



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

February 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
05000280/2021004 AND 05000281/2021004

Dear Mr. Stoddard:

On December 31, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Surry Power Station. On January 31, 2022, the NRC inspectors discussed the results of this inspection with Johnny Henderson, Director of Safety and Licensing, 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 did not involve a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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,

/RA/

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

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

Enclosure:
As stated

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SUBJECT: SURRY POWER STATION – INTEGRATED INSPECTION REPORT
05000280/2021004 AND 05000281/2021004- DATED February 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: 05000280/2021004 and 05000281/2021004

Enterprise Identifier: I-2021-004-0021

Licensee: Virginia Electric and Power Company

Facility: Surry Power Station

Location: Surry, VA

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

Inspectors: D. Bacon, Senior Operations Engineer
A. Butcavage, Reactor Inspector
L. McKown, Senior Resident Inspector
B. Towne, 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 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 Implement Spent Fuel Pool Instrumentation Equipment Functionality Requirements			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000280,05000281/2021004-01 Open/Closed	[H.11] - Challenge the Unknown	71111.15
The inspectors identified a finding (FIN) of very low safety significance (Green) associated with Dominion Energy's failure to implement Spent Fuel Pool Instrumentation Equipment Functionality requirements established in CM-AA-BDB-102, Beyond Design Basis FLEX Equipment Unavailability Tracking, Revision 12. Specifically, Dominion Energy did not recognize the red alarm light identified on May 29, 2021 could not be due to a spurious user input battery life expiration alarm as the station previously disabled these triggers.			

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	Open

PLANT STATUS

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

Unit 2 began the inspection period at 91 percent rated thermal power in coastdown in advance of the scheduled refueling outage shutdown performed on October 24, 2021. On December 2, 2021, Unit 2 achieved criticality following the outage returning to rated thermal power on December 5, 2021. Unit 2 operated at or near rated thermal power for the remainder of 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

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 in December 2021.
 - Emergency Service Water Pump House
 - Safeguards Buildings
 - Emergency Diesel Generators

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 station battery charger alignment during surveillance testing on October 20, 2021.
- (2) Unit 1 and 2 emergency diesel fuel oil storage and transfer system on November 2, 2021
- (3) Unit 2 recirculation spray containment ring on November 4, 2021.

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

- (1) The inspectors evaluated system configurations during a complete walkdown of the Unit 2 residual heat removal (RHR) system in shutdown cooling alignment on November 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 mechanical equipment room #5 on October 19, 2021.
- (2) No. 2 emergency diesel generator room on October 19, 2021.
- (3) Unit 2 Turbine Building (Basement, Mezzanine, and Deck) on October 26, 2021.
- (4) Unit 2 Containment on October 27, 2021.

71111.06 - Flood Protection Measures

Cable Degradation (IP Section 03.02) (1 Sample)

The inspectors evaluated cable submergence protection in:

- (1) Cable vaults 1-EP-MH-1, 1-EP-MH-2, 1-EP-MH-3 associated with WO38204216570, on October 24, 2021.

71111.07A - Heat Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

- (1) Unit 1, component cooling water heat exchangers A, B, C, & D, on December 15, 2021.

71111.08P - Inservice Inspection Activities (PWR)

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

- (1) The inspectors verified that the reactor coolant system boundary, steam generator tubes, reactor vessel internals, risk-significant piping system boundaries, and containment boundary are appropriately monitored for degradation and that repairs and replacements were appropriately fabricated, examined and accepted by reviewing the following activities from 11/1/21 to 11/30/21:

03.01.a - Nondestructive Examination and Welding Activities.

