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

August 9, 2018

EA-18-101

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 – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 05000259/2018002, 05000260/2018002 AND 05000296/2018002, AND APPARENT VIOLATION

Dear Mr. Shea:

On June 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Nuclear Plant, Units 1, 2, and 3. On July 20, 2018, the NRC inspectors discussed the results of this inspection with Mr. Lang Hughes and other members of your staff. The results of this inspection are documented in the enclosed report.

The enclosed inspection report discusses a finding with an associated apparent violation of 10 CFR 50.48(c)(3)(ii) “Fire Protection” for the failure to perform a required analysis using the methodology in Chapter 2 of NFPA 805 for the RHRSW piping as a result of a postulated fire scenario for which the NRC has not yet reached a preliminary significance determination. As described in the Inspection Results Section 71153 of the enclosed report, the finding is related to an unanalyzed condition associated with a fire-induced spurious opening of the Residual Heat Removal Service Water (RHRSW) outlet valves on the Residual Heat Removal (RHR) heat exchangers. A subsequent restart of RHRSW pumps could then cause a water-hammer which might damage the piping. The finding does not present an immediate safety concern as your staff has taken immediate compensatory actions that will remain in place until final corrective actions can be implemented.

We intend to complete and issue our final safety significance determination within 90 days from the date of this letter. The NRC’s significance determination process (SDP) is designed to encourage an open dialogue between your staff and the NRC; however, neither the dialogue nor the written information you provide should affect the timeliness of our final determination. We ask that you promptly provide any relevant information that you would like us to consider in making our determination. We are currently evaluating the significance of this finding and will notify you in a separate correspondence once we have completed our preliminary significance review. You will be given an addition opportunity to provide additional information prior to our final significance determination unless our review concludes that the finding has very low safety significance (i.e., Green).

NRC inspectors documented one finding which was determined to be of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. Additionally, NRC inspectors documented one Severity Level IV violation with no associated finding. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. 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 the 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 the Browns Ferry Nuclear Plant.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 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:
IIR 05000259/2018002, 05000260/2018002
and 05000296/2018002

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SUBJECT: BROWNS FERRY NUCLEAR PLANT – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 05000259/2018002, 05000260/2018002 AND 05000296/2018002, AND APPARENT VIOLATION August 9, 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 Nos.:	05000259/2018002, 05000260/2018002, AND 05000296/2018002
Enterprise Identifier:	I-2018-002-0031
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, 2018 through June 30, 2018
Inspectors:	T. Stephen, Senior Resident Inspector A. Ruh, Acting Senior Resident Inspector M. Kirk, Resident Inspector S. Monarque, Acting Resident Inspector N. Hobbs, Resident Inspector S. Sanchez, Senior Emergency Preparedness Inspector C. Fontana, Emergency Preparedness Inspector J. Walker, Emergency Preparedness Inspector (In Training) A. Nielsen, Senior Health Physicist W. Pursley, Health Physicist
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 and an emergency preparedness program inspection 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 tracking items are summarized in the tables below.

List of Findings and Violations

HPCI System Over Pressurization due to Failure to Maintain Procedure			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000259, 260, 296/2018-002-01 Closed	[P.3] - Resolution	71152
A self-revealed, Green, NCV of 10 CFR 50, Appendix B, Criterion V Instructions, Procedures, and Drawings was identified for failure to maintain procedure 2-SR-3.8.4.3(MB-2) Revision 11, "Main Bank 2 Battery Service Test". Specifically, the licensee failed to evaluate the impact of an emergent, Unit 2 procedure revision to a step intended to mitigate over pressurizing Unit 1 High Pressure Coolant Injection (HPCI) system.			

Inoperable Residual Heat Removal (RHR) Pump Results in Condition Prohibited by Technical Specifications			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000296/2018-002-02 Closed	Not applicable	71153
A self-revealed SL IV NCV of TS 3.5.1 and 3.6.2.3 was identified when the licensee discovered that the 3A RHR pump was inoperable for longer than the allowed outage time and follow on action completion time.			

Failure to analyze for a Water Hammer event due to Spurious Operation of Residual Heat Removal Service Water (RHRSW) Valves during a Fire Event			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	TBD AV 05000259, 260, 296/2018-002-03 Open	None	71153
An Apparent Violation (AV) of 10 CFR 50.48(c)(3)(ii) was identified for the failure to perform a required analysis using the methodology in Chapter 2 of NFPA 805 for the RHRSW piping as a result of a postulated fire scenario.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000260/2017-004-00	Main Steam Relief Valves Lift Settings Outside of Technical Specification Required Setpoints	71153	Closed
LER	05000296/2017-001-00	Inoperable Residual Heat Removal Pump Results in Condition Prohibited by Technical Specifications	71153	Closed
LER	05000259/2018-001-00	Fire Damage to Cables for Residual Heat Removal Service Water Valves Could Result in Water Hammer and Piping Damage	71153	Closed
LER	05000259/2018-002-00	Automatic Reactor Scram Due to an Unanticipated Electro-Hydraulic Control Logic Condition	71153	Closed
LER	05000296/2018-001-00	Separated Pressure Switch Sensing Line Causes Unit 3 Scram	71153	Closed
LER	05000259/2018-003-00	Unanalyzed Condition due to an Incorrectly Wired Breaker on Emergency Equipment Cooling Water Pump	71153	Closed
AV	05000259/260/296/2018-02-03	Failure to Analyze for a Water Hammer event due to Spurious Operation of Residual Heat Removal Service Water (RHRSW) Valves during a Fire Event	71153	Open

PLANT STATUS

Unit 1 operated at 100 percent rated thermal power (RTP) for the duration of the inspection period.

Unit 2 operated at 100 percent RTP until May 7, 2018 when the plant was shut down to repair a leaking Safety Relief Valve (SRV). The plant was restarted on May 11, 2018, and returned to 100 percent RTP on May 12, 2018, where it remained for the remainder of the inspection period except for 1 unplanned downpower to 78 percent on May 21, 2018, due to a degraded main condenser vacuum condition.

Unit 3 began the inspection period in a refueling outage. The unit was restarted on April 6, 2018, and was in power ascension associated with their approved Extended Power Uprate (EPU) schedule for the remainder of the quarter.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." 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

Summer Readiness (1 Sample)

The inspectors evaluated summer readiness of offsite and alternate alternating current (AC) power systems on June 5, 2018 through June 8, 2018.

Impending Severe Weather (1 Sample)

The inspectors evaluated readiness for impending adverse weather conditions for severe thunderstorm warning and tornado watch on June 22, 2018.

