



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II**

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ATLANTA, GEORGIA 30303-1257

May 8, 2018

Mr. J. W. Shea  
Vice President, Nuclear Regulatory  
Affairs and Support Services  
Tennessee Valley Authority  
1101 Market Street, LP 4A  
Chattanooga, TN 37402-2801

**SUBJECT: BROWNS FERRY NUCLEAR PLANT – NRC INTEGRATED INSPECTION  
REPORT 05000259/2018001, 05000260/2018001, AND 05000296/2018001**

Dear Mr. Shea:

On March 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Nuclear Plant, Units 1, 2, and 3. On April 20, 2018, the NRC inspectors discussed the results of this inspection with Mr. W. Paulhardt and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented four findings which were determined to be of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements. Because of their very low safety significance, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest any of the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Browns Ferry Nuclear Plant.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II, and the NRC Resident Inspector at Browns Ferry Nuclear Plant.

J. Shea

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This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

***/RA/***

Anthony D. Masters, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

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

Enclosure:  
NRC IIR 05000259/2018001,  
05000260/2018001 and 05000296/2018001

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SUBJECT: BROWNS FERRY NUCLEAR PLANT – NRC INTEGRATED INSPECTION  
 REPORT 05000259/2018001, 05000260/2018001, AND 05000296/2018001  
May 8, 2018

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DATE	5/8/2018					

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

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

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

Report No.: 05000259/2018001, 05000260/2018001, and 05000296/2018001

Enterprise Identifier: I-2018-001-0052

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: January 1, 2018 through March 31, 2018

Inspectors: D. Dumbacher, Senior Resident Inspector  
M. Kirk, Resident Inspector  
A. Ruh, Resident Inspector  
A. Nielsen, Senior Health Physicist  
R. Kellner, Senior Health Physicist  
R. Carrion, Senior Reactor Inspector  
S. Monarque, Project Engineer  
J. Seat, Project Engineer  
P. Heher, Project Engineer  
R. Williams, Senior Reactor Inspector  
G. Crespo, Senior Construction Inspector

Approved by: A. Masters, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee’s performance by conducting quarterly integrated baseline inspections at Browns Ferry Nuclear Plant, Units 1, 2, and 3 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC’s program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. NRC and self-revealed findings, violations, and additional items are summarized in the table below.

### List of Findings and Violations

Inadequate Post-Maintenance Testing of 4kV Breaker Stationary Switches			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green Non-cited Violation (NCV) 05000259, 260, 296/2018001-01 Closed	[H.1] - Resources	71111.19
A self-revealing, Green, NCV of 10 CFR Part 50 Appendix B, Criterion V, was identified when the licensee failed to perform an adequate post-maintenance test in accordance with NPG-SPP-06.3, “Pre-/Post-Maintenance Testing.” Specifically, the post maintenance testing on the 3C diesel generator output breaker did not ensure that all contacts on replacement stationary switches successfully changed state after installation.			

Unauthorized Entry into a High Radiation Area (HRA)			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000259, 260, 296/2018001-02 Closed	[H.8] – Procedure Adherence	71124.01
A self-revealing, Green, NCV of Technical Specification (TS) 5.7.1, was identified for a worker who entered a HRA without proper authorization. Specifically, the worker entered the Unit 3 A & C Residual Heat Removal Heat Exchanger Room using an incorrect Radiation Work Permit and without being briefed on the radiological conditions.			

Failure to Implement Controls for Locked High Radiation Area (LHRA) Access			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000259/260/296/ 2018001-03 Opened/Closed	[H.4] – Teamwork	71124.01
A self-revealing, Green, NCV of TS 5.7.2, was identified for the failure to control access to a LHRA. Specifically, a worker installed and climbed a ladder in the Unit 3 drywell without Radiological Personnel (RP) present. In doing so, the worker accessed an area with dose rates >1 rem/hr that had not been posted, locked, or surveyed prior to entry.			

Inadequate Configuration Control of High Pressure Coolant Injection (HPCI) Valve Design Issues			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000296/2018001-04 Closed	None	71152 - Annual Follow-up of Selected Issues
A self-revealing, Green, NCV of 10 CFR Part 50, Appendix B, Criterion III, was identified when the licensee failed to ensure adequate control of valve design configurations in accordance with NPG-SPP-9.3, "Plant Modifications and Engineering Change Control" Revision 6. Specifically, the licensee changed, over time, HPCI discharge valve yoke nut and bearing components contrary to original design without documenting or evaluating the changes			

### Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000260,296/2017008-01	Potential Inadequate Weak Link Analysis for Unit 2 and Unit 3, HPCI Discharge Valves	71152	Closed
URI	05000260,296/2017008-02	Potential Inadequate Commercial Grade Dedication of Components in Safety Related Valves	71152	Closed
URI	05000260,296/2017008-03	Potential Inadequate Configuration Control of the Unit 2 and Unit 3 HPCI Discharge Valves	71152	Closed
URI	05000296/2017008-04	Potential Inadequate Operator Response to Inadvertent HPCI Injection	71152	Closed
LER	05000260/2017-002-00	Inoperable Primary Containment Isolation Valve Resulting in Condition Prohibited by Technical Specifications	71153	Closed
LER	05000259/2016-004-01	Incorrect Tap Settings for 480 Volt Shutdown Transformer Results in Inoperability of Associated 480V Shutdown Boards	71153	Closed

## PLANT STATUS

Unit 1 operated at 100% rated thermal power (RTP) except for a reactor scram related to a turbine control valve partial closure transient on March 18, 2018. The unit returned to 100% RTP on March 24, 2018, and operated at that level for the remainder of the inspection period.

Unit 2 operated at 100% RTP for the duration of the inspection period.

Unit 3 operated at 100% RTP until a reactor scram occurred on January 10, 2018, related to vibration-induced failure of hydraulic piping for the #2 turbine control valve. The unit returned to 100% power on January 15, 2018, and operated at that level until February 17, 2018. There

were two unplanned downpowers during the inspection period due to #3 turbine control valve oscillations, one planned downpower for 3C reactor feed pump maintenance. From February 17, 2018, through March 31, 2018, Unit 3 was shutdown for a planned refueling outage U3R18.

## **INSPECTION SCOPES**

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards."

## **REACTOR SAFETY**

### 71111.01 - Adverse Weather Protection

#### Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal cold temperatures on January 2, 2018.

