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

August 8, 2022

Mr. Jim Barstow
Vice President Nuclear Regulatory Affairs & Support Services
Tennessee Valley Authority
1101 Market Street, LP 4A-C
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT – INTEGRATED INSPECTION REPORT 05000259/2022002, 05000260/2022002 AND 05000296/2022002

Dear Mr. Barstow:

On June 30, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Browns Ferry Nuclear Plant. On July 12, 2022, the NRC inspectors discussed the results of this inspection with Mr. Matthew Rasmussen 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 Browns Ferry Nuclear Plant.

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 McKown, Louis
on 08/08/22

Louis J. McKown, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket Nos. 05000259, 05000260 and 05000296
License Nos. DPR-33, DPR-52, and DPR-68

Enclosure:
As stated

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SUBJECT: BROWNS FERRY NUCLEAR PLANT – INTEGRATED INSPECTION REPORT 05000259/2022002, 05000260/2022002 AND 05000296/2022002 – DATED August 8, 2022

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X SUNSI Review		X Non-Sensitive ☐ Sensitive		X Publicly Available ☐ Non-Publicly Available	
OFFICE	DRP/RPB5	DRP/RPB5			
NAME	J. Steward	L. McKown			
DATE	8/8/2022	8/8/2022			

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000259, 05000260 and 05000296
License Numbers:	DPR-33, DPR-52 and DPR-68
Report Numbers:	05000259/2022002, 05000260/2022002 and 05000296/2022002
Enterprise Identifier:	I-2022-002-0013
Licensee:	Tennessee Valley Authority
Facility:	Browns Ferry Nuclear Plant
Location:	Athens, Alabama
Inspection Dates:	April 01, 2022 to June 30, 2022
Inspectors:	R. Fanner, Reactor Inspector C. Fontana, Emergency Preparedness Inspector P. Gresh, Emergency Preparedness Inspector N. Karlovich, Resident Inspector B. Kellner, Senior Health Physicist M. Kirk, Resident Inspector S. Sanchez, Senior Emergency Preparedness Insp J. Steward, Senior Resident Inspector J. Walker, Emergency Response Inspector
Approved By:	Louis J. McKown, Chief Reactor Projects Branch 5 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 Browns Ferry Nuclear Plant, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information.

List of Findings and Violations

Failure to perform adequate testing on incipient fire detection systems.			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000259,05000260,05000296/2022010-01 Closed	None (NPP)	71111.21N.05
The inspectors identified a finding and associated Non-Cited Violation of License Condition C.13, C.14, and C.7 for Units 1, 2, and 3 respectively when the licensee failed to perform adequate testing on credited incipient fire detection systems. This Non-Cited Violation documents the closure and final significance determination of Apparent Violation 05000259, 05000260, 05000296/2022010-01 as documented in inspection report 05000259/2022010, 05000260/2022010 and 05000296/2022010.			

Additional Tracking Items

None.

PLANT STATUS

Unit 1 began the inspection period in Mode 1, 100 percent (full) rated thermal power (RTP). On April 22, 2022, the Unit down powered to 68 percent RTP for a planned rod pattern adjustment and other planned testing. On April 23, 2022, Unit 1 returned to full RTP. On June 24, 2022, Unit 1 reduced power to 65 percent in response to a power supply alert, a planned rod pattern adjustment, and scram time testing. Following completion of the testing on June 25, 2022, the Unit was returned to full RTP where it remained through the end of the inspection period.

Unit 2 began the inspection period at full RTP. On May 27, 2022, Unit 2 performed a planned down power to 66 percent RTP for control rod sequence exchange and other valve testing. Unit 2 returned to full RTP on May 29, 2022, where it remained through the end of the inspection period.

