

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

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In the Matter of: )

NEXTERA ENERGY SEABROOK, LLC )

(Seabrook Station Unit 1) )

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Docket No. 50-443-LA-2

December 13, 2019

**NEXTERA ENERGY SEABROOK LLC'S  
RESPONSIVE PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW**

Pursuant to 10 C.F.R. § 2.1209, and the Atomic Safety and Licensing Board's ("Board") December 2, 2019 Order,<sup>1</sup> NextEra Energy Seabrook, LLC ("NextEra") submits its Responsive Proposed Findings of Fact and Conclusions of Law ("Responsive Proposed Findings") regarding C-10 Research and Education Foundation, Inc.'s ("C-10") Contention, as admitted by the Board in LBP-17-7, in response to C-10's Proposed Findings of Fact and Conclusions of Law filed on November 21, 2019.<sup>2</sup> NextEra's Responsive Proposed Findings provide citations to the evidentiary record in this proceeding and are set out in numbered paragraphs beginning in the next section. NextEra's Responsive Proposed Findings are submitted in the form of a supplement to NextEra's initial Proposed Findings (which was in the form of a proposed Initial Decision by the Board), and therefore continue using the same acronyms and short citations as previously defined.

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<sup>1</sup> Board Order (Granting Time Extension to File Motions for Leave to Submit Responsive Proposed Findings of Fact and Conclusions of Law) (Dec. 2, 2019).

<sup>2</sup> C-10 Research and Education Foundation's Proposed Findings of Fact and Conclusions of Law (Nov. 21, 2019).

## I. SUPPLEMENTAL FINDINGS

### A. Additions to “History of the Proceeding”

1. On November 21, 2019, NextEra, C-10, and the NRC Staff filed their respective Proposed Findings of Fact and Conclusions of Law (“Proposed Findings”) for the Board’s consideration.<sup>3</sup> However, C-10’s Proposed Findings failed to comply with the requirements of 10 C.F.R. §§ 2.1209 and 2.712(c). NRC’s regulations require that proposed findings of fact and conclusions of law “must be clearly and concisely set forth in numbered paragraphs.”<sup>4</sup> C-10’s Proposed Findings, however, are not set forth in numbered paragraphs. The law also requires that parties provide “exact citations to the transcript of record and exhibits in support of each proposed finding.”<sup>5</sup> Many of C-10’s Proposed Findings fail to include the required citations.<sup>6</sup> And finally, the law requires that proposed factual findings and legal conclusions be “confined” to material issues presented in the proceeding.<sup>7</sup> C-10’s Proposed Findings include inflammatory and irrelevant accusations<sup>8</sup> and various non-material issues.<sup>9</sup> Accordingly, each of these provide an independent basis for the Board to disregard or give substantially lesser weight to C-10’s Proposed Findings.

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<sup>3</sup> NextEra Energy Seabrook, LLC’s Proposed Findings of Fact and Conclusions of Law (Nov. 21, 2019) (“NextEra FOF”); NRC Staff Proposed Findings of Fact and Conclusions of Law for the Admitted Contention (Nov. 21, 2019); C-10 Research and Education Foundation’s Proposed Findings of Fact and Conclusions of Law (Nov. 21, 2019) (“C-10 FOF”).

<sup>4</sup> 10 C.F.R. § 2.712(c).

<sup>5</sup> *Id.*

<sup>6</sup> *See generally* NextEra Energy Seabrook, LLC’s Responsive Proposed Findings of Fact and Conclusions of Law (Dec. 13, 2019).

<sup>7</sup> 10 C.F.R. § 2.712(c).

<sup>8</sup> *See, e.g.*, C-10 FOF at 31 (calling Staff’s review a “rubber stamp” and accusing it of “abdicat[ing] its role as a regulator”).

<sup>9</sup> *See, e.g., id.* (discussing unrelated proceedings before the Federal Aviation Administration).

