



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET, SW, SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

August 7, 2008

Mr. William R. Campbell, Jr.  
Chief Nuclear Officer and Executive Vice President  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

**SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC INTEGRATED INSPECTION  
REPORT 05000259/2008003, 05000260/2008003 AND 05000296/2008003**

Dear Mr. Campbell:

On June 30, 2008, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Nuclear Plant, Units 1, 2, and 3. The enclosed inspection report documents the inspection results which were discussed, on July 2 and 17, 2008, and on August 4, 2008, with Mr. Rusty West and Mr. Steve Douglas and Mr. James Emens, respectively, and with other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

In addition to the routine Reactor Oversight Process baseline inspections for all three units, the inspectors continued to conduct augmented inspections on Unit 1 as delineated in NRC letters dated May 16 and December 6, 2007. These Unit 1 augmented inspections were conducted to compensate for the lack of valid data for certain Performance Indicators (PIs). These additional inspections were only considered to be an interim substitute for the invalid Unit 1 PIs until complete and accurate PI data is developed and declared valid. However, since Unit 1 startup on May 22, 2007, the PIs in the Initiating Events and Barrier Integrity cornerstones, and the Safety System Functional Failure PI of the Mitigating Systems cornerstone, have since become valid as acknowledged by the Tennessee Valley Authority letter dated January 7, 2008. Consequently, the only PIs that remained invalid, and thereby subject to the augmented baseline inspection, were the Mitigating Systems Performance Index PIs.

This report documents two self-revealing and one NRC-identified findings which were determined to involve a violation of NRC requirements. However, because these three findings were of very low safety significance and were entered into your corrective action program, the NRC is treating these violations as non-cited violations (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest any NCV in the enclosed report, you should provide

a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Senior Resident Inspector at the Browns Ferry Nuclear Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if any, will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Eugene F Guthrie, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000259/2008003, 05000260/2008003 and 05000296/2008003  
w/Attachment: Supplemental Information

cc w/encl.: (See page 3)

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Letter to William R. Campbell, Jr. from Eugene Guthrie dated August 7, 2008

SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC INTEGRATED INSPECTION  
REPORT 05000259/2008003, 05000260/2008003 AND 05000296/2008003

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 05000259, 05000260, 05000296

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

Report No.: 05000259/2008003, 05000260/2008003 and 05000296/2008003

Licensee: Tennessee Valley Authority (TVA)

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

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

Dates: April 1, 2008 through June 30, 2008

Inspectors: T. Ross, Senior Resident Inspector  
C. Stancil, Resident Inspector  
K. Korth, Resident Inspector  
H. Gepford, Senior Health Physicist (Sections 2OS1 and 2OS3)  
R. Hamilton, Senior Health Physicist (Sections 2PS1 and 2PS3)  
D. Jones, Senior Reactor Inspector (4OA5.1)  
A. Nielsen, Health Physicist (Sections 2PS3 and 4OA1)

Approved by: Eugene F. Guthrie, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000259/2008003, 05000260/2008003 and 05000296/2008003; 04/01/2008 – 06/30/2008; Browns Ferry Nuclear Plant, Units 1, 2 and 3; Occupational and Public Radiation Safety and Other Activities.

The report covered a three-month period of routine inspections by the resident inspectors, two senior health physicists, a health physicist and a senior reactor inspector. Three Green NCVs were identified. The significance of most findings are indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, Significance Determination Process (SDP). Findings for which the SDP does not apply may be Green or assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, Reactor Oversight Process, Revision 4, dated December 2006.

### A. NRC-Identified and Self-Revealing Findings

#### Cornerstone: Mitigating Systems

Green. The NRC identified a Green non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for the licensee's failure to identify and correct deficiencies in watertight doors that protect the safety-related Residual Heat Removal Service Water pumps and Emergency Equipment Cooling Water pumps from external flooding. The licensee issued work orders to correct the conditions and entered the issue into their corrective action program as Problem Evaluation Reports 133891 and 134346.

This finding was more than minor because it affects the External Factors (Flood Hazard) attribute of the Mitigating Systems Cornerstone. It impacted the cornerstone objective of ensuring the availability, reliability, and operability of safety-related pumps to perform their intended safety function during a design basis flooding event. A Significance Determination Process Phase 3 analysis determined that the finding was of very low safety significance because of the low likelihood of the design basis flood. The finding was directly related to the cross-cutting aspect of procedural compliance of the work control component of the cross-cutting area of Human Performance. Mechanics were not complying with quarterly work orders and maintenance procedure to assure functionality of the watertight doors (H.4(b)). (Section 4OA5.1)

#### Cornerstone: Occupational Radiation Safety

Green. A Green, self-revealing non-cited violation of Technical Specification (TS) 5.7.1 was identified for the licensee's failure to conspicuously post, barricade, and control access to a high radiation area (HRA) with dose rates not exceeding 1.0 rem per hour at 30 centimeters from the source. On June 13, 2007, operations personnel raised Unit 1 reactor power from 25 percent rated thermal power (RTP) to 34 percent RTP, resulting in general area dose rates in the Unit 1 turbine building moisture separator room increasing to greater than 100 millirem/hour (mrem/hr), making it an HRA. But contrary to TS 5.7.1., the room was posted and controlled as a radiation area at the time of the power increase. Three individuals working in the room received electronic dosimeter dose rate alarms of 140 mrem/hr, 212 mrem/hr, and 215 mrem/hr. Once the change in radiological conditions was recognized, radiological control personnel immediately

posted and controlled the work area as an HRA. The finding was entered into the licensee's corrective action program as Problem Evaluation Report 126211.

This finding was more than minor because it was associated with the Occupational Radiation Safety cornerstone attribute of exposure control and it affected the associated cornerstone objective because the failure to post, barricade, and control access to an HRA did not ensure the adequate protection of worker health and safety from exposure to radiation. The finding was evaluated using the Occupational Radiation Safety Significance Determination Process and was determined to be of very low safety significance because the finding did not involve a substantial potential for overexposure and did not affect the ability to assess dose. The cause of this finding was directly related to the work activity coordination cross-cutting aspect in the work control component of the Human Performance cross-cutting area because operations and health physicists personnel failed to effectively communicate and coordinate the activities associated with the power increase (H.3(b)). (Section 2OS1)

Cornerstone: Public Radiation Safety

Green. A Green, self-revealing non-cited violation of 10 CFR 20.1801 was identified for the licensee's failure to secure stored radioactive material from unauthorized removal. On August 14, 2007, a shipment of "clean" scrap metal from Browns Ferry alarmed the truck monitor at a vendor recycling facility. Using a hand-held survey instrument, the vendor identified the contaminated item to be a small (4 ounces) metal can containing pipe threading compound. Subsequently, upon arrival at the site, licensee personnel retrieved the item and performed radiation surveys as necessary. The finding was entered into the licensee's corrective action program as Problem Evaluation Report 128870.

This finding was more than minor because it was associated with the Public Radiation Safety cornerstone attribute of program and process and it affected the associated cornerstone objective because the failure to secure stored radioactive material from removal did not ensure the adequate protection of public health and safety from exposure to radiation. The finding was evaluated using the Public Radiation Safety Significance Determination Process and was determined to be of very low safety significance because the failure to secure radioactive material from removal was a finding in the radioactive material control program that did not result in a public exposure exceeding 5 mrem. The cause of this finding was related to the evaluation of identified problems cross-cutting aspect in the corrective action component of the Problem Identification and Resolution cross-cutting area because evaluations performed by the licensee subsequent to previous radioactive material control events had failed to thoroughly evaluate and identify the weaknesses in the radioactive material control program (P.1(c)). (Section 2PS3)

B. Licensee-Identified Violations

None.



## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at essentially full rated thermal power (RTP) the entire report period except for two planned downpowers. On April 19, 2008, Unit 1 reduced power to 70 percent RTP to fully withdraw a control rod, clean waterboxes, and adjust rod sequence. The unit was returned to full RTP the next day. On May 18, 2008, Unit 1 reduced power to 78 percent RTP to repair an 1B3 reactor feedwater (RFW) heater leak. The unit was returned to full power on May 22, 2008.

Unit 2 operated at essentially full power the entire report period except for several planned downpowers. On April 12, 2008, Unit 2 reduced power to 92 percent RTP for RFW heater leak repairs, and main turbine generator control valve testing. The unit was returned to full RTP the next day. On April 27, 2008, Unit 2 reduced power to 95 percent RTP to repair the 2B1 moisture separator level control valve and was also returned to full RTP the next day. Lastly, on May 31, 2008, Unit 2 reduced power to 70 percent RTP to conduct scram time testing and clean waterboxes. The unit was returned to full RTP on June 2, 2008.

Unit 3 was in a refueling outage at the beginning of the inspection period. Unit 3 entered Mode 2 on May 15, 2008, achieved full RTP on May 19, 2008, and remained at full RTP throughout the rest of the report period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection

##### .1 Offsite and Alternate Alternating Current (AC) Power Systems Readiness

###### a. Inspection Scope

Prior to the summer season, inspectors reviewed electrical power design features, onsite risk and work management procedures, and corporate transmission and power supply procedures to verify appropriate operational oversight and assurance of continued availability of offsite and onsite alternate AC power systems. Inspectors verified that communication protocols existed between the transmission system operator and Browns Ferry Nuclear Plant for coordination of off-normal and emergency events affecting the plant, including event details, estimates of return-to-service times, and notifications of grid status changes. Inspectors also verified that procedures included controls to adequately monitor both offsite AC power systems (including post-trip voltages) and onsite alternate AC power systems for availability and reliability. Furthermore, inspectors interviewed onsite licensed operators and offsite transmission personnel to determine their understanding and implementation of the power monitoring and assessment process.

Enclosure

b. Findings

No findings of significance were identified.

.2 Readiness for Seasonal Extreme Weather Conditions (Hot Weather Preparations)

a. Inspection Scope

Prior to and during the onset of hot weather conditions, the inspectors reviewed the licensee's implementation of 0-GOI-200-3, Hot Weather Operations, including checklist Attachment 1, Hot Weather Operational Checklist. The inspectors also reviewed Browns Ferry Work Order Report PA-104 for Hot Weather Focus Areas and discussed implementation of 0-GOI-200-3 with responsible Operations personnel and management. Additionally, the inspectors conducted walkdowns of potentially affected risk significant equipment systems located in the common Residual Heat Removal Service Water (RHRSW) and Emergency Equipment Cooling Water (EECW) Rooms, and the three units Refueling and Reactor Zone Supply Fan Rooms. Furthermore, the inspectors reviewed licensee procedure 0-GOI-200-1, Attachment 14, Restoration from Freeze Protection, for verification of licensee actions to recover from cold weather conditions in preparation for hot weather conditions.

b. Findings

No findings of significance were identified.

.3 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

On April 4, a Tornado Warning for Limestone County (without a prior Watch condition), and on May 8, a Tornado Watch, and then a Tornado Warning (for an adjacent county - Lauderdale County), were declared. For both of these events, the inspectors reviewed the licensee's overall preparations/protection for the unexpected onset of severe weather conditions and observed the licensee's implementation of abnormal operating instruction (AOI) 100-7, Severe Weather, including parallel implementation of actions for Tornado Watch and Warning. Inspectors observed applicable contingency actions associated with Unit 3 in a refueling outage and the subsequent elevation of shutdown risk to level Orange. The inspectors also reviewed and discussed the implementation of AOI 100-7 with the responsible Unit Supervisor (US), Outage Control Center Supervisor, and shift manager (SM). Furthermore, the inspectors witnessed the licensee's execution of evacuation orders of vulnerable areas and buildings outside the power block, and the termination of work and evacuation of the turbine building and refueling floor. The inspectors also verified adequate operator staffing and their accessibility to controls and indications for those systems required for safe control of the plant.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed eight partial walkdowns of the safety systems listed below to verify train operability, as required by the plant Technical Specifications (TS), while the other redundant trains were out of service (OOS) or after the specific safety system was returned to service following maintenance. These inspections included reviews of applicable TS, operating instructions (OI), and/or piping and instrumentation drawings (P&IDs), which were compared with observed equipment configurations to identify any discrepancies that could affect operability of the redundant train or backup system. The systems selected for walkdown were also chosen due to their relative risk significance from a Probabilistic Safety Assessment perspective for the existing plant equipment configuration. The inspectors verified that selected breakers, valves, and support equipment were in the correct position for system operation. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program (CAP).

- Unit 1/2 Standby Diesel Generator B per P&ID 0-47E861-2 and 0-OI-82, Standby Diesel Generator System and Attachments 1D, 2D, 3D and 4D
- Unit 1 High Pressure Coolant Injection (HPCI) System per P&IDs 1-47E812-1 and 0-47E861-6 and 1-OI-73, High Pressure Coolant Injection (HPCI) System
- Unit 1 Reactor Core Isolation Cooling (RCIC) System per P&ID 1-47E813-1 and 1-OI-71, Reactor Core Isolation Cooling System
- Unit 1 RHRSW System per P&ID 1-47E858-1 and 0-OI-23, Residual Heat Removal Service Water System
- Unit 1 Division I RHR System per P&ID 1-47E811-1 and 1-OI-74, Residual Heat Removal System
- Unit 2 HPCI System per P&ID 2-47E812-1 and 2-OI-73, Attachment 1, High Pressure Coolant Injection System
- Unit 2 RCIC System per P&ID 2-47E813-1 and 2-OI-71, Reactor Core Isolation Cooling (RCIC) System
- Unit 3 Division II Core Spray (CS) System per P&ID 3-47E814-1 and 3-OI-75, Core Spray (CS) System

b. Findings

No findings of significance were identified.

## 1R05 Fire Protection

### .1 Routine Walkdowns

#### a. Inspection Scope

The inspectors reviewed licensee procedures, Standard Programs and Processes (SPP)-10.10, Control of Transient Combustibles, and SPP-10.9, Control of Fire Protection Impairments, and conducted a walkdown of the six fire areas (FA) and fire zones (FZ) listed below. Selected FAs/FZs were examined in order to verify licensee control of transient combustibles and ignition sources; the material condition of fire protection equipment and fire barriers; and operational lineup and operational condition of fire protection features or measures. Also, the inspectors verified that selected fire protection impairments were identified and controlled in accordance with procedure SPP-10.9. Furthermore, the inspectors reviewed applicable portions of the Site Fire Hazards Analysis Volumes 1 and 2 and Pre-Fire Plan drawings to verify that the necessary fire fighting equipment, such as fire extinguishers, hose stations, ladders, and communications equipment, were in place.

- 1B Electrical Board Room, EL 593' (FA - 4)
- 2B Electrical Board Room, EL 593' (FA - 8)
- Unit 3 Control Building El. 593 (FA 19)
- 3A Electric Board Room and 3A/3B 480V Shutdown Board Rooms (FA-13, 14 and 15)
- Unit 3 Diesel Generator Building, including Unit 3 4KV Shutdown Board Rooms (FA-21, 22, 23 and 24)
- Unit 2 Reactor Building El. 519-565 (FZ 2-1)

#### b. Findings

No findings of significance were identified.

## 1R06 Internal Flood Protection Measures

#### a. Inspection Scope

The inspectors performed a review of all three Units' reactor building 519 foot elevation bulkhead doors for internal flood protection measures. The inspectors reviewed plant design features and measures intended to protect the plant and its safety-related equipment from internal cross-unit flooding events, as described in the Updated Final Safety Analysis Report (UFSAR), general design criteria, the internal flooding notebook, and various surveillance and alarm response procedures.