Unit 3 began the inspection period shutdown in Mode 4, cold shutdown, preparing for reactor startup from a planned refueling outage (3R20). The Unit entered Mode 2 and commenced reactor startup on April 1, 2022. The Unit was placed in Mode 1 on April 2, 2022, and power was raised to 15 percent thermal power. A manual scram was inserted on April 3, 2022, with shutdown to Mode 4 to perform emergent maintenance. Following completion of emergent maintenance, the Unit recommenced reactor startup and entered Mode 2 on April 4, 2022. The Unit was placed in Mode 1 and the main generator was synchronized to the grid on April 4, 2022. The Unit slowly ascended in power over the next several days as testing and maintenance was performed on the newly installed high pressure feedwater heaters. On April 10, 2022, Unit 3 achieved full RTP. On April 15, 2022, Unit 3 was down powered to 80 percent for planned maintenance activities and the unit was returned to full RTP power on April 17, 2022. On June 2, 2022, Unit 3 was down powered to 63 percent RTP due to transmission grid maintenance at the direction of the Transmission System Operator. During this time, a planned control rod sequence exchange and other valve testing was performed. The Unit was returned to full RTP on June 6, 2022, where it remained through the end 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

71111.01 - 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 hot temperatures for the following systems:

Unit 3 Emergency Diesel Generator (EDG) system, Unit 1, 2 and 3 main transformers, unit station service and common station service transformers and Unit 0 4KV AC shutdown boards on June 17, 2022, and June 20, 2022

Impending Severe Weather Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from impending severe weather of high winds on May 25, 2022

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (6 Samples)

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

(1) Unit 1 480 V Shutdown board 1A and 1B and 4kv shutdown boards A, B, C, and D due to the performance of 250 Vdc shutdown board battery service test on April 13, 2022
(2) Unit 1 Residual Heat Removal (RHR) Loop 1 while maintenance was performed on RHR pump 1D on May 11, 2022 and May 12, 2022
(3) Unit 3 RHR Loop 1 while maintenance was performed on RHR pump 3B on May 17, 2022
(4) Unit 2 Core Spray (CS) Loop 2 while maintenance was performed on CS Loop 1 on May 24, 2022
(5) Main Battery 2, Battery Board 2, and Shutdown Board Batteries A, B, C and D due to removal from service of Main Battery 3 for planned maintenance on June 28, 2022
(6) EDG A Starting Air and Fuel Oil Systems while EDG B is removed from service for planned 2 year maintenance on June 29, 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) Unit 3 Turbine Building, Fire Area 26, 617' and 604' Elevations on April 2, 2022
(2) Unit 1 Electric Board Room 1B, Fire Area 4, 593' Elevation on May 13, 2022
(3) Unit 3 Auxiliary Instrument Room 3, Fire Area 16-O, Control Bay 593' Elevation on May 16, 2022
(4) Unit 1 Battery Board Room 1 and Battery Room 1, Fire Area 17, Control Bay 593' Elevation on May 19, 2022
(5) Units 1 and 2 Cable Spreading Room A, Fire Area 16-A, Control Bay 606' Elevation on May 23, 2022
(6) RHR Service Water pumps division B and D at the intake pump station, Fire Area 25-1, 565' Elevation on May 25, 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 actual fire which occurred on April 2, 2022, in the Feed water Heater Room below Unit 3 Reactor Feed Pump Turbine B, Unit 3 Turbine Building 604' Elevation requiring a Notification of Unusual Event (NOUE) for a fire in the Turbine Building lasting more than 15 minutes.

71111.06 - Flood Protection Measures

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

The inspectors evaluated internal flooding mitigation protections in the:

(1) (Partial)
Unit 3 EDG Building on June 21, 2022 through June 24, 2022

71111.07A - Heat Exchanger/Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) Unit 3 3B RHR Heat Exchanger on June 2, 2022, and June 22, 2022

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 Unit 3 Control Room during rod withdrawal to critical, point of adding heat and pressurization to rated pressure on April 1, 2022.

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

(1) The inspectors observed and evaluated a licensed operator requalification training session which included a loss of Reactor Building Closed Cooling Water Pump (RBCCW) A, trip of Reactor Protection System (RPS) A Motor Generator and a High Pressure Coolant Injection (HPCI) system steam leak which ultimately required the operating crew to perform emergency depressurization on the Unit 2 Simulator on April 27, 2022.

