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

January 27, 2006

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 05000390/2005005 AND 05000391/2005005

Dear Mr. Singer:

On December 31, 2005, 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 January 4, 2006, with Mr. M. Skaggs and other members of your staff.

This report documents one NRC-identified finding of very low safety significance (Green). The issue was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the 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.

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

Sincerely,

/RA by Joseph W. Shea Acting for/

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 05000390/2005005, 05000391/2005005
w/Attachment: Supplemental Information

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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 Nos:	05000390/2005005, 05000391/2005005
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Watts Bar Nuclear Plant, Units 1 and 2
Location:	1260 Nuclear Plant Road Spring City, TN 37381
Dates:	October 1, 2005 - December 31, 2005
Inspectors:	J. Bartley, Senior Resident Inspector M. Pribish, Resident Inspector J. Kreh, Emergency Preparedness Inspector (Sections 1EP4, 4OA1) M. Maymi, Reactor Inspector (Section 1R12.2) J. Policikoski, Project Engineer (Section 1R01, 1R17) M. Scott, Senior Reactor Inspector (Section 1R12.2)
Approved by:	Stephen J. Cahill, Chief Reactor Projects Branch 6 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000390/2005005, 05000391/2005005, 10/01/2005 - 12/31/2005, Watts Bar, Units 1 & 2. Identification and Resolution of Problems.

The report covered a three-month period of routine inspection by resident inspectors and announced inspections by an emergency preparedness specialist and regional reactor inspectors. One finding of significance was identified. The significance of an issue is indicated by its color (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 (NCV) for the failure to comply with 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, in that turbine-driven auxiliary feedwater (TDAFW) turbine casing jet plug leaks identified on June 3, 2004, were not corrected which resulted in the TDAFW pump being declared inoperable on May 17, 2005, while performing steam leak repairs. This finding affected the Problem Identification and Resolution Cross-Cutting Area.

  This finding was considered more than minor because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone to ensure the availability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The failure to repair turbine jet plug steam leaks during the refueling outage resulted in unnecessary unavailability of the TDAFW pump during power operations. The finding was determined to be of very low safety significance because the motor-driven auxiliary feedwater (MDAFW) pumps were available and the TDAFW pump was out of service for less than its Technical Specification allowed outage time. (Section 4OA2.3)

B. Licensee-Identified Violations

None.

Report Details

Summary of Plant Status

Unit 1 operated at or near 100 percent power for the entire inspection period. Unit 2 remained in a suspended construction status.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors reviewed licensee actions taken in preparation for low temperature weather conditions to limit the risk of freeze-related initiating events and to adequately protect mitigating systems from its effects. The inspectors reviewed the licensee procedure 1-PI-OPS-1-FP, Freeze Protection, and walked down selected components associated with the four areas listed below to evaluate implementation of plant freeze protection. In addition, the material condition of insulation, heat trace elements, and temporary heated enclosures on selected freeze-protected components were inspected for damage and viability. Corrective actions for items identified in relevant problem evaluation reports (PERs) and work orders (WOs) were assessed for effectiveness and timeliness. Specific documents reviewed are listed in the attachment.

- Intake pumping station
- Emergency diesel generators (DGs)
- Refueling water storage tank
- Main feedwater sense lines enclosure

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Quarterly Partial Walkdowns

a. Inspection Scope

The inspectors conducted three 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.

- A-train auxiliary building gas treatment system (ABGTS) during B-train ABGTS component outage
- A-train safety injection (SI) pump and centrifugal charging pump (CCP) during B-train SI pump component outage
- B-train residual heat removal (RHR) and containment spray (CS) during A-train RHR pump component outage

b. Findings

No findings of significance were identified.

