UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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April 11, 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: WATTS BAR NRC INTEGRATED INSPECTION REPORT NO. 50-390/01-05 AND 50-391/01-05

Dear Mr. Scalice:

On March 16, 2002, the NRC completed an inspection at your Watts Bar Nuclear Plant, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on March 22, 2002, with Mr. D. Kulisek 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. No findings of significance were identified.

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/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/ (for) P. Taylor

Paul E. Fredrickson, 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 50-390/01-05, 50-391/01-05

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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:	50-390/01-05, 50-391/01-05
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Watts Bar Nuclear Plant, Units 1 and 2
Location:	1260 Nuclear Plant Road Spring City TN 37381
Dates:	December 16, 2001 through March 16, 2002
Inspectors:	J. Bartley, Senior Resident Inspector J. Reece, Resident Inspector W. Bearden, Reactor Inspector (Section 1R08) R. Carrion, Project Engineer (Section 1R06) R. Hamilton, Health Physicist (Sections 2OS1, 2OS2, 2PS2, 4OA1, 40A7) D. Jones, Senior Health Physicist (Sections 2OS1, 2OS2, 2PS2, 4OA1, 40A7) P. Taylor, Project Engineer (Resident Inspector activities) M. Widmann, Senior Resident Inspector, V. C. Summer (Resident Inspector activities) F. Wright, Senior Health Physicist (Sections 2OS1, 2OS2, 2PS2, 4OA1, 40A7)
Approved by:	P. Fredrickson, Chief Reactor Projects Branch 6 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

Integrated Inspection Report 05000390-01-05, 05000391-01-05, on December 16, 2001 - March 16, 2002, Tennessee Valley Authority, Watts Bar, Units 1 & 2.

The inspection was conducted by resident inspectors, regional health physics specialists, a regional reactor inspector**,** and project engineers. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process Web site at http://www.nrc.gov/NRR/OVERSIGHT/index.html.

a. Inspector-Identified Findings

None

b. Licensee-Identified Violations

Three violations of very low significance which were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee appear reasonable. These violations are listed in Section 4OA7 of this report.

Report Details

Summary of Plant Status

Unit 1 operated at or near 100 percent power for the inspection period except for a reactor trip and the shutdown to begin the fourth refueling outage. On December 19, 2001, Unit 1 automatically tripped due to a hold order causing an invalid anticipated transient without scram mitigation system actuation circuitry (AMSAC) system actuation. The cause of the scram was determined and the unit was restarted on December 21, 2001. Unit 1 was shut down on February 24, 2001, for the fourth refueling outage and remained shut down through the end of the reporting period. Unit 2 remained in a suspended construction status.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

The inspectors conducted 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 (TS) 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.

- A and B train auxiliary feedwater (AFW) with standby main feedwater pump out of service
- B train centrifugal charging pump with A train centrifugal charging pump out of service
- A train residual heat removal (RHR)

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

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

- A train RHR pump room
- A and B train containment spray pump rooms
- Turbine driven AFW pump room
- A and B train centrifugal charging pump rooms
- A and B train safety injection pump rooms

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed internal and external flood protection barriers and flood analysis documents listed below to identify design features important to flood protection and those areas that can be affected by internal or external flooding, design flood levels, and protection features for areas containing safety-related equipment, such as level switches, room sumps, and “blowout” panels. The inspectors also interviewed cognizant licensee personnel knowledgeable about site flood protection measures and plant drainage plans. In addition, licensee instructions were reviewed for cross-tying systems in the event of severe flooding and evaluated the availability of spool pieces identified in the instructions. Licensee’s corrective action documents were reviewed to verify corrective actions with respect to flood-related items identified in Problem Evaluation Reports (PER) written in year 2001 were adequate. The inspectors also reviewed selected completed preventive maintenance procedures and work orders for identified level switches, pumps, and class 1E manholes for frequency of performance and completeness of documentation.

- UFSAR, Sections 2.4.14, 3.4, 3.6, 3.8.1, 3.8.2, and 3.8.4, including related figures and drawings
- Maintenance Instruction (MI)-17.021, Installation of Spool Pieces Between Essential Raw Cooling Water (ERCW) System and Component Cooling Water, Revision 6
- MI-17.022, Flood Preparation - Installation of Spool Pieces Between SFPC System and RHR System, Revision 5
- PER 01-006280-000, The WBN Flood Mode Design Criteria, Flood Protection Provisions, WB-DC-40-29, Section 4.6.13, does not define proper restraints for temporary hose size.

