



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

February 14, 2022

Mr. Daniel G. Stoddard
Senior Vice President and Chief Nuclear Officer
Virginia Electric & Power Company; Dominion Energy
5000 Dominion Boulevard
Glen Allen, VA 23060

**SUBJECT: NORTH ANNA POWER STATION, UNITS 1 AND 2 – INTEGRATED
INSPECTION REPORT 05000338/2021004 AND 05000339/2021004**

Dear Mr. Stoddard:

On December 31, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at North Anna Power Station, Units 1 and 2. On February 14, 2022, the NRC inspectors discussed the results of this inspection with Ms. Lisa Hilbert, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

Two findings of very low safety significance (Green) are documented in this report. Two of these findings involved violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance or severity of the violations documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC Resident Inspector at North Anna Power Station, Units 1 and 2.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC Resident Inspector at North Anna Power Station, Units 1 and 2.

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

Sincerely,

/RA/

Stewart N. Bailey, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: NORTH ANNA POWER STATION, UNITS 1 AND 2 – INTEGRATED
INSPECTION REPORT 05000338/2021004 AND 05000339/2021004

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| DATE | 1/28/22 | 1/31/22 | 1/31/22 | 2/14/22 | |

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers: 05000338 and 05000339

License Numbers: NPF-4 and NPF-7

Report Numbers: 05000338/2021004 and 05000339/2021004

Enterprise Identifier: I-2021-004-0015

Licensee: Virginia Electric & Power Company; Dominion Energy

Facility: North Anna Power Station, Units 1 and 2

Location: Mineral, Virginia

Inspection Dates: October 1, 2021 to December 31, 2021

Inspectors: D. Bacon, Senior Operations Engineer
K. Carrington, Resident Inspector
J. England, Senior Resident Inspector
A. Rosebrook, Senior Reactor Analyst
M. Tobin, Senior Resident Inspector

Approved By: Stewart N. Bailey, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY

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

List of Findings and Violations

| Failure to Perform Proper Maintenance Affecting Performance of Unit 1 Safety-Related Air Conditioning System | | | |
|--|---|----------------------|----------------|
| Cornerstone | Significance | Cross-Cutting Aspect | Report Section |
| Barrier Integrity | Green NCV 05000338/2021004-01 Open/Closed | [H.9] - Training | 71111.12 |
| A self-revealed finding of very low safety significance (Green) and associated non-cited violation (NCV) of Technical Specifications 5.4, "Procedures," was identified when the Unit 1 heating, ventilation, and air conditioning (HVAC) air handling unit (AHU), 1-HV-AC-2, drive belts became dislodged due to the licensee's failure to properly perform maintenance affecting the performance of safety-related equipment in accordance with Regulatory Guide 1.33, Section 9, "Procedures for Performing Maintenance," Revision 2, Appendix A, February 1978. Specifically, on November 2, 2020, the licensee failed to adequately install the 1-HV-AC-2 AHU's fan and motor sheaves resulting in the inoperability of the main control room HVAC system. | | | |

| Failure to Properly Preplan and Perform Maintenance Results in Main Control Room Chiller Trip | | | |
|---|---|----------------------|----------------|
| Cornerstone | Significance | Cross-Cutting Aspect | Report Section |
| Barrier Integrity | Green NCV 05000338/2021004-02 Open/Closed | None (NPP) | 71111.12 |
| A self-revealed finding of very low safety significance (Green) and associated NCV of Technical Specifications 5.4, "Procedures," was identified after the 'C' control room chiller experienced multiple trips due to the licensee's failure to properly preplan and perform maintenance in accordance with Regulatory Guide 1.33, Section 9, "Procedures for Performing Maintenance," Revision 2, Appendix A, February 1978. Specifically, prior to November 4, 2021, the licensee failed to plan and perform maintenance on its Unit 1 'C' main control room (MCR) safety-related chiller thermal expansion valves which ultimately led to the thermal expansion valves being out of balance and the chiller being declared inoperable. | | | |

Additional Tracking Items

None.

PLANT STATUS

Unit 1 started the inspection period at or near 100 percent rated thermal power where it remained for the duration of the inspection period.