71111.12 - Maintenance Effectiveness

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) Commercial Grade Dedication Equivalency of a freon isolation valve for the Unit 3 Control Bay Chiller 3B on June 30, 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 Standby Liquid Control Pump Functional Test 1-SI-4.4.A.1, which is considered high risk because the surveillance tests both redundant trains on May 10, 2022
(2) Unit 2 Loop I CS risk assessment strategy and protected equipment scheme during planned maintenance window on May 24, 2022
(3) Unit 0 Cooling tower 1 functional post maintenance test (PMT) testing which was considered high risk due to the size and scope of equipment being tested and that this was the initial application of real load to the equipment following rebuild and expansion of Cooling tower 1 on April 8, 2022
(4) Unit 3 turbine control valve and RPS testing with the site at elevate aggregate risk on June 3, 2022
(5) Unit 1 and Unit 3 elevated phoenix yellow risk due to 250Vdc Main Battery 3 Cell Replacement on June 29, 2022

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (8 Samples)

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

(1) Unit 3 Operability determination associated with failed acceptance criteria during 3-TI-428 Reactor Core Isolation Cooling (RCIC) reactor pressure vessel injection test under CR 1768428 on April 9, 2022
(2) Unit 3 High Pressure Coolant Injection (HPCI) Turbine Overspeed Test Result per CR 1766038 on April 16, 2022
(3) Unit 3 Average Power Range Monitor (APRM) #4 Neutron Power Range Detector Input from Local Power Range Monitor (LPRM) 56-17A failed upscale per CR 1774454 on May 25, 2022
(4) 3B Unit Station Service Transformer (USST) Load Tap Changer Electronic Voltage Regulator nonfunctional per CR 1774591 on May 31, 2022
(5) Unit 1 and Unit 2 D EDG slip ring eccentricity exceeds criteria on June 16, 2022
(6) Unit 3 Jet Pump Mismatch and Operability on June 16, 2022
(7) Unit 1 and Unit 2 D EDG Jacket Water Leak on Temperature Regulating Valve per CR 1782539 on June 16, 2022
(8) Unit 3 RHR pump B suppression pool suction valve 74-24 failed to open during testing per CR 1778803 on June 2, 2022

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (7 Samples)

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

(1) Reactor Recirculation Pump Discharge Valve, 3-FCV-068-0079 following replacement of the stem, wedges, wedge pin and bonnet bolts on April 1, 2022
(2) Main Steam Stop Valve 2, 3-FCV-001-078 following calibration of the valve on April 3, 2022
(3) Unit 3 3B Chiller, BFN-3-CHR-031-1951, following repairs per WO 122884702 on May 7, 2022
(4) Unit 1 Breaker BKR-74-39 for RHR Pump 1D following implementation of a modification per WO 122123708 on May 11, 2022
(5) Unit 3 Reactor Water Cleanup (RWCU) Outer Isolation Valve, 3-69-02 dual position indication following corrective maintenance per WO 122927558 on June 1, 2022
(6) Standby Gas Treatment Train B Relative Humidity Breaker found tripped per CR 1781168 on June 10, 2022
(7) Control Room Air Rad Monitor, 0-RM-90-259B following repairs per WO 122123479 on June 10, 2022

71111.20 - Refueling and Other Outage Activities

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

(1) The inspectors completed evaluation of the Unit 3 Refueling Outage (3R20) planned activities, including installation of new high pressure feedwater heaters 3A1, 3A2, 3C1 and 3C2 from April 1, 2022 to April 4, 2022. Credit taken for partial completion during 2022-001 inspection period.

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) (1 Sample)

(1) 3-SR-3.3.1.1.8(9), Unit 3 turbine control valve fast closure, or turbine trip and recirc pump trip logic functional test on June 3, 2022.

RCS Leakage Detection Testing (IP Section 03.01) (2 Samples)

(1) Unit 1, Drywell Floor Drain Leakage Rate slow rise which triggered entry into Action Level 3 of Inspection Manual Chapter 2515, Appendix D, Attachment 1 on May 24, 2022.
(2) Unit 2, Drywell Floor Drain Leakage Rate slow rise documented under CRs 1784864, 1775181, 1769075, and 1768987 which triggered entry on April 12, 2022 into Action Level 3 of Inspection Manual Chapter 2515, Appendix D, Attachment 1 and triggered entry on June 23, 2022 into Action Level 2 of Inspection Manual Chapter 2515, Appendix D, Attachment 1.

71114.02 - Alert and Notification System Testing

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

(1) The inspectors evaluated the maintenance and testing of the alert and notification system during the week of June 6, 2022.