- Ultrasonic Examination (UT), Component ID: 11548-WMKS-0117A1-1 / 14-RH-101 / 1-03, Elbow to Pipe Weld, NDE Report ISI-2-UT-21-019, ASME Class 1
- Magnetic Particle Examination (MT), Component ID: 11548-WMKS-0103A2-1 / 30-SHP-122 / H0, ASME Class 2
- UT Examination, CRD-48, CRD-55, and CRD-67, ASME Section XI, BO Full Penetration Weld of Adaptor to Penetration, ASME Class 1
- Penetrant Examination (PT), Component ID: 11548-WMKS-0117A1-1 / 14-RH-101 / H016-2, Integral Attachments, RH System, ASME Class 2
- MRP-227 Examinations of Reactor Vessel Internals, Surry Unit 2 Phase 1, UT of Baffle Bolts, VT of CRDM Guide Tube Guide Cards, VT Core Barrel Upper Flange Weld, Lower Core Barrel Flange Welds, VT of Thermal Shield Support Block Cap Screws
- ASME Section. XI, IWE, VT, Comp. ID, 11548-IWE/E1.11A, Containment Floor Slab to Metal Liner Interface Area
- Weld No. 1-05A, WO 38204217640, Line No. 2"-RC-500-1502, 02-RC--102-VALVE, NDE Rpt. No BOP-PT-21-16
- Weld No. 2-20A, WO 38204235324, Descript. 14"-WFPD-113-601 / 2-FW-43, Final, NDE Rpt. No BOP-MT-21-108

03.01.b - Pressurized-Water Reactor Vessel Upper Head Penetration Examination Activities.

- RVCH VT-2 Leakage exam IAW N-729: Sample Penetration Videos for # 14, #16, #18 and #44. Plus RVLIS and Vent Line Penetrations

03.01.c – Pressurized-Water Reactor Boric Acid Corrosion Control Activities.

- CR-1183703, Weld Repair for Tubing, Fitting Leak, 02-CH-ICV-3642-VALV, WO 3820424851
- CR1161992, CA8245219, Boric Acid Evaluation for 02-CS--73-VALVE, Leakage
- CR1183722, Boric Acid Evaluation IAW N-566-2, for Valve 2-RC-HCV-2557A, Valve Material, and Bolts
- Review of Initial Containment Walkdown Inspection Results

03.01.d – Pressurized-Water Reactor Steam Generator Tube Examination Activities.

- Site Eddy Current Examinations on: Sg "2A", SG "2B", SG "2C", in accordance with Document No.: 51-9333405-000
- Observations SG "C" Hot Leg Row 6, Col. 48 ,
- Observations SG "B" HL Row 42, Col. 40, Row 10, Col 58, Row 21, Col 21.
- Site Secondary side visual examinations] SG "2A" "2B" "2C"
- CR 1185827, WO 38204223840, Steam Drum Inspection on "2C" Steam Generator, Indications on Moisture Separator Top Deck, Lower Bank

71111.11A - Licensed Operator Requalification Program and Licensed Operator Performance

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

- (1) The licensee completed the requalification annual operating tests required to be administered to all licensed operators in accordance with Title 10 of the *Code of*

Federal Regulations 55.59(a)(2), "Requalification Requirements," of the NRC's "Operator's Licenses." During the week of December 6, 2021, the inspector performed an in-office review of the overall pass/fail results of the individual operating tests and crew simulator operating tests in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program." These results were compared to the thresholds established in Section 3.03, "Requalification Examination Results," of IP 71111.11.

The inspectors reviewed and evaluated the licensed operator examination failure rates for the requalification annual operating tests completed on March 11, 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 Control Room during the planned shutdown for Unit 2 fall refueling outage on October 24, 2021

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

- (1) The inspectors observed and evaluated operations in the simulator during an Emergency Preparation drill including a tornado in the switchyard, partial loss of all AC power, and a small break loss of coolant accident on October 14, 2021.

71111.12 - Maintenance Effectiveness

Aging Management (IP Section 03.03) (1 Sample)

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

- (1) Unit 2 recirculation spray nozzles on November 4, 2021.

