

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Kristine L. Svinicki, Chairman  
Jeff Baran  
Stephen G. Burns

In the Matter of

DOMINION VIRGINIA POWER

(North Anna Power Station, Unit 3)

Docket No. 52-017-COL

**CLI-17-08**

**MEMORANDUM AND ORDER**

On March 23, 2017, we held a hearing on the combined license (COL) application of Dominion Virginia Power to construct and operate a new nuclear reactor at the North Anna Power Station site in Louisa County, Virginia. In this uncontested proceeding, we consider whether the review of the application by the NRC Staff has been adequate to support the findings set forth in 10 C.F.R. §§ 52.97(a) and 51.107(a). As discussed below, we conclude that the Staff's review was sufficient to support the regulatory findings and authorize issuance of the combined license.

**I. BACKGROUND**

**A. Proposed Action**

In November 2007, Virginia Electric and Power Company, doing business as Dominion Virginia Power (Dominion) and Old Dominion Electric Cooperative (ODEC), applied to build an

Economic Simplified Boiling Water Reactor (ESBWR) at the North Anna Power Station site.<sup>1</sup> In 2011, ODEC terminated its interest in the proposed Unit 3; Dominion, a wholly-owned subsidiary of Dominion Resources, Inc., will solely own, construct, and operate Unit 3.<sup>2</sup> Two units are currently operating at the site.<sup>3</sup>

Consistent with 10 C.F.R. Part 52, Appendix E, Dominion's COL application references the ESBWR certified design, as amended by Revision 10 of the design control document (DCD).<sup>4</sup> The first combined license application for a given design is designated the "reference COL" application (RCOLA) and later applications referencing the same design are designated "subsequent COL" applications (SCOLA). Where the Staff has already resolved an issue with respect to the RCOLA, the Staff's review of the same issue (a "standard issue") in an SCOLA consists of confirming that the information is identical in both applications and that there are no site-specific issues that require further consideration. The application for Fermi Nuclear Power

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<sup>1</sup> Letter from David A. Christian, President and Chief Nuclear Officer, Dominion, to NRC Document Control Desk (Nov. 26, 2007) (ADAMS accession no. ML073320913).

<sup>2</sup> Ex. NRC-005A, Dominion, North Anna 3 Combined License Application, Part 1: General and Administrative Information, rev. 4 (July 2013), at 1, 5 (ML17086A245) (Application); *id.*, attach. A, Dominion Resources Inc., Form 10-K (Feb. 28, 2013), at 97. For ease of reference, we refer to the COL applicant as "Dominion."

<sup>3</sup> Ex. NRC-005A, Application, at 1; see Exs. NRC-005B to NRC-005K, Dominion, North Anna Unit 3 Combined License Application, Part 2: Final Safety Analysis Report, rev. 9 (various dates) (ML17086A246, ML17086A247, ML17086A248, ML17086A249, ML17086A251, ML17086A252, ML17086A253, ML17086A254, ML17086A256) (COL FSAR).

<sup>4</sup> See Ex. NRC-005A, Application, at 1; see also GE Hitachi ESBWR Design Control Document, rev. 10 (Apr. 1, 2014) (ML14104A929 (package)) (ESBWR DCD). The certified design is codified in 10 C.F.R. Part 52, Appendix E, "Design Certification Rule for the ESBWR Design."

Plant, Unit 3 was designated as the RCOLA for the ESBWR design; the North Anna combined license application is therefore considered an SCOLA.<sup>5</sup>

Dominion's application also incorporates by reference the North Anna Power Station Early Site Permit (ESP).<sup>6</sup> Issuance of the ESP resolved the suitability of the North Anna site for and authorized certain activities related to the construction of up to two additional nuclear units at the site.<sup>7</sup> The ESP used the plant parameter envelope (PPE) approach, meaning that no reactor design was designated, and the Staff's review of the ESP relied on a set of design parameters serving as a surrogate for the design ultimately chosen.<sup>8</sup> The Staff prepared an

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<sup>5</sup> See Ex. NRC-001, "Staff's Statement in Support of the Uncontested Hearing for Issuance of a Combined License for North Anna Power Station Unit 3," Commission Paper SECY-17-0009 (Jan. 18, 2017), at 5 (ML17086A240) (Staff Information Paper).

<sup>6</sup> Ex. NRC-005A, Application, at 1. In 2013, the Staff approved the transfer of ODEC's interest in the ESP to Dominion. In the Matter of Virginia Electric and Power Company, and Old Dominion Electric Cooperative; ESP for North Anna ESP Site; Order Approving Direct Transfer of Early Site Permit and Approving Conforming Amendment, 78 Fed. Reg. 8193 (Feb. 5, 2013).

<sup>7</sup> Dominion Nuclear North Anna, LLC, North Anna ESP Site, Docket No. 52-008, Early Site Permit No. ESP-003 (Nov. 27, 2007) (ML073180440) (Early Site Permit); Virginia Electric and Power Co., North Anna ESP Site, Docket No. 52-008, Early Site Permit No. ESP-003, Amendment No. 3 (Jan. 30, 2013) (ML12297A207); see Ex. DVP-001-R, *Dominion Virginia Power's Corrected Pre-Filed Testimony in Support of the Mandatory Hearing of the North Anna Power Station, Unit 3 Combined License* (Mar. 16, 2017), at 10-14 (ML17086A075) (Dominion Pre-Filed Testimony) (describing the scope of the ESP, the effect of the ESP on the combined license application, the ESP combined license action items, ESP conditions, and variances from the ESP).

<sup>8</sup> The rules applicable to early site permits in 10 C.F.R. Parts 51, 52, and 100 do not require specific design information, although 10 C.F.R. § 52.17(a)(1) lists what technical information must be included in the application. The design parameters chosen for the PPE provided sufficient design details to support review of the ESP and were intended to bound multiple reactor designs. The ESBWR design, as discussed *infra*, was reviewed to confirm that it fits within the PPE as reviewed for the early site permit. See Ex. NRC-001, Staff Information Paper, at 3-4. See *generally* Early Site Permit, apps. B & D.

environmental impact statement (EIS) for the ESP.<sup>9</sup> The Staff's environmental review of the North Anna COL application includes: analysis of issues deferred to the COL stage, issues unresolved by the ESP, and any new and potentially significant information that has become available since the ESP environmental review or otherwise has the potential to affect the Staff's findings or conclusions from the ESP EIS.<sup>10</sup> The Staff's environmental review at the COL stage focused on those issues that were deferred or unresolved at the ESP stage, including information where the design selected fell outside the design parameters specified in the ESP.<sup>11</sup>

The Staff's safety review did not address issues resolved in connection with either the ESP or the ESBWR design certification, except where Dominion sought variances from the ESP or exemptions or departures from the certified design. The Staff's safety review focused on information provided in the application to demonstrate that the design of the facility falls within the site characteristics and design parameters specified in the ESP.<sup>12</sup> The Staff also reviewed

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<sup>9</sup> "Environmental Impact Statement for an Early Site Permit (ESP) at the North Anna ESP Site" (Final Report), NUREG-1811, vols. 1-2 (Dec. 2006) (ML063470330, ML063470332) (ESP Final EIS). The Staff's environmental review of Dominion's combined license application is therefore a supplement to the ESP Final EIS. Ex. NRC-009, "Supplemental Environmental Impact Statement for the Combined License (COL) for North Anna Power Station Unit 3" (Final Report), NUREG-1917 (Feb. 2010) § 1.0 (ML17086A259) (Final SEIS); see Ex. NRC-001, Staff Information Paper, at 4.

<sup>10</sup> Ex. NRC-009, Final SEIS § 1.1.1; Ex. NRC-001, Staff Information Paper, at 4.

<sup>11</sup> Ex. NRC-001, Staff Information Paper, at 4.

<sup>12</sup> The Staff's review of the ESP application included the "major features" of the emergency plan; the complete and integrated emergency plan was submitted as part of the COL application. "Safety Evaluation Report for an Early Site Permit (ESP) at the North Anna ESP Site," NUREG-1835 (Sept. 2005), at 1-1 (ML052710305) (ESP SER); see Ex. NRC-005C, COL FSAR § 13.3; Ex. NRC-007, "Final Safety Evaluation Report for the North Anna Unit 3 Combined License Application" (Jan. 2017) § 13.3 (ML17086A258) (COL Final SER); see *also* 10 C.F.R. § 52.17(b)(2). A portion of the Final SER is non-public and was admitted into the record as Ex. NRC-008.

site-specific safety issues not addressed in either the ESP or design certification reviews. Safety matters resolved at the ESP and design certification stages are generally excluded from our review of Dominion's combined license application.<sup>13</sup>

Over the past nine years, the Staff has spent approximately 105,000 hours on the safety and environmental reviews of the application.<sup>14</sup> During this time, the Staff conducted approximately 100 public meetings and teleconferences.<sup>15</sup> Dominion responded to approximately 820 Staff requests for additional information, 800 of which were associated with the safety review and twenty of which were associated with the environmental review.<sup>16</sup>

Staff from across the agency contributed to the Office of New Reactors' technical review of Dominion's application.<sup>17</sup> The U.S. Army Corps of Engineers (Corps) commented on the Draft SEIS.<sup>18</sup> In addition, the Staff consulted with federal, state, local, and tribal organizations and governments concerning a variety of issues, including those arising under the National Environmental Policy Act of 1969 (NEPA), the National Historic Preservation Act (NHPA), and

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<sup>13</sup> 10 C.F.R. §§ 52.39 and 52.63; ESP SER; "Safety Evaluation Report for an Early Site Permit (ESP) at the North Anna ESP Site," NUREG-1835, supp. 1 (Nov. 2006) (ML063170371); see also Ex. NRC-001, Staff Information Paper, at 12; Ex. NRC-010, Combined License Application (COLA) Review for North Anna 3 (NA3)—Overview Panel (Mar. 23, 2017), at 4 (ML17086A260) (Staff Overview Presentation). See generally ESP Final EIS.

<sup>14</sup> Tr. at 46 (Ms. Ordaz).

<sup>15</sup> Ex. NRC-001, Staff Information Paper, at 6; Tr. at 46 (Ms. Ordaz).

<sup>16</sup> Tr. at 47 (Ms. Ordaz).

<sup>17</sup> *Id.* at 47-48 (Ms. Ordaz).

<sup>18</sup> See, e.g., Ex. NRC-009, Final SEIS, app. C, at C-11; *id.*, app. E, tbl. E-1; Ex. NRC-004, *NRC Staff Responses to Commission Pre-Hearing Questions* (Mar. 2, 2017), at 13 (ML17086A244) (Staff Pre-Hearing Responses).

the Endangered Species Act.<sup>19</sup> The Advisory Committee on Reactor Safeguards (ACRS), a committee of technical experts advising the Commission, provided an independent assessment of the safety aspects of Dominion's application.<sup>20</sup>

## **B. Review Standards**

Section 189a. of the Atomic Energy Act of 1954, as amended (AEA), requires that we hold a hearing on each application to construct a nuclear power plant, regardless of whether an interested member of the public requests a hearing on the application.<sup>21</sup> With respect to safety matters, we must determine whether

- (1) the applicable standards and regulations of the AEA and the Commission's regulations have been met;
- (2) any required notifications to other agencies or bodies have been duly made;
- (3) there is reasonable assurance that the facility will be constructed and will operate in conformity with the license, the provisions of the AEA, and the Commission's regulations;
- (4) the applicant is technically and financially qualified to engage in the activities authorized by the license; and
- (5) issuance of the license will not be inimical to the common defense and security or to the health and safety of the public.<sup>22</sup>

With respect to environmental matters, we must

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<sup>19</sup> Tr. at 56 (Ms. Bradford), 123 (Ms. Dozier); see Ex. NRC-009, Final SEIS, app. B & app. C.

<sup>20</sup> Atomic Energy Act § 182b., 42 U.S.C. § 2232(b); 10 C.F.R. §§ 1.13, 52.87; see Letter from Dennis C. Bley, ACRS, to Stephen G. Burns, Chairman, NRC (Nov. 16, 2016) (ML16312A412) (generally recommending approval of the combined license application) (ACRS Letter).

<sup>21</sup> AEA § 189a., 42 U.S.C. § 2239(a).

<sup>22</sup> 10 C.F.R. § 52.97(a).

- (1) determine whether the requirements of NEPA section 102(2)(A), (C), and (E), and the applicable regulations in 10 C.F.R. Part 51 (the NRC regulations implementing NEPA) have been met;
- (2) independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken;
- (3) determine, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, whether the combined license should be issued, denied, or appropriately conditioned to protect environmental values; and
- (4) determine whether the NEPA review conducted by the NRC Staff has been adequate.<sup>23</sup>

We do not review Dominion's application *de novo*; rather, our inquiry is whether the Staff's review was sufficient to support these findings.<sup>24</sup>

### **C. Procedural History**

In order to provide context for the COL proceeding, this section first relates a brief history of the North Anna ESP proceeding. Next, it recounts the history of the contested COL proceeding, which spanned from 2008 through 2015 and involved both site-specific litigation and petitions affecting multiple dockets.

