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

July 18, 2002

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 50-259/2002-02, 50-260/2002-02, 50-296/2002-02

Dear Mr. Scalice:

On June 22, 2002, the NRC completed an inspection at your Browns Ferry Units 1, 2, and 3. The enclosed report documents the inspection findings which were discussed on June 27, 2002, with Mr. R. G. Jones and other members of your staff.

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.

Based on the results of this inspection, the inspectors identified two issues of very low safety significance (Green). These issues were determined to involve a violation of NRC requirements. However, because the violations were of very low safety-significance and because the problems were entered into your corrective action program, the NRC is treating both issues as non-cited violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you elect to deny a non-cited violation, 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 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 Resident Inspector at the Browns Ferry facility.

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/ for Peter A. Taylor

Paul E. Fredrickson, Chief
Reactor Projects Branch 6
Division of Reactor Projects

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

Enclosure: NRC Integrated Inspection Report 50-259/2002-02,
50-260/2002-02, and 50-296/2002-02
w/Attachment - Supplemental Information

cc w/encl: (See page 3)

cc w/encl:
Karl W. Singer
Senior Vice President
Nuclear Operations
Tennessee Valley Authority
Electronic Mail Distribution

Jack A. Bailey, Vice President
Engineering and Technical Services
Tennessee Valley Authority
Electronic Mail Distribution

Ashok S. Bhatnagar
Site Vice President
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

General Counsel
Tennessee Valley Authority
Electronic Mail Distribution

Robert J. Adney, General Manager
Nuclear Assurance
Tennessee Valley Authority
Electronic Mail Distribution

Robert G. Jones, Plant Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

Mark J. Burzynski, Manager
Nuclear Licensing
Tennessee Valley Authority
Electronic Mail Distribution

Timothy E. Abney, Manager
Licensing and Industry Affairs
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

State Health Officer
Alabama Dept. of Public Health
RSA Tower - Administration
Suite 1552
P. O. Box 303017
Montgomery, AL 36130-3017

Chairman
Limestone County Commission
310 West Washington Street
Athens, AL 35611

Distribution w/encl: (See page 4)

Distribution w/encl:
K. Jabbour, NRR
C. Evans (Part 72 Only)
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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-259, 50-260, 50-296
License Nos:	DPR-33, DPR-52, DPR-68
Report No:	50-259/2002-02, 50-260/2002-02, 50-296/2002-02
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Browns Ferry Nuclear Plant, Units 1, 2, & 3
Location:	Corner of Shaw and Nuclear Plant Roads Athens, AL 35611
Dates:	March 24 - June 22, 2002
Inspectors:	W. Smith, Senior Resident Inspector B. Holbrook, Senior Project Engineer J. Kreh, Health Physicist (Sections 1EP2-1EP5, 4OA2) L. Mellen, Senior Operations Engineer (Sections 1EP2-1EP5, 4OA2) R. Carrion, Project Engineer (Sections 1R05,1R12) W. Bearden, Reactor Engineer (Section 1R08)
Approved by:	P. E. Fredrickson, Chief Reactor Projects Branch 6 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000259-02-02, IR 05000260-02-02, IR 05000296-02-02, on 03/24-06/22/2002, Tennessee Valley Authority, Browns Ferry Nuclear Plant, Units 1, 2, & 3. Refueling and outage activities, access control, identification and resolution of problems.

The inspection was conducted by the resident inspectors and the following regional inspectors: senior project engineer, reactor engineer, health physicist, senior operations engineer, and a project engineer. The inspection identified two findings which were non-cited violations. 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 are indicated by "No Color," or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear reactors is described at its Reactor Oversight Process website at http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/index.html.

A Inspector Identified Findings

Cornerstone: Public Radiation Safety

Green. The inspector identified a non-cited violation (NCV) of Technical Specification (TS) 4.5.1.a for failure to maintain adequate alarm response procedures, implemented to ensure that in the event of an inadvertent discharge of radioactivity to the environment via the residual heat removal service water (RHRSW) effluent, that the limits of 10 CFR 20.1301(d) or 10 CFR 50, Appendix I will not be exceeded. As of April 23, 2002, when an alarm occurred on Unit 2, there was no limit to the potential radioactive discharge that could occur while waiting for a confirmatory sample analysis.

This finding was of very low safety significance because, on April 23, 2002 the analyzed sample was negative for radioactivity, therefore, regulatory limits were not exceeded and prompt action was taken to revise the applicable alarm response procedure to immediately stop the discharge if the radioactivity reaches a specified level (Section 1R20).

Cornerstone: Physical Protection

Green. The inspector identified a NCV of TS 4.5.1.a, for failure to maintain the operability of vital area doors designed to restrict access to the Unit 2 control room as required by the Security Plan. Consequently, the resident inspector was able to gain access to the control room without authorization.

This finding was of very low safety significance, because a person could not gain access to the control room undetected, the individual would have already been subjected to access controls to enter the protected area and although the physical barriers to the control room were, at times, not fully functional, the alarm was operable such that if an unauthorized individual entered the control room, the alarm would annunciate and security could respond promptly (Section 3PP2).