2. On November 25, 2019, the Board issued an Order granting C-10's September 30, 2019 post-hearing motion regarding the production of "mineralogy data."<sup>10</sup> The Board required NextEra to provide to C-10 by December 5, 2019, any documents not previously produced that contain "data regarding the tested mineralogical components of aggregate in Seabrook concrete."<sup>11</sup> NextEra provided the requested information to C-10 on December 5, 2019.<sup>12</sup> The Board's Order also granted leave for (1) C-10 to submit Second Supplemental Testimony on that information by December 20, 2019; (2) NextEra and the NRC Staff to file written rebuttal testimony in response thereto by January 10, 2020; and all parties to file supplemental Proposed Findings (only on that limited issue) by January 31, 2020, absent further instructions from the Board.<sup>13</sup>

3. The Board's November 25, 2019 Order also denied C-10's October 28, 2019 motion seeking leave to submit an additional exhibit (INT050) and Third Supplemental Testimony (INT049-R).<sup>14</sup> C-10's Proposed Findings, however, were framed as if the Board had granted this motion and admitted these additional exhibits. Thus, we disregard C-10's proposed findings related to these excluded exhibits.<sup>15</sup>

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<sup>10</sup> ASLB Order (Granting C-10's Motion to Compel Mineralogical Data and Request to Submit Supplemental Written Testimony concerning the data; Denying C-10's Motion to Submit Additional Exhibits) at 23 (Nov. 25, 2019) ("11/25/19 Order").

<sup>11</sup> *Id.* at 17.

<sup>12</sup> Letter from P. Bessette to D. Curran, "Mineralogical Data" (Dec. 5, 2019) (ML19339H135) (including one attachment, "Santa Ana Aggregates" (ML19339H136)).

<sup>13</sup> 11/25/19 Order at 17.

<sup>14</sup> *Id.* at 23.

<sup>15</sup> C-10 FOF at 19-21, 52-53.

4. On November 29, 2019, NextEra filed an unopposed motion, joined by C-10, seeking an extension of time to seek leave to file Responsive Proposed Findings.<sup>16</sup> The Board granted that request on December 2, 2019, establishing a deadline of December 13, 2019, for such motions.<sup>17</sup> On December 13, 2019, NextEra filed a Motion for Leave to File Responsive Proposed Findings,<sup>18</sup> which we [granted/denied] on [date].

**B. C-10's Erroneous Presentation of Law on Staff Review and Witness Qualifications**

5. The Board notes that C-10's Proposed Findings include certain misstatements of law. First, C-10 argues that because Staff's safety review is deficient (in their view), NextEra has therefore failed to satisfy its burden of proof and the LAR must be "reversed."<sup>19</sup> As legal support for this claim, C-10 cites a licensing board decision in the *PFS* proceeding.<sup>20</sup> C-10 represents that, in the *PFS* case, the licensing board "refused to issue a decision that did not have the benefit of a complete NRC Staff safety evaluation."<sup>21</sup> Citing this rationale, C-10 claims that "as a matter of law," the Board cannot find in favor of NextEra in this proceeding.<sup>22</sup>

6. As a preliminary matter, we note that the *PFS* board's decision is not binding on this Board and thus imposes no particular result "as a matter of law."<sup>23</sup> Moreover, we find that

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<sup>16</sup> Unopposed Motion for Extension of Time to Seek Leave to File Responsive Proposed Findings of Fact and Conclusions of Law (Nov. 29, 2019).

<sup>17</sup> Board Order (Granting Time Extension to File Motions for Leave to Submit Responsive Proposed Findings of Fact and Conclusions of Law) at 2 (Dec. 2, 2019).

<sup>18</sup> NextEra Energy Seabrook LLC's Motion for Leave to File Responsive Proposed Findings of Fact and Conclusions of Law (Dec. 13, 2019).

<sup>19</sup> C-10 FOF at 5 (citing *Private Fuel Storage, LLC* (Indep. Spent Fuel Storage Installation), LBP-03-4, 57 NRC 69, 140 (2003)).

<sup>20</sup> *Id.*

<sup>21</sup> *Id.* at 16.