### 71111.04 - Equipment Alignment

#### Partial Walkdown (4 Samples)

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

- (1) Unit 3 Residual Heat Removal (RHR) Loop II Shutdown Cooling alignment on February 18, 2018
- (2) Unit 3 Alternate Decay Heat Removal (ADHR) on February 23, 2018
- (3) 4160V AC Electrical System on March 10, 2018
- (4) Unit 3 Main Steam System on March 15 and 19, 2018

#### Complete Walkdown (1 Sample)

- (1) The inspectors evaluated system configurations during a complete walkdown of the Unit 3 Emergency High Pressure Makeup (EHPM) system on March 22, 2018.

### 71111.05AQ - Fire Protection Annual/Quarterly

#### Quarterly Inspection (4 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Compartment 25-1, Units 1,2, and 3, 550' Intake Pumping Station and 565' Component Cooling Water (CCW) Pump Deck on January 26, 2018
- (2) Unit 2 RHR Heat Exchanger 2B, 2D, 2A, and 2C Rooms Elevation 565 and 593, and Area 2-4 – South of Q - Unit 2 Elevation 593 on February 21, 2018
- (3) Unit 2 Auxiliary Instrument room, Fire Area 16-M on March 14, 2018
- (4) Compartment 26-A, Units 1, 2 and 3 Turbine Building on March 16, 2018

Annual Inspection (1 Sample)

- (1) The inspectors evaluated fire brigade performance on March 6, 2018. The Browns Ferry Fire brigade responded to report of smoke coming from a motor for the Unit 1/2 Diesel Building CO2 tank compressor.

71111.06 - Flood Protection Measures

Internal Flooding (1 Sample)

- (1) The inspectors evaluated internal flooding mitigation protections in the Unit 2 480V Shutdown Board Rooms on February 2, 2018

Cables (1 Sample)

The inspectors evaluated cable submergence protection in:

- (1) Hand holes 15 and 26 containing underground cables on January 8, 2018

71111.08 - Inservice Inspection Activities (1 Sample)

The inspectors evaluated boiling water reactor non-destructive testing by observing or reviewing the following examinations from February 28 to March 1, 2018:

- (1) Magnetic Particle Examination (MT)
  - a) MT of Weld HPCI-3-009-003 C1R2, Work Order (WO) 117544712, American Society of Mechanical Engineers (ASME) Class 2. This review involved a pressure boundary weld. (Reviewed)
- (2) Liquid Penetrant Examination (PT)
  - a) PT of Weld RWCU-3-001-078 C1R0, WO 117656145 ASME Class 1. This review involved a pressure boundary weld. (Reviewed)
- (3) Radiographic Examination (RT)
  - a) RT of Weld HPCI-3-009-003 C1R0, WO 117544712, ASME Class 2. This review involved a pressure boundary weld. (Reviewed)
  - b) RT of Weld HPCI-3-009-003 C1R1, WO 117544712, ASME Class 2. This review involved a pressure boundary weld. (Reviewed)
  - c) RT of Weld HPCI-3-009-003 C1R3, WO 117544712, ASME Class 2. This review involved a pressure boundary weld. (Reviewed)



- (4) Ultrasonic Test (UT)
  - a) UT Examination Report R-049, Pipe to Elbow Weld, Component ID: DSRHR-3-04. ASME Class 1. This review involved a pressure boundary weld. (Reviewed)
  - b) UT Examination Report R-085, Nozzle to Shell Weld, Component ID: N3D-NV. ASME Class 1. This review involved a pressure boundary weld. (Observed)
- (5) Visual Test (VT)
  - a) VT Examination Report R-033, Pipe Support, Component ID: 3-478400-099. ASME Class 1. (Reviewed)
  - b) VT Examination Report R-069, Variable Spring Can, Component ID: RHR-3-H-146. ASME Class 1. (Reviewed)

#### 71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

##### Operator Requalification (1 Sample)

The inspectors observed and evaluated a licensed operator requalification exam session for the Group 0 operating crew on the Unit 3 Simulator involving a stuck open main steam relief valve, inadvertent high pressure coolant injection actuation, unit board trip and Anticipated Transient Without Scram (ATWS) with main steam isolation valves open on January 4, 2018.

##### Operator Performance (1 Sample)

The inspectors observed and evaluated startup of the Unit 3 reactor on January 12, 2018, Unit 3 turbine control valve manipulations and power maneuvering on January 26, 2018, shutdown of Unit 3 on February 17, 2018, and startup of the Unit 1 reactor on March 21, 2018.

#### 71111.12 - Maintenance Effectiveness

##### Routine Maintenance Effectiveness (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

- (1) Unit 3 Turbine Stop and Control Valves. Maintenance Rule (MR) Function 047-B and history of vibrations causing problems.
- (2) MR Functions for System 575, 4kV Power Supply and Busses in (a)(1) status

#### 71111.13 - Maintenance Risk Assessments and Emergent Work Control (9 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Planned risk, associated with inoperable Main Bank Battery 3 and Battery Board 3 on January 2, 2018
- (2) Emergent work associated with oscillations of the Unit 3 number 3 Control Valve on January 22, 2018
- (3) In-office review of proposed Unit 3 refueling outage risk plan

- (4) Shutdown risk associated with Unit 3 on shutdown cooling and reactor water level control at 80 inches on February 17, 2018 (day 1) with Time to Boil at 37 minutes
- (5) Reactor pressure vessel head lift on February 18, 2018
- (6) Shutdown risk associated with Unit 3 during Operations with Potential for Draining the Reactor Vessel (OPDRV) for replacing B Recirculation Pump seals on February 22, 2018
- (7) Shutdown risk associated with Unit 3 during OPDRV for replacing 32 control rod drives on February 27, 2018
- (8) Yellow shutdown risk during planned maintenance on Unit 3 Division II 4160V boards on March 10, 2018
- (9) Yellow shutdown risk on U-1 with short time to boil with Unit 3 still in a refueling outage on March 20, 2018

71111.15 - Operability Determinations and Functionality Assessments (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Unit 2, HPCI valve 73-44, design opening thrust exceeding the bearing rating and the associated operator work around (OWA) on January 22, 2018
- (2) Incorrect RHR system pressure gage used for verification of Technical Specification surveillance test requirements (Condition Report (CR) 1372616, 1373852) on January 5, 2018
- (3) Turbine Control Valve Fast Closure channel operability with Unit 3 turbine control valve control circuit fuse and wiring changes (CR 1379519, 1382150) on January 22, 2018
- (4) APRM 4 fault and 2-out-of-4 voter number 4 operability (CR 1382124) on January 30, 2018
- (5) Past operability evaluation for diesel generator 3C load acceptance test failure (CR 1389131)

71111.18 - Plant Modifications (1 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) DCN 69424 Replace Unit 3 Condenser Vacuum Pressure Switches with Pressure Transmitters