B. Licensee Identified Violations

A violation of very low significance, which was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee appear reasonable. This violation 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 unit is in the early stages of reactivation, i.e., engineering walkdown inspections, asbestos removal, outage power installation, planning, and material procurement.

Unit 2 operated at or near full power, except as noted, with brief scheduled reductions in power to adjust control rods and perform routine testing. However, on April 23, 2002, Unit 2 was shut down for a mid-cycle outage to detect and remove leaking reactor fuel. On May 2, after successfully replacing four leaking fuel bundles, the licensee restored the unit to full power operation.

At the beginning of this inspection period, Unit 3 was at 87% power and coasting down in preparation for refueling outage U3C10. The unit was shut down at 9:00 a.m., on March 26, 2002. After successful completion of the 14-day refueling outage, the unit was restarted and the main generator output breaker closed on April 9, at 2:54 a.m. Unit 3 was restored to full power operation on April 16, where it remained, with brief scheduled reductions in power to adjust control rods and perform routine testing.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

.1 Partial Equipment Walkdown

The inspectors performed a partial walkdown of the below-listed systems to verify redundant or diverse train operability, as required by the plant Technical Specification (TS) while one train was out of service. Consideration was given to the operable trains' configuration as required by the applicable operating procedures:

- Unit 3 control bay chiller 3B while control bay chiller 3A was out of service for repair of a refrigerant leak
- Unit 2 core spray (CS) Loop II while CS Loop I was out of service for a maintenance outage
- Units 1 and 2 emergency diesel generators (EDGs) A, B, and C while EDG D was out of service for the four-year inspection and preventive maintenance (PM)
- Unit 3 CS Loop II while CS Loop I was inoperable for replacement of the air handling unit leaking cooling coil and preventive maintenance on the motors for CS pumps A and C.

.2 Complete Equipment Walkdown

The inspectors also performed a complete walkdown of the emergency equipment cooling water (EECW) system. System diagrams were studied and compared with the actual installed systems (where accessible), operating instructions were reviewed for clarity and compliance with the TS, and outstanding work orders (WOs) were reviewed to verify that outstanding work items did not cause the system to be degraded or inoperable. Valve and switch configurations were sampled from the operating instructions and verified to be in the positions specified. The status of surveillances was reviewed to verify that TS surveillance requirements were being met, and that outstanding deficiencies, if any, did not impact system operability.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors toured the below-listed plant areas to evaluate, as appropriate, conditions related to: (1) licensee control of transient combustibles and ignition sources; (2) the material condition and operational status of selected fire protection systems, equipment, and features; and (3) the fire barriers used to prevent fire damage or fire propagation. The inspectors used area maps and pre-plan descriptions from the licensee's Fire Protection Report to verify that the equipment described is available. In addition, for some areas, surveillance instructions were referenced to verify the location of detection equipment:

- Fire area (FA)-8, Unit 2 4 kV shutdown board room D
- FA-13, Unit 3 shutdown board room E
- FA-18, Unit 2 battery and battery board rooms
- FA-23, Unit 3 4 kV shutdown board room 3EC and 3ED
- Fire zone (FZ) 2-3, 2-4, 2-5, Unit 2 reactor building, elevation 593/621
- FZ 3-3, 3-4, Unit 3 reactor building, elevation 593/621

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (ISI) Activities

a. Inspection Scope

The inspectors observed in-process ISI work activities on Unit 3 and reviewed selected ISI records. The observations and records were compared to the TS and the applicable Code (ASME Boiler and Pressure Vessel Code, Sections V and XI, 1995 Edition, with 1996 Addenda) to verify compliance. The inspectors observed calibration of ultrasonic (UT) examination equipment and portions of the ongoing manual UT examination of the

reactor vessel 28-inch Recirculation system suction nozzle N1B weld. In addition, the inspectors reviewed the weld examination reports and radiographs of the following completed ASME Class 2 weld repairs:

- Weld RADW-3-001-002, Three-inch ASME Class II liquid radwaste piping
- Weld RADW-3-001-003, Three-inch ASME Class II liquid radwaste piping
- Weld RADW-3-001-004, Three-inch ASME Class II liquid radwaste piping
- Weld CRD-3-008-055, Two-inch ASME Class II CRD scram discharge piping
- Weld CRD-3-008-056, Two-inch ASME Class II CRD scram discharge piping
- Weld CRD-3-008-072, Two-inch ASME Class II CRD scram discharge piping
- Weld CRD-3-008-073, Two-inch ASME Class II CRD scram discharge piping

The inspectors also observed various ongoing augmented inspections included in the licensee's Vessel Internals Program (VIP). This included observation of calibration activities and remote automated UT examinations of welds P5, P8A, and P8B on the CS System Loop I spray sparger piping; remote visual inspection of portions of Jet Pumps 5 and 6; and remote visual inspection of welds P2, P3, and repaired support plate welds on the T-Box junction on the CS System Loopl spray sparger piping.

