LBP-17-07

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Ronald M. Spritzer, Chairman
Nicholas G. Trikouros
Dr. Sekazi K. Mtingwa

In the Matter of	Docket No. 50-443-LA-2
NEXTERA ENERGY SEABROOK, LLC	ASLBP No. 17-953-02-LA-BD01
(Seabrook Station, Unit 1)	Oct. 6, 2017

MEMORANDUM AND ORDER
(Ruling on Standing and Admission of Contentions)

Contents

I. Introduction

Before the Licensing Board is a Petition for Leave to Intervene filed by pro se petitioner C-10 Research & Education Foundation, Inc. (C-10 or Petitioner).[1] Petitioner seeks a hearing on the License Amendment Request (LAR) filed by NextEra Energy Seabrook, LLC (NextEra),[2] concerning the operating license for Seabrook Station, Unit 1 (Seabrook), located in Seabrook, New Hampshire. The LAR would revise the Unit 1 Updated Final Safety Analysis Report (UFSAR) to include methods for analyzing the impact of concrete degradation caused by an alkali-silica reaction (ASR) affecting Seismic Category I reinforced concrete structures[3] (i.e.,

[1] C-10 Research and Education Foundation, Inc. Petition for leave to intervene: Nuclear Regulatory Commission Docket No. 50-443 (Apr. 10, 2017) [hereinafter Petition].

[2] License Amendment Request 16-03, Revise Current Licensing Basis to Adopt a Methodology for the Analysis of Seismic Category I Structures with Concrete Affected by Alkali-Silica Reaction, 1–3 of 73 (unnumbered) (Aug. 1, 2016) (ADAMS Accession No. ML16216A240). ML16216A240 is a 73-page PDF with unnumbered pages that also contains the following documents:

1. Affidavit in Support of Application for Withholding Proprietary Information from Public Disclosure, 4–5 of 73 (unnumbered) (Aug.1, 2016);

2. SBK-L-16071 Enclosure 7, "NextEra Energy Seabrook's Evaluation of the Proposed Change (Non-Proprietary)," 6–40 of 73 (unnumbered) (undated) [hereinafter Evaluation of Proposed Change];

3. SBK-L-16071 Enclosure 8, "Affidavit in Support of Application for Withholding Proprietary Information from Public Disclosure," 41–42 of 73 (unnumbered) (undated);

4. Attachment 1, "Markup of UFSAR Pages," 43–73 of 73 (unnumbered) (undated) [hereinafter Markup of UFSAR Pages].

These documents are enclosures to the LAR and are considered part of the LAR. For ease of access to citations, we will cite to all documents included in the LAR package with the identified name above and the page number out of 73 unnumbered pages.

[3] Seismic Category I structures, systems, and components include those necessary to control the release of radioactive material or otherwise mitigate the consequences of an accident. See Regulatory Guide RG 1.29, Seismic Design Classification for Nuclear Power Plants, Rev. 5 at 5 (July 2016) (ADAMS Accession No. ML1618A148).

structures that are constructed of concrete that is reinforced with steel bars or rods called rebars).[4]

For the reasons set forth below, we conclude that C-10 has standing to intervene and we admit five of C-10's contentions. Because those contentions are closely related, we have combined them into one reformulated contention similar to that proposed by the Staff. C-10's remaining contentions are not admitted.

A. ASR and the Investigation of Its Effects at Seabrook

ASR is a chemical reaction in susceptible concrete that causes the concrete to expand in volume and potentially reduces the structural capacity of concrete structures.[5] The presence of water promotes ASR. The reaction produces an alkali-silicate gel that expands as it absorbs moisture. The expansion exerts stress on the surrounding concrete and results in cracking.[6] The LAR seeks to account for the effects of ASR in the design basis of Seismic Category I structures at Seabrook.

The expansion of concrete and resulting cracking caused by ASR can potentially impact both the material properties of a concrete structure and the load-bearing capacity of the

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[4] Evaluation of Proposed Change at 7 of 73. The proprietary version of the Evaluation of Proposed Change is also Enclosure 1 to the LAR, but we cite to the non-proprietary version included in the LAR package. See supra note 2.

Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," contains general design criteria (GDC) for nuclear power plants. GDC 2, "Design Bases for Protection Against Natural Phenomena," requires that nuclear power plant structures, systems, and components important to safety must be designed to withstand the effects of earthquakes and other natural phenomena without loss of capability to perform their safety functions. Structures that must remain functional in the event of a safe shutdown earthquake are referred to as "Category I structures." Regulatory Guide, 1.29, Rev. 5, at 5 (July 2016).

[5] Evaluation of Proposed Change at 7 of 73.

[6] Id. at 8 of 73.

structure.[7] These material properties include: 1) compressive strength (maximum external force per unit area applied inwardly to the two end faces of a cylindrical sample before failure); 2) tensile strength (maximum external force per unit area applied outwardly to the two end faces of a cylindrical sample before failure); and 3) elastic modulus (measured in units of pressure as the ratio of the force per unit area applied to the two end faces of a cylindrical sample to its fractional change in length).[8] Concrete expansion caused by ASR can also lead to deformation of a structure, and can cause stresses where the expansion is resisted internally by steel reinforcement or externally by supports, other structures, or adjoining parts of the same structure that are outside the ASR-affected region.[9]

NextEra initially identified pattern cracking typical of ASR at Seabrook in the "B" Electrical Tunnel in 2009, and, subsequently, in several other Seismic Category I structures.[10] A root cause investigation into ASR at Seabrook concluded that the original concrete mix designs used a coarse aggregate that was susceptible to ASR. This, in combination with groundwater intrusion during plant life, appears to have resulted in the observed ASR in several Seabrook structures.[11]

NextEra conducted an interim structural assessment in 2012, which evaluated the structural adequacy of reinforced concrete structures at Seabrook affected by ASR and system/component anchorages in ASR-affected concrete. The evaluation concluded that, given the extent of ASR identified at that time, the reinforced concrete structures at Seabrook

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[7] Id.

[8] Id. at 9 of 73.

[9] Id.

[10] Id. at 8 of 73.

[11] Id. at 9 of 73.

remained suitable for continued service for an interim period. The evaluation noted that additional testing was required, and that the testing would produce the data necessary to assess fully the design compliance of the concrete structures at Seabrook.[12]

NextEra also assessed ASR-affected concrete to determine the impact on the operability of systems, structures, and components at Seabrook. Prompt operability determinations for the affected structures concluded that the structures and concrete anchors are operable but degraded, and structures, systems, and components housed within the structures are operable.[13]

At Seabrook, safety-related structures other than the containment were designed and constructed to comply with the 1971 edition of American Concrete Institute (ACI) Standard 318, Building Code Requirements for Reinforced Concrete (ACI 318-71).[14] The containment structure was designed and constructed to comply with the 1975 edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section III, Division 2, Subsection CC.[15] Neither code contains methods to address the effects of ASR on the structural properties used in the design of concrete structures,[16] and publicly available test data related to ASR effects on structures focuses primarily on the science of ASR rather than the structural implications.[17] NextEra therefore devised its own methodology. It concluded that

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[12] Id.

[13] Id.

[14] Id. at 12 of 73.

[15] Id. at 13 of 73.

[16] Id. at 10 of 73.

[17] Id. at 15 of 73.

"[l]oad testing of the as-built structures is impractical for the Seabrook Station ASR issue."[18] It thus decided to conduct a strength evaluation by analysis to demonstrate that, despite the effects of ASR, Seabrook structures "will have strength close to or in excess of that envisaged in the original design or as required by the code."[19]

NextEra's methodology is based on "large-scale test programs"[20] and its review of the existing technical literature.[21] The large-scale test program involved testing concrete specimens constructed by MPR Associates—a consultant to NextEra—to reflect the structural characteristics of ASR-affected structures at Seabrook.[22] The tests on those specimens were performed at the Ferguson Structural Engineering Laboratory (FSEL), part of the University of Texas at Austin. FSEL completed tests reflecting various levels of ASR cracking to assess the impact on selected "limit states," where "limit state" is a condition of a structure beyond which it no longer fulfills the relevant design criteria.[23] These include "all relevant limit states except compression (i.e., flexure and reinforcement anchorage, shear, and anchor bolts and structural attachments to concrete)."[24] "The results of the test program demonstrated that none of the

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[18] Id.

[19] Id.

[20] The LAR uses the terms "large-scale test programs" and "large-scale test program" interchangeably. See e.g., id. at 14. We will use the term "large-scale test program." Some of the quotations in this order refer to the test program as the large-scale test programs, but all refer to the same test program performed by FSEL.

[21] Id. at 9 of 73.

[22] Id. at 14 of 73.

[23] Id. at 15 of 73.

[24] Id.

assessed limit states are reduced by ASR when ASR expansion levels in plant structures are below those evaluated in the large-scale test programs."[25]

The expansion of concrete from ASR increases the compressive stress in the concrete, and the additional compressive stresses reduces the capacity of compression elements to react to external loads.[26] As mentioned above, the effect of ASR on compressive strength was not assessed in the large-scale test program. Instead, that ASR effect was evaluated using existing data from published literature sources.[27] The evaluation concluded that ASR expansion in reinforced concrete results in a compressive load that should be combined with other loads already included in design calculations.[28] The LAR includes proposed modifications to Tables 3.8-1, 3.8-14, and 3.8-16 of the UFSAR to include the loads from ASR expansion in design calculations.[29] Those calculations, modified to include the loads from ASR expansion and other changes, will be used to determine whether 1) the containment continues to meet the acceptance criteria in the ASME Code and 2) the other safety-related structures continue to meet the acceptance criteria in ACI 318-71.[30]

Although the specimens used in the large-scale test program experienced levels of ASR more severe than those found at Seabrook, "the number of available test specimens and nature of the testing prohibited testing out to ASR levels where there was a clear change in limit state

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[25] Id.

[26] Id. at 19 tbl.2 of 73.

[27] Id. at 16 of 73.

[28] Id. at 19 tbl.2 of 73.

[29] Markup of UFSAR Pages at 69–71 of 73.

[30] Evaluation of Proposed Change at 36 of 73.

capacity."[31] Because of the lack of testing data for more advanced levels of ASR, "periodic monitoring of ASR at Seabrook is necessary to ensure that the conclusions of the large-scale test program remain valid and that the level of ASR does not exceed that considered under the test programs."[32] The test program therefore identified methods for monitoring ASR.[33] LAR Table 4 and proposed UFSAR Table 3.8-18 provide ASR expansion limits that are intended to ensure that expansion will remain within the parameters validated by the large-scale test program results for Seabrook structures (i.e., that the assessed limit states are not reduced by ASR).[34] According to the LAR, the periodic monitoring of in-plane expansion in accordance with the frequencies in LAR Table 5 will ensure that NextEra can take "appropriate action" before the ASR expansion criteria are exceeded.[35]

NextEra's proposed methodology for analyzing the effects of ASR and monitoring ASR in concrete structures at Seabrook is the basis for the LAR at issue in this proceeding.

B. The Petition to Intervene and Responses

On February 7, 2017, the NRC published a Federal Register notice of opportunity to request a hearing on the LAR.[36] In that notice, the Staff proposed "to determine that the amendment request involves no significant hazards consideration" under 10 C.F.R. § 50.92(c).[37]

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[31] Id. at 16 of 73.

[32] Id.

[33] The specific monitoring methods are discussed infra at Part IV.A.2.a. at 37–38.

[34] Evaluation of Proposed Change at 16, 31 tbl.4 of 73.

[35] Id. at 32 of 73.

[36] Applications and Amendments to Facility Operating Licenses and Combined Licenses Involving Proposed No Significant Hazards Considerations and Containing Sensitive Unclassified Non-Safeguards Information and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information, 82 Fed. Reg. 9,601, 9,604 (Feb. 7, 2017).

[37] Id.

On April 10, C-10 timely filed a petition to intervene in this proceeding, including ten proposed contentions.[38] C-10, which has been shortened from the organization's original name, "Citizens within the 10-Mile radius (of Seabrook Station)," is a non-profit 501(c)(3) membership organization with the mission to protect public health and the environment surrounding Seabrook Station.[39] On May 5, the Staff and NextEra filed answers to the Petition.[40] Both the Staff and NextEra argued that the Petition failed to demonstrate standing and should be denied.[41] NextEra further argued that C-10 failed to submit an admissible contention.[42] The Staff argued that, while none of C-10's contentions were independently admissible, portions of certain contentions could be combined to produce one admissible contention challenging the representativeness of the testing that serves as a basis for the LAR. The Staff maintains that C-10's remaining contentions are inadmissible.[43]

On May 12, C-10 submitted a reply to the Staff's and NextEra's answers.[44] On May 22, the Staff filed a motion to strike portions of C-10's Reply, arguing that the Reply provided

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[38] See Petition at 1.

[39] 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 at 2 (May 12, 2017) [hereinafter C-10's Reply].

[40] NRC Staff's Answer to C-10 Research and Education Foundation, Inc. Petition for Leave to Intervene (May 5, 2017) [hereinafter Staff's Ans. to Petition]; NextEra's Answer Opposing C-10 Research & Education Foundation's Petition for Leave to Intervene and Hearing Request on NextEra Energy Seabrook, LLC's License Amendment Request 16-03 (May 5, 2017) [hereinafter NextEra's Ans. to Petition].

[41] Staff's Ans. to Petition at 14; NextEra's Ans. to Petition at 13–15.

[42] NextEra's Ans. to Petition at 16.

[43] Staff's Ans. to Petition at 26.

[44] C-10's Reply.

"entirely new details and standing arguments," therefore, should not be considered by the Board.[45]

Also on May 12, NextEra filed a motion seeking leave to reply to the Staff's Answer to the Petition, claiming that the Staff had impermissibly proposed that the Board admit a "New/Amended Contention" consisting of various contentions or parts thereof from C-10's petition that are not independently admissible.[46] Neither the Staff nor C-10 opposed NextEra's Motion for Leave.[47] NextEra filed its Reply together with the Motion for Leave to Reply.[48] On May 26, the Board granted NextEra's Motion and also ordered the Staff and C-10 to file any response to the new arguments raised by NextEra within ten days, accompanied by a motion seeking leave to file any such response.[49] On June 5, the Staff timely filed an unopposed motion for leave to respond to NextEra's Reply,[50] accompanied by the Staff's response (labeled

[45] NRC Staff Motion to Strike Portions of C-10's Reply (May 22, 2017) at 1 [hereinafter Staff's Motion to Strike]. The Motion was accompanied by an attachment showing proposed portions of C-10's Reply to be stricken. Staff's Motion to Strike, Attachment A, Redline Strike-Out Excerpts of C-10's Reply (May 22, 2017).

[46] NextEra's Motion for Leave to File a Reply to NRC Staff's Answer to C-10's Petition for Leave to Intervene at 1–2 (May 12, 2017).

[47] Id. at 5.

[48] NextEra's Reply to NRC Staff's Answer to C-10's Petition for Leave to Intervene (May 12, 2017) [hereinafter NextEra's Reply to Staff's Ans.].

[49] Licensing Board Order (Granting NextEra's Motion to File a Reply) at 2 (May 26, 2017) (unpublished).

[50] NRC Staff's Motion for Leave to File a Sur-Reply to NextEra's Reply to NRC Staff's Answer to C-10's Petition for Leave to Intervene (June 5, 2017). C-10 did not file a response to NextEra's Reply.

the Staff's "Sur-Reply").[51] The Board granted the Staff's Motion for Leave to Sur-Reply on June 6.[52]

On June 29, 2017, the Board heard oral argument from representatives for C-10, the Staff, and NextEra on standing and contention admissibility regarding C-10's Petition.[53] During the argument, the Staff stated that it plans to decide whether to grant the LAR "towards the fall of 2018."[54]

II. Standing

Under section 189a of the Atomic Energy Act, the NRC is required to grant a hearing in a license amendment proceeding "upon the request of any person whose interest may be affected by the proceeding."[55] A hearing request will be granted if the petitioner meets the standing requirements of 10 C.F.R. § 2.309(d), which states that the petitioner's hearing request must contain:

> (i) The name, address and telephone number of the requestor or petitioner;
>
> (ii) The nature of the requestor's/petitioner's right under the [Atomic Energy Act or National Environmental Policy Act] to be made a party to the proceeding;
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> (iii) The nature and extent of the requestor's/petitioner's property, financial or other interest in the proceeding; and

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[51] NRC Staff's Sur-Reply to NextEra's Reply to NRC Staff's Answer to C-10's Petition for Leave to Intervene (June 5, 2017) [hereinafter Staff's Sur-Reply].

[52] Licensing Board Order (Granting NRC Staff's Motion to File a Reply to NextEra's Response) at 2 (June 7, 2017) (unpublished).

[53] See Tr. at 4; Licensing Board Order (Scheduling Oral Argument and Providing Instructions) (June 5, 2017) (unpublished).

[54] Tr. at 60.

[55] 42 U.S.C. § 2239(a)(1)(A) (2017).

(iv) The possible effect of any decision or order that may be issued in the proceeding on the requestor's/petitioner's interest.[56]

In determining whether a petitioner has the requisite interest to satisfy these requirements, the Commission has long applied contemporaneous judicial concepts of standing, requiring a showing of a "concrete and particularized injury that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision."[57]

When an organization such as C-10 seeks to intervene, it may establish standing either in its own right or as a representative for an individual.[58] To intervene in its own right, an organization must satisfy the same standing requirements of injury, traceability, and redressability as an individual seeking to intervene.[59] Alternatively, an organization may intervene based on the interests, germane to the purpose of the organization, of a member or members injured by the proposed actions.[60] Associational standing, generally referred to as representational standing, requires that at least one injured member authorize the organization to represent the member's interests.[61]

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[56] 10 C.F.R. § 2.309(d)(1).

[57] Cleveland Elec. Illuminating Co. (Perry Nuclear Power Plant, Unit 1), CLI-93-21, 38 NRC 87, 92 (1993) (citing Lujan v. Defs. of Wildlife, 504 U.S. 555, 561 (1992)); see, e.g., Yankee Atomic Elec. Co. (Yankee Nuclear Power Station), CLI-98-21, 48 NRC 185, 195 (1998); Ga. Inst. of Tech. (Ga. Tech. Research Reactor), CLI-95-12, 42 NRC 111, 115 (1995).

[58] E.g., Yankee Nuclear, CLI 98-21, 48 NRC at 195; Ga. Tech., CLI-95-12, 42 NRC at 115.

[59] Consumers Energy Co. (Palisades Nuclear Power Plant), CLI-07-18, 65 NRC 399, 411 (2007) (citing Fla. Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 & 4), ALAB-952, 33 NRC 521, 528, aff'd in relevant part, CLI-91-13, 34 NRC 185, 187–88 (1991)).

[60] See Hunt v. Wash. State Apple Advert. Comm'n, 432 U.S. 333, 343 (1977); Entergy Nuclear Operations, Inc. (Palisades Nuclear Plant), CLI-08-19, 68 NRC 251, 258–59 (2008).

[61] Private Fuel Storage, L.L.C. (Indep. Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 323 (1999).

In operating license or construction permit proceedings, the Commission has additionally adopted a proximity presumption that allows an individual or group living,[62] having frequent contacts,[63] or having a significant property interest[64] within 50 miles of a nuclear power reactor to establish standing without the need to make an individualized showing of injury, causation, and redressability.[65] "The presumption rests on our finding . . . that persons living within the roughly 50-mile radius of the facility 'face a realistic threat of harm' if a release from the facility of radioactive material were to occur."[66] An organization, like an individual, is entitled to the benefit of the presumption when it applies because "an organization, like an individual, is considered a 'person' as we have defined that word in 10 C.F.R. § 2.4 and as we have used it in 10 C.F.R. § 2.309 regarding standing."[67] Thus, in deciding standing, "[r]egardless of whether the petitioner seeking to intervene is an individual or an organization, the same showing is required."[68]

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[62] Fla. Power & Light Co. (St. Lucie, Units 1 & 2), CLI-89-21, 30 NRC 325, 329 (1989) ("[L]iving within a specific distance from the plant is enough to confer standing on an individual or group in proceedings for construction permits, operating licenses, or significant amendments thereto . . . .").

[63] Sequoyah Fuels Corp. (Gore, Okla. Site), CLI-94-12, 40 NRC 64, 75 (1994) (stating that the proximity presumption also applies to "persons who have frequent contacts in the area near a nuclear power plant.").

[64] USEC, Inc. (Am. Centrifuge Plant), CLI-05-11, 61 NRC 309, 314 (2005).

[65] Calvert Cliffs 3 Nuclear Project, LLC (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-09-20, 70 NRC 911, 915–17 (2009).

[66] Id. at 917 (quoting Calvert Cliffs 3 Nuclear Project, LLC (Calvert Cliffs Nuclear Power Plant, Unit 3), LBP-09-4, 69 NRC 170, 183 (2009)).

[67] Palisades, CLI-07-18, 65 NRC at 411. The Staff acknowledged that the proximity presumption could apply to an organization. See Staff's Ans. to Petition at 21–22; Tr. at 63–65 ("It is potentially a fair reading of the regulation . . . . [B]ecause the regulations do . . . account for corporations being treated as [a] person . . . .").

[68] Turkey Point, ALAB-952, 33 NRC at 528.