71114.03 - Emergency Response Organization Staffing and Augmentation System

Inspection Review (IP Section 02.01-02.02) (1 Sample)

(1) The inspectors evaluated the readiness of the Emergency Response Organization (ERO) during the week of June 6, 2022.

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 (EALs), Emergency Plan, and Emergency Plan Implementing Procedure changes during the week of June 6, 2022. This evaluation does not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness

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

(1) The inspectors evaluated the maintenance of the emergency preparedness program during the week of June 6, 2022.

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) (3 Samples)

(1) Unit 1 (April 1, 2021 through March 31, 2022)
(2) Unit 2 (April 1, 2021 through March 31, 2022)
(3) Unit 3 (April 1, 2021 through March 31, 2022)

MS07: High Pressure Injection Systems (IP Section 02.06) (3 Samples)

(1) Unit 1 (April 1, 2021 through March 31, 2022)
(2) Unit 2 (April 1, 2021 through March 31, 2022)
(3) Unit 3 (April 1, 2021 through March 31, 2022)

MS08: Heat Removal Systems (IP Section 02.07) (3 Samples)

(1) Unit 1 (April 1, 2021 through March 31, 2022)
(2) Unit 2 (April 1, 2021 through March 31, 2022)
(3) Unit 3 (April 1, 2021 through March 31, 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

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) Reviewed the effectiveness of corrective actions associated with reactivity control events that have occurred on Unit 1 and Unit 3 during the inspection period from April 1, 2022 to June 30, 2022.

71152S - Semiannual Trend Problem Identification and Resolution

Semiannual Trend Review (Section 03.02) (1 Sample)

(1) The inspectors reviewed the licensee's corrective action program for potential adverse trends in the program administration and execution of the foreign material exclusion (FME) program that might be indicative of a more significant safety issue. This review was focused on how the licensee performance in this area compared to a prior seven month period of time from October 2, 2020 through April 20, 2021, when corrective action reports and self- assessments associated with the Unit 1 Refueling Outage (1R13) and Unit 2 Refueling Outage (2R21) were initiated. For this sample, the inspectors reviewed licensee corrective action reports and a self-assessment initiated during the Unit 1 Forced Outage (F108), from January 15, 2022 through January 24, 2022 and the Unit 3 Refueling Outage (3R20), from February 25, 2022 through April 4, 2022.

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Followup (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated a confirmed fire in the Unit 3 Turbine Building, RFPT B Feedwater Heater Room, TB 604' Elevation resulting in licensee declaration of a notice of Unusual Event declaration for a fire in the Turbine Building lasting greater than 15 minutes on April 2, 2022 and the licensee's response including licensee follow-up actions on April 4, 2022.

INSPECTION RESULTS

Failure to perform adequate testing on incipient fire detection systems.			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000259,05000260,05000296/2022010-01 Closed	None (NPP)	71111.21N.05
The inspectors identified a finding and associated Non-Cited Violation of License Condition C.13, C.14, and C.7 for Units 1, 2, and 3 respectively when the licensee failed to perform adequate testing on credited incipient fire detection systems. This Non-Cited Violation documents the closure and final significance determination of Apparent Violation 05000259, 05000260, 05000296/2022010-01 as documented in inspection report 05000259/2022010, 05000260/2022010 and 05000296/2022010.			
Description: As part of transitioning to a risk informed fire protection program at Browns Ferry, the site installed air sampling incipient fire detection systems in several fire areas. The Auxiliary Instrument rooms on all three units were determined to be risk significant areas and the prompt detection provided from incipient fire detection provided the requisite risk reductions needed to fully transition to a risk informed fire protection program under 10 CFR 50.48(c). The incipient fire detection systems provided this risk reduction by providing a means to promptly detect a fire or even potential fire by sampling air in selected electrical cabinets. In order for these systems to function properly and within their design basis, the systems must show a balanced air flow from all sampling points. Additionally, the time required to detect products of combustions, known as the transport time, must be within a certain threshold. Annual verification of the transport time is required to determine system operability. While reviewing the work orders that documented the completion of the annual testing of the incipient fire detection systems at Browns Ferry, the inspectors noted that the annual surveillance test did not include a transport time test. The inspectors requested the vendor manual for the installed systems as well as the code of record and licensing commitments for the detection systems. In reviewing the vendor manual and the applicable National Fire Protection Association code, NFPA 72-2010 "National Fire Alarm and Signaling Code," the inspectors noted that the annual testing of air sampling detection devices must include a transport time test. The NRC inspectors raised these concerns with the licensee who acknowledged that the affected systems only completed the requisite transport time test as part of system commissioning and had not been subsequently tested. The licensee declared the systems inoperable and implemented appropriate compensatory actions. The site then initiated a test to validate the transport time for all the installed incipient systems that are credited for risk reduction, systems 1/2/3-SDET-026-0103A which are installed in the associated units Auxiliary Instrument room. Upon completion of these tests, the licensee indicated that the installed systems did not pass the transport time requirements of the NFPA codes and NRC commitments.			