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (6 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) Change in risk at Unit 2 high level intake structure due to emergent failure of hose house #15 hydrant (CR1182734) on October 14, 2021.
- (2) Unit 2 high pressure turbine enclosure heavy lift, station battery testing, and safety significant pre-outage ventilation lineup changes on October 20, 2021.
- (3) Protected system lineup during H bus functional testing on October 26, 2021
- (4) Unit 2 elevated risk due to prolonged time at lowered inventory (reactor flange) from head installation error on November 21, 2021.

- (5) Unit 2 plant cooldown from Hot Shutdown to Cold Shutdown via steam generator atmospheric PORVs, due to steam leak in main steam valve house on November 29, 2021.
- (6) Elevated site risk due to Unit 2 emergency condensate storage tank auxiliary feedwater recirculation line leakage (CR1187639), on December 10, 2021.

71111.15 - Operability Determinations and Functionality Assessments

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

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

- (1) CR1181764, Unit 1, B charging pump motor inboard bearing darkened oil sample on October 7, 2021.
- (2) CR1182734, hose house #15 hydrant failure on October 14, 2021.
- (3) CR1183214, Number 2 emergency diesel generator nonconforming seismic strap bolting on October 21, 2021.
- (4) CR1186371, Beyond design basis spent fuel pit indication uninterruptible power supply battery failure on November 24, 2021.
- (5) CR1187639, Unit 2 emergency condensate storage tank auxiliary feedwater recirculation line leakage on December 10, 2021.

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (2 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) 2-MCM-1150-01, Unit 2 Reactor Disassembly and Reassembly, Revision 45 one time only changes 1, 2, & 3 following human performance event associated with improper installation of reactor vessel head studs on November 21, 2021.
- (2) ETE-SU-2021-0072 & CR1186299, Classification of piping between main steam trip and non-return valves on November 18, 2021.

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (5 Samples)

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

- (1) Correction of deficiencies from Section XI inspection (WO38103760049) on November 12, 2021.
- (2) Emergency diesel generator 2 operational performance test following outage scope maintenance and start circuit design change (DCN 04-004 & WO38204218250), on November 5, 2021.
- (3) Repair of steam leak at Unit 2 main steam trip valve steam trap bypass valve seal weld connection (CR1186767) on November 30, 2021.

- (4) Operational performance test of Unit 2 turbine driven auxiliary feedwater pump following outage maintenance (WO38204219508), on December 01, 2021.
- (5) Unit 1 new regulator installed for pressurizer backup air supply bank 'A' failed during post-maintenance testing (CR1188322 & CR1188455), on December 28, 2021.

71111.20 - Refueling and Other Outage Activities

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

- (1) The inspectors evaluated unit 2 refueling outage 2R30 activities from October 24 to December 2, 2021.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (2 Samples)

- (1) 2-OPT-EG-001, No. 2 emergency diesel generator monthly start exercise test, on October 19, 2021
- (2) 2-OPT-ZZ-001, Engineered safety features actuation with undervoltage and degraded voltage - 2H bus, on October 26, 2021

Inservice Testing (IP Section 03.01) (2 Samples)

- (1) 1-OPT-RS-001, Containment outside recirculation spray pump flow and leak test (38204209707) on November 9, 2021
- (2) 2-OPT-RC-001, 2-RC-PCV-2455C power operated relief valve stroke time testing (CR1186258) on November 24, 2021

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

- (1) Reactor Coolant Letdown Containment Penetration (Penetration 28) Type 'C' test and post test valve operability stroke (2-CH-TV-2204B), work order 382042199004 on November 12, 2021.