The inspectors conducted walkdowns of all units' reactor building 519' elevation reactor bulkhead airlocks (eight total) and associated corner rooms, to review flood-significant features such as door operating mechanisms and gaskets, airlock bulkhead inter-seal

conditions, and door seal thresholds that might be subjected to flood conditions. Plant procedures for mitigating flooding events were also reviewed to verify that licensee actions were consistent with the plant's design basis assumptions. Furthermore, the inspectors reviewed a sampling of the licensee's corrective action documents with respect to flood-related items to verify that problems were being identified and corrected.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors examined the licensee's implementation of biofouling controls associated with all three units' RHRSW heat exchangers. The inspectors reviewed procedures used for continuous EECW chemical injection, periodic RHRSW chemical injection, and establishment of adequate heat exchanger flow rates. The inspectors also reviewed Electric Power Research Institute (EPRI) heat exchanger performance monitoring guidelines and licensee raw water inspection records to evaluate the licensee's program for maintaining heat sinks. Furthermore, the inspectors reviewed related PERs and corrective actions to verify that the licensee was identifying issues and correcting them.

The inspectors performed walkdowns of chemical addition systems and RHRSW/EECW interfaces to verify material conditions were acceptable and physical arrangements matched procedures. The inspectors also observed operations personnel align RHRSW heat exchangers for chemical injections in accordance with procedures to minimize excessive outlet valve vibration and erosion. Furthermore, the inspectors reviewed the documented results of the last periodic raw water inspection for each RHRSW heat exchanger to verify that monitoring related to the EPRI guidance was adequate and that issues were being addressed within the CAP.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

.1 Resident Inspector Quarterly Review

a. Inspection Scope

On May 21, 2008, the inspectors observed licensed operator requalification simulator examination for two crews. Each crew received the same examination scenario: "Dual Recirculation Pump Trip with Stuck Open SRV." The inspectors specifically evaluated the following attributes related to each operating crew's performance:

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of AOs, and Emergency Operating Instructions (EOIs)
- Timely and appropriate Emergency Action Level declarations per Emergency Plan Implementing Procedures (EPIP)
- Control board operation and manipulation, including high-risk operator actions
- Command and Control provided by the US and SM

The inspectors attended a post-examination critique to assess the effectiveness of the licensee evaluators, and to verify that licensee-identified issues were comparable to issues identified by the inspector. The inspectors also reviewed simulator physical fidelity (i.e., the degree of similarity between the simulator and the reference plant control room, such as physical location of panels, equipment, instruments, controls, labels, and related form and function).

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

.1 Routine

a. Inspection Scope

The inspectors reviewed one specific equipment issue listed below for structures, systems and components (SSC) within the scope of the Maintenance Rule (MR) (10CFR50.65) with regard to some or all of the following attributes: (1) work practices; (2) identifying and addressing common cause failures; (3) scoping in accordance with 10 CFR 50.65(b) of the MR; (4) characterizing reliability issues for performance; (5) trending key parameters for condition monitoring; (6) charging unavailability for performance; (7) appropriateness of performance criteria in accordance with 10 CFR 50.65(a)(2); (8) system classification in accordance with 10 CFR 50.65(a)(1); and (9) appropriateness and adequacy of (a)(1) goals and corrective actions (i.e., Ten Point Plan). The inspectors also compared the licensee's performance against site procedure SPP-6.6, Maintenance Rule Performance Indicator Monitoring, Trending and Reporting; Technical Instruction 0-TI-346, Maintenance Rule Performance Indicator Monitoring, Trending and Reporting; and SPP 3.1, Corrective Action Program. The inspectors also reviewed, as applicable: work orders, surveillance records, PERs, system health reports, engineering evaluations, and MR expert panel minutes; and attended MR expert panel meetings to verify that regulatory and procedural requirements were met.

- Unit 2 and 3 RHR Heat Exchanger RHRSW Outlet Valves Repetitive Mechanical Failures

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

For planned online work and/or emergent work that affected the six combinations of risk significant systems listed below, the inspectors reviewed licensee maintenance risk assessments and actions taken to plan and control work activities to effectively manage and minimize risk. The inspectors verified that risk assessments and applicable risk management actions (RMA) were conducted as required by 10 CFR 50.65(a)(4) and applicable plant procedures such as SPP-7.1, Work Control Process; 0-TI-367, BFN Equipment to Plant Risk Matrix; and BP-336, Risk Determination And Risk Management. The inspectors also evaluated the adequacy of the licensee's risk assessments and implementation of RMAs.

- Unit 3 Auxiliary Decay Heat Removal (ADHR) Backup Diesel Start Failure
- A1 and A2 RHRSW Pumps, C3 EECW Pump and 2A RHR Pump OOS
- Unit 2 HPCI Pump, B Emergency Diesel Generator (EDG) and A3 RHRSW Pump OOS
- Unit 2 HPCI pump, 2A Standby Liquid Control (SLC) Pump and the 2B SLC Pump OOS
- A EDG, Unit 1 HPCI Pump and C3 EECW Pump OOS
- 3EC EDG, 1B Control Rod Drive (CRD) Pump, A3 EECW Pump, 2D CS Pump, and Trinity 1 500KV Line OOS

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the eight operability/functional evaluations listed below to verify technical adequacy and ensure that the licensee had adequately assessed TS operability. The inspectors also reviewed applicable sections of the UFSAR to verify that the system or component remained available to perform its intended function. In addition, where appropriate, the inspectors reviewed licensee procedure SPP-3.1, Corrective Action Program, Appendix D, Guidelines for Degraded/Non-conforming Condition Evaluation and Resolution of Degraded/Non-conforming Conditions, to ensure that the licensee's evaluation met procedure requirements. Furthermore, where applicable, inspectors examined the implementation of compensatory measures to verify that they achieved the intended purpose and that the measures were adequately

controlled. The inspectors also reviewed PERs on a daily basis to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations.

- C3 EECW Pump Shaft Degradation (PER 143172)
- Unit 2 RHRSW HX Outlet Valves With Respect to Unit 3 Failures (PER 141380)
- Unit 2 Torus Dynamic Ring Girder Snubber Replacement (PER 141653)
- Unit 3 RHRSW HX Outlet Valves Failures (PERs 140768 and 143128)
- Unit 3 Cycle 13 Refueling Outage De-Tensioning of Wrong Control Rod Drive Mechanism (PER 141170)
- RHRSW and EECW Pump Room Water Tight Door Seal Leakage (PER 133899)
- 3D Emergency Diesel Generator High Vibration in Excess of High Alarm Level 2 (PER 143225)
- Unit 2 HPCI Main Steam Admission Valve (2-FCV-73-16) Seat Leakage (PER 144253)

b. Findings

No findings of significance were identified.

1R18 Plant Modifications

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the two temporary modifications listed below to verify regulatory requirements were met, along with procedures such as 0-TI-405, Plant Modifications and Design Change Control; 0-TI-410, Design Change Control; and SPP-9.5, Temporary Alterations. The inspectors also reviewed the associated 10 CFR 50.59 screening and evaluation and compared each against the UFSAR and TS to verify that the modification did not affect operability or availability of the affected system. Furthermore, the inspectors walked down each modification to ensure that it was installed in accordance with the modification documents and reviewed post-installation and removal testing to verify that the actual impact on permanent systems was adequately verified by the tests.

- Temporary Alteration Control Form (TACF) 1-08-002-085, Installation of Temporary Manual Isolation Valve downstream of 1-DRV-085-0659, CRD Seal Water Drain Valve
- TACF 2-08-002-073, Leak Repair of 2-FCV-73-81, HPCI Steam Line Warmup Valve

b. Findings

No findings of significance were identified.



1R19 Post-Maintenance Testinga. Inspection Scope

The inspectors reviewed the seven post-maintenance tests (PMT) listed below to verify that procedures and test activities confirmed SSC operability and functional capability following maintenance. The inspectors reviewed the licensee's completed test procedures to ensure any of the SSC safety function(s) that may have been affected were adequately tested, that the acceptance criteria were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test and/or reviewed the test data, to verify that test results adequately demonstrated restoration of the affected safety function(s). The inspectors verified that PMT activities were conducted in accordance with applicable work order (WO) instructions, or procedural requirements, including SPP-6.3, Post-Maintenance Testing, and MMDP-1, Maintenance Management System. Furthermore, the inspectors reviewed problems associated with PMTs that were identified and entered into the CAP.

- 3B RHRSW HX Outlet Valve, 3-FCV-23-46, PMT following stem to disc separation per WOs 08-711545-000 through 08-711545-004 and 3-SI-4.5.C.1(3), RHRSW Pump and Header Operability and Flow Test
- A3 EECW Pump PMT, Following Cable and Motor Replacement, per WO 05-721415-000 and 3-SI-4.5.C.1(2), EECW Pump Operation
- D1 RHRSW Pump PMT per 2-SI-4.5.C.1 (3), Quarterly RHRSW System Rated Flow Test and WO 07-266550-008
- Unit 1 HPCI PMT for Steam Admission Valve 73-16 Repairs per WOs 08-717402-000 and -003, and 1-OI-73, HPCI System
- PMT for Replacement of 1-LS-073-0056A, HPCI Condensate Header Low Level Switch, in accordance with 1-SR-3.3.5.1.3(D), HPCI Condensate Header Low Level Switch Calibration and Functional Test, and WO 08-711587-000
- PMT for Unit 2 HPCI Oil Sump Moisture/Particulate Contamination per WO 08-715815-000,-001, and -005, and 2-SR-3.5.1.7, HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Reactor Pressure
- PMT for Shaft replacement on 2B RHR Room Cooler in accordance with 0-TI-134, Core Spray and Residual Heat Removal Coolers Air Flow Verification, and WO 08-717848-000

b. Findings

No findings of significance were identified.

## 1R20 Refueling and Other Outage Activities

### .1 Unit 3 Scheduled Refueling Outage (U3C13)

#### a. Inspection Scope

From March 18 through May 19, 2008, the inspectors examined critical outage activities associated with the U3C13 refueling outage and Unit 3 restart to verify that they were conducted in accordance with TS, applicable procedures, and the licensee's outage risk assessment and management plans. Refueling outage activities that occurred prior to March 31 were documented in NRC inspection report (IR) 05000296/2008002. Since April 1, the inspectors reviewed and examined selected refueling outage and power ascension activities. Some of the more significant critical outage activities observed and/or examined by the inspectors, were as follows:

- Control of Hot Shutdown (Mode 3), Cold Shutdown (Mode 4), Startup (Mode 2), and Power Operation (Mode 1) conditions, including critical plant parameters
- Restoration of off-site power to backfeed Unit 3 following main generator breaker repairs
- Plant Oversight Review Committee event review and restart meetings on May 9 and 11, and the final restart approval on May 13
- Clearance tagging controls during maintenance and testing of safety-related equipment
- Reactor vessel disassembly and reassembly, and reactor cavity level controls
- 3EC standby diesel generator load acceptance test
- Unit 3 Cycle 14 Core Reload Verification Video Tape
- Control rod scram time testing
- ASME Section XI system leakage test of the reactor pressure vessel and associated piping following heatup and pressurization of Unit 3
- Reactor startup and power ascension activities per General Operating Instruction (GOI) 3-GOI-100-1A, Unit Startup, including rod withdrawal for criticality, reactor coolant system heatup, initial turbine roll, and synchronization of the main generator
- Outage risk assessment and management
- Control and management of emergent work activities

#### Drywell and Suppression Pool Closeout

On May 1 and 2, the inspectors performed an independent detailed closeout inspection of the Unit 3 Suppression Pool, including emergency core cooling system suction strainer conditions, and verification of foreign material exclusion (FME) control. The inspectors also observed and reviewed the licensee's final FME verification for hatch closure in accordance with MSI-0-064-HLT002, Opening and Closing Primary Containment Hatches.

On May 9 and 13, the inspectors performed an independent detailed closeout inspection of all Unit 3 Drywell elevations. The inspectors also reviewed and verified the licensee's conduct of 3-GOI-200-2, Drywell Closeout.

#### Outage Risk Assessment

During the Unit 3 62 day U3C13 refueling outage that ended on May 19, the inspectors verified that the licensee appropriately maintained adequate defense-in-depth measures for all critical safety functions. The inspectors also reviewed the daily U3C13 Refueling Outage Reports, including the Outage Risk Assessment Management Safety Function Status, and frequently attended the twice a day outage status meetings. These reviews were compared to the requirements in licensee procedure SPP-7.2, Outage Management, the Outage Risk Assessment Report, and TS. The inspectors' reviews and walkdowns also verified that for identified high risk significant conditions (i.e., Orange), due to equipment availability and/or system configurations, that contingency measures and RMAs were identified and implemented by the overall outage and contingency response plan. Furthermore, the inspectors frequently discussed risk conditions and designated protected equipment with Operations and outage management personnel to assess licensee awareness of actual risk conditions and mitigation strategies.

#### Decay Heat Removal

The inspectors reviewed licensee procedures 3-OI-74, Residual Heat Removal System; 3-OI-78, Fuel Pool Cooling and Cleanup System; and 0-AOI-72-1, Alternate Decay Heat Removal (ADHR) System Failures; and conducted a main control room panel and in-plant walkdowns of system and components to verify correct system alignment. In addition, the inspectors monitored licensee work controls to ensure that outage work would not adversely impact the ability of operators to operate spent fuel pool (SFP) cooling, RHR shutdown cooling, and/or ADHR systems when these systems were required. Furthermore, the inspectors conducted several walkdowns of the ADHR system during operation with the fuel pool gates removed.

#### Outage Activities

On a routine basis, the inspectors observed and monitored ongoing outage activities to verify that they were conducted in accordance with TS, licensee procedures, and the licensee's outage risk control plan. Some of the more significant routine inspection activities accomplished by the inspectors were as follows:

- Verified electrical systems availability and alignment
- Monitored important control room plant parameters (e.g., reactor coolant system pressure, level, flow, and temperature) and TS compliance during the various shutdown modes of operation, and mode transitions
- Examined implementation of reactivity controls
- Reviewed control of overall secondary containment integrity especially during specific maintenance associated with reactor building ventilation boundaries

- Examined FME controls particularly in proximity to and around the reactor cavity, equipment pit, and SFP
- Routine tours of the control room, reactor building, refueling floor and drywell

### Corrective Action Program

The inspectors reviewed PERs generated during U3C13, and attended the PER screening committee and Corrective Action Review Board (CARB) meetings to verify that initiation thresholds, priorities, mode holds, operability concerns and significance levels were adequately addressed. Resolution and implementation of corrective actions of several PERs were also reviewed for completeness.

#### b. Findings

No findings of significance were identified.

### 1R22 Surveillance Testing

#### a. Inspection Scope

The inspectors witnessed portions and/or reviewed completed test data for the following six surveillance tests of risk-significant and/or safety-related systems to verify that the tests met TS surveillance requirements, UFSAR commitments, and in-service testing and licensee procedure requirements. The inspectors' review confirmed whether the testing effectively demonstrated that the SSCs were operationally capable of performing their intended safety functions and fulfilled the intent of the associated surveillance requirement.