Corrective Actions: The licensee declared the incipient detection systems inoperable and established fire watches in the affected fire areas.

Corrective Action References: The licensee captured this in CR 1751964.

Performance Assessment:

Performance Deficiency: The licensee's failure to implement and perform adequate maintenance and surveillance procedures was a performance deficiency. Specifically, the licensee was not performing annual transport time tests and ensuring air flow through all ports on the incipient fire detection systems in the auxiliary instrument rooms.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Protection Against External Factors 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 loss of the incipient fire detection systems greatly reduces the licensee's ability to promptly detect and respond to a significant plant fire in a timely manner.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix F, "Fire Protection and Post - Fire Safe Shutdown SDP." The inspectors assessed the significance of the finding using Appendix F, "Fire Protection and Post - Fire Safe Shutdown SDP." The issue was determined to impact Fixed Fire Protection Systems and was screened with question 1.4.2-A. The inspectors answered No and determined that further screening is required. Per section 1.5 of the SDP, the NRC is utilizing the fire PRA of the licensee to assess the risk. Given the scope of the issue, the licensee developed and provided an accurate risk assessment of the issue for the NRC to review. The Inspectors and Regional Senior Reactor Analyst reviewed the methodology, assumptions, application of NUREG 2230, "Methodology for Modeling Fire Growth and Suppression Response for Electrical Cabinet Fires in Nuclear Power Plants," and calculations of the assessment. The inspectors and SRA concurred with the licensee's conclusion the Delta CDF was less the 1E-6 and Delta LERF was less than 1 E-7 for all three units. Therefore, per section 1.5.1-A Question: Does the plant have a fire PRA capable of adequately evaluating the risk associated with the finding, as determined by an SRA? Yes – Continue to the next question. Question 1.5.1-B Question: Does the licensee's risk-based evaluation for this fire finding indicate a CDF of less than 1E-6, and is the evaluation result accepted by an SRA? Yes – Screen to Green.

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. The licensee completed transition to NFPA 805 in October 2015 and all programs and surveillances were developed and implemented at that time. Therefore, this issue is not indicative of current licensee performance.

Enforcement:

Violation: Brown's Ferry operating license condition C.13, C.14, and C.7 for Units 1, 2, and 3 respectively states that the site shall implement and maintain in effect all provisions of the approved protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c). NFPA 805, as incorporated by 10 CFR 50.48(c), section 3.2.3 "Procedures" states that procedures shall be established for implementation of the fire protection program.

Contrary to the above, since October 28, 2015, the licensee did not establish adequate testing procedures for the incipient fire detection system. Specifically, the licensee was not conducting the required annual transport time testing as required.

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

Observation: Foreign Material Exclusion Program Observation	71152S

The inspectors reviewed the licensee's foreign material exclusion program document, NPG-SPP-06.5, Foreign Material Control, and a self-assessment documented under CR 1717846. Of the seventeen issues classified in the assessment as human performance deficiencies, nine were determined to be FME intrusion events defined as where a foreign material enters a plant system, equipment or component. Eight other events were determined to be worker behavior gaps in performance that did not meet the standard established by the program document. During F108, the licensee classified a worker behavior FME issue documented under CR 1749652 as a threat or vulnerability, which if not detected would result in the loss of FME log accountability in a high-risk FME zone. The condition involved video captured during a leak inspection at power which identified tools left in the Unit 1 drywell that were not removed at the completion of the associated work activity. Immediate corrective action taken by the licensee was to reduce power on the Unit to make a drywell entry to remove the tools and reinforce the importance of proper worker accountability and job site ownership to all site personnel.

