



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

August 10, 2015

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

**SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC INTEGRATED INSPECTION  
REPORT 05000259/2015002, 05000260/2015002, AND 05000296/2015002**

Dear Mr. Shea:

On June 30, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Nuclear Plant, Units 1, 2, and 3. On July 28, 2015, the NRC inspectors discussed the results of this inspection with Mr. S. Bono and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

No NRC-identified or self-revealing findings were identified during this inspection. However, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as noncited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the NCV, 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 the Browns Ferry Nuclear Plant.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS).

J. Shea

2

ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

***/RA/***

Alan J. 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 Integrated Inspection Report 05000259/2015002,  
05000260/2015002 and 05000296/2015002

cc: Distribution via ListServ

J. Shea

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Letter to Joseph W. Shea from Alan J. Blamey dated

SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC INTEGRATED INSPECTION  
REPORT 05000259/2015002, 05000260/2015002, AND 05000296/2015002

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

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

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

Report No.: 05000259/2015002, 05000260/2015002, 05000296/2015002

Licensee: Tennessee Valley Authority (TVA)

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

Location: Corner of Shaw and Nuclear Plant Road  
Athens, AL 35611

Dates: April 1, 2015, through June 30, 2015

Inspectors: D. Dumbacher, Senior Resident Inspector  
T. Stephen, Resident Inspector  
A. Ruh, Resident Inspector  
R. Hamilton, Senior Reactor Inspector  
R. Kellner, Reactor Inspector  
W. Pursley, Reactor Inspector  
P. Cooper, Reactor Inspector  
J. Montgomery, Reactor Inspector  
M. Singletary, Reactor Inspector

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

Enclosure

## SUMMARY

IR 05000259/2015002, 05000260/2015002, 05000296/2015002; 4/01/2015–06/30/2015; Browns Ferry Nuclear Plant, Units 1, 2 and 3; Occupational Radiation Safety.

The report covered a three month period of inspection by resident and regional inspectors. One licensee identified violation was documented. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using IMC 0609, "Significance Determination Process" dated April 29, 2015. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process" Revision 5, dated February 2014.

### Licensee Identified Violations

A Violation of very low safety or security significance that was identified by the licensee has been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at 100 percent of rated thermal power (RTP) until a planned shutdown on April 28, 2015, for a Drywell entry. The licensee identified packing leaks on 1A main steam line inboard isolation valve and a reactor building closed loop cooling water leak. The unit returned to 100 percent power on May 3rd. On May 4, 2015, and June 6, 2015, Unit 1 was downpowered to 65 percent for planned maintenance. The unit operated at 100 percent power for the remainder of the quarter.

Unit 2 operated at 100 percent of RTP until May 14, 2015, when power was reduced briefly to 95 percent and returned to 100 percent in the same day to allow securing 2C Reactor Feedwater (RFW) Pump for thrust bearing checks. On May 15, 2015, power was reduced to 70 percent for planned maintenance. The unit returned to 100 percent power on May 17, 2015. On June 17, 2015, the unit was downpowered to 98 percent power to address elevated river intake temperatures greater than allowed by Technical Specifications until cooling tower operations could be established that evening. The unit operated at 100 percent power for the remainder of the quarter.

Unit 3 operated at 100 percent of RTP until April 8, 2015, for an unplanned downpower to 73 percent to address excessive bearing oil leakage on 3C RFW Pump. The unit returned to 100 percent power on April 10th. On June 17, 2015, the unit was downpowered to 98 percent power to address elevated river intake temperatures greater than allowed by Technical Specifications (TS) until cooling tower operations could be established that evening. The unit operated at 100 percent power for the remainder of the quarter.

## 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, 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 to protect risk-significant systems from a Local Intense Precipitation (LIP) event on May 27, 2015. The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures, including operator staffing, 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 an LIP event. The inspectors verified that operator actions specified in the licensee's adverse weather procedure maintain readiness of essential systems. The inspectors verified that required surveillances were current, and completed, if practical, before the onset of anticipated adverse weather conditions. The inspectors also verified that the licensee implemented periodic equipment walkdowns or other measures to ensure that the condition of plant equipment met operability requirements. Documents reviewed are listed in the attachment. This constituted one Impending Adverse Weather sample.

##### b. Findings

No findings were identified.

#### .2 Summer Readiness of Offsite and Alternate AC Power Systems

##### a. Inspection Scope

Prior to the summer season, inspectors reviewed electrical power design features, and onsite risk and work management procedures to verify appropriate operational oversight and assurance of continued availability of offsite and alternate AC power systems. Inspectors verified that communications protocols existed between the transmission system operator and Browns Ferry Nuclear Plant for coordination of off-normal and emergency events affecting the plant, event details, estimates of return-to-service times, and notifications of grid status changes. The inspectors verified that the changes made since June 2014 to the licensee's procedures addressing offsite AC power and onsite alternate AC power did not affect their availability and reliability. The inspectors walked down the licensee's switchyard to verify the physical condition of offsite power sources. This activity constituted one Summer Readiness of Offsite and Alternate AC Power System inspection sample.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

Partial Walkdown

a. Inspection Scope

The inspectors conducted partial equipment alignment walkdowns to evaluate the operability of selected redundant trains or backup systems, listed below, while the other subsystems were inoperable or out of service. The inspectors reviewed the functional systems descriptions, Updated Final Safety Analysis Report (UFSAR), system operating procedures, and TS to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify that critical components were properly aligned and to identify any discrepancies which could affect operability of the redundant train or backup system. Documents reviewed are listed in the attachment. This activity constituted three Equipment Alignment Partial Walkdown inspection samples.

- Unit 3, Loop I of the Residual Heat Removal (RHR) system while it was protected during the 3D Diesel outage
- Unit 2 Reactor Building Closed Loop Cooling Water (RBCCW)
- Unit 3 High Pressure Coolant Injection (HPCI)

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 the fire areas (FA) and fire zones (FZ) listed below. Selected FAs/FZs 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 operational 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 Report, Volumes 1 and 2, including the applicable Fire Hazards Analysis, and Pre-Fire Plan drawings, to verify that the necessary firefighting equipment, such as fire extinguishers, hose stations, ladders,

and communications equipment, was in place. Documents reviewed are listed in the attachment. This activity constituted five Fire Protection Walkdown inspection samples.

- Fire Area 19 Unit 3 Control Bay, Elevation 593', Battery and Battery Board rooms
- Fire Area 15 Unit 3 Reactor Building, Elevation 621', 480v Shutdown Board 3B
- Fire Area 16 Control Bldg, Elevation 617', all units, including Technical Support Center
- Fire Area 23 Unit 3 Diesel Generator Building, Elevation 656' and 583', 4kV Shutdown Board Room 3EC and 3ED
- Fire Area 24 Unit 3 Diesel Generator Building, Elevation 565', 4kV Bus Tie Board Room

b. Findings

No findings were identified.

.2 Observe Fire Brigade

a. Inspection Scope

The inspectors witnessed the fire brigade response during an announced fire drill that simulated a fire in the intake structure. The inspectors assessed the response time for notifying and assembling the fire brigade; the readiness of firefighting equipment; use of personnel fire protective clothing and equipment (e.g., turnout gear, self-contained breathing apparatus); communications; incident command and control; teamwork; and firefighting strategies. The inspectors also attended the post-event critique to assess the licensee's ability to review fire brigade performance and identify areas for improvement. Following the critique, the inspectors compared their observations with the requirements specified in the licensee's Fire Protection report. This activity constituted one Fire Brigade response inspection sample.

b. Findings

No findings were identified

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

Internal Flooding

The inspectors reviewed related flood analysis documents and walked down the areas listed below containing risk-significant structures, systems, and components susceptible to flooding. The inspectors verified that plant design features and plant procedures for flood mitigation were consistent with design requirements and internal flooding analysis assumptions. The inspectors also assessed the condition of flood protection barriers

and drain systems. In addition, the inspectors verified the licensee was identifying and properly addressing issues using the corrective action program. Documents reviewed are listed in the attachment. This activity constituted one Internal Flooding inspection sample.

- Unit 3 Shutdown Board Rooms containing 4kV shutdown boards 3EB and 3ED

b. Findings

No findings were identified

1R08 Inservice Inspection Activities (71111.08)

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

The inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system boundary, risk-significant piping and component boundaries, and containment boundaries in Unit 2.

The inspectors either directly observed or reviewed the following non-destructive examinations (NDEs), mandated by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code of Record: 2004 Edition) to evaluate compliance with the ASME Code, Section XI and Section V requirements. The inspectors also reviewed the qualifications of the NDE technicians performing the examinations, to determine whether they were current and in compliance with the ASME Code requirements.

- Magnetic Particle Examination (MT), Core Spray System, 2-47B458S0004-IA, ASME Class 2 Equivalent (reviewed)
- Phase Array Ultrasonic (UT), DCS-2-13, Core Spray System, 12" Pipe-to-Pipe Weld, ASME Class 2 Equivalent (reviewed)
- UT, DCS-2-14, Core Spray System, 12" Pipe-to-Valve Weld, ASME Class 2 Equivalent (reviewed)
- UT, Residual Heat Removal System, DSRHR-2-06, 24" Pipe-to-Pipe Weld, ASME Class 2 Equivalent (reviewed)
- VT-3, Residual Heat Removal Service Water, Pipe Support 2-17B300S0070 (observed)

Browns Ferry Unit 2 received a renewed license and entered into the period of extended operation on August 2, 2014. The inspectors conducted a walkdown of the containment structure as well as the structures, systems, and components (SSCs) housed within this structure to visually assess the overall health of the licensee's applicable aging management programs. As a result of the walkdown, the inspectors did not identify any

SSC's that exhibited unmanaged or accelerated aging that would challenge the ability of the SSCs to perform its safety function.

The inspectors either directly observed or reviewed the following welding activities, qualification records, and associated documents, in order to evaluate compliance with procedures and the ASME Code, Section XI and Section IX requirements. Specifically, the inspectors reviewed the work order, repair and replacement plan, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- RCIC Steam Leak Repair, BFN-2-RTV-071-0005H, Remove and Replace 1" Socket Welded Globe Valve and Pipe Fittings, ASME Class 2 (reviewed)

During non-destructive surface and volumetric examinations performed since the previous refueling outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service; therefore, no NRC review was completed for this inspection procedure attribute.

#### Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the corrective action program, to determine if the licensee had appropriately described the scope of the problem, and had initiated corrective actions. The review also included the licensee's consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" requirements. Documents reviewed are listed in the attachment. This activity constituted one Inservice Inspection Activities sample.

#### b. Findings

No findings were identified.

### 1R11 Licensed Operator Requalification and Performance (71111.11)

#### .1 Licensed Operator Requalification

##### a. Inspection Scope

On April 29, 2015, the inspectors observed a licensed operator training session for an operating crew according to the Unit 2 Simulator Exercise Guide (SEG) OPL173S060, Security Event Response & Control Room Abandonment, Revision 15.

