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**Coalition Public Comments re: NRC's DSGEIS on NextEra Point Beach Nuclear Power Plant Subsequent License Renewal, Docket ID NRC-2020-0234, NUREG-1437, Supplement 23, Second Renewal, Draft**

To Whom It May Concern,

On behalf of the undersigned 51 organizations and 30 individuals, please find below and attached our coalition's public comments regarding **Docket ID NRC-2020-0234**, the Draft Supplemental Generic Environmental Impact Statement (DSGEIS) for License Renewal of Nuclear Plants, **Supplement 23, Second Renewal, Regarding Subsequent License Renewal for Point Beach Nuclear Plant, Units 1 and 2, Draft Report for Comment (NUREG-1437)**, November 2021 (DSGEIS).<sup>1</sup>

**Comment 1: The NRC DEIS compounds NextEra's Environmental Report error, in failing to consider a reasonable range of alternatives to the proposed action because of a failure to analyze thermal pollution mitigation as a means of reducing aquatic biota and migratory and year-round resident bird impingement, entrainment, and damage from thermal pollution, as required by NEPA and the NRC**

The NextEra Environmental Report (ER, § 7.3) failed to comply with 10 C.F.R. §§

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<sup>1</sup>Docket ID NRC-2020-0234, the Draft Supplemental Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 23, Second Renewal, Regarding Subsequent License Renewal for Point Beach Nuclear Plant, Units 1 and 2, Draft Report for Comment (NUREG-1437), November 2021 (DSGEIS), < <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML21306A226> >

51.45(c) and 51.53(c)(3)(iii) because it failed to consider an alternative under which the unmitigated once-through cooling system of Units 1 and 2 would be replaced with a closed-cycle cooling tower system to reduce the adverse environmental effects related to the once-through cooling system, including massive impingement and entrainment of aquatic organisms and even birds, and thermal pollution whereby the water temperature of Lake Michigan is significantly elevated. NRC's Draft Supplemental Generic Environmental Impact Statement (abbreviated DSGEIS, and further abbreviated to DEIS hereafter) continues and compounds this error. The ER, and now the DEIS, fail to include an accurate or complete analysis of "alternatives available for reducing or avoiding adverse environmental effects" and because it does not contain an adequate "consideration of alternatives for reducing adverse impacts . . . for all Category 2 license renewal issues."<sup>2</sup> The ER, and now the DEIS, unlawfully fail to consider replacement of the once-through cooling system with cooling towers as a reasonable alternative that would "reduc[e] or avoid[ ] adverse environmental effects" relating to the Category 2 issues described below.<sup>3</sup> NRC regulations at 10 CFR § 51.45( c) require that the environmental report to "include an analysis that considers and balances the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects." NEPA, and NRC's implementing regulations, require the agency to correct such errors as in the NextEra ER, in the EIS, and yet NRC has failed to do so.

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<sup>2</sup>10 C.F.R. § 51.53(c)(3)(iii).

<sup>3</sup>10 C.F.R. § 51.45( c).

B. Scope

This comment is within the scope of this subsequent license renewal EIS public comment proceeding because it concerns environmental impacts. The scope of the required NEPA environmental review is established by 10 CFR Part 51 and the GEIS for license renewal cases.<sup>4</sup> This comments challenges the sufficiency of the environmental analysis in the NextEra Environmental Report within the parameters set by the GEIS, and NRC’s continuation of this violation in the DEIS. Matters of mitigation of thermal pollution, entrainment and impingement are encompassed within Appendix B to 10 CFR Part 51, Subpart A. That regulation treats the impacts of impingement and entrainment of aquatic organisms at plants with once-through cooling systems as a Category 2 site-specific issue where the effects might be deemed “SMALL, MODERATE, or LARGE. The impacts of impingement and entrainment are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems, depending on cooling system withdrawal rates and volumes and the aquatic resources at the site.” And as to thermal impacts, Appendix B to 10 CFR Part 51, Subpart A also classifies the issue as site-specific and under Category 2, concluding that thermal impacts on aquatic organisms at plants with once-through cooling systems may be “SMALL, MODERATE, or LARGE. Most of the effects associated with thermal discharges are localized and are not expected to affect overall stability of populations or resources. The magnitude of impacts, however, would depend on site-specific thermal plume characteristics and the nature of aquatic

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<sup>4</sup>*Entergy Nuclear Vermont Yankee, LLC (Vermont Yankee), LBP-06-20, 64 N.R.C. 131, 148-49 (2006).*

resources in the area.”

C. Concise Statement of Facts

The basis for this comment is that the NextEra ER considered only two alternatives: (1) the preferred alternative (renew the operating licenses for Units 1 and 2 and keep operating) and (2) the no-action alternative (to not renew the operating licenses and, instead, implement replacement power sources).<sup>5</sup> There was no consideration of the alternative of continued operations at Point Beach Nuclear Plant (PBNP) with closed-cycle cooling systems as mitigation. NRC’s DEIS has inadequately corrected these errors and violations.

The current problem is that PBNP Units 1 and 2 are “super predators” in terms of their recurring effects of killing aquatic organisms and even birds. Nuclear power plants are the most thermodynamically inefficient way of producing electricity (Carnot efficiency). As such, they discharge an enormous amount of waste heat (hot water), and they consume a massive amount of cold water.<sup>6</sup>

In addition, PBNP has undergone two thermal uprates in the past two decades to accommodate the use of high burnup fuel. Mitigation in the form of mechanical draft or passive cooling tower systems would sharply reduce the thermal pollution discharges to Lake Michigan, but as importantly, the volume of water withdrawn from the Lake would shrink by about 95% and with that decrease, far fewer animals and plants would be sacrificed for the generation of electricity.

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<sup>5</sup>ER at 7-1.

<sup>6</sup>Gundersen Declaration at ¶ 9.9.

Withdrawing surface waters through cooling water intake structures (“CWISs”) at power plants causes adverse environmental impacts by pulling large numbers of fish, larvae, eggs, and other small aquatic organisms into a facility’s cooling system. Once pulled in, they may be killed by heat, stress, or chemical exposure (entrainment). Larger fish, crustaceans, and even marine mammals may be killed or injured when they are trapped against screens at the front of an intake structure by the force of water being drawn into the system (impingement). According to the U.S. Environmental Protection Agency (“U.S. EPA”), 2.1 billion fish, crabs, and shrimp are killed by impingement and entrainment annually.<sup>7</sup>

The environment may also be affected when the cooling water is discharged. Because the temperature of the effluent is higher than that of the receiving water, it may negatively affect plant growth, ecosystem composition, and fish reproduction and migration.<sup>8</sup>

The PBNP ER provides very limited historical data on the plant’s aquatic and wildlife killing in Lake Michigan as a result of impingement and entrainment at the plant intakes. NRC’s DEIS has inadequately addresses such errors and violations.

A 7.5-month long study in 1975 suggested that 2,082,525 fish larvae were entrained at PBNP during the study period, including 20% (416,505) alewife, 61% (1,270,340) rainbow smelt, 17% (354,029) sculpin, and 2% (41,651) longnose sucker. An estimated 4,661,410

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<sup>7</sup>U.S. EPA Office of Inspector General, “EPA Oversight Addresses Thermal Variance and Cooling Water Permit Deficiencies But Needs to Address Compliance With Public Notice Requirements,” Report No. 13-P-0264 at 1 (May 23, 2013). <https://www.epa.gov/sites/production/files/2015-09/documents/20130523-13-p-0264.pdf>

<sup>8</sup>*Id.*

fertilized alewife eggs were entrained.<sup>9</sup> In a one-year impingement study conducted at PBNP in 1975-76, over 313,000 fish from 31 species were collected in impingement samples generally obtained every fourth day of plant operation.<sup>10</sup> Total estimated impingement for the year was 1,056,724 fish.<sup>11</sup> Alewives and rainbow smelt constituted over 99 percent of all fish impinged during the study.<sup>12</sup> The estimated 161,389 rainbow smelt impinged at PBNP during the 1975 to 1976 study had an equivalent weight of 973 kg (2,145 lb).<sup>13</sup>

In a 2005-2006 impingement study, 1.6 million fish and crayfish were collected, weighing approximately 6,134 kilograms.<sup>14</sup>

A 2017 entrainment study from April through September resulted in 32,477 organisms collected, representing five shellfish taxa and five ichthyoplankton taxa.<sup>15</sup>

Point Beach has also entrained or impinged waterfowl. In 1990 the intakes killed double-crested cormorants.<sup>16</sup> From 2001-2003, 33 birds were trapped, mainly gulls.<sup>17</sup>

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<sup>9</sup>NUREG-1437, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 23.” (Regarding Point Beach Nuclear Plant Units 1 and 2), ML052230490, at pp. 4-11 - 4-12.

<sup>10</sup>*Id.* at 4-15.

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

<sup>12</sup>*Id.*

<sup>13</sup>*Id.* at 4-16.

<sup>14</sup>ER (2020) at 3-129.

<sup>15</sup>*Id.* at 3-128.

<sup>16</sup>NUREG-1437 at 2-30.

<sup>17</sup>*Id.* at 4-19.

Respecting thermal pollution caused by PBNP, the plant withdraws cooling water from Lake Michigan at a peak rate of about 1,080,000,000 gallons per day for both units.<sup>18</sup> Since 2002 there have been two thermal uprates at PBNP. In 2003, PBNP underwent a 1.4 percent power uprate, which increased the rated thermal output to 1,540 MW(t) and increased the gross electrical power to 545 MW(e) (518 MW[e] net).<sup>19</sup> At that time PBNP switched to “high burnup” fuel, enriched to contain a nominal 5.0 weight percent of uranium-235.<sup>20</sup> The 2005 Supplemental Environmental Impact Statement (NUREG-1437) does not indicate that any study was conducted prior to that uprate to predict the thermal effects and lethal implications for aquatic life. The National Pollutant Discharge Elimination System (“NPDES,” in Wisconsin called the “WPDES”) at that time required monitoring and reporting of PBNP discharges to the Lake, but imposed no thermal water-quality standards for compliance.<sup>21</sup> The WPDES permit also required a study of the cooling-water intake to assess any potential adverse impacts in future permits.<sup>22</sup>

Ahead of the next uprate, as required by the WPDES permit, NextEra in 2004 had EA Engineering compile a study, “Point Beach Nuclear Plant Evaluation of the Thermal Effects Due to a Planned Extended Power Uprate,” which “modeled temperature increases for potential plant upgrades and determined that the plume predicted area, volume, and behavior will not be

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<sup>18</sup>ER p. 4-25.

<sup>19</sup>*Id.* at p. 2-4.

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

<sup>21</sup>*Id.* at 4-20.

<sup>22</sup>*Id.* at 2-19, (citing WDNR 2004a).

substantially different from previous conditions.”<sup>23</sup> The extended power uprates (“EPUs”) were estimated to result in a 2°C (3.6°F) increase in discharge temperature. Pre-uprate, the month of August, which typically showed the highest water temperatures, saw an average discharge temperature of 19.3°C (66.74°F). The maximum temperature increase over intake temperature as a result of the uprate at 1,000 feet offshore (within the security zone) was predicted to be 8.57°C (15.43°F) with an assumed along-shore current of 0.2 feet/second. This increase, when added to the average temperature at the intake for August (19.3°C (66.74°F)), resulted in an estimated average temperature of 27.9°C (82.2°F) at the approximate end of the security zone.<sup>24</sup> The average August discharge temperatures for years 2014–2018 for Units 1 or 2 (whichever was higher) were 82.2°F, 75.6°F, 84.8°F, 87.7°F, and 84.0°F, and the highest average daily discharge temperature for August 2019 was 88.8°F.<sup>25</sup>

PBNP’s present WPDES permit limits waste heat rejected to Lake Michigan to a weekly average of 8,273 MBtu per hour. The permit requires reporting of intake and discharge temperatures to allow for the calculation of the heat rejection.<sup>26</sup> In a 2012 internal memo entitled “Approval of the alternative effluent temperature limit for the Point Beach Nuclear Plant,”<sup>27</sup> the Wisconsin Department of Natural Resources noted that a 2009 study commissioned by PBNP

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<sup>23</sup>ER (2020) at 4-25, 10-4.

<sup>24</sup>ER at 3-212.

