UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

July 28, 2003

Tennessee Valley Authority
ATTN.: Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT 05000260/2003003, 05000296/2003003

Dear Mr. Scalice:

On June 28, 2003, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Units 2 and 3 reactor facilities. The enclosed integrated inspection report documents the results of the inspection, which were discussed on July 11, 2003, with Mr. Mike Skaggs and other members of your staff. Please note that this integrated report deviates from previous NRC reports in that it only covers Unit 2 and 3 activities. Effective April 6, 2003, inspections of your recovery activities at Browns Ferry Unit 1, which are being conducted outside of the NRC Reactor Oversight Program, will be documented under dedicated integrated quarterly inspection reports, beginning with Inspection Report 05000259/2003009.

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

A licensee-identified non-cited violation (NCV) is listed in section 4OA7 of this report. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at Browns Ferry.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure 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 Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Stephen J. Cahill
Reactor Projects Branch 6
Division of Reactor Projects

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

Enclosure: Inspection Report 05000260/2003003, 05000296/2003003
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-260, 50-296
License Nos:	DPR-52, DPR-68
Report No:	05000260/2003003, 05000296/2003003
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Browns Ferry Nuclear Plant, Units 2 and 3
Location:	Corner of Shaw and Nuclear Plant Roads Athens, AL 35611
Dates:	April 6, 2003 - June 28, 2003
Inspectors:	B. Holbrook, Senior Resident Inspector E. Christnot, Resident Inspector W. Sartor, Senior Emergency Preparedness Inspector (Sections 1EP4 and 4OA1.2)
Approved by:	Stephen J. Cahill, Chief Reactor Project Branch 6 Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000260/2003-003, 05000296/2003-003; 4/6/2003 - 6/28/2003; Browns Ferry Nuclear Plant, Units 2 and 3; routine integrated report.

The report covered a three-month period of inspection by resident inspectors and an announced inspection by an Emergency Preparedness inspector. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be 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 3, dated July 2000.

A. Inspector Identified and Self-Revealing Findings

None

B. Licensee-Identified Findings

Cornerstone: Mitigating System

A violation of very low safety significance, which was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's correction action program. The violation and corrective action tracking number is listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 has been shut down since March 19, 1985, and has remained in a long-term lay-up condition with the reactor defueled. The licensee has initiated long-term recovery actions to return the unit to operational condition. Inspections of Unit 1, outside of the Reactor Oversight Program, will be documented separately, beginning with Inspection Report 05000259/2003009.

On April 23, Unit 2 power was decreased to about 83% RTP to repair control system linkage on feedwater pump turbine 2A. Power was returned to 100% RTP the same day. On April 28, unit power was decreased to about 85% RTP to repair control system linkage on feedwater pump turbine 2B and 2C. Power was returned to 100% RTP the same day.

On June 19, Unit 3 began a mid-cycle outage to remove leaking fuel, replace a leaking safety relief valve, replace/repair main transformer bushing insulation, and other corrective maintenance activities. The unit was still in the mid-cycle outage at the end of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors reviewed licensee procedure 0-GOI-200-3, Hot Weather Operations, and reviewed licensee actions to implement the procedure in preparations for hot weather conditions. The inspectors verified that selected valves and components listed in the attachments of the procedure were in the position specified by the procedure. The inspectors reviewed the list of open Problem Evaluation Reports (PERs) to verify that the licensee was identifying and correcting potential problems relating to hot weather operations. The inspectors specifically reviewed PER 03-008254 where personnel conducted system checks using an incorrect revision of procedure 0-GOI-200-3. The inspectors reviewed immediate and planned corrective actions to verify they were appropriate.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (Partial)

a. Inspection Scope

The inspectors performed a partial walkdown of four safety systems listed below to verify redundant or diverse train operability, as required by the plant Technical Specifications (TS). In some cases, the system was selected because it would have been considered an unacceptable combination from a Probabilistic Safety Assessment

(PSA) perspective for the equipment to be removed from service while another train or system was out of service. The inspectors' walkdown was to verify that selected breaker, valve position, and support equipments were in the correct position for support system operation. The walkdown was also to identify any discrepancies that impact the function of the system that could lead to increased risk.

Also, the inspectors reviewed that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the availability and functional capability of mitigating systems or barriers. The inspectors' observations of equipment and component alignment for the partial walkdowns were compared to the alignment specified in system procedures included in the attachment of the report.