71111.19 - Post Maintenance Testing (10 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Unit 3 4kV Shutdown Board 3EB loss of power logic system test on March 6, 2018
- (2) Testing of Unit 3 overhauled motor operated valve 74-53, RHR Loop I Low Pressure Coolant Injection Valve
- (3) Testing of replacement Unit 3 Division I Emergency Core Cooling System (ECCS) Inverter
- (4) Local leak rate test of 3-FCV-73-45 HPCI discharge check valve following installation of softer seat material.
- (5) Unit 3 Emergency High Pressure Make-Up Basic Pump Recirculation Testing
- (6) Surveillance 3-SR-3.1.7.3 Standby Liquid Control System Enriched Sodium Pentaborate Solution Concentration, Quantity Calculation, and ATWS Equivalency Calculation

- following implementation of modified boron enrichment for Extended Power Uprate
- (7) Test of DCN to install parallel auxiliary contact for 3EC 4kv shutdown board normal feeder breaker 1338
  - (8) Testing of Unit 3 overhauled motor operated valve 74-73, RHR Loop II Test Outboard Isolation Valve
  - (9) Testing of Unit 3 overhauled motor operated valve 73-2, HPCI Turbine Steam Supply Inboard Primary Containment Isolation Valve
  - (10) Testing of replacement STA switch on 3EC diesel generator output breaker

#### 71111.20 - Refueling and Other Outage Activities (Partial Sample)

The inspectors evaluated refueling outage U3R18 activities from February 16, 2018 through March 31, 2018. The inspectors completed inspection procedure sections 03.01.a, b, c, d and e.2.

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

##### Routine (2 Samples)

- (1) 3-SR-3.8.1.9, (3B OL) Unit 3 EDG load acceptance test, on February 6, 2018,
- (2) 3-SR-3.3.1.1.13 APRM 1-4 calibrations per DCN 68463 Stage 4 associated with the Extended Power Uprate (EPU) modification on March 13, 2018

##### In-service (3 Samples)

- (1) 0-SI-4.5.C.1(A2-COMP) – Residual Heat Removal Service Water (RHRSW) Pump A2 IST Comprehensive Pump on January 2, 2018
- (2) 1-SR-3.5.1.6 (RHR II) – Quarterly RHR System Rated Flow Test Loop II, on February 7, 2018
- (3) 3-SR-3.1.7.7, Unit 3 Standby Liquid Control system functional test on March 22, 2018

### **RADIATION SAFETY**

#### 71124.01 - Radiological Hazard Assessment and Exposure Controls

##### Radiological Hazard Assessment (1 Sample)

The inspectors evaluated radiological hazards assessments and controls.

##### Instructions to Workers (1 Sample)

The inspectors evaluated worker instructions.

##### Contamination and Radioactive Material Control (1 Sample)

The inspectors evaluated contamination and radioactive material controls.

Radiological Hazards Control and Work Coverage (1 Sample)

The inspectors evaluated radiological hazards control and work coverage.

High Radiation Area and Very High Radiation Area Controls (1 Sample)

The inspectors evaluated risk-significant high radiation area and very high radiation area controls.

Radiation Worker Performance and Radiation Protection Technician Proficiency (1 Sample)

The inspectors evaluated radiation worker performance and radiation protection technician proficiency.

71124.08 - Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Radioactive Material Storage (1 Sample)

The inspectors evaluated the licensee's radioactive material storage.

Radioactive Waste System Walk-down (1 Sample)

The inspectors evaluated the licensee's radioactive waste processing facility during plant walkdowns.

Waste Characterization and Classification (1 Sample)

The inspectors evaluated the licensee's radioactive waste characterization and classification.

Shipment Preparations (1 Sample)

The inspectors evaluated the licensee's radioactive material shipment preparation processes.

Shipment Records (1 Sample)

The inspectors evaluated the licensee's non-excepted package shipment records.

**OTHER ACTIVITIES – BASELINE**

71151 - Performance Indicator Verification

The Resident Inspectors verified licensee performance indicators submittals listed below for the period from January 1, 2017, through December 31, 2017. (6 Samples)

- (1) Units 1, 2, and 3 Reactor Coolant System Leakage
- (2) Units 1, 2, and 3 Reactor Coolant System Activity

The inspectors reviewed licensee PI submittals listed below for the period from April 1, 2017, through February 12, 2018. (1 Sample)

(1) OR01: Occupational Exposure Control Effectiveness

#### 71152 - Problem Identification and Resolution

##### Annual Follow-up of Selected Issues (5 Samples)

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

- (1) Unresolved Item (URI) 05000260, 296/2017008-01, Potential Inadequate Configuration Control of the Unit 2 and Unit 3 HPCI Discharge Valves
- (2) URI 05000260, 296/2017008-02, Potential Inadequate Commercial Grade Dedication of Components in Safety Related Valves
- (3) URI 05000260, 296/2017008-03, Potential Inadequate Configuration Control of the Unit 2 and Unit 3 HPCI Discharge Valves
- (4) URI 05000296/2017008-04, Potential Inadequate Operator Response to Inadvertent HPCI Injection
- (5) Problem Identification & Resolution and Regulatory Commitments associated with Unit 3 Extended Power Uprate

#### 71153 - Follow-up of Events and Notices of Enforcement Discretion

##### Events (3 Samples)

- (1) The inspectors evaluated the plant response and licensee's response for a Unit 3 reactor scram on January 10, 2018.
- (2) The inspectors responded to a Notice of an Unusual Event after a routine search of a work-related vehicle noted a suspicious object underneath the vehicle. It was later determined the suspicious object was a normal part of the vehicle
- (3) The inspectors evaluated the plant response and licensee's response for a Unit 1 reactor scram on March 18, 2018.

##### Licensee Event Reports (2 Samples)

The inspectors evaluated the following licensee event reports (LER) which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

- (1) LER 05000260/2017-002-00, Inoperable Primary Containment Isolation Valve Resulting in Condition Prohibited by Technical Specifications
- (2) LER 05000259/2016-004-01, Incorrect Tap Settings for 480 Volt Shutdown Transformer Results in Inoperability of Associated 480V Shutdown Boards

## **OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL**

### 71004 - Power Uprate

#### Erosion-Corrosion/Flow-Accelerated-Corrosion Monitoring Programs (2 samples)

Inspectors reviewed the Erosion Corrosion/Flow-Accelerated Corrosion (EC/FAC) program in accordance with the guidance contained in NRC Inspection Procedure 49001, "Inspection of Erosion-Corrosion/Flow-Accelerated-Corrosion Monitoring Programs" dated 12/11/98.