Qualification and certification records for examiners, equipment and consumables, and nondestructive examination (NDE) procedures for the above ISI examination activities were reviewed. Seven Notice of Indications, associated with loose bolting, support clearance concerns, and minor surface rust or scratches, were reviewed by the inspectors.
In addition, two Problem Evaluation Reports (PERs) associated with ISI activities which had been documented in the licensee's corrective action program were reviewed. Documents reviewed are included in the attachment to this report.

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

On June 20, 2002, the inspector observed a control room simulator portion of requalification training involving lessons learned from the failed reactor jet pump and recirculation pump trip that occurred at another nuclear power plant. The inspector evaluated communications, coordination of efforts by the crew, response to alarms, procedure usage, leadership of the senior reactor operators, compliance with the TS, and the conduct of briefings, turnover, and instructor critiques. The acceptance criteria used in the inspector's evaluation were the expectations established by the licensee's departmental and standard process procedures for the conduct of plant operations.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

Sampling the equipment issues described below and using the acceptance criteria outlined in Inspection Procedure 71111.12, the inspectors reviewed the licensee's implementation of the Maintenance Rule (10 CFR 50.65) to assess the effectiveness of the licensee's maintenance efforts that apply to scoped structures, systems, and components (SSCs):

- Failure of inboard Unit 2 main steam isolation valve (MSIV) 2C to respond as expected when the operator attempted to slow-close the valve by pressing and holding test button 2-HS-001-0037.
- Bearing failure (and removal from service because of substantial vibration and noise) on Unit 2 low pressure coolant injection (LPCI) motor-generator (M-G) 2EA following return to service after performing scheduled maintenance.
- Failure of the hydrogen sample inlet pump of the 3A hydrogen/oxygen analyzer to maintain minimum required flow rate.
- Failure of the 3B recirculation pump discharge valve (3-FCV-68-79) to close while removing the 3B recirculation pump from service.
- Preventable functional failure due to personnel error in the installation of a rubber "boot" on a relay contact during performance of common accident signal logic functional testing, resulting in the auto start of the 3B diesel generator, an engineered safety feature (ESF).

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Controls

a. Inspection Scope

The objectives of this inspection were to verify that risk assessments were being performed when and as required by 10 CFR 50.65(a)(4). The inspectors reviewed the licensee's risk assessments and the implementation of compensatory measures for the planned maintenance activities listed below for adequacy. The inspectors also verified that, upon identification of the emergent equipment issue listed below, the licensee had taken the necessary steps to plan and control the resulting emergent work activities to effectively manage and thus minimize that risk:

- Unit 2: Replacement of flywheel bearings on LPCI M-G 2EA (Division II) during a Division I work-week per WO 02-001252-001 (emergent)

- Unit 2: Troubleshoot and repair of the local manual governor control on EDG A subsequent to failure during surveillance testing (emergent)
- Unit 2: Troubleshoot cause of abnormal fuel pressure alarm on EDG D, replace fuel oil filters with "spin-on" design to resolve fuel oil leakage per WO 00-05743-000 (emergent)

- Unit 2: Perform maintenance on electro-hydraulic control system Pump 2B in accordance with WO 02-002131-000 and 02-002133-000 during a power generation advisory (planned)
- Unit 2: Replacement of flywheel bearings on LPCI M-G 2EN (Division II) during a Division I work-week per WO 02-006146-000 (emergent)

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following operability evaluations affecting mitigating systems or barrier integrity to ensure that operability was properly justified as permitted by Generic Letter 91-18 (Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions), and the SSC remained available or was addressed by plant TS or technical requirements manual limiting conditions for operation such that no unrecognized increase in risk occurred:

- Operability of the MSIVs was questioned in PER 02-002858-000 when an operational event notification identified a possibility that drywell pressure opposing valve closing piston forces would slow the stroke time thereby exceeding the TS maximum.
- Operability of a steam admission valve (3-FCV-73-16) for Unit 3 high pressure coolant injection (HPCI) that was over-torqued by a valve operator malfunction, as identified by PER 02-003730-000.
- Past operability of the C shutdown board during the time when EECW pump B3 sequencing time delay was inoperative (no delay) as identified by PER 02-004782-000.
- Operability of the pressure suppression chamber (torus) after determining that the torus air space temperature would not be the same as the torus water as assumed in previous containment accident analyses. This change in anticipated conditions called to question the effect of potential stresses on the torus and attached structures as identified by PER 02-005438-000.