<sup>22</sup> *Id.*

<sup>23</sup> See, e.g., *Balt. Gas & Elec. Co.* (Calvert Cliffs Nuclear Power Plant, Units 1 and 2), CLI-98-25, 48 NRC 325, 343 n.3 (1998) (citing *Fla. Power & Light Co.* (St. Lucie Nuclear Power Plant, Unit 1), ALAB-893, 27 NRC 627, 629 n.5 (1988)) ("unreviewed Board rulings do not constitute precedent or binding law at this agency");

C-10 misrepresents the relevant holding in the *PFS* case. First, the *PFS* board did not “refuse to issue a decision,” as C-10 asserts. Rather, the cited discussion pertains to the *PFS* board’s rationale for granting a motion *in limine* to exclude intervenor testimony on a topic that did not appear relevant to the proceeding, and on which the Staff had neither reviewed (in its safety evaluation) nor presented testimony.<sup>24</sup> Second, the *PFS* case “involved the *absence* of Staff review of, or a position on,” that topic.<sup>25</sup> Accordingly, the facts of the *PFS* case do not support C-10’s arguments here. In this proceeding, Staff has (1) reviewed NextEra’s LAR, (2) issued a safety evaluation, (3) taken a position, and (4) presented testimony.<sup>26</sup> Accordingly, C-10’s citation to *PFS* is unpersuasive here.

7. C-10 also points to the *TMI* case for the proposition that witnesses at an evidentiary hearing must “establish their independence.”<sup>27</sup> C-10 then cites that case for its argument that NextEra’s witnesses failed to satisfy this alleged requirement because they “acted as agents of NextEra.”<sup>28</sup> But C-10 misrepresents the holding in the *TMI* case. In fact, the Appeal Board’s ruling in that case is the *opposite* of what C-10 argues here. In *TMI*, just as C-10 does here, the intervenors challenged the “independence” of the applicant’s consultants (who testified as witnesses).<sup>29</sup> The Appeal Board ruled that this objection was “baseless,” and explicitly stated that the value of witness testimony is in no way undermined by virtue of its

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*Private Fuel Storage, LLC* (Indep. Spent Fuel Storage Installation), CLI-05-19, 62 NRC 403, 405 (declining to review LBP-03-04).

<sup>24</sup> *PFS*, LBP-03-4, 57 NRC at 136-40.

<sup>25</sup> *Id.* at 139.

<sup>26</sup> See generally Final SE (INT025 (P), INT024 (NP)); NRC Staff Statement of Position (July 24, 2019); NRC Staff Testimony (NRC001, NRC004).

<sup>27</sup> C-10 FOF at 22 (citing *Metro Edison Co.* (Three Mile Island Nuclear Station, Unit 1), ALAB-772, 19 NRC 1193 (1984)).

<sup>28</sup> *Id.* at 29.

<sup>29</sup> *TMI*, ALAB-772, 19 NRC at 1210.

coming from a consultant.<sup>30</sup> Moreover, the Appeal Board took a favorable view of the applicant’s approach—identical to NextEra’s approach here—of using a diverse panel of witnesses, consisting of *both employees and consultants*, from “a range of disciplines.”<sup>31</sup> The Appeal Board noted that “no one witness” could possibly be an expert in all relevant areas.<sup>32</sup> Ultimately, nothing in C-10’s arguments or the *TMI* case in any way undermines the independence or testimony of NextEra’s diverse panel of witnesses.

**C. C-10’s Erroneous Assertions Regarding Establishment of ASR Expansion Monitoring Limits and Monitoring Intervals**

8. In its Proposed Findings, C-10 asserts that NextEra has presented “no rationale” to explain how the SMP ASR Expansion Monitoring Limits were established.<sup>33</sup> But this assertion is directly counter to substantial evidence in the record. NextEra presented extensive evidence regarding the technical basis for its monitoring limits.<sup>34</sup> C-10 may not agree with that evidence or rationale, but it is unquestionably addressed throughout the record.

9. C-10 also claims that Seabrook’s “box” concept explicitly relies on an assumption of “slow” ASR expansion.<sup>35</sup> But the evidence establishes that this is incorrect. As noted throughout NextEra’s testimony, the “box” concept (i.e., Seabrook’s ASR Expansion Monitoring Acceptance Criteria) does not rely on *predictions* of the *rate* of ASR expansion.<sup>36</sup> Rather,

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<sup>30</sup> *Id.* at 1211 (citing *La. Power & Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1091 (1983)).

<sup>31</sup> *Id.* at 1210-11.

