

**ATTACHMENT 2**

To NextEra’s Answer Opposing C-10’s Motion for Leave to File a Reply and Motion for Leave to File INT053  
(Sept. 28, 2020)

**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)	)	September 28, 2020

**AFFIDAVIT OF JOHN SIMONS, CHRISTOPHER BAGLEY, AND EDWARD CARLEY  
IN SUPPORT OF NEXTERA’S ANSWER OPPOSING C-10’S MOTION FOR LEAVE  
TO FILE A REPLY AND MOTION FOR LEAVE TO FILE INT053**

We (John Simons, Christopher Bagley, and Edward Carley) do hereby state as follows:

**I. INTRODUCTION**

1. We previously provided written and oral testimony in the above-captioned proceeding.<sup>1</sup> Our backgrounds (including employment, education, and other professional qualifications) are detailed in our written testimony and attachments thereto.<sup>2</sup>
2. We have reviewed the Atomic Safety and Licensing Board’s (“Board”) Initial Decision in the above-captioned proceeding (“LBP-20-9”).<sup>3</sup> We have also reviewed the subsequent adjudicatory filings by the parties related thereto, including: C-10 Research and Education Foundation’s (“C-10”) motions for leave to seek reconsideration and for reconsideration and to reopen the evidentiary record and its attachments;<sup>4</sup> the U.S. Nuclear Regulatory

<sup>1</sup> NER001-00-BD01, Testimony of NextEra Witnesses Michael Collins, John Simons, Christopher Bagley, Oguzhan Bayrak, and Edward Carley (July 24, 2019).

<sup>2</sup> *Id.* §§ I.B. (background of John Simons), I.C. (background of Christopher Bagley), I.E. (background of Edward Carley) (July 24, 2019); NER008-00-BD01, John Simons *Curriculum Vitae* (July 24, 2019); NER009-00-BD01, Chris Bagley *Curriculum Vitae* (July 24, 2019); NER011-00-BD01, Edward Carley Resume (July 24, 2019).

<sup>3</sup> *NextEra Energy Seabrook, LLC* (Seabrook Station Unit 1), LBP-20-9, 92 NRC \_\_ (Aug. 21, 2020) (slip op.).

<sup>4</sup> C-10 Research and Education Foundation’s Motion for Leave to File Motion for Partial Reconsideration of LBP-20-09 (Aug. 31, 2020) (ML20244A320); C-10 Research and Education Foundation’s Motion for Partial Reconsideration and Motion to Re-Open the Record for Consideration of Supplemental Testimony Regarding License Conditions in LBP-20-09 (Aug. 31, 2020) (ML20244A321) (accompanied by the Declaration by Victor E. Saouma, Ph.D in Support of C-10 Research and Education Foundation’s Motion to Re-open the Record (Aug. 28, 2020) (ML20244A323), and a proposed new Exhibit INT052, Supplemental Testimony of Victor E. Saouma, Ph.D Regarding LBP-20-09 (Aug. 28, 2020) (ML20244A314) (Proprietary)).

Commission (“NRC”) Staff’s answer to those motions and its attachment;<sup>5</sup> NextEra Energy Seabrook, LLC’s (“NextEra”) answers to those motions;<sup>6</sup> and C-10’s motion for leave to file a reply and its attachments.<sup>7</sup>

3. The purpose of this affidavit is to offer factual clarifications regarding certain statements made in the documents listed in the preceding paragraph, and to present our professional opinions regarding the significance and materiality of certain of those statements from a technical perspective, in order to support NextEra’s Answer to C-10’s Motion for Leave to Reply and Motion for Leave to File INT053.

## **II. LICENSE CONDITION (c)**

4. License condition (c) in LBP-20-9 states as follows:

NextEra shall undertake the monitoring required by MPR-4273, Appendix B, Check 3, for control extensometers every six months, rather than in 2025 and every ten years thereafter.<sup>8</sup>

5. This provision requires NextEra to check extensometer measurements from locations with in-plane expansion less than 1.0 mm/m (i.e., “control” extensometers) every six months. NextEra’s monitoring methodology requires extensometers to be installed in locations with in-plane expansion of 1.0 mm/m or greater (i.e., “Tier 3” locations) and requires monitoring of those extensometers every six months.<sup>9</sup> Thus, License Condition (c) is intended to ensure the prompt detection of any observation that would challenge the extensometer installation threshold by aligning the monitoring frequencies of the Tier 3 extensometers and the control extensometers.<sup>10</sup>

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<sup>5</sup> NRC Staff’s Answer to C-10’s Motion for Partial Reconsideration and to Reopen the Record (Sept. 10, 2020) (ML20254A238) (accompanied by the Affidavit of Angela Buford, Bryce Lehman, Jacob Philip, and George Thomas in Response to C-10’s Motion for Partial Reconsideration and to Reopen the Record (Sept. 10, 2020) (ML20254A239) (“NRC Affidavit”).

<sup>6</sup> NextEra’s Answer Opposing C-10’s Motion to Re-open the Record for Consideration of Supplemental Testimony (Sept. 10, 2020) (ML20254A235); NextEra’s Answer Opposing C-10’s Motion for Leave and Motion for Partial Reconsideration of LBP 20-9 (Sept. 10, 2020) (ML20254A234).

<sup>7</sup> C-10 Research and Education Foundation’s Motion for Leave to File Reply to Oppositions to Motion for Partial Reconsideration of LBP-20-09 (Sept. 17, 2020) (ML20261H604) (accompanied by C-10 Research and Education Foundation’s Reply to Oppositions to Motion for Partial Reconsideration and Motion to Re-open the Record for consideration of Supplemental Testimony Regarding License Conditions in LBP-20-09 (Sept. 17, 2020) (ML20261H601) (Proprietary), and another proposed new Exhibit INT053, Rebuttal Supplemental Testimony of Victor E. Saouma, Ph.D Regarding License Conditions in LBP-20-09 (Sept. 17, 2020) (ML20261H600) (Proprietary)).

<sup>8</sup> *Seabrook*, LBP-20-9, 92 NRC at \_\_ (slip op. at 192).

<sup>9</sup> NRC016-00-BD01, SBK-L-18072, Letter from E. McCartney, NextEra, to NRC Document Control Desk, “Seabrook Station Revised Structures Monitoring Aging Management Program,” Encl. 1 at 3 & Encl. 2 at 18 & 20 (May 18, 2018).

<sup>10</sup> *Seabrook*, LBP-20-9, 92 NRC at \_\_ (slip op. at 96).

6. In practice, the plant’s monitoring procedure (MS0517.53, Rev. 3, “Periodic Monitoring of Concrete Expansions; Geokon Snap-Ring Borehole Extensometers”) does not distinguish between the Tier 3 extensometers and the control extensometers. Accordingly, NextEra has been monitoring all extensometers every 6 months since the first extensometer was installed at the plant, and has been evaluating those measurements against the expansion limits. In essence, the intent of License Condition (c) is already being fulfilled.<sup>11</sup>
7. In INT052, Dr. Saouma “urge[d] the ASLB to add language requiring the use of error bars” on the extensometer measurements because, in his view, “it is particularly difficult to interpret laboratory data for purposes of evaluating next steps.”<sup>12</sup> The NRC Affidavit argued that error bars were not necessary because, among other reasons, extensometers have been shown to provide accurate and reliable measurements.<sup>13</sup> In INT053, Dr. Saouma reiterated his demand for the use of “error bars,” but revised and expanded his argument.<sup>14</sup>
8. In our view, Dr. Saouma’s argument in INT052 appeared to provide a new objection pertaining to extensometer accuracy. However, his clarification in INT053 redirected his objection back, at least in part, to alleged uncertainty in the Modulus Correlation.<sup>15</sup> Dr. Saouma previously advanced arguments regarding uncertainty in the Modulus Correlation in his Rebuttal Testimony,<sup>16</sup> his Supplemental Rebuttal Testimony,<sup>17</sup> and during the hearing.<sup>18</sup> NextEra responded to these arguments in Supplemental Written Testimony<sup>19</sup> and during the hearing.<sup>20</sup> In LBP-20-9, the Board specifically addressed Dr. Saouma’s arguments pertaining to uncertainty in the Modulus Correlation and concluded that “the Board finds C-10’s arguments unpersuasive.”<sup>21</sup>
9. With respect to License Condition (c), the net result of INT052 and INT053 is largely a restatement of Dr. Saouma’s arguments regarding alleged uncertainty in the Modulus Correlation. Accordingly, in our professional judgment, this supplemental commentary

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<sup>11</sup> Our prior written and oral testimony did not explicitly address this frequency or reference MS0517.53 because C-10 did not offer any specific challenge regarding control extensometers.

<sup>12</sup> INT052 at 2.

<sup>13</sup> NRC Affidavit at 7.

<sup>14</sup> INT053 at 2-5.

<sup>15</sup> *Id.* at 3 (“my purpose in proposing the use of error bars has nothing to do with the accuracy or reliability of extensometer equipment per se, and everything to do with accounting for the inherent uncertainties in NextEra’s *methodology* for interpreting extensometer readings.”) (emphasis added); *id.* at 3-5 (discussing the modulus correlation methodology).

<sup>16</sup> INT028-00-BD01, Rebuttal Testimony of Victor E. Saouma, Ph.D Regarding Scientific Evaluation of NextEra’s Aging Management Program for Alkali-Silica Reaction at the Seabrook Nuclear Power Plant § D.9.1 (Aug. 23, 2019)

<sup>17</sup> INT030-R-00-BD01, Saouma Supplemental Rebuttal Testimony (Revised Sept. 23, 2019).

<sup>18</sup> *E.g.*, Tr. at 535-541, 554.

<sup>19</sup> NER076-00-BD01, Testimony of NextEra Witnesses John Simons, Christopher Bagley, Oguzhan Bayrak, and Edward Carley in Response to Exhibit INT030 (Sept. 22, 2019).

<sup>20</sup> *E.g.*, Tr. 541-548.

<sup>21</sup> *Seabrook*, LBP-20-9, 92 NRC at \_\_ (slip op. at 169).

does not identify any unresolved safety or technical issue that has not already been thoroughly briefed by the parties and examined by the Board during the hearing process and, therefore, is not significant or relevant to License Condition (c).<sup>22</sup>

### III. LICENSE CONDITION (d)

10. License Condition (d) in LBP-20-9 states as follows:

If stress analyses conducted pursuant to the SEM show that the stress in the rebar from ASR-induced expansion and other loads will exceed the yield strength of the rebar, NextEra must develop a monitoring program sufficient to ensure that rebar failure or yielding does not occur, or is detected if it has already occurred, in the areas at-risk of rebar failure or yielding.<sup>23</sup>

11. In INT052, Dr. Saouma urged the Board to add two additional license conditions related to rebar monitoring: (1) requiring NextEra to install “acoustic sensors” to detect rebar fracture, and (2) requiring NextEra to obtain readings from those sensors no less than every six months.<sup>24</sup> This position was based on Dr. Saouma’s opinion that License Condition (d) “leaves too much discretion to NextEra” and “the significant uncertainties surrounding the issue of rebar fracture.”<sup>25</sup> Dr. Saouma adds that this topic was discussed in his written testimony and during the hearing.<sup>26</sup> The NRC Affidavit disagreed with this demand because “as explained in the Staff’s [SE],” NextEra already has provisions for additional examination and analysis if code acceptance criteria are not met or if cracking index values exceed a specified threshold that is “conservative with respect to the yielding of rebar.”<sup>27</sup> In INT053, Dr. Saouma restated his position, arguing with the NRC’s characterization of the threshold as “conservative.”<sup>28</sup>

12. As Dr. Saouma noted, he previously discussed alternative ASR monitoring methods in his written testimony. The table of monitoring methods therein identifies acoustic emission monitoring as a “Potentially Applicable Technique for monitoring ASR-relevant parameters, but not performed with success yet at the structural level in the field.”<sup>29</sup> Additionally, Dr. Saouma’s written testimony characterizes the acoustic emission method

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<sup>22</sup> With respect to the editorial changes to License Condition (c) proposed by the NRC Staff, we believe that these also are not safety-significant issues. However, we view them as equivalent to *scrivener’s errors* that could be corrected administratively.

<sup>23</sup> *Seabrook*, LBP-20-9, 92 NRC at \_\_ (slip op. at 193).

<sup>24</sup> INT052 at 2.

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

<sup>26</sup> *Id.* (referencing INT027, which is the redacted version of INT001-R, at 35, and Tr. at 1150).

<sup>27</sup> NRC Affidavit at 8.

<sup>28</sup> INT053 at 5.

<sup>29</sup> INT001-R-00-BD01, Pre-filed Testimony of Victor E. Saouma, Ph.D Regarding Scientific Evaluation of NextEra’s Aging Management Program for ASR at the Seabrook Nuclear Power Plant § C.8. (Corrected June 20, 2019).

as having the lowest level of accuracy (i.e., “C” on a scale of “A” to “C,” with “A” being most accurate).<sup>30</sup> NextEra’s pre-filed testimony included a response to Dr. Saouma’s suggestion to use alternative monitoring methods, highlighting the investigation that NextEra had performed into such methods and the basis for not using them.<sup>31</sup> Specifically, NextEra concluded that “additional development work appears to be required to support deployment of any of these methods in a nuclear power plant.”<sup>32</sup>

13. We note that the NRC is correct—the issue of rebar yielding is already addressed at Seabrook through other monitoring and analysis techniques that are documented in the Structural Evaluation Methodology and which rely on crack indexing.<sup>33</sup> We also note that the Board found it unnecessary to consider Dr. Saouma’s recommended alternatives to crack indexing, such as acoustic emission, given the sufficiency of crack indexing as a monitoring method.<sup>34</sup>
14. In summary, with respect to License Condition (d), INT052 and INT053 restate Dr. Saouma’s arguments regarding alternative means for monitoring. Accordingly, in our professional judgment, this supplemental commentary does not identify any unresolved safety or technical issue that is significant or relevant to License Condition (d).<sup>35</sup>

#### **IV. LICENSE CONDITION (e)**

15. License Condition (e) in LBP-20-9 states:

If the ASR expansion rate in any area of a Seabrook seismic Category I structure significantly exceeds 0.2 mm/m (0.02%) through-thickness expansion per year, NextEra’s Management will perform an engineering evaluation focused on the continued suitability of the six-month monitoring interval for Tier 3 areas. If the engineering evaluation concludes that more frequent monitoring is necessary, it shall be implemented under the SMP.<sup>36</sup>

16. The Board deemed this license condition necessary because, calculating future expansion at a rate of 0.2 mm/m per year, there exists a possibility that certain structures could exceed

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<sup>30</sup> *Id.*

<sup>31</sup> NER001-00-BD01 at A222.

<sup>32</sup> *Id.*

<sup>33</sup> INT022-00-BD01, Simpson Gumpertz & Heger Document No. 170444-MD-01, Rev. 1, “Methodology for the Analysis of Seismic Category I Structures with Concrete Affected by ASR,” for Seabrook (Encl. 3 to Letter SBK-L-18074) § 3.1.1 (June 7, 2019).

<sup>34</sup> *Seabrook*, LBP-20-9, 92 NRC at \_\_ (slip op. at 145) (“we find that using CCI as a monitoring technique is sufficient when analyzed with the additional assurances provided by our license condition.”)

<sup>35</sup> With respect to the editorial changes to License Condition (d) proposed by the NRC Staff, we believe that these also are not safety-significant issues. However, we view them as equivalent to *scrivener’s errors* that could be corrected administratively.

<sup>36</sup> *Seabrook*, LBP-20-9, 92 NRC at \_\_ (slip op. at 193).

NextEra's acceptance criteria before expiration of the license.<sup>37</sup> Accordingly, the Board sought to impose a requirement to evaluate expansion rates and the need for adjusting monitoring intervals.<sup>38</sup>

17. In INT052, Dr. Saouma stated that the Board should delete the words "significantly exceeds" from this license condition (effectively recommending a prescriptive threshold of 0.2 mm/m per year) on the basis that the language in LBP-20-9 is "too vague," among other reasons.<sup>39</sup> The NRC Affidavit agreed with eliminating the words "significantly exceeds," but further recommended a prescriptive threshold of 0.24 mm/m per year.<sup>40</sup> In INT053, Dr. Saouma disagreed with the NRC Staff's recommendation.<sup>41</sup>
18. At the outset, we think it is critically important to note that—regardless of the specific wording or value in the license condition—NextEra is already fulfilling the intent of License Condition (e) by checking the remaining margin relative to the expansion limit for *every* measurement that is taken (not just those above a particular prescriptive rate) and determining whether a change in monitoring frequency is necessary. As noted in our original written testimony, NextEra reviews "each measurement that is obtained" in order to "identify any unusual ASR progression," and "[i]f the evidence suggests that the monitoring intervals . . . are insufficient, the plant *will evaluate* the need for potential changes."<sup>42</sup> We also explained that "the SMP includes specific provisions for ASR monitoring. Plant personnel trend the observed expansion levels and *would trigger* corrective action before loss of intended function of the structures occurred due to ASR."<sup>43</sup>
19. Additionally, as we discussed at the evidentiary hearing, this is not an optional feature of the monitoring program; NextEra is subject to an ongoing *regulatory obligation* to evaluate the trend data regarding actual expansion rates at Seabrook and to take action if it identifies information that would challenge the appropriateness of the intervals.<sup>44</sup> At a procedural level, Seabrook Station procedure SMP3.1, Revision 4, "ASR Monitoring Walkdowns, Data Collection, and Evaluation," requires that the margin to the limit be evaluated. It also contains the following mandate: "If one or more monitoring locations are anticipated to approach or exceed the In-Plane Expansion threshold limit prior to the next inspection, write an AR [Action Report] (type CR [Condition Report]). The AR *shall formally evaluate* the condition as well as prompt any recommended actions."
20. In our opinion, the Board likely included the "significantly exceeds" qualifier as a purposeful and common sense means of tailoring the condition to require thoughtful

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<sup>37</sup> *Id.* at \_\_ (slip op. at 134-35).

<sup>38</sup> *Id.* at \_\_ (slip op. at 134).

<sup>39</sup> INT052 at 2-4.

<sup>40</sup> NRC Affidavit at 10.

<sup>41</sup> INT053 at 6.

<sup>42</sup> NER001-00-BD-01 at A193 (emphasis added).

<sup>43</sup> *Id.* at A158 (emphasis added).

<sup>44</sup> Tr. at 1135-37 (discussing the NUREG-0737 Operating Experience program and specific docketed commitments made to the NRC).

consideration of safety significance, which is reasonable and appropriate. We suspect that this wording was selected, in part, out of recognition that the 0.2 mm/m per year is the nominal expansion rate measured for the Tier 3 extensometers, not a maximum. However, from an implementation standpoint, the 0.2 mm/m per year value will be treated as a hard criterion to ensure compliance. Accordingly, in our professional judgment, neither INT052, INT053, nor the NRC Affidavit identify any unresolved safety or technical issue that is significant to License Condition (e).

## V. LICENSE CONDITION (f)

21. License Condition (f) in LBP-20-9 states:

Each core extracted from Seabrook Unit 1 will be subjected to a petrographic analysis to detect internal microcracking and delamination.<sup>45</sup>

22. In INT052, Dr. Saouma urged the Board to add prescriptive language requiring that the mandated petrography should be capable of detecting microcracks as small as 10  $\mu\text{m}$ .<sup>46</sup> The NRC Affidavit stated that this prescriptive definition was not necessary because it “would not produce safety-significant information” and because petrographic examinations are performed in accordance with industry standards such as ASTM C856.<sup>47</sup> In INT053, Dr. Saouma agreed that his prescriptive 10  $\mu\text{m}$  definition was unnecessary and that “a reference to ASTM C856 as the governing guidance for NextEra’s petrographic analyses would be an adequate substitute.”<sup>48</sup>
23. Our pre-filed testimony specifically identified ASTM C856 as the “industry standard for performing petrographic examinations.”<sup>49</sup> We also explained that all petrographic examinations performed on concrete at Seabrook Station and in the Large Scale Test Program (“LSTP”) were conducted pursuant to this standard.<sup>50</sup>
24. In our professional judgment, the Board’s original wording in License Condition (f) is sufficient because, even without a prescriptive reference to ASTM C856, it is appropriately interpreted as requiring adherence to industry standard petrography practices. In fact, if ASTM C856 is superseded or replaced in the future, a prescriptive requirement may mandate adherence to an outdated methodology. Accordingly, in our professional judgment, neither INT052, INT053, nor the NRC Affidavit identify any unresolved safety or technical issue that is significant to License Condition (f).

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<sup>45</sup> *Seabrook*, LBP-20-9, 92 NRC at \_\_ (slip op. at 193).

<sup>46</sup> INT052 at 5.

<sup>47</sup> NRC Affidavit at 10-12.

<sup>48</sup> INT053 at 7.

<sup>49</sup> NER001-00-BD01 at A77.

<sup>50</sup> *Id.*

## VI. CONCLUSION

25. In our professional engineering judgment, neither INT052, INT053, nor the NRC Affidavit raise any safety-significant issues from a technical perspective.
26. We declare under penalty of perjury that the foregoing is true and correct to the best of our knowledge and belief.

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

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Executed this 28th day of September 2020

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