The inspectors also reviewed the licensee's Foreign Material Exclusion Program Performance which indicates the site weighted monthly FME performance was above the established goals for the three most recent outage periods. It also reflects that there are gaps identified in the licensee's "Gap, Drivers, Actions and Results - Foreign Material Control" document which details a number of corrective actions documents and actions which are planned or in progress to reduce or eliminate identified gaps in the FME program administration and implementation.

Based on the samples reviewed the inspectors found that there was an apparent increasing trend in adverse foreign material exclusion events when the two periods are compared. FME events are being captured in the corrective action program and corrective actions taken to date do not appear to be effective to significantly reverse the trend of FME events between the two periods, however the licensee has additional corrective actions in progress and planned for future completion designed to reduce or eliminate identified gaps. The inspectors did not identify any findings or violations as a result of this inspection.

EXIT MEETINGS AND DEBRIEFS

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

- On July 12, 2022, the inspectors presented the integrated inspection results to Mr. Matthew Rasmussen and other members of the licensee staff.
- On June 10, 2022, the inspectors presented the Emergency Preparedness Program inspection results to Mr. D. Komm and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Procedures	0-AOI-100-7	Severe Weather	Rev 48
		0-GOI-200-3	Hot Weather Operations	Rev 15
		0-OI-31	Control Bay and Off-Gas Treatment Building Air Conditioning System	Rev 171
		0-OI-57A	Switchyard and 4160V AC Electrical System	Rev 174
		3-OI-82	Standby Diesel Generator System	Rev 154
		NPG-SPP-07.1.8	Severe Weather and Natural Disasters	Rev 2
71111.04	Drawings	0-45E702-1-LR	License Renewal Wiring Diagram - Battery Board 2, Panel 1-7 Single Line	Rev 1
		0-45E702-2	Wiring Diagram Battery Board 2, Panel 8-11, Single Line	Rev 50
		0-47E840-3	Flow Diagram Fuel Oil System	Rev 27
		0-47E861-1-LR	License Renewal Flow and Control Diagram Diesel Starting Air System Diesel Generator A	Rev 0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		1-47E811-1	Flow Diagram Residual Heat Removal System	Rev 48
		2-47E814-1	Flow Diagram Core Spray System	Rev 56
		3-47E811-1	Flow Diagram Residual Heat Removal System	Rev 73
	Miscellaneous	OPL171.037	DC Systems	06/28/2022
		OPL171.247	Fuel Oil System	Rev 1
		UFSAR Section 8.6	250-V DC Power Supply and Distribution	06/22/2022
	Procedures	0-OI-18/ATT-1	Fuel Oil System Valve Lineup Checklist	Rev 59
		0-OI-57B	480V/240V AC Electrical System	Rev 205
		0-OI-57B/ATT-3D	Unit 1 480V Shutdown Boards and Reactor MOV Boards Electrical Lineup Checklist	Rev 182
		0-OI-57D	DC Electrical System	Rev 181
		0-OI-82/ATT-1A	Standby Diesel Generator A Valve Lineup Checklist	Rev 103
		1-OI-74/ATT-1	Residual Heat Removal System Attachment 1 Valve Lineup Checklist	Rev 80
		1-OI-74/ATT-2	Residual Heat Removal System	Rev 80

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Attachment 2 Panel Lineup Checklist	
		1-OI-74/ATT-3	Residual Heat Removal System Attachment 3 Electrical Lineup Checklist	Rev 79
		1-OI-74/ATT-4	Residual Heat Removal System Attachment 4 Instrument Inspection Checklist	Rev 77
		2-OI-75	Core Spray System	Rev 120
		2-OI-75/ATT-1	Core Spray System Valve Lineup Checklist	Rev 106
		2-OI-75/ATT-2	Panel Lineup Checklist Unit 2	Rev 107
		2-OI-75/ATT-3	Core Spray System Electrical Lineup Checklist	Rev 106
		2-OI-75/ATT-4	Core Spray System Instrument Inspection Checklist	Rev 105
		3-OI-74	Residual Heat Removal System	Rev 138
		3-OI-74/ATT-1	Valve Lineup Checklist Unit 3	Rev 89
		3-OI-74/ATT-2	Panel Lineup Checklist	Rev 91
		3-OI-74/ATT-3	Electrical Lineup	Rev 95