The inspectors walked down selected areas, listed below, which contain risk-important equipment located below design flood levels to evaluate the adequacy of flood barriers, doors, floor drains, sump level switches, and sump pumps to protect the equipment, as well as their material condition.

- Intake pumping structure, lower level
- Auxiliary building, elevations 676', 692', and 713'
- Control building, elevation 708'
- Turbine building, elevation 685'

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities

a. Inspection Scope

The inspectors observed in-process inservice inspection (ISI) work activities and reviewed selected ISI records. The observations and records were compared to the TS and the applicable ASME Boiler and Pressure Vessel Code, Sections V and XI, 1989 Edition, with no addenda to verify compliance. Portions of the ongoing ultrasonic and liquid flourescent magnetic particle examinations of four reactor vessel studs were observed. Additionally, the inspectors reviewed the weld examination reports and radiographs of the following completed ASME Class 2 weld repairs:

- Weld 1-015A-T007-29, Four-inch steam generator blowdown piping weld
- Weld 1-015A-T007-33A, Two-inch steam generator blowdown piping weld

Qualification and certification records for examiners, equipment and consumables, and nondestructive examination procedures for the above ISI examination activities were reviewed. One Notice of Indication (NOI) which had not reached the threshold for the licensee's corrective action program had been issued and was reviewed by the inspectors. That NOI, associated with Examination Report R-0725, documented the acceptance of a visual examination deficiency for a rigid support.

In addition to the above observations and reviews for the current outage, the inspectors observed activities and reviewed selected inspection records for the eddy current examination (ET) of the steam generators. The records were compared to the TS, license amendments, and applicable industry-established performance criteria to verify compliance. Qualification and certification records for examiners, equipment, and procedures for the above ET activities were reviewed. Approximately 12 examples of bobbin and rotating coil inspection ET data were reviewed to evaluate the adequacy of completed data analysis. In addition, the inspectors observed in-situ tube testing for two steam generator tubes being plugged during the ongoing refueling outage.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed operators in the plant's simulator during licensed operator retraining to verify operator performance was adequate and that training was being conducted in accordance with Procedures TRN-1, Administering Training, and TRN-11.4, Continuing Training for Licensed Personnel. In addition, the inspectors verified that the training program included risk-significant operator actions, emergency plan implementation, and lessons learned from previous plant experiences.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors sampled portions of selected structures, systems or components (SSCs), listed below, as a result of performance-based problems, to assess the effectiveness of maintenance efforts that apply to scoped 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) maintenance rule scoping in accordance with 10 CFR 50.65; (2) characterization of failed SSCs; (3) safety significance classifications; (4) 10 CFR 50.65 (a)(1) or (a)(2) classifications; and (5) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1).

- PER 01-015543-000, B train RHR pump room cooler has reduced ERCW flow
- PER 01-012550-000, Valve 2-ISV-67-505A gear box failure
- PER 01-014652-000, Supply breaker for B train hydrogen recombiner tripped
- PER 01-014086-000, Failure of vital battery charger 6-S caused reactor trip
- PER 01-015746-999, Fouling caused low flow and spiking on O-LPR-90-B4/141

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 selected SSCs 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 unforseen 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.

- Failure of Eagle 21 card affecting #1 steam generator (SG) level alarms (emergent)
- Degradation of #3 SG level indicator delays auxiliary feedwater room cooler work
- Standby main feedwater pump outage during inclement weather
- 1B-B emergency diesel generator maintenance while component cooling water (CCS) room cooler out of service

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

a. Inspection Scope

On January 2, the control room staff entered Abnormal Operating Instruction (AOI) 30.1, Plant Fires, following receipt of alarms for fire detection/protection components and the subsequent report of smoke at the Radcon Lab. The inspectors observed the licensee's response and verified that fire brigade personnel responded in accordance with the Watts Bar Fire Protection Plan and AOI-30.1. In addition, the inspectors verified that personnel performance deficiencies identified during the response were entered into the licensee's corrective action program.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed selected 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, and SPP-10.6, Engineering Evaluations for Operability Determinations.

- PER 02-000729-000, C CCS heat exchanger is approximately 30 percent blocked
- PER 02-000749-000, scaffolding in vicinity of safety-related equipment not secured properly
- PER 02-001840-000, E-B ERCW motor oil level
- PER 02-001745-000, Motor driven AFW pump 1A-A high bearing oil level

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed 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.