The inspectors specifically evaluated the following attributes related to the operating crew's performance:

- 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 procedures including Abnormal Operating Instructions (AOIs), Emergency Operating Instructions (EOIs) and Safe Shutdown Instructions (SSI)
- Timely control board operation and manipulation, including high-risk operator actions
- Timely oversight and direction provided by the shift manager, including ability to identify and implement appropriate technical specifications actions such as reporting and emergency plan actions and notifications
- Group dynamics involved in crew performance

The inspectors assessed the licensee's ability to assess the performance of their licensed operators. The inspectors reviewed the post-examination critique performed by the licensee evaluators, and verified that licensee-identified issues were comparable to issues identified by the inspector. The inspectors reviewed simulator physical fidelity (i.e., the degree of similarity between the simulator and the reference plant control room, such as physical location of panels, equipment, instruments, controls, labels, and related form and function). Documents reviewed are listed in the attachment. This activity constituted one Observation of Requalification Activity inspection sample.

b. Findings

No findings were identified.

.2 Control Room Observations

a. Inspection Scope

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.

Inspectors utilized 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 with several observations occurring on different dates, totaling approximately 4 hours of observation.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine

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 in accordance with 10 CFR 50.65(b) of the MR; (4) Characterizing reliability issues for performance monitoring; (5) Tracking unavailability for performance monitoring; (6) Balancing reliability and unavailability; (7) Trending key parameters for condition monitoring; (8) System classification and reclassification in accordance with 10 CFR 50.65(a)(1) or (a)(2); (9) Appropriateness of performance criteria in accordance with 10 CFR 50.65(a)(2); and (10) Appropriateness and adequacy of 10 CFR 50.65 (a)(1) goals, monitoring and corrective actions. The inspectors compared the licensee's performance against site procedures. The inspectors reviewed, as applicable, work orders, surveillance records, PERs, system health reports, engineering evaluations, and MR expert panel minutes; and attended MR expert panel meetings to verify that regulatory and procedural requirements were met. Documents reviewed are listed in the attachment. This activity constituted two Maintenance Effectiveness inspection samples.

- Fuel Oil Storage Tanks used to resupply the Unit 1, 2, and 3 Emergency Diesel Generator (EDG) seven day tanks
- Reactor Building Closed Cooling Water (RBCCW) maintenance rule scoping

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 (RMA) were conducted as required by 10 CFR 50.65(a)(4) and plant procedures. As applicable, the inspectors verified the actual in-plant configurations to ensure accuracy of the licensee's risk assessments and adequacy of RMA implementations. Documents reviewed are listed in the attachment. This activity constituted five Maintenance Risk Assessment inspection samples.

- Unit 1 entering Yellow Risk with Unit 2 in a refueling outage due to a tornado warning in an adjacent county.
- Unit 2 entering Yellow Risk with work being performed on the B Residual Heat Removal Service Water (RHRSW) system and the 2B RHR Heat Exchanger.
- Unit 3 Green risk during Conservative Operations Alert (power grid nearing load limit) with HPCI out of service.
- Unit 2 entering Yellow Risk with work being performed on Loop 1 RHR and maintenance on A, B, and C electric fire pumps.
- Unit 2 with an increased risk of a plant trip due to one RFW Pump out of service, RCIC out of service, and a five gph main turbine control valve hydraulic leak.

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 PERs on a daily basis to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the attachment. This activity constituted eight regular Operability Evaluation inspection samples.

- Unit 2 Automatic Depressurization System accumulator low pressure alarm (PER 1011955)
- Unit 3 Emergency Diesel Generator 3A cooling water heat exchanger leak (PER 1007206)
- Unit 1 Core Spray Pump motor 1A heaters (PER 1017748)
- Unit 3 High Pressure Coolant Injection turbine exhaust drain pot level high following flowrate surveillance testing (PER 1018316)
- Unit 1 Standby Liquid Control 1A loss of continuity to explosive charge (CR 1031635)

- Unit 1 High Pressure Coolant Injection turbine exhaust drain pot level high following flowrate surveillance testing (PER 1022487)
- Unit 1, 2, and 3 Standby Gas Treatment (SBGT) system functional evaluation for a high humidity condition in the Reactor Building (PER 991511)
- Unit 2 air leak on Alternate Rod Injection scram valve (CR 1041082)

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

The inspectors verified that the plant modification(s) listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modifications did not degrade the design bases, licensing bases, and performance capability of risk significant structures, systems and components. The inspectors also verified 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. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with modifications. Documents reviewed are listed in the attachment. This activity constituted three Plant Modification samples.

- Unit 2 RCIC oil cooler modification for a beyond design basis accident (DCN 71329)
- Unit 2 HPCI Turbine Exhaust 2" Drain Line (DCN 69953)
- Unit 3 HPCI Steam Supply Valve Replacement (DCN 70577)

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 Structure, System, or Component (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, 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 Corrective Action Program (CAP). Documents reviewed are listed in the attachment. This activity constituted seven Post Maintenance Test inspection samples.

- Unit 2 Drywell Spray Header Loop II Test (WO 115754552)
- Unit 2 Main Steam Isolation Valve (MSIV) Line C Outboard valve Local Leak Rate Test (WO 116691537)
- Unit 2 Excess Flow Check Valve replacement (WO 116592053)
- Unit 2 Drywell Equipment Drain Flow Integrator Logic System Functional Test (WO 115753924)
- Unit 2 Main Steam Relief Valve Manual Cycle Test (WO 115754684)
- Unit 1 Main Steam Isolation Valve Fast Closure Test and Verification of Fail-Safe Position (WOs 114979334 and 116363878)
- Unit 3 HPCI Turbine Exhaust Vacuum Breaker Local Leak Rate Test, Disassembly and Inspection, Operability Testing (WOs 116833318, 116835254, 116835261, 116835265)

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20)

.1 Unit 2 Refueling Outage 18

a. Inspection Scope

From April 1, through April 9, 2015, the inspectors examined the refueling outage activities to verify that they were conducted in accordance with Technical Specifications (TS), applicable plant procedures, and the licensee's outage risk assessment and management plans. The outage began during the previous inspection period and inspector activities during that period are not covered in this report. Inspectors monitored critical plant parameters and observed operator control of plant conditions from Refueling (Mode 5) to full power operations (Mode 1). This Refueling and Other Outage Activities inspection sample was credited in the previous inspection report. Some of the significant outage activities specifically reviewed and/or witnessed by the inspectors were as follows:

Decay Heat Removal

The inspectors reviewed licensee procedures for normal and alternate decay heat removal and conducted main control room panel and in-plant walkdowns of system and components to verify correct system alignment. During planned evolutions that resulted in increased outage risk conditions for shutdown cooling, inspectors verified that the

plant conditions and systems identified in the risk mitigation strategy were available. In addition, the inspectors reviewed controls implemented to ensure that outage work was not impacting the ability of operators to operate spent fuel pool cooling, RHR shutdown cooling, and/or the Alternate Decay heat Removal system.

#### Critical Outage Activities

The inspectors examined outage activities to verify that they were conducted in accordance with Technical Specifications, licensee procedures, and the licensee's outage risk control plan. Some of the more significant inspection activities accomplished by the inspectors were as follows:

- Walked down selected safety-related equipment clearance and associated with tagout numbers:
  - 1) 2-TO-2015-003; Unit 2 HPCI (Steam Side)
  - 2) 2-TO-2015-003; 4kV Shutdown Board B
  - 3) 2-TO-2015-003; Unit 2 HPCI Suppression Pool Outboard Suction Valve
- Verified Reactor Coolant System (RCS) inventory controls, specifically, the makeup methods used during operations with the potential to drain the reactor vessel (OPDRV's)
- Verified electrical systems availability and alignment
- Monitored important control room plant parameters (e.g., RCS pressure, level, flow, and temperature) and Technical Specification compliance during the various shutdown modes of operation, and mode transitions
- Evaluated implementation of reactivity controls
- Reviewed control of containment penetrations and overall integrity
- Examined foreign material exclusion controls particularly in proximity to and around the reactor cavity, equipment pit, and spent fuel pool
- Performed routine tours of the control room, reactor building, refueling floor, and drywell
- Verified the licensee was managing fatigue by performing a sample review of fatigue assessments, schedules and work hours of online and outage personnel.

#### Drywell Closeout

The inspectors reviewed the licensee's conduct of Drywell Closeout, and performed a detailed closeout inspection.

#### Restart Activities

The inspectors specifically observed the following:

- Unit 2 approach to criticality and power ascension
- Reactor Coolant Heatup/Pressurization to Rated Temperature and Pressure

#### Corrective Action Program

The inspectors reviewed PERs generated during the refueling outage and attended management review committee meetings to verify that initiation thresholds, priorities, mode holds, operability concerns and significance levels were adequately addressed.

Resolution and implementation of corrective actions of several PERs were also reviewed for completeness.

Documents reviewed are listed in the attachment. This activity constituted one Refueling Outage inspection sample.

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 technical specification 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. Documents reviewed are listed in the attachment. This activity constituted five Surveillance Testing inspection samples: three routine tests, one in-service test, and one reactor coolant system leakage detection test.

Routine Surveillance Tests:

- 3-SR 3.8.1.1 (3C) Diesel Generator '3C' Monthly Operability Test (WO 115566590)
- 0-SI-4.5.C.1(D SMP) RHRSW Room 'D' Sump Pump Test (WO 115755952)
- 1-SR-3.5.1.7 HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Reactor Pressure (WO 115555587)

In-service Tests:

- 1-SR-3.5.1.6(RHR I) Quarterly RHR System Rated Flow Test – Loop I (WO 115623778)

Reactor Coolant System Leakage Detection Tests:

- 2-SI-4.2.E-5 Drywell Floor Drain Leak Detection System Logic System Functional Test (WO 115753947)

b. Findings

No findings were identified.

## Cornerstone: Emergency Preparedness (EP)

### 1EP6 Drill Evaluation (71114.06)

#### EP Radiological Emergency Plan (REP) training drill

##### a. Inspection Scope

The inspectors observed an EP REP training drill that contributed to the licensee's Drill/Exercise Performance and Emergency Response Organization performance indicator (PI) measures on May 6, 2015. This drill was intended to identify any licensee weaknesses and deficiencies in classification, notification, dose assessment and protective action recommendation development activities. The inspectors observed emergency response operations in the simulated control room to verify that event classification and notifications were done in accordance with Emergency Plan Implementing Procedure (EPIP)-1, Emergency Classification Procedure, and licensee conformance with other applicable EIPs. The inspectors also observed licensee actions in the simulated control room to verify actions were completed in accordance with applicable emergency procedures. The inspectors attended the post-drill critique 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 in to the CAP, as appropriate. This activity constituted one EP simulator evaluation inspection sample.

##### b. Findings

No findings were identified

## 2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

### 2RS1 Radiological Hazard Assessment and Exposure Control (71124.01)

##### a. Inspection Scope

Hazard Assessment and Instructions to Workers During facility tours, the inspectors directly observed labeling of radioactive material and postings for radiation areas, HRAs, Locked High Radiation Areas (LHRA)s, and Very High Radiation Areas (VHRA)s established within the radiologically controlled area (RCA) of the Unit 1 (U1), Unit 2 (U2), and Unit 3 (U3) reactor buildings, U1,U2, and U3 turbine buildings, the Independent Spent Fuel Storage Installation (ISFSI), and radioactive waste (radwaste) processing and storage locations. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for selected RCA areas. The inspectors reviewed survey records for several plant areas including surveys for alpha emitters, discrete radioactive particles, airborne radioactivity, gamma surveys with a range of dose rate gradients, and pre-job surveys for upcoming tasks. The inspectors

also discussed changes to plant operations that could contribute to changing radiological conditions since the last inspection. For selected outage jobs, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers.