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

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

- (1) Unit 1 (October 1, 2018 – September 30, 2021)
- (2) Unit 2 (October 1, 2018 – September 30, 2021)

MS07: High Pressure Injection Systems (IP Section 02.06) (2 Samples)

- (1) Unit 1 (October 1, 2018 – September 30, 2021)
- (2) Unit 2 (October 1, 2018 – September 30, 2021)

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

- (1) Unit 1 (October 1, 2018 – September 30, 2021)
- (2) Unit 2 (October 1, 2018 – September 30, 2021)

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

- (1) Unit 1 (October 1, 2018 – September 30, 2021)
- (2) Unit 2 (October 1, 2018 – September 30, 2021)

MS10: Cooling Water Support Systems (IP Section 02.09) (2 Samples)

- (1) Unit 1 (October 1, 2018 – September 30, 2021)
- (2) Unit 2 (October 1, 2018 – September 30, 2021)

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

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

BI02: RCS Leak Rate Sample (IP Section 02.11) (2 Samples)

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

71152 - Problem Identification and Resolution (PI&R)

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

- (1) The inspectors reviewed the licensee's corrective action program for potential adverse trends in foreign material exclusion that might be indicative of a more significant safety issue.

INSPECTION RESULTS

Failure to Implement Spent Fuel Pool Instrumentation Equipment Functionality Requirements			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000280,05000281/2021004-01 Open/Closed	[H.11] - Challenge the Unknown	71111.15
The inspectors identified a finding (FIN) of very low safety significance (Green) associated with Dominion Energy's failure to implement Spent Fuel Pool Instrumentation Equipment Functionality requirements established in CM-AA-BDB-102, Beyond Design Basis FLEX Equipment Unavailability Tracking, Revision 12. Specifically, Dominion Energy did not			

recognize the red alarm light identified on May 29, 2021 could not be due to a spurious user input battery life expiration alarm as the station previously disabled these triggers.

Description: On November 22, 2021, operators on rounds discovered the uninterruptible power supply (UPS) backup battery status-of-charge indicator on 01-FC-CAB-105-2-CABNET, Spent Fuel Pit Wide Range Level Display Cabinet, Channel 2 was blinking red where normally there are five solid green lights (CR1186371). This indicated a reduced state of charge definitively indicating loss of functionality. The red UPS alarm light was also in. This red light was initially identified on rounds on May 29, 2021 (CR1174127). Per the vendor manual the red UPS alarm could be due to battery almost empty, battery not detected, battery replacement required, inadequate remaining backup time, or other user defined parameters. The onboard UPS software records alarms and triggers while continuously monitoring battery charge, health, and function to adapt UPS performance to maximize battery needs.

Spent Fuel Pit Wide Range Level Display Cabinets were installed in accordance with NRC Order EA-12-051 wherein the Commission found that, “[d]uring the events in Fukushima, responders were without reliable instrumentation to determine water level in the spent fuel pool. This caused concerns that the pool may have boiled dry, resulting in fuel damage. Fukushima demonstrated the confusion and misapplication of resources that can result from beyond-design-basis external events when adequate instrumentation is not available.” Within this order, the NRC further required, “[o]n-site generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.” The UPS battery backups provide for 72 hours of power to the level indication.

Dominion Energy developed CM-AA-BDB-102, Beyond Design Basis FLEX Equipment Unavailability Tracking, Revision 12, to meet the commitments of EA-12-051. CM-AA-BDB-102, Attachment 2, FLEX Strategy Equipment Unavailability Requirements, Spent Fuel Pool Instrumentation - Equipment Functionality (NEI 12-02), provides, “The primary or back-up instrument channel can be Out-of-Service for testing, maintenance, and/or calibration for up to 90 days provided the other channel is functional. Additionally, compensatory actions must be taken if the instrumentation channel is NOT expected to be restored or is NOT restored within 90 days.”

On October 19, 2021, station engineering completed review of the repeat history of 01-FC-CAB-105-02 failures and alarm light indications (CA8504223). This noted that the UPS batteries had recently been replaced on April 13, 2021, following identification of the red alarm light in on rounds on January 17, 2021. CA8504223 further determined that the probable cause of the alarm was the need to adjust the battery replacement date which impacts the alarm set point for user defined time-for-battery-life-expiration. At that time, with the red alarm light in for 143 days, the licensee failed to recognize that they had previously turned off the battery life expiration alarm trigger, as described below, and how that impacted the UPS functionality (CA8504223).

