



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

July 3, 2018

Mr. Daniel G. Stoddard  
Senior Vice President  
and Chief Nuclear Officer  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

**SUBJECT: NORTH ANNA POWER STATION – NRC TRIENNIAL FIRE PROTECTION  
INSPECTION (TEAM) REPORT 05000338/2018011 AND 05000339/2018011**

Dear Mr. Stoddard:

On May 24, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station, Units 1 and 2, and the NRC inspectors discussed the results of this inspection with Mr. Jim Jenkins and other members of your staff. The results of this Triennial Fire Protection Inspection (TFPI) are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. The NRC is treating the violation as non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest this violation or significance of these NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC resident inspector at the North Anna Power Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

*/RA/*

Scott M. Shaeffer, Chief  
Engineering Branch 2  
Division of Reactor Safety

Docket Nos.: 50-338, 50-339  
License Nos.: NPF-4, NPF-7

Enclosure:  
Inspection Report 05000338/2018011  
and 05000339/2018011

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SUBJECT: NORTH ANNA POWER STATION – NRC TRIENNIAL FIRE PROTECTION INSPECTION (TEAM) REPORT 05000338/2018011 AND 05000339/2018011

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Number(s): 50-338, 50-339

License Number(s): NPF-4, NPF-7

Report Number(s): 05000338/2018011 AND 05000339/2018011

Enterprise Identifier: I-2018-011-0024

Licensee: Virginia Electric & Power Company

Facility: North Anna Power Station, Units 1 and 2

Location: Mineral, VA 23117

Inspection Dates: May 7 – 11, 2018 to May 21 – 25, 2018

Inspectors: R. Fanner, Senior Reactor Inspector (Team Leader)  
W. Satterfield, Reactor Inspector  
L. Jones, Senior Reactor Inspector  
E. Coffman, Reactor Inspector

Approved By: Scott M. Shaeffer, Chief  
Engineering Branch 2  
Division of Reactor Safety

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Dominions' performance by conducting an announced team (TFPI) at the North Anna Power Station, Units 1 and 2, in accordance with the NRC Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. NRC-identified findings and violations are summarized in the table below.

### List of Findings and Violations

Failure to ensure compliance with the Technical Specification (TS) 5.4.1.a requirement relevant to procedures for plant fires			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000338-339/2018011-01 Closed	None	71111.05T – 02.02e
The NRC identified a Green finding and associated non-cited violation (NCV) of the TS 5.4.1.a requirement to establish and maintain fire contingency action procedures based upon the licensee's failure to effectively perform reviews during the revisions of the procedures in accordance with procedure VPAP-0502, "Procedure Process Control." The failure led to undetected errors and was a performance deficiency that was determined to be more than minor because, if left uncorrected, it could potentially lead to a more significant safety concern during Appendix R fire events.			

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### INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The team reviewed the selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards."

### REACTOR SAFETY

#### 71111.05T - Fire Protection (Triennial)

The team evaluated applicable fire protection licensing commitments from May 7, 2018 to May 24, 2018 by review of the following:

#### Fire Protection Inspection Requirements (3 Samples)

The team evaluated fire protection program implementation in the following selected areas:

- (1) Unit 2, Cable Vault & Tunnel (CV&T), FA 3-2, Compliance A/R
- (2) Service Water Pump house, FA-12, Compliance R
- (3) Unit 1, Cable Tray Spreading Room, FA 4-1, Compliance A/R

#### B.5.b Inspection Activities (1 Sample)

The team evaluated feasibility of the following B.5.b Mitigating Strategies:

- (1) The team reviewed the strategy for supplying make-up to the steam generator, post B.5.b initiating event.

### OTHER ACTIVITIES – BASELINE

#### INSPECTION RESULTS

Cornerstone	Significance	Cross-cutting Aspect	Report Section
<i>Mitigating systems</i>	<i>Green Finding 50-338, 50-339/2018-011-01 Closed</i>	None	<i>71111.05T-02.02e</i>
The NRC identified a Green finding and associated non-cited violation (NCV) of TS 5.4.1.a for the licensee's failure to adequately establish and maintain fire contingency action procedures supporting North Anna, Units 1 & 2.			

