

**Additional Questions for the Record**

**Subcommittee on Energy and  
Subcommittee on Environment and Climate Change**

**Hearing on**

**“Keeping Us Safe and Secure: Oversight of the Nuclear Regulatory Commission”**

**July 14, 2021**

The Honorable Jeff Baran, Commissioner, Nuclear Regulatory Commission

**The Honorable Ann M. Kuster (D-NH)**

1. Commissioner Baran, given that Seabrook is the first nuclear power plant that has experienced issues with ASR cracking, has the NRC worked with independent experts to determine the best oversight regime to ensure the safety of Seabrook Nuclear Power Station? Please provide a complete list of those independent experts.

**RESPONSE:**

After consulting with the NRC staff, my understanding is that they engaged with the following independent experts about ASR at Seabrook:

- Due to the first-of-a-kind nature of ASR in the U.S. nuclear fleet, the Advisory Committee on Reactor Safeguards (ACRS) reviewed the NRC staff’s draft Safety Evaluation for the licensee’s ASR-related license amendment request. Established by the Atomic Energy Act, ACRS is independent of the NRC staff and reports directly to the Commission, which appoints its expert members. The ACRS’s subcommittee on Plant License Renewal met with the NRC staff and NextEra and its consultants, on October 31, 2018, to conduct a review of past, current, and future actions to address ASR at Seabrook.

- NRC's Office of Nuclear Reactor Regulation (NRR) conducted an audit during the review of the license amendment request. This audit was supported by a technical specialist from Brookhaven National Laboratory.
  - NRC sponsored a research project at the National Institute of Standards and Technology (NIST) entitled "Structural Performance of Nuclear Power Plant Concrete Structures Affected by Alkali-Silica Reaction (ASR)" that began in May 2014. This research had five tasks related to structural and material aspects of ASR including assessing the effects of ASR on in-situ mechanical properties of concrete; assessing development and lap-splice lengths of reinforcing bars in ASR-affected concrete; and evaluating cyclic seismic response characteristics of ASR-affected concrete structural members. The staff reports that the research is complete, but that its review of the NIST report is ongoing.
  - NRC's Office of Research works to stay abreast of ongoing ASR research performed or sponsored by other independent organizations, such as DOE Oak Ridge National Laboratory, Electric Power Research Institute, and Canadian Nuclear Safety Commission. The NRC staff has participated in several seminars, workshops, and conferences that included ASR material and structural experts in order to increase its knowledge of ASR.
2. Commissioner Baran, has the NRC consulted with the operators of other major facilities that are experiencing ASR cracking, like Hydro-Quebec, to develop cross-industry best practices for monitoring ASR cracking? Please provide a complete list of other organizations the NRC has consulted with about best practices for monitoring ASR cracking.

**RESPONSE:**

My understanding from the NRC staff is that there have not been direct consultations with operators like Hydro-Quebec, which experienced ASR issues at the Gentilly-2 nuclear power plant. However, the NRC staff is aware of the approach taken to address the ASR issue at Gentilly-2 when the plant was operating through the available literature and participation by NRC's research staff in international cooperative research activities under the Committee for the Safety of Nuclear Installations (CSNI) of the Nuclear Energy Agency (NEA). According to the NRC staff, a CSNI initiative informed its evaluation and oversight of ASR at Seabrook.

CSNI led an activity related to concrete degradation: "Assessment of Structures Subjected to Concrete Pathologies" (ASCET) to make general recommendations for aging management of concrete nuclear facilities, taking into account the effect of concrete pathologies on structural degradation.

ASCET Phase 1 concluded with an international workshop held at the NIST campus in Gaithersburg, MD from June 29 to July 1, 2015. The workshop, which was led by the Canadian Nuclear Safety Commission (CNSC) and NRC's Office of Research, included presentations and group discussions by global experts on concrete pathologies including ASR. Experts from Hydro-Quebec also presented their analyses and evaluations for the Gentilly-2 nuclear power plant as well as for other facilities owned and operated by Hydro-Quebec.

Building in part on recommendations from Phase 1, Phase 2 of ASCET's work consisted of pre-test and post-test analyses by various organizations around the world doing research on nuclear safety, including a series of structural tests of structural walls with and without ASR. This work was conducted at the University of Toronto under a program sponsored by the CNSC. NRC's

Office of Research participated in this work. Phase 3 involved similar analyses for all post-testing conditions.