#### Routine Surveillance Tests:

- 0-SR-3.7.3.2(HEPA), Control Room Emergency Ventilation System In-Place Leak Test
- 3-SR-3.1.4.1, SCRAM Insertion Times
- 3-SR-3.8.1.9(3D OL), Diesel Generator 3D Emergency Load Acceptance Test with Unit 3 Operating
- 3-SR-3.5.3.4, Reactor Core Isolation Cooling System Rated Flow at Low Reactor Pressure Vessel Pressure

#### In-Service Tests:

- 1-SR-3.5.1.6(CS II), Core Spray Flow Rate Loop II
- 2-SR-3.5.1.7, HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Reactor Pressure

#### b. Findings

No findings of significance were identified.

## 2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

### 2OS1 Access Control To Radiologically Significant Areas

#### a. Inspection Scope

Access Controls: The inspectors reviewed and evaluated licensee guidance and its implementation for controlling and monitoring worker access to radiologically significant areas and tasks associated with Unit 1, Unit 2, and Unit 3 operations and the U3C13 refueling outage. The inspectors evaluated changes to, and adequacy of, procedural guidance; directly observed implementation of established administrative and physical radiation controls; appraised radiation worker (radworker) and health physics technician (HPT) knowledge of, and proficiency in, implementing radiation protection (RP) activities; and assessed radworker exposures to radiation and radioactive material.

The inspectors directly observed controls established for radworker and HPT staff in actual or potential airborne radioactivity area, radiation area, high radiation area (HRA), and locked HRA (LHRA) locations. Established radiological controls were evaluated for selected U3C13 tasks including shielding, scaffolding, torus diving, fuel movement, control rod drive exchange, and undervessel work. Postings and physical controls established within the radiologically controlled area for access to the Unit 3 drywell, Unit 1, Unit 2, and Unit 3 reactor building and turbine building locations, and radioactive waste processing and radioactive material storage areas were evaluated directly during facility tours. The inspectors independently measured radiation dose rates during these tours. In addition, the inspectors directly observed conduct of licensee surveys and results of radiation levels, airborne radionuclide concentrations, and/or surface contamination levels for select areas and equipment associated with outage activities. Results were compared to current licensee surveys and assessed against established postings and established radiation controls. The inspectors also reviewed select radiological controls and data associated with a Unit 1 power ascension on June 13, 2007.

For select tasks, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements to workers. Radworker adherence to select RWPs and HPT proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. Direct reading dosimeter (DRD) equipment alarm set-points were evaluated against area radiation survey results for select outage and routine operations activities.

The inspectors walked down the Unit 1, Unit 2, and Unit 3 SFP areas to determine if appropriate controls were applied to materials and equipment stored in the pools and reactor cavity. The inspectors also reviewed the inventory of items stored in the pools. Controls and their implementation for LHRAs and for storage of irradiated material within the SFPs were reviewed and discussed in detail.

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The inspectors evaluated implementation and effectiveness of licensee controls for both airborne and external radiation exposures. The inspectors reviewed and discussed selected whole-body count analyses conducted between February 8, 2008, and April 1, 2008, to evaluate implementation and effectiveness of personnel monitoring and administrative and physical controls including air sampling, barrier integrity, engineering controls, and postings for tasks having the potential for individual worker internal exposures to exceed 30 millirem committed effective dose equivalent. As Low As Reasonably Achievable (ALARA) evaluations for ongoing U3C13 activities were reviewed and discussed. Effectiveness of external radiation exposure controls were evaluated through review and discussion of individual worker dose as measured by DRD from February 1, 2007, to February 29, 2008, for select tasks.

Radiation protection activities were evaluated against UFSAR, TS, and 10 CFR Parts 19 and 20 requirements. Specific assessment criteria included 10 CFR 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; TS Sections 5.4, Procedures and 5.7, High Radiation Area; and approved licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 and 4OA1 of the report Attachment.

Problem Identification and Resolution: The inspectors reviewed and assessed selected PER documents associated with access control to radiologically significant areas. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with procedure SPP-3.1, Corrective Action Program, Rev. 13. In addition, the inspectors reviewed self-assessments conducted related to access controls. Specific CAP documents associated with access control issues, personnel radiation monitoring, and personnel exposure events reviewed and evaluated during inspection of this program area are identified in Sections 2OS1 and 4OA1 of the report Attachment.

The inspectors completed the 21 required line-item samples described in Inspection Procedure (IP) 71121.01.

b. Findings

Introduction: A Green, self-revealing non-cited violation (NCV) of TS 5.7.1 was identified for failure to conspicuously post, barricade, and control access to an HRA with dose rates not exceeding 1.0 rem per hour at 30 cm from the source.

Description: On June 13, 2007, three workers were performing leak inspections in the Unit 1 moisture separator room when Operations raised reactor power from 23 percent RTP to 34 percent RTP. This power ascension caused radiation levels in the Unit 1 moisture separator room to increase from radiation area conditions to HRA conditions, with general area dose rates of approximately 150 mrem/hr. The controlling procedure for reactor startup, 1-GOI-100-1A, step 103.7, included a sign-off for radiation control (Radcon) to ensure appropriate HRA controls and postings were in place prior to exceeding 25 percent RTP. This procedure step was the corrective action from a previous similar event on Unit 3 which occurred on March 23, 2006. Radcon was

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notified, but the step was not signed-off prior to Operations personnel raising reactor power above 25 percent RTP.

The three workers received electronic dosimeter dose rate alarms of 140 mrem/hr, 212 mrem/hr, and 215 mrem/hr, which exceeded the dose rate setpoint of 50 mrem/hr. The workers were on a RWP that did not allow access to HRAs and had been briefed on radiological conditions that would be present with the reactor at 25 percent RTP. Upon identification of the change in radiological conditions, Radcon staff immediately posted and controlled the work area as an HRA.

Analysis: The failure to post, barricade, and control an HRA is a performance deficiency. This finding is more than minor because it is associated with the Occupational Radiation Safety cornerstone attribute of exposure control and it affected the associated cornerstone objective because the failure to post, barricade, and control access to a HRA did not ensure the adequate protection of worker health and safety from exposure to radiation. The finding was evaluated using the Occupational Radiation Safety Significance Determination Process (SDP), and was determined to be of very low safety significance (Green) because the failure to post, barricade, and control the room did not pose a substantial potential for overexposure and did not affect the licensee's ability to assess doses. Dose could be assessed because the involved individuals were monitored for exposures from external radiation fields using alarming electronic dosimeters.

The cause of this finding is directly related to the work activity coordination cross-cutting aspect in the work control component of the Human Performance cross-cutting area because operations and health physicists personnel failed to effectively communicate and coordinate the activities associated with the power increase (H.3(b)).

Enforcement: Technical Specification 5.7.1 required that HRAs with dose rates not exceeding 1.0 rem per hour at 30 centimeters from the radiation source shall have each entryway barricaded and conspicuously posted as an HRA. In addition, access to such areas shall be controlled by a RWP that includes specification of radiation dose rates in the immediate area. Contrary to the above, on June 13, 2007, the licensee failed to barricade, conspicuously post, and control an HRA with an RWP when Operations personnel raised reactor power from 25 percent RTP to approximately 34 percent RTP while workers were in the Unit 1 turbine building moisture separator room.

The finding was documented in the licensee's CAP as PER 126211. Because this violation was of very low safety significance and was entered into the licensee's CAP, it is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-259/2008003-01, Failure to Conspicuously Post, Barricade, and Control Access to a High Radiation Area During Power Ascension.

## 2OS3 Radiation Monitoring Instrumentation and Protective Equipment

### a. Inspection Scope

Radiation Monitoring Instrumentation: During tours of the Units 1, 2, and 3 reactor buildings and turbine buildings, the inspectors observed installed radiation detection equipment including the following instrument types: area radiation monitors (ARMs), continuous air monitors, personnel contamination monitors (PCMs), portal monitors, and components of the Post-Accident Sampling System (PASS). The inspectors observed the physical location of the components, noted the material condition, and compared sensitivity ranges with UFSAR requirements.

In addition to equipment walk-downs, the inspectors observed functional checks and alarm setpoint testing of various fixed and portable detection instruments. These observations included: source checks of portable ion chambers and G-M survey meters using a Shepherd calibrator, source check of a neutron rem ball, source checks of PCMs and portal monitors at the Radiologically Controlled Area exit, and response checks for portable instruments being checked out for use. In addition, the response of the PCMs and portal monitors to a 5000 dpm plant mix smear was observed. The most recent 10 CFR Part 61 analysis for dry active waste was reviewed to determine if calibration and check sources are representative of the plant source term.

The inspectors reviewed the last two calibration records for selected PCMs, portal monitors, ARMs, and continuous air monitors (CAMs). Calibration stickers on portable survey instruments were noted during inspection of storage areas for "ready-to-use" equipment. Records of quality assurance checks for the whole body counter were also reviewed.

Operability and reliability of selected radiation detection instruments were reviewed against details documented in the following: 10 CFR Part 20; NUREG-0737, Clarification of TMI Action Plan Requirements; TS Section 3; UFSAR Chapter 12; and applicable licensee procedures. Documents reviewed during the inspection are listed in Sections 2OS3 and 2PS3 of the report Attachment.

Self-Contained Breathing Apparatus (SCBA) and Protective Equipment: Selected SCBA units staged for emergency use in the Units 1 and 2 and Unit 3 control rooms and other locations were inspected for material condition, breathing air cylinder pressure, and number of units available. The inspectors also reviewed maintenance records for selected SCBA units for the past five years and certification records associated with supplied air quality.

Qualifications for individuals responsible for testing and repairing SCBA vital components were evaluated through review of training records. In addition, control room operators were interviewed to determine their knowledge of available SCBA equipment locations, including corrective lens inserts if needed, and their training on bottle change-out during a period of extended SCBA use. Respirator qualification records were reviewed for several control room operators.



Licensee activities associated with maintenance and use of respiratory protection equipment were reviewed against 10 CFR Part 20; Regulatory Guide (RG) 8.15, Acceptable Programs for Respiratory Protection; and applicable licensee procedures. Documents reviewed during the inspection are listed in Section 2OS3 of the report Attachment.

Problem Identification and Resolution: Selected licensee PERs associated with instrumentation and protective equipment were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with procedure SPP-3.1, Corrective Action Program. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results. Documents reviewed are listed in Section 2OS3 of the report Attachment.

The inspectors completed 9 of the 9 required line-item samples detailed in IP 71121.03.

b. Findings

No findings of significance were identified.

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

Effluent Monitoring and Radwaste Equipment: During inspector walk-downs, accessible sections of the liquid and gaseous radioactive waste (radwaste) and effluent systems were assessed for material condition and conformance with system design diagrams. The inspection included floor drain tanks, liquid waste system piping, the Liquid Radwaste Effluent Monitor (RM-90-130), Turbine Building Exhaust Monitors (RM-90-249/251), Reactor Building Exhaust Monitor (RM-90-250), Radwaste Building Vent Monitor (RM-90-252), the Main Stack Monitors (RM-90-147/148), and associated airborne effluent sample lines. The inspectors interviewed licensee staff regarding radwaste equipment configuration and effluent monitor operation.

The inspectors reviewed performance records and calibration results for selected radiation monitors and flowmeters. Recent surveillance test results for the main stack air treatment system were also reviewed. The inspectors evaluated out-of-service effluent monitors and compensatory action data for the period February 2006 – May 2008. In addition, isokinetic sample line flow rates, line-loss calculations, and ventilation flow rates for the turbine building and reactor buildings were reviewed and discussed with chemistry staff to evaluate the adequacy of airborne effluent sampling.

Installed configuration, material condition, operability, and reliability of selected effluent sampling and monitoring equipment were reviewed against details documented in the following: 10 CFR Part 20; RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials In Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants; American Nuclear Standards Institute

(ANSI)-N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities; TS Section 5; the Offsite Dose Calculation Manual (ODCM); and UFSAR, Chapter 7. Documents reviewed during the inspection are listed in Section 2PS1 of the report Attachment.

Effluent Release Processing and Quality Control Activities: The inspectors reviewed selected procedures for effluent sampling, processing, and release. Recent liquid and gaseous release permits were reviewed against ODCM specifications for pre-release sampling, effluent monitor setpoints, and projected doses to the public. The inspectors also reviewed the 2006 and 2007 radioactive effluent release reports to evaluate annual doses to the public and reviewed changes to the ODCM. The inspectors directly observed the weekly collection of airborne effluent samples from the main stack. Chemistry technician proficiency in collecting, processing, and counting the samples, as well as, preparing the applicable release permits was evaluated.

Quality Control (QC) activities regarding gamma spectroscopy and beta-emitter detection were discussed with count room technicians and Chemistry supervision. The inspectors reviewed daily QC data logs for selected gamma spectroscopy and liquid scintillation equipment and reviewed licensee procedural guidance for count room QC. In addition, results of the 2006 and 2007 radiochemistry cross-check program were reviewed.

Observed task evolutions, count room activities, and offsite dose results were evaluated against details in the following: 10 CFR Part 20, Appendix I to 10 CFR Part 50; ODCM; RG 1.21; RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment; and TS Section 5. Procedures and records reviewed during the inspection are listed in Section 2PS1 of the report Attachment.

Groundwater Monitoring: The inspectors discussed current and future programs for onsite groundwater monitoring with licensee staff, including number and placement of monitoring wells and identification of plant systems with the most potential for contaminated leakage. The inspectors also reviewed procedural guidance for identifying and assessing onsite spills and leaks of contaminated fluids. In addition, the inspectors reviewed records of historical contaminated spills retained for decommissioning purposes as required by 10 CFR Part 50.75(g).

The site had a series of wells that were installed as part of the pre-operational monitoring program. Of these wells, well number 6 was sampled routinely by grab sampling until the late 1970s at which time an automatic composite sampler was installed. In 1980-1981 eleven groundwater monitoring wells were installed for the Low Level Radioactive Waste disposal facility. TVA added six regional monitoring wells circa 1984 around the site. In 2000 three additional wells were added. In 2006 as part of a site hydrology study 34 geoprobe wells were installed. Most of these wells have been routinely sampled for tritium, the results have been used to narrow down the number of wells that need to be sampled, and the frequency of sampling is being reduced.

Analyses are performed for tritium and, for selected samples, hard-to-detect radionuclides. To date, tritium has been the only radionuclide identified in the well samples. One of the wells shows slightly elevated levels of tritium (approximately 4325 picocuries per liter (pCi/L)) due to historical spills and leakage. No levels exceeding the EPA drinking water limit of 20,000 pCi/L (corresponding to 4 millirem per year to a member of the public) have been identified in the onsite or offsite environs.

Problem Identification and Resolution: Selected PERs associated with effluent release activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve selected issues in accordance with procedure SPP-3.1, Corrective Action Program. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results. Reviewed documents are listed in Section 2PS1 of the report Attachment.

The inspectors completed 3 of the 3 required line-item samples for IP 71122.01.

b. Findings

No findings of significance were identified.

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program

a. Inspection Scope

REMP Implementation: Inspectors reviewed and discussed with licensee representatives the results published in the Browns Ferry Annual Radiological Environmental Operating report for 2006 and 2007. The inspectors observed the collection and preparation of weekly particulate and radioiodine samples by licensee personnel and assessed material condition of four air-sampling stations along with the collocated thermoluminescent dosimeters (TLDs) to evaluate procedural compliance. The inspectors assessed the calibration status of each air-sampling pump. The inspectors also verified the placement of collection station locations against the sectors specified in the ODCM using a handheld global positioning system (GPS). The inspectors discussed with licensee representatives the procedures, methods, and equipment used to perform vegetation and sediment sampling. The inspectors reviewed and discussed with licensee representatives the procedures used to calibrate and determine the lower limit of detection (LLD) for environmental sample gamma spectroscopy analysis.

