



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

October 31, 2017

EA-16-064

Mr. J. W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

**SUBJECT: BROWNS FERRY NUCLEAR PLANT – NRC INTEGRATED INSPECTION
REPORT 05000259/2017003, 05000260/2017003, AND 05000296/2017003**

Dear Mr. Shea:

On September 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Nuclear Plant, Units 1, 2, and 3. On October 13, 2017, the NRC inspectors discussed the results of this inspection with Mr. S. Bono and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two findings which were determined to be of very low safety significance (Green) in this report. Both findings involved violations of NRC requirements. Because of their very low safety significance, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy. If you contest any of the violations or significance of these NCVs, 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, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Browns Ferry Nuclear Plant.

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 Browns Ferry Nuclear Plant.

J. Shea

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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 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Alan Blamey, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos.: 50-259, 50-260, 50-296
License Nos.: DPR-33, DPR-52, DPR-68

Enclosure:
NRC IIR 05000259/2017003, 05000260/2017003
and 05000296/2017003 w/Attachment:
Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-259, 50-260, and 50-296

License Nos.: DPR-33, DPR-52, and DPR-68

Report No.: 05000259/2017003, 05000260/2017003, and 05000296/2017003

Licensee: Tennessee Valley Authority (TVA)

Facility: Browns Ferry Nuclear Plant, Units 1, 2, and 3

Location: Athens, AL 35611

Dates: July 1, 2017 through September 30, 2017

Inspectors: D. Dumbacher, Senior Resident Inspector
A. Ruh, Resident Inspector
J. Dolecki, Acting Resident Inspector
M. Kirk, Resident Inspector
P. Cooper, Reactor Inspector
N. Hobbs, Acting Resident Inspector
T. Steadham, Sr. Construction Inspector
A. Wilson, Project Engineer

Approved by: Alan Blamey, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

SUMMARY

05000259/2017003, 05000260/2017003, 05000296/2017003; 07/01/2017- 09/30/2017; Browns Ferry Nuclear Plant, Units 1, 2, and 3; (Flood Protection Measures, Problem Identification and Resolution of Problems, Follow-up of Events and Notices of Enforcement Discretion).

The report covered a three-month period of inspection by resident and regional inspectors. Two findings were identified. The significance of inspection findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP) dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross-Cutting Areas" dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6. Documents reviewed, not identified in the Report Details, are listed in the Attachment.

Cornerstone Mitigating Systems

- **Green:** An NRC-identified non-cited violation (NCV of 10 CFR Part 50, Appendix B, Criterion V) was identified for the licensee's failure to use appropriate procedural surveillance criteria to ensure the diesel generator buildings were protected against flood-water up to the design basis flood elevation. The annual door inspection procedure did not contain instructions with appropriate acceptance criteria to determine whether the diesel generator building doors would create a watertight seal when closed.

The performance deficiency is 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. A detailed risk evaluation by a regional Senior Risk Analyst (SRA) determined the finding was of very low safety significance (Green). The licensee entered the violation into the corrective action program (CAP) as CR 1306268. The inspectors determined that the finding had a cross-cutting aspect in the Self-Assessment area of the Problem Identification and Resolution aspect [P.6], because recent self-assessments had not been self-critical of the external flood protection program and practices. (Section 1R01)

- **Green:** An NRC-identified NCV of Technical Specification (TS) 5.4.1, "Procedures," was identified for the failure to follow procedure MCI-0-023-PMP003, Emergency Equipment Cooling Water (EECW) and Residual Heat Removal Service Water Pump (RHRSW) Removal and Reinstallation, Revision 22.

The performance deficiency is more than minor because it affected the Mitigating Systems cornerstone attribute of Equipment Performance and adversely affected the cornerstone objective. A detailed risk evaluation by a regional SRA determined the finding was Green. The licensee entered the violation into the CAP as CR 1338684. The finding had a cross cutting aspect in the Avoid Complacency component of the Human Performance area because the maintenance staff chose to not refer to a previously related condition report (CR) (PER 599190) or the maintenance procedure that were corrective actions for a previous NRC finding. [H.12]. (Section 4OA2.4).

REPORT DETAILS

Summary of Plant Status:

Unit 1 operated at 100 percent rated thermal power (RTP) except for one unplanned power reduction on August 21, 2017 to 78 percent for a leak on 1A1 feedwater heater, one unplanned reduction on August 23, 2017 to 95 percent for a 1C2 heater high level dump valve failure and six planned downpowers for various maintenance items associated with the condensate and feedwater systems, rod sequence exchanges, control rod drive hydraulic control unit repairs and MSIV and Scram time testing.

Unit 2 operated at 100% RTP except for seven planned downpowers for various maintenance items associated with the condensate and feedwater systems including main condenser tube leaks, control rod drive hydraulic control units, and MSIV testing.

Unit 3 operated at 100% RTP except for one unplanned downpower on September 29, 2017 to 75% for a partial loss of condenser vacuum. There were also two planned downpowers for hydraulic control unit maintenance, MSIV testing, and Scram time testing.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed the licensee's preparations and actions to protect risk-significant systems during a tornado warning on August 31, 2017. The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures, before the onset of and during the adverse weather conditions. The inspectors reviewed the licensee's plans to address the short and long term effects that may result from the tornado event. The inspectors verified that operator actions specified in the licensee's adverse weather procedure maintain readiness of essential systems. This activity constitutes two readiness for impending adverse weather conditions sample as described in IP 71111.01.

- Tornado warning on August 31, 2017
- Preparations for Tropical Depression Irma concurrent with NOED request related to control bay chillers on September 10, 2017

b. Findings

No findings were identified.

.2 External Flooding

a. Inspection Scope

The inspectors reviewed plant design features and licensee procedures intended to protect the plant and its safety-related equipment from external flooding events. The inspectors reviewed flood analysis documents including: UFSAR Section 2.4, Hydrology, Water Quality, and Marine Biology, Section 12.2 Principal Structures and Foundations and Appendix 2.4A, Probable Maximum Flood. The inspectors performed walkdowns of the below susceptible systems and equipment. The inspectors also reviewed the design and operation of the compartment sump pumps to determine if the discharge lines were vulnerable to reverse siphoning during an external flood. This activity constitutes two external flood protection samples.

- RHRSW pump and intake areas
- EDG flood doors (Unit common and Unit 3)

b. Findings

1. Introduction: An NRC-identified Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V was identified for the licensee's failure to use appropriate procedural surveillance criteria to ensure the diesel generator buildings were protected against flood-water up to the design basis flood elevation.