Description:

The first example identified by the team was associated with procedure 0-FCA-0, "Fire Protection – Operations Response." Specifically, the team identified in Attachment 2, "Safe Shutdown Function," the licensee staff incorrectly indicated that an Appendix R fire in the Unit 2 Cable Vault and Tunnel area would not affect the component cooling water (CCW) system since the Support System (CCW & SW) block was not annotated. This was inconsistent with the separation analysis specified in the Appendix R report, Table 4-1, which indicated that the CCW function would be lost. The team concluded the error was introduced via a procedure revision that was not conducted in accordance with the technical review criteria required by VPAP-0502, "Procedure Process Control," revision 35, which would have ensured the Appendix R analysis was accurately translated into 0-FCA-0. The definition of the technical review from VPAP-0502, revision 35, section 4.28.2, states, in part, that it is a review to verify the technical accuracy of the procedure.

The second example identified by the team focused on an error in procedure, 2-FCA-3, "Cable Vault and Tunnel Fire". This error was discovered in attachment 3 of the procedure entitled, "Placing RHR in Service without Containment Communications." The error was associated with the sequencing logic of procedural steps thereby affecting the usability of 2-FCA-3. The team determined the procedural deficiency would potentially pose confusion to an operator since the steps, once completed, would direct the operator to complete the same steps again (i.e., Do Loop with no directed exit). The team concluded the error was introduced when the initial issuance of the procedure was not conducted in accordance with the technical and validation review criteria required by VPAP-0502, revision 3-P4, which would have prevented the sequencing problem. Both the technical and validation review criteria from VPAP-0502, revision 3-P4, specify, in part, that the procedure be performable in the sequence that it was written.

The team determined the errors were introduced into procedure 0-FCA-0 during revision 9, dated January 2006, and procedure 2-FCA-3 during revision 0, dated March of 1993. The team identified the issues during tabletop reviews of the procedures.

Corrective Action(s): In response to the inspection discovery, the licensee promptly initiated condition reports to resolve the deficiencies via procedure revisions.

Corrective Action Reference(s): This issue is being tracked in the licensee's corrective action program by condition reports CR1097015 and CR1098252

Performance Assessment:

Performance Deficiency: The licensee's failure to establish and maintain FCA procedures consistent with procedure VPAP-0502, leading to the undetected errors, was a performance deficiency.

Screening: The performance deficiency was determined to be more than minor because, if left uncorrected, it could potentially lead to a more significant safety concern. Specifically, the procedure errors potentially introduce challenges and complications during the subsequent plant shutdown after the initiation of a fire.

Significance: The team assessed the finding using NRC Inspection Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," and determined the Mitigating System cornerstone was degraded. The team further assessed the finding using NRC Inspection

Manual Chapter 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," and determined the finding to be of very low safety significance (Green) based upon Step 1.3.1-A since the deficiencies could be compensated by operator experience or familiarity.

Cross-cutting Aspect: The team assessed the issue for cross-cutting aspects using IMC 0310, "Aspects Within Cross Cutting Areas," and concluded this deficiency was not indicative of current licensee performance.

Enforcement:

TS 5.4.1.a required, in part, that written procedures be established, implemented, and maintained covering the activities specified in Appendix A, "Typical Procedures for Pressurized Water Reactors and Boiling Water Reactors," of Regulatory Guide (RG) 1.33, "Quality Assurance Program Requirements (Operations)," dated February 1978. RG 1.33, Appendix A, Section 6, "Procedures for Combating Emergencies and Other Significant Events," required procedures for plant fires. Procedures 0-FCA-0 and 2-FCA-3 were plant procedures that implemented this requirement. VPAP-0502, Procedure Process Control, required the licensee to ensure procedure revisions for the credited procedures were adequate using the specified review criteria.

Contrary to the above, from March of 1993 to May of 2018, the licensee failed to establish and maintain fire contingency action procedures (e.g., 0-FCA-0 and 2-FCA-3), consistent with procedure VPAP-0502, "Procedure Process Control," one of their standards used for verification of adequacy of procedure revisions.

Disposition: This violation is being treated as an NCV consistent with Section 2.3.2a of the Enforcement Policy.

## **EXIT MEETINGS AND DEBRIEFS**

The team verified no proprietary information was retained or documented in this report.

The team confirmed that proprietary information was controlled to protect from public disclosure.

On May 24, 2018, the lead inspector and team presented the TFPI results to the Acting Plant Manager, Mr. Jim Jenkins, and other members of the North Anna Power Station staff.

## **THIRD PARTY REVIEWS**

The team did not perform any reviews of the Institute on Nuclear Power Reactor reports during the inspection period.