Radiological Hazard Control and Work Practices The inspectors reviewed implementation of controls for the storage of irradiated material within the spent fuel pool. Established radiological controls were evaluated for selected U2 Refueling Outage 18 (U2R18) tasks including control rod drive removal and reinstallation activities, radioactive waste processing, fuel handling, drywell head removal, activities in the under-vessel area, reactor water cleanup valve maintenance, work on the main steam isolation valves, and closeout inspections for Unit 2 restart. In addition, the inspectors reviewed licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations and evaluated the effectiveness of radiation exposure controls, including air sampling, barrier integrity, engineering controls, and postings through a review of both internal and external exposure results.

Through direct observations and interviews with licensee staff, inspectors evaluated occupational workers' adherence to selected RWPs and HP technician (HPT) proficiency in providing job coverage. Electronic dosimeter (ED) alarm set points and worker stay times were evaluated against area radiation survey results for selected U2R18 job tasks. As part of Inspection Procedure (IP) 71124.04, inspectors reviewed the use of personnel dosimetry (ED alarms, extremity dosimetry, multi-badging in high dose rate gradients, etc.). The inspectors also evaluated worker responses to dose and dose rate alarms during selected work activities.

During walk downs with a radiation survey meter, the inspectors independently verified if ambient radiological conditions were consistent with licensee performed surveys, RWPs, and pre-job briefings; observed the adequacy of radiological controls; and observed controls for radioactive materials stored in the spent fuel pool. ED alarm set points and worker stay times were evaluated against area radiation survey results for drywell and refueling floor activities. The inspector did an independent radiological survey of the Browns Ferry ISFSI installation.

Control of Radioactive Material The inspectors observed surveys of material and personnel being released from the RCA using small article monitor (SAM), personnel contamination monitor (PCM), and portal monitor (PM) instruments. The inspectors reviewed calibration records for selected release point survey instruments and discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff. The inspectors also evaluated the appropriateness of radionuclide sources used for detector testing and calibration. The inspectors reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Problem Identification and Resolution The inspectors reviewed and assessed CAP documents associated with radiological hazard assessment and control. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance procedure NPG-SPP-22.300, Corrective Action Program, Revision 2. The inspectors also reviewed recent self-assessment results.

Radiation protection activities were evaluated against the requirements of Final Safety Analysis Report (FSAR) Section 12, Technical Specifications (TS) Sections 5.4 and 5.7, 10 CFR Parts 19 and 20, and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material". Documents reviewed are listed in the attachment.

The inspectors completed 1 sample, as described in Inspection Procedure (IP) 71124.01.

b. Findings

One licensee identified violation associated with this inspection activity is documented in section 4OA7.

2RS2 Occupational ALARA Planning and Controls (71124.02)

a. Inspection Scope

Radiological Work Planning Inspectors evaluated As Low As Reasonably Achievable (ALARA) program guidance and implementation for ongoing tasks associated with U2R18. Inspectors also evaluated tasks and reviewed post-outage ALARA activities associated with the recently completed U1R10 and U3R16 refueling outages. U2R18 ALARA Plans were reviewed for various high collective exposure tasks including: under-vessel maintenance, refuel floor maintenance activities, drywell insulation and shielding support, and drywell snubber activities. For the selected tasks, the inspectors reviewed the assumptions and basis for the dose rate and man-hour estimates. The inspectors discussed with ALARA staff the means by which wrench-hours were derived from the work order hours provided by craft supervision to ALARA staff. The inspectors verified the licensee had established several means to track and trend doses for ongoing work activities. The inspectors evaluated the incorporation of exposure reduction initiatives and operating experience, including historical post-job reviews, into RWP requirements. Collective dose data for selected tasks were compared with established dose estimates and evaluated against procedural criteria (trigger points) for additional ALARA review. Where applicable, changes to established estimates were discussed with ALARA planners and evaluated against work scope changes or unanticipated elevated dose rate. The inspectors discussed the operation of the Station ALARA Committee with licensee staff. For ALARA Plans from U1R10 and U3R16, the inspectors compared the results achieved in terms of actual dose versus (vs.) planned dose and actual hours vs. estimated hours, reviewed in-progress and post-job ALARA reviews, and discussed the job planning, performance, and reviews with ALARA staff. For ALARA Plans associated

with 2R18, the inspectors reviewed dose-to-date on select jobs, comparing estimates with actuals, and observed development of selected in-progress reviews.

Verification of Dose Estimates and Exposure Tracking Systems Selected ALARA work packages, and the assumptions and basis for the current collective exposure estimates, were reviewed by inspectors. The inspectors reviewed ALARA procedures, had discussions with ALARA personnel, reviewed daily exposure graphs and outage reports that tracked and trended the dose of ongoing work, and reviewed monthly Station ALARA Committee Meeting Minutes. The use of Work-In-Progress reviews for ALARA trigger points were also evaluated by the inspectors.

Source Term Reduction and Radiation Worker Performance The inspectors reviewed the collective exposure three-year rolling average from 2010-2013 and reviewed historical collective exposure trends. The inspectors evaluated historical dose rate trends and compared them to current U2R18 data. Source term reduction initiatives were reviewed and discussed with HP staff. The inspectors evaluated source term reduction methods through the review of licensee documents and records, and discussions with ALARA personnel. Inspectors reviewed actions, ongoing or already executed, by the licensee to reduce source term, including replacing various plant components (turbine blades and control rod blade bearings) with Satellite free components, torus sludge removal/clean-up, desludging the condenser hotwells, On-Line Noble Chem application, and utilizing the Radiation Protection Closed Circuit Television (CCTV) Remote Monitoring System. The inspectors also reviewed future plans for source reduction, including the reduction of hotspots and soluble cobalt concentrations, and the use of permanent shielding.

The inspectors observed radiation worker performance through CCTV remote monitoring and direct observations. This included Control Rod Drive (CRD) removals, dry tube replacement, and attending ALARA, HRA, and pre-job briefs.

Problem Identification and Resolution The inspectors reviewed licensee corrective action documents associated with ALARA planning and controls. This included review of selected Problem Evaluation Reports (PERs) and self-assessments. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with procedure NPG-SPP-22.300, Corrective Action Program, Revision 2. Radiation worker performance was evaluated against the requirements found in TS Sections 5.4 and 5.7; Title 10 Code of Federal Regulations (CFR) Parts 19 and 20; and approved licensee procedures. Documents reviewed are listed in the attachment.

The inspectors completed 1 sample, as described in IP 71124.02.

b. Findings

No findings were identified.

## 2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

### a. Inspection Scope

Engineering Controls The inspectors reviewed the use of temporary and permanent engineering controls to mitigate airborne radioactivity during the Unit 2 Refueling Outage. In addition, during observations of jobs in-progress and containment walk-downs, inspectors observed the placement and use of High efficiency particulate arresting negative pressure units, and air sampling equipment.

Use of Respiratory Protection Devices & Self-Contained Breathing Apparatus for Emergency Use Inspectors reviewed the use of respiratory protection devices to limit the intake of radioactive material, including devices used for routine tasks and devices stored for use in emergency situations. Inspectors observed the physical condition of Self-Contained Breathing Apparatus (SCBA) units, negative pressure respirators (NPR)s, powered air purifying respirators (PAPRs) and device components staged for routine and emergency use throughout the plant. SCBA bottle air pressure, the number of units, and the number of spare masks and air bottles available was also evaluated by inspectors. The inspectors also reviewed records of Grade D (or better) air quality testing for supplied-air devices and SCBA bottles. The inspectors reviewed the status and surveillance records of SCBAs staged for in-plant use during emergencies through review of records and walk-down of SCBA staged in the control room and selected locations.

The inspectors verified the licensee had procedures in place to ensure that the use of respiratory protection devices was ALARA when engineering controls were not practicable. In addition, qualifications for individuals responsible for testing and repairing SCBA vital components were evaluated through review of training records. Selected maintenance records for SCBA units and air cylinder hydrostatic testing documentation were reviewed.

The inspectors verified that the licensee had procedural requirements in place for evaluating air samples for the presence of alpha emitters and reviewed airborne radioactivity and contamination survey records for selected plant areas to ensure air samples are screened and evaluated per the procedure requirements.

The inspectors walked-down the respirator issue and storage locations and verified that the equipment was appropriately stored and maintained. The inspectors observed the issue of various types of respiratory protection equipment to include PAPR hoods and PAPR Helmets. The inspectors discussed the process for issuing respirators, and verified that selected individuals qualified for respirator and/or SCBA use had completed the required training, fit-test, and medical evaluation.

Problem Identification and Resolution Licensee CAP documents associated with the control and mitigation of in-plant radioactivity were reviewed and assessed. This included review of selected service requests (SRs) related to use of respiratory protection devices including SCBA. The inspectors evaluated the licensee's ability to

identify, characterize, prioritize, and resolve the identified issues in accordance with procedure NPG-SPP-22.300, Corrective Action Program, Revision 2. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results. Licensee CAP documents reviewed are listed in Section 2RS3 of the Attachment.

Radiation protection activities were evaluated against the requirements specified in 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed are listed in the attachment.

The inspectors completed all specified line-items detailed in IP 71124.03 (sample size of 1).

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04)

a. Inspection Scope

External Dosimetry The inspectors reviewed National Voluntary Laboratory Accreditation Program (NVLAP) certification data and discussed program guidance for storage, processing, and evaluation of results for active and passive personnel dosimeters currently in use. Comparisons between ED and thermoluminescent detector data were discussed in detail. The inspectors reviewed ED alarm logs and reviewed licensee's dosimeter incident reports and assessment actions for selected alarm events.

Internal Dosimetry Program guidance and assessment results for internally deposited radionuclides were reviewed. The inspectors reviewed selected Whole Body Count (*in vivo*) analyses from January 2013 to March 2015. Capabilities for collection and analysis of special bioassay samples were discussed with licensee staff, there were no dose assessments based on biological samples to review.

Special Dosimetric Situations The inspectors evaluated the licensee's use of multi-badging, extremity dosimetry, and dosimeter relocation within non-uniform dose rate fields and reviewed assessments. Worker monitoring in neutron areas was discussed with licensee staff. The inspectors also reviewed records of monitoring for currently declared pregnant workers and discussed monitoring guidance with dosimetry staff. In addition, shallow dose assessments for selected Personnel Contamination Events occurring since the beginning of the outage were reviewed and discussed.

Problem Identification and Resolution The inspectors reviewed and discussed selected CAP documents associated with occupational dose assessment. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure NPG-SPP-22.300, Corrective Action Program, Revision 2. The inspectors

also discussed the scope of the licensee's internal audit program and reviewed recent assessment results.

Occupational dose assessment activities were evaluated against the requirements of 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed are listed in the attachment.