#### **1. Early Site Permit Proceeding**

In September 2003, Dominion Nuclear North Anna, LLC, an indirect wholly-owned subsidiary of Dominion Resources, Inc., applied for an ESP, seeking approval to locate additional nuclear power reactors at a location within the existing North Anna Power Station

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<sup>23</sup> *Id.* § 51.107(a).

<sup>24</sup> See, e.g., *DTE Electric Co. (Fermi Nuclear Power Plant, Unit 3)*, CLI-15-13, 81 NRC 555, 560-61 (2015).

site.<sup>25</sup> Later that year, the Staff issued a notice of hearing and opportunity for interested members of the public to petition to intervene.<sup>26</sup> In response, the Blue Ridge Environmental Defense League (BREDL), the Nuclear Information and Resource Service, and Public Citizen (collectively, the ESP Petitioners) sought a hearing.<sup>27</sup>

The Board found that the ESP Petitioners had established standing to intervene in the proceeding and admitted two environmental contentions.<sup>28</sup> Both admitted contentions were resolved without an evidentiary hearing. Thereafter, in December 2006, the Staff published its Final EIS associated with the ESP.

In 2007, the Board issued its initial decision on the uncontested portion of the ESP proceeding.<sup>29</sup> The Board found that the Staff's review of the ESP application was adequate and the record was sufficient to support the safety-related findings required for the issuance of the

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<sup>25</sup> Letter from David A. Christian, Senior Vice President, Nuclear Operations and Chief Nuclear Officer, Dominion, to James E. Dyer, Director, Office of Nuclear Reactor Regulation, NRC (Sept. 25, 2003) (ML032731511); Dominion, North Anna Early Site Permit Application, Part 1, rev. 9 (Sept. 2006), at 1-1-1 (ML062580103).

<sup>26</sup> Dominion Nuclear North Anna, LLC; Notice of Hearing and Opportunity to Petition for Leave to Intervene; Early Site Permit for the North Anna ESP Site, 68 Fed. Reg. 67,489 (Dec. 2, 2003).

<sup>27</sup> *Contentions of Blue Ridge Environmental Defense League, Nuclear Information and Resource Service, and Public Citizen Regarding Early Site Permit Application for Site of North Anna Nuclear Power Plant* (May 3, 2004) (ML041320393); *Hearing Request and Petition to Intervene by Blue Ridge Environmental Defense League, Nuclear Information and Resource Service, and Public Citizen* (Jan. 2, 2004) (ML040510285).

<sup>28</sup> *Dominion Nuclear North Anna, LLC* (Early Site Permit for North Anna ESP Site), LBP-04-18, 60 NRC 253, 262-63, 276 (2004).

<sup>29</sup> *Dominion Nuclear North Anna, LLC* (Early Site Permit for North Anna ESP Site), LBP-07-9, 65 NRC 539 (2007).

ESP.<sup>30</sup> The Board also determined that the Staff had satisfied the requirements of NEPA and the NRC's environmental regulations.<sup>31</sup> The Board, however, expressed concern with the use of the PPE given our stated policy against issuance of "partial" ESPs.<sup>32</sup> The Board therefore highlighted the question for our review.<sup>33</sup> Thereafter, we took briefs from the parties on a number of issues, including the "partial ESP" issue raised by the Board,<sup>34</sup> and we ultimately "authorize[d] the Staff to issue the ESP."<sup>35</sup>

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<sup>30</sup> *Id.* at 629.

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

<sup>32</sup> *Id.* at 627; see Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors; Final Rule, 54 Fed. Reg. 15,372, 15,378 (Apr. 18, 1989) ("Where adequate information is not available, early site permits will not be issued.").

<sup>33</sup> *North Anna*, LBP-07-9, 65 NRC at 628, 629. At the time the Board issued its initial decision, 10 C.F.R. § 2.340(f) provided that presiding officers' decisions concerning construction permits (including ESPs, which are partial construction permits) were not effective until the Commission itself analyzed both the record and the presiding officer's decision and determined whether a stay of the permit was warranted. 10 C.F.R. § 2.340(f) (2007). Shortly after the Board issued LBP-07-9, we promulgated a final rule revising this provision and providing that a presiding officer's decision regarding an early site permit (among other actions) is immediately effective "unless the presiding officer finds that good cause has been shown by a party why the initial decision should not become immediately effective." Licenses, Certifications, and Approvals for Nuclear Power Plants; Final Rule, 72 Fed. Reg. 49,352, 49,476 (Aug. 28, 2007) (Part 52 Final Rule); see 10 C.F.R. § 2.340(f) (2008).

<sup>34</sup> *Dominion Nuclear North Anna, LLC* (Early Site Permit for North Anna ESP Site), CLI-07-23, 66 NRC 35, 35-36 (2007).

<sup>35</sup> *Dominion Nuclear North Anna, LLC* (Early Site Permit for North Anna ESP Site), CLI-07-27, 66 NRC 215, 259 (2007). We concluded that "incomplete information is not necessarily a fatal flaw, or even a flaw at all, in an ESP proceeding." *Id.* at 235. Another issue we considered at the time concerned the applicability of multiple radiation protection standards to new reactor construction on a site with existing reactors. We observed that the Board's questions would be deferred to the COL or CP stage. *Id.* at 250, 252-54. Dominion's COL application addresses radiation protection standards. See Ex. NRC-005C, COL FSAR, ch. 12; see *also* Ex. NRC-007, COL Final SER, ch. 12 (finding that the information Dominion provided regarding radiation protection was within the scope of the certified design and therefore that all nuclear safety

## **2. Combined License Application Contested Proceeding**

Initially, Dominion's combined license application referenced the ESBWR design.<sup>36</sup> In response to a notice of hearing on the application,<sup>37</sup> BREDL and its Virginia-based chapter, People's Alliance for Clean Energy, petitioned for leave to intervene and filed eight proposed contentions.<sup>38</sup> The North Carolina Utilities Commission (NCUC) sought to participate as an interested government entity.<sup>39</sup>

The Board found that BREDL had standing to intervene, granted NCUC's request to participate, and admitted one contention.<sup>40</sup> In Contention 1, BREDL argued that Dominion's application did not include a plan to manage low-level radioactive waste and that Dominion's environmental report did not analyze the environmental consequences of retaining low-level radioactive waste onsite.<sup>41</sup> In May 2009, Dominion revised its application to describe its plans

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issues related to radiation sources, dose assessments, and the operational radiation protection program were resolved).

<sup>36</sup> Dominion, North Anna Unit 3 Combined License Application, Part 2: Final Safety Analysis Report, rev. 0 (Nov. 2007) § 1.1 (ML073321127).

<sup>37</sup> Dominion Virginia Power; Notice of Hearing and Opportunity to Petition for Leave to Intervene on a Combined License for North Anna Unit 3, 73 Fed. Reg. 12,760 (Mar. 10, 2008). Subsequently, the Staff supplemented this notice. Dominion Virginia Power; Supplement to Notice of Hearing and Opportunity to Petition for Leave to Intervene on a Combined License for North Anna Unit 3; Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information (SUNSI) and Safeguards Information (SGI) for Contention Preparation, 73 Fed. Reg. 21,162 (Apr. 18, 2008).

<sup>38</sup> *Petition for Intervention and Request for Hearing by the Blue Ridge Environmental Defense League* (May 9, 2008) (Petition).

<sup>39</sup> *Request of the North Carolina Utilities Commission for an Opportunity to Participate in Any Hearing and to Be Added to the Official Service List* (May 9, 2008).

<sup>40</sup> LBP-08-15, 68 NRC 294, 338 (2008).

<sup>41</sup> *Id.* at 312-13; see Petition at 5-7. The Board admitted Contention 1 only as to its "safety" aspects; the Board held that the environmental portion of the contention had been resolved

for onsite management of Class B and Class C low-level radioactive waste.<sup>42</sup> Based on this revision, Dominion moved to dismiss Contention 1.<sup>43</sup> Thereafter, BREDL filed a motion to admit Contention 10, challenging Dominion's plans.<sup>44</sup> The Board dismissed Contention 1 as moot<sup>45</sup> and shortly thereafter admitted Contention 10, limited to BREDL's challenge to Dominion's claim that improved fuel performance will reduce the amount of Class B and Class C waste.<sup>46</sup>

In May 2010, Dominion notified the Staff of a change in its selected reactor design from the ESBWR to the U.S. Advanced Pressurized Water Reactor design.<sup>47</sup> BREDL then submitted a new Contention 11, arguing that Dominion's "mid-stream change of nuclear reactor technology for North Anna Unit 3 ... deprives the interested public of its rightful opportunity to

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during the ESP proceeding and was therefore barred from reconsideration at the COL stage pursuant to 10 C.F.R. § 52.39(a)(2). LBP-08-15, 68 NRC at 325.

<sup>42</sup> Letter from Eugene S. Grecheck, Vice President of Nuclear Dev., Dominion, to NRC Document Control Desk (May 21, 2009), at 1 (ML091520636). To implement this plan, Dominion proposed a Tier 2 departure, NAPS DEP 11.4-1, "Long-term, Temporary Storage of Class B and C Low-Level Radioactive Waste." Ex. NRC-007, COL Final SER §§ 11.4, 12.2. Dominion proposed the change to provide for North Anna Unit 3's radwaste building to allow for at least ten years of Class B and Class C waste and at least three months of packaged Class A waste. The certified design, by contrast, allows for onsite storage for six months' volume of packaged low-level radioactive waste. ESBWR DCD, Tier 2 Material § 11.4.1.

<sup>43</sup> *Dominion's Motion to Dismiss BREDL Contention 1 as Moot* (June 1, 2009).

<sup>44</sup> *Intervenor's Motion to Submit New Contention* (June 8, 2009); *see also Intervenor's Amended Contention Ten* (June 26, 2009).

<sup>45</sup> Order (Dismissing Contention 1 as Moot) (Aug. 19, 2009), at 3-4 (unpublished).

<sup>46</sup> LBP-09-27, 70 NRC 992, 1012-13, 1016 (2009). Dominion sought reconsideration of the Board's admission of Contention 10, which the Board denied. Order (Denying Motion for Reconsideration of LBP-09-27) (Mar. 22, 2010) (unpublished).

<sup>47</sup> Letter from Eugene S. Grecheck, Vice President, Nuclear Dev., Dominion, to NRC Document Control Desk (May 18, 2010) (ML101410207); *see* Letter from Eugene S. Grecheck, Vice President, Nuclear Dev., Dominion, to NRC Document Control Desk (June 28, 2010) (ML101820627) (transmitting revised application).

review and comment on [NRC] proceedings.”<sup>48</sup> BREDL requested that we direct Dominion to restart the application process from the beginning.<sup>49</sup> Reserving judgment on the admissibility of Contention 11, the Board set a deadline for new contentions based on Dominion’s revised application.<sup>50</sup>

Contemporaneously, Dominion sought to dismiss Contention 10 as moot given the changes to its application.<sup>51</sup> The Board granted Dominion’s motion to dismiss and at the same time denied admission of proposed Contention 11 on the ground that the contention was not material to the NRC’s licensing decision and did not articulate a genuine dispute of law with Dominion’s revised application.<sup>52</sup> BREDL thereafter filed two new contentions on Dominion’s revised application.<sup>53</sup> In Contention 12, concerning Dominion’s environmental review, BREDL argued for consideration of alternate cooling mechanisms.<sup>54</sup> The Board found that one aspect of Contention 12 had been resolved during the ESP proceeding and that no exception allowed

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<sup>48</sup> *Intervenor’s New Contention Eleven* (June 17, 2010), at 2.

<sup>49</sup> *Id.*

<sup>50</sup> Order (Setting Deadline for Filing New Contentions Based on New Information in the Applicant’s June 29, 2010 Revision to the License Application) (Aug. 11, 2010) (unpublished); see Order (Concerning the Schedule for Filing New Contentions based on Applicant’s June 29, 2010 Revision to its License Application) (July 13, 2010) (unpublished) (seeking parties’ views on the supplemental schedule while reserving judgment on the admissibility of Contention 11).

<sup>51</sup> *Dominion’s Motion to Dismiss BREDL’s Contention 10 as Moot* (July 12, 2010).

<sup>52</sup> LBP-10-17, 72 NRC 501, 517 (2010).

<sup>53</sup> *Intervenor’s New Contentions* (Oct. 2, 2010) (BREDL’s Contentions 12 and 13). BREDL referred to the new contentions as Contention One and Contention Two, respectively. *Id.* at 2, 6. For clarity, we use the Board’s terminology and refer to them as Contentions 12 and 13. LBP-11-10, 73 NRC 424, 427 (2011).

<sup>54</sup> BREDL’s Contentions 12 and 13 at 2-6.

BREDL to revisit the issue.<sup>55</sup> The Board concluded that the remaining aspects of the contention had been previously analyzed with respect to the ESBWR design and that the information had not materially changed. Accordingly, the Board found those portions of the contention untimely.<sup>56</sup> And in proposed Contention 13, BREDL argued that “Dominion ha[d] improperly requested a site-specific exemption from the Design Control Document Tier 1 for proposed North Anna Unit 3.”<sup>57</sup> The Board denied Contention 13 for failing to identify a genuine dispute with Dominion’s exemption request.<sup>58</sup>

Following the August 2011 earthquake in Mineral, Virginia, BREDL argued in Contention 14 that the earthquake and its effects indicated that the North Anna nuclear reactor site “is unsuitable for a third reactor.”<sup>59</sup> Thereafter, Dominion, with BREDL and the Staff’s consent,

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<sup>55</sup> LBP-11-10, 73 NRC at 432, 442-47. The previously resolved portion of Contention 12 related to the dry cooling tower alternative to mitigate thermal discharges and water use. *Id.* at 432; *see also North Anna*, LBP-07-9, 65 NRC at 564-69.

<sup>56</sup> LBP-11-10, 73 NRC at 432, 445-47.

<sup>57</sup> BREDL’s Contentions 12 and 13 at 6. The exemption request was associated with an exceedance of the safe-shutdown earthquake.

<sup>58</sup> LBP-11-10, 73 NRC at 452-53 (“while BREDL says that the [exemption] request is ‘improper,’ it does not say what is improper about that request or under which section of [Part 52 or 10 C.F.R. § 50.12] that request is inappropriate.”) (citation omitted). Following the Board’s denial of Contentions 12 and 13, Dominion sought clarification regarding why the Board kept the proceeding open in the absence of any admitted contentions and requested that the Board terminate the proceeding. *Dominion’s Motion for Clarification of LBP-11-10* (Apr. 18, 2011). The Board denied Dominion’s request; Dominion sought our review. LBP-11-22, 74 NRC 259, 285 (2011); *Dominion’s Petition for Review of LBP-11-22* (Sept. 16, 2011). We reversed the Board’s ruling but directed the Board “to exercise jurisdiction for the limited purpose of considering whether to reopen the record” and admit a proposed new contention—filed during the pendency of Dominion’s motion for clarification—related to the August 2011 earthquake in Mineral, Virginia. CLI-12-14, 75 NRC 692, 701-02 (2012).

<sup>59</sup> *Request to Admit Intervenor’s New Contention* (Sept. 22, 2011), at 3.

moved to hold the proposed contention in abeyance until Dominion completed its analysis of the earthquake's impact on the combined license application.<sup>60</sup> The Board granted Dominion's consent motion and held Contention 14 in abeyance.<sup>61</sup> In April 2013, Dominion notified the Board and the parties that it planned to return to the ESBWR design.<sup>62</sup> Dominion committed to provide an action plan regarding the schedule for the application revisions and stated that the plan would include an updated schedule for the seismic assessment related to Contention 14.<sup>63</sup>

In January 2014, Dominion advised the Board that it had updated its application to reflect the use of the ESBWR reactor design and completed its seismic assessment.<sup>64</sup> BREDL then moved to reopen the record and admit an amended Contention 14, arguing that "[Dominion] ... has not presented a sound probabilistic basis for the magnitude of the possible adverse consequences and the likelihood of occurrence of each consequence for issuing a

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<sup>60</sup> *Consent Motion to Hold BREDL's New Contention in Abeyance* (Oct. 12, 2011). Notwithstanding the consent motion, Dominion and the Staff both opposed admission of Contention 14. See *Dominion's Opposition to BREDL's New Contention* (Oct. 17, 2011); *NRC Staff Answer to "Request to Admit Intervenor's New Contention" Filed by the Blue Ridge Environmental Defense League* (Oct. 17, 2011).

<sup>61</sup> Order (Granting Consent Motion to Hold BREDL's New Contention in Abeyance) (Oct. 20, 2011), at 2 (unpublished); see CLI-12-14, 75 NRC at 698-99.

<sup>62</sup> Letter from David R. Lewis, Counsel for Dominion, to the Administrative Judges (Apr. 26, 2013) (attaching Letter from Eugene S. Grecheck, Vice President, Nuclear Eng'g and Dev., Dominion, to NRC Document Control Desk (Apr. 25, 2013)).

<sup>63</sup> *Id.* at 1-2. BREDL filed a motion to reopen the record and file new contentions based on the change to the ESBWR design but sought to defer submission of new contentions until after Dominion revised its application. *Request to Reopen and Admit New Contention* (May 28, 2013), at 1-2. The Board effectively granted this request and held the motion in abeyance pending BREDL's submission of contentions. Order (Holding Motion to Reopen the Proceeding in Abeyance) (July 23, 2013) (unpublished).

<sup>64</sup> Letter from David R. Lewis, Counsel for Dominion, to the Administrative Judges (Jan. 6, 2014).

license to construct and operate North Anna Unit 3.”<sup>65</sup> The Board denied BREDL’s motions on the ground that BREDL’s proposed contention neither challenged nor otherwise addressed Dominion’s revised application or seismic assessment and therefore failed to articulate a litigable issue.<sup>66</sup>

Several petitions filed on multiple dockets were dispositioned over the course of the contested proceeding. BREDL joined several petitioners and filed a petition to suspend reactor licensing and rulemaking decisions and for other relief in light of the March 2011 Fukushima Dai-ichi accident.<sup>67</sup> We denied the petitions in all but two respects: we granted the request for a safety analysis of the accident based on the agency’s plans for a short-term and long-term lessons-learned review, and we referred portions of the petition relating to pending certified design documents, including the ESBWR amendment, to the Staff as comments on the design certification rulemakings.<sup>68</sup>

As did petitioners in a number of other reactor licensing proceedings, early on in the proceeding BREDL proposed a contention concerning the NRC’s then-proposed Waste Confidence Decision update.<sup>69</sup> The Board denied admission of the contention because it was

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<sup>65</sup> *Motion to Reopen and Admit New Contention* (Mar. 7, 2014), at 1-2.

<sup>66</sup> LBP-14-8, 79 NRC 519, 525-26 (2014).

<sup>67</sup> *Emergency Petition to Suspend all Pending Reactor Licensing Decisions and Related Rulemaking Decisions Pending Investigation of Lessons Learned from Fukushima Daiichi Nuclear Power Station Accident* (Apr. 18, 2011).

<sup>68</sup> *Union Electric Co. d/b/a Ameren Missouri* (Callaway Plant, Unit 2), CLI-11-5, 74 NRC 141, 173, 175-76 (2011); see *Economic Simplified Boiling-Water Reactor Design Certification*; Final Rule, 79 Fed. Reg. 61,944 (Oct. 15, 2014).

<sup>69</sup> *Intervenor’s New Contention Nine* (March 9, 2009). See generally *Waste Confidence Decision Update*, 73 Fed. Reg. 59,551 (Oct. 9, 2008); *Consideration of Environmental Impacts*

impermissibly late and did not rely on new and previously unavailable information.<sup>70</sup> In 2012, in response to the D.C. Circuit's vacatur and remand of the agency's Waste Confidence Decision Update and Temporary Storage Rule, BREDL and several other petitioners sought to suspend pending licensing decisions, including North Anna, until the agency completed action on the court's remand.<sup>71</sup> We granted the petitions in part—we suspended the issuance of final licensing decisions until the court's remand was appropriately addressed and held any related contentions, including BREDL's proposed contention in this case, in abeyance until further order.<sup>72</sup>

We lifted the suspension on final licensing decisions in August 2014, after we approved a generic environmental impact statement (GEIS) and final Continued Storage Rule that

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of Temporary Storage of Spent Fuel After Cessation of Reactor Operation, 73 Fed. Reg. 59,547 (Oct. 9, 2008).

<sup>70</sup> Order (Denying Motion to Admit Proposed Contention Nine) (June 2, 2009), at 5-6 (unpublished). And the Board concluded that even if Contention 9 had been timely filed, it would have been inadmissible because it sought to litigate the subject of an ongoing rulemaking. *Id.* at 6-7; see 10 C.F.R. § 2.335(a).

<sup>71</sup> *Petition to Suspend Final Decisions in all Pending Reactor Licensing Proceedings Pending Completion of Remanded Waste Confidence Proceedings* (June 18, 2012), at 12. See generally *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012); Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operation; Final Rule, 75 Fed. Reg. 81,032 (Dec. 23, 2010); Waste Confidence Decision Update, 75 Fed. Reg. 81,037 (Dec. 23, 2010). BREDL also filed a motion to reopen the proceeding to admit a contention challenging Dominion's Environmental Report in light of the court's decision. *Motion to Reopen the Record for North Anna Unit 3* (July 9, 2012); *Intervenors' Motion for Leave to File a New Contention Concerning Temporary Storage and Ultimate Disposal of Nuclear Waste at North Anna Unit 3* (July 9, 2012).

<sup>72</sup> *Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-12-16, 76 NRC 63, 67-69 (2012).

addressed the issues in the D.C. Circuit's remand.<sup>73</sup> BREDL thereafter joined another multi-docket suspension petition with a motion to reopen and a proposed new contention that challenged the Continued Storage Rule's lack of safety findings, later followed by three additional filings: a petition to supplement the Final SEIS to include the Continued Storage Rule and GEIS, a motion to lodge an associated "placeholder" contention challenging the NRC's reliance on the rule and GEIS, and another motion to reopen.<sup>74</sup> We denied the petitions and motions.<sup>75</sup> Resolution of these "continued storage" claims ended the contested proceeding.

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<sup>73</sup> *Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-14-8, 80 NRC 71, 74-75 (2014). At the same time, we dismissed BREDL's proposed contention as a challenge to the new rule. *Id.* at 81. See generally *Continued Storage of Spent Nuclear Fuel; Final Rule*, 79 Fed. Reg. 56,238 (Sept. 19, 2014); *Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel*, 79 Fed. Reg. 56,263 (Sept. 19, 2014); "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel" (Final Report), NUREG-2157, vols. 1-2 (Sept. 2014) (ML14196A105, ML14196A107).

<sup>74</sup> *Petition to Suspend Final Decisions in all Pending Reactor Licensing Proceedings Pending Issuance of Waste Confidence Safety Findings* (Sept. 29, 2014; errata filed Oct. 1, 2014); *Petitioner's Motion for Leave to File a New Contention Concerning the Absence of Required Waste Confidence Safety Findings in the Licensing Proceeding at North Anna Nuclear Power Plant* (Sept. 29, 2014); *Petition to Supplement Reactor-Specific Environmental Impact Statements to Incorporate by Reference the Generic Environmental Impact Statement for Continued Spent Fuel Storage* (Jan. 28, 2015); *Blue Ridge Environmental Defense League's Hearing Request and Petition to Intervene in Combined License Proceeding for North Anna Unit 3 Nuclear Power Plant* (Apr. 22, 2015); *Blue Ridge Environmental Defense League's Motion to Reopen the Record of Combined License Proceeding for North Anna Unit 3 Nuclear Power Plant* (Apr. 22, 2015).

<sup>75</sup> *Duke Energy Carolinas, LLC* (William States Lee III Nuclear Station, Units 1 and 2), CLI-15-15, 81 NRC 803, 804-05 (2015); *DTE Electric Co.* (Fermi Nuclear Power Plant, Unit 3), CLI-15-10, 81 NRC 535, 544 (2015); *DTE Electric Co.* (Fermi Nuclear Power Plant, Unit 3), CLI-15-4, 81 NRC 221, 242 (2015). Several petitioners sought review of the Continued Storage Rule and GEIS in the D.C. Circuit. The court denied the petitions for review, *New York v. NRC*, 824 F.3d 1012 (D.C. Cir. 2016), and a subset of petitioners, including BREDL, filed a petition for rehearing *en banc* that was also denied. *New York v. NRC*, No. 14-1210 (D.C. Cir. Aug. 8, 2016) (ML16221A602) (order denying petition for rehearing *en banc*).

#### **D. The Uncontested Proceeding**

All safety and environmental matters relevant to the combined license application, except those resolved in the contested combined license proceeding, are subject to our review in the uncontested proceeding.<sup>76</sup> The uncontested portion of the proceeding begins once the Staff has completed both its environmental and safety reviews. Here, the Final SEIS was completed in 2010; the release of the COL Final SER on January 12, 2017, triggered the uncontested proceeding.<sup>77</sup> Shortly after the Staff issued the COL Final SER, we received the Staff's statement in support of the uncontested hearing, which serves as the Staff's initial testimony and provides an overview of its safety and environmental review of the application.<sup>78</sup> Consistent with the design-centered review approach, the Staff's paper focused on "[n]onroutine matters ... that relate to any unique features of the facility or novel issues that arose as part of the review process."<sup>79</sup>

We issued a Notice of Hearing on January 31, 2017, which set a schedule for pre-hearing filings.<sup>80</sup> In that notice, we invited interested states, local government bodies, and federally recognized Indian tribes to provide a statement of issues for us to consider as part of

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<sup>76</sup> See, e.g., *Fermi*, CLI-15-13, 81 NRC at 564-65.

<sup>77</sup> See Ex. NRC-009, Final SEIS; see also NRC-007, COL Final SER.

<sup>78</sup> Ex. NRC-001, Staff Information Paper.

<sup>79</sup> *Id.* at 2.

<sup>80</sup> Dominion Virginia Power, North Anna Unit 3, 82 Fed. Reg. 8864 (Jan. 31, 2017).

the uncontested proceeding.<sup>81</sup> We also issued pre-hearing questions to both the Staff and Dominion and received their written responses prior to the hearing.<sup>82</sup>

The hearing presentations were made by witness panels.<sup>83</sup> The first panel of witnesses for Dominion and the Staff gave an overview of the license application and the Staff's review, respectively. The second panel focused on safety issues, and the third panel focused on environmental issues. Overall, the Staff made available seventy-four witnesses at the hearing, including scheduled panelists.<sup>84</sup> Ten witnesses offered testimony on behalf of Dominion at the hearing and in pre-filed testimony.<sup>85</sup>

Among other things, Dominion's overview panelists discussed the general qualifications and nuclear experience of Dominion, the selection of the ESBWR certified design, variances

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<sup>81</sup> *Id.* at 8864-65. We did not receive any statements in response to this invitation.

<sup>82</sup> Order (Transmitting Pre-Hearing Questions) (Feb. 17, 2017) (unpublished) (Pre-Hearing Question Order); Ex. NRC-004, Staff Pre-Hearing Responses; Ex. DVP-003, *Dominion Virginia Power's Responses to Pre-Hearing Questions* (Mar. 2, 2017) (ML17086A232) (Dominion Pre-Hearing Responses).

<sup>83</sup> A scheduling note set forth the topics and order of presentations for the hearing. Scheduling Note, "Hearing on Combined License for North Anna Nuclear Plant, Unit 3: Section 189a. of the Atomic Energy Act (Public Meeting)" (Mar. 13, 2017) (ML17073A161).

<sup>84</sup> See *NRC Staff Revised Witness List* (Mar. 16, 2017). Seventeen of the listed witnesses did not appear at the hearing. The Staff made available six additional witnesses—Emil Tabakov, Richard Turtill, Richard Clement, Joe Ashcraft, Nilesh Chokshi, and Lauren Kent—not previously included on its witness list. Compare *id.*, attach. at 1-3, with Tr. at 12-13 (Ms. Carpentier).

<sup>85</sup> See *Dominion Virginia Power's Revised Witness List* (Mar. 16, 2017); Ex. DVP-001-R, Dominion Pre-Filed Testimony; Tr. at 10 (Mr. Lewis). David Hinds, who was not included on Dominion's revised witness list, also offered testimony at the hearing. See Tr. at 106-08 (Mr. Hinds).

from the ESP, and environmental permits.<sup>86</sup> The Staff panelists provided background on the review of the COL application and a summary of the Staff's safety and environmental findings under 10 C.F.R. § 52.97(a); NEPA sections 102(2)(A), (C), and (E); and 10 C.F.R. § 51.107(a).<sup>87</sup>

The safety panel focused on particular novel issues in the Staff's review: (1) changes to the probabilistic seismic hazard analysis and ground motion response spectra following the 2011 Mineral, Virginia earthquake; (2) the certified seismic design response spectra (CSDRS) exceedances and their effect on site-specific structures, systems, and components; and (3) fuel assembly and control rod structural response.<sup>88</sup> The environmental panel first discussed the ESP Final EIS to provide context for the environmental review associated with the COL application. The panel went on to address the resolution of issues left open at the time of the ESP environmental analysis, the Staff's review process for the COL Final SEIS, and the Staff's process for considering new and potentially significant information following publication of the COL Final SEIS.<sup>89</sup> These issues are discussed further in section II.

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<sup>86</sup> See Tr. at 16-43; Ex. DVP-004, Dominion Virginia Power, Mandatory Hearing on Combined License for North Anna Power Station, Unit 3—Overview Panel (Mar. 23, 2017) (ML17086A233).

<sup>87</sup> See Tr. at 44-76; Ex. NRC-010, Staff Overview Presentation.

<sup>88</sup> See Tr. at 77-108; Ex. DVP-005, Dominion Virginia Power, Mandatory Hearing on Combined License for North Anna Power Station, Unit 3—Safety Panel (Mar. 23, 2017) (ML17086A234) (Dominion Safety Presentation); Ex. NRC-011, Combined License Application Review North Anna 3 (NA3)—Safety Panel (Mar. 23, 2017) (ML17086A261) (Staff Safety Presentation).

<sup>89</sup> See Tr. at 109-55; Ex. DVP-006, Dominion Virginia Power, Mandatory Hearing on Combined License for North Anna Power Station, Unit 3—Environmental Panel (Mar. 23, 2017) (ML17086A235); Ex. NRC-012, Combined License Application Review North Anna Unit 3—Environmental Panel (Mar. 23, 2017) (ML17086A262) (Staff Environmental Presentation).

Following the hearing, we posed two additional questions to the Staff.<sup>90</sup> The Staff's written response was admitted as an exhibit, and after adopting corrections to the hearing transcript, we closed the evidentiary record.<sup>91</sup>

## II. DISCUSSION

Although our review encompassed the entire application, our decision discusses just a few of the safety and environmental topics addressed during the uncontested portion of the proceeding. We first consider Dominion's requested exemptions from our regulatory requirements and departures from the ESBWR certified design. Our discussion then turns to site-specific and novel issues.

### A. Exemptions and Departures

Dominion requested five exemptions and identified six departures from the ESBWR certified design.<sup>92</sup> Where a combined license applicant references a certified design, changes to the design may be made in the combined license if proposed as a departure from the certified design. Some departures may be made without prior Commission approval.<sup>93</sup> But departures that involve a change to the design as described in the rule certifying the design require an

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<sup>90</sup> Order (Transmitting Post-Hearing Questions) (Mar. 30, 2016), at 2 (unpublished) (Post-Hearing Question Order).

<sup>91</sup> Order (Adopting Proposed Transcript Corrections, Admitting Post-Hearing Exhibit, and Closing the Record of the Proceeding) (Apr. 24, 2017) (unpublished).

<sup>92</sup> Ex. NRC-001, Staff Information Paper, at 13-19; see Ex. NRC-005L, Dominion, North Anna 3, Combined License Application, Parts 3, 4, 5, 7, 8 & 10 (various dates), pt. 7 (ML17086A257) (COLA Departures Report).

<sup>93</sup> 10 C.F.R. pt. 52, app. E, VIII.B.5.a.

exemption from our regulations.<sup>94</sup> The Staff may approve an exemption where it finds that the exemption is authorized by law, will not present an undue risk to the public health and safety, is consistent with the common defense and security, and special circumstances exist that warrant the exemption.<sup>95</sup> In addition, the Staff must determine that the special circumstances outweigh any decrease in safety resulting from the reduction in standardization that may result from the exemption.<sup>96</sup>

Exemption 1 removes certain requirements pertaining to material control and accounting for special nuclear materials, such that the same requirements apply to both Part 52 and Part 50 licensees.<sup>97</sup> This exemption has been granted to other combined license holders.<sup>98</sup> Dominion requested four additional exemptions from the ESBWR certified design. The Staff's technical evaluation of these exemptions is described in the Final SER.<sup>99</sup> And the ACRS reviewed the exemptions, found them acceptable, and recommended their approval.<sup>100</sup>

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<sup>94</sup> *Id.* pt. 52, app. E, VIII.A.4. The requirements that combined license applicants must meet when seeking an exemption from the Commission's regulations are found at 10 C.F.R. § 52.93.

<sup>95</sup> *See id.* §§ 52.63(b)(1), 52.7, 50.12(a).

<sup>96</sup> *Id.* § 52.63(b)(1). Prior to the hearing, we asked the Staff to describe its environmental review of Dominion's requested exemptions. Pre-Hearing Question Order at 7. The Staff provided a discussion of the results of the environmental review it performed of new and potentially significant information. Ex. NRC-004, Staff Pre-Hearing Responses, at 15-16. The Staff stated that it found the environmental impacts of the exemptions to be bounded by the findings it had made in both the ESP Final EIS and the COL Final SEIS. *Id.* at 16.

<sup>97</sup> Ex. NRC-007, COL Final SER § 1.5.4; *see Southern Nuclear Operating Co. (Vogtle Electric Generating Plant, Units 3 and 4), CLI-12-2, 75 NRC 63, 84 (2012) (citations omitted); Ex. NRC-001, Staff Information Paper at 14-15.*

<sup>98</sup> Ex. NRC-001, Staff Information Paper at 14-15; *see, e.g., Vogtle, CLI-12-2, 75 NRC at 84.*

<sup>99</sup> *See Ex. NRC-007, COL Final SER §§ 3.7.1.4, 8.1.4, 11.2.4, app. 19A.*

<sup>100</sup> ACRS Letter at 1.

Exemption 2 relates to a departure from the certified design: NAPS DEP 8.1-1, “Electrical Power Distribution Functional Arrangement.” This departure concerns a revision to the certified design (to incorporate an intermediate switchyard) to change the location information for the main generator circuit breaker.<sup>101</sup> The Staff found that the exemption met our regulatory criteria. The underlying purpose of the requirement “is to identify the standard ESBWR switchyard layout and configuration that will function in a manner the NRC has determined [will satisfy] NRC requirements.”<sup>102</sup> The Staff concluded that the switchyard, with the change in configuration, would continue to perform its intended function and meet the underlying purpose of the requirement.<sup>103</sup> The Staff found that special circumstances—namely, site-specific space constraints—outweighed the reduction in standardization and that there was no significant decrease in safety because the proposed exemption would not change the function of the switchyard.<sup>104</sup>

Exemption 3 concerns a departure to account for the site-specific seismological and geological conditions at the site, NAPS DEP 3.7-1, “Ground Response Spectra for Seismic Structural Loads and Floor Response Spectra.” This issue is discussed further in section II.B.1.

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<sup>101</sup> Ex. NRC-001, Staff Information Paper, at 15; see Ex. NRC-007, COL Final SER § 8.1.2. Additionally, Dominion proposed a departure from Tier 2, NAPS DEP 8.1-2, “Switchyard Surge Protection.” Ex. NRC-007, COL Final SER § 8.1.4, at 8-6. That departure involved exceptions from the Institute of Electrical and Electronics Engineers Standard C62.23. The Staff reviewed each proposed exception and found that the section either was inapplicable to North Anna Unit 3 or that Dominion’s departure provided equivalent protection. *Id.* § 8.1.4, at 8-7 to 8-8.

<sup>102</sup> *Id.* § 8.1.4, at 8-5.

<sup>103</sup> *Id.*

<sup>104</sup> *Id.* § 8.1.4, at 8-5 to 8-6.

Exemption 4, which is associated with NAPS DEP 12.3-1, “Liquid [Radioactive Waste] Effluent Discharge Piping Flow Path,” involves a revision to the liquid waste management system to simplify the design and construction of the cooling tower blow-down line.<sup>105</sup> The certified design defines the liquid waste management system as either returning processed water to the condensate system or discharging water to the environment via the circulating water system. Dominion seeks an exemption to use the liquid radioactive waste effluent discharge pipeline as a discharge mechanism.<sup>106</sup> The Staff evaluated the exemption request and found it acceptable.<sup>107</sup> Specifically, the Staff found that the change in the design would not alter the requirements of liquid radioactive waste release and, since Dominion asserted that it only planned to release liquid radioactive waste in unusual circumstances, the effluent would be properly diluted using a controlled procedure.<sup>108</sup> The Staff further determined that special circumstances are present because the application of the certified design in this case is not necessary to achieve the underlying purpose of the rule.<sup>109</sup> The Staff also found that there will be no reduction in safety resulting from the reduction in standardization due to the exemption.<sup>110</sup>

Dominion proposed Exemption 5, which relates to two departures: NAPS DEP 19A-1, “Design of Structures Housing [Regulatory Treatment of Non-Safety Systems (RTNSS)]

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<sup>105</sup> Ex. NRC-001, Staff Information Paper, at 18; Ex. NRC-007, COL Final SER § 11.2.2.

<sup>106</sup> Ex. NRC-001, Staff Information Paper, at 14; Ex. NRC-007, COL Final SER § 11.2.4, at 11-6 to 11-7.

<sup>107</sup> Ex. NRC-007, COL Final SER § 11.2.4, at 11-10.

<sup>108</sup> *Id.* § 11.2.4, at 11-8 to 11-9.

<sup>109</sup> *Id.* § 11.2.4, at 11-9 to 11-10.

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

Equipment for Hurricane-Wind-Generated Missiles,” and NAPS DEP 3.7-1, “Non-seismic Structures that House RTNSS Criterion C systems,” to account for the hurricane winds and hurricane-wind-generated missiles more severe than contemplated in the certified design.<sup>111</sup> RTNSS structures are designed to withstand the hurricane-wind-generated missile spectra in the certified design and the site-specific missile spectra and velocities derived using criteria in Regulatory Guide 1.221, “Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants.”<sup>112</sup> Following its receipt of the ESBWR certified design application, the Staff issued Regulatory Guide 1.221, which updated the definition of maximum hurricane winds and hurricane-wind-generated missile parameters.<sup>113</sup> The exemption and departures would address the site-specific hurricane-wind-generated missile velocities that exceed those set forth in the DCD.<sup>114</sup> Exemption 5 updates Tier 1 information to specify the use of Regulatory Guide 1.221 methodology for deriving site-specific missile velocities for design of structures housing RTNSS

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<sup>111</sup> Ex. NRC-007, COL Final SER, app. 19A, at 19-13 to 19-14; Ex. NRC-001, Staff Information Paper, at 14-15, 18-19.

<sup>112</sup> Ex. NRC-005L, COLA Departures Report, pt. 7, at 3-12; see ESBWR DCD, Tier 1 Material, tbl. 5.1-1 & n.7; “Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants,” Regulatory Guide 1.221 (Oct. 2011) (ML110940300). Regulatory Guide 1.221 provides one method the Staff considers acceptable for fulfilling the requirements of General Design Criteria 2 and 4 and 10 C.F.R. §§ 100.10(c)(2), 100.20(c)(2) and 100.21(d). *Id.* at 1-2.

<sup>113</sup> Ex. NRC-001, Staff Information Paper, at 18-19; Ex. NRC-005L, COLA Departures Report, pt. 7, at 1-17.

<sup>114</sup> Ex. NRC-005L, COLA Departures Report, pt. 7, at 1-17.

equipment when the site-specific missiles are more severe than specified in the certified design.<sup>115</sup> The Staff evaluated the exemption and found it acceptable.<sup>116</sup>

**B. Site-Specific Issues Addressed in the Proceeding**

**1. Safety-Related Issues**

**a. Revisions to the Application Related to the Mineral, Virginia Earthquake**

On August 23, 2011, a magnitude 5.8 earthquake occurred in Mineral, Virginia, 11 miles southwest of the North Anna site.<sup>117</sup> The Mineral earthquake was one of the largest earthquakes in the Central and Eastern United States in recent history.<sup>118</sup> The earthquake exceeded the design basis earthquake for the operating units at the site, and Dominion shut down both units and performed inspections.<sup>119</sup> Following the earthquake, and in view of the publication of new seismic source characterization and ground motion models for use in seismic hazard assessments for nuclear plants in the Central and Eastern United States, the Staff requested that Dominion provide additional information on the North Anna Unit 3 probabilistic seismic hazard analysis.<sup>120</sup>

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<sup>115</sup> *Id.* at 3-13.

<sup>116</sup> Ex. NRC-007, COL Final SER, app. 19A, at 19-11 to 19-13; Ex. NRC-001, Staff Information Paper, at 18-19.

<sup>117</sup> Ex. NRC-001, Staff Information Paper, at 29; Tr. at 86-87 (Mr. Graizer).

<sup>118</sup> Tr. at 86 (Mr. Graizer).

<sup>119</sup> *Id.*; Ex. NRC-011, Staff Safety Presentation, at 7.

<sup>120</sup> Tr. at 79 (Mr. Waddill); Ex. NRC-001, Staff Information Paper, at 29; see RAI Letter 102 (June 25, 2012) (ML12177A435); see also “Central and Eastern United States Seismic Source Characterization for Nuclear Facilities,” NUREG-2115, vols. 1-6 (Feb. 2012) (ML12048A776 (package)). Dominion sought a variance from the North Anna ESP to account for the actual elevation of the reactor and fuel building foundations in the combined license application and to use the updated models, data, and methodologies, rather than those previously used at the

Using the seismic hazard analysis results, Dominion recalculated the ground motion response spectra at the site and compared the new findings to the certified seismic design response spectra (CSDRS), the seismic design basis for the ESBWR design, and recordings of the Mineral earthquake.<sup>121</sup> Dominion found that the North Anna site ground motion response spectra exceeded the CSDRS by no more than ten percent at certain frequencies but concluded that the Mineral earthquake was bounded by the CSDRS.<sup>122</sup> Dominion performed further analyses, discussed below, to confirm that the plant could accommodate the increased ground motion.<sup>123</sup> The Staff independently confirmed Dominion's calculations and concluded that the updated site-specific probabilistic seismic hazard analysis and ground motion response spectra developed for the proposed new plant were acceptable.<sup>124</sup>

*b. Ground Response Spectra for Seismic Structural Loads and Floor Response Spectra*

General Design Criterion 2 requires that safety-related structures at nuclear power plants be able to withstand the most severe earthquakes historically reported for the site and the

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ESP stage. Ex. NRC-005L, COLA Departures Report, pt. 7, at 2-4 to 2-7; Ex. NRC-001, Staff Information Paper, at 21-22; Tr. at 87 (Mr. Graizer); Ex. NRC-007, COL Final SER § 2.5.2.2, at 2-158 to 2-159. Based on the redefinition of the ground motion response spectra and the updated seismic model, the Staff found Dominion's requested variance acceptable. Ex. NRC-007, COL Final SER § 2.5.2.4; Ex. NRC-001, Staff Information Paper, at 21-22.

<sup>121</sup> Tr. at 79 (Mr. Waddill); Ex. NRC-001, Staff Information Paper, at 29; Ex. NRC-011, Staff Safety Presentation, at 11-12; Ex. DVP-005, Dominion Safety Presentation, at 3-4; Ex. NRC-007, COL Final SER § 2.5.2.2, at 2-172 to 2-173.

<sup>122</sup> Ex. NRC-005B, COL FSAR § 3.7.1, at 3-4 to 3-5; see Ex. NRC-001, Staff Information Paper, at 29; Ex. NRC-011, Staff Safety Presentation, at 11-12.

<sup>123</sup> Ex. NRC-001, Staff Information Paper, at 29; see Ex. NRC-007, COL Final SER § 3.7.2.4, at 3-62 to 3-63.

<sup>124</sup> Ex. NRC-007, COL Final SER §§ 2.5.2.4, 3.7.2.4; Tr. at 88 (Mr. Graizer); Ex. NRC-001, Staff Information Paper, at 30; Ex. NRC-011, Staff Safety Presentation, at 10, 13.

area surrounding the site.<sup>125</sup> Dominion proposed a departure from the certified design, NAPS DEP 3.7-1, "Ground Response Spectra for Seismic Structural Loads and Floor Response Spectra," to include both the CSDRS and the site-specific foundation input response spectra (FIRS) for each seismically qualified structure.<sup>126</sup> As part of its seismic analyses, Dominion determined that the North Anna Unit 3 site horizontal and vertical FIRS for the reactor building and fuel building, control building, and firewater service complex structures were not bounded by the CSDRS at all frequencies.<sup>127</sup> To support the departure, Dominion performed site-specific soil-structure interaction analyses of these structures and used the updated seismic loads and the non-seismic standard design loads to evaluate the structural adequacy of the buildings.<sup>128</sup> As a result of these analyses, Dominion proposed changes such as the arrangement of steel reinforcements and shear ties and increasing the size of certain welds, anchor bolts, and a steel girder.<sup>129</sup>

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<sup>125</sup> 10 C.F.R. pt. 50, app. A, Criterion 2.

<sup>126</sup> Ex. NRC-001, Staff Information Paper, at 15, 30; Ex. NRC-007, COL Final SER § 3.7.1.2; Tr. at 90-91 (Mr. Chakravorty).

<sup>127</sup> Tr. at 79-80 (Mr. Waddill); Ex. NRC-007, COL Final SER § 3.7.1.4, at 3-25.

<sup>128</sup> Tr. at 80-81 (Mr. Waddill), 92 (Mr. Chakravorty); Ex. NRC-001, Staff Information Paper, at 30; Ex. NRC-007, COL Final SER § 3.7.1.2.

<sup>129</sup> Ex. NRC-005B, COL FSAR, app. 3G §§ 3G.7-3G.10; Ex. NRC-007, COL Final SER § 3.8.4.4; Tr. at 81-82 (Mr. Waddill) (describing minor adjustments to certain components, including larger anchor bolts for fuel racks and in the buffer pool), 92-93 (Mr. Chakravorty); Ex. NRC-011, Staff Safety Presentation, at 19. Dominion did not propose changes to the thickness of concrete walls or slabs. Tr. at 81 (Mr. Waddill), 93 (Mr. Chakravorty); Ex. NRC-001, Staff Information Paper, at 31.

In considering NAPS DEP 3.7-1, the Staff reviewed the information Dominion provided in its application and Dominion's responses to RAIs.<sup>130</sup> The Staff undertook a confirmatory analysis of Dominion's results and performed technical audits of Dominion's site-specific seismic analysis and structural evaluation of the certified design structures.<sup>131</sup> For example, the Staff examined Dominion's soil-structure interaction analyses for the reactor building and fuel building, the control building, and the firewater service complex.<sup>132</sup> The Staff found Dominion's final soil-structure interaction input response spectra for the reactor building and fuel building and the control building soil-structure interaction analysis acceptable because Dominion's methodology comported with applicable Staff guidance.<sup>133</sup> The Staff also found that the surface response generally bounds the performance-based surface response spectra for the two embedment configurations, and the soil-structure interaction input spectra comply with the minimum horizontal ground motion requirement set forth in our regulations.<sup>134</sup> In response to an RAI, Dominion tailored its soil-structure interaction analysis for the firewater service complex to include a new control motion at the bottom of the concrete fill.<sup>135</sup> The Staff reviewed Dominion's

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<sup>130</sup> Ex. NRC-007, COL Final SER §§ 3.7, 3.8; Ex. NRC-001, Staff Information Paper, at 31.

<sup>131</sup> Ex. NRC-001, Staff Information Paper, at 31; Ex. NRC-007, COL Final SER §§ 3.7, 3.8; Ex. NRC-011, Staff Safety Presentation, at 20; Tr. at 93-94 (Mr. Chakravorty).

<sup>132</sup> Ex. NRC-007, COL Final SER § 3.7.1.4, at 3-31 to 3-34.

<sup>133</sup> *Id.* at 3-33; see "Interim Staff Guidance on Ensuring Hazard-Consistent Seismic Input for Site Response and Soil Structure Interaction Analyses," DC/COL-ISG-017 (Mar. 24, 2010) (ML100570203).

<sup>134</sup> Ex. NRC-007, COL Final SER § 3.7.1.4, at 3-33; see 10 C.F.R. pt. 50, app. S, IV.(a)(1)(i).

<sup>135</sup> Ex. NRC-007, COL Final SER § 3.7.1.4, at 3-34; Letter from Mark D. Mitchell, Vice President – Generation Constr., Dominion, to NRC Document Control Desk (Feb. 23, 2015), encl. 5 (ML15056A047).

analysis and found it acceptable because it included soil-structure interaction input response spectra applied at both the foundation level and the concrete fill and the results of the two sets of soil-structure interaction analyses were enveloped to develop the site-specific seismic demand of the firewater service complex. The Staff determined that the soil-structure interaction input spectra met the minimum horizontal ground motion requirement set forth in our regulations.<sup>136</sup>

Because NAPS DEP 3.7-1 involves a change to Tier 1 information, Dominion's proposed departure from the ESBWR certified design requires an associated exemption from our regulations.<sup>137</sup> The Staff evaluated Dominion's request for an exemption regarding ground motion response spectra and found that it met the regulatory requirements for approval of the exemption.<sup>138</sup> Overall, the Staff found that changes to the certified design were minimal and that the modifications to the design augmented the certified design for the site-specific seismic conditions present at North Anna Unit 3.<sup>139</sup> The seismic design and analyses will be confirmed via appropriate inspections, tests, analyses, and acceptance criteria (ITAAC).<sup>140</sup>

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<sup>136</sup> Ex. NRC-007, COL Final SER § 3.7.1.4, at 3-34; see 10 C.F.R. pt. 50, app. S, IV.(a)(1)(i).

<sup>137</sup> Ex. NRC-001, Staff Information Paper, at 13, 15, 16-17, 30; Ex. NRC-007, COL Final SER § 3.7.1.2; see 10 C.F.R. pt. 52, app. E, III.B.; *id.* §§ 50.12, 52.7, 52.63(b)(1).

<sup>138</sup> Ex. NRC-007, COL Final SER § 3.7.1.4, at 3-26; see 10 C.F.R. § 50.12(a)(1).

<sup>139</sup> Ex. NRC-007, COL Final SER § 3.7.1.4, at 3-26.

<sup>140</sup> *Id.* at 3-24.

c. *Certified Seismic Design Response Spectra Exceedances and Fuel Analysis*

General Design Criterion 2 requires that the fuel assembly and control rod blade mechanical designs are capable of withstanding the effects of natural phenomena.<sup>141</sup> As a result of the site-specific seismic spectra exceedances identified in NAPS DEP 3.7-1, the Staff requested additional information from Dominion to demonstrate that both the fuel assembly and the control rod blade mechanical loads were within the bounds of the certified design.<sup>142</sup> Dominion responded that it had analyzed the fuel assembly and concluded that the combined load accelerations met the acceptance criteria.<sup>143</sup> Dominion also found that there was sufficient margin in the control rod design to account for anticipated dynamic loads along with site-specific seismic loads.<sup>144</sup>

With respect to the fuel assembly, the Staff evaluated Dominion's methodology and calculations and confirmed that Dominion had updated its application to reflect the analysis described in its RAI response.<sup>145</sup> The Staff concluded that the site-specific fuel assembly design

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<sup>141</sup> 10 C.F.R. pt. 50, app. A, Criterion 2. Control rod blades "perform the functions of power shaping, reactivity control, and scram reactivity insertion for safe shutdown response." ESBWR DCD, Tier 2 Material § 4.2.2.2.

<sup>142</sup> Request for Additional Information 130, North Anna, Unit 3 (July 24, 2014) (ML14283A563); Ex. NRC-011, Staff Safety Presentation, at 24; Tr. at 95 (Mr. Thomas).

<sup>143</sup> Letter from Mark D. Mitchell, Vice President – Generation Constr., Dominion, to NRC Document Control Desk (May 19, 2016), encl. 1, "Revised Response to NRC RAI Letter 130, RAI 7580 Question 04.02-1," at 2 (ML16146A277) (RAI 130 Response); Ex. NRC-007, COL Final SER § 4.4; Tr. at 95-96 (Mr. Thomas).

<sup>144</sup> RAI 130 Response, encl. 1, at 3; Ex. NRC-007, COL Final SER § 4.4; Tr. at 95-96 (Mr. Thomas).

<sup>145</sup> Ex. NRC-007, COL Final SER § 4.4, at 4-3 to 4-6.

complies with General Design Criterion 2.<sup>146</sup> Regarding the control blade mechanical loads, the Staff examined Dominion's methodology, found "ample margin in the site-specific calculation of fuel assembly displacement to the acceptance limits defined in the [certified design]," and found Dominion's proposed site-specific ITAAC acceptable.<sup>147</sup> Accordingly, the Staff found that the control rod blade design complies with General Design Criterion 2.<sup>148</sup>

*d. Draft Combined License for North Anna, Unit 3*

In January 2017, the Staff made available a draft combined license for proposed Unit 3.<sup>149</sup> Prior to the hearing, we posed several questions to the parties regarding the conditions proposed to be included in the license.<sup>150</sup> Among other things, we sought clarification from the Staff on proposed condition 2.D.(12)(f)2. regarding mitigation strategies for beyond-design-basis external events, which differs from the analogous license condition in the ESBWR RCOLA for Fermi Unit 3.<sup>151</sup> To align the license with the condition described in the COL Final SER, the

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<sup>146</sup> *Id.* § 4.4, at 4-6; see Ex. NRC-001, Staff Information Paper, at 31; Ex. NRC-011, Staff Safety Presentation, at 26; Tr. at 96 (Mr. Thomas).

<sup>147</sup> Ex. NRC-007, COL Final SER § 4.4, at 4-6; see Ex. NRC-001, Staff Information Paper, at 31-32.

<sup>148</sup> Ex. NRC-007, COL Final SER § 4.4, at 4-6 to 4-7; see Ex. NRC-001, Staff Information Paper, at 31-32; Ex. NRC-011, Staff Safety Presentation, at 26; Tr. at 96 (Mr. Thomas).

<sup>149</sup> Ex. NRC-002, Draft Combined License, North Anna, Unit 3, Dominion Virginia Power, Docket No. 52-017 (Jan. 18, 2017) (ML17086A242) (Draft License); see Ex. NRC-001, Staff Information Paper, at 2.

<sup>150</sup> See Pre-Hearing Question Order at 4-5.

<sup>151</sup> *Id.* at 5; compare Ex. NRC-002, Draft License, at 15, with Combined License for Enrico Fermi Nuclear Plant Unit 3, DTE Electric Company, License No. NPF-95 (May 1, 2015), at 15 (ML15084A170) (the former requiring that the overall integrated plan include provisions "to ensure" that accident mitigation procedures and guidelines are "coherent and comprehensive," while the latter requires that the overall integrated plan include provisions "to address" accident mitigation procedures and guidelines).

Staff proposed revising the draft condition to match the equivalent condition in the Fermi Unit 3 license.<sup>152</sup>

We also sought additional information regarding proposed condition 2.D.(11)(a). In pre-hearing question 7, we asked the parties to “provide the regulatory basis for the requirement that the schedule for implementation of the operational programs listed in FSAR Table 13.4-201, ‘Operational Programs Required by NRC Regulations,’ includes site-specific Severe Accident Management Guidelines.”<sup>153</sup> Dominion explained that the ESBWR certified design requires development of an accident management program and severe accident management guidelines (SAMGs).<sup>154</sup> The Staff noted Dominion’s proposal of the license condition and the inclusion of an analogous condition in the reference combined license for Fermi Unit 3.<sup>155</sup>

At the hearing, we inquired further about the condition.<sup>156</sup> The Staff explained that (as noted above) the ESBWR certified design requires that each combined license holder develop a severe accident management program.<sup>157</sup> To address the requirement, therefore, the Staff

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<sup>152</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 7; see Ex. NRC-007, COL Final SER § 14.2.5.

<sup>153</sup> Pre-Hearing Question Order at 4; see Ex. NRC-002, Draft License, at 9.

<sup>154</sup> Ex. DVP-003, Dominion Pre-Hearing Responses, at 11-12.

<sup>155</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 6.

<sup>156</sup> See Tr. at 102-03 (Chairman Svinicki).

<sup>157</sup> See Ex. NRC-013, *NRC Staff Responses to Post-Hearing Questions* (Apr. 6, 2017), attach. A, at 2 (ML17115A364) (Staff Post-Hearing Response); ESBWR DCD, Tier 2 Material § 18.9 (referencing Licensing Topical Report NEDO-33217, “ESBWR Man-Machine Interface System and Human Factors Engineering Implementation Plan,” rev. 6 (Feb. 2010) § 3.2.4.4, at 40 (ML100480284) (non-proprietary version) (stating that each COL applicant referencing the ESBWR is responsible for verifying, validating, and maintaining emergency operating procedures and severe accident guidelines)).

explained that “the COL applicant for Fermi, Unit 3, which references the ESBWR, proposed a license condition that required a schedule for implementing site-specific” SAMGs.<sup>158</sup> This license condition was approved and included in the Fermi 3 combined license. Dominion proposed an equivalent license condition for North Anna Unit 3 to maintain consistency among the ESBWR plants.<sup>159</sup>

Following the hearing, the Staff filed a revised draft license, which includes all changes it had previously committed to implement, along with additional administrative changes proposed based on Dominion’s comments.<sup>160</sup>

## **2. Environmental Issues**

### **a. Post-ESP Environmental Review**

As discussed previously, the Staff’s environmental review of Dominion’s combined license application takes the form of a supplement to the 2006 ESP Final EIS.<sup>161</sup> The ESP

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<sup>158</sup> Ex. NRC-013, Staff Post-Hearing Response, attach. A, at 2.

<sup>159</sup> *Id.* The license condition sets a schedule for development of SAMGs but does not impose any particular substantive SAMG requirements. *Id.* The Staff also acknowledged that an industry-wide SAMG initiative is under way, whereby individual COL holders may in the future undertake written commitments to follow an approach to maintaining SAMGs described by the Nuclear Energy Institute. This approach, which currently is being implemented by operating reactor licensees, could replace the license condition in the future. *Id.*, attach. A, at 2-3. In the meantime, “the SAMG license condition or commitment approach, as described above for the COL holders referencing the ESBWR design, provides a regulatory mechanism to transition between construction and operation of new reactors.” *Id.*, attach. A, at 3.

<sup>160</sup> *Id.*, attach. B; *see id.*, attach. A, at 1; *see* Post-Hearing Question Order at 2 (requesting that the Staff submit to us a revised draft license).

<sup>161</sup> Ex. NRC-009, Final SEIS § 1.0; *see* Ex. NRC-001, Staff Information Paper, at 4. The Staff testified that both the Final EIS for the ESP and the Final SEIS for the COL include analysis of “construction” activities that would be considered “preconstruction” following the 2007 publication of the Limited Work Authorization (LWA) Rule. *See* Ex. NRC-001, Staff Information Paper, at 4; Tr. at 118 (Mr. Kugler). The statements of consideration for the LWA Rule stated that ESP applications under consideration as of the effective date of the final rule—a category

environmental review, like the safety review, relied on certain design parameters based on seven potential reactor designs (the “plant parameter envelope”) rather than on a specific plant design.<sup>162</sup> The Staff’s environmental analysis associated with the ESP resolved many of the environmental issues related to the North Anna site, but Dominion and the Staff deferred several issues to the combined license stage.<sup>163</sup> Among other issues, as permitted by our regulations, Dominion and the Staff deferred to the combined license stage the analyses of need for power and energy alternatives.<sup>164</sup> Certain information was not available until Dominion selected a reactor design, including environmental impacts to water quality from plant operation;

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that included the North Anna ESP—need not comply with new requirements for site-preparation activities and would continue to be governed by the regulations in effect prior to the rule revision. Limited Work Authorizations for Nuclear Power Plants; Final Rule, 72 Fed. Reg. 57,416, 57,424 (Oct. 9, 2007); see Early Site Permit at 4. Accordingly, the ESP allows Dominion to perform site preparation activities pursuant to the regulations in effect when Dominion submitted its ESP application. See 10 C.F.R. § 50.10(e)(1) (2006); see *also* Early Site Permit at 4, app. E § 1.1.

<sup>162</sup> ESP Final EIS § 3.2; Ex. NRC-009, Final SEIS § 1.1.1; Tr. at 117 (Mr. Kugler).

<sup>163</sup> Ex. NRC-001, Staff Information Paper, at 4; Ex. NRC-012, Staff Environmental Presentation, at 4.

<sup>164</sup> Ex. NRC-012, Staff Environmental Presentation, at 7; Tr. at 120 (Mr. Kugler); ESP Final EIS § 1.1.3; *id.* § 10.0, at 10-2. In response to the notice of hearing, a member of the public expressed concern regarding the Staff’s analysis of the need for power. Letter from Erin Noakes, to Denise McGovern, Office of the Secretary, NRC (Feb. 4, 2017) (ML17037D071). Ms. Noakes argued that the base-load demand forecast was insufficient and that the consideration of alternatives (both those that require and do not require new generating capacity) was inadequate. See *id.* at 1 (summarizing concerns). Prior to the hearing we asked the Staff and Dominion to respond to these comments. Pre-Hearing Question Order at 8. Dominion noted that, while Ms. Noakes had highlighted Dominion’s 2007 need-for-power analysis, a revised analysis from 2013 supports a continued need for power. See Ex. DVP-003, Dominion Pre-Hearing Responses, at 20-27. The Staff testified that it had examined each of Dominion’s updated analyses, most recently in 2016. Tr. at 142 (Mr. Mussatti). And the Staff stated that it found Dominion’s analysis reasonable. Ex. NRC-004, Staff Pre-Hearing Responses, at 19.

chronic effects of electromagnetic fields on human health; certain system design alternatives; environmental impacts from accidents and severe accident mitigation alternatives; and impacts from the fuel cycle, transportation, and decommissioning.<sup>165</sup> And both Dominion and the Staff considered new and potentially significant developments following publication of the ESP Final EIS for those issues resolved as part of the ESP environmental review.<sup>166</sup>

*b. Analysis of New Information Following Publication of the COL Final SEIS*

Since the 2010 publication of the Final SEIS, both Dominion and the Staff have evaluated new information to determine whether a supplement to the Final SEIS was warranted in accordance with 10 C.F.R. § 51.92.<sup>167</sup> We asked the Staff to describe the issues that it considered in its review of new and potentially significant information since publication of the Final SEIS.<sup>168</sup> The Staff explained that it had evaluated approximately fifty new issues to determine whether they painted a “seriously different picture” of the environmental impacts from that set forth in the Final SEIS.<sup>169</sup> The Staff listed the most noteworthy issues it considered: the Continued Storage Rule, consultation under the Endangered Species Act, consultation

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<sup>165</sup> Ex. NRC-012, Staff Environmental Presentation, at 7; Tr. at 120-21 (Mr. Kugler); Ex. NRC-009, Final SEIS § 9.3; ESP Final EIS § 5.12, tbl. 9-2, app. J, tbl. J-3.

<sup>166</sup> Tr. at 111 (Mr. Banks), 122-23 (Ms. Dozier); Ex. NRC-009, Final SEIS § 1.1.1; Ex. DVP-003, Dominion Pre-Hearing Responses, at 27-30.

<sup>167</sup> Ex. NRC-001, Staff Information Paper, at 32; Tr. at 114 (Mr. Banks), 125-26 (Ms. Dozier); Ex. DVP-003, Dominion Pre-Hearing Responses, at 27-30; Ex. NRC-004, Staff Pre-Hearing Responses, at 20-21; see *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-06-3, 63 NRC 19, 28 (2006) (providing the standard for when the Staff must supplement an EIS to account for new and significant information).

<sup>168</sup> Pre-Hearing Question Order at 8.

<sup>169</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 20; see *Sierra Club v. Froehlke*, 816 F.2d 205, 210 (5th Cir. 1987) (citing *Wisconsin v. Weinberger*, 745 F.2d 412, 421 (7th Cir. 1984)).

regarding historic and cultural resources, and new information involving Dominion's proposed use of barges to transport large reactor components.<sup>170</sup> In addition, the Staff considered new information related to severe accident mitigation.<sup>171</sup>

The Staff testified that both the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) listed new species as either threatened or endangered after the Final SEIS was published.<sup>172</sup> First, in 2012 the NMFS listed as endangered under the Endangered Species Act a population segment of the Atlantic Sturgeon.<sup>173</sup> That species' range includes parts of the Mattaponi River, which would be used by barges carrying components for North Anna, Unit 3.<sup>174</sup> Second, FWS in 2015 listed as threatened the northern long-eared bat.<sup>175</sup> The bat's range includes the landscape around the North Anna site.<sup>176</sup> Third, the Staff highlighted public concern about the potential for barges carrying reactor components to adversely affect the sensitive joint vetch, listed as a threatened plant species under the

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<sup>170</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 20-21.

<sup>171</sup> *Id.* at 25-27.

<sup>172</sup> *Id.* at 20; Tr. at 127 (Ms. Dozier).

<sup>173</sup> Endangered and Threatened Wildlife and Plants; Threatened and Endangered Status for Distinct Population Segments of Atlantic Sturgeon in the Northeast Region, 77 Fed. Reg. 5880 (Feb. 6, 2012).

<sup>174</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 20; U.S. Nuclear Regulatory Commission, Biological Assessment, North Anna Power Station Combined License Application, Louisa County, Virginia, Docket No. 52-017 (Apr. 2016), at 14 (ML16082A287) (NMFS BA).

<sup>175</sup> Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Northern Long-Eared Bat With 4(d) Rule, 80 Fed. Reg. 17,974 (Apr. 2, 2015).

<sup>176</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 20; U.S. Nuclear Regulatory Commission, Supplemental Biological Assessment, North Anna Combined License Application, Louisa County, Virginia, Docket No. 52-017 (Dec. 2016), at 26-27 (ML16312A319) (FWS Supplemental BA).

Endangered Species Act.<sup>177</sup> The Staff evaluated the impacts of the proposed North Anna project on each species in a Biological Assessment prepared for the NMFS and a Supplemental Biological Assessment prepared for FWS.<sup>178</sup> Overall, the Staff found that the proposed project would not adversely affect the evaluated species.<sup>179</sup> The NMFS and FWS both concurred in the Staff's assessment, concluding the Staff's Endangered Species Act consultations.<sup>180</sup>

In 2016, the Staff considered new information regarding Dominion's proposed use of barges.<sup>181</sup> Dominion proposes to transport large reactor components via the Mattaponi River to Walkerton, Virginia, to a temporary roll-off facility prior to transferring the components from barges to trucks for transport to the North Anna site.<sup>182</sup> The Staff considered the "potential direct, indirect, and cumulative impacts from [Dominion's] proposed process for transporting large reactor components by barge and truck to the site."<sup>183</sup> The Staff explained that it based its

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<sup>177</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 20; see FWS Supplemental BA at 27-29; Letter from Mark D. Mitchell, Vice President – Generation Constr., Dominion, to NRC Document Control Desk (Feb. 20, 2017) (ML17053B270).

<sup>178</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 20; Tr. at 136-37 (Mr. Doub); see NMFS BA; FWS Supplemental BA; see *also* "Consideration of New Information Regarding Updated Consultation Under Section 7 of the Endangered Species Act for North Anna Power Station Unit 3 Combined License Review" (undated) (ML16342B385).

<sup>179</sup> NMFS BA § 8.0; FWS Supplemental BA § 5.0; see Ex. NRC-004, Staff Pre-Hearing Responses, at 20; Tr. at 137 (Mr. Doub).

<sup>180</sup> Letter from Cindy Schulz, Field Supervisor, Va. Ecological Servs., FWS, to Joseph E. Donoghue, Office of New Reactors, NRC (Feb. 22, 2017) (ML17058B064); Letter from Kimberly B. Damon Randall, Assistant Reg'l Adm'r for Protected Res., NMFS, to Joseph Donoghue, Office of New Reactors, NRC (Nov. 3, 2016) (ML16319A265).

<sup>181</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 21, 24-25.

<sup>182</sup> *Id.* at 21.

<sup>183</sup> *Id.* at 24.

evaluation on information Dominion included in its application for a Clean Water Act § 404 permit from the Corps.<sup>184</sup> The Staff concluded that the new information did not merit supplementation of the SEIS.<sup>185</sup>

With respect to severe accident mitigation alternatives (SAMAs), the Staff considered: changes to the ESBWR DCD; updates to Dominion's environmental report; and Dominion's and the Staff's site-specific seismic review following the 2011 earthquake.<sup>186</sup> The Staff also performed a SAMA sensitivity analysis pursuant to a recent decision in the Indian Point license renewal proceeding.<sup>187</sup> For each issue, the Staff concluded that the new information did not present a seriously different picture of the environmental impacts as described in the ESP EIS and COL SEIS.<sup>188</sup>

### **C. Findings**

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<sup>184</sup> *Id.*

<sup>185</sup> *Id.* at 25. The Staff's draft record of decision reflects that the Corps temporarily suspended Dominion's section 404 permit (originally issued in 2011) in November 2016 pending the conclusion of the Staff's Endangered Species Act consultation. Ex. NRC-003, U.S. Nuclear Regulatory Commission, Docket No. 52-017, Combined License Application for North Anna Power Station Unit 3, Draft Summary Record of Decision (Jan. 18, 2017), at 8 (ML17086A243) (Draft Record of Decision). The Staff testified that the temporary suspension did not affect its conclusions in the Final SEIS. Ex. NRC-004, Staff Pre-Hearing Responses, at 18; Tr. 138 (Ms. Dozier). On April 17, 2017, the Corps reinstated the permit and added two special conditions regarding the use of a turbidity curtain in order to minimize the effects of the authorized activities. *NRC Staff Submission of the Letter Regarding Reinstatement of the U.S. Army Corps of Engineers Permit* (Apr. 21, 2017); *id.*, attach. A.

<sup>186</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 25-26.

<sup>187</sup> *Id.* at 26-27; see *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-16-7, 83 NRC 293 (2016).

<sup>188</sup> Ex. NRC-004, Staff Pre-Hearing Responses, at 27.

We now turn to the findings necessary for issuance of the combined license. We have conducted an independent review of the sufficiency of the Staff's safety findings. Although our decision today highlights the topics discussed above, our findings are based on the entire record. Based on the evidence presented in the uncontested hearing, including the Staff's review documents and the testimony provided, we find that the applicable standards and requirements of the AEA and NRC regulations have been met. The required notifications to other agencies or bodies have been duly made.<sup>189</sup> We find that Dominion is technically and financially qualified to engage in the activities authorized. We further find that there is reasonable assurance that the facility will be constructed and operated in conformity with the license, the provisions of the AEA, and the NRC's regulations and that issuance of the license will not be inimical to the common defense and security or to the health and safety of the public. In addition, we find that the proposed regulatory exemptions meet the standards in 10 C.F.R. § 50.12. And finally, we find that the proposed license conditions, as revised, are appropriately drawn and sufficient to provide reasonable assurance of adequate protection of public health and safety.<sup>190</sup>

We also conducted an independent review of the Staff's environmental analysis in the Final SEIS, taking into account the particular requirements of NEPA. NEPA section 102(2)(A) requires agencies to use "a systemic, interdisciplinary approach which will insure the integrated

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<sup>189</sup> The Staff notified the Virginia State Corporation Commission, the NCUC, and the Federal Energy Regulatory Commission about the combined license application in April 2016. Ex. NRC-001, Staff Information Paper, at 33. The Staff published notices of the application in the *Federal Register* on April 27, 2016, May 4, 2016, May 11, 2016, and May 18, 2016 (at 81 Fed. Reg. 24,900; 81 Fed. Reg. 26,837; 81 Fed. Reg. 29,308; and 81 Fed. Reg. 31,263, respectively). See 10 C.F.R. § 50.43(a)(3).

<sup>190</sup> Ex. NRC-013, Staff Post-Hearing Response, attach. B.

use of the natural and social sciences and the environmental design arts” in decision-making that may impact the environment.<sup>191</sup> We find that the environmental review team used the systemic, interdisciplinary approach that NEPA requires.<sup>192</sup>

NEPA Section 102(2)(C) requires us to assess the relationship between short-term uses and long-term productivity of the environment (including consideration of the benefits of operating the new units), to consider alternatives, and to describe the unavoidable adverse environmental impacts and the irreversible and irretrievable commitments of resources associated with the proposed action.<sup>193</sup> The discussion of alternatives is in Chapter 9 of the Final SEIS; the other items are discussed in Chapter 10.<sup>194</sup>

The environmental review team found the principal short-term benefit of the project to be the production of electrical energy.<sup>195</sup> The review team also noted that, because the environmental analysis focused on expansion of electrical generating capacity at the North Anna site, the benefits analysis focused on the benefits of building Unit 3 rather than on the more generic benefits of electricity supply.<sup>196</sup> And the review team found that construction and

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<sup>191</sup> 42 U.S.C. § 4332(2)(A).

<sup>192</sup> See, e.g., Tr. at 53-59 (Ms. Bradford) (providing an overview of the Staff’s environmental review methodology); Ex. NRC-010, Staff Overview Presentation, at 9-14. The environmental review team consisted of individuals with expertise in disciplines including ecology, meteorology, hydrology, radiation protection, socioeconomics, and cultural resources. Ex. NRC-009, Final SEIS, app. A. The team consisted of individuals from the NRC and the Pacific Northwest National Laboratory.

<sup>193</sup> 42 U.S.C. § 4332(2)(C)(ii)-(v).

<sup>194</sup> Ex. NRC-009, Final SEIS, chs. 9-10.

<sup>195</sup> *Id.* § 10.6.1. At the ESP stage, the Staff deferred to the COL stage the analysis of the short-term uses and long-term productivity of the environment. ESP Final EIS § 10.4.

<sup>196</sup> Ex. NRC-009, Final SEIS § 10.6.1.

operation of North Anna Unit 3 would have tax revenue benefits.<sup>197</sup> The Virginia Economic Development Partnership Department (VEDP) projected the total tax benefit to be \$24.9 million in tax revenues over the expected three-year construction period. And during the expected operation period, the VEDP estimated that Unit 3 would generate \$14.8 million in state taxes and \$27.7 million in local taxes annually.<sup>198</sup>

NEPA section 102(2)(E) calls for agencies to study, develop, and describe appropriate alternatives.<sup>199</sup> The alternatives analysis is the “heart of the environmental impact statement.”<sup>200</sup> Based on the discussion in the Final SEIS and the Staff’s testimony, we find that the Staff identified an appropriate range of alternatives with respect to alternative power sources and alternative system designs and adequately described the environmental impacts of each alternative.<sup>201</sup> We find reasonable the Staff’s conclusion that none of the alternatives considered is environmentally preferable to the proposed action.<sup>202</sup>

The ESP Final EIS describes the unavoidable adverse environmental impacts during construction and operation.<sup>203</sup> The Final SEIS lists the unavoidable adverse environmental

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<sup>197</sup> *Id.* § 10.6.1.2.

<sup>198</sup> *Id.*

<sup>199</sup> 42 U.S.C. § 4332(2)(E).

<sup>200</sup> 10 C.F.R. pt. 51, app. A, § 5.

<sup>201</sup> *See, e.g.*, Tr. at 60-61 (Ms. Bradford); Ex. NRC-009, Final SEIS, ch. 9; Ex. NRC-003, Draft Record of Decision, at 5-7.

<sup>202</sup> Ex. NRC-009, Final SEIS § 10.3. As required by 10 C.F.R. § 51.50(b)(1) and (c)(1), the Staff resolved its consideration of alternative sites at the ESP stage; it did not consider alternative sites at the COL stage. *Id.* § 9.0. At the COL stage, the Staff considered the no-action alternative, energy alternatives, and system design alternatives. *Id.* § 10.3.

<sup>203</sup> *See* ESP Final EIS, chs. 4 & 5.

impacts identified since the ESP environmental analysis.<sup>204</sup> The Final SEIS also confirms that impacts assessed at the ESP Final EIS have not changed based on new information.<sup>205</sup> The COL review team confirmed that unavoidable adverse impacts for construction would remain small for land use impacts, offsite transmission line rights-of-way, meteorological and air-quality impacts, hydrological and water use and water quality impacts, terrestrial ecological impacts, aquatic ecosystem impacts, threatened and endangered species, historic and cultural resources, environmental justice, non-radiological health impacts, and radiological health impacts.<sup>206</sup> The COL environmental review team confirmed that socioeconomic adverse impacts would still range from small to moderate.<sup>207</sup>

For operation, the COL environmental review team confirmed that the unavoidable adverse impacts would remain small for land use impacts, meteorological and air-quality impacts, hydrological impacts, aquatic impacts, impacts to threatened and endangered species, historic and cultural resources, environmental justice, non-radiological health impacts, radiological impacts of normal operations, and postulated accidents.<sup>208</sup> The ESP environmental review team did not resolve water quality impacts (deferring these until the COL stage); the COL

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<sup>204</sup> See Ex. NRC-009, Final SEIS, chs. 4 & 5.

<sup>205</sup> See *id.*

<sup>206</sup> Ex. NRC-009, Final SEIS §§ 4.1, 4.2, 4.3.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2, 4.4.3, 4.6, 4.7, 4.8.4, 4.9.5; see *also* ESP Final EIS tbl. 4-1.

<sup>207</sup> Ex. NRC-009, Final SEIS § 4.5.5; see *also* ESP Final EIS tbl. 4-1.

<sup>208</sup> Ex. NRC-009, Final SEIS §§ 5.1, 5.2, 5.3.1, 5.4.2.5, 5.4.3.1, 5.4.3.2, 5.6, 5.7, 5.8.7, 5.9.3.3, 5.9.4, 5.9.5, 5.10.1, 5.10.2; see *also* ESP Final EIS § 5.12. The ESP environmental review team did not assess operational impact levels for chronic health impacts of electromagnetic fields. See ESP Final EIS § 5.8.5. As such, the COL environmental review team addressed this issue together with other nonradiological health impacts. Ex. NRC-009, Final SEIS § 5.8.7.

environmental review team assessed the issue and concluded that impacts to water quality from operation of North Anna Unit 3 would be small.<sup>209</sup> The review team confirmed that unavoidable adverse impacts would remain small to moderate for water use impacts.<sup>210</sup> And for socioeconomic impacts, the review team confirmed that adverse impacts would remain small to moderate.<sup>211</sup>

Finally, with regard to irreversible and irretrievable commitments of resources, the review team concluded that during construction of the plant, the material used, “while irretrievable, would be of small consequence with respect to the availability of such resources.”<sup>212</sup> And with regard to operation of the proposed unit, the review team determined that uranium would be irretrievably committed, but the amount would be of small consequence in comparison to the availability of uranium ore and existing stockpiles of highly enriched uranium in the United States and Russia that could be processed into fuel.<sup>213</sup>

We must weigh these unavoidable adverse environmental impacts and resource commitments—the environmental “costs” of the project—against the project’s benefits.<sup>214</sup> Considering the need for power in the region and the expected increase in productivity, jobs, and tax revenue as described in the hearing and in the Final SEIS, we find that the benefits of the project outweigh the costs described above. Moreover, we have considered each of the

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<sup>209</sup> Ex. NRC-009, Final SEIS § 5.3.3; *see also* ESP Final EIS § 5.3.3.

<sup>210</sup> Ex. NRC-009, Final SEIS § 5.3.2; *see also* ESP Final EIS § 5.3.2.

<sup>211</sup> Ex. NRC-009, Final SEIS § 5.5.5; *see also* ESP Final EIS § 5.12.

<sup>212</sup> Ex. NRC-009, Final SEIS § 10.5.

<sup>213</sup> *Id.*

<sup>214</sup> 10 C.F.R. § 51.107(a).

requirements of NEPA section 102(2)(C) and find that the record supports the Staff's conclusions on those requirements.

In sum, for each of the environmental topics discussed at the hearing and in this decision, we find that the Staff's review was reasonably supported in logic and fact and sufficient to support the Staff's conclusion. Based on our review, we also find that the remainder of the Final SEIS was reasonably supported and sufficient to support the Staff's conclusions.

Therefore, as a result of our review of the Final SEIS, and in accordance with the Notice of Hearing for this uncontested proceeding, we find that the requirements of NEPA section 102(2)(A), (C), and (E), and the applicable regulations in 10 C.F.R. Part 51, have been satisfied with respect to the combined license application. We independently considered the final balance among conflicting factors contained in the record of this proceeding. We find, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, that the combined license should be issued.

**III. CONCLUSION**

For the reasons discussed above, we find that the Staff's review of Dominion's combined license application was sufficient to support the findings in 10 C.F.R. §§ 52.97(a) and 51.107(a). We *authorize* the Director of the Office of New Reactors to issue the combined license for the construction and operation of North Anna Power Station, Unit 3. We *authorize* the Staff to issue the record of decision.

IT IS SO ORDERED.

For the Commission

**NRC SEAL**

**/RA/**

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Rochelle C. Bavor  
Acting Secretary of the Commission

Dated at Rockville, Maryland,  
this 31st day of May, 2017.

Additional Views of Chairman Svinicki.

I fully join in the conclusions that the review of the combined license application for North Anna Power Station, Unit 3, was sufficient to support the findings in 10 C.F.R. §§ 52.97(a) and 51.107(a) and that the Staff should therefore issue the record of decision and combined license, which includes a condition related to Severe Accident Management Guidelines (SAMG). I also agree with my colleagues' determination that the SAMG license condition is appropriate because it has a sufficient regulatory basis in the ESBWR design certification document, which is itself codified in our regulations.<sup>1</sup>

I write separately to emphasize that in reaching its conclusion, the Commission did not rely on the additional rationale for the SAMG license condition advanced by the Staff in its responses to our Post-Hearing Questions. In those responses, the Staff reasoned that while 10 C.F.R. § 52.47(a)(23) and (27) “do not include a specific requirement for implementation of SAMGs,” the Staff “expects as a *logical outgrowth* of these provisions that some type of accident management guidance would be necessary.”<sup>2</sup> I find the Staff's interpretation of 10 C.F.R. § 52.47(a)(23) and (27) to be inconsistent with recent Commission policy decisions. In Staff Requirements Memorandum SECY-15-0065, Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events, we approved removing “the proposed requirements for Severe Accident Management Guidelines” from the proposed rule.<sup>3</sup> Those provisions would have

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<sup>1</sup> See *supra*, section II.B.1.d.

<sup>2</sup> Ex. NRC-013, Staff Post-Hearing Response, attach. A, at 2 (emphasis added).

<sup>3</sup> Staff Requirements—SECY-15-0065—Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events (Aug. 27, 2015) (ML15239A767).

applied to operating licensees and applicants as well as COL holders.<sup>4</sup> Contrary to this Commission decision, the Staff's interpretation of 10 C.F.R. § 52.47 would effectively re-impose the SAMG requirements into future COLs because it would require that the underlying DCDs, which all COL applicants to date have referenced, contain SAMGs. Moreover, at a previous COL hearing, I asked the Staff whether, in light of the age of the DCDs, they may contain requirements, such as SAMGs, that no longer reflect Commission policy.<sup>5</sup> In response, the Staff indicated that while it lacked a formal policy for reviewing whether portions of DCDs had become outdated, it did look at this issue in practice. However, contrary to these assurances by Staff, its interpretation of 10 C.F.R. § 52.47 appears to ignore the Commission's most recently articulated policy on SAMGs.

Additionally, to avoid any confusion, I also disagree with the Staff's suggestion that "logical outgrowths" are a valid basis for regulatory interpretation. In administrative law, courts generally consider "logical outgrowths" to determine whether an agency provided sufficient notice of a proposed rule.<sup>6</sup> A difference between the proposed and final rule "will not invalidate the notice so long as the final rule is a 'logical outgrowth' of the one proposed."<sup>7</sup> "An agency's final rule qualifies as the logical outgrowth of its [proposed rule] if interested parties should have anticipated that the change was possible."<sup>8</sup> If our regulations included "logical outgrowths," as

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<sup>4</sup> "Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events," Commission Paper SECY-15-0065 (Apr. 30, 2015), encl. 2, at 148-51 (ML15049A201 (package)).

<sup>5</sup> *Duke Energy Carolinas, LLC* (William States Lee III Nuclear Station, Units 1 and 2), Order (Setting Deadline for Proposed Transcript Corrections) (Oct. 11, 2016), app., at 66-69 (unpublished) (ML16285A467).

<sup>6</sup> *Shell Oil Co. v. E.P.A.*, 950 F.2d 741, 747 (D.C. Cir. 1991).

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

<sup>8</sup> *Agape Church, Inc. v. F.C.C.*, 738 F.3d 397, 411 (D.C. Cir. 2013) (quotations omitted).

normally defined in administrative law, then 10 C.F.R. § 52.47(a)(23) and (27) could be read to include a SAMG requirement, as well as a potential host of other requirements that could have been anticipated. Again, such an approach would be clearly contrary to Commission policy, as discussed above.

The Commission has never used “logical outgrowths” for interpreting the meaning of our regulations in the adjudicatory context. Comparing the instant case to a situation in which a reviewing court would normally use “logical outgrowths” illustrates why. First, in examining the adequacy of notice for a final rule, the reviewing court considers two formal agency positions that have been written and published in the *Federal Register*: the proposed and final rules. Here the agency has never written, let alone published, what it considers to be the “logical outgrowths” of 10 C.F.R. § 52.47, or to my knowledge any NRC regulation.<sup>9</sup> Consequently, concluding that our regulations have “logical outgrowths” that impose additional requirements would create a whole class of unwritten rules of which licensees would have no prior notice. That result would perversely undermine the purpose of the “logical outgrowth” test in its regular context, which is to ensure that the public has a reasonable opportunity to become aware of, and provide input on, agency rules.

Moreover, in the context of determining the sufficiency of notice, because the “logical outgrowth” occurs between the proposed and final rule, the agency will have established its position once the rule is effective. In contrast, applying “logical outgrowths” to interpret the meaning of already promulgated regulations invites the agency to supplement the content of its

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<sup>9</sup> While the agency routinely publishes guidance interpreting its regulations, it is axiomatic at the NRC that guidance documents “do not impose requirements upon licensees but instead set forth *one* way in which a licensee or applicant can comply with our regulations.” *Curators of the University of Missouri*, CLI-95-1, 41 NRC 71, 100 (1995).

regulations years, in this case nearly ten, after going through the rulemaking process.<sup>10</sup> Again, the result is contrary to the purpose of the “logical outgrowth” test, which requires the agency to seek contemporaneous input from the public when announcing a new requirement.

Finally, the term “logical outgrowth” naturally fits in the notice and comment context but would create an untenable basis for regulatory interpretation. As noted above, a final rule will be a “logical outgrowth” of a proposed rule if interested parties “should have anticipated that the change was possible.”<sup>11</sup> In the context of notice and comment rulemaking, in which an agency considers a variety of approaches to a given problem, informed by additional proposals from members of the public, asking the public to provide comments on not just the proposed regulatory solution but others that could warrant consideration is reasonable and perhaps even necessary to bring the rulemaking process to closure.<sup>12</sup> In contrast, interpreting existing regulations to include “logical outgrowths” or all “possible changes” to the rule would leave our rules not worthy of the name.

As a result, using “logical outgrowths” to determine the meaning of a regulation would have the potential to undermine the very purpose of the “logical outgrowth” test by leading to regulatory requirements that are not publically written, contemporaneously developed with the notice and comment process, or fixed. Moreover, the results would be deeply inconsistent with

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<sup>10</sup> Part 52 Final Rule, 72 Fed. Reg. at 49,517, 49,528.

<sup>11</sup> *Agape Church*, 738 F.3d at 411 (quotations omitted).

<sup>12</sup> *See Am. Fed’n of Labor and Congress of Indus. Orgs. v. Donovan*, 757 F.2d 330, 338 (D.C. Cir. 1985) (“It is, of course, elementary that a final rule need not be identical to the original proposed rule. The whole rationale of notice and comment rests on the expectation that the final rules will be somewhat different—and improved—from the rules originally proposed by the agency.” (quotations omitted)).

our own principles of good regulation by leading to agency rules that are neither open, clear, nor reliable.<sup>13</sup> For these reasons, I believe that the Commission has wisely declined to adopt the Staff's suggestion that SAMGs may be "necessary" as a "logical outgrowth" of 10 C.F.R. § 52.47.

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<sup>13</sup> See NRC, Principles of Good Regulation, <https://www.nrc.gov/about-nrc/values.html#principles> (last updated Dec. 19, 2016) (noting that regulation should be public and candid, regulations should be coherent, and regulations should not be "unjustifiably in a state of transition").

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of )  
)  
DOMINION VIRGINIA POWER )  
) Docket No. 52-017-COL  
)  
(North Anna Power Station, Unit 3) )  
)  
(Mandatory Hearing) )

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **COMMISSION MEMORANDUM AND ORDER (CLI-17-08)** have been served upon the following persons by Electronic Information Exchange.

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[Original signed by Herald M. Speiser ]  
Office of the Secretary of the Commission

Dated at Rockville, Maryland,  
this 31<sup>st</sup> day of May, 2017