

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

Eric J. Leeds, Director

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

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(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 describes the bases for the request.

The PRB met on November 7, 2011, to discuss the petition and denied the petition's request for immediate action, because there was no immediate safety concern to North Anna 1 and 2, or 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 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 whether to 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 accept the petition, in part, 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 the petition was partially accepted for review under 10 CFR 2.206 and had been referred to the Office of Nuclear Reactor Regulation for appropriate action. This Director's Decision addresses 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 O1 F21, 11555 Rockville Pike (first floor), Rockville, Maryland. 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.

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 offsite power to the station was lost. 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 (DBE) for North Anna 1 and 2, were exceeded at certain frequencies for a short time.

In accordance with 10 CFR Part 100, Appendix A, Section V(a)(2), a nuclear power plant is required to be shut down when the vibratory ground motion exceeds that of the OBE. In addition, the regulations state that “prior to resuming operations, the licensee will be required 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.” As the August 23, 2011, earthquake resulted in ground accelerations greater than those assumed in the design of North Anna 1 and 2, 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

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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. An inspection report summarizing the AIT findings was published on 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 was also consistent with the guidance contained 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. The licensee's activities in support of the restart of North Anna 1 and 2, after the earthquake of August 23, 2011, are described in a letter from the licensee dated September 17, 2011 (ADAMS Accession No. ML11262A151), which enclosed the licensee's Restart Readiness Determination Plan for North Anna 1 and 2. (The licensee later supplemented its licensee's Restart Readiness Determination Plan numerous times in response

to NRC requests for additional information (RAIs) issued to support the development of the NRC's independent technical evaluation of the licensee's plan).

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 observed 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). In addition, the inspections led to the identification of nonearthquake-related issues. The NRC reviewed these issues through established licensee and NRC processes to ensure they are 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, which 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 inspections of plant equipment, observation of surveillance testing, and review of completed test data, calculations, root cause evaluations, and documents associated with the station's corrective action and work order programs confirmed the operability and functionality of plant 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) 10 CFR Part 100, Appendix A, Section V(a)(2), (2) the North Anna 1 and 2, updated final safety analysis report (UFSAR), (3) RG 1.167, (4) RG 1.166, (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 to the independent technical evaluation issued November 11, 2011, 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 for North Anna 1 and 2. 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. These long-term action items include those identified in Section 6.3 of NP-6695 and include changes to the North Anna 1 and 2, UFSAR. The NRC-issued CAL No. NRR-2011-002 (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 it could be safely restarted.

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, although the NRC staff noted in its acceptance letter dated March 16, 2012, that six of these 12 concerns were undergoing NRC review as part of the lessons-learned from the Fukushima event in Japan. The NRC staff noted that this activity may take longer than the standard of 120 days for reaching a decision on a petition and committed to providing periodic status updates to the petitioners if resolution of these issues is delayed. Accordingly, the concerns that are deferred for consideration by this partial Director's Decision will remain open and the NRC staff will provide periodic updates on the status of their resolution.

The Petitioners' concerns, and the NRC response to these concerns, are discussed in detail in this section. Many of these concerns are addressed, either in full or in part, by the NRC inspections and technical evaluation that reviewed the licensee's actions after the earthquake of August 23, 2011, to support completion of its Restart Readiness Determination Plan to demonstrate that no functional damage occurred at North Anna 1 and 2, to those features necessary for continued operation and that the units could be operated without undue risk to the

health and safety of the public. The petitioners' concerns and the NRC's resolution are described below:

(1) Prior to the approval of restart for North Anna 1 and 2, after the earthquake of August 23, 2011, Virginia Electric and Power Company (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 necessary retrofits.

The NRC staff has stated its position in RIS 2005-20, and in the accompanying revision to Inspection Manual Part 9900, that the licensee is permitted to start up from an outage as long as it can confirm operability of SSCs described in the technical specifications (TS) and demonstrate functionality for other safety-related and important-to-safety SSCs not described in the TS. As such, structures or components may exceed certain design-basis limits and still be considered acceptable for restart if the licensee can confirm that they are operable or functional. In the RRIT inspection report dated November 30, 2011, and in the NRC's technical evaluation dated November 11, 2011, the NRC found that SSCs were confirmed as operable or functional before plant startup. None of the inspections conducted indicated any significant damage that would render systems inoperable.