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds

a. Inspection Scope

The inspectors reviewed the status of operator workarounds for Units 2 and 3 to determine if the functional capability of the system or operator reliability in responding to an initiating event was affected. This included evaluating the effect of the operator workaround on the operator's ability to implement abnormal or emergency operating procedures. The inspectors selected and reviewed in detail operator workaround 2-047-OWA-2002-0003, Priority 1, Unit 2 main turbine oil tank level low annunciator disabled, to ensure that there was no significant effect on system or human reliability in responding to an initiating event. The inspectors also reviewed the cumulative effects of operator workarounds on both Units 2 and 3 that could increase an initiating event frequency or that could affect multiple mitigating systems. The review also considered the cumulative effects of operator workarounds on the ability of operators to respond in a correct and timely manner to plant transients and accidents.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors evaluated the following activities by observing testing and/or reviewing completed documentation to verify that the post maintenance test (PMT) was adequate to verify system operability and functional capability following completion of associated work:

- PMT of Unit 3 containment isolation valve/reactor core isolation cooling (RCIC) steam supply valve 3-FCV-071-0002 after a broken stem was replaced.
- PMT of new digital controller that replaced the obsolete analog controller in the RCIC system (DCN 50472, Stage 2) on Unit 3, in accordance with Procedure 3-TI-428
- PMT of new digital controller that replaced the obsolete analog controller in the HPCI system (DCN 50472, Stage 1) on Unit 3, in accordance with Procedure 3-TI-429
- PMT of the reactor vessel and associated piping for leakage following the refueling outage on Unit 3, tested in accordance with Procedure 3-SI-3.3.1.A.
- PMT of EDG A governor after failure of the governor to respond to manual control and the Bodine motor was replaced, in accordance with WO 02-005152-000
- PMT of new design duplex fuel oil filter installed on EDG D after resolving old design filter assembly leakage problem, in accordance with WO 02-005743-000

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

.1 Unit 3 Refueling Outage U3C10

a. Inspection Scope

The inspectors reviewed the licensee's outage safety plan and contingency plans for Unit 3 Refueling Outage U3C10 to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured defense-in-depth. During the refueling outage, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the below-listed outage activities:

- Configuration management, i.e., maintenance of defense-in-depth commensurate with the outage safety plan for key safety functions and compliance with the applicable TS when taking equipment out of service.
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and an accounting for instrument error.
- Controls over the status and configuration of electrical systems to ensure that TS and outage safety plan requirements were met.
- Decay heat removal processes.
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities that could affect reactivity.
- Maintenance of secondary containment as required by TS.
- Refueling activities, including new fuel receipt inspection, in-core fuel handling.
- Startup and ascension to full power operation, tracking of startup prerequisites, walkdown of the drywell (primary containment) to verify that debris had not been left which could block emergency core cooling system suction strainers, and reactor physics testing.
- Licensee identification and appropriate resolution of problems related to refueling outage activities.

b. Findings

No findings of significance were identified.

.2 Unit 2 Forced Outage to Remove Leaking Reactor Fuel

b. Inspection Scope

The inspectors reviewed the licensee's outage safety plan and contingency plans for the Unit 2 outage to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured defense-in-depth. During the outage, the inspectors observed portions of

the shutdown and cooldown processes and sampled licensee controls over the below-listed outage activities:

- Configuration management, i.e., maintenance of defense-in-depth commensurate with the outage safety plan for key safety functions and compliance with the applicable TS when taking equipment out of service.
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and an accounting for instrument error.
- Decay heat removal processes.
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities that could affect reactivity.

- Disposition and replacement of leaking fuel bundles identified by sipping.
- Maintenance of secondary containment as required by TS.
- Establishment of prerequisites for startup and power operation, including review of completed documentation of the drywell airlock leak rate test.
- Compliance with the TS during reactor startup, including review of the shutdown margin test results.

c. Findings

On April 23, 2002, while in forced cooldown using the RHR system, a radiation alarm annunciated, warning the Unit 2 control room operators that the effluent RHRSW may be radioactive. The operators referred to the alarm response procedure (ARP 2-9-3A) and followed it by ordering a confirmatory sample and analysis. Meanwhile, the inspector noted that the potentially radioactive discharge continued while the operators waited for the results of the confirmatory sample drawn by the chemist. For the radiation levels indicated by the recorder on April 23, the delay was acceptable. However, had the indicated radioactivity level exceeded the limits of 10 CFR 20.1301(d), the delay would have been unacceptable. The procedure did not support 10 CFR 50, Appendix A, Criterion 60 (Control of releases of radioactive materials to the environment), because it should have required something equivalent to stopping the discharge immediately if the radioactivity levels exceeded a value established to protect the environment.

This issue was determined by the SDP to be of very low safety significance (Green), because the radioactivity level regulatory limits were not exceeded.