- Unit 3 Emergency AC power while performing surveillance testing on emergency diesel generator 3A
- Units 2 and 3 480-Volt safety-related AC distribution
- Units 2 and 3 250-Volt DC distributions during a main battery performance test
- Unit 3 HPCI while Unit 3 RCIC was out of service for maintenance

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Area Walkdown

a. Inspection Scope

The inspectors reviewed licensee procedure, SPP-10.10, Control of Transient Combustibles, and SPP-10.9, Control of Fire Protection Impairments, and conducted a walkdown of the seven fire areas listed below to verify a selected sample of the following: licensee control of transient combustibles and ignition sources; the material condition of fire equipment and fire barriers; operational lineup; and operational condition of selected components. Also, the inspectors verified that those selected fire protection impairments were identified and controlled in accordance with the procedure SPP-10.9. In addition, the inspectors reviewed the Site Fire Hazards Analysis and applicable Pre-fire Plan drawings to verify that the necessary fire fighting equipment, such as fire extinguishers, hose stations, ladders, and communications equipment, was in place. The inspectors reviewed a sampling of fire protection-related PERs to verify that the licensee was identifying and correcting fire protection problems. Pre-fire Plan drawings and documents reviewed are included in the attachment to the report.

- Fire Area 1 (Unit 1 RHR Loop II, heat exchanger room, and Standby Liquid Control system area)
- Fire Zone 2-2 (Unit 2 reactor building 519 and 565 elevations east area)
- Fire Zone 2-3 (Unit 3 reactor building 593 elevation and RHR heat exchanger area)
- Fire Zone 2-4 (Unit 2 reactor building 593 south and RHR heat exchanger area)

- Fire Zone 2-5 (Unit 2 Reactor building 621 elevation North of R line)
- Fire Zone 2-6 (Unit 2 reactor building 639 elevation South of R line)
- Fire Zone 3-1 (Unit 3 reactor building 519 and 565 elevation West)

b. Findings

No findings of significance were identified.

.2 Licensee Response to Fire Alarm

a. Inspection Scope

The Inspectors observed licensee response to a fire alarm in the Unit 2 and Unit 3 cable spreading rooms on June 3. The inspectors assessed the fire brigade's actions to determine that the alarm was a spurious alarm caused by dust developed by concrete drilling activities in the spreading room. The inspectors reviewed PER 03-009973 developed as a result of the spurious alarm to verify that actions were in accordance with procedure SPP-3.1, Corrective Action Program.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

Resident Inspector Quarterly Review of Testing and/or Training Activities

a. Inspection Scope

The inspectors observed portions of an operations crew performance during Simulator Evaluation Guide, OLP173S250, Failed Suppression Pool Temperature Instrument, HPCI Steam Line Leak and Failure to Isolate, Injured People Due to Steam Line Break, Reactor Recirculation Pump Trip, and Reactor Scram Due to a Main Generator Load Reject. Also, the use of OSIL-107 checklist, and corrective actions for PER 02-16597 were emphasized. The inspectors reviewed licensee procedures TRN-11.4, Continuing Training for Licensed Personnel, TRN-11.9, Simulator Exercise Guide Development and Revision, and OPDP-1, Conduct Of Operations, to verify the conduct of training; that the exercises contained high risk operator actions, the formality of communication, procedure usage, alarm response, control board manipulations, and supervisory oversight were in accordance with the above-referenced procedures.

The inspectors also reviewed previously identified deficiencies to verify that they were included in the current training. The inspectors attended the post-exercise critiques to verify that the licensee-identified issues were comparable to issues identified by the inspectors.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a Inspection Scope

The inspectors reviewed the samples listed below for items such as: (1) appropriate work practices; (2) identifying and addressing common cause failures; (3) scoping in accordance with 10 CFR 50.65(b) of the maintenance rule; (4) characterizing reliability issues for performance; (5) trending key parameters for condition monitoring; (6) charging unavailability for performance; (7) classification and reclassification in accordance with 10 CFR 50.65(a)(1) or (a)(2); and (8) appropriateness of performance criteria for SSCs/functions classified as (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified as (a)(1).

- Unit 3 Electrical Board Room Chillers 3A and 3B were inoperable at the same time (PER 03-005968-000). The 3B system was declared inoperable due to tripping on high compressor oil temperature. The 3A system failed to start due to a defective low suction pressure switch. Failure of both systems was a maintenance preventable functional failure and resulted in the maintenance rule performance criteria being exceeded. Additional reviews indicated that the defective low suction pressure switch was previously identified as a common cause failure. The common cause was aging and obsolescence of the pressure switch.