#### Summary of Power Uprate Inspection Samples Contained in this Report:

##### Integrated Plant Operations at the Uprated Power Level (Unit 3) (1 sample)

(1) Licensed Operator Requalification Training for EPU (Section 71111.11)

##### Plant Modifications (all Units) (1 sample)

(1) DCN 69424 Replace Unit 3 Condenser Vacuum Pressure Switches with Pressure Transmitters (Section 71111.18)

##### Post-Maintenance / Post-Modification or Surveillance Tests (Unit 3) (2 samples)

- (1) Surveillance 3-SR-3.1.7.3 Standby Liquid Control System Enriched Sodium Pentaborate Solution Concentration, Quantity Calculation, and ATWS Equivalency Calculation following implementation of modified boron enrichment for Extended Power Uprate (Section 71111.19)
- (2) 3-SR-3.3.1.1.13 APRM 1-4 calibrations in accordance with DCN 68463 Stage 4 associated with the EPU modification (Section 71111.22)

##### Regulatory Commitments and Recommended Areas for Inspection (all Units) (1 sample)

(1) Regulatory Commitments related to EPU (Section 71152)

##### Identification and Resolution of Problems (Unit 3) (1 sample)

(1) Problem Identification and Resolution related to EPU (Section 71152)

##### Flow Accelerated Corrosion and Erosion Corrosion Program Reviews (all Units) (2 samples)

- (1) Flow Acceleration Corrosion Program (Section 71004)
- (2) Erosion Corrosion Program (Section 71004)

## INSPECTION RESULTS

### 71111.19 - Post Maintenance Testing

Inadequate Post-Maintenance Testing of 4kV Breaker Stationary Switches			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000259, 260, 296/2018001-01 Closed	[H.1] - Resources	71111.19
<p><b>Introduction:</b> A self-revealing, Green, NCV of 10 CFR Part 50, Appendix B, Criterion V, was identified when the licensee failed to perform an adequate post-maintenance test in accordance with NPG-SPP-06.3, "Pre-/Post-Maintenance Testing." Specifically, the post maintenance testing on the 3C diesel generator output breaker did not ensure that all contacts on replacement stationary switches successfully changed state after installation.</p>			
<p><b>Description:</b> On February 20, 2018, during the biannual performance of TS SR 3.8.1.9 for the 3C diesel generator, several automatic safety functions did not occur as designed. The 3B RHR, 3B Core Spray, and B1 RHRSW pumps did not automatically start after the 3C diesel generator output breaker closed in to the 3EC 4kV Shutdown Board. The Unit 3 480V Load Shed for Division II also did not occur. The degraded condition was determined to be the result of one pair of contacts on the diesel generator output breaker's stationary switch failing to make up when the breaker closed in. Troubleshooting revealed that the stationary switch contact failed to make up because the associated actuating arm on the breaker failed to rotate the stationary switch sufficiently. Although these actuations did not automatically occur, they could have been accomplished manually once recognized by control room operators.</p> <p>This particular contact was used in a part of the logic circuitry to signify that the diesel generator had successfully tied onto the board and was ready to accept the designed safety loads when there was an accident signal present and normal offsite power to the board was not available. The contact also initiates load shedding of non-essential 480 volt loads to prevent the diesel generator from being overloaded as the safety loads are automatically sequenced on. Additionally, because the 3B Core Spray pump would not have automatically started, the 3D Core Spray pump would also not have automatically started because of the design of the Core Spray initiation logic. The last time that the switch was known to be working correctly was during the last biannual surveillance test in February of 2016. The licensee's past operability evaluation concluded that the 3C diesel generator, 3B and 3D Core Spray pumps, 3B RHR pump, B1 RHRSW pump, and Unit 3 480V Division II Load Shed Logic be considered inoperable from February 25, 2016, until February 20, 2018.</p> <p>From a review of historical maintenance on this breaker, it was identified that the switch was replaced on March 3, 2016, via work order 116872223 as a 24 year preventative maintenance action; however, only a portion of the switch's contacts were tested for continuity during the post-maintenance tests. Inspectors identified that the testing performed did not satisfy the requirements of NPG-SPP-06.3, "Pre-/Post-Maintenance Testing." Specifically, section 3.2.2.A.5 required that, "PMTs for safety-related circuits shall include testing to ensure affected portions of the logic circuitry... are tested if they were potentially affected."</p>			
<p><b>Corrective Action(s):</b> The breaker stationary switch was replaced and retested satisfactorily.</p>			

Corrective Action Reference(s): CR 1389131

Performance Assessment:

Performance Deficiency: The failure to perform adequate post maintenance testing on the 3C diesel generator output breaker in accordance with NPG-SPP-06.3, "Pre-/Post-Maintenance Testing," was a performance deficiency.

Screening: The performance deficiency was more than minor because it was associated with the procedure quality attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency caused the licensee to return a safety-related breaker to service that was later discovered to not be able to perform all of its safety related functions and rendered multiple supported components inoperable.

Significance: Using Chapter 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as requiring a detailed risk evaluation because it resulted in an actual loss of function of at least a single train for greater than its TS allowed outage time. An NRC Regional Senior Reactor Analyst (SRA) performed the detailed risk evaluation using SAPHIRE Version 8.1.6 and SPAR Model Version 8.50 for Unit 3. The SRA modeled the condition by assuming the EDG 3C Load Sequencer was failed for one year, which accounted for pump automatic start failures, and that manual start remained available. To account for potential manual start failures, the SRA performed a human reliability analysis using the SPAR-H method and adjusted the model to include a probability of operator failure to recover the sequencer. The dominant sequences (12), which accounted for 90% of the change, involved loss of offsite power with failure of various EDG combinations leading to a station blackout, loss of suppression pool cooling, and failure of low pressure injection. The result was a change in core damage frequency of less than  $1E-7$ /year and was primarily mitigated by operator recovery. Because the change was less than  $1E-7$ /year, no further analysis was needed for external events or large early release, and this finding was determined to be of very low safety significance (Green).

Cross Cutting Aspect: [H.1] – Resources. The apparent cause of the performance deficiency was that leaders did not ensure that plant procedures contained guidance for developing adequate post-maintenance tests for breaker stationary switch replacements.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion V, Instructions Procedures and Drawings, states, in part, that instructions shall include appropriate quantitative and qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Contrary to the above, on March 3, 2016, work order 116872223 did not contain post-maintenance test instructions with appropriate acceptance criteria for determining that the breaker stationary switch replacement had been satisfactorily accomplished.