The petitioner has the burden to show that the proximity presumption should apply.[69] In a license amendment case, "a petitioner cannot base his or her standing simply upon a residence or visits near the plant, unless the proposed action quite 'obvious[ly]' entails an increased potential for offsite consequences."[70] In such a case, "[w]hether and at what distance a petitioner can be presumed to be affected must be judged on a case-by-case basis, taking into account the nature of the proposed action and the significance of the radioactive source."[71]

Standing is a threshold legal question, however, that does not require an assessment of the petitioner's case on the merits.[72] At the pleading stage, "it is generally sufficient if the petitioner provides plausible factual allegations that satisfy each element of standing,"[73] and the Board must accept as true all material allegations of the Petition.[74] In deciding standing, we do not decide the admissibility or merits of the petitioner's contentions. The Commission has identified a clear distinction between standing and the ultimate merits of a proposed contention,

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[69] Exelon Generation Co., LLC (Peach Bottom Atomic Power Station, Units 2 & 3), CLI-05-26, 62 NRC 577, 581 (2005).

[70] Commonwealth Edison Co. (Zion Nuclear Power Station, Units 1 & 2), CLI-99-4, 49 NRC 185, 191 (1999) (alteration in original) (rejecting proximity presumption argument in license amendment proceeding due to plant's shutdown and defueled status).

[71] Ga. Tech., CLI-95-12, 42 NRC at 116–17; accord Peach Bottom, CLI-05-26, 62 NRC at 580 ("In ruling on claims of 'proximity standing,' we decide the appropriate radius on a case-by-case basis.").

[72] See Sequoyah Fuels Corp. (Gore, Okla. Site Decommissioning), CLI-01-2, 53 NRC 9, 15 (2001).

[73] U.S. Army Installation Command (Schofield Barracks, Oahu, Haw., & Pohakuloa Training Area, Island of Haw., Haw.), LBP-10-4, 71 NRC 216, 229–30 (2010) (citing Lujan, 504 U.S. at 561 (1992)), aff'd, CLI-10-20, 72 NRC 185 (2010); see also Strata Energy, Inc. (Ross In Situ Recovery Uranium Project), LBP-12-3, 75 NRC 164, 177 (2012) (referencing "plausible factual allegations" standard).

[74] Ga. Inst. of Tech. (Ga. Tech Research Reactor, Atlanta, Ga.), LBP-95-6, 41 NRC 281, 286 (1995) (citing Warth v. Seldin, 422 U.S. 490, 501 (1975), and Kelly v. Selin, 42 F.3d 1501, 1507–08 (6th Cir. 1995)), aff'd, CLI-95-12, 42 NRC 111 (1995).

concluding that a "full-blown factual inquiry" is not required for the "threshold legal question" of standing.[75] The Commission has adopted the "oft-repeated admonition to avoid the familiar trap of confusing the standing determination with the assessment of petitioner's case on the merits."[76] It follows "the fundamental principle that the ultimate merits of the case have no bearing on the threshold question of standing."[77]

The Commission has also ruled that licensing boards should "construe the petition in favor of the petitioner" when evaluating whether a petitioner has met its burden to establish standing.[78] Additionally, "pro se petitioners are held to less rigid pleading standards, so that parties with a clear—but imperfectly stated—interest in the proceeding are not excluded."[79] In

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[75] Sequoyah, CLI-01-2, 53 NRC at 15; see also Shaw Areva MOX Servs. (Mixed Oxide Fuel Fabrication Facility), LBP-07-14, 66 NRC 169, 188 (2007) ("Petitioners are not required to demonstrate their asserted injury with 'certainty,' nor to 'provide extensive technical studies' in support of their standing argument. Resolving standing questions is an entirely different matter than adjudicating the ultimate merits of a contention." (citation omitted)). The Supreme Court has made clear that "when considering whether a plaintiff has Article III standing, a federal court must assume arguendo the merits of his or her legal claim." Parker v. D.C., 478 F.3d 370, 377 (D.C. Cir. 2007), aff'd sub nom. D.C. v. Heller, 554 U.S. 570 (2008) (citing Warth v. Seldin, 422 U.S. at 501–02); see also Sierra Club v. EPA, 292 F.3d 895, 898–99 (D.C. Cir. 2002).

[76] Sequoyah Fuels, CLI-01-2, 53 NRC at 15 (quoting Sequoyah Fuels Corp. (Gore, Okla. Site Decontamination & Decommissioning Funding), LBP-94-5, 39 NRC 54, 68 (1994), aff'd, CLI-94-12, 40 NRC 64 (1994)).

[77] Id. (quoting Campbell v. Minneapolis Pub. Hous. Auth., 168 F.3d 1069, 1074 (8th Cir. 1999)); see also Blackhawk Heating & Plumbing Co. v. Driver, 433 F.2d 1137, 1140 (D.C. Cir. 1970) ("[T]he question of standing is a preliminary matter which does not go to the merits of the case."). Thus, "[a]t the pleading stage, 'general factual allegations of injury resulting from the defendant's conduct may suffice,' and the court 'presum[es] that general allegations embrace the specific facts that are necessary to support the claim.'" Sierra Club, 292 F.3d at 898–99 (quoting Lujan, 504 U.S. at 561).

[78] Ga. Tech., CLI-95-12, 42 NRC at 115.

[79] U.S. Army Installation Command (Schofield Barracks, Oahu, Haw., & Pohakuloa Training Area, Island of Haw., Haw.), CLI-10-20, 72 NRC 185, 192 (2010); accord Fla. Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-15-25, 82 NRC 389, 394 (2015) ("While we generally place '[t]he burden of setting forth a clear and coherent argument for standing' on the petitioner, we do not hold CASE, a pro se petitioner, to the same 'standards of

this case, the Petition did not expressly refer to either organizational standing or representational standing, but, as detailed below, C-10 provided sufficient factual information for the Board to evaluate C-10's standing under both those bases. In its Reply, C-10 confirmed that it claims both organizational standing and representational standing.[80] We consider both grounds for C-10's standing below.

A. Organizational Standing

1. Organizational Standing under the Proximity Presumption

As discussed above, in license amendment proceedings, the standing requirements can be satisfied through the proximity presumption if there is an obvious potential for offsite consequences, and the petitioner lives, has frequent contacts, or owns property within an appropriate radius of the nuclear power plant. Without this potential for offsite consequences, "the standing inquiry reverts to the traditional standing analysis."[81]

The Staff argues that C-10 fails to satisfy the proximity presumption despite the location of its office within ten miles of the Seabrook plant because it "never factually alleges an obvious potential for offsite radiological consequences to itself," instead alleging such consequences only "to the public" and failing to "attempt to explain how [its] activities would be affected by the Seabrook LAR."[82] At oral argument, the Staff clarified its position "that this license amendment is not going to result in an obvious potential for offsite consequences" because "the concrete . . .

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clarity and precision to which a lawyer might reasonably be expected to adhere.'" (footnotes omitted)).

[80] C-10's Reply at 4. The Staff filed a motion to strike certain portions of C-10's Reply. See supra Part I.B. at 8. The Staff, however, did not move to strike C-10's claim of both organizational standing and representational standing. See Staff's Motion to Strike, Attachment A at 4.

[81] Staff's Ans. to Petition at 13–14.

[82] Id. at 19, 21.

is not being proposed to be modified in any way. The actual analysis of record that is being applied to the concrete is remaining the same and . . . all NextEra is attempting to do is provide sufficient technical analysis" to demonstrate that they can analyze ASR.[83] NextEra argues more strictly that "Petitioner's failure to provide physical addresses for any members precludes the Board from evaluating the proximity presumption's potential applicability."[84]

The Board disagrees. The requirement to provide affidavits from individual members applies when the organization asserts standing to represent the interests of those members.[85] An organization, however, can establish standing in its own right under the proximity presumption.[86] We conclude that C-10 has provided sufficient facts to demonstrate that the presumption applies.

An office location, as well as a residence, may serve as the basis of standing under the presumption.[87] The Petition provides the address of C-10's office, which is located within the ten-mile plume exposure pathway Emergency Planning Zone (EPZ) for Seabrook.[88] C-10's

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[83] Tr. at 63.

[84] NextEra's Ans. to Petition at 15.

[85] Palisades, CLI-07-18, 65 NRC at 409–10.

[86] See supra Part II. at 11–12.

[87] Ga. Tech., LBP-95-6, 41 NRC at 286–87, aff'd, CLI-95-12, 42 NRC at 115–17.

[88] Petition at 1. The Staff explains that under 10 C.F.R. § 50.33(g),

> "[t]he exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to the local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries"; however, "[g]enerally, the plume exposure pathway EPZ for nuclear power reactors shall consist of an area about 10 miles (16 km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius."

executive director, Ms. Natalie Treat, works at the office.[89] The Staff does not dispute that C-10's office is located within ten miles of the Seabrook plant.[90] We will therefore decide C-10's standing under the proximity presumption based on that location.

We next must determine whether the Petition alleges an obvious potential for offsite consequences if the LAR is granted. The LAR applies to concrete in Seismic Category I structures, which include those Seabrook structures necessary to control the release of radioactive material or otherwise mitigate the consequences of an accident.[91] Among the Seabrook Category I structures affected by ASR is the containment structure, the purpose of which is to confine radiation and fission products that might otherwise be released to the atmosphere in the event of an accident. Moreover, the Staff reports that there are 26 Seismic Category I concrete structures at Seabrook that are or could be affected by ASR.[92] In order to ensure safe operation, those safety-related structures must be able to withstand an earthquake and other natural disasters within the design basis of the plant.[93]

C-10 contends, however, that the LAR would "allow[] NextEra to continue to operate Seabrook Station's nuclear reactor with no way to adequately remedy the plant's deteriorating concrete."[94] The Petition is particularly concerned with the impact of ASR on Seabrook's safety

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Staff's Ans. to Petition at 21 n.98.

[89] See Petition at 1, 17; C-10's Reply at 2.

[90] Tr. at 66.

[91] See Regulatory Guide, 1.29, Rev. 5, at 5 (July 2016).

[92] Tr. at 85.

[93] 10 C.F.R. Part 50, App. A (Criterion 2).

[94] Petition at 1.

related structures.[95] C-10 argues that the LAR does "not provide for accurate assessment of the current, actual, physical condition of the concrete structural components of Seabrook Station[,] [and b]y logical extension . . . does not provide for the accurate assessment of [ASR] on the plant structures going forward."[96] The Petition includes contentions, supported by expert opinion, alleging that: 1) the LAR's monitoring program lacks sufficient tools for determining the presence and extent of ASR in safety-related structures at Seabrook; 2) the LAR ignores the potential for microcracking in reinforced concrete and the resulting abrupt loss of mechanical properties; 3) the large-scale test program on which the LAR is based yielded data that are not representative of the progression of ASR at Seabrook, and therefore it fails to support the LAR's proposed methodology; and 4) the LAR's monitoring intervals are too long and too fixed to effectively measure the ongoing effects of ASR on Seabrook Category I structures.[97] C-10 contends that "[t]he danger in misconstruing the effects of ASR, acting within the restraint imposed by reinforcing steel, is that serious degradation may go unnoticed without employing thorough petrographic analysis."[98] The decision not to require the testing C-10 argues for, "especially for safety-related structures," leaves NRC inspectors and surrounding communities with an "incomplete picture of the actual state of concrete degradation, and could endanger the public health and safety."[99]

If C-10's arguments are valid, granting the LAR would allow the plant to continue to operate without adequate methods to detect unacceptable levels of ASR-induced degradation of

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[95] See id. at 3, 6, 8, 9, 12, 17.

[96] Id. at 2.

[97] Id. at 3, 5, 8, 15.

[98] Id. at 5.

[99] Id. at 6.

Seismic Category I structures. This would put the plant and the surrounding population at risk in the event of a design basis event because those structures may not be able to perform their safety-related functions. As C-10 puts it, "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."[100]

The Commission and licensing boards have found an obvious potential for offsite consequences where the risk was less compelling. For example, in a case involving the relicensing of a research reactor, the Commission determined that the petitioner had standing under the proximity presumption despite the licensee's argument that the hypothetical accident scenarios underlying the standing argument were "incredible" because they would "first require three independent redundant safety systems to fail."[101] Similarly, licensing boards have found standing in cases where the proximity presumption was based on "unlikely" but plausible risk scenarios.[102] The Board therefore finds that C-10's allegations adequately demonstrate an obvious potential for offsite harm if the LAR is granted.

We are unpersuaded by the Staff's argument that there is no potential for offsite consequences because the plant will have to shut down if an unacceptable level of concrete degradation is reached.[103] This argument assumes that the LAR's reliance on the results of the

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[100] C-10's Reply at 3. The Staff's Motion to Strike did not ask the Board to strike this statement. Staff's Motion to Strike, Attachment A at 3.

[101] See Ga. Tech., CLI-95-12, 42 NRC at 116–17.

[102] See MOX Servs., LBP-07-14, 66 NRC at 187–88 (concluding based on "the Application and the Board's own technical expertise" that nuclear criticality was a "legitimate concern" in the context of license to operate a mixed oxide fuel fabrication facility); CFC Logistics, Inc., LBP-03-20, 58 NRC 311, 320 (2003) (identifying an "unlikely, yet plausible, scenario in which an accident of some sort could damage the armored pool containing the cobalt-60 at the [food processing irradiator] facility").

[103] Tr. at 72–73.

large-scale test program, including its monitoring program, monitoring intervals, and criteria for determining an acceptable level of concrete deterioration, provides an adequate methodology for detecting unacceptable levels of ASR advancement in Seabrook Category I structures. But the Petition contests all those aspects of the LAR. If C-10 is correct, the plant may in fact continue to operate even after an unacceptable level of concrete degradation is reached. As explained, our ruling on standing is not the point at which we resolve disputes that go to the merits of a petitioner's contentions. It is sufficient that C-10 has identified "some 'plausible chain of causation,' some scenario suggesting how [the] particular license amendments would result in a distinct new harm or threat" to the petitioner.[104]

We are also not persuaded by the Staff's argument that the LAR does not create a potential for offsite consequences because the concrete itself will not be physically changed as the result of the license amendment. It is clear from the LAR itself that Seabrook concrete has changed as a result of ASR and that further ASR-induced degradation is expected to occur. C-10 maintains that the LAR fails to provide a methodology adequate to assess both the changes to Seabrook concrete that have occurred and the future changes that may result from the continuing effects of ASR. That alleged deficiency is sufficient to establish an obvious potential for offsite consequences. The Commission and licensing boards have upheld application of the proximity presumption in cases that did not involve new construction or the replacement of existing structures. For example, the Commission determined that the proximity presumption applied even though the challenged license amendment affected only the petitioner's right to request a hearing on any changes to the material specimen testing schedule that might be proposed at some future date.[105] Also, in a case involving the relicensing of a research reactor

[104] Zion, CLI-99-4, 49 NRC at 192.

[105] Perry, CLI-93-21, 38 NRC at 90–96.

that did not involve new construction, the Commission determined that the petitioner had standing under the proximity presumption.[106] When the Commission has found no obvious potential for offsite consequences, it was because there were no changes to "the physical plant itself, its operating procedures, design basis accident analysis, management, or personnel."[107] Thus, the Commission has rejected proximity standing for license transfers,[108] license amendments associated with shutdown and de-fueled reactors,[109] and certain changes to worker-protection requirements.[110] Here, however, the proposed amendment provides a methodology and procedures for determining whether Seismic Category I structures are able to perform their safety-related functions. Thus, the LAR has significant implications for the safety of the plant and the nearby population.

In ruling on proximity standing, we must also decide whether C-10 is located within an appropriate radius of the Seabrook plant, "taking into account the nature of the proposed action and the significance of the radioactive source."[111] The Petition provides the address of its office, located within the ten-mile plume exposure pathway EPZ for Seabrook.[112] The radioactive source, an operating nuclear power reactor and spent fuel storage site, is significant, and the nature of the proposed action, a license amendment that would allow continuing reactor

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[106] See Ga. Tech., CLI-95-12, 42 NRC at 116–17.

[107] See Peach Bottom, CLI-05-26, 62 NRC at 582 (stating that the license transfer did not implicate these concerns).

[108] Id. at 581.

[109] Zion, CLI-99-4, 49 NRC at 191.

[110] St. Lucie, CLI-89-21, 30 NRC at 329–30.

[111] Peach Bottom, CLI-05-26, 62 NRC at 580–81 (quoting Ga. Tech., CLI-95-12, 42 NRC at 116–17).

[112] Petition at 1, 17.

operations despite the acknowledged potential for ASR advancement, creates a potential for offsite consequences that would likely affect the geographic area in which C-10's office is located.[113]

The Staff argues that C-10 does not satisfy the proximity presumption because it "never factually alleges an obvious potential for offsite radiological consequences to itself."[114] We reject this argument because it confuses the showing required under the proximity presumption of standing with that required under the traditional test for standing. The traditional test requires that the petitioner make a particularized showing of injury-in-fact caused by the challenged action.[115] By contrast, under the proximity presumption "a petitioner need not expressly 'establish the [traditional] standing elements of injury, causation or redressability.'"[116] Instead, proximity standing "rests on the presumption that an accident associated with the nuclear facility could adversely affect the health and safety of people working or living offsite but within a certain distance of that facility."[117] As previously noted, an organization, like an individual, is considered a "person" for the purpose of determining standing under 10 C.F.R. § 2.309.[118]

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[113] See, e.g., Susquehanna LLC (Susquehanna Steam Elec. Station, Units 1 & 2), LBP-07-10, 66 NRC 1, 18–19 (2007) (finding that an extended power uprate "directly associated with continuing reactor operations" was an action similar to that which supports a 50-mile presumption in operating license proceedings); see also Zion, CLI-99-4, 49 NRC at 191 (finding that because the reactor units were "shutdown and defueled," a license amendment relating to that defueled status did not show obvious danger of offsite consequences).

[114] Staff's Ans. to Petition at 21.

[115] Calvert Cliffs, CLI-09-20, 70 NRC at 915.

[116] Peach Bottom, CLI-05-26, 62 NRC at 580 (quoting Fla. Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-01-6, 53 NRC 138, 150, aff'd, CLI-01-17, 54 NRC 3 (2001)).

[117] Id.

[118] Palisades, CLI-07-18, 65 NRC at 411.

The first element of proximity standing in license amendment cases, the obvious potential for offsite consequences, requires that "the kind of action at issue, when considered in light of the radioactive sources at the plant, justifies a presumption that the licensing action 'could plausibly lead to the offsite release of radioactive fission products from . . . the . . . reactors.'"[119] The Staff criticizes the Petition because it "only" alleges offsite radiological consequences to the public, including "'potentially disastrous [safety] consequences' to the 'surrounding communities' posed by the 'radioactive substances contained within the [containment structures and spent fuel pool] walls.'"[120] In fact, such allegations are plainly sufficient to establish the obvious potential for radiological consequences. The likelihood that an offsite release of radioactive fission products will impact the petitioner is evaluated under the second element of proximity standing, which, as just explained, requires that the petitioner's location or sufficient contacts be within an appropriate radius of the nuclear power plant.[121] In this case, C-10 has provided sufficient allegations to show the obvious potential for offsite consequences, and the location of C-10's office within the ten-mile plume exposure pathway EPZ for Seabrook means that it would "'face a realistic threat of harm' if a release from the facility of radioactive material were to occur."[122] By satisfying the elements of the proximity presumption, C-10 has shown the threat of "radiologicial consequences to itself."[123] In arguing

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[119] Id. at 581 (quoting Commonwealth Edison Co. (Zion Nuclear Power Station, Units 1 & 2), LBP-98-27, 48 NRC 271, 277 (1998), aff'd, CLI-99-4, 49 NRC 185 (1999), petition for review denied; Dienethal v. NRC, 203 F.3d 52 (D.C. Cir. 2000)).

[120] Staff's Ans. to Petition at 21–22 (quoting Petition at 1–2, 6, 8).

[121] Peach Bottom, CLI-05-26, 62 NRC at 580 (quoting Ga. Tech., CLI-95-12, 42 NRC at 116–17).

[122] Calvert Cliffs, CLI-09-20, 70 NRC at 917 (quoting Calvert Cliffs, LBP-09-4, 69 NRC 170 at 183).

[123] Staff's Ans. to Petition at 22.

that C-10 must make a further demonstration of injury to itself, the Staff is attempting to require C-10 to satisfy the traditional test for standing in addition to the requirements of the proximity presumption. But that is precisely what the Commission has held is not required.[124]

2. Organizational Standing under the Traditional Test

Even if the proximity presumption does not apply, C-10 satisfies the traditional elements necessary to demonstrate organizational standing. The Petition alleges a concrete injury to an organizational interest. To claim such an injury, "an organization must allege that the defendant's conduct 'perceptibly impaired' the organization's ability to provide services in order to establish injury in fact."[125] "An organization's ability to provide services has been perceptibly impaired when the defendant's conduct causes an 'inhibition of [the organization's] daily operations.'"[126] However, "frustration of an organization's objectives 'is the type of abstract concern that does not impart standing.'"[127]

While the Petition does make reference to a more generalized organizational "vision" of "a clean, safe, sustainable energy future" and its concerns that the LAR "could put the public at serious risk," it also describes C-10's very specific organizational functions and services.[128] C-10 is not merely a nuclear watchdog or general environmental group; it is an organization focused on the safe operation of the Seabrook plant, and only that plant.[129] It maintains and

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[124] Calvert Cliffs, CLI-09-20, 70 NRC at 915; Peach Bottom, CLI-05-26, 62 NRC at 580.

[125] Turlock Irrigation Dist. v. FERC, 786 F.3d 18, 24 (D.C. Cir. 2015).