- Unit 2 High Pressure Injection Pump exceeded the maintenance rule unavailability and the reactor pressure level control criteria. The system also exceeded the vessel injection mode criteria of no more than one functional failure in the 24-month rolling interval. Based on this overall declining system performance, the Unit 2 HPCI system was placed in the maintenance rule 10 CFR 50.65(a)(1) status. This was documented as part of the licensee's corrective action program in PER 03-008722-000.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

For the six emergent work and one equipment issues listed below, the inspectors reviewed licensee actions taken to plan and control the emergent work activities to effectively manage and minimize risk. The inspectors verified that risk assessments were being performed as required by 10 CFR 50.65(a)(4). The inspectors reviewed: licensee procedure SPP-6.1, Work Order Process Initiation; SPP-7.1, Work Control Process; and 0-TI-367, BFN Dual Unit Maintenance, to verify that procedure steps and required actions were met. Also, the inspectors evaluated the adequacy of the licensee's risk assessments and the implementation of compensatory measures.

- Unit 3: Preferred MMG set motor breaker tripped when set was started; following the reset of the breaker, the DC motor failed to start on demand, PER 03-007071-000 (emergent)
- Unit 2: 250 volt DC RMOV board 2C placed on alternate source and load shed logic division 1 inoperable for test of the main battery bank, WO 030205300
- Unit 2: Diesel Generator D steel fuel oil tubing cracked in the work-hardened area of flare, PER 03-007285-000 (emergent)
- Units 2 and 3: Hard ground, 260 volts, on Shutdown Battery Distribution Panel D; ground removed per WO 03-008603-00, PER 03-008614-000 (emergent)
- Unit 2: Reactor water level indicating instrument 2-LI-3-46A failed upscale, instrument replaced per WO 03-007547-00 (emergent)
- Unit 2: Pressure switch 2-PS-73-1A, HPCI Steam Supply Pressure, 120 volts present when zero voltage should have been present, repaired per WO 03-008147-00 (emergent)
- Unit 3: During the performance of a surveillance test on the HPCI turbine, the steam stop valve did not open as required WO 03-009601-00, PER 03-009602-000 (emergent)

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following seven operability evaluations to verify the technical adequacy and ensure that the licensee had adequately assessed TS operability. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) to verify that the system or component remained available to perform its intended function. In addition, the inspectors reviewed implemented compensatory measures to verify that the compensatory measures worked as stated and the measures were adequately controlled. Where applicable, 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. The inspectors also reviewed a sampling of PERs to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations.

- Unit 2: Electrical ground across HPCI main steam line isolation logic circuit, pressure switch 73-1D (PER 03-008147-000)
- Units 2 and 3 safety-related vacuum breaker piping installed between the cooling towers' suction bay and the condenser circulating water system not being analyzed as installed (PER 03-005854-000)
- Units 2 and 3 safety-related cables supplying air handling unit, control bay chill water pump, and emergency battery room exhaust fan failed the ampacity criteria (PER 03-006738-000)
- Unit 2 primary containment isolation valve 2-FCV-74-47, RHR Low Pressure

Injection, due to leakage (PER 03-006823-000)
- Units 2 and 3 shutdown board battery A, cell 60, failed to meet acceptance criteria (PER 03-007766-000)
- Unit 3 standby liquid control pump 3A failed to meet acceptance criteria (PER 03-007916-000)
- Units 2 and 3 snubber stroke settings not verified to be consistent with design drawings (PER 03-010586-000)

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (PMT)

a. Inspection Scope

The inspectors evaluated the following six activities by observing testing and/or reviewing completed documentation to verify that the PMT was adequate to ensure system operability and functional capability following completion of associated work. The inspectors reviewed licensee procedure SPP-6.3, Post-Maintenance Testing, to verify that testing was conducted in accordance with procedure requirements. For some testing, portions of MMDP-1, Maintenance Management System, were referenced.

- Units 2 and 3: PMT on the 250-Volt main bank battery per electrical instruction ECI-0-248-BAT001, Equalize Charging the 250 Volt Main Bank Battery
- Unit 2: PMT following repairs on valve 3-FCV-85-82 per procedure 3-SR-3.1.8.2, Scram Discharge Volume Valve Operability, after the valve failed to meet the full-closed acceptance criteria
- Unit 3: RCIC turbine trunnion screw check and adjustment, WO 03-002083
- Unit 3: RCIC: Repair or replace RCIC test line cap, WO 03-004795
- Unit 3: PMT on 3DA Low Pressure Cooling Injection motor generator set per procedure MPI-0-074-BRG001, Inspection, Lubrication, and Replacement of LPCI MG-Set Couplings and Bearings
- Units 2 and 3: PMT on EECW/RHRSW pump D3 per procedure MCI-0-023-PMP002, Emergency Equipment Cooling Water and Residual Heat Removal Service Water Pump (Byron Jackson Type KX) Disassembly, Inspection, Rework, and Reassembly

