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

May 11, 2022

Mr. Daniel Stoddard
Senior Vice President and Chief Nuclear Officer
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION – INTEGRATED INSPECTION REPORT
05000280/2022001 AND 05000281/2022001

Dear Mr. Stoddard:

On March 31, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Surry Power Station. On April 7, 2022, the NRC inspectors discussed the results of this inspection with Fred Mladen, Site Vice President, 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 Surry 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 Surry 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 Endress, Matthew
on 05/11/22

Matthew F. Endress, Chief (Acting)
Reactor Projects Branch
Division of Reactor Projects

Docket Nos. 05000280 and 05000281
License Nos. DPR-32 and DPR-37

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: SURRY POWER STATION – INTEGRATED INSPECTION REPORT 05000280/2022001 AND 05000281/2022001 DATED MAY 11, 2022

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OFFICE	RII/DRP	RII/DRP	RII/DRP	RII/DRP	
NAME	J. Seat	B. Towne	L. McKown	M. Endress	
DATE	5/6/2022	5/5/2022	5/5/2022	5/11/2022	

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000280 and 05000281
License Numbers:	DPR-32 and DPR-37
Report Numbers:	05000280/2022001 and 05000281/2022001
Enterprise Identifier:	I-2022-001-0035
Licensee:	Virginia Electric and Power Company
Facility:	Surry Power Station
Location:	Surry, VA
Inspection Dates:	January 01, 2022 to March 31, 2022
Inspectors:	L. McKown, Senior Resident Inspector Pwr/TI B. Towne, Resident Inspector
Approved By:	Matthew F. Endress, Chief (Acting) Reactor Projects Branch 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 Surry 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 Restore Turbine Driven Auxiliary Feedwater Pump Trip Hook Latch-up Mechanism in accordance with Operating and Test Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000281/2022001-01 Open/Closed	[H.6] - Design Margins	71111.19
NRC inspectors identified a finding of very-low safety significance (Green) and an associated Non-Cited Violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," associated with Dominion Energy's failure to accomplish restoration of the Unit 2 turbine driven auxiliary feedwater (TDAWF) pump trip hook latch-up mechanism in accordance with operating and test procedures following performance of preventive maintenance on December 1, 2021. This finding closes Un-Resolved Item (URI) 05000281/2021004-02.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000281/2021004-02	Assessment of the Trip Hook Latch-up of the Unit 2 Turbine Driven Auxiliary Feedwater Pump	71111.19	Closed

PLANT STATUS

Unit 1 operated at or near rated thermal power for the entire 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 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

71111.01 - Adverse Weather Protection

Seasonal Extreme Weather Sample (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal cold temperatures on for the following systems:

- auxiliary feedwater
- emergency service water
- safety injection
- outside recirculation spray.

Impending Severe Weather Sample (IP Section 03.02) (2 Samples)

(1) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from impending severe weather including snow and ice precipitation, freezing temperatures, and high winds, on January 11, 2022.

(2) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from impending severe weather as characterized by a tornado warning, on March 24, 2022.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

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

(1) #1 emergency diesel generator (EDG) and emergency switchgear during monthly diesel performance testing, on January 31, 2022
(2) Unit 2 main steam admission to auxiliary feedwater turbine driven pump turbine, on February 2, 2022
(3) Charging system during pump 'B' removal from service, pump switching to place 'C' pump in service on alternate feed, on February 7, 2022
(4) Unit 1 1B low head safety injection pump and system during performance testing of 1A low head safety injection pump, on March 3, 2022.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (6 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) #3 EDG room, on January 19, 2022
(2) Unit 1 and 2 cable spreading rooms, and cable vault and tunnel rooms, on January 27, 2022
(3) Auxiliary building 45'-10" elevation, on February 7, 2022
(4) Fuel oil transfer vaults, on February 17, 2022
(5) Auxiliary building to Unit 2 cable vault and pipe tunnel room, on March 2, 2022
(6) Unit 2 safeguards building, on March 3, 2022.

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

(1) The inspectors evaluated the onsite fire brigade training and performance during an unannounced fire drill on March 10, 2022. Simulated fire location was in the condensate polishing building.