[126] Food & Water Watch, Inc. v. Vilsack, 808 F.3d 905, 919 (D.C. Cir. 2015) (alteration in original) (quoting People for the Ethical Treatment of Animals v. USDA, 797 F.3d 1087, 1094 (2015)).

[127] Id. (quoting Nat'l Taxpayers Union, Inc. v. U.S., 68 F.3d 1428, 1433 (D.C. Cir. 1995)).

[128] Petition at 1.

[129] Id.

operates "a field monitoring network to measure real-time radiological emissions from the plant, under contract with the Massachusetts Department of Public Health's Bureau of Environmental Health."[130] Its "more than 700 members" include an "overwhelming majority" who live within ten miles of Seabrook.[131] The Petition also provides the address of C-10's office, [132] which is located within the ten-mile plume exposure EPZ for Seabrook.

Assuming for the purposes of standing that C-10's allegations concerning the deficiencies in the LAR are correct, an accident within the design basis has the potential to injure C-10 as an organization. As the Staff acknowledged, such a nuclear accident could impact C-10's office, potentially requiring that it be evacuated.[133] The Staff suggested that C-10's activities such as monitoring, education, and providing information to the public could still be performed even if the office had to be evacuated.[134] It is likely, however, that those activities would be "perceptibly impaired"[135] if a radiological release from Seabrook made C-10's office unsafe or inaccessible. That is sufficient to show a realistic threat of injury to the organization's activities because, under judicially recognized concepts of standing, "[t]he magnitude, as distinct from the directness, of the injury is not critical to the concerns that underlie the requirement of standing."[136]

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[130] Id.

[131] C-10's Reply at 2. The Staff filed a motion to strike certain portions of C-10's Reply. See supra Part I.B. at 8. However, this statement by C-10 was not included in the portions the Staff sought to strike.

[132] Petition at 17.

[133] Tr. at 71.

[134] Tr. at 71.

[135] Turlock Irrigation Dist., 786 F.3d at 24.

[136] Am. Bottom Conservancy v. U.S. Army Corps of Engineers, 650 F.3d 652, 656 (7th Cir. 2011); see also LaFleur v. Whitman, 300 F.3d 256, 270–71 (2d Cir. 2002); Sierra Club v. Cedar

Moreover, a radiological release from Seabrook would also likely impact the organization's "core service," operating a network of monitoring stations in the vicinity of Seabrook.[137] In the event of a radiological release from Seabrook, C-10 could be prevented from providing those services for which it is under contract with the State of Massachusetts because "it could become impossible to visit crucial C-10 monitoring sites to perform needed maintenance and repairs, without suffering the consequences of radiation exposure."[138]

We therefore conclude that C-10 has demonstrated a risk of organizational injury in the event of a nuclear accident at Seabrook resulting from the ongoing effects of ASR. The requested amendment of Seabrook's license to allow continued operation given the facility's current condition creates the potential for injury to C-10 as an organization. The details of that amendment are based on testing that C-10 alleges is not representative of Seabrook concrete and is therefore inadequate to account for ASR degradation at Seabrook. Denial of the LAR would redress C-10's injury as an organization. Having demonstrated injury, traceability, and redressability, C-10 satisfies the requirements of the traditional standing analysis.

B. Representational Standing

Although we have concluded that C-10 has organizational standing, we will briefly review the argument that it also has representational standing.[139]

The Commission recognizes "that not even inherently representative organizations qualify for automatic standing, but that they must instead satisfy certain requirements before

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Point Oil Co., Inc., 73 F.3d 546, 557 (5th Cir.1996); Conservation Council of N.C. v. Costanzo, 505 F.2d 498, 501 (4th Cir. 1974).

[137] Petition at 1.

[138] C-10's Reply at 3.

[139] Id. at 4.

being permitted to represent others."[140] The Commission generally requires evidence that an organization has been authorized to represent one or more of its members.[141] In most cases an organization claiming representational standing must provide an affidavit specifically authorizing the organization to represent the interests of a named member.[142] Both the Staff and NextEra argue that C-10 failed to identify a specific member with standing to intervene that has authorized C-10 to represent his or her interests in a hearing.[143] Therefore, they assert that C-10 cannot claim representation standing.[144]

However, it has been enough "'for standing purposes that the petition had been signed by a ranking official of the organization who himself had the requisite personal interest to support an intervention petition.'"[145] Ms. Natalie Treat signed C-10's Petition as the Executive

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[140] Palisades, CLI-08-19, 68 NRC at 265.

[141] See, e.g., GPU Nuclear, Inc., Jersey Central Power & Light Co, & Amergen Energy Co, LLC (Oyster Creek Nuclear Generation Station), CLI-00-6, 51 NRC 193, 202 (2000) ("[A]n organization seeking representation standing . . . must show (preferably by affidavit) that the organization is authorized to request a hearing on behalf of that member.").

[142] Compare id., with Hous. Lighting & Power Co. (Allens Creek Nuclear Generating Station, Unit 1), ALAB-535, 9 NRC 377, 396 (1979) ("This does mean that, in the case of all organizations, there need be supplied a specific representational authorization of a member with personal standing. To the contrary, in some instances the authorization might be presumed."), and Va. Elec. & Power Co. (N. Anna Nuclear Power Station, Units 1 & 2), ALAB-536, 9 NRC 402, 404 n.2 (1979) ("[W]e reject the argument . . . that [an organization is] required to produce a specific authorization to represent the interests of at least one of its members shown to possess personal standing. To be sure, such an authorization is normally an ingredient of a demonstration of representational standing. But the authorization may be presumed in the case of members of organizations . . . ." (citation omitted)).

[143] See Staff's Ans. to Petition at 14; NextEra's Ans. to Petition at 14.

[144] Staff's Ans. to Petition at 14; NextEra's Ans. to Petition at 14.

[145] Consol. Edison Co. of N.Y. (Indian Point, Unit 2), LBP-82-25, 15 NRC 715, 728 (1982) (quoting Duke Power Co. (Amendment to Materials License SNM–1773—Transp. of Spent Fuel from Oconee Nuclear Station for Storage at McGuire Nuclear Station), ALAB-528, 9 NRC 146, 151 (1979)). At oral argument, C-10 quoted this rule from the Staff's Practice and Procedure Digest Number 15, Pre-Hearing Matter 78 (Jan. 2010). Tr. at 13. The Staff responded that this principle had been overruled in PPL Bell Bend, LLC (Bell Bend Nuclear Power Plant), CLI-10-7, 71 NRC 133 (2010). Tr. at 62. Bell Bend held that standing can only be determined based on

Director of C-10, which shows that she is a ranking official of the organization. In order to uphold standing on this ground, we must find that Ms. Treat herself meets the standing requirements as an individual. Underneath Ms. Treat's signature, the Petition provides her work address at C-10's office in Newburyport, Massachusetts,[146] and it also states that the office "is located within the EPZ of Seabrook Station Nuclear Power Plant."[147] C-10 confirms in its Reply that Ms. Treat "works within the [Emergency Planning Zone] (Newburyport) in her capacity as C-10 director."[148] Ms. Treat's signature on the Petition and Reply is a certification that those documents are true and correct,[149] meaning in this instance that Ms. Treat certifies that she works at C-10's office as the organization's Executive Director. It is undisputed that the office at which she works is located within Seabrook's plume exposure pathway EPZ. These work-related contacts alone are sufficient to confer standing on Ms. Treat individually through the proximity presumption (given our finding supra that C-10 has shown an obvious potential for offsite consequences).[150] Therefore, Ms. Treat's signature on the Petition, together with her requisite personal interest, is sufficient to support the organization's standing to represent her interest in this proceeding.

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the pleadings in the case at hand. Bell Bend, CLI-10-7, 71 NRC at 138. Because Ms. Treat's signature and information are found in the Petition and C-10's Reply in this case, that holding of Bell Bend does not apply here.

[146] Petition at 17.

[147] Id. at 1.

[148] C-10's Reply at 2.

[149] 10 C.F.R. § 2.304(d).

[150] See supra at Part II.A.1. at 19–21.

III. Motion to Strike

The Staff filed a Motion to Strike large portions of C-10's Reply as "providing entirely new details and standing arguments for the first time."[151] Of the cases cited by the Staff,[152] only Palisades directly addresses the extent to which a petitioner may include new information on standing in its reply.[153] In that case, the Commission ruled that the petitioner could not attach an authorization affidavit for standing to its reply because this would deprive the opposing party of the opportunity to challenge the sufficiency of the affidavit.[154]

The Staff, however, failed to mention subsequent Commission rulings that allow a petitioner to provide additional facts and/or argument related to standing in its reply, provided that the new information is reasonably related to the allegations originally presented.[155] In Summer, the Commission allowed persons who had filed declarations demonstrating their standing and cited their affiliation with the petitioner organization to submit revised declarations authorizing the organization to represent them.[156] In Bell Bend, the Commission held that a petitioner who made only "vague and generalized claims" supporting his argument for proximity standing "had the opportunity to cure on reply the defects in his initial petition."[157] We asked the

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[151] Staff's Motion to Strike at 1; see also id., Attachment A at 2.

[152] Id. at 3 nn.10–14.

[153] Id. at 2 (citing Entergy Nuclear Operations, Inc. (Palisades Nuclear Plant), CLI-08-19, 68 NRC 251, 261–62 (2008)).

[154] Palisades, CLI-08-19, 68 NRC at 261–62.

[155] S.C. Elec. & Gas Co. (Virgil C. Summer Nuclear Station, Units 2 & 3), CLI-10-1, 71 NRC 1, 7 (2010); Bell Bend, CLI-10-7, 71 NRC at 139–40.

[156] Summer, CLI-10-1, 71 NRC at 7.

[157] Bell Bend, CLI-10-7, 71 NRC at 139–40.

Staff to explain at oral argument why this precedent should not apply in the present case.[158] The Staff agreed that both decisions apply, but argued that the cases only allow supplementation if it is "in direct relationship to the arguments that were made in the initial pleading."[159]

We have cited only the following disputed information in our ruling on organizational standing: 1) Ms. Treat works at C-10's office within the EPZ;[160] and 2) in the event of a radiological release from Seabrook, "it could become impossible to visit crucial C-10 monitoring sites to perform needed maintenance and repairs, without suffering the consequences of radiation exposure."[161] In arguing that these and other statements in C-10's Reply constitute an entirely new argument on organizational standing, the Staff repeats its erroneous claim that "the Petition only asserted hypothetical injuries to the public in general," and not to C-10.[162] As explained in our ruling on organizational standing, the Petition provides facts sufficient to show a risk of injury to the organization itself from a radiological release at Seabrook.[163]

Viewing the contested new information in that context, C-10 has "simply used its reply to clarify and to develop information included in its initial petition."[164] Ms. Treat's signature on the Petition as C-10's Executive Director immediately above the address of the organization's office

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[158] Licensing Board Memorandum (Identifying Oral Questions for Oral Argument), at 2 (June 5, 2017) (unpublished).

[159] Tr. at 69.

[160] See supra Part II.B. at 28 (citing C-10's Reply at 2).

[161] See supra Part II.A.2. at 26 (citing C-10's Reply at 3).

[162] Staff's Motion to Strike at 6.

[163] See supra Part II.A.2. at 23.

[164] U.S. Dept. of Energy (High-Level Waste Repository), LBP-09-6, 69 NRC 367, 434 (2009), aff'd, CLI-09-14, 69 NRC 580 (2009).

at least suggests that she works at the organization's office, and the Petition also states that the office "is located within the EPZ of Seabrook Station nuclear power plant."[165] C-10's Reply merely confirms that Ms. Treat works at C-10's office in the EPZ. The Petition also states that C-10 operates a field monitoring network to measure real-time radiological emissions from Seabrook, and, as the Staff itself emphasizes, the Petition stresses the public health risk in the event of a radiological release from Seabrook.[166] C-10's Reply simply confirms the reasonable inference that a significant radiological release from Seabrook would impair C-10's ability to maintain its monitoring network due to the risk of radiation exposure. The disputed statements are therefore permissible under Bell Bend.[167] Moreover, both statements are responsive to the Staff and NextEra's arguments in their answers that C-10 failed to demonstrate organizational standing, and they are therefore consistent with Commission policy that replies should be "narrowly focused on the legal or logical arguments presented in the [answers]."[168]

We further note that while the Commission prohibits the introduction of new arguments in a reply when doing so "would unfairly deprive other participants of an opportunity to rebut new claims,"[169] both the Staff and NextEra took full advantage of the opportunity to rebut C-10's Reply during oral argument, so neither has been placed in an unfair position by our limited use of information from C-10's Reply.[170]

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[165] Petition at 1, 17.

[166] Staff's Motion to Strike at 6.

[167] Bell Bend, CLI-10-7, 71 NRC at 139–40.

[168] Final Rule: Changes to Adjudicatory Process, 69 Fed. Reg. 2,182, 2,203 (Jan. 14, 2004).

[169] Nuclear Mgmt. Co., LLC (Palisades Nuclear Plant), CLI-06-17, 63 NRC 727, 732 (2006).

[170] E.g., Tr. at 61–79, 99–102.

The Staff also moves to strike various statements in C-10's Reply related to representational standing,[171] but, other than the claim that Ms. Treat works at C-10's office within the EPZ, we have not relied on any of those disputed statements in our ruling on representational standing. As we have explained, representational standing can be established without an authorization affidavit or declaration when the petition has been signed by a ranking official of the organization who herself has standing.[172] The Staff's objections therefore do not affect our ruling on representational standing.

The Board therefore concludes that the limited information from C-10's Reply that we have cited as support for our standing ruling is within the appropriate scope of a reply. The Staff's Motion to Strike is moot as to the remaining information in C-10's Reply. We therefore deny the Staff's Motion to Strike.

IV. Contention Admissibility

To participate as a party in a licensing proceeding, a petitioner for intervention such as C-10 must not only establish standing, but must also proffer at least one contention that meets the requirements of 10 C.F.R. § 2.309(f)(1).[173] An admissible contention must: 1) provide a specific statement of the legal or factual issue; 2) provide a brief explanation of the basis for the contention; 3) demonstrate that the issue is within the scope of the proceeding; 4) demonstrate that the issue is material to the findings the NRC must make to support the action that is involved in the proceeding; 5) provide a concise statement of the alleged facts or expert opinions, including references to specific sources and documents, that support the petitioner's position and upon which the petitioner intends to rely at the hearing; and 6) provide sufficient

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[171] Staff's Motion to Strike at 4.

[172] Consol. Edison Co. of N.Y. (Indian Point, Unit 2), LBP-82-25, 15 NRC 715, 728 (1982).

[173] See 10 C.F.R. § 2.309(a).

information to show a genuine dispute concerning a material issue of law or fact, including references to specific portions of the application that the petitioner disputes, or, in the case where the application is alleged to be deficient, the identification of such deficiencies and supporting reasons for this belief.[174]

C-10's Petition includes ten contentions (Contentions A–J). According to NextEra, none of the contentions is admissible. The Staff takes a different position. Although the Staff maintains that none of C-10's contentions is independently admissible,[175] the Staff proposed a reformulated contention that combines C-10's Contentions A, B, C, D, G, and H. The Staff argues that its reformulated contention is admissible. C-10 does not object to the admission of the reformulated contention.[176]

We conclude that a simplified version of the reformulated contention proposed by the Staff is admissible.[177] We reach this conclusion on two independent grounds. First, we conclude that five of C-10's individually proposed contentions are admissible, but, for purposes of efficiency and clarity, we consolidate the contentions into a reformulated contention similar to that proposed by Staff. Infra Part IV.A. Alternatively, we conclude that, even assuming arguendo that none of C-10's contentions could be admitted as a stand-alone contention, a simplified version of the Staff's proposed reformulated contention satisfies the contention admissibility criteria, and we find it admissible for hearing. Infra Part IV.B. Finally, we explain

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[174] Id. § 2.309(f)(1)(i)–(vi).

[175] Staff's Ans. to Petition at 26.

[176] See Tr. at 35–36.

[177] The Staff's proposed reformulation included the consolidation of Contention A, B, C, D, G, and H. As we conclude in more detail infra in Part IV.A.2., Contentions A, B, C, D, and H are all independently admissible, and thus we accept the Staff's proposal to consolidate them into a single reformulated contention. However, as we conclude infra in Part IV.C.3., Contention G is inadmissible. Thus, as we explain infra in Part IV.A.3., our adoption of a simplified version of the Staff's reformulated contention incorporates Contentions A, B, C, D, and H, but does not incorporate the inadmissible Contention G.

our reasons for concluding that C-10's remaining contentions are inadmissible. Infra Part IV.C. We therefore admit the following reformulated contention:

> The large-scale test program, undertaken for NextEra at the FSEL, has yielded data that are not "representative" of the progression of ASR at Seabrook. As a result, the proposed monitoring, acceptance criteria, and inspection intervals are not adequate.

A. The Reformulated Contention Appropriately Consolidates C-10's Contentions and Is Consistent with Commission Precedent

In this Part, we explain our application of the contention admissibility criteria to Contentions A, B, C, D, and H and our decision to consolidate the contentions into a single reformulated contention. First, we outline our general authority to reasonably interpret C-10's arguments and reformulate contentions. Second, we address the admissibility of the individual contentions. Finally, we consolidate the individual contentions into one reformulated contention. Because of the interrelated nature of the five admissible contentions, consolidation will promote a more efficient proceeding.

1. The Board's Authority to Reasonably Interpret the Petition

Before we address the admissibility of C-10's contentions and their consolidation, we address NextEra's arguments concerning the Board's authority to reasonably interpret a petitioner's arguments in order to admit contentions. NextEra claims that Commission precedent, and especially the Commission's decision in Fermi 2,[178] established that the Board may not: 1) provide any "legal support" or "a reasoned basis or explanation for a conclusion" not provided by the petitioners,[179] or 2) connect arguments or support from separate contentions in a manner that is not clearly and explicitly pled by the petitioner.[180] In effect, NextEra appears

[178] DTE Electric Co. (Fermi Nuclear Power Plant, Unit 2), CLI-15-18, 82 NRC 135 (2015).

[179] NextEra's Ans. to Petition at 12–13.

[180] See Tr. at 119–20.

to argue that the Board is limited to virtually the exact words used by a pro se petitioner, with no interpretive authority and without the ability to consider even controlling Commission decisions or agency regulations (i.e., legal support) unless cited by the petitioner. The Staff, conversely, offers a more robust view on the limits of the Board's authority, asserting that the key limitation is that the Board may not provide new or missing information to render a contention admissible.[181]

We conclude that the Staff's views more accurately summarize agency precedent. Nothing in Fermi 2 convinces us that the Commission intended to circumscribe the Board's authority to consider legal support not cited by petitioners or to provide a reasoned explanation for the Board's ruling not explicitly stated by the petitioner. This is consistent with Turkey Point, decided after Fermi 2, in which the Commission affirmed that board's reformulation of a contention even though the petition was "not a model of clarity or organization," noting that pro se petitioners are not held to the same standards as parties represented by counsel.[182] In that case, the applicant and the Staff both objected to the board's reformulation on the grounds that it converted "a challenge to the 2012 extended power uprate to a challenge to the Environmental Assessment for the instant license amendments."[183] However, given the context of the petition and the petitioner's statements at the prehearing conference, the Commission concluded that the board did not err in construing the contention as a challenge to the Environmental Assessment—despite the fact that this argument was not clearly articulated within the four corners of the originally proffered contention.[184]

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[181] See Staff's Sur-Reply at 12, 15.

[182] Fla. Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-15-25, 82 NRC 389, 397 (2015) (internal quotation marks omitted).

[183] Id. at 398–99.

[184] Id. at 399–400.

Moreover, because the Turkey Point board reasonably interpreted Contention 1 as a challenge to the Environmental Assessment, the Commission found "no error in the Board's combination of similar issues submitted . . . in support of two separate contentions."[185] Far from prohibiting such action, the Commission "expect[s] . . . licensing boards to 'reformulate contentions to eliminate extraneous issues or to consolidate issues for a more efficient proceeding.'"[186]

The Commission's ruling also permits boards to consider the readily apparent legal implications of a pro se petitioner's arguments, even if not expressly stated in the petition. The Commission upheld the board's determination that the petition implicitly challenged the Staff's Finding of No Significant Impact under NEPA even though it did not expressly so state. It was sufficient, according to the Commission, that the challenge to the Staff's Finding was implicit in the petitioner's allegations concerning the significant environmental impacts of the proposed action.[187]

Thus, Turkey Point reaffirms that a reformulated contention is acceptable if it reasonably interprets a petitioner's arguments. If pro se petitioners must invariably present their arguments in clear and explicit terms, there would never be any cause to reformulate contentions to clarify their meaning. Thus, in admitting individual contentions or in reformulating contentions, the Board may reasonably interpret a pro se petitioner's arguments. The petitioner, however, must provide the information necessary to satisfy the contention admissibility criteria.[188]

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[185] Id. at 401.

[186] Id. (citing Crow Butte Res., Inc. (N. Trend Expansion Project), CLI-09-12, 69 NRC 535, 552–53 (2009) (quoting Shaw Areva MOX Servs. (Mixed Oxide Fuel Fabrication Facility), LBP-08-11, 67 NRC 460, 482 (2008)).

[187] Turkey Point, CLI-15-25, 82 NRC at 401–02.

[188] Fermi 2, CLI-15-18, 82 NRC at 145–46.