The inspectors completed all specified line-items detailed in IP 71124.04 (sample size of 1).

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05)

a. Inspection Scope

The inspectors reviewed the licensee's radiation monitoring instrumentation programs to verify the accuracy and operability of radiation monitoring instruments used to monitor areas, materials, and workers to ensure a radiologically safe work environment and to detect and quantify radioactive process streams and effluent releases.

Walkdowns and Observations: The inspectors walked down effluent and process monitoring systems, including the 0-RM-077-060 Liquid Rad Waste Discharge Monitor, 0-RM-090-252 Rad Waste Vent Exhaust Monitor, 1&3 RM-90-050 Unit1 and 3 Turbine Building and Refuel Floors Air Particulate Monitors, 1,2&3 –RM 90-055/057 Reactor Building Air Particulate Monitors, 0-RM-90-060 Rad Waste Packaging Area Air Particulate Monitor, 3-RM-90-51 Turbine Building 617' Air Particulate Monitors and 1,2 & 3-RM 90-256 Drywell Air Particulate Monitors.

During plant tours and observations in the instrument lab, the inspectors assessed material condition and operability of portable survey instruments in addition to verifying calibration and source checks were current. The inspectors reviewed records of survey instrument function/source checks and observed and discussed performance of required checks with instrument lab personnel. Material condition of source check devices, device operation, and establishment of source check acceptance range were also discussed with calibration lab personnel. The inspectors observed the function check of 10 survey instruments for ready issue.

The inspectors evaluated material condition and discussed performance of source checks on personal contamination monitors and small article monitors located at the RCA exit and discussed differences in source check geometries for portal monitors located at the protected area exit.

Calibration and Testing Program: The inspectors reviewed the last two calibration records for the following effluent, process, area radiation, and post-accident monitors: 1-RM-90-272A and 273A (U1 Containment High Range Radiation Monitors), 0-RE-90-130 (Liquid Radwaste Monitor), and 0-RE-90-147/148 (Main Stack). Instrumentation used in

the chemistry and health physics counting rooms was evaluated for material condition, operability, and use.

For the whole body counter, the inspectors reviewed the most recent calibration, assessed the isotope library, reviewed and discussed performance of daily quality control (QC) checks, and verified appropriate check and calibration sources were used. In addition, the inspectors reviewed calibrations of, and observed performance of source checks on select portal monitor, personnel monitor, and small article monitor equipment listed in the Attachment to the report.

The inspectors reviewed performance of the portable instrument calibration lab through review and discussion of instrument calibrations, direct observation of source and response checks, review of instrument calibration records, assessment of the established source check ranges of the Shepherd calibrator (geometry, sources, etc.), and review of the annual recertification of the Western Area Radiological Laboratory (WARL) high level gamma well calibrator. Portable instrument calibration records review included three ion chamber instruments, two neutron instruments, four low volume air samplers, and three friskers.

Operability and reliability of selected radiation detection instruments were reviewed against details documented in the following: 10 CFR Part 20; NUREG-0737, Clarification of TMI Action Plan Requirements; UFSAR Chapters 7 and 13; TS Sections 3.3.3.1, Post Accident Monitoring, 3.3.6.2, Secondary Containment Isolation Instrumentation, 5.4, Procedures, and 5.5 Programs and Manuals; and applicable licensee procedures. Documents reviewed during the inspection are listed in sections 2RS5 of the Attachment.

Problem Identification and Resolution: Selected corrective action program documents associated with radiation monitoring instruments, including condition reports and audits, were reviewed and assessed. This review of corrective action documents included evaluating the licensee's response to indications of degraded count room instrument performance. The inspectors verified that problems were being identified at an appropriate threshold and resolved in accordance with procedure NPG-SPP-22.300, Corrective Action Program, Revision 2. Documents reviewed are listed in the attachment.

The inspectors completed all specified line-items detailed in IP 71124.05 (sample size of 1).

b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator (PI) Verification (71151)

###### .1 Cornerstone: Mitigating Systems

###### a. 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 second quarter 2014 through first quarter of 2015. 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., PERs, 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 six PI inspection samples.

- Unit 1,2, and 3 Mitigating Systems Performance Index (MSPI) for High Pressure Injection System (HPCI)
- Unit 1,2, and 3 MSPI for Heat Removal System (RCIC)

###### b. Findings

No findings were identified.

###### .2 Cornerstone: Occupational Radiation Safety

###### a. Inspection Scope

The inspectors reviewed PI data collected from February 14, 2014 through February 1, 2015, for the Occupational Exposure Control Effectiveness PI. For the reviewed period, the inspectors assessed PER records to determine whether HRA, VHRA or unplanned exposures, resulting in TS or 10 CFR 20 non-conformances, had occurred during the review period. The inspectors reviewed radiologically controlled area exit transactions with exposures greater than 100 mrem to determine if they were consistent with the requirements of the RWP. The reviewed data was assessed against guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Indicator Guideline." The reviewed documents relative to these PI reviews are listed in Sections 2RS1 and 2RS2 of the report Attachment. This activity constituted three PI inspection samples.

b. Findings

No findings were identified.

.3 Cornerstone: Public Radiation Safety

a. Inspection Scope

The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone from February 14, 2014 through February 1, 2015. For the assessment period, the inspectors reviewed cumulative and projected doses to the public and PER documents related to Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual issues. Documents reviewed are listed in section 4OA1 of the Attachment. This activity constituted three PI inspection samples.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution of Problems (71152)

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

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. During this report period, the licensee implemented a change to their corrective action program. One of the changes was to revise the name of corrective action documents from a system that started with Service Requests (SR) that would transition to Problem Evaluation Reports (PER) to a system that involved Condition Reports (CR) only. This review was accomplished by reviewing daily CR, PER and SR reports, and periodically attending Management Review Committee (MRC) (formerly known as Corrective Action Review Board (CARB)) and Plant Screening Committee (PSC) (formerly PER Screening Committee (PSC)) meetings.

b. Findings

No findings were identified.

.2 Focused Annual Sample Review – Corrective actions for related PERs 885945, 933630, and 999196:

a. Inspection Scope

The inspectors conducted a review of the implementation of corrective actions from related PERs 885945, 933630, and 999196 which were written due to repeat observations of HPCI Turbine Exhaust Drain Pot High Level Alarms upon shutdown of the Unit 3 HPCI turbine. The inspectors reviewed the PERs to ensure that the licensee planned and/or implemented corrective actions commensurate with the safety significance of the issue. The basis for selecting this sample for review was based on the potential safety significance of the problem and the number of problem identification and resolution performance attributes affected by the issue. The potential safety consequences of having a large volume of water in the HPCI turbine prior to turbine startup is that the HPCI turbine exhaust piping could be subjected to water hammer forces created by the impact of a large slug of water moving along the exhaust piping. If these forces were to cause the system to be unavailable for accident mitigation, the operators would have to use alternate high pressure systems, such as the Automatic Depressurization System (ADS) or the Reactor Core Isolation Cooling (RCIC) system, to mitigate the consequences of an accident.

This activity constituted one focused annual inspection sample.

b. Findings

Introduction: The inspectors identified an unresolved item (URI) associated with repeat observations of HPCI Turbine Exhaust Drain Pot High Level Alarms upon shutdown of the Unit 3 HPCI turbine. Information associated with the licensee's cause determination, previous corrective actions, and design change documentation required for review of the HPCI Turbine's final operability determination and disposition the issue was not available at the conclusion of the inspection period.

Description: The inspectors conducted a review of the implementation of corrective actions from related PERs 885945, 933630, and 999196 which were written due to repeat observations of HPCI Turbine Exhaust Drain Pot High Level Alarms upon shutdown of the Unit 3 HPCI turbine. The review revealed that the HPCI system was unknowingly in a degraded state and because the licensee did not effectively document all aspects of the problem, appropriate corrective actions and operability determinations were not completed in a timely manner. Specifically, the amount of water drained from the turbine casing was not recorded until the third occurrence, but even then, the amount was an estimation. Following questioning by the NRC inspectors, the licensee discovered that the severity of the problem had been underestimated and that the turbine exhaust vacuum breakers may not be adequately designed to prevent siphoning of suppression pool water back to the turbine casing. Ultimately, with engineering support from the system vendor, the licensee determined that the HPCI system remained operable despite the presence of approximately 190 gallons of water in the turbine casing.

Because more information is necessary to properly evaluate the final operability determination, licensee actions, and system design, future inspection is required to determine if a more than minor performance deficiency or violation exists associated with this issue. Initial reviews have not identified any immediate safety concerns associated with the determination. This is identified as URI 05000296/2015002-01, HPCI Turbine Exhaust Drain High Level.

### .3 Semi-annual Trend Review

#### a. Inspection Scope

As required by Inspection Procedure 71152, the inspectors performed a review of the licensee's CAP and other associated programs and documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also included licensee trending efforts and licensee human performance results. The inspectors' review nominally considered the six-month period of January through June 2015. The inspectors reviewed licensee trend reports and the Integrated Trend Reports from December 1, 2014, to June 1, 2015, in order to determine the existence of any adverse trends that the licensee may not have previously identified. This inspection constituted one Semi-annual Trend Review inspection sample. Documents reviewed are listed in the Attachment.

#### b. Observations and Findings

No findings were identified. The licensee had identified trends and appropriately addressed them in their CAP. The inspectors observed that the licensee had performed a detailed review. The licensee routinely reviewed cause codes, involved organizations, key words, and system links to identify potential trends in their data. The inspectors compared the licensee process results with the results of the inspectors' daily screening. Trends that have been identified by the inspectors and reported to the licensee were appropriately entered into the licensee's trending program.

Noteworthy Licensee identified trends included:

- Cable Submergence issues in Manholes.
- Longstanding issues with 0-TA-023-0700, RHRSW and Emergency Equipment Cooling Water Pumps heat trace
- Quality of Operability reviews

Noteworthy NRC identified degrading trends included:

- Quality of Firewatch rounds
- Quality / Details in Operator log keeping

4OA3 Follow-up of Events and Notices of Enforcement Discretion (71153).1 (Closed) Licensee Event Report (LER) 05000259/2015-001-00, "D" Emergency Diesel Generator Inoperable Due To Mispositioned Switch.a. Inspection Scope

Inspectors reviewed LER 05000259/2015-001-00 dated April 22, 2015. On February 13, 2015, during a surveillance test, the "D" Emergency Diesel Generator control switch was left in the pulled out to stop position. This condition existed until approximately eight days later when it was discovered during a different surveillance test on a different Emergency Diesel Generator. Leaving the control switch in the pulled out to stop position prevented the automatic starting of the Emergency Diesel Generator leaving it inoperable. The technical specification allowed outage time and follow-on action completion time was exceeded. The LER did not provide any new information from what was inspected during the first quarter of 2015.

b. Findings

The findings associated with this event are contained in Browns Ferry Nuclear Plant Inspection Report 05000259, 260, 296/2015-001 (ML 15132A617). No new findings were identified in this LER. This LER is closed.