71111.04 - Equipment Alignment

Partial Walkdown (4 Samples)

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

(1) Unit 1 and Unit 2, A and B Emergency Diesel Generators (EDG) including Emergency Equipment Cooling Water (EECW) alignment on April 10, 2018
(2) Unit 3 RHR Loop I on May 17 and 18, 2018 while Loop II was inoperable for maintenance
(3) Common EECW system alignment on May 15, 22, and 23, 2018 while B3 EECW Pump was inoperable
(4) A and B Supplemental Diesel Generators including Emergency High Pressure Makeup (EHPM) pump system alignment on May 1, 2018

Complete Walkdown (1 Sample)

(1) The inspectors evaluated system configurations during a complete walkdown of the Main Bank 2 Battery system on April 24, 2018.

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (6 Samples)

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

(1) Compartment 25-1, Units 1, 2, and 3, B and D RHRSW Pump Rooms on April 13, 2018
(2) Reactor Building Unit 1 Electric Board Room 1B, Fire Area 04 on May 21, 2018
(3) Unit 3 Auxiliary Instrument Room, Fire Area 16-O on May 8, 2018
(4) Compartment 17, Unit 1 Battery and Battery Board Room on May 22, 2018
(5) Cable Spreading Room A, Fire Area 16-A on May 24, 2018
(6) Control Rooms, Units 1, 2, and 3, Fire Area 16-A on June 28, 2018

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated a licensed operator requalification simulator training scenario for the Group 1 operating crew on the Unit 2 Simulator involving a stuck open main steam relief valve, Anticipated Transient without Scram (ATWS), earthquake and torus pipe break on May 1, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated Unit 3 combined intermediate valve manipulations for Electro-Hydraulic Control (EHC) system troubleshooting on April 25, 2018. Inspectors also observed Unit 3 power ascension and operation above the previous license thermal power limit on May 22, 29, June 19, 2018. Inspectors reviewed flow induced vibration data acquired at the 91.9%, 96.2% and 100% power levels.

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 including one sample related to quality control:

(1) Unit 1 and 2, B EDG maintenance during planned extended outage on April 24, 2018.
(2) Unit 2, Quality Control related to SRV, 2-PCV-001-0041, and Pilot valve replacement during forced outage due leak by of the SRV

71111.13 - Maintenance Risk Assessments and Emergent Work Control (3 Samples)

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

(1) Planned risk, associated with inoperable Main Bank Battery 2 and Battery Board 2 on April 15, 2018
(2) Emergent work associated with unplanned Unit 1 HPCI inoperability during Main Bank Battery 2 outage on April 17, 2018
(3) Unit 1 and Unit 2, Planned risk and designated protected equipment in accordance with station procedures associated with extended maintenance outage for B Diesel Generator on April 25, 2018

71111.15 - Operability Determinations and Functionality Assessments (7 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Unit 1 and 2, Impact on B EDG operability and technical specifications with Temporary Diesel Generator block heater not operating as expected and lowering trend on battery voltage on April 29, 2018 (CRs 1408583, 1409826)
(2) Unit 2, Impact of SRV leakage on valve set point and operability (CRs 1390056, 1409286)
(3) Unit 1 cooling water components for HPCI system had erratic performance and leakage during October 13, 2017 surveillance test (CR 1347736)
(4) Unit 1 and 2, Prompt determination of operability for B EDG after abnormal wear was discovered on exhaust cam shaft lobes during April 23, 2018 diesel outage (CR 1409253)
(5) Unit 2 RHR operability with Minimum Flow Valve failed open due to fuse failure (CRs 1323697, 1418018)
(6) Unit 2 Technical Specification SR 3.6.1.2.2; Verification of containment air lock door interlock during Unit 2 outage May 9, 2018 (CR1414297)
(7) Unit 1, Past Operability Evaluation of HPCI due to a water side leak from the gland seal condenser on June 4, 2018 (CR 1406178)

71111.19 - Post Maintenance Testing (5 Samples)

The inspectors evaluated the following post maintenance tests:

(1) Unit 3 EHPM pump Reactor Pressure Vessel (RPV) Injection test on April 9, 2018
(2) Unit 2 SRV Solenoid Valve 2-PCV-1-41, Main Steam Line D SRV, on May 14, 2018
(3) Unit 1 and 2, Post maintenance testing following an extended outage on B EDG for a six year inspection and maintenance on May 3, 2018
(4) Unit 2 HPCI Valve 2-FCV-73-16, HPCI Turbine Steam Supply Valve on May 21, 2018
(5) Various Unit 3 integrated systems testing per 3-TI-700, 3-TI-130 and 3-TI-131 at extended power uprate conditions from April 8, to June 30, 2018

71111.20 - Refueling and Other Outage Activities (2 Partial Samples)

The inspectors evaluated refueling outage U3R18 activities from April 1, 2018 through April 6, 2018. The inspectors completed inspection procedure section 03.01.e.1.

The inspectors evaluated the Unit 2 planned mid-cycle outage activities from May 7, 2018 through May 12, 2018. The inspectors completed inspection procedure sections 03.01.c, d.6, and e.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (1 sample)

(1) 1, 2, and 3-SR-3.4.6.1, Dose Equivalent Iodine-131 sample for Units 1, 2 and 3 on June 20, 2018

In-service (2 Samples)

(1) 3-SI-4.4.A.1, Unit 3 Standby Liquid Control (SLC) Pump Functional Test on May 1, 2018
(2) 0-TI-345 (EECW), EECW Pump Curve Data Acquisition on May 15, 16, 21 and 25, 2018

EMERGENCY PREPAREDNESS

71114.02 - Alert and Notification System Testing (1 Sample)

The inspectors evaluated the maintenance and testing of the alert and notification system on April 23 through 27, 2018.

71114.03 - Emergency Response Organization Staffing and Augmentation System (1 Sample)

The inspectors evaluated the readiness of the Emergency Response Organization on April 23 through 27, 2018.

71114.04 - Emergency Action Level and Emergency Plan Changes (1 Sample)

The inspectors evaluated submitted Emergency Action Level and Emergency Plan changes on April 23 through 27, 2018. This evaluation does not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness (1 Sample)

The inspectors evaluated the maintenance of the emergency preparedness program on April 23 through 27, 2018.

71114.06 - Drill Evaluation

Emergency Planning Drill (1 Sample)

The inspectors evaluated an emergency preparedness training drill on May 2, 2018.

RADIATION SAFETY

71124.06 - Radioactive Gaseous and Liquid Effluent Treatment

Walk Downs and Observations (1 Sample)

The inspectors evaluated the licensee's radioactive gaseous and liquid effluent treatment systems during plant walkdowns.

Calibration and Testing Program (Process and Effluent Monitors) (1 Sample)

The inspectors evaluated the licensee's gaseous and liquid effluent monitor instrument calibration and testing.