We also conclude that nothing in Fermi 2 or 10 C.F.R. § 2.309(f)(1)'s contention admissibility requirements prohibits a board from citing Commission decisions, agency regulations, or other relevant legal support not cited by a petitioner, or from providing its own reasoned explanation for its conclusions. Such a prohibition cannot be reconciled with 10 C.F.R. § 2.319, which provides that "[a board] has the duty to conduct a fair and impartial hearing according to law" and has "all the powers necessary to those ends."[189] That regulation requires the Board to fairly and impartially judge all issues before it, which necessarily includes thoroughly reviewing and considering agency precedent and drawing our own conclusions based on that precedent.

2. Contentions A, B, C, D, and H are Independently Admissible

a. Contention A

Contention A states:

> Visual inspection, crack width indexing, and extensometer deployment are not sufficient tools for determining the presence and extent of Alkali-Silica Reactor (ASR) in safety-related structures at Seabrook Station.[190]

In Contention A, C-10 contests the sufficiency of the methods proposed in the LAR for monitoring the anticipated progression of ASR at Seabrook. Those methods include monitoring in-plane (parallel to the underlying rebars[191]) and through-thickness (perpendicular to the underlying rebars[192]) expansion of Seabrook structures in order to characterize the significance of ASR in those structures. In-plane expansion is monitored using a "Combined Cracking Index

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[189] 10 C.F.R. § 2.319; see also MODEL CODE OF JUDICIAL CONDUCT, § 2.2 (Am. Bar Ass'n 2011) (requiring that "[a] judge shall uphold and apply the law").

[190] Petition at 3.

[191] Evaluation of Proposed Change at 15 of 73.

[192] Id.

(CCI) methodology based on crack width summation," while through-thickness expansion is monitored using "[s]nap ring borehole extensometers (SRBEs)."[193] Table 5 of the LAR designates inspection frequencies for areas affected by ASR, with more frequent inspections for areas with greater in-plane expansion.[194] Under Table 5, an area is classified in Tier 1, 2, or 3 based on its level of in-plane expansion.[195] Tier 1 structures are those that show no indications of pattern cracking or water ingress and will be inspected according to the current Structural Monitoring Program (SMP). Tier 2 structures consist of "areas with pattern cracking that cannot be accurately measured" and areas with up to .05–0.1 percent in-plane expansion. They will be inspected every 30 months. Finally, Tier 3 areas are those exhibiting in-plane expansion of 0.1 percent or more; they will be inspected every six months.[196] For Tier 3 areas, NextEra will install extensometers to monitor through-thickness expansion.[197]

C-10 argues that "[c]ontinued reliance on visual inspection and crack width indexing as gauges of the extent of ASR is neither appropriate nor reliable, especially with regard to safety-

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[193] Id. at 16 of 73. The Staff explains that

> an extensometer is an instrument installed in a borehole that is perpendicular to the face of the wall (or slab). The instrument consists of two anchors and a rod. The rod is attached to the anchor installed deep in the borehole and slides through a hole in the anchor installed near the surface. Extensometers will be used to measuring through-thickness expansion of plant structures. Specifically, expansion is monitored by measuring the distance between the end of the rod and the reference surface on the anchor near the surface.

Staff's Ans. to Petition at 29 n.132 (citing Evaluation of Proposed Change at 30 of 73).

[194] Evaluation of Proposed Change at 32 tbl.5 of 73.

[195] Id.

[196] Id.

[197] Id. at 31 of 73 ("The [Structural Monitoring Program] requires installation of extensometers in the ASR affected locations that are classified as Tier 3.").

related structures at Seabrook Station."[198] C-10 also maintains that although extensometers, another monitoring tool proposed in the LAR, can measure overall dimensional change, they may completely miss localized ASR damage propagating in planes parallel to the planes of the walls.[199] C-10 asserts that while visual inspection, crack width indexing, and extensometer deployment are each a legitimate tool "that can, and should, be used to analyze the advancement of ASR, only sample testing of in-situ concrete can accurately gauge the extent of ASR within a given concrete matrix."[200] Therefore, according to Contention A, the monitoring methods proposed in the LAR fail to assure that the presence and extent of ASR will be accurately measured.

The Staff states that "Contention A is admissible to the extent that it challenges the representativeness of the MPR/FSEL large-scale test program."[201] Contention A, the Staff agrees, is within the scope of this proceeding "to the extent that it challenges the LAR's reliance on visual inspections, crack width indexing, and extensometers to assess ASR at Seabrook based on the results of the test program."[202] The admissible portion of Contention A, the Staff explains, "is material to the extent that the Staff must verify the representativeness of the test program to determine whether the use of visual inspections, crack width indexing, and extensometers is appropriate for Seabrook's ASR monitoring program."[203] Contention A, the Staff notes, is supported by reports disputing the reliability of using a crack width index and Dr.

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[198] Petition at 3.

[199] Id. at 4.

[200] Id.

[201] Staff's Ans. to Petition at 30.

[202] Id.

[203] Id.

Brown's 2016 commentary disputing the reliability of extensometers.[204] And Contention A "raises a genuine dispute with the LAR as to whether the test program is sufficiently representative such that it can provide a valid basis for NextEra's conclusion that visual inspections, crack width indexing, and extensometers are effective methods for assessing and monitoring ASR at Seabrook."[205]

The Staff argues, however, that Contention A is inadmissible to the extent it argues that the proposed monitoring program, even if sufficient, must be replaced by a program of in-situ sampling of the Seabrook concrete.[206] We do not understand Contention A to make such an argument; rather, it is based on the alleged insufficiency of the monitoring methods proposed in the LAR. We will not reject Contention A on the basis of an argument C-10 does not make.

NextEra argues that Contention A is inadmissible.[207] According to NextEra, C-10 "appears unaware that NextEra is already doing what it seeks: removing cores and testing Seabrook's concrete as part of its efforts to monitor the progression of ASR. In fact, it is a key element of the LAR."[208] NextEra further maintains that the opinions of Dr. Brown cited by C-10 actually concern "now-superseded iterations of NextEra's ASR assessment program and other outdated information rather than the current LAR."[209] Accordingly, NextEra claims, Contention A fails to demonstrate a genuine dispute with the application and lacks the "requisite support."[210]

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[204] Id.

[205] Id.

[206] Id. at 30–31.

[207] NextEra's Ans. to Petition at 19–28.

[208] Id. at 20.

[209] Id.

[210] Id. (citing 10 C.F.R. § 2.309(f)(1)(v)).

We conclude that Contention A is inadmissible to the extent it concerns visual inspections, because we have found no respect in which the LAR's monitoring methodology depends on visual inspections. We also conclude, however, that Contention A is admissible as to the utilization of combined crack width indexing and extensometer deployment.

To satisfy contention admissibility requirements, a contention must identify the specific issues intended to be raised, the basis for each issue, the facts and expert opinions on which it relies, and the specific sections of the LAR challenged.[211] C-10 contests the LAR's reliance on crack width indexing to monitor ASR.[212] It notes that the LAR endorses the use of such an index, claiming that "[e]xpansion measurements from the large-scale test programs have shown that crack index provides a reasonable and conservative approximation of true engineering strain for reinforced concrete members undergoing ASR expansion."[213] C-10 contends, however, that utilizing an index that only considers crack width can give a false indication of the rate of ASR advancement because concrete restrained by reinforcement will cause microcracks of greater number without restricting the length of cracks.[214] C-10 supports its argument with a March 2013 report reflecting the opinion of Dr. Paul Brown,[215] described in the Petition as a retired Professor of Ceramic Science and Engineering at Pennsylvania State University.[216]

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[211] 10 C.F.R. § 2.309(f)(1)(i), (ii), (v), (vi).

[212] Petition at 3 (quoting the Evaluation of Proposed Change at 28 of 73).

[213] Id.

[214] Id. at 3–4.

[215] UCS Report at 1 n.1. Id. at 3 (quoting Dr. Paul Brown, Commentary on "Seabrook Station: Impact of Alkali-Silica Reaction on Concrete Structures and Attachments," at 6 of 7 (unnumbered) (March 2013), http://www.C-10.org/research/wp-content/uploads/2013/11/C-10_UCSMarch2013commentary.pdf [hereinafter Brown 2013 Commentary]).

[216] Petition at 3.

Another Union of Concerned Scientists (UCS) document cited in the Petition describes Dr. Brown as an ASR concrete expert who has worked for the National Institute of Standards and Technology in Gaithersburg, Maryland, and who has advised the NRC.[217] Dr. Brown "was a contributor to the newly released report Codes and Standards for Nuclear Plant Concrete for Nuclear Power Plants, and is serving on an American Concrete Institute (ACI) ASR Task Group."[218] Dr. Brown opines that:

> A crack index that only considers crack width is not an appropriate measure of an expansive reaction in a structure restrained by steel reinforcement. Because of the restraint, an index that instead reflects the total lengths of cracks on a given cross sectional plane is expected to be a more reliable indicator of the extent of ASR.[219]

C-10 also contends that an NRC Inspection Report concerning tests conducted at FSEL supports its argument that a crack width index may not accurately measure the rate of ASR advancement.[220] According to the NRC Inspection Report, the "preliminary implication" of the test specimen expansion measurement trends is that:

> [T]he X- and Y- expansion measurement methods (CCI and crack width) currently used for monitoring the progression of ASR on Seabrook Station structure surfaces (per the Structures Monitoring Program) may not provide alone, an adequate means to monitor (1) ASR progression and (2) by inference (pending the completion of the testing program), the ASR impact on the affected building's structural performance.[221]

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[217] UCS Report at 1 n.1. Id. (citing Union of Concerned Scientists, Continuing Problems with Monitoring Concrete Damage at Seabrook at 1 n.1 (Nov. 4, 2013), http://www.ucsusa.org/sites/default/files/legacy/assets/documents/nuclear_power/Seabrook-concrete-damage-report-2013.pdf.

[218] Id.

[219] Brown 2013 Commentary at 6 of 7.

[220] Id. at 4 (quoting Letter from Glenn T. Dentel, Division of Reactor Projects, NRC Integrated Inspection Report 05000443/2014002 at 21 (May 6, 2014) (ADAMS Accession No. ML14127A376) [hereinafter NRC Inspection Report]).

[221] NRC Inspection Report at 21.

C-10 also questions the LAR's proposed use of extensometers, calling it "another valuable tool being used to make determinations about the interior changes to concrete structures that they are not designed to accomplish."[222] Specifically, C-10 argues that extensometers may miss localized ASR damage, relying on the opinion of Dr. Brown, who states that extensometers "can only provide information as to the overall dimensional change; they cannot determine the specific locations of expansion. Consequently, very localized and intensely damaging expansion could occur in planes parallel to the planes of the walls which would not result in a significant through-wall dimensional change."[223]

Turning to the other admissibility requirements, a contention must be within the scope of the proceeding,[224] which is defined by the Commission in its initial hearing notice.[225] In a license amendment proceeding, a petitioner's contentions must focus on the issues identified in the hearing notice, the license amendment application, and the Staff's environmental responsibilities relating to the application.[226] In this instance, the Federal Register notice provided an opportunity for a hearing on the LAR, which would revise the Seabrook UFSAR to include methods for analyzing Seismic Category I structures with concrete affected by ASR.[227]

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[222] Petition at 4 (citing Evaluation of Proposed Change at 15–16 of 73).

[223] Id. (quoting Dr. Paul Brown, Commentary of Seabrook Station License Amendment Request 16-03 at 2 (Sept. 30, 2016) (ADAMS Accession No. ML16306A248) [hereinafter Brown 2016 Commentary]).

[224] 10 C.F.R. § 2.309(f)(1)(iii).

[225] Duke Power Co. (Catawba Nuclear Station, Units 1 & 2), ALAB-825, 22 NRC 785, 790–91 (1985) ("The various hearing notices are the means by which the Commission identifies the subject matters of the hearings and delegates to the boards the authority to conduct proceedings." (footnotes omitted)).

[226] Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), LBP-91-39, 34 NRC 273, 282 (1991).

[227] Applications and Amendments to Facility Operating Licenses and Combined Licenses Involving Proposed No Significant Hazards Considerations and Containing Sensitive

Contention A is within the scope of this proceeding because it challenges the sufficiency of the LAR.

The materiality requirement of section 2.309(f)(1)(iv) requires a significant link between the claimed deficiency in the application and the agency's ultimate determination whether the applicant will adequately protect the health and safety of the public and the environment.[228] NRC regulations define the scope of review of a license amendment application broadly: "In determining whether an amendment to a license, construction permit, or early site permit will be issued to the applicant, the Commission will be guided by the considerations which govern the issuance of initial licenses, construction permits, or early site permits to the extent applicable and appropriate."[229] The "applicant must satisfy the requirements of 10 C.F.R. § 50.90 and demonstrate that the requested amendment meets all applicable regulatory requirements and acceptance criteria and does not otherwise harm the public health and safety or the common defense and security."[230] As the Staff explained, in order to grant the LAR it must find

> that there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner,

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Unclassified Non-Safeguards Information and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information, 82 Fed. Reg. 9,601, 9,604 (Feb. 7, 2017).

[228] See Private Fuel Storage, L.L.C. (Indep. Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 179–80 (1998), aff'd, CLI-98-13, 48 NRC 26 (1998).

[229] 10 C.F.R. § 50.92(a). As the Commission has referred this proceeding to the Atomic Safety and Licensing Board Panel without limitations, the Board operates under the same scope of review as the Commission. See Fla. Power & Light Co. (Turkey Point Nuclear Generating Station, Units 3 & 4), LBP-81-16, 13 NRC 1115, 1120 (1981) (reviewing a proposed license amendment to determine whether it would "endanger the health and safety of the public.").

[230] Tenn. Valley Auth. (Sequoyah Nuclear Plant, Units 1 & 2; Watts Bar Nuclear Plant, Unit 1), LBP-02-14, 56 NRC 15, 35 (2002); see also Tenn. Valley Auth. (Browns Ferry Nuclear Plant, Units 1, 2, & 3), ALAB-664, 15 NRC 1, 15–16 (1982) ("Prior to license issuance the NRC must first find reasonable assurance that the activities authorized by the amendment can be conducted without endangering the health and safety of the public, and in compliance with Commission regulations."), vacated and remand on other grounds, CLI-82-26, 16 NRC 880 (1982); N. States Power Co. (Prairie Island Nuclear Generating Plant, Units 1 & 2), ALAB-455, 7 NRC 41, 44 (1978).

> that there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and that the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.[231]

Contention A alleges that the monitoring methods proposed in the LAR, without appropriate in-situ testing of the concrete, are inadequate to measure ASR advancement in safety-related structures at Seabrook.[232] Accurate measurement of ASR advancement is necessary to determine whether it remains within the expansion limits in LAR Table 4 and proposed UFSAR Table 3.8-18, and thus that the large-scale test program results for Seabrook safety-related structures remain valid. The LAR itself acknowledges that, "because there is no testing data for . . . more advanced levels of ASR, periodic monitoring of ASR at Seabrook is necessary to ensure that the conclusions of the large-scale test program remain valid and that the level of ASR does not exceed that considered under the test program[s]."[233] Thus, "[o]ne of the objectives of the test program was to identify effective methods for monitoring ASR."[234] If the Staff is not assured that the proposed monitoring program will accurately monitor ASR advancement, the Staff could not plausibly conclude that the monitoring program will provide "reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner," or that "the issuance of the amendment will not be inimical to the . . . health and safety of the public."[235] Contention A is therefore material to the Staff's findings.

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[231] Staff's Ans. to Petition at 47 (citing 10 C.F.R. § 50.40).

[232] Petition at 3–4.

[233] Evaluation of Proposed Change at 16 of 73.

[234] Id.

[235] Staff's Ans. to Petition at 47 (citing 10 C.F.R. § 50.40).

Finally, under section 2.309(f)(1)(vi), C-10 must provide sufficient information to show a genuine dispute concerning a material issue of law or fact, including references to specific portions of the application that the petitioner disputes.[236] We have previously noted the specific parts of the LAR's proposed monitoring program that Contention A disputes. For the reasons just explained, those disputes concerning the adequacy of the monitoring program are material to the findings the Staff must make to issue the license amendment. Therefore, Contention A identifies disputes of material fact with the LAR.[237]

NextEra nonetheless claims that Contention A fails to demonstrate a genuine dispute with the application, as required by section 2.309(f)(1)(vi), because it is performing or will perform the core sampling that C-10 demands.[238] NextEra agrees with C-10 that "it is insufficient to rely solely 'on visual inspection and crack width indexing as gauges of the extent of ASR.'"[239] But it states that, at "Tier 3" locations, it has performed material property testing of cores removed from the structure to determine the current elastic modulus of the concrete, and that it is installing extensometers at those locations to monitor future through-thickness expansion ("Z-direction" expansion).[240] The "Tier 3 locations" referenced by NextEra are identified based on Table 5 of the LAR.[241] NextEra will combine the expansion at such locations measured by the extensometers with "the expansion that occurred up to the time of instrument

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[236] See 10 C.F.R. § 2.309(f)(1)(vi).

[237] U.S. Dept. of Energy, CLI-09-14, 69 NRC 580, 588 (2009) (demonstrating a genuine dispute of fact or law requires a petitioner to show "specific ties to NRC regulatory requirements, or to safety in general" (emphasis added)).

[238] NextEra's Ans. to Petition at 20.

[239] Id. at 22 (quoting Petition at 3).

[240] Id. at 21–22.

[241] Evaluation of Proposed Change at 32 tbl.5 of 73.

installation to yield the total through-thickness expansion to a given time."[242] To determine the expansion prior to instrument installation, NextEra will test the cores removed from the boreholes in which the extensometers will be installed to measure the current elastic modulus of those core samples. It will then use "an empirical correlation developed in the large-scale test program[s] to correlate concrete elastic modulus measurements with the through-thickness expansion to date."[243] According to NextEra, combining past expansion with that detected by the extensometers will provide a total measure of through-thickness expansion in areas affected by ASR.[244] NextEra thus argues that, because it is performing such sample testing of Seabrook concrete, Contention A fails to raise a dispute of material fact with the LAR.[245]

In fact, C-10's argument for testing actual concrete samples at Seabrook is not resolved by the core testing to which NextEra refers. NextEra's testing of core samples is to provide a means to measure ASR advancement in the boreholes in which extensometers are to be installed. C-10, however, wants sample testing of in-situ concrete because it contends that extensometers are not a sufficient means of determining future ASR advancement.[246] As explained above, Dr. Brown's opinion is that extensometers cannot determine certain specific locations of expansion, and consequently that "very localized and intensely damaging expansion could occur in planes parallel to the planes of the walls which would not result in a significant through-wall dimensional change."[247] If Dr. Brown's argument is correct, combining

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[242] Id. at 30 of 73.

[243] Id.

[244] See id. at 30–31 of 73.

[245] NextEra's Ans. to Petition at 20.

[246] Petition at 4.

[247] Id. (quoting Brown 2016 Commentary at 2).

past expansion with that detected by the extensometers may not provide an accurate measurement of total ASR expansion in the Tier 3 areas where the extensometers are installed. NextEra's testing to measure past expansion in Tier 3 boreholes is therefore insufficient to resolve C-10's argument that extensometers are not a sufficient means to measure future ASR advancement in Seabrook Category I structures.

In addition, because NextEra will use "an empirical correlation developed in the large-scale test program" to correlate the concrete elastic modulus measurements it obtains from core sample testing with the through-thickness expansion to date,[248] the validity of NextEra's calculations depends on whether the test program[s'] specimens were representative of Seabrook concrete.[249] The LAR also justifies a monitoring program based on the CCI and snap ring borehole extensometers because those methodologies were found accurate and reliable in the test program.[250] NextEra justifies its crack width methodology on that basis.[251] Contention D, however, maintains that the test programs' data are not representative of the progression of ASR at Seabrook, and for the reasons explained below that contention is admissible.[252] Thus, as the Staff's proposed reformulated contention recognizes, the Board's ruling on Contention D necessarily implicates the question whether NextEra's monitoring program will provide an adequate means of assuring that ASR progression at Seabrook remains within acceptable levels.

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[248] Evaluation of Proposed Change at 30 of 73.

[249] As discussed infra Part IV.A.2.d. at 68, 72–74, the LAR acknowledges that application of the results of the test program requires that the test specimens be representative of Seabrook's reinforced concrete.

[250] Staff's Ans. to Petition at 28 & n.127 (quoting Evaluation of Proposed Change at 16, 30 of 73).

[251] NextEra's Ans. to Petition at 25.

[252] See infra Part IV.A.2.d. at 65–78.

Furthermore, extensometers will be installed only to monitor through-thickness expansion in those areas where such CCI measurements show in-plane expansion of 0.1 percent or more. But C-10 contests the LAR's exclusive reliance on a CCI that measures only crack width, relying on Dr. Brown's opinion that a CCI test is not an appropriate measure of an expansive reaction in structures (such as those at Seabrook) that are restrained by reinforcement. He believes that an index which instead reflects the total lengths of cracks on a given cross sectional plane would be a more reliable indicator of the extent of ASR.[253] If Dr. Brown's argument is correct, then some areas with ASR advancement that are actually above the Tier 3 threshold may not be classified in Tier 3, and therefore will not undergo core sample testing or extensometer installation. Thus, the monitoring program may fail to detect ASR advancement exceeding the acceptable ASR expansion limits identified in Table 4.[254] If any one of those limits is exceeded, the conclusions of the test program concerning the safety of continued operations at Seabrook would no longer be valid.