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 sequential failure of the Unit 1 and 2 main control room oxygen analyzers, on March 12, 2022.

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

(1) The inspectors observed and evaluated the licensed operator requalification simulator exam on March 8, 2022. The scenario involved responses to an electrical bus fault, internal flooding in the turbine building, and a main steam line break inside containment.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (1 Sample)

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 condenser circulating water outlet motor-operated isolation valve preventive maintenance strategy upon discovery of apparent operator interference during surveillance testing, on March 9, 2022.

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (5 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) Unit 1 elevated risk response to 'B' train reactor protection logic test following a step performed out of sequence, on February 1, 2022
(2) Unit 1 elevated risk response during a switchyard event with a blown fuse and subsequent restoration of relay control power, on February 2, 2022
(3) Unit 2 elevated risk response and mitigation during 'C' charging pump quarterly test while 'B' charging pump is also out of service for maintenance, on January 26, 2022
(4) Unit 1 elevated risk response during 'B' charging pump removal from service and pump switching to place 'C' pump in service on alternate feed, on February 7, 2022
(5) Elevated risk following failure of the alternate AC (station blackout) diesel generator during return to service testing concurrent with Unit 2 turbine driven auxiliary feedwater pump oil replacement on February 22, 2022, and failure of both trains of lower-level instrument air, on February 23, 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) Condition report (CR) 1191263, 2-RC-TI-2422C B Loop Overtemperature Delta T Meter swinging 3%, on February 14, 2022
(2) CR1190825 'B' Charging Pump Motor elevated vibrations following second rebuild, on February 9, 2022
(3) CR1191263, Unit 2 B Reactor Coolant Loop Overtemperature Delta T Meter unexpected oscillations, on February 14, 2022
(4) CR1191900, Reasonable assurance of safety associated with failure of the Alternate AC (Station Blackout) Diesel Generator mechanical overspeed trip function, on February 23, 2022
(5) CR1192690, Unit 2 B Charging Pump seal and coupling unexpected oil viscosity results, on March 4, 2022.

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) Installation of encapsulation repair of through-wall flaw in straight-leg piping on emergency condensate storage tank return line from auxiliary feedwater work order ([WO]38204291380 & WO38204292784) on March 8, 2022.

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (8 Samples)

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

(1) #2 EDG operational performance test as a post-maintenance test for the diesel fuel transfer pump discharge relief valve 1-EE-RV-104, on January 10, 2022
(2) Unit 1 B charging pump motor anchor adjustments following elevated vibrations during return to service testing subsequent to second rebuild (CR1190825), on February 7, 2022
(3) Alternate AC (station blackout) diesel generator testing following six-year major maintenance window (CA10995285), on February 16, 2022
(4) Unit 1 and Unit 2 trains of lower-level instrument air following sequential failure, on February 25, 2022
(5) Unit 2 control element rod position indication location J-13 card failure (WO38204291679), on March 3, 2022
(6) Unit 1 and 2 main control room oxygen analyzers following sequential failure (WO38204294989), on March 14, 2022
(7) Through-wall leak in 'D' main control room chiller service water discharge piping (WO38204295084), on March 16, 2022
(8) Operational performance test of Unit 2 turbine driven auxiliary feedwater pump following outage maintenance (WO38204219508) for URI 05000281/2021004-02 closure, on March 21, 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) (2 Samples)

(1) Unit 2 Motor Driven Aux Feed Pump Operational Performance Test (2-OPT-FW-001), on January 12, 2022
(2) Unit 1 Low Head Safety Injection System Operational Performance Test (1-OPT-SI-005), on March 3, 2022.

OTHER ACTIVITIES – BASELINE

71152A - Annual Follow-up Problem Identification and Resolution

Annual Follow-up of Selected Issues (Section 03.03) (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Challenges with nuclear instrumentation during refueling outages, on March 14, 2022.