## **DOCUMENTS REVIEWED**

### **Licensing Basis, Design Basis, & Regulatory**

North Anna Appendix R Report, Rev. 40

North Anna Appendix R Report, Rev. 3

NAPS TS, "North Anna Power Station Units 1 and 2 Technical Specifications And Bases,"  
April 25, 2012

NAPS UFSAR, "Updated Final Safety Analysis Report," Rev. 47

NA-Technical Report No. EP-0015, "Fire Protection Program Information Relating to Appendix A  
to BTP .5-1, 1979 FP-SER and Nation Fire Protection Association (NFPA) Codes,"  
May 29, 2008

Safety Evaluation Report 02\_1979

Safety Evaluation Report 1982

Safety Evaluation Report 1986

### **Calculations**

EP-0017, "Combustible Loading Analysis - North Anna Power Station, Units 1 and 2," Rev. 15

EE-0110, "Appendix R Emergency Light Description Fire Protection," Rev. 6

ETE-NA-2012-0021, "Additional MSO Analysis for Appendix R III.G Fire Areas,"  
February 28, 2013

ETE-NA-2014-0008, "Appendix R Evaluation of Emergency Lights in VCT Cubicles,"  
May 8, 2014

ETE-NA-2014-0018, "Appendix R Evaluation of OEs 49902 & 49903, Unanalyzed Condition due  
to Postulated Hot Short of Non-fused DC Circuit," June 18, 2014

### **Procedures**

CM-AA-FPA-102, "Fire Protection and Fire Safe Shutdown Review and Preparation

PI-AA-200, "Corrective Action," Rev. 33

0-AP-12, "Loss of Service Water," Rev. 38

0-FCA-0, "Fire Protection Operations Response," Rev. 16

0-FCA-0, "Fire Protection Operations Response," Rev. 18

0-FCA-9, "Service Water Pump House Fire," Rev. 5

0-FS-CR-1, "Control Room Units 1 and 2 Safe Shutdown Equipment," Rev. 2

0-FS-CR-1, "Control Room Units 1 and 2 Safe Shutdown Equipment," Rev. 3

0-FS-CT-1, "Cable Tray Spreading and Battery Room 2-1, 1-1, 2-3, 1-3," Rev. 4

0-GOP-17.0, "Time Critical Action Validation and Verification," Rev. 15

0-PT-107.0, "Appendix R Locker Inspection," Rev. 9

1-FS-SW-1, "Service Water Pump House Units 1 and 2," Rev. 2

2-FCA-3, "Cable Vault and Tunnel Fire," Rev. 30

2-FCA-3, "Cable Vault and Tunnel Fire," Rev. 31

Process and Design Change Process," Rev. 8

2-FS-S-2, "Fire Fighting Preplan for Cable Vault and Tunnel and 280' Rod Drive Unit 2 Safe  
Shutdown Equipment," Rev. 11

### **Plant Modifications**

DC NA-15-00055, "Ultrasonic Flow Meter Cabinet Permanent Enclosure," November 17, 2015

DC NA-15-00080, "Appendix R Hot Short Circuit Modification for the DC Emergency Oil Pump  
and Air Side Seal Oil Backup Pump, February 4," 2017

DC NA-17-00002, "Appendix R Hot Short Circuit Modification for the DC Emergency Oil Pump  
and Air Side Seal Oil Backup Pump - Unit 1," April 27, 2017

### **Miscellaneous Documents**

ARS-DOM-18-005, "North Anna TFPI Self-Assessment," Rev. 0  
DNES-NA-GN-0026, "Cable and Raceway Data Control North Anna Power Station," Rev. 0  
Module NCRODP-51-NA, "Component Cooling System," April 4, 2011  
Module NCRODP-41-NA, "Chemical and Volume Control System," January 27, 2012  
Module NCRODP-40-NA, "Residual Heat Removal System," June 1, 2006  
Module NCRODP-35-NA, "Vital and Emergency Electrical System," May 18, 2010  
1-LOG-6F, Operations Log, date 1/18/18