- WO 02-000572-000, Repair #1 SG level circuit in Eagle 21
- WO 02-01864-000, Troubleshoot and repair 1-XS-67-100, lower containment vent cooler B temperature transfer switch
- WO 01-015850-000, Standby main feedwater pump (SBMFWP) oil cooler
- WO 01-015320-000, SBMFWP slinger rings not rotating
- WO 01-007465-000, SBMFWP bearing inspection/replacement
- WO 01-013232-001, Adjust mechanical seals on 1A-A centrifugal charging pump

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

The inspectors observed the following activities associated with the Unit 1 Cycle 4 refueling outage and verified that the activities were performed in accordance with the documents listed in the Attachment.

Review of Outage Plan - Reviewed the licensee's outage risk control plan and verified that the licensee appropriately considered risk, industry experience, and previous site problems. Confirmed that the licensee had mitigation/response strategies for loss of key safety functions.

Monitoring of Shutdown Activities - Observed portions of the cooldown and reviewed cooldown data to verify that TS cooldown restrictions were followed.

Decay Heat Removal (DHR) System Monitoring - Observed DHR parameters to assess proper system function and that the steam generators, when relied upon, were a viable means of backup DHR.

Outage Configuration Management - Verified that defense-in-depth and configuration changes due to emergent work were maintained in accordance with the outage risk control plan. Verified that control room operators were kept aware of plant configuration changes.

Electrical Power - Checked that status and configurations of electrical systems met TS requirements and the outage risk control plan and that switchyard activities were controlled commensurate with safety and the outage risk control plan assumptions.

Spent Fuel Pool Cooling System Operation - Verified spent fuel pool cooling was not affected by work during and after core offload.

Inventory Control - Reviewed flow paths, configurations, and alternative means for inventory addition for consistency with the outage risk plan. Reviewed activities with the potential to cause loss of inventory for adequacy of controls to prevent inventory loss.

Reactivity Control - Evaluated licensee control of reactivity for compliance with TS and evaluated activities or SSCs for potential to cause unexpected reactivity changes for inclusion and proper control under the outage risk plan.

Containment Closure - Reviewed control of containment penetrations for compliance with refueling operations TS and to ensure that containment closure could be achieved during selected configurations.

Reduced Inventory and Mid-Loop Conditions - Reviewed activities associated with reduced inventory and mid-loop operations with emphasis on the licensee's ability to monitor and control reactor coolant system (RCS) water level. Verified that licensee's commitments from Generic Letter 88-17 were in place and adequate.

Refueling Activities - Reviewed fuel handling operations (removal, inspection, and insertion) and other ongoing activities for conformance with TS and approved procedures. Confirmed that the location of fuel assemblies was tracked from core offload through core reload.

Monitoring of Heatup and Startup Activities - Reviewed on a sampling basis that TS and administrative procedure prerequisites for mode changes were met prior to changing modes or plant configurations. The inspectors walked down containment prior to reactor startup to verify that debris had not been left which could affect performance of the containment sumps.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors witnessed 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 other testing effectively demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions.

- 1-SI-72-901-B, Containment Spray Pump 1B-B Quarterly Performance Test
- 1-SI-0-53-B, 18-Month Verification of Remote Shutdown Transfer Switches for Train B Equipment
- 0-SI-82-15, 24-Hour Load Run - DG 2A-A
- 0-SI-30-8-A, Auxiliary Building Gas Treatment System Train A 10-Hour Operation
- 0-SI-82-3, 18-Month Loss of Offsite Power with Safety Injection Test - DG 1A-A

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary plant modifications against the requirements of SPP-9.5, Temporary Alterations, and SPP-9.4, 10 CFR 50.59 Evaluation of Changes, Test, and Experiments, and 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, procedures and drawings were updated, and post-installation tests verified operability of the affected systems.

- 1-01-15-67, Install temporary differential pressure gauges to monitor ERCW flow

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety and Public Radiation Safety

2OS1 Access Control To Radiologically Significant Areas

a. Inspection Scope

The inspectors reviewed the licensee's procedures for access control to airborne radioactivity areas, radiation areas, high radiation areas, and very high radiation areas. Those procedures were evaluated for consistency with the requirements in 10 CFR 20 for posting, surveying, and controlling access to radiologically significant areas and are listed in the inspection report attachment. The inspectors toured the Unit 1 auxiliary, containment and radioactive waste buildings, and observed radiological postings, barricades, and surveys associated with selected high radiation, locked high radiation, and very high radiation areas (VHRAs). The dose rates at various locations in the Unit 1 containment building, auxiliary building, and the radioactive materials shipping pad were independently surveyed by the inspectors and compared to dose rates recorded on survey maps for the selected areas.