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

.1 Unit 3 mid-cycle outage

a. Inspection Scope

Risk

Prior to the mid-cycle outage scheduled for June 19 - 29, to replace leaking fuel, a leaking safety relief valve, and a main transformer, the inspectors reviewed the Unit 3 mid-cycle Outage Risk Assessment Report, to verify that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. The inspectors specifically reviewed the contingency plans for two risk conditions of Orange for decay heat removal and AC power during the outage to verify that specific protective actions of equipment were identified. The inspectors' review was compared to the requirements in licensee procedure SPP-7.2, Outage Management. The review was also to verify that, for identified high risk significant conditions, due to equipment availability and/or system configurations, contingency measures were identified and incorporated into the overall outage and response plan. The inspectors frequently discussed posted risk conditions with operations and outage personnel to assess licensee personnel knowledge of the risk condition and mitigation strategies.

Shutdown and Cooldown Process

The inspectors observed selected activities and monitored licensee controls over outage activities listed below to verify that procedural and regulatory requirements were met. The inspectors compared their observations to licensee procedure SPP-12.1, Conduct of Operations, and 2-GOI-100-12A, Unit Shutdown from Power Operations to Cold Shutdown and Reduction in Power During Power Operations, to verify that procedure requirements were met. Part of the activities observed included the following:

- Unit power reduction with control rods and recirculation system flow
- Manual scram of unit and recovery actions
- Core thermal limit verification
- Reactivity monitoring and control
- Startup, shutdown, and realignment of components and systems
- Realignment and transfer of AC power sources
- TS instrument and system performance verification

Decay Heat Removal

The inspectors reviewed licensee procedures 2-OI-74, Residual Heat Removal System (RHR), and 2-OI-78, Fuel Pool Cooling and Cleanup System, and conducted a main control room panel walkdown to verify correct system alignment. The inspectors conducted a review of the increased outage risk condition of Orange, for the removal of decay heat, to verify that the plant conditions and systems identified in the risk mitigation strategy were available to remove decay heat. The inspectors reviewed operational logs

to verify that procedure and TS requirements to monitor and record reactor coolant temperature were met. In addition, the inspectors reviewed controls implemented to ensure that outage work was not impacting the ability of operators to operate spent fuel pool cooling and RHR shutdown cooling.

Reactivity Control

The inspectors observed licensee performance during shutdown, outage, refueling, and startup activities to verify that reactivity control was conducted in accordance with procedure and TS requirements. The inspectors conducted a review of outage activities and risk profile to verify that activities that could cause reactivity control problems were identified. Inspector observations were compared to procedure SPP-10.4, Reactivity Management, to verify that procedure and TS requirements were met. Reactivity manipulations observed included the following:

- Power reduction with control rods and recirculation flow
- Fuel movement during fuel sipping activities

Inspectors observed the following items to assess licensee performance in the respective area:

Inventory Control

- Reactor water inventories and controls including flow paths, system configurations, and alternate means for inventory addition
- Operator monitoring and control of reactor temperature and level profiles

Electrical Power

- Controls over electrical power systems and components to ensure that emergency power was available as specified in the outage risk report
- Controls and monitoring of electrical power systems and components and work activities in the power transmission yard
- Operator monitoring of electrical power systems and outages to ensure that TS requirements were met
- Review of clearance activities to verify that equipment was identified and controlled to support work and testing activities and that equipment was correctly returned to service or standby conditions

Containment Control and Closure

- Confirm secondary containment requirements
- Verify that leak rate and cold shutdown valve testing results met TS requirements
- Verify torus and drywell walkdown and closeout prior to unit restart

Refueling Activities
- Fuel sipping to identify leaking fuel
- Core alterations
- Reactor vessel reassembly activities

Additional Procedures and documents reviewed are listed in the attachment of the report.

b. Findings

No findings of significance were identified.