.2 Semiannual Complete Walkdown

a. Inspection Scope

The inspectors conducted a detailed walkdown/review of the alignment and condition of the vital 480-VAC systems including the 480-VAC shutdown power system, reactor motor-operated valve (MOV) power system, and the control and auxiliary ventilation power system to verify proper equipment alignment and identify any discrepancies that could impact the function of the system and increase risk. The inspectors utilized licensee procedures, as well as licensing and design documents, when verifying that the system alignment was correct. During the walkdown, the inspectors also verified, as appropriate, that: (1) electrical power was available as required; (2) major portions of the system and components were correctly labeled, cooled, ventilated, etc.; (3) essential support systems were operational; (4) ancillary equipment or debris did not interfere with system performance; and (5) tagging clearances were appropriate. Pending design and equipment issues were reviewed to determine if the identified deficiencies significantly impacted the system's functions. Items included in this review were the operator workaround list, the temporary modification list, system health reports, and outstanding maintenance work requests/work orders. In addition, the inspectors reviewed the licensee's corrective action program to ensure that the licensee was identifying equipment alignment problems and that they were properly addressed for resolution. Specific documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors conducted tours of 10 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. Specific documents reviewed are listed in the attachment.

- Cable spreading room
- 480-V reactor (RX) motor-operated valve (MOV) Board Rooms 1A and 1B
- 480-V RX MOV Board Rooms 2A and 2B
- Vital Battery Rooms I, II, III, IV, and V

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed internal flood protection barriers associated with an essential raw cooling water (ERCW) strainer room pipe break to verify that the flood protection barriers and equipment were being maintained consistent with the UFSAR. Specifically, the inspectors reviewed selected risk-important plant design features and procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors also reviewed room sump pump calculations, internal flooding water barrier requirements and room sump pump capacities to verify compliance with the licensee's design requirements. The inspectors conducted walkdowns of the areas and considered the following attributes: (1) sealing of equipment below the flood line, such as electrical conduits; (2) holes or unsealed penetrations in floors and walls between flood areas; (3) adequacy of watertight doors between flood areas; (4) common drain system and sumps, including floor drain piping and check valves; (5) operable sump pumps, level alarm and control circuits including maintenance and calibrations of flood protection equipment; and (6) sources of potential internal flooding that are not analyzed or not adequately maintained, such as failure of high pressure fire protection piping. In addition, the inspectors reviewed the licensee's corrective action program to ensure that the licensee was identifying flood-related problems and that they were properly addressed for resolution. Specific documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On October 21, 2005, the inspectors observed operators in the plant's simulator during licensed operator annual requalification examinations to verify 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. The inspectors observed a shift crew's response to Lesson Plan 3-OT-SRE0032B, Loss of Coolant Accident from 75% Power. 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 Effectiveness

.1 Routine Reviews

a. Inspection Scope

The inspectors reviewed a performance-based problem regarding low voltage in DG battery cells (PER 92140). In addition, the inspectors reviewed the licensee's Maintenance Rule (MR) (a)(1) action plan to correct performance problems on the auxiliary air system. 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 licensee procedure 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) 10 CFR 50.65(a)(1) or (a)(2) classification and re-classification; and (8) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1). Specific documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

.2 Periodic Evaluation (Biennial)

a. Inspection Scope

The inspectors reviewed the licensee's MR periodic assessment, Fifth Periodic Assessment Report, Revision 0 (data storage number T25 050 125 988, dated 2/1/05). This report was issued to satisfy paragraph (a)(3) of 10 CFR 50.65, and covered the 18-month period ending September 30, 2004. The inspection was to determine the effectiveness of the assessment and that it was issued in accordance with the time requirement of the MR and included evaluation of balancing reliability and unavailability, (a)(1) activities, (a)(2) activities, and use of industry operating experience. To verify compliance with 10 CFR 50.65, the inspectors reviewed selected MR activities covered by the assessment period for the following MR component and attendant systems; RHR, radiation monitor, auxiliary control air, ERCW, and ventilation (electrical board room and main control room) systems. Specific procedures and documents reviewed are listed in the attachment to this report.