INSPECTION RESULTS

<table>
<tr><td colspan="4">Failure to Restore Turbine Driven Auxiliary Feedwater Pump Trip Hook Latch-up Mechanism in accordance with Operating and Test Procedures</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 05000281/2022001-01
Open/Closed</td><td>[H.6] - Design Margins</td><td>71111.19</td></tr>
<tr><td colspan="4">NRC inspectors identified a finding of very-low safety significance (Green) and an associated Non-Cited Violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," associated with Dominion Energy's failure to accomplish restoration of the Unit 2 turbine driven auxiliary feedwater (TDAWF) pump trip hook latch-up mechanism in accordance with operating and test procedures following performance of preventive maintenance on December 1, 2021. This finding closes Un-Resolved Item (URI) 05000281/2021004-02.</td></tr>
<tr><td colspan="4">Description: On December 1, 2021, the licensee completed post-maintenance testing of the Unit 2 TDAFW pump train following performance of auxiliary feed pump terry turbine overspeed trip device inspection, overhaul, and adjustment. Following the testing, the associated trip throttle valve trip hook latch-up mechanism was left approximately 50% engaged. Operations recognized that they were unable to meet procedural guidance which states, in part, "Check status of TRIP HOOK - full engagement with LATCH UP LEVER (The surface area contact of the latching faces of the TRIP HOOK and the LATCH UP LEVER should be at least 75%)." Operations generated CR1187069 to capture the condition.

The trip hook latch-up mechanism holds the latch-up lever in the up position. When the turbine trips on overspeed, the trip mechanism pulls the trip hook away from the latch-up lever. This causes the trip throttle valve to rapidly close, removing steam input from the turbine and stopping the pump. Improper engagement of the trip hook latch-up mechanism can result in spurious closure of the trip throttle valve causing failures of the pump to start or run when required to respond to an event.

Station engineering reviewed CR1187069 and used engineering judgement to assert that a valve spring within the latch-up linkage mechanism would prevent any further inadvertent motion of the trip hook, based upon its applied pressure. Operations used this input to establish the full engagement status check as completed satisfactory. Station engineering further recommended the engagement be adjusted to 75% during the next quarterly test of the component, noting that the procedural requirement for 75% engagement was incorporated from vendor and other industry design standards.

The inspectors observed that the station had previously updated the design basis to incorporate revised requirements (e.g., 75%) for trip hook latch-up mechanism following a similar event in 2017 (CR1073366). The inspectors identified that this current assessment</td></tr>
</table>

did not address how the spring pressure allowed the latch mechanism to be less engaged than the design basis acceptance criteria. Furthermore, it did not address the actual amount of engagement or its impact on preventing spurious overspeed trips or the potential inability to reset from an overspeed trip, as described in the design basis incorporated following the similar event in 2017.

Given the TDAFW pump train's heat sink safety function associated with a loss of AC power event, the inspectors discussed their concerns with station management. On December 3, 2021, the station ran the TDAFW pump train. When attempting to reset the trip hook latch-up linkage, they, again, observed 50% engagement during the full engagement status check. The station again concluded that "Engineering does not have concern that the Unit 2 Terry Turbine will not be able to perform its design function based on observations during 2-OP-FW-002."

Corrective Actions: The station performed troubleshooting on December 9, 2021, under WO38204281432. This activity discovered lose set screws within the latch-up mechanism. Following tightening, the station performed post maintenance testing. With the linkage properly aligned, operators attained 100% surface area contact when resetting the trip throttle valve latch-up mechanism. The station confirmed the lack of additional margin with respect to the trip hook latch-up mechanism engagement in consultation with vendor subject matter experts and industry user groups, as described in Assessment of the Trip Hook Latch-up of the Unit 2 Turbine Driven Auxiliary Feedwater Pump (URI 05000281/2021004-02).

Corrective Action References: CR1172184, CR1172065, CR1172598, CR1175926, CA8483490, CA9212266

Performance Assessment:

Performance Deficiency: The inspectors found that Dominion Energy's failure to maintain the Unit 2 TDAFW pump trip hook latch-up mechanism in accordance with test and operating procedures was a performance deficiency reasonably within the licensee's ability to foresee and prevent. Specifically, on multiple occasions, station engineering used engineering judgement inconsistent with the design basis, to justify acceptance of trip hook latch-up mechanism engagement of 50%, when greater than 75% engagement was required.

