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

January 29, 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 INTEGRATED INSPECTION REPORT 05000338/2015004 and 05000339/2015004

Dear Mr. Heacock:

On December 31, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station, Units 1 and 2. On January 25, 2016, the NRC inspectors discussed the results of this inspection with Mr. G. Bischof and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented one finding which was determined to be of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. Further, inspectors documented two licensee-identified violations which were determined to be of very low safety significance. The NRC is treating these findings as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy.

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

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the North Anna Power

Station in accordance with Title 10 Code of Federal Regulations 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Steven D. Rose, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket Nos.: 05000338, 05000339
License Nos.: NPF-4, NPF-7

Enclosure:
IR 05000338/2015004 and 05000339/2015004
w/Attachment: Supplementary Information

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Letter to David A. Heacock from Steven D. Rose dated January 29, 2016

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REGION II

Docket Nos:	50-338, 50-339
License Nos:	NPF-4, NPF-7
Report No:	05000338/2015004 and 05000339/2015004
Licensee:	Virginia Electric and Power Company (VEPCO)
Facility:	North Anna Power Station, Units 1 & 2
Location:	Mineral, Virginia 23117
Dates:	October 1, 2015 through December 31, 2015
Inspectors:	B. Bishop, Project Engineer G. Croon, Senior Resident Inspector G. Eatmon, Resident Inspector G. Kolcum, Senior Resident Inspector D. Bacon, Senior Operations Engineer (Section 1R11.3)
Approved by:	Steven D. Rose, Chief Reactor Projects Branch 5 Division of Reactor Projects

Enclosure

SUMMARY

IR 05000338/2015-004, 05000339/2015-004; 10/01/2015 – 12/31/2015; North Anna Power Station, Units 1 and 2. Maintenance Effectiveness.

The report covered a three-month period of inspection by resident inspectors and inspectors from the regional office. One self-revealing finding was identified and was determined to be a non-cited violation (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, “Significance Determination Process” (SDP), dated April 29, 2015. The cross-cutting aspects are determined using IMC 0310, “Components Within the Cross Cutting Areas,” dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC’s Enforcement Policy, dated February 4, 2015. The NRC’s program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, “Reactor Oversight Process,” Revision 5.

Cornerstone: Mitigating Systems

- Green. A self-revealing, Green NCV of TS 5.4.1.a, "Procedures," as required by Regulatory Guide 1.33, Revision 2, Appendix A, Section 9a, “Procedures for Performing Maintenance,” was identified for inadequate implementation of licensee procedure MA-AA-102, Attachment 4, "Foreign Material Exclusion," Part ‘D’ “Closeout Inspections” Revision 15, which resulted in foreign material intrusion into the ‘B’ SW return header The licensee has entered this issue into their corrective action program as CR1010424.

  The inspectors identified a performance deficiency (PD) for the failure to adequately implement the foreign material exclusion maintenance procedure MA-AA-102, Attachment 4, "Foreign Material Exclusion," Part ‘D’ “Closeout Inspections” Revision 15. The inspectors determined that the PD was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone, and adversely affected the cornerstone objective to ensure the availability of systems that respond to initiating events to prevent undesirable consequences, (i.e., core damage). Specifically, the inadequate FME closeout led to foreign material intrusion into the ‘B’ SW return header when maintenance materials, such as plastic bags and mop heads, were not removed and made their way into the ‘B’ SW return header. The inspectors used Manual Chapter (IMC) 0609, Attachment 4, Initial Characterization of Findings, dated June 19, 2012, and determined that the finding was of very low safety significance or Green because the ‘B’ SW return header did not have an actual loss of safety function for greater than its allowed outage time (7 days). The finding had a cross-cutting aspect in the area of Human Performance, Work Management component, because licensee personnel did not follow procedure requirements of MA-AA-102, Attachment 4, "Foreign Material Exclusion," Part ‘D’ “Closeout Inspections” Revision 15 during the return to service portion of the work activity for the ‘B’ SW return header. [H.5]

Two violations of very low safety significance that were identified by the licensee have been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee’s corrective action program. The violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the period at full rated thermal power (RTP). Unit 1 operated at full power for the remainder of the report period.

Unit 2 began the period at full RTP. Unit 2 experienced a level controller problem with a feed water heater and reduced power to 97% for replacement on November 23, 2015. Unit 2 returned to full RTP on November 25, 2015. Unit 2 operated at full RTP for the remainder of the report period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed a site specific weather related inspection due to anticipated adverse weather conditions. On October 1, 2015, the inspectors reviewed the licensee's preparations for response to heavy winds and rains in the area from Hurricane Joaquin. Specifically, the inspectors reviewed licensee adverse weather response procedures and site preparations including work activities that could impact the overall maintenance risk assessments.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial Walkdowns

a. Inspection Scope

The inspectors conducted three equipment alignment partial walkdowns, listed below, to evaluate the operability of selected redundant trains or backup systems with the other train or system inoperable or out of service. The inspectors reviewed the functional systems descriptions, Updated Final Safety Analysis Report (UFSAR), system operating procedures, and Technical Specifications (TS) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify the operability of a redundant or backup system/train or a remaining operable system/train with a high risk significance for the current plant configuration (considering out-of-service, inoperable, or degraded condition); or a risk-significant system/train that was recently realigned following an extended system outage, maintenance, modification, or testing; or a risk-significant single-train system. The inspector conducted the reviews

to ensure that critical components were properly aligned, and to identify any discrepancies which could affect operability of the redundant train or backup system.

- Unit 1 outside recirculation spray system
- 'B' Service Water Header
- 1J emergency diesel generator (EDG) and support systems

b. Findings

No findings were identified.

1R05 Fire Protection

Quarterly Fire Protection Walkdowns

a. Inspection Scope

The inspectors conducted focused tours of the five areas listed below that are important to reactor safety to verify the licensee's implementation of fire protection requirements as described in fleet procedures CM-AA-FPA-100, "Fire Protection/Appendix R (Fire Safe Shutdown) Program," Revision 10, CM-AA-FPA-101, "Control of Combustible and Flammable Materials," Revision 8, and CM-AA-FPA-102, "Fire Protection and Fire Safe Shutdown Review and Preparation Process and Design Change Process," Revision 5. The inspectors evaluated, as appropriate, conditions related to: (1) licensee control of transient combustibles and ignition sources; (2) the material condition, operational status, and operational lineup of fire protection systems, equipment, and features; and, (3) the fire barriers used to prevent fire damage or fire propagation. Other documents reviewed are listed in the Attachment to this report.

- Unit 1 casing cooling pump house
- Unit 1 and 2 fuel oil pump house
- Unit 1 quench spray pump house
- Service water pump house
- Unit 1 and Unit 2 emergency diesel generator rooms

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance

.1 Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors reviewed a licensed operator performance on October 6, 2015, during a simulator scenario which involved a failure of charging pumps, loss of bearing cooling pumps, and a leak which led to a small break loss of coolant accident and entry into Emergency Action Level SU6.1, "Notification of Unusual Event." The scenario required classifications and notifications that were counted for NRC performance indicator input.

The inspectors observed the following elements of crew performance in terms of communications: (1) ability to take timely and proper actions; (2) prioritizing, interpreting, and verifying alarms; (3) correct use and implementation of procedures, including the alarm response procedures; (4) timely control board operation and manipulation, including high-risk operator actions; and (5) oversight and direction provided by the shift supervisor, including the ability to identify and implement appropriate TS actions. The inspectors observed the post training critique to determine that weaknesses or improvement areas revealed by the training were captured by the instructor and reviewed with the operators. Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings were identified.

.2 Quarterly Control Room Operator Performance Observations

a. Inspection Scope

During the inspection period, the inspectors conducted five observations of licensed reactor operators actions and activities to ensure that the activities were consistent with the licensee procedures and regulatory requirements. These observations took place during both normal and off-normal plant working hours. As part of this assessment, the inspectors observed the following elements of operator performance: (1) operator compliance and use of plant procedures including technical specifications; (2) control board/in-plant component manipulations; (3) use and interpretation of plant instruments, indicators and alarms; (4) documentation of activities; (5) management and supervision of activities; and, (6) communication between crew members.

The inspectors observed and assessed licensed operator performance during the following activities:

- October 5, 2015, during the 1H EDG slow start
- October 8, 2015, during maintenance on Ladysmith 230kV offsite power line
- October 9, 2015, during PT for Unit 1 ‘A’ motor-driven auxiliary feedwater pump
- October 10, 2015, during the 2J EDG slow start
- October 12, 2015, during the 2B safety injection pump PT

b. Findings

No findings were identified.

.3 Licensed Operator Requalification

a. Inspection Scope

Annual Review of Licensee Requalification Examination Results: On February 13, 2015, the licensee completed the comprehensive biennial requalification written examinations and the annual requalification operating examinations required to be administered to all licensed operators in accordance with Title 10 of the Code of Federal Regulations 55.59(a)(2), “Requalification Requirements,” of the NRC’s “Operator’s Licenses.” The

inspectors performed an in-office review of the overall pass/fail results of the individual operating examinations and the crew simulator operating examinations in accordance with Inspection Procedure (IP) 71111.11, “Licensed Operator Requalification Program.” These results were compared to the thresholds established in Section 3.02, “Requalification Examination Results,” of IP 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the three equipment issues listed below, the inspectors evaluated the effectiveness of the respective licensee's preventive and corrective maintenance. The inspectors performed walkdowns of the accessible portions of the systems, performed in-office reviews of procedures and evaluations, and held discussions with licensee staff. The inspectors compared the licensee’s actions with the requirements of the Maintenance Rule (10 CFR 50.65), and licensee procedure ER-AA-MRL-10, “Maintenance Rule Program,” Revision 6. Other documents reviewed are listed in the Attachment to this report.

- CR1002368, CR1010444, CR1010424, Service water valve foreign material
- WO59102051023, ‘A’ motor-driven auxiliary feedwater pump 5 year PMs
- WO59102870550, ‘H’ EDG standby jacket water pump control switch

b. Findings

Introduction: A self-revealing, Green NCV of TS 5.4.1.a, "Procedures," as required by Regulatory Guide 1.33, Revision 2, Appendix A, Section 9a, “Procedures for Performing Maintenance” was identified for inadequate implementation of licensee procedure MA-AA-102, Attachment 4, "Foreign Material Exclusion," Part ‘D’ “Closeout Inspections” Revision 15, which resulted in foreign material intrusion into the ‘B’ SW return header. Specifically, the inadequate FME closeout led to foreign material intrusion into the ‘B’ SW return header when maintenance materials like plastic bags and mop heads were not removed and made their way into the ‘B’ SW return header.

Description: On June 22, 2015, the licensee began removal of the 'B' SW return header for a planned maintenance. During the work activity, the area was controlled as a “Standard” FME level which eliminates the requirement for all equipment and materials to be logged in and out of the piping, based on the performance of a complete closeout inspection of the involved area, the licensee observed that two return header valves did not seat and were leaking by as observed at the spray array. The licensee complied with TS 3.7.8 by locking open and de-energizing the two leaking valves. This ensured that the valves were in their required safety position for a design basis accident. On September 21, 2015, the licensee reopened the ‘B’ SW return header for maintenance and discovered that maintenance materials such as plastic bags and mop heads were not removed prior to the FME closeout in June 2015. The mop heads were preventing two return header valves from seating properly. The licensee implemented an FME recovery plan and returned the 'B' SW return header to service.

Analysis: The inspectors identified a PD for the failure to adequately implement the foreign material exclusion maintenance procedure MA-AA-102, Attachment 4, "Foreign Material Exclusion," Part ‘D’ “Closeout Inspections” Revision 15. The inspectors determined that the finding was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone, and adversely affected the cornerstone objective to ensure the availability of systems that respond to initiating events to prevent undesirable consequences, (i.e., core damage). Specifically, the inadequate FME closeout led to foreign material intrusion into the ‘B’ SW return header when maintenance materials like plastic bags and mop heads were not removed and made its way into the ‘B’ SW return header. Using Manual Chapter 0609.04, “Initial Characterization of Findings,” dated June 19, 2012, the finding was determined to affect the Mitigating Systems Cornerstone. The inspectors screened the finding using IMC 0609, Appendix A, “Significance Determination Process (SDP) for Findings at-Power,” dated June 19, 2012, and determined that it screened as Green because the finding did not affect the design or qualification of the SW system and it did not represent a loss of system safety function. The finding had a cross-cutting aspect in the Human Performance cross-cutting area, Work Management component, because the licensee did not follow procedure requirements of MA-AA-102, Attachment 4, "Foreign Material Exclusion," Part ‘D’ “Closeout Inspections” Revision 15 during the return to service portion of the work activity for the ‘B’ SW return header. [H.5]

Enforcement: TS 5.4.1.requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A. Section 9a of Appendix A requires procedures for performing maintenance including "preventive and corrective maintenance operations which could have an effect on the safety of the reactor." The licensee established procedure MA-AA-102, Revision 15, to meet the Regulatory Guide 1.33 requirement. Attachment 4, "Foreign Material Exclusion,” Part ‘D’ “Closeout Inspections” was developed to ensure equipment was restored properly following maintenance. Contrary to the above, during the closeout on June 16, 2015, the licensee did not ensure that Part ‘D’ “Closeout Inspections” was fully implemented during the return to service portion of the SW work activity. Specifically, the inadequate FME closeout led to foreign material, such as plastic bags and mop heads, intrusion into the ‘B’ SW return header adversely impacting safety-related equipment. The licensee entered this condition into its corrective action program as CR1010424. The licensee restored compliance by removing the FME, conducting a "stand down," reinforcing the standards and requirements for FME controls and general procedural compliance, as well as reinforcing expectations for the attention to detail of work practices. Because this finding is of very low safety significance and the licensee has entered it into their corrective action program (CR1010424), this violation is being treated as an NCV, consistent with the NRC Enforcement Policy. (NCV 05000338, 339/2015004-01: Failure to Follow Foreign Material Exclusion Procedure)

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated, as appropriate, the four activities listed below for the following: (1) effectiveness of the risk assessments performed before maintenance activities were conducted; (2) management of risk; (3) appropriate and necessary steps taken to plan and control the resulting emergent work activities upon identification of an unforeseen

situation; and, (4) adequate identification and resolution of maintenance risk assessments and emergent work problems. The inspectors verified that the licensee was in compliance with the requirements of 10 CFR 50.65 (a)(4) and the data output from the licensee's safety monitor associated with the risk profile of Units 1 and 2. The inspectors reviewed the corrective action program to verify that deficiencies in risk assessments were being identified and properly resolved.

- Service water spray array maintenance week of October 12, 2015
- 1H EDG exhaust leakage during surveillance on November 3, 2015
- Work week activities for the week of November 16, 2015 and 1J EDG standby jacket pump seal leakage on November 20, 2015
- 2H EDG fuel oil tank flushing due to elevated particulates on November 30, 2015

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments

.1 Operability and Functionality Review

a. Inspection Scope

The inspectors reviewed three operability determinations and functionality assessments, listed below, affecting risk-significant mitigating systems, to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered as compensatory measures; (4) whether the compensatory measures, if involved, were in place, would work as intended, and were appropriately controlled; and (5) where continued operability was considered unjustified, the impact on TS Limiting Conditions for Operation and the risk significance in accordance with the SDP. The inspectors' review included a verification that operability determinations (OD) were made as specified by procedure OP-AA-102, "Operability Determination," Revision 13. Other documents reviewed are listed in the Attachment to this report.

- CA3010182, SW spray array piping
- CR1016789, 1H EDG small candle fire
- CR1020210, Unit 1 'C' charging pump coupling guard

b. Findings

No findings were identified.

1R18 Plant Modifications

Permanent Modifications

a. Inspection Scope

The inspectors reviewed one permanent plant modification design change packages listed below. The inspectors conducted a walkdown of the installation, discussed the

desired improvement with system engineers, and reviewed the 10 CFR 50.59 Safety Review/Regulatory Screening, technical drawings, test plans and the modification package to assess the TS implications. Other documents reviewed are listed in the Attachment to this report.

- DC-NA-15-00085, "EDG Fuel Oil Transfer Pump Equivalent Replacement"

b. Findings

No findings were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed three post maintenance test procedures and/or test activities, listed below, for selected risk-significant mitigating systems to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and, (8) equipment was returned to the status required to perform in accordance with VPAP-2003, "Post Maintenance Testing Program," Revision 14.

- WO59102761982 and WO59102761947 for Unit 1 casing cooling pump indicators, 1-RS-PI-102B and 1-RS-PI-103B
- 0-PT-75.27, "Delta P Testing of 'B' Service Water Header Spray Array MOVs," Revision 1 for 2-SW-MOV-222A
- 2-PT-89.1A, "Fuel Oil Sampling – Diesel Day Tank 2-EG-TK-2H," Revision 13

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the four surveillance tests listed below, the inspectors examined the test procedures, witnessed testing, or reviewed test records and data packages, to determine whether the scope of testing adequately demonstrated that the affected equipment was functional and operable, and that the surveillance requirements of TS were met. The inspectors also determined whether the testing effectively demonstrated that the systems or components were operationally ready and capable of performing their intended safety functions.

In-Service Test:

- 2-PT-71.2Q.1 "2-FW-P-3A, A Motor-Driven AFW IST Comprehensive Pump and Valve Test," Revision 12

Other Surveillance Tests:

- 1-PT-46.3A, "Primary-To-Secondary Leakrate Determination," Revision 15
- 2-PT-36.5.3A, "Solid State Protection System Output Slave Relay Test (Train A)," Revision 37
- 1-PT-71.1Q, "1-FW-P-2, Turbine Driven Auxiliary Feedwater Pump and Valve Test," Revision 63

b. Findings

No findings were identified.

1EP6 Drill Evaluation

Emergency Preparedness Drill

a. Inspection Scope

On October 6, 2015, the inspectors reviewed and observed the performance of a drill that involved an Alert with a small break loss of coolant accident leading to failed fuel. The inspectors assessed emergency procedure usage, emergency plan classification, notifications, and the licensee's identification and entrance of any problems into their corrective action program. This inspection evaluated the adequacy of the licensee's conduct of the drill and performance critique. Exercise issues were captured by the licensee in their corrective action program as CRs. Requalification training deficiencies were captured within the operator training program.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones: Barrier Integrity, Emergency Preparedness, Public Radiation Safety, and Occupational Radiation Safety

4OA1 Performance Indicator (PI) Verification

Mitigating Systems PIs

a. Inspection Scope

The inspectors performed a periodic review of the Unit 1 and Unit 2 PIs listed below to assess the accuracy and completeness of the submitted data, and whether the performance indicators were calculated in accordance with the guidance contained in

Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspection was conducted in accordance with NRC inspection procedure 71151, "Performance Indicator Verification." Specifically, the inspectors reviewed the Unit 1 and Unit 2 data reported to the NRC for the period October 1, 2014 through September 30, 2015. Documents reviewed included applicable NRC inspection reports, licensee event reports, operator logs, station performance indicators, and related CRs.

- Safety System Functional Failures

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution

.1 Review of Items Entered into the Corrective Action Program

As required by NRC inspection procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily CR report summaries and periodically attending daily CR Review Team meetings.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's corrective action program documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment and corrective maintenance issues but also considered the results of daily inspector corrective action program item screening discussed in Section 4OA2.1. The review included issues documented outside the normal corrective action program in system health reports, corrective maintenance work orders, component status reports, site monthly meeting reports, and maintenance rule assessments. The inspectors' review nominally considered the six month period of July through December 2015, although some examples expanded beyond those dates when the scope of the trend warranted.

The inspectors compared and contrasted their results with the results contained in the licensee's latest integrated quarterly assessment report. Corrective actions associated with a sample of the issues identified in the licensee's trend report were reviewed for adequacy. Trends noted by the inspectors were previously identified by the licensee and addressed in their corrective action program.

b. Assessment and Observations

No findings were identified. In general, the licensee has identified trends and has addressed the trends with their corrective action program.

.3 Annual Sample: Review of CR1010424, "Foreign Material Found Inside SW Spray Array Isolation Valve"

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions CR1010424, "Foreign Material Found Inside SW Spray Array Isolation Valve" to ensure that the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors also evaluated the CAs against the requirements of the licensee's CAP as specified in licensee procedure, PI-AA-200, "Corrective Action Program," Revision 28 and 10 CFR 50, Appendix B.

b. Findings and Observations

Findings are discussed in Section 1R12. In general, the inspectors verified that the licensee had identified problems at an appropriate threshold and entered them into the CAP database, and had proposed or implemented appropriate corrective actions.

4OA3 Event Followup

(Closed) Licensee Event Report (LER) 05000339/2015-001-00: Emergency Switchgear Outside Design Analysis for High Energy Line Break Due to an Unlatched Door

On October 7, 2015, the licensee discovered that for Unit 2 a high energy line break (HELB) door between Unit 1 turbine building and the safety-related Unit 2 emergency switchgear (ESGR) was slightly open and unlatched. The door was immediately latched and closed. The licensee was required to make an 8-hour Non-Emergency report to the NRC. This report was not made until October 8, 2015, at approximately 1823 hours, when the Unit 2 ESGR was determined to be outside of the design analysis for a Unit 1 HELB. Documents reviewed are listed in the Attachment to this report. This is a licensee identified violation and the corrective actions are discussed in Section 4OA7. This issue was entered into the licensee's CAP as CR1012468.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On January 25, 2016, the resident inspectors presented the inspection results to Mr. G. Bischof and other members of the staff, who acknowledged the findings. The inspectors verified no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) or Severity Level IV were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as Non-Cited Violations.

- NUREG 1022, “Event Reporting Guidelines 50.72 and 50.73,” Revision 3, section 3.2.4 and 3.2.7, cover degraded or unanalyzed conditions and an event or condition where structures, components, or trains of a safety system could have failed to perform their intended safety function as described in the plant safety analysis. Contrary to this, on October 7, 2015, the licensee failed to ensure the ESGR door was fully latched. As a result, when security personnel conducted their periodic rounds, the ESGR door, a HELB boundary, was determined to not be fully latched for approximately 46 minutes. The night shift operating crew failed to review the reportability for a HELB boundary not being met. The dayshift operating crew made the required 8 hour report to the NRC Headquarters Operations Center at 1823 on October 8, 2015. The inspectors determined that the failure to submit a report required by 10 CFR 50.72 for the unanalyzed condition described above had the potential to impact the regulatory process based, in part, on the information that 10 CFR 50.72 reporting serves. Since the issue impacted the regulatory process, it was dispositioned through the Traditional Enforcement process. The inspectors determined that this issue was a Severity Level IV violation based on Example 6.9.d.9 in the NRC Enforcement Policy. Example 6.9.d.9 specifically states, “A licensee fails to make a report required by 10 CFR 50.72 or 10 CFR 50.73.” This issue was entered into the licensee’s CAP as CR1012468.

- Procedure CM-AA-FPA-100, “Fire Protection/Appendix R (Fire Safe Shutdown) Program,” Revision 10, Attachment 2, Section 3.12, step ‘n.1’ states, “Fire doors must be closed and latched at all times.” Contrary to Section 3.12, step ‘n.1’ of CM-AA-FPA-100, the licensee failed to ensure the fire door to the ESGR was closed and latched at all times. Specifically, on October 7, 2015, when security personnel conducted their periodic round, the ESGR door, a fire boundary, was found to not be fully latched. The ESGR door, a HELB boundary, was determined to not be fully latched for approximately 46 minutes. This finding was identified by the license and entered in the licensee’s corrective action program as CR1012468. The inspectors performed a significance determination using NRC Inspection Manual 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” Exhibit 1 dated July 1, 2012. Because the Transient Initiator was a HELB that would impact both trains of mitigation equipment required to transition the plant to a stable shutdown condition, a detailed risk evaluation was required. A bounding risk evaluation was performed by a regional SRA which assumed that all pipe failures in turbine building high energy lines with enough energy to create a harsh environment would lead to failure of all equipment within the ESGR and result in a conditional core damage probability of 1.0. The systems considered were main steam, main steam drain, auxiliary steam, extraction steam, low pressure steam, blowdown, feedpump discharge and feedpump recirculation piping. Pipe mean failure rate data from EPRI report 102186 was used. No isolation of the pipe ruptures were assumed and no credit was allowed for operations to realize that a HELB had occurred and for closing the door. An exposure period of 46 minutes was utilized. The phase 3 SDP risk assessment determined the risk of the performance deficiency was an increase in core damage frequency of <1E-6, very low safety significance (Green). The short exposure period mitigated the risk of the performance deficiency.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:
M. Becker, Manager, Nuclear Outage and Planning
G. Bischof, Site Vice President
R. Evans, Radiation Protection and Chemistry Manager
B. Gaspar, Manager, Nuclear Site Services
R. Hanson, Manager, Nuclear Protection Services
E. Hendrixson, Director, Nuclear Site Engineering
L. Hilbert, Director, Nuclear Station Safety & Licensing
M. Hofmann, Site Supervisor Emergency Preparedness
J. Jenkins, Manager, Nuclear Maintenance
P. Kemp, Supervisor, Station Licensing
J. Leberstien, Technical Consultant, Licensing
F. Mladen, Plant Manager
J. Plossl, Supervisor, Nuclear Station Procedures
J. Schleser, Manager, Nuclear Organizational Effectiveness
G. Simmons, Supervisor Health Physics Operations
J. Slattery, Manager, Nuclear Operations
W. Standley, Manager, Nuclear Training
N. Turner, Corporate Manager Emergency Preparedness
M. Whalen, Technical Advisor, Licensing

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Open and Closed

05000338,339/2015-01	NCV	Failure to Follow Foreign Material Exclusion Procedure (Section 1R12)

Closed

05000339/2015-002	LER	Emergency Switchgear Outside Design Analysis for High Energy Line Break Due to an Unlatched Door (Section 4OA3.1)

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Procedure 0-AP-12, "Loss of Service Water," Revision 39
Procedure 0-OP-49.1A, "Valve Checkoff – Service Water," Revision 46
Drawing No. 11715-6.82-1A, "Spray Nozzles for Service Water Reservoir," June 24, 1975
Technical Data Sheet for Service Water Reservoir Spray Nozzles, May 13, 1985
EDG Starting Air 11715-FM-107A
Fuel Oil Transfer Pumps 11715-ESK-6GG
1H-1J Emergency and Synch Bus 11715-FE-21E
Bus 1H Under/degraded voltage 11715-FE-21T
EDG Room Details 11715-FE-27D
Fairbanks-Morse (Technical Manual) Air coolant 11867210
Fairbanks-Morse (Technical Manual) Lube oil 11867209
Fairbanks-Morse (Technical Manual) Fuel oil 11867211
Fairbanks-Morse (Technical Manual) Jacket coolant 11867208
Fairbanks-Morse (Technical Manual) Starting air 11867212
Fairbanks-Morse (Technical Manual) Control power 01760488, Sheet 1
Fairbanks-Morse (Technical Manual) Engine alarms 01760488, Sheet 5
Fairbanks-Morse (Technical Manual) Engine alarms 01760488, Sheet 6
Fairbanks-Morse (Technical Manual) Start circuit 11867230, Sheet 1
SW System (sheet 1) FM-78A, SW System (sheet 2) FM-78B, SW System (sheet 3) FM-78C
SW System (sheet 7) FM-78G, SW System FM-78H, SW System FM-22J, SW System FM-22K
SW lines yard (sheet 2) FP-5B, SW lines yard (sheet 3) FP-5C
SW lines Intake Structure to Aux Bldg tunnel (sheet 1) FP-5L
SW lines Intake Structure to Aux Bldg tunnel (sheet 3) FP-5N
SW reservoir spray piping FP-5AP
SW reservoir spray piping FP-5AQ
SW buried return headers FP-5AL
SW valve house FP-5AM
SW valve house FP-5AN
SW pump 1A ESK-5AS
SW pump 1B ESK-5AT
MOV-121A ESK-6EU
MOV-121B ESK-6EV
MOV-122A ESK-6EW
MOV-122B ESK-6EX
MOV-123A ESK-6EY
MOV-123B ESK-6EZ
SW Valve House Sump Pumps ESK-6JAG
SW instrumentation LSK-17-1G
SW instrumentation LSK-17-1J
Spray & Bypass MOVs LSK-17-2P
Procedure 0-OP-7.5A, "Valve Checkoff – Outside Recirc Spray System," Revision 10.
Procedure implemented March 26, 2015.
Alarm Response Procedure, 2-AR-J-G4, "RS PP 2B, Seal HD TK, Hi-Lo Level," Effective Date 11-23-2005

WO660919 for Operations Periodic Test, 1-PT-64.1.1, “Outside Recirculation Spray Pump 1-RS-P-2A,” Revision 28, implemented 3/22/2015.

Section 1R05: Fire Protection

Procedure 0-FS-S-4, “Loss Prevention Fire Strategy,” Revision 5
Procedure MA-AA-105, “Scaffolding,” Revision 15
DCP 05-015, Fire Detection System Replacement/North Anna Power Station/Units 1 & 2
DCP 05-002, Fire Protection Hydropneumatic System Upgrades/NAPS/Unit 1 & 2
Underground Yard Water and Fire Protection Sh 1 11715-FB-101A
Underground Yard Water and Fire Protection Sh 2 11715-FB-101B
Fire Protection and Domestic Water 11715-FB-41B
Fire Protection Arrangement Sh 1 11715-FB-2A
Fire Protection Arrangement Sh 2 11715-FB-2B
Yard-Water and Fire Protection Lines Sh 1 11715-FB-3A
Yard-Water and Fire Protection Lines Sh 2 11715-FB-3B
Yard-Water and Fire Protection Lines Sh 3 11715-FB-3C
Yard-Water and Fire Protection Lines Sh 4 11715-FB-3D
Low Pressure CO2 System 11715-FB-21B
Sprinkler & Water Systems Flow Diagram 11715-FB-21A
Fire Protection Hydro Tank 1-FP-TR-2 11715-FV-55A
Motor-Driven Fire Pump 11715-ESK-5B
Interior Fire Protection Hose Rack System 11715-FB-102A
Loss Prevention Fire Strategy, 1-FS-CC-1, “Casing Cooling Pumphouse Unit 1 Safe Shutdown Equipment,” Revision 2
Loss Prevention Fire Strategy, 1-FS-QS-1, “Quench Spray Building (SG-74) Unit 1,” Revision 5
CAN 7810050112, “Fire Protection Sys Review Supplement 3.” Responds to 780512 NRC Request for Addl Info & Agreements between NRC & Util Reached in July & Aug 1978. (Encl to 780050106)
Loss Prevention Fire Protection Maintenance, 1-FPMP-2.7, “Fire Extinguisher Inspection – Service Building and Misc,” Revision 7
0-FPMP-2.14, “Dry Chemical Fire Extinguisher Maintenance,” Revision 3
Loss Prevention Fire Strategy, 1-FS-SW-1, “Service Water Pumphouse Units 1 and 2,” Revision 2
WO59102851384, Loss Prevention Fire Protection Maintenance, 1-FPMP-2.9, “Hose Rack and Fire Extinguisher Inspection - Training Annex, Instrument Cal Lab, Dam, Switchyard, Service Water Pump House, Training Bldg, Media Center,” Revision 9, Dated 9/29/2015
Loss Prevention Fire Protection Maintenance, 1-FPMP-2.9, “Hose Rack and Fire Extinguisher Inspection - Training Annex, Instrument Cal Lab, Dam, Switchyard, Service Water Pump House, Training Bldg, Media Center,” Revision 9

Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance

Procedure E-0, “Reactor Trip or Safety Injection,” Revision 49
Operations Parodic Test, 1-PT-82H, “1H Emergency Diesel Generator Slow Start Test,” Revision 57
Alarm Response Procedure, 2-AR-A-C3, “Unit 2, Hi Range Radiation Trouble,” Effective Date 10/22/2001
Alarm Response Procedure, 1-AR-H-A6, “Emer DG #1H, Switch Not in Auto Remote,” Effective 5/9/1997

Section 1R12: Maintenance Effectiveness

Feedwater System 11715-FM-74A
Main and bypass feedwater regulating valves 11715-ESK-6QJ
Motor-operated valves MOV-150A/B/C 11715-ESK-6CG, MOV-154A, -100A/B/C/D 11715-ESK-6CL, MOV-154B/C 11715-ESK-6CL-1
Flow control valves FCV-150A/B 11715-ESK-6PG, FCV-150C 11715-ESK-6PH
Trip valve TV-MS111A/B 11715-ESK-6PR
Feed pump interlocking relays 11715-ESK-5Z
Auxiliary feed pumps 3A 11715-ESK-5AA, 3B 11715-ESK-5AB
Feedwater control and isolation diagram, 5655D33, Sheet 13 of 16.
Auxiliary feedwater pump startup diagram, 5655D33, Sheet 14 of 16

Section 1R15: Operability Determinations and Functionality Assessments

Fairbanks-Morse Opposed Piston Engines, Instructions for Model 38TD81/8 Diesel Marine Engines; Colt Industries; 1980
Factory Training Manual, Virginia Electric and Power Company North Anna Power Station, Units 1 and 2; Fairbanks-Morse Engine Division, Colt Industries; 1977
(1J and 2H) Woodward Manual 82340, Revision C, EGB Proportional Governor/Actuator with Hydraulic Amplifier Systems
(1J and 2H) Woodward Manual 32389, Revision P, “2301A Electronic Load Sharing and Speed Control”
Lister SR, I Cylinder Air Cooled Diesel Engines; R.A. Lister and Company
Woodward Manual 82006, Revision A, “Digital Reference Unit” (1J and 2H)
Woodward Manual 82510, Revision R, Magnetic Pickups and Proximity Switches (1J and 2H)
DC NA-14-00032, EDG Standby Jacket Cooling Circulating Pump Replacement
Main one line FE-1A
4160V ac one line Sheet 1 FE-1B
4160V ac one line Sheet 2 FE-1C
4160V ac one line Sheet 3 FE-1D
125V dc one line FE-1E
480V ac one line FE-1P
480V ac one line FE-1Q
480V ac one line FE-1R
480V ac one line FE-1T
120V ac one line FE-1V
Semi-vital buses FE-1W
480V ac one line FE-1Z
120V ac vital bus LSK-22-7A LSK-22-7B
125V dc power system LSK-22-8A LSK-22-8B LSK-22-8C

Section 1R18: Plant Modifications

DC NA 15-00085, “Fuel Oil Transfer Pump Replacement,” Dated 8/21/2015

Section 1R22: Surveillance Testing

CR1011672, “2-FW-FI-200C not indicating proper flow to “C” S/G”
WO660919, Operations Periodic Test, “2-FW-P-3B Motor Driven AFW Pump, and Valve Test,” Revision 39, dated 10/17/2013
Engineering Periodic Test, 2-PT-301FW, “Auxiliary Feedwater Pump 2-FW-P-2A System Pressure Test,” Revision 3
Alarm Response Procedure, 2-AR-F-C6, “AFW Pump Disch, FW-HCV-200C, Not Full Open,” Effective Date 4/24/2002

Alarm Response Procedure, 2-AR-F-C7, "AFW Pump Disch, FW-HCV-200A/B, Not Fully Closed," Effective Date 9/25/1994

Section 4OA2: Problem Identification and Resolution

CR1002368
CR1010444
CR1010424
CA3012143

Section 4OA7: Licensee Identified Violations

Security and Access Control, SY-AA-101, Revision 14
Unit 2 Safeguards Operations Daily Log, 2-LOG-6F, "Cable Vault – Emrg. Swgr Room Door," Revision 117
CR1012468, "This is a NRC Quarterly Reportable event under REG. Guide 5.62 – ESR Double Door not secured properly"
CA3012152, "Determine previous operability of Unit 2 EMSG"
NAI-1340-03, "GOTHIC Model for North Anna Turbine Building High Energy Line Break," Effective May 2008
Calc-ME-0581, "NAPS Turbine Building High Energy Line Break (HELB) Study," Dated 11/22/1999

LIST OF ACRONYMS

ADAMS	Agencywide Document Access and Management System
CA	Corrective Action
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
EDG	Emergency Diesel Generator
ESGR	Emergency Switchgear
HELB	High Energy Line Break
IMC	Inspection Manual Chapter
IP	Inspection Procedure
NCV	Non-cited Violation
NEI	Nuclear Energy Institute
No.	Number
NRC	Nuclear Regulatory Commission
OD	Operability Determination
PARS	Publicly Available Records
PD	Performance Deficiency
PI	Performance Indicator
Rev.	Revision
RTP	Rated Thermal Power
SDP	Significance Determination Process
SR	Surveillance Requirements
TI	Temporary Instruction
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
VEPCO	Virginia Electric and Power Company
VPAP	Virginia Power Administrative Procedure
WO	Work Order