Failure to maintain ARP 2-9-3A adequate to protect the environment is a violation of TS 5.4.1.a which requires, in part, that written procedures as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, shall be maintained. Regulatory Guide 1.33, Revision 2, Appendix A, Section 9, recommends, in part, that ARPs contain appropriate immediate operator actions. However, because of the very low safety significance of the issue and because the licensee included this problem in the corrective action program (PER 02-004456-000), and revised the ARP for all units

accordingly, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy, and is identified as NCV 50-260/2002-02-01, Failure to Maintain Adequate ARP for Terminating Excessive Radioactive RHRSW Effluent Discharges.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors witnessed surveillance tests and/or reviewed test data for selected risk-significant SSCs, listed below, to assess, as appropriate, whether the tests met TS Surveillance Requirements, Updated Final Safety Analysis Report (UFSAR) commitments, and licensee procedure requirements. The inspectors also confirmed that the testing effectively demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions:

- Surveillance Requirement (SR) 3-SR-3.3.5.1.6(FT), HPCI system logic functional test (Unit 3)
- SR 3-SR-3.6.1.3.10(A),(B),(C), and (D), primary containment local leak rate tests (LLRTS) for main steam lines A, B, C, and D penetrations X-7A, B, C and D, respectively (four LLRTs)(Unit 3)
- SR 3-SR-3.6.1.3.5(RCIC), RCIC system MOV operability (Unit 3)
- SR 2-SR-3.5.1.6(CS II), CS flow rate inservice test on Loop II (Unit 2)

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors conducted reviews of the weekly list of active temporary plant modifications, to maintain cognizance over temporary alteration control forms (TACFs) in effect. The following TACFs were selected because the systems were determined to be key systems from a probabilistic safety assessment perspective. The 10 CFR 50.59 screening and selected sections of the UFSAR and TSs were reviewed to verify that the alterations did not adversely affect the safety functions of important safety systems. Where practicable, the installed hardware was inspected to verify proper configuration and to ensure that there were no interferences with operable systems. Where specified below, the inspectors reviewed the removal of the temporary modifications and the adequacy of system restoration and testing:

- Removal of TACF 3-00-012-085, blocking of the intermittent “6" position at the input to the probe buffer card for Control Rod 18-27, after repairs were made during the Unit 3 refueling outage.
- Installation of TACF 0-02-001-032, backup control air supply for critical control air end users located in the stack and offgas buildings.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Testing

a. Inspection Scope

The inspector reviewed the testing program for the alert and notification system (ANS), which comprised 100 sirens in the ten-mile-radius emergency planning zone. This program, delineated in Sections 8.5 and A.4.1 of the licensee's Radiological Emergency Plan (REP), included biweekly silent tests, monthly full-volume tests, and annual growl tests (in conjunction with preventive maintenance). System changes, post-maintenance testing methodology, test records, and a sample of corrective actions were reviewed and discussed with cognizant management and maintenance personnel. The review of this program area encompassed the period January 2001 through March 2002. Documents reviewed are included in the attachment to this report.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization (ERO) Augmentation

a. Inspection Scope

The inspector reviewed the maintenance and testing of the licensee's capability to staff emergency response facilities (ERFs) in accordance with the personnel and timeliness requirements specified in Sections 3.0 and A.2 of the REP. The licensee's automated paging and manual backup systems for call-out of ERO personnel were reviewed to determine whether they would support staff augmentation in accordance with the ERF activation criteria. Records were reviewed of the last two off-hour ERO augmentation drills which involved actual travel to the plant and activation of ERFs, conducted on November 30, 2000, and December 18, 2001, respectively. Documentation of the most recent test of the backup call-out system (performed on December 14, 1999) was reviewed. Records of weekly ERO pager tests for the period January 2001 through March 2002 were also reviewed. Follow-up activities for a sample of problems identified through augmentation testing were evaluated to determine whether appropriate corrective actions were implemented. A shift manager (interim site emergency director upon declaration of an emergency) and a Unit operator were interviewed to determine the adequacy of call-out system activation procedures and associated personnel training.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level (EAL) and Emergency Plan Changes

a. Inspection Scope

The inspector reviewed changes made to the REP since the last inspection in this program area (conducted in June 2001) against the requirements of 10 CFR 50.54(q) to determine whether any of the changes decreased REP effectiveness. Revisions 62 and 63 contained modifications to Appendix A (site-specific for Browns Ferry) involving only minor changes to the EALs. The inspector determined whether the EAL modifications were reviewed with, and agreed upon by, State and local officials prior to implementation, as required by Section IV.B of Appendix E to 10 CFR Part 50.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies

a. Inspection Scope

The inspector reviewed numerous PERs and Activities Management Oversight System Reports, Nuclear Assurance (NA) Audit Report No. SSA0005, NA Assessment Report NA-CH-01-004, five 2.9.3A self-assessment reports (dated from August 2000 to February 2002), and critique reports for ERO integrated drills conducted on August 16, 2000, and September 5, 2001, respectively to evaluate the efficacy of licensee programs that addressed weaknesses and deficiencies in emergency preparedness. A sample of weaknesses and deficiencies identified by these programs was evaluated to determine whether corrective actions were effective and timely. Documents reviewed are included in the attachment to this report.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

On May 15, 2002, the inspector observed the conduct of the off-year emergency exercise in the plant control room simulator to assess the licensee's performance in executing the exercise in accordance with the acceptance criteria delineated in Inspection Procedure 71114.06. The inspector verified that the licensee classified the events in a correct and timely manner, took credit for Performance Indicators (PIs) appropriately, and the inspector compared his observations with the licensee's during the critiques that followed.

b. Findings

No findings of significance were identified.

