

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION

William M. Dean, Director

In the Matter of	)	Docket Nos. 50-338 and 50-339
	)	
VIRGINIA ELECTRIC	)	
AND POWER COMPANY	)	License Nos. NPF-4 and NPF-7
	)	
North Anna Power Station,	)	
Units 1 and 2	)	

**REVISED DIRECTOR'S DECISION UNDER 10 CFR 2.206**

**I. Introduction**

By letter dated October 20, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11293A116), Paul Gunter, Kevin Kamps, Thomas Saporito, Paxus Calta, Alex Jack, Scott Price, and John Cruickshank (Petitioners), filed a petition under Title 10 of the *Code of Federal Regulations* (10 CFR) Section 2.206, "Requests for Action Under This Subpart." Upon their request, the U.S. Nuclear Regulatory Commission (NRC, the Commission) added Eleanor Amidon, Erika Kretzmer, Lovell King II, David Levy, Hilary Boyd, G. Paul Blundell, Erica Gray, Edmund Frost, and Richard Ball to the list of Petitioners. The Petitioners requested in the petition that the NRC suspend the operating licenses for the North Anna Power Station, Units 1 and 2 (North Anna 1 and 2), until the completion of a set of activities described in the petition.

A letter dated November 2, 2011 (ADAMS Accession No. ML11308A027), and an e-mail message dated December 15, 2011 (ADAMS Accession No. ML12060A197), supplemented the petition. Two meetings with the NRC Petition Review Board (PRB), held on December 12, 2011 (meeting transcript at ADAMS Accession No. ML12033A025), and February 2, 2012 (meeting transcript at ADAMS Accession No. ML12047A240) further supplemented the petition.

Section II of this Director's Decision (DD) describes the bases for the request.

The PRB met on November 7, 2011, to discuss the petition, and it denied the petition's request for immediate action, because it identified no immediate safety concern to North Anna 1 and 2, and no undue risk to the health and safety of the public. The PRB concluded that the requirement "to demonstrate to the Commission that no functional damage has occurred from the August 23, 2011, earthquake to those features necessary for continued operation without undue risk to the health and safety of the public" already exists in Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," to 10 CFR Part 100, "Reactor Site Criteria." The PRB communicated this decision to the Petitioners in an e-mail dated November 10, 2011, and the Petitioners requested an opportunity to address the PRB before its initial meeting to provide supplemental information for the PRB's consideration.

The Petitioners met with the PRB at a public meeting on December 12, 2011, to discuss the petition. The PRB met on January 9, 2012, to consider if it would accept or reject the petition based on the criteria in the NRC staff's Management Directive (MD) 8.11, "Review Process for 10 CFR 2.206 Petitions" (ADAMS Accession No. ML041770328). The PRB made an initial recommendation to partially accept the petition based on the fact that some of the concerns identified in the petition met the criteria in MD 8.11, while other concerns did not. The PRB communicated its initial recommendation to the Petitioners in an e-mail dated January 19, 2012. The Petitioners received additional information about the PRB's

recommendation through an e-mail dated January 30, 2012. During the public meeting held on December 12, 2011, the Petitioners requested a second opportunity to address the PRB at a public meeting. The Petitioners met with the PRB on February 2, 2012, to provide supplemental information in support of the petition request.

The PRB considered the results of these discussions, along with the additional information, in determining its final recommendation to partially accept the petition for review and in establishing the schedule for reviewing the petition. In an acknowledgment letter dated March 16, 2012 (ADAMS Accession No. ML12060A090), the NRC informed the Petitioners that it had partially accepted the petition for review under 10 CFR 2.206 and that the petition had been referred to the Office of Nuclear Reactor Regulation (NRR) for appropriate action. That partial DD addressed the concerns raised in the original petition, along with the additional concerns raised during the public meetings between the Petitioners and the PRB held on December 12, 2011, and February 2, 2012, and in the supplemental letter and e-mail message to the NRC dated November 2, 2011, and December 15, 2011, respectively.

The NRC has treated the transcripts of these meetings between the PRB and the Petitioners as supplements to the petition and made them available in ADAMS for inspection at the Commission's Public Document Room (PDR), located at One White Flint North, Public File Area O1F21, 11555 Rockville Pike (first floor), Rockville, MD 20852. Publicly available documents created or received at the NRC are accessible electronically through ADAMS in the NRC Library section of the Web site at <http://www.nrc.gov/reading-rm/adams.html>. Persons who do not have access to ADAMS or who encounter problems accessing the documents located in ADAMS should contact the NRC PDR reference staff by telephone at 1-800-397-4209 or 301-415-4737, or by e-mail at [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).