Sampling and Analyses (1 Sample)

The inspectors evaluated radioactive effluent sampling and analysis activities.

Instrumentation and Equipment (1 Sample)

The inspectors evaluated radioactive effluent instrumentation and equipment.

Dose Calculations (1 Sample)

The inspectors evaluated dose calculations.

71124.07 - Radiological Environmental Monitoring Program

Site Inspection (1 Sample)

The inspectors evaluated the licensee's radiological environmental monitoring program.

Groundwater Protection Initiative Implementation (1 Sample)

The inspectors evaluated the licensee's groundwater monitoring program.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The Resident inspectors verified licensee performance indicators submittals listed below for the period from April 1, 2017, through March 31, 2018. (9 Samples)

(1) Units 1, 2, and 3 Mitigating Systems Performance Index (MSPI) for High Pressure Injection System
(2) Units 1, 2, and 3 MSPI for Heat Removal System
(3) Units 1, 2, and 3 Safety System Functional Failures

The Emergency Preparedness inspectors verified licensee performance indicators submittals listed below for the period from April 1 through December 31, 2017. (3 Samples)

(1) EP01: Drill & Exercise Performance (1 Sample)
(2) EP02: Emergency Response Organization Drill Participation (1 Sample)
(3) EP03: Alert & Notification System Reliability (1 Sample)

The radiation protection inspectors verified licensee performance indicators submittals listed below for the period from January 1, 2017, through March 31, 2018. (1 Sample)

(1) PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences (1 Sample)

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (1 Sample)

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

(1) Unit 1 HPCI Pump Suction Over Pressurization during Main Bank 2 Battery Test

Semi-Annual Trend (1 Sample)
The inspectors review for licensee trends included a review of the daily operator logs, several of their trend Condition Reports (CRs), and a review of the daily plant status from January 1 to June 30, 2018. The inspectors understood the trends identified by the licensee and did not identify any additional trends.

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

Events (1 Sample)

The inspectors evaluated response to the following event:

Notice of Unusual Event due to Toxic Gas (CO_2) in the Unit 1 and 2 EDG Building on June 20, 2018

Licensee Event Reports (6 Samples)

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

(1) LER 05000260/2017-004-00, Main Steam Relief Valves Lift Settings Outside of Technical Specification Required Setpoints
(2) LER 05000296/2017-001-00, Inoperable Residual Heat Removal Pump Results in Condition Prohibited by Technical Specifications
(3) LER 05000259/2018-001-00, Fire Damage to Cables for Residual Heat Removal Service Water Valves Could Result in Water Hammer and Piping Damage
(4) LER 05000259/2018-002-00, Automatic Reactor Scram Due to an Unanticipated Electro-Hydraulic Control Logic Condition
(5) LER 05000296/2018-001-00, Separated Pressure Switch Sensing Line Causes Unit 3 Scram
(6) LER 05000259/2018-003-00, Unanalyzed Condition due to an Incorrectly Wired Breaker on Emergency Equipment Cooling Water Pump

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

71004 - Power Uprate

Summary of Power Uprate Inspection Samples Contained in this Report:

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

(1) Power ascension above previous thermal power limit and flow induced vibration data reviews (Section 71111.11)

Monitor Major Integrated Tests (Unit 3) (1 Sample)

(1) Various Unit 3 integrated systems testing per 3-TI-700, 3-TI-130, and 3-TI-131 at extended power uprate conditions from April 8, to June 30, 2018 (Section 71111.19)

INSPECTION RESULTS

71152 - Problem Identification and Resolution

Failure to Establish Procedures to prevent Over Pressurizing the HPCI System			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000259/2018002-01 Closed	[P.3] - Resolution	71152 - Annual Follow-up of Selected Issues

Introduction: A self-revealed, Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for failure to establish procedures appropriate to the circumstances to preclude over pressurizing the High Pressure Coolant Injection (HPCI) system. Specifically, the licensee failed to ensure surveillance procedures 1-SR-3.8.4.3(MB-1), "Main Bank 1 Battery Service Test"; 2-SR-3.8.4.3(MB-2), "Main Bank 2 Battery Service Test"; and 3-SR-3.8.4.3(MB-3), "Main Bank 3 Battery Service Test" were adequate to prevent an over pressurization event.

Description: On April 16, 2018, Unit 2 was performing 2-SR-3.8.4.3(MB-2) Revision 10. During that test, a procedural error in a step was identified that operated Unit 1 HPCI valves. The intent of the step is to mitigate the potential for a known over pressure event of HPCI system piping when the HPCI injection valve is repositioned to support battery surveillance testing. The licensee made an emergent procedure change which removed the step in question rather than reword it. The test resumed following the procedure change. While opening the HPCI injection valve, a pressure pulse on the HPCI system occurred and the alarm for high HPCI suction pressure came in. Unit operators responded per the alarm response procedure (ARP) and closed the injection valve. The system pressure lowered and the alarm cleared. The resulting pressure pulse caused a leak on the gland seal condenser (GSC) that flooded the HPCI room to approximately 4 inches. The licensee entered the appropriate emergency operating instruction (EOI) and isolated the leak. As a result, HPCI was declared inoperable due to the system being isolated for the flooding. The licensee determined the source of the leak to be the supply from the condensate storage tank. The GSC was repaired and HPCI was declared operable on April 20, 2018.

The inspectors reviewed system data, logs and documentation dating back to January 1, 2014 for each of the units to see if similar pressure spikes had occurred in the past when performing this procedure and cycling the HPCI valve. The inspectors observed several instances when pressure increases occurred when the HPCI valve was repositioned.

Corrective Action(s): The licensee is revising all procedures that open the HPCI injection valves for all three units and equivalent valves as a part of an extent of condition. Currently, corrective actions are in place to prevent opening the valves without a relief path.

Corrective Action Reference(s): Condition Report (CR) 1406178

Performance Assessment:
Performance Deficiency: The failure to ensure surveillance procedures 1-SR-3.8.4.3(MB-1), 2-SR-3.8.4.3(MB-2), and 3-SR-3.8.4.3(MB-3) were adequate to prevent an over pressurization event was a performance deficiency.

Screening: The performance deficiency was more than minor because if left uncorrected, the performance deficiency could result in a more significant safety concern. Specifically, the failure to evaluate and maintain the surveillance procedures could result in the HPCI system being over pressurized which could damage the system or challenge its ability to perform its specified safety function. 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 of the HPCI system, but it maintained its operability.

Cross Cutting Aspect: The performance deficiency had a cross cutting aspect of Resolution in the area of Problem Identification and Resolution because operations and engineering did not take the time to take effective corrective action to address the issue in a timely manner commensurate with its safety significance.