Description: The inspectors visually examined the exterior equipment access doors that protect the diesel generator building from postulated external floods. On several doors, inspectors found visible gaps between the rubber seals and their sealing surface on the door frame. Subsequent chalk testing of all diesel building doors showed that all ten pairs of doors had at least some level of degradation associated with their seals. The licensee determined the degraded door seals rendered the doors non-functional because they could not satisfy the function described in UFSAR sections 12.2.8 and 12.2.13.

In-leakage during a design basis flood would impact the operability of the diesel generators without a capable water removal mechanism, unless manual actions were taken to remove the water. Inspectors observed that the flood mitigation procedure included instructions for operators to utilize the non-safety, permanently-installed EDG building sump pumps to remove building in-leakage during a flood; however, the reliability of these pumps was uncertain because of a lack of routine maintenance and testing. The licensee immediately implemented a compensatory action to stage sealant that could be applied to the doors upon entry into abnormal operating procedure, O-AOI-100-3, Flood Above Elevation 558. This compensatory action restored functionality to the doors.

Analysis: The failure to use appropriate procedural surveillance criteria to determine whether the diesel generator building doors would create a watertight seal when closed and ensure the diesel generator buildings were protected against flood-water up to the design basis flood elevation was a performance deficiency. 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 in that failure to maintain the diesel generator building dry during a

design basis external flood could challenge the operability of safety-related equipment used to mitigate the event. The finding was evaluated in accordance with NRC IMC 0609, Appendix A, dated June 19, 2012. The inspectors determined the finding required a detailed risk evaluation because the finding could degrade more than one train of systems used to support the risk significant functions associated with external flood protection.

A regional SRA performed the detailed risk evaluation using SAPHIRE Version 8.1.5 and SPAR Model Version 8.50 for each unit. In the evaluation the SRA conducted a bounding analysis using conservative assumptions in order to account for uncertainties. The evaluation used a new event tree for an external flood and the following major assumptions:

- All eight EDGs would fail if; there was a flood to Elevation 567, the door seals failed (the PD), and the building sump failed. This was a conservative assumption because there would be time after the sump failed before water would affect any EDG.
- Recovery of the EDGs after the flood entered the building was not considered. This was also conservative because there was a possibility that operators could prevent the EDGs from failing if water entered the buildings.
- The frequency of a flood to Elevation 567 was assumed to be 1E-3/year. This was based on information from the RASP Manual, which indicated flooding due to dam failure was between 1E-4/year and 1E-5/year.
- Offsite power was not assumed to fail as a result of the flood because the Switchyard was physically located at Elevation 578. Alternately, the SRA included a conditional probability in the fault tree for offsite power.
- Leakage through the degraded door seals would be less than the combined flowrate of both sump pumps in the building.
- Stage 2 of the licensee's BDB Mitigating Strategies was available to be used after a flood.

The dominant sequence, which accounted for 80% of the change, would be a flood with loss of offsite power where the door seals failed, the building sump failed, and the operators failed to successfully implement Stage 2 of the mitigating strategies. The resulting change in core damage frequency was less than 1E-6/year, which would be a finding of very low safety significance (Green). The risk would be further mitigated because the main risk drivers were chosen conservatively and recovery of the EDGs could be possible.

The inspectors determined that the finding had a cross-cutting aspect in the Self-Assessment area of the Problem Identification and Resolution aspect [P.6], because recent self-assessments have not been self-critical of the external flood protection program and practices.

Enforcement: Appendix B to 10 CFR Part 50, Criterion V, "Instructions, Procedures, and Drawings," required, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate

quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Contrary to the above, and since August 7, 2014, procedure MPI-0-260-DRS001, "Inspection and Maintenance of Doors," did not contain instructions with appropriate acceptance criteria to determine whether the diesel generator building doors would create a watertight seal when closed. As an immediate corrective action, the licensee developed a compensatory measure to seal gaps in the diesel building flood doors with sealant upon meeting the entry conditions of 0-AOI-100-3. The licensee also began permanent repairs to the door seals and modified inspection procedures. The licensee entered the violations into their CAP as CR 1306268. This violation is being treated as an NCV, consistent with the NRC's Enforcement Policy and is identified as NCV 05000259/260/296/2017003-01: "Degraded EDG Flood Door Seals."

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems to verify the operability of redundant or diverse trains and components when safety equipment was inoperable. The inspectors focused on identification of discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, walked down control system components, and determined whether selected breakers, valves, and support equipment were in the correct position to support system operation. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers, and entered them into the CAP. The inspectors completed four equipment alignment partial walkdown samples.

- Control room emergency ventilation system, while (A) was inoperable
- Unit 3 reactor water cleanup system, while the temperature indicating switch (3-TIS-069-0834D) of the Group 3 of the primary containment isolation system valve logic was in TRIP
- Transformer yard and 500 kV switchyard while both control bay chillers were inoperable
- Unit 1 spent fuel pool cooling system

b. Findings

No findings were identified.

.2 Complete Walkdown

a. Inspection Scope

The inspectors completed a detailed alignment verification of the Unit 1 RHR system. This included review of the relevant operating instruction, 3-OI-74. Several other licensee analyses were used to verify equipment availability and operability. The inspectors reviewed relevant portions of the Updated Final Safety Analysis Report

(UFSAR) and TS. This detailed walkdown also verified electrical power alignment, the condition of applicable system instrumentation and controls, component labeling, pipe hangers and support installation, and associated support systems status. The inspectors examined applicable system health reports, open work orders (WOs), and any previous CRs that could affect system alignment and operability. This activity constituted one equipment alignment complete walkdown inspection sample, as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Fire Protection Tours

a. Inspection Scope

The inspectors reviewed licensee procedures for transient combustibles and fire protection impairments, and conducted a walkdown of fire areas or selected compartments of larger fire areas as listed below. These fire areas or compartments were examined in order to verify licensee control of transient combustibles and ignition sources; the material condition of fire protection equipment and fire barriers; and operational lineup and condition of fire protection features or measures. The inspectors verified that selected fire protection impairments were identified and controlled in accordance with procedures. The inspectors reviewed applicable portions of the Fire Protection Requirements Manual to verify that the necessary firefighting equipment, such as fire extinguishers, hose stations, ladders, and communications equipment, was in place. This activity constituted five fire protection walkdown inspection samples, as defined in inspection Procedure 71111.05.

- Compartment 08, Electric Board Room 2B
- Compartment 02-03, Unit 2 Reactor Building 593' North
- Compartment 01-03, Unit 1 Reactor Building 593' North
- Compartment 16-A, Spreading Room B
- Compartment 01-04, Unit 1 Reactor Building 593' South of 'Q' 565' – 593' Reactor Heat Removal Heat Exchanger Rooms

b. Findings

No findings were identified.

