



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

May 8, 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 05000338/2015001 and 05000339/2015001

Dear Mr. Heacock:

On March 31, 2015, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station, Units 1 and 2. On April 22, 2015, 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.

Nuclear Regulatory Commission inspectors documented one self-revealing finding of very low safety significance (Green) in this report which was determined to involve a violation of NRC requirements. The NRC is treating this finding as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy.

If you wish to contest this 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.

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

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

Sincerely,

**/RA/**

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

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

Enclosure:  
IR 05000338/2015001 and 05000339/2015001  
w/ Attachment: Supplementary Information

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/RA/

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Letter to David A. Heacock from Steven D. Rose dated May 8, 2015.

SUBJECT: NORTH ANNA POWER STATION – NRC INTEGRATED INSPECTION  
REPORT 05000338/2015001 AND 05000339/2015001

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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: 05000338/2015001 and 05000339/2015001

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: North Anna Power Station, Units 1 & 2

Location: Mineral, Virginia 23117

Dates: January 1, 2015 through March 31, 2015

Inspectors: G.Kolcum, Senior Resident Inspector  
G. Skaggs Ryan, Resident Inspector  
R. Carrion, Senior Reactor Engineer, Section 1R08  
R. Hamilton, Senior Health Physicist, Section 2RS1

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

Enclosure

## SUMMARY

IR 05000338/2015-001, 05000339/2015-001; 01/01/2015 – 03/31/2015; North Anna Power Station, Units 1 and 2. Maintenance Effectiveness.

The report covered a three-month period of inspection by resident inspectors and senior operations engineers from the region. One self-revealing finding was identified and was determined to be a non-cited violation (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspect was determined using IMC 0310, "Components Within the Cross Cutting Areas." All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 5, 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, dated February 2014.

Cornerstone: Barrier Integrity

- Green. A self-revealing NCV of 10 CFR 50 Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for the licensee's failure to follow work management procedures. Specifically, the licensee failed to follow the conduct of maintenance procedure, MM-AA-100, "Conduct of Maintenance," Revision 10, where maintenance personnel should use an assortment of techniques and tools to avoid errors during work execution. Attachment 6 step 1b outlines various human error prevention techniques that should have been used during the work execution including "self checking" and "questioning attitude." This issue was entered into the licensee's corrective action program as CR 567185.

The licensee's failure to follow the conduct of maintenance procedure, MM-AA-100, "Conduct of Maintenance," Revision 10, was a performance deficiency. Specifically, on December 10, 2014, maintenance personnel failed to effectively use human error prevention tools when performing the maintenance on the Refueling Water Storage Tank (RWST) level channels which resulted in a loss of the safety function of the Recirculation Spray (RS) system. The performance deficiency was more than minor because it was associated with the configuration control attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to ensure that the physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events and is therefore a finding. Specifically, the RS system safety function was inadvertently rendered inoperable. The inspectors performed a Phase 1 analysis using the IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power", Exhibit 3 "Barrier Integrity Screening Questions," dated June 19, 2012 and Appendix H, "Containment Integrity Significance Determination Process," dated May 6, 2004, and determined the finding required a detailed risk evaluation because it involved the loss of safety function of the RS system.

A detailed risk evaluation was performed in accordance with NRC Inspection Manual Chapter (IMC) 0609, Appendix A by a regional senior reactor analyst using the latest NRC North Anna SPAR model and Sapphire risk program. The major analysis assumptions included: a thirty-two minute exposure interval, and a non-recoverable loss of both inside

recirculation spray pumps and both outside recirculation pumps. The dominant risk sequence was a small break loss of coolant accident initiator, success of the reactor protection system, success of feedwater, success of high pressure injection, success of secondary side cooldown and failure of recirculation spray resulting in loss of core and containment heat removal capability. The risk was mitigated by the short exposure period. The risk evaluation result was an increase in core damage frequency of  $<1 \text{ E-6/year}$  and an increase in large early release fraction of  $<1 \text{ E-7/year}$ , a GREEN finding of very low safety significance.

The finding has a cross-cutting aspect in the area of human performance associated with the work management attribute because the organization failed to implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. Furthermore, the licensee work process control includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, due to poor communication and coordination between the Control Room and the technicians calibrating the RWST level channels, and amongst the team of technicians calibrating the RWST level transmitters, the RS system was inoperable [H.5] (1R12).

## REPORT DETAILS

### Summary of Plant Status

Unit 1 entered a forced outage due to a leak in a Reactor Coolant System (RCS) drain pipe on December 22, 2014. Unit 1 began the period at full Rated Thermal Power (RTP) and operated at full power until the Unit experienced an automatic trip on February 26, 2015, due to a circuit card failure on 'B' main feed regulating valve for 'B' steam generator level control. Unit 1 restarted on February 28, 2015, and returned to ninety percent power on March 2, 2015. Unit 1 went off line on March 7, 2015, for the planned spring refueling outage. Unit 1 started up on March 28 and returned online March 29, 2015, and returned to full RTP on March 30, 2015.

Unit 2 began the period at full RTP and operated at full power for the entire report period.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection

##### .1 External Flooding

###### a. Inspection Scope

The inspectors assessed the external flood vulnerability of the North Anna for the fuel transfer pump building. The inspectors verified the condition of the emergency flood protection dike between the service water pond, and the plant and related drainage ditches and culverts, in addition to the west side flood protection dike. The inspectors also reviewed applicable station procedures and design documents to assess proper surveillance and maintenance for external flood protection features.

###### b. Findings

No findings were identified.

##### .2 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 56, 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 risk-significant areas listed below on two occasions to verify compliance with procedural requirements and to verify that the specified actions provided the necessary protection for the applicable structures, systems, or components (SSCs). 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 Rooms and Station Blackout (SBO) Diesel on January 7, 2015 with weather in the teens
- Unit 1 and 1 Emergency Diesel Generator room and the SBO Emergency Diesel Generator on February 15, 2015 with temperatures below 15 degrees Fahrenheit

b. Findings

No findings were identified.

.3 Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed a site specific weather related inspection due to anticipated adverse weather conditions. On February 2, 2015, the inspectors reviewed the licensee response to high wind warnings of 25 to 35 miles an hour with gusts up to 40 miles an hour for the area. Specifically, the inspectors reviewed licensee adverse weather response procedures, including O-AP-41, "Severe Weather Conditions," Revision 61, 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 seven equipment alignment partial walkdowns, listed below, to evaluate the operability of selected redundant trains or backup systems with the other train or system inoperable or out of service. The inspectors reviewed the functional systems descriptions, Updated Final Safety Analysis Report (UFSAR), system operating procedures, and Technical Specifications (TS) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify the operability of a redundant or backup system/train or a remaining operable system/train with a high risk significance for the current plant configuration (considering out-of-service, inoperable, or degraded condition); or a risk-significant system/train that was recently realigned following an extended system outage, maintenance, modification,

or testing; or a risk-significant single-train system. The inspector conducted the reviews to ensure that critical components were properly aligned, and to identify any discrepancies which could affect operability of the redundant train or backup system.

- Unit 1 Auxiliary Feedwater (AFW) Terry Turbine during startup preparations after refueling
- Unit 1 Motor-Driven AFW trains 'A' and 'B' during startup preparations after refueling
- 1H and 1J Emergency Diesel Generators (EDGs) during startup preparations after refueling
- Unit 1 component cooling heat exchangers after maintenance on 'A' component cooling heat exchanger
- 1H EDG fuel oil transfer system
- Unit 1 charging pumps during maintenance on 'B' charging pump
- Unit 2 'B' low head safety injection pump

b. Findings

No findings were identified

.2 Complete Walkdown

a. Inspection Scope

The inspectors performed a detailed walkdown and inspection of the Unit 1 AFW system to assess proper alignment and to identify discrepancies that could impact its availability and functional capacity. The inspectors assessed the physical condition and position of each recirculation spray and casing cooling valve, whether manual, power operated or automatic, to ensure correct positioning of the valves. The inspection also included a review of the alignment and the condition of support systems including fire protection, room ventilation, and emergency lighting. 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

.1 Quarterly Fire Protection Walkdowns

a. Inspection Scope

The inspectors conducted focused tours of the five areas listed below that are important to reactor safety to verify the licensee's implementation of fire protection requirements as described in fleet procedures CM-AA-FPA-100, "Fire Protection/Appendix R (Fire Safe Shutdown) Program," Revision 10, CM-AA-FPA-101, "Control of Combustible and Flammable Materials," Revision 6, 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.

- Main Control Room
- Unit 1 Emergency Switchgear Room
- Emergency Diesel Generators 1H and 2H
- Emergency Diesel Generators 1J and 2J
- Battery Rooms

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Internal Flooding

a. Inspection Scope

The inspectors assessed the internal flooding vulnerability of the two flood areas listed below 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.

- Unit 1 AFW Pump House
- Fuel Oil Pump House

b. Findings

No findings were identified.

1R07 Heat Sink Performance

System Heat Exchangers

a. Inspection Scope

The inspectors selected the risk significant Unit 1 'B' Charging Pump Lube Oil Heat Exchangers (HXs) for the 1B Gear Box Lube Oil Cooler and reviewed inspection records, test results, maintenance work orders, and other documentation to ensure that deficiencies which could mask or degrade performance were identified and corrected.

The test procedures and records were also reviewed to verify that they were consistent with Generic Letter 89-13 licensee commitments, and Electric Power Research Institute (EPRI) Heat Exchanger Performance Monitoring Guidelines. In addition, the inspectors reviewed inspection documentation of the related service water piping to assess general material condition and to identify any degraded conditions. Documents reviewed included Virginia Power Administrative Procedure (VPAP) -0811, "Service Water Inspection and Maintenance Program," Revision 6, and licensee procedure ER-AA-HTX-1003, "Heat Exchanger Monitoring and Assessment," Revision 6.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

From March 19 – 23, 2015, the inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system boundary, risk-significant piping and component boundaries, and containment boundaries in Unit 1.

The inspectors either directly observed or reviewed the following non-destructive examinations (NDEs) mandated by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code of Record: 2004 Edition with 2006 Addenda) to evaluate compliance with the ASME Code, Section XI and Section V requirements, and if any indications or defects were detected, to evaluate if they were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement. (Note: The Code of Record for IWE and IWL is the 2001 Edition with 2003 Addenda.) The inspectors also reviewed the qualifications of the NDE technicians performing the examinations, to determine whether they were current and in compliance with the ASME Code requirements.

- Ultrasonic Testing (UT), Weld 11715-WMKS-0102C/16-WFPD-22/18A, Elbow to Nozzle Weld, Class 2 (observed)
- Magnetic Particle Testing (MT), Weld 11715-WMKS-RC-E2/1-RC-E-2/8, Pressurizer Integral Attachment (reviewed)
- Penetrant Testing (PT), Weld 11715-WMKS-0110A/4-RC-34/1H, Pressurizer Integral Attachments (Lugs) (reviewed)
- PT, Weld 11715-WMKS-0104B/12-SI-14/41A, Pipe to Pipe (reviewed)
- UT, Weld 11715-WMKS-0102D/16-WFPD-17/51A, Pipe to Pipe (reviewed)
- UT, Weld 11715-WMKS-0104B/12-SI-14/41A, Pipe to Pipe (reviewed)
- UT Weld 11715-WMKS-0102C/16-WFPD-22/18A, Elbow to Nozzle reviewed)
- Visual Testing (VT)-15-024, Restraint 11715-WMKS-0103AT/2-CH-96/R24 (reviewed)

- VT-15-032, Restraint 11715-WMKS-01031B/32-SHP-1/R44 (reviewed)
- Phased array UT, Weld 11715-WMKS-RC-E-1A.2/29-RC-1/N-SE29IN, "A" SG Hot Leg WOR (Weld Overlay Repair) (reviewed)
- Phased array UT, Weld 11715-WMKS-RC-E-1B.2/29-RC-4/N-SE29IN, "B" SG Hot Leg WOR (reviewed)
- Phased array UT, Weld N-SE31 IN, "B" SG Cold Leg DM Weld (reviewed)
- Phased array UT, Weld N-SE31 IN, "C" SG Cold Leg DM Weld (reviewed)

The inspectors reviewed the following welding activities to evaluate compliance with procedures, and the ASME Code Section XI and Section IX requirements. Specifically, the inspectors reviewed the associated work orders, repair and replacement plans, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- Replacement of 3" Velan Check Valve, Class 1 (reviewed)
- Canopy Seal Weld Repair, 1-RC-64, Class 1 (reviewed)
- Valve Replacement of 1-CH-302, 4B Seal Water Injection Filter Inlet Isolation Valve (reviewed)
- Permanent Shielding for Charging Letdown Piping (reviewed)
- Replacement of 2" Elbow on "C" Loop Drain Line. (reviewed)

During non-destructive surface and volumetric examinations performed since the previous refueling outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service; therefore, no NRC review was completed for this inspection procedure attribute.

#### Pressurized Water Reactor Vessel Upper Head Penetration Inspection Activities

The inspectors verified that for the Unit 1 vessel head, a bare metal visual (BMV) examination and a volumetric examination were not required during this outage, in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D). The inspectors also reviewed the licensee's Alloy 600 Management Plan, to verify the implemented strategy provides reasonable assurance that plant safety will be maintained.

The licensee did not identify any relevant indications that were accepted for continued service during the previous BMV exams. Additionally, the licensee did not perform any welding repairs to the vessel head penetrations since the beginning of the last Unit 1 refueling outage; therefore, no NRC review was completed for these inspection procedure attributes.

#### Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the licensee's boric acid corrosion control program (BACCP) activities to ensure implementation with commitments made in response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," and applicable industry guidance documents. Specifically, the inspectors performed an onsite record review of procedures, and the results of the

licensee's containment walkdown inspections performed during the current spring refueling outage. The inspectors also interviewed the BACCP owner, conducted an independent walkdown of containment to evaluate compliance with licensee's BACCP requirements, and verified that degraded or non-conforming conditions, such as boric acid leaks, were properly identified and corrected in accordance with the licensee's BACCP, and corrective action program (CAP). The inspectors also reviewed the BACCP health reports since the last Unit 1 outage to evaluate program trends.

The inspectors reviewed the following engineering evaluations completed for evidence of boric acid leakage, to determine if the licensee properly applied applicable corrosion rates to the affected components; and properly assessed the effects of corrosion induced wastage on structural or pressure boundary integrity in accordance with the licensee procedures.

- Inservice Inspection Indication Evaluation Record for Code Case N-566-2 Compliance, Initiating Condition Report: 573530
- Inservice Inspection Indication Evaluation Record for Code Case N-566-2 Compliance, Initiating Condition Report: 573571

The inspectors reviewed the following condition reports (CRs) and associated corrective actions related to evidence of boric acid leakage, to evaluate if the corrective actions completed were consistent with the requirements of the ASME Code and 10 CFR Part 50, Appendix B, Criterion XVI.

CR 568076, Boric Acid Discovered at 1-IC-26  
 CR 568077, Boric Acid Discovered at 1-IC-1  
 CR 568078, Boric Acid Discovered at 1-IC-4  
 CR 568080, Boric Acid Discovered at 1-RC-1053  
 CR 568082, Boric Acid Discovered at 1-RC-1057  
 CR 568083, Boric Acid Discovered at Union Associated with 1-RC-RV-1  
 CR 568084, Boric Acid Discovered at 1-CH-332  
 CR 568107, Boric Acid Leakage Discovered at 1-SS-TV-109B  
 CR 568109, Boric Acid Leakage Discovered at 1-RC-69  
 CR 568119, Boric Acid Leakage Discovered at 1-CH-360  
 CR 568121, Boric Acid Leakage Discovered at Various Components  
 CR 568125, Boric Acid Leakage Discovered at Various Components

#### Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the CAP to determine if the licensee had appropriately described the scope of the problem, and had initiated corrective actions. The review also included the licensee's consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements.

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 January 14, 2015, during a simulator scenario which involved a steam generator tube rupture and an emergency boration for a reactor failing to trip. The scenario required classifications and notifications that were counted for NRC performance indicator input.

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

b. Findings

No findings were identified.

.2 Quarterly Control Room Operator Performance Observations

a. Inspection Scope

During the inspection period, the inspectors conducted four 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:

- During SBO EDG surveillance on January 23, 2015
- During 2J EDG Surveillance on February 10, 2015
- On March 26, 2015 during Unit 1 startup activities, from Mode 4 to Mode 3
- On March 27, 2015 during Unit 1 startup activities from Mode 3 to Mode 2

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

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

- CR568982, "Drive gear broken on 1-SW-230"
- CR568951, "Hydro Test Pump speed control constant at varying outputs"
- CR567185, "Two channels of U1 RWST level removed from service during calibrations"

b. Findings

Introduction: A Green self-revealing NCV of 10 CFR 50 Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for the licensee's failure to follow work management procedures. Specifically, the licensee failed to follow the conduct of maintenance procedure, MM-AA-100, "Conduct of Maintenance," Revision 10, where maintenance personnel should use an assortment of techniques and tools to avoid errors during work execution. Attachment 6 step 1b outlines various human error prevention techniques that should have been used during the work execution including 'self checking' and 'questioning attitude.'

Description: On December 10, 2014, the licensee was performing planned level transmitter calibrations for Level Channel I instrument loop (1-QS-L-100C) and Channel II instrument loop (1-QS-L-100D), for Unit 1 Refueling Water Storage Tank (RWST). The RWST is the suction source for all Emergency Core Cooling System pumps during the injection phase of a LOCA. There are three RWST level channels that feed the logic for auto-starting the Recirculation Spray (RS) system. The RS system is designed to



lower containment pressure for a loss of coolant accident (LOCA) by spraying water from the sumps in containment back into the containment atmosphere. As an event progresses, the RWST level will decrease, and water collects in the containment sumps. The RS system is initiated with the receipt of Containment Pressure High-High signal coincident with RWST Level-Low. With Containment Pressure High-High, and two of the three RWST level channels indicate RWST level low, the actuation logic to auto-start the RS system is satisfied.

TS 3.3.2, condition D, allows one RWST level channel to be inoperable at any time. During maintenance or surveillance activities, to satisfy TS 3.3.2, condition D, only one level channel is placed in trip for calibration at a time. However, on December 10, 2014, two required RWST level channels were inadvertently made inoperable due to concurrent channel level calibration work. The channel calibration work was briefed with emphasis to remove one level transmitter at a time; however there was no discussion about which channel calibration would be performed first: 1-QS-L-100C or 1-QS-L-100D. Due to communication and coordination errors in the work control process, two work packages were worked simultaneously. The channel calibration work is conducted in two locations, the instrument rack and locally at the RWST. The technicians at the instrument rack proceeded to trip 1-QS-L-100D for calibration, per the TS3.3.2 condition D action. The technicians at the RWST proceeded to isolate and drain the second channel, 1-QS-L-100C, for calibration, resulting in a low level indication for another tripped channel. Because of the condition of two inoperable RWST level channels, the station no longer met the requirements of TS 3.3.2 and had to enter TS 3.0.3 because TS 3.3.2 does not contain an action for two inoperable RWST level channels.

Additionally, the station entered TS 3.6.7, condition F, for three or more RS subsystems inoperable. The required action for TS 3.6.7, condition F, is to enter LCO 3.0.3. The RS system is comprised of four subsystems, and the pump suction source is the sumps in containment. All four RS subsystems were inoperable because part of the actuation logic to auto-start the system was satisfied due to two tripped RWST level channels, meaning the RS system would actuate immediately on Containment Pressure High-High. In the condition described, the RWST level-low did not mean that the RWST water was in the sumps. The RS suction source was severely reduced. Therefore, if the RS system was actuated on a Containment Pressure High-High indication, the RS subsystem pumps would auto-start and there would not be sufficient water for pump suction. The RS pumps would operate with reduced suction source until manually turned off by the operators, and therefore, all four RS subsystems were inoperable. The inspectors reviewed Procedure MM-AA-100 "Conduct of Maintenance," Revision 10, which provided the requirements for the conduct of maintenance process. Attachment 6 step 1b outlines various human error prevention techniques that should have been used during the work execution including 'self checking' and 'questioning attitude.' The inspectors concluded that the maintenance personnel did not use human error prevention tools when performing the maintenance.

Analysis: The licensee's failure to follow the conduct of maintenance procedure, MM-AA-100, "Conduct of Maintenance," Revision 10, was a performance deficiency. Specifically, on December 10, 2014, maintenance personnel failed to effectively use human error prevention tools when performing the maintenance on the RWST level

channels which resulted in a loss of the safety function of the RS system. The performance deficiency was more than minor because it was associated with the configuration control attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to ensure that the physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events and is therefore a finding. Specifically, the RS system safety function was inadvertently rendered inoperable. The inspectors performed a Phase 1 analysis using the IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 3 "Barrier Integrity Screening Questions," dated June 19, 2012, and Appendix H "Containment Integrity Significance Determination Process," dated May 6, 2004, and determined the finding required a detailed risk evaluation because it involved the loss of safety function of the RS system.

A detailed risk evaluation was performed in accordance with NRC Inspection Manual Chapter (IMC) 0609, Appendix A by a regional senior reactor analyst using the latest NRC North Anna SPAR model and Sapphire risk program. The major analysis assumptions included: a thirty-two minute exposure interval, and a non-recoverable loss of both inside recirculation spray pumps and both outside recirculation pumps. The dominant risk sequence was a small break loss of coolant accident initiator, success of the reactor protection system, success of feedwater, success of high pressure injection, success of secondary side cooldown and failure of recirculation spray resulting in loss of core and containment heat removal capability. The risk was mitigated by the short exposure period. The risk evaluation result was an increase in core damage frequency of  $<1 \text{ E-6/year}$  and an increase in large early release fraction of  $<1 \text{ E-7/year}$ , a GREEN finding of very low safety significance.

The finding has a cross-cutting aspect in the area of human performance associated with the work management attribute because the organization failed to implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. Furthermore, the licensee work process control includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, due to poor communication and coordination between the Control Room and the technicians calibrating the RWST level channels, and amongst the team of technicians calibrating the RWST level transmitters, the RS system was inoperable [H.5].

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," required, in part, that activities affecting quality be prescribed by documented instructions and procedures appropriate to the circumstances and shall be accomplished in accordance with these instructions and procedures.

The licensee's maintenance procedure, MM-AA-100, "Conduct of Maintenance," Revision 10, requires maintenance personnel to use an assortment of techniques and tools to avoid errors during work execution. Attachment 6 step 1b outlines various human error prevention techniques that should have been used during the work execution including 'self checking' and 'questioning attitude'.

Contrary to this requirement, the licensee failed to manage and accomplish activities affecting quality in accordance with documented procedures. Specifically, on December 10, 2014, maintenance personnel did not use human error prevention tools when performing the maintenance on the RWST level channels which resulted in the loss of the safety function of the RS system. Because it is of very low safety significance (Green), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. The violation was entered into the licensee's corrective action program as CR 567185. This non-cited violation is identified as NCV 05000338/2015001-01, Failure To Follow Procedure For RWST Instruments.

### 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.

- Emergent work for Unit 1 'A' Component Cooling Heat Exchange valve failure on January 11, 2015
- Outage safety review for Unit 1 forced outage on 'B' main feed regulating valve operation on February 26, 2015
- Emergent work on Unit 2 'C' containment air recirculation fan
- Maintenance activities during transition from Mode 4 to Mode 3 on March 25, 2015
- Maintenance activities during transition from Mode 3 to Mode 2 on March 26, 2015
- Maintenance activities during transition from Mode 2 to Mode 1 on March 27, 2015

#### b. Findings

No findings were identified.

### 1R15 Operability Determinations and Functionality Assessments

#### .1 Operability and Functionality Review

#### 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 12. Other documents reviewed are listed in the Attachment to this report.

- Review of OD000604 Revision 2, "Unit 2 Control Rod E-11 rod position indication signal stability"
- Review of OD000605, "OD to Evaluate N2 Leakage from 2-GN-TK-1B"
- Review of OD000609, "Need to Determine Operability of 'C' RCS Loop with Flawed Elbow"
- Review of OD000611, "Engineering to perform OD for U2 in light of Elbow Leakage in U1 RCS"
- Review of OD000612, "AFW Check Valve Leakage (2-FW-70 & 2-FW-279)"

b. Findings

No findings were identified.

.2 Operator Workaround (OWA) Management

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for OWAs. The inspectors reviewed the cumulative effects of the licensee's OWAs and procedure OP-AA-1700, Revision 6, "Operations Aggregate Impact." The inspectors reviewed the data package associated with this procedure which included an evaluation of the cumulative effects of the OWAs on the operator's ability to safely operate the plant and effectively respond to abnormal and emergency plant conditions. The inspectors reviewed and monitored licensee planned and completed corrective actions to address underlying equipment issues causing the OWAs. The inspectors also evaluated OWAs against the requirements of the licensee's corrective action program as specified in PI-AA-200, "Corrective Action," Revision 23, 10 CFR 50, Appendix B, and OP-AA-100, "Conduct of Operations," Revision 27.

b. Findings and Observations

No findings were identified.

In general, the inspectors verified that the licensee has identified OWA problems at an appropriate threshold and entered them in the corrective action program, and has proposed or implemented appropriate corrective actions.

1R18 Plant ModificationsPermanent Modificationsa. Inspection Scope

The inspectors reviewed the four completed permanent plant modification design change packages (DCP) listed below. The inspectors conducted a walkdown of the installation, discussed the desired improvement with system engineers, and reviewed the 10 CFR 50.59, Safety Review/Regulatory Screening, technical drawings, test plans and the modification package to assess the TS implications. Other documents reviewed are listed in the Attachment to this report.

- DC-NA-14-00004, "Install Tornado Missile Protection at U1/U2 AFW Pipe Tunnels."
- DC-NA-14-00087, "BDB Aux Feedwater Pump House Flood Doors"
- DC-NA-14-00086, "BDB Aux Feedwater Pump House Flood Doors"
- DC-NA-13-00001, "Internals and Actuator Removal from SW screen wash AOV"

b. Findings

No findings were identified.

1R19 Post Maintenance Testinga. 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.

- WO59102815326, "Valve Gearbox Replacement for 1A Component Cooling HX Service Water (SW) Return No. 4"
- WO59102400280, "Pump Repair for Hydro Test Pump 1-SI-P-2"
- WO59102813915, "AMSAC Controller Module Replacement"
- WO59102813478, "01-FW-FCV-1498 Repair Positioner"
- 1-PT-83.12J, "1J Diesel Generator Test (Start by ESF Actuation) Followed by 24-Hour Run and Hot Restart Test"
- WO59102832388/WO59102763186, "1-FW-P-2, Turbine Driven Auxiliary Feedwater Pump and Valve Test"

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities

.1 Unit 1 Refueling Outage

a. Inspection Scope

The inspectors reviewed the Outage Safety Review (OSR) and contingency plans for the Unit 1 refueling outage, which began March 7, 2015, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. The inspectors also confirmed that the licensee had mitigation/response strategies in place for any losses of key safety functions. Using NRC inspection procedure 71111.20, "Refueling and Outage Activities," the inspectors observed portions of the refueling, and maintenance activities to verify that the licensee maintained defense-in-depth commensurate with the outage risk plan and applicable TS. The inspectors monitored licensee controls over the outage activities listed below.

- Licensee configuration management, including daily outage reports, to evaluate maintenance of defense-in-depth commensurate with the OSR for key safety functions and compliance with the applicable TS when taking equipment out of service.
- Implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing.
- Installation and configuration of Reactor Coolant System instrumentation for system pressure, level, and temperature to provide accurate indication, and an accounting for instrument error.
- Implementation of licensee procedures for foreign material exclusion.
- Controls over the status and configuration of electrical systems to ensure that TS and outage safety plan requirements were met, and controls over switchyard activities.
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.
- Reactor inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities and structure, system or component (SSCs) which could affect reactivity.
- Fatigue management in accordance with meeting the rule requirements for each process.
- Refueling activities, including fuel handling operations (inspection, sipping, reconstitution and insertion), and fuel assemblies tracking, including new fuel, from core offload through core reload.
- Controls over containment penetrations, per TS, such that containment closure could be achieved at all times.

- Licensee identification and resolution of problems related to refueling outage activities
- Startup and ascension to full power operation, tracking of startup prerequisites, walkdown of the containment to verify that debris had not been left which could block emergency core cooling system strainers, and the review of reactor physics testing.

b. Findings

No findings were identified.

.2 Unit 1 Forced Outage for RCS Pressure Boundary Leak

a. Inspection Scope

Unit 1 forced outage on December 22, 2014, due to a leak in an RCS drain pipe, which continued until January 1, 2015. During the forced outage period, the inspectors used NRC inspection procedure 71111.20, "Refueling and Outage Activities," to observe portions of the maintenance and startup activities to verify that the licensee maintained defense-in-depth commensurate with outage risk assessments and applicable TS. The inspectors reviewed licensee actions for the outage activities listed below.

- Licensee configuration management, including daily outage reports, to evaluate defense-in-depth commensurate with the outage safety plan and compliance with the applicable TS when taking equipment out of service.
- Controls over the status and configuration of electrical systems and switchyard to ensure that TS and outage safety plan requirements were met.
- Decay heat removal processes to verify proper operation and that steam generators, when relied upon, were a viable means of backup cooling.
- Containment closure activities, including a focused containment walkdown prior to startup, to verify that there was no evidence of leakage and that debris had not been left which could affect the performance of the containment sump.
- Heat up and startup activities to verify TS, license conditions, and other requirements, commitments, and administrative procedure prerequisites for mode changes were met prior to changing modes or plant conditions. Reactor Coolant System (RCS) integrity was verified by reviewing RCS leakage calculations and containment integrity was verified by reviewing the status of containment penetrations and containment isolation valves.

b. Findings

No findings were identified.

.3 Unit 1 Forced Outage for Circuit Card Failure

a. Inspection Scope

Unit 1 forced outage on February 26, 2015, due to failed circuit card for the 'B' main feed regulator valve that went closed. During the forced outage period, the inspectors used

NRC inspection procedure 71111.20, "Refueling and Outage Activities," to observe portions of the maintenance and startup activities to verify that the licensee maintained defense-in-depth commensurate with outage risk assessments and applicable TS. The inspectors reviewed licensee actions for the outage activities listed below.

- Licensee configuration management, including daily outage reports, to evaluate defense-in-depth commensurate with the outage safety plan and compliance with the applicable TS when taking equipment out of service.
- Controls over the status and configuration of electrical systems and switchyard to ensure that TS and outage safety plan requirements were met.
- Decay heat removal processes to verify proper operation and that steam generators, when relied upon, were a viable means of backup cooling.
- Containment closure activities, including a focused containment walkdown prior to startup, to verify that there was no evidence of leakage and that debris had not been left which could affect the performance of the containment sump.
- Heat up and startup activities to verify TS, license conditions, and other requirements, commitments, and administrative procedure prerequisites for mode changes were met prior to changing modes or plant conditions. Reactor Coolant System (RCS) integrity was verified by reviewing RCS leakage calculations and containment integrity was verified by reviewing the status of containment penetrations and containment isolation valves.

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the seven 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-75.2A, "Service Water Pump (1-SW-P-1A) Quarterly Test," Revision 55
- 2-PT-57.1B, "Emergency Core Cooling Subsystem – Low Head Safety Injection Pump (2-SI-P-1B)," Revision 60

RCS Leakage:

- 1-GOP-52.2A, "Identifying Increased RCS Leakage," Revision 1



Containment Isolation Valve:

- 1-PT-57.5A, "Leakrate Test of 1-SI-P-1A and 1-SI-4," Revision 23
- 1-PT-57.5B, "Leakrate Test of 1-SI-P-1B and 1-SI-21," Revision 25

Other Surveillance Tests:

- 1-PT-14.1, "Charging Pump 1-CH-P-1A," Revision 54
- 2-PT-82J, "2J Emergency Diesel Generator Slow Start Test," Revision 57

b. Findings

No findings were identified.

1EP6 Drill EvaluationEmergency Preparedness (EP) Drilla. Inspection Scope

On January 14, 2015, the inspectors reviewed and observed the performance of a drill that involved a Site Area Emergency where an automatic trip failed to shutdown the reactor and a faulted steam generator. The inspectors assessed emergency procedure usage, emergency plan classification, notifications, and the licensee's identification and entrance of any problems into their corrective action program. This inspection evaluated the adequacy of the licensee's conduct of the drill and performance critique. Exercise issues were captured by the licensee in their corrective action program as CRs. Qualification training deficiencies were captured within the operator training program.

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

Cornerstones: Public Radiation Safety and Occupational Radiation Safety

## 2RS1 Radiological Hazard Assessment and Exposure Controls

a. Inspection Scope

Hazard Assessment and Instructions to Workers The inspectors discussed the possibility of changes to plant operations that could contribute to significant new radiological conditions since the last inspection with. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for selected radiologically controlled areas (RCAs) during plant walkdowns. The inspectors reviewed survey records for several plant areas in the auxiliary building, rad waste processing and Independent Spent Fuel Storage Installation (ISFSI), including surveys

for alpha emitters, airborne radioactivity, gamma surveys with a range of dose rate gradients, and pre-job and some post-job surveys for tasks. During facility tours, the inspectors directly observed labeling of radioactive material and postings for radiation areas, high radiation areas (HRAs) within the RCA of the auxiliary building and radioactive waste (radwaste) processing and storage locations. The inspectors reviewed radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers for select jobs in HRAs. The inspector observed the oversight and coaching of workers in the containment exit undress area.

Control of Radioactive Material The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments, in accordance with procedures. Inspectors also observed instrument calibration stickers and observed and discussed setpoints for some instrumentation. The inspectors reviewed records of inventory selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Risk-Significant Radiation Areas, Hazard Control and Work Practices The inspectors evaluated access barrier effectiveness for selected Locked High Radiation Area (LHRA) locations and discussed procedural guidance and adherence for LHRA and Very High Radiation Area (VHRA) controls with health physics (HP) supervisors. The inspectors observed and evaluated controls for the storage of irradiated material within the spent fuel pool (SFP). Established radiological controls (including airborne controls) were evaluated for outage related work on Unit 1. In addition, the inspectors reviewed and discussed licensee controls for areas where dose rates could change significantly.

Through direct observations and interviews with licensee staff, the inspectors evaluated occupational workers' adherence to selected RWPs and Health Physics Technicians' (HPTs) proficiency in providing job coverage. Electronic dosimeter (ED) alarm set points and worker stay times were evaluated against area radiation survey results for selected entries into various high radiation areas and locked high radiation areas. The inspectors discussed the use of personnel dosimetry for multibadging work and areas with high dose gradients. The inspectors also evaluated worker response to dose and dose rate alarms during selected work activities. Inspectors reviewed RWPs for airborne radioactivity areas.

Problem Identification and Resolution The inspectors reviewed and assessed Condition Reports (CRs) associated with radiological hazard assessment and control. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

Radiation protection activities were evaluated against the requirements of Updated Final Safety Analysis Report (UFSAR) Section 12; Technical Specifications (TS) Sections 5.4 (Procedures) and 5.7 (High Radiation Areas); 10 CFR Parts 19 and 20; and approved

licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material". Documents reviewed are listed in the report Attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors performed a periodic review of the three Unit 1 and 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 January 1, 2014 through December 31, 2014. 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 CR568624, "The normal level controller for Unit 2 1A feedwater heater has failed"

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for CR568624, "The normal level controller for Unit 2 1A feedwater heater has failed," 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 23 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 CR567185, "Two channels of U1 RWST level removed from service during calibrations," and CR567188, "North Anna Unit 1 Entered TS 3.0.3 due to 2 inoperable RWST Level Transmitters"

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for CR567185, "Two channels of U1 RWST level removed from service during calibrations," and CR567188, "North Anna Unit 1 Entered TS 3.0.3 due to 2 inoperable RWST Level Transmitters," 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 23, and 10 CFR 50, Appendix B.

b. Findings and Observations

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. See Section 1R12 for details of finding.

.4 Annual Sample: Review of CR568497, "3CND-P3 Oil bubbler low at 1/16<sup>th</sup> full"

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for CR568497, "3CND-P3 Oil bubbler low at 1/16<sup>th</sup> full," 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 23, 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.

4OA3 Event Followup

.1 Unit 2 Feedwater Transient due to 4A Feedwater Heater Down Power

The inspectors followed up on actions taken in response to the failure of the Unit 2 4A Feedwater (FW) Heater Controller which caused a unit transient on January 4, 2015. The 1A FW Heater Normal Level Controller failed and the normal level control/cascade valve for Unit 2 1A FW Heater failed closed and was unable to be adjusted. The licensee commenced ramp down for the unit to maintain reactor power. The inspectors reviewed the problem resolution documents and the licensee actions taken to ensure appropriate corrective actions were specified and prioritized. Documents reviewed are listed in the Attachment to this report.

.2 (Closed) LER 05000338/2014-002-00: Inadvertent Loss of Vital Instrumentation During Maintenance Due to Personnel Error

On December 10, 2014, with Unit 1 in Mode 1 at 100 percent power, Station technicians commenced scheduled periodic channel calibrations of level transmitters for the Unit 1 Refueling Water Storage Tank Level Channel I instrument loop and Channel II instrument loop. At 1344 hours, two channels of the Unit 1 Refueling Water Storage Tank (RWST) level instrumentation were inadvertently removed from service at the same time during maintenance. Operations personnel responded by entering abnormal procedure 1-AP-3, "Loss of Vital Instrumentation." The licensee also entered TS 3.0.3 due to two channels being inoperable that affect Recirculation Spray (RS) pump auto-start logic. At 1356 hours, both level indications returned to normal. At 1417 hours, Channel II was declared operable and TS 3.0.3 was cleared. At 1439, Channel I was declared operable and TS actions were cleared.

Had a containment depressurization actuation (CDA) occurred during this time, accident mitigation may have been impacted. The RS pumps would have started without sufficient suction water, however the control room could promptly reset the CDA signal and manually shutdown the RS pumps to prevent damage. The event posed no significant safety implications and the health and safety of the public were not affected by this event.

The cause of the event was personnel error. Station technicians failed to assess risk associated with the RWST level calibration tasks. Inattention as a result of repetition and/or becoming complacent and overconfident with the job task caused the team not to use human performance tools to mitigate the errors. Completed interim actions included removing the qualifications of the individuals involved until remediation was conducted; performing a stand down to ensure lessons learned are integrated into the daily work activities and department standards and expectations were reinforced; and supervisors have increased oversight for pre-job briefs and are maintaining field presence to ensure high risk error likely tasks are briefed adequately, barriers and defenses used and standards and expectations reinforced.

This issue is in the licensee's CAP as CR567185, "Two channels of U1 RWST level removed from service during maintenance." See Section 1R12 for details of finding.

#### 4OA6 Meetings, Including Exit

##### Exit Meeting Summary

On April 22, 2015, the resident inspectors presented the inspection results to Mr. G. Bischof and other members of the staff, who acknowledged the findings. The inspectors verified no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

## **SUPPLEMENTARY INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee personnel:**

M. Becker, Manager, Nuclear Outage and Planning  
R. Britt, BACCP Lead  
G. Bischof, Site Vice President  
C. Cherry, ISI Program Manager  
B. Derreberry, ISI/NDE Supervisor  
B. Evans, Manager Radiation Protection  
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  
J. Jenkins, Manager, Nuclear Maintenance  
P. Kemp, Supervisor, Station Licensing  
H. Le, Engineering Programs Manager,  
J. Leberstien, Technical Advisor, Licensing  
A. Maly, Supervisor Technical Services  
F. Mladen, Plant Manager  
N. Nicholson, Health Physicist III  
T. Pastor, Supervisor Radiation Protection Technical Services  
J. Plossl, Supervisor, Nuclear Station Procedures  
M. Sartain, Nuclear Engineering Vice President  
J. Schleser, Manager, Nuclear Organizational Effectiveness  
R. Simmons, Supervisor Radiation Protection Operations  
J. Slattery, Manager, Nuclear Operations  
R. Stack, NDE Lead  
W. Standley, Manager, Nuclear Training  
J. Swenson, Site Welding Engineer  
M. Whalen, Technical Advisor, Licensing

### **LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**

#### **Opened and Closed**

05000338/2015001-01	NCV	Failure To Follow Procedure For RWST Instruments (Section 1R12)
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#### **Closed**

05000338/2014-002-00	LER	Inadvertent Loss of Vital Instrumentation During Maintenance Due to Personnel Error (Section 4OA3.2)
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#### **Discussed**

None

Attachment

## **LIST OF DOCUMENTS REVIEWED**

### **Section 1R04: Equipment Alignment**

#### **Procedures**

WM-AA-100-1003, "Work Order Closeout," Revision 3  
0-PT-89.4B, "Underground Diesel Fuel Oil Storage Tank 1-EG-TK-2B Draining, Cleaning, and Inspecting," Revision 8  
1-OP-6.8A, "Valve Checkoff – Emergency Generator Fuel Oil System," Revision 6  
0-MCM-0703-03, "Emergency Generator Storage Tank 1-EG-TK-2B Inspection and Cleaning," Revision 2  
1-LOG-6F, "Unit 1 Safeguards Operations – Daily Default Tour Type, 1H Day Tank Level," Revision 109  
2-OP-7.1A, "Valve Checkoff – Low Head Safety Injection System," Revision 18

#### **Calculations**

SE-0018, "Emergency Diesel Generator Day Tank Capacity," Revision 1  
12050-X4-43, "Pipe Stress Analysis of the Containment Recirculating Spray and Low Head Safety Injection, Problem 43," Revision 1

#### **Condition Reports and Operability Determinations**

CR438180, "WO requested for U2 Safeguards SI support not supporting pipe dead weight"  
OD000409, "Pipe Support 2-SI-R-5 found with gap under pipe"  
WO59101871392, "Work Order to Perform 0-PT-89.4B"

#### **Drawing**

12050-EC1-104C, "Safeguards Areas, Containment Recirculation Spray and Low Head Safety Injection Pump Piping, North Anna Power Station Unit – 2," Revision 2

### **Section 1R05: Fire Protection**

#### **Procedures**

0-FPMP-2.12, "Dry Chemical Fire Extinguisher Maintenance," Revision 3  
0-FPMP-2.6, "Fire Extinguisher and Hose Station Inspection – Aux Buildings, Fuel Building, Clean Change, Health Physics, and Units 1 and 2 Instrument Shop," Revision 2

#### **Condition Reports**

CR570421, "Fire Extinguisher pressure questioned during walkdown"

### **Section 1R08: Inservice Inspection Activities**

#### **Procedures**

ER-AA-NDE-121, Dominion Written Practice for Certification of Nondestructive Examination Personnel In Accordance With ASME Section XI, Appendix VII Requirements, Revision 4  
ER-AA-NDE-122, Dominion Written Program for the Implementation of ASME Section XI, Appendix VIII Requirements, Revision 4  
ER-AA-NDE-130, Storage and Control of Calibrated NDE Equipment, Calibration Standards and Consumable NDE Materials, Revision 3



ER-AA-NDE-140, Processing of Dominion NDE Data, Revision 5 ER-AA-NDE-MT-200, ASME Section XI Magnetic Particle Examination Procedure, Revision 4  
 ER-AA-NDE-PT-300, ASME Section XI Liquid Penetrant Examination Procedure, Revision 7  
 ER-AA-NDE-UT-801, Ultrasonic Examination of Ferritic Piping Welds in Accordance with ASME Section XI Appendix VIII, Revision 5  
 ER-AA-NDE-UT-802, Ultrasonic Examination of Austenitic Piping Welds in Accordance with ASME Section XI Appendix VIII, Revision 3  
 ER-AA-NDE-VT-603, VT-3 Visual Examination Procedure, Revision 4  
 ER-AP-BAC-10, Boric Acid Corrosion Control Program, Revision 11  
 ER-AP-BAC-101, Boric Acid Corrosion Control Program Inspections, Revision 11  
 ER-AP-BAC-102, Boric Acid Corrosion Control Program Evaluations, Revision 12  
 ER-NA-NDE-UT-816, Fully Encoded Phased Array Ultrasonic Examination of Dissimilar Metal Piping Welds, Revision 0  
 ER-NA-NDE-UT-817, Fully Encoded Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Piping Welds, Revision 0

#### Condition Reports

CR 568262, Through-Wall Characterization of Indication Found in Weld 39, Line #2"-RC-59  
 CR 573453, Dry Component Cooling Residue on 1-CC-736 and 1-CC-746  
 CR 573459, 1-PT-46.21 Walkdown Issues below Maintenance Threshold  
 CR 573530, Inservice Inspection Indication Evaluation Record for Code Case N-566-2 Compliance  
 CR 573571, Inservice Inspection Indication Evaluation Record for Code Case N-566-2 Compliance

#### NRC-Initiated Corrective Action Documents

CR 574870, Components Found with Boric Acid Residue

#### Welding Documentation

Welder Performance Qualifications (WPQs) for Grubb, Hunter, Johnson, and Maxey  
 Welding Technique Sheet for Welding Technique Number 803, GTAW and SMAW Manual Welding, Revision 9  
 Procedure Qualification Record (PQR) 801, Manual GTAW, Revision 2  
 PQR 805, Manual SMAW, Revision 3  
 PQR 809, Manual SMAW, Revision 2  
 PQR 830, Manual GTAW, SMAW, dated July 20, 2001  
 PQR 831, Manual GTAW, SMAW, dated July 20, 2001

#### Work Orders

59101941646, Replace 3" Velan Check Valve, Class 1, Repair/Replacement Plan 2013-094 with Weld Data Records, Welding Technique Sheets, and NDE Reports  
 59102664702, Weld Repair to Canopy Seal Weld, 1-RC-64, Class 1  
 59102607821, Valve Replacement of 1-CH-302, 4B Seal Water Injection Filter Inlet Isolation Valve, IAW CACC000968 (Repair/Replacement Plan 2013-096, R-2, with Weld Data Records and NDE Reports)  
 59102763015, Permanent Shielding for Charging Letdown Piping IAW DC-NA-14-00039 (Repair/Replacement Plan 2015-007 with Weld Data Records)

59102811519, Replacement of 2" Elbow on "C" Loop Drain Line (Repair/Replacement Plan 2014-153, R-1, with Weld Data Records, Welding Technique Sheet with supporting Procedure Qualification Records)

#### Other Documents

Boric Acid Corrosion Control Program Health Report for 4<sup>th</sup> Quarter 2013  
 Boric Acid Corrosion Control Program Health Report for 1<sup>st</sup> Quarter 2014  
 Boric Acid Corrosion Control Program Health Report for 2<sup>nd</sup> Quarter 2014  
 Boric Acid Corrosion Control Program Health Report for 3<sup>rd</sup> Quarter 2014  
 Boric Acid Corrosion Control Program Health Report for 4<sup>th</sup> Quarter 2014  
 Boric Acid Corrosion Control Program Health Report for 1<sup>st</sup> Quarter 2015  
 Boric Acid Walkdown Personnel Certification Records for Anhold, Blanchard, Britt, Hamill, Jurkowitsch, Sipe, and Swenson  
 Certificate of Calibration for digital thermometer/32322-K, Asset Number: ATK-2, dated 2/19/2015  
 Certificate of Calibration for digital thermometer/32322-K, Asset Number: ATK-3, dated 2/19/2015  
 Certificate of Conformance for Flawed Specimens CB-02-217, CB-02-218, and CB-02-219 for FlawTech PDI Alternative ASME Calibration Blocks, dated 10/11/2006  
 Certificate of Conformance for alternative ASME Calibration Block, serial number 08-4345, dated 1/25/2008  
 Certificate of Certification for No. 1 Gray Powder, Batch Number 12K097  
 Certificate of Certification for Spotcheck Developer, SKD-S2, Batch Number 14F02K  
 Certificate of Certification for Spotcheck Developer, SKD-S2, Batch Number 10H16K  
 Certificate of Certification for Spotcheck Penetrant, Type: SKL-SP1, Batch Number 07B07K  
 Certificate of Certification for Spotcheck Cleaner, SKC-S, Batch Number 14B01K  
 Certification for Character Resolution Card, dated 4/3/2014  
 Certification for Ten-Pound Weight Lift Tests for Magnetic Yokes, dated 9/6/2012  
 Certificate of Test and Conformity for test block, serial number 05-6998, dated 4/14/2005  
 Certificate of Certification for UT Couplant, Ultra Gel II, Batch Number: 12J066, dated 9/28/2012  
 General Electric Transducer Certificate of Conformity for Probe 113232591, Serial Number SI0328, dated 11/20/2012  
 General Electric Transducer Certificate of Conformity for Probe 113232591, Serial Number SI0279, dated 11/15/2012  
 Krautkramer Transducer Certificate of Conformity for Product Code 113-222-591, Serial Number 01CWK2, dated 1/9/2006  
 Krautkramer Transducer Certificate of Conformity for Product Code 113-222-591, Serial Number 01CWK3, dated 1/9/2006  
 Krautkramer Transducer Certificate of Conformity for Product Code 113-222-591, Serial Number 01CTV4, dated 1/9/2006  
 Krautkramer Transducer Certificate of Conformity for Product Code 113-232-591, Serial Number 01CLN0, dated 11/30/2005  
 Krautkramer Transducer Certificate of Conformity for Product Code 113-242-591, Serial Number 00H45N, dated 12/2/99  
 Krautkramer Transducer Certificate of Conformity for Product Code 113-242-591, Serial Number 01CXPB, dated 1/10/2006

Krautkramer Transducer Certificate of Conformity for Product Code 113-242-591, Serial Number 01CXBL, dated 1/10/2006  
 Material Safety Data Sheet for ULTRAGEL II, dated June 5, 2012  
 NDE Personnel Certification Records for Fuechtmann, Johnson, Kimmen, Rogotzke, Sauter, and Zollner  
 Report Number MT-15-009, Magnetic Particle Examination of 11715-WMKS-RC-E2/1-RC-E-2/8, Pressurizer Integral Attachment  
 Report Number PT-15-007, Liquid Penetrant Examination of 11715-WMKS-0110A/4-RC-34/1H, Pressurizer Integral Attachments (Lugs)  
 Report Number PT-15-013, Liquid Penetrant Examination of 11715-WMKS-0104B/12-SI-14/41A, Pipe to Pipe  
 Report Number UT-15-007, UT Calibration/Examination for 11715-WMKS-0102D/16-WFPD-17/51A, Pipe to Pipe  
 Report Number UT-15-038, UT Calibration/Examination for 11715-WMKS-0104B/12-SI-14/41A, Pipe to Pipe  
 Report Number UT-15-051, UT Calibration/Examination for 11715-WMKS-0102C/16-WFPD-22/18A, Elbow to Nozzle  
 Report Number VT-15-024, Visual Examination for Restraint 11715-WMKS-0103AT/2-CH-96/R24  
 Report Number VT-15-032, Visual Examination for Restraint 11715-WMKS-01031B/32-SHP-1/R44  
 SAR000486, Nuclear Welding Program Formal Fleet Self-Assessment  
 SAR002257, Inservice Inspection / Risk Informed Inservice Inspection Program Formal Self-Assessment  
 SAR002813, Boric Acid Corrosion Control Program Self-Assessment  
 WCAP-15988-NP, Generic Guidance for an Effective Boric Acid Inspection Program for Pressurized Water Reactors, Revision 2

#### **Section 1R12: Maintenance Effectiveness**

CA295808, "1-SW-230 will not come off open seat-WO59102814424 (to status 85)"  
 CR568828, "1-SW-230 will not come off open seat"  
 WO59102815455 "Drive gear broken on 1-SW-230 (Dupe 59102815326)"  
 WO59102814424, "Actuator Inspection and Review"  
 WO59102815438, "Hydro Test Pump speed control switch not working (W/D with I&C/Eng next make-up)"  
 ACE19847, "Two channels of U1 RWST level removed from service during calibrations"  
 Procedure MA-AA-100, "Conduct of Maintenance," Revision 10  
 Procedure WM-AA-100, "Work Management," Revision 25  
 Procedure 1-ICP-QS-L-100D, "Refueling Water Storage Tank Level Channel II (1-QS-L-100D) Calibration," Revision 10  
 Procedure WM-AA-101, "Work Order Planning," Revision 5  
 SDBD-NAPS-RS, "Recirculation Spray System, North Anna Power Station, System Design Basis Document," Revision 19

#### **Section 1R15: Operability Determinations and Functionality Assessments**

CR563977, "Unit 2 Control Rod E-11 rod position indication signal"  
 CR565206, "2-GN-PCV-225B-2 (N2 Supply PCV to 2-RC-PCV-2455C) found leaking"  
 CR568262, "Through wall characterization of indication found in Weld 39, line # 2"-RC-59"

CR568327, "Need OD for U2 due to elbow failures experience on U1"  
 CR568511, "Leakby of check valves on 2-FW-P-2 line to 'A' steam"

### **Section 1R18: Plant Modifications**

CR545209, "WO needed to restore U1 AFW pipe tunnel missile protection"  
 OD000542, "OD assigned to Engineering to determine operability of the AFW tunnel manways"  
 WO59102745608, "Restore U1 AFW pipe tunnel missile protection iaw DC-NA-00004"  
 WO59102719995, "Restore U1 AFW pipe tunnel missile protection iaw DC-NA-00004"  
 CR274240, "ODCA – Prepare/issue a DC to establish adequate tunnel missile protection"  
 Procedure 1-OP-49.2, "Service Water Traveling Water Screens and Wash Pumps," Revision 23

### **Section 1R19: Post Maintenance Testing**

CR568982, "Drive Gear broken on 1-SW-230"  
 WO59102403941, "Blind Flange Leak Repair"  
 WO59102485756, "Change Oil in Pump/Lube Varidrive"  
 CR5568894, "Annunciator not functioning as expected"  
 Procedure 1-PT-36Q, "AMSAC System Logic Test," Revision 12  
 CR568495, "1-FW-FCV-1498 sluggish"  
 CR572803, "1-FW-P-2 (Steam Driven AFW pump) governor did not maintain speed during PT"  
 Procedure 1-MCM-1401-02, "Removal and Installation of Unit 1 Terry Turbine Woodward Governor," Revision 6  
 Procedure 1-PT-71.1Q, "1-FW-2, Turbine Driven Auxiliary Feedwater Pump and Valve Test," Revision 61  
 Pressure Trace for Turbine Driven Auxiliary Feedwater Pump Unit 1 Dates: February 27, 2015, February 26, 2015, October 11, 2013  
 Pressure Trace for Turbine Driven Auxiliary Feedwater Pump Unit 2 Dates: March 3, 2015, February 2, 2014

### **Section 1R22: Surveillance Testing**

Calculation ME-0348, "Low Head Safety Injection Pump and Discharge Relief Valve Set Point Calculation," Revision 0  
 WO5910276509, "Emergency Core Cooling Subsystem – Low Head Safety Injection Pump (2-SI-P-1B)"  
 WO59102747291, "2J Emergency Diesel Generator Slow Start Test"

### **Section 2RS1: Radiological Hazard Assessment and Exposure Controls**

#### **Procedures, Guidance Documents, and Manuals**

RP-AA-106, Radiological Work Control Program, Rev. 3  
 RP-AA-107, Radioactive Contamination Control Program, Rev. 5  
 RP-AA-109, Radiological Survey Program, Rev. 0  
 RP-AA-201, Access Controls for High and Very High Radiation Areas, Rev. 8  
 RP-AA-202, Radiological Posting, Rev. 8  
 RP-AA-203, Radiological Labeling and Marking, Rev. 4  
 RP-AA-225, Unrestricted Release of Material, Rev. 5  
 RP-AA-226, Alpha Monitoring, Rev. 4  
 RP-AA-230, Personnel Contamination Monitoring and Decontamination, Rev. 8  
 RP-AA-232, Radioactive Material Control, Rev. 6  
 RP-AA-240, Discrete Radioactive Particle Control, Rev. 1

RP-AA-260, Control of Radiography, Rev. 4  
 RP-AA-261, Control of Radiological Diving Activities, Rev. 1  
 RP-AA-262, Steam Generator Primary Side Work Controls, Rev. 0  
 RP-AA-263, Steam Generator Secondary Side Work Controls, Rev. 0  
 RP-AA-265, Failed Fuel Action Plan, Rev. 2  
 RP-AA-270, Providing RP Coverage during Work, Rev. 1  
 RP-AA-271, Use of Remote Monitoring, Rev. 1  
 RP-AA-274, Radiation Work Permits, Rev. 3  
 RP-AA-274-2001, RWP Writer's Guide, Rev. 0

#### Records and Data

National Source Tracking System Annual Inventory Confirmation, 1/14/15

#### Surveys

ISFSI Pad, 3/3/14, 11/21/14  
 U1 Containment 216' Incore Keyway 9/8/13, 10/1/13, 10/2/13  
 Waste Solids, 10/3/14, 10/6/14, 10/8/14, 11/12/14, 11/17/14, 12/2/14  
 Demin Alley, 9/11/14, 10/15/14, 10/16/14, 10/17/14, 12/24/14, 12/26/14

#### RWPs

RWP 15-3030 Walkdowns (Non-HRA)  
 RWP 15-3115 Valves (HRA)  
 RWP 15-3130 Walkdowns (HRA)  
 RWP 15-3205 Excore Detectors (LHRA)  
 RWP 15-3210 Insulation (LHRA)  
 RWP 15-3253 Blind Flange (LHRA)

#### Condition Reports (CR)

CR 559534  
 CR 560089  
 CR 560990  
 CR 561398  
 CR 569923

#### **4OA3: Event Followup**

CR568517, "A' Feedwater Heater normal level controller not working properly"  
 CR568529, "Low level alarm locked in with level in feedwater heater normal"  
 CR568532, "Unit 1 4A FW Heater Hi-Lo level alarm locked in with normal level"  
 CR568622, "The breaker for 2-ES-MOV-201A is Thermalled out"  
 CR568624, "The normal level controller for Unit 2 1A Feedwater heater has failed"  
 CR568627, "Failure of U2 1A Feedwater Heater Controller causes unit transient"  
 WO59102813884, "Torque switch replacement Forced Outage Candidate"  
 CA295664, "CA to Ops to perform a review of Operator Fundamentals for 2-SD-LC-203A failed"  
 CA295665, "CA to Operations to present CR568624 to RMRT for review of RM Classification"  
 CA295734, "CA to Operations to present this CR to RMRT for review of RM classification"  
 ACE019859, "ACE to Eng for 2-LCV-203A failed"

## LIST OF ACRONYMS

ACE	Apparent Cause Evaluation
ADAMS	Agencywide Document Access and Management System
AMSAC	Anticipated Transient without Scram (ATWS) Mitigating System Activation Circuitry
AOV	Air Operated Valve
ASME	American Society of Mechanical Engineers
BACCP	Boric Acid Corrosion Control Program
BDB	Beyond Design Basis
BMV	Bare Metal Visual
CAP	Corrective Action Program
CDA	Containment Depressurization Actuation
CFR	Code of Federal Regulations
CR	Condition Report
DCP	Design Change Packages
ED	Electronic Dosimeter
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
ESF	Engineered Safety Feature
FW	Feedwater
HP	Health Physics
HPT	Health Physics Technician
HRA	High Radiation Area
HX	Heat Exchangers
IMC	Inspection Manual Chapter
ISFSI	Independent Spent Fuel Storage Installation
ISI	In-service Inspection
LER	Licensee Event Report
LHRA	Locked High Radiation Area
LOCA	Loss of Coolant Accident
MT	Magnetic Particle Testing
NCV	Non-cited Violation
NDE	Non-destructive Examinations
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OD	Operability Determinations
OSR	Outage Safety Review
OWA	Operator Workaround
PARS	Publicly Available Records
PI	Performance Indicator
PT	Penetrant Testing
Radwaste	Radioactive Waste
RCA	Radiologically Controlled Area
RCS	Reactor Coolant System
RS	Radiation Safety
RTP	Rated Thermal Power
RWP	Radiation Work Permit

RWST	Refueling Water Storage Tank
SBO	Station Blackout
SDP	Significance Determination Process
SFP	Spent Fuel Pool
SSC	Structure, System or Component
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
U1	Unit 1
UT	Ultrasonic Testing
VEPCO	Virginia Electric and Power Company
VHRA	Very High Radiation Area
VPAP	Virginia Power Administrative Procedure
VT	Visual Testing
WO	Work Order