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



71124.01 - Radiological Hazard Assessment and Exposure Controls

Unauthorized Entry into a High Radiation Area (HRA)			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000259, 260, 296/2018001-02 Closed	[H.8] – Procedure Adherence	71124.01
<p><u>Introduction:</u> A self-revealing, Green, NCV of Technical Specification (TS) 5.7.1, was identified for a worker who entered a HRA without proper authorization. Specifically, the worker entered the Unit 3 A &amp; C Residual Heat Removal (RHR) heat exchanger room using an incorrect Radiation Work Permit (RWP) and without being briefed on the radiological conditions.</p>			
<p><u>Description:</u> On March 24, 2018, an electrician was assigned the job of installing a jumper on a component in the Unit 3 A &amp; C RHR heat exchanger room. At the time, this area was posted “Contaminated Area” and “High Radiation Area”. The electrician logged into RWP 18370011, which did not allow entry into HRAs. The worker also bypassed the Radiation Protection (RP) desk and failed to receive a briefing on radiological conditions in the area. The worker then dressed in anti-contamination clothing and proceeded past the HRA boundary into the room. He subsequently received a dose rate alarm of 82 mrem/hr, which exceeded the ED alarm setpoint of 60 mrem/hr, and immediately exited the area. A RP technician performed a follow up survey and confirmed the presence of HRA dose rates up to 300 mrem/hr at 30 cm.</p> <p>Corrective Action(s): The licensee took immediate corrective actions including Radiologically Controlled Area (RCA) access restriction for the individual and initiation of an investigation of the event including surveys of the areas entered.</p> <p>Corrective Action Reference(s): CR 1390579</p>			
<p><u>Performance Assessment:</u></p> <p>Performance Deficiency: The worker’s entry into a HRA without using an appropriate RWP and without being briefed on radiological conditions in the area, as required by TS 5.7.1, was a performance deficiency.</p> <p>Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Occupational Radiation Safety Cornerstone attribute of Human Performance and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation.</p> <p>Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter (IMC) 0609 C, “Occupational Radiation Safety Significance Determination Process”. The finding was not related to As Low As Reasonably Achievable (ALARA) planning, nor did it involve an overexposure or substantial potential for overexposure, and the ability to assess dose was not compromised. Therefore, the inspectors determined the finding to be of very low safety significance (Green).</p>			

Cross-cutting Aspect: This finding involved the cross-cutting aspect of Human Performance, Procedural Adherence, because the event was a direct result of the worker's failure to adhere to administrative requirements for HRA access.[H.8]

Enforcement:

Violation: Technical Specification 5.7.1 requires that access to HRAs be controlled by means of an RWP and entry into such areas shall be made only after dose rates in the area have been determined and entry personnel are knowledgeable of them. Contrary to this, on February 24, 2018, a licensee employee entered a posted high radiation area without proper RWP authorization and without being knowledgeable of the radiological conditions. Upon identification, the licensee immediately implemented RCA access restrictions for the individual and completed follow up surveys of the areas entered.

Enforcement Actions: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Implement Controls for Locked High Radiation Area (LHRA) Access			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000259/260/296/ 2018001-03 Closed	[H.4] – Teamwork	71124.01
<p><u>Introduction:</u> A self-revealing, Green, NCV of TS 5.7.2, was identified for the failure to control access to a LHRA. Specifically, a worker installed and climbed a ladder in the Unit 3 drywell without RP personnel present. In doing so, the worker accessed an area with dose rates &gt;1 rem/hr that had not been posted, locked, or surveyed prior to entry.</p>			
<p><u>Description:</u> On February 18, 2018, a carpenter was directed by the RP Drywell Coordinator to install a ladder on the 563' elevation of the Unit 3 drywell near the 'A' blower bank. The inspectors noted the ladder allowed access to an area that had not been surveyed by RP, was not posted or controlled as a LHRA, and no RP technician was present during the installation. While climbing up the ladder to complete a tie off, the carpenter received a dose rate alarm of 458 mrem/hr which exceeded the ED alarm setpoint of 400 mrem/hr. The ED alarm was seen by the remote monitoring station and a roving RP technician was dispatched to respond. The RP technician directed the carpenter to exit the drywell and report to RP. The technician immediately performed a survey of the area accessible by the ladder and discovered dose rates up to 20 rem/hr on contact and 6 rem/hr at 30cm.</p> <p>Corrective Action(s): The licensee took immediate corrective actions including posting a LHRA guard until appropriate controls could be implemented.</p> <p>Corrective Action Reference(s): CR 1388425</p>			

Performance Assessment:

Performance Deficiency: The failure to post, lock, and survey the area prior to entry (or be escorted by RP), as required by TS 5.7.2, was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Occupational Radiation Safety Cornerstone attribute of Human Performance and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation.

Significance: The inspectors assessed the significance of the finding using IMC 0609 C, "Occupational Radiation Safety Significance Determination Process". The finding was not related to ALARA planning, nor did it involve an overexposure or substantial potential for overexposure (due to the use of remote monitoring), and the ability to assess dose was not compromised. Therefore, the inspectors determined the finding to be of very low safety significance (Green).

Cross-cutting Aspect: This finding involved the cross-cutting aspect of Human Performance, Teamwork, because the event was a direct result of poor coordination between work groups. [H.4]

Enforcement:

Violation: Technical Specification 5.7.2 requires that HRAs with dose rates > 1 rem/hr at 30 cm, but less than 500 rad/hr at 1 m, be conspicuously posted and provided with a locked or continuously guarded door. TS 5.7.2 also requires that, except for personnel escorted by RP, entry into such areas be made only after dose rates in the area have been determined and entry personnel are knowledgeable of them. Contrary to this, on February 18, 2018, a licensee employee installed a ladder that allowed access to an area with dose rates > 1 rem/hr at 30 cm, but less than 500 rad/hr at 1 m, that was not posted or locked. In addition, the employee entered the area without a RP escort and prior to dose rates being determined. The licensee took immediate corrective actions including posting a LHRA guard until appropriate controls could be implemented.

Enforcement Actions: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

71152 - Problem Identification and Resolution

Inadequate Configuration Control of HPCI Valve Design Issues			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000296/2018001-04 Closed	None	71152 - Annual Follow-up of Selected Issues
<p><u>Introduction:</u> A self-revealing, Green, NCV of 10 CFR Part 50, Appendix B, Criterion III, was identified when the licensee failed to ensure adequate control of valve design configurations in accordance with NPG-SPP-9.3, "Plant Modifications and Engineering Change Control" Revision 6. Specifically, the licensee machined a HPCI discharge valve contrary to original design and did not document the change.</p>			

Description: On September 24, 2017, during the performance of the quarterly HPCI pump test an unintentional injection of colder condensate water into the reactor vessel occurred causing reactor power to be at 104% power for about 5 minutes. The injection was caused by a fractured actuator yoke nut that had developed during the June 2017 stroke test of 3-FCV-73-44 leaving the valve partially open. The licensee disassembled and inspected 3-FCV-73-44, and three other valves as a part of their extent of condition review.