The NRC staff sent a copy of the proposed partial DD to the Petitioners and to the licensee for comment on July 10, 2012 (ADAMS Accession Nos. ML12165A208 and ML12165A209, respectively). The licensee indicated by letter dated July 30, 2012 (ADAMS Accession No. ML12219A120), that it had no comments. By e-mail dated July 31, 2012 (ADAMS Accession No. ML12261A228), Paul Gunter and Kevin Kamps of Beyond Nuclear, one of the parties to the petition, sent comments on the proposed partial DD. By e-mail dated July 31, 2012 (ADAMS Accession No. ML12261A227), Scott Price of the Alliance for Progressive Values (APV), another party to the petition, indicated that the comments submitted by Beyond Nuclear “accurately describes APV’s concerns as well” and restated the comments contained in the letter by Beyond Nuclear.

The NRC staff issued the partial DD on October 19, 2012 (ADAMS Accession No. ML12262A156). As detailed in the partial DD, the NRR decided to partially grant the Petitioners’ request. Twelve of the concerns were accepted for review by the NRC staff. As detailed in the partial DD, eight of these concerns were closed. The remaining four concerns accepted for review were identified as those that may take longer than the target timeframe for reaching a decision on a petition based on the fact they were undergoing NRC review as part of the agency’s response to the Fukushima event in Japan.

The NRC staff completed its activities as discussed in the Background section of this document before restart of North Anna 1 and 2, to ensure that, before resuming operations, the licensee had demonstrated no functional damage from the August 23, 2011, earthquake had occurred to those features at North Anna 1 and 2, necessary for continued operation without undue risk to the health and safety of the public, consistent with the requirements of 10 CFR Part 100, Appendix A, Section V(a)(2).

The four remaining issues accepted for review by the NRC were incorporated into the staff's review as part of the agency's response to the Fukushima event in Japan. The NRC staff's response to these issues is provided in Section II of this DD.

On August 21, 2015, the NRC issued the final director's decision (ADAMS Accession No. ML15175A465). Subsequently, the NRC identified portions of the director's decision on the long-term storage of spent fuel in the spent fuel pool (SFP) at North Anna 1 and 2, and at the North Anna independent spent fuel storage installation (ISFSI), that required clarification (identified as Concern 8 of the partial director's decision). Accordingly, the decision's response to this concern has been revised to clarify the NRC's resolution of the matter. In addition, the responses to Concerns 7, 9, and 11 (as identified in the partial director's decision) have been updated to reflect developments that have occurred since the August 21, 2015, final director's decision issuance.

## **II. Discussion**

### Background

On August 23, 2011, with North Anna 1 and 2 operating at 100 percent power, the site experienced ground motion from a seismic event (a magnitude 5.8 earthquake reported by the U.S. Geological Survey) in Mineral, Virginia, approximately 11 miles from the site. Shortly after the earthquake, both of the North Anna reactors tripped, and the station lost offsite power. After the earthquake, both units were stabilized, taken to a hot shutdown condition, and offsite power was restored. During the loss of offsite power, the four emergency diesel generators, along with the one alternate alternating current (AC) diesel generator, were activated to provide onsite AC power. Subsequent analysis indicated that the spectral and peak ground accelerations for the operating-basis earthquake (OBE) and design-basis earthquake for North Anna 1 and 2, were exceeded at certain frequencies for a short time.

The August 23, 2011, earthquake resulted in ground accelerations exceeding the OBE of North Anna 1 and 2. The requirements of 10 CFR Part 100, Appendix A, Section V(a)(2) required North Anna 1 and 2, to be shut down and to remain shut down until the licensee for this plant demonstrated to the NRC that no functional damage occurred to those features necessary for continued operation without undue risk to the health and safety of the public.

Following the earthquake, the NRC dispatched an augmented inspection team (AIT) to North Anna 1 and 2, to better understand the event and the licensee's response. The AIT's findings included the following: (1) operators responded to the event in accordance with established procedures and in a manner that protected public health and safety, (2) the ground motion from the earthquake exceeded the plant's licensed design basis, (3) no significant damage to the plant was identified, (4) safety system functions were maintained, and (5) some equipment issues were experienced. Overall, the AIT concluded that the event did not adversely impact the health and safety of the public. Safety limits were not approached and there was no measurable release of radioactivity associated with the event. The NRC staff published an inspection report summarizing the AIT findings October 31, 2011 (ADAMS Accession No. ML113040031).

To demonstrate that no functional damage occurred as a result of the earthquake and that it was safe to operate North Anna 1 and 2, without undue risk to the health and safety of the public, the licensee performed a number of inspections, tests, and analyses to address the requirements of Appendix A to 10 CFR Part 100. This demonstration also aligned with the guidance in the Electric Power Research Institute (EPRI) document NP-6695, "Guidelines for Nuclear Plant Response to an Earthquake." In Regulatory Guide (RG) 1.167, "Restart of a Nuclear Power Plant Shut Down by a Seismic Event," the NRC endorsed EPRI NP-6695, with exceptions, as an acceptable way of performing inspections and tests of nuclear power plant

equipment and structures prior to restart of a plant that has been shut down by a seismic event. A letter from the licensee dated September 17, 2011 (ADAMS Accession No. ML11262A151), described the licensee's activities in support of the restart of North Anna 1 and 2, after the earthquake of August 23, 2011. In the letter, the licensee enclosed its Restart Readiness Determination Plan for North Anna 1 and 2. (The licensee later supplemented its plan numerous times in response to NRC requests for additional information issued to support the development of the NRC's independent technical evaluation).

