



# RESEARCH & EDUCATION FOUNDATION

*Towards a clean, safe energy future for the seacoast region*

May 12, 2017

*Via electronic submission*

## UNITED STATES NUCLEAR REGULATORY COMMISSION ATOMIC SAFETY AND LICENSING BOARD

### **C-10 Research and Education Foundation, Inc. Response to U.S. NRC staff's answer to C-10 Foundation's Petition for leave to intervene: Nuclear Regulatory Commission Docket No. 50-443**

In the Matter of: *NextEra Energy Seabrook Station Unit 1 - License Amendment Request 16-03 dated August 1, 2016*  
Docket No. 50-443: NextEra Energy Seabrook LLC, Seabrook Station, Unit No. 1, Rockingham County, New Hampshire

## **I INTRODUCTION**

Pursuant to 10 C.F.R. § 2.309(i), on behalf of our members, staff and board of directors, C-10 Research and Education Foundation, Inc. ("C-10") hereby files its response to U.S. Nuclear Regulatory Commission ("NRC") staff ("Staff") 5/5/17 "Answer" to C-10's Petition for Leave to Intervene ("Petition") in the license amendment request ("LAR") from NextEra Energy Seabrook, LLC ("NextEra") to adopt a methodology to minimize the impacts of alkali-silica reaction ("ASR") on concrete structures at Seabrook Station, Unit No. 1 ("Seabrook").

It must be noted here that in many respects, the responses to C-10's Petition from NRC and NextEra are more alike than dissimilar. Each displays a readiness to disregard the meaning of these contentions, and the grave concerns — regarding the NRC's course of action to deal with the advance of concrete degradation at Seabrook — held by actual community members for whom we speak. As working people trying hard to protect our homes and families within the 10-mile radius of the Seabrook Station reactor, we have attempted to use the democratic process to appeal to NRC for a fair and just hearing of our grievances, which are, in fact, the grievances of our board of directors, and our members — most of whom live within the 10-mile radius.

We continue to hold the NRC accountable for disposing the most important aspect of your mission: the protection of public health and safety. You are supposed to work for us; and you are supposed to regulate the industry. Furthermore, we expect that NRC, and NextEra are aware that we filed our contentions pro se. NRC and NextEra had nearly a month from the April 10, 2017 submission of our Petition to file responses that are more than twice, and nearly four times respectively, the length of our submission — for which we then have one calendar week to submit our response, so that we have one quarter of the time to deal with six times the volume.

## II Standing

While Staff does grant the admissibility of portions of six of C-10's submitted contentions as a single contention, it recommends denial of our request on the basis of lack of standing: "While portions of C-10's proposed contentions, when combined, could amount to a single admissible contention, C-10 has failed to establish standing in its Petition. Specifically, C-10 has not satisfied its burden of either demonstrating the traditional requirements for standing or demonstrating the existence of a proximity presumption of standing. Consequently, and without regard to the admissibility of C-10's proposed contentions, the Atomic Safety and Licensing Board ("Board") should deny the Petition. Should the Board examine the admissibility of C-10's proposed contentions independent of the necessary showing of standing, the Board could find that, as explained below, when combined, portions of the proposed contentions amount to a single admissible contention. However, due to C-10's failure to establish standing to intervene in this proceeding, the Petition should be denied." (NRC Staff's Answer to C-10..., 5/5/17, Docket No. 50-443-LA2)

We take strong issue with Staff assertion that C-10's request to intervene in the License Amendment Request at issue should be denied "on the basis of lack of standing". We are a membership organization, with more than 700 members. The overwhelming majority of our members live within the 10-mile radius of Seabrook. The "C-10" designation was shortened from the original name, Citizens within the Ten-Mile Radius (of Seabrook Station)." Because the individuals and families who belong to C-10 live on both sides of the Massachusetts / New Hampshire border, scattered throughout the Emergency Planning Zone, the obvious fact is that we can only work to protect our members through working to protect the health and safety of the public living where our members live: in the shadow of the atomic plant and its radioactive inventory. Therefore, any reference made to "public health and safety" within our petition is a statement of responsibility we make for our membership.