<sup>32</sup> *Id.* at 1211 (“In this age of specialization, it would be rare indeed to find such a Renaissance man or woman.”) (citing *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-379, 5 NRC 565, 569 (1977)).

<sup>33</sup> C-10 FOF at 36.

<sup>34</sup> MPR Testimony at A179-A187 (NER001) (discussing each limit and its corresponding technical basis) (further citing the technical basis discussions in MPR-4273 (INT019-R (NP), INT021 (P))). This issue was also the subject of extensive hearing testimony.

<sup>35</sup> C-10 FOF at 36.

<sup>36</sup> MPR Testimony at A220 (NER001).

NextEra's LAR uses a classic aging management approach that monitors progression against pre-established expansion *limits* regardless of the *rate* of ASR expansion.<sup>37</sup> And to the extent the rate of ASR expansion is material to NextEra's *inspection intervals*, the evidence demonstrates that NextEra is actively monitoring and trending the real-time rate of ASR expansion in Seabrook structures, and is obligated to evaluate such information to confirm those intervals remain appropriate.<sup>38</sup> Thus, contrary to C-10's claim, the evidence shows that NextEra's ASR Expansion Monitoring Acceptance Criteria are not contingent on a "slow" rate of ASR expansion.

**D. C-10's Erroneous Statements Regarding the Modulus Correlation and Corroboration Study**

10. C-10 claims that NextEra's "corroboration study" entails "a substantial margin of error . . . that has not been acknowledged by NextEra."<sup>39</sup> As a preliminary matter, Dr. Saouma's supplemental rebuttal testimony conflated the Modulus Correlation and the Corroboration Study, which are two different concepts.<sup>40</sup> NextEra's testimony called attention to Dr. Saouma's misunderstanding and expressly identified the differences between these two concepts.<sup>41</sup> Nevertheless, C-10's Proposed Findings continue to confuse the two concepts.<sup>42</sup> As the record evidence shows, the Modulus Correlation is used to estimate the through-thickness expansion at

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<sup>37</sup> *Id.* at A220, A229.

<sup>38</sup> *Id.* at A193 (NER001) (discussing the license amendment requiring a Periodic Expansion Assessment); Tr. at 1135-37 (discussing the NUREG-0737 Operating Experience program and specific docketed commitments made to the NRC).

<sup>39</sup> C-10 FOF at 38.

<sup>40</sup> *See, e.g.*, NextEra Testimony in Response to INT030 at A5 (NER076) ("Dr. Saouma appears to confuse the modulus correlation with the corroboration study").

<sup>41</sup> *Id.* at A6-A7.

<sup>42</sup> *See, e.g.*, C-10 FOF at 38.

Seabrook before an extensometer is installed,<sup>43</sup> whereas the Corroboration Study is an approach for obtaining in-plant data to evaluate how expansion at the plant aligns with observed expansion of the LSTP specimens.<sup>44</sup> Because C-10’s challenge pertains to NextEra’s method of estimating pre-extensometer through-thickness expansion, we interpret it as a challenge to the Modulus Correlation, not the Corroboration Study. Notwithstanding, the evidence clearly establishes that uncertainty in the Modulus Correlation was in fact “acknowledged”—and explicitly addressed—by NextEra. This topic was openly considered and evaluated in MPR-4153, which contains an entire section titled “Uncertainty Considerations.”<sup>45</sup> Thus, we find no merit in C-10’s assertion to the contrary.<sup>46</sup>

**E. C-10’s Erroneous Assertions Regarding Potential Modifications to the SMP ASR Expansion Monitoring Acceptance Criteria or the Modulus Correlation Reduction Factor**

11. C-10 asserts that NextEra could unilaterally change the acceptance criteria in the SMP ASR Expansion Monitoring Program, or change the Modulus Correlation Reduction Factor, without any “public accountability.”<sup>47</sup> First, C-10’s position appears to stem from its mistaken belief that the acceptance criteria are “not referenced in the LAR itself.”<sup>48</sup> In fact, those limits are explicitly presented in the LAR.<sup>49</sup> Second, C-10’s claims disregard the law applicable to such changes. As explained in NextEra’s testimony,

Title 10 of the Code of Federal Regulations (“10 C.F.R.”) section 50.59(c)(2)(viii) requires a licensee to obtain a license amendment

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<sup>43</sup> NextEra Testimony in Response to INT030 at A6 (NER076).

