



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

EA-15-210

November 12, 2015

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 05000338/2015003 AND 05000339/2015003 AND EXERCISE OF
ENFORCEMENT DISCRETION**

Dear Mr. Heacock:

On September 30, 2015, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station Units 1 and 2. On October 14, 2015, the NRC inspectors discussed the results of this inspection with Mr. F. Mladen and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

The inspectors documented a licensee-identified violation, which was determined to be of very low safety significance, in this report. The NRC is treating this finding as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy.

In addition, contrary to the above, Unit 1 Reactor Coolant System (RCS) pressure boundary leakage existed in Modes 1, 2, 3 and 4 before December 23, 2014; therefore, it exceeded the (TS) 3.4.13.a action statement. Although a violation of the TS occurred, the violation was not attributable to an equipment failure that was avoidable by reasonable licensee quality assurance measures or management controls. Therefore, the violation of TS 3.4.13.a was not associated with a licensee performance deficiency. The inspectors concluded that the violation would normally be characterized as Severity Level III in accordance with Enforcement Policy section 6.1.c. However, because the violation was not associated with a licensee performance deficiency and it was not avoidable by reasonable licensee quality assurance (QA) measures or management controls, I am authorized, after consultation with the Director of the Office of Enforcement and the Regional Administrator, to exercise enforcement discretion (Enforcement Action (EA)-15-210) in accordance with Section 2.2.4.d and 3.5 of the Enforcement Policy. This violation will not be considered in the assessment process or the NRC's Action Matrix.

D. Heacock

2

If you wish to contest the NCV, 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 20555-001; 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.

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/

Joel T. Munday, Director
Division of Reactor Projects

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

Enclosure:
IR 05000338/2015003 and 05000339/2015003
w/Attachment: Supplementary Information

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D. Heacock

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DATE	11/03/2015	11/02/2015	10/30/2015	11/05/2015	11/02/2015	11/04/2015
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NAME	GKolcum	AMasters	JMunday			
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E-MAIL COPY?	YES NO					

D. Heacock

3

Letter to David A. Heacock from Anthony D. Masters dated November 12, 2015

SUBJECT: NORTH ANNA POWER STATION – NRC INTEGRATED INSPECTION
REPORT 05000338/2015003 AND 05000339/2015003 AND EXERCISE OF
ENFORCEMENT DISCRETION

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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: 05000338/2015003 and 05000339/2015003

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: North Anna Power Station, Units 1 & 2

Location: Mineral, Virginia 23117

Dates: July 1, 2015 through September 30, 2015

Inspectors: G. Kolcum, Senior Resident Inspector
G. Skaggs Ryan, Resident Inspector
J. Parent, Project Engineer
L. McKown, Resident Inspector, RI, Millstone Plant

Approved by: Anthony D. Masters, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Enclosure

SUMMARY

IR 05000338/2015-003, 05000339/2015-003; 07/01/2015 – 09/30/2015; North Anna Power Station, Units 1 and 2. Routine Integrated Inspection Report.

The report covered a three-month period of inspection by resident inspectors and a project engineer from the region. No NRC findings were 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 April 29, 2015. 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.

One violation of very low safety significance that was identified by the licensee has been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and corrective action tracking number 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. On September 16, Unit 2 reduced power to 98 percent due to boron blender calculations and returned to full power on September 18 for the remainder of the report period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

.1 Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed a site specific weather related inspection due to anticipated adverse weather conditions. On September 29, 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 four 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 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.

- Starting air for 2H emergency diesel generator (EDG)
- 'A' service water header
- Instrument air system
- Alternate fire protection system diesel fire pump

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Quarterly Fire Protection Walkdowns

a. Inspection Scope

The inspectors conducted focused tours of the eight 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 charging pump cubicles
- Unit 2 charging pump cubicles
- Unit 1 main steam valve house
- Unit 1 cable spreading room
- Unit 2 cable spreading room
- Unit 1 fire barrier breach between emergency switchgear and cable tunnel
- Unit 1 and Unit 2 normal switchgear
- Unit 1 and Unit 2 emergency diesel generator rooms

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Cables in Manholes/Underground Bunkers

a. Inspection Scope

The inspectors performed an annual review of cables located in underground bunkers/manholes. The inspectors evaluated, as appropriate, the security and electrical cable vaults for the following: (1) verified by direct observation that the cables were not submerged in water; (2) verified by direct observation that cables and/or splices appeared intact; (3) verified that drainage or an appropriate dewatering device (sump pump) was in operation; and, (4) verified that level alarm circuits were set appropriately to ensure that the cables would not be submerged. Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance

.1 Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors reviewed a licensed operator performance on August 26, 2015 during a simulator scenario. 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 two 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 events:

- On August 11, 2015, during Unit 2 Control Rod Operability, Unit 2 radiation monitor PT, Unit 1 Service Water Heat Exchanger PT, and 4 trainees in Control Room
- On August 27, 2015 during a 2H EDG temperature switch failure

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the five 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.

- CR1003106,"2-CH-P-1B outboard seal leaking 2 dpm"
- Unit 2 'C' charging pump start and temperature control valve
- Unit 2 'A' safety injection pump mechanical seal leakage
- Service water valve leakage for 1-SW-MOV-121B
- Alternate diesel fire pump fails to start

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated, as appropriate, the six 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.

- Work week activities for the week of July 13, 2015 with leakby on service water 'B' header spray array
- 2H EDG cylinder liner replacement after cylinder line #8 developed a leak during the slow start PT concurrent with service water spray array piping replacement for the week of July 26, 2015
- Service water spray array maintenance week of August 3, 2015
- 2H EDG exhaust support degradation during week of August 17, 2015
- 'B' Service water header, return header outage for pipe coating inspection and repair with discharge MOV inspection, repair or replacement for the week of September 20, 2015
- Work week activities for the week of September 28, 2015 and increased vibration monitoring for Unit 2 'A' and 'B' feedwater pumps on September 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 seven 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 13. Other documents reviewed are listed in the Attachment to this report.

- Review of CA3001996, "1-SW-MOV-121B, 1-SW-MOV-122B, 2-SW-222A have been identified as leaking by. Additionally, 2-SW-MOV-222A was over torqued during Quiklook testing and it is believed that 1-SW-MOV-122B would be over torqued if it were stroked closed electrically. All three of these MOVs are on the B Service Water Header."
- Review of CA302864, "Regarding CR579372 (Both Motor Driven AFW Pumphouse fans tagged for preventative maintenance), simultaneous vent fan tag-outs were reviewed (both Units) over the last 3 years."
- Common Cause Evaluation (CR1004337) for TS Common Cause aspect associated with the 2J EDG due to a cylinder liner jacket crack identified during the monthly testing of 2H EDG under 2-PT-82H

- Unit 1 'B' safety injection pump oil level for CR1008149, CR506608, and CR559858
- Unit 2 'B' charging pump oil pressure for CR1000849
- Unit 1 'A' motor driven AFW pump outboard packing leakage basis under CR11569
- Unit 1 terry turbine followup to OD616, water in lube oil

b. Findings

No findings were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed six 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.

- Unit 2, motor driven auxiliary feedwater pumphouse fans, 2-OP-21.4, "Building Heating and Ventilation System," Revision 14
- 0-PT-213.18, "Valve Inservice Inspection (Service Water Discharge Valves)," Revision 4
- 2-PT-82.4A, "2H Diesel Generator Test (Start by ESF Actuation)," Revision 73
- 2-PT-75.2A, "Service Water Pump (2-SW-P-1A) Quarterly Test," Revision 56
- 0-PT-82.14, "SBO Diesel Generator Test (Start by Simulated Loss of Reserve Station Service Power)," Revision 29
- 1-PT-81.1A, "Emergency Diesel Generator Fuel Oil Transfer Pump 1-EG-P-1HA and 1-EG-P-1HB Quarterly Test," Revision 24 after replacement of 1-EG-P-1HA

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the six 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:

- 1-PT-71.3Q, "1-FW-P-3B, B Motor-Driven AFW Pump, and Valve Test," Revision 50

Other Surveillance Tests:

- 1-PT-14.2, "Charging Pump 1-CH-P-1B," Revision 54
- 2-PT-17.1, "Control Rod Operability," Revision 37
- 2-PT-82H, "2H Emergency Diesel Generator Slow Start Test," Revision 60
- 1-PT-36.5.3A, "Solid State Protection System Output Slave Relay Test (Train A)," Revision 36
- 2-PT-82H, "2H Emergency Diesel Generator Slow Start Test," Revision 62

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.1 Mitigating Systems PIsa. Inspection Scope

The inspectors performed a periodic review of the five 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 July 1, 2014 through June 30, 2015. Documents reviewed included applicable NRC inspection reports, licensee event reports, operator logs, station performance indicators, and related CRs. Other documents reviewed are listed in the Attachment to this report.

- Emergency AC Power System
- High Pressure Injection System
- Heat Removal System
- Residual Heat Removal System
- Cooling Water System

b. Findings

No findings were identified.

40A2 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 CR1003315, "Water in Conduit"

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions CR1003315, "Water in Conduit," 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 licensee procedure, PI-AA-200, "Corrective Action Program," Revision 28 and 10 CFR 50, Appendix B.

b. Findings and Observations

No findings were identified. 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.

.3 Annual Sample: Review of CR1005687, "2J EDG Expansion Tank Bacterial Growth"

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for CR1005687, "EDG Expansion Tank Bacterial Growth," 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 licensee procedure, PI-AA-200, "Corrective Action Program," Revision 28, and 10 CFR 50, Appendix B.

b. Findings and Observations

No findings were identified. 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.

40A3 Followup of Events and Notice of Enforcement Discretion

.1 (Closed) Licensee Event Report (LER) 05000338/2014-003-00, Technical Specification (TS) Required Shutdown due to Reactor Coolant System Pressure Boundary Leakage

a. Inspection Scope

The LER documented that the North Anna Unit 1 TS required the unit to be shutdown due to RCS pressure boundary leakage on December 23, 2014. The inspectors reviewed the LER and the associated corrective action document (CR 568000) to verify the accuracy and completeness of the LER and the appropriateness of the licensee's corrective actions. The inspectors also reviewed the LER and CR to identify any licensee performance deficiencies associated with the issue. Documents reviewed are listed in the Attachment to this report.

b. Findings

On December 22, 2014, the North Anna Unit 1 reactor power was reduced from 100% to 30% to allow containment entry into the RCS loop rooms to investigate an increased unidentified leak rate of 0.053 gallons per minute (gpm). During a containment walkdown, the licensee discovered steam coming from underneath the lagging on the 'B' RCS intermediate loop. The licensee's investigation identified a pressure boundary leak on the 'B' loop drain piping between the loop connection and 1-RC-68, the 'B' Loop Cold Leg Drain Isolation valve. At that time, the limiting condition for operation action statement of TS 3.4.13.b, RCS 1 gpm unidentified leakage, was entered, which required placing the unit in Mode 3 within 6 hours and Mode 5 within 36 hours. Due to the pressure boundary leakage, the event was reported at 0057 on December 23, 2014, in accordance with 10 CFR 50.72(b)(2), for "initiation of plant shutdown required by Technical Specifications" and 10 CFR 50.72(b)(3)(ii)(A) for "Any event or condition that results in the condition nuclear power plant including its principle safety barriers, being serious degraded." On December 23, 2014, the unit was placed in Mode 3, and at 1629 on December 23, 2014, the unit was placed in Mode 5.

The licensee determined that the cause of the through-wall leak in the 'B' loop drain line elbow was thermal fatigue of the elbow. Limitations in the industry generic model used to predict swirl penetration thermal fatigue in stagnant RCS branch lines allowed the Non-Destructive Examination (NDE) test frequency of the 'B' Loop drain line elbow to be set non-conservatively, which resulted in the thermal fatigue cracking to go unmonitored. The inspectors reviewed the licensee's root cause evaluation and the Electric Power Research Industry (EPRI) Material Reliability Program (MRP) 146, Management of Thermal Fatigue In Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines. The inspectors determined that the licensee has appropriately evaluated the two inch 'B' loop drain line elbow and implemented the NDE test frequency requirements in accordance with the licensee's commitments on the current industry EPRI MRP 146 standard guidelines. No violations of NRC ASME Code Section XI requirements were identified. The licensee is working with EPRI and industry peers to develop a new model and/or new guidance to better predict the impact of the thermal fatigue and other sources of thermal loading. Since the cause was not reasonably within the licensee's ability to foresee and correct, the inspectors concluded that there was no performance deficiency associated with this issue. The inspectors utilized available risk-informed tools to assess the safety significance of this RCS pressure boundary leakage issue and a detailed risk assessment for this issue was performed by a regional SRA in accordance with NRC Inspection Manual Chapter 0609 Appendix A. The major analysis assumptions included: a conservative one year exposure interval, the two inch break was considered a small loss of cooling accident (SLOCA), conditional core damage probability for SLOCA from the licensee's full scope NAPS PRA model, and conditional

rupture probability from EPRI report TR-111880. The result of the analysis was a risk increase for the condition of $1.4E-6$ /year, representing low to moderate safety significance.

Nonetheless, the inspectors determined a violation of TS occurred because it constituted pressure boundary leakage. North Anna TS Limiting Condition for Operation (LCO) 3.4.13.a requires, in part, that RCS leakage be limited to No PRESSURE BOUNDARY LEAKAGE, when in Modes 1, 2, 3 and 4. The associated action statement requires, in part, that with any (RCS) pressure boundary leakage, the unit be in Hot Standby within 6 hours and in Cold Shutdown within the following 36 hours. Contrary to the above, on December 23, 2014, it was discovered that RCS pressure boundary leakage did exist while the unit was in Modes 1, 2, 3 and 4; and that the unit was not placed in Hot Standby within 6 hours and in Cold shutdown within the following 36 hours. Although a violation of the TS occurred, the violation was not attributable to an equipment failure that was avoidable by reasonable licensee quality assurance measures or management controls. Therefore, the violation of TS 3.4.13.a was not associated with a licensee performance deficiency. The inspectors concluded that the violation would normally be characterized as Severity Level III in accordance with Enforcement Policy section 6.1.c. However, because the violation was not associated with a licensee performance deficiency and it was not avoidable by reasonable licensee QA measures or management controls, enforcement discretion (Enforcement Action (EA)-15-120) in accordance with Section 2.2.4.d and 3.5 of the Enforcement Policy was provided. The violation will not be considered in the assessment process or the NRC's Action Matrix. This issue was documented in the licensee's corrective action program as CR568000. Licensee corrective actions included the following:

- Performed an extent of condition NDE of all three cold leg loop drain lines for Unit 1. Results indicated low level craze cracking and a circumferential defect in the similar elbow on 'C' drain loop piping. No issues were found in the "A" drain loop piping.
- Replaced the cracked elbow from the 'B' loop drain piping.
- Provided the failed 'B' loop elbow/piping for materials failure analysis. The results of the evaluation are being used to confirm the direct cause of thermal fatigue and provide more insight on the failure mechanism.
- Performed an evaluation in accordance with ASME Section XI Sub-article IWB-3640, Evaluation Procedures and Acceptance Criteria for Austenitic Piping, of the Unit 1 'C' loop drain elbow. The results determined that it was acceptable to operate the unit until the Spring 2015 Refueling Outage (RFO), during which, the repairs were made.
- Discontinued taking RCS cold leg (T_c) chemistry samples. RCS chemistry samples are currently being taken from the hot leg (T_h).
- Informed the EPRI Materials Reliability Program of this failure, and continue to work with the industry on this and similar issues.

.2 (Closed) LER 05000338, 339/2015-003-00: Both Motor Driven Auxiliary Feedwater Pump House Fans Concurrently Tagged Out For Maintenance Due To The Design Basis Not Clearly Understood

On May 8, 2015, the licensee discovered that two AFW trains were inoperable for more than 12.5 hours and TS Action C.1 was not completed. TS 3.7.5 for Auxiliary Feedwater

System requires that three AFW trains be operable in Modes 1, 2, and 3. TS Action C.1 also requires that if two AFW trains are inoperable in Modes 1, 2, or 3, a required action places both units in Mode 3 within 6 hours. 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 CR579372, and resulted in Apparent Cause Evaluation, ACE19928.

4OA5 Other Activities

Review of the Operation of an Independent Spent Fuel Storage Installation – Selected Records Review (Inspection Procedure 60855 and Inspection Procedure 60855.1)

a. Inspection Scope

Inspectors reviewed the normal operation of the Independent Spent Fuel Storage Installation (ISFSI). The inspectors walked down the ISFSI pad to assess the material condition of the casks, the installation of security equipment, and the performance of monitoring systems. The inspector reviewed procedure 0-OP-4.54, "Transfer Cask/Dry Shielded Canister Transfer to ISFSI and Dry Shielded Canister Transfer Cask to Horizontal Storage Module," Revision 9. The inspector reviewed applicable procedures documented in the attachment. The inspector reviewed records pertaining to each fuel assembly placed in casks which were most recently transferred to the ISFSI.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On October 14, 2015, the resident inspectors presented the inspection results to Mr. F. Mladen 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 violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy, being for dispositioned as a NCV:

Technical Specification (TS) 3.7.5 for Auxiliary Feedwater System requires that three AFW trains be operable in Modes 1, 2, and 3. TS Action C.1 also requires that if two AFW trains are inoperable in Modes 1, 2, or 3, a required action places both units in Mode 3 within 6 hours. Contrary to the above, on May 8, 2015, the licensee discovered that two motor-driven AFW (MDAFW) trains were inoperable for more than 12.5 hours and TS Action C.1 was not completed. Using Manual Chapter 0609, Attachment 4, "Initial Characterizations of Findings," Table 2, dated July 1, 2012 and Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings at-Power," Exhibit 2, dated July 1, 2012, the inspectors determined a detailed risk evaluation was

required because the finding represented both MDAFW out of service exceeding its allowed outage. A Detailed SDP risk evaluation was performed by a regional SRA in accordance with the guidance of NRC IMC 0609, Appendix A, using the latest NRC North Anna SPAR risk model. The major analysis assumptions included: a one day exposure period, both MDAFW pumps assumed to fail to run with no ventilation available, and no recovery credit applied, for a twenty four hour mission time. A sensitivity analysis was run with a seven day mission time and recovery credit allowed. Both analyses determined the increase in Δ CDF due to the performance deficiency was $< 1.0E-6$ /year a GREEN finding of very low safety significance. The dominant sequence for both analyses was a Reactor Trip Initiator with a Loss of the Condenser Heat Sink (IE-LOCHS), failure of Main Feedwater (MFW), failure of AFW, and failure of the operator to implement Feed and Bleed cooling leading to core damage. MFW was failed due to loss of condensate. MDAFW was failed due to the PD and the Turbine Driven AFW (TDAFW) was a random failure to run. The risk was mitigated by the availability of TDAFW and the short exposure period.

This issue was entered into the licensee's CAP as CR579372, and resulted in Apparent Cause Evaluation, ACE19928, that determined additional training was required for licensee personnel to develop sensitivity to auxiliary equipment required to maintain operability of safety related systems that is not specifically mentioned in the Technical Specifications.

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

Closed

05000338/2015-001-00	LER	Technical Specification (TS) Required Shutdown due to Reactor Coolant System Pressure Boundary Leakage (Section 4OA3.1)
05000338, 339/2015-003-00	LER	Both Motor Driven Auxiliary Feedwater Pump House Fans Concurrently Tagged Out For Maintenance Due To The Design Basis Not Clearly Understood (Section 4OA3.2)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Procedure 2-MOP-6.02, "Removal From and Return to Service of 2H and 2J Emergency Diesel Generator Air Compressors and Air Dryers," Revision 9
Work Order 59101673419, "6 Year Emergency Diesel Inspection," November 13, 2009
Drawing No. 12050-FM-107A, "Flow/Valve Operating Number Diagram Emergency Diesel Air Service System, North Anna Power Station, Unit 2," Revision 13
Procedure 2-OP-6.7, "Diesel Air System," Revision 19
Procedure 2-PT-230.1, "2H Emergency Diesel Generator Starting Air Subsystem (Compressor, Motor, Dryer, Aftercooler, and Lister Diesel) Operability Test – Train A," Revision 9
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
System Health reports instrument air dated Q2-2015
1-AP-28, "Loss of Instrument Air," Revision 35

Section 1R05: Fire Protection

Procedure 1-Log-17, "Unit 1 & 2 Control Room Boundary Breaching Log," Revision 8
Procedure GMP-E-146, "Cable and Pipe Penetration Silicone Foam Installation and Repair," Revision 9
Procedure 0-PT-104.1.4E, "Fire Protection System – Fire Barriers," Revision 9
Procedure 0-FS-CT-1, "Cable Tray Spreading and Battery Room 2-1, 1-1, 2-3, 1-3," Revision 3
Procedure 1-FS-AB-1, "Auxiliary Building (All Elevations) Fire Fighting Strategy Safe Shutdown Equipment," Revision 6
Procedure 0-FS-S-4, "Loss Prevention Fire Strategy," Revision 5
Procedure MA-AA-105, "Scaffolding," Revision 15
CR1006492, "Simplex Smoke Detector Alarm"
Loss Prevention Fire Strategy, 1-FS-QS-1, "Quench Spray Building (SG-74) Unit 1," Revision 5
Loss Prevention Fire Strategy, 1-FS-MS-1, "Main Steam Valve House (All Elevations)," Revision 6

Section 1R06: Flood Protection Measures

Procedure 0-MPM-1207-01, "Quarterly Pumping of Security and Electrical Cable Vaults," Revision 20
Procedure 0-MPM-1207-03, "Semi-Annual Pumping of Security and Electrical Cable Vaults," Revision 7
Procedure 0-MPM-1207-04, "Annual Pumping of Security and Electrical Cable Vaults," Revision 8

Section 1R11: Licensed Operator Regualification Program

Procedure 1-AP-38, "Excessive Load Increase," Revision 19
Procedure E-0, "Reactor Trip or Safety Injection," Revision 49
Procedure 1-AP-4.3, "Malfunction of Nuclear Instrumentation (Power Range)," Revision 21

Section 1R12: Maintenance Effectiveness

Condition Report CR1003106, "2-CH-P-1B outboard seal leaking 2 dpm"

Corrective Action CA003451, "Other to Eng to determine charging pump seal leakage threshold value"

Corrective Action CA3002569, "Perform Boric Acid Review" on CR1003106

CR563699, "2-SW-TCV-202C adjusted to clear 2C-B6 Annunciator during 2PT-14.3"

CR546834, "2-SW-TCV-202C very slow to open on U2 'C' charging pump start"

CR515507, "2-SW-TCV-202C slow to respond during 2-CH-P-1C pump start"

CR513530, "2-SW-TCV-202C 'C' charging pump oil TCV required adjustment"

CR1000323, "Service water spray array 1B1 MOV 1-SW-MOV-121B is leaking by while in the closed position"

CR1000360, "1-SW-MOV-121B does not close fully"

Work Order 59102877744

CR1003676, "1-FP-P-10 failed to start on 1 battery"

Section 1R15: Operability Determinations and Functionality Assessments

Condition Report, CR1004337, "During performance of 2-PT-82H. 2-EE-EG-2H #8 cylinder developed coolant leak."

Condition Report, CR021190, "#4 Cylinder liner on 1-EE-EG-1J has indication of a crack"

Engineering Log Entry, July 28, 2015 at 19:22 addressing Technical Specification Common Cause Failure Mechanism of 2J Emergency Diesel Generator

NRC Information Notice No. 85-32: Recent Engine Failures of Emergency Diesel Generators, April 22, 1985

NRC Information Notice No. 2007-27: Recurring Events Involving Emergency Diesel Generator Operability, August 6, 2007

Licensee Event Report, LER2511990012, Turkey Point Unit 4, "4B Emergency Diesel Generator (DG) Water Leak Due to Manufacturing Defect Could Prevent DG from Performing Intended Safety Function," December 21, 1990

Licensee Event Report, LER2491996016, Dresden Unit 3, "Dresden Unit 3 Inability to meet Technical Specification 3.9 Limiting Condition for Operation due to Redundant Emergency Diesel Generators Inoperable," October 15, 1996

Licensee Event Report, LER2472002006, Indian Point 2, "Two of Three Emergency Diesel Generators Inoperable due to Component Failures; a Condition Prohibited by Tech Specs," October 9, 2002

Licensee Event Report, LER2712014001, Vermont Yankee, "Inoperable Emergency Diesel Generator due to Hydraulic Lock from Internal Jacket Cooling Water Leak," September 29, 2014

Licensee Event Report, LER2982014002, Cooper Station, "Jacket Water Leak into Emergency Diesel Generator Engine Results in Condition Prohibited by Technical Specification and Loss of Safety Function," October 7, 2013

Condition Report, CR1002368, "1-SW-MOV-122B leakage present following hand torque"

Prompt Operability Determination, CA3001996, "1-SW-MOV-121B, 1-SW-MOV-122B, 1-SW-MOV-222A have been identified as leaking by," July 17, 2015

Procedure 0-OP-49.6, "Service Water System Throttling Alignment," Revision 23

Calculation ME-0317, Attachment 8.1, "Service Water Motor Operated Valve Operating Torque Requirements," Revision 5

Calculation ME-0317, Addendum F, Attachment 2, Revision 0

Procedure 0-GEP-19, "MOV Hand Torque Calculation," Revision 0

Condition Report, CR 579372, "Both Motor Driven AFW Pumphouse fans tagged for preventative maintenance"

Apparent Cause Evaluation, ACE019928, "Both Motor Driven AFW Pumphouse fans (2-HV-F-70A and 2-HV-F-70B) concurrently tagged out for maintenance,"
 Corrective Action CA302864, Previous Operability, "Regarding CR579372, simultaneous vent fan tag-outs were reviewed (both Units) over the last 3 years"
 Calculation 11715/12050, "Auxiliary Feedwater Pump House Ventilation," February 18, 1984
 Operating Log Search for Motor Driven AFW Pumphouse fans (2-HV-F-70A and 2-HV-F-70B) for the date range October 1, 2000 to May 8, 2015

Section 1R19: Post Maintenance Testing

Procedure 2-OP-21.4, "Building Heating and Ventilation System," Revision 14
 Tagout Coversheet for 2-HV-F-70B, "Auxiliary Feedwater Pump House Exhaust Fan," September 18, 2015
 Condition Report CR1001533, "1-SW-MOV-122B is leaking by"
 Trouble Shooting Plan, "B" SW header spray MOV leak by trouble shooting to support SW array piping replacement work
 Operating and Maintenance Instructions, Contromatics 150 Class Butterfly Valve
 Procedure 0-PT0213.18, "Valve In-service Inspection (Service Water Discharge Valves)," Revision 4
 Work Order WO54102752577, January 15, 2015
 Drawing 1101201-12050-ESK-6EW, "Elementary Diagram, Service Water Reservoir, Spray MOV-SW-222A," Revision 5

Section 1R22: Surveillance Testing

Procedure 2-PT-82H, "2H Emergency Diesel Generator Slow Start Test," Revision 60
 Work Order WO823735
 Procedure 2-PT-17.1, "Control Rod Operability," Revision 37
 Work Order WO59102827944
 Condition Report CR1005938, "Unclear Instructions in 2-PT-17.1 for Rod E11 Position"
 Corrective Action CA3004915, "Engineering to revise 2-PT-17.1 to provide clear acceptance criteria for Rod E11 position"
 Procedure 1-PT-14.2, "Charging Pump 1-CH-P-1B," Revision 54
 Work Order WO59102832206
 Procedure 1-PT-71.3Q, 1-FW-P-3B, B Motor-Driven AFW Pump, and Valve Test, Revision 50
 Work Order 59102797920
 CR1003315, "Water coming out of conduit"
 Procedure, 1-OP-8.3, "Boron Concentration Control," Revision 34

Section 4OA1: Performance Indicator Verification

North Anna Power Station Engineering Department MSPI and WANO Data for July, 2014
 North Anna Power Station Engineering Department MSPI and WANO Data for August, 2014
 North Anna Power Station Engineering Department MSPI and WANO Data for September, 2014
 North Anna Power Station Engineering Department MSPI and WANO Data for October, 2014
 North Anna Power Station Engineering Department MSPI and WANO Data for November, 2014
 North Anna Power Station Engineering Department MSPI and WANO Data for December, 2014
 North Anna Power Station Engineering Department MSPI and WANO Data for January, 2015
 North Anna Power Station Engineering Department MSPI and WANO Data for February, 2015
 North Anna Power Station Engineering Department MSPI and WANO Data for March, 2015
 North Anna Power Station Engineering Department MSPI and WANO Data for April, 2015
 North Anna Power Station Engineering Department MSPI and WANO Data for May, 2015
 North Anna Power Station Engineering Department MSPI and WANO Data for June, 2015

Section 40A2: Problem Identification and Resolution

Condition Report, CR1007597, "2J EDG Coolant Expansion Tank level increased by 1.25" from 9.5 to 10.75" since yesterday's logs," August 26, 2015
 Corrective Action, CA30046660, "Determine/initiate required actions to address expansion tank level increase (2-EE-EG-2J)," August 18, 2015
 Condition Report, CR1005687, "2J EDG Coolant expansion tank level has increased possibly due to a micro biological issue," August 8, 2015
 Condition Report, CR557188, "Unit 2 H and Unit 1 J EDG jacket water elevated biological activity," August 28, 2014
 Apparent Cause Evaluation ACE019785, "Continued increasing trend 2H-EDG coolant level," August 19, 2014
 Condition Report, CR556475, "Continued increasing trend 2H-EDG coolant level," August 19, 2014
 Corrective Action, CA243603, "CA to Eng to document results of sampling and recommend/initiate any additional actions," October 23, 2012
 ECOLAB Report Number 705159 for 1J EDG Sample, Analytical Report, September 17, 2012
 Condition Report, CR486990, "Unexplained level increase in 1J EDG coolant level," September 5, 2012
 Apparent Cause Evaluation ACE013855, "2H EDG coolant expansion tank level increasing," April 16, 2009

Section 40A5: Other Activities

Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 8
 Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 7
 Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 6
 Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 5
 Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 4
 Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 3
 Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 2
 Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 1
 Radiation Protection, RP-AA-201, Access Controls for High and Very High Radiation Areas, Revision 0
 Health Physics, 0-HSP-ISIFSI-002, "Nuhoms Dry Spent Fuel Storage System; Preparation, Loading, Transport, and Technical Specifications Surveillances Surveys," Revision 5
 Health Physics, 0-HSP-ISIFSI-002, "Nuhoms Dry Spent Fuel Storage System; Preparation, Loading, Transport, and Technical Specifications Surveillances Surveys," Revision 4
 Health Physics, 0-HSP-ISIFSI-002, "Nuhoms Dry Spent Fuel Storage System; Preparation, Loading, Transport, and Technical Specifications Surveillances Surveys," Revision 3
 Health Physics, 0-HSP-ISIFSI-002, "Nuhoms Dry Spent Fuel Storage System; Preparation, Loading, Transport, and Technical Specifications Surveillances Surveys," Revision 2
 Health Physics, 0-HSP-ISIFSI-002, "Nuhoms Dry Spent Fuel Storage System; Preparation, Loading, Transport, and Technical Specifications Surveillances Surveys," Revision 1

Health Physics, 0-HSP-ISIFSI-002, "Nuhoms Dry Spent Fuel Storage System; Preparation, Loading, Transport, and Technical Specifications Surveillances Surveys," Revision 0

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 8

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 7

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 6

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 5

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 4

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 3

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 2

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 1

Radiation Protection, RP-AA-202, "Radiological Posting," Revision 0

Health Physics, C-HP-1032.080, "Controlled Area and Restricted Area Radiological Surveys," Revision 9

Health Physics, C-HP-1032.080, "Controlled Area and Restricted Area Radiological Surveys," Revision 8

Health Physics, C-HP-1032.080, "Controlled Area and Restricted Area Radiological Surveys," Revision 7

Health Physics, C-HP-1032.080, "Controlled Area and Restricted Area Radiological Surveys," Revision 6

Health Physics, C-HP-1032.080, "Controlled Area and Restricted Area Radiological Surveys," Revision 5

Health Physics, C-HP-1032.080, "Controlled Area and Restricted Area Radiological Surveys," Revision 4

Health Physics, C-HP-1032.080, "Controlled Area and Restricted Area Radiological Surveys," Revision 3

Operating Procedure, 0-OP-4.54, "Transfer Cask/Dry Shielded Canister Transfer To ISFSI and Dry Shielded Canister Transfer From Transfer Cask To Horizontal Storage Module," Revision 9

Operations Periodic Test, 0-PT-4.51, "Horizontal Storage Module Thermal Performance Verification," Revision 2

ISFSI Alarm logs

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
DAW	Dry Active Waste
DOT	U.S. Department of Transportation
ED	Electronic Dosimeter
EDG	Emergency Diesel Generator
HRA	high radiation area
IMC	Inspection Manual Chapter
IP	Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
JPM	Job Performance Measures
LHRA	Locked High Radiation Area
LHSI	Low Head Safety Injection
NCV	Non-cited Violation
NEI	Nuclear Energy Institute
No.	Number
NRC	Nuclear Regulatory Commission
NSTS	National Source Tracking System
OD	Operability Determination
ODCM	Off-site Dose Calculation Manual
PARS	Publicly Available Records
PCM	Personnel Contamination Monitor
PCP	Process Control Program PI
PI	Performance Indicator
PRT	Pressurizer Relief Tank
QS	Quench Spray
RCA	Radiologically Controlled Area
RCE	Root Cause Evaluation
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring Program
Rev.	Revision RTP Rated Thermal Power
RFO	Refueling Outage
RS	Radiation Safety
SBO	Station Blackout
SDP	Significance Determination Process
SFP	Spent Fuel Pool
SR	Surveillance Requirements
TDAFWP	Turbine Driven Auxiliary Feedwater Pump
TLDs	thermoluminescent dosimeters
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