The inspectors also reviewed selected plant WO data, assessment, modifications, the site guidance implementing procedures; discussed and reviewed relevant corrective action issues (i.e., PERs), reviewed generic operations event data, attendant MR-related meeting minutes, probabilistic risk reports; and discussed issues with system engineers. Operational event information was evaluated by the inspectors in its use in MR functions. The inspectors selected WOs and other corrective action documents on systems recently removed from 10 CFR 50.56a(1) status and those in a(2) status for the assessment period to investigate the justification for their status. The inspectors selected MR valves found in the plant's EOPs to verify functional testing. The inspectors toured and inspected repaired components. The documents were compared to the site's MR program criteria, and the MR a(1) evaluations and rule-related data bases.

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 any resultant risk increases; (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); and licensee procedures SPP-7.0, Work Control and Outage Management; SPP-7.1, Work Control Process; and TI-124, Equipment to Plant Risk Matrix.

- Emergent work on 1B-B MDAFW pump suction pressure gage during A-train shutdown board room chiller outage
- Concurrent maintenance on B-train ABGTS, 2B-B CCS pump and containment air return fan
- A-A auxiliary air compressor outage affecting multiple systems including auxiliary feedwater (AFW) level control valves and steam generator atmospheric dumps
- Emergent work on A-train Eagle 21 during B-train work week
- B-B auxiliary air compressor outage affecting multiple systems concurrent 480-V board room chiller component outage

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

a. Inspection Scope

The inspectors reviewed personnel performance during a loss of B-train auxiliary air which occurred on December 5, 2005. The loss of B-train auxiliary air was due to the inadvertent bumping of a switch during maintenance activities. The inspectors observed the licensee's response, both in the main control room and at the B-train auxiliary air compressor skid, to verify that appropriate actions were taken in accordance with Abnormal Operating Instruction (AOI) 10, Loss of Control Air. The inspectors verified that the correct Technical Specification (TS) limiting conditions for operations (LCOs) were entered and that system responses were as expected for a loss of B-train auxiliary air.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the five operability evaluations which are listed below and affected 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 compensatory 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 LCOs and the risk significance in accordance with the SDP. The inspectors verified that the operability evaluations were performed in accordance with SPP-3.1, Corrective Action Program.

- PER 90643, Incorrect bolts (wrong material) installed on DG battery racks

- PER 5313, Emergency gas treatment system (EGTS) pressure control valve logic with annulus vacuum
- PER 91670, EGTS logic issues
- PER 93750, Temporary spray shield installed on TDAFW pump outboard bearing
- PER 89590, 1B-B CS pump suction relief valve external leak through set screw

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed the cumulative effects of operator workarounds to assess: (1) the effect on the reliability, availability, and potential for mis-operation of a system; (2) the potential for increasing an initiating event frequency or affecting multiple mitigating systems; and (3) the cumulative effects on the ability of the operators to respond in a correct and timely manner to plant transients and accidents. The inspectors reviewed the current operator workarounds as defined by Operations Department Procedure (OPDP)-1, Conduct of Operations, and interviewed operators to determine if there were other conditions which would require actions to compensate for equipment problems or deficiencies. There were no risk-significant operator workarounds during this quarter and no Priority 1 or 2 operator workarounds during the time of the inspection in December 2005.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed one permanent plant modification accomplished by WO 05-814940-003, Implementation of DCN 51872-A, Place a hard line jumper on steam generator PORV controllers to prevent the local/remote switch from inadvertently opening the PORV. The inspectors verified that pre-job coordination and communication and design change installation controls were adequate; that affected operational procedures were identified and revised accordingly; and that post-maintenance testing and equipment return to service was adequate.

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. Specific documents reviewed are listed in the attachment.

- WO 04-819795-000, Replace pressure regulator and actuator diaphragm on ABGTS exhaust fan 2B-B discharge damper
- WO 05-811405-000, A-A auxiliary air compressor not shutting down automatically
- WO 04-820414-000, B-train main control room chiller maintenance
- WO 04-818773-000, B-train electric board room chiller maintenance
- WO 05-823565-000, Replace containment isolation valve 1-FCV-30-135-A
- WO 05-825673-000, Replace 50/51 relay modules on the 1A-A SI pump breaker

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. 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. Specific documents reviewed are listed in the attachment.