Enforcement:
Violation: 10 CFR Part 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by procedures of a type appropriate to the circumstances. Contrary to the above, the licensee did not ensure that activities affecting quality were prescribed by procedures of a type appropriate to the circumstances. Specifically, the licensee failed to ensure surveillance procedures 1-SR-3.8.4.3(MB-1), 2-SR-3.8.4.3(MB-2), and 3-SR-3.8.4.3(MB-3), were adequate to prevent an over pressurization event similar to the event described above which resulted in a leak from the GSC due to a pressure pulse.

Enforcement Actions: This violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy.

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

Inoperable Residual Heat Removal (RHR) Pump Results in Condition Prohibited by Technical Specifications			
Cornerstone	Severity	Cross-cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000296/2018-002-02 Closed	Not applicable	71153
A self-revealed SL IV NCV of TS 3.5.1 and 3.6.2.3 was identified when the licensee discovered that the 3A RHR pump was inoperable for longer than the allowed outage time and follow on action completion time.			

Description: The LER was associated with the 3A RHR pump failing to start on September 1, 2017, due to failure of the pump breaker to close, which prevented automatic and manual starting of the pump. This was discovered during a quarterly flowrate surveillance. The licensee determined that the direct cause of the failure was that Procedure EPI-0-000-BKR015, '4kV Wyle/Siemens Horizontal Vacuum Circuit Breaker (Type-3AF) and Compartment Maintenance,' Revision 43 was revised to include steps to secure the breaker's mounting hardware, which caused internal binding of the indication flag. This prevented the closing spring of the breaker from charging and the breaker from closing on demand. As a result, automatic start of the 3A RHR pump was prevented. The licensee determined that the 3A RHR pump was inoperable from July 26, 2017 to September 1, 2017. The inspectors

reviewed the licensee event report and determined that the report adequately documented the summary of the event including the cause of the event and potential safety consequences.

Corrective Action(s): The licensee inspected, lubricated, and tested the indication flag mounting bolt. The licensee also performed inspections of 43 risk significant safety related horizontal Wyle/Siemens Breakers to address common mode failure. The licensee found that the closing springs of the 43 breakers inspected were all charged as expected with no indication of common mode failure. The licensee revised Procedure EPI-0-000-BKR015 to inspect the indicating flag for freedom of movement.

Corrective Action Reference(s): CR 1334534

Performance Assessment:
Performance Deficiency: The NRC staff determined that the equipment failure could not have been avoided or detected by the licensee's quality assurance program or other related control measures. Thus, the issue of concern was not within TVA's ability to foresee and correct, and could not have been prevented. The breaker operated and tested satisfactorily for more than 4 years since the last maintenance activity that could have introduced the degraded condition. Additionally, the nature of the condition caused the breaker to incorrectly indicate that it was in a charged and ready condition which prevented prompt detection by operators.

Enforcement:
Severity: Traditional Enforcement is being used because there was no performance deficiency using the Interim Guidance for Dispositioning Severity Level IV Violations with No Associated Performance Deficiency (ML18158A220). This violation is characterized as a Severity Level IV NCV based on its similarity to a SLIV example 6.1.d.2 in the Enforcement Policy for a violation having a very low (Green) risk significance.

Violation: Browns Ferry Nuclear Plant, Unit 3 Technical Specifications (TS) Subsection 3.5.1, 'ECCS – Operating,' Condition A required that with one low pressure ECCS injection/spray system inoperable, that ECCS injection/spray system be restored to operable status within 7 days. Condition B required that if the required action and associated completion time of condition A could not be met that the unit be placed in Mode 3 in 12 hours and mode 4 in 36 hours. TS Subsection 3.6.2.3, 'Residual Heat Removal (RHR) Suppression Pool Cooling,' Condition A required that with one RHR suppression pool cooling subsystem inoperable, RHR suppression pool cooling subsystem be restored to operable status within 30 days. Condition D required that if the required action and associated completion time could not be met that the unit be placed in mode 3 in 12 hours and mode 4 in 36 hours. Contrary to the above, the 3A RHR pump was inoperable for 37 days from July 26, 2017 to September 1, 2017 and the unit did not enter mode 3 as required in 12 hours after exceeding the allowed outage time.

Enforcement Action(s): This violation is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to analyze for a Water Hammer event due to Spurious Operation of Residual Heat Removal Service Water (RHRSW) Valves during a Fire Event			
Cornerstone	Significance	Cross-cutting Aspect	Report Section

Mitigating Systems	TBD AV 259/260/296/2018-002-03 Open	None	71153 - Follow-up of Events
The licensee identified an Apparent Violation (AV) of 10 CFR 50(c)(3)(ii).			

Description:
On February 19, 2016, at 1235 Central Standard Time (CST), BFN personnel discovered a failure to consider Residual Heat Removal (RHR) Service Water (SW) water hammer in Fire Safe Shutdown (FSS) analyses. This condition affected the RHR heat exchangers (HX) in a postulated fire event. It was discovered that the RHRSW piping associated with the HXs in the National Fire Protection Association (NFPA) 805 Nuclear Safety Capability Analysis could experience water hammer. A legacy condition existed where RHR HXs were subject to voiding and water hammer due to a single spurious opening of the RHRSW outlet valve and subsequent manual or spurious start of a pump. Spurious opening of the valves was recognized and addressed for flow diversion, but the potential effects of water hammer were not addressed.

The Functional Evaluation (FE) for this condition contained a non-conservative evaluation error leading to the conclusion that heat exchangers deterministically credited for Decay Heat Removal (DHR) in the Appendix R and NFPA 805 analyses would not be impacted. In March 2018, the evaluation error was discovered as the result of a periodic review of degraded and non-conforming conditions.

Corrective Action(s): The licensee has established compensatory fire watch measures until plant modifications or further analysis can be completed.

Corrective Action Reference(s): Condition Reports (CR) 1139620 and 1397087

Performance Assessment:
Performance Deficiency: The failure to analyze the potential valve circuit damage due to a fire event which would lead to flow diversion and subsequent water hammer for a water hammer event due to a spurious operation of Residual Heat Removal Service Water (RHRSW) valves was a performance deficiency. Specifically, the license amendment request for NFPA 805 did not contain any analysis of a water hammer event. It only contained an analysis of the loss of flow due to spurious operation of RHRSW heat exchanger outlet valves which failed to consider the implications of spurious operation of equipment and the subsequent voiding of piping which provided the increased likelihood of a water-hammer event.

Screening: The performance deficiency was more than minor because it adversely effected the mitigating systems cornerstone objective of protecting against external hazards such as fires.

Significance: This AV is pending a final risk determination.

