



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
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October 22, 2004

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

SUBJECT: WATTS BAR NRC INTEGRATED INSPECTION REPORT 05000390/2004004  
AND 05000391/2004004

Dear Mr. Singer:

On September 25, 2004, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant, Units 1 and 2. The enclosed integrated inspection report documents the inspection results which were discussed on September 29, 2004, with Mr. W. Lagergren 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.

This reports documents one NRC-identified finding and one self-revealing finding of very low safety significance (Green). The issues were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest any NCV in the enclosed report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the 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 Watts Bar facility.

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Sincerely,

*/RA/*

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

Docket Nos. 50-390, 50-391  
License No. NPF-90 and Construction  
Permit No. CPPR-92

Enclosure: NRC Inspection Report 05000390/2004004, 05000391/2004004  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-390, 50-391

License Nos: NPF-90 and Construction Permit CPPR-92

Report No: 05000390/2004004, 05000391/2004004

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Units 1 and 2

Location: 1260 Nuclear Plant Road  
Spring City TN 37381

Dates: June 27 through September 25, 2004

Inspectors: J. Bartley, Senior Resident Inspector  
J. Reece, Resident Inspector  
N. Staples, Reactor Inspector  
J. Wallo, Regional Inspector  
L. Mellen, Senior Reactor Inspector (Sections 1EP2, 1EP3, 1EP4, and 1EP5)

Approved by: Stephen J. Cahill, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

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## SUMMARY OF FINDINGS

IR 05000390/2004004, 05000391/2004004, 06/27/2004 - 09/25/2004, Watts Bar, Units 1 & 2; Fire Protection, Personnel Performance During Non-routine Plant Evolutions

The report covers approximately a three-month period of routine inspection by resident and regional inspectors and an announced inspection by a regional emergency preparedness specialist. Two findings of significance were identified. The significance of issues is indicated by the color assigned (Green, White, Yellow, Red) using the Significance Determination Process in Inspection Manual Chapter 0609, Significance Determination Process (SDP). 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. NRC-Identified Findings and Self-Revealing Findings

#### **Cornerstone: Mitigating Systems**

- Green. The inspectors identified a non-cited violation of Section 9.1 of the Watts Bar Fire Protection Report because the licensee's assessment of a fire brigade drill was inadequate. Fire brigade performance deficiencies were not accurately characterized and drill performance was incorrectly deemed satisfactory, therefore not requiring the scheduling of additional training.

This finding is more than minor because it had a high negative impact or degradation on the ability of the fire brigade to effectively carry out its manual fire fighting control and suppression function. This finding was of very low safety significance because the observed crew was only one of four crews of the site fire brigade team, and that the overall condition of the fire detection and suppression systems had been satisfactory. The cause of the finding is related to the cross-cutting element of problem identification and resolution. (Section 1R05.2)

#### **Cornerstone: Barrier Integrity**

- Green. A self-revealing non-cited violation of Technical Specification 5.7.1, which requires that written procedures be implemented covering the activities in the applicable procedures recommended by Regulatory Guide 1.33, including procedures for authorities and responsibilities for safe operation and shutdown of the plant, was identified because shift management failed to maintain an appropriate level of oversight during a rod drop event. Shift management became overly involved with stabilizing the secondary transient and did not maintain a broad perspective. This resulted in a 3½-minute delay in tripping the reactor due to multiple dropped control rods.

This finding is more than minor because it affected the human performance attribute of the barrier integrity cornerstone. Shift management's failure to maintain a broad perspective and becoming involved in the stabilization of the secondary system resulted in a delay in manually tripping the reactor, which could affect the fuel cladding barrier. This finding is of very low safety significance because it affected only the

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barrier integrity cornerstone. The cause of the finding is related to the cross-cutting element of human performance. (Section 1R14)

B. Licensee-Identified Violations

None

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## Report Details

### Summary of Plant Status

Unit 1 operated at or near 100 percent power for the entire inspection period except for one reactor trip. On September 19, Unit 1 was manually tripped when four control rods dropped into the core due to a rod control system failure. The unit was restarted on September 21. Unit 2 remained in a deferred construction status.