- WO 05-816402-000, 1-SI-211-5-B, Channel Calibration Test on Degraded Voltage Relays for 6.9-kV Shutdown Board 1B-B
- WO 05-816566-000, 1-SI-63-901-B, Safety Injection Pump 1B-B Quarterly Performance Test*

- WO 05-817034-000, 0-SI-82-17-A, 184-day Fast Start and Load Test DG 1A-A
- WO 05-818152-000, 1-SI-72-901-A, Containment Spray Pump 1A-A Quarterly Performance Test*
- WO 05-814498-000, 0-SI-236-33, 125-VDC Battery III Annual Inspection
- WO 05-8164996-000, 1-SI-3-902 Turbine-Driven AFW Pump 1A-S Quarterly Performance Test*

*This procedure included inservice testing requirements.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following two 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. Specific documents reviewed are listed in the attachment.

- TACF 0-05-0004-032, Install temporary service air compressor during D station air compressor maintenance
- Temporary spray shield installed over TDAFW pump outboard packing under WO 05-817480-000 for adjusting packing

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

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

a. Inspection Scope

The inspectors reviewed the Radiological Emergency Plan (REP) changes in Revision 77 (Appendix C: Watts Bar only). Minor EAL modifications were made in the subject revision. The revision of the REP in effect at the time of the inspection was Revision 79.

The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 4, Emergency Action Level and Emergency Plan Changes. The applicable

planning standard 10 CFR 50.47(b)(4) and related requirements contained in Appendix E to 10 CFR Part 50 were used as reference criteria. This inspection activity represents one sample on an annual cycle. Specific documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed a licensee-evaluated requalification scenario on October 21, 2005, which included a formal evaluation of the event classification. The inspectors observed the drill 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 dispositioning performance against the performance indicator criteria in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verifications

a. Inspection Scope

The inspectors reviewed the licensee's procedure for developing the data for the emergency preparedness (EP) performance indicators (PIs), which are: (1) drill and exercise performance (DEP); (2) emergency response organization (ERO) drill participation; and (3) alert and notification system (ANS) reliability. The inspectors examined data reported to the NRC for the period July 2004 - September 2005. Procedural guidance for reporting PI information and records used by the licensee to identify potential PI occurrences was also reviewed. The inspectors verified the accuracy of the PI for ERO DEP 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 ANS reliability through review of a sample of the licensee's records of periodic system tests.

The inspection was conducted in accordance with NRC Inspection Procedure 71151, Performance Indicator Verification. The applicable planning standard 10 CFR 50.9 and NEI 99-02, Regulatory Assessment Performance Indicator Guidelines, Revision 3, were

used as reference criteria. This inspection activity represents three samples on an annual cycle. Specific documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

4OA2 Identification & Resolution of Problems

.1 Review of Items Entered into the Corrective Action Program

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 (CAP). This review was accomplished by reviewing daily PER summary reports and attending daily PER review meetings.

.2 Semi-Annual Review to Identify Trends

a. Inspection Scope

As required by Inspection Procedure 71152, Identification and Resolution of Problems, the inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on human performance trends, licensee trending efforts, and repetitive equipment and corrective maintenance issues. The inspectors also considered the results of the daily inspector CAP item screening discussed in Section 4OA2.1. The inspectors' review nominally considered the six-month period of June through December 2005, although some examples expanded beyond those dates when the scope of the trend warranted. The inspectors compared and contrasted their results with the results contained in the licensee's latest integrated quarterly assessment report and trend PERs in the CAP. The inspectors also performed an independent trend evaluation based on PERs that were NRC identified between January and December 2005 and compared this to the licensee's trend reports.