Our organizational structure is conventional, with an Executive Director working in close communication with the Board of Directors. In the case of this particular Petition, Board members drafted the document, and our Executive Director, Natalie Hildt Treat, signed it for submission on behalf of herself, and the entire Board. For your narrowly defined purposes, you may consider the entire Petition to be the signed affidavit you require. [According to Webster's New Collegiate Dictionary, an "affidavit" is usually, but not necessarily, witnessed by a court official.]

C-10 wishes to make absolutely plain that the legal and literal "authorization" of the Board supports the actions of Ms. Treat in this regard. Let us also make plain that Ms. Treat works within the EPZ (Newburyport) in her capacity as C-10 Executive Director; she lives in Salisbury, Mass., approximately 3.5 miles from Seabrook Station; and she has a family that includes a young child. While Staff has been so helpful to clarify that no new information may be submitted to further substantiate the determination of "standing," you still have Ms. Treat's signature, submitted in time and on behalf of the board; and you already know that she works within the EPZ—because she works in our office, at the address found just under her signature. This is all known by NRC, and submitted on time.

Then to the subject of potential harm. In order to meet stipulations for "organizational standing," Staff has stated: "...an organization would have organizational standing if it had suffered or will suffer a concrete and demonstrable injury to its activities, with the consequent drain on its resources, as opposed to a mere setback to its abstract social interests." (Ibid, p.12)

NRC and NextEra are each familiar with C-10. NRC and NextEra know that one of our primary functions is the maintenance of a real-time air-borne radiation monitoring network, funded on the Massachusetts side of the border under contract with that state's Department of Public Health – Bureau of Environmental Health. C-10 has stated as concisely as possible the extraordinary danger a miscalculation of ASR-caused degradation could mean for the entire EPZ and beyond: "The burden of proof for safety is greatest where the risk of environmental and human consequence is

greatest. The Seabrook reactor complex presents just such risk of consequence, due to the use and storage of highly radioactive substances, all of which are carcinogenic, mutagenic, or teratogenic—some of which are all three together. These substances can be found, always, inside the concrete walls of the containment structures and the spent fuel pool, by virtue of their being used and stored there.” (C-10 Petition for Leave to Intervene,” Docket No. 50-443, p.7)

We believe it is obvious that a protocol for strength analysis of concrete that misrepresents the extent of degradation due to ASR attack could lead to catastrophic airborne and/or waterborne radioactive releases. In one particularly vivid scenario, a failure of the concrete structure underpinning the Spent Fuel Pool due to the combination of ASR-weakened concrete and a greater-than-expected earthquake could cause the loss of cooling water sufficient for waterborne and airborne radioactive releases. Such releases could contaminate areas within Seabrook’s EPZ, and could not only disrupt and cause injury to the lives of our members, but could cause Ms. Treat to run for her child and leave the area, making it impossible for her to effectively discharge her duties as C-10’s Executive Director. Were such an emergency to follow from an ASR-affected emergency, it could become impossible to visit crucial C-10 radiation monitoring sites to perform needed maintenance and repairs, without suffering the consequences of radiation exposure.

All of this (minus the child in Ms. Treat’s life) should be evident to the NRC, and implicit in our appeal to intervene. You know that concrete failure due to a cascade of events, poses the risk of radioactive releases, because you are the NRC. However remote the probability you may believe such risks are, you know that should such a radiological emergency occur, C-10’s members (who we work for), C-10’s Board (on whose behalf Ms. Treat signed our Petition), and indeed Ms. Treat herself would all be adversely impacted—with possible physical, psychological, emotional, and financial consequences. You know all of this because you are the NRC, and for you everything stated here is fundamental to the discharge of your responsibilities as the NRC—whose mission includes the protection of public health and safety. (It is nothing if not ironic that our respective missions seem to bear such similarity in this regard, given how adversarial this “arena”.)