## **1. REACTOR SAFETY**

### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R04 Equipment Alignment

##### a. Inspection Scope

The inspectors conducted four equipment alignment partial walkdowns to evaluate the operability of selected redundant trains or backup systems, listed below, with the other train or system inoperable or out of service. The inspectors reviewed the functional system descriptions, Updated Final Safety Analysis Report (UFSAR), system operating procedures, and Technical Specifications (TSs) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify that critical components were properly aligned and to identify any discrepancies which could affect operability of the redundant train or backup system. Additional documents reviewed are listed in the attachment.

- 1A containment spray (CS) train with 1B CS train inoperable for a component outage
- 1A residual heat removal (RHR) train with 1B RHR train inoperable for a component outage
- 1B safety injection (SI) pump with 1A SI pump inoperable for component outage
- 1A and 2A emergency diesel generators (EDG) with 1B EDG inoperable for component outage

##### b. Findings

No findings of significance were identified.

#### 1R05 Fire Protection

##### .1 Quarterly Fire Area Tours

##### a. Inspection Scope

The inspectors conducted tours of 12 areas important to reactor safety, listed below, to verify the licensee's implementation of fire protection requirements as described in the licensee's Fire Protection Program; licensee procedure Standard Programs and Processes (SPP)-10.0, Control of Fire Protection Impairments; SPP-10.10, Control of Transient Combustibles; and SPP-10.11, Control of Ignition Sources (Hot Work).

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The inspectors evaluated, as appropriate, conditions related to (1) licensee control of transient combustibles and ignition sources; (2) the material condition, operational status, and operational lineup of fire protection systems, equipment, and features; and (3) the fire barriers used to prevent fire damage or fire propagation.

- Auxiliary instrument room (CB 708)
- 1A-A EDG
- 2A-A EDG
- 1B-B EDG
- 2B-B EDG
- A train essential raw cooling water (ERCW) pumps
- B train ERCW pumps
- A train high pressure fire protection (HPFPs)
- B train HPFPs
- A train ERCW strainers
- B train ERCW strainers
- ERCW traveling screens

b. Findings

No findings of significance were identified.

.2 Fire Protection - Drill Observation

a. Inspection Scope

The inspectors observed an unannounced backshift fire drill on September 16, 2004, that involved a simulated fire in the diesel generator building fuel oil transfer pump room. The inspectors evaluated the readiness of the licensee's personnel to prevent and fight fires and attended the post-drill critique to verify that the licensee addressed observed areas-for-improvement and deficiencies in the corrective action program.

b. Findings

Introduction: A Green non-cited violation (NCV) was identified by the NRC for a failure to comply with the Fire Protection Report (FPR) regarding the correction of performance deficiencies by additional or remedial training.

Description: The inspectors observed the drill and the post-drill critique to evaluate the fire brigade performance and the ability of the evaluation team to identify performance deficiencies. The inspectors determined that, while the fire operations evaluation team identified some deficiencies, several significant deficiencies were not identified. These deficiencies included excessive time in applying an extinguishing agent to the fire, poor command and control, and the backup team entering the scene with their hose disconnected. Deficiencies identified by the fire brigade participants included: personnel unfamiliar with the personal alarm devices, the initial entry team had insufficient hose to reach the fire area, radio communication difficulties, and a thermal imager was not available for the initial entry team.

The inspectors reviewed the licensee's FPR and the WBN Fire Drill Critique Form which documented the drill performance. The FPR stated that "Performance deficiencies of the fire brigade or individual brigade members are remedied by scheduling additional training." The critique form stated that a drill will result in a failure and require remedial training if any one critical item or a specified number of non-critical items are evaluated as a "NO." The inspectors determined that at least two critical items and one non-critical item were incorrectly documented as acceptable and that the fire drill performance was not satisfactory. Additional training was not specified on the drill critique form. The inspectors noted that instead of identifying a critical item as unsatisfactory, the licensee identified a list of critique comments which included areas for improvement. None of the areas for improvement described remedial training. A review of fire operations training records revealed that, since 2000, no fire drills were graded as unsatisfactory. Training performed for areas of improvement identified on the drill critique forms typically consisted of reviewing night order entries describing the deficiencies. The inspectors therefore determined that the cause of this finding impacted the problem identification and resolution cross-cutting area.

Analysis: The inspectors performed an analysis of the unsatisfactory fire drill performance using MC 0609, Significance Determination Process, Appendix F, Phase 2, Attachment 2, dated February 7, 2001, and determined that the finding was more than minor due to a high negative impact or degradation on the ability of the fire brigade to effectively carry out its manual fire fighting control and suppression function based on the fire brigade members not performing satisfactorily as a team; general weaknesses associated with the fire fighting equipment and its deployment; and unsatisfactory communications. The inspectors determined that the finding was of very low safety significance (Green) because the observed crew was only one of four crews of the site fire brigade team, and that the overall condition of the fire detection and suppression systems had been satisfactory.