The inspectors discovered a series of similar alarms and battery maintenance of both Spent Fuel Pit Wide Range Level Display Cabinet UPS Channels 1 & 2 had been documented in summer of 2019 (CR1125899 & CR1128332). To preclude future spurious red alarm lights, on August 27, 2019, the licensee turned off the user defined time-for-battery-life-expiration alarm trigger, crediting the remaining associated alarms to indicate battery or UPS failure. Therefore, the alarm first observed on May 29, 2021, could not have been from a user defined battery life expiration trigger. In May, the licensee generated work order

38204242505 to perform corrective maintenance on the degraded UPS. On November 22, 2021, (177 days later) the work order was still in early development.

Corrective Actions: On December 2, 2021, Surry performed corrective maintenance under work order 38204242505 including as found battery voltage measurement and battery replacement. This activity did not include capture of UPS alarm or trigger data.

Corrective Action References: 38204242505, CR1187117

Performance Assessment:

Performance Deficiency: The inspectors found that Dominion Energy's failure to implement Spent Fuel Pool Instrumentation Equipment Functionality requirements established in CM-AA-BDB-102 following identification of red UPS alarm light in on May 29, 2021 until loss of all charge failure on November 22, 2021 was a performance deficiency reasonably within the licensee's capability to foresee and prevent.

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, since alarm discovery in May 2021 until loss of charge in November 2021, the station mischaracterized the probable cause of the UPS alarm as a spurious user defined battery life expiration trigger which inspectors identified had been previously defeated. This actual failure condition indicated by the alarm had the potential to challenge spent fuel pit level instrument channel 2 power capacity to maintain the level indication. A function required until offsite resource availability can be reasonably assured as intended under Order EA-12-051 commitments.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." This finding is associated with spent fuel pool level instrumentation required by Order EA-12-051.

Cross-Cutting Aspect: H.11 - Challenge the Unknown: Individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding. The abnormal indication, red UPS alarm light in, was attributed to an indication problem. Dominion Energy did not thoroughly investigate the prior maintenance activity that disabled the user defined battery life expiration trigger before proceeding.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Unresolved Item (Open)	Assessment of the Trip Hook Latch-up of the Unit 2 Turbine Driven Auxiliary Feedwater Pump URI 05000281/2021004-02	71111.19
<u>Description:</u> On December 1, 2021, the licensee completed post maintenance testing of the Unit 2 turbine-driven auxiliary feedwater (TDAFW) pump train following performance of Auxiliary Feed Pump 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 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."

The inspectors found that Dominion Energy's failure to maintain the unit 2 TDAFW 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.

Planned Closure Actions: The licensee has established a corrective action (CA9212266) to engage with the vendor subject matter experts on the applicability of the trip hook latch-up requirements established within the design basis. The licensee believes greater margin exists within the full engagement criteria described. Upon completion of this activity planned within the first calendar quarter of 2022, the inspectors will review the results of CA9212266 to provide input on the more than minor determination associated with the identified performance deficiency.

Licensee Actions: The station performed troubleshooting on December 9, 2021 under WO#38204281432. This activity discovered loose 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.

Corrective Action References: CR1073366, CR1189974, CA9212266

Observation: Trend Review of Foreign Material Exclusion

71152

The inspectors performed a review of potential adverse trends in foreign material exclusion that might be indicative of a more significant safety issue. The inspectors performed interviews and sampled a population of maintenance records, documented inspections, condition reports, and log entries during the period of January 1, 2021 through December 31, 2021.

Based upon the samples reviewed, the inspectors found that there was an apparent increasing trend in adverse foreign material exclusion events between unit refueling outages. However, the station performance improvement team properly identified the need for trend review upon reaching condition and performance monitoring thresholds generating corrective actions consistent with their programs. The inspectors did not identify any findings as a result of this inspection.

EXIT MEETINGS AND DEBRIEFS

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

- On January 31, 2022, the inspectors presented the integrated inspection results to Johnny Henderson, Director of Safety and Licensing, and other members of the licensee staff.