You also know that C-10 has repeatedly appealed to you, NRC, through every avenue open to private citizens and citizens’ groups, to require petrographic analysis—including core sample testing—of the structures underpinning the reactor containment, and those underpinning the spent fuel pool. Our focused concern for these structures is obviously because of the risks to the biosphere posed by the presence of the toxins contained within—as clearly stated within C-10 petition for leave to intervene. C-10 has appealed to you, NRC, through a rule-making petition, a 2.206 petition for emergency enforcement action, and now the petition for leave to intervene, to require thorough petrographic analysis as outlined in already-extant ACI and ASTM standards, for the aforementioned structures. We have pursued this course of action for the last several years, because of the risk of grave consequence from a failure of these structures, imposed on the general public within the EPZ—including C-10 members, C-10’s Board, and our Executive Director, Ms. Treat—by the continued operation of this atomic reactor outside the bounds of its design basis.

With regard to the “potential harm or threat” stipulation, Staff states: “...simply enumerating the proposed license changes and alleging without substantiation that the changes will lead to offsite radiological consequences is not sufficient. Although the cause of the injury need not flow directly from the challenged action, the chain of causation must be plausible.”

NRC and NextEra may each dispute the *probability* that a miscalculation of concrete degradation within the supporting structures for the spent fuel pool, or the reactor containment, could lead to offsite radiation releases. The *plausibility* of such an event cannot really be denied, especially given the possible concurrence with some natural disaster such as an earthquake. There have been three known serious accidents at atomic reactors, involving major releases of radiation to the biosphere. In each of those cases, “plausibility” was only granted to those accident scenarios with the aid of 20/20 hindsight. In the case of Japan’s disaster, steam explosions in the spent fuel pools unleashed a criticality that has not been quelled seven years on. Of course, Seabrook’s Pressurized Water Reactor (PWR) is a different breed; but that is

the point, really: accident scenarios will be different. Indeed, within U.S. borders we have had a PWR sitting crippled in the middle of the Susquehanna River for nearly forty years.

Because of all these facts, which are known to you, NRC, and not “new information,” C-10 clearly has both “representational” standing “organizational” standing. Staff assertions to the contrary are not only unnecessarily adversarial, it is as though they took the creature we put on your table, cut the head, tail, and gills off of it, and declared “This is not a fish!” What does that make Staff? Good with a knife.

C-10 regrets that we cannot fully address the comprehensive and compelling arguments made in NextEra’s attempt to be a good neighbor for us. Time being of the essence now, we can only choose some points of particular interest.

## I REPRESENTATIVENESS

From NextEra: “3. Petitioner’s Programmatic Challenges to the LSTP Are Unsupported... Contention D argues that core sample testing must be performed because the LSTP data is not ‘representative’ of the progression of ASR at Seabrook Station. First, Petitioner offers nothing to explain the relevance of representativeness in the specific context of the LAR. Fundamentally, Petitioner fails to recognize that the LSTP results are not applied directly to plant structures, but rather are used to calibrate ACI 318-71 and ASME Code equations; and fails to address or challenge the conclusion in MPR-4288 that the code equations remain valid and indicate that using the original specified concrete strength and the code equations is conservative. Second, Petitioner’s only citation to authority in the whole of Contention D (aside from quoting the LAR and citing a NUREG document that it does not explain) is a letter from 2012 authored in part by the Petitioner that opines on non-linear progression of ASR. Petitioner offers no connection from this statement to the topic of “representativeness.” The remainder of the discussion is comprised merely of speculation, conjecture, and surmise by Petitioner.” (“NextEra’s Answer...,” 5/5/17, p45)

C-10 wishes not to dignify everything that is false about that statement by answering. It is not the responsibility of C-10 to establish “relevance” for the concept of “representativeness:” and it is frankly spurious for NextEra to advance such an argument. NextEra’s contractor for the FSEL project established the relevance of “representativeness” for all of us, in their supporting document for the LAR; C-10 can only assume that what they said is factual in establishing an agreement between ownership and contractor, concerning the purpose of the task undertaken.