Enforcement: Facility Operating License NPF-90 for Watts Bar Nuclear Plant Unit 1, Condition 2.F, requires that TVA shall implement and maintain in effect all provisions of the approved fire protection program as described in the FPR Section 9.1 of the FPR, Fire Brigade Staffing, specified, "Performance deficiencies of the fire brigade or individual brigade members are remedied by scheduling additional training." Contrary to this, on September 16, 2004, fire brigade performance deficiencies were not accurately characterized and drill performance was incorrectly deemed satisfactory, therefore not requiring the scheduling of additional training. Because the finding is of very low safety significance and because it has been entered into the licensee's corrective action program as problem evaluation report (PER) 69187, this violation is being treated as a Green NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-390/2004004-01, Failure to Identify Unsatisfactory Performance of a Fire Brigade Crew.

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## 1R11 Licensed Operator Requalification

### a. Inspection Scope

On August 20, 2004, the inspectors observed operators in the plant's simulator during scenario 3-OT-SRT0069B, Loss of Coolant Accident Outside Containment. The inspectors verified that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with procedures TRN-1, Administering Training, and TRN-11.4, Continuing Training for Licensed Personnel.

### b. Findings

No findings of significance were identified.

## 1R12 Maintenance Effectiveness

### a. Inspection Scope

The inspectors reviewed the two performance-based equipment problems listed below. The focus of the reviews was to assess the effectiveness of maintenance efforts that apply to scoped structures, systems, or components (SSCs) and to verify that the licensee was following the requirements of TI-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65, and SPP-6.6, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65. Reviews focused, as appropriate, on (1) appropriate work practices; (2) identification and resolution of common cause failures; (3) scoping in accordance with 10 CFR 50.65; (4) characterization of reliability issues; (5) charging unavailability time; (6) trending key parameters; (7) 10CFR50.65 (a)(1) or (a)(2) classification and reclassification; and (8) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1). Additional documents reviewed are listed in the attachment.

- RM-90-101, auxiliary building radiation monitor in a(1) status
- PER 68269, EDG 1B-B has exceeded its maintenance rule unavailability performance criteria of 2% (@2.2%)

### b. Findings

No findings of significance were identified.

## 1R13 Maintenance Risk Assessments and Emergent Work Evaluation

### a. Inspection Scope

The inspectors evaluated, as appropriate for the five work activities listed below, (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors verified that the licensee was complying with the requirements of 10 CFR 50.65 (a)(4); SPP-7.0, Work Control and Outage Management; SPP-7.1, Work Control Process; and TI-124, Equipment to Plant Risk Matrix. Additional documents reviewed are listed in the attachment.

- Work Order (WO) 04-820519-000, Repair loose bolt on fuel rack associated with 1B-B EDG
- WO 03-014609-000, Clean/replace D-A ERCW pump motor upper bearing oil cooler in B train work week
- WO 04-820692-000 1B RHR component outage in parallel with B-B electrical boardroom (EBR) chiller outage and emergent work on 2B 480V boardroom chiller
- WO 04-820692-000, Change to A train workweek with 2B 480V boardroom chiller out of service
- WO 04-821230-000, A-A EBR chiller out of service for scheduled maintenance and emergent work on 1A RHR pump motor

### b. Findings

No findings of significance were identified.

## 1R14 Personnel Performance During Non-routine Plant Evolutions

### .1 Manual Reactor Trip Due to Dropped Control Rods

#### a. Inspection Scope

The inspectors responded to a manual reactor trip on September 19 initiated due to the four rod control cluster assemblies (RCCA) of control bank B group 2 dropping into the core. The inspectors observed operator performance in the control room, performance of mitigating systems, and the licensee's event notification process. The inspectors also conducted interviews of the main control room operators and reviewed the licensee's post-trip report including chart recorder printouts, alarm reports, and main control room logs. Additional documents reviewed are listed in the attachment.

b. Findings

Introduction: A self-revealing NCV of very low safety significance was identified for shift management failing to maintain a broad perspective and becoming too involved in a single operation during a plant transient.