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			Checklist	
		3-OI-74/ATT-4	Instrument Inspection Checklist	Rev 87
		BFN-ODM-4.18	Protected Equipment	Rev 31
		NPG-SPP-07.3.4	Protected Equipment	Rev 12
71111.05	Fire Plans	FPR Appendix F- FA04	Appendix F Fire Area 04	Rev 4
		FPR Appendix F- FA16	Appendix F Fire Area 16	Rev 4
		FPR Appendix F- FA17	Appendix F Fire Area 17	Rev 2
		FPR Appendix F- FA25-01	Appendix F Fire Area 25-01	Rev 2
		FPR-Volume 2	Fire Protection Report Volume 2	Rev 71
71111.07A	Drawings	3-47E811-1	Flow Diagram Residual Heat Removal System	Rev 73
		3-47E859-1	Flow Diagram Emergency Equipment Cooling Water	Rev 43
	Procedures	0-TI-522	Program for Implementing NRC Generic Letter 89-13	Rev 10
		MCI-0-074-HEX001	Maintenance of RHR Heat Exchangers	Rev 25
		NPG-SPP-09.14	Generic Letter (GL) 89-13	Rev 5

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Implementation	
	Work Orders	WO 122132535		
71111.11Q	Procedures	SEG#OPL175S481	Simulator Exercise Guide #6, Cycle 2022 Evaluated Scenario 3	Rev 0
71111.12	Corrective Action Documents	1510198		06/30/2022
	Work Orders	121289278		06/30/2022
71111.13	Engineering Evaluations	41218 COC HRM SLC FT and Air Sparge	Unit 1, 2, 3 SLC Flow rate testing and air sparge of SLC boron tank to support Chemistry sampling	10/15/2020
	Procedures	1-SI-4.4.A.1	Standby Liquid Control Functional Test	Rev 34
		BFN-ODM-4.18	Protected Equipment	Rev 31
		NPG-SPP-07.3.4	Protected Equipment	Rev 12
	Work Orders	122123210		
		122244074		06/27/2022
		WO 122138571		
		WO 122160407, 122866532,122953296,122862841, 122953295, 122866081		
71111.15	Corrective Action Documents	1774454		05/25/2022
		1774591, 1661003		05/31/2022
		1780847	3-SR-3.4.2.1 required Engineering Judgement/Review	06/03/2022

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		1781988		06/08/2022
		1782539, 1094482		
		CR 1695665 Equipment Failure Investigation Checklist	3-FCV-74-24 Failed to reopen	07/12/21
		CR 1766038		
		CR 1768428 Document Critical Thinking	CR 1768428 Document Critical Thinking	Rev 0
		CR 1778803, 1695665		
		FE 43074 for PER 159257	Functional Evaluation 43074 for PER 159257	12/24/08
		U3 RCIC PDO CR 1768428	Prompt Determination of Operability for CR 1768428	04/13/22
	Drawings	0-47E861-8	Flow Diagram-Cooling System & Lubricating Oil System Standby Diesel Generator D	Rev 17
	Engineering Evaluations	PDO for PER 1094482	Prompt Determination of Operability Documentation for PER 1094482	Rev 0
	Miscellaneous	BFN-50-7082	Standby Diesel Generator	Rev 29
		BFN-VTD-E147-0020	Electro-Motive 645E4 Turbocharged Engine Maintenance Manual	Rev 6

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		BFN-VTD-G080-8265	Terry Improved HPCI Turbine Mechanical-Hydraulic Trip Design	Rev 0
		ODNC 755713-020/767839-801	10 CFR 50.59 Applicability Determination, Screening Review	Rev 0
	Operability Evaluations	PER 755713		06/14/2022
	Procedures	3-OI-92B	Average Power Range Monitoring	Rev 22
		3-SR-3.4.2.1	Jet Pump Mismatch and Operability	Rev 55
		3-SR-3.5.3.3	RCIC System Rated Flow at Normal Operating Pressure	Rev 81
		3-TI-428	RCIC RPV Injection Test	Rev 3
		ECI-0-000-CLN003	General Electric Relay and Switch Contact Cleaning Instruction	Rev 5
		ECI-0-000-RLY005	CR120A, CR120B, and CR122A Relay Maintenance	Rev 26
		MSI-3-073-GOV001	High Pressure Coolant Injection (HPCI) Turbine Overspeed Trip Test	Rev 35