1R07 Triennial Review of Heat Sink Performance (71111.07t)

a. Inspection Scope

The inspectors reviewed, where applicable, operability determinations, vendor manual information, associated calculations, performance test results, and inspection results associated with the 1A Residual Heat Removal Service Water (RHRSW) heat exchanger/cooler and the Diesel Generator 0C1 and 0C2 heat exchanger. These heat

exchangers were chosen based on their risk significance in the licensee's probabilistic safety analysis, their important safety-related mitigating system support functions and their relatively low margin.

The inspectors determined, where applicable, whether the testing, inspection, maintenance, and monitoring of biotic fouling and macrofouling programs for the selected heat exchangers were adequate to ensure proper heat transfer. This was accomplished by determining whether the test method used was consistent with accepted industry practices, or equivalent; the test conditions were consistent with the selected methodology; the test acceptance criteria were consistent with the design basis values; and reviewing results of heat exchanger performance testing. The inspectors also determined whether the test results appropriately considered differences between testing conditions and design conditions, the frequency of testing based on trending of test results was sufficient to detect degradation prior to loss of heat removal capabilities below design basis values, and test results considered test instrument inaccuracies and differences.

For the heat exchangers selected, the inspectors reviewed the methods and results of heat exchanger performance inspections. The inspectors determined whether the methods used to inspect and clean heat exchangers were consistent with as-found conditions identified and expected degradation trends and industry standards. The inspectors also verified the licensee's inspection and cleaning activities had established acceptance criteria consistent with industry standards, and the as-found results were recorded, evaluated, and appropriately dispositioned so that the as-left condition was acceptable.

In addition, the inspectors determined whether the condition and operation of the heat exchangers selected were consistent with design assumptions in heat transfer calculations, and as described in the final safety analysis report. This included determining whether the number of plugged tubes was within pre-established limits based on capacity and heat transfer assumptions. In addition, eddy current test reports and visual inspection records were reviewed to determine the structural integrity of the heat exchanger.

The inspectors determined whether the licensee's biocide treatments for biotic control were adequately conducted and whether the results were adequately monitored, trended, and evaluated.

The inspectors determined whether the performance of ultimate heat sinks (UHS), such as the 2D RHRSW Outlet Valve, sump pump pits, and intake screens, was appropriately evaluated by tests or other equivalent methods, to ensure availability and accessibility to the in-plant cooling water systems.

The inspectors performed a system walkdown of the service water (SW) intake structure to determine whether the licensee's assessment on structural integrity and component functionality was adequate, and that the licensee ensured proper functioning of traveling screens and strainers, and structural integrity of component mounts. In addition, the inspectors determined whether the SW pump bay silt accumulation was monitored, trended, and maintained at an acceptable level by the licensee.

The inspectors determined whether the licensee's inspection of the UHS was thorough and of sufficient depth to identify degradation of the shoreline protection or loss of structural integrity. This included a determination of whether vegetation present along the slopes was trimmed, maintained, and was not adversely impacted the embankment. The inspectors also determined whether the licensee ensured sufficient reservoir capacity by trending and removing debris, or sediment buildup, in the UHS.

In addition, the inspectors reviewed CRs related to the heat exchangers/coolers and heat sink performance issues to determine whether the licensee had an appropriate threshold for identifying issues, and to evaluate the effectiveness of the corrective actions.

These inspection activities constituted four heat sink inspection samples as defined in IP 71111.07-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification and Performance (71111.11)

.1 Licensed Operator Requalification

a. Inspection Scope

On August 14, 2017, the inspectors observed a licensed operator training session for Crew A operating group on the Unit 2 simulator involving a control rod drift, failed fuel, earthquake, and an un-isolable leakage of the suppression pool. The inspectors evaluated the following attributes to assess the performance of the licensed operators:

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of normal and emergency procedures
- Timely control board operation and high-risk operator actions
- Timely oversight and direction provided by the shift supervisor, including implementing appropriate TS and emergency plan notifications
- Group dynamics involved in crew performance.

The inspectors reviewed the critiques performed by the licensee evaluators, and verified that licensee-identified issues were comparable to issues identified by the inspector. The inspectors attended the debriefing of the scenario. The inspectors reviewed simulator physical fidelity. This activity constituted one observation of requalification activity inspection sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.2 Control Room Observations

a. Inspection Scope

The inspectors observed and assessed licensed operator performance in the plant and main control room, particularly during periods of heightened activity or risk and where the activities could affect plant safety. Inspectors reviewed various licensee policies and procedures covering Conduct of Operations, Plant Operations and Power Maneuvering. The inspectors used activities such as post maintenance testing, surveillance testing and other activities to focus on the following conduct of operations as appropriate;

- Operator compliance and use of procedures
- Control board manipulations
- Communication between crew members
- Use and interpretation of plant instruments, indications and alarms
- Use of human error prevention techniques
- Documentation of activities, including initials and sign-offs in procedures
- Supervision of activities, including risk and reactivity management
- Pre-job briefs

This activity constituted one control room observation inspection sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed the specific structures, systems and components (SSC) within the scope of the Maintenance Rule (MR) (10CFR50.65) with regard to some or all of the following attributes, as applicable:

- (1) Appropriate work practices
- (2) Identifying and addressing common cause failures
- (3) Scoping
- (4) Characterizing reliability issues
- (5) Tracking unavailability
- (6) Balancing reliability and unavailability
- (7) Trending key parameters for condition monitoring
- (8) System classification and reclassification
- (9) Appropriateness of performance criteria
- (10) Appropriateness and adequacy of 50.65 (a) (1) goals, monitoring and corrective actions
- (11) Quality control aspects

The inspectors compared the licensee's performance against site procedures. The inspectors reviewed, as applicable, work orders, surveillance records, CRs, system

health reports, engineering evaluations, and MR expert panel minutes. The inspectors attended MR expert panel meetings to verify that regulatory and procedural requirements were met. This activity constituted two routine maintenance effectiveness samples as defined in Inspection Procedure 71111.12:

- Unit 2 RCIC turbine exhaust check valve 2-71-14
- Unit 1,2 and 3 TIP probe surveillances resulting in the inability to close the associated containment isolation valves

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation (71111.13)

a. Inspection Scope

For planned online work and/or emergent work that affected the combinations of risk significant systems listed below, the inspectors examined on-line maintenance risk assessments, and actions taken to plan and/or control work activities to effectively manage and minimize risk. The inspectors verified that risk assessments and applicable risk management actions were conducted as required by 10 CFR 50.65(a)(4) applicable plant procedures. As applicable, the inspectors verified the actual in-plant configurations to ensure accuracy of the licensee's risk assessments and adequacy of risk management action implementations. This activity constituted three maintenance risk assessment inspection samples as defined in Inspection Procedure 71111.13.