.2 Unit 3 Main Steam Dryer Damage

a. Inspection Scope

The inspectors reviewed and assessed the design change and repair activities following the licensee's identification of broken and damaged stiffener bars on the Unit 3 main steam dryer. The damage was identified during reactor vessel reassembly activities following the mid-cycle outage that began on June 19. The inspectors discussed the immediate corrective actions with licensee management, reviewed the 10 CFR 50.59 screening, work plan package, and functional evaluation. The inspectors also discussed actions for root cause and long term improvements. Documents reviewed are included in the attachment of the report.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors either witnessed portions of surveillance tests or reviewed test data for the seven risk-significant SSC's listed below, to verify that the tests met TS surveillance requirements, UFSAR commitments, and in-service testing (IST) and licensee procedure requirements. The inspectors' review was to confirm that the testing effectively demonstrated that the SSCs were operationally capable of performing their intended safety functions. IST data was compared against the requirements of licensee procedures 0-TI-362, Inservice Testing of Pumps and Valves, and 0-TI-230, Vibration Monitoring and Diagnostics. The inspectors also reviewed procedures OSIL-108, Reactivity Management Expectations, and ODM 3-3, Pre-Evolution, Mid-, and End-of-Shift Briefings, to verify that procedure requirements were met for the surveillance activities. The surveillances either witnessed or reviewed included:

- 1-SR-3.8.4.4 (MB-1), Main Battery Bank Modified Performance Test
- 1-SR-3.8.6.2 (1), Quarterly Check for 250 Volt Number 1 Battery
- 3-SR-3.5.1.6(RHRI), Quarterly RHR System Rated Flow Test Loop I

- 3-SR-3.6.1.3.5(RHRI), RHR System MOV Operability Loop I
- 3-EPI-3082-DZ004, Diesel Generator 3D Redundant Start Test
- 3-SR-3.5.3.3, RCIC System Rated Flow at Normal Operating Pressure (IST)
- 3-SR-3.1.3.2, Control Rod Drive Exercise Test for Fully Withdrawn Control Rods

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed licensee procedures 0-TI-405, Plant Modifications and Design Change Control; 0-TI-410, Design Change Control; SPP-9.5, Temporary Alterations; and the two temporary modifications listed below to ensure that procedure and regulatory requirements were met. The inspectors reviewed the associated 10 CFR 50.59 screening against the system design bases documentation to verify that the modifications had not affected system operability/availability. The inspectors reviewed selected completed work activities and walked down portions of the systems to verify that installation was consistent with the modification documents and Temporary Alteration Control Form (TACF).

- TACF 2-02-005-068, Install temporary vibration monitoring instruments for RR, RHR, RWCU piping in the Unit 2 drywell
- TACF 3-03-004-069 RO, Furmanite 1-inch drain valve 3-DRV-69-577 to stop leakage past the valve seat

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspector reviewed changes to the Radiological Emergency Plan (REP) as contained in Revisions 64, 66, 67, 68, and 69, against the requirements of 10 CFR 50.54(q) to determine whether any of the changes decreased REP effectiveness.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed licensee performance in the control room simulator and the technical support center during an emergency training exercise on April 30. The drill was to focus on degraded plant conditions that led to implementation of the Emergency Operating procedures and to the General Emergency classification. In addition, site evacuation and accountability actions were demonstrated. The inspectors review was to verify implementation of licensee procedures NP-REP, Radiological Emergency Plan, Browns Ferry Emergency Plan Implementing Procedures, SPP- 3.5, Regulatory Reporting Requirements, and OPDP-1, Conduct of Operations. The inspectors assessed operator performance, formality of communications, event classifications, and offsite emergency notifications to verify that they were in accordance with the requirements of the above-referenced procedures. In addition, procedure usage, alarm response, control board manipulations, and supervisory oversight were evaluated to verify that the procedure requirements were met. The inspectors also reviewed drill documents to verify that drill evaluations focused on improvement items identified during previous drills. The inspectors attended the post-exercise critiques and reviewed the licensee's post drill report to verify that the licensee-identified issues were comparable to issues identified by the inspectors. The inspectors reviewed the drill objectives to verify that licensee actions met the requirements of the objectives.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

Cornerstones: Mitigating Systems, Initiating Events, Barrier Integrity

.1 Safety System Unavailability - Heat Removal System (RCIC)
Safety System Unavailability - Heat Removal System (RHR)
Unplanned Power Changes per 7000 Critical Hours
Reactor Coolant System Activity (RCSA)

a. Inspection Scope

The inspectors reviewed the licensee's procedures and methods for compiling and reporting PIs, including Procedure SPP-3.4, Performance Indicator for NRC Reactor Oversight Process, for Compiling and Reporting PI's to the NRC. The inspectors reviewed raw PI data for the PI's listed below for the second quarter 2002 through the first quarter 2003. The inspectors compared graphical representations, from the most recent PI report to the raw data to verify that the data was correctly reflected in the report. The inspectors reviewed licensee procedure SPP 6.6, Maintenance Rule Performance Indicator Monitoring, Trending and Reporting - 10 CFR 50.65; category A and B PERs; engineering evaluations and associated PERs; and licensee records to

verify that the PI data was appropriately captured for inclusion into the PI report, and the PI was calculated correctly. The inspectors reviewed Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, to verify that industry reporting guidelines were applied.