In addition, the provisions of 10 CFR Part 100, Appendix A, Section V(a)(2), require that "if vibratory ground motion exceeding that of the OBE occurs, shutdown of the nuclear power plant will be required." The licensee complied with that regulatory requirement on August 23, 2011. This regulation also states that "prior to resuming operations, the licensee will be required 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." As documented in its technical evaluation of November 11, 2011, and in its RRIT inspection report of November 30, 2011, the NRC staff determined through its independent

evaluation that the licensee met that requirement. Although the NRC staff is monitoring and evaluating the licensee's update of current licensing basis documentation (scheduled to be complete by April 30, 2013) to ensure its adequacy in light of the earthquake of August 23, 2011, there is no requirement for the licensee to submit a license amendment request following an earthquake that exceeds its DBE.

(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.

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 detailed walkdowns of all the major stations at North Anna 1 and 2, and focused inspections of selected structures and components. In addition, NRC inspectors from the AIT and RRIT, NRC fuel experts, and the North Anna 1 and 2, NRC resident inspectors performed independent inspections and walkdowns. Nuclear industry seismic experts and nuclear systems personnel from another utility also conducted independent inspections and walkdowns of limited scope. These inspections sought to identify any physical damage or deformation that could potentially impact the operability or functionality of station SSCs.

Following each of the walkdowns and inspections performed by licensee, industry, and NRC personnel, the licensee reviewed any issues identified to determine if they were seismically-related. If so, the licensee entered them into the corrective action program (CAP) for evaluation to determine if they had been seismically-induced and if so, what additional inspections or testing were required to support a position of operability or functionality. Before the station's staff conducted the walkdowns, the licensee provided training to each engineer

who took part in the inspection teams to ensure that they used a consistent approach in the walkdowns.

There were some differences in the exact number and level of inspections conducted at North Anna 1 in comparison with North Anna 2 based on plant status (e.g., the licensee was already performing inspections for the North Anna 2 refueling outage and it took credit, where appropriate, for the scope of these inspections when they also addressed readiness for restart). The licensee identified more than 400 surveillance procedures to be performed before declaring North Anna 1 “ready for restart,” to demonstrate the availability and operability of components and systems important to nuclear safety or required to mitigate the consequences of an accident as defined in the UFSAR and TS. For North Anna 2 to achieve this demonstration, the licensee identified more than 150 surveillance procedures for performance, in addition to those already scheduled to support the refueling outage before restarting the unit. While there were differences in the inspections conducted at each unit, the licensee defined a methodology to be used in its walkdowns and communicated this methodology to the engineers involved in the inspection effort through a training module to ensure consistent performance of the procedures. In instances where the level of inspection differed between the two units (e.g. the North Anna 2 reactor core was inspected, while the North Anna 1 reactor core was not), the licensee provided an adequate rationale for the differences.

The RRIT concluded that the licensee’s staff adequately inspected plant SSCs to ensure that any damage from the August 23, 2011, seismic event was identified and, if found, was properly evaluated and corrected before initiating restart activities. As a result of the inspections performed by licensee, industry and NRC personnel, no significant seismically induced damage was identified that could affect the operability or functionality of plant SSCs. Only some instances of lesser issues were identified during these inspections, as described in the RRIT’s

inspection report, dated November 30, 2011. Based on the results of its inspections, the RRIT concluded that the licensee's staff adequately inspected plant SSCs to ensure that any damage from the August 23, 2011, seismic event was identified and if found, was properly evaluated and corrected prior to initiating restart activities.

(3) The licensee should be required to reanalyze and reevaluate the North Anna Independent Spent Fuel Storage Installation (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.

The licensee has taken action to assess the structural integrity and radiation shielding capability of both the TN 32 cask and NUHOMS HD dry cask storage systems after the earthquake of August 23, 2011. The licensee reviewed this event for reportability under 10 CFR 72.75, "Reporting requirements for significant events and conditions" (significant reduction in effectiveness of any spent fuel storage cask confinement system), and determined that the TN 32 displacement and NUHOMS HD 32PTH damage described above was not reportable. In addition, the licensee completed an extensive operability evaluation and determined that the dry storage systems continue to perform their design safety functions.