Description: On September 19 at 0452, the four RCCAs of control bank B group 2 dropped into the core due to a failure in the rod control system. This failure was indicated by a Control Rod Urgent Failure, Rod Position Indication Trouble, and Rods at Bottom annunciators within the first two seconds of the event. However, due to the individual rod position indications for the four dropped rods flashing magenta for eight seconds which indicates invalid data, the control room crew was confused and erroneously thought that there was a malfunction of the rod position indication system. Eighteen seconds into the event the operators were further distracted by a secondary system transient. This was caused by the primary transient and was indicated by steam flow/feedwater flow mismatch annunciators. The crew focused their attention on stabilizing the secondary which they erroneously thought was inducing the transient on the primary. Approximately two minutes into the event, the crew had stabilized the secondary enough to refocus on the primary and determined that the indications of four dropped rods were valid. The crew entered Abnormal Operation Instruction (AOI)-2, Malfunction of Reactor Control System, and manually tripped the reactor 3½-minutes after the rods had dropped. Based on a review of the data, trip report, and interviews with the crew, the inspectors determined that shift management failed to maintain a broad perspective and oversight of the unit response. Specifically, the senior licensed operators became too involved with stabilizing the secondary. This allowed the crew to inappropriately prioritize their response to stabilizing the secondary instead of taking timely actions to respond to the drop of multiple RCCAs. In addition, the licensee's investigation revealed additional contributors to the shift crew's poor response, including training on rod drop events in the simulator that was not realistic, the individual rod position indication in the simulator did not flash magenta on rod drops, and the plant feedwater regulating valves were over-responsive causing significant swings in feedwater flows. The cause of this finding impacts the human performance cross-cutting area.

Assessment: The inspectors determined that this finding was more than minor because it affected the human performance attribute of the barrier integrity cornerstone. Shift management's failure to maintain a broad perspective and becoming involved in the stabilization of the secondary system resulted in a delay in manually tripping the reactor which could affect the fuel cladding barrier. The inspectors evaluated this finding using MC 0609, Appendix A, and determined that it was of very low safety significance (Green) because it only affected the barrier integrity cornerstone.

Enforcement: Technical Specification 5.7.1 requires that written procedures shall be established, implemented, and maintained covering the activities in the applicable procedures recommended by Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, paragraph 1.b, specifies procedures for authorities and responsibilities for safe operation and

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shutdown. Operations Department Procedure (OPDP) - 1, Conduct of Operations, paragraph 3.1.I, directed that the "Shift Manager should not become involved in any single operation that distracts him when multiple operations are required in the control room (e.g., during plant transients or an emergency)." Contrary to this, during the rod drop event on September 19, shift management became involved in the response to the secondary side transient which delayed the response to the dropped RCCAs. Shift management did not maintain a broad perspective which should have allowed them to recognize earlier that the initial indications by the individual rod position indication system were valid and the crew needed to trip the reactor. Because this finding is of very low safety significance and because it has been entered into the licensee's corrective action program as PER 68941, this violation is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000390/2004004-02, Failure to Maintain Adequate Oversight During Rod Drop Event.

.2 Secondary Chemistry Excursion Caused by Resin Beads in the Makeup Water System

a. Inspection Scope

The inspectors reviewed personnel performance during an event where depleted resin was inadvertently injected into the plant's demineralized water header while sluicing resin from a demineralizer. The event occurred due to an error by the demineralized water supply contractor staff. The inspectors reviewed operator and chemistry logs; steam generator, reactor coolant system, condensate storage tank (CST), and spent fuel pool sample results, and videotapes of the interior of the CST and makeup water storage tank to determine if the licensee responses were in accordance with Chemistry Manual (CM)-3.01, System Chemistry Specifications, and Technical Instruction (TI)-268, Secondary Water Chemistry Program. Additional documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed four operability evaluations affecting risk-significant mitigating systems, listed below, to assess, as appropriate (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered as compensating measures; (4) whether the compensatory measures, if involved, were in place, would work as intended, and were appropriately controlled; (5) where continued operability was considered unjustified, the impact on TS Limiting Conditions for Operation (LCOs) and the risk significance in accordance with the Significance Determination Process (SDP).

The inspectors verified that the operability evaluations were performed in accordance with SPP-3.1, Corrective Action Program. Additional documents reviewed are listed in the attachment.

