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

November 12, 2021

Mr. Daniel G. Stoddard
Senior Vice President and Chief Nuclear Officer
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

SUBJECT: NORTH ANNA POWER STATION – INTEGRATED INSPECTION REPORT 05000338/2021003 AND 05000339/2021003

Dear Mr. Stoddard:

On September 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at North Anna Power Station. On October 14, 2021, the NRC inspectors discussed the results of this inspection with Fred Mladen and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation 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.

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.

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 – INTEGRATED INSPECTION REPORT 05000338/2021003 AND 05000339/2021003 November 12, 2021

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ADAMS ACCESSION NUMBER: **ML21316A247**

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DATE	11/10/2021	11/10/2021	11/10/2021	11/12/2021	

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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:	05000338/2021003 and 05000339/2021003
Enterprise Identifier:	I-2021-003-0020
Licensee:	Virginia Electric & Power Co.
Facility:	North Anna Power Station
Location:	Mineral, VA
Inspection Dates:	July 01, 2021 to October 31, 2021
Inspectors:	K. Carrington, Resident Inspector J. Diaz-Velez, Senior Health Physicist J. McHugh, Sr. Reactor Technology Instructor W. Pursley, Health Physicist J. Rivera, Health Physicist J. Seat, Senior Project Engineer G. Smith, Senior Resident Inspector D. Strickland, Reactor Inspector M. Tobin, Senior Resident Inspector J. Zeiler, 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, 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

Unit 2 A Charging Pump Breaker Not In Fully Connected Position			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000339/2021003-01 Open/Closed	[H.1] - Resources	71111.19
A finding of very low safety significance (Green) and associated non-cited violation of Technical Specification 5.4.1.a, was self-revealed on August 31, 2021, when the safety-related 4160 Volt (V) breaker for the Unit 2 'A' charging pump was discovered not fully racked into the "CONNECT" position, after the licensee failed to properly preplan and perform post-maintenance testing following predictive maintenance affecting the performance of safety-related equipment.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000338,05000339/2021012-01	URI 2021-012 for North Anna Power Station Unit 1 and Unit 2. Following a fire-induced hot short stall event of North Anna Power Station chemical and volume control system motor-operated valves, it is uncertain whether the valves' pressure boundary components would be compromised and challenge safe shutdown capability.	71111.21N.05	Closed

PLANT STATUS

Unit 1 began the inspection period operating at or near rated thermal power. On September 12, 2021, the unit was shutdown for a planned mid-cycle maintenance outage to repair the no. 9 turbine bearing and Unit 1 reactor vessel inner o-ring leakage. The unit was restarted and the turbine generator was synchronized to the grid, on September 20. The unit was returned to operating at or near rated thermal power on September 21, 2021, where it remained through the end of the inspection period.

Unit 2 operated at or near rated thermal power for the entire 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 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. Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time, the resident inspectors performed periodic site visits each week, increasing the amount of time on site as local COVID-19 conditions permitted. As part of their onsite activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; observed risk significant activities; and completed on site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

External Flooding Sample (IP Section 03.03) (1 Sample)

(1) The inspectors evaluated that flood protection barriers, mitigation plans, procedures, and equipment are consistent with the licensee's design requirements and risk analysis assumptions for coping with external flooding on August 6, 2021.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (3 Samples)

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

(1) Unit 1 spent fuel pit cooling system prior to the Unit 1 mid-cycle outage, on September 9, 2021.
(2) Unit 1 'A' and 'B' motor-driven auxiliary feedwater (MDAFW) pump systems following planned maintenance, on September 19, 2021.
(3) Unit 1 main control room (MCR) ventilation system (air handlers and chilled water system) following a failure of the Unit 1 'C' MCR chiller (1-HV-E-4C), on September 29, 2021.

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated system configurations during a complete walkdown of the Unit 2 casing cooling system, on September 10, 2021.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (4 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) Unit 2 main steam valve house, on July 20, 2021.
(2) Unit 1 normal switchgear, on July 21, 2021.
(3) Unit 2 normal switchgear, on July 21, 2021.
(4) Unit 2 safeguards alley, on July 21, 2021.

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

(1) Unit 1 and 2 emergency switchgear room, on September 10, 2021.

71111.07A - Heat Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) Unit 2 component cooling heat exchanger 1A, 2-CC-E-1A, on July 29, 2021.

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

(1) The inspectors observed and evaluated licensed operator performance in the main control room during Unit 1 shutdown for a forced outage, on September 12, 2021.

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

(1) The inspectors observed and evaluated Drill SXG-55; Licensed Operator Requalification Program, on August 17, 2021.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 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) Bearing cooling water system functions BC002 and BC004, on August 4, 2021.
(2) Plant computer system functions CM002 and CM004, on July 28, 2021.

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSCs remain capable of performing their intended function:

(1) Unit 1 feedwater level transmitter card 1-FW-LT-1486 per work order (WO) 59203308933, and Unit 2 emergency diesel generator (EDG) air start solenoid operated valve per WO 59203276141.

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities, to ensure configuration changes and appropriate work controls were addressed:

(1) Hot weather alerts in June and July, on July 19, 2021.
(2) Elevated risk during the 2H EDG extended nine day outage, on July 21, 2021.
(3) Safe shutdown Appendix R cables requiring an hourly fire watch, on August 4, 2021.
(4) Potentially missed risk evaluation for excavation for wood retrieval from Unit 1 containment dome, on August 17, 2021.

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (6 Samples)

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

(1) VG-RM-180-1/2 declared nonfunctional due to ground and sporadic fluctuations during VG-RM-179 maintenance, on July 16, 2021.
(2) Unit 2 containment sump check valve stuck open, on July 27, 2021.
(3) Unit 2 turbine driven auxiliary feedwater pump low oil level, on August 6, 2021.
(4) Unit 2 charging pump gear box oil level high, on August 16, 2021.

(5) Unit 1 containment barrier partially degraded due to foreign material found in concrete during American Society of Mechanical Engineers (ASME) Section XI inspections, on September 21, 2021.
(6) Unit 1 reactor vessel leak-off line through wall leak, on September 17, 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-21-00056, Temporary Missile Shield for Unit 1 Containment, on September 22, 2021.

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (4 Samples)

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

(1) Unit 2 'A' charging pump breaker post-maintenance testing (PMT) following predictive maintenance and discovery of breaker not in required position, on September 28, 2021.
(2) Unit 1 turbine driven auxiliary feedwater (TDAFW) system PMT following turbine inboard bearing oil line maintenance, on September 19, 2021.
(3) Unit 1 reactor vessel leak-off piping PMT following weld repairs, on September 19, 2021.
(4) Unit 2 'H' emergency diesel generator PMT following an extended maintenance outage, on August 11, 2021.

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated Unit 1 mid-cycle forced outage activities from September 12 to 21, 2021.

71111.21N.05 - Fire Protection Team Inspection (FPTI)

Structures, Systems, and Components (SSCs) Credited for Fire Prevention, Detection, Suppression, or Post-Fire Safe Shutdown Review (IP Section 03.01)

During an NRC Triennial Fire Protection Inspection (TFPI), as documented in NRC Inspection Report 05000338 AND 05000339/2021012, inspectors documented an unresolved item (URI) regarding the licensee's evaluation of certain motor operated valves (MOVs) in North Anna Power Station's (NAPS') Unit 1 and Unit 2 Chemical and Volume Control System (CVCS). For these MOVs, the NRC was verifying that fire damage to control cabling would not cause an electrical hot short, bypassing thermal overload protection, and result in the loss of pressure boundary integrity and potentially reactor

coolant inventory. In response, North Anna provided an evaluation, 1114-0093-CALC-001, "Evaluation of North Anna Power Station (NAPS) MOV Pressure Boundaries for a Hot-Short Stall Event."

The NRC Team reviewed this calculation to ensure the licensee's evaluation adequately addressed the potential for compromise of analyzed MOV pressure boundaries. Additionally, the Inspectors posed additional questions regarding the effect on the sealing performance of the packing/joint seals of the valves. Following the review of the provided calculation as well as the responses to the NRC's inquiry, the NRC Team determined that the postulated motor stall events would not be expected to cause excessive leakage from the CVCS valves' sealing components and that the valves would retain their pressure boundary integrity.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

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

(1) Unit 1 containment dome surveillance inspection per ER-AA-NDE-VT-606, on August 25, 2021.

Inservice Testing (IP Section 03.01) (1 Sample)

(1) Unit 1 'B' low head safety injection pump comprehensive inservice pump test, on August 2, 2021.

FLEX Testing (IP Section 03.02) (1 Sample)

(1) Shared FLEX diesel generator yearly inspection per 00-BDB-GEN-1C-UNIT, on August 4, 2021.

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

(1) The 'A' Team emergency preparedness drill on July 13, 2021.

RADIATION SAFETY

71124.02 - Occupational ALARA Planning and Controls

Radiological Work Planning (IP Section 03.01) (3 Samples)

The inspectors evaluated the licensee's radiological work planning by reviewing the following:

(1) RWP 21-1224, NUHOMs EOS Cask Loading Campaign Preparation Activities.
(2) 2021 UNIT 1 REFUELING OUTAGE (1 EOC 28) Shutdown Chemistry Plan.
(3) 2020 Unit 2 ALARA Refueling Outage Report for N2R27.

Verification of Dose Estimates and Exposure Tracking Systems (IP Section 03.02) (5 Samples)

The inspectors evaluated dose estimates and exposure tracking.

The inspectors reviewed the following as low as reasonably achievable (ALARA) planning documents and outcome evaluations:

(1) RWP 21-1224, NUHOMs EOS Cask Loading Campaign for Three Casks.
(2) RWP 21-3251 Disassemble and Reassemble Reactor Vessel Head to include all maintenance activities.
(3) RP-AA-301 - Attachment 2, Department ALARA Goals 2021.
(4) 2020 Unit 2 ALARA Refueling Outage Report for N2R27.
(5) North Anna Unit 1 - Cycle 27 Primary Coolant Shutdown Chemistry Evaluation
RWP 21-3753 Work in the Transfer Canal; to include removing and replacing transfer canal blank flange and transfer cart inspection.

Implementation of ALARA and Radiological Work Controls (IP Section 03.03) (3 Samples)

The inspectors reviewed as low as reasonably achievable practices and radiological work controls.

(1) RWP 21-1216, U1 Reactor Building Entry at Power to Replace Solenoid.
(2) RWP 21-1216, U2 Reactor Building Entry at Power Using Drone to Evaluate Reactor Head "O" Ring Leakage.
(3) RWP 21-1224, NUHOMs EOS Cask Loading Campaign Preparation Activities.

Radiation Worker Performance (IP Section 03.04) (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance during:

(1) RWP 21-1216, U1 Reactor Building Entry at Power to Replace Solenoid.
RWP 21-1216, U2 Reactor Building Entry at Power Using Drone to Evaluate Reactor Head "O" Ring Leakage.
RWP 21-1224, NUHOMs EOS Cask Loading Campaign Preparation Activities.

71124.06 - Radioactive Gaseous and Liquid Effluent Treatment

Walkdowns and Observations (IP Section 03.01) (4 Samples)

The inspectors evaluated the following radioactive effluent systems during walkdowns:

(1) Plant vent stacks “A” and “B” radiation monitoring system.
(2) Steam generator high-capacity blowdown radiation monitoring system.
(3) Liquid radwaste effluent monitoring system.
(4) Ventilation filtration systems for plant vent stacks "A" and "B."

Sampling and Analysis (IP Section 03.02) (3 Samples)

(1) Evaluated compensatory sampling for Unit 2 steam generator high capacity blowdown radiation monitor that went out of service on February 24, 2021.
(2) Evaluated compensatory sampling for ventilation vent B radiation monitor that went out of service on July 13, 2021.
(3) Observed compensatory sampling for out-of-service process vent system radiation monitor.

Dose Calculations (IP Section 03.03) (2 Samples)

The inspectors evaluated the following dose calculations:

(1) Liquid clarifier continuous release sampled on May 1, 2021.
(2) Plant vent stacks "A" and "B" sampled on May 07, 2021.

71124.07 - Radiological Environmental Monitoring Program

Environmental Monitoring Equipment and Sampling (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated environmental monitoring equipment and observed collection of environmental samples.

Radiological Environmental Monitoring Program (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated the implementation of the licensee's radiological environmental monitoring program.

GPI Implementation (IP Section 03.03) (1 Sample)

(1) The inspectors evaluated the licensee's implementation of the Groundwater Protection Initiative program to identify incomplete or discontinued program elements.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS05: Safety System Functional Failures (SSFFs) Sample (IP Section 02.04) (2 Samples)

(1) Unit 1 (July 1, 2020 through June 30, 2021).
(2) Unit 2 (July 1, 2020 through June 30, 2021).

MS08: Heat Removal Systems (IP Section 02.07) (2 Samples)

(1) Unit 1 (July 1, 2020 through June 30, 2021).
(2) Unit 2 (July 1, 2020 through June 30, 2021).

BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 02.10) (2 Samples)

(1) Unit 1 (July 1, 2020 through June 30, 2021).
(2) Unit 2 (July 1, 2020 through June 30, 2021).

PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences Sample (IP Section 02.16) (1 Sample)

(1) Unit 1 (August 01, 2019 through July 31, 2021)
Unit 2 (August 01, 2019 through July 31, 2021)

71152 - Problem Identification and Resolution

Semiannual Trend Review (IP Section 02.02) (1 Sample)

(1) The inspectors reviewed the licensee's corrective action program for potential adverse trends in human performance (work coordination) that might be indicative of a more significant safety issue.

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Follow Up (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated an unanalyzed condition associated with an Appendix R noncompliance affecting the emergency diesel generators on both units and the licensee's initial response on July 22, 2021.

INSPECTION RESULTS

Unit 2 A Charging Pump Breaker Not In Fully Connected Position			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000339/2021003-01 Open/Closed	[H.1] - Resources	71111.19
A finding of very low safety significance (Green) and associated non-cited violation of Technical Specification 5.4.1.a, was self-revealed on August 31, 2021, when the safety-related 4160 Volt (V) breaker for the Unit 2 'A' charging pump was discovered not fully racked into the "CONNECT" position, after the licensee failed to properly preplan and perform post-maintenance testing following predictive maintenance affecting the performance of safety-related equipment.			
Description: North Anna Unit 2 contains three charging pumps which inject coolant into the reactor coolant system. One pump is powered by each emergency electric bus and the third pump can be powered by either emergency electric bus. The charging pumps also provide high-head safety-injection which will provide borated water during the injection phase of the design basis accident. On August 5, 2021, the licensee tagged the 'A' charging pump out of service for predictive maintenance in accordance with Tagout TR 2-21-0007. This required placing a danger tag on 4160V pump breaker 25H6, placing the 'A' charging pump's control switch in "Pull-to-Lock," and racking the 25H6 breaker into the "DISCONNECT" position in accordance with licensee Maintenance Operating Procedure (MOP), 2-MOP-8.01, "2-CH-P-1A, 'A' Charging Pump Breaker," and 0-GOP-26.9, "4160-Volt Breaker Operation." On			

August 6, 2021, following completion of the predictive maintenance, the licensee removed the tags from breaker 25H6, but did not fully rack the breaker into the "CONNECT" position as required, and placed the ‘A’ charging pump’s control switch in "Automatic."

On August 31, 2021, the licensee tagged the 'B' charging pump out of service for scheduled testing per 2-PT-36.29, "Operability Testing of Interlocks from Control Circuits for Breaker 25J6, Charging Pump 2-CH-1B." To establish the initial conditions for testing, an electrical jumper is installed in the breaker cubicle for the 'A' charging pump breaker (25H6). During implementation of the step, the licensee found that the 'A' charging pump breaker was not completely racked into the “CONNECT” position. The breaker was found with its "Trip" push button slightly depressed and breaker pivot (racking) arm rotated out of the expected position. This condition would result in the breaker re-opening after an attempted closure. The Unit 2 ‘A’ charging pump control switch was subsequently placed in "Pull-to-Lock" in the main control room and a preliminary investigation was launched to determine the cause of the improper configuration. The licensee's preliminary investigation determined that the identified condition would have prevented the 'A' charging pump 4160V breaker (25H6) from closing in an emergency.

The residents performed a review of the issue, referencing the licensee's tagout instructions, implementing procedures 2-MOP-8.01 and 0-OP-26.9, 0-GOP-26.9, and operator rounds. During their review, the inspectors noted the operator rounds' acceptance criteria contained vague instructions for distinguishing between a breaker in normal alignment versus off-normal alignment, only requiring verification of target and charging springs status, which do not entirely inform operators if a breaker is fully racked in position or in an off-normal alignment. The inspectors noted a job aid was present on the breaker, which displayed the proper positioning of the breaker racking arm, but had not been followed or referenced. Additionally, the inspectors noted that Step 1 of the MOP referenced in tagout TR 2-21-0007 required the licensee to utilize 0-GOP-26.9, "4160 Breaker Operation," to perform breaker manipulations and concurrently verify the breaker trip pushbutton was not in the depressed position. The inspectors noted that 0-OP-26.9, "4160 Breaker Operation," (which was also referenced in the procedure) also had a note warning that with the breaker trip pushbutton depressed, the breaker may attempt to close in during an emergency but will not remain closed.

Corrective Actions: Upon discovery of the condition, the licensee properly racked the breaker into the "CONNECT" position, performed an extent of condition walkdown of all 4160V breakers throughout the plant, and captured the issue in its corrective action program. A licensee human performance review board investigation was also conducted, which identified an operator training gap related to racking 4160V breakers.

Corrective Action References: Condition Report CR1179746

Performance Assessment:

Performance Deficiency: The licensee’s failure to preplan and perform post-maintenance testing following predictive maintenance, to ensure operability of the Unit 2 'A' charging pump, 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 Mitigating Systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent

undesirable consequences. Specifically, the 4160V breaker 25H6 was nonfunctional following maintenance activities because it was not properly racked into the cubicle.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding was determined to be Green based on a detailed risk evaluation performed by a senior reactor analyst (SRA). The SRA modelled the condition using the North Anna Units 1 & 2 SPAR model, Version 8.56, dated February 28, 2017, and SAPHIRE 8, Version 8.2.3. The exposure period was from the maintenance on August 5, 2021, until discovery and return to service on August 31, 2021, a period of 25 days. Charging Pump 'A' was set to Failure to Start. The dominant accident sequence was a small break loss of coolant accident, with a failure to perform a secondary side cooldown, and failure of high-pressure recirculation. The change in Core Damage Frequency for a 25-day exposure period was approximately 1 E-8, which corresponds to a finding of very low safety significance (Green).

Cross-Cutting Aspect: H.1 - Resources: Leaders ensure that personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety. The finding had a cross-cutting aspect in the Human Performance area of Resources because the licensee failed to ensure adequate resources were available to support nuclear safety. Specifically, the licensee failed to ensure training, operator rounds, and procedural instructions were sufficient to identify the Unit 2 'A' charging pump breaker was not properly racked in position following maintenance.

Enforcement:

Violation: Technical Specifications 5.4, "Procedures," requires, in part, 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 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 post-maintenance testing following predictive maintenance that could affect the Unit 2 safety-related 'A' charging pump. As a result, from August 5 to August 31, the Unit 2 'A' charging pump remained inoperable due to its 4160V breaker being not properly racked in the "CONNECT" position. This would have prevented the pump from starting in an emergency.

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

Observation: Semi-Annual Trend Results	71152

The resident inspectors reviewed the licensee's corrective action program documents to determine if there exists a negative trend in the area of work management and configuration control. Such a trend, if not corrected, has the potential to result in a significant misposition event that renders a safety system inoperable. The following examples demonstrate a negative trend in work management and configuration control events during the last 12 months:

- CR1175625 – NRC identified minor violation for a thermostat setpoint being outside of procedurally driven setpoints

- CR1179746 – A 4160 volt breaker found not fully in the CONNECT position
- CR 1172105 – Unit 1 cation bed bypass valve found out of its expected position
- CR1179864 – NRC identified CR for the service water pump house tornado missile door open when it should have been partially shut per procedure due to thunderstorms in the area
- CR1169954 – Self-revealed NRC minor violation for the outside recirculation spray valve found out of its expected position
- CR1169347 – Breaker 1-EE-BKR-1H1-4-C3R found out of its expected position
- CR1181870 – Main Control room chiller thermostats have incorrect replacement frequency
- CR1180098 – Containment penetration pressure transmitter surveillance was missed and exceeded the drop-dead date
- CR1179360 – Unit 1 anticipated transient without scram mitigation system actuation circuitry (AMSAC) preventative maintenance (PM) schedule not updated to reflect the new requirements when the system was replaced
- CR1179232 – Unit 1 feedwater level transmitter 1486 PM schedule not updated to reflect the new requirements when the transmitter was replaced
- CR1171597—Unit 2 circulating water pump running without the normally installed screen protecting from rotating equipment.

The inspectors note that each of the above work management or configuration control issues did not adversely affect nuclear safety; however, a continued degrading trend could lead to more significant issues. This trend closely aligns with a previously identified trend on human performance errors. The station continues efforts to improve performance in this area using their human error review board process, as well as all-hands meetings, and one-on-one discussions with individuals on an as-needed basis, and the resident office continues to monitor this trend closely.

EXIT MEETINGS AND DEBRIEFS

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

- On October 14, 2021, the inspectors presented the integrated inspection results to Fred Mladen and other members of the licensee staff.
- On August 5, 2021, the inspectors presented the RP Public Radiation Safety Inspection, results to Ms. Lisa Hilbert, Plant Manager, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Miscellaneous	NAPS UFSAR Appendix 2A	Revised Analysis, Probable Maximum Flood	55
	Procedures	0-GOP-4	Cold Weather Operations	67
		0-PT-9.4	Inspection of Roof Drains, Yard Drains, Roofs, and BDB Lip Flood Barriers	5
71111.04	Corrective Action Documents Resulting from Inspection	CR1180327	NRC Identified Debris on Top of the SFP Cooling Pumps Suction Strainer	09/10/2021
		CR1180880	Unit 1 3A MDAFW pump inboard packing gland nut found loose	09/19/2021
		CR1180896	NRC Identified: Debris Under U1 TDAFW Pump House Grating	09/20/2021
	Drawings	11715-FB-040D, Sheet 1	Flow/Valve Operating Numbers Diagram Air Conditioning Condenser Water System Sh. 1 of 3	47
		11715-FB-40A, Sheet 1	Flow Diagram Air Conditioning Chilled Water Systems - Sh. 1 of 3	21
		11715-FM-74A, Sheet 1	Flow/Valve Operating Numbers Diagram Feedwater System, Unit 1	57
		11715-FM-74A, Sheet 3	Flow/Valve Operating Numbers Diagram Feedwater System, Unit 1	48
	Miscellaneous	MODULE NCRODP-36-NA	Secondary Plant Ventilation Systems	12/03/2020
	Procedures	1-OP-21.6	Main Control Room and Relay Room Air Conditioning	39
		1-OP-31.2A	Valve Checkoff – Auxiliary Feedwater	25
		1-PT-71.12	AFW System Valve Position Verification	7
		2-OP-7.10A	Valve Checkoff - Casing Cooling System	12
71111.05	Corrective Action Documents Resulting from Inspection	CR1176961		
		CR1177759		
	Fire Plans	0-FS-S-4	Unit 1 & 2 Normal Switchgear Rooms	5
		2-FS-MS-1	Main Steam Valve House	5
		2-FS-SG-1	Safeguards Area Safe Shutdown Equipment Unit 2	5

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.06	Calculations	CALC-NFL-SM-1342 (ADD-000-001)	North Anna Internal Flooding Integration Into the At-Power PRA Models	0
		NA-CALC-NFL-234MAF.N	Internal Flood Analysis for the IPE	04/16/1993
		NA-CALC-NFL-SM-1342	North Anna Internal Flooding Integration Into The At-Power PRA Models	0
		NA-CALC-NFL-SM-1342 (ADD-000-00B)	North Anna Internal Flooding Integration Into The At-Power PRA Models	0
		NA-CALC-NFL-SM-1503	PRA Evaluation of North Anna Chiller Room Dike Bypass Event N-2005-2565	1
	Corrective Action Documents	CA7362095	Engineering to review the licensing and design basis of the sump pumps	08/20/2018
	Corrective Action Documents Resulting from Inspection	CR1177759		
		CR1177763		
	Drawings	11715-FB-201A	Flow/Valve Operating Numbers Diagram Secondary Plant Drain System	4
		11715-FB-201A	Flow/Valve Operating Numbers Diagram Secondary Plant Drain System	4
		11715-FB-26A	Plumbing Service Building	21
		11715-FB-26B	Plumbing Service Building	21
		NA-DWG-000-11715-FB-201A SH-002	FLOW/VALVE OPERATING NUMBERS DIAGRAM SECONDARY PLANT DRAIN SYSTEM NORTH ANNA POWER STATION UNITS 1 & 2	4
		NA-DWG-000-11715-FM-5C	ARRANGEMENT SERVICE BUILDING SHEET 3 NORTH ANNA POWER STATION	19
		NA-DWG-000-11715-LP-1512	LIGHTING PANELBOARD SCHEDULE LTG PANEL 1-EP-PNL-1S12 (LTG PNL-05)	9
		NA-DWG-000-12050-LP-2512	LIGHTING PANELBOARD SCHEDULE LTG PANEL 2S12 (LTG PNL-05-2)	9
	Engineering	NA-09-00136	Removal of Unit 1 Air Handling Room Floor Drains	06/15/2009

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Changes	NA-20-00050	Installation Instructions for Lift-Hinge Flood Gates	2
		NA-DCP-000-59-DCP-05-147	Emergency Switchgear Sump Modifications / NAPS / Units 1 & 2	05/10/2006
	Engineering Evaluations	NA-ETE-000-ETE-CPR-2012-0012 (50.59AP)	Beyond Design Basis - FLEX Strategy Basis Document and Final Integration Plan	14
	Miscellaneous	ACE 000337	ACE to Eng. ACE is to address conditions noted on CR 008734 and CR 008737	03/16/2007
	Self-Assessments	NA-NOTEBK-PRA-NAPS-IF.2	NAPS PROBABILISTIC RISK ASSESSMENT MODEL NOTEBOOK	1
71111.07A	Miscellaneous	2-CC-E-1A As Found 05-25-2021		
		Engineering Logs		05/25/2021
	Procedures	ER-AA-HTX-1002		
	Work Orders	WO 59203270062	Cleaning and Plugging of Component Cooling Heat Exchanger Tubes	06/01/2021
71111.12	Miscellaneous		RCS Leak Rate Program for Execution on Plant Computer System- Design Specification	2
			Tracking Group and Performance Criteria Basis Documents for Maintenance Rule Functions BC002, BC003	
			A(1) Action Plan Report- Perform MRule Functional Failure Evaluation for 2-BC-P-1A Pump Casing is Not Full	
			Maintenance Rule Evaluations	
		NA-VTM-59-D840-00001	Sequence of Events Recorder	1
	Work Orders	WO 59203276141		
		WO 59203308933		
71111.13	Corrective Action Documents Resulting from Inspection	CR1177651		
	Miscellaneous		Operations Narrative Logs for June and July 2021	
			North Anna Plan of the Week	July 2021

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Work Week 4- North Anna Plan of Week (POW) - July 11 to July 31, 2021	
71111.15	Calculations	CEM-0208	Evaluation of Missile Barrier for North Anna Power Station Service Water Pump House Installed per DC NA-18-00125	10/29/2019
	Corrective Action Documents	CA242962	Document Previous Operability (due 20 days)	09/17/2012
		CR1177199	App R Concern Identified with Cable Separation Associated with U1&U2 EDG and Emergency Bus Operation	07/20/2021
		CR1177264	Missile Protection on Unit 1 Containment is Less than Required	07/21/2021
		CR1177270	Active Packing and fitting Leakage on 1-RC-33	
		CR1177293		
	Drawings	11715-CBM-093A-5	ISI Classification Boundary Dwg Interval 5, Reactor Coolant System- Loop 1	0
	Engineering Changes	NA-21-00056	Temporary Missile Shield for Unit 1 Containment	07/21/2021
	Engineering Evaluations	CEP 00-0031	Evaluation of Concrete Block and Structural Steel Fire Barriers	3/1/2000
		ET CCE 01-0007	Initial Concrete Containment Assessment, North Anna Power Station, Unit 1	08/13/2001
	Miscellaneous		Test Oil Industrial Analysis - 1-CH-P-1A	08/13/2021
		NAPS Appendix R Report		48
		ODM CA8453522	Unit 1 Reactor Vessel Flange Leakoff Hi Temp Annunciator	6/28/2021
		SDBD-NAPS-RC	System Design Basis Document for Reactor Coolant System	29
	Procedures	ER-AA-NDE-VT-605	Nondestructive Examination Procedure	3
	Work Orders	WO 59203369270		
71111.18	Engineering Changes	NA-21-00056	Temporary Missile Shield for Unit 1 Containment	07/21/2021
	Miscellaneous	Sikaflex-1A Product Data Sheet		August 2019
		WO59203369270	Install Temp Mod NA-21 -00056	07/21/2021
71111.19	Corrective Action	CR1180896	NRC identified transient combustible debris under U1	09/19/2021

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Documents Resulting from Inspection		TDAFW pumphouse grating	
	Miscellaneous		Unit 2 Operator Narrative Logs (08/04/2021 to 08/31/2021)	
			Training Module Basic Electric Distribution	
		INPO 87-028	Post-Maintenance Testing	December 1994
		Tagout 2-21-CH-007	Tagout for 2-CH-P-1A, Unit 2 High Head Safety Injection Pump '1A'	09/28/2021
	Procedures	0-MPM-0701-04	Maintenance Run Test Procedure for Emergency Diesel Generator	36
		0-OP-26.9	4160 Volt Breaker Operation	34
		1-PT-46.21	RCS Pressure Boundary Components Affected by Boric Acid Accumulation	32
		1-PT-46.21.1	Containment Boric Acid Accumulation Inspection	5
		1-PT-71.1Q	1-FW-P-2, Turbine Driven Auxiliary Feedwater Pump and Valve Test	74
		2-MOP-8.01	2-CH-P-1A, A Charging Pump	64
		2-PT-36.39	Operability Testing of Interlocks from Control Circuits for Breaker 25J6, Charging Pump 2-CH-P-1B	7
		2-PT-82.2A	2H Diesel Generator Test (Simulated Loos of Off-Site Power)	78
		MA-AA-100	Conduct of Maintenance	22
		NCRODP18.NA	Basic Electrical Distribution System	11/12/2019
		OP-AA-200	Equipment Clearance	34
		VPAP-2003	Post Maintenance Testing Program	14
	Work Orders	59203303225		
		59203354024		
		59203366914		
		59203370038		
71111.20	Corrective Action Documents Resulting from Inspection	CR1180743	NRC Closeout Walkdown- Unit 1 Containment	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Miscellaneous		Reactor engineering reactivity plan for Unit 1 startup from maintenance outage	09/17/2021
		Startup Just-In-Time-Training (JITT)	'A' operations crew startup JITT for maintenance outage	05/21/2021
	Procedures	1-OP-1.3	Unit Startup from Mode 5 to Mode 4	75
		1-OP-1.4	Unit Startup from Mode 4 to Mode 3	80
		1-OP-1.5	Unit Startup from Mode 3 to Mode 2	94
		1-OP-1C.2	Estimated Critical Position Calculation Using RXMAN Code	3
		1-OP-2.1	Unit Startup from Mode 2 to Mode 1	128
71111.22	Calculations	CALC 59-01-PT-138	1-SI-P-1A & 1-SI-P-1B Comprehensive Pump Testing	3
		CALC ME-0628	Minimum Delivered LHSI Flow For LB LOCA Analysis And Acceptance Criteria For LHSI Pump Operability Verification Testing, North Anna 1 & 2	1 Addendum 00A
	Corrective Action Documents	CR1170488		
		CR1170820		
		CR1176404		
		CR1176549		
		CR1176602		
		CR1176858		
		CR1176867		
	Miscellaneous		ASME OM Code for Operation and Maintenance of Nuclear Power Plants, Subsections ISTB and ISTC, Inservice Testing of Pumps in Light-Water Reactor Plants	
		ETE-CEP-2019-0005	Summary of Design Basis Accident Flow Rates for Pumps in the North Anna IST Program	1
		NA-PLAN-000-U1	North Anna Power Station Unit 1 Inservice Testing Program Plan for Pumps and Valves- Fifth Inservice Testing Interval (December 15, 2020 - December 14, 2030)	2
	Procedures	0-MPM-2000-01	Annual/Full Load Test of FLEX Equipment	9
		1-PT-138	Valve ISI- LHSI System Functional Verification	2
		ER-AA-IST-101	ASME IST Program - Inservice Testing of Pumps	5
		ER-AA-IST-PMP-	ASME IST Program - Inservice Testing of Pumps	10

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		101	Implementation	
		ER-AA-NDE-TV-606	IWL Visual Examination Procedure	2
	Work Orders	59203308119	BDB Annual Inspections	
71114.06	Corrective Action Documents	CR1176786		
71124.02	Procedures	RP-AA-103	ALARA Program	Revision 2
		RP-AA-103-1000	Department, Station and Fleet ALARA Committees	Revision 5
		RP-AA-274	Radiation Work Permits	Revision 10
		RP-AA-275	Radiological Risk Assessment Process	Revision 5
71124.06	Corrective Action Documents	CR1161309	1-VG-RI-180 has been non-functional for 7 days	11/23/2020
		CR1176799	Fault on 1-VG-RM-180-1 and 180-2	07/13/2021
	Miscellaneous	HP-1033.206	Grab sampling due to radiation monitor #1-GW-RM-178 being out of service	08/01/2021
		HP-1033.206	Grab sampling due to radiation monitor #2-SS-RM-225 being out of service	02/24/2021
	Procedures	HP-3010.021	Radioactive Liquid Waste Sampling and Analysis	Rev. 23
71124.07	Calibration Records	Air Sampler Calibration Kit #15	Air Sampler Calibration Kit #15	03/04/2021
		Air Sampler Calibration Kit #16	Air Sampler Calibration Kit #16	02/17/2021
		Air Sampler Calibration Kit #20	Air Sampler Calibration Kit #20	02/18/2021
		Air Sampler Calibration Kit #27	Air Sampler Calibration Kit #27	02/16/2021
		O-PT-40.1	METEOROLOGICAL MONITORING SYSTEM CALIBRATION	01/08/2019
	Corrective Action Documents	CRs 1129605, 1131123, 1151189,	Corrective Action Document	Various

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		1154302, 1159285, 1166236, and 1166315.		
	Engineering Changes	NA-21-00020	Met Tower Wind Sensor Replacement	07/29/2021
	Engineering Evaluations	NA-2020-022	CM-AA-REA-1001 - Request for Engineering Assistance: Meteorological Monitoring	05/20/2020
		PA7642310	Met Tower F460 cup and valve parts discontinued from production	07/15/2019
		PA7933602	Met Tower annual inspection PM strategy	05/13/2020
		PA8077843	Met Tower Wind Speed Sensor Obsolete	07/07/2020
		PA8334529	Prep and Issue DC for REA NA-2020-022 - Met Tower Speed Sensor Obsolete	01/19/2021
	Miscellaneous	2019 Interlaboratory Comparison Program Results	2019 Interlaboratory Comparison Program Results	N/A
		2019 Joint Frequency Distribution	Joint Frequency Distribution report based on the annual meteorological data collected in 2019 (includes 5 yr data integration)	03/03/2020
		2020 Interlaboratory Comparison Program Results	2020 Interlaboratory Comparison Program Results	N/A
		2020 Joint Frequency Distribution	Joint Frequency Distribution report based on the annual meteorological data collected in 2020 (includes 5 yr data integration)	02/04/2021
		HP 3051.010	HP 3051.010 - Attachment 10 (Field Log: Environmental Air Sampler Stations)	08/03/2021
	Procedures	0-ACP-MM-NIS-001P	Primary Meteorological Tower Instrument Calibration	Rev. 9
		0-HSP-REMP-001	RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM, LAND USE CENSUS	Rev. 2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		0-PT-40.1	METEOROLOGICAL MONITORING SYSTEM CALIBRATION	Rev. 9
		C-HP-1033.620	PORTABLE AIR SAMPLERSCALIBRATION AND OPERATION	Rev. 9
		HP-3051.010	RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM	Rev. 33
		HP-3051.020	GROUND WATER PROTECTION PROGRAM	Rev. 15
		RP-AA-502	Groundwater Protection Program	Rev. 9
		VPAP-2103N	Offsite Dose Calculation Manual (North Anna)	Rev. 29
	Self-Assessments	19-10 ODCM, REMP, EPP Self-Assessment	ODCM, REMP, EPP Self-Assessment	01/13/2020
		2017 GWP Initiative Self-Assessment	2017 GWP Initiative Self-Assessment (Appendix B)	12/2017
	Work Orders	59203324540	Replace Sump Pump (02-DB-P-27-PUMP)	03/09/2021
71151	Miscellaneous		North Anna Heat Removal Performance Limit Exceeded (PLE) Derivation Report (June 2020 to July 2021)	
			NAPS MSPI Basis Document	9
			Monthly Fuel Reliability Indicator June 2021 for North Anna Power Station	
			Unit 1 and 2 Heat Removal URI Derivation Reports for June 2020 to July 2021	Generated 08/23/2021
			Max Dose Equivalent Iodine Excelsheet (from April 2020 to June 2021)	
71152	Corrective Action Documents	CR1170098		
		CR1171597		
		CR1179232		
		CR1179360		
		CR1181870		
	Corrective Action Documents Resulting from Inspection	CR1182856	NRC 3Q21 Integrated Inspection Exit Brief Items	