To further ensure compliance with regulatory requirements, the NRC issued Confirmatory Action Letter (CAL) No. 2-2011-001 to the licensee of North Anna 1 and 2, on September 30, 2011 (ADAMS Accession No. ML11273A078), which confirmed the licensee's commitment that the reactors at North Anna 1 and 2, would not be restarted until the NRC staff had completed its review of the licensee's demonstration to the Commission that no functional damage occurred to those features necessary for continued operation of North Anna 1 and 2, without undue risk to the health and safety of the public. In addition, the licensee performed other testing and inspections not included in the NP-6695 guidelines, some of which it performed as a result of questions raised by the NRC staff.

Following completion of the AIT inspection, the NRC sent another team of inspectors, the restart readiness inspection team (RRIT), to assess the licensee's inspection program and readiness for restarting North Anna 1 and 2. The RRIT began its inspection on October 5, 2011. The RRIT followed Inspection Procedure 92702, "Followup on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternative Dispute Resolution Confirmatory Orders." The following sources provided supplemental guidance to this inspection procedure: EPRI NP-6695; NRC RG 1.166, "Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Post-Earthquake

Actions”; RG 1.167; the AIT inspection report dated October 31, 2011; and input from NRC subject-matter experts.

The objectives of the RRIT included the following: (1) assess the licensee's inspection process to ensure damage attributable to the event would be identified, (2) ensure the underlying causes of the dual unit reactor trip and failure of the 2H diesel generator were properly identified and the appropriate corrective actions were assigned, (3) review how licensee-identified issues were evaluated and dispositioned, (4) observe and review licensee testing of plant systems and selected surveillance test data packages completed since the seismic event, (5) review the tracking and completion of the licensee's committed actions, and (6) support a final determination as to the overall condition of the plant to support restart.

The RRIT completed its onsite inspection activities on October 14, 2011. They observed some earthquake-related damage to nonsafety-related equipment at North Anna 1 and 2 (e.g., limited damage to main generator step-up transformer bushings); however, this damage was considered minor (i.e., it was not functional damage that would preclude safe operation of the facility). The NRC reviewed these issues through established licensee and NRC processes to ensure they were adequately addressed without undue risk to the health and safety of the public.

The licensee and the NRC staff discussed the resolution of issues that the RRIT identified at an exit meeting held on November 7, 2011, that was documented in the RRIT's inspection report dated November 30, 2011 (ADAMS Accession No. ML113340345). The RRIT concluded that the licensee performed adequate inspections, walkdowns, and testing to ensure that the August 23, 2011, earthquake had not adversely affected safety-related structures, systems, and components (SSCs). The NRC's independent inspection of plant equipment, observation of selected surveillance testing, and its review of completed test data, calculations,



root cause evaluations, and other documents associated with the station's corrective action process and work order programs confirmed the licensee's process to properly evaluate the operability and functionality of the plant's SSCs. The RRIT reviewed the unresolved items from the AIT and determined that the licensee had completed the corrective actions necessary to support the restart of North Anna 1 and 2.

In addition to the onsite inspection activities, the NRC performed an independent technical evaluation of the information submitted by the licensee to demonstrate that no functional damage occurred at North Anna 1 and 2, as a result of the August 23, 2011, earthquake. The regulatory requirements and guidance used in the NRC's independent technical evaluation of the licensee's restart readiness determination included the following: (1) Appendix A of 10 CFR Part 100, Section V(a)(2); (2) the North Anna 1 and 2, Updated Final Safety Analysis Report (UFSAR); (3) Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Post-Earthquake Actions (RG 1.166); (4) Restart of a Nuclear Power Plant Shut Down by a Seismic Event (RG 1.167); (5) NRC Generic Letter (GL) 88-20, Supplement 4; "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities," along with the licensee's response to GL 88-20, Supplement 4; (6) International Atomic Energy Agency Safety Reports Series No. 66, "Earthquake Preparedness and Response for Nuclear Power Plants"; and (7) NRC Inspection Manual, Part 9900, "Operability Determinations and Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," and the associated NRC Regulatory Issue Summary (RIS) 2005-20, Revision 1, "Revision to NRC Inspection Manual Part 9900 Technical Guidance, 'Operability Determinations and Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety.'" In the summary of the independent technical evaluation issued November 11, 2011 (ADAMS Accession No. ML11308B406), the NRC staff

concluded that the licensee acceptably demonstrated that no functional damage occurred at North Anna 1 and 2, to those features necessary for continued operation and that North Anna 1 and 2, could be operated without undue risk to the health and safety of the public.