b. Assessment and Observations

No findings of significance were identified. The licensee's trending methodology, scope, and implementation were, in general, broad-based and thorough. The licensee site support organization monitored for trends on a monthly and semi-annual basis using PER reports sorted on standardized cause codes, systems, organizations, and key words. The licensee site support organization also reviewed each PER generated during the six-month period to identify potential trends that may not be identified using the reports. Potentially negative trends were brought to the attention of the responsible organization and site management. The engineering organization trended repetitive equipment issues under the MR program. Equipment issue trends were monitored by trending component/system failures and unavailability time. The inspectors compared

the licensee process results with the results of the inspectors' daily screening and did not identify any discrepancies or potential trends in the CAP data that the licensee had failed to identify. The most recent Site Integrated Review for January through June 2005 identified problems in the areas of work control, operations precisely controlling plant evolutions, plant status control, and refueling outage planning/preparation. These identified issues are consistent with the inspectors' observations. The inspectors noted, as part of the review of NRC-identified PERs, that there is an increasing trend in status and configuration control issues being identified by the inspectors. During July through September the inspectors identified five conditions in this area, while 10 conditions were identified during October through December. These were all determined to be minor in the NRC SDP. The licensee initiated PER 94842 to address the overall configuration control issue. In addition, the licensee identified an equipment trend associated with an increased rate in pinhole leaks in high pressure fire protection piping. The licensee initiated a trend PER to evaluate the condition and has WOs planned to replace affected piping during the next refueling outage.

The inspectors performed a review of human performance trends for calendar year 2005. The number of PERs generated for human performance issues has been slightly decreasing over the past six months. This slight decrease in the number of human performance PERs occurred during a period when the overall PER generation rate increased from 210 per month to approximately 260 per month indicating an improving trend in human performance. The inspectors confirmed this trend by doing an independent trend review based on NRC identified PERs during the last year.

.3 Annual Sample: Decision to Defer TDAFW Pump Steam Leak Repairs Out of RF06

a. Inspection Scope

The inspectors reviewed the licensee's evaluation of the decision to defer planned work on the Unit 1 TDAFW pump. The work was planned due to increasing moisture and particulate levels into the TDAFW turbine and governor oil lubricating system. The inspectors evaluated whether the licensee promptly identified and corrected conditions adverse to quality in accordance with 10 CFR 50, Appendix B, Criterion XVI, Corrective Action. Documents reviewed are listed in the attachment to this report.

Background: On February 18, 2005, three days before the start of the Spring 2005 refueling outage, the licensee made the decision to remove TDAFW work to repair low energy casing leaks, identified in WO 04-814482-000 (March 2004), from the Spring 2005 refueling outage and defer the work to the Fall 2006 refueling outage. The basis for the decision was documented in PER 76734. The PER justification concluded that the moisture intrusion was due to a known low energy exhaust steam leak that was not expected to worsen, on the joint between the turbine casing and the gland seal housing of the turbine. The justification also took into consideration that the highest moisture levels over the last operating cycle had not exceeded the August 2004 value of 0.12%. On May 17, 2005, oil sample results were received from the May 6, 2005, quarterly surveillance run of the TDAFW pump. The turbine oil sample particulate levels exceeded the licensee's administrative warning limit defined in licensee procedure

TI-78, Lubrication Program. The turbine oil sample moisture level was 0.41%, which was approaching the TI-78 warning limit of 0.50%, so the TDAFW pump was declared inoperable. On May 19, 2005, the licensee determined that additional turbine casing steam leaks at the turbine jet plugs were the cause of the moisture intrusion into the turbine oil system. Turbine insulation removal was necessary to determine the location of the jet plug leaks.

On May 18, 2005, the licensee initiated PER 82869 to evaluate the adequacy of the decision to defer the TDAFW pump work to the Fall 2006 outage. The PER was presented to the licensee's management review committee (MRC) on May 23, 2005, as a B level (second highest PER classification) PER requiring a root cause evaluation. In August 2005, the PER cause evaluation was changed to an apparent cause. On November 28, 2005, the PER was downgraded to a C level PER requiring an apparent cause and the corrective action plan was approved by the MRC.