- PER 64987, 2A-A EDG electric boardroom exhaust fan damper failed open
- PER 64509, Use of check valve 0-CKV-32-264-B for system operability when gagging 0-FCV-32-85-B
- PER 65933, Resin beads in Unit 1 condensate storage tank
- PER 67347, Fitting leak at 1A motor-driven auxiliary feedwater (MDAFW) pump outboard bearing cooling supply connection due to deformed piping

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed six post-maintenance test (PMT) procedures and/or test activities, as appropriate, for selected risk-significant mitigating systems to assess whether (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and (8) equipment was returned to the status required to perform its safety function. The inspectors verified that these activities were performed in accordance with SPP-8.0, Testing Programs; SPP-6.3, Pre-/Post-Maintenance Testing; and SPP-7.1, Work Control Process. Additional documents reviewed are listed in the attachment.

- WO 04-814065-000, Disassembly and inspection of 1-CKV-072-0563-B per 1SI-72-907 and MI-0.007
- WO 04-819083-000, Troubleshoot and repair 1A vital battery charger
- WO 04-818758-000, Implement TACF 1-04-001-067, Temporary repair clamp for leak on 20" ERCW header
- WO 04-818597-000, Clean and inspect C-A ERCW motor windings and intake screens
- WO 04-811033-000, Replacement of diaphragm and pressure regulator on 1-MVOP-074-0028
- WO 04-814376-000, Replace pipe nipple/flange between relief valves 1-RFV-67-509A and 1-RFV-67-514A

b. Findings

No findings of significance were identified.

1R22 Surveillance Testinga. Inspection Scope

The inspectors witnessed six surveillance tests and/or reviewed test data of selected risk-significant SSCs, listed below, to assess, as appropriate, whether the SSCs met the requirements of the TS; the UFSAR; SPP-8.0, Testing Programs; SPP-8.2, Surveillance Test Program; and SPP-9.1, ASME Section XI. The inspectors also determined whether the testing effectively demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions.

- WO 04-814137-000, Perform 1-SI-72-901-B, Containment Spray Pump 1B Quarterly Performance Test
- WO 04-814400-000, Perform 0-SI-70-902-S, Component Cooling System Pump C-S Quarterly Performance Test
- WO 04-814506-000, Perform 1-SI-68-32, Reactor Coolant System Water Inventory Balance
- WO 04-812357-000, 0-SI-215-43-A, Diesel Generator 2A-A 18-Month Service Test and Battery Charger Test
- WO 04-815596-000, Perform 1-SI-3-902, Turbine-Driven Auxiliary Feedwater Pump 1A-S Quarterly Performance Test
- WO 04-817180-000, Perform 0-SI-82-17-A, 184-Day Fast Start and Load Test DG 1A-A

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modificationsa. Inspection Scope

The inspectors reviewed one temporary plant modification associated with cleanup of resin beads in the demineralized makeup water header discussed in Section 1R14.1. The temporary alteration was implemented by WOs 04-820685-000, 04-820792-000, and 04-820960-000, which installed drain hoses, filter canisters, and underwater camera equipment for tank inspections. The modifications were evaluated against the requirements of SPP-9.5, Temporary Alterations, and SPP-9.4, 10 CFR 50.59 Evaluation of Changes, Test, and Experiments. The inspectors verified that the modifications did not affect system operability or availability as described by the TS and UFSAR. In addition, the inspectors verified that the installation of the temporary modification was in accordance with the work package, that adequate configuration

control was in place, that procedures and drawings were updated, and that post-installation tests verified operability of the affected systems.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

1EP2 Alert and Notification System Testing

a. Inspection Scope

The inspectors ascertained the licensee's commitments with respect to the testing and maintenance of the alert and notification system (ANS), which comprised 99 sirens in or near the ten-mile-radius emergency planning zone. The inspectors evaluated the design of the ANS, the licensee's methodology for testing the system, and the adequacy of the testing program design. Assessment of the program as actually implemented included review of siren test records (with an emphasis on identification of any repetitive individual siren failures), system changes during the past two years, procedures for periodic preventative maintenance (including post-maintenance testing), and a sample of corrective actions and their effectiveness for siren failures and issues. The review of this program area encompassed the period November 2003 through August 2004. Licensee procedures, records, and other documents reviewed within this inspection area are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization (ERO) Augmentation

a. Inspection Scope

The inspectors identified the licensee's commitments with respect to timeliness and numbers of personnel for staffing emergency response facilities (ERFs) in the event of an emergency declaration at Alert or higher. The licensee's automated paging system and manual backup system for call-out of ERO personnel were reviewed to determine whether they would support staff augmentation in accordance with the criteria for ERF activation timeliness. Methodologies for testing the primary and backup systems for augmenting the ERO were reviewed and discussed with cognizant licensee personnel. The inspectors also reviewed and discussed the changes to the augmentation system and process during the past two years. The inspectors reviewed records of the last off-hour ERO augmentation drill which involved actual travel to the plant and activation of ERFs. Records of ERO pager tests (the backup system for ERO notification) were reviewed. Follow-up activities for a sample of problems identified through augmentation testing were evaluated to determine whether appropriate corrective actions were

implemented. Licensee procedures, records, and other documents reviewed within this inspection area are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed a selected sample of changes made to the Emergency Response Plan (ERP) since the last inspection in this program area (conducted in November 2003) against the requirements of 10 CFR 50.54(q) to determine whether any of the changes decreased ERP effectiveness. The subject changes, which were incorporated in Tennessee Valley Authority Nuclear Radiological Emergency Plan, Revision 74, and Appendix C, Watts Bar Nuclear Plant, Revision 74. The changes did include modifications to the emergency action levels (EALs).

The inspectors reviewed documentation of the licensee's 10 CFR 50.54(q) screening evaluations for these changes. Licensee procedures, records, and other documents reviewed within this inspection area are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies

a. Inspection Scope

The inspectors evaluated the efficacy of licensee programs that addressed weaknesses and deficiencies in emergency preparedness. The procedure governing the plant corrective action program was reviewed for applicability to the emergency preparedness program. The inspectors reviewed event documentation to assess the adequacy of implementation of ERP requirements, as well as the licensee's self-assessment of ERO performance during the event. The inspectors evaluated selected drill scenarios and associated critiques to determine whether the licensee had properly identified failures to implement regulatory requirements and planning standards. A sample of weaknesses and deficiencies identified by means of these licensee processes was evaluated to determine whether corrective actions were effective and timely. Licensee procedures, records, and other documents reviewed within this inspection area are listed in the attachment to this report.

Findings

No findings of significance were identified.

#### 1EP6 Drill Evaluation

##### a. Inspection Scope

The resident inspectors observed a licensee-evaluated emergency preparedness drill on August 17, 2004, to verify that the emergency response organization was properly classifying the event in accordance with Emergency Plan Implementing Procedure (EPIP)-1, Emergency Plan Classification Flowchart, and making accurate and timely notifications and protective action recommendations in accordance with EPIP-2, Notification of Unusual Event; EPIP-3, Alert; EPIP-4, Site Area Emergency; EPIP-5, General Emergency; and the Radiological Emergency Plan. In addition, the inspectors verified that licensee evaluators were identifying deficiencies and properly characterizing performance against the performance indicator criteria in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline.

##### b. Findings

No findings of significance were identified.

#### 4. **OTHER ACTIVITIES**

##### 4OA1 Performance Indicator Verifications

Licensee records were reviewed to determine whether the submitted performance indicator (PI) statistics were calculated in accordance with the guidance contained in Nuclear Energy Institute 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 2.

##### .1 Mitigating Systems

##### a. Inspection Scope

The inspectors verified the accuracy of two PIs for safety system unavailability associated with the high pressure injection system and the residual heat removal system. The inspectors reviewed operating logs and TS LCO entry records for the period of July 1, 2002, through June 30, 2003, to verify the accuracy and completeness of the high pressure injection and residual heat removal safety system unavailability PIs.

##### b. Findings

No findings of significance were identified.

## .2 Emergency Preparedness

### a. Inspection Scope

The inspectors sampled licensee submittals relative to the PIs listed below for the period October 1, 2003, through June 30, 2004, to verify the accuracy of the PI data reported during that period.

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

The inspectors verified the accuracy of the PI for ERO drill and exercise performance through review of a sample of drill and event records. The inspectors reviewed selected training records to verify the accuracy of the PI for ERO drill participation for personnel assigned to key positions in the ERO. The inspectors verified the accuracy of the PI for alert and notification system reliability through review of a sample of the licensee's records of periodic system tests. The inspectors also interviewed the licensee personnel responsible for collecting and evaluating the PI data. Licensee procedures, records, and other documents reviewed within this inspection area are listed in the attachment to this report.

### b. Findings

No findings of significance were identified.