REMP guidance, implementation, and results were reviewed against ODCM guidance and applicable procedures listed in Section 2PS3 of the report Attachment.

Meteorological Monitoring Program: The inspectors reviewed the operability of the meteorological monitoring equipment and operator access to meteorological data. Current meteorological monitoring equipment performance, calibration and data recovery were reviewed. The inspectors interviewed licensee technicians responsible for equipment maintenance and surveillance concerning equipment performance,

reliability, and routine inspections. Inspectors verified the availability of meteorological data on the plant computers.

Meteorological instrument operation, calibration, and maintenance were reviewed against FSAR, Chapter 2; NRC Safety Guide 23, Onsite Meteorological Programs-1972; and applicable licensee procedures. Section 2PS3 of the report Attachment lists the documents reviewed.

Unrestricted Release of Materials from the Radiologically Controlled Area (RCA): Radiation protection activities associated with radioactive material control and the unconditional release of materials from the RCA were reviewed and evaluated. The inspectors observed surveys of personnel and material exiting the RCA. The inspectors reviewed calibration records for three small article monitors. Types of sources used for checks and minimum detectable activities were discussed with an instrument technician. Additional efforts taken to reduce the background radiation and therefore increase the sensitivity of the monitors were discussed with health physics technicians, their supervisors and the Radiation Protection Manager.

The inspectors verified that radiation detection sensitivities were consistent with NRC guidance in IE Circular 81-07 and IE Information Notice 85-92. Section 2PS3 of the report Attachment lists the documents reviewed.

Problem Identification and Resolution: Licensee CAP issues associated with environmental monitoring, meteorological monitoring, and release of materials were reviewed and discussed with cognizant licensee representatives. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure SPP-3.1, Corrective Action Program. Section 2PS3 of the report attachment lists the documents reviewed.

The inspectors completed 10 of 10 required line-item samples for IP 71122.03.

b. Findings

Introduction: A Green self-revealing NCV of 10 CFR 20.1801 was identified for failure to secure stored radioactive material from unauthorized removal.

Description: On August 14, 2007, a shipment of "clean" scrap metal from Browns Ferry alarmed the truck monitor at a vendor recycling facility. Using a hand-held survey instrument, the vendor identified the contaminated item to be a small (4 oz) metal can containing pipe threading compound. Upon arrival at the site, licensee personnel retrieved the item and performed radiation surveys as necessary. Surveys determined the contaminated can read 6000 counts per minute on contact with a frisker, and 0.5 milliroentgen per hour (mR/hr) on contact and 0.1 mR/hr at 30 centimeters with an ion chamber. No other items contaminated with licensed material were identified.

The licensee initiated a "B" level PER, 128870, to review this event and evaluate the root and common causes for this event and previous similar events. In developing a timeline

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for the event, it was determined that the pipe threading compound was received by the licensee on May 24, 2005; became contaminated during use sometime after that date; was removed from a contamination zone; was removed from the RCA; and inappropriately discarded into a scrap metal bin located at the low-level modifications facility sometime between July 24, 2007 and August 14, 2007. There was no way to identify the specific use, time of use, or individual(s) who used/discarded the particular can in question.

Although unable to determine how this specific item was released from the RCA, the barrier analysis performed by the root cause analysis team identified a number of weak barriers and a failed barrier. The root cause was determined to be that processes and procedures governing control and transportation of potentially contaminated materials between RCAs and non-RCAs were not robust enough. The root cause team also concluded that the processes and controls for radioactive material control (including physical barriers) were not adequate. Self-assessment BFN-RP-07-003 of the radioactive material control program, completed shortly after this event, found that PER corrective actions generated due to plant events and previous self-assessments had been ineffective in resolving long standing radioactive material control problems. Based on discussion of PER 128870, self-assessment BFN-RP-003, and the radioactive material control program with cognizant licensee personnel, the inspectors learned that previous evaluations and self-assessments/audits had failed to thoroughly evaluate and identify all of the weaknesses in the radioactive material control program.

Analysis: The failure to secure radioactive material from unauthorized removal is a performance deficiency. This finding is more than minor because it is associated with the Public Radiation Safety cornerstone attribute of program and process and it affected the associated cornerstone objective because the failure to secure stored radioactive material from removal did not ensure the adequate protection of public health and safety from exposure to radiation in that contaminated material was inappropriately released to the public domain. The finding was evaluated using the Public Radiation Safety SDP, and was determined to be of very low safety significance (Green) because the failure to secure radioactive material (contaminated can containing pipe threading compound) from removal was a finding in the radioactive material control program that did not result in a public exposure exceeding 5 mrem.

The cause of this finding is related to the evaluation of identified problems cross-cutting aspect in the corrective action component of the Problem Identification and Resolution cross-cutting area because evaluations performed by the licensee subsequent to previous radioactive material control events had failed to thoroughly evaluate and identify the weaknesses in the radioactive material control program. [P.1(c)]

Enforcement: 10 CFR 20.1801 requires that the licensee secure licensed materials stored in controlled or unrestricted areas from unauthorized removal or access. Contrary to the above, the licensee failed to secure licensed material from unauthorized removal in that a can of pipe threading compound that was contaminated with licensed material was identified on August 14, 2007 at a vendor recycling facility by a truck monitor.

The finding was documented in the licensee's CAP as PER 128870. Because this violation was of very low safety significance and was entered into the licensee's CAP, it is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-259, 260, 296/2008003-02, Failure to Secure Stored Radioactive Material from Unauthorized Removal.

#### 4. OTHER ACTIVITIES

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

##### .1 Cornerstone: Mitigating Systems

##### Safety System Functional Failures

##### a. Inspection Scope

The inspectors reviewed the licensee's procedures and methods for compiling and reporting the PIs listed below, including procedure SPP-3.4, Performance Indicator and MOR Submittal Using INPO Consolidated Data Entry. The inspectors reviewed the raw data for the PIs listed below for the second quarter of 2007 through the first quarter of 2008, including applicable Licensee Event Reports and Maintenance Rule Cause Determination Evaluations. The inspectors compared the licensee's raw data against graphical representations and specific values reported to the NRC in the first quarter 2008 PI report to verify that the data was correctly reflected in the report. The inspectors also reviewed the past history of PERs for any that might be relevant to problems with the PI program. Furthermore, the inspectors met with responsible licensee personnel to discuss and go over records to verify that the PI data was appropriately captured, calculated correctly, and discrepancies resolved. The inspectors reviewed Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, to verify that industry reporting guidelines were applied.

- Unit 1 Safety System Functional Failures
- Unit 2 Safety System Functional Failures
- Unit 3 Safety System Functional Failures

##### b. Findings

No findings of significance were identified.

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

##### Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspectors sampled licensee data for the PI listed below. To verify the accuracy of the PI data reported during the period reviewed, PI definitions and guidance contained in NEI 99-02 was used to verify the basis for each data element.

The inspectors reviewed results from February 2007 through February 2008. For this period, the inspectors reviewed electronic dosimeter alarm logs and assessed CAP records to determine whether HRA, very HRA, or unintended radiation exposures had occurred. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. In addition, the inspectors reviewed selected personnel contamination event data and internal dose assessment results. Report Section 2OS1 contains additional details regarding the inspection of controls for exposure significant areas. Documents reviewed are listed in Sections 2OS1 and 4OA1 of the report Attachment.

- Occupational Exposure Control Effectiveness for Units 1, 2, and 3

b. Findings

No findings of significance were identified.

.3 Cornerstone: Public Radiation Safety

Radiological Control Effluent Release Occurrences

The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results of Units 1, 2, and 3 for the Public Radiation Safety Cornerstone from April 2007 through April 2008. For this period, the inspectors reviewed cumulative and projected doses to the public and selected PERs related to Radiological Effluent Technical Specifications (RETS)/ODCM issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Licensee records were reviewed against guidance contained in NEI 99-02, and the NEI Frequently Asked Questions (FAQ) list. Documents reviewed are listed in section 4OA1 of the report Attachment.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Routine Review of Problem Evaluation Reports

a. Inspection Scope

The inspectors performed a daily screening of all PERs entered into the licensee's CAP. The inspectors followed NRC Inspection Procedure 71152, Identification and Resolution

of Problems, in order to help identify repetitive equipment failures or specific human performance issues for follow-up.

b. Findings and Observations

No findings of significance were identified.

.2 Semiannual Trend Review

a. Inspection Scope

As required by Inspection Procedure 71152, the inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review included the results from daily screening of individual PERs (see Section 4OA2.1 above), licensee trend reports and trending efforts, and independent searches of the PER database and WO history. The review also included issues, documented outside the normal CAP, in system health reports, corrective maintenance WOs, component status reports, site monthly meeting reports and maintenance rule assessments. The inspectors' review nominally considered the six-month period of January 2008 through June 2008, although some PER database and WO searches expanded beyond these dates. Furthermore, the inspectors verified that adverse or negative trends identified in the licensee's PERs, periodic reports and trending efforts were entered into the CAP. In particular, the inspectors reviewed the licensee's Integrated Trend Review (ITR) program and the implementation of the program. Inspectors also interviewed the appropriate licensee management.

b. Findings and Observations

No findings of significance were identified.

As documented in the Brown's Ferry Turn-Around Plan, trend reviews were conducted each quarter. The intent of this review was to identify the top organizational issues, both at the department and site level, and to report on the progress being made to resolve them. The inspectors determined that the licensee's trending program, in general, has shown improvement from previous inspection reports. The ITR Meeting was scheduled in the plan of the day (POD) well in advance and departments were actively participating in the process. It was also noted that a new Performance Improvement Department Procedure (PIDP-11) had been issued during this period, to provide additional guidance on conducting trending.

The inspectors noted two observations with the trending program. First, some departmental trends that were continuing from previous ITRs relied on existing PERs without conducting a thorough evaluation to determine if the existing PERs were adequate to correct the problem. Secondly, some trend PERs were not assigned priorities and/or causal analysis levels that were effective in addressing the adverse trend. These observations are described in greater detail below:



- Some trends were identified during the ITR process as continuing from previous reports with reliance on existing PERs to reverse the trend. It was not apparent that adequate evaluation was being conducted to ensure that the existing PER corrective actions were being effective, that these actions were timely enough or that criteria was being established where additional actions were needed (i.e., when an additional PER would be required).
- Some trend PERs were not assigned priorities and/or causal analysis levels that were effective in addressing the adverse trend. For example several trend PERs were written on the work management process (PERs 138297, 140600, 140738, and 145505) which were all assigned as Level C with no causal analysis required. Subsequently, a Level A PER was initiated on the work management process based on Nuclear Safety Review Board review. PERs categorized as Level C without any causal evaluation included Engineering not using department performance indicators or department clock resets to monitor performance; inadequate oversight of Engineering products by management; and, inadequate use of self-assessments to improve performance.

The inspectors also conducted an independent review to identify potential negative trends. This review noted that several parameters were experiencing negative trends including human performance, industrial safety, corrective/elective maintenance backlogs, deferred/late preventive maintenances (PMs), PMs in grace period, cause analysis quality and PER backlog. The licensee acknowledged these trends and has put action plans in place to address them.

### .3 Focused Annual Sample Review - Browns Ferry's Organizational Effectiveness

#### a. Inspection Scope

The inspectors reviewed the specific corrective actions associated with B level PER 132649, Fundamentals of Engineering, in accordance with the guidelines and requirements of SPP 3.1, Corrective Action Program. This PER originally dealt with a Self-Assessment Area for Improvement (AFI) in Engineering on shortfalls in management escalation of important issues, monitoring of training effectiveness and addressing staffing shortfalls which have resulted in a plant trip, program and training ineffectiveness, and staffing shortfalls. The PER problem description was subsequently changed to address the broader issue of Browns Ferry's Organizational Effectiveness at identifying and correcting performance shortfalls over the past 24 months associated with the numerous Unit 1, 2 and 3 reactor scrams, and the 2007 Mid-cycle Self-Assessment.

#### b. Findings and Observations

No findings of significance were identified.

Seven other PERs were closed to PER 132649. However, some of the issues in these seven PERs were not specifically addressed by PER 132649, nor were previous similar events for each of the conditions evaluated. Only four of the seven closed PERs were referenced in PER 132649. In particular, the original condition described in PER 132649, on Engineering Department training effectiveness and staffing shortfalls, was not addressed by the broader PER. Additionally, some of the other PER conditions closed to PER 132649 that were not directly addressed, included on-line maintenance risk management (PER 133019), weaknesses in the work control process (PER 134677), poor industrial safety performance (PER 132659) and management of changes in the work force (PER 132660).

PER132651 was written as a result of the 2007 mid-cycle self-assessment and dealt with repeat events caused by ineffective cause analysis and corrective action, and with the timeliness of corrective action plans and actions. [Note, it was one of the PERs specifically addressed and referenced by PER 132649.] Numerous previous PERs written during the last two years have identified weaknesses with the CAP. However no rigorous evaluation was conducted on why actions from these PERs were ineffective in improving the program. The licensee initiated PER 147684 to review this condition and implement appropriate corrective actions.

Several actions were extended without a formal extension request. Action 21 of PER 132649 was originally due January 31, 2008, and was formally extended to February 29, 2008. However, review of the PER on March 5 showed the due date as March 7, 2008 and the action currently shows a due date of June 17, 2008. No extension request was submitted for these changes. Additional examples of due date extensions without extension requests were actions 22, 23, 24 and 25. The licensee initiated PER 147685 to review this condition and implement appropriate corrective actions.

Two actions in PER 132649 were not properly designated. One corrective action to prevent recurrence (CATPR), Action 40, was to re-perform the employee survey to identify changes in perceptions and to use the new station performance metrics to evaluate progress toward industry performance expectations. This action was an evaluation of the effectiveness of the other corrective actions and was not a true CATPR. The other CATPR, Action 41, was to develop a turn around plan. The development of the turn around plan, in of itself was not a CATPR. As a result, the turn around plan actions could be extended, changed or deleted without additional Corrective Action Review Board (CARB) review which was the licensee's practice for a CATPR. Thus, specific actions in the turn around plan which might be actions to prevent recurrence, i.e., CATPRs, could be extended, changed or deleted without their normal CARB review. The licensee initiated PER 147686 to review these conditions and implement appropriate actions.

One of the actions (Action 29) in PER 132649, was to issue a PER on any CAP metric (i.e., performance indicator) that was red for three months. This action was closed on January 31, 2008. To date, the only red CAP indicators that have had PERs written were the indicators for A and B PERs greater than 1 year old and the overall backlog of open PERs. Other CAP indicators that were currently red include Apparent Cause

Evaluation quality and percentage of effectiveness reviews that determine actions have been effective. No PERs have been submitted on these other red CAP PIs. The licensee initiated PER 147687 to review this condition and implement appropriate corrective actions.