NextEra argues that Dr. Brown did not provide a reasoned basis for his opinion that a combined crack index that only considers crack width is not an appropriate measure for the reinforced concrete at Seabrook.[255] We have, however, reviewed the accompanying analysis, and it adequately explains his conclusion.[256] Similarly, Dr. Brown's 2016 Commentary provides a reasoned basis for his opinion that extensometers may fail to detect very localized and

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[253] Petition at 3 (quoting Brown 2013 Commentary at 6 of 7).

[254] Thus, NextEra's argument that Dr. Brown does not dispute the Tier 3 threshold misses the point. NextEra's Ans. to Petition at 24. The relevance of Dr. Brown's criticism of the crack width index is that NextEra may fail to detect areas that should be classified in Tier 3.

[255] NextEra's Ans. to Petition at 25.

[256] Brown 2013 Commentary at 1–2, 5–6 of 7.

intensely damaging expansion.[257] Underlying both opinions is Dr. Brown's position that ASR expansion in reinforced concrete will eventually result in high density cracking that reduces the strength of the concrete, but such cracking may be missed or underestimated by extensometers or an index that only considers crack width.[258]

This is not the point at which to resolve the disputes as to the validity of Dr. Brown's conclusions. At the contention admissibility stage, petitioners are not required to prove their case on the merits. Also, petitioners are not required to provide expert or factual support in the form or of the quality necessary to withstand a summary disposition motion.[259] The requirement to demonstrate a genuine dispute of material fact at the summary disposition stage requires "a more rigorous evidentiary showing than that required to establish an admissible contention."[260] The petitioner also need not set forth all the evidence on which it may rely at later stages of the proceeding.[261] At this initial pleading stage, C-10 has provided sufficient expert opinion to

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[257] Brown 2016 Commentary at 1–3.

[258] Brown 2013 Commentary at 1–2, 5–6 of 7; Brown 2016 Commentary at 1–3. The issue of high density cracking is discussed in more detail in infra Part IV.A.2.b.

[259] S. Nuclear Operating Co. (Vogtle Electric Generating Plant, Units 3 & 4), CLI-11-8, 74 NRC 214, 221 (2011); Gulf States Utils. Co. (River Bend, Unit 1), CLI-94-10, 40 NRC 43, 51 (1994); USEC, Inc. (Am. Centrifuge Plant), LBP-05-28, 62 NRC 585, 596–97 (2005).

[260] Pac. Gas and Elec. Co. (Diablo Canyon Nuclear Plant, Units 1 & 2), CLI 11-11, 74 NRC 427, 442 & n.81 (2011) (citing Final Rule: Changes to Adjudicatory Process, 69 Fed. Reg. 2,182, 2,190 (Jan. 14, 2004) ("The contention standard does not contemplate a determination of the merits of a proffered contention."); and then citing Final Rule: Rules of Practice for Domestic Licensing Proceedings – Procedural Changes in the Hearing Process," 54 Fed. Reg. 33,168, 33,171 (Aug. 11, 1989) ("[A]t the contention filing stage the factual support necessary to show that a genuine dispute exists need not be in affidavit or formal evidentiary form and need not be of the quality necessary to withstand a summary disposition motion.")).

[261] Nuclear Innovation N. Am. LLC (S. Tex. Project, Units 3 & 4), LBP-11-25, 74 NRC 380, 397 (2011) ("At the contention admissibility stage of a proceeding, Intervenors need not marshal their evidence as though preparing for an evidentiary hearing."); U.S. Dept. of Energy (High-Level Waste Repository), LBP-09-6, 69 NRC 367, 416 (2009) (requiring petitioners to proffer conclusive support for the effect of their proposed contention "would improperly require . . . Boards to adjudicate the merits of contentions before admitting them.").

demonstrate a dispute concerning the adequacy of NextEra's monitoring program, and, given the acknowledged likelihood of continued ASR advancement at the Seabrook plant, the adequacy of that monitoring program is clearly a material issue.

Accordingly, Contention A is admissible as to crack width indexing and extensometer deployment.

b. Contention B

Contention B states:

> Expansion occurring within a reinforced concrete structure due to Alkali-Silica Reaction is not equivalent to a pre-stressing effect. Any mitigation of lost structural capacity, due to reinforcement, is temporary and unpredictable.[262]

Contention B disputes the LAR's claim that "[w]hen reinforcement is present to restrain the tensile force exerted by ASR expansion, an equivalent compressive force develops in the concrete that is comparable to prestressing."[263] C-10 also disputes the LAR's claim that "the change in material properties does not necessarily result in a corresponding decrease in capacity of a reinforced concrete structure [because] ASR-induced expansion in reinforced concrete has a pre-stressing effect that mitigates the loss of structural capacity that would be assumed based on the change in material properties."[264] According to C-10, NextEra's claim that ASR-impacted concrete held under "restraint" by steel rebar increases in strength "reflects a false understanding of the forces at work;" the concrete may show "a temporary increase in

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[262] Petition at 4.

[263] Id. at 5 (quoting MPR Associates, MPR-4288, "Seabrook Station: Impact of Alkali-Silica Reaction on Structural Design Evaluations," July 2016 at 4-1, 4-3 (rev. 0, July 31, 2016) (ADAMS Accession No. ML16216A241) [hereinafter MPR-4288]). MRP-4288 is Enclosure 2 (Non-Proprietary) and Enclosure 5 (Proprietary) to the LAR, and is therefore part of the LAR.

[264] Id. (quoting Evaluation of Proposed Change at 8–10 of 73).

certain measures of strength, but irrevocably will advance toward failure."[265] C-10 further alleges that "[t]he danger in misconstruing the effects of ASR, acting within the restraint imposed by reinforcing steel, is that serious degradation may go unnoticed without employing thorough petrographic analysis."[266]

In support of its argument, C-10 relies on Dr. Brown's 2016 critique of NextEra's LAR.[267] According to Dr. Brown,

> It appears that the central argument being advanced by NextEra to support a license amendment is that ASR, in a highly reinforced concrete, does not result in a significant loss of structural capacity – at least under the conditions of the tests carried out at the University of Texas. While there is no basis to question the results obtained in these particular tests, there is a strong basis to question their relevance to the Seabrook facility.[268]

Dr. Brown explains that "[w]hile the course of ASR in unrestrained samples will be to eventually introduce networks of cracks, the course of ASR in highly reinforced concrete will be to produce a concrete fabric wherein aggregate is embedded in a clay-like paste with minimal mechanical properties."[269] Dr. Brown alleges that the test program avoided "establishing the extent of this heterogeneity both on local mechanical properties and on microstructure."[270] He maintains that "restraint does not stop the progress of the reaction" and that while "[t]he course of ASR in restrained samples is known to initially cause pore filling, resulting in densification, which will for some period of time counteract the loss of structural capacity," eventually cracking does occur

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[265] Id. (emphasis removed).

[266] Id.

[267] Id. (quoting Brown 2016 Commentary at 3–4).

[268] Brown 2016 Commentary at 2.

[269] Id.

[270] Id.

"with an abrupt loss of mechanical properties."[271] He recommends that tests be performed on the test program specimens at varying locations and at the plant itself in order to provide an adequate comparison of the specimens to the concrete at Seabrook.[272] Dr. Brown argues that the failure to perform the tests he recommends "severely limits the ability to predict such a possible change in behavior or, more relevantly, provide a firm basis to assert that abrupt changes in structural capacity will not occur during the operating life of the facility."[273]

As further support for the contention, C-10 cites a March 2013 UCS report noting Dr. Brown's opinion that expansive ASR reaction in concrete under restraint eventually results in higher densities of microcracks, which reduces the strength of the concrete.[274] C-10 also cites Dr. Brown's commentary, submitted to the Advisory Committee on Reactor Safeguards in 2012, stating that a degradation mechanism such as ASR has an "autocatalytic" aspect, so that "the worse it gets, the worse it gets."[275] Dr. Brown explains that "[t]his is because the cracks serve as high conductivity paths for the movement of water and aggressive species."[276]

Contention B provides a specific statement of the issue of law or fact to be raised or controverted.[277] C-10 has also explained the basis of the contention,[278] arguing that: 1) any

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[271] Id. at 3.

[272] Id. at 2.

[273] Id. at 3.

[274] Petition at 4 (quoting Brown 2013 Commentary at 2 of 7).

[275] Id. at 5 (quoting Dr. Paul Brown, Commentary on Advisory Committee on Reactor Safeguards Transcript ML122070401 at 6 (Sept. 15, 2012), included as Attachment A to Staff's Ans. to Petition).

[276] Id.

[277] 10 C.F.R. § 2.309(f)(1)(i).

[278] Id. § 2.309(f)(1)(ii).

mitigation of lost structural capacity due to reinforcement is temporary at best; 2) failure of the concrete due to microcracking will inevitably occur; and, 3) because the LAR misconstrues the effects of ASR acting within the restraint imposed by reinforcing steel, serious and rapid degradation of the Seabrook concrete may go unnoticed.[279] Contention B challenges a specific aspect of the LAR,[280] and therefore is within the scope of this proceeding as defined by the Commission in its initial Federal Register notice.[281] Contention B identifies the expert opinions of Dr. Brown on which C-10 relies[282] and the specific sections of the LAR it disputes.[283]

We must also decide whether Contention B presents a dispute of material fact affecting the Staff's licensing decision.[284] NextEra argues that the LAR's discussion of prestressing "merely provides background information; it is not an element of the methodology for which NextEra is seeking NRC approval in the LAR."[285] Therefore, according to NextEra, the argument that ASR induced expansion within a reinforced concrete structure is not equivalent to a prestressing effect is not material to any finding the NRC must make to approve the LAR.[286] The Staff also maintains that the argument concerning the prestressing effect is not material to its findings "because the LAR depends on limits derived from the MPR/FSEL large-scale test program such that, as long as the test program was bounding of the Seabrook concrete, then

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[279] Petition at 5.

[280] 10 C.F.R. § 2.309(f)(1)(iii).

[281] Id. § 2.309(f)(1)(iii).

[282] See id. § 2.309(f)(1)(v).

[283] See id. § 2.309(f)(1)(vi).

[284] Id. § 2.309(f)(1)(iv), (vi).

[285] NextEra's Ans. to Petition at 33.

[286] Id. at 29.

the limits would also be bounding regardless of which theory correctly explains the forces giving rise to these limits."[287]

Unlike NextEra, however, the Staff recognizes that "portions of Contention B could be admissible to the extent that C-10 is challenging the representativeness of the test program itself."[288] It further concludes that "this aspect of Contention B is material because, in order to approve the LAR, the Staff must determine that NextEra's evaluation of ASR behavior (including any prestressing effect) based on its test program is representative of the structures at Seabrook."[289] The Staff concluded that a portion of Contention B does "argue how a non-representative test program could affect the findings that the Staff must make on the LAR," and that it could therefore be included in a reformulated contention that includes Contentions A, C, D, G, and H.[290]

We agree that the Staff need not resolve the theoretical question whether ASR induced expansion within a reinforced concrete causes an effect that is equivalent to prestressing. Therefore, that specific issue is not material to the findings the Staff must make on the LAR. But the contention is not limited to that specific issue. Instead, reading the full contention together with the statement of its basis, we understand the contention to allege that the LAR misconstrues the effects of ASR acting within the restraint imposed by reinforcing steel, and that, as a result, significant microcracking and resulting concrete degradation may go unnoticed unless there is additional analysis not contemplated under the LAR. C-10 argues that, contrary to the claims made in the LAR, any mitigation of lost structural capacity due to reinforcement is

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[287] Staff's Ans. to Petition at 32.

[288] Id. at 33.

[289] Id.

[290] Id. at 26.

merely temporary and unpredictable, and that the eventual result of ASR induced expansion in reinforced concrete will be high density microcracking that reduces the strength of the concrete. C-10 further alleges that "[t]he danger in misconstruing the effects of ASR, acting within the restraint imposed by reinforcing steel, is that serious degradation may go unnoticed without employing thorough petrographic analysis."[291]

The claim that, because of the alleged misunderstanding of the effects of ASR, significant concrete degradation may go unnoticed is sufficient to establish a significant link between the claimed deficiency and the agency's ultimate determination whether the applicant will adequately protect the health and safety of the public.[292] C-10 has provided adequate support for its claim that the LAR's analysis is inadequate through the opinion of Dr. Brown discussed above. Dr. Brown's analysis challenges "the representativeness of the test program itself,"[293] because it alleges that further testing is necessary to ensure that the results of the test program do in fact apply to the Seabrook plant. This implicates the representativeness of the test program results, the issue the Staff recognizes as material to its findings on the LAR. For example, because the LAR's expansion limits are derived from the test program, the argument that further testing is necessary to ensure that the test program results apply to the Seabrook plant is material to determining whether the expansion limits will assure adequate protection of public health and safety. C-10 has therefore properly pled a dispute of material fact.

NextEra additionally claims that, even if the mitigating effect of concrete reinforcement is unpredictable, the LAR includes monitoring intervals and sets expansion limits that ensure it can

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[291] Petition at 5 (emphasis in original).

[292] See Private Fuel Storage, L.L.C. (Indep. Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 180 (1998).

[293] Staff's Ans. to Petition at 33.

take corrective action before there is any unacceptable impact on structural integrity.[294] The adequacy of the monitoring intervals, however, is challenged in Contention H, and the adequacy of the monitoring program for ensuring that ASR expansion remains within the limits of LAR Table 4, is challenged in Contention A. As explained in detail above, one of the components of the monitoring program is the use of extensometers to measure through-thickness expansion.[295] According to Dr. Brown, extensometers cannot determine the specific locations of expansion, and consequently "very localized and intensely damaging expansion could occur in planes parallel to the planes of the walls which would not result in a significant through-wall dimensional change."[296] Thus, if Dr. Brown is correct, NextEra's monitoring program may overlook ASR-induced microcracking and the resulting deterioration of Seabrook concrete.

While NextEra agrees with C-10 that the mitigating effect of reinforcement is temporary and does not stop the progress of the ASR reaction, it maintains that it has adequately addressed this concern in its LAR and supporting documents.[297] Therefore, according to NextEra, Contention B does not identify a genuine material dispute with the LAR. NextEra cites MPR-4288, which indicates that, for the mitigating effect of reinforcement to be overcome, the compressive force that is comparable to prestressing must be completely overcome.[298] But the cited discussion does not address whether this change, if and when it occurs, will result in the microcracking and resulting concrete degradation described by Dr. Brown. Rather it merely explains what must occur to overcome the compressive force and does not address what the

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[294] NextEra's Ans. to Petition at 33.

[295] See supra Part I.A. at 37–38.

[296] Petition at 4 (quoting Brown 2016 Commentary at 2).

[297] NextEra's Ans. to Petition at 30.

[298] Id. at 32 (citing MPR-4288 at 4-2).

consequence to the subject concrete structure at Seabrook will be if that point is reached.[299] MPR-4288 also does not address Dr. Brown's concern that absent additional testing of both the test specimens and Seabrook concrete, the LAR lacks "a firm basis to assert that abrupt changes in structural capacity will not occur during the operating life of the facility."[300]

We therefore conclude that Contention B is admissible. To eliminate the unnecessary issue of the prestressing effect, we narrow the contention to the following:

> The LAR misconstrues expansion occurring within a reinforced concrete structure due to the Alkali-Silica Reaction because any mitigation of lost structural capacity, due to reinforcement, is temporary and unpredictable.

c. Contention C

Contention C states:

> Thorough petrographic analysis, including core sample testing of Seabrook's in-situ concrete, must be integral to NextEra's assessment of the advance of ASR. Because of the extreme danger imposed by the radioactive substances contained within their walls, petrographic analysis of concrete from the Containment structures and the Spent Fuel Pool should be required by NRC. NextEra's choice not to continue core sample testing—especially for safety-related structures—is based on spurious assumptions, leaves inspectors and the surrounding communities with an unnecessarily incomplete picture of the actual state of concrete degradation, and could endanger the public health and safety.[301]

This contention repeats the same demand for "thorough petrographic analysis" that appears in the statement of basis for Contention B. The essence of C-10's claim here is primarily the same argument supporting Contention B; i.e., that the benefit from ASR expansion in reinforced concrete is only temporary and that microcracking will eventually lead to an

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[299] See MPR-4288 at 4-2.

[300] Brown 2016 Commentary at 3.

[301] Petition at 6.

"autocatalytic collapse of the concrete's properties."[302] Further, just as Contention B argues that "[t]he danger in misconstruing the effects of ASR, acting with the restraint imposed by reinforcing steel, is that serious degradation may go unnoticed without employing thorough petrographic analysis."[303] Contention C argues that "[u]ntil thorough petrographic analysis is performed on Seabrook's concrete structures, NextEra has no real basis by which it can reassure . . . the NRC[] that Seabrook's ASR progression is truly understood."[304] C-10 also relies upon several opinions of Dr. Brown that C-10 cited in support of Contention B, including his 2016 critique of the LAR.[305]

If Contention C were merely a restatement of Contention B, we would reject it as duplicative.[306] However, some of the arguments in support of Contention C go beyond those offered in support of Contention B. Citing the opinion of Dr. Brown, C-10 disputes NextEra's primary rationale for not undertaking petrographic analysis: that once ASR-affected cores are removed, the behavior of those cores no longer reflects that of the confined structure.[307] In disputing NextEra's argument in this regard, C-10 refers to Dr. Brown's opinion asserting that insofar as models have been proposed to predict the path of ASR in reinforced concrete structures, those proposing such models have uniformly also cited the critical need to carry out core testing in reinforced concrete in order to test such models. Dr. Brown faults the LAR for its

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[302] Id. at 7–8.

[303] Id. at 5.

[304] Id. at 8.

[305] See id. at 5–7.

[306] See Turkey Point, LBP-15-13, 81 NRC at 468.

[307] Petition at 6–7.

failure to refer to any of those models.[308] C-10 also identifies the "testing and analysis protocols" for petrographic analysis that it believes should be followed.[309] Thus, we understand the purpose of Contention C to be not merely a restatement of the previous contention, but to provide additional argument in support of C-10's demand for thorough petrographic analysis.

As explained by the Staff, "Contention D argues that the test program is not representative of the progression of ASR at Seabrook," and that "to the extent that C-10's arguments in Contention C pertain to the representativeness of the test program, these portions of Contention C should be admitted."[310] We conclude that C-10's arguments in support of Contention C do pertain in part to the representativeness of the test program. Dr. Brown's analyses that provide the support for both Contentions B and C challenge the representativeness of the test program itself because he maintains that further testing is necessary to ensure the results of the test program do in fact apply to Seabrook.[311] C-10 summarizes its arguments in support of Contention C by stating that, absent thorough petrographic analysis, NextEra lacks the necessary technical justification to assure the NRC

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[308] Id. at 7.

[309] Id. (citing American Concrete Institute, ACI 349.3R, Evaluation of Existing Nuclear Safety-Related Concrete Structures (2002), https://global.ihs.com/doc_detail.cfm?rid=IHS&gid=VKLUABAAAAAAAAAA and American Society for Testing & Materials, ASTM C856-11, Standard Practice for Petrographic Examination of Hardened Concrete (2011), https://compass.astm.org/Standards/HISTORICAL/C856-11.htm [hereinafter ASTM C856-11]). ACI 349.3R has been superseded by ACI 349.3R-02. American Concrete Institute, ACI 349.3R-02, Evaluation of Existing Nuclear Safety-Related Concrete Structures (2010), http://civilwares.free.fr/ACI/MCP04/3493r_02.PDF. ASTM C856-11 has been superseded by ASTM C856-17. Standard Practice for Petrographic Examination of Hardened Concrete (2017), https://compass.astm.org/EDIT/html_annot.cgi?C856+17.

[310] Staff's Ans. to Petition at 35.

[311] See supra Part IV.A.2.b. at 52–53.

that ASR progression at Seabrook is truly understood.[312] Therefore, Contention C is material to the question of whether the test program is truly representative of Seabrook concrete and so fulfills the admissibility requirement of section 2.309(f)(1)(iv).

Contention C also satisfies the other admissibility criteria. It provides a specific statement of the issue of law or fact to be raised or controverted.[313] C-10 has also explained the basis of the contention,[314] arguing that "the seeming benefit gained by the 'confined' environment—mitigating the deleterious impact of the ASR attack on concrete—is in fact a temporary reprieve from the unpredictable and irreversible march toward structural failure,"[315] making thorough petrographic analysis essential to ensure that the progression of ASR at Seabrook is fully understood.[316] Contention C challenges the LAR,[317] and therefore is within the scope of this proceeding as defined by the Commission in its initial Federal Register notice.[318] Contention C identifies the expert opinions of Dr. Brown on which C-10 relies.[319] We understand from Contention C's express reference to pages 4–6 of the Petition (pages which include Contention B) that Contention C is intended to challenge the same parts of the LAR as

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[312] Petition at 8.

[313] 10 C.F.R. § 2.309(f)(1)(i).

[314] Id. § 2.309(f)(1)(ii).

[315] Petition at 7.

[316] Id. at 8.

[317] 10 C.F.R. § 2.309(f)(1)(iii).

[318] Id.; Applications and Amendments to Facility Operating Licenses and Combined Licenses Involving Proposed No Significant Hazards Considerations and Containing Sensitive Unclassified Non-Safeguards Information and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information, 82 Fed. Reg. 9,601, 9,604 (Feb. 7, 2017).

