



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

March 30, 2016

Mr. David A. Heacock  
President and Chief Nuclear Officer  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060

**SUBJECT: NORTH ANNA POWER STATION – NRC TEAM INSPECTION REPORT  
05000338/2016008 AND 05000339/2016008**

Dear Mr. Heacock:

On February 25, 2016, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station. The enclosed report documents the inspection results, which were discussed on February 25, 2016, with Mr. G. Bischof and other members of your staff. A re-exit was conducted with Ms. Klearman via telephone on March 25, 2016, to discuss the final results of the inspection.

The inspection examined activities conducted under your license as they relate to the implementation of mitigation strategies and spent fuel pool instrumentation orders (EA-12-049 and EA-12-051) and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans, your compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved examination of selected procedures and records, observation of activities, and interviews with station personnel.

The NRC inspectors did not identify any findings or violations of more than minor significance.

D. Heacock

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Sincerely,

*/RA/*

Anthony D. Masters, Chief  
Reactor Projects Branch 7  
Division of Reactor Projects

Docket No.: 50-338, 50-339  
License No.: NPF-4, NPF-7

Enclosure:  
IR 05000338/2016008 and 05000339/2016008  
w/Attachment: Supplementary Information

cc: Distribution via ListServ

D. Heacock

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NAME	R. Rodriguez	A. Masters	S. Rose	G. MacDonald	J. Hanna	B. Bartlett	
DATE	03/28/2016	03/30/2016	30/28/2016	03/28/2016	03/28/2016	03/28/2016	
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D. Heacock

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Letter to David A. Heacock from Anthony D. Masters dated March 30, 2016.

SUBJECT: NORTH ANNA POWER STATION – NRC TEAM INSPECTION REPORT  
05000338/2016008 AND 05000339/2016008

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No.: 50-338, 50-339

License No.: NPF-4, NPF-7

Report No.: 05000338/2016008, 05000339/2016008

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: North Anna Power Station, Units 1 & 2

Location: Mineral, Virginia 23117

Dates: February 22 – 25, 2016

Inspectors: R. Rodriguez, Senior Project Engineer (Team Leader)  
B. Bartlett, Senior Reactor Inspector, Region III  
J. Hanna, Senior Reactor Analyst  
G. MacDonald, Senior Reactor Analyst  
T. Brown, Project Manager, JLD (Observer)  
J. Quinones, Reactor Operations Engineer, JLD  
(Observer)

Approved by: Anthony D. Masters, Chief  
Reactor Projects Branch 7  
Division of Reactor Projects

Enclosure

## SUMMARY

IR 05000338/2016008 and 05000339/2016008; 2/22/2016 – 2/25/2016; North Anna Power Station Units 1 and 2; Temporary Instruction 2515/191, Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans issued December 23, 2015.

The inspection covered a one week inspection by one senior project inspector, a senior reactor inspector, and two senior reactor analysts. No findings of significance were identified. The significance of most findings is identified by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, Significance Determination Process (SDP); cross-cutting aspects were determined using IMC 0310; Aspects Within Cross-Cutting Areas; and findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

### A. NRC-Identified and Self-Revealing Findings

None

### B. Licensee-Identified Violations

None

## REPORT DETAILS

### 4. Other Activities

#### 4OA5 Other Activities (TI 2515/191)

The objective of Temporary Instruction (TI) 2015/191, "Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans," is to verify that licensees have adequately implemented the mitigation strategies as described in the licensee's Final Integrated Plan [ADAMS ML15149A143] and the NRC's plant safety evaluation (ADAMS Accession No. ML15324A341) and to verify that the licensees installed reliable water-level measurement instrumentation in their spent fuel pools. The purpose of this TI is also to verify the licensees have implemented Emergency Preparedness (EP) enhancements as described in their site-specific submittals and NRC safety assessments, including multi-unit dose assessment capability and enhancements to ensure that staffing is sufficient and communications can be maintained during such an event.

The inspection verifies that plans for complying with NRC Orders EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (ADAMS Accession No. ML12229A174) and EA-12-051, Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation (ADAMS Accession No. ML12056A044) are in place and are being implemented by the licensee. Additionally, the inspection verifies implementation of staffing and communications information provided in response to the March 12, 2012 request for information letter and multiunit dose assessment information provided per COMSECY-13-0010, Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned, dated March 27, 2013 (ADAMS Accession No. ML12339A262).

The team discussed the plans and strategies with plant staff, reviewed documentation, and where appropriate, performed plant walk downs to verify that the strategies could be implemented as stated in the licensee's submittals and the NRC staff prepared safety evaluation. For most strategies, this included verification that the strategy was feasible, procedures and/or guidance had been developed, training had been provided to plant staff, and required equipment had been identified and staged. Specific details of the team's inspection activities are described in the following sections.