THIRD PARTY REVIEWS

Inspectors reviewed Management Safety Review Committee reports that were issued during the inspection period.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04	Corrective Action Documents Resulting from Inspection	CR1184906	NRC Identified questions/issues in U2 containment and Aux	11/07/2021
	Drawings	11548-FP-13C	Containment & Recirc Spray System SH.3	Rev 005
	Engineering Evaluations	PTR-10000032901	Commercial Grade Dedication Plan - Diesel Fuel Oil	1
		PTR-10000032901	Commercial Grade Dedication Plan - Diesel Fuel Oil	3
	Miscellaneous	Commercial Grade Survey DS-14-011	Vendor Programs Commercial Grade Survey of Intertek	06/17/2014
		Sample ID 2015-NFLK-000748-008	Fuel Oil Report of Analysis	08/25/2015
		Sample ID 2015-NFLK-000748-008	Fuel Oil Report of Analysis	08/25/2015
		Sample ID 2015-NFLK-000989-001	Fuel Oil Report of Analysis	11/23/2015
		Sample ID 2015-NFLK-000989-008	Fuel Oil Report of Analysis	11/24/2015
		Sample ID 2015-NFLK-000989-012	Fuel Oil Report of Analysis	11/25/2015
		Sample ID 2021-NFLK-000465-003	Fuel Oil Report of Analysis	08/02/2021
		Sample ID 2021-NFLK-000465-	Fuel Oil Report of Analysis	08/02/2021

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Procedures	005		
		Sample ID 2021-NFLK-000465-013	Fuel Oil Report of Analysis	08/02/2021
		2-OP-RH-001A	RHR System Valve Alignment	Rev 7
		CY-AA-AUX-310	Diesel Fuel Oil Sampling and Testing	13
		VPAP-2205	Diesel Fuel Oil Testing Program	6
71111.05	Procedures	0-FS-FP-122	Fire Pre-Plan, Diesel Generator Room Number 2, Elevation 27 feet - 6 inches	2
		0-FS-FP-224	Fire Pre-Plan, Mechanical Equipment Room (MER 5), Elevation 27 feet - 6 inches	4
71111.08P	Corrective Action Documents	CA 7665977	Corrective Action (CA) to Engineering to update documents (ER-SU-AUG-101 and AMP) as required	8/20/19
		CA 7726026	A new Augmented Plan (ER-SU-AUG-101) should be created to enhance specifications for examination requirements based on TB-19-5.	11/1/19
		CR-1176685	ASME Section XI IWL Unit 2 Inspection Indications 2021	07/12/2021
		CR-1183591	2-RH-P-1B RHR PUMP Boric Acid Evaluation	11/7/21
		CR-1183703	Boric Acid found on weld 2-CH-PT-3642 (potential thru-weld leak, 3/8-inch tubing)	10/25/21
		CR-1183717	Boric Acid Evaluation Valve 2-SI-91, IAW Code Case N-566	11/5/21
		CR-1183843	Boric Acid Evaluation of 2-RH-19, IAW Code Case N-566-2	11/8/21
		PA 7560972	Evaluate/Implement Needed Requirements of MRP 2019-008	4/4/19
	Engineering Evaluations	51-9334439-000	Site Validation of EPRI Qualified Eddy Current Techniques for Surry 2R30	10/31/21
		ETE-CEP-2021-1011	Steam Generator Degradation .Assessment, Surry Unit 2 Refueling Outage 2R30	Fall 2021
		ETE-SU-2021-0055	Surry Unit-2, MRP-227-1-A Reactor Vessel Internals Examinations, Engineering Evaluation- Phase 1	11/12/21
	Miscellaneous	51-9333405 - 000	Surry Unit 2, 2R30 Steam Generator ECT Examination	9/17/21