The operability evaluation included extensive walkdowns to determine the condition of the spent fuel dry storage systems, ISFSI pads, and auxiliary equipment for the ISFSIs. The operability evaluation determined that: (a) ISFSI pads did not reveal any cracking or damage, (b) 25 of 27 casks moved by as much as 4.5 inches, (c) visual inspections of the casks did not reveal any damage, (d) spalling damage to the horizontal storage modules (HSMs) was minimal and did not impact the structural integrity or radiation shielding capability of the HSMs, (e) no movement occurred at the bases of the loaded HSMs (spacing between several HSM roofs indicated some very slight movement). (Later surveys, conducted after the operability

evaluation, indicated that all but one of the loaded HSMs exhibited a slight (less than 1 inch) sideways shift), (f) inlet/outlet vents were inspected and no abnormal blockage was found, (g) thermal performance measurements for all loaded HSM's were performed and no abnormal temperature differences were found, and (h) radiological surveys of both pads indicated no changes to cask surface dose. Postseismic inspection results concluded that the NUHOMS HD 32PTH HSMs and TN 32 casks remain operable and continue to perform their intended design and safety functions.

The NRC staff did not discover any significant safety issues at the North Anna ISFSI. This is based on (1) initial AIT confirmatory inspections to assess the condition of the ISFSIs, which concluded that there are no immediate safety issues associated with the movement of the vertical casks and horizontal storage ISFSI systems, and (2) the licensee's actions to ensure that regulatory requirements continue to be met. In addition, radiological conditions at the ISFSI remain normal and monitoring systems are functional.

Licensee actions are underway to evaluate and repair, as necessary, the ISFSI dry cask storage systems and components. In response to the NRC staff's request, the licensee has submitted an action plan that includes completion target dates for its evaluations and HSM repairs. Some actions identified in this plan have been completed (i.e., detailed visual inspections and HSM concrete repairs), while others are ongoing. Ongoing actions include translation of seismic parameters from the plant's power block to the ISFSI and analysis of the seismic event (using the resulting seismic acceleration response spectra), including an analysis of both systems (on Pads 1 and 2). These ongoing actions also include resolution of generic issues such as seismic instrumentation and locations, pressure monitoring systems, and radiological surveys.

The NRC is monitoring and independently assessing the licensee's analyses and corrective actions described in the action plan to ensure that the licensee adequately addresses short- and long-term ISFSI issues. As part of this effort, the NRC staff conducted an inspection of the ISFSI on January 19, 2012 (inspection report at ADAMS Accession No. ML12062A012). The results of this inspection were that no findings were identified. The NRC inspection team concluded that the licensee's staff adequately inspected the plant's ISFSI, including associated SSCs, to ensure that any damage from the August 23, 2011, seismic event was identified and was being properly evaluated and corrected prior to initiating the next fuel loading campaign. The NRC inspectors did not identify any significant seismically-induced damage. The inspectors also noted that items had been entered into the corrective action or work control programs as required; that required root cause evaluations had been, or were being, conducted following the seismic event; and that the action plan established by the licensee's staff was adequate and would be completed prior to introducing additional spent fuel into the ISFSI. The NRC staff will continue to monitor the licensee's progress in completing its action plan.

(4) The licensee should ensure the reliability and accuracy of the seismic instrumentation at North Anna 1 and 2.

The NRC staff and the licensee have evaluated the reliability and accuracy of the seismic instrumentation at North Anna 1 and 2, and the licensee has taken a number of actions to address this issue. The AIT inspection report identified an unresolved issue (URI), URI 05000338, 339/2011011-06, "Seismic Alarm Panel" and this issue was later documented as a Green inspection finding (see inspection report at ADAMS Accession No. ML12131A545), although the finding did not involve a violation of NRC requirements. Following the seismic event, the licensee installed a temporary uninterruptible power supply (UPS) to ensure that the seismic monitoring panel and its associated alarms, which are used to determine if an

emergency plan entry is required, will remain operable during periods when power is being transferred between the normal supply and the emergency power supply. While the long-term corrective action calls for the UPS to be replaced with a different configuration, the immediate issue has been addressed and functionally tested. The licensee is evaluating ways to upgrade the existing seismic monitoring system as a long-term option. The RRIT inspectors determined that the licensee had taken appropriate actions to address the issue and documented it in its CAP. Therefore, the RRIT identified no restart concerns.