On November 28, 2005, PER 82869 was approved by the MRC with the conclusion that: (1) there was a rigorous evaluation of the details for the justification to defer the work; (2) the problem identified by the oil sample of May 6, 2005, was due to emergent leaks that occurred during the performance of the surveillance test of May 6, 2005, and; (3) the licensee's apparent cause investigation did not identify a cause and that the decision to defer the work to the 2006 outage was adequate.

b. Assessment and Observations

The inspectors determined that the licensee's evaluation conducted under PER 82869 failed to identify that the deferral justification was inadequate. In addition, the inspectors identified a minor non-compliance of the licensee's corrective action program for approval of extensions for completing corrective action plans.

The inspectors performed an independent investigation after the MRC approved PER 82869 as complete on November 28, 2005. Contrary to the licensee's conclusion, the inspectors determined that the deferral justification was not rigorous and that the problem identified by the oil sample of May 6, 2005 was not due to an emergent leak that occurred during the surveillance test. The inspectors found that there was known jet plug leakage and indications of a steam leak other than the low energy exhaust steam leak on the turbine casing joint which was the basis for the deferral justification. The licensee's PER 82869 investigation failed to identify these and two other lower level deficiencies associated with the deferral justification.

- The deferral justification did not include jet plug leakage identified during a June 2004 uninsulated run. The inspectors reviewed WO 04-814482-000 after concluding the oil moisture content problems were indicative of a condition beyond the casing joint leak. The WO contained a picture with an arrow pointing to the jet plug and a handwritten comment indicating that the jet plug appeared to be leaking. No additional WOs or corrective action documents were generated to address the apparent jet plug leakage and the engineer performing the deferral evaluation was not aware of the condition. Leakage from the jet

plugs is high energy steam and is expected to get worse with time. The compliance aspects of this observation are addressed in Section 4AO2.3.c.

- The deferral justification assumed that the only steam leak was the low energy leak at the turbine casing joint. The deferral justification and the PER 82869 investigation did not question why very similar steam leaks (location, type and magnitude) had occurred during previous cycles at Watts Bar and at other plants without affecting moisture content of the lube oil. After the May 2005 jet plug steam leak repairs, oil moisture levels returned to normal with the low energy exhaust steam leak identified in March 2004 still existing.

- The deferral justification stated that oil moisture content never exceeded 0.12% during the cycle. The deferral justification did not consider that the oil was changed prior to the next routine surveillance run. Post-run oil sample moisture levels were low, as expected, after the oil change.

- The deferral justification did not address high oil particulate levels and the effect on the turbine's governor system.

The inspectors also identified that the licensee did not comply with administrative timeliness requirements for developing corrective action plans. The corrective action plan development for PER 82869 exceeded the time period allowed by SPP-3.1 on several occasions without MRC-approved extension requests. The licensee initiated PER 94841 to identify that extensions were not implemented as expected. This finding is considered minor because it did not adversely affect safety and has been entered into the licensee's CAP.

c. Findings

Introduction: The inspectors identified a Green NCV for the failure to comply with 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, in that TDAFW turbine casing jet plug leaks were not promptly corrected which resulted in the TDAFW pump being declared inoperable and was unavailable while performing steam leak repairs.

Description: On June 4, 2004, licensee maintenance personnel identified a leaking turbine jet plug during an uninsulated run of the TDAFW pump. A photograph was taken and annotated to indicate the leaking jet plug. The photograph was inserted into WO 04-814482-000 which was for repairing low energy exhaust steam leaks on the turbine casing and gland seal housing joint. However, during the followup inspection for PER 82869, the inspectors identified that no WO or PER was generated to document the set plug deficiency. On May 17, 2005, routine oil sample results were received from the May 6, 2005, quarterly surveillance run of the TDAFW pump.

The turbine oil sample particulate levels exceeded the licensee's administrative warning limit in accordance with licensee procedure TI-78, Lubrication Program. The turbine oil sample moisture level was 0.41%, which was approaching the TI-78 warning limit of 0.50%. The licensee declared the TDAFW pump inoperable, entered LCO 3.7.5, and commenced troubleshooting to identify the source of the problem. On May 19, 2005, the licensee determined that turbine casing steam leaks at the turbine jet plugs were the cause of the moisture intrusion into the turbine oil system. The jet plugs were seal welded which stopped the high energy steam leaks and corrected the oil moisture level and particulate problems. The TDAFW pump was returned to service on May 20, 2005.