- Unit 2 Safety System Unavailability: Heat Removal System RCIC
- Unit 3 Safety System Unavailability: Heat Removal System RCIC
- Unit 2 Safety System Unavailability: Heat Removal System RHR
- Unit 3 Safety System Unavailability: Heat Removal System RHR
- Unit 2 Unplanned Power Changes per 7000 Critical Hours
- Unit 3 Unplanned Power Changes per 7000 Critical Hours
- Unit 2 RCSA
- Unit 3 RCSA

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

.2 Emergency Response Organization (ERO) Drill/Exercise Performance
ERO Drill Participation
Alert and Notification System Reliability

a. Inspection Scope

Licensee records were reviewed to determine whether the submitted PI values through the first quarter of 2003 were calculated in accordance with the guidance contained in Section 2.4 (Emergency Preparedness Cornerstone) of NEI 99-02, Revision 2, "Regulatory Assessment Performance Indicator Guideline."

The inspector assessed the accuracy of the PI for ERO drill and exercise performance (DEP) over the past eight quarters through review of a sample of drill and event records. The inspector reviewed training records to assess the accuracy of the PI for ERO drill participation during the previous eight quarters for personnel assigned to key positions in the ERO. The inspector assessed the accuracy of the PI for the alert and notification system reliability through review of a sample of the licensee's records of the bi-weekly silent tests and monthly full-cycle tests.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Annual Sample Review

a. Inspection Scope

The inspectors selected two Problem Evaluation Reports (PERs) for detailed review (PERs 03-002763-000 and 01-012733-000). The first PER was associated with a recurring low pressure condition on residual heat removal service water (RHRSW) header B; and the second two PERs were for RHR/RHRSW pump exceeding the maintenance rule unavailability time. The PERs were reviewed to verify that the full extent of the issues was identified, an appropriate evaluation performed, and appropriate corrective actions were specified and prioritized. The PERs were evaluated against the requirements of the licensee's CAP as delineated in the Standard Programs and Processes Procedure SPP-3.1, Corrective Action Program, and 10 CFR 50, Appendix B.

b. Findings and Observations

- PER 03-002763-000: There were no identified findings associated with the review of this sample; however the PER stated that the decrease in pressure had occurred numerous times since May, 2001. The inspectors observed that PERs were not written to document each of these occurrences. Low RHRSW header pressure could result in damage to plant equipment if a RHRSW pump were to start.

  As a result of the low RHRSW header pressure, a series of PERs was written such as the following: PER 02-001539-000, dated February 13, 2002, identified that RHRSW pressure B had decreased to 15 psig following a test and valve 2-FCV-23-46 was suspected of not fully closing; PER 02-002247-000, dated March 4, 2002, identified that the pressure unexpectedly decreased to zero psig when RHRSW pump B1 was stopped during the performance of a surveillance test; PER 02-002781-000, dated March 17, 2002, identified that the pressure had decreased eight times since November, 2001; and PER 03-002763-000, dated February 18, 2003, identified that the pressure had decreased numerous times since May, 2001. These PERs illustrate that these pressure drops were intermittent and unpredictable. A partial MOVATS test, on January 10, 2003, indicated no problem with valve 2-FCV-23-46 seating fully closed. PER 03-002763-000 stated that the header pressure was restored by starting a RHRSW pump and that no attempt was made to identify a cause. The root cause was eventually identified, through radiography, as a lift check valve with internal damage, in the keep-fill system for the header.

The keep-fill water for the header is supplied from the raw service/fire protection water system. The damage was such that the valve disk was free to shift around inside the valve body and, at times, blocked the keep-fill water flow. This accounted for the intermittent nature of the pressure decreases. The corrective action was to replace all four valves, one in each header, with a type not susceptible to the same failure. The valves were replaced in March, 2003. The inspectors observed that, although the intermittent pressure decrease conditions started in May, 2001, they were not all identified in PERs and were not corrected until March, 2003.