Selected radiation work permits (RWPs) used for work in radiologically significant areas during the ongoing outage were evaluated for incorporation of the access controls specified in As Low As Reasonably Achievable (ALARA) Planning Reports (APRs). These documents are listed in the attachment to this report. The RWP specified alarm setpoints for electronic dosimeters were evaluated for consistency with APRs and for appropriateness with regard to the expected work area dose rates.

The inspectors attended several RWP briefings for outage work activities to evaluate the radiological controls planned. A pre-job briefing was attended for work in the Unit 1 containment building keyway, a posted VHRA, to determine whether access and ALARA controls were adequately addressed and consistent with licensee procedures.

The inspectors observed the performance of the radiation workers and the radiation protection staff and the application of radiation controls through completion of the job. The licensee's implementation of procedures for accessing the posted VHRA were also observed. The inspectors made independent radiation surveys during job observation.

Interviews concerning RWP requirements and dosimeter setpoints were conducted with radiation workers. Radiological worker and radiation protection technician training/skill level, adherence to access control procedures and RWP specified access controls were observed and evaluated by the inspectors during selected job site reviews and tours throughout the Radiologically Controlled Area (RCA). The inspectors also reviewed the qualifications of the vendor Health Physics (HP) staff to verify they met licensee

commitments. The level of management and supervisory presence in the RCA was also observed by the inspectors.

Access control procedures for VHRAs and areas which may become VHRA during changing plant conditions were reviewed and discussed with radiation protection management and supervision. The licensee's procedurally established access controls for highly activated non-fuel materials stored in spent fuel pool were also evaluated by the inspectors for consistency with 10 CFR 20. The inspectors reviewed the licensee's inventory and inspected the material conditions of the spent fuel storage pool.

A listing of documents reviewed with respect to this section is located in the Attachment.

b. Findings

No findings of significance were identified.

2OS2 As Low As Reasonably Achievable (ALARA) Planning and Controls

a. Inspection Scope

For the current outage, the inspectors reviewed dose estimates for selected exposure significant jobs and the accuracy of the person-hour estimates provided to ALARA for planing purposes. Licensee dose tracking protocols were reviewed to determine the level of management involvement in the dose management process.

Outage sequencing, scope growth, and ALARA estimates for high dose jobs such as installation of temporary shielding, scaffold erection, steam generator nozzle dam installation/removal, steam generator eddy current testing and tube plugging were reviewed for incorporation of appropriate ALARA planning considerations and discussed with the licensee's staff.

Several work locations were observed for application of ALARA principles. Dose reduction techniques and radiation protection access and engineering controls were reviewed. The inspectors observed the application of engineering controls such as temporary shielding and temporary ventilation. Radioactive material and contamination controls were also evaluated for adequacy with regard to maintaining total effective dose equivalent (TEDE) ALARA. The indication and utilization of low dose waiting areas were also observed and assessed.

The inspectors reviewed the licensee's shutdown chemistry program and results, including the effect of a recent mid-cycle outage. Source term reduction initiatives such as sub-micron filtration, ion specific resin overlays, zinc injection, and cobalt reduction were also reviewed with licensee personnel. The plant source term was reviewed and discussed with licensee personnel to determine if it was at equilibrium, increasing or declining. The future implications of a potentially increasing source term were discussed with licensee management.

For the previous refueling outage, the inspectors reviewed estimated vs. actual doses and evaluated the licensee's process for in-progress dose estimating adjustments. Lessons learned reports and post outage critique issues from that outage were also reviewed. Integration of the lessons learned into the current outage were also evaluated.

The inspectors reviewed declared pregnant woman program procedures and associated documentation for compliance with 10 CFR 20, Regulatory Guide 8.13 and Regulatory Guide 8.29.

A listing of documents reviewed with respect to this section is located in the Attachment.

b. Findings:

No findings of significance were identified.

2PS2 Radioactive Material Processing and Transportation

a. Inspection Scope

The inspectors reviewed elements of the licensee's radioactive material processing and transportation activities to verify compliance with licensee procedures, descriptions in the UFSAR, Title 10 CFR Parts 20, 61 and 71 and Title 49 CFR Parts 170-189 requirements.

The inspection included observations of radioactive material packaging, shipment preparation, and loading. Radioactive shipping surveys, transportation vehicle inspections, driver briefings, and radioactive waste processing personnel training and qualifications were reviewed. The inspectors interviewed and observed persons responsible for a shipment of radioactive materials to determine the proficiency and knowledge of the shipping regulations and whether shipping personnel demonstrated adequate skills to accomplish the requirements for public transport of radioactive materials. Documentation for six radioactive material and radioactive waste shipments referenced in the attachment to this report were reviewed for completeness and accuracy. The procedures and processes for transferring radioactive waste resin into shipping and disposal containers and the licensee's process for sampling and analysis of radioactive waste streams for characterization and classification of radioactive waste for disposal were assessed. The inspectors verified that the licensee maintained Certificate of Compliance documents for applicable packages on file.

