

United States Senate

May 10, 2021

The Honorable Christopher T. Hanson
Chairman
Nuclear Regulatory Commission
Mail Stop O-16 C12
Washington, DC 20555-0001

Dear Chairman Hanson,

We write regarding the March 5, 2021 Nuclear Regulatory Commission (NRC) order to extend the time for review of the License Amendment for Seabrook Nuclear Power Station (Seabrook).¹ In August 2020, the Atomic Safety and Licensing Board (ASLB) issued its Initial Decision,² which upheld the NRC's approval of NextEra Energy's License Amendment, subject to four license conditions. Although the inclusion of these four license conditions was an important step towards ensuring public safety, we are concerned that they are insufficient. We therefore urge the NRC to re-open the record for consideration of supplemental testimony³ and strengthen the four license conditions in the ASLB's Initial Decision.

One of the four license conditions of the ASLB's Initial Decision required increased testing and monitoring of alkali-silica reaction (ASR) degradation at Seabrook. ASR is a process that occurs when concrete with high alkali content is exposed to high levels of moisture, leading to cracking and degradation of concrete over time.⁴ ASR degradation is of particular concern for nuclear reactors and is a prime factor in nuclear safety in the long-term, particularly for those reactors that are located on coasts. ASR degradation at Seabrook — which NextEra first identified in 2009 — is a serious concern because the station sits on a marsh and its concrete has continual contact with water.⁵ Currently, there are no NRC regulations on aging concrete at nuclear reactors. As the NRC has acknowledged, the ASR expansion monitoring program at Seabrook is “a first-of-a-kind” program.⁶ Thus, it is imperative that the NRC pursue all measures necessary to monitor and mitigate ASR degradation at Seabrook.

Vague language in the ASLB's Initial Decision does not sufficiently improve the concrete testing and monitoring protocols for Seabrook's degraded concrete. The imprecise language also fails to

¹ Nuclear Regulatory Commission, *ORDER (Extending Time for Commission Review)* (Mar. 5, 2021).

² LBP 20-09.

³ Nuclear Regulatory Commission, Exhibit Number INT052: *NON-PUBLIC - Supplemental Testimony of Victor E. Saouma, Ph.D Regarding LBP-20-09* (Aug. 28, 2020), <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML20244A314>.

⁴ H. Aryan et al., *ASR Degradation and Expansion of Plain and Reinforced Concrete*, American Society of Civil Engineers (ASCE) Library, Structures Congress 2020, <https://ascelibrary.org/doi/10.1061/9780784482896.029>.

⁵ Nuclear Regulatory Commission, *Special NRC Oversight at Seabrook Nuclear Power Plant: Concrete Degradation*, <https://www.nrc.gov/reactors/operating/ops-experience/concrete-degradation.html> (last visited Mar. 6, 2021).

⁶ Nuclear Regulatory Commission, LBP-20-09: *Initial Decision (Ruling on the Reformulated Contention)* at 168 (August 21, 2020), <https://www.nrc.gov/docs/ML2025/ML20254A339.pdf>.

ensure timely and reliable detection of unacceptable ASR-induced internal cracks in concrete structures at Seabrook. The NRC's decision to extend the time for its review of the License Amendment for Seabrook provides a brief window in time for the Commission to make adjustments that ensure the U.S. nuclear fleet is adequately equipped to handle the threats of ASR degradation. We urge the NRC to seize this critical opportunity and make the four license conditions stronger and unambiguously enforceable by adopting recommendations that are aligned with those provided by Dr. Victor Saouma in his expert⁷ Supplemental Testimony⁸ provided during the ASLB Initial Decision proceedings for Seabrook. These recommendations include:

1. **Quantify the reliability of concrete expansion monitoring** by requiring the use of error bars to provide graphical representations of the uncertainties in the calibration curve used by NextEra Energy. The NRC staff should independently review the error bars.
2. **Install acoustic sensors** to detect possible reinforcement failure, using ultrasonic waves to detect and measure when a material deforms under stress.
3. **Eliminate ambiguous terms.** For example, the phrase "significant expansion" is too vague and could allow NextEra to defer addressing ASR development until cracks expand to irreversibly dangerous proportions. License condition (e) should eliminate the word "significantly" and instead require NextEra to perform an engineering evaluation when a specific expansion threshold is crossed.
4. **Specify that the "petrographic analysis" required in license condition (f) should be capable of detecting micro-cracks as small as 10 µm.** Petrography is a generic term, and different methods of petrography have differing degrees of identification. By specifying the micro-crack size that NextEra must analyze, the NRC can ensure that unacceptable developments of micro-cracking do not go undetected.

The NRC should prioritize safety, scientific expertise, and regulatory specificity as it works to develop regulations to ensure that this unprecedented condition does not threaten the structural integrity of the facilities in which it occurs. We request that the NRC reopen the record for consideration of supplemental testimony and strengthen the four license conditions in the ASLB's Initial Decision.

Thank you for your consideration of this request.

Sincerely,



Edward J. Markey
United States Senator



Elizabeth Warren
United States Senator

⁷ Nuclear Regulatory Commission, LBP-20-09: *Initial Decision (Ruling on the Reformulated Contention)* at 50 (August 21, 2020), <https://www.nrc.gov/docs/ML2025/ML20254A339.pdf>.

⁸ Nuclear Regulatory Commission, Exhibit Number INT054: *Supplemental Testimony of Victor E. Saouma, Ph.D Regarding LBP-20-09 - REDACTED PUBLIC VERSION* (Aug. 28, 2020), <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML20279A482>.