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

<sup>26</sup>*Id.*

<sup>27</sup>The August 29, 2012 memo is an attachment to PBNP’s current WPDES permit, ER at p. 639/705 of .pdf, *et seq.*



showed that “the area of water elevated more than 1°C increased by 28% to 1170 acres) extending approximately 1.8 miles downshore and a maximum of 1.5 miles offshore. The area of the 2°C contour increased 24% to 390 acres and the area of the 5°C contour increased 41% to 44 acres or roughly a circle with a diameter of 1900 feet.”<sup>28</sup> The agency determined:

After reviewing the available temperature data and the temperature preferences of the representative important species, there appears [*sic*] to be portions of the mixing zone that will not be suitable for all life stages of these species. Although the discharge plume may cause some negative impacts to the fish community of the immediate area or to the localized ecology of the area, the Department has concluded that the thermal plume created at 8,273 MBTU/hr will cause minimal impacts to the fish and invertebrate communities on the representative important species list.<sup>29</sup>

The analysis performed by NextEra in the ER is incomplete and insufficient to support the determination to not consider a closed-cycle cooling tower alternative, for several reasons. NextEra essentially considers the impact of PBNP’s thermal discharge in isolation, and does not consider the cumulative impacts of its thermal discharge together with all other significant impacts on the species affected.<sup>30</sup> “[A] determination of the thermal discharge cannot be made without considering all other effects on the environment, including the effects of the intake (*i.e.*, entrainment and entrapment). . . .” *In re Pub. Serv. Co. of N.H.* (Seabrook Station, Units I & II), 1977 EPA App. LEXIS 16, \*19-20; 1 E.A.D. 332 (Adm'r 1977). NRC’s DEIS has not adequately addressed these shortcomings.

Also, NextEra’s analysis inappropriately assumes the aquatic “community” to include all

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<sup>28</sup>*Id.* at 640 of ER.

<sup>29</sup>*Id.* at 641 of ER.

<sup>30</sup>See ER at 4-25, WI DNR analysis at ER pp. 639/705 of .pdf.

of Lake Michigan, whereas a proper analysis should focus on specific, localized site conditions. *See, e.g., Appalachian Power Co. v. Train*, 545 F.2d 1351, 1372 (4th Cir. 1976) (upholding EPA's interpretation of § 316(a)<sup>31</sup> as “providing for consideration of specific site conditions in the setting of thermal limitations for individual power plants” and that even where a discharge might satisfy state temperature standards, “such discharge might nevertheless cause serious harm to a particular spawning ground, for example, located just below the plant's discharge point.”). NRC’s DEIS has not adequately addressed these errors.

Additionally, PBNP relied largely on ancient (1975) data in conducting its analysis in the ER, and applied only a list of a few representative important species (“CRIS”) in the retrospective on the plant's 2012 thermal uprate. There is insufficient analysis of the impacts of the thermal discharge between 1975 and 2020 (an omission PBNP attempts to account for by relying on data from other power plants on Lake Michigan). Even PBNP’s spotty data from the past 45 years suggests substantial changes to the aquatic community. NRC’s DEIS has not corrected this error.

Notwithstanding these distinct scientific weaknesses in its analysis, and the changed regulatory view of the need to impose closed-cycle cooling to stop power plant carnage, NextEra concluded in the ER that “[b]ecause there are no planned operational changes during the proposed SLR operating term that would increase the temperature of PBN’s existing thermal discharge, impacts are anticipated to be SMALL and mitigation measures are not warranted.”<sup>32</sup>

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<sup>31</sup>Clean Water Act § 316 is codified as 33 U.S.C. § 1326.

<sup>32</sup>ER at 4-26.

NextEra’s trivialization of the effects of its once-through, unmitigated thermal pollution system is evident where despite the 10 CFR 51.53(c)(3)(iii) mandate that the ER “*must* contain a consideration of alternatives for reducing adverse impacts, as required by 51.45(c) for all Category 2 license renewal issues,” PBNP asserts there are “no significant adverse effects that would require consideration of additional alternatives. Therefore, NEPB [NextEra Point Beach] concludes that the impacts associated with renewal of the PBN OLs [Point Beach Nuclear operating licenses] would not require consideration of alternatives for reducing adverse impacts. . . .”<sup>33</sup> (Emphasis added). NRC’s DEIS has inadequately addressed NextEra’s ER shortcomings.

Meanwhile, the passage of time has seen retrofits being forced on older nuclear power and other plants. Palisades Nuclear Plant, an 800-MWe plant across Lake Michigan from PBNP, converted from a once-through cooling system to a closed-cycle wet cooling tower system after a significant period of operating utilizing the once-through system.<sup>34</sup> At least five other power plants have also been required to convert to a closed-cycle system.<sup>35</sup> One is the Indian Point complex in New York. *See Indian Point Nuclear Facility (NY)*: “Pursuant to Section 316(b) of the CWA,<sup>36</sup> and 6 NYCRR Part 704.5, the Department has determined that the site-specific best technology available (BTA) to minimize adverse environmental impact of the Indian Point Units

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<sup>33</sup>ER at 7-39.

<sup>34</sup>U.S. Environmental Protection Agency, “Technical Development Document for the Proposed Section 316(b) Phase II Existing Facilities Rule” (Apr. 2002), at 4-1 (hereinafter “EPA 2002 TDD”).

<sup>35</sup>EPA 2002 TDD, at 4-1 to 4-6; Cooling Tower Feasibility Assessment, at 28–29 & n. 138.

<sup>36</sup>33 U.S.C. § 1326(b).

2 and 3 cooling water intake structures is closed-cycle cooling.”<sup>37</sup> On January 9, 2017, Entergy Corporation, the State of New York, and environmental groups agreed to close the Indian Point Units 2 and 3 nuclear reactors in 2020 and 2021, rather than install cooling towers for Entergy’s proposed licensure venture.

Oyster Creek Generating Station (OCGS), located on Barnegat Bay in New Jersey and owned by Exelon Corporation, applied for and received a 20-year license extension from the NRC in 2009, but was denied the ability to discharge its waste heat into the Bay at the State permit level. *See, Oyster Creek Generating Station (NJ)*:<sup>38</sup> “Further, this draft renewal permit incorporates NJDEP’s determination pursuant to Section 316(b) of the Clean Water Act regarding the best technology available for the cooling water intake structure. Specifically, the Department has determined that closed-cycle cooling (*i.e.* cooling towers) constitutes best technology available for the OCGS in accordance with best professional judgment.”<sup>39</sup> Consequently, environmental groups, the State of New Jersey, and Exelon then negotiated an agreement that the plant would close by 2019 rather than operate until 2029, and Exelon would not install cooling towers for Oyster Creek. Exelon chose to give up the additional 10-years of

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<sup>37</sup>Fact Sheet, New York State Pollutant Discharge Elimination System (SPDES) Draft Permit Renewal with Modification (Indian Point Electric Generation Station, Buchanan, New York) 0004472 – Rev. January 2017, <https://www3.epa.gov/region1/npdes/schillerstation/pdfs/AR-392.pdf>

<sup>38</sup>Draft Surface Water Renewal Permit Action, Category: B-Industrial Wastewater NJPDES Permit No. NJ0005550, Oyster Creek Generating Station, Lacey Twp, Ocean County, [http://www.state.nj.us/dep/dwq/pdf/draft\\_permit100107.pdf](http://www.state.nj.us/dep/dwq/pdf/draft_permit100107.pdf)

<sup>39</sup>*Id.*

operation of Oyster Creek and those profits rather than installing cooling towers.<sup>40</sup>

NRC has not addressed these facts in its DEIS.

Perhaps the most damning evidence that cooling towers are *de rigueur* is in the NextEra ER itself. The three alternatives postulated by NextEra include: an Advanced Light Water Reactor (“ALWR”) “with mechanical draft cooling towers” located at the PBN site; a cluster of small modular reactors (“SMRs”) “with mechanical draft cooling towers” located at the PBN site; and a “Combination Alternative” involving natural gas combined cycle units “with mechanical draft cooling towers” located at the PBN site backing up an expanded photovoltaic installation there.<sup>41</sup> NRC has not acknowledged this evidence in the DEIS.

Yet NextEra does not compare its preferred alternative of continued operations without closed-cycle cooling tower systems against an alternative where operations continue, but such a cooling system is built. NRC repeats this error in its DEIS.

PBNP indulges a fiction that the annual destruction of 6,134 kg of fish biota - 12.75 short tons – is a “small impact” simply because there are no further temperature uprates planned for the 2030-2050 period. But the fish killed at Point Beach in 2011 were calculated to reduce the yield of Lake Michigan's fisheries by an estimated 10,625 pounds a year, or about 4.5 percent of the annual commercial fishing catch by weight.<sup>42</sup> But regardless of that, it is absurd to treat the recurring, known and completely predictable and voluminous future impacts of once-through

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<sup>40</sup>Gundersen Declaration at ¶ 9.6; also, see <https://www.worldnuclearreport.org/Oldest-US-Reactor-Oyster-Creek-Closed.html>

<sup>41</sup>ER at 7-3 - 7-4.

<sup>42</sup><https://www.chicagotribune.com/news/ct-met-great-lakes-fish-kills-20110614-story.html>

cooling at PBNP as “small.” The carnage will go on, unabated, producing hundreds more tons of senseless animal deaths during the extension period. NRC has inadequately addressed this in its DEIS, in violation of NEPA, Council on Environmental Quality (CEQ) guidance, and the agency’s own implementing regulations.

Cooling tower mitigation is also within the scope of the NRC DEIS public comment proceeding because NRC’s NEPA regulations require a plant-specific assessment of cumulative impacts in the applicant’s Environmental Report, as well as the NRC’s own DEIS and FEIS.<sup>43</sup> The NRC recognizes that “impacts from individually minor actions may be significant when considered collectively over time.”<sup>44</sup> According to the 2013 GEIS:

Impacts typically result from activities (*e.g.*, water withdrawal, effluent discharges . . .) . . . associated with . . . industrial and commercial development. . . . Perhaps the most important source of surface water impacts is the withdrawal of water for plant cooling systems (both once-through and closed-cycle). These impacts relate to water use conflicts with other users.<sup>45</sup>

The Union of Concerned Scientists estimates that recirculation cooling systems on nuclear plants withdraw about 5% of the water volume that once-through systems like Point Beach require.<sup>46</sup>

Point Beach is not the only mass water intake and discharge system on Lake Michigan. Palisades, D.C. Cook, coal burning power plants, and municipal water systems also cause

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<sup>43</sup>10 CFR Part 51, Subpt. A, App. B.

<sup>44</sup>ER at 4-49 (referencing 2013 GEIS § 4.13).

<sup>45</sup>§ 4.13.4 of the 2013 GEIS.

<sup>46</sup><https://www.ucsusa.org/resources/water-power-plant-cooling> (table).

impingement, entrainment and in the case of power plants, thermal pollution and resulting wildlife casualties.

It is obvious that NextEra *must* analyze mitigation in the ER, just as NRC *must* do so in the EIS. According to 10 C.F.R. § 51.53(c)(3)(iii), the environmental report must contain “consideration of *alternatives for reducing adverse impacts*, as required by § 51.45(c),” for all Category 2 license renewal issues in Appendix B to subpart A Part 51. And 10 CFR § 51.45(c) commands that “The environmental report must include an analysis that considers and balances . . . alternatives available for reducing or avoiding adverse environmental effects.” (Emphasis added). Irrespective of whether entrainment, impingement and thermal pollution entail small, medium or large impacts, the mass killing of aquatic biota and birds is an “adverse environmental impact” that must be accounted for and analyzed under NEPA. Yet, NRC has inadequately done so in the DEIS, continuing NextEra’s error in the ER. Mitigating thermal pollution will draw enormously less water from Lake Michigan and will kill fewer creatures drawn into the PBNP intakes.

Indeed, the NRC’s mitigation discussion and disclosure obligations are underscored by the obligation in 10 C.F.R. §§ 51.53(c)(1) and (2), which require the environmental report to “discuss in this report the environmental impacts of alternatives and any other matters described in § 51.45,” bringing § 51.45(c)’s command that there be “alternatives available for reducing or avoiding adverse environmental effects” into play, again. NEPA and NRC’s implementing regulations require NRC to correct such errors by NextEra in the ER. Yet, NRC has failed to do so in the DEIS.