- Planned risk associated with the 3A EDG maintenance two and four year PMs
- Risk associated with loss of control bay chillers during a period with an unqualified electrical grid
- Risk associated with the 3B EDG maintenance two and four year PMs while Unit 3 HPCI was inoperable for maintenance

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessment (71111.15)

a. Inspection Scope

The inspectors reviewed the operability/functional evaluations listed below to verify technical adequacy and ensure that the licensee had adequately assessed TS operability. The inspectors reviewed applicable sections of the UFSAR to verify that the system or component remained available to perform its intended function. In addition, where appropriate, the inspectors reviewed licensee procedures to ensure that the licensee's evaluation met procedure requirements. Where applicable, inspectors examined the implementation of compensatory measures to verify that they achieved the intended purpose and that the measures were adequately controlled. The inspectors reviewed CRs on a daily basis to verify that the licensee was identifying and correcting

any deficiencies associated with operability evaluations. This activity constituted two operability evaluation inspection samples as defined in Inspection Procedure 71111.15.

- Unit 2 RHR Loop II Minimum Flow Valve 2-FCV-74-30 blown fuse (CR 1323697)
- Offsite Power Grid declared inoperable affecting all three units (CR 1333071 and CR1333665)

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

Permanent Plant Modifications

a. Inspection Scope

The inspectors verified that the plant modification listed below did not affect the safety functions of important safety systems. The inspectors confirmed that the modifications did not degrade the design bases, licensing bases, and performance capability of risk significant SSCs. The inspectors also verified that modifications performed during plant configurations involving increased risk did not place the plant in an unsafe condition. Additionally, the inspectors evaluated whether system operability and availability, configuration control, post-installation test activities, and changes to documents, such as drawings, procedures, and operator training materials, complied with licensee standards and NRC requirements. The inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with modifications. This activity constituted one plant modification sample as defined in Inspection Procedure 71111.18.

- Unit 3 standby liquid control (SLC) pump 3A discharge accumulator gauge/valve assembly permanent plant modification, per Design Equivalent Change Package 72400

b. Findings

No findings were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors witnessed and reviewed post-maintenance tests (PMT) listed below to verify that procedures and test activities confirmed SSC operability and functional capability following the described maintenance. The inspectors reviewed the licensee's completed test procedures to ensure any of the SSC safety function(s) that may have been affected were adequately tested, and that the acceptance criteria were consistent with information in the applicable licensing basis and/or design basis documents. The inspectors witnessed and/or reviewed the test data, to verify that test results adequately demonstrated restoration of the affected safety function(s). The inspectors verified that

problems associated with PMTs were identified and entered into the CAP. This activity constituted four PMT inspection samples as defined in Inspection Procedure 71111.19.

- Unit 1 – PMT following eddy current and tube replacement on 1A RHR heat exchanger WO 118498674
- Unit 3 – 3A EDG surveillance test following 3A EDG maintenance outage and other 4 year planned maintenance items, WO 118066861
- Unit 1 – Core Spray MOV Operability Test, 1-SR-3.6.1.3.5 (CS II), and Core Spray Flow Rate Loop II, 1-SR-3.5.1.6(CS II), following CS Loop II maintenance outage and Min Flow Isolation Valve Flow Switch (1-FS-75-49) replacement, WOs 118058199 and 118058207
- Unit 1 and 2 – P following capacitor and thermistor replacement on Control Bay Chiller A, WOs 119037027 and 119030421

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors witnessed portions of, and/or reviewed completed test data for the following surveillance tests of risk-significant and/or safety-related systems to verify that the tests met TS surveillance requirements, UFSAR commitments, and in-service testing and licensee procedure requirements. The inspectors' review confirmed whether the testing effectively demonstrated that the SSCs were operationally capable of performing their intended safety functions and fulfilled the intent of the associated surveillance requirement. This activity constituted three surveillance testing inspection samples; one routine test, one in-service test, and one reactor coolant system leak detection test as defined in Inspection Procedure 71111.22.

Routine Surveillance Tests:

- 0-SR-3.8.1.8(II), 480 volt Load Shed Logic System Functional Test (Division II)

Inservice Test

- 0-SI-4.5.C.1 (A3), RHRSW Pump A3 IST Group A Quarterly Pump Test, Rev. 15

Reactor Coolant System Leak Detection Test

- 1-SR-3.4.4.1, Manual Calculation of Unidentified, Identified, and Total Leakage

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)a. Inspection Scope

The inspectors observed radiological emergency plan training drills that contributed to the licensee's drill/exercise performance and emergency response organization performance indicator (PI) measures. This drill was intended to identify any licensee weaknesses and deficiencies in classification, notification, dose assessment and protective action recommendation (PAR) development activities. The inspectors observed emergency response operations in the simulated control room on August 30, 2017, to verify that event classification and notifications were done in accordance with the licensee's procedures. The inspectors attended the post-drill critiques to compare any inspector-observed weaknesses with those identified by the licensee in order to verify whether the licensee was properly identifying EP related issues and entering them into the CAP. This constituted one simulator sample as defined in Inspection Procedure 71114.06.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones; Initiating Events, Mitigating Systems

4OA1 Performance Indicator (PI) Verification.1 Cornerstone: Mitigating Systemsa. Inspection Scope

The inspectors reviewed the licensee's procedures and methods for compiling and reporting the following PIs. The inspectors examined the licensee's PI data for the specific PIs listed below for the third quarter of 2016 through the second quarter of 2017. The inspectors reviewed the licensee's data and graphical representations as reported to the NRC to verify that the data was correctly reported. The inspectors validated this data against relevant licensee records (e.g., CRs, Daily Operator Logs, Plan of the Day, Licensee Event Reports, etc.), and assessed any reported problems regarding implementation of the PI program. The inspectors verified that the PI data was appropriately captured, calculated correctly, and discrepancies resolved. The inspectors used the Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, to ensure that industry reporting guidelines were appropriately applied. This activity constituted three PI inspection samples, as defined in Inspection Procedure 71151.

- Units 1, 2, and 3 EDG MSPI

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution of Problems (71152)

.1 Review of items entered into the Corrective Action Program (CAP):

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily CR reports, and periodically attending Management Review Committee and Plant Screening Committee meetings.

b. Findings

No findings were identified.