3. SAFEGUARDS

Cornerstone: Physical Protection

3PP2 Access Control

a. Inspection Scope

Concurrent with the plant status inspections performed by the resident inspectors in accordance with the guidance of IC 2515, Appendix D, the inspector observed the status of physical security equipment, including vital area access doors, to ensure that they were functioning properly to prevent unauthorized access, as described in the plant Security Plan, Section 4.2.3.

b. Findings

On May 10, 2002, while determining plant status, the inspector found a control room door unlatched, but not in an alarm state. This occurred a second time on May 17, 2002, with a different door to the control room. These doors are physical barriers between the protected area and vital areas, as defined in 10 CFR 73.55(a). The inspector notified the central alarm station operator, who promptly posted a security officer at the door until it was repaired. Security logged the events as required by 10 CFR 73, Appendix G, and initiated PER 02-005242-000 to enter this problem into the corrective action program. The licensee recognized that the doors to the control room were exposed to heavy traffic every day, and took appropriate action to adjust the frequency of preventive door maintenance so that the functionality of the doors would remain satisfactory in the future.

In accordance with IMC 0610*, Appendix B, this finding was more than minor and required application of the SDP, because the issue involved a failure to meet the requirements of 10 CFR 73.55 (b)-(h), or associated plans, procedure or rules. Based upon the Interim Physical Protection SDP, this issue was considered to have very low safety-significance (Green), because a person could not gain access to the control room undetected, and the individual would have already been subjected to access controls in order to enter the protected area.

Failure to establish a preventive maintenance program that assured continued maintenance of physical protection related components such as the control room doors in an operable and effective condition is a violation of 10 CFR 73.46(g)(4). However, because of the very low safety significance of the issue and because the licensee has included this problem in their corrective action program (PER 02-005242-000), this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy, and is identified as NCV 50-260/2002-02-02, Failure to Maintain Operability of Control Room Doors.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

Licensee records were reviewed by the inspectors under the guidance of Inspection Procedure 71151 to determine whether the submitted PI statistics were calculated in accordance with the guidance contained in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline.

Cornerstone: Initiating Events

.1 Unplanned Transients per 7000 Critical Hours

a. Inspection Scope

The inspectors reviewed the licensee's first quarter, 2002, Units 2 and 3 PI data pertaining to unplanned transients for accuracy and completeness (i.e., unplanned changes in reactor power of greater than 20% of full power) per 7000 critical hours. Records reviewed included control room operator logs, the plant status section of the past four quarters' NRC inspection reports, monthly operating reports, and PI data on the NRC web site.

b. Findings

No findings of significance were identified.

Cornerstone: Mitigating Systems

.2 Safety Systems Unavailability - RHR

a. Inspection Scope

The inspectors reviewed the licensee's first quarter, 2002, Units 2 and 3 PI data pertaining to RHR safety system unavailability for accuracy and completeness. Records reviewed on a sampling basis included control room operator logs, the system engineer's PI database, and PI data submitted to the NRC for the NRC web site.

b. Findings

No findings of significance were identified.

.3 Heat Removal System (RCIC) Unavailability

a. Inspection Scope

The inspectors reviewed the licensee's data on the Unit 2 and 3 Heat Removal System Unavailability PI for accuracy and completeness. The period covered was the second, third and fourth quarters of 2001 and the first quarter of 2002. Records reviewed

included PI data maintained by the system engineer and PI data appearing on the NRC web site.

b. Findings

No findings of significance were identified.

Cornerstone: Barrier Integrity

.4 Reactor Coolant System (RCS) Specific Activity

a. Inspection Scope

The inspector reviewed weekly RCS chemistry sample analyses for maximum dose equivalent Iodine-131 for the period from April 2001 through March 2002 for Units 2 and 3 to verify that the percent of TS limit was the same or lower than the maximum value reported by the licensee for the applicable month. In addition to record reviews, the inspectors observed a chemistry technician obtain RCS samples from Units 2 and 3.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

.5 Emergency Response Organization Drill/Exercise Performance

a. Inspection Scope

The inspector reviewed a sample of drill records to assess the accuracy of the PI for ERO drill and exercise performance (DEP). Documentation was reviewed for ERO drills conducted on May 9 and October 17, 2001, and licensed operator requalification examinations conducted in November 2001 to verify the licensee's reported data regarding successes in emergency classifications, notifications, and protective action recommendations.

b. Findings

No findings of significance were identified.

.6 ERO Drill Participation

a. Inspection Scope

The inspector reviewed the training records for the 49 individuals assigned to key positions in the ERO as of the end of the fourth quarter of 2001 to assess the accuracy of the PI for ERO drill participation.

b. Findings

No findings of significance were identified.