- PER 01-012733-000: There was no finding associated with the review of this sample. This PER documented the failure of RHRSW pump A3 and RHRSW pump 1D failure to meet the maintenance rule availability hours. RHRSW pump A3 experienced a failure on November 17, 2001. Since there was no spare to replace the faulted motor, the A3 motor was replaced with the 1D pump motor. RHRSW pump 1D exceeded the maintenance rule unavailibity hours. The licensee's corrective action program initiated a series of action items to determine the cause of the A3 pump failure and to identify improvements in the replacement/contract repair process. The lack of a spare motor and no clear process to expedite the repair of the failed motor contributed to the excessive unavailability of pump 1D. A review of the preventative maintenance program identified that program elements were not expected to provide early warning of the type of random failure that occurred. The licensee adequately addressed the problems in the PER and implemented the Large Motor Refurbishment Program to reduce the probability of in-service motor failures.

.2 Cross-References of PI&R Findings

Section 4OA7, Licensee-Identified Violations, of this report describes a finding for failure to establish and implement procedures for Units 2 and 3 Technical Surveillance Requirement, TSR, 3.7.4.2.c, of the Units 2 and 3 Technical Requirements Manual (TRM) to verify that stroke settings of snubbers were consistent with the design drawings. The required inspections were being completed and data was obtained for all except the torus snubbers. The licensee failed to compart the obtained data to design drawings. The licensee completed the snubber inspections for Units 2 and 3, compared the obtained data to design drawings and no functional or operability concerns were identified.

4OA3 Event Follow-up

.1 (Closed) Licensee Event Report (LER) 50-260/03-001-00): Automatic Scram Resulting from Low Reactor Water Level During Reactor Cooldown

On February 24, Unit 2 experienced an automatic scram while reactor level control was being transferred from operation of a single turbine-driven reactor feedwater pump to the motor-driven condensate/condensate booster pumps via the reactor feedwater startup level control valve.

This event is documented in Sections 1R14 and 4OA3.2 of NRC Inspection Report 50-259, 260, and 296/2003-02. The LER was reviewed by the inspectors and no findings of significance were identified. The licensee documented the event in PER 03-003081-000.

.2 (Closed) LER 50-260/03-002-00: High Pressure Coolant Injection (HPCI) Inoperable Due to Loss of Turbine Feedback Signal

This LER documented an automatic isolation of the HPCI system during a surveillance procedure on March 16, due to a failed connector in the turbine speed feedback circuit. The licensee repaired and completed post-maintenance testing and the system was returned to operable condition. This event is documented in Section 1R14 of NRC Inspection Report 50-259, 260, and 296/03-02. The LER was reviewed by the inspectors and no findings of significance were identified. The licensee documented the event in PER 03-004817-000.

.3 (Closed) LER 50-260/03-003-00: Manual Scram of Unit 2 Resulting from the 2b Reactor Recirculating Pump Trip with OPRM Function Inoperable.

This LER documented a manual Scram of Unit 2 on March 26, following a trip of a second recirculating pump that resulted in a loss of forced flow reactor coolant. The first pump had tripped about two hours prior to the second pump trip. This event is documented in Section 4OA3.7 of NRC Inspection Report 50-259, 260, and 296/03-02. This LER was reviewed by the inspectors and no findings of significance were identified. This event was documented in the licensee's corrective action program as PERs 03-005483 and 03-0005485.

4OA5 Other

.1 Review of Institute of Nuclear Power Operations (INPO) Report

In May, 2003, the inspectors reviewed the results of an INPO review of Browns Ferry performance completed during the fall of 2002. The report did not identify any significant issues that had not been previously addressed and/or reviewed by the NRC.

.2 Review of Nuclear Safety Review Board (NSRB) Activities

On April 10, the inspectors attended selected NSRB meetings and reviewed site documents selected by the NSRB for their review and assessment. The inspectors verified that items selected by the NSRB committee for review, such as Technical Specification changes, LERs, 10 CFR 50.59 evaluations, site self-assessments and audits, and corrective action documents met the requirements specified in the Nuclear Quality Assurance Plan for review of items to ensure compliance with regulatory requirements and improve nuclear safety. No findings of significance were identified.

4OA6 Management Meetings

Exit Meeting Summary

On July 11, 2003, the resident inspectors presented the inspection results to Mr. Mike Skaggs and other members of his staff, who acknowledged the findings. The inspectors confirmed that proprietary information reviewed by the inspectors during the inspection period was returned to the licensee.

4OA7 Licensee-Identified Violation

The following finding of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an non-cited violation.