.2 Annual Follow-up of Selected Issues: Review of Response to High or Invalid Control Rod Drive (CRD) Temperature Readings

a. Inspection Scope

The inspectors reviewed the licensee's corrective actions for CR 1311713 related to the high CRD temperature annunciator alarm (1-XA-55-5A) received on June 28, 2017. At that time, having at least two adjacent control rods being considered "slow", TS LCO 3.1.4 Condition A required entry into MODE 3 within 12 hours. The inspectors also reviewed the site's corresponding annunciator response procedure, operator work arounds, and technical instructions. The inspectors questioned subject matter experts and obtained procedures from other similar BWR plants. Inspectors noted that responses to high or invalid CRD temperature readings are not always consistent across crews and that procedural actions do not thoroughly address all conditions that could contribute to a high CRD temperature. The Inspector review concluded that sole focus on scram outlet valve leak-by does not address build-up of debris. High CRD temperatures present a nuclear safety risk since they reduce the speed of the CRD's scram time. An unknown or unresolved high temperature could worsen and affect nearby safety equipment. Since the licensee incorporates a penalty to scram time when high and/or invalid CRD temperatures are observed this issue is considered minor. In response, the licensee evaluated the process to respond to high or invalid CRD temperatures and created CR 1319604 to consider corrective actions. This inspection constituted one focused annual follow-up of selected issues sample as defined in Inspection Procedure 71152.

b. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues: Review of Procedure to Determine Drywell Unidentified Leakage

a. Inspection Scope

On July 12, 2017, 1B drywell floor drain sump pump 1B failed to indicate flow during a quarterly surveillance (1-SI-4.2.E-6). The inspectors reviewed the licensee's corrective actions and site procedures for determining reactor coolant system (RCS) unidentified leakage related to the pump failure (CR 1316550). Inspectors noted that a specific drywell floor drain sump pump (A or B) is used throughout the two-year operating cycle and that the potential exists for RCS unidentified leakage to increase for an extended period of time without it being identified. High or increasing RCS unidentified leakage presents a nuclear safety risk since it is an early indicator of a potential RCS piping integrity problem. An increasing or unresolved RCS unidentified leakage could challenge the integrity of a fission product barrier and lead to a more safety significant condition. The inspectors concluded that operators, because the procedure permits use of either sump pump A or B, tend to use a specific drywell floor drain sump pump throughout the entire two-year operating cycle. This can mask early identification of a sump pump failure. In response, the licensee created CR 1319602 to determine if the procedure could be improved. This inspection constituted one focused annual follow-up of selected issues sample as defined in Inspection Procedure 71152.

b. Findings

No findings were identified.

.4 Annual Follow Up of Selected Issues: Inadequate Flood Barrier In RHRSW Pump Rooms

a. Inspection Scope

For this annual follow-up the inspectors reviewed the licensee's corrective actions for PER 599190 related to the failure to maintain a flood barrier resulting in the inoperability of safety-related pumps. The licensee received a Green NCV in 2012 for failing to maintain an adequate flood protection barrier in the RHRSW C pump room. The corrective actions included modifying the maintenance procedure for RHRSW pump replacement to require that a fastened flood protection cover is installed over the pump foundation hole while the pump is removed.

Inspectors observed maintenance activities for the replacement of the RHRSW D2 pump and noted that a fastened cover was not installed over the foundation hole. The inspectors reviewed the work order and maintenance procedure. This inspection constituted one focused Annual Follow-up of Selected Issues sample as defined in Inspection Procedure 71152.

b. Findings

Introduction: An NRC identified Green NCV of TS 5.4.1, "Procedures," was identified for the failure to follow BFN procedure MCI-0-023-PMP003, Emergency Equipment Cooling

Water and Residual Heat Removal Service Water Pump Removal and Reinstallation, Revision 22. The licensee failed to maintain the flood barrier in the RHRSW D pump room.

Description: On September 11, 2017, the licensee removed the RHRSW D2 pump from the D room of the intake pumping station as part of design change notice (DCN) 71313 to replace the RHRSW pumps. The D room houses the safety related RHRSW D1 and D2 pumps and the safety related EECW D3 pump. On September 12, the NRC inspectors observed that the foundation hole for the RHRSW D2 pump was covered with a foreign materials exclusion barrier, but the cover was not bolted down. No licensee personnel were present around the foundation hole at the time of discovery. The pump was removed at 1300 on September 11, 2017, and the new pump was installed at 1300 on September 13th. During the 48-hour period, the foundation hole did not have a fastened cover to serve as a flood barrier.

The pump floor penetration is a flood barrier with both internal and external flooding concerns. UFSAR Section 12.2.7.1.1 states, in part, that each room is designed to protect the RHRSW pumps from water and wave forces resulting from a probable maximum flood. Additionally, the RHRSW rooms are part of the intake structure, which also houses 9 condenser circulating water pumps and associated non-seismic intake lines. The licensee received a Green NCV in 2012 for a similar issue in the RHRSW C pump room, as documented in Inspection Report 2012002. As part of the corrective actions for this NCV, the licensee issued PER 599190, which required a cover to be fastened if the foundation hole is not accessed within 8 hours. The PER referenced MCI-0-023-PMP003, which required a cover to be fastened if the foundation hole is left unattended. The pump replacement work order referenced PER 599190, but no specific instructions were included.

Analysis: The licensee's failure to comply with maintenance procedure MCI-0-023-PMP003, step 3.0.I, to protect the RHRSW pump room flood barrier is a performance deficiency. The performance deficiency is more than minor because it affected the mitigating systems cornerstone attribute of equipment performance and affected the cornerstone objective to ensure the availability, reliability, and capability of the RHRSW and EECW pumps to respond to events and prevent undesirable consequences. Specifically, the failure to follow procedures resulted in the flood barrier not being maintained, which could have rendered the D1, D2, and D3 pumps inoperable in a flooding event. The finding was screened in accordance with NRC IMC 0609 Appendix A, dated June 19, 2012, The Significance Determination Process (SDP) for Findings at Power, Exhibit 4, External Events Screening Questions and determined that a detailed risk assessment was required because the loss of the flood barrier, during the external initiating event it was designed to mitigate, would degrade one or more systems that support a risk significant function. A Phase 2 SDP was performed using a modified NRC plant model. The model was modified to assume a failure of the D1, D2, and D3 pumps for 48 hours, which reflected the exposure time during which the flood barrier was not protected. The model was solved for both an internal flooding event and an external flooding event. The result was below the CDF or LERF threshold for a finding of significance. The finding is Green because of the short exposure time and the low likelihood of the flood.