Although the NRC staff concluded that North Anna 1 and 2, could be safely restarted, the licensee identified several activities (inspections and tests) that would be performed as part of the restart process. The NRC monitored the startup of North Anna 1 and 2, to confirm that the plant would be safely operated (see inspection report at ADAMS Accession No. ML113540520). In addition to these startup activities, the licensee identified several long-term action items consistent with the guidance contained in the EPRI document NP-6695, "Guidelines for Nuclear Plant Response to an Earthquake" and changes to the North Anna 1 and 2 UFSAR. The NRC issued CAL No. NRR-2011-002 on November 11, 2011 (ADAMS Accession No. ML11311A201) documents these actions, which are independent of the NRC's conclusion that the licensee demonstrated that no functional damage occurred to North Anna 1 and 2, and that the plant could be restarted safely.

The licensee has completed all long-term actions identified in NRC CAL No. NRR-2011-002 dated November 11, 2011 (ADAMS Accession No. ML11311A201). The licensee periodically provided summaries of the completed actions to the NRC. The final closure summaries of the remaining CAL items were provided on May 13, 2013 (ADAMS Accession No. ML13135A637).

#### Concerns Raised by the Petitioners and the Response by the NRC

The Petitioners raised a total of 16 concerns in the petition dated October 20, 2011, and in supplements to the original petition. Of these 16 concerns, 12 were accepted for review, as documented in the partial DD issued on October 19, 2012 (ADAMS Accession No. ML12262A156). The NRC staff noted that this activity may take longer than the standard of 120

days for reaching a decision. The four concerns that were deferred for consideration by that partial DD were to remain open and the NRC staff provided periodic updates on the status of the 2.206 petition.

As the basis for this request, the Petitioners state several concerns which are summarized as follows:

- (1) Prior to the approval of restart for North Anna 1 and 2, after the earthquake of August 23, 2011, the licensee should be required to obtain a license amendment from the NRC that reanalyzes and reevaluates the plant's design basis for earthquakes and for associated retrofits.
- (2) Prior to the approval of restart for North Anna 1 and 2, after the earthquake of August 23, 2011, the licensee should be required to ensure that North Anna 1 and 2, are subjected to thorough inspections of the same level and rigor.
- (3) The licensee should be required to reanalyze and requalify the adequacy and condition of the Lake Anna dam after the earthquake of August 23, 2011.
- (4) The licensee should be required to reanalyze and reevaluate the North Anna ISFSI due to damage caused by the earthquake of August 23, 2011, and ensure that no threat is posed to public health and safety by its operation.
- (5) The licensee should ensure the reliability and accuracy of the seismic instrumentation at North Anna 1 and 2.
- (6) The NRC staff made hasty decisions about the restart of North Anna 1 and 2, and gave priority to economic considerations. The long-term action plan was not even complete before the NRC gave authorization to restart.

- (7) Regulatory commitments are an inadequate regulatory tool for ensuring that the critical long-term tasks identified in the NRC staff's CAL dated November 11, 2011 (ADAMS Accession No. ML11311A201), are completed.
- (8) The NRC should provide greater access to certain documents concerning North Anna 1 and 2, which are stored at the University of Virginia.
- (9) The licensee needs to address the possibility of both boildown and rapid draindown events at the North Anna 1 and 2, spent fuel pool.
- (10) The long-term storage of spent fuel in the spent fuel pool at North Anna 1 and 2, and at the North Anna ISFSI poses challenges to the public health and safety.
- (11) "Hardened on-site storage" strategies for spent fuel should be used at North Anna 1 and 2.
- (12) Concerns exist about age-related degradation at North Anna 1 and 2.
- (13) Concerns exist about the response of North Anna 1 and 2, to a prolonged station blackout.
- (14) The current emergency evacuation plans for North Anna 1 and 2, need to be revised to reflect the possible need to evacuate a larger area than that identified in the current emergency planning zone.
- (15) Concerns exist about damage to the structural integrity of the spent fuel pool structure at North Anna 1 and 2, as represented on pages 41 and 42 of the NRC staff's technical evaluation for the restart of North Anna 1 and 2, dated November 11, 2011 (ADAMS Accession No. ML11308B406).
- (16) There are concerns about lack of compliance at North Anna 1 and 2, with a public law requiring storage of potassium iodide in areas surrounding a nuclear reactor.

The NRC partially accepted the petition based on the fact that some of the concerns identified in the petition met the criteria from MD 8.11, while other concerns did not. Concerns numbered as 1, 2, 4-7, 9-11, and 13-15 above were accepted for review while concerns numbered as 3, 8, 12 and 16 above were not accepted for review. Additionally, it should be noted that concerns numbered as 9-11 and 13-15 were undergoing NRC review as part of the lessons-learned from the Fukushima event. The PRB denied the request for immediate action because there was no immediate safety concern at North Anna 1 and 2, and no undue risk to the health and safety of the public. The PRB concluded that the requirement “to demonstrate to the Commission that no functional damage has occurred to those features necessary for continued operation without undue risk to the health and safety of the public” already exists in Appendix A, “Seismic and Geologic Siting Criteria for Nuclear Power Plants,” to 10 CFR Part 100, “Reactor Site Criteria.”