Cross Cutting Aspect: None. The PD occurred greater than 3 years ago during preparation of the NFPA 805 licensee amendment and is not indicative of current licensee performance.

Enforcement:
Violation: 10 CFR 50.48(c)(3)(ii) required, in part, the licensee to complete its implementation of the methodology in Chapter 2 of NFPA 805 (including all required evaluations and

analyses) and, upon completion, modify the fire protection plan. NFPA 805 Chapter 2, section 2.4.2.2.1, Circuits Required in Nuclear Safety Functions required, in part, that circuits required for the nuclear safety functions shall be identified. This includes circuits that are required for operation or that result in the mal-operation of the equipment identified. This evaluation shall consider fire-induced failure modes such as hot shorts (external and internal), open circuits, and shorts to ground, to identify circuits that are required to support the proper operation of components required to achieve the nuclear safety performance criteria, including spurious operation and signals.

Contrary to the above, from February 19, 2016 until March 16, 2018 the licensee failed to perform a required analysis using the methodology in Chapter 2 of NFPA 805 for the RHRSW piping as a result of a postulated fire scenario. Specifically, the licensee's nuclear safety performance criteria analysis did not evaluate the fire induced failure mode of spurious opening of the RHRSW outlet valves and subsequent voiding of piping which provided the increased likelihood of a water-hammer event.

Enforcement Action(s): This violation is being treated as an apparent violation (AV) pending a final significance (enforcement) determination.

Licensee Identified Non-Cited Violation	71153
LER 05000259, 260, 296/2018-003-00 identified a violation of 10 CFR 50.48(c)(4)(iii). This violation of very low safety significance was identified by the licensee and has been entered into the licensee corrective action program and is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: 10 CFR 50.48(c)(4)(iii) Fire Protection required, in part, that the licensee maintain fire protection defense in depth (post-fire safe shutdown capability). Contrary to the above, from October 28, 2015 until March 10, 2018, the C3 Emergency Equipment Cooling Water (EECW) pump did not have the Fire Protection Plan required backup control panel function. Significance/Severity: Using IMC 0609 Appendix F, the violation was screened to green following a risk analysis performed by the licensee that a NRC Senior Risk Analyst reviewed and agreed was correctly performed. Corrective Action Reference(s): CR 1394604	

EXIT MEETINGS AND DEBRIEFS

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

- On April 27, 2018, the Emergency Preparedness inspectors presented the emergency preparedness inspection results to Mr. Glen Pry and other members of the licensee staff.
- On June 22, 2018, the Radiation Protection inspectors presented the radiation protection inspection results to Mr. Lang Hughes and other members of the licensee staff.
- On July 13, 2018, the Resident inspectors presented an apparent violation of 10 CFR 50.48(c)(3)(ii) to Mr. Lang Hughes and other members of the licensee staff.
- On July 20, 2018, the quarterly resident inspector inspection results were presented to Mr. Lang Hughes and other members of the licensee staff.

DOCUMENTS REVIEWED

IP 71111.01

Procedures
0-AOI-57-1E, Grid Instability, Revision 11
0-OI-57A, Switchyard and 4160V AC Electrical System, Revision 163
0-GOI-200-3, Hot Weather Operations, Revision 15
0-GOI-200-3 Attachment 1, Hot Weather Remarks Log, Revision 15
0-GOI-200-3 Attachment 2, Hot Weather Operational Checklist, Revision 15
0-GOI-300-4, Switchyard Manual, Revision 106
0-GOI-300-1/ATT-12, Outside Operator Rounds Log, Revision 250
0-AOI-100-7, Severe Weather, Revision 43

Drawings
PIP 02-03, AC Electrical Distribution System Browns Ferry Nuclear Plant, Dated 7-21-2015

Other Documents
Hot Weather Discrepancy List dated June 5, 2018
WO 118800055
WO 119584337
WO 117524433
WO 115977579
WO 116836517
CR 1379651
Operation Logs for June 23, 2018

IP 71111.04

Procedures
0-GOI-300-1/ATT-5, Unit 1 Reactor Building Operator Round Logs, Revision 259
3-OI-74, Residual Heat Removal System, Revision 0128
3-OI-74, Residual Heat Removal System, Attachment 1, Valve Lineup Checklist Unit 3, Revision 88
3-OI-74, Residual Heat Removal System, Attachment 2, Panel Lineup Checklist, Revision 91
3-OI-74, Residual Heat Removal System, Attachment 3, Electrical Lineup Checklist, Revision 93
0-OI-83, Supplemental Diesel Generator System, Revision 2
0-OI-83/ATT-1, Attachment 1 Supplemental Diesel Generator Valve Lineup Checklist, Revision 0
0-OI-83/ATT-2, Attachment 2 Supplemental Diesel Generator System Panel Lineup Checklist, Revision 0
0-OI-83/ATT-3, Attachment 3 Supplemental Diesel Generator System Electrical Lineup Checklist, Revision 0

Drawings
1-47E859-1, Flow Diagram Emergency Equipment Cooling Water, Revision 98
2-47E859-1, Flow Diagram Emergency Equipment Cooling Water, Revision 36
0-47E861-5, Flow Diagram – Cooling System & Lubricating Oil System Standby Diesel Generator A, Revision 17
0-47E861-6, Flow Diagram – Cooling System & Lubricating Oil System Standby Diesel Generator A, Revision 15

3-47E811-1, Flow Diagram Residual Heat Removal System, Revision 67
0-47E610-83-1, Mechanical Control Diagram Supplemental Diesel Generator, Revision 0
0-47E610-83-2, Mechanical Control Diagram Supplemental Diesel Generator, Revision 1
3-45E722-1, Wiring Diagram 4160V EHPM Pump Power Schematic Diagram, Revision 0
3-45E722-2, Wiring Diagram 4KV EHPM BD 3 Transformer Feeder BKR Schematic Diagram, Revision 0
3-45E722-3, Wiring Diagram 4KV EHPM BD 3 Single Line Diagram, Revision 0
3-45E722-6, Wiring Diagram 4160V EHPM BD 3 Main BKR Schematic Diagram, Revision 0
3-45E722-7, Wiring Diagram 4160V EHPM BD 3 Alternate Breaker Schematic Diagram, Revision 0
3-45E721, Wiring Diagram 4160V Unit BD 3A, 3B, 3C Single Line, Revision 35
0-45E763-23, Wiring Diagram 4160V Unit Auxiliary Power Schematic Diagram, Revision 0

Other Documents
CR 1184994
CR 1252636
CR 1324110
CR 1332650
CR 1350366
CR 1351211
CR 1353355
CR 1375055
CR 1377619
CR 1407079
DCN 71582, Revision A, NFPA 805, Issue 35a – Supplemental Diesel Generators