The inspectors walked down portions of the liquid radioactive waste processing systems to verify that the current system equipment agreed with the descriptions contained in the UFSAR and licensee procedures. The inspectors reviewed the licensee's processes for handling and disposal of solid radioactive waste.

The inspectors interviewed the radioactive waste system engineer and discussed the status of plant equipment to review the adequacy of any changes made to the radioactive waste processing systems since the last inspection and whether radioactive waste processing equipment had been abandoned. The inspectors reviewed the design

change package to replace an obsolete waste disposals system computer with standard instrumentation designed to perform the same functions. The change's implications on the FSAR described design function were also reviewed.

The inspectors reviewed licensee radioactive waste processing and transportation self-assessments and audits performed, during the period of 2001 and 2002, to verify that the program was periodically reviewed for compliance with regulatory requirements and that the licensee was identifying and documenting program deficiencies in the corrective action program.

A listing of documents reviewed with respect to this section is located in the Attachment.

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 (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline.

Initiating Events Cornerstone

.1 Unplanned Power Changes per 7,000 Critical Hours

a. Inspection Scope

The inspectors reviewed operating logs and monthly operating reports for the period of June 1 through December 31, 2001, to verify the accuracy and completeness of the Unplanned Power Changes Per 7,000 Critical Hours PI.

b. Findings

No findings of significance were identified.

Mitigating Systems Cornerstone

.2 Auxiliary Feedwater System Unavailability & Emergency AC Power Systems Unavailability

a. Inspection Scope

The inspectors reviewed operating logs, TS LCO entry records, weekly work schedules, and emergent work lists for the period of October 1 to December 31, 2001, to verify the accuracy and completeness of the Auxiliary Feedwater System and Emergency AC Power Systems Unavailability PIs.

b. Findings

No findings of significance were identified.

Occupational Radiation Safety Cornerstone

.3 Exposure Control Effectiveness

a. Inspection Scope

The inspectors interviewed cognizant personnel and reviewed condition reports for the period September 2001 to present to support the PI verification. Records were reviewed for events involving lack of access control, unplanned exposures and untimely identification and resolution of problems.

b. Findings

No findings of significance were identified.

Public Radiation Safety Cornerstone

.4 RET/ODCM Radiological Effluent Occurrences

a. Inspection Scope

The inspectors interviewed cognizant personnel and evaluated plant issue reports for the period September 2001 to present to support the PI verification. The evaluation included a review of procedures, effluent release permits, coolant source term, plant history with regard to failed fuel, and 10 CFR Part 61 analyses. Interviews with various members of radiation protection and chemistry staff were also made during the evaluation.

b. Findings

No findings of significance were identified.

4OA3 Event Followup

.1 (Closed) LER 50-290/2001-002-00, Manual Reactor Trip Due to A Loss of the 1-I Vital AC Inverter

The inspectors reviewed the LER to determine if the cause of the September 4, 2001, reactor trip event was identified and that corrective actions were reasonable. The inspectors also reviewed the event using Inspection Procedure (IP) 71111 Attachment 14, Personnel Performance During Non-Routine Evolutions, and IP 71153, Event Followup (refer to Inspection Report 50-390, 391/2001-03, Sections 1R14 and 4OA3.2). No violations of regulatory requirements were identified.

.2 (Closed) LER 50-390/2001-004-00 Turbine/Reactor Trip Initiated by an Invalid AMSAC Signal

The inspectors responded to the control room for an automatic reactor trip on November 20, 2001. The reactor trip was caused by an inadequate hold order which de-energized the four steam generator level inputs into AMSAC. The inspectors reviewed plant parameters, performance of mitigating systems, and operator performance. The inspectors verified that timely notifications were made in accordance with 10 CFR 50.72, licensee staff properly implemented the appropriate plant procedures, and plant equipment performed as required. A violation of regulatory requirements was identified (refer to Section 4OA7).

c. Issues and Findings

No findings of significance were identified.

4OA5 Other

.1 (Closed) Temporary Instruction (TI) 2515/145, Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (NRC Bulletin 2001-001)

Watts Bar Nuclear Plant Unit 1 was identified as a Bin 4 plant. The inspectors verified that the licensee's inspections during the Unit 1 Cycle 4 outage were consistent with the actions identified for Bin 4 plants.

