**NORTH ANNA POWER STATION RESTART ACTION PLAN (PUBLIC)***

Initial Action Plan: 10/7/2011
Lead Division: DORL
Supporting Divisions: DE, DSS, DLR, DIRS, DPR, and DRA
Supporting Offices: Region II, NMSS, NRO, RES, and OGC

Docket Nos. 50-338 and 50-339
TAC Nos. ME7254 and ME7255

## GOAL

The goal of this action plan is to identify and coordinate the agency's ongoing initiatives related to the North Anna Power Station (NAPS) restart decision as a result of the recent seismic event on August 23, 2011.

## BACKGROUND

On August 23, 2011, with NAPS Units 1 and 2 operating at 100 percent, the site experienced a seismic event (from a Magnitude 5.8 earthquake reported at the epicenter by the U.S. Geological Survey) in Mineral, Virginia, approximately 10 miles from NAPS. The earthquake caused a series of reactor trip signals to both the Unit 1 and Unit 2 reactors, as well as a loss of offsite power to the station. Four emergency diesel generators and one alternate AC diesel generator were activated to provide onsite power. Separately, the 2H Emergency Diesel Generator developed a coolant leak and was subsequently manually secured. A Root Cause Evaluation of the leak was performed. Subsequent analysis indicated that the spectral and peak ground accelerations for the Operating Basis and Design Basis Earthquakes (OBE and DBE, respectively) for NAPS were exceeded.

Both NAPS units are currently shutdown. Unit 1 currently has fuel in the reactor, whereas Unit 2 entered a refueling outage which was planned to begin in mid-September. At the time this plan was being developed, no significant equipment damage to safety-related systems (including Class 1 structures) has been identified through site walkdowns nor has equipment degradation been detected through plant performance and surveillance testing following the earthquake.

## REGULATORY CONSIDERATIONS

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Appendix A to Part 100, Paragraph V(a)(2), a nuclear power plant is required to be shutdown when the vibratory ground motion exceeds that of the Operating Basis Earthquake. In addition, the regulations state that "prior to resuming operations, the licensee will be required to demonstrate to the Commission that no functional damage occurred to those features necessary for continued operation without undue risk to the health and safety of the public." It is also noted that the NAPS Updated Final Safety Analysis Report (UFSAR), Section 3.7.4.6 commits to demonstrate to the NRC that no functional damage has occurred to those features necessary for continued operation without undue risk to the health and safety of the public.

*Updated November 21, 2013, only to reflect completion dates noted in the table.

Licensee actions are underway to inspect, evaluate, test, and repair if necessary, the systems, and components to ensure they are capable of performing their required functions. The licensee is performing plant walkdowns in accordance with Regulatory Guide (RG) 1.167, "Restart of a Nuclear Power Plant Shutdown by a Seismic Event," which endorses the Electric Power Research Institute's (EPRI's) NP-6695, "Guidelines for Nuclear Plant Response to an Earthquake," with conditions.

The staff's assessment will utilize the guidance provided in NRC's RG 1.167, which endorses the EPRI guidelines. In addition, the staff will utilize the International Atomic Energy Agency (IAEA) Safety Report No. 66, "Earthquake Preparedness and Response for Nuclear Power Plants," inform its reviews. It should be noted that the IAEA safety report acknowledges the prospect that hidden damage (especially after an SSE) is a possibility. In addition, the staff will utilize its expertise and knowledge to review areas beyond the RG 1.167 and EPRI guideline. Since the August 23, 2011, earthquake produced ground motion that exceeded the plant's SSE, the staff will review the licensee's activities, as documented in its September 17, 2011, submittal as well as any supplemental information, in accordance with 10 CFR Part 100, Appendix A. Specific actions are identified in the table below, entitled, "North Anna Power Station Restart Action Plan Milestones."

The licensee may use a variety of approaches to demonstrate that no functional damage occurred as a result of the earthquake. For example, the licensee may analyze and evaluate the actual earthquake to show that structures, systems, and components (SSCs) were not adversely affected. In lieu of analyses/evaluations or in combination with them, the licensee may inspect and/or test various SSCs to demonstrate that there was no functional damage.

The licensee's submittals for demonstrating no functional damage will be reviewed by the NRC staff to confirm that the licensee's analyses, evaluations, inspections, or tests, are in accordance with RG 1.167, which endorses the EPRI NP-6695 guidelines, are adequate for demonstrating 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 a result of the earthquake (as required by Appendix A to Part 100).

The following actions must be completed before the NRC approves restart of NAPS:

1. visual walkdowns by the licensee in accordance with the EPRI guidelines by personnel trained and qualified in accordance with ASME and ACI Codes,
2. confirmatory inspections by the NRC inspectors, and
3. review and acceptance by the staff of short term evaluations performed by licensee prior to restart.