.7 Alert and Notification System (ANS) Reliability

a. Inspection Scope

The inspector reviewed a sample of the licensee's records of siren tests conducted from April 1 to December 31, 2001, to assess the accuracy of the PI for the ANS reliability.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

Cornerstone: Mitigating Systems

.1 HPCI Steam Inlet Valve Damaged and Rendered Inoperable by Maintenance Error

a. Inspection Scope

The inspector selected PER 02-003730-000 as a sample of the licensee's processing of problems affecting important safety systems. The inspector reviewed the initial identification (manifested by the HPCI steam inlet valve failing to function), the licensee's determination of the cause, and the corrective action in view of previous maintenance errors that have been identified by the licensee and the inspectors. The inspector evaluated the licensee's corrective actions using the criteria provided by Inspection Procedure 71152, and verified that the actions were commensurate with the causes and significance of the issue.

b. Findings

On April 6, 2002, while testing motor operated valves in the HPCI system for operability on Unit 3, turbine steam inlet Valve 3-FCV-73-16 was damaged and rendered inoperable. The valve closed when it was given a signal to open and, due to a malfunctioning limit switch, the motor operator damaged the stem and other parts of the valve. The licensee initiated the PER and processed work orders to repair the valve. The cause of the damage was pinched and short circuited wiring in the valve operator under the limit switch cover. The switch cover was installed without first ensuring that the wiring inside the casing was clear of the cover. The inspector reviewed the procedures involved with this work and noted that they did not address any precautions to be taken when installing the cover. The licensee's problem evaluation did not specifically identify the cause of this poor work practice and inattention to detail; however, the licensee's corrective action addressed the problem by calling for procedure sign-offs verifying that the wires were secured (tied back) prior to reinstalling the covers. The licensee also addressed personnel accountability. The inspector determined that

the failure to maintain adequate procedures for controlling work performed on MOVs was a licensee-identified violation of regulatory requirements which was of very low safety significant (Green). Refer to Section 4OA7.

4OA3 Event Follow-up

.1 (Closed) LER 50-296/2002-002: An Unplanned Auto-start of Two Emergency Diesel Generators due to Personnel Error During an Equipment Clearance Process. On March 26, 2002, while attempting to install safety grounding devices on the 3B 4 kV non-safety related unit board, the electrician erroneously grounded the energized breaker stab. This caused an electric arc flashover that injured the four electricians present, with up to 3rd degree burns. The high capacity ground tripped the feeder breakers to the Unit board, which, in turn, de-energized the 4 kV shutdown safety related boards fed by them. When power was lost to the 4 kV shutdown boards, the corresponding EDGs 3C and 3D started automatically. Because the shutdown boards actually lost power, this was a valid ESF actuation. The EDGs assumed the shutdown board loads, and after it became safe to do so, the operators restored 4 kV power to the unit boards and then to the shutdown boards. Five primary containment isolation valves shut as a result of the loss of power. Because the unit was shut down and in a refueling outage, this event caused a temporary loss of shutdown cooling for 13 minutes, which was not long enough for the reactor to heat up to Mode 3 (hot shutdown).

The event was determined to be of very low safety significance (Green), by the SDP process because the plant systems responded to the event as designed, and there were no adverse consequences as a result of the short-term loss of shutdown cooling. The licensee entered the issue into the corrective action program as PER 02-003140-000 and took appropriate corrective action. Although this event involved a human performance issue on the part of licensee personnel, it was in a non-safety related area. Therefore, it did not constitute a violation of NRC requirements.

.2 (Closed) LER 50-296/2002-003: Actuation of RPS (Reactor Protection System) While Shutdown due to Inadvertent Depressurization of Scram Pilot Air Header. On April 6, 2002, during the final stages of the Unit 3 refueling outage, and while testing to verify the insertion and withdrawal speed of the reactor control rods, an automatic scram occurred. At the time, one control rod was withdrawn to position 26 (about half way out of the core), and a half scram on RPS Channel B was being reset as part of tests being conducted on a modification to the scram discharge volume instruments. The rod scrammed normally, as designed. All other rods were already fully inserted as required by TS and the mode switch was locked in the REFUEL position as required. The scram was valid on the basis that scram pilot air header pressure had dropped below the 50 psig minimum scram setpoint.

The licensee investigated to determine the cause of this event and identified that the resetting of the half scram caused both of the backup scram solenoid air valves for RPS Channels A and B to be open, thereby bleeding off scram pilot air header pressure. As the B RPS contactor (one of four heavy duty relays, each one similar to a motor controller) closed in response to the reset, the auxiliary contacts on the C RPS contactor vibrated closed, opening the Channel A backup scram valve. The C RPS contactor auxiliary contacts were vulnerable to vibration because the screw holding the actuation

arm had become loose. Maintenance personnel tightened the actuation arm screws on all four contactors A, B, C, and D, and they functioned properly thereafter. The licensee entered the problem in their corrective action program under PER 02-003704-000 and reported the scram to the NRC in accordance with 10 CFR 50.72(b)(3)(iv)(A) and (B) as Event No. 38838.

The event was determined to be of very low safety significance (Green) by the SDP process, because the reactor was shutdown, all rods except one were already inserted, and shutdown margin was satisfied. Also, this was not a human performance issue on the part of the licensee. This event did not constitute a violation of NRC requirements.