During the disassembly of the valves, the licensee identified that the yoke nut flanges on two of the valves were found to be 1" versus that specified in the original vendor drawing which showed the flange was 1.25". The licensee's evaluation determined that during past modifications of these valves the yoke nuts were received from the vendor and machined down to 1" without approval or documentation. Licensee extent of condition reviews identified another HPCI valve with an unapproved and undocumented 0.25" spacer below the bottom bearing set. Other deviations identified, were missing ball bearings and additional components in the bearing housing (bearing cage).

Corrective Action(s): As an immediate corrective action the licensee restored each of the valves to their original configurations in accordance with the vendor drawings.

Corrective Action Reference(s): CRs 1341458, 1357076, 1347334, and 1359556

Performance Assessment:

Performance Deficiency: The failure to ensure adequate control of valve design configurations, as required by NPG-SPP-9.3 revision 6, was a performance deficiency. Specifically, the licensee machined a HPCI discharge valve contrary to original design and did not document the change.

Screening: The performance deficiency was more than minor because it was associated with the design control attribute and affected the associated cornerstone objective to ensure availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the resulting yoke nut and bearing configuration contributed to the failure of the valve, and prevented the valve from stroking fully closed.

Significance: Using Chapter 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a deficiency that affected the design and qualification of safety related, HPCI valves, but operability was maintained.

Cross Cutting Aspect: No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion III, Design Control, states, in part, that measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. NPG-SPP-9.3 establishes a process of administrative controls and regulatory/quality requirements for plant modifications and changes to engineering documents. NPG-SPP-9.3 Rev. 6, Step 3.1.9.A.1 states, in part, that vendor manuals and configuration control design documents affected by the change package have been revised or updated. Contrary to the above, in April 2012, the licensee failed to ensure that vendor manuals and other

configuration control design documents affected by the change were revised or updated for 3-FCV-73-44.

Enforcement Actions: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

This finding closes URI 05000260, 296/2017008-03

Unresolved Item (Closed)	URI 05000260, 296/2017008-01, Potential Inadequate Weak Link Analysis for Unit 2 and Unit 3, HPCI Discharge Valves	71152 - Annual Follow-up of Selected Issues
<p><u>Description:</u> The subject URI was identified to determine if a performance deficiency exists regarding the adequacy of the weak link analysis for the valve and actuator of the HPCI Unit 2 and Unit 3 discharge valves. Inspectors reviewed the various historical weak link analyses for these valves. The original vendor analysis only included the results for the most limiting part in the valve rather than a complete documented analysis for each area analyzed. This minimal level of documentation met the licensee's and regulatory standards. As a result, the licensee had no documentation that would cause engineers to believe that the valve's yoke nut or yoke nut bearings would exceed their load ratings once the valve's actuator thrust was increased in 2012. The valve vendor failed to recognize these loading limitations during their reviews that supported the licensee's thrust modification. As a result of this discovery, Crane Nuclear Inc. issued a 10 CFR Part 21 Notification of Defect to the NRC on December 19, 2017.</p> <p>Corrective Action Reference(s): CR 1344131</p> <p>Closure Basis: Inspectors concluded that the defects described in the valve vendor's notification were not reasonably within the licensee's ability to foresee and did not represent a performance deficiency.</p>		

Unresolved Item (Closed)	URI 05000296/2017008-02, Potential Inadequate Commercial Grade Dedication of Components in Safety Related Valves	71152 - Annual Follow-up of Selected Issues
<p><u>Description:</u> The subject URI was identified to determine if a performance deficiency existed regarding the adequacy of the commercial grade dedication of the valve yoke nut bearings in the HPCI discharge valves on Unit 2 and Unit 3.</p> <p>Corrective Action Reference(s): CR 1358257</p> <p>Closure Basis: Since the original thrust bearings were purchased/provided directly from the valve manufacturer, the licensee's commercial grade dedication process was not applicable and there was no performance deficiency attributable to the licensee associated with the variation in bearing configuration. The acceptability of the valve manufacturer's dedication process for the commercial grade bearings was not within the scope of this inspection. Replacement bearings were procured after the as-found configurations were discovered to be different than the original design configuration. These replacement bearings were procured</p>		

as commercial grade items and dedicated by the licensee prior to installation. No findings were identified.

Unresolved Item (Closed)	URI 05000296/2017008-04, Potential Inadequate Operator Response to Inadvertent HPCI Injection	71152 - Annual Follow-up of Selected Issues
<p><u>Description:</u> The subject URI was identified to determine if a performance deficiency exists regarding the adequacy of control room operator's response to the September 24, 2017, Unit 3 inadvertent HPCI system injection into the reactor vessel.</p> <p>Prior to the surveillance, reactor power had been reduced to 99.3 percent. The inadvertent injection caused reactor power to exceed the 100 percent licensed thermal power limit (RTP) and initiated an alarm for a reactor feedwater control system input failure. After the alarm, operators noticed that the HPCI check valve 3-73-45 was indicating open despite the upstream discharge valve 3-FCV-73-44 indicating closed. Once the operators diagnosed that HPCI injection was occurring, they initiated a HPCI turbine trip. The HPCI injection lasted approximately five minutes and reactor power stabilized at 104.8 percent. The 2 hour average RTP was less than 100%.</p> <p>The inspectors reviewed the licensee's performance analysis, Regulatory Information Summary (RIS) 2007-21, Adherence to Licensed Power Limits and IMC 0612, Appendix E, Examples of Minor Issues which discussed this circumstance. The training analysis concluded that the crew did not understand the expected plant response with a HPCI injection and thus were delayed in performing actions specified in AOI-3-1, Loss of Reactor Feedwater. Step 15 directed tripping the HPCI pump. The RIS stated that thermal power may rise slightly due to normal changes in plant parameters and operators are expected to take prompt corrective action to reduce thermal power once it is discovered to be above the licensed limit. Licensees may not intentionally operate or authorize operation above the maximum power level as specified in the license.</p> <p>IMC0612, Appendix E found this circumstance to be one of minor significance when:</p> <ul style="list-style-type: none"> <li>• Operators had performed the prerequisite power reduction and after realizing that thermal power had exceeded RTP, promptly decreased thermal power below the RTP.</li> <li>• Operators made appropriate and timely adjustments to prevent the 2 hour average CTP from exceeding RTP</li> </ul> <p>Corrective Action Reference(s): CR 1346991</p> <p>Closure Basis: The Inspectors concluded that there was no intentional operation above RTP and that the operator response met the guidance in both the RIS 2017-21 and the IMC 0612, Appendix E.</p>		