Subsequent to restart, the staff will review long term evaluations by the licensee that demonstrate long term operability.

The staff will evaluate the adequacy of the scope of the licensee's inspections, tests and analyses, which are intended to demonstrate that no functional damage resulted from the earthquake to systems, subsystems, trains, components and devices (i.e., SSCs) (1) that are required to be operable by technical specifications (TSs); (2) that perform required support functions to maintain a TS-required system operable; (3) that are risk significant or safety-related; and (4) SSCs that are not described in TSs, but which warrant programmatic

controls to ensure that SSC availability and reliability are maintained (e.g., nonsafety-related SSCs that are risk significant).

NRC Inspection Manual Part 9900, "Operability Determinations and Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," provides more detailed guidance for determinations of operability and resolution of degraded or nonconforming conditions**.** The NRC staff will evaluate the adequacy of the licensee's plan, that details the methods used to search for nonconforming conditions, and the resulting evaluation method if non-conforming conditions are found. The staff will also confirm that the licensee's plan includes a determination of an adequate search for nonconforming conditions.

In ensuring that the licensee has adequately identified the long-term actions, the staff will assess the need for a regulatory vehicle to ensure that the long-term actions are completed following plant restart. The staff will also assess whether there is a sufficient technical basis to require the licensee, following plant restart, to update its seismic licensing basis related to the SSE for NAPS, and, if so, the appropriate regulatory tool(s) to bring this about.

**MILESTONES, UPDATE FREQUENCY, AND SCHEDULED DATES FOR COMPLETION:**

**Noted in Table**

**Current Status: Noted in table**
**Potential Problems: N/A**

**Closeout Criteria: N/A**

**CONTACTS:**

| | |
|---|---|
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**REFERENCES:**

1. 10 CFR Part 100, Appendix A, Seismic and Geologic Siting for Nuclear Power Plants.

2. RG 1.167, “Restart of a Nuclear Power Plant Shut Down By a Seismic Event.”

3. EPRI NP-6695 Guideline, “Guidelines for Nuclear Power Plant Response to an Earthquake.”

4. IAEA Safety Report No. 66, “Earthquake Preparedness and Response for Nuclear Power Plants.”

5. NUREG-1407, “Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities, June 1991.

6. Augmented Inspection Team Charter to Evaluate Total Loss of Offsite Power, Dual Unit Reactor Trips and Plant Equipment Issues Following a Seismic Event at North Anna (ADAMS Accession No. ML11243A021).

7. Dominion Presentation Slides, September 8, 2011 (ADAMS Accession No. ML11252A006).

8. Virginia Electric and Power Company (Dominion) North Anna Power Station Units 1 and 2, North Anna Independent Spent Fuel Storage Installation Summary Report of August 23, 2011 Earthquake Response and Restart Readiness Determination Plan, dated September 17, 2011 (ADAMS Accession No. ML11262A151).

9. Virginia Electric and Power Company North Anna Power Station Units 1 and 2, Post Earthquake Restart Readiness Determination Plan Status Update, dated September 27, 2011.

10. Virginia Electric and Power Company North Anna Power Station Units 1 and 2, Response to Request for Additional Information Regarding the Earthquake on August 23, 2011 and Restart Readiness Determination Plan, dated September 27, 2011 (Fuels and Reactor Systems).

11. Virginia Electric and Power Company (Dominion) North Anna Power Station Units 1 and 2, Response to Request for Additional Information Regarding the Earthquake on August 23, 2011 and Restart Readiness Determination Plan, dated October 3, 2011 (Fuels and Reactor Systems).

12. Virginia Electric and Power Company (Dominion) North Anna Power Station Units 1 and 2, Response to Request for Additional Information Regarding the Earthquake on August 23, 2011 and Restart Readiness Determination Plan, dated October 3, 2011 (HVAC, Containment, Electrical, I&C, Fire Protection, PRA, Steam Generators, Snubbers, and Reactor Vessel Internals).

13. Virginia Electric and Power Company (Dominion) North Anna Power Station Units 1 and 2 Response to Request for Additional Information Restart Readiness Determination Plan, dated October 10, 2011 (Electrical, Steam Generators, Snubbers, and Reactor Vessel Internals).

14. Virginia Electric and Power Company (Dominion) North Anna Power Station Units 1 and 2 Response to Request for Additional Information Restart Readiness Determination Plan, dated October 10, 2011 (Piping, EMCB, and License Renewal).