.2 (Closed) LER 05000296/2015-003-00 Transversing Incore Probe Operation Caused Inoperability of Primary Containment Isolation Valves for Longer Than Allowed by Technical Specificationsa. Inspection Scope

The inspectors reviewed LER 05000296/2015-003-00 dated June 1, 2015. This LER detailed the sequence of events that resulted in leaving the 3D and 3E Transversing Incore Probes (TIP) partially retracted while the automatic retraction function was inoperable. This resulted in the Primary Containment Isolation Valves being in an inoperable condition from January 7 to January 8 which was in excess of the allowed outage time and follow on action completion time.

b. Findings

The findings associated with this event are contained in Browns Ferry Nuclear Plant Inspection Report 05000259, 260, 296/2015-001 (ML 15132A617). No new findings were identified in this LER. This LER is closed.

.3 (Closed) LER 05000259/2014-005-00 Automatic Depressurization System Valve Inoperable for Longer Than Allowed by Technical Specifications

a. Inspection Scope

The inspectors reviewed LER 05000259/2014-005-00 dated December 23, 2014. This LER detailed the sequence of events that resulted in the control air flex hoses being swapped between the Main Steam Relief Valve (MSRV) 1-19 and MSR 1-18. MSR 1-19 was designated as an ADS valve and was required to have a control air receiver. The swapped flex hoses caused MSR 1-19 to be in an inoperable condition for the ADS function from May 22, 2007 to November 7, 2014 which was in excess of the allowed outage time and follow on action completion time.

b. Findings

The finding associated with this event is contained in Browns Ferry Nuclear Plant Inspection Report 05000259, 260, 296/2014-005 (ML 15042A249). No new findings were identified in this LER. This LER is closed.

.4 (Closed) LER 05000296/2015-001-00, High Pressure Coolant Injection and Reactor Core Isolation Cooling Inoperable Due To No Suction Source Aligned

a. Inspection Scope

The inspectors reviewed LER 05000296/2015-003-00 dated, April 13, 2015. This LER detailed the cause, impact, and corrective actions for a faulty hand switch discovered on February 11, 2015. During surveillance testing, the Condensate Storage Tank (CST) emergency discharge isolation valve motor was energized and inadvertently the valve closed due to stuck closed contacts on the local handswitch. The loss of the high pressure coolant injection system resulted in the temporary loss of safety function for a single train system which is reportable under 10 CFR 50.73(a)(2)(v). The inspectors reviewed the licensee event report associated with this event and determined that the report adequately documented the summary of the event including the cause of the event and potential safety consequences. The licensee made design changes to prevent spurious operation of the CST discharge valves when the breakers were closed for testing.

b. Findings

No findings were identified. This licensee event report is closed.

These activities constitute completion of four event follow-up samples, as defined in Inspection Procedure 71153. Documents reviewed are listed in the attachment.

- .5 (Discussed) LERs 2014-002-00 Fire Damage To Cables During An Appendix R Fire Event Could Cause Loss Of Control Power To 480 VAC Shutdown Board; 2013-008-00 Fire Damage to Cables in Fire Areas Could Cause Residual Heat Removal Pumps to Spuriously Start; 2014-001-00 Fire Damage to Cable in Fire Area Could Cause Improper Operation of 4kV Shutdown Board Crosstie Breaker

a. Inspection Scope

The inspectors reviewed three LERs that documented deficiencies in the Browns Ferry fire protection program. These LERs documented discovery of conditions where a postulated fire could result in previously unanalyzed plant damage and equipment conditions. These conditions were identified during the licensee's transition to NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants." The inspectors reviewed information contained in the LERs and associated corrective action program documents to determine if a violation of regulatory requirements occurred. The inspectors also assessed the adequacy of the licensee's compensatory measures and corrective actions associated with the findings. Additional inspection is required to review qualitative and quantitative risk analyses to determine if the findings meet the criteria established for enforcement discretion in accordance with the NRC Enforcement Policy, Section 9.1, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)" and Inspection Manual Chapter 0305, Operating Reactor Assessment Program, Section 11.05.b.

b. Findings

No findings were identified.

4OA5 Other Activities

- .1 Operation of an Independent Spent Fuel Storage Installation (ISFSI) (60855.1)

a. Inspection Scope

The inspectors performed a walkdown of the onsite ISFSI and monitored the activities associated with the preparation for a dry fuel storage campaign that will be conducted in the next few months. The inspectors reviewed changes made to the ISFSI programs and procedures, including associated 10 CFR 72.48, "Changes, Tests, and Experiments," screens and evaluations to verify that changes made were consistent with the license or certificate of compliance. The inspectors reviewed records to verify that the licensee recorded and maintained the location of each fuel assembly placed in the ISFSI. The inspectors also reviewed surveillance records to verify that daily surveillance requirements were performed as required by technical specifications. Documents reviewed are listed in the attachment. This activity constituted one semi-annual Operation of an ISFSI inspection sample.

b. Findings

No findings were identified.

#### 4OA6 Meetings, Including Exit

On July 28, 2015, 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 verified that all proprietary information was returned to the licensee.

#### 4OA7 Licensee Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as a Non-Cited Violation.

Browns Ferry Technical Specification (TS) 5.7.1, "High Radiation Area", requires, in part, that each individual or group entering HRAs shall possess: 1) A radiation monitoring device that continuously displays radiation dose rates in the area; or 2) A radiation monitoring device that continuously integrates the radiation dose rates in the area and alarms when the device's dose alarm setpoint is reached, with an appropriate alarm setpoint, or 3) A radiation monitoring device that continuously transmits dose rate and cumulative dose information to a remote receiver monitored by radiation protection personnel responsible for controlling personnel radiation exposure within the area. Contrary to the above, on April 3, 2015, the licensee did not ensure the use of a radiation monitoring device that continuously transmits dose rate and cumulative dose information by an individual who entered the refueling cavity, a high radiation area with a radiation dose rate of approximately 260 mrem in one hour at 30 centimeters from the reactor vessel. Upon identification, the licensee immediately implemented RCA access restrictions for the individual and relocated the 'smart' turnstile at the HRA entrance. This violation was determined to be not greater than very low safety significance (Green) because it was not related to As Low As Reasonably Achievable planning, it did not involve an overexposure or substantial potential for overexposure, and the ability to assess dose was not compromised because the individual was wearing passive dosimetry (OSLD). Subsequent comparison of the workers OSLD with the OSLD and electronic dosimeter of coworkers on the same crew resulted in the worker being assigned 19 mrem for the time he was in the area without an electronic dosimeter. This violation was violation was entered into the licensee's Corrective Action Program as SR1008704.

ATTACHMENT: SUPPLEMENTARY INFORMATION

## **SUPPLEMENTARY INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee**

M. Aker, Site Licensing  
K. Bronson, Senior Site Vice President  
S. Bono, Site Vice President  
T. Cagle-Jaudon, RP Supervisor – RP Operations  
D. Campbell, Superintendent of Operations A. Cole, Radiation Protection Superintendent  
R. Coons, Site Licensing  
J. Covey, Radiation Protection - ALARA  
D. Drummonds, Above Ground Tank Program Engineer G. Dudley, Site Welding Engineer  
J. Ferguson, Radiation Protection Manager  
L. Hughes, General Plant Manager  
S. Jeffers, Radiation Protection - Dosimetry  
M. Kirschenheiter, Assistant Director for Site Engineering  
J. Kulisek, EP Manager  
M. Lawson, Acting Radiation Protection Manager  
S. Locke, Civil Engineering Manager  
I. Lockhart, Civil Engineer M. McAndrew, Manager of Operations  
B. L. McCoy, Spent Fuel Storage Program Manager  
F. Nelsen, ISI/CISI Program Engineer  
J. Paul, Nuclear Site Licensing Manager  
M. Roy, Maintenance Rule Coordinator  
J. Smith, System Engineer  
P. Summers, Director of Safety and Licensing  
J. Wheat, Motor Engineer  
J. Wynn, Chemistry Manager

**LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**

Opened

05000296/2015002-01	URI	Unit 3 HPCI HPCI Turbine Exhaust Drain High Level (Section 4OA2.2)
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Closed

05000259/2015-001-00	LER	"D" Emergency Diesel Generator Inoperable Due To Mispositioned Switch (Section 4OA3.1)
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05000296/2015-003-00	LER	Transversing Incore Probe Operation Caused Inoperability of Primary Containment Isolation Valves for Longer Than Allowed by Technical Specifications (Section 4OA3.2)
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05000259/2014-005-00	LER	Automatic Depressurization System Valve Inoperable for Longer Than Allowed by Technical Specifications (Section 4OA3.3)
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05000296/2015-001-00	LER	High Pressure Coolant Injection and Reactor Core Isolation Cooling Inoperable Due To No Suction Source Aligned (Section 4OA3.4)
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Discussed

5000259,260,296/2013-008-00	LER	Fire Damage to Cables in Fire Areas Could Cause Residual Heat Removal Pumps to Spuriously Start (Section 4OA3.5)
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5000259/2014-001-00	LER	Fire Damage to Cable in Fire Area Could Cause Improper Operation of 4kV Shutdown Board Crosstie Breaker (Section 4OA3.5)
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5000260,296/2014-002-00	LER	Fire Damage To Cables During An Appendix R Fire Event Could Cause Loss Of Control Power To 480 VAC Shutdown Board (Section 4OA3.5)
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## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection**

0-AOI-100-3, Flood Above Elevation 558', Rev 41  
0-AOI-100-7, Severe Weather, Rev 35  
0-GOI-200-3, Hot Weather Operations, Rev 14  
0-TI-599, External Flood Protection Program, Rev 0  
0-TI-600, External Flood Protection Program Bases Document, Rev 0  
Flood Hazard Reevaluation Report for Browns Ferry Nuclear Plant, Response to NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) dated March 12, 2015 (ML 15072A130)  
FSAR Section 2.4A, Probable Maximum Flood, Amendment 25.3  
TOPS-RA-SOP-30.405, Nuclear Offsite Power Operating Requirements, Rev 0  
TVA-SPP-10.010, NERC Standard Compliance Processes Shared by TVA's Nuclear Power Group and Transmission and Power Supply, Rev 5  
0-GOI-300-4, Switchyard Manual, Rev 95

### **Section 1R04: Equipment Alignment**

3-OI-73, High Pressure Coolant Injection System, Rev 55  
3-SR-3.5.1.1 (RHR I), RHR System Venting Loop I  
3-SR-3.5.1.2 (RHRI), Monthly RHR Valve Lineup Verification Loop I  
BFN-50-7073, General Design Criteria Document, High Pressure Coolant Injection, Rev 29  
CR 839045, BFN Response to NRC Information Notice 87-10, Supplement 1, (Potential for Water Hammer During Restart of Residual Heat Removal Pumps)  
CR 907143, Unit 3 MSPI Residual Heat Removal System KPI is Yellow  
DWG 3-47E812-1, Unit 3 Flow Diagram High Pressure Coolant Injection System, Rev 69  
FSAR Section 6.4, High Pressure Coolant Injection  
Maintenance Rule scoping database entries for RBCCW as of May 27, 2015  
NEDO-33150-NP, BWR Residual Heat Removal System Potential for Water Hammer, dated July 2004  
RBCCW system health dated May 27, 2015 for Units 1, 2, and 3  
SR 557049, 3C RHR room cooler replacement was not like for like  
SR 726846, Install T-drains for valve 74-0007 actuator  
SR 963857, Corrosion discovered on 2A RHR Heat Exchanger divider plate  
SR 990605 Errors in RBCCW tube plugging calculation  
WO 114857134, Replace divider plate for RHR Heat Exchanger 3C