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Inspection Plan	
		Boric Acid Inspector PETER05	Qualifications	11/10/21
		Docket Nos.: 50-280/281, Letter Serial No. 20-136	Proposed License Amendment Request One-Time Deferral of Surry Unit-2 Steam Generator "B" Inspection	4/14/20
		ID No.: 03-9315755	Steam Generator Tube - Rolled Tube Plug & Stabilizer Installation (ZR) Field Procedure	Rev. 4
		NDE Inspector ID: B0861	Certificate of Personnel Qualification	7/29/21
		NDE Inspector ID No.: 3351	Ultrasonic Testing Certification	Exp. Date 1/13/23
		NDE Inspector ID No.: 57120	Certificate of Personnel Qualification	10/17/21
		NDE Inspector ID No.: C5341	Certificate of Personnel Qualification	9/0/21
		NDE Personnel Qualification and Certification Record	IWE, VT Level II Examiner (ID Initials D.V.R)	1/24/20
		Surry ISI Standard Plan (Baseline) Standard Code ASME XI, 2004Ed	Interval Completion Summary Status	November 2021
		Surry Tech Spec Amendment No. 299	One -Time Deferral of Surry Unit-2 Steam Generator B" Spring 2020 Refueling Outage Inspection (EPID NO. L-2019-LLA-0071)	5/7/2020
		Tech Spec 6.4-11 Q	Steam Generator Program	1/28/13
		Virginia Electric and Power Company	SURRY POWER STATION, UNIT2, INSERVICE INSPECTION PLAN FOR COMPONENTS AND COMPONENT SUPPORTS, FIFTH 10-YEAR INSERVICE	MAY10, 2014 - MAY 9, 2024

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		(Dominion), Serial No. 14-194, Docket No. 50-281	INSPECTION INTERVAL	
	NDE Reports	NDE Report No. ISI-2-UT-21-030	UT Examination, Component ID No.11548-WMKS-0127J3 / 6-RC-320 / 1-038, Valve to Elbow Weld	11/15/21
		NDE Rpt. No. - BOP-PT-21-157	PT Results, 02-CH-ICV-3642-VALV, Tubing Fitting, Weld Repair	11/11/21
		NDE Rpt. No. ISI-2-PT-21-010	Integral attachment of Component ID 11548-WMKS-0117A1-1 / 14-RH-101 / H016-2	11/5/21
		Report No.: ISI-2-UT-21-019	UT Examination of Component ID: 11548-WMKS-0117A1 -1 / 14-RH-101 / 1-03, Elbow to Pipe, RH System	11/8/21
		Rpt. No. ISI-2-MT-21-011	Magnetic Particle (MT) Examination of Comp ID No. 11548-WMKS-0103A2-1 / 30-SHP-122 / H03	11/15/21
		Summary No. 52.El.11 A .001	IWE Examination, Comp. ID, 11548-IWE/E1.11A, Floor Slab to Metal Liner Interface Area	11/16/21
	Procedures	54-131-370-008	Remote Underwater Visual Examination of PWR Reactor Pressure Vessel Internals in Accordance with MRP 227 & 228	8/27/21
		Doc. No.: 03-9259968	Field Procedure for Performing CRGT Guide Card Wear Measurements	Rev. 003
		ER-AA-NDE-UT-802	Ultrasonic Examination of Austenitic Piping Welds in Accordance with ASME Section XI, Appendix VIII	Rev. 8
		ER-AA-NDE-VT-605	IWE Visual Examination Procedure	Rev.3
		ER-AP-BAC-10	Boric Acid Corrosion Control Program	Rev. 14
		ER-AP-BAC-101	Boric Acid Corrosion Control Program (BACCP) Inspections	Rev. 14