.4 Focused Annual Sample Review - Turnaround Plan Equipment Reliability

a. Inspection Scope

In February 2008, the licensee instituted the Turnaround Plan to Excellence for the Browns Ferry Nuclear Plant. One of the major focus areas of this Plan was "Equipment Reliability." In the area of Equipment Reliability, the inspectors specifically reviewed the licensee's corrective action plans to address the principal aspects of "Top Equipment Priorities for System Health" and "Equipment Reliability Longterm Improvement." The inspectors also reviewed the most recent Plant Health Report and various System Health Report Cards (e.g., RHRSW/EECW), and attended several Plant Health Meetings. As part of these plant health and system reviews, the inspector reviewed the applicable program guidance of BP-254, Plant Health Committee and Conduct of Action Teams, and NEDP-12, System, Component and Program Health, Equipment Failure Trending. Furthermore, the inspectors interviewed responsible system engineers, Engineering Department management, Outage and Non-outage Work Control management, Corporate Systems and Component management, and Turnaround Plan management.

b. Findings and Observations

No findings of significance were identified.

The inspectors identified a number of observations which are described below:

- All the Top Equipment Priorities for System Health action plans were complete except for action #9 and #10. Action #9 for providing site wide communication on the top equipment issues was overdue since June 13, 2008. However, communication action plans were in progress. Action #10 for executing the actual work to resolve the numerous top equipment issues was the responsibility of the appropriate department managers (e.g., Engineering, Maintenance, Modifications, etc.) in accordance with specific schedules. The "First Round" of top equipment issues coded as T/A by the Turnaround Plan were scheduled to be implemented during the next two refueling outages (U1C7 and U2C15) and next two fiscal years. Essentially all of the outage related T/A top equipment issues were appropriately scheduled for the next Unit 1 and 2 refueling outages. However, only about half of the non-outage related T/A top equipment issues had definitive schedules for executing work within this and the next fiscal year. Of these unscheduled non-outage T/A equipment issues, almost all were associated with EDG reliability improvement. Due to the number and complexity of EDG reliability issues, the licensee just recently in July assigned a project manager to specifically coordinate execution of these issues

- Only about half of the Equipment Reliability Longterm Improvement actions plans were complete. Actions #1, 2, 5, 10 and 11 were still incomplete, some of which were overdue or needed significant revision. The first two action plans involved establishing a Plant Health Subcommittee by June 4, 2008, to accelerate System Health scrubs and assist the Plant Health Committee by identifying and escalating important issues. However, this subcommittee was never established. The licensee intends on revising/eliminating these actions. The development of long range action plans for improving important systems and components was due July 18, 2008. However, little had been accomplished to date, and the licensee was planning to revise their action plan approach and schedule. Action #10 for extracting the identification of critical spare issues was overdue since June 3, 2008. This action was still in progress.
- The verification of EECW flow through RHR room coolers per SI-3.2.4, EECW Check Valve Test, and 0-TI-54, EECW System Operational Flush, only measured the combined EECW flow for both RHR pump room coolers in a division. This measurement was made at the common EECW discharge header while both RHR room coolers were aligned in parallel. The EECW flow rate for individual RHR pump room coolers was not being measured, evaluated or trended to ensure adequate EECW flow. The licensee initiated PER 148300 to address this issue.
- There was no integrated project plan or schedule for addressing the numerous RHRSW/EECW system equipment reliability issues (e.g., motor replacement, power cable replacement, pump shaft replacement, RHR Hx service water outlet valve and inlet check valve replacement/repair, 2B and 2D RHR Hx floating head replacement, RHRSW/EECW sump pump leakage, etc.) to ensure maximum optimization of system unavailability and reliability. To date, the B3 EECW and A2 RHRSW pumps have exceeded their Maintenance Rule unavailability performance criteria and been entered into MR (a)(1) status, and the B2 RHRSW pump was at 75% of its unavailability performance criteria. The 1B, 2B, and 2D RHR Hx's have already exceeded their unavailability performance criteria and were also in MR (a)(1) status. Currently, the licensee continues to rely on their routine work control and scheduling processes to balance reliability and unavailability of future work.
- The Browns Ferry Equipment Reliability Indicator (ERI) indices for Units 2 and 3 have not shown any sustained improvement over the past three and half years. The ERI index for Units 2 and 3 have remained within a band of 59 to 71 (out of 100) since 2006. In addition, the first Unit 1 ERI index since restart was reported as 68 for the first quarter of 2008. The overall ERI indices for Units 2 and 3, have been oscillating around the Yellow/White threshold of 65 since 2006. Although, the licensee did not initiate a comprehensive PER to address their ineffectiveness at generating sustained improvement in overall plant equipment reliability performance, they did initiate individual PERs to develop recovery plans for the specific ERI sub-indicators that had turned Red. Furthermore, the licensee initiated PER 148702 to specifically improve the System Health/Plant Health Program.

- The number of systems identified by the system health process as Red and Yellow had been at 38 since September 2007. Following the most recent Unit 3 refueling outage (i.e., U3C13), the number of Red and Yellow systems improved to 34. However, the Plant Health Report issued in July indicated the number had increased back to 36 with a significant increase in the number of red systems from four to seven. A significant contributor to the persistent number of Red and Yellow systems was the backlog and increased age of S2 coded work orders [S2 code is for system issues that could lead to MR functional failure or exceed unavailability criteria; are needed to resolve a Red or Yellow condition; represent a degraded/non-conforming condition; have a significant impact on reactivity management, etc.]. The number of S2 coded work orders has increased from 330 to 375 since March 2008. The excessive backlog of these higher priority WO's and the station's difficulty in working them off was a significant contributor to the persistently high number of important systems that need system health improvement. The licensee was aware of these program issues and had initiated PER 148700 to address the impact of large backlogs on equipment reliability and the lack of effectively managing priority work.
- The "Road to Green" for almost all Red and Yellow systems in the Plant Health report were flagged as having inadequate corrective action plans to meet their goal of improving system health color by September 30, 2008. The licensee has not developed revised goals or action plans to improve their "Road to Green" performance. In addition, approximately one fourth of the 38 Red and Yellow systems had no specific date for a projected return to either White or Green. For those Red and Yellow systems that did have projected dates, these dates did not reflect the future impact of existing S2 WO's that were continuing to age and would exceed the 24 and 48 week thresholds. The licensee was aware of these program issues.
- As part of the Turnaround Plan, it was recognized that very few systems have long range improvement plans. PER 132638 had been initiated previously in October 2007 to address the lack of ownership and accountability for long range planning and asset management. Equipment Reliability Longterm Improvement is an integral part of the Turnaround Plan. However, the corrective actions of PER 132638 had not been updated to reflect subsequent changes by Corporate and site Project management in their proposed and ongoing actions.
- The last critical component failure trend report was completed in July 2007. However, this report did not initiate any PERs for adverse trends. Although, individual PERs were routinely issued for each critical component failure, no thresholds were established for initiating PERs to address potential adverse trends. There were several systems (e.g., Radiation Monitoring, 480V Reactor Motor Operated Valve Boards) with numerous critical component failures that might have warranted further evaluation as an adverse trend. The licensee intended to address these issues in the next critical component trend report due this year.

4OA5 Other Activities.1 (Closed) Unresolved Item (URI) 05000259, 260, 296/2007007-03, Degraded Flood Protection Doors for the Intake Cooling Structure

During the component design bases inspection conducted November 13, 2007, to December 14, 2007, an URI was identified concerning inadequate maintenance of watertight protection doors. This URI was initially discussed in NRC Inspection Report 05000259, 260, 296/2007007 dated January 25, 2008.

Introduction: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for the licensee's failure to identify and correct deficiencies in watertight doors that protect safety-related pumps from external flooding.

Description: The RHRSW and EECW pumps are housed in the A, B, C, and D rooms of the intake cooling structure. Each room is protected from external flooding by a watertight door. UFSAR Section 12.2.7.1.2 states, in part, that the doors protect the pumps from the probable maximum flood (PMF). The UFSAR also specifies that the watertight doors are to be inspected periodically. The licensee uses Maintenance Procedure, MPI-0-260-DRS001, Inspection and Maintenance of Doors, Section 7.8, "Chalk Test and Seal Adjustment – Watertight/Flood Doors" on a quarterly basis for maintaining the functionality of the doors.

On November 20, 2007, the inspection team observed closed watertight doors with gaps up to ½ inch between the door seal and door frame. The licensee's subsequent evaluation determined that three of the four doors would not provide adequate protection for the RHRSW and EECW pumps during a flood. The licensee initiated work orders to repair the doors and PERs 133899 and 134346.

The inspectors reviewed WO 07-717987-000 (completed September 26, 2007) which was the most recently completed quarterly inspection of the doors. The WO directed the performance of quarterly door inspections in accordance with Section 7.8 of Procedure MPI-0-260-DRS001. The work order documented all four doors were functional, although Door D had missing components (gear covers and two dog arms). The inspectors determined that based on the severity of the degradation in the door seals and the short duration between the September 2007 inspection and the discovery of the conditions on November 20, 2007, the degradation had existed at the time of the September 2007 inspection. Thus, the inspectors concluded that the inspection performed in September 2007 was inadequate.

Analysis: Brown Ferry's failure to identify and correct the degraded watertight doors that protect safety-related pumps during an external flooding event is a performance deficiency. This finding is more than minor because it affects the External Factors (Flood Hazard) attribute of the Mitigating Systems Cornerstone. It impacts the cornerstone objective of ensuring the availability, reliability, and operability of RHRSW and EECW pumps to perform their intended safety function during a design basis flooding event. In accordance with the SDP Phase 3 analysis was performed to

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determine the finding's significance because the finding involved the degradation of equipment designed to mitigate a flooding event and it was risk significant due to external initiating event core damage sequences. Using information from the licensee's river group concerning probability of flooding, input from the UFSAR describing the design basis flood, and records of discussions held before the Advisory Committee on Reactor Safeguards on October 9, 1985, a conservative estimate for the design basis flood was set to about E-3. Conditional Core Damage Probabilities (CCDPs) were calculated for cases where the B and D Rooms were flooded, and for the A, B, and D Rooms flooded. The initiating event frequency was multiplied by the CCDPs in sensitivity calculations, to obtain an idea of the risk using the bounding assumptions. The Core Damage Frequencies (CDFs) were assumed to be the same as the Large Early Release Frequencies, because the dominant sequences involved loss of containment heat removal at a Mark 1 BWR. The most limiting result for the change in CDF due to the condition was at the Green to White threshold. Because this was the upper bound and this evaluation contained a large degree of conservatism, the CDF was determined to be below the Green to White threshold. Thus, the finding was determined to be of very low safety significance, Green, because of the low likelihood of the design basis flood.

The finding was directly related to the cross-cutting aspect of procedural compliance of the work control component of the cross-cutting area of Human Performance. Mechanics were not complying with quarterly work orders and a maintenance procedure to assure functionality of the watertight doors (H.4(b)).

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, states, in part that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, conditions adverse to quality were not promptly identified and corrected, in that, gaps in the door seals for three doors which provide protection to safety-related pumps, were not identified during door inspections prior to their discovery by the NRC on November 20, 2007. Because this finding is of very low safety significance (Green) and because it was entered into the licensee's corrective action program as PER 133899 and 134346, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000259, 260 and 296/2008003-03, Failure to Identify and Correct Deficiencies in Degraded Flood Protection Doors.

## .2 Quarterly Resident Inspector Observations of Security Personnel and Activities

### a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

b. Findings

No findings of significance were identified.

.3 Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope

ISFSI Radiological Controls: The inspectors walked-down the ISFSI facility, observing the physical condition of the casks, radiological postings, and barriers. The inspectors performed independent gamma radiation surveys of the area and select casks, and reviewed gamma and neutron radiation surveys of the ISFSI facility performed by licensee personnel. Inspectors also compared the independent survey results to previous surveys and against procedural and TS limits. The inspectors evaluated implementation of radiological controls, including labeling and posting, and discussed controls with RP staff. Environmental monitoring results for direct radiation from the ISFSI were reviewed and inspectors observed the placement and physical condition of thermoluminescent dosimeters around the facility. ALARA planning for, and a self-assessment of, the most recent dry cask storage campaign were reviewed.

Radiological control activities for ISFSI areas were evaluated against 10 CFR Part 20, 10 CFR Part 72, and TS details. Documents reviewed are listed in section 4OA5 of the report Attachment. The inspectors completed the RP line-item sample activities specified in IP 60855.1.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

Exit Meeting Summary

On July 2, 2008, and the resident inspectors presented the integrated inspection results to Mr. Rusty West, and other members of his staff, who acknowledged the findings. During a conference call on July 17, 2008, the finding in Section 4OA5.2 was discussed with Mr. Steve Douglas and members of your staff. On August 4, 2008, the findings were re-exited with Mr. James Emens. The inspectors confirmed that proprietary information was not provided or examined during the inspection period.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure



## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee**

S. Berry, Systems Engineering Manager  
G. Boles, Corporate Systems and Components Manager  
S. Bono, Engineering Manager  
T. Brumfield, Site Nuclear Assurance Manager  
P. Chadwell, Field Maintenance Superintendent  
S. Douglas, General Manager of Site Operations  
A. Elms, Assistant General Manager Operations  
J. Emens, Site Licensing Supervisor  
D. Feldman, Interim Operations Manager  
E. Frevold, Design Engineering Manager  
J. Hopkins, Outage Scheduling Manager  
L. Hughes, Operations Superintendent  
D. Langley, Site Licensing Manager  
E. May, Radwaste Supervisor  
R. Marks, Extended Power Uprate Manager  
J. Mitchell, Site Security Manager  
W. Pinson, Projects Manager  
B. Robinson, Corporate Radiation Protection Manager  
R. Rogers, Maintenance & Modifications Manager  
P. Sawyer, Radiation Protection Manager  
E. Scillian, Operations Training Manager  
T. Schults, Balance of Plant System Engineering Supervisor  
R. Stowe, Nuclear Ops Support Superintendent  
J. Underwood, Chemistry Manager  
R. West, Site Vice President  
J. Woodward, Equipment Reliability Manager

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

#### **Opened and Closed**

05000259/2008003-01	NCV	Failure to Conspicuously Post, Barricade, and Control Access to a High Radiation Area During Power Ascension (Section 2OS1)
05000259, 260, 296/2008003-02	NCV	Failure to Secure Stored Radioactive Material from Unauthorized Removal (Section 2PS3)
05000259, 260, 296/2008003-03	NCV	Failure to Identify and Correct Deficiencies

Attachment

in Degraded Flood Protection Doors  
(Section 4OA5.1)

Closed

05000259, 260, 296/2007007-03      URI      Degraded Flood Protection Doors for the  
Intake Cooling Structure (Section 4OA5.1)

Discussed

None.