IP 71111.05

Procedures
0-FSS-16-1, Control Building EL 593', 606', 617' and 635', Revision 10

Other Documents
Browns Ferry Fire Protection Report-Volume 2, Fire Protection Report Volume 2, Revision 59
Appendix R Penetration Seal Tabular Drawings EL. 593 Sections A-A, B-B, and Details
Appendix R Penetration Internal Conduit Seals Pressure/Smoke and Gas Seal
NFPA 805 Fire Protection Report, Revision 0
EDQ099920110010, NFPA 805 – Nuclear Safety Capability Analysis, Revision 45
NFPA 805 Fire Protection Requirements Manual, Revision 5
MDN0009992012000100, Browns Ferry Nuclear Power Plant, Units 1, 2, and 3, Fire Risk Evaluations, Revision 6

Drawings
Drawing 3-47W3392-315, Revision 67, Browns Ferry Nuclear Plant, Fire Protection – 10 CFR
Drawing 0-47W393-1, Revision 67, Browns Ferry Nuclear Plant, Fire Protection – 10 CFR
0-47E216-105, Ignition Source Drawings Plan El. 593.0 & 604.0, Revision 3

IP 71111.11

Procedures
NPG-SPP-17.8.4, Conduct of Simulator Operations, Revision 5
OPDP-1, Conduct of Operations, Revision 40
EPIP-1, Emergency Classification Procedure Event Classification Matrix, Revision 55
Troubleshooting Plan for WO 119534677, Revision 1
3-OI-47A, EHC System, Revision 38
3-TI-380, Power Ascension Turbine Valve Test, Revision 3
3-TI-701, EPU Vibration Monitoring, Revision 1
3-TI-130, Main Steam Pressure Control, Revision 3
3-TI-131, Feedwater Level Control System, Revision 6
3-TI-700, EPU Master Startup Test Instruction, Revision 5

IP 71111.12

Procedures
0-TI-346, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting - 10CFR50.65, Revision 51
0-SR-3.4.3.1.A, Bench Test Relief Valves – As Left, Revision 5
NPG-SPP-04.2, Material Receipt and Inspection, Revision 5

Other Documents
Functional failure and Unavailability data for System 082 through March 2018
System Monitoring Plan for Diesel Generators and Supporting Systems (018, 082, 086)
CR 1409253
CR 1407944
CR 1408598
WO 119528621
WO 119418985
WO 118099141
PEG package No. 1698478-BFNK0

IP 71111.13

Procedures:
BFN-ODM-4.18 Protected Equipment, Revision 18
2-SR-3.8.4.3(MB-2), Main Bank 2 Battery Service Test, Revision 0011
0-TI-576, Temporary Diesel Generator (TDG), Revision 15
0-SR-3.8.1.1, Temporary Diesel Generators Implementing Surveillance, Revision 26
NPG-SPP-07.3, Work Activity Risk Management Process, Revision 23

Drawings:
0-45E702-1, Wiring Diagram, Battery Board 2, Panel 1-7 Single Line
3-45E724-9, Wiring Diagram, 4160V Shutdown BD 3ED Single Line

Other Documents:
CR 1406178
CR 1408583

IP 71111.15

Procedures:
OPDP-8, Operability Determination Process and Limiting Conditions for Operation Tracking, Revision 24

Drawings:
1-47E812-1, Flow Diagram High Pressure Coolant Injection, Revision 46
47W335-9, High Pressure Coolant Injection Sys-Isometric, Revision 8
0-105E2694, Process Diagram High Pressure Coolant Injection System for 3458 MWT, Revision 1

Other Documents:
CR 1408583
CR 1414297
TS & TS Bases 3.6.1.2 and 3.8.1
ODMI for CR 1390056
NRC Inspection Report 05000333/2015007
Past Operability Evaluation for CR 1347736
TVA Central Laboratories Services Technical Report AU28955, dated November 20, 2017
Equipment Failure Investigation Checklist for CR 1347736
EN#53014
PDO for CR 1409253
WO 119559039
Technical Specification Bases 3.3.5.1
FSAR Section 6.5
NDQ0074880118, “Evaluation of LPCI Flow to Reactor Pressure Vessel (RPV) with Failed Open Min-Flow Bypass Valve,” Revision 6
NDQ099920100006, “Diesel Generator Frequency Variation Evaluation,” Revision 0
MDQ0074920113, “Documentation of RHR Pump Discharge Test Flow Rate and System Test Pressure,” Revision 0
2-GOI-200-2B, “Primary Containment Closeout,” Revision 0001
Past Operability Evaluation for CR 1406178

IP 71111.19

Procedures
3-OI-7, Emergency High Pressure Makeup System, Revision 1
PMTI-71673-002, Emergency High Pressure Makeup Pump RPV Injection Test, Revision 0
2-SR-3.4.3.2, Main Steam Relief Valves Manual Cycle Test, Revision 11
MPI-0—82-INS004, Standby Diesel Engine Six Year Inspection, Revision 66
0-PMTI-82-1(DG B), Diesel Generator B 2301A and DRU Setup & Tuning Instruction, Revision 3
0-PMTI-82-2(DG B), WO 119021718 PMT Diesel Generator B Monthly Operability Test with Large Load Reject, Revision 1
2-SR-3.6.1.3.5 (HPCI), HPCI System Motor Operated Valve Operability, Revision 38

Drawings
3-47E819-1, Emergency High Pressure Makeup Pump System Flow Diagram, Revision 2

Other Documents
WO 119021718
CR 1410665
CR 1410743
WO 119543701
WO 119524745

IP 71111.20

Procedures
3-GOI-100-1A, Unit Startup and Power Operation, Revisions 119 and 120
2-GOI-100-12A, Unit Shutdown from Power Operations to Cold Shutdown and Reductions in Power During Power Operations, Revision 0111
2-OI-74, Residual Heat Removal System, Revision 0181
2-GOI-100-1A, Unit Startup and Power Operation, Revision 170

IP 71111.22

Procedures
1-SR-3.4.6.1, Dose Equivalent Iodine-131 Concentration, Revision 7
2-SR-3.4.6.1, Dose Equivalent Iodine-131 Concentration, Revision 12
3-SR-3.4.6.1, Dose Equivalent Iodine-131 Concentration, Revision 9
CI 403, Reactor Building Sampling, Revision 90
3-SI-3.1.7.6, Standby Liquid Control System ATWS Equivalency Calculation for Newly Established Pump Flow Rate, Revision 1
0-TI-345(EECW), EECW Pump Curve Data Acquisition, Revision 5
0-TI-345(RHRSW), RHRSW Pump Curve Data Acquisition, Revision 6