1. Mitigation Strategies for Beyond-Design Basis External Events
  - a. Inspection Scope

The team examined the licensee's established guidelines and implementing procedures for the beyond-design basis mitigation strategies. The team assessed how the licensee coordinated and documented the interface/transition between existing off-normal and emergency operating procedures with the newly developed mitigation strategies. The team selected a number of mitigation strategies and conducted plant walk downs with licensed operators and responsible plant staff to assess: the adequacy and

completeness of the procedures; familiarity of operators with the procedure objectives and specific guidance; staging and compatibility of equipment; and the practicality of the operator actions prescribed by the procedures, consistent with the postulated scenarios.

The team verified that a preventive maintenance program had been established for the Diverse and Flexible Coping Strategies (FLEX) portable equipment and that periodic equipment inventories were in place and being conducted. Additionally, the team examined the introductory and planned periodic/refresher training provided to the Operations and Security staffs most likely to be tasked with implementation of the FLEX mitigation strategies. The team also reviewed the introductory and planned periodic training provided to the Emergency Response Organization personnel. Documents reviewed are listed in the attachment.

b. Assessment

Based on samples selected for review, the inspectors verified that the licensee satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant specific submittal(s) and the associated safety evaluation and determined that the licensee is generally in compliance with NRC Order EA-12-049. The inspectors verified that the licensee satisfactorily:

- developed and issued FLEX Support Guidelines (FSG) to implement the FLEX strategies for postulated external events
- integrated their FSGs into their existing plant procedures such that entry into and departure from the FSGs are clear when using existing plant procedures.
- protected FLEX equipment from site-specific hazards.
- developed and implemented adequate testing and maintenance of FLEX equipment to ensure their availability and capability.
- trained their staff to assure personnel proficiency in the mitigation of beyond-design-basis events.
- developed means to ensure that the necessary off-site FLEX equipment will be available from off-site locations.

The inspectors verified that noncompliances with current licensing requirements, and other issues identified during the inspection were entered into the licensee's corrective action program.

2. Spent Fuel Pool Instrumentation

a. Inspection Scope

The team examined the licensee's newly installed spent fuel pool instrumentation. Specifically, the inspectors verified the sensors were installed as described in the plant specific submittals and the associated safety evaluation and that the cabling for the power supplies and the indications for each channel are physically and electrically separated. Additionally, environmental conditions and accessibility of the instruments were evaluated. Documents reviewed are listed in the attachment.

b. Assessment

Based on samples selected for review, the inspectors determined that the licensee satisfactorily installed and established control of the spent fuel pool (SFP) instrumentation as described in the plant specific submittal(s) and the associated safety evaluation and determined that the licensee is generally in compliance with NRC Order EA-12-051. The inspectors verified that the licensee satisfactorily:

- installed the SFP instrumentation sensors, cabling and power supplies to provide physical and electrical separation as described in the plant specific submittal(s) and safety evaluation.
- installed the SFP instrumentation display in the location, environmental conditions and accessibility as described in the plant specific submittal(s)
- trained their staff to assure personnel proficiency with the maintenance, testing, and use of the SFP instrumentation.

The inspectors verified that noncompliances with current licensing requirements, and other issues identified during the inspection were entered into the licensee's corrective action program.

3. Staffing and Communication Request for Information

a. Inspection Scope

Through discussions with plant staff, review of documentation and plant walk downs, the team verified that the licensee has implemented required changes to staffing, communications equipment and facilities to support a multi-unit extended loss of offsite power (ELAP) scenario as described in the licensee's staffing assessment and the NRC safety assessment. The team also verified that the licensee has implemented multi-unit dose assessment (including releases from spent fuel pools) capability using the licensee's site-specific dose assessment software and approach as described in the licensee's multi-unit dose assessment submittal. Documents reviewed are listed in the attachment.

b. Assessment

The inspectors reviewed information provided in the licensee's multi-unit dose submittal and in response to the NRC's March 12, 2012, request for information letter and verified that the licensee satisfactorily implemented enhancements pertaining to Near-Term Task Force Recommendation 9.3 response to a large scale natural emergency event that results in an extended loss of all AC power to all site units and impedes access to the site. The inspectors verified the following:

- Licensee satisfactorily implemented required staffing change(s) to support a multi-unit ELAP scenario.
- EP communications equipment and facilities are sufficient for dealing with a multi-unit ELAP scenario.
- Implemented multi-unit dose assessment capabilities (including releases from spent fuel pools) using the licensee's site-specific dose assessment software and approach.

The inspectors verified that noncompliances with current licensing requirements, and other issues identified during the inspection were entered into the licensee's corrective action program.

4OA6 Exit

Exit Meeting Summary

On February 25, 2016, the inspectors presented the inspection results Mr. G. Bischof and other members of the site staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection. A re-exit was conducted with Ms. Klearman via telephone on March 25, 2016, to discuss the final results of the inspection.