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		ER-AP-BAC-102	Boric Acid Corrosion Control Program (BACCP) Evaluations	Rev. 16
		ER-SU-AUG-101	Surry Augmented Inspection Program	Rev. 19
		SRY-SGPMS-002	SURRY SITE SPECIFIC EDDY CURRENT ANALYSIS GUIDELINES	Rev. 30
	Self-Assessments	PI-AA-100-1004, Attachment 2, PIR-1030006	Review of the Steam Generator Program	????
		Assessment No. PIR1119200	Provide a review of the Reactor Coolant System, Material Degradation Management Program	Surry , June 19-22, 2017
		PIR 1079417	Fleet Inservice Inspection Program Formal Self-Assessment	1/24/18
71111.11Q	Miscellaneous Procedures		Emergency Preparedness Drill Guide	10/14/2021
		2-GOP-2.2	Unit Shutdown, Less than 30% to Hot Shutdown	52
		2-OP-RH-001	Residual Heat Removal Operations	30
71111.12	Corrective Action Documents Resulting from Inspection	CA8816961		
		CR1184906		
71111.13	Miscellaneous	Unit 2 Outage Risk Assessment		10/20/2021
		Unit 2 Outage Risk Assessment		10/26/2021
		Unit 2 Outage Risk Assessment		11/21/2021
		Unit 2 Outage Risk Assessment		11/29/2021
71111.19	Procedures	0-MCM-0113-02	Auxiliary Feedwater Pump Inspection and Maintenance	Rev 21
		0-MCM-1403-01	Terry Turbine Overhaul, 1-FW-T-2 and 2-FW-T-2	Rev 28
		0-MCM-1403-01	TERRY TURBINE OVERHAUL, 1-FW-T-2 AND 2-FW-T-2	28
		0-MCM-1403-02	AUXILIARY FEED PUMP TERRY TURBINE OVERSPEED TRIP DEVICE INSPECTION, OVERHAUL, AND ADJUSTMENT	15
		2-OPT-EG-009	Number 2 Emergency Diesel Generator Major Maintenance Operability Test	Rev 64
		2-OPT-FW-003	Turbine Driven Auxiliary Feedwater Pump 2-FW-P-2	Rev 70

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		2-OPT-FW-007	Turbine Driven AFW Pump Steam Supply Line Check Valve test	Rev 7
	Work Orders	38204218250	547 Day Freq. PT: EDG 2 Major Maintenance Operability Test	11/05/2021
71111.20	Miscellaneous	S2C31 Full Core Loading Map		Revision 0
	Procedures	2-GOP-1.4	Unit Startup, Hot Shutdown to 2% Reactor Power	59
		2-GOP-2.2	Unit Shutdown, Less than 30% to Hot Shutdown	52
		2-MCM-1150-01	Unit 2 Reactor Vessel Disassembly and Reassembly	45
		2-OP-RC-004	Draining the Reactor Coolant System to Reactor Flange Level	44
		2-OP-RH-001	Residual Heat Removal Operations	30
71111.22	Procedures	2-OPT-CT-201	Containment Isolation Valve Local Leak Rate Testing (Type C Containment Testing)	Rev 23
		2-OPT-EG-001	Number 2 Emergency Diesel Generator Monthly Start Exercise Test	84
	Work Orders	38204209707	Perform 1-OPT-RS-001, Outside recirculation spray pump flow and leak test on November 9, 2021	05/03/2021
		38204219904	547 Day Freq. PT: Cont. Isol. Vlv. Local Leak Rate test (Type C) - OC-23B 2-OPT-CT-201	
71151	Miscellaneous		Consolidated Data Entry Derivation and Margin Reports for Surry Power Station Mitigating System Performance Index Performance Indicators 2018 through 2021.	
71152	Corrective Action Documents	CR1164749, CR1163901, CR1163867, CR1171442, CR1170791, CR1171369, CR1171899, CR1172206, CR1172891, CR1173717, CR1171978,	Foreign Material Exclusion condition reports	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		CR1173624, CR1173938, CR1172050, CR1172361, CR1184233, CR1185749, CR1186575, CR1186578, CR1184593, CR1186059, CR1186207, CR1185965, CR1185620, CR1185053, CR1184640, CR1186267, CR1186310, CR1184544, CR1185486, CR1185002, CR1188042, CR1188395		