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 NRC identified that the licensee failed to restore the Unit 2 TDAFW pump trip hook latch-up mechanism consistent with procedural requirements which prevent spurious overspeed trips. The inspectors used IMC 0612, Appendix E, "Examples of Minor Issues," dated January 1, 2021, to inform answers to the more than minor screening questions and found this condition consistent with more than minor example 2.d.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." This finding was determined to be of very low safety significance (Green) as the degraded condition did not represent a loss of probabilistic risk assessment function of one train of a multi-train technical specification system for greater than its technical specification allowed outage time.

Cross-Cutting Aspect: H.6 - Design Margins: The organization operates and maintains equipment within design margins. Margins are carefully guarded and changed only through a systematic and rigorous process. Special attention is placed on maintaining fission product barriers, defense-in-depth, and safety related equipment. The inspectors found that Dominion Energy failed to apply rigorous processes in lieu of engineering judgement when interpreting the impact of the discovered trip hook latch-up mechanism condition against the proceduralized operating requirements.

Enforcement:

Violation: 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states in part, "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."

Contrary to the above, from December 1, 2021 until December 9, 2021, Dominion Energy failed to accomplish restoration of the Unit 2 TDAFW pump trip hook latch-up mechanism in accordance with operating and test procedures which included appropriate quantitative and qualitative acceptance criteria for determining that restoration had been satisfactorily accomplished.

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

The disposition of this finding and associated violation closes URI: 05000281/2021004-02.

Observation: Challenges with Nuclear Instrumentation during Refueling Outages	71152A

The inspectors performed a review of the licensee's challenges with nuclear instrumentation during refueling outages, to determine if prior corrective actions or newly identified conditions adverse to quality could indicate the existence of a more significant safety issue. The inspectors reviewed preventative maintenance records, procedures, corrective action program documents, and station logs.

The inspectors found that licensee preventative maintenance and corrective action activities were consistent with manufacturer recommendations and industry best practices to maintain the equipment. The inspectors determined that the licensee, in general, took reasonable actions to identify, communicate, and correct newly identified conditions adverse to quality in a timely manner with a focus on near and long-term impacts upon safety functions.

EXIT MEETINGS AND DEBRIEFS

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

- On April 7, 2022, the inspectors presented the integrated inspection results to Fred Mladen, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Corrective Action Documents	CR1194655		
	Procedures	0-AP-37.01	Abnormal Environmental Conditions	77
		0-OP-ZZ-021	Severe Weather Preparations	30
71111.04	Corrective Action Documents Resulting from Inspection	CR1191179		
	Drawings	11548-FM-064A	Main Steam System Sheet 4 of 6	57
	Procedures	1-OP-CH-004	Charging Pump C Operations	30
		1-OP-SI-001A	Safety Injection System Alignment	Rev 19
71111.05	Corrective Action Documents Resulting from Inspection	CR1190806		
		CR1190812		
	Fire Plans	0-FS-FP-162	Auxiliary Building Elevation 45 feet - 10 inches	4
		0-FS-FP-186	FUEL OIL PUMP HOUSE A ELEVATION 16 FEET	1
		0-FS-FP-187	FUEL OIL PUMP HOUSE B ELEVATION 16 FEET	1
	Procedures	SA-AA-115	Conduct of Fire Drills	Rev 7
71111.11Q	Corrective Action Documents	CR1193555		
		CR1193566		
	Procedures	TR-AA-750	Conduct of Simulator Training and Evaluation	Rev 12
71111.12	Corrective Action Documents	CR1193132		
	Miscellaneous		1-CW-MOV-100D, Unit 1 Condenser Circulating Water Outlet Motor Operated Isolation Valve D, Preventive Maintenance Database	
	Work Orders	38103797348, 38204294841		
71111.22	Procedures	1-OPT-SI-005	Operations Periodic Test - Low Head Safety Injection System	Rev 34
	Work Orders	WO#38204246394	1-OPT-SI-005 Operations Periodic Test - Low Head Safety	03/03/2022

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Injection System, both pumps	
71152A	Corrective Action Documents	CA8620925		
	Miscellaneous	TB-09-8	Westinghouse Technical Bulletin on Nuclear Instrumentation System Ex-Core Detector Cable Tape Enhancement	