

Degraded Concrete at Seabrook: An Intro to “ASR”

What is the Alkali-Silica Reaction?

Alkali-Silica Reaction, or “ASR,” is a chemical combining of reactive silica from concrete aggregate with the alkali from cement paste in the presence of moisture. The result of the reaction is a gel, which can expand and may cause micro-cracks in concrete. ASR is known to be progressive and irreversible. Seabrook Station in coastal New Hampshire is the first U.S. nuclear power plant known to be experiencing [ASR](#), though it has been found to be a problem impacting safety and longevity of reactors in Canada and Belgium.

How is ASR Impacting Seabrook Station?

- ASR was first detected at Seabrook in 2009, but the progress and rate of decay is not yet established. Despite visual monitoring and core sampling, the full extent of ASR damage to Seabrook’s concrete is unknown, though plant operators have admitted the condition has led to building “deformation events.”
- ASR is known to be present in the outer containment building, the spent fuel pool, the reactor dome, and 80 percent of Seabrook’s key structures.
- The U.S. Nuclear Regulatory Commission (NRC) determined that because ASR may impact the ability of the plant’s concrete to perform as designed, Seabrook is functioning outside the parameters of its current operating license. This triggered further study and a new regulatory proceeding.
- In 2016, plant owner NextEra Energy Seabrook, LLC submitted License Amendment Request ([LAR](#)) [16-03](#) seeking to “Revise Current Licensing Basis to Adopt a Methodology for the Analysis of Seismic Category I Structures with Concrete Affected by Alkali-Silica Reaction.”






Former NRC Chairman Allison MacFarlane inspecting ASR at Seabrook.

*“The worse it gets,
the worse it gets.”*

- Concrete expert Dr. Paul Brown
on ASR

Learn More about C-10:

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C-10 Weighs in on ASR

Citing serious safety concerns with the concrete and flaws in the testing and monitoring methodologies undertaken by NextEra, the C-10 Research & Education Foundation, Inc., sought intervenor status in NRC [Docket Number 50-443-LA-2](#), and requested a public hearing.

In October 2017, the NRC's Atomic Safety and Licensing Board (ASLB) [ruled](#) that C-10 has standing to intervene in the case, and admitted five of the group's concerns as one reformulated contention. C-10 is working with leading concrete experts and structural engineers to better understand ASR, as we prepare for a public hearing on NextEra's license amendment request in early 2019. Meanwhile, NRC staff are conducting their own review of the LAR.

Background on Seabrook

- Seabrook Station nuclear power plant is the largest single electric generator on the New England power grid, and an important part of the region's economy, with 600 employees.
- Construction on Seabrook's pressurized water reactor began in 1976. The plant has been operational since 1990, and is currently licensed until 2030. NextEra is seeking a license extension to 2050.
- Nuclear plants are permitted to release small amounts of radiation on a regular basis through steam venting and water involved in cooling processes. Over 500 tons of high-level nuclear waste are stored onsite at Seabrook, with no long-term national storage solution.

About the C-10 Research & Education Foundation

The C-10 Research and Education Foundation, Inc. is a non-profit 501(c)(3) membership organization whose mission is to protect public health and the environment surrounding the Seabrook Station nuclear power plant in coastal New Hampshire.

C-10's core service is to operate a field monitoring network to measure airborne radiological emissions surrounding the plant, which we have done under contract with the Commonwealth of Massachusetts since 1993.

Known and trusted for our integrity and expertise, the C-10 Foundation communicates regularly with key local, state and federal agencies as well as NextEra Energy Resources, the plant's owner. With over 20 years of monitoring data and technical knowledge of plant safety and security issues, we are also an informational resource for the public, partner organizations and the scientific community.

For more information, please contact C-10's Executive Director, Natalie Hildt Treat: 978-465-6646 or natalie@c-10.org.

C-10's Objectives:

- Conduct real-time monitoring of radiological emissions from Seabrook Station in an effort to protect public health and the environment.
- Research and advocate for adequate oversight of nuclear safety and security
- Serve as an educational resource regarding safety at Seabrook Station and related public health issues.