Unit 2 started the inspection period at or near 100 percent rated thermal power and reduced power to 97 percent rated thermal power, on October 4, 2021, for planned maintenance. The unit was returned to operating at or near 100 percent on November 8, 2021, where it remained for the duration of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed activities described in IMC 2515, Appendix D, "Plant Status," conducted routine reviews using IP 71152, "Problem Identification and Resolution," observed risk significant activities, and completed on-site portions of IPs. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (1 Sample)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 1 safety injection system on November 8, 2021.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Station Blackout Diesel room, on October 14, 2021;
- (2) Auxiliary Building (all elevations), on October 29, 2021; and
- (3) Unit 1 and Unit 2 Auxiliary Feedwater Pumphouses, on November 10, 2021.

71111.06 - Flood Protection Measures

Cable Degradation (IP Section 03.02) (1 Sample)

The inspectors evaluated cable submergence protection in:

- (1)
 - safety-related manholes 1-BLD-MBAR-4MH03, 1-BLD-MBAR-5MH03, 1-BLD-MBAR-5MH04

71111.11A - Licensed Operator Regualification Program and Licensed Operator Performance

Regualification Examination Results (IP Section 03.03) (1 Sample)

- (1) The licensee completed the regualification written examinations and annual operating tests required to be administered to all licensed operators in accordance with Title 10 of the *Code of Federal Regulations* 55.59(a)(2), "Regualification Requirements," of the NRC's "Operator's Licenses." During the week of December 6, 2021, the inspector performed an in-office review of the overall pass/fail results of the individual written examinations, operating tests, and crew simulator operating tests in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Regualification Program." These results were compared to the thresholds established in Section 3.03, "Regualification Examination Results," of IP 71111.11.

The inspectors reviewed and evaluated the licensed operator examination failure rates for the regualification written examinations and annual operating tests completed on February 19, 2021.

71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

Licensed Operator Regualification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated simulator training, on October 16, 2021, and just-in-time training for a letdown isolation evolution on Unit 1, on October 19, 2021.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (3 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

- (1) Unit 1 main steam trip valve 111A, failure on July 7, 2021;
- (2) Units 1 and 2 main control room and emergency switchgear heating and ventilation system under maintenance rule functions HV004 and HV003, multiple trips or failures, between October 2019 and October 2021; and
- (3) Units 1 and 2 onsite emergency diesel generator systems, multiple trips or failures between January 2020 and October 2021.

Aging Management (IP Section 03.03) (1 Sample)

The inspectors evaluated the effectiveness of the aging management program for the following SSCs that did not meet their inspection or test acceptance criteria:

- (1) CR1181978, Unsatisfactory Insulation Resistance Readings on 1H1-3 MCC Feeder Cable, on October 5, 2021.

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (5 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) CR1182249, 2-FW-H-200A Abbreviated Maintenance, on November 16, 2021;
- (2) CR1186046, Unit 2 'E' Incore Detector Stuck at Fully Withdrawn Position, on November 18, 2021;
- (3) CRs 1168559, 1169730, Unit 1 'H' and 'J' emergency diesel generator crankcase overpressure trips, on December 10, 2021;
- (4) CR1168675, Unit 1 'J' emergency diesel generator 110% load test failure, on December 10, 2021; and
- (5) CR1185468, Unit 2 'J' EDG copper in oil, on December 31, 2021.

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Design Change NA-13-00016, Station Service Bus to Emergency Crosstie Installation.

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the following post-maintenance test activities to verify system operability and functionality:

- (1) 2-PT-17.1, Control Rod Operability, following upgrade of the plant computer system, on November 18, 2021;
- (2) 1-ICP-RP-RPI-001, Rod Position Indication Calibration Using Actual Position, following auxiliary power supply replacement under work request 59203374546, on December 3, 2021; and
- (3) 2-SW-MOV-220B, 2-SW-MOV-201C, 1-SW-MOV-121B, and 1-SW-MOV-122B testing, following 'B' service water header outage, on December 12, 2021.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (1 Sample)

- (1) 2-PT-63.1B, Quench Spray System - 'B' Subsystem, on November 9, 2021.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS06: Emergency AC Power Systems (IP Section 02.05) (2 Samples)

- (1) Unit 1 (October 1, 2020 to September 30, 2021)
- (2) Unit 2 (October 1, 2020 to September 30, 2021)

MS09: Residual Heat Removal Systems (IP Section 02.08) (2 Samples)

- (1) Unit 1 (October 1, 2020 to September 30, 2021)
- (2) Unit 2 (October 1, 2020 to September 30, 2021)

INSPECTION RESULTS

| Failure to Perform Proper Maintenance Affecting Performance of Unit 1 Safety-Related Air Conditioning System | | | |
|--|---|----------------------|----------------|
| Cornerstone | Significance | Cross-Cutting Aspect | Report Section |
| Barrier Integrity | Green NCV 05000338/2021004-01 Open/Closed | [H.9] - Training | 71111.12 |
| <p>A self-revealed finding of very low safety significance (Green) and associated non-cited violation (NCV) of Technical Specifications 5.4, "Procedures," was identified when the Unit 1 heating, ventilation, and air conditioning (HVAC) air handling unit (AHU), 1-HV-AC-2, drive belt became dislodged due to the licensee's failure to properly perform maintenance affecting the performance of safety-related equipment in accordance with Regulatory Guide 1.33, Section 9, "Procedures for Performing Maintenance," Revision 2, Appendix A, February 1978. Specifically, on November 2, 2020, the licensee failed to adequately install the 1-HV-AC-2 AHU's fan and motor sheaves resulting in the inoperability of the main control room HVAC system.</p> <p><u>Description:</u> The main control room air conditioning system consists of two independent 100% redundant, safety-related, air conditioning trains, one powered from each emergency bus (H and J). An air conditioning train consists of a control room AHU, a relay room AHU, chilled water piping and a water chiller. An additional water chiller (HV-E-4C) for each reactor unit is provided which is also powered by the H emergency bus. The control room and relay room atmospheres are controlled for personnel habitability and equipment cooling to allow plant parameters to be monitored, and equipment to remain operating so the reactor may be maintained in a safe condition under normal and accident conditions.</p> <p>On November 2, 2020, the licensee performed maintenance on the Unit 1, 1-HV-AC-2 AHU which included replacement of the AHU belt and pulley system in accordance with licensee procedure 0-MCM-0580-01, "Repair Buffalo Forge Centrifugal Fans." The system was subsequently tested and returned to service on November 3, 2020.</p> <p>On November 19, 2020, the licensee observed increased vibrations and heard an abnormal</p> | | | |

rumbling noise coming from the unit. Subsequent troubleshooting concluded that the AHU remained capable of performing its safety function. On December 10, 2020, the control room received HVAC alarms and noted an increase in ambient air temperature. An operator was dispatched and discovered the belt to the 1-HV-AC-2 AHU had become dislodged. The licensee's investigation determined the AHU's motor sheave set screws were loose which caused the motor sheave to become loose and resulted in the drive belt for the 1-HV-AC-2 air handling unit being dislodged. The licensee's corrective actions included updating its maintenance procedure to provide additional instructions to ensure the set screws were adequately tightened. The inspectors reviewed the procedural revisions and noted that while setscrew tightening might typically be considered a skillset of maintenance craft, Step 6.10 in 0-MCM-0580-01, Revision 9 (the revision in use at the time of maintenance), also contained vague instructions for installing the fan and motor sheaves. Specifically, the procedure directed the performer to install the fan and motor sheaves without specificity on how to install the sheaves nor instructions for verifying/ensuring the setscrews adjoining the two sheaves were adequately tightened.

The 1-HV-AC-2 air handling unit belt and pulley system is comprised of two sheaves (fan sheave and motor sheave) connected via a shaft. Setscrews are used to join the shaft of the sheaves together. A belt then rotates around the adjoined sheaves thus forming the pulley system. In order for the system to operate properly, the sheaves must be precisely aligned and the set screws adequately tightened to ensure the sheaves do not become loose during operation. If a sheave becomes misaligned or a set screw becomes loose, the belt in the pulley system can become dislodged.

As a result of the event, the licensee declared the Unit 1 main control room air conditioning system inoperable, swapped to the operable air conditioning subsystem (1-HV-AC-1, 1-HV-AC-7 air handling units, and the 1-HV-E-4B chiller), and performed the actions required by the North Anna Power Station, Unit 1, Technical Specifications, Limiting Condition of Operation 3.7.11, Condition A. The licensee documented this issue in its corrective action program.

Corrective Actions: The licensee's corrective actions included revisions to the maintenance procedure to include instructions for verifying set screws are adequately tightened, placement of the operable air conditioning subsystem in service, repairs to the HVAC fan/motor sheaves and belt pulley system, and testing and restoration of the Unit 1 main control room HVAC system to operable status on December 15, 2020.

Corrective Action References: CR1162240, CR1162008, CA8361435, CA8248460

Performance Assessment:

Performance Deficiency: The inspectors determined the licensee's failure to properly perform maintenance affecting the 1-HV-AC-2 air handling unit in accordance with maintenance procedure 0-MCM-0508-01, "Repair Buffalo Forge Centrifugal Fans, was a performance deficiency and was therefore reasonably within the licensee's ability to foresee and correct since set screw tightening is an essential step in ensuring sheaves in a belt pulley system are secure.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events.

Specifically, the performance deficiency resulted in the inability of 1-HV-AC-2 to perform its function, a loss in the Unit 1 air conditioning system redundancy, and led to increased ambient air temperatures in the main control room. The inspectors reviewed the past operability of the 1-HV-AC-2 air handling unit and determined the AHU was last operable prior to November 2, 2020, and due to the deficiency, the AHU remained inoperable for a period of greater than 30 days.

Additionally, the inspectors reviewed IMC 0612, Appendix E, and determined the issue was similar to more-than-minor Example 2.d since the performance deficiency impacted the ability of the 1-HV-AC-2 AHU to perform its function.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding screened as "Green" using Exhibit 3, "Barrier Integrity," since the inspectors answered "No" to all of the questions in the exhibit.

Cross-Cutting Aspect: H.9 - Training: The organization provides training and ensures knowledge transfer to maintain a knowledgeable, technically competent workforce and instill nuclear safety values. Specifically, the licensee's failure to adequately install the setscrew sheaves is reflective of not ensuring certain skills and knowledge is transferred to maintain a competent workforce.

Enforcement:

Violation: Technical Specifications 5.4, "Procedures," requires, in part, that written procedures be established, implemented, and maintained covering activities in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Section 9, "Procedures for Performing Maintenance," requires, in part, that "maintenance that can affect the performance of safety-related equipment be properly preplanned and performed."

Contrary to the above, on November 2, 2020, the licensee failed to properly perform maintenance in accordance with Maintenance Procedure 0-MCM-0508-01, "Repair Buffalo Forge Centrifugal Fans," when it did not adequately tighten the 1-HV-AC-2 air handling unit fan and motor sheave setscrews. As a result, on December 10, 2020, the 1-HV-AC-2 belt was found dislodged resulting in increased temperatures in the main control room and the Unit 1 air conditioning system being declared inoperable. The licensee entered the issue into its corrective action program, repaired the system and restored it to operable on December 15, 2020. Additionally, the licensee revised its procedure to include additional instructions for installing fan and motor sheaves.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Properly Preplan and Perform Maintenance Results in Main Control Room Chiller Trip

| Cornerstone | Significance | Cross-Cutting Aspect | Report Section |
|-------------------|----------------------------------|----------------------|----------------|
| Barrier Integrity | Green NCV 05000338/2021004-02 | None (NPP) | 71111.12 |

| | | | |
|---|-------------|--|--|
| | Open/Closed | | |
| <p>A self-revealed finding of very low safety significance (Green) and associated NCV of Technical Specifications 5.4, "Procedures," was identified after the 'C' control room chiller experienced multiple trips due to the licensee's failure to properly preplan and perform maintenance in accordance with Regulatory Guide 1.33, Section 9, "Procedures for Performing Maintenance," Revision 2, Appendix A, February 1978. Specifically, prior to November 4, 2021, the licensee failed to plan and perform maintenance on its Unit 1 'C' main control room (MCR) safety-related chiller thermal expansion valves which ultimately led to the thermal expansion valves being out of balance and the chiller being declared inoperable.</p> | | | |
| <p><u>Description:</u> On September 26, 2021, the Unit 1 'C' MCR chiller was found tripped during routine operator rounds. As a result, the licensee immediately placed the 'A' chiller in service and performed an investigation into the event. The licensee's investigation determined a faulty thermostat prevented the chiller from unloading in its 3rd stage of refrigeration cooling. This condition resulted in abnormally low chilled water outlet and refrigerant temperatures and eventually led to the chiller tripping. The thermostat was replaced on October 18, 2021, and the chiller was returned to service and was monitored from October 19th and October 25th. On October 25th, following two successful maintenance runs, the chiller again experienced multiple trips. The licensee identified the potential causes of the trips as low suction pressure and/or low refrigerant temperature. The licensee determined that the conditions resulted from the chiller's thermal expansion valves being out of balance which caused inadequate refrigerant from being admitted to the system evaporator. With reduced refrigerant flow to the evaporator, the compressor was starved of refrigerant ultimately leading to low suction pressure conditions and the resultant chiller trips. The thermal expansion valves were subsequently replaced, and the chiller was tested and restored to operable on November 4, 2021.</p> | | | |
| <p>The inspectors performed a review of the licensee's evaluations of the various chiller trips and subcomponent issues. The inspectors found that the licensee could not identify a cause for the faulty thermostat issues, but the thermostat was planned for replacement due to being obsolete and had failed prior to its required preventive maintenance replacement frequency of 6-years. The inspectors noted that the licensee identified that a similar chiller trip occurred in 1996 as a result of a faulty thermal expansion valve associated with the Unit 1 MCR 'C' chiller and that the licensee's corrective actions at the time included a recommendation to replace all three thermal expansion valves for this chiller. However, the inspectors noted that only one of the three valves for the 'C' MCR chiller was actually replaced at the time and that one of the valves recommended for replacement was determined to be degraded during the licensee's troubleshooting and investigation in October 2021. The inspectors were unable to identify the reason the thermal expansion valves were never replaced due to the historic nature of the previous event; however, the inspectors noted the licensee's evaluation identified that the degradation of the thermal expansion valves could have been detected if properly trended. Furthermore, the licensee identified that the superheat values for the chiller and suction pressure parameters were not being appropriately calculated or monitored. In particular, the licensee's investigation found that the superheat values for each thermal expansion valve were being averaged instead of individually recorded which prevented the detection of valve degradation. The licensee's corrective actions included replacing the thermal expansion valves and enhancing its procedures to allow better monitoring of the thermal expansion valves for degradation.</p> | | | |
| <p><u>Corrective Actions:</u> The licensee entered this issue into its corrective action program, performed an immediate chiller swap, replaced the faulty components with new ones,</p> | | | |

returned the chiller to service, and revised its procedures to aid in better monitoring of the thermal expansion valves for degradation.

Corrective Action References: CR1163752, CA8585707, CR1182825

Performance Assessment:

Performance Deficiency: The inspectors determined the licensee's failure to properly preplan and perform maintenance that can affect the performance of safety-related equipment was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The finding also impacted the Equipment Performance attribute of the Initiating Events cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations.

Specifically, the 'C' MCR chiller was inoperable due to inadequate preventive maintenance which prevented the chiller from performing its safety-related function.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding screened as "Green" using Exhibits 1 and 3, "Initiating Events," and "Barrier Integrity," since it did not represent a degradation of the radiological barrier function provided for the control room and was not a degradation in the barrier function of the control room against smoke or a toxic atmosphere. Additionally, loss of the support system would not result in a plant trip nor did the performance deficiency represent a full or partial loss of the support system's PRA function that would lead to a plant trip.

Cross-Cutting Aspect: Not Present Performance. No cross-cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Technical Specifications 5.4, "Procedures," requires, in part, that written procedures be established, implemented, and maintained covering activities in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Section 9, "Procedures for Performing Maintenance," requires, in part, that "maintenance that can affect the performance of safety-related equipment be properly preplanned and performed."

Contrary to the above, the licensee failed to preplan and perform maintenance for the Unit 1 'C' MCR chiller when it did not replace a faulty thermal expansion valve. As a result, between September 26, 2021, and November 4, 2021, the Unit 1 'C' MCR chiller experienced multiple trips and periods of inoperability until maintenance was performed for the thermal expansion valves.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

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

- On January 20, 2022, the inspectors presented the integrated inspection results to Ms. Lisa Hilbert, Site Vice President, and other members of the licensee staff.
- The inspectors performed a re-exit of the inspection results on February 4, and February 14, 2022 with Ms. Lisa Hilbert and other members of the licensee staff.

DOCUMENTS REVIEWED

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|-------------------|--|------------------|
| 71111.04 | Drawings | 11715-FM-096A | Flow/Valve Operating Numbers Diagram Safety Injection System North Anna Power Station Unit 1 | 40 |
| | Procedures | 1-OP-7.2A | Valve Checkoff - High Head Safety Injection System | 20 |
| 71111.05 | Fire Plans | 1-FS-SBO-1 | Station Blackout Building Fire Fighting Strategy | |
| | | 1-FS-AB-1 | Auxiliary Building (all Elevations) Fire Fighting Strategy | 7 |
| | | 1-FS-AF-1 | Safe Shutdown Equipment Auxiliary Feedwater Pumphouse | 3 |
| | | 2-FS-AF-1 | Fire Fighting Strategy for Safe Shutdown Equipment for Auxiliary Feedwater Pumphouse | 2 |
| 71111.06 | Corrective Action Documents | CR1181978 | Unsat Insulation Resistance Readings on 1H1-3 MCC Feeder Cable | 10/05/2021 |
| | Corrective Action Documents Resulting from Inspection | CA7769225 | CA to Licensing to Disposition Concerns with Water Discovered in Manhole | 11/12/2019 |
| | Engineering Evaluations | ETE-CEP-2012-1007 | Non-EQ Cable Monitoring, License Renewal Aging Management Program (LR-1772/LR-2772) | 05/10/2021 |
| | Miscellaneous | RE514974 | PM/Surveillance Detail Report- 2 YR Pumping and Inspection of Manholes [Cable Vaults] | |
| | Procedures | 0-MPM-1207-04 | Mechanical Maintenance Support of Cable Inspection | 13 |
| | | ER-AA-CBL-10 | Cable Management Program | 2 |
| | | ER-AA-CBL-101 | Evaluation and Testing of Low Voltage Cables | 4 |
| | Work Orders | 59102882196 | | |
| | | 59102906821 | | |
| | | 59203303690 | | |
| | | 59203324727 | | |
| | | 59293301696 | | |
| 71111.12 | Corrective Action Documents | CA8248460 | | |
| | | CA8361435 | | |
| | | CA8564028 | | |
| | | CA8585707 | | |
| | | CR1162008 | | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---------------|---------------|--|--|
| | | CR1162240 | | |
| | | CR1163752 | | |
| | | CR1181978 | | |
| | | CR1182825 | | |
| | Miscellaneous | | Engineering Logs | September 24, 2021 to November 5, 2021 |
| | | | MRule CR Evaluation for CA8585498: 1-HV-E-4C, ('C' MCR Chiller) was found tripped | 11/10/2021 |
| | | | MRule CR Evaluation: CA8506307- 2-HV-E-4C, Through-wall leak on 4"WS-H86-151-Q3 (SW Hdr to 2-HV-E-4C) | |
| | | | MRule CR Evaluation: CA8078423- 1-HV-E-4A loading/unloading issues | 08/18/2020 |
| | | | MRule CR Evaluation: CA7593171- Perform MRule Functional Failure Evaluation for Possible Low Refrigerant Charge on 2-HV-E-4C | 10/17/2019 |
| | | | MRule CR Evaluation: CA7932137- Unit 2 B Main Control Room Chiller Tripping on Low Suction Pressure | 06/25/2020 |
| | | | MRule CR Evaluation: CA8073941- Perform MRule Functional Failure Evaluation for 2-HV-E-4C fails PT due to bad solenoid valve | 08/13/2020 |
| | | | NU-MARC 93-01 | |
| | | | 12-month Performance Criteria Basis Document for Function HV003 | |
| | | | MRule CR Evaluation, CA8248460- 1-HV-AC-2 belts were found thrown off | 01/21/2021 |
| | | | Rolls-Royce - Maintenance Rule - Heating and Ventilation Functions HV003 and HV004 | |
| | | | MRule CR Evaluation for CA8592559: 2-HV-E-2A/C, Service water mic leak found in MCR chiller room | 11/16/2021 |
| | | NAS-3014 | Specification for Electrical Installation for North Anna Power Station Units 1 & 2 | 21 |
| | Procedures | ER-AA-AMP-101 | Implementation of Activities Performed by License Renewal | 11 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-----------------------------|------------------------|--|------------------|
| | | | Aging Management Coordinators | |
| 71111.15 | Corrective Action Documents | CR1168559 | | |
| | | CR1168675 | | |
| | | CR1169730 | | |
| | | CR1182249 | | |
| | | CR1185468 | | |
| | | CR1186046 | | |
| | Drawings | 12050-FM-54B, Sheet 2 | Arrangement of Nuclear Incore Instrumentation | 6 |
| | Miscellaneous | SDBD-NAPS-AFW | System Design Basis Document for Auxiliary Feedwater System | 21 |
| | | SDBD-NAPS-NI | System Design Basis Document for Nuclear Instrumentation System | 16 |
| | Procedures | 0-ICM-XX-AOV-001 | AOV Inspection and Diagnostic Testing | 30 |
| | | ICP-FW-2-H-200A | Auxiliary Feed Pump Discharge Flow Control | 8 |
| 71111.19 | Procedures | 1-PT-25 | Instrument Position Indication System Channel Calibration | 14 |
| | Work Orders | 59048524004 | | |
| | | 59075853601 | | |
| | | 59103061534 | | |
| | | 59203130740 | | |
| | | 59203130741 | | |
| | | 59203309267 | | |
| | | 59203325820 | | |
| | | 59203326346 | | |
| | | 59203366143 | | |
| | | 59231301390 | | |
| 71111.22 | Drawings | 12050-FM-091A, Sheet 1 | Flow/Valve Operating Numbers Diagram Cont Quench & Recirc Spray Sub Sys North Anna Station Unit 2 Virginia Power | 41 |
| | | 12050-FM-091A, Sheet 2 | Flow/Valve Operating Numbers Diagram Cont. Quench & Recirc Spray Sys North Anna Power Station Unit 2 Virginia | 32 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---------------|--------------------------|--|--------------------------------|
| | | | Power | |
| | Procedures | 2-PT-63.1B | Quench Spray System 'B' Subsystem | 37 |
| 71151 | Miscellaneous | | MSPI Derivation Reports - Emergency AC Power System - Unreliability - Units 1 and 2 | October 2021 |
| | | | NAPS Performance Indicator Data | October 2020 to September 2021 |
| | | | MSPI Derivation Reports - Residual Heat Removal System - Units 1 and 2 | October 2021 |
| | | | MSPI Derivation Reports - Emergency AC Power System - Unavailability - Units 1 and 2 | October 2021 |
| | | NA-SDBD-000-SDBD-NAPS-RH | System Design Basis Document - Residual Heat Removal System | 17 |
| | | NAPS MSPI Basis Document | NRC Mitigating System Performance Index (MSPI) Basis Document - North Anna Power Station Units 1 and 2 | 6, 7 |
| | | NEI 99-07 | Regulatory Assessment Performance Indicator Guideline | 7 |
| | | NOTEBK-PRA-NAPS-RA.PR.1 | North Anna Power Station Units 1 and 2 - Probabilistic Risk Assessment Notebook- PRA Input to the Mitigating Systems Performance Index | 10 |