**NORTH ANNA POWER STATION RESTART ACTION PLAN MILESTONES**

| Item # | Milestone | Completion Date | Lead |
|---|---|---|---|
| 1 | Conduct daily conference calls with the licensee to obtain status of activities. | 11/11/11 (C) | DORL |
| 2 | Conduct audit on the effects of the earthquake on the nuclear fuel. | 9/19/11-9/22/11 (C) | SNPB |
| 3 | Prepare acceptance criteria for reviewers. | 9/20/11 (C) | DORL |
| 4 | Issue Communications Plan, and update as necessary. | 9/20/11 (C) | DE |
| 5 | Brief NRR OD of regulatory basis for restart and review process. | 9/22/11 (C) | DORL |
| 6 | Provide briefing books to EDO (VEPCO Drop-ins with Chairman and Commissioners - 9/29 and 9/30. | 9/23/11 (C) | DORL |
| 7 | Provide response to GT–IAEA one pager. | 9/23/11(C) | DORL |
| 8 | Develop SE template for reviewers. | 9/28/11 (C) | DORL |
| 9 | Conduct Commissioner's TA briefing. | 9/28/11 (C) | DORL |
| 10 | Applicable technical branches within DE, DSS, DCI, DIRS, DRA, and DLR identify questions and issues that the licensee should address in the short term (prior to restart) and long term initiatives (post restart), and provide to DORL. | 11/11/13 (O) (Ongoing) | All |
| 11 | Meeting with Chairman to address regulatory process for restart and licensing process. | 9/29/11 (C) | NRR/OGC |
| 12 | Dominion drop-in with Chairman and Commissioners. | 9/29/11 and 9/30/11 (C) | EDO |
| 13 | Issue Confirmatory Action Letter to licensee (after communicating CAL language to VEPCO). | 9/30/11 (C) | Region II |
| 14 | Issue formal requests for additional information to licensee. | 9/30/2011 (C) | DORL |
| 15 | NRR OD and Region 2 RA to tour site prior to AIT exit meeting. | 10/3/11 (C) | NRR and Region II |
| 16 | Identify issues for regional follow-up (walkdowns and inspections). | 10/3/11 (C) | All |
| 17 | Conduct AIT public exit briefing and provide insights to DORL for their review of the restart submittal. | 10/3/11 (C) | Region II |
| 18 | Restart Readiness Inspection | 10/5/11 - 10/14/11 (C) | Region II |
| 19 | Prebrief with NRR OD regarding 10/21 Comm. Mtg. | 10/11/11 (C) | DORL/DE |

**NORTH ANNA POWER STATION RESTART ACTION PLAN MILESTONES, CONT.**

| Item# | Milestone | Completion Date | Lead |
|---|---|---|---|
| 20 | Obtain acceptance from FEMA National regarding infrastructure to support restart prior to restart. | 10/11/11 (C) | NSIR |
| 21 | EDO alignment/prebrief for 10/21/11 Commissioner Meeting. | 10/12/11 (C) | DORL/DE |
| 22 | Receive draft safety evaluation input from reviewers. | 10/13/11 (C) | All |
| 23 | Determine regulatory vehicle, as necessary, to address long-term actions | 9/30/11(C) | DORL |
| 24 | Develop the language for appropriate regulatory vehicle to address long-term actions if necessary. | 9/30/11(C) | DORL/DE |
| 25 | Conduct Commissioner TA briefing. | 10/18/11 (C) | DORL |
| 26 | Conduct Public Commission Meeting regarding North Anna Restart Initiative. | 10/21/11 (C) | DORL |
| 27 | Obtain facilitator and contractor support for AV needs for the public meeting in Louisa, Virginia. | 10/26/11 (C) | DORL/ Region II |
| 28 | Receive final safety evaluation input from reviewers. | 10/31/11 (C) | DORL |
| 29 | Conduct Public Meeting in Louisa, VA, to discuss the Restart Readiness Inspection and technical review. | 11/1/11 (C) | Region II NRR |
| 30 | Issue letter to VEPCO on restart decision (reference inspection activities and attach NRC SE). | 11/11/11(C) | NRR |
| 31 | Update 1-pager for Commissioners. | Completed | DORL |
| 32 | Address GT 20110668 regarding 2.206 petition. | 4/26/12 (C) | DORL/DPR |
| 33 | Address any potential generic issues (e.g., seismic instrumentation power supplies, seismic monitor locations on structures as well as in the “free field,” and seismic monitors on ISFSI pads). | Ongoing | Region II NMSS/DE/DPR |
| 34 | Continue to respond to routine communications between the resident inspectors and local officials based on public interest. See Communications Plan. | Completed | DORL |
| 35 | Address issues for resolution. | Completed | DORL/DIRS |
| 36 | Conduct ACRS briefings, as needed. | NA | DORL and Technical Branches |
| 37 | Conduct EDO and Commissioner briefings, as needed. | Completed | DORL and DE |
| 38 | Develop SharePoint site. | C | DORL |

T = Target
C = Complete
O = Ongoing