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		NEDP-22	Operability Determinations and Functional Evaluations	Rev 23
	Work Orders	122914381		05/31/2022
		122916875		05/25/2022
71111.19	Corrective Action Documents	1765764, 1781168		06/10/2022
		CR 176849, CR 1766069, CR 1766662, 1766783, 1768085		
		CR 1770983, 1772133, 1772904, 1773907, 1774067		
	Drawings	0-0106D8865-2	4KV Shutdown Bd D	8
		0-45E724-4	Wiring Diagram 4160V Shutdown Board D Single line	Rev 45
	Engineering Changes	BFN-19-975-02	U3 Control Bay Chiller 3B Compressor Replacement	Rev 2
	Engineering Evaluations	22-3-IST-068-792	Evaluation Form for ASME OM Code IST Test Results	04/01/2022
	Miscellaneous	0-MEG-TRBSHT-001	Initial Troubleshooting	Rev 3
	Procedures	0-SR-3.3.7.1.3(B)	Control Room Air Supply Duct Radiation Monitor, 0-RM-90-259B, Calibration and Functional Test	Rev 36
		1/2-ETU-SMI 1-D.4	Relay Functional Checks on 4kV Shutdown Board D	Rev 29
		3-SR-3.3.1.1.8(8)	Turbine Stop Valve	Rev 44

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Closure - RPS and RPT Trip Channel Functional Test	
		3-SR-3.5.1.5(B)	Reactor Recirculation Pump 3B Discharge Valve Cycling	Rev 3
		3-SR-3.6.1.3.5(RWCU)	RWCU System PCIV Operability Test	Rev 5
		ECP-BFN-20-1605-08	Test 4kV Shutdown BD D, RHR Pump 1D Feeder Breaker 1-BKR-074-0039 due to ECP BFN-20-1605-08 Modifications	Rev 0
	Work Orders	119334055		04/01/2022
		122123479		06/10/2022
		122927558		06/01/2022
		122975359, 122975557, 122976897, 122980829		06/10/2022
		WO 122123708		
		WO 122845342		
		WO 122884702, 121290903, 122580983, 122577793		
71111.20	Miscellaneous	R06 220405 977	Unit 3 Cycle 20 Containment Leak rate program Post outage report spring 2022	04/05/2022
	Work Orders	WO 121471756	3-SR-3.6.1.1.1(OPT-A) - Primary Containment Total Leak rate Option A	03/31/2022

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71111.22	Corrective Action Documents	CR 1784864, 1775181, 1769075, and 1768987		
		ODMI for CR 1784864	Unit 2 Evaluation of continued operation and set trigger values due to unidentified leakage on a slowly increasing trend	06/21/22
	Procedures	3-SR-3.3.1.1.8(9)	Turbine Control Valve Fast Closure, or Turbine Trip and Recirculation Pump Trip Logic	Rev 37
	Work Orders	WO 122160407		
71114.06	Procedures	EPIP-1	Emergency Classification Procedure	Rev 62
		EPIP-1 HOT	Browns Ferry Hot Initiating Conditions Modes 1, 2, 3	Rev 62
71151	Miscellaneous	NEI 99-02	Regulatory Assessment Performance Indicator Guideline	Rev 7
71152A	Corrective Action Documents	1781236,1782963,1783156,1760978,1782854,1768448,1768449 and 1597198	Various condition reports associated with recent rod drift events and the strategy of addressing cracking of teflon	06/15/2022

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			seats of scram inlet and outlet valves and directional control valves	
71152S	Corrective Action Documents	1749652		
	Miscellaneous		Gaps, Drivers, Action, Results: Foreign Material Control	06/14/2022
			Foreign Material Exclusion Program Performance "Outage"	06/14/2022
	Procedures	NPG-SPP-06.5	Foreign Material Control	Rev 18
	Self-Assessments	1717846	Foreign Material Exclusion	05/13/2022