Observation	71152 - Annual Follow-up of Selected Issues
<p>For the implementation of Unit 3 extended power uprate, inspectors assessed the licensee's performance regarding problem identification and resolution against selected attributes listed in section 03.06 of Inspection Procedure 71152. Inspectors reviewed condition reports associated with extended power uprate to verify that problems were being promptly identified, evaluated, prioritized and resolved within the licensee's corrective action program. Inspectors also reviewed the NRC Safety Evaluation for any regulatory commitments associated with extended power uprate and found that the licensee did not make any regulatory commitments. Overall, inspectors found no licensee performance weaknesses during this review.</p>	

### **EXIT MEETINGS AND DEBRIEFS**

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

- On January 25, 2018, the EC/FAC inspection results were presented to Steve Bono and other members of the licensee staff
- On March 2, 2018, the radiation protection inspection and in-service inspection results were presented to Mr. D. L. Hughes and other members of the licensee staff.
- On April 20, 2018, the quarterly resident inspector inspection results were presented to Mr. Werner Paulhardt and other members of the licensee staff.

## **DOCUMENTS REVIEWED**

### IP 71111.04

#### Procedures

3-OI-74, Residual Heat Removal System, Revision 125  
0-OI-72, Auxiliary Decay Heat Removal System, Revision 60  
0-OI-57A, Switchyard and 4160V AC Electrical System, Revision 163

#### Drawings

3-47E811-1, Flow Diagram Residual Heat Removal System, Revision 72  
0-47E873-1, Flow Diagram Aux Heat Removal System, Revision 8  
0-15E740-1, Single-Line Diagram ADHR Service Entrance and MCC, Revision 13

#### Other Documents

CR 1388305  
0-BFN-VM-5003, Installation, Operation and Maintenance Instructions and Engineering Document Package  
FSAR Chapter 8.4, Normal Auxiliary Power System  
DCN 71673, Implementation of U3 Emergency High Pressure Make-Up Pump System

### IP 71111.05

#### Procedures

Browns Ferry Fire Protection Report-VOLUME 2, Fire Protection Report Volume 2, Revision 58

#### Other Documents

MDN0009992012000100, Browns Ferry Nuclear Power Plant, Units 1, 2, and 3, Fire Risk Evaluations, Revision 6  
EDQ099920110010, NFPA 805 – Nuclear Safety Capability Analysis, Revision 33

### IP 71111.06

#### Drawings

2-47W2392-642, Fire Protection – 10CFR50 Appendix R Penetration Seal Tabular Drawings EL. 621.25, Revision 2  
0-47W510-1, Mechanical Roof Drains, Revision 1  
0-47W510-2, Mechanical Roof Drains, Revision 4

#### Other Documents

BFN-57250, BFN-0-PMP-040-0031, Visual Inspection of Listed Handholes and Sumps Per 95003 Commitment, Revision 6  
WO 118861289  
CR 1375311  
CR 1375316  
NDN-000-999-2007-0031, Internal Flooding BFN Probabilistic Risk Assessment, Revision 0  
DED-TM-PF2, Concluding Report of the Effects of Postulated Pipe Failure Outside of Containment for the Browns Ferry Nuclear Plant Units 2 and 3, dated March 1, 1974



IP 71111.08

Procedures

N-UT-64, Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds, Revision 0016  
N-UT-78, PDI Generic Procedure for the Manual Ultrasonic Examination of Reactor Pressure Vessel Welds, PDI-UT-6, Revision 9  
N-UT-90, Generic Procedure for the Ultrasonic Detection and Sizing of Reactor Pressure Vessel Nozzle to Shell Welds and Nozzle Inner Radius, Revision 003  
N-VT-1, Visual Examination Procedure for ASME Section XI Preservice and Inservice, Revision 0047  
PDI-UT-2, PDI Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds, Revision H, October 4, 2017  
PDI-UT-6, PDI Generic Procedure for the Ultrasonic Examination of Reactor Pressure Vessel Welds, Revision I, August 1, 2017  
PDI-UT-11, Generic Procedure for the Ultrasonic Examination of Reactor Pressure Vessel Nozzle-to-Shell Welds and the Nozzle Inner Corner Radius, Revision D 08-01-2017, Revision D, August 1, 2017

Drawings

2-47W2392-6

Other Documents

CDQ0-003-2006-0002, BFN RPV Feedwater Nozzles Fatigue and Fracture Mechanics Evaluation, Revision 14  
CR 1135166, ISI Examination Drawings  
CR 1143845, CR to Track Accept-As-Is for Indication on Top of Unit 3 Vessel Head  
CR 1145011, FME Voluntary Stop Work for 3A Feed Water Heater Welding  
CR 1145022, FME Procedure Not Followed by Contractors  
CR 1145738, Incorrect Detail Weld Procedure Specification  
CR 1146291, Documentation Errors on Weld Data Sheets  
CR 1146995, Tack Welds Made without Sufficient Purging  
CR 1146888, Potential Rework Event  
CR 1147745, Discrepancies and Errors on Weld Data Sheet  
CR 1147756, A D&Z Mods Welder Contaminated in RCA Clean Area  
CR 1148490, U3R17 Jet Pump Wedge Wear and Set Screw Gaps / Indications  
CR 1150215, Welding Being Performed without a Fire Watch  
CR 1150705, NOI U3R17-007: Moisture Seal Barrier (MSB) Loss of Adhesion.  
CR 1166944, Core Shroud Off-Axis Cracking Interim Inspection & Flaw Evaluation Guidance  
CR 1184618, Through-Wall Penetration in Safety-Related Heat Exchanger Shell  
CR 1187114, Part 21 - Inadequate Vendor Documentation of Far Vision Acuity Certifications  
CR 1210910, Potential Code Class-2 Piping Leak on RBCW Piping @ 1-DRV-70-507 Connection Elbow  
CR 1221309, Two Welding Machines Left On and Unattended  
CR 1223258, Invertec V350 Pro Welder Left On and Unattended  
CR 1227532, Scheduled Containment ISI Examination Not Performed  
CR 1229969, Leakage Coming from 1-CKV-73-45  
CR 1244822, Welding Sparks Escaped Containment Tent on RFF  
CR 1250683, Request for Review of BWRVIP Position Regarding Aging Management of Orificed Fuel Support Castings  
CR 1284288, Re-Welding Stainless Steel Multiple Times Presents Various Issues  
CR 1324316, (CRP-ENG-FSA-17-004) ISI Program Deficiencies