**LIST OF DOCUMENTS REVIEWED**

**Section 1R01: Adverse Weather**

Offsite and Alternate AC Power Systems Readiness

FSAR Section 8.0, Electrical Power Systems, BFN-22  
BP-336, Risk Determination and Risk Management, Rev. 7  
SPP-7.1, On Line Work Management, Rev. 10  
TRO-TO-SOP-10.128, Browns Ferry Nuclear Plant (BFN) Grid Operating Guide, Rev. 5  
TRO-RA-SOP-10.303, Nuclear Offsite Power – Grid Status Forecast Website, Rev. 0  
TRO-TO-SOP-10.328, Nuclear Offsite Power Disqualification Notification and Call-In Procedure,  
Rev. 4  
IGA-6, Intergroup Agreement, Transmission/Power Supply, Rev. 10

Readiness for Seasonal Extreme Weather Conditions

0-GOI-200-1, Attachment 14, Restoration from Freeze Protection, Rev. 59  
0-GOI-200-3, Hot Weather Preparations, initial completed package dated 5/31/08, Rev. 9  
FSAR Section 10.12, Heating Ventilation and Air Conditioning, BFN-22  
1, 2, 3-OI-24, Raw Cooling Water System, Revs. 47, 72, and 46 respectively  
Browns Ferry Report PA-104, Hot Weather Focus Area, dated 6/14/08

**Section 1R06: Internal Flood Protection Measures**

FSAR Section 12 Structures and Shielding, BFN-22  
TVA Browns Ferry Nuclear Plant Unit 1 Probabilistic Safety Assessment Internal Flooding  
Notebook, Rev. 1  
BFN-50-C-7105 General Design Criteria for Pipe Rupture, Internal Missiles, Internal Flooding,  
Seismic Equipment Qualification and Vibration Qualification of Piping, Rev. 9  
0-SR-3.6.4.1.1, Secondary Containment Equipment Hatches and Access Doors Position  
Verification, Rev. 9  
0-SI-4.11.G.2, Semiannual Fire Door Inspection, Rev. 21  
0-SI-4.11.G.2.a, Monthly Functional Test of Fire Door Supervision Circuits, Rev. 9  
0-SI-4.11.G.2.b, Fire Door Inspection, Rev. 17  
MPI-0-260-DRS001, Inspection and Maintenance of Doors, Rev. 34

Unit 1 Panel 9-3 Annunciator Response Procedure 1-ARP-9-3D, Window 23, Rx Bldg Water Tight Door Open, Rev. 21  
 Unit 3 Panel 9-3 Annunciator Response Procedure 3-ARP-9-3D, Window 23, Rx Bldg Water Tight Door Open, Rev. 26  
 Drawing 0-45E619-1, Wiring Diagram Door Interlock & Alarm System Schematic Diagram, Rev. 22  
 Drawing 1-45E620-2-2, Wiring Diagram Annunciator System Key Diagram, Rev. 8  
 Drawing 41N705, Concrete Foundation Plan & Sections Outline – Sheet 1, Rev. A

### **Section 1R07: Heat Sink Performance**

EPRI NP-7552, Heat Exchanger Performance Monitoring Guidelines, December 1991  
 CI-137, Raw Water Chemical Treatment, Rev. 18  
 0-OI-23, Residual Heat Removal Service Water System, Section 8.4, RHR Heat Exchanger RHRSW Side Chemical Layup, Rev. 85  
 GL 89-13 Heat Exchanger Visual Inspection and Evaluation packages for 1B (May 2007), 1D (October 2007), 3A (April 2008), 3B (March 2008), 3C (April 2008), and 3D (February 2008)  
 Corrosion Monitoring Visual Inspection and Evaluation packages for 2A (May 2005), 2B (December 2006), 2C (November 2006), and 2D (November 2004)  
 PER 146770, Weekly Chemical Treatment Not Performed

### **Section 1R11: Licensed Operator Requalification**

OPDP-1, Conduct of Operations, Rev. 9  
 OPL178.092, Simulator Evaluation Guide, Radiation Monitor Failure, Failure of RPS “A” with Failure of “C” SBGT to Start, Dual Recirc Pump Trip, Reactor Scram, Stuck Open SRV and SRV Tailpipe Break in Containment, Rev. 0  
 OTG-46, Evaluation of Simulator/Plant Differences, Rev. 0

### **Section 1R12: Maintenance Effectiveness**

#### **Problem Evaluation Reports**

35419, Valve 3-FCV-023-0046 Disk Found Separated from Stem  
 38168, Anti-Rotation Plate for BFN-3-FCV-023-0046 Found On Top of Packing Gland  
 38915, 2-FCV-23-52, 2D Outlet Valve Handwheel Fell Off  
 41912, 3-FCV-23-46 Anti-Rotation Device Out of Position Several Occasions  
 44050, 2-FCV-023-0040 Valve Seat Requires Machining for Proper Leakage Prevention  
 50732, Valve 2-FCV-23-0040 Repeat Maintenance Due to Gasket Leakage  
 59437, Handwheel for 2-FCV-23-52 Dislocated From Limitorque Stem  
 101897, 2-FCV-23-52 Stem Cover Fell Off  
 104621, MR PC exceeded on 3A RHR HX  
 114173, Handwheel for valve 2-FCV-23-52 Found On the Floor  
 122218, Stem failure of 2-FCV-23-52  
 140768, 3-FCV-23-34 Stem Separated from Disc  
 140824, 3-FCV-23-40 Stem Separated from Disc  
 141137, 3-FCV-23-46 Stem Separated from Disc  
 141219, 3-FCV-23-52 Broken Tack Welds

Work Orders

94-020161-000, Reinstall 2-MVOP-23-40 Handwheel  
 98-011271-001, Reinstall 3-MVOP-23-46 Stem Anti-Rotation Collar  
 00-003802-000, Disassemble and Refurbish 3-FCV-23-46  
 00-008114-000, Take Vibration Data On 3-FCV-23-46  
 02-003214-000, Reinstall 2-MVOP-23-52 Handwheel  
 02-004605-000, Reinstall Handwheel With Mod On 2-MVOP-23-52  
 02-004605-001, Install Handwheel Mod On 2-MVOP-23-46  
 02-004605-002, Install Handwheel Mod On 2-MVOP-23-40  
 02-004605-003, Install Handwheel Mod On 2-MVOP-23-34  
 02-004605-004, Install Handwheel Mod On 3-MVOP-23-52  
 02-004605-005, Install Handwheel Mod On 3-MVOP-23-46  
 02-004605-006, Install Handwheel Mod On 3-MVOP-23-40  
 02-004605-007, Install Handwheel Mod On 3-MVOP-23-34  
 02-006589-001, Repair Operator Shaft and Reinstall Handwheel On 2-MVOP-23-52  
 03-003010-000, Disassemble, Inspect, and Repair 2-FCV-23-40  
 03-006967-001, Install New Valve Disc On 2-FCV-23-40  
 03-007163-000, Realign 3-MVOP-23-46 Anti-Rotation Collar  
 04-714325-000, Realign 3-MVOP-23-46 Anti-Rotation Collar  
 04-717160-000, Install Anti-Rotation Collar Mod On 3-MVOP-23-46  
 04-717160-001, Install Anti-Rotation Collar Mod On 3-MVOP-23-52  
 04-722062-000, Realign 3-MVOP-23-34 Anti-Rotation Collar  
 04-722067-000, Realign 3-MVOP-23-40 Anti-Rotation Collar  
 05-722104-000, Machine 2-FCV-23-40 Fluted Disc  
 06-716018-000, Reinstall 2-MVOP-23-52 Stem Cap  
 06-718716-000, Replace 3-MVOP-23-52 Stem Cap  
 06-725311-000, Disassemble and Inspect 2-FCV-23-52  
 07-720665-000, Replace 3-FCV-23-34 Packing, Handwheel Key, and MOVATS  
 08-711543-000, Disassemble, Inspect, and Refurbish 3-FCV-23-34  
 08-711544-000, Disassemble, Inspect, and Refurbish 3-FCV-23-40  
 08-711545-000, Disassemble, Inspect, and Refurbish 3-FCV-23-46  
 08-711546-000, Disassemble, Inspect, and Refurbish 3-FCV-23-52

Procedures

MCI-0-000-GLV001, Generic Maintenance Instruction for Globe Valves, Rev. 21  
 2-SI-3.2.1, First and Augmented In-Service Test Valve Performance, Rev. 23  
 3-SI-3.2.1, First and Augmented In-Service Test Valve Performance, Rev. 9  
 2-SI-4.5.C.1(3), Residual Heat Removal Service Water Pump and Header Operability and Flow Test, Rev. 98  
 3-SI-4.5.C.1(3), Residual Heat Removal Service Water Pump and Header Operability and Flow Test, Rev. 30  
 Functional Evaluation 42538 (PER 141380) Unit 2 Heat Exchanger Outlet Valves 2-FCV-23-34, -40, -46 & 52  
 Functional Evaluation 42520 (PER 141380) Unit 3 Heat Exchanger Outlet Valves 3-FCV-23-34, -40, -46 & 52 and 2-FCV-23-52  
 0-OI-23, Residual Heat Removal Service Water System, Rev. 45

Other Documents

Engineering Design Change 69327, Revise design output to allow repair of valves as needed

**Section 1R15: Operability Evaluations**

Functional Evaluation 42592, C3 EECW Pump

WO 08-715525-001, Remove packing, inspect and reinstall packing on B3 RHRSW Pump

MSI-0-000-PCK001, Rains-Flo Packing Guide, Rev. 1

Functional Evaluation 42538 for PER 141380, U2 Heat Exchanger Outlet Valves 2-FCV-23-34, -40, -46, & -52, dated April 11, 2008

Technical Specifications and Bases 3.7.1, Residual Heat Removal Service Water (RHRSW) System and Ultimate Heat Sink (UHS), Amendment 214

FSAR Section 10.9, RHR Service Water System, BFN-22

Functional Evaluation (FE) 42539, Unit 2 Torus Snubber (torus dynamic restraint) 2-SNUB-64-1

PER 141653 Torus Snubber 2-SNUB-64-1

PER 141606 Torus Snubber 2-SNUB-64-1 LCO Due to Replacement

Civil Engineering Branch Report CEB-83-34, Browns Ferry Nuclear Plant Torus Integrity Long-Term Program, Plant Unique Analysis Report, Revision 2

Civil Engineering Branch Report CEB-76-23, Torus Support System and Attached Piping Analysis for the Browns Ferry Nuclear Plant Units 1, 2, and 3, Revision 1

Drawing 2-48W1265-1, Miscellaneous Steel Torus Dynamic Restraints Installation and Details, Revision 2

Technical Requirements Manual and Bases 3.7.4 Snubbers, Revision 42

FSAR Section 5.2.3.3.2, Description of the Pressure Suppression Pool (Torus) Modifications, BFN-22

FSAR Appendix C, Structural Qualification of Subsystems and Components (C.2.5, C.3.5, and C.5.3), BFN-22

WO 08-714033-000 Torus Snubber 2-SNUB-64-1 Replacement

BFN-50-C-7100, Attachment A, Browns Ferry Nuclear Plant General Design Criteria for the Torus Integrity Long-Term Program, Revision 17

Functional Evaluation 42520 for PER 140768, U3 Heat Exchanger Outlet Valves 3-FCV-23-34, -40, -46, & -52, and 2-FCV-23-52, dated April 26, 2008

Functional Evaluation 42616 for PER 143128, BFN-3-FCV-23-46 Experiencing Abnormal Vibration, dated May 13, 2008

0-OI-23, Residual Heat Removal Service Water System, Revisions 84 and 85

Technical Specifications and Bases 3.7.1, Residual Heat Removal Service Water (RHRSW) System and Ultimate Heat Sink (UHS), Amendment 214

FSAR Section 10.9, RHR Service Water System, BFN-22

Functional Evaluation 42524, Inadvertent De-Tensioning of CRD 34-07, April 19, 2008

PER 141170 De-Torque of Incorrect Control Rod Drive

MCI-0-085-CRD001, Control Rod Drive Removal and Installation, Revision 43

3-POI-200.5, Operations with Potential to Drain the Reactor Vessel/Cavity, Revision 10

SPP-7.2, Outage Management, Revision 7

Outage Risk Assessment Management (ORAM) Safety Function Run for 3/30/08 2300 to 3/31/08 0500

CRD 34-07 De-Tensioned Analysis Report: GEH 0000-0084-2605, GE/Hitachi Nuclear Energy, LLC, Letters GEH 1-1X3GSU-002 and -003 respectively April 18 and 25, 2008

TVA Record of Visual Examination for CRDM Bolting for CRDN-3-3407-BC, April 21, 2008

GE Services Information Letter (SIL) 483 CRD Cap Screw Crack Indications, August 5, 1992  
 Functional Evaluation 42331 (PER 133899), RHRSW Pump Room Doors  
 EDG 1C and 3D Bearing Vibration Trend data  
 Functional Evaluation (PER 143225), 3D EDG High Vibration Issue  
 Operational Decision-Making Issue (ODMI) Evaluation Document for PER 143225  
 ODMI Evaluation Document for PER 116989  
 Unit 2 HPCI Oil Analysis Results  
 Functional Evaluation 42603 (PER 144253), Unit 2 HPCI Main Steam Admission Valve Seat Leak

### **Section 1R18: Plant Modifications**

TACF 1-08-002-085, Installation of Temporary Manual Isolation Valve downstream of 1-DRV-085-0659, Seal Water Drain Valve  
 TACF 2-08-002-073, Leak Repair of 2-FCV-73-81, HPCI Steam Line Warmup Valve  
 WO 07-717733-002, Install 2" Drain Valve downstream of Valve BFR-1-DRV-085-0659, to Stop Leakage  
 WO 08-713467-002, Fermanite repair to 2-FCV-73-81  
 1-OI-85, Control Rod Drive System, Rev. 8  
 1-OI-85/Attachment 1, Control Rod Drive System Valve Lineup Checklist, Rev. 2  
 2-OI-73, High Pressure Coolant Injection, Rev. 78  
 2-ARP-9-3F, Alarm response Procedure, Rev. 26  
 2-GOI-100-12A, Unit Shutdown from power Operation to Cold Shutdown and Reduction in Power During Power Operations, Rev. 87  
 2-AOI-64-2B, Group 4 High Pressure Coolant Injection Isolation, Rev. 14  
 2-SR-3.3.3.1.4(G), Verification of Remote Position Indicators for High Pressure Coolant Injection System Valves, Rev. 4  
 2-SR-3.3.3.1.1, Required PAM Instrumentation Channel Checks, Rev. 13  
 2-SR-3.3.5.1.6(FT), HPCI System Logic Functional Test, Rev. 11  
 2-SR-3.6.1.3.5(HPCI), HPCI System Motor Operated Valve Operability, Rev. 20  
 1-47E820-2, Flow Diagram Control Rod Drive System, Rev. 7  
 2-47E812-1, Flow Diagram High Pressure Coolant Injection System, Rev. 54

### **Section 1R19: Post Maintenance Testing**

PER 147128 Unit 1 HPCI Steam Supply Valve Failed to Open and Close  
 PER 144253 Unit 2 HPCI Oil Sample High Moisture  
 2-SI-4.5.C.1(3), RHRSW Pump and Header Operability and Flow Test, Rev. 98  
 3-SI-4.5.C.1(2), EECW Pump Operation, Rev. 96, Completed package dated May 23, 2008  
 3-SI-4.5.C.1(3), RHRSW Pump and Header Operability and Flow Test, Rev. 30, Completed package dated April 26, 2008  
 1-SR-3.3.3.1.4(G), Verification of Remote Position Indicators for HPCI System Valves, Rev. 0  
 1-SR-3.6.1.3.5(HPCI), HPCI System Motor Operated Valve Operability, Rev. 3  
 1-SR-3.3.5.1.3(D), HPCI Condensate Header Low Level Switch Calibration and Functional Test, Rev. 2  
 2-SR-3.5.1.7, HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Reactor Pressure, Revision 43  
 Technical Specifications 3.5.1 and Bases, Amendment 294

Technical Specifications 3.7.2 and Bases, Emergency Equipment Cooling Water System and Ultimate Heat Sink