The NRC's NEPA regulations require that alternatives be presented in "comparative form" to "aid the Commission in developing and exploring, pursuant to section 102(2)(E) of NEPA, 'appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.'"<sup>47</sup> Agencies must, to the fullest extent possible, "[s]tudy, develop, and describe appropriate alternatives to recommended courses of action in any proposal. . . ."<sup>48</sup> There must be examination of every alternative within the nature and scope of the proposed action,<sup>49</sup> "sufficient to permit a reasoned choice."<sup>50</sup> NEPA requires a "discussion of alternatives" that "must '[r]igorously explore and objectively evaluate all reasonable alternatives.'"<sup>51</sup> "The existence of a viable, but unexamined alternative renders an environmental impact statement inadequate."<sup>52</sup> NRC's DEIS is thus inadequate.

Moreover, agencies must "study. . . significant alternatives suggested by other agencies or

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<sup>47</sup>10 CFR § 51.45(b)(3).

<sup>48</sup>42 U.S.C. § 4322(2)(E); *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1519-20 (9th Cir. 1992).

<sup>49</sup>*California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982).

<sup>50</sup>*Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810, 815 (9th Cir. 1987).

<sup>51</sup>*Union Neighbors United, Inc. v. Jewell*, 831 F.3d 564, 569 (D.C. Cir. 2016) (quoting 40 C.F.R. § 1502.14).

<sup>52</sup>*Idaho Conservation League, supra*; *Natural Res. Defense Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005) (internal quotation marks omitted); *see also City of Grapevine v. Dep't of Transp.*, 17 F.3d 1502, 1506 (D.C. Cir. 1994) (agency must consider "all 'feasible' or 'reasonable' alternatives[.]").



the public. . . .”<sup>53</sup> Even an alternative which would only partially satisfy the need and purpose of the proposed project must be considered by the agency if it is “reasonable,”<sup>54</sup> because it might convince the decision-maker to meet part of the goal with less impact.<sup>55</sup>

If the agency has not adequately studied the issue, the courts may “substitute their judgment of the environmental impact for the judgment of the agency.”<sup>56</sup>

Clearly, a genuine dispute existed between PSR WI (Physicians for Social Responsibility Wisconsin) and NextEra on a material issue of law or fact, in the NRC ASLB extreme license extension proceeding. NRC has continued the error in the DEIS, hence our related comments here now. The harm NEPA seeks to prevent commenced at the point that NextERA concluded that there were no adverse environmental consequences from 50 years of once-through cooling at PBNP and that consequently there need be no consideration of mitigation.<sup>57</sup> “The injury of an increased risk of harm due to an agency's uninformed decision is precisely the type of injury [NEPA] was designed to prevent.”<sup>58</sup> And yet, NRC has perpetuated NextEra’s errors and violations, throughout both the environmental scoping, and now the DEIS, stages.

A “hard look” for a superior alternative is a condition precedent to an agency licensing

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<sup>53</sup>*DuBois v. U.S. Dept. of Agric.*, 102 F.3d 1273, 1286 (1st Cir. 1996), *cert. denied*, 117 S.Ct. 1567 (1997).

<sup>54</sup>*Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 93 (2nd Cir. 1975).

<sup>55</sup>*North Buckhead Civic Ass’n v. Skinner*, 903 F.2d 1533, 1542 (11th Cir. 1990).

<sup>56</sup>*Crounse Corp. v. Interstate Commerce Comm’n*, 781 F.2d 1176 (6th Cir. 1986).

<sup>57</sup>*Sierra Club v. Marsh*, 872 F.2d 497, 500 (1st Cir. 1989).

<sup>58</sup>*Comm. to Save the Rio Hondo v. Lucero*, 102 F.3d 445, 448-49 (10th Cir. 1996).

determination that an applicant's proposal is acceptable under NEPA.<sup>59</sup> In the NRC ASLB licensing proceeding, petitioner PSR WI had articulated an admissible contention that there must be analysis in the ER (and ultimately the NRC Environmental Impact Statement) of the alternative of continued operation of PBNP with closed-cycle cooling towers. Despite this, the PSR WI contention fell on deaf ears at the ASLB. NRC has now compounded this error and violation in the DEIS.

The above comment is relevant to the following sections of the NRC's supplemental DEIS (that is, the DSGEIS, namely [NUREG-1437, Supplement 23, Second Renewal, Draft](#)): Section 3 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATING ACTIONS; 3.5 Water Resources, specifically 3.5.1 Surface Water Resources; 3.7 Aquatic Resources, especially 3.7.1 Lake Michigan; 3.8 Special Status Species and Habitats, particularly 3.8.1 Endangered Species Act: Federally Listed Species and Critical Habitats; and 3.16 Cumulative Impacts, particularly 3.16.2 Water Resources. In terms of the underlying GEIS, namely the [Generic Environmental Impact Statement for License Renewal of Nuclear Plants \(NUREG-1437\)](#), the above comment is relevant to the following sections: [2. Description of Nuclear Power Plants and Sites, Plant Interaction with the Environment, and Environmental Impact Initiators Associated with License Renewal](#); [2.2 Plant and Site Description and Plant Operation](#); [2.2.3 Cooling and Auxiliary Water Systems](#); [2.3 Plant Interaction with the Environment](#), especially [2.3.2 Water Use](#), [2.3.3 Water Quality](#), and [2.3.5 Aquatic Resources](#); [3.](#)

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<sup>59</sup> *Public Service Co. of New Hampshire (Seabrook Station, Units 1 & 2)*, ALAB-471, 7 NRC 477, 513 (1978).

[Environmental Impacts from Nuclear Power Plant Refurbishment](#), including [3.4 Surface Water and Groundwater Quality](#), and [3.4.1 Surface Water](#); [3.5 Aquatic Ecology](#); [3.9 Threatened and Endangered Species](#); and [4. Environmental Impacts of Operation](#), including the entirety of [4.2 Once-Through Cooling Systems](#), as well as [4.3 Cooling Towers](#).

**Comment 2: Point Beach’s continued operation violates 10 CFR Part 50, Appendix A, Criterion 14 because the reactor coolant pressure boundary has not been tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture, and the aging management plan does not provide the requisite reasonable assurance.**

The following comment is relevant to the following sections of the underlying GEIS: much of [5. Environmental Impacts of Postulated Accidents](#), especially including the entirety of [5.2 Plant Accidents](#), [5.3 Accident Risk and Impact Assessment for License Renewal Period](#), and [5.4 Severe Accident Mitigation Design Alternatives \(SAMDA\)](#)s).

In recent years, the NRC has systematically removed conservative calculational aspects of the embrittlement process to allow continued operation. The NRC has not incorporated the actual data from coupons/capsules in the remaining five worst embrittled atomic power reactors in the country, one of which is Point Beach Unit 2, for analysis which could be used to assess whether the Point Beach reactors should be allowed continued operation. Significantly, once Palisades in Michigan closes for good, by May 31, 2022, Point Beach Unit 2 will be the single worst embrittled reactor pressure vessel in the United States. The NRC has allowed Point Beach and its cohorts to use analytical techniques that ignore the data from sample coupons it could readily test. There is no scientific basis by which the Point Beach reactors should continue

operating without a complete physical analysis of the coupons from its reactors and the five other reactors that are its embrittled cohorts. Point Beach's continued operation violates 10 CFR Part 50, Appendix A, Criterion 14 because the reactor coolant pressure boundary has not been tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

*A. Within the Scope*

This comment is within the scope of this DEIS proceeding and material to the findings the NRC must render. After all, a safety risk, like reactor pressure vessel embrittlement, carries with it related, consequent, and inescapable environmental risks. For a license renewal proceeding, 10 C.F.R. Part 54 establishes the scope of the proceeding for safety concerns.<sup>60</sup> NEPA, of course, sets the rules and requirements for related, inextricably interlinked environmental concerns. NRC regulations promulgated pursuant to the AEA at 10 CFR § 54.29(a) requires that a renewed license may be issued by the Commission if “[a]ctions have been identified and have been or will be taken . . . that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB [current licensing basis],” including “managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21(a)(1). . . .”<sup>61</sup> NRC's failure to address these safety risks in the

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<sup>60</sup>*PPL Susquehanna, LLC* (Susquehanna Steam Electric Station, Units 1 & 2), LBP-07-4, 65 NRC 281, 306 (2007).

<sup>61</sup>10 CFR § 54.29(a).

ASLB proceeding have now been continued and compounded by NRC's failure to address these same safety risks in this DEIS proceeding, a violation of NEPA because these safety risks have inescapably connected environmental risks. This comment is thus "material" to the findings NRC must make,<sup>62</sup> because it is an issue that would make a difference in the outcome of the proceeding.<sup>63</sup> This included the DEIS public comment proceeding, for unless NRC corrects its errors, NEPA, CEQ guidance, and agency implementing regulations will be violated. Also, there is a "significant link between the claimed deficiency and either the health and safety of the public or the environment."<sup>64</sup> If pressurized thermal shock were to occur within one of the Point Beach reactors, as explained below, it could result in a Class 9 accident. The consequent release of catastrophic amounts of hazardous ionizing radioactivity would of course cause LARGE, negative impacts on the environment and public health, downwind, downstream, up the food chain, and down the generations. For NRC to ignore such LARGE potential impacts, as it does in the DEIS, gratuitously violates NEPA.

*B. Concise Statement of Evidence*

Petitioner PSR WI's expert witness for this contention is Arnold Gundersen, who has more than

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<sup>62</sup>10 C.F.R. § 2.309(f)(1)(iv).

<sup>63</sup>Rules for Practice for Domestic Licensing Proceedings—Procedural Changes in the Hearing Process, 54 Fed. Red. 33,168, 33,172 (Aug. 11, 1989).

<sup>64</sup>*Vermont Yankee*, 60 NRC 548, 557 (2004).

50 years of experience in Nuclear Engineering.<sup>65</sup> He has a Bachelor's Degree in Nuclear Engineering (BSNE) from Rensselaer Polytechnic Institute (RPI) *cum laude* and a Master's Degree in Nuclear Engineering (MENE) from RPI via an Atomic Energy Commission Fellowship. He studied cooling tower operation and cooling tower plume theory for his Master's. Mr. Gundersen progressed in his career from reactor operator and instructor to the

ASLB petitioner PSR WI's expert witness for the contention related to this comment, is Arnold Gundersen. Gundersen has more than 50 years of experience in Nuclear Engineering.<sup>66</sup> He has a Bachelor's Degree in Nuclear Engineering (BSNE) from Rensselaer Polytechnic Institute (RPI) *cum laude* and a Master's Degree in Nuclear Engineering (MENE) from RPI via an Atomic Energy Commission Fellowship. He studied cooling tower operation and cooling tower plume theory for his Master's. Mr. Gundersen progressed in his career from reactor operator and instructor to the position of Senior Vice President for a nuclear licensee prior to becoming a nuclear engineering consultant and expert witness. He has considerable experience testifying as an expert witness to the NRC ASLB and the Advisory Committee on Reactor Safeguards ("ACRS"), in federal court, before the State of Vermont Public Service Board, the

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<sup>65</sup>Mr. Gundersen's *curriculum vitae* is attached to the Declaration of Arnold Gundersen ("Gundersen Declaration") filed with this comment, just as it was to the intervention Petition in the NRC ASLB proceeding.

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State of Vermont Environmental Court, the Florida Public Service Commission, and the California Public Utility Commission (“CPUC”). He is an author of the first edition of the U.S. Department of Energy (“DOE”) Decommissioning Handbook. His five decades of professional nuclear experience include Cooling Tower Operation, Cooling Tower Plumes, Consumptive Water Loss, Nuclear Plant Operation, Nuclear Management, Nuclear Safety Assessments, Reliability Engineering, In-service Inspection, Criticality Analysis, Licensing, Engineering Management, Thermohydraulics, Radioactive Waste Processes, Decommissioning, Waste Disposal, Structural Engineering Assessments, Nuclear Fuel Rack Design and Manufacturing, Nuclear Equipment Design and Manufacturing, Prudency Defense, Employee Awareness Programs, Public Relations, Contract Administration, Technical Patents, Archival Storage and Document Control, Source Term Reconstruction, Dose Assessment, Whistleblower Protection, and NRC Regulations and Enforcement.

In short, our comment on the environmental risks due to embrittlement of the reactor pressure vessels at Point Beach, is based on the expertise of a nationally and internationally renowned expert. NRC should take our comment on this subject matter most seriously in its EIS, which thus far it has utterly failed to do.