The finding had a cross-cutting aspect in the avoid complacency component of the human performance area as defined in NRC IMC 0310, because the organization failed to recognize the possibility of mistakes and use appropriate error reduction tools. Specifically, the maintenance staff chose to not refer to a previously related CR (PER 599190) or the maintenance procedure changes that were corrective actions for a previous NRC finding. [H.12].

Enforcement: TS 5.4.1, "Procedures," required, in part, that written procedures be established, implemented, and maintained covering activities related to procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Section 9, "Procedures for Performing Maintenance," required that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to the above, from September 11, 2017 to September 13, 2017, the licensee failed to adhere to maintenance procedure MCI-0-023-PMP003, Revision 22, step 3.0.1, which required the foundation hole flood protection cover to be installed, sealed, and fastened. Because this finding is of very low safety significance (Green) and was entered into the CAP (CR 1338684), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the Enforcement Policy. This violation was applicable to U1, U2, and U3 and is identified as NCV 05000259/260/296/2017003-02, Failure to Maintain Intake Building Flood Barrier.

4OA3 Follow-up of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report (LER) 05000259/260/296-2017-003-00 and -01, Unanalyzed Conditions Regarding Tornado Missile Protection

On April 25, 2017, it was discovered that a tornado missile strike could potentially damage the exposed and unprotected Unit 3 emergency diesel generator (EDG) fuel oil vent lines and the Unit 1/2 D EDG fuel oil vent line. On June 14, 2017, it was determined that a nonconforming condition existed due to the potential for a tornado missile strike to damage equipment near door 484 of the reactor building. The nonconforming condition is a plant design legacy issue. A specific cause was not identified. The inspectors reviewed the LER and the licensee's corrective actions. No findings were identified.

.2 Unresolved Item 05000259/260/296/2017-003-03: Notice of Enforcement Discretion Granted from TS LCO 3.0.3 Related to Loss of Control Room Chillers

As required by Inspection Manual Chapter 0410 Section 06.03.c, an unresolved item is being opened associated with a Notice of Enforcement Discretion 17-2-01 related to approval to not comply with TS requirements associated with loss of cooling to the Unit 1 / 2 main control rooms and 4kv electric board rooms on September 10, 2017.

On the basis of the NRC staff's evaluation of the TVA request, granting the NOED was consistent with the NRC's Enforcement Policy and had no adverse impact on public health and safety or the environment. Therefore, as communicated orally to the TVA staff on September 10, the NRC exercised enforcement discretion to not enforce compliance with TS LCO 3.0.3 requirements that Browns Ferry Nuclear Plant, Units 1, 2, and 3, be in Mode 2 by 9:51 p.m. on September 10, 2017. Unit 1, 2, and 3 Mode 2 entry

was extended to 10:00 a.m. on September 11 to allow completion of maintenance on either of the two CB chillers. TVA completed repairs to the B CB chiller sufficiently early to allow Units 1, 2, and 3 to exit TS LCO 3.0.3 prior to the TS required completion time on September 10, 2017.

40A5 Other Activities

.1 Follow-up on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternate Dispute Resolution Confirmatory Orders (92702)

a. Inspection Scope

The inspectors performed an in-office review of TVA's records related to corrective actions taken in response to a Severity Level (SL) III Notice of Violation (NOV), issued on November 28, 2016, in NRC Inspection Report 05000296/2016015 (ML16333A437). The NOV was associated with fire watch employees who deliberately failed to conduct compensatory roving fire watch patrols contrary to the requirements of 10 CFR 50.48, "Fire Protection." The NOV was described in NRC Inspection Report 05000296/2016013 issued on July 27, 2016 (ML16211A006). The objectives of the inspection were to ensure that TVA implemented adequate corrective actions for the SL III NOV, identified causes, addressed generic implications, and appropriately enhanced TVA's programs and practices to prevent recurrence.

The inspectors reviewed CAP documents which included the Level 2 apparent cause evaluation report, to verify that corrective actions had been implemented and were effective. TVA's review concluded individuals involved in the event understood the procedural requirements, but chose not to follow the requirements. TVA concluded that the supervision observation plan lacked the necessary rigor to verify fire watches were adhering to procedural requirements. TVA's corrective actions were to administer discipline to the workers who failed to adhere to procedural requirements and develop alternate means of tracking the thoroughness of fire watch round performance.

The inspectors reviewed documentation and verified that appropriate personnel accountability actions were completed for the individuals identified as not conducting fire watch rounds in accordance with procedures. The inspectors reviewed the revisions made to procedure FP-0-000-INS012, Fire Watch Expectations, and FP-0-000-INS019, Fire Protection Weekly Inspection, to ensure that the appropriate guidance and management expectations for fire watch rounds were incorporated into plant procedures. The inspectors reviewed FP-0-000-INS019 to verify that the procedure now requires the Fire Operations Foreman to conduct weekly unannounced, random observations of personnel, to ensure that rounds are being performed per procedure. The inspectors reviewed the records of the unannounced observations for August 28, September 4, and September 11, 2017, to verify that the observations are being performed in accordance with site procedures. Additionally, the inspectors reviewed FP-0-000-INS019 to verify that the procedure has a step in place for management to perform random reviews of security card reader information on a quarterly basis. The inspectors reviewed fire watch briefing forms to ensure that personnel are being briefed and understand the fire watch expectations prior to performing a fire watch for a new impairment. Additionally,

TVA identified that operating experience reviews failed to identify the potential for this problem. The inspectors noted that TVA assigned the Performance Improvement Coordinator for Operations the responsibility for operating experience reviews.

b. Findings and Observations

No findings were identified. In general, the inspectors concluded the following:

- The licensee's evaluations of the violation identified how the issue was identified, how long it existed and possible opportunities for identification
- The SL III violation received an appropriate level of evaluation to identify causes
- The evaluation included appropriate consideration of prior occurrences
- The evaluation appropriately addressed extent of condition and extent of cause of the problem
- Corrective actions were appropriate, and were appropriately prioritized and scheduled
- Measures of success were developed and being monitored to determine the effectiveness of the corrective actions

The inspectors determined that the corrective actions taken in response to the violation have been adequate. VIO 05000296/2016013-01 is closed.