The NRC staff sent a copy of the proposed partial DD for comment on July 10, 2012 (ADAMS Accession Nos. ML12165A208 and ML12165A209). The Petitioners responded with comments on July 31, 2012 (ADAMS Accession Nos. ML12261A228 and ML12258A012), and the licensee responded on July 30, 2012 (ADAMS Accession No. ML12219A120), that they did not have comments. The NRC staff issued the partial DD on October 19, 2012 (ADAMS Accession No. ML12262A156). As detailed in the partial DD, the NRR decided to partially grant the Petitioners' request.

As detailed in the partial DD, eight of these concerns were addressed. The remaining four concerns accepted for review were identified as those that may take longer than the target timeframe for reaching a decision on a petition based on the fact they were undergoing NRC review as part of the agency's response to the Fukushima event in Japan.

The remaining four concerns are summarized as follows:

- (1) The licensee needs to address the possibility of both boildown and rapid draindown events at North Anna 1 and 2, spent fuel pool. (Concern Number 7 listed in Partial DD)
- (2) The long-term storage of spent fuel in the spent fuel pool at North Anna 1 and 2, and at the North Anna Independent Spent Fuel Storage Installations poses challenges to the public health and safety. (Concern Number 8 listed in Partial DD)
- (3) “Hardened on-site storage” strategies for spent fuel should be used at North Anna 1 and 2. (Concern Number 9 listed in Partial DD)
- (4) The current emergency evacuation plans for North Anna 1 and 2, need to be revised to reflect the possible need to evacuate a larger area than that identified in the current emergency planning zone. (Concern Number 11 in listed Partial DD)

After reviewing the NRC’s progress in responding to the Fukushima event since acceptance of the petition for review, the NRC staff has determined that these concerns have been adequately addressed.

The sections below discusses the four remaining Petitioners’ concerns and the NRC’s response:

**(7) The licensee needs to address the possibility of both boildown and rapid draindown events at the North Anna 1 and 2, spent fuel pool.**

NRC decision: Concern 7 of this petition is within the scope of Recommendation 7 of the Near-Term Task Force (NTTF) report dated July 12, 2011 (ADAMS Accession No. ML11186A950). The Commission issued Order EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,” on March 12, 2012 (ADAMS Accession No. ML12054A736), for beyond-design-basis external events. Such actions significantly enhance the margins of safety from extreme natural phenomena at commercial operating reactors in the United States.

This Order requires a three-phase approach for mitigating beyond-design-basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment and SFP cooling capabilities. The transition phase requires providing sufficient, portable, onsite equipment, and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely. Additionally, this Order imposes requirements to maintain or restore SFP cooling capability through the use of self-powered portable pumps via multiple connection points, including connections diverse from the spent fuel deck and ensures makeup independent of AC or direct current power.

Further, the NRC issued an Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," on March 12, 2012 (ADAMS Accession No. ML12056A044), which requires the licensees to install instrumentation for observing the temperature and water level in the SFP, as well as radiation levels in the SFP area. The availability of these indications would enhance operator actions to mitigate any rapid boiling of water in the SFP and rapid draindown from the SFP.

North Anna 1 and 2, submitted its Overall Integrated Plan (ADAMS Accession No. ML13063A182) dated February 28, 2013, and three six-month updates (ADAMS Accession No. ML13242A012, dated August 23, 2013, ADAMS Accession No. ML14069A012, dated February 27, 2014, and ADAMS Accession No. ML14251A024, dated August 28, 2014). The licensee stated that based on the information available, they will be able to meet the requirements of the Order by following the revised milestone and associated target completion dates by April 2015. The NRC staff performed an interim review of the licensee's plan and issued Interim Staff Evaluation and Audit Report (ADAMS Accession No. ML12228A448) dated

January 29, 2014, concluding that the licensee has provided sufficient information to determine that there is reasonable assurance that the plan, when properly implemented, will meet NRC requirements. The licensee confirmed (ADAMS Accession No. ML15149A143 dated May 19, 2015) that it has completed the NRC requirements of the Order and is in full compliance with the Order for North Anna Power Station, Units 1 and 2. The NRC plans to conduct a post-compliance inspection at North Anna in early 2016. Therefore, Concern 7 is resolved and will be closed.