4OA6 Management Meetings

Exit Meeting Summary

The inspectors presented the inspection results to Mr. R. G. Jones, and other members of licensee management on June 27, 2002. Proprietary materials were examined during this inspection period and were returned to the licensee.

4OA7 Licensee-Identified Violations

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

NCV Tracking Number	Requirement Licensee Failed to Meet
NCV 50-296/2002-02-03	(Green) TS 5.4.1.a requires, in part, that written procedures as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, shall be maintained. Regulatory Guide 1.33, Revision 2, Appendix A, Section 9, recommends, in part, that maintenance that can affect the performance of safety-related equipment should be performed in accordance with written procedures appropriate to the circumstances. Contrary to the above, on April 7, 2002, WO 01-009409-000 had no provision to ensure that the limit switch wires were clear before installing the cover on MOV operator 3-MVOP-73-16. Consequentially, control wiring was pinched and parts of the valve were damaged during post-maintenance testing. This issue was determined to be of very low safety significance because HPCI was not required to be operable for those plant conditions (<150 psig in the reactor vessel).

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Abney, Nuclear Site Licensing & Industry Affairs Manager
A. Bhatnagar, Site Vice President
L. Clardy, Site Nuclear Assurance Manager
R. Coleman, Radiation Control Superintendent
J. Corey, Radiation Protection and Chemistry Manager
T. Cornelius, Emergency Preparedness Supervisor
R. Jones, Nuclear Plant Manager
G. Little, Nuclear Plant Operations Manager
B. Marks, Manager, Emergency Preparedness (Corporate)
T. Niessen, Jr., Engineering & Site Support Manager
J. Ogle, Site Security
R. Rogers, Maintenance & Modifications Manager
J. Rupert, Unit 1 Project Manager
M. Scaggs, Assistant Nuclear Plant Manager
R. Wiggall, Site Engineering Manager
J. Valente, Unit 1 Project Engineering Manager

NRC

R. Bernhard, Region II Senior Reactor Analyst

ITEMS OPENED AND CLOSED

Opened and Closed		
50-260/2002-02-01	NCV	Failure to Maintain Adequate Alarm Response Procedure for Terminating Excessive Radioactive RHRSW Effluent Discharges (Section 1R20).
50-296/2002-02-02	NCV	Failure to Maintain Operability of Control Room Doors (Section 3PP2).
50-296/2002-02-03	NCV	Failure to Maintain Adequate Procedures for Controlling Safety Related Maintenance (Section 4OA2 & 4OA7).
Closed		
50-296/2002-002	LER	An Unplanned Auto-start of Two Emergency Diesel Generators Due to Personnel Error During an Equipment Clearance Process (Section 4OA3.1).

Attachment

50-296/2002-003	LER	Actuation of RPS While Shutdown due to Inadvertent Depressurization of Scram Pilot Air Header (Section 4OA3.2).

LIST OF DOCUMENTS REVIEWED

Section 1R08

Procedures

- Framatome Procedure 54-ISI-160-02, Remote Ultrasonic Examination of BWR Reactor Vessel Internals Core Spray Piping Welds
- Framatome Procedure 54-ISI-363-00, Remote Underwater In-Vessel Visual Inspection of Reactor Pressure Vessel Internals and Components
- Inspection and Examination Procedure IEP-205, Radiographic Film Processing, Handling and Storage of TVA Radiographs and Acceptance of Contractor Radiographs
- Non-Destructive Examination (NDE) Procedure N-VT-1, Visual Examination for ASME Section XI Preservice and Inservice
- NDE Procedure N-GP-18, Ultrasonic Testing Supplements
- NDE Procedure N-UT-9, Ultrasonic Examination of Reactor Vessel Welds
- NDE Procedure N-UT-55, Ultrasonic Examination of Nozzle Inner Radius Sections Refracted
  L-Waves from the Blend Radius
- NDE Procedure N-RT-1, Radiographic Examination of Nuclear Power Plant Components
- Surveillance Instruction 3-SI-4.6.G, Inservice Inspection and Risk-Informed Inservice Inspection Program, Unit 3
- Technical Instruction (TI) 0-TI-376, Primary Containment Inspection
- TI 3-TI-173, ASME Section XI Containment Inservice Inspection Program, Units 2 and 3
- TI 0-TI-365, Reactor Pressure Vessel Internals Inspection, Units 1, 2 and 3
- TVA Standard, SPP-9.1, ASME Section XI

Other Documents

- Problem Evaluation Report (PER) 02-000097-000, Ultrasonic examination of RHR component weld performed to NDE procedure N-UT-18 which had not been updated to incorporate requirements of correct versions of ASME Sections V and XI.
- PER 02-003012-000, Several contractor qualifications not submitted 30 days prior to outage as required by Framatome Proposal No. 1600649.

Section 1EP2

- Radiological Emergency Plan
- SPP-3.1 Corrective Action Program

Section 1EP5

- EPIL-5 EP Tracking System: Activities Management Oversight System
- SPP-3.1 Corrective Action Program