<sup>44</sup> *Id.* at A7.

<sup>45</sup> MPR-4153 § 4.2 (INT018-R (NP), INT020 (P)).

<sup>46</sup> Furthermore, as noted elsewhere in our decision, we find that NextEra’s approach to addressing uncertainty is fully adequate to provide reasonable assurance. *See* [NextEra FOF § IV.E.(1)b].

<sup>47</sup> C-10 FOF at 39.

<sup>48</sup> *Id.*

<sup>49</sup> *See, e.g.*, LAR Evaluation § 3.5.1, tbl.4 (NRC089 (P), INT010 (NP)).



pursuant to 10 C.F.R. § 50.90, “Application for amendment of license, construction permit, or early site permit,” prior to implementing a proposed change if the change would “[r]esult in a departure from a method of evaluation described in the [Final Safety Analysis Report or ] FSAR (as updated) used in establishing the design bases or in the safety analyses.”<sup>50</sup>

Thus, any changes to the methodology in the LAR that would trigger this requirement *would*, in fact, require NextEra to seek NRC approval via license amendment. And as discussed at the evidentiary hearing, “the NRC has to be part of this process and agree with the methodology . . . it’s not done in a vacuum.”<sup>51</sup> Even C-10’s witness, Dr. Saouma, stated that he was “certain” NextEra would fully comply with the requirements of 10 C.F.R. § 50.59.<sup>52</sup> Thus, contrary to C-10’s claims, we find that NextEra is fully accountable and will be subject to appropriate regulatory oversight for any potential future modifications to the expansion monitoring limits in the SMP ASR Expansion Monitoring Program or the Modulus Correlation Reduction Factor.

**F. C-10’s Conflated Discussion of the Purpose of Using a “Reference Location”**

12. C-10 notes that, in developing the LSTP, NextEra used the structural details of the B Electrical Tunnel at Seabrook as a “reference location.”<sup>53</sup> C-10 claims that NextEra’s basis for selecting the B Electrical Tunnel as the reference location is that it was the “worst” ASR-affected area at Seabrook.<sup>54</sup> However, C-10’s claim finds no support in the record. As noted in NextEra’s testimony, “[t]he B Electrical Tunnel was used as the reference location for Seabrook because it was the location where ASR was first identified and it is representative of other

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<sup>50</sup> MPR Testimony at A55 (NER001) (citing 10 C.F.R. § 50.59(c)(2)(viii)).

<sup>51</sup> Tr. at 946-47 (Judge Trikouros speaking and Ms. Buford confirming).

<sup>52</sup> *Id.* at 947.

<sup>53</sup> C-10 FOF at 40.

<sup>54</sup> *Id.*

structures at the plant.”<sup>55</sup> In other words, contrary to C-10’s claim, NextEra’s selection of the B Electrical Tunnel as the reference location was not dependent on having the greatest ASR severity. The evidence in the record establishes that the purpose of selecting a reference location was to identify key “structural details” for purposes of fabricating test specimens.<sup>56</sup>

13. C-10 also asserts that the “stress” on a structure from hydrostatic or seismic loads is an appropriate consideration in gauging whether it has the “worst” ASR, and suggests in its Proposed Findings that the Board should take “judicial notice” regarding alleged differences in those loads between the CEB and the B Electrical Tunnel.<sup>57</sup> First, it is unclear to the Board how “stress” (i.e., *demand*) on a particular structure would be relevant to the selection of *structural details* (i.e., from a “reference location”) for the LSTP, which tested *capacity*. Nevertheless, the Board is prohibited by law from taking “official notice” of facts that the other parties have not had an opportunity to address in evidentiary filings.<sup>58</sup>

**G. C-10’s Erroneous Claim of Alleged Disregard of Internal Delamination**

14. C-10 also claims that the LSTP misidentified (as an “edge effect crack”) what C-10 claims was internal delamination in the test specimens.<sup>59</sup> C-10 claims that Dr. Saouma’s discussion of “microcracks,”<sup>60</sup> and Figures 11 and 12 in Dr. Saouma’s Rebuttal Testimony,

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<sup>55</sup> MPR Testimony at A111 (NER001).

<sup>56</sup> Tr. at 1045.

<sup>57</sup> C-10 FOF at 40.

<sup>58</sup> 10 C.F.R. § 2.337(f); *see also, e.g., Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-88-13, 27 NRC 509, 565-66 (1988) (declining to take official notice of a matter initially presented in a party’s proposed findings of fact and conclusions of law since this would deny opposing parties the opportunity under 10 C.F.R. § 2.337(a) to confront the facts noticed); *Inquiry Into Three Mile Island Unit 2 Leak Rate Data Falsification*, LBP-87-15, 25 NRC 671, 687-88 (1987) (also declining to take official notice of information first presented in proposed findings of fact and conclusions of law).

<sup>59</sup> C-10 FOF at 43.

<sup>60</sup> *Id.* at 44 (citing Tr. at 1040-41).

provide a “scientific explanation” of what occurred in the test specimen.<sup>61</sup> C-10 then claims that NextEra “was not able to respond” to this information or to Dr. Saouma’s assertion that delamination can result from the unrestrained expansion of concrete,<sup>62</sup> and that NextEra has summarily “dismissed the possibility” that cracking could result in ASR-caused delamination.<sup>63</sup> But C-10’s assertions present a mischaracterization of the evidence.

15. We find that NextEra is in full agreement with C-10 that ASR causes expansion, which leads to cracking, which can cause structural consequences.<sup>64</sup> We understand that is why NextEra selected expansion as the correlating parameter between the LSTP and Seabrook.<sup>65</sup> Moreover, Dr. Saouma’s discussion of microcracking is consistent with NextEra’s testimony, which notes that “[t]he test observations suggested that along the specimen edges, expansion is concentrated into a large crack; whereas away from the edge, expansion is distributed into finer cracks along the specimen cross-section.”<sup>66</sup> Thus, we find no disagreement between NextEra and C-10 on these fundamental principles.

16. Furthermore, we find that NextEra responded to figures 11 and 12 in Dr. Saouma’s Rebuttal Testimony.<sup>67</sup> C-10’s contrary claim selectively cites a statement from Dr. Bayrak in which he says he has no “further” response on this topic.<sup>68</sup> But C-10 omits the preceding and directly relevant question from Judge Trikouros, which acknowledges that “we

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<sup>61</sup> *Id.* at 45 (citing Saouma Rebuttal Testimony at 28-29 (INT028)).

<sup>62</sup> *Id.* at 44.

<sup>63</sup> *Id.* at 43.

<sup>64</sup> *See, e.g.*, MPR Testimony at A118 (NER001).

<sup>65</sup> *Id.*

<sup>66</sup> MPR Testimony at A132 (NER001); *see also* Prop. App’x, fig. 6 (NER003) (illustrating this phenomenon).

<sup>67</sup> *See, e.g.*, Tr. at 564-569.

<sup>68</sup> C-10 FOF at 44-45 (citing Tr. at 1140-41).

covered this the other day.”<sup>69</sup> For example, Dr. Bayrak’s earlier testimony explained that the cross-sections of the *actual* LSTP specimens (which show no delamination) unquestionably contradict Dr. Saouma’s figure 11,<sup>70</sup> which he created for purposes of illustration using unknown assumptions and non-LSTP inputs.<sup>71</sup> Furthermore, NextEra’s conclusions regarding the *actual* LSTP specimens are supported by an extensive technical basis in the evidentiary record.<sup>72</sup> Finally, we note that NextEra explicitly requires inspections of Seabrook cores and corresponding boreholes for evidence of the type of internal cracking postulated by Dr. Saouma.<sup>73</sup> Thus, C-10’s claim that NextEra has summarily dismissed the possibility that cracking could result in ASR-caused delamination is unsupported and factually incorrect.

#### **H. C-10’s Erroneous Claim of Conflicting Evidence Regarding In-plane Shear Testing**

17. C-10 alleges in its Proposed Findings that NextEra presented conflicting evidence regarding in-plane shear testing.<sup>74</sup> C-10 asserts that Dr. Bayrak testified that the LSTP included in-plane shear testing as part of the reinforcement anchorage testing program; but that MPR-3727 (which documents the interim ASR structural assessment at Seabrook)<sup>75</sup> contradicts Dr.

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<sup>69</sup> Tr. at 1141.

<sup>70</sup> *Id.* at 564-569.

<sup>71</sup> *See* Tr. at 564 (Dr. Saouma confirming that these were simply models created in finite element software).

<sup>72</sup> *See, e.g.*, MPR Testimony at A208 (NER001); MPR-4273, § 4.2.3 (INT019-R (NP), (INT021)(P)); MPR-4262 § 5.2.3 (NER022). Accord Tr. at 1138 (NRC Staff stating they were present and observed the “edge effect crack,” and NextEra’s investigation thereof, first-hand).

<sup>73</sup> SMPM, ch. 3 at 3-1.5 (NER007) (“The cores that are taken will be subjected to visual examination to confirm the absence of mid-plane cracks”); *see also* MPR Testimony at A208 (NER001); MPR-0326-062-88 Rev. 2 at 4 (NER020); Tr. at 456, 572, 705, 1097.

<sup>74</sup> C-10 FOF at 46-47.

<sup>75</sup> MPR-3727, Rev. 1, “Seabrook Station: Impact of Alkali-Silica Reaction on Concrete Structures and Attachments” (Jan. 2014) (NER018).

Bayrak’s statement because it does not, in fact, show that in-plane shear testing was conducted.<sup>76</sup>

The specific exchange cited by C-10 reads as follows:

DR. SAOUMA: . . . there is a lot of potential for that rebar, which has been anchored, to debond or lose that bond.

DR. BAYRAK: Your honor, if I may, that particular failure mode is explicitly addressed in our reinforcing bar anchorage testing programs.

As is evident from the cited exchange, Dr. Bayrak’s statement is that the potential for rebar debonding—not in-plane shear testing—is the topic addressed in the reinforcing bar anchorage testing program. NextEra’s evidence consistently shows that NextEra concluded “there was *no need* to evaluate in-plane shear as part of the LSTP.”<sup>77</sup> In-plane shear at Seabrook is resisted by concrete *and* reinforcement; and published literature provides a sufficient technical basis for concluding that “one-way shear *with* reinforcement was not a concern for Seabrook.”<sup>78</sup> Thus, we find no contradiction in NextEra’s testimony. C-10’s contrary claim simply rests on a misreading of the transcript.

**I. C-10’s Erroneous Claims Regarding Creep, Compressive Stress, Size Effect, and Leaching**

18. In its Proposed Findings, C-10 briefly presents a series of claims suggesting that the LSTP failed to account for certain technical issues—namely, creep, compressive stress, and size effect.<sup>79</sup> However, the evidence of record contradicts C-10’s claims on each point. For example, C-10 claims that the LSTP did not account for the fact that “the beneficial effect of the chemical prestressing will diminish with time due to creep.”<sup>80</sup> But as noted in the Staff’s Final

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<sup>76</sup> C-10 FOF at 46-47.

<sup>77</sup> MPR Testimony at A202 (NER001).

<sup>78</sup> *Id.* at A202 (NER001) (emphasis added); *see also* See MPR-3727 tbl.6-4 (NER018); *see also* State of the Art, tbl.4 (NER019); Deschenes § 7.2.2 (NRC075).

<sup>79</sup> C-10 FOF at 49-50.

<sup>80</sup> *Id.* at 49 (citing Tr. at 964, 829).

SE, this topic was explicitly addressed because “the approach of monitoring ASR progression via expansion *inherently* accounts for creep, because measuring expansion includes the impacts of creep and ASR-induced prestressing.”<sup>81</sup> NextEra also provided a “quantitative example” demonstrating that “the creep effect is relatively minor.”<sup>82</sup> Furthermore, creep is explicitly considered in the individual Structural Evaluations.<sup>83</sup> C-10 neither acknowledged nor challenged any of this information.

19. C-10 likewise claims that NextEra failed to account for the “increase in compressive stresses of the concrete and the tensile stresses in the reinforcement” that accompany the prestressing effect.<sup>84</sup> But NextEra’s testimony explicitly acknowledges this fundamental behavior of restrained concrete.<sup>85</sup> And the evidence shows these stresses are explicitly accounted for in the individual Structural Evaluations.<sup>86</sup> C-10 further suggests that NextEra determined that it was unnecessary for the LSTP to account for “size effect.”<sup>87</sup> But as Dr. Bayrak noted at the evidentiary hearing, “size effect” was addressed in the LSTP by invoking the use of through-thickness reinforcement when necessary.<sup>88</sup> Furthermore, the LSTP included a shear test specimen with greater depth for the *specific purpose* of evaluating “size effect,” and the results were consistent with published data for shear tests of larger width specimens.<sup>89</sup> Thus, NextEra’s methodology (which supplements ACI 318-71) inherently accounts for “size effect” in

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<sup>81</sup> Final SE at 29.

<sup>82</sup> *Id.*

<sup>83</sup> SEM Document § 3.1.1 (INT022).

<sup>84</sup> C-10 FOF at 49 (citing Tr. at 829); *id.* at 50 (citing Tr. at 628).

<sup>85</sup> SGH Testimony at A53 (NER004).

<sup>86</sup> *See* Tr. at 630; Rev. 0 CEB Evaluation at 40 (INT015).

<sup>87</sup> C-10 FOF at 49-50.

<sup>88</sup> Tr. at 624-27.

<sup>89</sup> *See* MPR-4273, Section 5.2.4 & MPR-4262, Sections 4.2.1 & Section 6.5 (NRC009 (P), NRC008 (NP)).

this context. Again, C-10's suggestion that NextEra fails to account for each of these phenomena is unsupported.

20. Finally, C-10 argues that NextEra offered a "justification for its failure to account for leaching."<sup>90</sup> By way of background, "[t]he potential concern with leaching is that exposure to water, as was done in the LSTP for accelerating ASR development, could remove [*i.e.*, leach] some of the chemical reactants that produce ASR and therefore cause non-representative cracking at the surface of the specimen."<sup>91</sup> But as noted in NextEra's testimony, "[t]he LSTP *specifically addressed this concern* in the development stage through experimental design that would have identified any differences between expansion at the surface and in the middle of the specimens."<sup>92</sup> Thus, C-10's claim that NextEra failed to account for this phenomenon is unsupported. And as discussed elsewhere in our decision,<sup>93</sup> the crack width indexing technique advocated by concrete industry guidelines, and used by NextEra, would not be compromised by a postulated lack of surface ASR expansion (due to drying, leaching, etc.) because internal ASR expansion and shrinkage will still result in surface cracking that will be monitored via NextEra's SMP.<sup>94</sup> Thus, we find no merit in C-10's arguments regarding leaching.

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<sup>90</sup> C-10 FOF at 54.

<sup>91</sup> MPR Testimony at A136 (NER001).

<sup>92</sup> *Id.* at A136 (NER001); *see id.* at A126 (explaining that expansion in the LSTP specimens was measured by both embedded rods (measuring internal in-plane expansion) and CCI (measuring surface in-plane expansion), and that those measurements tracked together, indicating leaching of alkali materials did not have a significant effect on ASR development). *See also* MPR-4273 § 4.5 (INT019-R (NP), INT021 (P)).

<sup>93</sup> *See* [NextEra FOF § IV.E.(1)a.].

<sup>94</sup> *See also* SGH Testimony at A65, A109; Tr. 495-99 (NER004).

Respectfully submitted,

Executed in Accord with 10 C.F.R. § 2.304(d)

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Dated in Washington, DC  
this 13th day of December 2019



**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

In the Matter of:	)	
NEXTERA ENERGY SEABROOK, LLC	)	Docket No. 50-443-LA-2
(Seabrook Station Unit 1)	)	December 13, 2019

**CERTIFICATE OF SERVICE**

Pursuant to 10 C.F.R. § 2.305, I certify that, on this date, the foregoing “NextEra Energy Seabrook LLC’s Responsive Proposed Findings of Fact and Conclusions of Law” was served upon the Electronic Information Exchange (the NRC’s E-Filing System), in the above-captioned proceeding.

*Signed (electronically) by Ryan K. Lighty*

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