MPR stated the following—as we clearly cited in our Petition: “While most research on ASR has focused on the science and kinetics of ASR, there is a substantial body of knowledge that exists in the literature on structural testing of ASR-affected concrete specimens. However, **the application of the conclusions from the literature to structures at Seabrook Station can be challenged by lack of representativeness. As a result, for selected structural limit states, NextEra commissioned MPR/FSEL to perform large-scale structural testing using specimens that were designed and fabricated to be *representative* of structures at Seabrook Station.**” [bold and italics added.] (MPR-4288, Revision 0, “Seabrook Station: Impact of Alkali-Silica Reaction on Structural Design Evaluations,” 4.1, July 2016)

The burden of establishing “relevance” does not rest with the Petitioner here. Because of this clear understanding in agreement between NextEra and MPR, the *most relevant* question becomes: Did they, in fact, achieve a level of “representativeness” that allows them to use data from the FSEL test program, plugged into the pertinent equations, that would accurately track the rate of ASR degradation at Seabrook? Would they have better served the goal of “representativeness”, had they removed choice sections from the ASR-affected concrete in the unused Unit 2 at Seabrook Station—which is the same age, from the same source, subject to much of the same environmental conditions as Unit 1—instead of purpose-forming beams with ASR? Would not the relatively rapid propagation of ASR require a

different chemistry for the FSEL beams than what is known of the chemistry for Seabrook Station?

Without recapitulating the entire section D of the Petition, we would add one salient point from our “speculation and conjecture,” as NextEra (too generously) put it. It does not take an engineering degree to know that placing a piece of wet fabric over one side of a concrete sample during a 28-day test cannot begin to ‘represent’ the wall sections at Seabrook that have been sitting in brackish water for 28 years. MPR even felt compelled to state a kind of disclaimer about the test specimens: “MPR conducted large-scale test programs at [FSEL] using specimens that were designed and fabricated to **represent** reinforced concrete at Seabrook Station *to the maximum extent practical*.” [bold and Italics added.] (MPR-4273, 1.2.2)

C-10 has no reason to question the *quality* of the testing performed by MPR at FSEL. Even so, MPR’s above statement, as ambiguously qualified as it is, is in fact not true. Seabrook Unit 2 concrete sections could meet MPR’s “to the maximum extent practical” criterion better than any purpose-formed sections, for reasons already stated. The burden of justification for not using Unit 2 concrete does not rest with MPR, who simply conducted tests they were under contract to perform; nor with NextEra, who clearly wants as little to do with testing of any Seabrook Station concrete as they can get away with. The burden of justification for not using Unit 2 concrete for FSEL-type analysis rests with you, NRC. C-10 believes that a real concern and curiosity, about the initiation of ASR in the presence brackish water—which ought to be a subject of great interest—should serve as an impetus to test the actual material at the actual site. The fact that this has not been done causes C-10 to wonder whether in fact it is being avoided—and of course, if so, why? (Perhaps you, NRC, could provide C-10 some relief on this question.) For NRC to *require* the use of Unit 2 concrete for such testing as was performed at FSEL, would constitute an act of true regulation.

## II TIPPING POINT

C-10 concedes some confusion—and a great deal at times—with regard to engineering language, data, concepts, and more. We do not concede the need for point-of-failure testing for concrete. Upon reading NextEra’s helpful rebuttal on this subject, their intent on this issue clarified: “...Petitioner misses the point of the LAR, which is designed to verify that ASR-affected structures never reach the tipping point, much less the point of failure, through multiple levels of monitoring, measurement, trending, and expansion limits... Petitioner does not explain why, given the use of acceptance criteria below the tipping point, the LSTP needed to go further to identify a tipping point or the point of failure that exists somewhere beyond the acceptance criteria.” (“NextEra’s Answer...,” 5/5/17)

From C-10’s reading of NextEra’s reply to our Petition, their intent in this matter is finally clear: to allow the sacrifice of a significant portion of the margin of safety engineered into the Seabrook’s concrete structures through their original “overbuilding”—and trying from here to stay “within the margins” of the acceptance criteria. We all know that as of the initial core sampling performed in 2010, the tested concrete had lost nearly one third of its expected compressive strength. [C-10 is sure that NextEra disavows those results; but therein lies the contention.] Hopefully someone within the engineering staff for NRC—and NextEra—are concerned about this gambit.