Analysis: This finding was considered more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone to ensure the availability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The failure to promptly repair turbine jet plug steam leaks during the refueling outage resulted in unnecessary unavailability of the TDAFW pump during power operations. Using Appendix A of MC 0609, the finding was determined to be of very low safety significance (Green) because the MDAFW pumps were available and the TDAFW pump was out of service for less than its technical specification allowed outage time. The cause of this finding affects the Problem Identification and Resolution (PI&R) cross-cutting area.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, requires that measures be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to this, jet plug steam leaks on the TDAFW pump turbine identified on June 3, 2004, a condition adverse to quality, were not promptly corrected and resulted in unnecessary unavailability during power operations. Because this violation was of very low safety significance and has been entered into the corrective action program as PER 95189, this violation is being treated as a non-cited violation consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000390/2005005-01, Failure to Take Adequate Corrective Action to Correct TDAFW Jet Plug Leaks.

.4 Annual Sample: PMT Requirements When Instrument Tubing/Fittings are Replaced

a. Inspection Scope

The inspectors reviewed the licensee's actions for PER 63799 which was initiated to resolve an NRC question concerning whether the PMT program should require a functional/operational test of associated instruments when tubing/fittings are replaced. Specific documents reviewed are listed in the attachment.

b. Assessment and Observations

No findings of significance were identified. The licensee performed a review of PMT requirements at other TVA nuclear units, other nuclear utilities, and other nuclear maintenance organizations to determine if the Watts Bar requirements were adequate. The licensee's review found that the Watts Bar PMT requirements as specified in licensee procedure TI-126, Post-Maintenance Testing Matrices, were consistent with

those of the organizations reviewed. As a PER corrective action, an item was added to the piping/tubing replacement matrix of TI-126 to "check that the instrument is reading correctly for plant operation when plant conditions allow." The instrument check was considered an enhancement action and would only be implemented in WOs planned after the TI-126 revision date.

The inspectors reviewed the corrective actions of PER 63799 and determined that the corrective actions were adequate and timely to address the initial concern. The inspectors reviewed seven completed WOs, which were planned after the TI-126 revision date, and determined that the TI-126 requirement to check instrument readings during PMTs was not implemented in five of the WOs. The licensee initiated PER 93877 concerning the improper implementation of TI-126 requirements and initiated an immediate action to remind all planners and maintenance supervisors of the TI-126 specific requirements for tubing/fitting replacement. The inspectors determined that the TI-126 procedural compliance finding was minor because no instruments were rendered unavailable due to the omission of the TI-126 instrument check requirement.

.5 Annual Sample: Failure to Perform an Adequate PMT for RHR Pump Seal (NCV 05000390/2005002-03)

a. Inspection Scope

The inspectors reviewed the implementation of corrective actions for NCV 05000390/2005002-03, Failure to Perform an Adequate PMT for RHR Pump Seal, which was documented in Level B PER 78875.

b. Assessment and Observations

No findings of significance were identified. The inspectors reviewed the licensee's apparent cause determination and corrective actions. The licensee's apparent cause was performed using a "why staircase" methodology and determined that there were three causes: the PMT coordinator overlooked that there were specific pressure requirements; the foreman/performer made the assumption that the specified PMT conditions were met; and there was no barrier (signoff) in place to ensure that pressure requirements were met (inadequate work order preparation). The inspectors concluded that the apparent causes were appropriately identified.

The inspectors reviewed the planned corrective actions and determined that the actions appeared to be adequate to correct the deficiency. Five corrective actions were implemented to address the three identified causes. The inspectors reviewed the corrective actions as implemented and confirmed that four of the five were completed as specified in the CAP. The inspectors were not able to review documentation that confirmed that corrective action 78775-002, "distribute a PER lessons learned to maintenance, operations, and modifications personnel", was completed. The PER lessons learned was drafted and e-mailed to a single representative of each of the organizations. The corrective action was documented as being complete based on this e-mail. The inspectors checked with the personnel who received this e-mail and verified

the PER lessons learned was distributed to the organizations. However, there was no documentation showing that the PER lessons learned was actually distributed to the craft level. The organizations described the process they would have followed on receipt of the e-mail, such as covering the material at shift turnover briefs or shop talks. Typically, there is no documentation for these actions. The inspectors interviewed a sampling of maintenance and operations personnel who were aware of the issue which indicated that the corrective action appeared to have been carried out.