## 40A2 Identification & Resolution of Problems

### .1 Daily Reviews

As required by Inspection Procedure 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. This review was accomplished by reviewing daily PER summary reports and attending daily PER review meetings.

### .2 Annual Sample Review

#### a. Inspection Scope

The inspectors reviewed the licensee's assessments and corrective actions for three conditions, PER 64928 (component cooling water system [CCS] 6900 gallon per minute (gpm) flow limit exceeded), PER 03-011622-000 (operating experience evaluation for NRC Information Notice [IN] 2004-01: Auxiliary Feedwater Pump Recirculation Line Orifice Fouling - Potential Common Cause Failure), and the event mentioned in Section 40A3 of this report. The conditions were reviewed to ensure that the full extent of the issues was identified, an appropriate evaluation was performed, and appropriate

Enclosure

corrective actions were specified and prioritized. The inspectors also evaluated the reports against the requirements of the licensee's corrective action program as specified in SPP-3.1, Corrective Action Program, and 10 CFR 50, Appendix B. Additional documents reviewed are listed in the attachment.

b. Findings and Observations

There were no findings of significance identified. The inspectors determined that PER 03-011622-000 appropriately assessed the applicability and necessary actions for the conditions described in IN 2004-01. However, PER 64928 did not assess or take corrective actions for the operators configuring the CCS by using procedure steps in a manner not allowed by SPP-2.2, Administration of Site Technical Procedures. The PER was initiated following an attempt by the licensee to implement a clearance to isolate CCS to the A train spent fuel heat exchanger. The licensee aligned CCS flow through the A train RHR heat exchanger prior to isolation of the CCS flow through the spent fuel heat exchanger resulting in overall flow greater than a system description limit of 6900 gpm per CCS pump. The inspectors reviewed the corrective actions by the licensee and determined that while the licensee had performed an apparent cause analysis which concluded that an "infrequently performed evolution had inadequate/lack of procedural guidance," the licensee failed to initiate any corrective actions for improper procedural usage that resulted in an unexpected system response. The inspector's review of the system description determined that there was no safety impact because short term flow excursions up to 9000 gpm are allowed during flow balancing and the maximum flow during the attempt to implement the clearance was less than this value. Consequently, the inspectors determined that the failure to properly implement the procedure was a minor violation. The licensee initiated PER 70062 to address this issue.

.3 Cross-Cutting Issues

Section 1R05.2 describes a problem identification and resolution cross-cutting issue where the licensee staff failed to identify significant fire brigade drill deficiencies and inappropriately characterized the fire brigade's performance as satisfactory.

40A3 Event Followup

a. Inspection Scope

The inspectors observed the licensee's initial response to an equipment perturbation which occurred on June 29, 2004. The inspectors verified the licensee's response against the requirements of their licensing basis. The results of a followup inspection for this event conducted by NRC inspectors was documented in IR 50-390, 391/2004007.

40A4 Cross-Cutting Issues

Section 1R14.1 describes a human performance error where the licensee staff failed to take prompt action to trip the reactor during a control rod drop event. Shift management became too involved in stabilizing a feedwater transient and did not maintain the crews' focus on responding to four dropped control rods.

4OA5 Other.1 (Closed) NRC Temporary Instruction (TI) 2515/154, Spent Fuel Material Control and Accounting at Nuclear Power Plants

During previous reporting periods, the inspectors completed Phase I and Phase II of Temporary Instruction 2515/154, Spent Fuel Material Control and Accounting at Nuclear Power Plants. Appropriate documentation of the results was provided to NRC management, as required by the TI. This completes the Region II inspection requirements for this TI.

.2 (Closed) NRC TI 2515/156, Offsite Power System Operational Readiness

During the previous reporting period, inspectors collected data from licensee maintenance records, event reports, corrective action documents and procedures, and through interviews of station engineering, maintenance, and operations staff, as required by TI 2515/156. Appropriate documentation of the results was provided to headquarters staff for further analysis, as required by the TI. This completes the Region II inspection requirements for this TI.

4OA6 Meetings, including Exit

The inspectors presented the inspection results to Mr. William Lagergren and other members of licensee management at the conclusion of the inspection on September 29, 2004. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION**  
**PARTIAL LIST OF PERSONS CONTACTED**

Licensee

T. Wilkerson, Radiological Control Manager  
L. Bryant, Plant Manager  
G. Vickery, Chemistry Manager  
W. Lagergren, Site Vice President  
N. Moon, Engineering and Site Support Manager  
P. Pace, Licensing and Industry Affairs Manager  
A. Hinson, Maintenance and Modifications Manager  
R. O'Rear, Operations Superintendent  
J. Roden, Training Manager  
T. Wallace, Operations Manager  
M. DeRoche, Site Nuclear Assurance Manager  
J. Kammeyer, Engineering Manager  
J. McCollum, Security Manager

**ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened and Closed

|                     |     |                                                                                        |
|---------------------|-----|----------------------------------------------------------------------------------------|
| 05000390/2004004-01 | NCV | Failure to Identify Unsatisfactory Performance of a Fire Brigade Crew (Section 1R05.2) |
| 05000390/2004004-02 | NCV | Failure to Maintain Adequate Oversight During Rod Drop Event (Section 1R14.1)          |

Closed

|                   |    |                                                                                     |
|-------------------|----|-------------------------------------------------------------------------------------|
| 05000390/2515/154 | TI | Spent Fuel Material Control and Accounting at Nuclear Power Plants (Section 4OA5.1) |
| 05000390/2515/156 | TI | Offsite Power System Operational Readiness (Section 4OA5.2)                         |

## LIST OF DOCUMENTS REVIEWED

### Section 1R04

- SOI-72.01, Containment Spray System
- SOI-74.01, Residual Heat Removal System
- SOI-63.01, Safety Injection System
- SOI-82.01, Diesel Generator (DG) 1A-A
- SOI-82.03, Diesel Generator (DG) 2A-A

### Section 1R12

- Control Room Log entries for TS 3.8.1 and SSPS testing
- Plant computer trends for point 07/063, 204-A DG 1B-B Mode Selector in Maint
- 0-SI-82-9, Diesel Generator Start History, Appendix C, Diesel Generator Out-Of-Service (INOP) Logs for 03/02 through 06/04
- Watts Bar System Status Reports, System 082, for previous 8 quarters

### Section 1R13

- Work Week Risk Evaluation - WW04-312-01, R1
- Work Week Risk Evaluation - WW04-402-01, R0

### Section 1R14

- WAT-D-10486, Negative Flux Rate Trip Deletion Analysis
- Abnormal Operating Instruction (AOI) 14, Condenser Tube Leak
- PER 66647, Spent fuel pool sulfate concentration exceeded CM-3.01 limit
- PER 65993, Hotwell, feedwater, and steam generator blowdown sodium concentration began to rise rapidly. Action Level 1 was entered for steam generator sodium

### Section 1R15

- PER 960221, TDAFW pump bearing oil cooling line break
- WBN-VTD-I075-0080, Installation, Operation and Maintenance Instructions for 3 HMTA-9 Stage Auxiliary Feed Water Pumps
- N3-3B-4002, System Description for Auxiliary Feedwater System
- WO 98-012675-000
- N3-32-4002, Compressed Air System
- Maintenance Rule Expert Panel meeting minutes, Meeting No. 02-16
- PER 01-014623-000, Damper 2-FCO-030-0462-B, 2B-B EDG electric board room exhaust fan damper, failed to spring return to the closed position

Section 1R19

- WBN-VTD-S106-0020, Instruction Book for Siemens Energy and Automation Systems, Essential Raw Cooling Water Pump Motors
- WBN PM 0-MTR-067-0028-A, Quarterly Inspection and Lubrication of Inactive ERCW Motors

Sections 1EP2 - 1EP5Plans and Procedures

- Tennessee Valley Authority Nuclear Radiological Emergency Plan, Revision 74
- Appendix C, Watts Bar Nuclear Plant, Rev 74

Records and Data

- Watts Bar Emergency Planning Performance Indicator data from October 2003 - July 2004

Action Requests (Corrective Action Documents)

- WBN 67303, 8/19/2004
- WBN 67290, 8/19/2004
- WBN 65731, 7/26/2004
- WBN 64475, 7/06/2004
- WBN 61284, 5/17/2004
- WBN 33356, 3/19/2004

Section 4OA2

- System description, N3-70-4002, Component Cooling System
- Clearance No. 052205078, SFP heat exchanger A
- SOI-70.01, Component Cooling Water (CCS)
- WO 01-013203-000, Repair leak on SFP heat exchanger A
- Control Room logs for night shift, July 11, 2004
- Plant computer trends for point Y2200A, RHR Ht Exchg Supply Header