.2 (Closed) TI 2515/146, Hydrogen Storage Locations

The inspectors reviewed the UFSAR and walked down the plant to identify areas where bulk hydrogen gas was stored. The inspectors determined that all bulk hydrogen storage was much greater than 50 feet from ventilation intakes, safety related water tanks, and safety-related or risk-significant SSC's.

4OA6 Meetings, including Exit

.1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. D. Kulisek and other members of licensee management at the conclusion of the inspection on March 22, 2002. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

.2 Annual Assessment Meeting Summary

On March 27, 2002, the Region II, Division of Reactor Projects Branch Chief and the Senior Resident Inspector assigned to Watts Bar met with Tennessee Valley Authority, to discuss the NRC's Reactor Oversight Process (ROP) and the Watts Bar annual assessment of safety performance for the period of April 1, 2001 - December 31, 2001. The major topics addressed were: the NRC's assessment program, the results of the Watts Bar assessment, and the NRC's Agency Action Matrix. Attendees included Watts Bar site management, members of site staff, local officials, and members of the public.

These meetings were open to the public. Information used for the discussions of the ROP is available from the NRC's document system (ADAMS) as accession number ML020600179. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

4OA7 Licensee-Identified Violations: The following findings of very low significance were identified by the licensee and are violations of NRC requirements which met the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as a non-cited violation (NCV).

The licensee was informed that if these NCVs are denied, a response, with the basis for denial, should be provided, within 30 days of the date of this inspection report, to the U. S. Nuclear Regulatory Commission, Attn: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Watts Bar Nuclear Plant.

50-390/01-05-01	(Green) 10 CFR 50 Appendix B, Criterion V, Instructions, Procedures, and Drawings, requires that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Contrary to this, on December 19, 2001, instructions for implementing DCN 50844-A were not accomplished in accordance with the DCN. This resulted in a reactor trip due to an AMSAC actuation. This issue is in the corrective action program as PER 01-017198-000.

50-390/01-05-02	(Green) TS 5.2.2 Unit Staff, requires that deviation from the overtime guidelines for personnel performing safety-related functions be authorized in advance by the plant manager or his designee. Contrary to this, on March 5 and 14, 2002, personnel performing safety-related functions exceeded the overtime guidelines without advance authorization. This issue is in the corrective action program as PERs 02-003845-000 and 02-003368-000.
50-390/01-05-03	(Green) TS 5.11.1b and 1d, High Radiation Areas With Dose Rates Not Exceeding 1.0 rem/hour, requires that these areas shall be controlled by means of RWP and that each individual entering such areas shall possess a radiation monitoring device. Contrary to this, on March 13, 2002, an individual entered a high radiation area without signing in on an RWP and with an inoperable radiation monitoring device. This issue is in the licensee's corrective action program as PER 02-003763-000.

SUPPLEMENTAL INFORMATION
PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Boone, Radiological Control Manager
L. Bryant, Plant Manager
S. Casteel, Radiological and Chemistry Control Manager
J. Cox, Training Manager
L. Hartley, Maintenance Rule Coordinator
M. King, Chemistry Superintendent
D. Kulisek, Assistant Plant Manager
W. Lagergren, Site Vice President
D. Nelson, Business and Work Performance Manager
P. Pace, Licensing and Industry Affairs Manager
K. Parker, Maintenance and Modifications Manager
J. Roden, Operations Superintendent,
T. Wallace, Operations Manager
J. West, Site Nuclear Assurance Manager

NRC

J. Bartley, Senior Resident Inspector
J. Reece, Resident Inspector

ITEMS OPENED AND CLOSED

Opened and Closed

50-390/01-05-01	NCV	Failed to Follow Instructions for Implementing DCN 50844-A (Section 4OA7).
50-390/01-05-02	NCV	Exceeded Overtime Guidelines for Unit Staff without Advance Authorization (Section 4OA7).
50-390/01-05-03	NCV	An Individual Entered a High Radiation Area without Signing In on an RWP and with an Inoperable Radiation Monitoring Device. (Section 4OA7).

Closed

50-290/2001-002-00	LER	Manual Reactor Trip Due to a Loss of the 1-I Vital AC Inverter (Section 4OA3.1).
50-390/2001-004-00	LER	Turbine/Reactor Trip Initiated by an Invalid AMSAC Signal. (Section 4OA3.2).

Closed

2515/145	TI	Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (NRC Bulletin 2001-001) (Section 4OA5).
2515/146	TI	Hydrogen Storage Locations (Section 4OA5).

LIST OF DOCUMENTS REVIEWED

Section 1R20

- 0-SI-79-1, Verification of Fuel Storage Configurations
- FBI-7, Fuel Handling and Movement
- GO-1, Unit Startup from Cold Shutdown to Hot Standby
- GO-2, Reactor Startup
- GO-6, Unit Shutdown from Hot Standby to Cold Shutdown
- GO-7, Refueling Operations
- GO-10, Reactor Coolant System Drain and Fill Operations
- MI-61.06, Servicing Ice Condenser
- SO 78.01, Spent Fuel Pool Cooling and Cleaning
- Standard Programs and Processes (SPP)-5.8, Special Nuclear Material Control
- Technical Specifications
- TI-68.002, Containment Penetrations and Closure Control
- Unit 1 Cycle 4 Outage Safety Plan

Section 2OS1

Procedures, Instructions, Lesson Plans, and Manuals

- SPP-1.1, Training and Qualification of Personnel, Rev. 4, 05/21/01
- SPP-5.1, Radiological Controls, Rev. 3, 12/20/99
- Training -20, Health Physics Technician-Training, Rev. 9, 5/23/01
- SPP-5.1 Radiological Controls, Rev. 3, 12/15/99
- Radiological Control Department Procedure (RCP)-1 Conduct of Radiological Controls, Rev. 2, 2/12/01
- RCP-3 Administration of Radiation Work Permits, Rev. 2, 11/2/99
- Radiological Control Instruction (RCS) - 100 Control of Radiological Work, Rev. 17, 2/4/02
- RCS-111 Special Exposure Monitoring, Rev. 8, 2/22/00
- RCS-112 WBC Operation and Calibration, Rev. 9, 2/1/01
- Technical Instruction - 7.005 Storage of Material in the Spent Fuel Pool, Cask Pit, & New Fuel Vault, Rev. 2, 4/6/01

Radiation Work Permits

- RCP 02008180 U1C4 Activities in Keyway Associated with Refueling Outage
- RCP 02008317 U1C4 CRDM Cooler Motors - Repair/Replace/Trouble Shoot
- RCP 02008300 U1C4 Maintenance in U1 Lower Containment
- RCP 02008051 U1C4 Snubber Inspection in the Excess Letdown/ Regen HX Room
- RCP 02006070 Steam Generator Full Jump for Installation/Removal of Nozzle Dams
- RCP 02006040 U1C4 Eddy Current Test, Tube Plugging, and In-Situ Test

Section 2OS2

Procedures, Instructions, Lesson Plans, and Manuals

- RCS-128, ALARA Program Implementation, Rev. 2, 11/30/1999
- SDP-5.2, ALARA Program, Rev. 0, 3/6/1998
- SDP-5.1, Radiological Controls, Rev. 3, 12/20/1999
- Chemistry Manual Chapter 5.08, Startup Primary Chemistry Control, Rev. 6, 10/5/1999
- Chemistry Manual Chapter 5.09, Shutdown Primary Chemistry Control, Rev. 10, 9/7/2000
- RCP-4, Personnel In processing and Dosimetry Administrative Processes, Rev. 4, 2/1/2001
- Mechanical Maintenance Department Procedure - 11, Erection of Scaffolds/Temporary Work Platforms and Ladders, Rev. 2, 3/15/2001
- Design Standard - Mechanical 18.7.1, Incorporating Radiation Protection Into Nuclear Plant Design, Rev. 4, 12/12/2001

ALARA Pre-Planning Reports

- ALARA Preplanning Report 00-0016, Construct, Inspect, and Remove Temporary Scaffolding to Support U1C3 Refueling Outage
- ALARA Preplanning Report 00-0019, Setup Preparation and Restoration of Work Area for Steam Generator Maintenance Activities to Support U1C3 Refueling Outage
- ALARA Preplanning Report 00-0020, Installation and Removal of Nozzle Dams
- ALARA Preplanning Report 00-0023, U1C3 Refueling Outage: This APR covers work associated with Reactor Assembly and Disassembly
- ALARA Preplanning Report 00-0026, Modify Fuel Transfer Canal Cart Drive System, Manipulator Crane and Associated Support Activities
- ALARA Preplanning Report 01-0005, All Activities Associated with Repair of Valve 1-FCV-062-0069-A During WBN Forced Outage (U1C4)
- ALARA Preplanning Report 02-0009, U1C4 Refueling Outage Miscellaneous Work
- ALARA Preplanning Report 02-0013, U1C4 Refueling Outage Snubber Work
- ALARA Preplanning Report 02-0016, Construct, Inspect, and Remove Temporary Scaffolding to Support U1C4 Refueling Outage
- ALARA Preplanning Report 02-0019, Setup Preparation and Restoration of Work Area for Steam Generator Maintenance Activities to Support U1C4 Refueling Outage
- ALARA Preplanning Report 02-0020, Installation and Removal of Nozzle Dams
- ALARA Preplanning Report 02-0021 U1C4 Refueling Outage Eddy Current Testing
- ALARA Preplanning Report 02-0022, U1C4 Steam Generators 1 through 4 Sludge Lancing Activities
- ALARA Preplanning Report 02-0023, U1C4 Refueling Outage: This APR covers work associated with Reactor Assembly and Disassembly"
- ALARA Preplanning Report 02-0029, U1C4 Refueling Outage Design Change Activities