Even before Point Beach's design, scientists had discovered that neutron radiation from inside the nuclear core would gradually weaken, and even destroy, the thick metal nuclear reactor that surrounds that core. This phenomenon, called “neutron embrittlement,” can be problematic because if embrittlement becomes extensive, the dense metallic nuclear reactor can shatter like

glass and cause a Class 9 radiological accident, the worst nuclear catastrophe category.<sup>67</sup> Such a catastrophe would clearly have LARGE impacts on human health and the environment, making it relevant to NEPA public comment proceedings like this one.

Neutron embrittlement of metal cannot be halted. In the nuclear industry, in order to create a viable means of monitoring its progress in nuclear reactor vessels and components, engineers have placed numerous samples of the same exact metal the vessels are made of inside each reactor prior to operation. These samples are called coupons or capsules, and they are withdrawn periodically and measured in a laboratory to determine the progression and extent of embrittlement.<sup>68</sup>

Engineers designed the Point Beach reactors to operate for 40 years, and the reactors contained enough sample coupons to last for 40 years of operation, but now that the PBNP reactors are licensed to operate for 60 years, there are not enough coupons in the reactor core to test for embrittlement, let alone for an additional 20 years out to 80 years of Point Beach operations, as NextEra proposes, and NRC is considering approving, the very scheme that initiated this NEPA proceeding in the first place.<sup>69</sup> If a nuclear reactor were to suddenly shut down during one of the dozens of atomic power mishaps that nuclear reactor design engineers and the NRC anticipate could happen, the safety system would immediately inject cool water into the reactor vessel in an attempt to cool the reactor core in hopes of preventing a meltdown.<sup>70</sup>

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<sup>67</sup>Gundersen Declaration at ¶¶ 7.4.1, 7.4.4.

<sup>68</sup>*Id.* at 7.4.5.

<sup>69</sup>*Id.* at 7.4.6.

<sup>70</sup>*Id.* at 7.5.1.



However, in a seriously embrittled reactor like Point Beach, when that cool water is injected and comes in direct contact with the hot reactor vessel, it can cause “Pressurized Thermal Shock” (“PTS”). After this, the 8-inch thick steel reactor vessel may crack, through-wall, from PTS, causing it to break open and release massive radioactivity into the surrounding area and the environment.<sup>71</sup> Clearly, such risks are not only safety related, but also relevant to NEPA, per the law itself, CEQ guidance, and agency implementing regulations. Thus NRC should have adequately addressed such risks in its DEIS, but has utterly failed to do so.

This rapid cooling and sudden pressurization sequence can cause a radioactive disaster.<sup>72</sup> There have been several historical precursor sequences showing that abrupt temperature and pressure changes do occur at operating nuclear power plants.<sup>73</sup>

One of the Point Beach units is officially regarded as the most embrittled reactor still operating in the United States. Of the six most embrittled nuclear reactors in the U.S., one is already closed, four more are slated to close by 2024, and only Point Beach plans to continue operations beyond 2024 – and that is until 2053. (NRC acknowledged in April 2013 that Point Beach Unit 2, and Palisades, are tied for worst embrittled reactor pressure vessels in the country. See point number four, on page 5 of 15 on the PDF counter, of the following document: Giessner, J., U.S. Nuclear Regulatory Commission, letter to Entergy Nuclear Operations, Inc., "Summary of the March 19, 2013, Public Meeting Webinar Regarding Palisades Nuclear Plant,"

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<sup>71</sup>*Id.* at 7.4.5.

<sup>72</sup>*Id.* at 7.5.2.

<sup>73</sup>*Id.* at 7.5.4. *See also* Gundersen Declaration ¶¶ 7.5.4.1 and 7.5.4.2.

dated April 18, 2013 (ADAMS Accession No. ML13108A336).)

Thus, once Palisades shuts down by May 31, 2022, Point Beach Unit 2 will be the single worst embrittled reactor pressure vessel in the U.S. The other three worst embrittled reactor pressure vessels in the U.S. include Indian Point Unit 3 (permanently closed in April 2021), a unit at Beaver Valley in Pennsylvania, and a unit at Diablo Canyon in California (scheduled to close for good by 2024-2025 at the latest). Point Beach Unit 2's sister reactor, Unit 1, also raises serious embrittlement concerns, of course.

The NRC's approach to increasing neutron embrittlement has been to develop new operator administrative controls. These administrative controls are requirements that the atomic reactor operators at Point Beach must implement during a reactor emergency to avoid cracking the 8-inch thick steel atomic power reactor vessel.<sup>74</sup> These administrative controls require the reactor operators to raise the reactor's temperature before increasing the pressure, and *unless the operators implement these controls perfectly*, the reactor vessel will experience cracking.<sup>75</sup>

To measure embrittlement, when the Point Beach reactor vessels were manufactured, identical metallic coupons, also called capsules, were manufactured as well and were installed in the Point Beach reactors when the reactors were built.<sup>76</sup> Since Point Beach was designed and anticipated to operate for only 40 years, only 40 years' worth of coupon samples were installed in the reactors. Now there are not enough sample coupons to remove from the reactor and test for

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<sup>74</sup>*Id.* at 7.6.1.

<sup>75</sup>*Id.* at 7.6.1.1.

<sup>76</sup>*Id.* at 7.7.1.

embrittlement during the 60-year period of operations, let alone for an additional 20 more years out to 80 years, as NextEra seeks to do.<sup>77</sup> PBNP is storing two capsules in the spent fuel storage pool at the reactor site, one from each unit.<sup>78</sup> They were removed from the reactors in 1994 and 1997, respectively and have apparently not been tested. Testing now, 25 years after removal, will provide no useful data as to current embrittlement conditions. In addition, each reactor still contains a Capsule “N” inside the two reactor units, noted as being held on “standby.”<sup>79</sup> PBNP has not announced when it will remove or test either one, if ever.

Instead of performing metallurgical tests on the coupons/capsules, the NRC has instead modified its calculations to allow aging, embrittled nuclear power reactors to continue to operate well past their lifespans and certainly into risky uncharted territory.<sup>80</sup>

Even though neutron embrittlement of the Point Beach reactors presents a clear and present danger — one that will worsen even more significantly over the course of 80 years of operations — the NRC and Point Beach have relied upon error-prone analytical calculations rather than use all the tools available to identify just how serious the embrittlement treatment has become as Point Beach ages. Mr. Gundersen’s review of the publicly available files in the NRC’s ADAMS database indicates that the NRC has granted waivers for each of the four most embrittled reactors still operating (as mentioned above, Indian Point 3 closed earlier this year) to

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<sup>77</sup>*Id.* at 7.7.2.

<sup>78</sup>“Point Beach Nuclear Plant Units 1 and 2 Subsequent License Renewal Application” (Public Version), November 2020 (ML20329A247), p. 1208/1528 of .pdf.

<sup>79</sup>*Id.*

<sup>80</sup>Gundersen Declaration ¶ 7.7.3.

avoid testing their actual embrittlement through the measurement of their actual metallurgical coupons. At Diablo Canyon Nuclear Plant, the NRC has allowed the unit to avoid testing any coupon samples for almost two decades, and at Palisades, Indian Point (since closed in April 2021), and Point Beach, he could find no record of coupon samples being tested for at least ten years.<sup>81</sup> The NRC did not require that when the Yankee Rowe reactor in western Massachusetts was completely dismantled in 1992, the reactor vessel was not tested to determine how significant its embrittlement was.<sup>82</sup>

Mr. Gundersen concluded in his NRC ASLB proceeding expert witness testimony:

As the US nuclear fleet ages, the NRC has systematically removed conservative calculational aspects of the embrittlement process to allow continued operation. The NRC has not incorporated the actual data from coupons in the remaining five worst atomic power reactors in the U.S. to be used for the embrittlement analysis applied to NextEra's Point Beach reactors to allow their continued operation. Instead of evaluating Point Beach's specific metallurgy, the NRC has allowed Point Beach and its cohorts to use analytical techniques that ignore the data from sample coupons it could readily test. Additionally, there is no scientific basis by which the Point Beach reactors should continue operating unless there is a complete physical analysis of the coupons from its reactors and the five other reactors that are its embrittled cohorts.<sup>83</sup>

Therefore, I conclude that Point Beach's continued operation violates 10 CFR Part 50 Appendix A, Criterion 14.<sup>84</sup>

Criterion 14 requires that "[t]he reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture."

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<sup>81</sup>*Id.* at 7.8.1.

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

<sup>83</sup>*Id.* at 7.8.2.

<sup>84</sup>*Id.* at 7.8.3.

As previously mentioned in this comment, such gross safety risks and violations are relevant under NEPA, due to the inextricably interlinked LARGE negative impacts on human health, the environment, and the economy that would result, if reactor pressure vessel embrittlement at Point Beach results in a through-wall crack, resulting in catastrophic releases of hazardous radioactivity. Thus, this should be adequately addressed in NRC's DEIS, but has not been.

Mr. Gundersen offered this further professional conclusion in his NRC ASLB proceeding expert witness declaration:

During the last 50 years of operation, Point Beach has failed to develop an adequate coupon program to physically test the integrity of the RPV [reactor pressure vessel] for PB's operational life. As defined in Appendix A Criterion 14, "testing" obviously does not include analytical techniques prone to error. There is inadequate coupon data specific to PB to justify its continued operation beyond its 50th year, let alone until it reaches 80. PB has been violating GDC 14<sup>85</sup> by not testing coupons, and relying on analytical handwaving instead!<sup>86</sup>

The NRC already knows the PB reactor vessel to be the most embrittled vessel in the nation, as previously noted above. PB was not "designed and fabricated... to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture." Thus the NRC's acknowledgment proves that the Point Beach reactors fail to meet Criterion 14.

This unaddressed safety risk in the NRC ASLB proceeding, has now gone unaddressed in NRC's DEIS. This is a violation of NEPA, CEQ guidance, and agency

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<sup>85</sup>General Design Criterion 14, *supra*.

<sup>86</sup>*Id.* at 7.8.4.

implementing regulations.

C. Materiality to Findings/Relevance to DEIS

The NRC license renewal safety review focuses on potential detrimental effects of aging that ongoing regulatory oversight programs do not routinely address. If an aging-related issue is “adequately dealt with by regulatory processes” on an ongoing basis, it will not warrant review at the time of a license renewal application.<sup>87</sup> The evidence strongly suggests that embrittlement at Point Beach has not been “adequately dealt with by regulatory processes,” hence it warrants review in this subsequent license extension proceeding.

As mentioned previously in this comment, safety risks are also environmental risks, and thus relevant to NRC’s DEIS. NRC has failed to adequately address this LARGE, negative, potentially catastrophic environmental risk in the DEIS.

The NRC-commissioned, Sandia National Lab-conducted CRAC-II analysis emphasizes this point. CRAC-II is both a computer code (titled Calculation of Reactor Accident Consequences) and the 1982 report of the simulation results performed by Sandia National Laboratories for the NRC. The report is sometimes referred to as the CRAC-II report because it is the computer program used in the calculations, but the report is also known as the 1982 Sandia Siting Study or as NUREG/CR-2239.

CRAC-II’s figures, for casualties and property damage, at Point Beach due to a reactor meltdown catastrophe (as due to PTS resulting from RPV embrittlement), are shocking. If a

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<sup>87</sup>*PPL Susquehanna, LLC* (Susquehanna Steam Electric Station, Units 1 & 2), LBP-07-4, 65 NRC 281, 307-09 (2007).

meltdown at one unit leads to a domino-effect meltdown at the second unit, casualties and property damage could be expected to double in severity. Such a domino-effect, multiple reactor meltdown took place at Fukushima Daiichi in Japan, beginning in mid-March, 2011, of course. The “fallout,” to health, environment, and economy, continues still, more than a decade later. Tellingly, the Japanese government and nuclear power industry chose to shutdown that country’s worst embrittled reactor — Genkai Unit 1 — in the aftermath of Fukushima, when a capsule pull there revealed that embrittlement was significantly worse than optimistic hypotheses had predicted. NRC would be wise to apply such lessons learned at Point Beach, and shut it down, rather than approve an extreme license extension out to 80 years of operations.

CRAC-II reported that a meltdown at one unit at Point Beach would result in up to 2,000 peak early fatalities (acute radiation poisoning deaths), 9,000 peak early radiation injuries, and 7,000 peak cancer deaths (latent cancer fatalities). Again, a meltdown at one unit then causing a meltdown at the second unit could be expected to double such casualties.

In terms of property damage, CRAC-II reported that a meltdown at a single Point Beach unit would result in \$41.4 billion in property damage, as expressed in 1982 dollar figures. Adjusting for inflation alone, the figure would surmount \$112.5 billion, as expressed in 2021 dollar figures.

But these figures can be considered significant underestimates. Associated Press investigative reporter Jeff Donn, in his 2011 four-part series entitled “Aging Nukes,” reported that populations have soared since 1982 around nuclear power plants like Point Beach. (See the entire series, posted online here: <<https://www.ap.org/press-releases/2012/aging-nukes-a-four->

[part-investigative-series-by-jeff-donn](#)>.) Thus, deaths and injuries from a meltdown at one or both reactors at Point Beach would now be much worse, in terms of numbers of people thus impacted, than even the shocking figures reported by CRAC-II in 1982. Tellingly, Donn's top example of high-risk NRC regulatory retreat at "Aging Nukes" was in regards to the weakening of reactor pressure vessel embrittlement safety standards, given the ever worsening age-related degradation problem.

Similar to casualty rates, CRAC-II, published in 1982, does not account for economic development in the past four decades. Thus, property damage from a meltdown at one or both Point Beach reactors would now be much worse than the \$112.5 to \$225 billion figure (when adjusted for inflation from 1982 to 2021 dollar figures) reported by CRAC-II.

Clearly, a safety risk at Point Beach that could kill or injure many tens of thousands of residents downwind, downstream, up the food chain, and down the generations (certain radioactive isotopes remain hazardous for at least a million years, as the US EPA acknowledged in its court-ordered rewrite of Yucca Mountain regulations in 2008), is also an environmental risk. It should be rigorously addressed by NRC in the DEIS. NRC has utterly failed to do so adequately, a violation of NEPA law, CEQ guidance, and agency implementation regulations.

The Commission has concluded that "the 'only issue' where the regulatory process may not maintain a plant's current licensing basis involves the potential "detrimental effects of aging on the functionality of certain systems, structures, and components in the period of



extended operation.”<sup>88</sup> The scope of a safety review for license renewal is thus limited to (1) managing the effects of aging of certain systems, structures, and components (“SSCs”)<sup>89</sup> with the aim being to provide “reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB;<sup>90</sup> (2) review of time-limited aging evaluations; and (3) any matters for which the Commission itself has waived the application of

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<sup>88</sup>*Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-14, 71 NRC 449, 454 (2010).

<sup>89</sup>10 CFR § 54.29(a)(1).

<sup>90</sup>10 CFR § 54.3(a) defines “current licensing basis (CLB)” as “the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect. The CLB includes the NRC regulations contained in 10 CFR parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 52, 54, 55, 70, 72, 73, 100 and appendices thereto; orders; license conditions; exemptions; and technical specifications. It also includes the plant-specific design-basis information defined in 10 CFR 50.2 as documented in the most recent final safety analysis report (FSAR) as required by 10 CFR 50.71 and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

these rules.<sup>91</sup> Three general categories of SSCs “fall within the ‘initial focus’” of license renewal review as outlined in 10 CFR § 54.4.<sup>92</sup> And 10 CFR § 54.21 provides standards for license renewal applicants to determine which of the components within the three general categories defined in § 54.4 require aging management review.<sup>93</sup> With respect to each structure, system, or component requiring aging management review, “a license renewal applicant must demonstrate that the ‘effects of aging will be adequately managed so that the intended function(s) [as defined in § 54.4] will be maintained consistent with the CLB for the period of extended operation.’”<sup>94</sup> While some SSCs perform more than one function, the license renewal application is only required to provide reasonable assurance that SSCs “will perform such that the intended functions, as delineated in §54.4, are maintained consistent with the CLB.”<sup>95</sup>

Additionally, SSCs subject to an aging management review perform an intended function in a passive fashion (“without moving parts or without a change in configuration or

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<sup>91</sup>*Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), LBP-08-22, 68 NRC 590, 598-600 (2008); *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-01-6, 53 NRC 138, 152 (2001); *Entergy Nuclear Generation Co. And Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), LBP-06-24, 64 NRC 257, 276, 277 (2006).

<sup>92</sup> *Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-14, 71 NRC 449, 456 (2010).

<sup>93</sup>*Id.*

<sup>94</sup>*Id.* (quoting 10 C.F.R. 54.21(a)(3)).

<sup>95</sup>*Nuclear Generation Co. and Entergy Nuclear Operations, Inc., supra* at 71 NRC 456.

properties”<sup>96</sup>) and are not already subject to replacement based on a qualified life or specified time period.

NextEra must demonstrate that the “effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.”<sup>97</sup> The evidence shows that the capacity for the PBNP reactor vessels to become embrittled unmistakably exists, but that the reactor coolant pressure boundary has not been “tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture” for perhaps more than 20 years, and that both Point Beach reactors contain a coupon/capsule that might shed relevant light on whether the two units should be given consideration for licensure beyond 2030 and 2033, respectively.

Notably, 10 CFR § 54.4 considers plant systems, structures, and components within the scope of Part 54 to include SSCs that are “relied upon to remain functional during and following design-basis events . . . to ensure . . . [t]he integrity of the reactor coolant pressure boundary; . . . [t]he capability to shut down the reactor and maintain it in a safe shutdown condition; or . . . [t]he capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 50.34(a)(1), § 50.67(b)(2), or § 100.11 of this chapter, as applicable.”<sup>98</sup> The embrittled Point Beach reactor vessels are thus SSCs requiring the utmost attention to ascertain “detrimental effects of aging on the functionality

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<sup>96</sup>*Id.*

<sup>97</sup>*Id.*

<sup>98</sup>10 CFR § 54.4(a) (1)(i-iii).

of certain systems, structures, and components in the period of extended operation.”<sup>99</sup> Since NextEra cannot make such a showing, the subsequent license extension application should have been denied by the ASLB in the intervention proceeding. Petitioner PSR WI had depicted a compelling issue of fact with the license extension application, in great detail, backed by a nationally and even internationally renowned expert witness, and this contention should have been admitted for hearing. Instead, NextEra and NRC staff attacked the contention, and the ASLB rejected it outright, denying even a hearing on the merits. NRC staff’s utterly inadequate treatment of reactor pressure vessel embrittlement risks at Point Beach, in the DEIS, continues and compounds such prior errors, further violation NEPA law itself, CEQ guidance, and agency implementing regulations.

**Comment 3: The PBNP Environmental Report, as well as the NRC DEIS, utterly fail to adequately evaluate the full potential for renewable energy sources, such as solar electric power (photovoltaics) to offset the loss of energy production from PBNP, and to make the requested license renewal action from 2030 to 2053 unnecessary.**

Violating 10 C.F.R. § 51.53(c)(3)(iii) and 10 CFR § 51.45, the PBNP Environmental Report treated all of the alternatives to license renewal as unreasonable except for new nuclear and the combination of natural gas combined cycle and 25MW of on-site solar, and does not provide a substantial analysis of the potential for significant alternatives, such as widespread solar power plus storage in the Region of Interest for the requested relicensing period of 2030 to 2053. The scope of the ER (which, we feared, would also occur in the DEIS) was improperly

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<sup>99</sup>*Nuclear Generation Co. and Entergy Nuclear Operations, Inc., supra* at 454.

narrow. The intrinsic need for PBNP to be available to provide power during the period of subsequent license extension is weak and eroding by the day, in light of continuing positive developments in the growth of solar power.

Our fears were borne out, when NRC staff utterly failed to adequately address the great potential for renewables to replace Point Beach nuclear plant by the end of 60 years of operations (that is, by 2033), let alone by the end of 80 years of operations (that is, by 2053).

NextEra postulated only two alternatives: either renew the PBNP operating licenses for 20 more years, or close the plant (the no-action alternative). The no-action scenario, then, called for identifying replacement power sources for the loss of PBNP generation.<sup>100</sup> According to NextEra, only three alternatives were deemed “reasonable” enough to be worthy of consideration:

Option 1: ALWR with mechanical draft cooling towers located at the PBN site.

Option 2: Cluster of small modular reactors (SMRs) with mechanical draft cooling towers located at the PBN site.

Option 3: A “Combination Alternative” involving a “configuration of natural gas combined cycle units with mechanical draft cooling towers located at the PBN site” and “expansion of the Point Beach solar facility using the identified alternative array location.”<sup>101</sup>

NRC staff have continued and compounded such errors — violations of NEPA law, CEQ guidance, and agency implementation regulations — in the DEIS.

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<sup>100</sup>ER at 7.1.

<sup>101</sup>ER at 7.2.1.

In its ER, NextEra rejected all three alternatives as unable to competitively replace PBNP. It was Petitioner PSR WI's position in the NRC ASLB proceeding, however, that the consideration by NextEra of an ALWR plant and creation of an SMR farm were chimeras that NextEra should have fully realized are economic impossibilities. NextEra's refusal to recognize the considerable genuine prospects for solar photovoltaic replacement power is astounding, given the firm's solar expansion investments in multiple states, including some nearby Midwestern locations.

Sadly and most unfortunately, NRC staff have compounded and continued such errors and violations in the DEIS.

The 2013 "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" contemplates a discussion of alternatives in the applicant ER, and hence the agency DEIS, that covers replacement power if PBNP were to have its licenses terminated in a decade. There are firm expectations:

The following sections describe alternatives identified by the NRC as capable of meeting the purpose and need of the proposed action (license renewal) or replacing the power generated by a nuclear power plant. A reasonable alternative must be commercially viable on a utility scale and operational prior to the expiration of the reactor's operating license, or expected to become commercially viable on a utility scale and operational prior to the expiration of the reactor's operating license. As technologies improve, the NRC expects that some alternatives not currently viable may become viable at some time in the future. The NRC will make that determination during plant-specific license renewal reviews. The amount of replacement power generated must equal the baseload capacity previously supplied by the nuclear plant and reliably operate at or near the nuclear plant's demonstrated capacity factor.<sup>102</sup>

As PSR WI showed during the NRC ASLB proceeding, the Petitioner met that standard

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<sup>102</sup>GEIS, NUREG-1437 (2013) at 2.3.

in its presentation. However, NextEra and NRC staff attacked it, and the ASLB itself rejected the contention, not even granting a hearing on the merits. NRC staff cannot now compound and continue such errors and violations in the DEIS.

A. Within the Scope/Relevant

The scope of the environmental review is defined by 10 C.F.R. Part 51, the NRC’s “Generic Environmental Impact Statement for License Renewal of Nuclear Plants,” NUREG-1437 (May 1996), and “Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants,” NUREG-1437, Vols. 1 & 3, Rev. 1 (June 2013) (“GEIS”). It is also defined by NEPA law, CEQ guidance, and NRC implementation regulations, as stated previously. As the immediately above quotation suggests, this comment is well within the scope of this subsequent license renewal (SLR) DEIS public comment proceeding, just as PSR WI’s related contention was within the scope of the SLR NRC ASLB proceeding, and should have been granted a hearing on the merits, but inexplicably and unjustly was not.

This comment, as with the related earlier contention on which it is based, is “material” to the findings NRC must make<sup>103</sup> because its determination would make a difference in the outcome of the proceeding.<sup>104</sup> “This means that there should be some significant link between the claimed deficiency and either the health and safety of the public or the environment.”<sup>105</sup>

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<sup>103</sup>10 C.F.R. § 2.309(f)(1)(iv).

<sup>104</sup>Rules for Practice for Domestic Licensing Proceedings—Procedural Changes in the Hearing Process, 54 Fed. Red. 33,168, 33,172 (Aug. 11, 1989).

<sup>105</sup>*Vermont Yankee*, 60 NRC 548, 557 (2004).

### B. Concise Statement of Facts

In the NRC ASLB licensing proceeding, Petitioner PSR WI provided expert reports from two witnesses in support of its contention related to this comment, Dr. Alvin Compaan, a physicist with considerable solar power expertise, and Dr. Mark Cooper, an expert in utility economics. Dr. Compaan destroyed NextEra's hollow discounting of solar photovoltaic, while Dr. Cooper wrecked the notion, not just of ALWR or SMR replacement power generation, but of any alleged economic justification for the continued operation of PBNP today through the early 2030s, let alone the early 2050s. However, NextEra and NRC staff attacked the contention, and the experts' declarations. The ASLB sided with such attacks, rejecting a hearing on the merits. Such errors and violations — this time of NEPA law, CEQ guidance, and NRC implementing regulations — should not and cannot be repeated by NRC staff at this DEIS stage.

#### 1. Dr. Alvin Compaan on the photovoltaic alternative

Dr. Alvin Compaan resides in the Toledo, Ohio metropolitan area.<sup>106</sup> He holds a Ph.D. in Physics from the University of Chicago and is a Professor Emeritus of Physics from the University of Toledo. He currently is President of Lucintech Inc., a research and development company with numerous patents in photovoltaics technology and thin-film neutron detectors. Dr. Compaan has extensive academic and practical experience in photovoltaic solar power and its commercial applications, both land-based and aerospace-based. He has been active in educating the public through TEDx and similar talks and through scientific presentations across the nation, around the State of Ohio, and to the Ohio legislature. Dr. Compaan is the inventor of 12 patents

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<sup>106</sup>Declaration of Alvin Compaan (“Compaan Declaration”) ¶ 1.



in the area of solar and nuclear detectors and has authored more than 270 publications in refereed professional journals and conference proceedings. Between 1987 and 2009 at the University of Toledo he was the principal advisor to 20 Ph.D. and M.S. students and 13 postdoctoral fellows. Dr. Compaan's *curriculum vitae* was attached as Exhibit 7 to his Declaration in the NRC ASLB licensing proceeding, and both the CV and Declaration are again attached to this comment on the DEIS.

Dr. Compaan contends that the NextEra Point Beach (NEPB) Environmental Report (ER) fails to adequately evaluate the full potential for renewable energy sources, such as solar electric power or photovoltaics (hereinafter "solar power"), to offset the loss of energy production from NEPB, and to make the requested license renewal action from 2030 to 2053 unnecessary.

Calling PBNP's ER discussion of the solar power alternative "hollow, cursory, and often out-of-date,"<sup>107</sup> Dr. Compaan exposed in his Declaration how NextEra has grossly failed to adequately assess the solar option. NRC staff have made similar to identical errors, and committed similar to identical violations, in its DEIS on this same point.

Dr. Compaan agrees with NextEra the array of solar panels needed to replace the power from Point Beach would of necessity occupy 65.7 square miles,<sup>108</sup> but articulates a realistic vision as to how that will occur pretty painlessly.

Using a National Renewable Energy Laboratory (NREL) computational tool called SLOPE, Dr. Compaan calculated that there are thousands of available rooftops which are

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<sup>107</sup>Compaan Declaration ¶ 4.

<sup>108</sup>*Id.* at ¶ 17.

oriented properly and free of shading and other obstructions to serve as suitable locations for solar rooftop installations. He found that the State of Wisconsin has residential rooftops capable of providing suitable space for average generation (over 24 hours) of 1,382 MWe of solar electric (total annual energy generation of 12,111,240 MWh).<sup>109</sup> He identifies commercial rooftop space suitable for solar panels that could deliver average generation of 1,760 MW (total annual energy generation of 15,415,280 MWh).<sup>110</sup> Dr. Compaan showed that the NREL/SLOPE tool shows that residential and commercial solar – and at that, either residential rooftops alone or commercial rooftops alone -- could host solar panels sufficient to cover all of the yearly electricity energy output of the PBNP's 1,200 MWe (full year of 8,760 hours and total electric energy of 10,512,000 MWh.).<sup>111</sup>

Dr. Compaan also found that the federal farmland Conservation Reserve Program has nearly 100,000 enrolled acres, which if solarized completely would result in more than 18,000 MWe of solar generation power three (3) times the annual energy output of PBNP.<sup>112</sup> Dr. Compaan pointed out that realistically, solar will be deployed in a mix of locations, from conventional solar farms to high voltage power line transmission easements, awnings, parking lot canopies, landfills, brownfields, and on highway rights-of-way, as well as rooftop installations and installations on Conservation Reserve land.<sup>113</sup>

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<sup>109</sup>*Id.* at 21.

<sup>110</sup>*Id.*

<sup>111</sup>*Id.*

<sup>112</sup>*Id.* at ¶ 22.

<sup>113</sup>*Id.* at ¶ 24.

His testimony further showed that solar is low cost and available, that the supply of modules is growing rapidly and the cost of solar power has been falling dramatically so that today solar power is the lowest cost electricity in many regions of the U.S. and internationally, even when compared to the cost of established nuclear power.

He found that solar is suited to Wisconsin and particularly within PBNP's distribution territory because solar availability in Wisconsin is comparable to that of northern California.

Respecting the intermittency of solar, Dr. Compaan wrote about battery storage, since the technology of large-scale batteries for electricity energy storage has been improving rapidly and the costs have been dropping quickly. He pointed out in his report the brand-new Florida Power & Light (FPL) solar-charged battery storage project, believed to be the world's biggest. FPL is a subsidiary of NextEra Energy; the plant will be 409MWe/900MWh in Manatee County, Florida.<sup>114</sup>

Dr. Compaan found that with "recent advances in battery storage technology, increasing manufacturing scale, and reductions in costs, battery energy storage is a very viable option to combine with solar to provide a durable and reliable solution to the limited capacity factor of solar."<sup>115</sup>

Dr. Compaan explained that the solar + storage approach is scalable and adaptable because the delivery of solar power closely follows the time-of-day demand curve, which can mitigate some of the need for baseload power. He observes that even "baseload" nuclear plants

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<sup>114</sup>*Id.* at ¶ 29.

<sup>115</sup>*Id.* at ¶ 30.

are not available 100% of the time, and that the utility grid must be able to fill in for the periods when refueling and other outages occur and nuclear power is not available, sometimes for many weeks.<sup>116</sup> Moreover, he stated that nuclear plants are unable to follow the demand curve of usage which typically peaks in the daytime and is very low at night.<sup>117</sup> Dr. Compaan illustrated that the inclusion of large scale wind and solar power into the California grid tends to offset the need for large baseload plants to provide “peak” power at the highest-demand times of day.<sup>118</sup> Dr. Compaan opined that “as the amount of solar and wind increase, this minimum demand could go all the way to zero so that no baseload power would be required in the middle of the day, for some days. . . .”<sup>119</sup> He points out that there “is too much thermal energy stored in a 600 MW energy generation facility to dial back the steam generation so quickly. So it is quite possible that by 2030 a 1200 MW supply of baseload power to replace PB Nuclear may be entirely superfluous.”<sup>120</sup>

Dr. Compaan showed that solar power has minimal environmental impacts even when compared with existing nuclear plants. His survey of the scientific literature showed that the best estimate of greenhouse gas emissions from already-constructed nuclear power plants is 66 grams of CO<sub>2</sub> equivalent per kWh, mostly from mining, milling, enrichment, waste management and disposal, and decommissioning. While solar power causes some emissions during manufacture,

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<sup>116</sup>*Id.* at ¶¶ 25-26.

<sup>117</sup>*Id.* at 31.

<sup>118</sup>*Id.* at 33 (discussing Compaan Exh. 6).

<sup>119</sup>*Id.*

<sup>120</sup>*Id.*

mining, milling and purification, there are no emissions during power generation.<sup>121</sup> Dr. Compaan found that crystalline silicon wafer-based solar modules had greenhouse gas emissions of 50g of CO<sub>2</sub>-equivalent and thin-film cadmium telluride modules had only 20g of CO<sub>2</sub>-equivalent emissions per kWh, and that because since 2008, the average manufactured module efficiencies have increased by about 20%, the emissions per kWh are estimated for solar as ranging from 16 to 40 grams of CO<sub>2</sub>-equivalent, well below that of nuclear power.<sup>122</sup>

Dr. Compaan decisively laid out the case for the ongoing photovoltaic revolution:

[O]ver the last decade technological advancements, manufacturing growth, deployment experience, and rapidly dropping prices have all established solar photovoltaics and battery storage as the most attractive technologies for grid power in Wisconsin. Not only does solar plus battery storage have compelling economic advantages today, solar plus battery storage has the lowest environmental footprint of any technology. It can power today's modern grid with the flexible and nimble response times that are demanded from a modern grid where voltage and frequency stability are of utmost importance. For these reasons and all the other environmental issues presented in the preceding discussion, we contend that the 20-year subsequent operating license renewals for the Point Beach Nuclear Plant units 1 and 2 should be denied.<sup>123</sup>

Just as Dr. Compaan's cutting edge insights should have been given the time of day in the NRC ASLB licensing proceeding (but inexplicably and unjustifiably were not), they should be given a rigorously adequate "hard look" by NRC staff in this DEIS, per NEPA law, CEQ guidance, and agency implementing regulations.

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<sup>121</sup>*Id.* at ¶ 35.

<sup>122</sup>*Id.*

<sup>123</sup>*Id.* at ¶ 37.

## 2. Dr. Mark Cooper on ‘Baseload Myopia’

Dr. Mark Cooper is a Senior Fellow for Economic Analysis at the Institute for Energy and the Environment at Vermont Law School. He holds a Ph.D. from Yale University. He is also Director of Research at the Consumer Federation of America, where he served for two decades as Director of Energy. He has testified over 400 times on energy and telecommunications issues at federal and state regulatory and legislative bodies in over forty jurisdictions in the U.S. and Canada. His *curriculum vitae* was attached to his Declaration as MNC-1 in the NRC ASLB proceeding, and are attached again to these comments on the DEIS.<sup>124</sup>

Dr. Cooper asserted that “Nuclear power is far too costly to include in a 21st century electricity system based on efficiency, distributed and renewable resources that deliver lower cost and much less pollution while effectively decarbonizing the sector.”<sup>125</sup> According to him, “Wisconsin is underperforming in efficiency and renewables. Under the purchased power agreement [between PBNP and We Power], I estimate that compared to 21st century alternatives, ratepayers will bear unnecessary charges of about \$5 billion.”<sup>126</sup> The reason, he said, is:

Once the direction of a least-cost route to a decarbonized economy is set by the superiority of renewables, it becomes impossible for nuclear power to participate in the ultimate portfolio. The idea of pursuing an “all-of-the-above” scenario runs afoul of the fundamental differences between the 20th-century baseload fossil fuel approach and 21st-century renewable energy approach. The two technologies simply do not mix well because nuclear is not flexible. The vigorous attack on renewables launched by advocates of nuclear power in an effort to secure favorable treatment of aging reactors is testimony

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<sup>124</sup>The Declaration of Mark Cooper, Ph.D. (“Cooper Declaration”) was filed with the PSR WI Petition in the NRC ASLB licensing proceeding, and is attached to these comments as well.

<sup>125</sup>Cooper Declaration at 3.

<sup>126</sup>*Id.*

to the incompatibility between the two...<sup>127</sup>

The large and inflexible performance of nuclear reactors, “old or new,” Dr. Cooper said, “makes them a burden, not a benefit in the 21<sup>st</sup> century system.”<sup>128</sup> Noting the “basic economic evidence of the prospective superiority of the alternatives,” the professor commented that “the great threat of maintaining the output of nuclear reactors is the obstacle they present to the development of the alternative. The longer they continue their massive, inflexible output with uneconomic subsidies, such as the Point Beach Purchased Power Agreement and/or unjustified preference in dispatch, the more difficult it is for the alternatives to take root and achieve their potential.”<sup>129</sup>

Dr. Cooper accused NextEra of being afflicted with “baseload myopia” en route to determining that “*lead time necessary to ensure the operation of a 21st century system is more than adequate between now and 2030 (for Point Beach Unit 1) and 2033 (for Point Beach Unit 2), not to mention the two decades of operation during the license extension.*”<sup>130</sup> (Emphasis added).

The expert laid out significant long-term economic trends that are eviscerating nuclear power as an option: “[T]he costs of solar and batteries are projected to decline about 5 percent per year in the 30 years from 2000 to 2030. The cost of wind is estimated to decline by over 2

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<sup>127</sup>*Id.*

<sup>128</sup>*Id.*

<sup>129</sup>*Id.* at 4-5.

<sup>130</sup>*Id.* at 5.

percent per year for the 50-years between 1980 and 2030. In contrast, the cost of nuclear power has increased by almost 3 percent per year over that same, 50-year period.”<sup>131</sup> On this foundation, he broke more bad economic news for the nuclear industry, that “the technologies of grid management, information, computer capacity, and advanced control technologies have made it possible to manage and integrate demand, matching it more closely with supply with much greater precision. This has directly lowered the costs of the system, but it has also yielded a transformation dividend, a reduction in the size of the system needed to meet demand.”<sup>132</sup> Further, “the link between electricity consumption and economic growth has been broken.”<sup>133</sup> There is now an inverse relationship between GDP growth and electrical consumption, where electricity consumption per unit of GDP growth has been declining recently.<sup>134</sup>

Just as NextEra’s ER was blind to such facts and truths, NRC’s DEIS is as well. This cannot stand.

Noting the suggestion of using Small Modular Reactors as a replacement for baseload power from PBNP, Dr. Cooper said “Promises that a new generation of ‘small modular’ nuclear technologies will do better are doubtful at best. They will be much more expensive than the alternatives already available and take decades to deploy. Their costs will likely create pressures to demand priority in dispatch, which frustrates flexibility. They leave serious doubts about

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<sup>131</sup>*Id.* at 6.

<sup>132</sup>*Id.*

<sup>133</sup>*Id.* at 7.

<sup>134</sup>*Id.* at 7.



security and pollution.” Dr. Cooper described a “nightmare” scenario with SMRs.<sup>135</sup> According to him, “ Nuclear power should be held to strict economic standards, without any subsidies. If it cannot compete on cost, it cannot be part of the 21st century energy sector.”

Dr. Cooper’s review of relevant literature supported the notion that difficulties in “the integration of distributed supply and actively managed demand are quite small” has become mainstream thinking and is reflected in U.S. DOE analysis. DOE’s *Wind Vision* analysis argues that “wind generation variability has a minimal and manageable impact on grid reliability and related costs.” DOE believes that operational challenges arising from much higher levels of wind power construction can be easily overcome by expanding the use of tried techniques such as increased system flexibility, greater electric system coordination, faster dispatch schedules,

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<sup>135</sup>*Id.* at 22-23: “Hyped as the dream solution, [SMRs] turn into a nightmare. Small modular reactors that have been on the drawing board for at least a decade exhibit all of the characteristics of failure. Like the “nuclear renaissance” before it, the initial estimates of cost have doubled before they go into construction and cost overruns really only begin when construction does. While they can find companies to back them and governments to support them, and academics to explain the theory of why they should work, the one thing they cannot do is deliver low cost power.

While they claim to be safer than large units, they achieve that goal not by solving safety problems, but by being excused from safety rules (like exclusion zones). While they are low in carbon emissions during operation, they suffer from the problem that, even if the production of small units will be possible in the future, they will arrive long after the battle against climate change is lost. While they are small, they still need “must run” status and large numbers of units shipped in order to lower their cost. Small modular reactors are likely to be between three and five times as costly as the already available technologies to build a low cost, low carbon, low pollution electricity sector.”

improved forecasting, demand response, greater power plant cycling, and in some cases, storage options.<sup>136</sup> He thinks that the prospect of achieving reliability that equals or exceeds current levels with the alternative approach is increasingly seen as quite good.<sup>137</sup>

Dr. Cooper sees the confrontation between large baseload providers such as PBNP and distributed energy sources as “inevitable” frontal assaults by nuclear advocates on alternative resources and the institutions that support them. He warned that responsible policymakers should reject the “all of the above” argument “because the severely restricted market created by the forced presence of nuclear power will strangle the ability of non-hydro renewables to expand, which is likely to drive the market clearing price down, as resources compete for a smaller market.”<sup>138</sup>

But Dr. Cooper’s harshest criticism was for the Purchased Power Agreement keeping Point Beach afloat:

[T]he purchased power agreement is totally uneconomic. In 2020, the price is \$20/MWh higher than the bundle of alternatives analyzed above. The overcharge mounts steadily to almost \$100/MWh through 2030. The average excess is \$55/MWh. The cumulative excess cost imposed on ratepayers is almost \$5 billion for the period ending in 2030, which works out to over \$3,000 per electricity customer, or \$300 per year.

With \$5 billion and the remaining time between the early-2030s expirations of Point Beach Units 1 and 2, the net expected power generation from the plant during that period could be completely obviated by construction of renewables and implementation of efficiency. Given the current cost of alternatives, the output of Point Beach would cost ratepayers over twice as much as a least cost, low carbon, low pollution approach. Thus, the purchased power agreement for Point Beach imposes enormous excess costs on Point Beach ratepayers and is unconscionable. By 2030 and 2033, but for the PPA, efficiency

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<sup>136</sup>*Id.* at 14.

<sup>137</sup>*Id.*

<sup>138</sup>*Id.* at 21.

and renewable energy sources could have expanded and displaced this myopic baseload power plant. *By 2030, Point Beach Units 1 and 2 will be completely redundant and obsolescent.*<sup>139</sup>

In the face of harsh economic realities in the form of a collapsing baseload market and the onslaught of ever-cheaper photovoltaic solar, the NRC's Atomic Safety and Licensing Board should have admitted this contention for adjudication, but inexplicably and unjustly did not. According to 10 C.F.R. § 51.53(c)(3)(iii), the environmental report must contain "consideration of *alternatives for reducing adverse impacts*, as required by § 51.45( c)." (Emphasis added). And 10 CFR § 51.45( c) commands that "The environmental report must include an analysis that considers and balances . . . alternatives available for reducing or avoiding adverse environmental effects." Also, 10 C.F.R. §§ 51.53(c)(1) and (2) require the environmental report to "discuss in this report the environmental impacts of alternatives and any other matters described in § 51.45," bringing § 51.45(c)'s command that there be "alternatives available for reducing or avoiding adverse environmental effects" into play, again.

Such errors and violations of NEPA law, CEQ guidance, and agency implementing regulations cannot be allowed to be repeated by NRC staff at this DEIS stage. NRC staff must take a "hard look," per NEPA, at the renewable alternatives, as described by PSR WI's nationally renowned expert witnesses above and attached.

The NRC's NEPA regulations require that alternatives be presented in "comparative form" to "aid the Commission in developing and exploring, pursuant to section 102(2)(E) of NEPA, 'appropriate alternatives to recommended courses of action in any proposal which

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<sup>139</sup>*Id.* at 24 (Emphasis added).

involves unresolved conflicts concerning alternative uses of available resources.”<sup>140</sup> Agencies must, to the fullest extent possible, “[s]tudy, develop, and describe appropriate alternatives to recommended courses of action in any proposal. . . .”<sup>141</sup> There must be examination of every alternative within the nature and scope of the proposed action,<sup>142</sup> “sufficient to permit a reasoned choice.”<sup>143</sup> NEPA requires a “discussion of alternatives” that “must [r]igorously explore and objectively evaluate all reasonable alternatives.”<sup>144</sup> “The existence of a viable, but unexamined alternative renders an environmental impact statement inadequate.”<sup>145</sup>

Moreover, agencies must “study. . . significant alternatives suggested by other agencies or the public. . . .”<sup>146</sup> Even an alternative which would only partially satisfy the need and purpose

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<sup>140</sup>10 CFR § 51.45(b)(3).

<sup>141</sup>42 U.S.C. § 4322(2)(E); *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1519-20 (9th Cir. 1992).

<sup>142</sup>*California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982).

<sup>143</sup>*Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810, 815 (9th Cir. 1987).

<sup>144</sup>*Union Neighbors United, Inc. v. Jewell*, 831 F.3d 564, 569 (D.C. Cir. 2016) (quoting 40 C.F.R. § 1502.14).

<sup>145</sup>*Idaho Conservation League, supra*; *Natural Res. Defense Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005) (internal quotation marks omitted); *see also City of Grapevine v. Dep’t of Transp.*, 17 F.3d 1502, 1506 (D.C. Cir. 1994) (agency must consider “all ‘feasible’ or ‘reasonable’ alternatives[.]”).

<sup>146</sup>*DuBois v. U.S. Dept. of Agric.*, 102 F.3d 1273, 1286 (1st Cir. 1996), *cert. denied*, 117 S.Ct. 1567 (1997).

of the proposed project must be considered by the agency if it is “reasonable,”<sup>147</sup> because it might convince the decision-maker to meet part of the goal with less impact.<sup>148</sup>

It is incumbent on the NRC to not indulge in a self-imposed ignorance, the turning of a blind eye or actual censure of expert opinion and material fact to define otherwise reasonable alternatives out of existence. “NEPA's requirement for forecasting environmental consequences far into the future implies the need for predictions based on existing technology and those developments which can be extrapolated from it.”<sup>149</sup> As NextEra was not free to favor bad technical information over legitimate technical information (but was allowed to do so in the licensing proceeding), NRC staff are not free to do so at this DEIS stage.<sup>150</sup>

The reasonable alternatives for license renewal proceedings must be feasible technically and available commercially.<sup>151</sup> Solar photovoltaic fulfills all of these criteria. “[W]hen a reasonable alternative has been identified, it must be objectively considered by the evaluating agency so as not to fall victim to ‘the sort of tendentious decisionmaking that NEPA seeks to

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<sup>147</sup>*Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 93 (2nd Cir. 1975).

<sup>148</sup>*North Buckhead Civic Ass’n v. Skinner*, 903 F.2d 1533, 1542 (11th Cir. 1990).

<sup>149</sup>*Natural Resources Defense Council, Inc. v. Nuclear Regulatory Commission (Vermont Yankee I)*, 547 F.2d 633, 637, 6 ELR 20615 (D.C. Cir. 1976), *rev'd on other grounds sub nom. Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 8 ELR 20288 (1978).

<sup>150</sup>*Seattle Audubon Society v. Espy*, 998 F.2d 699, 703-04 (9th Cir. 1993) (overturning decision which “rests on stale scientific evidence, incomplete discussion of environmental effects . . . and false assumptions”).

<sup>151</sup>*Entergy Nuclear Operations, Inc. (Indian Point, Units 2 and 3)*, LBP-08-13, 68 NRC 43, 205 (2008).

avoid.”<sup>152</sup>

Clearly, a genuine dispute existed between PSR WI and NextEra on multiple issues of law and fact and this contention should have been admitted for adjudication in the licensing proceeding, but was instead attacked by NRC staff and rejected by the ASLB. The NRC staff should not and cannot be allowed to continue and compound such errors and violations of NEPA law, CEQ guidance, and NRC implementing regulations, at this DEIS stage.

The above comment is relevant to the NRC DEIS Section 2, ALTERNATIVES INCLUDING THE PROPOSED ACTION, and its subsections, 2.2 Proposed Action, 2.3 Alternatives, specifically 2.3.2 Replacement Power Alternatives, namely 2.4.1 Solar Power, and 2.4.3 Wind Power. And the above comment is relevant to the following sections in the underlying GEIS: [8. Alternatives to License Renewal](#), including [8.2 Environmental Impacts of the No-Action Alternative](#), [8.3 Environmental Impacts of Alternative Energy Sources](#), especially [8.3.1 Wind](#), and [8.3.2 Photovoltaic Cells](#).

**Comment 4: PBNP has an elevated risk of a turbine missile accident owing to the poor alignment of its major buildings and structures.**

The following comment is relevant to the following sections of the underlying GEIS: much of [5. Environmental Impacts of Postulated Accidents](#), especially including the entirety of

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<sup>152</sup>*Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-01-34, 54 NRC 293, 302 (2001), citing *I-291 Why? Association v. Burns*, 372 F. Supp. 223, 253 (D. Conn. 1974), *aff'd* 517 F.2d 1077 (2d Cir. 1975).

[5.2 Plant Accidents](#), [5.3 Accident Risk and Impact Assessment for License Renewal Period](#), and [5.4 Severe Accident Mitigation Design Alternatives \(SAMDA\)s](#).

As mentioned above, safety risks have inextricable connections to environmental risks, and thus are relevant under NEPA, as in this NRC DEIS. This is true here.

Historically, Point Beach and many other early reactors have a turbine hall that is dangerously aligned relative to the reactor buildings and control rooms. This alignment was inexpensive and was later determined to be unsafe and is no longer an acceptable design anywhere in the world.<sup>153</sup> The PBNP design is unsafe, because a turbine failure will send 600 lb. pieces of shrapnel hurtling at 600 mph into the containment, safety-related components, and the control room.<sup>154</sup>

Construction of reactors built after Point Beach changed the turbine hall's orientation to be radially outward from the containment to protect the control room and its operators, the safety-related components, and the containment from the threat of turbine shrapnel.<sup>155</sup> This realignment of the turbine hall to the radially outward design meant that shrapnel would fly into the parking lot rather than the safety-related equipment, control room, and containment building in the event of a turbine failure.<sup>156</sup>

Turbine failures are likely events. Fermi 2 in Michigan experienced turbine failure, as

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<sup>153</sup>Gundersen Declaration ¶ 7.3.3.