4OA6 Meetings

.1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. M. Skaggs, Site Vice President of the Watts Bar Nuclear Plant, and other members of licensee management at the conclusion of the inspection on January 4, 2006. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. One proprietary document was identified.

.2 Regulatory Performance Meeting

A meeting was held on November 22, 2005 at the Watts Bar site between the licensee's Mr. M. Skaggs and Mr. Stephen Cahill, Chief, Reactor Projects Branch 6 of the NRC Region II office. The purpose of the meeting was to discuss a White Finding regarding the failure to promptly identify and correct silt clogging of an Essential Raw Cooling Water backup cooling line to the 1A Charging Pump in November 2004 and the results of the associated NRC Supplemental Inspection that was done July 13-15, 2005 at the Watts Bar site (see NRC Supplemental Inspection Report No. 05000390/2005011). The corrective action implementation plan for the issue and the licensee's perception of the corrective action program lessons learned from the finding were discussed. The meeting constituted the Regulatory Performance Meeting for the finding. Both the Supplemental Inspection and the Regulatory Performance Meeting are required per the NRC Action Matrix (contained in NRC Manual Chapter 305, Operating Reactor Assessment Program) for a licensee in the Regulatory Response Column. As discussed in the NRC Annual Assessment Follow-up Letter dated May 31, 2005, Watts Bar Unit 1 was in the Regulatory Response Column due to the White Finding. At the conclusion of the meeting, all of the Action Matrix requirements for the White Finding were completed.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION
PARTIAL LIST OF PERSONS CONTACTED

Licensee

B. Briody, Maintenance Manager
M. DeRoche, Site Nuclear Assurance Manager
D. Feldman, Training Manager
J. Frisco, Site Engineering Manager
A. Hinson, Maintenance and Modifications Manager
J. Hinman, Manager of Projects
G. Laughlin, Plant Manager
P. Pace, Licensing and Industry Affairs Manager
P. Sawyer, Radiation Protection Manager
M. Skaggs, Site Vice President
S. Smith, Operations Superintendent
D. White, Operations Manager

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

50-390/2005005-01	NCV	Failure to Take Adequate Corrective Action to Correct TDAFW Jet Plug Leaks (Section 4OA2.3)

Attachment

LIST OF DOCUMENTS REVIEWED

Section 1R01

Problem Evaluation Report - PERs

- PER 92837, Freeze protection discrepancies for the MFW feed flow venturis, RWST level transmitter, and intake pumping structure
- PER 93038, Insulation not restored on ERCW pump motors E-B and H-B oil cooler lines

Work Orders - WOs

- WO 03-019203-002, replace DG 2B-B room heater 2A thermostat
- WO 04-824705-000, condensate storage tank B heat trace circuits failed on low current flow
- WO 05-821341-000, DG 2A-A room heater 2B does not work
- WO 05-821342-000, DG 1B-B room heater 1A does not work
- WO 05-821343-000, DG 2B-B room heater 2B does not work

Section 1R04

- SOI-212.01/02/03/04, 480V Shutdown Board 1A1-A/1A2-A/1B1-B/1B2-B
- SOI-213.01/02/03/04, 480V Reactor MOV Board 1A1-A/1A2-A/1B1-B/1B2-B
- SOI-214.01/02, 480V C&A Bldg Vent Board 1A1-A/1A2-A
- SOI-215.01/02/03/04,480V Diesel Auxiliary Board 1A1-A/1A2-A/1B1-B/1B2-B
- 0-PI-OPS-17.1, 18 Month Locked Breaker Verification

Section 1R05

- PER 91195, