



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

May 1, 2014

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 05000338/2014002 and 05000339/2014002**

Dear Mr. Heacock:

On March 31, 2014, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station, Units 1 and 2. On April 28, 2014, 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 self-revealing finding of very low safety significance (Green) in this report. This finding did not involve a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the 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.

Additionally, as we informed you in the most recent NRC integrated inspection report, cross-cutting aspects identified in the last six months of 2013 using the previous terminology were being converted in accordance with the cross-reference in Inspection Manual Chapter 0310. Section 4OA5 of the enclosed report documents the conversion of these cross-cutting aspects which will be evaluated for cross-cutting themes and potential substantive cross-cutting issues in accordance with IMC 0305 starting with the 2014 mid-cycle assessment review. If you disagree with the cross cutting aspect assigned, you should provide a response within 30 days of the date 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 of the 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's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agency-wide 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/

Michael F. King, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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

Enclosure: Inspection Report 05000338/2014002, and 05000339/2014002
w/ Attachment: Supplemental Information

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D. Heacock

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Letter to David A. Heacock from Michael F. King dated May 1, 2014.

SUBJECT: NORTH ANNA POWER STATION – NRC INTEGRATED INSPECTION
REPORT 05000338/2014002 and 05000339/2014002

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-338, 50-339

License Nos: NPF-4, NPF-7

Report No: 05000338/2014002, and 05000339/2014002

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: North Anna Power Station, Units 1 & 2

Location: Mineral, Virginia 23117

Dates: January 1, 2014 through March 31, 2014

Inspectors: G.Kolcum, Senior Resident Inspector
R. Clagg, Resident Inspector
M. Bates, Senior Operations Engineer, Section 1R11
A. Toth, Operations Engineer, Section 1R11
R. Carrion, Senior Reactor Inspector, Section 4OA5.2

Approved by: Michael F. King, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000338/2014-002, 05000339/2014-002; 01/01/2014 – 03/31/2014; North Anna Power Station, Units 1 and 2; Post Maintenance Testing

The report covered a three-month period of inspection by resident inspectors, operations engineers, and reactor inspectors from the region. One self-revealing finding was identified. 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 June 2, 2011. The cross-cutting aspect was determined using IMC 0310, "Components Within the Cross Cutting Areas" dated December 19, 2013. 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.

Cornerstone: Mitigating Systems

- Green: A self-revealing finding was identified for the licensee's failure to mark a foreign material exclusion (FME) closure device, as required by licensee procedure MA-AA-102, "Foreign Material Exclusion," Revision 14. This resulted in the non-functionality of the alternate AC (AAC) diesel.

The inspectors reviewed the issue of concern in accordance with IMC 0612, Appendix B, "Issue Screening." The inspectors determined that the licensee's failure to mark the #4 lifter side cover as an FME closure device as required by licensee procedure MA-AA-102 was a performance deficiency (PD). The PD is more than minor, and therefore a finding, because it adversely affected the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences, and the related attribute of equipment performance. Specifically, the resultant improper installation of the #4 lifter side cover caused the non-functionality of the AAC diesel. The inspectors evaluated the finding using IMC 0609, Appendix A, "The Significance Determination Process For Findings At-Power", issued June 19, 2012, and determined that Exhibit 2, "Mitigating Systems Screening Question" was applicable since the AAC diesel is a mitigating system component. The inspectors determined that a Detailed Risk Evaluation was required because the finding represented an actual loss of function of one or more non-Technical Specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hrs. A detailed risk evaluation of the PD was performed by a regional senior reactor analyst (SRA) using the guidance of NRC Inspection Manual Chapter (IMC) 0609 Appendix A, and the latest NRC North Anna SPAR model. The resultant increase in core damage frequency from the PD was $<1\text{E-6}/\text{year}$, a GREEN finding of very low safety significance. In addition, this finding involved the cross-cutting area of Human Performance and the aspect of Avoid Complacency, H.12, because the licensee failed to recognize and plan for the possibility of mistakes caused by not labeling the FME closure device during the AAC diesel maintenance. (Section 1R19)

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REPORT DETAILS

Summary of Plant Status

Unit 1 began the period at full Rated Thermal Power (RTP) and operated at full power for the entire report period.

Unit 2 began the inspection period at RTP. On February 2, 2014 the unit was manually tripped following a failure of a main feedwater pump. On February 5, 2014 Unit 2 returned to full RTP operation and operated at full power for the remainder of the report period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

.1 Seasonal Susceptibilities

a. Inspection Scope

The inspectors reviewed the licensee's adverse weather preparations for cold weather operations specified in 0-GOP-4, "Cold Weather Operations," Revision 55, 0-GOP-4.2, "Extreme Cold Weather Operations," Revision 36, and 0-GOP-4.2A, "Extreme Cold Weather Daily Checks," Revision 8, as well as the licensee's corrective action data base for cold weather related issues. The inspectors walked down the three risk-significant areas listed below to verify compliance with procedural requirements and to verify that the specified actions provided the necessary protection for the applicable structures, systems, or components. The inspectors reviewed the licensee's corrective action program (CAP) database to verify that weather related problems due to temperature were being identified at the appropriate level, entered into the CAP, and appropriately resolved.

- Unit 1 and 2 Emergency Diesel Generator (EDG) Rooms
- Station Blackout (SBO) Diesel
- Unit 1 Safeguards Areas

b. Findings

No findings were identified.

.2 Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed two site-specific weather related inspections due to anticipated adverse weather conditions. Specifically, the inspectors reviewed licensee adverse weather response procedures and site preparations including work activities that could impact the overall maintenance risk assessments.

- Extreme cold weather on January 21, 2014
- Heavy snow on February 12, 2014

b. Findings

No findings were identified.

1R04 Equipment Alignment

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

- Unit 1 'B' Motor Driven Auxiliary Feedwater (MDAFW) during surveillance of 'A' MDAFW
- 1J EDG while 1H EDG was tagged out for maintenance
- 'A' Service Water header during 'B' Service Water header maintenance outage

b. Findings

No findings were identified.

.2 Complete Walkdown

a. Inspection Scope

The inspectors performed a detailed walkdown and inspection of the Unit 1 Vital 125 VDC System to assess proper alignment and to identify discrepancies that could impact its availability and functional capacity. The inspectors assessed the physical condition and positioning of the system equipment. The inspection also included a review of the alignment and the condition of support systems for the 125 VDC System. Equipment deficiency tags were reviewed and the condition of the system was discussed with the engineering personnel.

b. Findings

No findings were identified.

1R05 Fire Protection

Quarterly Fire Protection Walkdowns

a. Inspection Scope

The inspectors conducted focused tours of the six 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 9, CM-AA-FPA-101, "Control of Combustible and Flammable Materials," Revision 5, 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.

- Battery Rooms Unit 1 (I, II, III, and IV) and Unit 2 (I, II, III, and IV)
- Cable Tray Spreading Room Unit 1 and Unit 2
- Normal Switchgear Room Unit 1 and Unit 2
- Emergency Switchgear Room Unit 1
- Emergency Switchgear Room Unit 2
- Auxiliary Building (including Z-18 and Z-20)

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Internal Flooding

a. Inspection Scope

The inspectors assessed the internal flooding vulnerability of the Unit 2 Auxiliary Feedwater Pump Houses with respect to adjacent safety-related areas to verify that the flood protection barriers and equipment were being maintained consistent with the UFSAR. The licensee's corrective action documents were reviewed to verify that corrective actions with respect to flood-related items identified in condition reports were adequately addressed. The inspectors conducted a field survey of the selected areas to evaluate the adequacy of flood barriers, and floor drains to protect the equipment, as well as their overall material condition. Documents reviewed during the inspection are listed in Attachment to this report.

b. Findings

No findings were identified.

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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 March 11, 2014, during Simulator Examination Guide SXG-2, which involved a RCS level transmitter failure, a loss of service water, main turbine high vibration/anticipated transient without scram, and a steam generator tube rupture. 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.

b. Findings

No findings were identified.

.2 Quarterly Control Room Operator Performance Observations

a. Inspection Scope

During the inspection period, the inspectors conducted three observations of licensed reactor operators actions and activities, during the events below, to ensure that the activities were consistent with the licensee procedures and regulatory requirements. 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.

- Unit 1 main generator reactive power test on January 10, 2014 during off-normal plant working hours, which involved coordination across both Unit 1 and Unit 2
- On February 2, 2014, during a Unit 2 manual trip
- On February 3, 2014, while placing Unit 2 online following a manual trip

b. Findings

No findings were identified.

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.3 Licensed Operator Requalification

a. Inspection Scope

The inspectors reviewed the facility operating history and associated documents in preparation for this inspection. During the week of January 6 – 10, 2014, the inspectors reviewed documentation, interviewed licensee personnel, and observed the administration of operating tests associated with the licensee's operator requalification program. Each of the activities performed by the inspectors was done to assess the effectiveness of the facility licensee in implementing requalification requirements identified in 10 CFR Part 55, "Operators' Licenses." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and inspection procedure 71111.11, "Licensed Operator Requalification Program." The inspectors also evaluated the licensee's simulation facility for adequacy for use in operator licensing examinations using ANSI/ANS-3.5-2009, "American National Standard for Nuclear Power Plant Simulators for use in Operator Training and Examination." The inspectors observed three crews during the performance of the operating tests. Documentation reviewed included written examinations, Job Performance Measures (JPMs), simulator scenarios, licensee procedures, on-shift records, simulator modification request records, simulator performance test records, operator feedback records, licensed operator qualification records, remediation plans, watchstanding records, and medical records. The records were inspected using the criteria listed in inspection procedure 71111.11. Documents reviewed during the inspection are documented in Attachment to this report.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the four 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 5.

- Maintenance Rule Evaluation (MRE) 017111, "SBO has an oil leak on #4 cylinder"
- Condition Report (CR) 533586, "Manually tripped SBO diesel due to surging and abnormal indications"

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- MRE017279, "MRE to Eng for Fuel Rod Failure in North Anna 2 Cycle 23"
- MRE017278, "MRE for Unit 2 Feedwater UFM Calorimeter Failure," and associated CR541006, "Unit 2 Feedwater UFM Calorimeter Failure"

b. Findings

No findings were identified.

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) upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and 4) maintenance risk assessments and emergent work problems were adequately identified and resolved. 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 CAP to verify that deficiencies in risk assessments were being identified and properly resolved.

- Updated maintenance risk assessment for repair of SBO diesel oil leak and replacement of temperature control valves as documented in CR533865 on January 3, 2014
- Risk review for Unit 2-III battery charger failure as documented in CR536099 on January 3, 2014
- Service Water outage risk assessment on March 17, 2014
- Reserved Station Service Transformer outage risk assessment on March 31, 2014

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments

a. Inspection Scope

The inspectors reviewed five 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 Significant Determination

Process (SDP). The inspectors' review included a verification that operability determinations (OD) were made as specified by procedure OP-AA-102, "Operability Determination," Revision 11.

- OD000576, "Leakby of Check Valves on 2-FW-P-2 Line to 'A' Steam Generator"
- OD000578, "Determine Operability of Containment Structure"
- CR539935, "1-EE-EG-1J found broken/missing cotter pins on lower connecting rods"
- CR542295, "SBO Lube Oil temperature low"
- OD000579, "Perform an operability determination on 2H EDG due to a small candle flame"

b. Findings

No findings were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed five 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.

- Work Order (WO) 59102679460, Removal of #4 valve cover to perform inspection
- WO 59192681366, Reposition of upper hose clamp to stop air leak, 1H EDG
- WO 59102686714, Repair station battery 2-III charger
- CR540362, 1J EDG Low Sump Switch
- WO 59102088612, 01-SW-MOV-121B Valve Actuator Rebuild

b. Findings

Introduction: A Green, self-revealing finding for the licensee's failure to mark a foreign material exclusion (FME) closure device which resulted in the non-functionality of the alternate AC (AAC) diesel was identified.

Description: On January 3, 2014, during a run of the AAC diesel to raise jacket water temperature in response to a low jacket water temperature condition, the licensee identified that a previously-documented slight oil leak on the #4 lifter side cover had increased to 7 drops per second. A run of this type was necessary while the licensee

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was preparing to replace degraded temperature control valves that prevented the jacket water subsystem from maintaining the jacket water at an appropriate temperature and was separate from the normal quarterly surveillance run. The licensee shutdown the AAC diesel and declared it non-functional due to the severity of the oil leak. The licensee initiated CR536183, "SBO has an oil leak on #4 cylinder," and WO59102679991, "Replace seal on #4 guide cover," to investigate and repair the leak. Subsequent investigation by the licensee revealed that corrective maintenance performed on the AAC diesel in November 2013 under WO59102679460, "Removal of #4 Valve Cover To Perform Inspection," led to a condition where an O-ring for the #4 lifter side cover was not reinstalled. Specifically, during the course of the November 2013 corrective maintenance the licensee removed the cover and while awaiting a new O-ring to install on the cover the licensee affixed the cover as a FME closure device but failed to properly label it as such after initial attempts to affix a magnetic label were unsuccessful. During subsequent turnovers between maintenance personnel the exact status of the cover was not discussed. This resulted in an assumption being made by maintenance personnel that the #4 lifter side cover was fully reinstalled. Operation of the AAC diesel for post maintenance testing identified a small amount of oil seepage on the #4 lifter side cover with the licensee initiating a condition report and work order for later repair in response. The AAC diesel was not operated and no maintenance occurred on the #4 lifter side cover before the machine was operated on January 3, 2014.

The inspectors reviewed CR533865, "Number 4 lifter side cover has a slight oil leak", CR536183, "SBO has an oil leak on #4 cylinder," MA-AA-102, "Foreign Material Exclusion," Revision 14, and WO59102679460, "Removal of #4 Valve Cover To Perform Inspection." The inspectors noted that the November 2013 AAC diesel maintenance performed under WO59102679460 was determined to require a standard risk plan for FME when evaluated using licensee procedure MA-AA-102. The inspectors also noted that MA-AA-102 requires that Steps 3.2.2, "FMEA/Material Pre-Cleaning/CLEANING AS YOU GO," and 3.2.3, "Cover Unattended Openings," be used for any maintenance determined to need a standard risk plan for FME. MA-AA-102, Step 3.2.3 states that all unattended openings into systems or components be covered and directs the user to see Attachment 7. The inspectors reviewed Attachment 7 and noted that it requires FME closure devices be clearly marked. The inspectors noted that in CR536183 the licensee determined that failure to properly label the #4 lifter side cover as a FME closure device directly resulted in its ultimate improper installation.

The inspectors concluded that during the November 2013 AAC diesel maintenance the licensee failed to mark the #4 lifter side cover as an FME closure device as required by licensee procedure MA-AA-102 and this failure resulted in improper installation of the #4 lifter side cover and the subsequent non-functionality of the AAC diesel.

Analysis: The inspectors reviewed the issue of concern in accordance with IMC 0612, Appendix B, "Issue Screening." The inspectors determined that the licensee's failure to mark the #4 lifter side cover as an FME closure device as required by licensee procedure MA-AA-102 was a performance deficiency (PD). The PD is more than minor, and therefore a finding, because it adversely affected the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to

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initiating events to prevent undesirable consequences, and the related attribute of equipment performance. Specifically, the resultant improper installation of the #4 lifter side cover caused the non-functionality of the AAC diesel.

The inspectors evaluated the finding using IMC 0609, Appendix A, "The Significance Determination Process For Findings At-Power," issued June 19, 2012, and determined that Exhibit 2, "Mitigating Systems Screening Question," was applicable since the AAC diesel is a mitigating system component. The inspectors determined that a Detailed Risk Evaluation was required because the finding represented an actual loss of function of one or more non-Technical Specification Trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hrs. A detailed risk evaluation of the PD was performed by a regional senior reactor analyst (SRA) using the guidance of NRC Inspection Manual Chapter (IMC) 0609 Appendix A, and the latest NRC North Anna SPAR model. A condition assessment was performed with the SBO DG failed for an exposure period of 37 days with no recovery allowed. External event risk associated with seismic and tornado/high winds were considered but were not significant contributors. Fire risk was estimated using a bounding evaluation with data from the licensee's Individual Plant Examination of External Events (IPEEE). The dominant risk was from loss of offsite power (LOOP) sequences therefore Large Early Release Fraction (LERF) risk was not significant. The dominant sequence was a LOOP initiator leading to station blackout (SBO) with failure of the emergency power system and failure to recover offsite power or a diesel generator (DG) including failure of the SBO DG resulting in a long term core heat removal failure. The sequence was a late failure with success of RPS, successful DC load stripping, rapid secondary depressurization, RCP seals remaining intact and manual control of AFW. The resultant increase in core damage frequency from the PD was $<1\text{E-6}/\text{year}$, a GREEN finding of very low safety significance. In addition, this finding involved the cross-cutting area of Human Performance and the aspect of Avoid Complacency, H.12, because the licensee failed to recognize and plan for the possibility of mistakes caused by not labeling the FME closure device during the AAC diesel maintenance.

Enforcement: This finding does not involve enforcement action because no violation of a regulatory requirement was identified. Licensee procedure MA-AA-102, "Foreign Material Exclusion," Revision 14, requires, in part, that FME closure devices be clearly marked. Contrary to the above, from November 27, 2013 to January 3, 2014 the licensee failed to mark an FME closure device on the AAC diesel. Because this finding does not involve a violation, is of very low safety significance (Green) and was entered into the licensee's CAP as CR536183, it is identified as FIN 05000338, 339/2014002-01, Failure to Mark a Foreign Material Exclusion Closure Device Results in Non-Functionality of the Alternate AC Diesel.

1R22 Surveillance Testing

a. Inspection Scope

For the five 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

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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:

- 1-PT-71.2Q.1, "1-FW-P-3A, A Motor-Driven AFW IST Comprehensive Pump and Valve Test," Revision 10

Other Surveillance Tests:

- 1-PT-82.2A, "1H Emergency Diesel Generator Test (Simulated loss of off-site power)," Revision 50
- 1-GOP-15.2, "Generator Reactive Power Capability Testing," Revision 1
- 2-PT-36.15.2, "Train A Reactor Protection and ESF Logic Actuation Logic Test," Revision 65
- 2-PT-82H, "2H Emergency Diesel Generator Slow Start Test," Revision 54

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

Emergency Preparedness (EP) Drill

a. Inspection Scope

On March 4, 2014, the inspectors reviewed and observed the performance of an emergency planning drill that involved a dropped fuel assembly, loss of main and auxiliary feedwater, a steam generator tube rupture, and a stuck open main steam safety. 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 critique performance. Exercise issues were captured by the licensee in their corrective action program as CR541655. Requalification training deficiencies were captured within the operator training program.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors performed a periodic review of the following three Unit 1 and 2 PIs 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 January 1, 2013 through December 31, 2013. Documents reviewed included applicable NRC inspection reports, licensee event reports, operator logs, station performance indicators, and related CRs.

- Unplanned Scrams per 7000 Critical Hours (IE01)
- Unplanned Transients per 7000 Critical Hours (IE03)
- Unplanned Scrams With Complications (IE04)

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 Annual Sample: Review of CR536618, Service Water Valve House door locking pins frozen again

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for CR536618, "Service Water Valve House door locking pins frozen again," 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 CR against the requirements of the licensee's CAP as specified in procedure, PI-AA-200, "Corrective Action Program," Revision 21 and 10 CFR 50, Appendix B.

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b. Findings and Observations

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

.3 Annual Sample: Review of CR533586, Manually Tripped SBO Diesel due to surging and abnormal indications

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for CR533586, "Manually Tripped SBO Diesel due to surging and abnormal indications," 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 CR against the requirements of the licensee's CAP as specified in procedure, PI-AA-200, "Corrective Action Program," Revision 21 and 10 CFR 50, Appendix B.

b. Findings and Observations

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

.4 Annual Sample: Review of CR525328, Unit 1 letdown orifice isolation valves leaking by

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions CR525328, "Unit 1 letdown orifice isolation valves leaking by," 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 CR against the requirements of the licensee's CAP as specified in procedure, PI-AA-200, "Corrective Action Program," Revision 21 and 10 CFR 50, Appendix B.

b. Findings and Observations

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

4OA3 Event Follow-up

(Closed) LER 05000338/2013-001-00 and LER 05000338/2013-001-01: Unit 1 Emergency Diesel Generators Inoperable During Core Alterations

On September 26, 2013, with Unit 1 in Mode 6, zero percent power, a condition prohibited by technical specifications (TS) occurred when reactor core alterations began with two inoperable emergency diesel generators. The 1J EDG was removed from

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service for maintenance at the time core alterations began with the 1H EDG relied up on for TS compliance. The licensee's investigation of a failure of the 1H EDG on October 5, 2013 determined that it had been inoperable since being returned to service following maintenance on September 24, 2013. The apparent cause of the failure was a loose fuse holder due to numerous removal and re-installation evolutions during design change implementation, testing, and troubleshooting. Investigation by the licensee determined that a momentary loss of power to the electronic governor and digital reference unit (DRU), due to an internal issue in the DRU electronics, a loose wiring connection, or a loose fuse holder would have resulted in the DRU resetting to 900 RPM I 60 Hz set point. The 900 RPM I 60 Hz set point is the reference value used in isochronous mode of operation (design basis function for the EDG). Therefore a complete loss of power or momentary power interruption to the electronic governor and DRU would not have prevented the 1H EDG from supplying emergency electrical power during a loss of offsite power to the emergency bus in the isochronous mode.

North Anna TS 3.8.2 requires one qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by TS 3.8.10 and one operable emergency diesel generator (EDG) during movement of recently irradiated fuel assemblies. Contrary to the above, on September 26, 2013, the licensee conducted movement of Unit 1 recently irradiated fuel assemblies without the required one operable EDG. Although a violation of TS occurred; the inspectors concluded that there was no performance deficiency associated with the loose fuse holder which caused the momentary loss of control power to the 1H EDG. The inspectors determined that the violation did not adversely impact the associated cornerstone objective because one qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s), required by TS 3.8.10, was operable and the station blackout EDG was also available to supply power if required. Additionally, had a loss of offsite power occurred, the 1H EDG would have been able to supply power to the emergency bus at the time. The licensee's corrective actions included replacement of the 1H EDG mechanical actuator, DRU, and power supply fuse holder; all wiring connections were verified tight; and post maintenance testing was completed satisfactorily. Therefore, the inspectors concluded that this failure to comply with TS 3.8.2 constitutes a minor violation that is not subject to enforcement action in accordance with NRC's Enforcement Policy. This LER is closed.

4OA5 Other Activities

.1 Institute of Nuclear Power Operations (INPO) Plant Assessment Report Review

a. Inspection Scope

The Senior Resident Inspector reviewed the final report for the INPO plant assessment of North Anna Power Station that was conducted in July 2013. The report was reviewed to ensure that issues identified were consistent with the NRC perspectives of licensee performance and to verify if any significant safety issues were identified that required further NRC follow-up.

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b. Findings

No findings were identified.

.2 (Closed) Temporary Instruction (TI) 2515/182 – Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks

a. Inspection Scope

The inspectors conducted a review of records and procedures related to the licensee's program for buried piping and underground piping and tanks in accordance with Phase II of TI 2515-182 to confirm that the licensee's program contained attributes consistent with Sections 3.3.A and 3.3.B of NEI 09-14, "Guideline for the Management of Buried Piping Integrity," Revision 3, and to confirm that these attributes were scheduled to be completed by the NEI 09-14, Revision 3, deadlines. The inspectors interviewed licensee staff responsible for the buried piping program and reviewed activities related to the buried piping program to determine if the program was managed in a manner consistent with the industry's buried piping initiative.

The licensee's buried piping and underground piping and tanks program was inspected in accordance with paragraph 03.02.a of the TI and it was confirmed that activities which correspond to completion dates specified in the program which have passed since the Phase I inspection was conducted, have been completed. The licensee's buried piping and underground piping and tanks program was inspected in accordance with paragraph 03.02.b of the TI and responses to specific questions found in <http://www.nrc.gov/reactors/operating/ops-experience/buried-pipe-ti-phase-2-insp-req-2011-11-16.pdf> were submitted to the NRC headquarters staff. Documents reviewed during the inspection are documented in Attachment to this report.

b. Findings

No findings were identified. Based upon the scope of the review described above, Phase II of TI-2515/182 was completed.

.3 (Closed) Unresolved Item (URI) 05000338/2013005-01, Fuse Failure on 1 H EDG Governor Circuit

This URI was identified for the licensee's failure to establish and implement adequate preventative maintenance (PM) for the 1H EDG control system fuse holders that were susceptible to relaxation of the spring clips. Specifically, the licensee failed to develop an adequate PM for periodic inspection and replacement of fuse clips prior to the 1H EDG control system failure as required ER-AA-PRS-1010, "Preventative Maintenance Task Basis and Maintenance Strategy," Revision 4, as documented in inspection report NA2013-005, Section 4OA5.7. Subsequently, the licensee provided additional information to the inspectors in the Region II office and the NRC inspectors reviewed the additional information to determine if this posed a credible safety issue. After further review, no findings were identified. This URI is closed.

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.4 New Cross-Cutting Aspects

The table below provides a cross-reference from the 2013 and earlier findings and associated cross-cutting aspects to the new cross-cutting aspects resulting from the common language initiative. These aspects and any others identified since January 2014, will be evaluated for cross-cutting themes and potential substantive cross-cutting issues in accordance with IMC 0305 starting with the 2014 mid-cycle assessment review.

Finding	Old Cross-Cutting Aspect	New Cross-Cutting Aspect
05000339/2013004-02	H.1(a)	H.13
05000338/2013005-01	H.2(c)	H.7

4OA6 Meetings, Including Exit

Exit Meeting Summary

On April 28, 2014, the senior resident inspector presented the inspection results to Mr. G. Bischof and other members of the staff, who acknowledged the finding. The inspectors verified no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel:

V.Armentrout, Consulting Engineer, Nuclear Engineering Programs
L. Baron, Licensed Operator Requalification Program Lead Instructor
M. Becker, Manager, Nuclear Outage and Planning
G. Bischof, Site Vice President
J. Daugherty, Director, Nuclear Station Safety & Licensing
R. Evans, Manager, Radiological Protection
B. Gaspar, Manager, Nuclear Site Services
R. Hanson, Manager, Nuclear Protection Services
E. Hendrixson, Director, Nuclear Site Engineering
J. Jenkins, Manager, Nuclear Maintenance
P. Kemp, Supervisor, Station Licensing
J. Leberstien, Technical Advisor, Licensing
C. McClain, Manager, Nuclear Training
F. Mladen, Plant Manager
S. Osburn, Station UPTI Coordinator
J. Plossl, Supervisor, Nuclear Station Procedures
P. Rittenhouse, Station UPTI Coordinator
J. Schleser, Manager, Nuclear Organizational Effectiveness
J. Slattery, Manager, Nuclear Operations
D. Struckmeyer, Supervisor, Engineering Programs
R. Wesley, Training Manager
M. Whalen, Technical Advisor, Licensing

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Opened and Closed

05000338, 339/2014002-01	FIN	Failure to Mark a Foreign Material Exclusion Closure Device Results in Non-Functionality of the Alternate AC Diesel (Section 1R19)
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Closed

TI 2515/182	TI	Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks, Phase II (Section 4OA5.2)
05000338/2013005-01	URI	Fuse Failure in 1H EDG Governor Circuit (Section 4OA5.3)

05000338/2013-001-00	LER Unit 1 Emergency Diesel Generators Inoperable During Core Alterations (Section 4OA3)
05000338/2013-001-01	LER Unit 1 Emergency Diesel Generators Inoperable During Core Alterations (Section 4OA3)

Discussed
None

LIST OF DOCUMENTS REVIEWED

Section 1R06: Flood Protection Measures

Work Order WO59102626538, Quarterly Pumping and Inspection of Cable Vaults
 Procedure 0-MPM-1207-03, Semi-Annual Pumping of Security and Electrical Cable Vaults, Revision 6
 Procedure 0-MPM-1207-01, Quarterly Pumping of Security and Electrical Cable Vaults, Revision 17
 CR539962, 72 inches of water found in 1-EP-MH-25
 Work Order WO59102698580, 84 inches of water found in 1-EP-MH-25

Section 1R11: Licensed Operation Requalification

Records:

License Reactivation Packages, OP-AA-103 (complete records of two licensed operators)
 Medical Files (12 complete medical records)
 Remedial Training Records, TR-AA-400 (last two years)
 Remedial Training Examinations (last two years of records)
 Feedback Summaries, TR-AA-500 (last two years of records)
 Simulator Work Orders (last two years of records)
 Exam Grades for 2012 and 2013
 LORP Attendance Records for 2012 and 2013

Written Examinations:

2013 A Shift Part A Written Exam
 2013 A Shift Part B Written Exam
 2013 B Shift Part A Written Exam
 2013 B Shift Part B Written Exam

Procedures:

TR-AA-SIM-400, Simulator Performance Testing, Revision 4
 TR-AA-SIM-100, Simulator Modification Process, Revision 5
 TR-AA-SIM-101, Simulator Configuration Control Committee, Revision 1
 TR-AA-SIM-200, Simulator Hardware Management, Revision 3
 TR-AA-SIM-300, Simulator Software Management, Revision 2
 TR-AA-100, Analysis, Revision 10
 TR-AA-101, Conduct of Training, Revision 2
 TR-AA-200, Design, Revision 2
 TR-AA-300, Development, Revision 8

TR-AA-310, Just-In-Time Training, Revision 1
 TR-AA-400, Implementation, Revision 10
 TR-AA-710, NRC Exam Security Requirements, Revision 3
 TR-AA-730, Licensed Operator Biennial and Annual Operating Requalification Exam Process, Revision 4
 TR-AA-750, Conduct of Simulator Training and Evaluation, Revision 0

Condition Reports:

CR536478 (JPMs Designated for LORP Requal Need to be Verified as Alt Path)
 CR460540 / CR460540-ACE (U1 Turbo TOC Tag Out Incorrectly Performed)
 CR468505 / CR468505-ACE (1-CH-TK-5, Batch Tank, overflowed during tag out execution)
 CR522419 and CR522419-ACE (Valve Misposition)
 CR531002 (Fatigue Limit Exceeded)

Simulator Records:

NAPS-RX-SWO-201203150905, Simulator Core Cycle 23 Test Procedure, Revision 0, 4/25/12
 Simulator Core Model Verification Report, North Anna Unit 1, Cycle 23, July 2012
 Simulator Steady State Performance Test Report for 2012 (100%, 75%, 28%) 4/16/13
 2012 Simulator Performance Tests (Transient Tests), 4/16/13
 North Anna – List of Open SWR's/SWO's
 Scenario-Based Testing for SGX-17, Revision 9
 Scenario-Based Testing for SXG-29, Revision 11

Scenario Packages:

Week 1 C Shift scenarios (SXG-17 Rev 9, SXG-29 Revision 11)
 Week 2 D Shift scenarios (SXG-14 Rev 14, SXG-40 Revision 8)
 Week 3 E Shift scenarios (SXG-1 Rev 11, SXG-11 Revision 13)

JPM Packages:

Week 1 C Shift JPMs (12312, 13368, N907, R664, N935)
 Week 2 D Shift JPMs (11359, 16383, N1506, R742, N1528)

Section 40A5: Other Activities

Procedures

1-PT-302QS, RWST and Refueling Water Cooling System Pressure Test, Revision 4
 1-PT-305QS, Quench Spray Pump 1-QS-P-1A System Pressure Test, Revision 4
 1-PT-305RS, Casing Cooling Pump 1-RS-P-3A System Pressure Test, Revision 4
 1-PT-306QS, Quench Spray Pump 1-QS-P-1B System Pressure Test, Revision 7
 1-PT-306RS, Casing Cooling Pump 1-RS-P-3B System Pressure Test, Revision 5
 1-PT-309SI, Safety Injection System Suction Piping System Pressure Test, Revision 3
 2-PT-302QS, RWST and Refueling Refrigeration Unit Piping System Pressure Test, Revision 4
 2-PT-305QS, Quench Spray Pump 2-QS-P-1A System Pressure Test, Revision 4
 2-PT-305RS, Casing Cooling Pump 2-RS-P-3A System Pressure Test, Revision 4
 2-PT-306QS, Quench Spray Pump 2-QS-P-1B System Pressure Test, Revision 4
 2-PT-306RS, Casing Cooling Pump 2-RS-P-3B System Pressure Test, Revision 3
 2-PT-310SI, Safety Injection System Suction Piping System Pressure Test, Revision 4
 CH-99.500, Primary Chemistry Program, Revision 9

CH-99.600, Secondary Chemistry Program, Revision 10
 CHAP-0105, Auxiliary Cooling Water System Chemistry Control Program (North Anna),
 Revision 18
 CY-AA-100, Conduct of Chemistry, Revision 9
 ER-NA-PFM-314, Inspection of Auxiliary Feedwater Tunnel Piping Supports, Revision 1

Drawings

13075-EY-8A, Composite for Underground Systems – Yard Area – Sheet 1, Revision 3
 13075-EY-8B-1, Composite for Underground Systems – Yard Area – Sheet 2, Revision 4
 13075-EY-8C-1, Composite for Underground Systems – Yard Area – Sheet 3, Revision 1
 13075-EY-8D-1, Composite for Underground Systems – Yard Area – Sheet 4, Revision 1

Corrective Actions

Condition Report (CR) 531525, Drawing 11715-FB-4A not matching field conditions for FO piping
 CR 531804, Drawing 11715-FB-4A not matching field conditions for A train and SBO FO piping
 Self-Assessment Report (SAR) 001156, Buried Piping Risk Self-Assessment
 SAR 002497, Underground Piping and Tank Program Condition Assessment Informal Self-Assessment
 Program/Comp Health Report, UPTI – Underground Piping and Tank Integrity (Q4-2013)

Work Orders

59101935117, 01-BLD-BLD-AFWT-BLDG, Engineering Inspection of Unit 1 AFW Piping and Supports
 59101935130, 02-BLD-BLD-AFWT-BLDG, Engineering Inspection of Unit 2 AFW Piping and Supports
 59102145923, Manual Location List, Support Buried Pipe Inspections / Unit 1 RWST QS Lines
 59102339588, 01-FP-Buried Pipe Doc, WO needed to record buried pipe program inspection
 59102362938, Buried Pipe Inspection FP, WO needed to record buried pipe program inspection
 59102420578, GWP-6 Tritium, Excavate U1 RWST buried piping for GWP-6 tritium investigation
 59102431506, Opportunistic inspection of main Fire Protection headers from pump house to warehouse 5 area
 59102520435, CAT-PROT-SW, Service Water Cathodic Protection Inspection
 59102272853, Opportunistic inspection of the southern portion of the main fire protection loop outside of the west PA gate
 59102147425, Buried Pipe Program inspection of external pipe surface
 59101915127, Opportunistic Buried Pipe Program inspection due to fire protection piping replacement to the west of the Unit 2 casing cooling pump house
 59102484959, Buried Pipe Program inspection to remove temporary pipe support from under the buried pipes
 59102484957, Buried Pipe Program inspection to remove temporary pipe support from under the buried pipes
 59101915066, Opportunistic Buried Pipe Program inspection due to fire protection piping replacement in the southwest corner of the PA yard
 59102145921, Buried Pipe Program inspection of external pipe surface
 59102147424, Buried Pipe Program inspection of external pipe surface and welds around the 8x6 reducer on the upstream side of the 8" elbow

59102272714, Opportunistic inspection of the northern portion of the main fire protection loop outside of the northwest corner of the PA fence

59102577831, 00-BFO-PP-1.50-BFO-PIPE-1-151, Excavation support of buried pipe inspection – SBO Fuel Oil Piping

59102577832, Expose the 10 fuel oil pipes leaving the west side of the Fuel Oil Pump House on Drawing 11715-FB-4A/B

Other

2318: Improvement Initiative: Equipment Reliability – Implement Fleet Underground Piping and Tank Initiative

Bench Mark Assessment (BMA) 004451, Benchmark Results from INPO System Engineers Managers Forum

Electric Power Research Institute (EPRI) 1025255, BPWORKS 2.1 Software User's Manual, Data Management and Risk Ranking of Buried Piping Systems

Engineering Technical Evaluation (ETE)-NA-2012-0064, Life Cycle Management Plan – Underground Piping and Tank Integrity Program – North Anna Power Station, Revision 0

Engineering Technical Evaluation (ETE)-NA-2013-0064, Life Cycle Management Plan – Underground Piping and Tank Integrity Program – North Anna Power Station, draft

Final Survey Report – Phase II Cathodic Protection System Service Water Lines – Units 1 and 2 North Anna Nuclear Power Station, prepared by Corrpro Companies, Inc, dated July 2010

Life Cycle Management Plan – Underground Piping and Tank Integrity Program, dated January 4, 2014

North Anna Buried Piping Program Gap Analysis vs. EPRI Buried Piping Report 116456, November 2009

LIST OF ACRONYMS

ACE	Apparent Cause Evaluation
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
IMC	Inspection Manual Chapter
ISFSI	Independent Spent Fuel Storage Installation
JPM	Job Performance Measures
LHSI	Low Head Safety Injection
NCV	Non-cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OD	Operability Determination
PARS	Publicly Available Records
PI	Performance Indicator
PRT	Pressurizer Relief Tank
QS	Quench Spray
RCE	Root Cause Evaluation
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RTP	Rated Thermal Power
SBO	Station Blackout
SDP	Significance Determination Process
SR	Surveillance Requirements
TDAFWP	Turbine Driven Auxiliary Feedwater Pump
TI	Temporary Instruction
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VEPCO	Virginia Electric and Power Company
VPAP	Virginia Power Administrative Procedure
WO	Work Order