, 2019, NRC Staff counsel described Ramuhalli 2017 as a “draft” document that had been created by PNNL under contract with the NRC, but was “predecisional” because it had not yet been approved by the NRC. Tr. at 116-17 (Gamin). According to NRC Staff counsel, the document was posted on these government and international nuclear information websites “by mistake.” Tr. at 117. Yet, the document contains not a single marking indicating it is a draft, and appears for all intents and purposes to be the authors’ final product.

Beyond Nuclear has made the report publicly available on its own website at: http://static1.1.sqspcdn.com/static/f/356082/28026831/1542303608657/autopsy_PNNL-27120_harvesting_Dec2017.pdf?token=PNlt6T%2B62RYl3p9NYz7OHvj3kno%3D.

Ramuhalli 2017 has never been posted on the public version of NRC’s Agencywide Documents sAccess and Management System (“ADAMS”).

2017 at 21-22). Comparison between cables that had been used in an operating plant and cable that had never been installed “shed insights about insulation degradation over time versus degradation aided by exposure to harsher environmental conditions.” *Id.* (citing Ramuhalli 2017 at 21, 22). Mr. Lochbaum also pointed to examples of post-operational harvesting of cables that were discussed in Ramuhalli 2017. *Id.* at 37 (citing Ramuhalli 2017 at 21).

Mr. Lochbaum’s Expert Report advocated harvesting of components from shutdown reactors as a reasonable and potentially necessary means of obtaining external operating experience. *Id.* at 34-41. But he also noted Ramuhalli 2017’s conclusion that harvesting “can be expensive,” and therefore a top priority should be “[c]learly identifying the need for harvesting the material.” *Id.* at 40 (citing Ramuhalli 2017 at 24).

C. Ramuhalli Rev. 1

By letter dated April 2, 2019, the NRC Staff notified the Board and parties of the issuance of a revised version of Ramuhalli 2017: PNNL-27120, Rev. 1, Criteria and Planning Guidance to Ex-Plant Harvesting to Support Subsequent License Renewal (March 31, 2019) (ADAMS Accession No. ML19081A006) (“Ramuhalli Rev. 1”).² None of the factual information reviewed by the researchers who prepared Ramuhalli 2017 appears to be changed in Ramuhalli Rev. 1. But Rev. 1 makes significant changes to language that qualitatively characterizes the state of understanding of material degradation, the safety significance of missing information, and whether harvesting is necessary or merely desirable.

A comparison of the “Summary” sections in Ramuhalli 2017 and Ramuhalli Rev. 1 is illustrative. Ramuhalli 2017 states that “[m]any of the remaining questions regarding degradation

² While the NRC posted Ramuhalli Rev. 1 on ADAMS, at this writing Ramuhalli Rev. 1 has not been publicly posted on the PNNL, OSTI or IAEA INIS websites. *See* note 1.

of materials will likely *require* a combination of laboratory studies as well as other research conducted on materials sampled from plants (decommissioned or operating).” Ramuhalli 2017 at v (emphasis added). In contrast, Rev. 1 states that “[i]nsights into degradation mechanisms from studies on harvested materials *can provide confirmation* of the effectiveness of aging management approaches used by the nuclear industry.” Ramuhalli Rev. 1 at ii (emphasis added).

Similarly, while Ramuhalli 2017 characterizes harvesting as necessary for benchmarking in most cases, Ramuhalli Rev. 1 describes harvesting as merely a potential aid to benchmarking. *Compare* Ramuhalli 2017 at 2 (“Where available, benchmarking can be performed using surveillance specimens. In most cases, however, benchmarking of laboratory tests *will require* harvesting materials from reactors.”) (emphasis added) with Ramuhalli Rev. 1 at 1-2 (“Where available, such benchmarking can be performed using surveillance specimens exposed to field conditions during the course of operation of the reactor. However, surveillance specimens are often limited to critical components such as the RPV, and do not exist for components in other locations in a plant. In such cases, benchmarking of laboratory tests *may be achieved* by harvesting materials from reactors.”) (emphasis added).

Ramuhalli 2017 also contains 63 references to “gaps” in technical understanding and knowledge regarding materials degradation. *See, e.g.*, Ramuhalli 2017 at 5, 7, 15, 16, 17, 22. Yet, the word “gap” appears only three times in Ramuhalli Rev. 1. In place of phrases like “technical gaps” and “knowledge gaps,” Rev. 1 substitutes phrases like “technical issues” and “technical questions.” *See, e.g.*, Ramuhalli Rev. 1 at 11, 13, 15, 18.

And Ramuhalli Rev. 1 eliminates entire paragraphs from Ramuhalli calling for harvesting as an essential tool to fill “knowledge gaps” regarding material degradation. These missing paragraphs include the “Abstract” in the introduction to Ramuhalli 2017, which states:

As U.S. nuclear power plants look to subsequent license renewal (SLR) to operate for a 20-year period beyond 60 years, the U.S. Nuclear Regulatory Commission and the industry will be addressing technical issues around the capability of long-lived passive components to meet their functionality objectives. A *key challenge* will be to better understand likely materials degradation mechanisms in these components and their impacts on component functionality and safety margins. *Research addressing many of the remaining technical gaps in these areas for SLR may greatly benefit from materials sampled from plants (decommissioned or operating). Because of the cost and inefficiency of piecemeal sampling, there is a need for a strategic and systematic approach to sampling materials from structures, systems, and components (SSC) in both operating and decommissioned plants.* This document describes a potential approach for sampling (harvesting) materials that focuses on prioritizing materials for sampling using a number of criteria. These criteria are based on an evaluation of technical gaps identified in the literature, research needs to address these technical gaps, and lessons learned from previous harvesting campaigns. The document also describes a process for planning future harvesting campaigns; such a plan would include an understanding of the harvesting priorities, available materials, and the planned use of the materials to address the technical gaps.

Id. at iii (emphasis). Similarly, the following paragraph in Ramuhalli 2017 has been completely excised from Ramuhalli Rev. 1:

Over the past several years, a number [of nuclear power plants] (both within the United States and elsewhere) have either permanently ceased operation or have indicated that they will shut down in the next few years. *These shutdown plants provide an opportunity to extract materials that have real-world aging and provide an avenue for benchmarking laboratory-scale studies on materials aging. The resulting insights into material aging mechanisms and precise margins to failure will be essential to provide reasonable assurance that the materials/components will continue to perform their safety function throughout the plant licensing period.* The extracted materials could also help in determining specific methods for condition assessment or nondestructive evaluation (NDE) that may be applied to these components in the field to assess component aging.

Id. at 2 (emphasis added).

Thus, as a general matter, the NRC Staff substantially weakened the conclusions and recommendations of Ramuhalli 2017 in Rev. 1, without changing the underlying facts.

III. DISCUSSION

Beyond Nuclear seeks to amend the basis statements for Contentions 1 and 2 to include reference to Ramuhalli Rev. 1 to establish the following support for the contentions:

1. Despite its characterization by NRC Staff counsel as a draft or provisional document, Ramuhalli 2017 continues to provide reliable factual information and expert opinion in support of Contentions 1 and 2 by describing the nature and significance of knowledge gaps with respect to degradation mechanisms in nuclear power plants; and by identifying necessary and appropriate ways to address those gaps, including harvesting of nuclear reactor components. The reliability of Ramuhalli 2017 is demonstrated by the following:
 - a. Despite statements by NRC Staff counsel that Ramuhalli 2017 was a “draft” and “predecisional” document, Ramuhalli 2017 itself contains no indication that the authors considered their research to be incomplete or their conclusions and recommendations to be provisional.
 - b. Ramuhalli Rev. 1 does not make any significant changes to the facts relied on by the authors of Ramuhalli 2017 for their conclusions and recommendations regarding the existence of technical knowledge gaps in the understanding of nuclear reactor aging mechanisms, and appropriate means to resolve them.
2. The circumstances described in par. 1 above, taken together with the significant inconsistencies between the conclusions and recommendations of Ramuhalli 2017 and Ramuhalli Rev. 1 regarding the same set of facts, raise questions about whether Ramuhalli 2017 was “watered down” by the NRC Staff in Rev. 1 without a technical basis, in response to industry pressure to avoid advocating the necessity of aging management measures that are potentially costly.
3. The inconsistencies between the conclusions and recommendations of Ramuhalli 2017 and Ramuhalli Rev. 1, despite their reliance on a common set of facts, supports Contention 2 by underscoring NEPA’s requirement for a “hard look” at the

environmental impacts of extending the Peach Bottom operating license for a subsequent license renewal term. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349-50 (1989); *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 443 (4th Cir. 1996). *See also* 40 C.F.R. § 1500.1(c) (“NEPA's purpose is not to generate paperwork--even excellent paperwork--but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.”).

IV. BEYOND NUCLEAR HAS GOOD CAUSE TO FILE THIS MOTION AFTER THE INITIAL DEADLINE FOR HEARING REQUEST.

Beyond Nuclear satisfies the three requirements of 10 C.F.R. § 2.309(c)(1) for establishing good cause to amend Contentions 1 and 2 after the initial November 11, 2018 deadline for filing hearing requests on Exelon’s SRP application. First, the information on which the amended contentions are based “was not previously available.” 10 C.F.R. § 2.309(c)(1)(i). Rumhalli Rev. 1 did not become available until it was posted on ADAMS on April 2.

Second, the information upon which the amendment to the contentions is based is “materially different” from the information that was previously available (10 C.F.R. § 2.309(c)(1)(ii)) in two respects. First, Ramuhalli 2017 literally disappeared from the public record, and in that sense was not “publicly available” at the time Beyond Nuclear filed its contentions. Now the existence of Ramuhalli 2017 has been confirmed, and Rev. 1 has reappeared with its changed conclusions and recommendations.

Second, as discussed above in Section II.C, while the factual information evaluated in Ramuhalli 2017 has not changed, the characterization of the significance of those facts and actions needed to address those facts has materially changed. While Ramuhalli 2017 characterized the current state of knowledge regarding aging of nuclear reactor equipment as

inadequate to support subsequent license renewal and described harvesting of reactor components as a necessary means of filling knowledge gaps, Ramuhalli Rev. 1 now characterizes the current state of knowledge as sufficient and describes harvesting as beneficial but not necessarily essential.

Finally, this motion has been submitted in a “timely fashion based on the availability of the subsequent information.” Ramuhalli Rev. 1 was posted on ADAMS April 2, 2019, and this motion is being filed within 30 days.

V. CONCLUSION

For the foregoing reasons, the Board should allow Beyond Nuclear to amend the basis statements of its contentions to incorporate additional reference to Ramuhalli Rev. 1, in addition to its continuing reliance on Ramuhalli 2017, for the purposes described above in Section IV.

Respectfully submitted,

 /signed electronically by/

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CERTIFICATE OF SERVICE

I certify that on May 1, 2019, I posted copies of the foregoing Beyond Nuclear, Inc.'s Amended Hearing Request and Petition to Intervene on the NRC's Electronic Information Exchange System.

/signed electronically by/
Diane Curran