Other Documents
WO 118065506
CR 1251754, 1405326, 1407532, 1404074

71114.02: Alert and Notification System Evaluation

Procedures and Reports
EPDP-8, Emergency Preparedness Quality Assurance, Revision 5
EPDP-10, Facilitation of the Alert and Notification System and Notification Tests, Revision 7
EPDP-14, Evaluation of Changes to Alert and Notification Systems (ANS), Revision 1
EPFS-9, Inspection, Service, and Maintenance of the Prompt Notification System (PNS) at Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants, Revision 10
NPG-SPP-18.3.5, Equipment Important to Emergency Response, Revision 7
Installation, Operation, & Service Manual for Models 2001-130, Equinox, & 508-128 Sirens, Revision A1 0516

Records and Data
Documentation of monthly siren testing for 2nd quarter 2016 to 4th quarter 2017
Documentation of bi-weekly siren tests for 2nd quarter 2016 to 4th quarter 2017
Siren Maintenance records: 2016 to 2017
2017 & 2018 Browns Ferry Emergency Planning Calendar mailer to members of the public in the 10-mile EPZ

FEMA REP-10 ANS Report for the Browns Ferry Nuclear Plant, Revision 6/14, dated 6/11/14
Letter to FEMA for 2016 siren operability data for Browns Ferry Nuclear Plant, dated 1/3/17
Letter to FEMA for 2017 siren operability data for Browns Ferry Nuclear Plant, dated 1/3/18

Corrective Action Program Documents (Condition Report)
CR 1167312, BFN-0-PNS-901-015 failed to report to morning poll
CR 1200727, BFN-0-PNS-901-040 failed to rotate during the monthly activation test on 8/8/16
CR 1221214, BFN-0-PNS-901-071 failed to rotate during the monthly activation test on 10/10/16
CR 1306169, BFN-0-PNS-901-080 failed to activate during monthly test

71114.03: Emergency Response Organization Staffing and Augmentation System

Procedures
NP-REP Appendix A, BFN – Radiological Emergency Plan, Revision 109
EPDP-3, Emergency Plan Exercises and Preparedness Drills, Revision 15
EPIP-2, Notification of Unusual Event, Revision 36
EPIP-3, Alert, Revision 40
EPIP-6, Activation and Operation of the Technical Support Center (TSC), Revision 38
EPIP-7, Activation and Operation of the Operations Support Center (OSC), Revision 34
TRN-30, Radiological Emergency Preparedness Training, Revision 38

Records and Data
Browns Ferry Nuclear Plant On-Shift Staffing Analysis Report, dated 7/10/14
Exercise Report Browns Ferry Augmentation Drill, dated 2/5/2018
Selected Qualification Records for Key Position ERO Personnel
Various EP staff and ERO member training records
EPDP-10, Rev. 7, Facilitation of the Alert and Notification System and Notification Tests (TEENS Test Performance Documentation, Attachment 2), dated 10/11/17
EPDP-10, Rev. 7, Facilitation of the Alert and Notification System and Notification Tests (TEENS Test Performance Documentation, Attachment 2), dated 1/5/17

Corrective Action Program Documents
CR 1248187, January 5, 2017 BFN Routine TEENS Test, the individuals failed to respond to the TEENS test
CR 1268177, ECNS phone in main control room failed to work during NOUE
CR 1280531, Adverse trend in TEENS Response

71114.04: Emergency Action Level and Emergency Plan Changes

Procedures
NP-REP TVA Nuclear Power Radiological Emergency Plan, Appendix C, Revision 108 & 109
TVA Generic Radiological Emergency Plan, Revision 107
EPDP-3, Emergency Plan Exercises and Preparedness Drills, Revision 15
EPDP-17, 10 CFR 50.54 (q) Evaluations of Emergency Plan Changes, Revision 6
NPG-SPP-18.3, Emergency Preparedness, Revision 15
NPG-SPP-22.300, Corrective Action Program, Revision 10
EPIP-1, Emergency Classification Procedure, Revision 54 & 55
TRN-30, Radiological Emergency Plan Training, Revision 38

Change Packages
BFN 2017-006, EPDP-17, Att. 2 Screening Evaluation Form for EPIP-3 Revision 40, EPIP-4 Rev. 39, & EPIP-5 Rev. 52, dated 3/7/17
BFN 2017-010 R1, EPDP-17, Att. 2 Screening Evaluation Form for EPIP-13, Revision 24, dated 10/3/17
BFN 2017-010 R1, EPDP-17, Att. 4 Effectiveness Evaluation Form for EPIP-13, Revision 24, dated 10/3/17
BFN 2017-011 R1, EPDP-17, Att. 2 Screening Evaluation Form for EPIP-13, Revision 24, dated 10/3/17
BFN 2017-011 R1, EPDP-17, Att. 4 Effectiveness Evaluation Form for EPIP-13, Revision 24, dated 10/3/17
BFN 2017-012 R1, EPDP-17, Att. 2 Screening Evaluation Form for EPIP-13, Revision 24, dated 2/2/18
BFN 2018-004, EPDP-17, Att. 2 Screening Evaluation Form for EPIP-1, Revision 55, dated 3/12/18
BFN 2018-004, EPDP-17, Att. 4 Effectiveness Evaluation Form for EPIP-1, Revision 55, dated 3/12/18
BFN 2018-005, EPDP-17, Att. 2 Screening Evaluation Form for EPIP-5 Revision 53, dated 3/19/18
CECC 2018-015, EPDP-17, Att. 2 Screening Evaluation Form for REP App. A Revision 109, dated 3/12/18
CECC 2018-015, EPDP-17, Att. 4 Effectiveness Evaluation Form for REP App. A Revision 109, dated 3/12/18

Corrective Action Program Documents
CR 1157129, EPIP-4 changes made with inadequate 10 CFR 50.54 (q) evaluation
CR 1164203, EPIP-2 changes made with inadequate 10 CFR 50.54(q) evaluations
CR 1166017, Conceptual change to EOI- C-4 has led to additional procedural errors in EPIPs
CR 1170978, NRC – Q1 2016 integrated inspection report – failure to adequately maintain EPIP-5
CR 1180166, NRC identified – during the 2016 BFN baseline inspection
CR 1189404, BFN has not submitted the summary of analysis for changes since October 2015
CR 1192010, EPIP-6 changes made with inadequate 10 CFR 50.54(q) evaluations
CR 1192018, EPIP-14 changes made with inadequate 10 CFR 50.54(q) evaluations
CR 1192010, EPIP-6 changes made with inadequate 10 CFR 50.54(q) evaluations
CR 1194366, EPIP-12 changes made with inadequate 10 CFR 50.54(q) evaluations
CR 1312372, NRC identified EPIP-13 revision log issue
CR 1312385, NRC identified PCR CECC EPIP-8 references
CR 1409301, PCR CECC EPIP-9 Attachment 8 inconsistencies (NRC-identified)

71114.05: Maintenance of Emergency Preparedness

Procedures
CECC EPIP-1, Central Emergency Control Center (CECC) Operations, Revision 64
CECC EPIP-4, Operations Duty Specialist Procedure for SAE, Revision 46
CECC EPIP-5, Operations Duty Specialist Procedure for GE, Revision 51
CECC EPIP-8, Dose Assessment Staff Activities During Nuclear Plant Radiological Emergencies, Revision 46
EPDP-3, Emergency Plan Exercises & Preparedness Drills, Revision 15
EPDP-11, Emergency Preparedness Performance Indicators, Revision 8
EPDP-17, NPG Emergency Plan Effectiveness Review, Revision 6

EPDP-22, Central Emergency Control Center Setup Relocation, Revision 0
EPIP-1, Emergency Classification Procedure, Revision 55
EPIP-4, Site Area Emergency, Revision 39
EPIP-5, General Emergency, Revision 53
EPIP-6, Activation of the Technical Support Center (TSC), Revision 38
EPIP-7, Activation of the Operational Support Center (OSC), Revision 34
EPIP-13, Dose Assessment, Revision 24
NPG-3.18, Conduct of Quality Assurance Assessment, Revision 7
NPG-SPP-3.19, Conduct of Quality Assurance Internal Audits, Revision 7
NPG-SPP-3.22, Quality Assurance Periodic Reports, Revision 5
NPG-SPP-18.3, Emergency Preparedness, Revision 15
NPG-SPP-18.3.5, Equipment Important to Emergency Response, Revision 7
NPG-SPP-18.3.7, Alternate Facility Activity and Operation, Revision 2
NPG-3.19, Conduct of Quality Assurance Internal Audits, Revision 7
NPG-SPP-22.102, NPG Self-Assessment and Benchmarking Programs, Revision 4
NPG-SPP-22.300, Corrective Action Program, Revision 10
NPG-SPP-22.600, Issue Resolution, Revision 3
NP-REP TVA Nuclear Power Radiological Emergency Plan, Appendix C, Revision 109
TVA Generic Radiological Emergency Plan, (Appendix A- BFN) Revision 107

Records and Data
2016 10 CFR 50.54(t) Site Audit Report SSA1612, dated 10/31/16 to 11/4/16
Annual Population Update, ARCADIS memo to Walt Lee, dated 11/23/16
Annual Population Update, ARCADIS memo to Walt Lee, dated 12/9/17
BFN Pass Drill Report, dated 11/30/16
BFN-EP-SSA-17-001, Snapshot Self-Assessment Report, dated 3/27/17 to 3/31/17
BFN-EP-SSA-16-002, Snapshot Self-Assessment Report, dated 5/9/16 to 5/27/16
BFN Augmentation Drill, dated 8/30/17
Drill Report for BF Training Drill, dated 7/13/16
ETE for BFN Plume Exposure Pathway Emergency Planning Zone, dated 8/13
Equipment Important to Emergency Response (EITER) sample of maintenance records from 4/1/16 to 3/12/18
Exercise Report for BF Augmentation Drill 7/13/16
NOUE Actual Event Report BFN, dated 4/6/16
NOUE 3/13/17 Actual Event Report Browns Ferry 3/13/17
NOUE 3/13/17 Actual Event Report Browns Ferry 3/7/18
QA-BF-16-022, Emergent Assessment of Emergency Preparedness BFN Plant, dated 11/15/16 to 12/20/16
QA-BF-17-003, Emergency Preparedness Drill BFN Plant, dated 1/25/17
QA-BF-17-014, Emergency Preparedness Drill and Exercise Assessment, BFN, dated 5/23/17 to 5/24/17

Corrective Action Documents
CR 1159943, On Wednesday, April 6, 2016, BFN Operators did not declare an NOUE
CR 1163146, EPIP13 Changes made with inadequate 10CFR50.54 (q) evaluations
CR 1167934, Emergency Response equipment missing appropriate Q-codes
CR 1172144, Failure to respond to a routine TVA enterprise emergency notification system
CR 1173006, MIG reported 46M wind speed MET data erratic
CR 1175377, BFN-EP-SSA-16-002, DEP failure during the April 6th missed NOUE
CR 1180169, During the 2016 BFN NRC baseline inspection, one of two control books were the wrong revisions

CR 1181337, CR to document 8 hr. report to NRC (EN 52004) on 6/13/16 @ 2213 EDT
CR 1189508, Inaccurate procedure information led to unnecessary NRC event report
CR 1190518, QA PDS for ERO muster attendance
CR 1229301, QA identified the following EP procedure deficiency during SSA1612
CR 1292179, SED failed to classify General Emergency within 15 minutes
CR 1305792, Meter wind direction and speed are showing blue data on ICS
CR 1306346, Met data for 91M wind speed and direction is bad
CR 1367002, Intermittent 91M wind data missing (Dec 8th, 9th, and 10th)
CR 1393790, Error found in EPIP-5, General Emergency, Appendix A
CR 1394652, Misaligned sensor at BFN 91 meters
CR 1406803, TSC Technical Assessment Team Leader placed on active duty list was not qualified
CR 1409305, REP van contained wrong revision of CECC EPIP-17 (NRC-identified)

71114.06 - Drill Evaluation

Procedures
EPIP-1, Emergency Classification Procedure, Revision 55

Other Documents
2018 BFN May 2 Training Drill Package

Section 2RS6: Radioactive Gaseous and Liquid Effluent Treatment

Procedures, Guidance Documents and Manuals
Offsite Dose Calculation Manual, Revision 24

Records and Data
2016 and 2017 Annual Radioactive Effluent Release Reports
Work Order 117444727, Main Stack Monitor System Calibration, 12/8/16
Work Order 118058071, Main Stack Monitor System Functional Test, 10/26/17
Work Order 117444541, Liquid Radwaste Monitor Calibration and Flow Test, 1/20/17
Work Order 117929200, SBGTS Iodine Removal Efficiency, 5/3/17
Work Order 118447168, Airborne Effluent Release Rate by Manual Sampling When a Gaseous Effluent Monitor is OOS, 1/27/17
Certificate of Calibration, Standard Radionuclide Source, 22688-135, Co-60 Button Source
Gaseous Radioactive Waste Release Permit 180332.031.020.G
Liquid Radioactive Waste Release Permit 180037.094.001.L

Section 2RS7: Radiological Environmental Monitoring Program (REMP)

Procedures and Guidance Documents
Offsite Dose Calculation Manual, Revision 24
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