[319] See id. § 2.309(f)(1)(v).

Contention B.[320] This interpretation is consistent with the fact that Contention C in large part reiterates the arguments of Contention B. Contention C therefore adequately identifies the parts of the LAR in dispute.[321] The dispute is material to the Staff's findings on the LAR, for the reasons explained above.

In arguing against the admissibility of Contention C, NextEra repeats its argument in response to Contention A that it is conducting mechanical property testing of sample cores from Seabrook.[322] We have reviewed that argument in our ruling on the admissibility of Contention A, and we discuss it again in connection with Contention D, below. We conclude in both instances that the core sample testing NextEra is conducting is not the only core sample testing that C-10 contends is necessary.[323]

NextEra also implies that the code provisions C-10 cites regarding petrographic analysis, ACI 349.3R and ASTM C 856-11, may not be considered because C-10 filed a petition for rulemaking under 10 C.F.R. § 2.802 asking the NRC to issue a regulation that would require compliance with those standards.[324] NextEra does not claim, however, that the NRC has initiated or is about to initiate a rulemaking in response to the Petition, so the rule prohibiting litigation of such matters does not apply.[325]

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[320] Petition at 7.

[321] 10 C.F.R. § 2.309(f)(1)(vi).

[322] NextEra's Ans. to Petition at 36.

[323] See supra Part IV.A.2.a. at 46–47; infra Part IV.A.2.d. at 75–78.

[324] NextEra's Ans. to Petition at 37.

[325] Duke Energy Corp. (Oconee Nuclear Station, Units 1, 2, & 3), CLI-99-11, 49 NRC 328, 345 (1999).

NextEra also argues that splitting tensile strength testing, recommended by Dr. Brown, was conducted in the large-scale test program and showed little correlation to ASR.[326] NextEra further maintains that use of the model cited by Dr. Brown is unnecessary because the large-scale test program relies on actual measurements.[327] However, C-10 challenges the reliability of data derived from the test program in Contention D, discussed below, which we conclude is admissible. We will not reject Contention C on the basis of arguments that implicitly presume the validity of data derived from the test program because that is a disputed issue.

For the same reason, we will not reject Contention C based on NextEra's argument that C-10 has not shown a genuine dispute with the LAR supplement submitted to the NRC on September 30, 2016, which included MPR-4153 as an attachment.[328] Referring to MPR-4153, the LAR explains that NextEra will use "an empirical correlation developed in the large-scale test program" to correlate the concrete elastic modulus measurements it obtains from core sample testing with the through-thickness expansion to date.[329] Here also, the validity of NextEra's calculations depends on whether the test program's specimens are representative of Seabrook concrete.[330] By disputing that issue, C-10 necessarily disputes all the results of the test program.

NextEra further argues that the testing recommended by Dr. Brown would not impact structural evaluations at Seabrook that are conducted under ACI 318-71 and the ASME

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[326] NextEra's Ans. to Petition at 38.

[327] Id. at 40.

[328] NextEra's Ans. to Petition at 40–41.

[329] Evaluation of Proposed Change at 30 of 73.

[330] As discussed infra Part IV.A.2.d. at 68, 72–74, the LAR acknowledges that application of the results of the test program requires that the test specimens be representative of Seabrook's reinforced concrete.

Code.[331] We do not understand Dr. Brown to recommend additional testing for that specific purpose. Instead, he recommends that tests be performed on the test program specimens at varying locations and at the plant itself in order to provide an adequate comparison of the large-scale test program specimens to the concrete at Seabrook.[332] He contends this testing is necessary to ensure that the results of the test program do in fact apply to Seabrook.[333] This is the representativeness issue that the Staff recognizes as material to its findings and that is the subject of Contention D.

We therefore conclude that Contention C is admissible.

d. Contention D

Contention D states:

> The Large-Scale Test Program, undertaken for NextEra at the Ferguson Structural Engineering Laboratory (FSEL), has yielded data that are not "representative" of the progression of ASR at Seabrook Station, and therefore cannot be substituted for the required comprehensive petrographic analysis of in-situ concrete at the Seabrook reactor—now many years overdue.[334]

In support of this argument, C-10 repeats the argument of Contentions B and C that NextEra misunderstands the effect of confinement on the advancement of ASR, that concrete degradation due to ASR is not a linear phenomenon, and that comprehensive petrographic analysis of Seabrook concrete should be required.[335] C-10 disputes the test program specimens adequately represent the "non-linear advancement of ASR over the course of 35-40 years," given that many of the Seabrook structures affected by ASR "have been submerged at

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[331] NextEra's Ans. to Petition at 37, 39.

[332] Brown 2016 Commentary at 2.

[333] Id.

[334] Petition at 8.

[335] Id. at 8–9.

their footings by as much as six feet for all of that time; and for some of that time, the water inundating those foundations has had a relatively high salt content."[336] Furthermore, C-10 stresses "some of those concrete structures have been subjected to significant, even high levels of heat; and some of those structures have been subjected to significant, and even high levels of radiation and the resulting neutron bombardment."[337] C-10 maintains that the allegedly representative samples of Seabrook concrete used in the test program were not actually representative of Seabrook concrete because the program did not sufficiently account for those factors.[338] For example, C-10 argues that the test program failed to evaluate the contribution of radiation and heat exposure to the progressive weakening of Seabrook concrete through ASR.[339]

NextEra contends that Contention D is inadmissible. Its primary argument is that it is, in fact, conducting the core sample testing that C-10 claims is necessary—and hence that Contention D therefore fails to demonstrate a genuine dispute with the LAR.[340] The Staff, on the other hand, would admit Contention D as part of its reformulated contention. The Staff notes that Contention D both provides a specific statement of the issue of law or fact to be raised and explains the basis of the contention.[341] The Staff also agrees that C-10 has provided alleged

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[336] Id. at 10.

[337] Id.

[338] Id.

[339] Id. at 9–10.

[340] NextEra's Ans. to Petition at 49.

[341] Staff's Ans. to Petition at 28.

facts or expert opinions supporting Contention D, and that the contention shows that a genuine dispute exists with the LAR.[342]

The Staff contends, however, that Contention D is not independently admissible because "it does not explain why its representativeness argument is within the scope of the proceeding or material to any of the findings that the Staff must make on the LAR."[343] Nevertheless, the Staff concludes that

> [p]ortions of Contentions A, B, C, G, and H do . . . assert consequences from the alleged lack of representativeness of the test program. For instance, these contentions raise concerns with the monitoring, acceptance criteria, and inspection intervals proposed in the LAR, all of which are based in part on the LAR's finding that the test program is representative of the Seabrook concrete.[344]

The Staff therefore submits that Contention D is admissible when combined with the portions of Contentions A, B, C, G, and H that allege defects in the LAR's monitoring program, acceptance criteria, and inspection intervals.[345]

We conclude that Contention D is independently admissible. We agree with the Staff that

> Contention D provides a specific statement of the issue of law or fact to be raised or controverted (i.e., whether the test program is representative of the Seabrook concrete), [and] it provides the basis for this contention (i.e., that the test program does not sufficiently account for the Seabrook concrete with respect to [its] age; the length of time ASR has propagated; the effect of the fresh water at varying levels; the effect of the salt in the water at varying levels of height and concentration; the effects of heat; [and] the effects of radiation).[346]

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[342] Id.

[343] Id.

[344] Id.

[345] Id.

[346] Id. (internal quotations omitted).

The contention thus satisfies 10 C.F.R. § 2.309(f)(1)(i) and (ii).

We further conclude that Contention D is within the scope of the proceeding as required by section 2.309(f)(1)(iii). Contention D challenges the sufficiency of the LAR and is therefore within the scope of the proceeding.

Unlike the Staff, we conclude that Contention D, even if not combined with other contentions, is "material to the findings the NRC must make to support the action that is involved in the proceeding."[347] The Staff faults Contention D because it does not include a statement expressly connecting the lack of representativeness issue to any of the findings that the Staff must make on the LAR.[348] But we think the connection is readily apparent from what C-10 did say. C-10 quoted the LAR's acknowledgement that "[a]pplication of the results of the [large-scale] test program requires that the test specimens be representative of reinforced concrete at Seabrook Station and that expansion behavior of concrete at the plant be similar to that observed in the test specimens."[349] We also think the connection is apparent from what the Staff itself has said. The Staff recognized that "to approve the LAR, the Staff must determine that NextEra's evaluation of ASR behavior based . . . on its test program is representative of the structures at Seabrook."[350] The Staff identifies specific statements in the LAR connecting the test program (and thus the representativeness issue) to NextEra's monitoring, acceptance

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[347] 10 C.F.R. § 2.309(f)(1)(iv).

[348] See Staff's Ans. to Petition at 28.

[349] Petition at 9 (emphasis added) (quoting MPR Associates, MPR-4273, "Seabrook Station – Implications of Large-Scale Test Program Results on Reinforced Concrete Affected by Alkali-Silica Reaction," July 2016 at 6-3 (rev. 0, July, 2016) (ADAMS Accession No. ML16216A242) [hereinafter MPR-4273]). MRP-4273 is Enclosure 3 (Non-Proprietary) and Enclosure 6 (Proprietary) to the LAR, and is therefore part of the LAR.

[350] Staff's Ans. to Petition at 33.

criteria, and inspection intervals.[351] For example, the LAR attempts to justify NextEra's monitoring program based on a combined cracking index (CCI) and snap ring borehole extensometers because those methodologies were found to be accurate and reliable in the test program.[352] NextEra's ASR expansion limits that apply to the structural limit states, identified in LAR Table 4,[353] are also derived from the large-scale test program.[354] Thus, if the test program was not sufficiently representative of Seabrook concrete, as Contention D alleges, the LAR's reliance on the test program to support the monitoring program, acceptance criteria, and inspection intervals would be undermined.

Contention D is therefore material to "the agency's ultimate determination whether the applicant will adequately protect the health and safety of the public and the environment."[355] Like the Turkey Point Board, we will not reject a contention filed by a pro se petitioner because it did not use specific words to connect its allegations to the Staff's ultimate findings:

> At oral argument, FPL reiterated its argument that CASE's petition fails to tie its contentions to any NEPA requirements or specific citations to the EA, while acknowledging that, "had they said the EA is inadequate because it fails to comply with NEPA by failing to address or failing to adequately address these certain issues, that might be an admissible contention." . . . [T]he Board will not require such procedural formalism from a pro se petitioner in order to reject an otherwise valid contention.[356]

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[351] Id. at 28 n.127.

[352] Id. at 28 (quoting Evaluation of Proposed Change at 16, 30 of 73).

[353] We understand that the phrase "acceptance criteria," as used by the Staff, refers to the expansion limits in LAR Table 4.

[354] Staff's Ans. to Petition at 28 (citing Evaluation of Proposed Change at 31–32 of 73).

[355] Va. Elec. & Power Co. D/B/A Dominion Va. Power (N. Anna Power Station, Unit 3), LBP-09-27, 70 NRC 992, 1006 (2009) (citing Private Fuel Storage, L.L.C. (Indep. Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 179 (1998)).

[356] Fla. Power & Light Co. (Turkey Point, Units 3 & 4), LBP-15-13, 81 NRC 456, 472 (2015); see also Yankee Atomic Elec. Co. (Yankee Nuclear Power Station), CLI-96-1, 43 NRC 1, 5 (1996) ("[W]e decline the suggestions by the Staff and the Licensee that we dismiss the petition solely on the basis of a technical pleading defect."); Consumers Power Co. (Midland Plant, Units 1 &

We next consider whether C-10 has identified the facts and expert opinion on which it relies to support Contention D, as required by section 2.309(f)(1)(v). To support its argument that the test program yielded data that are not representative of the progression of ASR at Seabrook, C-10 relies on a research report prepared for the NRC entitled "A Review of the Effects of Radiation on Microstructure and Properties of Concretes Used in Nuclear Power Plants," (NUREG/CR-7171), which explains that:

> It was noted in Section 6.1 of this report that there may be a coupling effect between radiation and ASR that can potentially accelerate ASR activity or cause ASR to occur with aggregates that are not normally reactive. As plants age, the potential of ASR to occur in structures forming the biological shield or support for the reactor pressure vessel may increase as these structures are located in areas in which they are subjected to moderate elevated temperature in combination with radiation.[357]

The next paragraph of NUREG/CR-7171 identifies methods for detecting ASR-induced expansion of concrete. Primarily, ASR is detected through "visual examinations indicating evidence of expansion, relative movements between structural elements, and cracking."[358] However, if ASR is capable of being detected visually, it is likely in a fairly advanced state of development.[359] Thus, other methods of detecting ASR in suspect areas include the removal,

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2), CLI-74-3, 7 AEC 7, 12 (1974) ("[W]e refuse to apply our rules of procedure, as the licensee urges, in an overly formalistic manner."); Sacramento Mun. Utility Dist. (Rancho Seco Nuclear Generating Station), LBP-93-23, 38 NRC 200, 206 (1993) ("[I]t is clear that the 'raised threshold' incorporated by the Commission into its contention rule must be reasonably applied and is not to be mechanically construed. The Commission has long held that its rules of procedure are not to be applied in an 'overly formalistic' manner.").

[357] Petition at 10 (quoting Kaspar William, Yunping Xi & Dan Naus, NUREG/CR-7171, A Review of the Effects of Radiation on Microstructure and Properties of Concretes Used in Nuclear Power Plants at 88 (Nov. 2013) (ADAMS Accession No. ML13325B077) [hereinafter NUREG/CR-7171]).

[358] NUREG/CR-7171 at 89.

[359] Id.

examination, and testing of the suspected concrete.[360] Two examples of examination and testing methods include 1) "[p]etrographic examinations of thin sections of aggregate materials," and 2) "tests developed for identification of ASR reactivity products (e.g., use of sodium cobalt nitrite solution to detect potassium and uranyl acetate to detect sodium)."[361]

NextEra does not dispute these statements in NUREG/CR-7171 itself. Instead, it argues that C-10's pleadings failed to explain how NUREG/CR-7171 exposes a material deficiency in NextEra's LAR.[362] We have no difficulty discerning the connection between these provisions of NUREG/CR-7171 and C-10's claim that the test program specimens were not representative of Seabrook concrete. Contention D maintains that, for the test program results to apply to Seabrook, the test specimens must be representative of the reinforced concrete at Seabrook.[363] Contention D identifies heat and radiation, together with other factors, as contributing to the "non-linear advancement of ASR over the course of 35-40 years" in the concrete structures at Seabrook.[364] NUREG/CR-7171 supports C-10's argument by noting the "coupling effect between radiation and ASR that can potentially accelerate ASR activity."[365] Contention D further alleges that the test program specimens fail to accurately represent the characteristics of Seabrook concrete because they do not reflect the effects of heat and radiation, among other variables.[366]

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[360] Id.

[361] Id.

[362] NextEra's Ans. to Petition at 46–47.

[363] Petition at 9 (quoting MPR-4273 at 6-3).

[364] Id. at 10.

[365] NUREG/CR-7171 at 88.

[366] Petition at 11.

As far as we can determine, ASR has not yet been identified at Seabrook in the structures specifically identified in NUREG/CR-7171 (the biological shield or the support for the reactor pressure vessel). NextEra acknowledges, however, that "Seabrook's [Structures Monitoring Program] treats all structures that are subject to monitoring as if ASR is present—thus, there is no need to 'detect' what it already assumes."[367] NextEra also quotes a letter it sent to the NRC, in which it reported that "all of the concrete structures at Seabrook Station are susceptible to ASR. For this reason, NextEra's ASR Monitoring Program assumes that every structure has ASR, regardless of whether it has actually been identified and confirmed. As a result, NextEra performs visual ASR examinations of all concrete structures, as though those structures have confirmed ASR."[368]

Given that all Seabrook concrete structures are not only susceptible to ASR, but are assumed to have ASR, C-10 has raised a material issue by alleging that the large-scale test program failed to consider the potential impact of heat and radiation on ASR activity in Seabrook concrete structures. NextEra does not claim that the concrete specimens used in the test program were in fact exposed to heat and radiation, much less exposed at levels representative of those at Seabrook. NextEra does state that MPR-4273 "describes the key features of its programmatic design for representativeness."[369] However, after reviewing the cited pages of that document, we have found nothing therein that addresses the impacts of heat and radiation on Seabrook concrete.

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[367] NextEra's Ans. to Petition at 34–35.

[368] Id. at 35 n.150 (quoting Letter from D. Curtland, NextEra, to NRC Document Control Desk, Response to Request for Voluntary Response to 2.206 Petition Regarding methods for Identification of Concrete Affected by Alkali-Silica Reaction at 2 (Feb. 23, 2016) (ADAMS Accession No. ML16056A083)).

[369] Id. at 46 (citing MPR-4273 at 2-6 to 2-7).

Thus, NUREG/CR-7171 supports C-10's claim of a material deficiency in the test program. This is a disputed issue worthy of examination at an evidentiary hearing, given that the actual Seabrook concrete has been exposed to radiation for decades, even if at low levels in most places.[370] The apparent lack of radiation exposure of the large-scale test program samples explains why the Staff included that issue in its reformulated Contention D as one of the reasons why the test results may not be representative of the Seabrook concrete.[371]

Finally, like the Staff, we conclude that C-10 has shown a genuine dispute with the application, as required by 10 C.F.R. § 2.309(f)(1)(vi), by citing the LAR's claims that the test program is representative of the Seabrook concrete.[372] C-10 emphasizes that, in the words of the LAR itself, the large-scale test program was designed to be "representative" of the structural characteristics of safety-related structures at Seabrook.[373] C-10 argues, however, that "[w]hile the testing at FSEL yielded important and valuable data about the behavior of short-term ASR progression in 'confinement,' the FSEL data cannot, in any meaningful way, 'stand in' for or 'represent' the current state of in-situ concrete at the Seabrook reactor, under sustained attack from Alkali-Silica Reaction."[374] C-10 has supported this argument by pointing to the test program's apparent failure to consider the effects of heat and radiation.[375]

NextEra argues that Contention D fails to raise a genuine dispute with the LAR because it allegedly fails to address the bounding and conservative nature of the large-scale test

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[370] NUREG/CR-7171 at 88.

[371] Staff's Ans. to Petition at 27.

[372] Id. at 28.

[373] Petition at 8–9 (citing MPR-4288 at 4-1, 4-3).

[374] Id. at 11.

[375] Petition at 11.

program's results.[376] In a similar vein, NextEra also argues that C-10 "fails to address or challenge the conclusion in MPR-4288 that the [ACI 318-71 and ASME Code] equations remain valid and indicate that using the original specified concrete strength and code equations is conservative."[377] C-10 responded that "NextEra's contractor for the FSEL project established the relevance of 'representativeness' for all of us," pointing to the statement that "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."[378] As C-10 puts it, the question that must be resolved is whether the test program achieved a level of representativeness that allows NextEra and its consultant "to use data from the FSEL test program, plugged into the pertinent equations, [to] track the rate of ASR degradation at Seabrook?"[379] We agree with C-10 that, given the LAR's acknowledgement that application of the results of the large-scale test program depends on the representativeness of the test specimens, Contention D necessarily challenges all applications of the test program results.

We also note that the LAR itself acknowledges that because "the number of available test specimens and nature of the testing prohibited testing out to ASR levels where there was a clear change in limit state capacity . . . periodic monitoring of ASR at Seabrook is necessary to ensure that the conclusions of the large-scale test program remain valid and that the level of ASR does not exceed that considered under the test programs."[380] Thus, whether the test program results will continue to be conservative or bounding of Seabrook concrete depends on

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[376] NextEra's Ans. to Petition at 47 (citing Evaluation of Proposed Change at 16 of 73).

[377] Id. at 45.

[378] C-10's Reply at 4 (quoting MPR-4288 at 4-1) (emphasis in original).

[379] Id.

[380] Evaluation of Proposed Change at 16 of 73.

the results of the monitoring program, and the material dispute raised by Contention D concerning the representativeness of the test program specimens is directly relevant to determining the adequacy of NextEra's proposed monitoring program. As the Staff explains, the monitoring program, as well as the acceptance criteria and inspection intervals proposed in the LAR, "are based in part on the LAR's finding that the test program is representative of the Seabrook concrete."[381] The Staff identifies specific aspects of the monitoring program that are based on the test program, and thus are subject to the claim that the test program is not sufficiently representative of Seabrook concrete.[382] Of primary relevance to Contention D, the LAR justifies a monitoring program based on the CCI and snap ring borehole extensometers because those methodologies were found to be accurate and reliable in the test program.[383] In addition, because NextEra will use "an empirical correlation developed in the large-scale test program" to correlate the concrete elastic modulus measurements it obtains from core sample testing with the through-thickness expansion to date, the validity of NextEra's calculations depends on whether the test program is representative of Seabrook concrete.[384] Thus, the dispute concerning the representativeness of the test program specimens is material to the Staff's determination whether the monitoring program will yield data that accurately represent ASR advancement in Seabrook concrete. The Staff's reformulated contention expressly recognizes this connection between the representativeness of the large-scale test program and the adequacy of the monitoring program.[385]

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[381] Staff's Ans. to Petition at 28.

[382] Id. at 28 n.127.

[383] Id. (quoting Evaluation of Proposed Change at 16, 30 of 73).

[384] Evaluation of Proposed Change at 30 of 73.

[385] Staff's Ans. to Petition at 26.