4OA6 Meetings, Including Exit

.1 Exit Meeting Summary

On October 13, 2017, the resident inspectors presented the quarterly inspection results to Mr. Steve Bono, Site Vice President and other members of the licensee's staff, who acknowledged the findings. The inspectors confirmed that proprietary information was controlled to protect it from public disclosure.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

J. Barker, Operations Superintendent
E. Bates, Licensing Engineer
R. Beck, Engineering FIN team Manager
S. Bono, Site Vice President
B. Bruce, Work Management Director
P. Derriso, Site Programs Engineering Manager
D. Drummonds, GL 89-13 Program Owner
J. Garner, Licensing Engineer
R. Guthrie, Emergency Diesel System Engineer
L. Hughes, General Manager, Site Operations
M. McAndrew, Manager of Operations
M. Oliver, Senior Program Manager, Licensing
K. Parker, Heat Exchanger Program Owner
J. Paul, Nuclear Site Licensing Manager
B. Tidwell, EP Manager

LIST OF REPORT ITEMS

Opened

URI 05000259/260/296/2017-003-03 Notice of Enforcement Discretion Granted from TS
LCO 3.0.3 Related to Loss of Control Room
Chillers

Opened and Closed

NCV 05000259/260/296/2017003-01 Degraded EDG Flood Door Seals (1R01)
NCV 05000259/260/296/2017003-02 Failure to Maintain Intake Building Flood Barrier
(4OA2)

Closed

LER 05000259/260/296/2017-003-00, -01 Unanalyzed Condition for Tornado Missiles
Striking the Emergency EDG Fuel Oil Vent Lines
VIO 05000296/2016013-01 Failure to Implement Proper Control of Fire
Protection Impairments

LIST OF DOCUMENTS REVIEWED

Section 1R01

Procedures

0-AOI-100-7, Severe Weather, Rev. 39

Drawings

PIP-02-03, AC Electrical Distribution System for the Browns Ferry Nuclear Plant,
dated March 15, 2010

Section 1R04

Procedures

0-SR-3.7.3.2(HEPA), Control Room Emergency Ventilation System In Place Leak Test, Rev. 11

0-SR-3.7.3.2(A VFTP), Control Room Emergency Ventilation Unit A Flow Rate and Filter
Testing Program, Rev. 14

1-OI-74, Residual Heat Removal Operating Instruction, Rev. 99

1-OI-74/ATT-1, Residual Heat Removal System Attachment 1 Valve Lineup Checklist, Rev. 79

1-OI-74/ATT-2, Residual Heat Removal System Attachment 2 Panel Lineup Checklist, Rev. 80

1-OI-74/ATT-3, Residual Heat Removal System Attachment 3 Electrical Lineup Checklist,
Rev. 78

Drawings

0-47E865-4, Flow Diagram Ventilation and Air Conditioning Air Flow, Rev. 0

3-47E810-1, Flow Diagram Reactor Water Cleanup System, Rev. 55

3-730E927, Primary Containment Isolation System, Rev. 3

1-47E811-1, Flow Diagram Residual Heat Removal System, Rev. 46

Other Documents

WOs 118566259, 118059857, and 118059858

OPL173.935, Control Room Emergency Ventilation System (CREVS), Rev. 0

CRs 668768, 1328654, 1329975, 1331321, 1331419, 1333073, 1329478

WO 113467039

OPL171.013, Reactor Water Cleanup System, Rev. 20

OPL171.017, Primary Containment Isolation System, Rev. 18

Section 1R05

Procedures

FPR-VOLUME 2, Fire Protection Report Volume 2, Rev. 55

0-FSS-8, U-2, Electric Board Room 2B EL 593', Rev. 4

0-SI-4.11.G.2, Semiannual Fire Door Inspection, Rev. 31

0-FSS-2-3, U-2, RB EL 593' North of Column Line R, Rev. 5

Drawings

0-47E216-69, NFPA 805 Fire Areas Plan EL. 593.0 and 586.0, Rev. 0

0-47E216-69-1, NFPA 805 Physical Analysis Units Plan EL. 593.0 and 586.0, Rev. 0

47E216-68, 69, 70, 72, 71

Other Documents

CRs 1316594, 1316997, 1323205, 1324432, 1329518, 1329032

WOs 118896051 and 118869927

NDN0009992012000096, Browns Ferry Nuclear Fire Probabilistic Risk Assessment –
Summary Document, Rev. 8

EDQ099920110010, NFPA 805 – Nuclear Safety Capability Analysis, Rev. 33

0-FSS-1-4, Rev. 5

0-FSS-1-3, Rev. 7

FPR-Volume 2, Fire Protection Report Volume 2, Rev. 55

NFPA 805 Fire Protection Report, Appendix F, Fire Area 01-03, Rev. 0

Section 1R07

CR821164, 2-FCV-023-0052 High Running Loads

CR822205, 2-FCV-023-0052 High As Left Packing Loads

CR1191126, No Performance of Biocide Injection

CR1294718, Raw Water Fouling on 3D EDG Jacket Water Cooler

CR1215985, Biocide not Performed

CR1316927, Zebra Mussel Sample

PM

PM 500102570, Eddy Current Test the DG-A Cooling Water Heat Exchanger 1A

PM 500108600, Disassemble, Clean Heat Exchanger RHR Hx 1A, BFN-1-HEX-074-0900A

Procedures

0-TI-63, RHRSW Flow Blockage Monitoring, Rev. 27

0-TI-322, RHR Heat Exchanger Performance Testing, Rev. 5

0-TI-389, Raw Water Fouling and Corrosion Control, Rev. 17

0-TI-522, Program for Implementing NRC Generic Letter 89-13, Rev. 8

0-TI-556, MIC and Cavitation Degradation Monitoring Program, Rev. 7

0-TI-611, Monitoring Program for Carbon Steel Subject to Raw Uncontrolled Water, Rev. 1

0-TI-616, Aging Management Program Basis Document Open-Cycle Cooling Water System
Program, Rev. 3

0-TPP-ENG-389, Raw Water Fouling and Corrosion Control, Rev. 1

CI-137, Raw Water Chemical Treatment, Rev. 23

CI-137.5, Raw Water Chemical Treatment Molluscicide Control, Rev. 41

N-ET-6, Eddy Current Examination of Tubing in Balance of Plant Components, Rev. 6

NPG-SPP-09.7, Corrosion Control Program, Rev. 7

NPG-SPP-09.7.1, Corrosion Control- General, Localized and Galvanic, and Stress Corrosion
Cracking Program, Rev. 2

NPG-SPP-09.7.3, Raw Water Corrosion Program, Rev. 2

NPG-SPP-09.14, Generic Letter 89-13 Implementation, Rev. 4

NPG-SPP-09.26.9, Heat Exchanger Testing and Maintenance Program, Rev. 0

Work Orders

112264003, RHR Hx 2D Visual Inspection

112999027, License Renewal Visual Inspection of the RHRSW Pump Pit Seismic Restraints