CR 1326645, BWRVIP Skip Outage Project Initiation  
CR 1333664, BFN Leak Source Evaluation  
Browns Ferry Nuclear Standard ISI Plan (Baseline) Standard Code ASME Section XI, 2007 Ed /  
2008 Add Category Scheduling Compliance  
Calibration Block WB-084 As-Built Verification Documentation  
Certification for Magnaflux Ultrage II, Batch Number 16H031  
Certificate of Compliance for Miniature Angle Beam Block, Serial Number 789631  
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Certificate of Conformity I07120001 for Visual Illumination Cards  
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CRP-ENG-FSA-17-004, Focused Self-Assessment Report, Inservice Inspection at Browns  
Ferry, Approved September 14, 2017  
Detail Welding Procedure Specification (DWPS) GT88-O-1-N, Manual Gas Tungsten Arc  
Welding, Revision 5  
Drawing 3-47B400-99, Mechanical, Main Steam System Pipe Support, Revision 000  
Drawing BF-18, Calibration Blocks As-Built BF-18, Material: A-533, Revision 01  
IVVI Examination Checklist Browns Ferry Unit 3 R18 Spring 2018 (BF3R18) Outage  
Krautkramer Transducer Certification for Number 01FH9V  
Krautkramer Transducer Certification for Number 16B003AA  
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and 3 - Request for ASME Code, Section XI, Alternatives 2-ISI-30 and 3-ISI-27 for the Periods  
of Extended Operation Regarding Reactor Pressure Vessel Circumferential Shell Weld  
Examinations  
Owner's Activity Report for BFN, Unit 3, Cycle 17 Operation, dated 6/21/16  
NDE Personnel Qualifications for J. Hoover, M. Kleinjan, D. Maclean, D. Sawatzky  
Report of Calibration for Krautkramer Ultrasonic Flaw Detector, Serial Number 0100H4  
Report of Calibration for Krautkramer Ultrasonic Flaw Detector, Serial Number 0132M6  
Report of Calibration for TEGAM Digital Thermometer, Serial Number T-257196  
Report of Calibration for Keithley Digital Thermometer, Serial Number T-12463  
UT Examination Report R-049, Pipe to Elbow Weld, Component ID: DSRHR-3-04  
UT Examination Report R-085, Nozzle to Shell Weld, Component ID: N3D-NV  
VT Examination Report R-033, Pipe Support, Component ID: 3-478400-099  
VT Examination Report R-069, Variable Spring Can, Component ID: RHR-3-H-1  
Welder Qualification Records for C. Brock, K. Davenport, J. Gautney, C. Hill, C. Lindsey,  
J. Parker, S. Laird, and E. Woods  
Weld Map and Data Sheets for WOs 117544712 and 117656145  
Welding Procedure Qualification Record GTA 88-0-1, Gas Tungsten Arc Welding, dated  
December 29, 1978  
Welding Procedure Qualification Record GTA 88-0-5, Gas Tungsten Arc Welding, dated  
April 15, 2004  
WO 117544712, HPCI Mod per DCN 71865, Valve 73-23 and 73-603 to be Relocated  
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#### IP 71111.11

#### Procedures

3-AOI-3-1, Loss of Reactor Feedwater or Reactor Water Level High/Low, Revision 12  
3-AOI-1-1, Relief Valve Stuck Open, Revision 14  
NPG-SPP-17.8.4, Conduct of Simulator Operations, Revision 4

BFN-ODM-4.20, Strategies for Successful Transient Mitigation, Revision 4  
3-GOI-100-1A, Unit Startup, Revision 116  
0-TI-248, Station Reactor Engineer, Revision 113  
NPG-SPP-10.4, Reactivity Management Program, Revision 6  
3-GOI-100-12A, Unit Shutdown from Power Operation to Cold Shutdown and Reductions in Power During Power Operations, Revision 61  
3-SR-3.4.9.1(1), Reactor Heatup and Cooldown Rate Monitoring, Revision 26  
3-OI-47, Turbine-Generator System, Revision 11  
1-GOI-100-1A, Unit Startup, Revision 48

Other Documents

OPL175S055, SRV Fails Open, HPCI inadvertent actuation, 3B 4kV Unit Board Trip, ATWS with MSIVs Open, Revision 0

IP 71111.12

Procedures

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

Other Documents

System Health Report for System 575 4kV AC Power Distribution, U1/2&3 Function 575-B, C & E 4kV Power Supply Busses Sys (a)(1) Plan, Revision 11, Effective October 27, 2017  
Functional failure and Unavailability data for System 575 through February 2018

IP 71111.13

Procedures:

BFN-ODM-4.18 Protected Equipment, Revision 17  
NPG-SPP-09.11.1 Equipment Out of Service Management, Revision 12  
0-TI-248, Reactor Engineer, Revision 113  
3-OI-47, Turbine-Generator System, Revision 111  
MSI-0-000-LFT001, "Lifting instructions for the control of heavy loads," Revision 0074  
FSAR Appendix C, Structural Qualifications of Subsystems and Components, C.8, Control of Heavy Loads  
1-POI-200.5, Operations with Potential for Draining the Reactor Vessel/Cavity, Revision 8  
3-POI-200.5, Operations with Potential for Draining the Reactor Vessel/Cavity, Revision 0017  
NPG-SPP-10.6, Infrequently Performed Test or Evolutions, Revision 1  
MCI-0-085-CRD001, Control Rod Drive Removal and Installation, Revision 0061  
0-OI-57A, Switchyard and 4160V AC Electrical System, Revision 163

Drawings:

3-47E610-47-1, Mechanical Control Diagram Turbine, Revision 6  
3-47E610-47-4, Mechanical Control Diagram Turbine, Revision 21  
3-9952-582, Diagram Main Turbine Control Wiring, Revision A

Other Documents:

CR 1292238  
Operator logs from May 4, 2017 through May 5, 2017  
Protected equipment list May 05, 2017

Equipment Apparent Cause Evaluation for PER 959856  
CR 1379519  
Clearance 3-TO-2018-0001 Section 3-001-0004  
OPL171.228, Electro-Hydraulic Control Logic, Revision 6  
OPL171.230, Electro-Hydraulic Control (EHC) System: Hydraulics, Revision 4  
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