With thanks to NextEra for that clarification, we must then state the obvious in reply. Concrete performing at a compromised strength due to ASR-caused degradation, could be further stressed to the point of failure, because of the escalating effects natural disasters, such as earthquake, tsunami, or tornado; or a mechanical problem such as excessive vibration caused by bearing failure or a stuck valve; or the “cascading” phenomenon of natural disaster bringing about one or more mechanical problems. NextEra must not work to ensure, but rather to *guarantee* the viability of safety-related structures in the event of such disasters; so that it is imperative to know the proximity to concrete failure for a given structure, showing its particular level of ASR degradation.

The NRC must act to hold NextEra to this guarantee of the viability of safety-related structures, regardless of conditions in the outer world—because this kind of cascading effect, from natural disaster to mechanical failure, can precipitate catastrophic accidents, such as occurred at the nuclear complex at Fukushima. Perhaps we can all agree we don't want that here. But if Seabrook's containment structures have already shifted as a result of ASR degradation, how much more of a safety margin actually remains to withstand the stress added to that structure from an earthquake?

Perhaps naively, C-10 is certain that NextEra, and you, NRC, already know what is stated here is true. It is *common knowledge* that cascading events as herein described have been a major cause of catastrophic engineering failures through the centuries. As stated in C-10's Petition, one cannot know just how close a given structure is to failure unless you know where "failure" is. Therefore, our insistence on the inclusion of this contention remains.

## Summary

Introduction - Here C-10 registers a kind of two-fold protest. First: NRC appears to be more a "teammate" of NextEra, than an arbiter or judge in this proceeding. Second: the skewed timeframes for NextEra and Staff to reply to our Petition, versus the time allotted C-10 to respond to their replies, is simply grossly unfair; in fact, we are not certain that NRC cares about that. In other words, it seems to be "by design." However, C-10 stills holds NRC accountable for the health and safety of residents of the EPZ, many of whom are our members.

Standing (NRC Staff, p9 ff) - In spite of Staff's adversarial reading of C-10's submission, we assert in strongest possible terms that our standing is legitimate. NRC received, on time, a 17-page signed affidavit declaring all the facts of our contentions filed in opposition to adoption of the LAR in question. The signatory being C-10's Executive Director, following long-established protocol, signed on behalf of, and with the authorization of, the Board of Trustees. The threat of consequence from implementation of the LAR was referenced in the Petition and further clarified herein. We assert that we have shown that we have both organizational and representational standing.

Representativeness (NextEra, p45 ff) – It appears to us that the concept of "representativeness" was adopted in agreement between NextEra and MPR as a kind of justification for purpose-forming concrete in Texas, instead of using concrete from Seabrook's unused Unit 2. This has tremendous relevance to question of the legitimacy of the use of data gathered from the FSEL program to calculate the actual strength of ASR-damaged concrete back in New Hampshire. The contractors themselves called their testing program "unique," and issued a disclaimer concerning just how "representative" they were able to be. Serious doubts remain about the efficacy of using short-lived purpose-formed beams to "stand in" for concrete that has been exposed to a salt water environment for three decades. Serious questions remain concerning why—if they were in fact concerned for meeting some standard for "representativeness"—did NextEra not cut and use concrete from Unit 2. Why has NRC not insisted that they do so?

TIPPINIG POINT (NextEra, p59 ff) - In their well-worded rebuttal, NextEra greatly clarifies their intent in relation to the decision in Texas not to test to-failure: they intend to sacrifice the once built-in margin of safety for Seabrook concrete, and monitor through various means to ensure that the "tipping point" for strength degradation is never reached. C-10 responds here that this course of action then leaves the atomic reactor more vulnerable than ever to the possibility that a natural disaster and/or mechanical problem could initiate a "cascade" of events leading to a failure of the weakened concrete. We remind NextEra, and NRC, that the radiological catastrophe at Fukushima came about in this way. The only way to really know how much of a margin exists between the present level of degraded strength, and the arrival at the tipping point, is to test to-failure...which has not been done.



Signed,

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