Contention D repeats C-10's claim in Contentions A–C that NextEra must perform a comprehensive petrographic analysis of Seabrook concrete. NextEra argues that because it is conducting core sample testing, C-10's claim that NextEra "turned away from core sampling" fails to demonstrate a genuine dispute of material fact with the LAR.[386] NextEra's argument that it is conducting core sample testing substantially reiterates its arguments concerning Contention A and C, where in response to C-10's demand for "[t]horough petrographic analysis" of Seabrook concrete,[387] NextEra maintains that it is conducting mechanical property testing of sample cores from Seabrook.[388] NextEra again argues that it is in fact doing what C-10 wants, referring to its more detailed arguments on Contentions A and C.[389] Specifically, NextEra states that it is "conducting material property testing of sample cores from Seabrook to determine the through-thickness expansion to date using the methodology defined in MPR-4153."[390] NextEra further states that "[t]his testing examines the current elastic modulus of the concrete, which in turn requires compressive strength testing."[391] Because "NextEra interprets Petitioner's call for the 'full range' of testing to mean compressive strength testing and elastic modulus testing for purposes of structural analyses," it concludes that the core sample testing described in the LAR is equivalent to the core sample testing that C-10 contends is necessary.[392]

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[386] NextEra's Ans. to Petition at 43 (quoting Petition at 10).

[387] Petition at 6.

[388] NextEra's Ans. to Petition at 20, 36.

[389] Id. at 43–44.

[390] Id. (citing MPR Associates, MPR-4153, Seabrook Station, Approach for Estimating Through-Thickness Expansion from Alkali Silica Reaction at iv (rev. 1, June, 2015) (ADAMS Accession No. ML15183A020) [hereinafter MPR-4153]). MRP-4153 is Enclosure 3 (Non-Proprietary) and Enclosure 5 (Proprietary) to the Supplement to the LAR, and is therefore part of the LAR.

[391] Id. (citing MPR-4273 at 5-1).

[392] Id.

NextEra's argument depends on its interpretation of C-10's demand for comprehensive petrographic analysis as limited to compressive strength and elastic modulus testing of extracted concrete cores to determine expansion to date (i.e., to the date extensometers are installed in specific areas).[393] Contention D does quote Dr. Brown's opinion that, "[i]n concrete restrained by reinforcement, mechanical testing of extracted concrete cores to establish compressive strength and [elastic] moduli are appropriate."[394] But, critically, that is not the only core sample testing that C-10 contends is necessary. We have already reviewed NextEra's argument in our ruling on Contention A, where we explained that C-10 wants more than testing of sample cores from Seabrook to determine the through-thickness expansion to date.[395] It also wants comprehensive petrographic analysis of Seabrook because of the possibility of "very localized and intensely damaging expansion could occur in planes parallel to the planes of the walls which would not result in a significant through-wall dimensional change," which according to Dr. Brown would not be detected by the extensometers that will be installed after the core samples are removed.[396] It is certainly not apparent to us that compressive strength and elastic modulus testing of extracted concrete cores to determine expansion up to the date of installation of the extensometers would be sufficient to detect the "very localized and intensely damaging

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[393] See id.

[394] Petition at 9 (quoting Letter from Dr. David Wright, UCS, to William M. Dean, Regional Administrator, NRC Region 1 at 2 (Sept. 13, 2012) (ADAMS Accession No. ML12265A398) [hereinafter Wright Letter]). Dr. Wright relies on the opinion of Dr. Brown, whom he describes as an expert retained by UCS. Wright Letter at 1.

[395] See supra Part IV.A.2.a. at 47–48.

[396] Id.; Brown 2016 Commentary at 2–3.

expansion" that Dr. Brown contends may not be detected by the extensometers once they are installed. This is a technical issue that should be addressed after the contention is admitted.[397]

C-10 further maintains, citing the opinion of Dr. Brown, that "although NextEra's plan to utilize some non-standard tests may have merit, they are incomplete . . . . NextEra must also systematically evaluate the concrete via petrography and physical testing of cores, and evaluate the expansive capacity of ASR based on [American Society for Testing and Materials (ASTM)] standard tests as promulgated by ASTM Committee C-9 on Concrete and Aggregates."[398] C-10 confirmed at oral argument that it seeks "thorough petrographic analysis of core samples" in conformance with standards ACI 349.3R and ASTM 856-11.[399] ASTM 856-11 describes the standard practice under which a trained petrographer examines hardened concrete using a stereomicroscope.[400] Among other things, laboratory specimens of concrete may be examined under the stereomicroscope "[t]o establish whether alkali-silica reaction has taken place, what aggregate constituents were affected, what evidence of the reaction exists, and what were the effects of the reaction on the concrete."[401] The petrographic examination of concrete specimens pursuant to ASTM 856-11 appears to involve a quite different procedure from NextEra's "material property testing of sample cores from Seabrook to determine the through-thickness expansion to date using the methodology defined in MPR-4153."[402] The cited part of MPR-4153

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[397] See Ariz. Pub. Serv. Co. (Palo Verde Nuclear Generating Station, Units 1, 2, & 3), CLI-91-12, 34 NRC 149, 156 (1991).

[398] Petition at 9 (quoting Wright Letter at 2–3).

[399] Tr. at 19, 30, 35.

[400] See ASTM C856-11.

[401] Id. at 5.

[402] NextEra's Ans. to Petition at 43 (citing MPR-4153 at iv).

does not mention either ASTM 856-11 specifically or stereoscopic examination of concrete specimens in general.

Therefore, we disagree with NextEra's interpretation that the LAR provides for all of the core sample testing that C-10 claims is necessary. With respect to Contention D, C-10 has demonstrated a genuine dispute of material fact as required by section 2.309(f)(i)(vi) and has otherwise satisfied the admissibility criteria. We therefore admit Contention D.

e. Contention H

Contention H states:

> The proposed inspection intervals laid out in LAR 16-03 are too long, and too fixed, to effectively measure the ongoing effects of ASR to structures at the Seabrook Nuclear Power Plant in a timely manner.[403]

Table 5 of the LAR includes the SMP's ASR in-plane expansion acceptance criteria and monitoring frequencies.[404] Regions of structures with signs of ASR are classified based upon the total ASR in-plane expansion to date. Contention H maintains that the monitoring intervals that NextEra proposes for Tier 2 and Tier 3 areas are too long and too fixed to effectively measure the ongoing effects of ASR to structures. C-10 claims that there is no real knowledge of the speed of concrete deterioration caused by advancing ASR, i.e., "there is no determination as to whether ASR progresses at a steady rate or at an accelerating (or decelerating) rate" and therefore the SMP's monitoring intervals are not appropriately conservative.[405] For support, C-10 relies on the comments of Dr. Brown that we have previously reviewed in connection with Contention B.[406] Dr. Brown questions NextEra's ability to predict the responses of Seabrook

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[403] Petition at 15.

[404] Evaluation of Proposed Change at 32 tbl.5 of 73.

[405] Petition at 15.

[406] Id.; see supra Part IV.A.2.b. at 53.

structures to ASR without direct physical testing of concrete from those structures.[407] Because C-10 maintains that the rate of progression of ASR degradation of concrete at Seabrook has not been adequately tested or evaluated, it argues that NextEra's proposed monitoring intervals fail to provide adequate protection of public health and safety.[408]

NextEra disputes C-10's claim that there is insufficient knowledge of the speed of disintegration of concrete caused by advancing ASR. In defense of its proposed monitoring intervals in Table 5, NextEra cites MPR reports that assert that Seabrook's ASR has a "slow rate of change,"[409] and an NRC report that describes "the slow progression of the ASR expansion" at Seabrook.[410] The NRC report concluded that Seabrook's ASR degradation would have been identified at the time of construction had it not been for the slow progression of the ASR. NextEra also argues that its monitoring schedule is consistent with the guidance from the Federal Highway Administration (FHWA) cited in the LAR, which "recommends [for ASR-affected structures] inspections from six months to 5 years depending on the age of the damage to the structure and the rate of change in degradation."[411] As for C-10's charge that the inspection intervals are "too fixed," NextEra maintains that if it "determines that the rate of ASR degradation is changing, NextEra will change its monitoring intervals accordingly. In fact, such action is required by the Maintenance Rule."[412]

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[407] See Petition at 15.

[408] Id. at 16.

[409] See MPR-4288 at 1-2; MPR-4153 at 1-2.

[410] NRC Inspection Report at 3.

[411] NextEra's Ans. to Petition at 65 (citing Evaluation of the Proposed Change at 33 of 73).

[412] Id. (citing 10 C.F.R. § 50.65(a)(1)).

On the other hand, the Staff concludes that Contention H is admissible when added to Contention D.[413] In its discussion of Contention D, the Staff observed that the inspection intervals (as well as the monitoring program and the acceptance criteria) are based in part on the LAR's assertion that the test program is representative of the Seabrook concrete.[414] Thus, if the test program is not sufficiently representative of Seabrook concrete, the LAR's reliance on the test program to support the inspection intervals would be undermined. Referring to Contention H, the Staff notes C-10's argument that there is an insufficient technical rationale for NextEra's proposed inspection intervals because they are derived from the large-scale test program and not from the testing of Seabrook concrete. Thus, the Staff concludes, the "issue in dispute is the representativeness of the test program," and to that extent "C-10's challenge to the appropriateness of the LAR's inspection intervals amounts to an admissible contention when added to Contention D."[415]

We conclude that Contention H is admissible in part, as explained below. The specific factual issue that C-10 raises is the adequacy of the proposed inspection schedule in Table 5 of the LAR for monitoring ASR degradation in Seabrook Category 1 structures.[416] Given the uncertainty about the speed of ASR degradation, the timing of an abrupt concrete failure, and whether the large-scale test program accurately assesses the rate of concrete degradation at Seabrook, C-10 maintains that Table 5 should be ruled invalid until such time as adequate tests

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[413] Staff's Ans. to Petition at 38.

[414] Id. at 28 & n.127 (citing Evaluation of the Proposed Change at 31–32 of 73).

[415] Id. at 38.

[416] Petition at 15.

of Seabrook's concrete are completed and properly analyzed.[417] C-10 has thus identified both the issue in dispute and the basis of Contention H as required by section 2.309(f)(1)(i) and (ii).

Contention H is within the scope of this proceeding as defined by the Commission in its initial Federal Register notice, which provided an opportunity for a hearing on LAR 16-03 that would revise the Seabrook UFSAR to include methods for analyzing Seismic Category I structures with concrete affected by ASR.[418] Contention H challenges the monitoring intervals of Table 5 of the LAR and is therefore within the scope of the proceeding in accordance with section 2.309(f)(1)(iii). Contention H is material to the findings that the NRC must make relative to the adequacy of Table 5 in Section 3.5.1 of LAR 16-03, and thus satisfies section 2.309(f)(1)(iv). The NRC must determine that Table 5 will not be inimical to the common defense and security or to the health and safety of the public.

Consistent with section 2.309(f)(1)(v), C-10 has also identified the expert opinions on which it relies. Dr. Brown's opinions are sufficient to create a genuine material dispute as to the adequacy of inspection time intervals delineated in Table 5, as required by section 2.309(f)(1)(vi). NextEra points out that Dr. Brown does not directly address the monitoring intervals in the LAR.[419] But Dr. Brown does state that "[t]he course of ASR in restrained samples is known to initially cause pore filling, resulting in densification, which will for some period of time counteract the loss of structural capacity. . . . However, eventually cracking does occur with an abrupt loss of mechanical properties."[420] Dr. Brown questions whether NextEra

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[417] Id. at 15–16.

[418] Applications and Amendments to Facility Operating Licenses and Combined Licenses Involving Proposed No Significant Hazards Considerations and Containing Sensitive Unclassified Non-Safeguards Information and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information, 82 Fed. Reg. 9,601, 9,604 (Feb. 7, 2017).

[419] NextEra's Ans. to Petition at 66.

[420] Brown 2016 Commentary at 3.

has the ability to predict such a sudden change due to advancing ASR in the absence of actually testing the Seabrook concrete.[421] His opinion supports C-10's challenge to NextEra's proposed monitoring intervals in Table 5, which assumes a slow progression of ASR expansion at Seabrook.[422]

NextEra criticizes C-10 for failing to "acknowledge, discuss, or dispute" the FHWA guidance cited in the LAR.[423] But NextEra's criticism misses the point. Although the LAR does refer to the FHWA guidance, it does so only to support the monitoring intervals in Table 6, "Structure Deformation Monitoring Requirements."[424] In contrast, Contention H (and the technical support proffered in support of Contention H) does not challenge the monitoring intervals in Table 6—rather it challenges the monitoring intervals in Table 5, "ASR Expansion Acceptance Criteria and Condition Monitoring Frequencies."[425] Because the FHWA guidance was not cited in support of Table 5, C-10 had no reason to address it.

NextEra cites two MPR reports that refer to "low level of observed cracking and the apparent slow rate of change" of ASR expansion at Seabrook,[426] and an NRC inspection report from 2013 referring to the "slow progression of the ASR expansion" at Seabrook.[427] NextEra relies on these statements to support the assumption of a continuously slow rate of ASR

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[421] Id.

[422] NextEra's Ans. to Petition at 64.

[423] Id. at 65.

[424] Evaluation of the Proposed Change at 33 of 73.

[425] Petition at 15; Evaluation of the Proposed Change at 32 of 73.

[426] NextEra's Ans. to Petition at 64 (citing MPR-4288 at 1-2; MPR-4153 at 1-2).

[427] Id. (quoting Letter from R. Lorson, NRC, to K. Walsh, NextEra, "Seabrook Station, Unit No. 1 – Confirmatory Action Letter Follow-up Inspection – NRC Inspection Report 05000443/2012010," at 3 (Aug. 9, 2013) (ADAMS Accession No. ML13221A172)).

expansion not only in the past but through the termination of the current Seabrook license in 2030.[428] Dr. Brown clearly disputes the reasonableness of that assumption. He maintains that a slow rate of ASR progression may eventually give way to more rapid deterioration that the test program failed to address. According to Dr. Brown, when the mitigating effect of restraint is lost, rapid microcracking and accelerating concrete degradation are likely, with the potential for rapid loss of structural integrity.[429] Because the LAR's monitoring intervals assume a consistent and slow rate of ASR progression, Dr. Brown's opinion identifies a clear dispute of material fact that has significant implications for the Staff's evaluation of NextEra's monitoring intervals. At the contention admissibility stage, we do not decide which side has the better argument on the merits.[430] We need only conclude, as we do, that C-10 has demonstrated a genuine dispute of material fact sufficient to support the admission of Contention H.

We agree with NextEra, however, that C-10's claim in Contention H that the monitoring intervals are "too fixed" is inadmissible. NextEra acknowledges that it is obligated by NRC regulation to change the monitoring intervals if it determines that the rate of ASR degradation is changing.[431] Therefore, the claim that the monitoring intervals are "too fixed" is based on a misunderstanding of the governing regulation that, in any event, is not subject to challenge in this proceeding absent a waiver request showing of special circumstances, which C-10 has not provided in this instance.[432]

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[428] Id.

[429] See Brown 2016 Commentary at 2–3.

[430] Pac. Gas and Elec. Co. (Diablo Canyon Nuclear Plant, Units 1 & 2), CLI-11-11, 74 NRC 427, 443 (2011).

[431] NextEra's Ans. to Petition at 65 (citing 10 C.F.R. § 50.65(a)(1)).

[432] See 10 C.F.R. § 2.335(b).

Accordingly, Contention H is admissible but limited to the appropriate length of monitoring intervals.

3. The Reformulated Contention

Pursuant to 10 C.F.R. §§ 2.319(j) and 2.329(c)(1),[433] licensing boards have the authority to hold conferences in order to simplify and clarify the petitioner's contentions for adjudication.[434] Pursuant to this authority, boards possess the authority to reformulate contentions in order to consolidate multiple similar contentions, trim out extraneous or inadmissible portions of contentions, and clarify issues.[435] We conclude that the admissible portions of Contentions A, B, C, D, and H all pertain to the same issue—whether the large-scale test program is representative of Seabrook's concrete and the corresponding consequences if the concrete is not representative—and thus it is appropriate to consolidate the contentions in order to clarify the issue to be resolved at the evidentiary hearing.

As we noted supra, the Staff does not consider Contentions A, B, C, D, G, and H to be independently admissible, but asserts that, due to the interrelated nature of the contentions, the contentions can be consolidated into a single admissible contention.[436] Thus, the Staff proposes that we adopt the following reformulated contention that consolidates Contentions A, B, C, D, G, and H:

> The MPR/FSEL large-scale test program is not bounding of the Seabrook concrete because of the age of the Seabrook concrete,

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[433] 10 C.F.R. § 2.319(j) authorizes Boards to "[h]old conferences before or during a hearing for . . . [the] simplification of contentions," while 10 C.F.R. § 2.329(c)(1) authorizes Boards to hold a prehearing conference to consider matters including the "[s]implification, clarification, and specification of the issues."

[434] Crow Butte Res., Inc. (N. Trend Expansion Project), CLI-09-12, 69 NRC 535, 552–53 (2009).

[435] See Shaw Areva MOX Servs. (Mixed Oxide Fuel Fabrication Facility), LBP-08-11, 67 NRC 460, 482–83 (2008); see also Crow Butte, CLI-09-12, 69 NRC at 552 n.79 (2009) (adopting the MOX Services Board's reasoning for reformulating contentions).

[436] See supra Part IV. at 33.

> the length of time that ASR has propagated in the Seabrook concrete, the effect of water at varying levels of height and varying levels of salt concentration on the Seabrook concrete, the effect of heat on the Seabrook concrete, and the effect of radiation on the Seabrook concrete. As a result, the proposed monitoring, acceptance criteria, and inspection intervals are not adequate.[437]

NextEra objects to the Staff's proposal to reformulate C-10's contentions at all, claiming that the Staff's act is "unprecedented," and is inconsistent with the Staff's authority because the Staff is not authorized to introduce new contentions. The Staff, however, is authorized to propose a reformulation of a petitioner's contentions pursuant to 10 C.F.R. § 2.309(i)(1) as part of its authority to address its view of the admissibility of the petitioner's proffered contentions.[438] Given that licensing boards may reformulate contentions, parties may ask the Board to do so. Furthermore, the Staff's perspective on whether the Board should reformulate a petitioner's proffered contentions is especially valuable, given that the Staff provides an "independent regulatory perspective for the record," and its perspective is that of "public servants, serving the public interest."[439] Thus, the Staff acted within the scope of its authority in proposing the reformulated contention to the Board.

Unlike the Staff, we have concluded that Contentions A, B, C, D, and H are at least partially independently admissible.[440] Nonetheless, we agree with the Staff that it is appropriate to consolidate the admissible contentions into a single reformulated contention. As the Staff asserts, the key issue is Contention D's challenge to the representativeness of the large-scale test program, and Contentions A, B, C, and H's alleged consequences from its alleged lack of

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[437] Staff's Ans. to Petition at 26.

[438] See 10 C.F.R. § 2.309(i)(1).

[439] Commission Voting Record, Final Rule—10 CFR Parts 2, 12, 51, 54, and 61, "Amendments to Adjudicatory Process Rules and Related Requirements" at 7 of 39 (unnumbered) (ADAMS Accession No. ML121840015).

[440] See supra Part IV.A.2.a.–e.

representativeness.[441] This issue does not need to incorporate the alleged bases for the lack of representativeness of the test program, namely the

> age of the Seabrook concrete, the length of time that ASR has propagated in the Seabrook concrete, the effect of water at varying levels of height and varying levels of salt concentration on the Seabrook concrete, the effect of heat on the Seabrook concrete, and the effect of radiation on the Seabrook concrete.[442]

Given that, at this state of the proceedings, "we admit contentions, not bases," we conclude it is appropriate to adopt a simplified version of the Staff's proposed reformulation that focuses solely on the representativeness of the test program and the corresponding consequences.[443] Thus, we adopt the following reformulated contention:

> The large-scale test program, undertaken for NextEra at the FSEL, has yielded data that are not "representative" of the progression of ASR at Seabrook. As a result, the proposed monitoring, acceptance criteria, and inspection intervals are not adequate.

Our reformulation includes the consolidation of Contentions A, B, C, D, and H, but does not consolidate Contention G as originally proposed by the Staff. Contention G is not consolidated because 1) as we conclude infra, it is not independently admissible,[444] and 2) its connection with Contentions A, B, C, D, and H is too attenuated.[445]

B. The Reformulated Contention is Admissible Even if Not Every Component is Independently Admissible

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[441] Staff's Ans. to Petition at 28.

[442] Id. at 26.

[443] See Tenn. Valley Auth. (Watts Bar Nuclear Plant, Unit 2), LBP-09-26, 70 NRC 939, 988 (2009).

[444] See infra Part IV.C.3. at 97.

[445] As the Staff admitted at oral argument, Contention G is only "slightly related" to Contention D. Tr. at 91. The Staff further stated that the inclusion of Contention G is not necessary to admit the reformulated contention. Tr. at 92.

Even assuming arguendo that one or more of Contentions A, B, C, D, or H is not independently admissible, we conclude that our reformulation appropriately consolidates C-10's arguments into a single admissible contention.