### **Section 1R05: Fire Protection**

Fire Protection Report Volume 1, Rev 20  
Fire Protection Report Volume 2, Rev 52  
NPG-SPP 18.4.7 Control of Transient Combustibles, Rev 5

### **Section 1R06: Flooding Protection**

UFSAR Appendix M, Amendment 25.3

**Section 1R08: Inservice Inspection Activities (71111.08)****Procedures:**

2-SI-4.6.G, Inservice Inspection and Risk – Informed Inservice Inspection Program Unit 2, Rev. 53  
 N-MT-6, Magnetic Particle Examination for ASME and ANSI Code Components and Welds, Rev. 34  
 N-UT-84, Procedure for the Phased Array Ultrasonic Examination of Austenitic and Ferritic Pipe Welds, Rev. 4  
 EPRI, Nondestructive Evaluation: Procedure for Manual Phased Array Ultrasonic Testing of Piping, 2/13/2013

**Drawings:**

2-ISI-0271-C, Core Spray System Weld Locations, Rev. 5  
 2-ISI-0280-C, Core Spray System Support Locations, Rev. 2  
 2-ISI-0221-C, Residual Heat Removal System Weld Locations, Rev. 3

**Self-Assessments:**

CRP-ENG-F-13-023, Weld Program, 7/19/2013  
 BFN-ENG-S-15-001, U2R18 ISI Scope, 12/5/2014

**Work Orders/Work Requests:**

WO# 115181115, Perform UT Exam – Component DSRHR-2-06, 4/2/2015  
 WO# 116140765, Perform MT Exam – Component 2-47B458S0004-IA, 3/31/2015  
 WO# 116299180, RCIC STM Supply DR POT HI Press Root Valve, 3/16/2015  
 WO# 116365667, Perform UT Exam – Component DCS-2-13, 3/31/2015  
 WO# 116365668, Perform UT Exam – Component DCS-2-14, 3/31/2015  
 WO# 116115743, Perform VT-3 Exam – Component 2-17B300S0070, 3/31/2015  
 WO# 114579913, Perform UT at Flaw found on 6” RCIC, 4/21/2013

**Problem Evaluation Reports:**

PER 564211, Expert Panel Recommends the RHR Room Cooler Replacement, 7/27/2012  
 PER 707545, Flaw Found on 6” RCIC Piping, 4/21/2013

**NDE Examiner Quals:**

EPRI Performance Demonstration Initiative Program, PDI-UT-1, Rev. B: D. Kleinjan  
 EPRI Performance Demonstration Initiative Program, PDI-UT-2, Rev. B: D. Kleinjan  
 EPRI Performance Demonstration Initiative Program, PDI-UT-3, Rev. C: D. Kleinjan  
 EPRI Performance Demonstration Initiative Program, PDI-UT-10, Rev. C, Add. 1: D. Kleinjan,  
 EPRI Performance Demonstration Initiative Program, EPRI-PIPE-MPA-1, Rev. 0: D. Kleinjan  
 IHI Southwest Technologies, Inc. Visual Acuity Examination Record: B. Compton, D. Kleinjan  
 IHI Southwest Technologies Certificate of Qualification: B. Compton, D. Kleinjan  
 IHI Southwest Technologies Ultrasonic Hands-on Practice Documentation: B. Compton  
 PDI Piping Program Hands-on Practice Documentation: D. Kleinjan

Miscellaneous Documents:

01497-ISI-BFN2, Phased Array Ultrasonic Calibration Data Sheet, 3/26/2015  
 Letter from TVA to NRC, American Society of Mechanical Engineers Section XI, Inservice Inspection, System Pressure Test, Containment Inservice Inspection, and Repair and Replacement Programs - Owner's Activity Report for Browns Ferry Nuclear Plant, Unit 2, Cycle 17 Operation, Dated: 8/2/2013  
 02453-ISI-BFN2, Magnetic Particle Examination, MT-15-006, 3/26/2015  
 DCS-2-14, Ultrasonic Piping Examination Data Sheet, 3/26/2015  
 Krautkramer Transducer Certification for S/N SE1640  
 TVA Calibration Block As-Built Verification, WB-82, WB-83, WB-84, WB-85, 6/24/2002  
 Jess W. Jackson & Associates, Inc, Certificate of Conformity, Visual Illumination Cards, Certificate No. I07120001, Serial No. 801 through 1300  
 Jess W. Jackson & Associates, Inc, Certificate of Conformity, Visual Illumination Cards, Certificate No. I11030001, Serial No. 301 through 800  
 Jess W. Jackson & Associates, Inc, Certificate of Calibration, Flaw Detector, Certificate No. Serial No. 01VNBF  
 TVA Report of Calibration, Digital Thermometer, Serial No. T-257197  
 Krautkramer Transducer Certificate of Conformity for S/N 01RLFL  
 Krautkramer Transducer Certificate of Conformity for S/N 01TCT7-1  
 Krautkramer Transducer Certificate of Conformity for S/N 01TCT7-2  
 Magnaflux, Certificate of Certification, Ultra Gel II, Batch# 13K078

**Section 1R11: Licensed Operator Regualification**

SEG # OPL173S060 Security Event Response & Control Room Abandonment, Rev 15  
 2-AOI-100-2 Control Room Abandonment, Rev 57

**Section 1R12: Maintenance Effectiveness**

0-TI-346 Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10CFR50.65, Rev 47  
 Above Ground Carbon Steel Tanks Program FSAR Section O.1.23, Rev 1  
 API 653 Tank Inspection, Repair, Alternation, and Reconstruction dated November 2014  
 Maintenance Rule scoping database entries for RBCCW as of May 27, 2015  
 NRC commitments for license renewal dated October 1, 2012  
 PER 965452 Fuel Oil Storage Tank Inspections beyond their due date  
 PM #72682 for Fuel Oil Storage Tank Inspection  
 RBCCW system health dated May 27, 2015 for Units 1, 2, and 3  
 SR 990605 Errors in RBCCW tube plugging calculation

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Browns Ferry Unit 1, 2, and 3 Equipment Out Of Service Report dated April 3, May 27, and June 22, 2015  
 NPG-SPP-09.11.1 Equipment Out of Service Management, Rev. 10  
 NPG-SPP-07.3.4 Protected Equipment, Rev. 2  
 Outage Risk Plan for Unit 2 for April 3, 2015  
 eSOMS Action Tracking Status for Units 1, 2 and 3 on April 3, May 27, and June 22 2015  
 eSOMS Narrative Logs dated April 3, 2015, May 27, and June 22, 2015

**Section 1R15: Operability Evaluations**

3-OI-73, High Pressure Coolant Injection System, Rev 55  
 BFN-50-7073, General Design Criteria Document, High Pressure Coolant Injection, Rev 29  
 CR 1031635 1-XA-55-5B Window 20, SLC squib valve continuity lost annunciator came in  
 CR 1041082 Air leak adjacent to ARI scram valve on Unit 2  
 DWG S102042-012 Core Spray Pump motor schematic  
 FE for PER 991511  
 GE AID-56, HPCI/RCIC Turbine Exhaust Check Valve Cycling  
 GE SIL 30, HPCI/RCIC Turbine Exhaust Line Vacuum Breakers  
 GE SIL 580, HPCI and RCIC Turbine Drains  
 PDO 1007206 Functionality Evaluation for 3A EDG heat exchanger leak  
 PDO for PER 1011955  
 PDO for PER 1018316  
 PDO for PER 1022487  
 PER 1011955 Unit 2 ADS accumulator low pressure alarm sealed in  
 PER 1017748 1A Core Spray Pump motor heaters measured at higher than expected temperature  
 PER 1018316 NRC identified concern with HPCI Turbine exhaust drain pot levels  
 PER 1022487 HPCI Exhaust Drain Pot Level High  
 PER 991511 Functional Evaluation needed for SBT Filters  
 Purchasing specifications for Core Spray Pump motor heaters  
 Technical Operability Evaluation 2-95-073-0208  
 VPF 2300-58-2, Terry Steam Turbine Co. HPCI Pump Drive  
 WO 115752909 Testing of air supply system for MSIVs and ADS  
 WO 115754684 2-SR-3.4.3.2 MSRV manual cycle test

**Section 1R18: Plant Modifications**

DCN 69953, Cut and cap HPCI Turbine Exhaust 2" Drain Line at the Drain Pot and at the Torus  
 DCN 70577, Replace Flowserve-Anchor/Darling Gate Valves with Crane-GE/KALSI Sentinel Valve  
 DCN 71329 RCIC piping modification to support Fukushima NRC order requirements  
 DWG 2-47E812-1, Unit 2 Flow Diagram High Pressure Coolant Injection System, Rev 70  
 DWG 3-47E812-1, Unit 3 Flow Diagram High Pressure Coolant Injection System, Rev 69  
 EDQ2073940027, 2-02-073-0015 and 3-02-073-0015, Setpoint and Scaling Calculation for HPCI Gland Seal Condensate Pump Timer, Rev 4  
 FSAR Section 6.4, High Pressure Coolant Injection  
 MD-Q3073-920409, Evaluation of Browns Ferry MOVs 1/2/3-FCV-073-0016 Using the EPRI MOV Performance Prediction Methodology, Rev 0  
 Technical Operability Evaluation 2-95-073-0208

**Section 1R19: Post Maintenance Testing**

ASME OM Code-2004 Code for Operation and Maintenance of Nuclear Power Plants  
 NETP-116.3 Inservice Testing Program Preconditioning Guidelines, Rev 1  
 PER 1002855 Loop 2 Drywell Spray (Unit 2)  
 WO 114979334 1-SR-3.6.1.3.6 MSIV Fast Closure Test, 1A Inboard MSIV

WO 115753924 2-SI-4.2.E-4 Reactor Coolant Leak Detection Instrumentation Equipment Drain Logic System Functional Test

WO 115754552 Residual Heat Removal System Loop II Drywell Spray Header Air Test (2-SR-3.6.2.5.2(II))

WO 115754684 2-SR-3.4.3.2 MSR/V manual cycle test

WO 116363878 1-SI-3.2.12(INBD) Verification of Fail-Safe Position for Inboard MSIVs

WO 116691437 Main Steam Isolation Valve (MSIV) C outboard Local Leak Rate Test (LLRT)

WO 116833318 BFN-3-CKV-073-0633 – Replace HPCI vacuum breaker check valve cap and disc

WO 116835254 BFN-3-CKV-073-0634 – Replace HPCI vacuum breaker check valve caps and discs

WO 116835261 BFN-3-CKV-073-0635 – Replace HPCI vacuum breaker check valve caps and discs (originally SR 1026651)

WO 116835265 BFN-3-CKV-073-0636 – Replace HPCI vacuum breaker check valve caps and discs (originally SR 1026651)

### **Section 1R20: Refueling and Other Outage Activities**

NPG Daily Outage Reports (multiple)

### **Section 1R22: Routine Surveillance**

WO 115555587 1-SR-3.5.1.7 HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Reactor Pressure

WO 115623778 1-SR-3.5.1.6(RHR I) – Quarterly RHR System Rated Flow Test – Loop I

WO 115753947 2-SI-4.2.E-5 Drywell Leak Detection Instrumentation Floor Drain Logic System Functional Test

WO 115755952 0-SI-4.5.C.1(D SMP) – RHRSW Room D Sump Pump Test

### **Section 2RS1: Radiological Hazard Assessment and Exposure Controls**

#### Procedures, Guidance Documents, and Manuals

NPG-SPP-05.0, Radiological and Chemistry Control, Rev. 0003

NPG-SPP-05.1, Radiological Controls, Rev. 0004

NPG-SPP-05.6, Controlling Byproduct and Source Material, Rev. 0003

NPG-SPP-05.9, Radiological Control and Radioactive Material Shipment Augmented Quality Assurance Program, Rev. 0002

NPG-SPP-05.16, Radiological Controls for Performance of Radiography Operations, Rev. 0005

RCI-1.2, Radiation, Contamination, and Airborne Surveys, Rev. 0028

RCI-7, Byproduct and Source Material Control, Rev. 0023

RCI-9.1, Radiation Work Permits, Rev. 0077

RCI-17, Control of High Radiation Areas and Very High Radiation Areas, Rev. 0081

RCI-27, Source Term Reduction and Control, Rev. 0011

RCI-43, Radioactive Material Control, Rev. 0006

RCI-47, Diving Operations in the Radiologically Controlled Area, Rev. 0001

RWI-111, Storage of Radioactive Waste and Materials, Rev. 0019

#### Records and Data

Air Sample Detail Report, From 12/25/2104 to 3/25/2105, 3/25/2105

BFN Key Control Record, RCI-17 Attachment 3, 10/8 - 10/12/2014  
 BFN Locked High Radiation Area Verification, RCI-17 Attachment 4, 3/10/2015  
 BFN Sealed Source Inventory List (Excel Worksheet), 2/25/2015  
 Browns Ferry Nuclear Plant Area Dosimeter Trend Report, 2<sup>nd</sup> Quarter Calendar Year 2014, 8/19/2014  
 Browns Ferry Nuclear Plant Area Dosimeter Trend Report, 3rd Quarter Calendar Year 2014, 12/21/2014  
 Browns Ferry Unit 1, National Source Tracking System (NSTS) 2015 Confirmation of Annual Inventory Reconciliation, 1/22/2015  
 Browns Ferry Unit 3, National Source Tracking System (NSTS) 2015 Confirmation of Annual Inventory Reconciliation, 1/22/2015  
 Control of SFSPs [Unit 1 Spent Fuel Pool Inventory], 0-TI-540 Attachment 1, 7/30/2014  
 Control of SFSPs [Unit 2 Spent Fuel Pool Inventory], 0-TI-540 Attachment 1, 7/30/2014  
 Control of SFSPs [Unit 3 Spent Fuel Pool Inventory], 0-TI-540 Attachment 1, 7/30/2014  
 Gamma Spectroscopy Results for RCA Release, # 20150205-5 and #20150205-7, 2/5/2015  
 Radiological Work Permits:  
     Number 15270113, RX & TB BLDG Motor Operated Valve Work, Rev. 0  
     Number 15270133, TORUS Desludge Activities, Rev. 0  
     Number 15270136, TORUS Underwater Inspection, Rev. 0  
     Number 15270503, Refueling – Radiation Protection, Rev. 0  
     Number 15280012, Drywell SI / SR, Rev. 0  
     Number 15290002, Refuel Floor Maintenance Activities, Rev. 0  
     Number 15280142, Drywell – Under Vessel Maintenance Activities, Rev. 0  
 RCA Exit Point (LAB) Release Surveys: 15-10075, 3/21/2015; 15-10018, 1/21/2015; 15-10033, 2/5/2015  
 Spreadsheet, Beta-Gamma to Alpha Ratio Tracking, 3/25/2015  
 Survey Map M-20140815-3, Move Posting to SVD Cage, 8/15/2014  
 Survey Map M-20140908-12, U3 RXB 565' West Scram Volume Discharge Cage, 9/8/2014  
 Survey Map M-20141004-31, U1 Initial survey in the cavity with drywell head on, 10/5/2014  
 Survey Map M-20141010-37, ISFSI Pad and Perimeter Monthly Survey, 10/20/2014  
 Survey Map M-20141016-15, U1 TB 535' - 575' Quarterly Routine Survey, 10/23/2014  
 Survey Map M-201150310-8, U3 RXB 621' General Area, 3/10/2015  
 Survey Map M-201150115-10, U1 RXB 565' General Area, 1/15/2015  
 Survey Map M-201150323-10, U2 RXB 565' General Area, 3/23/2015  
 Survey Map M-201150318-1, U3 RXB 565' General Area, 3/17/2015  
 Survey Map M-201150314-59, U1 RXB 621' General Area, 3/14/2015  
 Survey Map M-201150114-7, U1 RXB 621' General Area, 1/14/2015  
 Survey Map M-20150302-9, U3 Rx Bldg. 565' West Side, 3/2/2015  
 Survey Map M-20150310-11, U3 RXB 565' West Scram Volume Discharge Cage, 3/10/2015  
 Survey Map M-20150106-5, ISFSI Pad and Perimeter Monthly Survey, 1/6/2015  
 Survey Map M--20150204-10, ISFSI Pad and Perimeter Monthly Survey, 2/4/2015  
 Survey Map M-20150109-6, U1 TB 535' - 575' Quarterly Routine Survey, 1/3/2015  
 Survey Map M-20150213-5, ADHR piping storage area, 2/22/2015  
 Survey Map M-20150315-56, ISFSI Pad and Perimeter Annual Neutron, 3/17/2015  
 Survey Map M-20150313-47, U2 Drywell Initial Entry Survey, 3/14/2015  
 Survey Map M-20150314-49, U2 RXB 519' HPCI Initial Shut-Down Survey, 3/14/2015  
 Survey Map M-20150317-37, U2R18 RFF Platform Over the Cavity, 3/17/2015  
 Survey Map M-201150309-10, ADHR System in Service, 3/9/2015

Survey Map M-201150309-14, U2 664' ADHR LHRA / CA, 3/9/2015  
 Survey Map M-20150317-10, Update Survey Following TIP Tubing Removal, 3/17/2015  
 Survey Map M-201150403-25, U2R18 Drywell Head in place, 4/3/2015  
 Survey Number 15-20083, Air Sample U1 TB 6167' Sandblast Tent, 3/19/2015  
 Survey Number 15-20116, Air Sample U1 TB 6167' Sandblast Tent, 3/24/2015  
 TVA Nuclear Power Radiation Protection Neutron Spectra Study Plan for Each TVA Unit,  
 11/20/2014

#### CAP Documents

SR 996217  
 SR 999029  
 SR 1003534  
 SR 1003785  
 SR 1005227  
 SR 1008704  
 SR 1010390  
 SR 1010794  
 PER 944775  
 PER 994874  
 Self-Assessment Report BFN-RP-S-14-001, Rad Hazard and Transportation Inspection,  
 11/21/2013

### **Section 2RS2: Occupational ALARA Planning and Controls**

#### Procedures, Guidance Documents and Manuals

NPG-SPP-05.2, ALARA Program, Rev. 0005  
 NPG-SPP-05.2.1, Operational ALARA Planning and Controls, Rev. 0004  
 NPG-SPP-05.2.2, Establishing Collective Radiation Exposure Annual Business Plan Goals,  
 Rev. 0000  
 NPG-SPP-05.2.3, Outage Exposure Estimating and Tracking, Rev. 0000  
 NPG-SPP-05.6.1, Radiation Protection Implementation of 10CFR37 Category 1 and Category 2  
 Quantities of Radioactive Materials, Rev. 0000  
 RCI-15.2, Temporary Shielding, Rev. 0028  
 RCI-15.5, Primary System Survey Procedure, Rev. 0005  
 RCI-27, Source Term Reduction and Control, Rev. 0011  
 RCI-47, Diving Operations in the Radiologically Controlled Area, Rev. 0001

#### Records and Data

BFN ALARA Plan 15-0004, U2R18 DRYWELL CARPENTER ACTIVITIES, 2/13/2015  
 BFN ALARA Plan 15-0005, U2R18 DRYWELL INSULATION AND SHIELDING SUPPORT,  
 1/15/2015  
 BFN ALARA Plan 15-0011, U2R18 DRYWELL SNUBBER ACTIVITIES, 1/15/2015  
 BFN ALARA Plan 15-0010, U2R18 REFUEL OUTAGE UNDER-VESSEL MAINTENANCE,  
 2/9/2015  
 BFN ALARA Plan 15-0022, U2R18 OUTAGE REFUEL FLOOR MAINTENANCE ACTIVITIES,  
 2/12/2015

BFN ALARA Post-Job Reviews: ALARA Plan Number 14-0026, U3R16 Outage Refuel Floor Maintenance Activities, 8/10/2014; ALARA Plan Number 15-0022, U2R18 Outage Refuel Floor Maintenance Activities, 2/12/2015;

BFN ALARA Work- in-Progress Reviews: ALARA Plan Number 15-0022, U2R18 Outage Refuel Floor Maintenance Activities [> 1 Rem change], 4/13/2015; ALARA Plan Number 15-0024, U2R18 RXB/TB Carpenter Support [50% review and Dose Tracking], 3/25/2015 and 3/28/2015; ALARA Plan Number 15-0001, Turbine Building - GE Maintenance [50% review and Dose Tracking], 3/25/2015 and 3/28/2015; ALARA Plan Number 15-0008, U2R18 Drywell and Rx Building Inspections (ISI), [50% Review], 3/25/2015

BFN Radiation Protection Daily Dose Status Report dated, 3/23/2015, 3/24/2015, 4/5/2015, and 4/7/2015

NPG Daily Outage Report, Browns Ferry Nuclear Plant U2R18 Refueling Outage, 3/24/2015 Spreadsheet, SRF Listing, undated

Spreadsheet, 2015 Temporary Shielding Request, undated

Spreadsheet, Unit 2 Recirc BRACs [1993 to 2015], 3/26/2015

Spreadsheet, U2R18 APR [ALARA Plans] Listing, 3/18/2015

Station ALARA Committee (SAC) Meeting Minutes dated 9/25/2013, 9/24/2014, 12/3/2014, 1/5/2015, and 1/28/2015

Tennessee Valley Authority Browns Ferry Nuclear Plant Dose Excellence Plan 2015 – 2019, Rev.0, 2/3/2015

#### CAP Documents

SR 949173

SR 949096

SR 949593

SR 949612

SR 999607

SR 999708

Self-Assessment Report BFN-RP-S-13-001, Collective Radiation Exposure, 9/6/2013

#### **Section 2RS3: In-Plant Airborne Radioactivity Control And Mitigation**

##### Procedures and Guidance Documents

FP-0-000-INS027, Self-Contained Breathing Apparatus (SCBA), Rev. 17

NPG-SPP-05.1, Radiological Controls, Rev. 4

NPG-SPP-05.1.1, Alpha Radiation Monitoring Program, Rev. 5

RCI-3.1, Respiratory Protection Program Implementation, Rev. 36

RCI-1.2, Radiation, Contamination, and Airborne Surveys-Appendix B, Rev. 28

RCI-11.2, Radiation Protection Airborne Instrument Maintenance, Rev. 7

RCI-24, Control of Vacuum Cleaners and Portable HEPA Units within the RCA, Rev. 29

RCTP-101, Operation of the Mask Fit System, Rev. 7

##### Records and Data Reviewed

Air Sample Detail Report 12/25/14-3/25/15

BFN Nuclide Trend Report 2013

Calibration of Canberra Fast Scan Whole Body Counter, 1/29/2015

Grade D Air Report SN0505110968A, 11/24/14  
 Grade D Air Report SN0505110969A, 11/20/14  
 HP063.002, SCBA Training Lesson Plan, Rev. 10  
 INS027, 2/28/15MSA C.A.R.E Certificate for people who repair SCBA regulators, 9/13/13  
 PER 947614, Positive Whole Body Count due to internal contamination, 10/15/2014  
 Report of Positive air samples taken 12/25/14 through 3/25/15  
 Spreadsheet Beta-Gamma to Alpha Ratio.xlsx Last Modified: 5/28/2014  
 WO 116110511 Monthly Inspection and Maintain SCBA kits per Requirements in FP-0-000-

#### CAP Documents

PER 767234  
 PER 779795  
 PER 798908  
 PER 834696  
 PER 915886

### **Section 2RS4: Occupational Dose Assessment**

#### Procedures and Guidance Documents

NPG-SPP-05.1, Radiological Controls, Rev. 4  
 RCI-1.1, Radiation Operations Program Implementation, Rev. 162  
 RCI-2.1, External Dosimetry Program Implementation, Rev. 63  
 RCI-8.1, Internal Dosimetry Program Implementation, Rev. 49  
 RCTP-105, Personnel Inprocessing and Dosimetry Administrative Processes, Rev. 5  
 RCTP-106, Special Dosimetry Operations, Rev. 3  
 RCTP-109, Whole Body Counting and Calibration, Rev. 0

#### Records and Data Reviewed

NVLAP Certification 1/1/2014 through 12/31/2014  
 NVLAP Scope of Certification Document  
 PER 947614 (POSITIVE WBC) See 71124.03  
 Site Audit Report Audit SSA 1309, Radiation Protection, Browns Ferry Nuclear Plant August 5-  
 August 16, 2013

#### CAP Documents

PER 783164  
 PER 783179  
 PER 813764  
 PER 847078  
 PER 853370

### **Section 2RS5: Radiation Monitoring Instrumentation**

#### Procedures, Guidance Documents and Manuals

CI-1107, Procedure for Obtaining Monthly QA Data for Germanium Detectors, Revision 0004  
 1-TI-331, Post Accident Sampling Procedure, Revision 0011

2-TI-331, POST ACCIDENT SAMPLING PROCEDURE, Revision 0021  
 NPG-SPP-22.300, Corrective Action Program, Rev. 0002  
 RCI-11.1, Radiation Protection Instrument Program Implementation, Revision 0075  
 RCI-11.3, Radiation Protection Radiation / Contamination Instrument Maintenance, Revision 0037  
 RCI-11.6, Calibration of the Canberra Argos 5AB Personnel Contamination Monitor, Revision 0004  
 RCI-11.13, Counting Equipment Calibration and Performance Tests, Rev. 0002  
 RCI-41, Radiation Protection's Periodic Routines, Revision 0029

#### Records and Data Reviewed

Calibration of the Canberra Argos 5AB Personnel Contamination Monitor, 00RE-90-100, 4/25/13  
 Calibration of the Canberra Argos 5AB Personnel Contamination Monitor, 00RE-90-206, 9/11/14  
 Calibration of Eberline PCM2 Personnel Contamination Monitor, 00RE-90-006 (East Access), 9/17/14  
 Calibration of Eberline PCM2 Personnel Contamination Monitor, 00RE-90-388 (East Access), 9/18/14  
 Calibration of Eberline PCM2 Personnel Contamination Monitor, 00RE-90-478 (East Access), 9/18/14  
 Calibration of Eberline PCM2 Personnel Contamination Monitor, 00RE-90-479 (East Access), 9/19/14  
 INST-51-Small Article Monitor (SAM 11) Calibration form, Tag# 841990, 10/15/13  
 INST-51-Small Article Monitor (SAM 11) Calibration form, Tag# 860067, 1/22/15  
 INST-51-Small Article Monitor (SAM 11) Calibration form, Tag# 860068, 12/20/13  
 INST-51-Small Article Monitor (SAM 11) Calibration form, Tag# 860069, 12/29/14  
 WARL Calibration Package for their Cesium 137 Source by University of Wisconsin - Madison 9/12/12  
 WO 112814333 Main Stack Monitor 8/6/12  
 WO 114783813 Main Stack Monitor 1/30/14  
 WO 114633839 Main Stack Monitor -Cover Page only 2/4/14  
 WO 113332176 Liquid Radwaste Monitor 7/19/12  
 WO 114782941 Liquid Radwaste Monitor 1/21/14  
 WO 111671614 Containment High Range Monitor Calibration & Function Test 1-RM-090-272A, 5/8/11  
 WO 114057530 Containment High Range Monitor Calibration & Function Test 1-RM-090-272A, 5/13/13  
 WO 113860770 Containment High Range Monitor Calibration & Function Test 1-RM-090-273A, 5/13/13  
 WO 115555219 Containment High Range Monitor Calibration & Function Test 1-RM-090-273A, 1/27/15

#### CAP Documents

PER 730466  
 PER 771559  
 PER 795364  
 PER 811619

PER 841042  
PER 930276  
PER 866896  
PER 871922

**Section 40A1: Performance Indicator (PI) Verification**

NEI 99-02 Regulatory Assessment Performance Indicator Guideline, Rev 7  
FAQ for NEI 99-02 Regulatory Assessment Performance Indicators as of February 9, 2015

Radiation Protection Performance Indicator Information from April 1, 2014 to March 31, 2015

Procedures

RCI-39, Radiation Protection Cornerstones, Rev.13  
NEI 99-02 and FAQ 100 and 345

Records and Data Reviewed

Gaseous Radioactive Release Permit 150060.038.006.G, U3 REACTOR BLDG EXHAUST,  
1/28/2015  
Gaseous Radioactive Release Permit 150060.040.005.G, U3 REACTOR BLDG EXHAUST,  
1/22/2015  
Liquid Radioactive Release Permit 150023.004.023.L, Batch Release through 0-RM-90-130,  
2/14/2015  
List of Dose and Dose Rate alarms, 3/1/2014 through 3/9/2015

**Section 40A2: Identification and Resolution of Problems**

PER 885945  
PER 933630  
PER 999196  
PER 1018316  
CR 1025994  
CR 1032843  
CR 1038747  
CR 1039036  
CR 1042150  
CR 1043410  
PER 885945 HPCI Turbine Drain Pot Level High  
PER 933630 HPCI Turb Exh Drain Pot is Not Draining Through Normal Path  
PER 999196 U3 HPCI Possible Water Hammer Situation  
PER 1018316 NRC Identified Concern with HPCI Turbine Exhaust Drain Pot Levels  
CR 1025994 Level 2 Evaluation for Unit 3 HPCI Exhaust Drain Pot  
CR 1032843 CR to Track PDO Revision  
CR 1038747 U3 HPCI Drain Pot Full  
CR 1039036 Unit 3 HPCI Exhaust Water  
CR 1042150 Water Level Monitoring in Unit 3 HPCI Turbine Exhaust Line  
CR 1043410 Water Level Monitoring in Unit 3 HPCI Turbine Exhaust Line

**Section 40A3: Event Follow-up**

LER 05000259/2015-001-00, "D" Emergency Diesel Generator Inoperable Due To Mispositioned Switch

LER 05000296/2015-003-00, Transversing Incore Probe Operation Caused Inoperability of Primary Containment Isolation Valves for Longer Than Allowed by Technical Specifications

LER 05000259/2014-005-00, Automatic Depressurization System Valve Inoperable for Longer Than Allowed by Technical Specifications

LER 05000296/2015-001-00, High Pressure Coolant Injection and Reactor Core Isolation Cooling Inoperable Due To No Suction Source Aligned

**Section 40A5: Other Activities**

Browns Ferry Nuclear Plant 10 CFR 72.212 Report of Evaluations, Rev 6

10 CFR 72.48 evaluation of MSI-0-079-DCS100.4VW Rev 0 HI-TRAC VW Annual Inspection

10 CFR 72.48 evaluation of 0-GOI-100-3C Rev 79

10 CFR 72.48 evaluation of MSI-0-079-DCS100.11 Rev 1

10 CFR 72.48 evaluation of MSI-0-079-DCS100.7 Rev 5

10 CFR 72.48 evaluation of MSI-0-079-DCS400.1FW Rev 0

10 CFR 72.48 evaluation of 2-AOI-78-1 Rev 29

## LIST OF ACRONYMS

ALARA	As Low As Reasonable Achievable
ARM	Area Radiation Monitor
CAD	Containment Air Dilution
CCW	Condenser Circulating Water
CCTV	Closed Circuit Television
COC	Certificate Of Compliance
DCN	Design Change Notice
EP	Emergency Preparedness
EPIP	Emergency Plan Implementing Procedure
FAs	Fire Areas
FE	Functional Evaluation
FPR	Fire Protection Report
FZs	Fire Zones
HPT	Health Physics Technician
IMC	Inspection Manual Chapter
IR	Inspection Report
Kv	Kilo volt (1000 Voltz)
LER	Licensee Event Report
MR	Maintenance Rule
MT	Magnetic Particle Examination
MSIV	Main Steam Isolation Valve
MSPI	Mitigating Systems Performance
MSRV	Main Steam Relief Valve
NCV	Non-cited Violation
NSTS	National Source Tracking System
NVLAP	National Voluntary Laboratory Accreditation Program
ODCM	Off-Site Dose Calculation Manual
PAPR	Power Air Purifying Respirator
PCIV	Primary Containment Isolation Valve
PMT	Post-maintenance Test
QA	Quality Assurance
RBCCW	Reactor Building Closed Cooling Water
RCE	Root Cause Evaluation
RCS	Reactor Coolant System
RCW	Raw Cooling Water
REMP	Radiological Environmental Monitoring Program
RFW	Reactor Feedwater
RG	Regulatory Guide
RMA	Risk Management Actions
RPT	Radiation Protection Technician
RS	Radiation Safety
RPS	Reactor Protection System
SDP	Significance Determination Process
SLC	Standby Liquid Control
SNM	Special Nuclear Material
SR	Service Request
SRV	Safety Relief Valve
TLD	Thermoluminescent Detector
TI	Temporary Instruction

TIP	Transverse In-core Probe
TRM	Technical Requirements Manual
UT	Ultrasonic Test
VT	Visual Test