WO 08-711545-000, RHR HX Cooling Water Outlet Valve Disassemble, Inspect, and Refurbish  
 WO 08-715591-001, 3-FCV-23-46 Flow and Vibration Data Collection  
 WO 08-711545-001, MSB Support for 3-FCV-23-46 and MOVATS  
 WO 08-711545-002, 3-FCV-23-46 Disassemble and Inspect for Excessive Noise  
 WO 08-711545-003, 3-FCV-23-46 Limitorque Rebuild and MOVATS  
 WO 08-711545-004, 3-FCV-23-46  
 WO 05-721415-000, Motor Replacement  
 WO 06-722466-000, Repair Packing Leaks  
 WO 07-725807-000, Strainer A Gear Oil Change and Valve Inspection  
 WO 07-726655-005, Cable Replacement  
 WO 07-726655-014, A3 EECW Pump Uncoupling, Recoupling, and Impeller Set  
 WO 07-725566-008, Implement DCN 63959 Stage 8, Replace Cable to D1 RHRSW Pump  
 WO 07-725566-009, Remove/Reinstall Thermal for RHRSW Pump Cable Replacement (JBOX 4859, 108, 8542, 8553  
 WO 07-725566-017, Couple/Uncouple D1 RHRSW Pump  
 WO 08-717402-000 HPCI Steam Valve 73-16 Disassembly, Inspect, and Repair  
 WO 08-717402-003 HPCI MOVATS  
 WO 08-711587-000, Replacement of 1-LS-073-0056A  
 WO 08-715815-000 HPCI Turbine Oil Inspection  
 WO 08-715815-001 HPCI Turbine Bearing Disassembly and Inspection  
 WO 08-715815-005 HPCI Turbine Oil Cleanup  
 WO 08-717848-000, Shaft Replacement on 2B RHR Room Cooler  
 MMDP-1, Maintenance Management System, Rev. 12  
 1-OI-73, Section 8.4 and 8.5, HPCI CST-to-CST Recirc and Restoration to Standby respectively, Rev. 9  
 2-OI-73 HPCI System, Section 8.2, Warm and Pressurize HPCI Steamline,  
 0-TI-134, Core Spray and Residual Heat Removal Coolers Air Flow Verification, Rev. 15  
 0-TI-230V, Vibration Program, Rev. 5  
 MPI-0-000-BLT001, Belt Drive Maintenance, Rev. 43  
 MSI-0-000-PRO002, Fabrication of Parts for Safety Related Application, Rev. 10  
 1-47E811-1, Flow Diagram High Pressure Coolant Injection System, Rev. 29  
 1-45E714-2, Wiring Diagram 250 VDC Reactor MOV BD 1A Schematic Diagram, Rev 8  
 Functional Evaluation 42603, PER 144253 Unit 2 HPCI Oil Sample High Moisture

**Section 20S1: Access Control To Radiologically Significant Areas**

Procedures

RCDP-7, Bioassay and Internal Dose Program, Rev. 1  
 RCI-1.2, Radiation, Contamination and Airborne Surveys, Rev. 3  
 RCI-9.1, Radiation Work Permit, Rev. 57  
 RCI-17, Control of HRAs and VHRAs, Rev. 60  
 RCI-26, Radiation Protection Standards and Expectations, Rev. 12  
 SPP-5.1, Radiological Control Program, Rev. 6  
 1-GOI-100-1A, Unit Startup, Rev. 11 (effective 8/17/07)  
 SPP-3.1, Corrective Action Program, Rev. 13

Radiation Work Permits

07280004, U2C14 drywell miscellaneous maintenance outside support (dose control)  
 07282265, U2C14 drywell work above 604' elevation during fuel movement to remove/replace valve 2-CKV-75-26  
 07282205, U2C14 drywell, 2B recirc motor/seal/pump replacement  
 07270695, U2C14 reactor building maintenance on RWCU system  
 07270696, U2 reactor building all elevations  
 07224025, U2C14 pre-outage ISI  
 08380006, Drywell miscellaneous maintenance (LHRA various dress)  
 08380852, U3C13 drywell CRD change-out RP coverage  
 08380854, U3C13 drywell CRD change-out, outside support  
 08380855, U3C13 drywell CRD change-out (HRA)  
 08380856, U3C13 drywell CRD change-out (LHRA)  
 08380857, U3C13 drywell CRD change-out (LHRA, bubble suit)  
 08380925, U3C13 drywell maintenance on neutron monitoring system (HRA)  
 08380926, U3C13 drywell maintenance on neutron monitoring system (LHRA)  
 08380929, U3C13 drywell maintenance on neutron monitoring system (LHRA, respirator)

Records and Data

Survey 030707-10, Unit 2 Drywell 563', 3/6/07  
 Survey 032507-2, U2 Reactor Building 621' Demin Valve Room, 3/25/07  
 Survey 032507-3, U2 Reactor Building 621' Demin Valve Room, 3/25/07  
 Survey 030607-3, U2 Reactor Building 621' Demin Valve Room, 3/05/07  
 Survey 033108-26, U3 Drywell 628', 3/31/08  
 Survey 033108-29, U3 Drywell 616', 3/31/08  
 Survey 033108-28, U3 Drywell 604', 3/31/08  
 Survey 033108-40, U3 Drywell 584', 3/31/08  
 Survey 033108-41, U3 Drywell 563', 3/31/08  
 Survey 033108-39, U3 Drywell 550', 3/31/08  
 Control Rod Drive Assembly Surveys: 033108-38, 040108-8, 032708-21, 040208-7, 032608-32, 032608-35, 032608-29, 040108-24, 032608-33, 040208-2, 033108-36, 040108-9, 040208-9, 032608-27, 032608-28, 032608-1, 040108-11, 032708-5, 032708-3, 032608-34, 040208-1, 032608-18, 032608-31  
 ALARA Planning Report 08-0047, U3C13 Outage Undervessel Work Activities  
 TEDE-ALARA Assessments (08-052, 08-053, 08-065, 08-068, 08-071, 08-072)

BFN U3C13 Outage Personnel Contaminations Report, 4/03/08  
 Whole body count reports, 2/8/08 – 4/1/08

CAP Program Documents

NA-BF-08-001, Quarterly Oversight Report for October 1, 2007 – December 31, 2007  
 BFN-RP-07-005, High Radiation Area / Locked High Radiation Area Controls, 9/07  
 PER 99818, Unanticipated dose rate alarms received in U3 moisture separator room, 3/23/06  
 PER 119829, Unanticipated dose rate alarm building scaffold on RHR line (U2 torus), 2/16/07  
 PER 120861, Dose rate alarm due to wrong RWP, 3/4/07  
 PER 121347, Worker used wrong RWP, 3/12/07  
 PER 125917, Alpha monitoring guidelines for operating nuclear power stations, 6/7/07  
 PER 126211, Dose rates in U1 moisture separator room, 6/13/07



PER 126213, Response to moisture separator high rad event, 6/13/07  
 PER 126442, Radioactive shipment manifest incorrect, 6/19/07  
 PER 127629, High radiation area events trend, 7/17/07  
 PER 128878, U1 turbine rolled without notifying RP, 8/15/07  
 PER 129685, Adverse trend in BFN Operations Department communications, 8/30/07  
 PER 132443, BFN-RP-07-005 self-assessment AFI #8, 10/21/07  
 PER 134362, Unanticipated dose rate alarms U3 TB while building scaffold, 11/29/07

### **Section 2OS3: Radiation Monitoring Instrumentation and Protective Equipment**

#### Procedures and Guidance Documents

1-TI-24, Primary Containment Leak Detection Continuous Air Monitor (CAM) 1-RM-90-256 Alert and High Alarm Setpoint Determination, Rev. 2  
 1-ARP-9-3D, Alarm Response Procedure, Rev. 21  
 SPP-6.6, Maintenance Rule Performance Indicator Monitoring, Trending and Reporting – 10 CFR 50.65, Rev. 9  
 0-TI-346, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10 CFR 50.65, Rev. 33  
 Emergency Plan Implementing Procedure EPIP-12, Emergency Equipment and Supplies, Rev. 6  
 Emergency Operating Instruction EOI-3, Secondary Containment Control Guideline, Rev. 0  
 FP-0-000-INS027, Self Contained Breathing Apparatus (SCBA), Rev. 9

#### Reports, Records and Data

PIC 69281, BFN-1-PMP-90-256 Pump Change, 1/30/08  
 U3 Plant Mix Smear Gamma Spec Results, 6/5/08  
 Browns Ferry Nuclear Plant Annual Radionuclides Trend and Assessment Report for 2007 System Health Report Cards, Radiation Monitoring, Units 1, 2, and 3 (Fiscal Years 2006 and 2007)  
 Design Criteria Document BFN-50-7090, Radiation Monitoring System, Rev. 14  
 BFNAPS3-014, Reactor Coolant Leakage Detection Monitor Sample Line Loss Review, 2/11/88  
 Calculation ED-N-090-940030, Appendix A, Interdisciplinary Review and Acceptance of Setpoint and Scaling Calculation Results, Rev. 3  
 Calculation ED-N-090-940030, 1/2/3-R-90-256 Setpoint and Scaling Calculation, Rev. 10  
 Calculation NDQ0090920110, Containment high Range Monitor, Rev. 7  
 Calculation NDQ0090930055, Drywell Radiation Monitor Reading for the Emergency Action Level (EAL), Rev. 12  
 SSD 2R-090-272A-00-02, Setpoint and Scaling Document, Rev. 2  
 WO 08-710149-000, Calibrate PCM-2 #007, 5/6/08  
 WO 08-710123-000, Calibrate PM-7 Radiation Monitor 0-MON-90-1003, 3/11/08  
 WO 04-713949-000, Calibrate 3-RR-090-0001 and associated ARMs and power supplies (3-RM-90-26)  
 WO 06-723798-000, Calibrate 3-RR-090-0001 and associated ARMs and power supplies (3-RM-90-26)  
 WO 04-714634-000, Calibrate 2-RR-90-0001 and associated equipment (2-RM-90-30)  
 WO 06-724143-000, Calibrate 2-RR-90-0001 and associated equipment (2-RM-90-30)  
 WO 03-002221-000, Calibrate 1-RE-90-21 and associated equipment  
 WO 06-711834-000, Calibrate 1-RE-90-21 and associated equipment

WO 05-719632-000, Calibrate 1-RE-90-11 and associated equipment  
 WO 03-001824-000, Calibrate 1-RE-90-11 and associated equipment  
 1-SR-3.4.5.4, Drywell Leak Detection Radiation Monitor Calibration and Functional Test 1-RM-90-256, 8/22/07  
 1-SR-3.4.5.4, Drywell Leak Detection Radiation Monitor Calibration and Functional Test 1-RM-90-256, 6/7/07  
 Regulator Maintenance Records: SCBA Kit 55 (10/30/07, 10/10/06, 12/02/05, 2/7/05, 1/25/04), SCBA Kit 18 (12/20/07, 1/23/07, 2/16/06, 3/7/05, 2/21/04), SCBA Kit 19 (12/20/07, 1/23/07, 2/16/06, 3/7/05, 2/21/04)  
 Breathing Air Testing: Compressor 012H-1080 (3/28/08, 1/12/07, 2/27/08, 11/28/07, 8/23/07, 3/19/07), Compressor 012H-1078 (3/31/08, 2/19/08, 11/28/07, 8/23/07, 6/7/07, 3/19/07, 1/12/07)  
 Calibration: Bicron RSO-50, s/n A1905, 12/17/07  
 Calibration: Ludlum 1204, s/n 92319, 1/22/08  
 Calibration: Bicron RSO-5, s/n A255C, 1/24/08  
 Calibration: Eberline Teletector, s/n 120977, 4/21/08  
 Calibration: Bicron Surveyor 50, s/n C149E, 3/28/08  
 Calibration: Bicron RSO-5, s/n A956F, 3/3/08  
 Calibration: Bicron RSO-50, s/n A2075, 3/11/08  
 Calibration: Ludlum 12-4, s/n 215355, 2/21/08

#### Corrective Action Program Documents

PER 101930, Out of service CAMs  
 PER 103878, 1-RE-90-11 bug source missing  
 PER 113847, Many of BFN's radiation protection instruments are in excess of 20 years old  
 PER 121212, New panel mounting location creating radiation shield  
 PER 124651, Drywell post accident monitor setpoints  
 PER 125847, Unplanned LCO entry for 1-RM-90-256  
 PER 126317, Functional failure for 1-RE-90-22  
 PER 129050, PCLD CAM sample piping bends  
 PER 131395, Contaminated individual at Hatch  
 PER 131985, BFN-RP-07-003 Radioactive Material Control Self-Assessment AFI#1, release instrumentation operational checks, calibration methods, and evaluation of plant contamination composition increase the potential for inadvertent release of radioactive material from RCAs and the site  
 PER 136328, 1-RM-90-256 Inop  
 PER 137937, Insufficient smear count time for alpha  
 PER 138527, Potential compliance instrumentation issue, 1-RM-90-256  
 PER 139866, Longer personnel contamination monitor count times  
 PER 146427, PER 129050 inappropriately closed  
 PER 146435, Tip room area radiation monitor

#### **Section 2PS1: Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems**

##### Procedures, Instructions, Guidance Documents, and Operating Manuals

CI-738, Sampling Effluent Monitors (CAMS) for Tritium and Gamma Isotopics, Rev. 27  
 0-SI-4.8.B.2-8, Airborne Effluent Analysis – Stack Noble Gas, Rev. 10

0-TI-45, Liquid Process Radiation Monitors, Rev. 14  
 0-TI-15, Radioactive Gaseous Effluent Engineering Calculations and Measurements, rev. 15  
 CHTP-109, Chemistry QA/QC, 3/14/08  
 SPP-3.1, Corrective Action Program, Rev. 13  
 0-ODCM-001, Offsite Dose Calculations Manual, Rev. 19  
 SPP-5.14, Guide for Communicating Inadvertent Radiological Spills/Leaks to Outside Agencies,  
 Rev. 1

#### Reports, Records, and Data

Browns Ferry Nuclear Plant Investigation of Tritium Releases to Groundwater  
 Annual Radioactive Effluent Release Reports, 2006 and 2007  
 0-SI-4.2.D.1, Liquid Radwaste Monitor Calibration/Functional Test, 5/30/06, 6/26/06, and  
 9/26/07  
 0-SI-4.2.D.4, Liquid Radwaste Effluent Flow Rate (77-60 Loop) Calibration/Functional Test,  
 7/13/06 and 12/29/06  
 0-SI-4.2.K.4.a, Radwaste Building Vent Exhaust Monitor Source Calibration and Functional  
 Test 0-RM-90-252, 5/29/06 and 8/28/07  
 2-SI-4.2.K.2.d, Reactor Building Vent Exhaust Monitor Sample Flow Calibration and Functional  
 Test 2-RM-90-250, 4/18/06 and 11/26/07  
 0-SI-4.2.K.1, Airborne Effluents – Main Stack Monitoring System Calibration, 8/25/06 and 2/8/08  
 3-TI-161, Determination of Offgas Prefilter Performance, 5/25/07 and 8/15/07  
 Radioactive Effluent Release Permit Nos. 80014.002.002.L (4/3/08), 80029.002.003.L (6/4/08),  
 80333.030.022.G (4/23/08), and 80470.030.030.G (6/4/08)  
 Results of Count Room Inter-laboratory Cross-Check Program, 2006 and 2007  
 Germanium Detector No.3, QC Trend Logs, 1/1/07 – 6/1/08  
 Liquid Scintillation Detector, QC Trend Logs, 1/1/08 – 6/3/08  
 Compensatory sample data for selected out-of-service effluent radiation monitors, February  
 2006 – May 2008

#### Corrective Action Program Documents

Audit No. SSA0702, Radiological Protection and Control Programs, 2/15/08  
 PER 100200, Radiation monitor 1-RM-90-132 out of service greater than 30 days, 3/31/06  
 PER 135165, Potential trend in ODCM compensatory sampling near misses, 12/13/07  
 PER 142731, Radiation monitor 2-RM-90-133 out of service greater than 30 days, 4/21/08  
 PER 96105, 10 CFR 50.75(g) documenting groundwater sampling results from onsite wells (5%  
 of EPA drinking water limit max).  
 PER 96242, 10CFR 50.75(g) documenting historic leakage into cable tunnel  
 PER 113100, A five gallon per minute leak was discovered inside the radioactive waste piping  
 tunnel. (Majority of water was due to ground water intrusion).  
 PER 134094, Pin hole leak identified in radwaste line in radwaste piping tunnel by camera. (This  
 is a follow on action in response to PER 113100.)  
 PER 139809, Describes an event where the unit 3 condensate storage tank overflowed into the  
 condensate piping tunnel (11000 gallons). PER created to document event for  
 decommissioning records.