ATTACHMENT: SUPPLEMENTARY INFORMATION

## **SUPPLEMENTARY INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee personnel:

G. Bischof, Site Vice President  
M. Becker, Outage & Planning Manager  
B. Boetig, BDB Site Program Owner  
P. Bradley, Supervisor Corporate Regulatory Programs  
E. Collins, Emergency Preparedness Director  
A. Elms, Fleet Project Owner  
R. Evans, Radiation Protection / Chemistry Manager  
C. Flaig, Principal Engineer, Nuclear Analysis and Fuels  
B. Gaspar, Engineering Programs Supervisor  
M. Hayder, Security Manager  
M. Hofmann, Emergency Preparedness Supervisor  
E. Hendrixson, Site Engineering Director  
L. Hilbert, Safety & Licensing Director  
J. Jenkins, Maintenance Manager  
R. Klearman, Licensing Manager  
H.V. Le, Engineering Manager  
J. Leberstein, Technical Consultant, Licensing  
D. Nunburg, Senior Reactor Operator  
J. Slattery, Operations Manager  
D. Spears, Shift Manager  
B. Standley, Training Manager  
B. Webster, Probabilistic Risk Assessment Supervisor

#### NRC personnel:

C. Croon, Senior Resident Inspector  
G. Eatmon, Resident Inspector  
M. Franovich, Deputy Director, Division of Reactor Projects  
A. Masters, Chief, Reactor Projects Branch 7

### **LIST OF REPORT ITEMS**

#### Opened and Closed

None

#### Discussed

None

## LIST OF DOCUMENTS REVIEWED

### Procedures

0-AP-10, Loss of Electrical Power, Rev. 80  
0-AP-41, Severe Weather Conditions, Rev. 64  
0-FSG-5, Initial Assessment and FLEX Equipment Staging, Rev. 2  
0-FSG-11, Alternate SFP Makeup and Cooling, Rev. 2  
1-AP-10.1, Loss of All AC Power While on RHR, Rev. 0  
1-E-0, Reactor Trip or Safety Injection, Rev. 49  
1-ECA-0.0, Loss of All AC Power, Rev. 31  
1-ECA-1.1, Loss of Emergency Coolant Recirculation, Rev. 20  
1-FSG-1, RCS Inventory Control, Rev. 0  
1-FSG-2, Alternate AFW Suction Source, Rev. 0  
1-FSG-3, Alternate Low Pressure Feedwater, Rev. 0  
1-FSG-4, ELAP DC Bus Load Shed / Management, Rev. 0  
1-FSG-6, Alternate ECST Makeup, Rev. 0  
1-FSG-7, Loss of Vital Instrumentation or Control Power, Rev. 0  
1-FSG-8, Alternate RCS Boration, Rev. 0  
1-FSG-9, Local Operation of S/G PORVs, Rev. 0  
1-FSG-12, Alternate Containment Cooling, Rev. 0  
1-FSG-13, Transition from FLEX Equipment, Rev. 0  
2-AP-10.1, Loss of All AC Power While on RHR, Rev. 0  
2-AP-22.4, Loss of Both Motor-Driven AFW Pumps, Rev. 7  
2-E-0, Reactor Trip or Safety Injection, Rev. 52  
2-ECA-0.0, Loss of All AC Power, Rev. 27  
2-ECA-1.1, Loss of Emergency Coolant Recirculation, Rev. 18  
2-FSG-2, Alternate AFW Suction Source, Rev. 0  
2-FSG-4, ELAP DC Bus Load Shed / Management, Rev. 0  
2-FSG-6, Alternate ECST Makeup, Rev. 0  
2-FSG-7, Loss of Vital Instrumentation or Control Power, Rev. 0  
2-FSG-12, Alternate Containment Cooling, Rev. 0  
2-FSG-15, 4160 VAC Generator Connection and Operation, Rev. 0  
DNES-AA-GN-1003, Design Effects and Considerations, Rev. 16  
ER-AA-PRS-1010, Preventive Maintenance Task Basis and Maintenance Strategy, Rev. 7  
ETE-CPR-2012-0012, Beyond Design Basis – FLEX Strategy Basis Document and Final Integrated Plan, Rev. 8 and 9  
ETE-CPR-2014-1004, North Anna Power Station Beyond Design Basis FLEX Validation for Time Sensitive Actions, Rev. 0  
EPIP-2.01, Report of Emergency to State and local Governments, Attachment 2, Rev. 39  
OP-AA-100-1001, Operations Department Minimum Manning, Rev. 0

### Drawings

NPSFIGURE-11-1.DGN, 480 V Portable Diesel (BDB Flex Electrical Connections) 480V MCC1H and 1J North Anna Power Station Unit 1 Figure 11-1 Sheet 1 of 1 Rev. 2  
NPSFIGURE-11-2.DGN, 480 V Portable Diesel (BDB Flex Electrical Connections) 480V MCC2H and 2J North Anna Power Station Unit 2 Figure 11-2 Sheet 1 of 1 Rev. 2  
NPSFIGURE-12-1.DGN, 4160 Volt Portable Diesel (BDB Flex Electrical 4160V Connections) 4160V MCC1H and 1J North Anna Power Station Unit 1 Figure 12-1 Sheet 1 of 1 Rev. 0

NPSFIGURE-12-2.DGN, 4160 Volt Portable Diesel (BDB Flex Electrical 4160V Connections)  
4160V MCC2H and 2J North Anna Power Station Unit 2 Figure 12-2 sheet 1 of 1 Rev. 0

#### Calculation

ME-0972 (with Addendum A and B), Evaluation of Room Air Temperatures Following Extended Loss of AC Power, Rev. 0  
ETE-CPR-2012-0012, "NAPS Final Integrated Plan," Rev. 2  
ETE-NAF-2012-0150, "Evaluation of Core Cooling Coping for Extended Loss of AC Power (ELAP) and Proposed Input for Dominion's Response to NRC Order EA-12-049 for Dominion Fleet," Rev. 3  
ETE-CPR-2014, "North Anna Power Station Beyond Design Basis FLEX Validation for Time Sensitive Actions (TSA's)," Rev. 1

#### CRs Reviewed

CR 552543, BDB 120 V Generators Incorrectly Sized  
CR 553289, As-Found Initial FME Inspection Identified Debris Unit 1 SFP Emergency Fill Line  
CR 563842, Evaluate North Anna for BDB Non-Collapsible Hose Failures at Millstone  
CR 572127, Potential Impact on FLEX Strategies from Newly Identified Fault Zone  
CR 579386, BDB Storage Building Missile Door Non-Functional  
CR 1020782, BDB FLEX Equipment Both RCS Injection Pumps Removed From Storage Facility – Conflicting Guidance  
CR 1024167, BDB Dome Ventilation May Be Non-Functional for More Than 7 Days  
CR 1025992, Plant Status Report BDB/FLEX Equipment Section Issues  
CR 1026632, Spent Fuel Pool Makeup from Fire Protection Removed from Service

#### CRs Generated as part of the Inspection

CR 1028391, BDB Unavailability Tracking Guidance Requires Revision  
CR 1028407, NRC TI-191 Inspection Identified a Potential Issue with Timeliness of Off-Site Notifications  
CR 1028362, No Documented Evaluation of the SWPH Temperature was Performed with 1-FP-P-2 running Under ELAP

#### Other

N1777, Non-Licensed Operator Job Performance Measure, Load Shed the CD and Vital Bus in Accordance with 2-FSG-4  
N1780, Non-Licensed Operator Job Performance Measure, Align an Alternate Makeup Source to the Emergency Condensate Storage Tank in Accordance with 2-FSG-6  
N1781, Non-Licensed Operator Job Performance Measure, Align the BDB AFW Pump to Supply all Steam Generators in Accordance with 2-FSG-3  
N1786, Non-Licensed Operator Job Performance Measure, Operate the Steam Generator Atmospheric Dump Valve (PORV) locally (BDB)(1-FSG-9, 2-FSG-9)  
CA269345, North Anna Operator Training BDB Work List  
NAPS NEI 12-01 Phase 2 ELAP ERO Staffing Analysis Report, Rev. 1  
NRC Safety Evaluation Letter dated January 15, 2016 – "North Anna Power Station Units 1 and 2 – Safety Evaluation Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (TAC Nos.MF0998, MF0999, MF0986, and MF0987."

VEPCO letter Serial No. 13-065C dated 2-22-2013 "Virginia Electric and Power Company North Anna Power Station Units 1 and 2, Technical Issues For Resolution Regarding Communications Submittal Associated With Near Term Task Force Recommendation 9.3"

NRC letter dated 7-31-2013 subject: "Surry Power Station (SPS), North Anna Power Station (NAPS) and Millstone Power Station (MPS), Units 1 and 2 – Staff Assessment In Response to Recommendation 9.3 of the Near Term Task Force Related to the Fukushima Dai-Ichi Nuclear Power Plant Accident (TAC Nos. MF0037, MF0038, MF0018, MF0019, ME9967, ME9968).

USNRC Office of Nuclear Reactor Regulation Emergency Preparedness Position (EPPOS) On Timeliness of Classification of Emergency Conditions EPPOS No. 2 dated August 1, 1995

Non-Routine Surveillance Log – No: 7610 1-LOG-14 Mark No 0-BDB-DOME. Monitoring O2 Concentration and combustible levels in the BDB Storage Building daily and performing weekly Forced air ventilation of the BDB Dome.