<sup>154</sup>*Id.* at ¶ 7.3.4.

<sup>155</sup>*Id.* at ¶ 7.3.5.

<sup>156</sup>*Id.* at ¶ 7.3.7.

have other nuclear plants and airplane jet engines.<sup>157</sup>

On Christmas Day, December 25, 1993, at Fermi Nuclear Power Plant, Unit 2, the main turbine automatically tripped due to an erroneous mechanical overspeed signal caused by high vibrations. The reactor, which was operating at 93 percent power, received an automatic scram signal triggered by the turbine trip. The high vibration was caused by catastrophic failure of the turbine blades.<sup>158</sup> Ejected blade parts ripped through the turbine casing and severed condenser tubes and other piping. The rupture of piping supplying hydrogen gas to the generator for cooling caused a large fire. The plant's fire brigade took 37 minutes to muster, dress, and enter the turbine building to fight the fire.<sup>159</sup> Their efforts were hindered by numerous communication problems, including malfunctions of personnel motion detectors (*e.g.*, “man down” alarms<sup>160</sup>). About 500,000 gallons of water from broken general service water piping and turbine building closed cooling water piping flooded the radwaste building basement to a depth of approximately six feet.

Workers were slow to isolate the systems with broken piping to terminate the flooding, due to the lack of procedures for a turbine building internal flood.<sup>161</sup> The severed condenser

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<sup>157</sup>*Id.* at ¶ 7.3.8.

<sup>158</sup>Augmented Inspection Team, FERMI 2 TURBINE GENERATOR FAILURE, December 25, 1993, INSPECTION REPORT NUMBER 50-341/93029(DRS) (2/4/1994) (ML20069J693), pp. 6-8, 10-11, 16-17/72 of .pdf.

<sup>159</sup>*Id.*, p. 42/72 of .pdf.

<sup>160</sup>*Id.*, p. 28/72 of .pdf.

<sup>161</sup>*Id.*



tubes permitted water from Lake Erie to flow into the condenser hotwell, from where it was pumped to the condensate storage tank and thence the standby feedwater system pumped water from the condensate storage tank to the reactor vessel. The lake water caused conductivity and chloride levels of the reactor vessel water to significantly exceed specifications.<sup>162</sup>

Nuclear engineer Gundersen of Fairewinds — expert witness for PSR WI in the NRC ASLB licensing proceeding — has reviewed publicly available photos of the PBNP turbine hall and sees no indication that shielding from turbine missiles has been implemented.<sup>163</sup> A search through the “Point Beach Nuclear Plant Units 1 and 2 Subsequent License Renewal Application” (Public Version), November 2020<sup>164</sup> turned up dozens of results respecting aging management to guard against missiles from fragmented components, but none of them appear to involve steam turbine shafts or blades. PBNP appears to recognize the possibility of pump shafts breaking up, but not the large turbines: “Missiles can be generated from internal events such as failure of rotating equipment or external events. Inherent nonsafety-related features that protect safety-related equipment from internal and external missiles are within the scope of SLR per 10 CFR 54.4(a)(2).”<sup>165</sup>

Mr. Gundersen observed that “While PB cannot rotate its entire turbine hall to assure that a turbine failure does not result in safety-related consequences, there is a solution. To mitigate the impact of a turbine failure, PB could install an inexpensive ‘Energy Absorbing Turbine

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<sup>162</sup>*Id.* at p. 34/72 of .pdf.

<sup>163</sup>Gundersen Declaration ¶ 7.3.9.

<sup>164</sup>ADAMS ML20329A247.

<sup>165</sup>*Id.* at p. 2.1-14 (p. 68/1528 of .pdf).

Missile Shield, US Patent #4397608A. I conclude that to reduce the risk of damage to safety-related systems, structures, and components, PB should be required to install an energy-absorbing turbine missile shield around its turbine.”<sup>166</sup>

The NRC license renewal safety review focuses on potential detrimental effects of aging that ongoing regulatory oversight programs do not routinely address. If an aging-related issue is “adequately dealt with by regulatory processes” on an ongoing basis, it will not warrant review at the time of a license renewal application.<sup>167</sup> The evidence strongly suggests that turbine missiles at Point Beach have not been “adequately dealt with by regulatory processes,” hence it warrants review in this subsequent license extension proceeding.

The Commission has concluded that “the ‘only issue’ where the regulatory process may not maintain a plant’s current licensing basis involves the potential “detrimental effects of aging on the functionality of certain systems, structures, and components in the period of extended operation.”<sup>168</sup> The scope of a safety review for license renewal is thus limited to (1) managing the effects of aging of certain systems, structures, and components (“SSCs”)<sup>169</sup> with the aim being to provide “reasonable assurance that the activities authorized by the renewed

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<sup>166</sup>Gundersen Declaration ¶

<sup>167</sup>*PPL Susquehanna, LLC* (Susquehanna Steam Electric Station, Units 1 & 2), LBP-07-4, 65 NRC 281, 307-09 (2007).

<sup>168</sup>*Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-14, 71 NRC 449, 454 (2010).

<sup>169</sup>10 CFR § 54.29(a)(1).

license will continue to be conducted in accordance with the CLB;<sup>170</sup> (2) review of time-limited aging evaluations; and (3) any matters for which the Commission itself has waived the application of these rules.<sup>171</sup> Three general categories of SSCs “fall within the ‘initial focus’” of license renewal review as outlined in 10 CFR § 54.4.<sup>172</sup> And 10 CFR § 54.21 provides standards for license renewal applicants to determine which of the components within the three general

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<sup>170</sup>10 CFR § 54.3(a) defines “current licensing basis (CLB)” as “the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect. The CLB includes the NRC regulations contained in 10 CFR parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 52, 54, 55, 70, 72, 73, 100 and appendices thereto; orders; license conditions; exemptions; and technical specifications. It also includes the plant-specific design-basis information defined in 10 CFR 50.2 as documented in the most recent final safety analysis report (FSAR) as required by 10 CFR 50.71 and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

<sup>171</sup>*Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), LBP-08-22, 68 NRC 590, 598-600 (2008); *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-01-6, 53 NRC 138, 152 (2001); *Entergy Nuclear Generation Co. And Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), LBP-06-24, 64 NRC 257, 276, 277 (2006).

<sup>172</sup> *Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-14, 71 NRC 449, 456 (2010).

categories defined in § 54.4 require aging management review.<sup>173</sup> With respect to each structure, system, or component requiring aging management review, “a license renewal applicant must demonstrate that the ‘effects of aging will be adequately managed so that the intended function(s) [as defined in § 54.4] will be maintained consistent with the CLB for the period of extended operation.’”<sup>174</sup> While some SSCs perform more than one function, the license renewal application is only required to provide reasonable assurance that SSCs “will perform such that the intended functions, as delineated in §54.4, are maintained consistent with the CLB.”<sup>175</sup>

Plant systems, structures, and components within the scope of 10 CFR Part 54 are—

(1) Safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the following functions--

- (i) The integrity of the reactor coolant pressure boundary;
- (ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or
- (iii) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 50.34(a)

(1), § 50.67(b)(2), or § 100.11 of this chapter, as applicable.<sup>176</sup>

NextEra must demonstrate that the “effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended

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<sup>173</sup>*Id.*

<sup>174</sup>*Id.* (quoting 10 C.F.R. 54.21(a)(3)).

<sup>175</sup>*Nuclear Generation Co. and Entergy Nuclear Operations, Inc., supra* at 71 NRC 456.

<sup>176</sup>10 CFR § 54.4(a)(1).

operation.”<sup>177</sup> Cracking and suddenly crumbling turbine blade shrapnel can easily impair or destroy SSCs from performing in a crisis. Section § 54.4 considers plant systems, structures, and components within the scope of Part 54 to include SSCs that have “[t]he capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 50.34(a)(1), § 50.67(b)(2), or § 100.11 of this chapter, as applicable.”<sup>178</sup> Since NextEra cannot make a showing that it has mitigated the possibilities of major damage from a turbine missile event, the current licensing basis may not be sustained. It is no longer permissible to align turbine halls and critical reactor operations equipment and features as was done in the late 1960's when PBNP was constructed. NRC ASLB licensing proceeding Petitioner PSR WI had demonstrated an issue of fact with the license extension application, and this contention should have been admitted for hearing by the ASLB, but was not.

Such an error, and violation of NEPA law, CEQ guidance, and NRC implementing regulations, should not and cannot be allowed at this DEIS stage. As was stated above, in the comments re: reactor pressure vessel embrittlement, safety risks and environmental risks are inextricably interconnected. If a turbine failure at Point Beach led to a reactor core meltdown, the catastrophic release of hazardous radioactivity into the environment would have LARGE, negative impacts on people and property downwind, downstream, up the food chain, and down the generations for as long as a million years (as mentioned above, US EPA has acknowledged a million year hazardous persistence associated with irradiated nuclear fuel, the very substance that

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<sup>177</sup>*Id.*

<sup>178</sup>10 CFR § 54.4(a) (1)(i-iii).

would melt down in the reactor core, and escape into the environment during such a catastrophe). For this reason, NRC staff should take a “hard look” at the environmental risks of a turbine failure and turbine missile leading to one or more meltdowns (as via domino-effect multiple meltdowns on the same nuclear power plant site, as happened at Fukushima Daiichi, Japan) at Point Beach nuclear power plant. NRC staff have not done so in the DEIS.

**Re: Comments 1-4:**

As previously mentioned above, the three experts’ (Arnie Gundersen, Dr. Al Compaan, and Dr. Mark Cooper) declarations from the NRC ASLB licensing proceeding in 2021, which form the basis for the four comments above, will be attached to these coalition comments. They should be incorporated by reference as if rewritten here in their entirety.

**Comment 5: Re: Misuse by Misinterpretation and Misrepresentation of 10 CFR 51.53(c)(3)**

We the undersigned organizations and individuals also endorse comments filed on December 29, 2021 by Paul Gunter, Director of the Reactor Oversight Project at Beyond Nuclear, re: an “error of law” committed by both the U.S. Nuclear Regulatory Commission as well as NextEra.

Beyond Nuclear’s comments are posted online at < [http://static1.1.sqspcdn.com/static/f/356082/28492118/1640938822827/12+29+21+20211229\\_POIN\\_slra\\_bn-cmts\\_dsgeis.pdf?token=FdIscMMS8US3i1SVrhM1d7%2FpE1I%3D](http://static1.1.sqspcdn.com/static/f/356082/28492118/1640938822827/12+29+21+20211229_POIN_slra_bn-cmts_dsgeis.pdf?token=FdIscMMS8US3i1SVrhM1d7%2FpE1I%3D) > and are incorporated into these coalition comments as if rewritten in their entirety herein.

## Conclusion

The No-Action Alternative should be the preferred alternative. That is, the Point Beach Nuclear Power Plant, Units 1 and 2, should be shut down for good. The subsequent license renewal, out to 80 years of operations, should not be approved. After closure of Point Beach nuclear power plant, the proposed renewable energy alternatives, namely solar photovoltaic and wind, can readily provide replacement electricity supply, as spelled out in great detail by the expert witness reports cited above, and attached.

Thank you for considering our comments.

If you have any questions regarding these coalition comments, please contact: Kevin Kamps, Radioactive Waste Specialist, Beyond Nuclear, at [kevin@beyondnuclear.org](mailto:kevin@beyondnuclear.org), or (240) 462-3216. He can also be written to at: Beyond Nuclear, 7304 Carroll Avenue, #182, Takoma Park, MD 20912. You can also contact Terry Lodge, attorney in Toledo, OH, who serves as legal counsel for PSR WI, at [tjlodge50@yahoo.com](mailto:tjlodge50@yahoo.com), or (419) 205-7084.

The comments above have been submitted by the following organizations and individuals:

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**Beyond Nuclear**

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**Canadian Coalition for Nuclear Responsibility**

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**Citizens Awareness Network**

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**Citizens' Resistance at Fermi Two (CRAFT)**

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**Coalition for a Nuclear Free Great Lakes**

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**Concerned Citizens for Nuclear Safety**

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