In Section 2.3, "Seismic Instrumentation," of the NRC staff's technical evaluation dated November 11, 2011, the NRC staff evaluated a number of issues associated with the seismic instrumentation at North Anna 1 and 2. As described in this report, there are two types of seismometers, Engdahl and Kinometrics, located at different elevation levels of the North Anna 1 containment and auxiliary buildings (as indicated in Figure 5 of the NRC staff technical evaluation dated November 11, 2011). The seismic monitors for both types of equipment at the North Anna 1 basemat were connected to the seismic instrumentation panel located in the control room with indication of OBE exceedance. During the earthquake, the annunciation panel lost power for about 8 seconds. Therefore, the licensee's plant operators were not informed about the occurrence or magnitude of the earthquake through the panel annunciator.

Several issues raised in the AIT inspection report about the seismometers and annunciation panel in the main control room (MCR) led the NRC staff to develop an RAI regarding the licensee's plans for modernization of the seismic instrumentation at both North Anna 1 and 2, for both rock- and soil-supported structures, to provide a reliable system and to accommodate onsite data interpretation. The licensee's response indicated that the plan for modernization of the seismic instrumentation at North Anna 1 and 2, consists of completed and scheduled work. First, a UPS was seismically qualified and installed in the control room in

September 2011. This UPS provides backup power to the Kinometrics equipment and Engdahl peak shock alarms in the control room. The seismic switch event alarm and peak shock alarms provide control room operators with immediate feedback on whether the OBE has been exceeded. Second, an autonomous, temporary free-field seismic monitor was installed within the North Anna 1 and 2, owner-controlled area, east of the training building, in September 2011. In addition, the station abnormal procedure for seismic events was updated to include reference to, and use of, the free-field monitor. Also, a procedure is in place for obtaining and evaluating free-field seismic data as it relates to cumulative average velocity (CAV) and an OBE or DBE exceedance determination. Although the licensee has not formally adopted RG 1.166 into its licensing basis, both of these actions facilitate the licensee's ability to assess earthquake data within 4 hours of an earthquake as described in RG 1.166.

The licensee has also initiated a project to replace the existing seismic equipment and MCR indication with more modern equipment. Permanent, free-field seismic equipment will be installed to facilitate the performance of CAV calculations. The upgrade will also include installation of seismic recording instrumentation at the station's ISFSI pad. The licensee completed the first phase of equipment installation during the North Anna 1 spring 2012 refueling outage and is scheduled to complete the final phase by December 31, 2012.

As described in the AIT inspection report dated October 31, 2011, the NRC staff found that Engdahl seismometers at North Anna 1 and 2, are less reliable than Kinometrics. The licensee installed the free-surface/free-field seismometer with temporary settings. While this does not have the direct connection to the MCR instrumental panel to alert plant operators immediately during an earthquake event, the plant operator can still make an appropriate operating and reporting decision within the 4-hour limit. Therefore, with the combination of Kinometrics and free field seismometer, the NRC staff considered the licensee response

acceptable. In addition, the licensee had connected the MCR instrument panel with a noninterruptible seismically-qualified backup power; therefore, power disruption would not be expected in a future earthquake event.

The licensee also indicated that the Kinometrics seismometers at the plant did not have accurate timing for the recorded time history because the start time of seismic data is estimated. The NRC staff asked the licensee to address how this potential uncertainty impacts the use of the seismic time history when matching it to other recorded events (e.g., the nuclear instrumentation signal changes) for the reactor shutdown root cause analysis. In evaluating this issue, the NRC staff had asked the licensee to discuss any plans to update seismic instrumentation at the plant to provide better ground motion recordings for any future earthquake events.

Furthermore, the NRC staff asked the licensee to confirm the operability and reliability of the seismic instrumentation (specifically, channel orientation, sensor calibration, and sensitivity test implementation) and alarming systems to ensure they accurately record earthquake ground motion and provide real-time alarm notifications to the plant operators during any earthquake events.

The licensee responded that the applicable Technical Requirements Manual (TRM) TS-required surveillances have been completed satisfactorily for the seismic instrumentation and alarming systems following the earthquake. These include channel functional testing and channel checks of installed instrumentation for functionality. This also included channel calibrations of all peak acceleration and response spectrum recorders and the associated control room alarm indications. Channel calibrations were also completed for the time-history accelerographs and the seismic switch control room alarm indications. A channel orientation issue was identified for the time-history accelerographs whereby the horizontal sensors were

90 degrees off specified orientation. This discrepancy was entered into the CAP for resolution; however, there is no issue with either affected channel's functionality or the ability to record an earthquake event. Further investigation found no identifiable issues of a vertical recording channel interchanged for a horizontal recording channel for any of the installed systems.