112999039, License Renewal Visual Inspection of the RHRSW Pump Pit Internals

115189131, BFN-2-MVOP-023-0052, RHR Hx 2D Water Outlet MOVATS

116566153, DG-3A Cooling Water Hx 3A1 Visual Inspection

116604823, RHR Hx 1A Visual Inspection

116679931, 2-FCV-026-0035, Visual Inspection for Corrosion Monitoring

116749031, DG-3A Cooling Water Hx 3A1 Visual Inspection
 116993775, DG Hx 0C1 and 0C2 Visual Inspection
 117582277, Eddy Current Test DG-A Heat Exchanger
 118020064, 3D EDG 3D1/3D2 Heat Exchanger Visual Inspection
 118498674, RHR Hx 1A Eddy Current Examination Results
 118500508, Perform underwater inspection/cleaning of RHRSW/EECW pump suction screens

Other

BFN-50-7023, RHR Service Water System, Rev. 20
 BFN-ENG-SSA-17-002, GL 89-13 Program Self Assessment, 1/27/17
 Eddy Current Examination Report, RHR 1B, Jan 2007
 R05160622005, Browns Ferry Nuclear Plant U1 "1A" and "1C" RHR Thermal Performance Test, 6/16/16
 R14001016138, Diesel Generator Jacket Cooling Water Cooler Capacity and Tube Plugging, Rev. 1
 R14980819102, RHR Heat Exchanger Tube Plugging Analysis for Power Uprates, Rev. 2
 Treatment Report for the EECW and RCW Systems, July 2017
 Treatment Report for the EECW and RCW Systems, May 2017
 Treatment Report for the EECW and RCW Systems, March 2016
 Treatment Report for the EECW and RCW Systems, December 2016

Section 1R11

Procedures

OPDP-1, Conduct of Operations, Rev. 38
 OPDP-14, Operator Fundamentals, Rev. 1
 BFN-ODM-4.20, Strategies for Successful Transient Mitigation, Rev. 4

Section 1R12

Procedures

0-TI-346, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10CFR50.65, Rev. 50

Other Documents

CRs 882273, 961173, 975124, 1008300, 1086808, 1098760, 1142053, 1198887, 1242562, 629614

Expert Panel Meeting Notes for July 26, 2017
 System Health Report for system 074 for 1st quarter of 2017
 WO 1115395094

Section 1R15

Procedures:

0-TI-362, Browns Ferry Nuclear Plant, Units 1, 2, and 3, Inservice Testing Program, Rev. 54

Drawings:

2-47E811-1, Flow Diagram Residual Heat Removal System, Rev. 76
 2-45E779-9, Wiring Diagram 480V Shutdown Auxiliary Power Schematic Diagram, Rev. 10

Other Documents:

CRs 1323697, 1323915, and 1324047
 WO 118910011

BFN-50-7074, General Design Criteria Document, Browns Ferry Nuclear Plant, Residual Heat Removal System, Rev. 29
 NDQ0074880118, Evaluation of LPCI Flow to Reactor Pressure Vessel (RPV) with Failed Open Min-Flow Bypass Valve, Rev. 4
 OPL171.044, Residual Heat Removal System, Rev. 21
 PER 208285

Section 1R18

Procedures:

3-SI-4.4.A.1, SLC Pump Functional Test, Rev. 59

Drawings:

3-47E854-1, Revision 14

Other Documents:

Design Equivalent Change (DEC) Package 72400, SDP – Standby Liquid Control (SLC) Pump Discharge Accumulator Gauge/Valve Assembly
 MCI-0-063-ACC001, Rev. 0015, SLC Accumulator Maintenance
 PMT-0-000-MEC001, Rev. 0008, Leak Checks on Tube Fittings, Threaded, Flanged, Bolted or Welded Connections
 WO 118661953 (SLC 3A Accumulator (BFN-3-ACC-063-0580))

Section 1R19

Procedures:

3-SR-3.8.1.1(3A), Diesel Generator 3A Monthly Operability Test, Rev. 62
 1-SR-3.6.1.3.5(CS II), Core Spray MOV Operability Test, Rev. 7
 1-SR-3.5.1.6(CS II), Core Spray Flow Rate Loop II, Rev. 25

Drawings

1-47E814-1, Flow Diagram Core Spray System, Rev. 23

Other Documents:

WO 118066861
 WOs 118947771, 118058199, and 118058207
 WO -119037027 Replace capacitors
 WO 119030421 Replace thermistors--
 CRs 1336729 and 1329188

Section 1R22

Procedures

1-SR-2, Instrument Checks and Observations
 1-SR-3.4.4.1, Manual Calculation of Identified and Unidentified Leakage
 1-OI-64, Rev. 23, Sect. 6.4, Manually Pumping Down Drywell Floor Drain Sump
 1-SI-4.2.E-6, Drywell Equipment/Floor Drain Sump Pump Flow Rate Adjustment, Rev. 8
 0-SI-4.5.C.1 (A.3), RHRSW Pump A3 IST Group A Quarterly Pump Test, Rev. 15
 0-SR-3.8.1.8(II) 480 volt Load Shedding Logic System Functional Test (Division II)

Drawings

1-47E852-1, Flow Diagram Floor & Dirty Radwaste Drainage

Other Documents

CRs 1316550, 1319602, 1320572
WOs 118058418, 118887832, and 118888227
WO 117448042 Load Shed Test

Section 40A2Procedures:

1-TI-393, Evaluation of CRD Temperature Alarms, Rev. 0
1-OI-85, Control Rod Drive System, Rev. 42
1-ARP-9-5A, Page 22 of 46, Control Rod Drive Unit Temp High 1-TA-85-7, Rev. 23
OPDP-4, Annunciator Disablement, Rev. 4
1-SR-2, Instrument Checks and Observations
1-SR-3.4.4.1, Manual Calculation of Identified and Unidentified Leakage
1-OI-64, Rev. 23, Sect. 6.4, Manually Pumping Down Drywell Floor Drain Sump
1-SI-4.2.E-6, Drywell Equipment/Floor Drain Sump Pump Flow Rate Adjustment, Rev. 8
0-SI-4.5.C.1(A.3), RHRSW Pump A3 IST Group A Quarterly Pump Test, Rev. 15

Drawings:

1-47E820-2, Flow Diagram Control Rod Drive Hydraulic System, Rev. 13
1-47E852-1, Flow Diagram Floor & Dirty Radwaste Drainage

Other Documents:

CRs 1311713, 1312440, 1312434, 1316959, 1318934, 1317671, 1317676, 1319604, 1316550,
1319602
GE SIL No. 173, Supplement 1, Rev. 1