### **Condition Reports Reviewed during inspection**

CA3073909 CR551264 CR552193 CR552652 CR1082090 CR1092157  
PI-N-2006-0342

### **Condition Reports Written Due to this Inspection**

CR1097015, "1/2 FCA-3 Att 3 step 15 not written correctly," Rev. 0  
CR1097083, "FP Valves Not Found on Checkoff Procedure," Rev. 0  
CR1097093, "Corrections needed for two references in 0-FCA-0," Rev. 0  
CR1097099, "1-FP-1688 not listed in 1-OP-52.2A," Rev. 0  
CR1097199, "Administrative Errors in the Appendix R Report Identified during TFPI," Rev. 0  
CR1097201, "Editorial Errors Discovered in Appendix R Report during TFPI," Rev. 0  
CR1098252, "TFPI identified that table needs updating in 0-FCA-0 Attachment 2," Rev. 0  
CR1098257, "TFPI identified update needed for UFSAR table 9.5-7," Rev. 0  
CR1098389, "Multiple Errors in Appendix R Report and Other Program Documents," Rev. 0

### **Drawings**

11715-DAR-79A, Appendix R Safe Shutdown Flow Diagram Component Cooling Water, Rev. 4  
11715-ESK-6EV, Elementary Diagram Service Water Reservoir Spray MOV-SW-121B, Rev. 9  
11715-ESK-6DM, Elementary Diagram 480V Circuits Motor Operated Valves 01-CH-MOV-1115B & D, Rev. 20  
11715-ESK-6DR, Elementary Diagram 480V Circuits Motor Operated Valves 02-CH-MOV-1115C & E, Rev. 21  
11715-FE-3DL, Service Water Logic "B" Panel SW-1B, Rev. 34  
11715-FE-3L, Main Control Bench Board 1-1, Sh.11 Terminal Block Section 2C, Rev. 20  
11715-FE-3N, Main Control Bench Board 1-1, Sh.13 Terminal Block Section 2A, Rev. 23  
11715-FE-4AM, Solid State Prot. Sys. Output Cabinet Train B View A & C, Rev. 21  
11715-FE-4AK, Solid State Prot. Sys. Output Cabinet Train A View A & C, Rev. 22  
11715-FE-9EP, Wiring Diagram 480V Emer. MCC 1H1-2N Sect's E & F, Rev. 15  
11715-FE-9FF, Wiring Diagram 480V Emer. MCC 1J1-2N Sect's E & F, Rev. 18  
12050-ESK-6DM, Elementary Diagram 480V Circuits Motor Operated Valves 02-CH-MOV-2115B & D, Rev. 19  
12050-ESK-6DN, Elementary Diagram 480V Circuits Motor Operated Valves 02-CH-MOV-2289A, 2289B, 2373, Rev. 23  
12050-ESK-6DR, Elementary Diagram 480V Circuits Motor Operated Valves 02-CH-MOV-2115C & E, Rev. 18  
12050-FE-1AF, 480V One Line Diagram Emergency Buses 2H, 2H1, 2J & 2J1, Rev. 16  
12050-FE-1N, 480V One Line Diagram Emergency MCC 2H1-2N & S Cable Tunnel, Rev. 46

12050-FE-1R, 480V One Line Diagram Emergency MCC 2H1-3, 2J1-3 Serv. W. Pp. HSE. & Emergency MCC 2H1-1A & 2J1-1A Gen. RMS 2H & 2J, Rev. 37  
12050-FE-1T, 480V One Line Diagram Emergency MCC 1H1-3, 1J1-3 Serv. W. Pp. HSE. & Emergency MCC 1H1-1A & 1J1-1A Emer. Gen. 2H & 2J, Emer. MCC 1H-3A & 1J1-3A Serv. W. Rsvr. Vlv House, Rev. 44  
12050-FE-3DL, Service Water Logic "B" Panel SW-2B, Rev. 34  
12050-FE-3L, Main Control Bench Board 2-1, Sh.11 Terminal Block Section 2C, Rev. 16  
12050-FE-3N, Main Control Bench Board 2-1, Sh.13 Terminal Block Section 2A, Rev. 22  
12050-FE-4AK, Solid State Prot. Sys. Output Cabinet Train A View A & C, Rev. 20  
12050-FE-4AM, Solid State Prot. Sys. Output Cabinet Train B View A & C, Rev. 20  
12050-FE-9EP-13, Wiring Diagram 480V Emer. MCC 2H1-2N Sect's E & F, Rev. 13  
12050-FE-9EQ, Wiring Diagram 480V Emer. MCC 2H1-2N Sect's G, H & J, Rev. 18  
12050-FE-9FF, Wiring Diagram 480V Emer. MCC 2J1-2N Sect's E & F, Rev. 16  
12050-FE-9FG, Wiring Diagram 480V Emer. MCC 2J1-2N Sect's G & H, Rev. 14