Based on completed inspections and testing following the August 23, 2011, earthquake, there are presently no concerns with the functionality or reliability of the installed seismic instrumentation at North Anna 1 and 2. In addition, the licensee indicated in its response dated October 10, 2011 (ADAMS Accession No. ML11286A019), that the seismic instrumentation at North Anna 1 and 2, will be upgraded to enhance the station's ability to monitor and assess seismic events. The NRC staff agrees with the licensee's short-term transitional usage of the current seismic instrumentation.

(5) 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 staff gave authorization to restart.

As discussed above, the licensee's schedule for restart of North Anna 1 and 2, after the August 23, 2011, earthquake was based on completion of all activities necessary to demonstrate to the NRC that no functional damage had 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 both the RRIT's inspection report dated November 30, 2011, and the technical evaluation by the NRC staff dated November 11, 2011, the NRC staff found that the licensee had performed the actions necessary to demonstrate meeting this standard. The purpose of the CAL dated November 11, 2011, was to respond to the earthquake of August 23, 2011, with a set of actions above and beyond those needed to ensure the safe startup and operation of North Anna 1 and 2.

(6) Regulatory commitments are an inadequate regulatory tool for ensuring that the critical long-term tasks identified in the NRC staff's confirmatory action letter dated November 11, 2011, are completed.

The licensee identified several actions for completion in a letter dated November 7, 2011 (ADAMS Accession No. ML11314A069). These commitments are documented in the NRC-issued CAL No. NRR-2011-002, and are unrelated to the NRC's conclusion that the licensee demonstrated that no functional damage occurred to the North Anna 1 and 2, and that it could be safely restarted. The CAL lists a series of commitments with milestones ranging from December 31, 2011, to April 30, 2013.

As per the NRC's Enforcement Manual (ADAMS Accession No. ML102630150), CALs are letters issued to licensees or vendors to emphasize and confirm a licensee's or vendor's agreement to take certain actions in response to specific issues. Furthermore, the NRC expects licensees and vendors to adhere to any obligations and commitments addressed in a CAL. In the process of issuing CAL No. NRR-2011-002, the NRC staff determined that it was consistent with the NRC Enforcement Policy and Enforcement Manual.

(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.

In reviewing this concern, the NRC staff noted that out of the 12 concerns accepted for review, the NRC is currently reviewing six concerns as part of the lessons-learned from the Fukushima event. At the time of this partial DD, the NRC staff is still in the process of reaching a decision on this concern and resolution of this issue is forthcoming. The NRC staff will provide periodic status updates to the petitioners concerning progress on its resolution.

(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.

In reviewing this concern, the NRC staff noted that out of the 12 concerns accepted for review, the NRC is currently reviewing six concerns as part of the lessons-learned from the Fukushima event. At the time of this partial DD, the NRC staff is still in the process of reaching a decision on this concern and resolution of this issue is forthcoming. The NRC staff will provide periodic status updates to the petitioners concerning progress on its resolution.

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

In reviewing this concern, the NRC staff noted that out of the 12 concerns accepted for review, the NRC is currently reviewing six concerns as part of the lessons-learned from the Fukushima event. At the time of this partial DD, the NRC staff is still in the process of reaching a decision on this concern and resolution of this issue is forthcoming. The NRC staff will provide periodic status updates to the petitioners concerning progress on its resolution.

(10) Concerns exist about the response of North Anna 1 and 2, to a prolonged station blackout (SBO).

In reviewing this concern, the NRC staff noted that out of the 12 concerns accepted for review, the NRC is currently reviewing six concerns as part of the lessons-learned from the Fukushima event. At the time of this partial DD, the NRC staff has issued an advanced notice of proposed rulemaking (ANPR) dated March 20, 2012 (77 FR 16175), which addresses the substance of this concern. The NRC issued this ANPR to begin the process of considering amendments of its regulations that address a condition known as SBO. SBO involves the loss of all onsite and offsite AC power at a nuclear power plant. The NRC is seeking public comment on specific questions and issues with respect to possible revisions to the NRC’s requirements for addressing SBO conditions to develop new SBO requirements and a supporting regulatory basis.

(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.