**(8) The long-term storage of spent fuel in the spent fuel pool at North Anna 1 and 2, and at the North Anna ISFSI poses challenges to the public health and safety.**

NRC Decision: It is unclear from the petition, as supplemented, whether the petitioners' assertion that long-term storage of spent fuel poses challenges to the public health and safety is generic or site-specific. To the extent that the petitioners are asserting that long-term storage poses public health and safety challenges generically, they do not demonstrate that the requested enforcement action is warranted against North Anna. The NRC has determined that safe long-term storage of spent fuel is technically feasible, and that it will take appropriate rulemaking or enforcement action as specific issues arise in the future. In its Memorandum and Order denying petitions to suspend final reactor licensing decisions pending a "waste confidence safety finding" (CLI-15-4, 81 NRC 221 (Feb. 26, 2015) (ADAMS Accession No. ML15057A261)), the Commission explained:

[O]ur statutory obligation to ensure the adequate protection of public health and safety encompasses an ongoing responsibility to regulate the continued storage of spent fuel, with or without a repository. Our long history with these issues (including our ability to adapt our regulatory processes based upon changing circumstances) continues to support our conclusion that safe, permanent disposal of spent nuclear fuel is technically feasible and that spent fuel can be safely stored until a repository becomes available, or indefinitely should such storage become necessary.



The NRC has an extensive history of ensuring that spent fuel stored in both pools and dry casks provides adequate protection of the public health and safety and the environment. The NRC ensures spent fuel safety through regulatory oversight (licensing and inspection) of licensees, considering relevant operating experience (domestic and international), and conducting studies of spent fuel safety. If any issues are identified that may challenge the safety of spent fuel, the NRC takes immediate action to ensure that safety is not compromised. The NRC has numerous requirements in place requiring effective protection against accidents that could affect the safe storage of spent fuel, which are inspected by the NRC routinely. Operating experience has shown that spent fuel pools (SFPs) have safely withstood challenging events, maintaining structural integrity and a large inventory of coolant to protect the stored fuel. Similarly, dry cask storage systems are designed to be passive systems (i.e., relying on natural air circulation for cooling) that are inherently robust, massive, and highly resistant to damage.

The NRC has completed several studies of SFP safety, appearing in NUREG-1353, “Regulatory Analysis for the Resolution of Generic Issue 82, ‘Beyond Design Basis Accidents in Spent Fuel Pools’”; NUREG-1738, “Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants”; and NUREG-2161, “Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling-Water Reactor.” All concluded that SFPs continue to provide adequate protection of public health and safety.

Following the accident at the Fukushima Dai-ichi Nuclear Power Plant in Japan on March 11, 2011, the NRC conducted an evaluation to determine whether regulatory action should be taken to require the expedited transfer of spent fuel from spent fuel pools to dry cask storage at nuclear power plants in the United States. The NRC staff’s analysis in COMSECY-13-0030, “Staff Evaluation and Recommendation for Japan Lessons Learned Tier 3 Issue on

Expedited Transfer of Spent Fuel” (ADAMS Accession No. ML13273A601) concluded that SFPs are very robust structures with large safety margins, and that regulatory actions to reduce the amount of fuel in the spent fuel pool were not warranted. The Commission subsequently approved the staff’s recommendation in Staff Requirements Memorandum (SRM)-COMSECY-13-0030, issued on May 23, 2014 (ADAMS Accession No. ML14143A360), concluding that in light of the low risk of accident for SFP storage, further regulatory action to require the expedited transfer of spent fuel to dry cask storage need not be pursued.

Additionally, in response to the Fukushima Dai-ichi accident, the NRC is currently implementing regulatory actions to further enhance reactor and SFP safety. On March 12, 2012, the staff issued Order EA-12-051, “Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation” (ADAMS Accession No. ML12054A679), which requires that licensees install reliable means of remotely monitoring wide-range SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis external event. Although the primary purpose of the order was to ensure that operators were not distracted by uncertainties related to SFP conditions during the accident response, the improved monitoring capabilities will help in the diagnosis and response to potential losses of SFP integrity. As explained in response to the petitioners’ Concern 7, North Anna has confirmed that it is in compliance with Order EA-12-051. In addition, on March 12, 2012, the staff issued Order EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events” (ADAMS Accession No. ML12054A735), which requires licensees to develop, implement, and maintain guidance and strategies to maintain or restore SFP cooling capabilities, independent of AC power, following a beyond-design-basis external event. These requirements ensure that a more

reliable and robust mitigation capability is in place to address degrading conditions in SFPs if an emergency situation were ever to occur.

In SECY-15-0081, “Staff Evaluation of Applicability of Lessons Learned from the Fukushima Dai-ichi Accident to Facilities Other Than Operating Power Reactors” (ADAMS Accession No. ML15050A066), the NRC staff conducted an evaluation of the safety of spent fuel dry storage systems that could be impacted by natural phenomena and other external events, including seismic events. The NRC staff’s assessment found that the NRC’s existing regulatory framework ensures safe and secure storage designs and found no safety concerns associated with the designs of spent fuel storage systems.

To the extent that the petitioners assert that long-term storage of spent fuel at the North Anna SFP and ISFSI poses site-specific public health and safety challenges, the petitioners do not demonstrate that the requested enforcement action is warranted. The North Anna SFP and ISFSI are licensed by the NRC and subject to NRC inspection. Those inspections have not identified conditions that would warrant the petitioners’ requested enforcement action (see, e.g., August 12, 2014, Integrated Inspection Report 2014003 (ADAMS Accession No. ML14224A152); November 10, 2014 Integrated Inspection Report 2014004 (ADAMS Accession No. ML14316A338); May 7, 2013 Integrated Inspection Report 05000338/2013002, 05000339/2013002, and 07200056/2013001 (ADAMS Accession No. ML13127A186)).