### **Section 2PS3: Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program**

#### Procedures, Instructions, Guidance Documents, and Operating Manuals

0-ODCM-001, Offsite Dose Calculations Manual, Rev. 19  
 EMSTD-01 (WARL), Environmental Radiological Monitoring Program, Rev. 24  
 G-03 (WARL), Gamma Analysis by Germanium Spectroscopy, Rev. 6  
 I-01 (WARL), Iodine 131 Activity Determination in Environmental Samples, Rev. 11  
 SC-03 (WARL), Calibration Procedure For Radiological Environmental Monitoring Air Sampler System Gas Meter, Rev. 4  
 SP-01 (WARL), Sample Preparation, Rev. 7  
 SR-01(WARL), Radiochemical Determination Of Strontium-89-90 In Environmental Samples, Rev. 17  
 T-01 (WARL), Beta Activity Determination By Liquid Scintillation, Rev. 15  
 TLD-0018 (WARL), Environmental Dosimetry Procedure, Rev. 10  
 CI-420, Collection of Radiological Environmental Monitoring Samples, Rev. 1  
 RCI-11.3, Radiation Protection Radiation / Contamination Instrument Maintenance, Rev. 4  
 RCI-1.2, Radiation, Contamination and Airborne Surveys, Rev. 3  
 SPP-3.1, Corrective Action Program, Rev. 13  
 BFN UFSAR Section 2.6, Environmental Radiological Monitoring Program

#### Records and Data

Tennelec LB-5100 #129, Control Chart (Beta), January-December 2007  
 Control Charts(Beta-Gamma Coincidence System), #110, 111 and 112, January- December 2007  
 Control Charts Germanium Detectors #141, 143, 148, 149 and 154, January- December 2007  
 Control Charts Liquid Scintillation Detectors #283, 284 and 285, January- December 2007  
 Laboratory Cross check results for 2007 (WARL)  
 Laboratory Cross check Browns Ferry Count room 2007  
 Browns Ferry Annual Environmental Operating Report, 2006  
 Browns Ferry Annual Environmental Operating Report, 2007  
 Calibration Data Sheet, Air sampling Station Gas Meter LM-4A, 3/6/07  
 Calibration Data Sheet, Air sampling Station Gas Meter LM-1, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter LM-2, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter LM-3, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter LM-4A, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter LM-4B, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter LM-6, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter LM-7, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter PM-1A, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter PM-1B, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter PM-2, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter PM-2A, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter PM-3, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter RM-1, 11/30/07  
 Calibration Data Sheet, Air sampling Station Gas Meter RM-6, 11/30/07  
 Small Article Monitor (SAM-11) Calibration Form, #841990, 2/15/08  
 Small Article Monitor (SAM-11) Calibration Form, #860067, 2/14/08

Small Article Monitor (SAM-11) Calibration Form, #860216, 12/1/07  
 Survey 081407-11, Green Tag Pipe Thread Sealant, 8/14/07  
 Gamma spectral analysis, Pipe Thread Sealant, 8/14/07

#### Corrective Action Program Documents

PER 140934, Change from cloth lanyards to nonporous rubber lanyards to reduce contamination spread potential  
 PER 141237, Individual alarmed PM-7 at gatehouse  
 PER 141357, Received bag of trash from laundry vendor with incorrect dose rates on label.  
 PER 122505, Three of 12 guy cables on met tower needed tension adjusted.  
 PER 137621, During ERM&I self assessment differences were noted between the sites with regard to the use of a Periodic Instruction package for weekly sample collection.  
 PER 137618, Describes a change in practice resulting from changing environmental dosimeter vendors that had not been captured in procedures.  
 BFN-RP-07-003, 2007 Radioactive Material Control Self Assessment, 8/07  
 PER 128870, Contaminated material in dumpster, 8/14/07  
 PER 127909, Contaminated mop bucket outside RCA, 7/24/07

### **Section 40A1: Performance Indicator Verification – Occupational Safety**

#### Procedures

RCI-39, Radiation Protection Cornerstones, Rev. 1

#### Records and Data

Radiation Protection FY 2007 Cornerstone Performance (9/07)  
 Radiation Protection FY 2008 Cornerstone Performance (12/07, 2/08)  
 BFN Key Control Record (RCI-17), 3/7/07 – 3/24/07  
 Survey 040707-10, U1 Radwaste 565' evaporator room, 4/7/07  
 Survey 040707-5, RB 541' 55 gallon drum with CRD filters from U1 A CRD pump, 4/7/07  
 Survey 032108-38, Reactor vessel drain line lead replacement, 3/21/08

#### CAP Documents

Radiation Protection Integrated Trend Review (September – December 2007)  
 Radiation Protection Integrated Trend Review FY 2007 (April – August)  
 Radiation Protection Integrated Trend Review Second Quarter FY 2007 (January – March)  
 PER 122984, Unanticipated dose rate alarm moving CRD suction filter, 4/7/07  
 PER 122654, Dose alarm in U2 565' steam tunnel, 4/1/07  
 PER 122183, LHRA in U2 RWCU demin valve room, 3/25/07  
 PER 140622, Drywell worker receives dose alarm, 3/21/08

### **Section 40A1: Performance Indicator Verification – Public Radiation Safety**

#### Procedures and Guidance Documents

CI-138, Reporting NEI Indicators, Rev. 3

#### Records and Data

0-SI-4.8.B.3, Appendix I Dose Calculations – Airborne Effluents, 4/15/08  
 0-SI-4.8.A.5-1, Appendix I Dose Calculations – Liquid Effluents, 4/2/08

CAP Documents

PER 123545, Delays in setting up compensatory sampling for 1-RM-90-250, 4/18/07

PER 136071, Two particulate filters found in WRGERM sample holder instead of one, 1/6/08

**Section 40A2: Identification and Resolution of Problems**Semi-Annual Trend Review

SPP-3.1, Corrective Action Program, Rev. 13

TVAN Business Practice BP-250, Corrective Action Program Handbook, Rev. 12

SPP-3.1, Corrective Action Program, Rev. 14

PIDP-11, PER Trending, Rev. 0

Departmental Integrated Trend Analysis Reports (ITR) for September to December 2007

Selected Departmental ITRs for January to March 2008

Corrective Action Program Quality Index

Browns Ferry Turn-Around Plan

PER 136489, Substantive Cross-Cutting Issue related to Corrective Action Program

PER 136925, Adverse Trend on RWCU System Reliability

PER 136925, Adverse Trend on Condensate Demineralizer Reliability

PER 136926, Fuel Pool Cleanup System trend due to operational issues

PER 137062, Administrative Errors when conducting 50.59 Evaluations

PER 137291, Chemistry Department Negative Trend in Human Performance

PER 137613, Potential Adverse Trend Related to Release of Magazines from Weapons

PER 138174, Operations ITR Identified Challenge to Operation from System 001

PER 138297, Potential Trend in Scheduling Resources from Support Organizations

PER 138481, Maintenance ITR Identified Negative Trend in Procedure Compliance

PER 138482, Maintenance ITR Identified that MIG Dose Exceeded Goal

PER 138484, Maintenance ITR Identified Increase in Productivity Goal Backlogs

PER 138493, Training ITR Identified Needed Improvement in Training Material Detail

PER 138494, Training ITR Identified Omission of Relevant Procedural Guidance

PER 138495, Training ITR Identified Potential Trend in Lack of Refresher Training

PER 138614, Operations ITR Identified Challenge to Operation from System 002

PER 138618, Operations ITR Identified Challenge to Operation from System 026

PER 138619, Operations ITR Identified Challenge to Operation from System 027

PER 138620, Operations ITR Identified Challenge to Operation from System 064

PER 138621, Operations ITR Identified Challenge to Operation from System 073

PER 138623, Operations ITR Identified Challenge to Operation from System 085

PER 138624, Operations ITR Identified Challenge to Operation from System 090

PER 138625, Operations ITR Identified Challenge to Operation from System 092

PER 138724, Potential Negative Trend Related to Work Practices

PER 140360, Engineering ITR Identified Inadequate Oversight of Engineering Products

PER 140361, Engineering ITR Identified Inadequate Performance Monitoring

PER 140364, Engineering ITR Identified Inadequate Participation in BBS Program

PER 140366, Engineering ITR Identified Department Clock Resets Not Being Tracked

PER 140368, Engineering ITR Identified Instances of Exceeding Dose Goals

PER 140369, Engineering ITR Identified Engineering Not Meeting CAP PI Goals

PER 140371, Engineering ITR Identified Inadequate Use of Self-Assessments

PER 140559, Multiple Instances of Root Cause Analyses Not Using All OE Available

PER 140600, Trend in Over-scheduling Maintenance Resources

PER 140738, Continuing Trend in Scheduling Maintenance Resources Over Available  
 PER 142285, Potential Negative Trend in Clearance Errors  
 PER 142343, Trend PER for Radiological Safety Issues during U3C13  
 PER 143282, Repetitive Unplanned LCO Entries for 1-RM-90-132D  
 PER 143369, WO and PER Process not correcting Condensate Demineralizer Problems  
 PER 145505, Trend in Surveillances Not Performed until Maximum Extension Dates  
 PER 145620, Lack of MSB Resources Not Corrected Despite Numerous Trend PERs  
 PER 145876, Potential Adverse Trend in Vehicle Accidents by Security  
 PER 146444, NSRB Identified Work Management Below Industry Standards  
 PER 147094, Procurement Engineering Not Using ITR to Improve Performance  
 PER 147298, Adverse Trend in RWCU Pump Seal Failures

#### Focused Annual Sample Review

SPP-3.1, Corrective Action Program, Rev. 13  
 BP-250, Corrective Action Program Handbook, Rev. 12  
 PER 68747, Missed opportunities to correct recurring events. A lack of management focus on the CAP resulted in large backlogs of PERs, untimely corrective actions and poor root cause quality. (SQN)  
 PER 72369, Corrective actions for some important performance problems have not been sufficiently comprehensive or timely.  
 PER 80823, Ineffective corrective actions to prevent recurrence of inadequate Root Cause Evaluation quality (Corporate)  
 PER 92593, Some evaluations of consequential events do not identify underlying causes or lead to effective corrective actions. (WBN)  
 PER 94234, BFN Generic review of WBN PER 92593  
 PER 101460, NA PER on extension of PER actions  
 PER 116592, Some cause evaluations for performance and equipment issues do not correctly identify the cause of the problem or consider the sufficiency of previous corrective actions.  
 PER 122582, Trend PER for addressing continuing Corrective Action Program issues concerning PER documentation, quality and timeliness. (WBN)  
 PER 125527, BFN Generic review of WBN PER 122582  
 PER 130980, Problem and corrective action backlogs have not been kept low enough to avoid impeding management's ability to determine and respond to issues of safety and reliability in a timely manner.  
 PER 132579, Leadership weaknesses are contributing to deficient performance at Browns Ferry  
 PER 132649, Engineering shortfalls in escalating technical issues, in monitoring training effectiveness and in addressing staffing shortfalls  
 PER 132651, Station Events are repeated due to ineffective cause analysis and corrective actions. In some cases, timeliness of corrective action plans and actions are contributing to untimely resolution of issues  
 PER 132652, Some issues are not being entered into the corrective action process, or not being entered in a timely manner  
 PER 132657, Some PIs are not providing management the data to help them focus, prioritize, and measure efforts on important issues  
 PER 132659, Decline in Industrial Safety Performance and actions from previous PER 122380 were ineffective in improving safety performance

PER 132660, Progress toward resolving some organizational effectiveness issues (ineffective management of workforce changes and high standards of performance not being reinforced) had not been aggressive

PER 133019, Effectiveness review for PER 89506 has determined corrective actions were not effective. PER 89506 dealt with conducting high-risk maintenance activities.

PER 134677, Corrective actions from PER 93779 were not effective. PER 93779 dealt with ineffective work management process.

PER 136489, NRC Substantive Cross-Cutting Issue in Corrective Action Program

PER 138724, Potential Cross-Cutting Issue in Human Performance

PER 141361, Backlog of non-outage level A and B PERs open > 1 year above goal

PER 141362, Backlog of open PERs remains above goal

BFN-SIT-05-003, Browns Ferry Nuclear Plant Mid-Cycle Self-Assessment

BFN-SIT-06-008, Browns Ferry Corrective Action Program

BFN-SIT-07-002, BFN Corrective Action Self-Assessment

BFN-SIT-08-001, BFN Mid-Cycle Self-Assessment

NRC Letter, Bellefonte Combined License Application – Nuclear Regulatory Commission  
Inspection of the Implementation of the Quality Assurance Program Governing the  
Stimulated Open Channel Hydraulics Model – Inspection Report Numbers 05200014/2008-  
001 and 05200015/2008-001 and Notice of Violation, dated 3/19/08

#### **Section 40A5: Other Activities - Independent Spent Fuel Storage Installation (ISFSI)**

##### Procedures

0-SR-DCS3.1.2.1, Spent Fuel Storage Inspection, Rev. 4

RCI-28, HI-TRAC Average Surface Dose Rates, Rev. 1

RCI-29, HI-TRAC Contamination Surveys, Rev. 1

##### Records and Data

ALARA Planning Report 07-0092, U3 Dry Spent Fuel Storage Activities

Site Environmental TLD Data, Fourth Quarter 2006 – Third Quarter 2007

Survey 031208-7, ISFSI Pad

Survey 110707-23, Hi-STORM Average Surface Dose Rates, p.1

Survey 110707-24, Hi-STORM Average Surface Dose Rates, p.2

Survey 110707-25, Hi-STORM Average Surface Dose Rates, p.3

RWP 07331049, U3 Refuel Floor Dry Cask Storage Project (HRA, hot particle)

RWP 07331042, U3 Dry Spent Fuel Storage Activities (HRA)

RWP 07331044, U3 Dry Spent Fuel Storage Activities (dose control)

RWP 07331046, U3 Dry Spent Fuel Storage Activities (LHRA)

##### CAP Documents

NA-BF-07-012, Assessment of Oversight of the 2007 Independent Spent Fuel Storage  
Campaign, 1/14/08