- Units 2 and 3 Technical Specification (TS) 5.4.1a requires, in part, that written procedures shall be established and implemented covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Contrary to this, on June 11, 2003, it was discovered that the implementing procedures for Units 2 and 3 Technical Surveillance Requirement, TSR 3.7.4.2.c, of the Units 2 and 3 Technical Requirements Manual (TRM) did not require verifying that the stroke settings are consistent with the design drawings. This was identified in the licensee's CAP as PER 03-010586-000. This finding, which impacts the Barrier Integrity and Mitigating Systems Cornerstones, is of very low safety significance because the required inspections were being completed and data was obtained for all except the torus snubbers. The data obtained was not compared to design drawings. The licensee completed the risk evaluation requirements of the TRMs, and completed the snubber inspections for Units 2 and 3 with no functional or operability concerns identified. This violation did not result in an inoperable system or component.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Abney, Nuclear Site Licensing & Industry Affairs Manager
A. Bhatnagar, Site Vice President
L. Clardy, Site Nuclear Assurance Manager
J. Corey, Radiation Protection and Chemistry Manager
R. Jones, Unit 1 Plant Restart Manager
J. Lewis, Nuclear Plant Operations Manager
T. Niessen, Jr., Engineering & Site Support Manager
J. Ogle, Site Security Manager
R. Rogers, Maintenance & Modifications Manager
M. Skaggs, Nuclear Plant Manager
R. Wiggall, Site Engineering Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-260/03-001-00	LER	Automatic Scram Resulting from Low Reactor Water Level During Reactor Cooldown (Section 4OA3.1)
50-260/03-002-00	LER	High Pressure Coolant Injection (Hpci) Inoperable Due to Loss of Turbine Feedback Signal (Section 4OA3.2)
50-260/03-003-00	LER	Manual Scram of Unit 2 Resulting from the 2b Reactor Recirculating Pump Trip with OPRM Function Inoperable (Section 4OA3.3)

Attachment

LIST OF DOCUMENTS REVIEWED

Section 1R04: Partial/Complete Equipment Alignment

- Procedure 3-OI-82, Standby Diesel Generator System, Attachments 3B, 3C, and 3D, Electrica Lineup
- Procedure, 3-OI-73, High Pressure Coolant Injection System
- Procedure, 0-OI-57, 240/480 V AC Electrical Systems
- Procedure, 0-OI-57, 250 V DC Systems

Section 1R05: Fire Protection

- Fire Hazards Analysis, Volume 1 and 2
- Smoke Detector Locations: Procedure 0-SI-4.11.A.1(3)b
- Pre-fire Plans: RX2-519 NE and SE, RX2-565, RX2-593, RX2-621 and 639, RX3-519 NW and SW

Section 1R20.1: Refueling and Outage Activities

- Equipment clearance, tagout 3-TO-2003-001, Section 3-47-03, electro-hydraulic system
- Equipment clearance, tagout 3-TO-2003-001, Section 3-57-03, main transformers
- Procedure 3-AOI-100-1, Reactor Scram
- Procedure 3-EOI-1, Flowchart, RPV Control
- Procedure 3-OI-68, Reactor Recirculation System
- Procedure 3-SR-3.6.1.3.6, Main Steam Isolation Valve Fast Closure Test (A, B, C, and D)
- Procedure 3-SR-3.5.1.5, Reactor Recirculation Pump Discharge Valve Cycling
- Procedure 3-SI-4.7.A.2g-2/FHa, Primary Containment Local Leak Rate Test: Flanges and Hatches, Torus Hatch X-200A and Drywell Head
- WO 02-04099-00, Replace damaged flex conduit for valve 3-MVOP-69-1

Section 1R20.2: Unit 3 Main Steam Dryer Damage

- Design Change Notice (DCN) 60003A, Alternative design to steam dryer tie-rods
- 10CFR50.59, Changes, tests, and experiments, screening review for DCN 60003A
- Functional Evaluation, 03-11791-000, Unit 3 Reactor Vessel Steam Dryer Damage
- WO 03-6843-003, Repair Main Steam Dryer
- PER 03-11791, Unit 3 Main Steam Dryer Tie Rod Damaged
- Design Change Notice 60003A, Repair Main Steam Dryer
- Visual VT-1 Examination Report of Unit 3, Steam Dryer

Section 1EP4: Emergency Action Level and Emergency Plan Changes

- REP, Appendix A, Revision 64, dated July 30, 2002
- TVA Nuclear REP, Revision 66, dated October 17, 2002
- REP Appendix A, Revision 67, dated October 25, 2002
- TVA Nuclear REP, Revision 68, dated December 9, 2002
- REP, Appendix A, Revision 69, dated March 27, 2003.