Reports
- TVA Watts Bar Nuclear Plant U1C3 ALARA Report
- TVA Watts Bar Nuclear Plant 2000 Annual ALARA Report
- TVA Watts Bar Nuclear Plant 2001 Annual ALARA Report
- Watts Bar U1C4 Refuel Outage Rev. C Schedule, January 13, 2002
- Radcon Status Report, 1/2001 thru 1/2002

Miscellaneous Documents
- Shift Daily Logbook (SG) Watts Bar Nuclear Plant 9/20/2001 06:00 to 19:00
- RFO4 ALARA Summary 3/11-14/2002
- RWPs associated with ALARA Packages 02-016, 02-019, 02-020, 02-021, 02-022, and 02-023
- Plant Access Training PAT010/000 and Radiation Worker Training (RWT) 010/000
- Individual Dosimetry Records for Declared Pregnant Woman Program Participants.

Section 2PS2

Procedures, Instructions, Lesson Plans, and Manuals
- RCS-105, Shipping Radioactive Material, Rev. 10, 07/02/01
- RCS-106, 10CFR61 Sampling Program, Rev. 4, 08/15/98
- RCS-117, High Integrity Container (HIC) Handling Procedure, Rev. 2, 05/15/00
- RCS-118, Cask Handling Procedure, Rev. 5, 10/02/00
- RCS-125, Operation of the Mobile Demineralizers, Rev. 5, 02/22/99
- System Operating Instruction (SO), SO-77.03, Spent Resin Handling, Rev. 19, 01/29/02

Drawings
- Watts Bar Unit 1, Mechanical Flow Diagram Waste Disposal System, 1-47W830-1, Rev. 23; 1-47W830-2, Rev. 22; 1-47W830-3 Rev.16; 1-47W830-4, Rev. 6; and 1-47W830-6, Rev. 24.
- Chem Nuclear, Mobile Demin System, C-334-D-0320, Rev. 4

Manuals and Plans
- Plant Administrative Instruction - 13.01, Process Control Program, Rev. 0, 01/15/99
- Radioactive Material Shipment Manual, Rev. 35, 06/30/00

Updated FSAR Sections, Safety Evaluations Reports, and License Amendments
- Watts Bar Unit 1 FSAR, Section 11

Miscellaneous Documents
- Change Request 50990, Replace Obsolete Waste Disposal System Computer With Standard Instruments, 01/17/02
- Nuclear Assurance- TVAN-Wide -Audit Report NO. SSA0102 - Plant Support Functional Area Audit, 07/27/01
- Work Order WBN-0-Tank-077-0206, 03/08/02
- WBN NA Observation, Effectiveness of Radwaste Processes, 07/02/01
- WBN NA Observation, Radwaste Shipment Personnel are Adequately Trained, 05/02/01
- WBN NA Observation, Package Quality Assurance Program, 08/17/01
- WBN NA Observation, Analyzing Radioactive Waste Streams, 08/17/01
- WBN NA Observation, Process Control Program, 05/07/01

- N3-77C-4001, Liquid Radwaste Processing System Rev. 6, 07/18/1988
- Certificate of Compliance 9168, For Radioactive Packages Model No. CNS 8-120B, Rev. 12

Radioactive Shipment Documentation

- WBN 01-10, Radioactive Material, Surface-Contaminated Object, 7, UN2913, CCP Element, 03/22/01
- WBN 01-16, Radioactive Material, LSA, n.o.s, 7, UN2912, DAW, 05/31/01
- WBN 01-22, Radioactive Material, LSA, n.o.s, 7, UN2912, Laundry, 07/07/01
- WBN 01-52, Radioactive Material, LSA, n.o.s, 7, UN1912, RQ Radionuclides, Mechanical Filters, 12/13/01
- WBN 02-03, Radioactive Material, LSA, n.o.s, 7, UN2912, Fissile Excepted, RQ - Radionuclides CVCS Resin, 01/15/02
- WBN 01-11, Radioactive Material, LSA, n.o.s, 7, UN2912, Laundry, 02/26/02