Through implementation of all these regulatory controls, the NRC has identified no conditions at North Anna to indicate that safe long-term storage of spent fuel at North Anna is not technically feasible. Nor has the NRC identified any conditions at North Anna that would call into doubt the NRC’s ability to address any future issues as they arise, or the NRC’s ability to adapt its regulatory process to changing circumstances in the form of rulemakings or orders.

Nor does the petition, as supplemented, identify any such information. Therefore, Concern 8 is resolved and will be closed.

**(9) “Hardened on-site storage” strategies for spent fuel should be used at North Anna 1 and 2.**

NRC decision: This issue has been addressed by the NRC staff’s evaluation of a petition for rulemaking (PRM), PRM 72-6, “Petition for Rulemaking Submitted by C-10 Research and Education Foundation, Inc.” Specifically, Petitioner Request 11 of PRM 72-6 requests the NRC to: 1) require Hardened On-Site Storage (HOSS) at all nuclear power plants as well as away-from-reactor dry cask storage sites; and 2) that all nuclear interim on-site or off-site dry cask storage installations or ISFSIs be fortified against attack. The status of the NRC’s consideration of Petitioner Request 11 of PRM 72-6 can be found in the *Federal Register* Notice dated October 16, 2012 (77 FR 63254) and at <http://www.regulations.gov> by searching NRC Docket ID NRC-2009-0558.

NRC has conducted considerable analyses regarding the safety of dry storage casks in use in the United States. The agency has consistently found that the robust nature of dry storage systems approved by the NRC under 10 CFR Part 72 assures the protection of public health, safety, and security and therefore has not mandated HOSS. Nevertheless, the NRC has considered potential rulemaking regarding enhancements to the security of spent fuel dry storage facilities (SRM-SECY-10-0114 and SRM-SECY-07-0148 - ADAMS Accession Nos. ML103210025 and ML073530119, respectively). On September 11, 2015, the NRC staff recommended to the Commission in COMSECY-15-0024 that this review be postponed 5 years, noting that the existing security requirements for ISFSIs, together with additional requirements in post-9/11 security orders, provide continued high assurance of adequate protection of public health and safety (ADAMS Accession No. ML15229A231). On October 6, 2015, the

Commission approved the NRC staff's recommendation and rescheduled the staff's review of the technical basis for such a rulemaking to 2020 (ADAMS Accession No. ML15280A105). Because Concern 9 raises issues that are relevant to this rulemaking regarding enhancements to the security of spent fuel dry storage facilities, the NRC will address this item in the context of this proposed rule.

The NRC has determined that SFPs and dry casks both provide adequate protection of the public health and safety and the environment. Therefore, there is no safety or security reason to mandate earlier transfer of fuel. In a staff requirements memorandum dated May 23, 2014 (ADAMS Accession No. ML14143A360), the Commission directed the NRC staff based on the staff's recommendation, to cease activity on possible regulatory actions that would require the expedited transfer of spent fuel to dry storage casks. As part of that staff requirements memorandum, the Commission also directed the staff to provide an assessment of limited term operational vulnerabilities associated with SFPs. The NRC staff completed that assessment and provided the results to the Commission on November 26, 2014, in SECY-14-0136 (ADAMS Accession No. ML14297A232). The NRC staff concluded that SFPs are safe and secure, that no additional regulatory action is necessary at this time. Therefore, this concern will be closed.

**(11) The current emergency evacuation plans for North Anna 1 and 2 need to be revised to reflect the possible need to evacuate a larger area than that identified in the current emergency planning zone.**

NRC decision: In SECY-12-0095, "Tier 3 Program Plans and 6-Month Update in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami," dated July 13, 2012 (ADAMS Accession No. ML12208A210), the NRC staff determined that the existing basis for the emergency planning zones (EPZ) size remains

valid including for response to multi-unit events. This matter is being further discussed in a November 17, 2015, Commission meeting related to Fukushima Lessons Learned. After this meeting, the Commission will make a determination as to how the staff should proceed relative to any rulemaking or other activities in this area.

The Commission has found that the basis for the current size of the EPZs is valid for existing reactors and proposed new reactors. Furthermore, the Commission has reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at an existing nuclear power plant. For new reactors under construction and licensed to operate, the Commission has determined that subject to the required conditions and limitations of the full-power license, adequate protective measures can and will be taken in the event of a radiological emergency.

The NRC recently denied a similar petition for rulemaking (PRM-50-104), on April 9, 2014 (79 FR 19501), requesting that the NRC amend its regulations that govern domestic licensing of production and utilization facilities to expand existing EPZs around nuclear power plants and create a new EPZ. In SECY-13-0135, "Denial of Petition for Rulemaking Requesting Amendments Regarding Emergency Planning Zone Size (PRM-50-104)," the Commission stated, in part, that

Nuclear power plant licensees; Federal, State, and local governments; and offsite response organizations perform comprehensive planning for these zones and routinely test and evaluate these plans through full participation exercises. The NRC concludes that emergency actions could be successfully carried out beyond the 10-mile EPZ for several reasons. The 10-mile emergency planning basis establishes an infrastructure similar to that used by other offsite response organizations, such as police and fire departments. The infrastructure consists of

emergency organizations, communications capabilities, training, and equipment that can be used in the event of an accident at the facility. Coordination is enhanced by the practice of having offsite response organizations, which include local, State, and Federal responders, participate in training exercises with the licensee.

Therefore, the NRC staff concluded that the current size of the EPZs is valid for existing reactors and that this concern can be closed.

On April 17, 2015 (ADAMS Accession Nos. ML15071A339) the NRC issued the proposed DD for comment to the Petitioners and the licensee. The Petitioners provided comments in a response dated May 18, 2015 (ADAMS Accession No. ML15138A277) and the licensee provided comments in a response dated May 20, 2015 (ADAMS Accession No. ML15147A517).

### **III. Conclusion**

The NRC evaluated the Petitioner's concerns, including comments received on the proposed DD. Based on the above, NRC has decided to close the Petitioners' request for the remaining four concerns. As provided in 10 CFR 2.206(c), a copy of this DD will be filed with the Secretary of the Commission for the Commission to review. As provided for by this regulation, this Decision will constitute the final action of the Commission 25 days after the date of the Decision unless the Commission, on its own motion, institutes a review of the Decision within that time.

Dated at Rockville, Maryland, this 30<sup>th</sup> day of October, 2015.

For The Nuclear Regulatory Commission.

***/RA/***

William M. Dean, Director,  
Office of Nuclear Reactor Regulation.

Attachment:  
Resolution of Comments



COMMENTS RECEIVED FROM THE PETITIONER  
ON THE PROPOSED DIRECTOR'S DECISION

DATED APRIL 17, 2015

The U.S. Nuclear Regulatory Commission (NRC) sent a copy of the proposed Director's Decision (DD) to Mr. Paul Gunter (the Petitioner) and the licensee, for comment on April 17, 2015 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML15071A339). By e-mail dated May 18, 2015 (ADAMS Accession No. ML15138A277), the Petitioner provided comments on the proposed partial DD. The licensee provided comments on May 20, 2015 (ADAMS Accession No. ML15147A517). The NRC's response to the comments is provided below:

Comment 1 - Received from Virginia Electric and Power Company (Dominion)

Dominion recommended that the following paragraph be added after the first paragraph at the top of page 10, which ends with the statement, "...no functional damage occurred to North Anna 1 and 2 and that the plant could be restarted safely." "The licensee has completed all long term actions identified in NRC confirmatory action letter (CAL) No. NRR-2011-002 dated November 11, 2011 (ADAMS Accession No. ML11311A201). The licensee periodically provided summaries of the completed actions to the NRC. The final closure summaries of the remaining CAL items were provided on May 13, 2013 via letter Serial No. 13-143 (ADAMS Accession No. ML13135A637)".

Response:

The NRC has revised the DD on page 10 to include the licensee's recommended changes.

Comment 2 - Received from Petitioners

In summary, the Petitioners comments reiterate that their overall concerns that were not initially accepted by the NRC should still be addressed by more thorough inspections and a formal public hearing. In particular, there have been a number of event reports since the restart of North Anna 1 & 2 that Petitioners remain concerned may be related by origin to damage sustained during the earthquake. The Petitioners cite excerpts from a number of reports including Independent Spent Fuel Storage Installation Annual Radioactive Effluent Release Report (ADAMS Accession No. ML15105A080), Technical Evaluation of Restart Readiness Determination Plan (ADAMS Accession No. ML11308B406), Onsite Audit Report Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Instrumentation related to orders EA-12-049 and EA-12-051 dated September 24, 2014 (ADAMS Accession No. ML14259A458), Event Notification Report, Annual Inspection Report, and the NRC Safety Evaluation for the approved relief request for Unit 2 (ADAMS Accession No. ML15023A219) since the restart, that Petitioners remain concerned may be related by origin to damage sustained during the earthquake.

Response:

The NRC's DD has adequately addressed the issues stated in the Petitioner's comments. The actions already taken by the NRC and described in the DD ensured adequate protection of public health and safety following the earthquake event. As discussed in the DD, the actions described will ensure the continued protection of the public health and safety. The NRC has concluded that no other actions, beyond the actions described in the DD are needed.

The NRC appreciates the Petitioner's comments and thanks the Petitioners for raising the concerns in the interest of protection of the health and safety of the American people. Upon

reviewing the comments received from the Petitioners, the Petitioner Review Board (PRB) concluded that the Petitioners did not raise any new or different concerns that were not already thoroughly evaluated and resolved by the PRB.