NextEra objects to this approach of admitting the reformulated contention, arguing that if C-10's individual contentions are inadmissible, reformulating them into a single admissible contention is contrary to Commission precedent.[446] The Staff argues, however, that Contentions A, B, C, D, and H can be consolidated into a single admissible contention without supplementing the Petition, and we agree. According to the Staff, Contention D, challenging the representativeness of the large-scale test program, provides a specific issue to be controverted.[447] While the Staff believes Contention D is not admissible in and of itself for lack of explaining how the lack of representativeness is material to the findings the Staff must make, the Staff notes that Contentions A, B, C, and H do provide the consequences of a lack of representativeness of the large-scale test program.[448] Thus, according to the Staff, when Contention D is read in conjunction with Contentions A, B, C, and H, all of 10 C.F.R. § 2.309(f)(1)'s requirements are satisfied.[449]

The Staff's reading of the Petition is consistent with our own interpretation. As we discussed supra, many of C-10's contentions are interrelated. For instance, in Part IV.A.1.b., we discussed the interconnection between Contentions A, B, and H in that all three challenge facets of NextEra's approach to monitoring for ASR.[450] We further explained that Contentions B

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[446] NextEra's Reply to Staff's Ans. at 6–9.

[447] Staff's Ans. to Petition at 28.

[448] Id.

[449] See id.; see also Tr. at 85–86.

[450] See supra Part IV.A.1.b. at 56–57.

and C are closely related,[451] and that Contention D implicates the monitoring program, acceptance criteria, and inspection intervals—all of which are specifically discussed in Contentions A, B, C, and H.[452]

Notably, the Staff's and our interpretation of the Petition, which forms the basis for consolidating C-10's contentions, requires no supplementation of the Petition. It only requires that the Petition be read as a whole. Moreover, at oral argument, the Board asked C-10 to further clarify whether its contentions were interrelated by asking if its contention was that the test program data were not representative of Seabrook, and therefore anything associated with it was also not appropriate for Seabrook.[453] In response, C-10 confirmed its argument that "the testing that was done . . . [and] its applicability to Seabrook is unknown."[454] This reframing of C-10's issue with the LAR is in essence our reformulation of portions of C-10's multiple contentions all referencing the one key dispute C-10 has with the LAR—that the large-scale test program is not representative of the progression of ASR in the Seabrook concrete, and, because the large-scale test program is not representative, NextEra's other methods for detecting and testing for ASR progression, which are based on that program, are inadequate.

Because this argument was put forth, though inarticulately, by C-10, the reformulated contention does not supplement arguments that are missing from the Petition. Instead, it consolidates those portions of the contentions that pertain to or are implicated by the representativeness of the large-scale test program in order to provide clarity. Providing additional clarity is one of the principal purposes served by the adoption of reformulated

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[451] See supra Part IV.A.1.c. at 59–60.

[452] See supra Part IV.A.1.d. at 67–68.

[453] Tr. at 36.

[454] Tr. at 36.

contentions.[455] Since all of the support and arguments used to consolidate C-10's contentions into our reformulated contention are sourced from the Petition, the reformulation falls within the permissible boundaries established by the Commission.

Finally, it is worth noting that the Commission has approved substantially more significant reformulations than the reformulation in this case.[456] For example, the MOX Servs. board extensively rewrote a contention that was originally one sentence, transforming it into a three paragraph reformulated contention.[457] The board submitted the reformulated contention to the parties for review and then rewrote the contention again based on their comments.[458] Obviously, then, the final contention was quite different from that proposed by the petitioners. Far from criticizing the board, the Commission cited with approval its legal analysis of board authority to rewrite contentions.[459] The MOX Servs. board, in the text to which the Commission referred, stated that, while boards may not provide the threshold information required for contention admissibility, they have "reformulated a wide range of contentions in order either to eliminate extraneous issues or to consolidate related issues for a more efficient

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[455] See Fla. Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-15-25, 82 NRC 389, 401 (2015) ("[T]he Board did not supply its own basis for the contention but reasonably reformulated it to clarify the issue for hearing.").

[456] The Commission concluded that a board may decide a contention admissibility issue on a theory different from those argued by the litigants, provided that it explains the specific basis of its ruling and gives the litigations a chance to present argument and, where appropriate, evidence "regarding the Board's new theory." Tenn. Valley Auth. (Bellefonte Nuclear Power Plant, Units 3 & 4), CLI-09-3, 69 NRC 68, 73 n.24 (2009) (citing N. States Power Co. (Prairie Island Nuclear Generating Plant, Units 1 & 2), ALAB-455, 7 NRC 41, 55-56 (1978) (quoting Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 354 (1975))).

[457] Shaw Areva MOX Servs. (Mixed Oxide Fuel Fabrication Facility), LBP-08-11, 67 NRC 460, 481 (2008).

[458] Id. at 487.

[459] Crow Butte Res., Inc. (N. Trend Expansion Project), CLI-09-12, 69 NRC 535, 553 n.79 (2009).

proceeding."[460] The MOX Servs. board also noted that 10 C.F.R. §§ 2.319(j) and 2.329(c)(1) authorize boards to reformulate contentions.[461]

Lastly, we consider whether the reformulated contention independently satisfies 10 C.F.R. § 2.309(f)(1)'s admissibility criteria. NextEra contends that the reformulated contention is inadmissible because it "remains unsupported and ignores, rather than disputes, relevant portions of the LAR."[462] However, all of NextEra's arguments largely rehash its arguments from its Answer concerning why the individual Contentions A, B, C, D, and H are inadmissible, as we detailed supra in Part IV.A.2.a.–.e.[463] Given that we have already rejected most of NextEra's arguments concerning the admissibility of the individual contentions, and have narrowed the contentions based on NextEra's valid arguments, we need not re-evaluate the same arguments here.

Furthermore, we accept the Staff's argument that, even if Contentions A, B, C, D, and H do not form individually admissible contentions, when they are consolidated into a single contention, the reformulated contention satisfies the admissibility criteria. First, as we noted supra in Part IV.A.2.d., the question raised by whether the large-scale test program is representative of the concrete at Seabrook satisfies 10 C.F.R. § 2.309(f)(1)(i)'s requirement that the contention "[p]rovide a specific statement of the issue of law or fact to be raised or controverted."[464] Second, as required by 10 C.F.R. § 2.309(f)(1)(ii), the Petition provides a basis for this contention in that the test program does not sufficiently account for the non-linear

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[460] MOX Servs., LBP-08-11, 67 NRC at 482–83 (emphasis in original).

[461] Id. at 483.

[462] NextEra's Reply to Staff's Ans. at 13.

[463] See id. at 13–16.

[464] See supra Part IV.A.2.d. at 66.

progression of ASR in concrete subject to the effects of heat and radiation.[465] Third, as required by 10 C.F.R. § 2.309(f)(1)(iii), the issue is within the scope of the proceeding because the representativeness of the large-scale test program, and the adequacy of the proposed monitoring, acceptance criteria, and inspection intervals, all concern the sufficiency of the LAR.[466] Fourth, as required by 10 C.F.R. § 2.309(f)(1)(iv), the contention concerns an issue that is material to the findings that the NRC must make because, if the large-scale test program is not representative of the concrete at Seabrook, the NRC may not be able to determine that the proposed monitoring, acceptance criteria, and inspection intervals are adequate and will not be inimical to the health and safety of the public.[467] Fifth, as we detailed supra, each of the individual contentions is supported by adequate alleged facts or expert opinion, as required by 10 C.F.R. § 2.309(f)(1)(v).[468] Lastly, because the LAR relies on the representativeness of the large-scale test program to the Seabrook concrete in order to justify its proposed monitoring, acceptance criteria, and inspection intervals, the fact that C-10 disputed whether the test program could "in any meaningful way, 'stand in' for or 'represent' the current state of in-situ concrete at the Seabrook reactor," the contention raises a genuine dispute on a material issue of law or fact, as required by 10 C.F.R. § 2.309(f)(1)(vi).[469] Thus, we conclude that the reformulated contention satisfies the admissibility criteria.

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[465] See supra Part IV.A.2.d. at 72–73.

[466] See supra Parts IV.A.2.a. at 44, IV.A.2.b. at 54, IV.A.2.c. at 61, IV.A.2.d. at 67, IV.A.2.e. at 81.

[467] 10 C.F.R. § 50.40; see supra Parts IV.A.2.a. at 44–45, IV.A.2.b. at 55–56, IV.A.2.c. at 60–61 IV.A.2.d. at 67–68, IV.A.2.e. at 81.

[468] See supra Parts IV.A.2.a. at 42–43, IV.A.2.b. at 54, IV.A.2.c. at 61–62, IV.A.2.d. at 69–70, IV.A.2.e. at 81–82.

[469] See supra Part IV.A.2.d. at 73.

C. Contentions E, F, G, I, and J are Not Admissible

1. Contention E

Contention E states:

> NextEra's insistence that data from the FSEL testing is proprietary is not good science. The redaction of findings for any aspect of Seabrook's ASR testing creates an air of secrecy that prevents review, and undermines any trust within the nearby communities that the problem is being handled with the public's best interests at heart. NextEra's cloaking of data behind a proprietary curtain harms the interests of the community around Seabrook as well as the nuclear community. C-10 anticipates that the proceedings initiated by our filing will result in this data seeing the light of day for the benefit of many.[470]

Contention E challenges NextEra's use of proprietary information drawn from the large-scale test program in the LAR, arguing that the use of such information is "not good science," "creates an air of secrecy that prevents review," and "undermines . . . trust within the nearby communities."[471] The Staff and NextEra both respond that this contention lacks materiality, impermissibly challenges NRC regulation, and is outside the scope of this license amendment proceeding.[472] The Board agrees with the Staff and NextEra.

10 C.F.R. § 2.390 allows applicants to withhold from public disclosure "[t]rade secrets and commercial or financial information obtained from a person and privileged or confidential."[473] As was noted previously, under 10 C.F.R. § 2.335, a petitioner cannot challenge any rule or regulation in an adjudicatory proceeding such as this one unless the petitioner also requests a waiver of the regulation for the proceeding. No such waiver was requested here. C-10 does not challenge whether the proprietary designation of this particular

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[470] Petition at 11.

[471] Id.

[472] Staff's Ans. to Petition at 39–40; NextEra's Ans. to Petition at 50.

[473] 10 C.F.R. § 2.390(a)(4).

information was correct, but rather challenges whether proprietary information may be used at all. As such, C-10's challenge to NextEra's use of proprietary information is an impermissible challenge to a Commission regulation and thus falls outside the scope of this proceeding.

Even reading the Petition to assume that Contention E challenges the NRC's decision to grant proprietary designation to this particular information, the use of this specific proprietary information in the LAR is not material to the findings the Staff must make regarding the LAR, as required under 10 C.F.R. § 2.309(f)(1)(iv). The designation of information as proprietary is not part of the LAR itself, but happens separately. Additionally, the Staff has access to all of this information regardless of whether it is withheld from public disclosure, so the designation of the information as proprietary will not affect the Staff's findings.

For the above reasons, Contention E is not admitted. We note that if the parties seek, and the Board enters, an appropriate protective order, C-10 will be granted access to proprietary information related to its admitted challenges to the LAR.[474]

2. Contention F

Contention F States:

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[474] Id. § 2.390(b)(6). We note that C-10 has already attempted to gain access to this information by petitioning the NRC pursuant to 10 C.F.R. § 2.206. However, the NRC denied the request. See Letter from Douglas A. Broaddus, Chief of Special Projects and Process Branch, Division of Operating Reactor Licensing, to Patricia Lang Skibbee & Natalie Hildt Treat of C-10, Response to Request Pursuant to 2.206, "Request for action under this subpart" (Sep. 11, 2017) (ADAMS Accession No. ML17248A295). In explaining its reasoning for the denial, the NRC stated that

> there is an ongoing proceeding before the ASLB in which C-10 has intervened and raised an identical concern. . . . [T]o the extent the ASLB issues a ruling granting a hearing in the Seabrook LAR proceeding—the ASLB will govern the parties' access to information, including information currently withheld as proprietary. In sum, because another ongoing proceeding is already addressing your concern, the NRC staff is declining your request for action under 10 CFR 2.206.

Id. at 2.

> Assumptions made by NextEra and MPR concerning the continued robustness of reinforcing steel at the Seabrook reactor are unsupported by direct evidence. The long-term inundation, from brackish water, of foundation walls in safety-related areas of the complex, has exposed the concrete to elevated levels of salt. When combined with the chemical processes of ASR propagation through the concrete, this has likely created the conditions for corrosion of reinforcing steel to set in. Only in-situ monitoring for evidence of these impacts can ensure corrosion does not further degrade the strength of already impaired concrete.[475]

In Contention F, C-10 argues that "[a]ssumptions made by NextEra and MPR Associates concerning the continued robustness of reinforcing steel[, or rebar,] at the Seabrook reactor are unsupported by direct evidence."[476] C-10 goes on to state that exposure to brackish water in combination with ASR propagation "has likely created the conditions for corrosion of reinforcing steel to set in" and that "in-situ monitoring" is the only method that can "ensure corrosion does not further degrade the strength of already impaired concrete."[477] The Staff and NextEra both argue that Contention F is outside the scope of the proceeding because monitoring rebar for corrosion is already a part of the SMP in Seabrook's current licensing basis, which is not being updated in the LAR.[478] Both parties also argue that C-10 provides only speculation without evidentiary support,[479] with NextEra going further to provide its own evidence that "several . . . inspections and analyses have confirmed" the plant's rebar integrity.[480]

As stated previously, the scope of a license amendment proceeding is limited to issues identified in the hearing notice, the LAR, and the Staff's environmental responsibilities relating to

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[475] Petition at 12.

[476] Id.

[477] Id.

[478] Staff's Ans. to Petition at 43; NextEra's Ans. to Petition at 54.

[479] Staff's Ans. to Petition at 42; NextEra's Ans. to Petition at 54–55.

[480] NextEra's Ans. to Petition at 55–56.

the application.[481] The plant's rebar is already subject to a monitoring program that is not being altered in this LAR. Therefore, Contention F is outside the scope of this license amendment proceeding under 10 C.F.R. § 2.309(f)(1)(iii) and is not admitted.

3. Contention G

Contention G states:

> Omitted from the LAR 16-03 is the "tipping point" concept. While there is acknowledgment of the progressive nature of ASR, there has been no testing nor proposed future testing of either manufactured concrete samples as in the FSEL . . . tests nor of actual concrete from Seabrook Station itself to the point of failure/limit state.[482]

In support of this contention, C-10 argues that the LAR should set out a methodology to test materials up to and beyond their point of failure in order to have a full understanding of the effects of ASR.[483] "Progressive ASR," C-10 states, "will continue to weaken structures gradually over time. Then, one day, there may well be a profound failure because, even if the speed of progression of ASR damage did not change, that 'tipping point' of structural failure is reached."[484] C-10 protests the inclusion of "percentages of ASR damages at which failure occurs" in certain sections of the LAR because the LAR "states that no testing was done to the point of limit state/failure."[485]

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[481] Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), LBP-91-39, 34 NRC 273, 282 (1991).

[482] Petition at 13.

[483] Id. at 15.

[484] Id. at 13–14.

[485] Id. at 14.

In its response, NextEra maintains that although samples were not tested to the point of failure, the test samples were representative of actual current ASR progression at Seabrook.[486] That representative testing was then used to develop conservative acceptance criteria, which necessitates periodic monitoring of ASR at Seabrook "to ensure that the conclusions of the large-scale test program remain valid."[487] As a result, NextEra asserts that its proposed monitoring criteria would show that a reinforced concrete structure had exceeded the acceptance criteria and so necessitated action before that structure ever reached the "tipping point."[488] As such, NextEra argues that Contention G does not show a genuine dispute with the LAR and is not material to the findings the NRC must make on the LAR.[489] The Staff similarly states that "[s]ince the LAR is structured such that the limits on the Seabrook concrete are more conservative than the 'tipping point' of the concrete, whether NextEra should be required to affirmatively determine this 'tipping point' is not material to the findings the NRC must make on the LAR."[490]

We view Contention G as C-10's attempt to require the use of a specific methodology for determining acceptance criteria. NextEra has chosen to set the acceptance criteria for structures affected by ASR below the limits set by the test program. That is, even though the test program did not test out to the point of failure, the current ASR levels at Seabrook and the LAR acceptance criteria are bounded by the test program, such that the tipping point would not be reached before the acceptance criteria are exceeded. As such, we agree that a requirement to test to the tipping point is not material to the findings the Staff must make about the LAR

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[486] NextEra's Ans. to Petition at 61–62.

[487] Id. at 61 (quoting Evaluation of Proposed Change at 16 of 73).

[488] NextEra's Ans. to Petition at 60.

[489] Id. at 63.

[490] Staff's Ans. to Petition at 37.

under 10 C.F.R. § 2.309(f)(1)(iv). Further, Contention G does not raise a genuine dispute with the LAR on a material issue of law or fact under section 2.309(f)(1)(vi). Accordingly, Contention G is not admitted.

The Board notes that the Staff included a portion of Contention G in its reformulated contention, "to the extent that C-10 argues that the test program is not representative of the Seabrook concrete, the limits in the LAR may also not be conservative with respect to the Seabrook concrete's 'tipping point.'"[491] However, because we view Contention G as requiring a specific methodology not based on C-10's argument about the lack of representativeness of the test samples, we do not agree that Contention G has an appropriate nexus to be included in the reformulated contention. Further, we do not believe that any part of Contention G falls within the scope of the reformulated contention.

4. Contention I

Contention I states:

> Completely omitted from LAR 16-03 is the vital factor of expected sea level rise on the progression of ASR at the portions of the plant exposed to possible sea water encroachment/ inundation.[492]

C-10 argues that "Seabrook Station is in a seaside location in a part of the world where sea levels are rising faster than in most other areas . . . . This factor needs to be taken into consideration in assessing the future impact of the potential damage to the plant due to ASR exacerbation."[493] C-10 provides no expert support or references to specific sources or documents backing its assertions that to do otherwise would be "short-sighted and

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[491] Id.

[492] Petition at 16.

[493] Id.

irresponsible," and C-10 states that the reason it does not cite any relevant section of the LAR is because "the issue of sea level rise is not addressed within the LAR."[494]

The Staff argues that Contention I does not satisfy the 10 C.F.R. § 2.309(f)(1)(v) requirement to provide alleged facts or expert opinions and citations to specific sources or documents on which C-10 intends to rely for support.[495] Further, the Staff argues that Contention I is outside the scope of this proceeding under section 2.309(f)(1)(iii) and not material to the findings that must be made by the NRC required by section 2.309(f)(1)(iv).[496] NextEra also argues that Contention I is not material, outside the scope of this proceeding, and unsupported.[497]

We agree with the Staff and NextEra that Contention I fails to meet the requirement of section 2.309(f)(1)(v) to provide support for its allegations, as well as being not material and outside the scope of this LAR proceeding. As such, Contention I is not admitted.

5. Contention J

Contention J states:

> The language used in LAR 16-03 is inappropriate for a document written for the purpose of demonstrating objectivity in the testing—and the conclusions of that testing—by MPR / FSEL, on its manufactured concrete specimens.[498]

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[494] Id.

[495] Staff's Ans. to Petition at 45.

[496] Id.

[497] NextEra's Ans. to Petition at 68–69.

[498] Petition at 16.

In this challenge to the tone of the LAR, C-10 provides no citation to expert support and argues that the LAR "seems to pre-suppose test outcomes in favor of NextEra's continued operation of the plant."[499]

The Staff responds by stating that

> [t]he particular language used to convey the information in a license amendment request is not material to the findings that the NRC must make. . . . Regardless of how the information . . . is presented, the NRC makes these determinations based on the information provided and not on the manner by which that information is provided.[500]

NextEra argues that Contention J is not material to the findings the NRC must make on the LAR, and that C-10's objection would not render the LAR "legally or technically deficient" because C-10 does not cite any legal requirement that the LAR's language fails to satisfy.[501]

We agree with the Staff that the challenge to the language of the LAR presented in Contention J is not material to the Staff's findings, as required by 10 C.F.R. § 2.309(f)(1)(iv); and with NextEra that Contention J neither cites any legal standard, as required by section 2.309(f)(1)(i), nor provides any support, as required by section 2.309(f)(1)(v). Contention J is therefore not admitted.

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[499] Id.

[500] Staff's Ans. to Petition at 47.

[501] NextEra's Ans. to Petition at 70.

V. Conclusion

The Board finds that C-10 has established its standing to intervene in this proceeding and admits Contentions A, B, C, D, and H, as reformulated into a single contention. Contentions E, F, G, I, and J are not admissible. C-10 is admitted as a party to this proceeding and its Request for a Hearing and Petition to Intervene is granted. The Staff's Motion to Strike is denied.

This Order is subject to appeal to the Commission to the extent permitted by 10 C.F.R. § 2.311. Any petitions for review meeting applicable requirements set forth in that section must be filed within 25 days of service of this Memorandum and Order.

It is so ORDERED.

THE ATOMIC SAFETY
AND LICENSING BOARD

/RA/

Ronald M. Spritzer, Chairman
ADMINISTRATIVE JUDGE

/RA/

Nicholas G. Trikouros
ADMINISTRATIVE JUDGE

/RA/

Dr. Sekazi K. Mtingwa
ADMINISTRATIVE JUDGE

Rockville, Maryland
Oct. 6, 2017

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
NEXTERA ENERGY SEABROOK, LLC	)	Docket No. 50-443-LA-2
(Seabrook Station, Unit 1)	)	
	)	
(License Amendment)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **MEMORANDUM AND ORDER (Ruling on Standing and Admission of Contentions) (LBP-17-07)** have been served upon the following persons by Electronic Information Exchange.

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[Original signed by Herald M. Speiser]
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