In reviewing this concern, the NRC staff noted that out of the 12 concerns accepted for review, the NRC is currently reviewing six concerns as part of the lessons-learned from the Fukushima event. At the time of this partial DD, the NRC staff is still in the process of reaching a decision on this concern and resolution of this issue is forthcoming. The NRC staff will provide periodic status updates to the petitioners concerning progress on its resolution.

(12) 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.

In reviewing this concern, the NRC staff noted that out of the 12 concerns accepted for review, the NRC is currently reviewing six concerns as part of the lessons-learned from the Fukushima event. At the time of this partial DD, the NRC staff has issued an Order, EA-12-049 (ADAMS Accession No. ML12054A736), and a request for information (ADAMS Accession No. ML12073A348), dated March 12, 2012, which address the substance of this concern. The NRC issued Order EA-12-049 requiring affected licensees to provide mitigation strategies for beyond-design-basis external events. The Order dated March 12, 2012, also requires affected licensees to provide additional information to support the evaluation of the NRC staff recommendations for the Near Term Task Force (NTTF) review of the accident at the Fukushima Dai-ichi nuclear facility for its implications for U.S. nuclear power plants.

Enforcement Actions Requested by the Petitioners and the Response by the NRC

The NRC staff has evaluated the petitioners' request to take escalated enforcement action against the licensee and suspend the operating licenses for North Anna 1 and 2, until the completion of a set of activities described in the petition. With respect to the petitioners' request for enforcement action, the NRC staff concludes that it has partially granted that request in that the NRC issued CAL No. 2-2011-001 dated September 30, 2011, which stated the following:

This Confirmatory Action Letter (CAL) confirms that NAPS [North Anna Power Station] Units 1 and 2, will not enter Modes 1-4 (as defined in the technical specifications), until the Commission has completed its review of your information, performed confirmatory inspections, and completed its safety evaluation review. The permission to resume operations will be formally communicated to Virginia Electric and Power Company (VEPCO) in a written correspondence.

VEPCO shall submit to the NRC all documentation requested by the NRC as being necessary to demonstrate that NAPS Units 1 and 2, can be operated safely following the seismic event that exceeded the safe shutdown event analyzed in the current revision of the Updated Final Safety Analysis Report.

This CAL will remain in effect until the NRC has (1) reviewed your information, including responses to staff's questions and the results of your evaluations, and (2) the staff communicates to you in written correspondence that it has concluded that NAPS can be operated without undue risk to the health and safety of the public or the environment.

This CAL, therefore, confirmed the licensee's understanding that North Anna 1 and 2, could not be restarted unless and until the licensee had demonstrated to the NRC staff's satisfaction that "... no functional damage has occurred to those features 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). Restart was contingent upon addressing a number of issues before startup, many of which issues were identified in whole or in part in the petition as concerns.

Issues in the petition, identified and discussed above as concerns 1, 2, 3, 4, and 5, were discussed and substantially addressed, either in the inspection reports issued October 31, 2011, and November 30, 2011, or in the NRC technical evaluation dated November 11, 2011. The activities by the NRC staff were completed before restart to ensure that, before resuming operations, the licensee had demonstrated no functional damage 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. In that respect, these concerns described in the petition as requiring completion before the restart of North Anna 1 and 2, were addressed before restart.

The issue in the petition, identified and discussed above as concern 6, was evaluated by the NRC staff, but disposition of this concern by the NRC staff differs from the course of action requested in the petition. In that respect, this aspect of the petition is denied for the reasons discussed above.

Six of the issues in the petition, identified and discussed above as concerns 7, 8, 9, 10, 11, and 12, were accepted for review by the NRC staff, but, as indicated above, the NRC staff noted that these concerns were undergoing NRC review as part of the lessons-learned from the Fukushima event. After further review, the NRC staff has determined that concerns 10 and 12 have been addressed by NRC activities associated with the NTF. Since concerns 7, 8, 9, and 11 will take longer than the target timeframe for reaching a decision on a petition, the NRC staff commits to providing periodic status updates to the petitioners on

the resolution of these issues. As concerns 7, 8, 9, and 11 are not fully addressed in the Director's Decision, this Director's Decision is partial.

III. Conclusion

Based on the above, the Office of Nuclear Reactor Regulation has decided to partially grant the petitioners' request. As provided in 10 CFR 2.206(c), a copy of this Director's Decision will be filed with the Secretary of the Commission for the Commission to review. As provided for by this regulation, the 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 day of 2012.

FOR THE NUCLEAR REGULATORY COMMISSION

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation