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

November 7, 2022

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

SUBJECT: NORTH ANNA POWER STATION – INTEGRATED INSPECTION REPORT
05000338/2022003 AND 05000339/2022003

Dear Daniel Stoddard:

On September 30, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at North Anna Power Station. On October 27, 2022, the NRC inspectors discussed the results of this inspection with Ms. Lisa Hilbert 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.

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,

Signed by Fannon, Matthew
on 11/07/22

Matthew S. Fannon, 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 05000338/2022003 AND 05000339/2022003 DATED NOVEMBER 7, 2022

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X SUNSI Review		X Non-Sensitive ☐ Sensitive		X Publicly Available ☐ Non-Publicly Available	
OFFICE	RII/DRP	RII/DRP			
NAME	K. Carrington	M. Fannon			
DATE	11/7/2022	11/7/2022			

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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:	05000338/2022003 and 05000339/2022003
Enterprise Identifier:	I-2022-003-0029
Licensee:	Dominion Energy
Facility:	North Anna Power Station
Location:	Mineral, Virginia
Inspection Dates:	July 1, 2022 to September 30, 2022
Inspectors:	K. Carrington, Senior Resident Inspector C. Fontana, Emergency Preparedness Inspector L. Jones, Senior Reactor Inspector S. Kennedy, Senior Resident Inspector S. Sanchez, Senior Emergency Preparedness Inspector M. Schwieg, Senior Reactor Inspector J. Walker, Emergency Response Inspector T. Fanelli, Senior Reactor Inspector
Approved By:	Matthew S. Fannon, 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

Failure to Follow Procedure Results in 2J Emergency Diesel Generator Fuel Oil Transfer Pump Isolation Valve Being Closed During Performance Test			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000339/2022003-01 Open/Closed	[H.12] - Avoid Complacency	71111.15
A finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed on June 16, 2022, when the 2J emergency diesel generator (EDG) fuel oil test loop isolation valve, 2-EG-1020, was discovered in the closed position during the 2J EDG post-maintenance run. Specifically, on June 4th, while performing 0-PT-89.9L, the licensee failed to ensure 2-EG-1020 was left in the open position. This resulted in both 2J diesel fuel oil transfer subsystems being unavailable to support the function of the 2J EDG.			

Failure to Verify Adequacy of Assumptions			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000339/2022003-02 Open/Closed	None (NPP)	71111.15
The NRC identified a finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, for the licensee's failure to verify or check the adequacy of the design of the fire protection carbon dioxide (CO_2) system effects on the operability of the 2H Emergency Diesel Generator (EDG) by the performance of design reviews or by the use of alternate or simplified calculational methods.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000338,05000339/2021-002-00	LER 2021-002-00 for North Anna Power Station, Unit 1 and 2, Unanalyzed Condition Due to Appendix R Concerns with Cable Separation	71153	Closed

PLANT STATUS

Unit 1 began the inspection period operating at or near rated thermal power. On September 20, the unit was shut down for a planned refueling outage, where it remained through the end of the inspection period.

Unit 2 began the inspection period operating at or near rated thermal power. On August 14, the unit was shut down to support planned maintenance on the 'C' reactor coolant pump. The unit was restarted on August 26. On August 27, the unit was shutdown from approximately 28% rated thermal power due to a transformer fire. The unit was restarted following repairs to the transformer on September 19. The unit reached full rated thermal power on September 21, where it continued to operate for the remainder 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,” 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) (3 Samples)

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

(1) Unit 1 'J' emergency diesel generator (EDG) system during planned testing of 1H EDG, on July 6, 2022
(2) Unit 1 'A' quench spray system prior to 'B' quench spray system planned testing, on September 6, 2022
(3) Unit 1 turbine-driven auxiliary feedwater (AFW) system during 'A' and 'B' AFW timed response and logic testing, on September 21, 2022

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (2 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) Fire Zone 8, Unit 1 turbine building basement, on September 6, 2022
(2) Fire Zone 9B-2, Unit 2 J EDG room, on September 22, 2022

Fire Brigade Drill Performance Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated the onsite fire brigade training and performance during unannounced Fire Drill 3-4, on August 8, 2022.

71111.08P - Inservice Inspection Activities (PWR)

PWR Inservice Inspection Activities Sample (IP Section 03.01) (1 Sample)

(1) The inspector evaluated the following the pressurized water reactor non-destructive examinations from Sept 23, 2022, to September 28, 2022:

Visual Inspections:
- Electrical penetration to fuel building flange bolting
- Spring hanger SH-21 inside containment

Ultrasonic Examination
- Welding overlays on pressurizer spray and safety relief lines

The inspector evaluated the licensee's boric acid control program performance.

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 control room during Unit 2 shutdown for a planned mid-cycle outage to repair the 'C' reactor coolant pump seal, on August 14, and Unit 2 shutdown for a main transformer fire and turbine trip, on August 27, 2022.

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

(1) The inspectors observed and evaluated licensed operator requalification and just-in-time training activities for the unit 2 mid-cycle outage, on August 8 and September 8, 2022.

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) 1-FP-P-2, diesel-driven fire pump associated with condition report (CR)1198378, 1-FP-P-2 exceeded maintenance rule unavailability hours during annual engine maintenance, on September 8, 2022

(2) U1 'J' EDG air receivers associated with CR1202859, 1-EG-C-1JB running with no corresponding pressure increase, on September 20, 2022

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSC remains capable of performing its intended function:

(1) 2-RC-SV-2551B, pressurizer safety valve, following replacement, on September 13, 2022

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) North Anna plant risk during Pennsylvania, New Jersey, Maryland transmission owner hot weather alert, from July 19 to July 22, 2022
(2) North Anna plant risk during Unit 2 shutdown for main transformer fire and automatic turbine trip with manual reactor trip, on August 27, 2022
(3) Unit 2 shutdown safety risk during reactor coolant system inventory drain down evolutions, on August 31, 2022
(4) Units 1 and 2 online and shutdown risk during 1R29 and Unit 2 startup activities, between September 19 and 22, 2022

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) CR1199293, Inadvertent CO2 release in 2H EDG room, on July 21, 2022
(2) CR1205450, NRC Questioned Operability of AFW During Performance of 1-PT-71.15, on August 12, 2022
(3) CR1205988, 2-I Battery Charger and inverter trouble, and CR1206033, 9 Volt Ground on 2-BY-BC-2-I, on August 15, 2022
(4) CR1201855, 2-EG-1020 Found Closed, on August 16, 2022
(5) CR1206126, NLP card PQ-FW201A (CA-125) Output is Erratic, on August 22, 2022

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (2 Samples)

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

(1) Post-maintenance testing of Unit 1 'H' EDG following maintenance during refuel outage 1R29, on September 24, 2022
(2) Post-maintenance testing of 'A' service water system in accordance with 0-MOP-49.08 and 0-OP-49.6, following service water header outage, on July 8, 2022

71111.20 - Refueling and Other Outage Activities

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

(1) The inspectors evaluated Unit 2 maintenance outage activities from August 13, 2022, to September 17, 2022.
(2) (Partial)
The inspectors evaluated Unit 1 refueling outage activities from September 20, 2022, to September 30, 2022.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance testing activities to verify system operability and/or functionality:

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

(1) 1-PT-213.5J, Valve Inservice Inspection (1-QS-MOV-101B), on September 9, 2022
(2) 1-PT-211.6, Valves Inservice Inspection (AFW check valves), on September 20, 2022
(3) 1-PT-83.1, Simulated Loss of Offsite Power (LOOP) and ESF Actuation- H Bus, on September 21, 2022

Containment Isolation Valve Testing (IP Section 03.01) (1 Sample)

(1) 1-PT-61.3, Containment Type C Test [Valve Penetration 44], on September 29, 2022

71114.01 - Exercise Evaluation

Inspection Review (IP Section 02.01-02.11) (1 Sample)

(1) The inspectors evaluated the biennial emergency plan exercise during the week of July 18, 2022. The simulated scenario began with a reactor coolant pump (RCP) experiencing excessive vibration that caused a loose parts alarm for the lower reactor vessel area. A subsequent increase in the letdown radiation monitor readings soon exceeded the threshold value for declaration of an Unusual Event. A short time later, Health Physics/Chemistry reported that the dose equivalent iodine exceeded the threshold for indication of a loss of fuel clad barrier, thus meeting the conditions for declaration of an Alert. As RCP vibrations increased, the necessity to trip the reactor occurred, followed by another loose parts alarm for the ‘A’ steam generator (SG) area. A short time later, a steam generator tube rupture occurred in the ‘A’ SG, thus meeting the conditions for declaration of a Site Area Emergency. Lastly, the ‘A’ main steam safety valve failed open and conditions for declaration of a General Emergency were met, and the Offsite Response Organizations were able to demonstrate their ability to implement emergency actions.

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

(1) The inspectors evaluated submitted Emergency Action Level, Emergency Plan, and Emergency Plan Implementing Procedure changes during the week of July 18, 2022. This evaluation does not constitute NRC approval.

71114.08 - Exercise Evaluation - Scenario Review

Inspection Review (IP Section 02.01 - 02.04) (1 Sample)

(1) The inspectors reviewed and evaluated in-office, the proposed scenario for the biennial emergency plan exercise at least 30 days prior to the day of the exercise.

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, 2021, through June 30, 2022)
(2) Unit 2 (July 1, 2021, through June 30, 2022)

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

(1) Unit 1 (July 1, 2021, through June 30, 2022)
(2) Unit 2 (July 1, 2021, through June 30, 2022)

EP01: Drill/Exercise Performance (DEP) Sample (IP Section 02.12) (1 Sample)

(1) April 1, 2021, through March 31, 2022

EP02: Emergency Response Organization (ERO) Drill Participation (IP Section 02.13) (1 Sample)

(1) April 1, 2021, through March 31, 2022

EP03: Alert And Notification System (ANS) Reliability Sample (IP Section 02.14) (1 Sample)

(1) April 1, 2021, through March 31, 2022

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Followup (IP Section 03.01) (2 Samples)

(1) The inspectors evaluated a notice of unusual event and the licensee’s response, on September 4, 2022.

(2) The inspectors evaluated a fire on the 'B' phase of the Unit 2 main power transformer with a subsequent automatic turbine and manual reactor trip and the licensee's response, on August 27, 2022.

Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports (LERs):

(1) LER 50-338/2021-002-00, Unanalyzed Condition Due to App R Concern Identified with Cable Separation (ADAMS Accession No. ML22035A167). The inspection conclusions associated with this LER are documented in Inspection Report 05000338/2022001; 05000339/2022001; and 07200056/2022001, in inspection results Section 71153. This LER is closed.

INSPECTION RESULTS

<table>
<tr><td colspan="4">Failure to Follow Procedure Results in 2J Emergency Diesel Generator Fuel Oil Transfer Pump Isolation Valve Being Closed During Performance Test</td></tr>
<tr><td>Cornerstone</td><td>Significance</td><td>Cross-Cutting Aspect</td><td>Report Section</td></tr>
<tr><td>Mitigating Systems</td><td>Green
NCV 05000339/2022003-01
Open/Closed</td><td>[H.12] - Avoid Complacency</td><td>71111.15</td></tr>
<tr><td colspan="4">A finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed on June 16, 2022, when the 2J emergency diesel generator (EDG) fuel oil test loop isolation valve, 2-EG-1020, was discovered in the closed position during the 2J EDG post-maintenance run. Specifically, on June 4th, while performing 0-PT-89.9L, the licensee failed to ensure 2-EG-1020 was left in the open position. This resulted in both 2J diesel fuel oil transfer subsystems being unavailable to support the function of the 2J EDG.</td></tr>
<tr><td colspan="4">Description: The diesel fuel oil transfer system is a support system of the EDG system that is relied upon during an emergency to transfer fuel oil from a fuel oil storage tank to a diesel day tank via an associated fuel oil transfer pump. While the EDGs at North Anna are each provided with two redundant fuel oil transfer subsystems, only one subsystem is required to support diesel operability. One subsystem consists of a single diesel fuel oil transfer pump, fuel oil piping, and associated controls.

Periodically, the licensee pressure tests the piping from a fuel oil transfer pump to its associated EDG day tank. During the test, the fuel oil transfer pump is unavailable. On June 4th, the licensee performed a pressure test of the lines from the 2-EG-P-2JA and 2-EG-P-2JB EDG fuel oil transfer pumps to the 2J EDG day tank in accordance with 0-PT-89.9L and 0-PT-89.9M, respectively. To pressure test the piping in each flow path, the respective EDG fuel oil transfer pump is removed from service by closing its associated suction and discharge valves; additionally, the respective pump's test loop isolation valve is verified in the open position. Pressure is then applied to the piping via a test rig.

During performance of 0-PT-89.9L, which tests the piping from the 2JA fuel oil transfer pump to the 2J EDG diesel day tank, the 2JA test loop isolation valve, 2-EG-1020, was placed in the closed position. This was contrary to Step 6.1.3.e which required the valve be verified in the open position. This valve is normally in the open position when the 2JA fuel oil transfer</td></tr>
</table>

system is in a standby configuration. Following completion of the 2JA surveillance, the licensee performed 0-PT-89.9M, which tests the line from the 2JB fuel oil transfer pump to the 2J EDG diesel day tank. During that time the 2JB fuel oil transfer pump was made unavailable. With the 2JB transfer pump unavailable and the 2-EG-1020 test loop isolation valve closed, both diesel fuel oil transfer pump subsystems were unavailable to support the safety function of the 2J EDG. This condition existed for a duration of three hours between June 4, and June 16, 2022. The licensee determined the 2J EDG was inoperable during this timeframe.

On June 16, during a post-maintenance test run of the 2J EDG following a 6-year preventive maintenance activity, the licensee received fuel oil day tank low level alarms in the main control room. Upon investigation, the licensee noted that there was no change in tank level while the 2J fuel oil transfer pump was running and that the 2-EG-1020 test loop isolation valve closed. The licensee subsequently placed the valve in the open position, restoring the transfer subsystem to an available status.

Corrective Actions: The licensee repositioned the fuel oil transfer test isolation loop valve in the correct configuration, performed a human performance review board to capture learnings from the event, and captured the issue in its corrective action program. Additionally, the licensee reperformed the surveillance following discovery of the 2-EG-1020 valve being mispositioned.

Corrective Action References: CR1201855

Performance Assessment:

Performance Deficiency: The licensee's failure to open the fuel oil transfer system test loop isolation valve, 2-EG-1020, as directed in Step 6.1.3e of 0-PT-89.9L was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Configuration Control 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.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix A, “The Significance Determination Process (SDP) for Findings At-Power.” The finding screened as Green because the inspectors answered "no" to all of the questions in Exhibit 2, "Mitigating Systems Cornerstone Screening Questions," since the performance deficiency did not impact the quality or design of the emergency diesel fuel oil transfer system, did not cause the system to be inoperable for greater than the TS-allowed outage and ORA-mission times, and would not have resulted in a loss of safety function of the emergency diesel generating system.

Cross-Cutting Aspect: H.12 - Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. Specifically, the licensee failed to implement error reduction tools to ensure the diesel fuel oil system would remain available.

Enforcement:

Violation: 10 CFR 50, Appendix B, Criterion V, requires that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

0-PT-89.9L (an activity affecting quality), Step 6.1.3.e, required in part, "verify open 2-EG-1020, fuel oil test loop isolation valve."

Contrary to the above, from June 4 to June 16, 2022, the licensee failed to accomplish the instructions in Step 6.1.3.e. of procedure 0-PT-89.9L when it did not verify the 2-EG-1020 was in the open position.

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

Failure to Verify Adequacy of Assumptions			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000339/2022003-02 Open/Closed	None (NPP)	71111.15

The NRC identified a finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, for the licensee's failure to verify or check the adequacy of the design of the fire protection carbon dioxide (CO_2) system effects on the operability of the 2H Emergency Diesel Generator (EDG) by the performance of design reviews or by the use of alternate or simplified calculational methods.

Description: On May 12, 2022, planned maintenance on fire protection electrical circuits inadvertently triggered the CO_2 system in the 2H EDG room. The licensee isolated the EDG room because oxygen levels did not support entry of personnel into the room. Condition Report (CR) 1199293 was written to document the event. The licensee performed an operability evaluation of the event that relied on calculation CME 94-057, SDBD-NAPS-EG, Open Item 24.14.46, North Anna Power Station [NAPS] -Units 1 & 2, Revision 0, dated December 8, 1994. Based on Information Notice (IN) 94-12, "Insights Gained from Resolving Generic Issue 57: Effects of Fire Protection System Actuation on Safety-Related Equipment," the calculation investigated the effects of a release from the CO_2 fire protection system on EDG performance.

The inspectors were concerned that the CO_2 could have affected the combustion air quality of the 2H EDG. The inspectors determined that the licensee's reliance on calculation CME 94-057 was flawed because it inaccurately represented the potential CO_2 concentration in the EDG rooms from an inadvertent release. The calculation overestimated the EDG room volume solely based on the design of the EDG radiator fan capacity, although the fan capacity has no effect on the actual volume of the room. The calculation stated that the CO_2 fire protection system was designed for 30% concentration in a 2-minute period. However, this was a minimum design requirement not the actual design of the CO_2 system. The actual design calculation 131035-Z2-6, "Low Pressure CO_2 Hydraulic Calculations," dated October 10, 2007, stated that the system was designed for a 50% concentration in a room (modeled

to be approximately 25% larger than the 2H EDG room). Thus, the 2H EDG could see CO2 concentrations exceeding 50% in the smaller room, and since CO2 is heavier than air, the diesel combustion air intakes would likely see concentrations higher than the general room concentration.

North Anna Calculation CME 94-057 stated that a 10-second CO2 release would equal 164 lbs., but North Anna calculation 131035-Z2-6 stated that a 10-second CO2 release would equal approximately 510 lbs. The licensee postulated this would equate to about 3.3% CO2 concentration in the room for a 7-second discharge.

Additionally, the calculation, CME 94-057, stated that the diesel radiator fan would sweep the CO2 from the room, which would not be possible because the fan cannot run if the diesel cannot start and the room's ambient fan is disabled during CO2 system actuation. The inspectors determined that the licensee incorrectly based their operability determination on a calculation that did not meet 10 CFR 50 Appendix B, Criterion III requirements.

Following discussions, the licensee reevaluated the amount of CO2 discharged into the 2H EDG room and determined the system released 12.3% CO2 which is significantly higher than the 3.3%. The licensee concluded the 12.3% fell below the 15% CO2 concentration limit for allowable concentration in the room to ensure diesel operability. The inspectors noted this change in margin was significant and the resulting number showed there was less margin available to support diesel operability.

Corrective Actions: The licensee initiated a corrective action document (CA11214300) to revise the calculation.

Corrective Action References: CR1199293, CA11214300

Performance Assessment:

Performance Deficiency: The failure to verify or check the adequacy of design of the fire protection system effects on the operability of the Emergency Diesel Generator (EDG) by the performance of design reviews or by the use of alternate or simplified calculational methods was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control 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. The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control 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, underestimating the amount of CO2 released in the EDG room affects the reliability and availability of plant mitigation systems and could cause undesirable consequences.

Additionally, the inspectors noted the performance deficiency mirrored more-than-minor example 3.h in IMC 0612, Appendix E, "Examples of Minor Issues," since the inspectors noted the EDG design calculation specified a higher air room volume than actual, which in turn resulted in a significant change in margin that if other inconsistencies had been taken into consideration would provide a case for reasonable doubt.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix A, “The Significance Determination Process (SDP) for Findings At-Power.” The finding screened as Green because the inspectors answered "no" to all of the questions in Exhibit 2, "Mitigating Systems Cornerstone Screening Questions," since the performance deficiency did not impact the quality or design of the emergency diesel fuel oil transfer system, did not cause the system to be inoperable for greater than the TS-allowed outage and PRA-mission times, and would not have resulted in a loss of safety function of the emergency diesel generating system.

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: 10 CFR 50, Appendix B, Criterion III, “Design Control,” requires, that design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, on or before May 12, 2022, the licensee failed to provide design control measures for verifying or checking the adequacy of EDG design, such as by the use of alternate or simplified calculational methods to determine the effects of CO2 on the performance of the EDG.

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 October 27, 2022, the inspectors presented the integrated inspection results to Ms. Lisa Hilbert and other members of the licensee staff.
- On July 21, 2022, the inspectors presented the emergency preparedness exercise inspection results to Ms. Lisa Hilbert and other members of the licensee staff.
- On September 28, 2022, the inspectors presented the Unit 1 inservice inspection results to 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-		
		11715-FM-074		
		11715-FM-091D		
	Procedures		Valve Checkoff	
71111.08P	Corrective Action Documents	1207956	ISI exam of PH-9023 clearance gap greater than shown on design drawing	09/16/2022
		1208876	Boric Acid cleaned from various components	09/28/2022
	Engineering Evaluations		BACC evaluation 1-CH-P-2A	08/17/2022
			BACC evaluation 1-LW-524	04/26/2022
			BACC evaluation 1-RP-P-1C	08/09/2022
			BACC evaluation 1-SS-TV-200B	08/24/22
			BACC evaluation 1-BR-P-7B	04/28/2022
	Miscellaneous		NANN Unit 1 Interval 3 IWE Schedule	
	NDE Reports	N1-103420	Spring Hanger	10/03/2022
		N1-110115	PWOL-6 (Weld 11)	09/28/2022
		N1-716210	Electrical penetration to Fuel Bld Flange Bolting	09/27/2022
71111.11Q	Procedures	1-OP-2.2	Unit Power Operation From Mode 1 to Mode 2	82
71111.12	Miscellaneous		Receipt Inspection for PO70370052	08/17/2022
71111.13	Miscellaneous		Plan of the Week	07/21/2022
		Notebk-PRA-NAPS-RA.PR.3.A	North Anna Power Station PRA Risk Summary	4
	Procedures	WM-AA-100	Work Management	
		WM-AA-301	Operational Risk Management	
71111.15	Calculations	NA-CALC-ZZZ-SE-0028	Minimum Levels for the Fire Protection Low Pressure C02 Tanks	5/25/2001
71111.20	Miscellaneous		59 NAPS- Outage Master Schedule	08/13-08/24/2022
			Unit 2 Planned Outage 0705 and 1600 Outage Manager Shift Brief	08/14/2022 to 08/24/2022
			Shutdown Safety Assessment	8/14/2022 -

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
				9/20/2022
	Procedures	1-GOP-13.0	Alternate Core Cooling Method Assessment	
		2-OP-1.5	Unit Startup from Mode 3 to Mode 2	
		2-OP-1.5A	Mode 3 to Mode 2 Checklist	
		2-OP-1.7	Unit Startup from Mode 3 to Mode 2 Following Refueling	38
		OU-AA-200	Shutdown Risk Management	
71111.22	Procedures	1-PT-211.6	Valves Inservice Inspection (AFW check valves)	13
		1-PT-61		
	Work Orders	WO 592033808885	Valve Inservice Inspection	09/08/2022
71151	Miscellaneous	U2 April 2022 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 Aug 2021 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 Dec 2021 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 Feb 2022 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 Jan 2022 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 Jul 2022 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		U2 July 2022 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 June 2022 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 March 2022 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 May 2022 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 Nov 2021 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 Oct 2021 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
		U2 Sep 2021 - Heat Removal MSPI Derivation Report URI	MSPI System MSPI Heat Removal System	Rev. 1
71152A	Corrective Action Documents	CR1203760		
71153	Miscellaneous	EAL MATRICES	Emergency Action Level Matrices	10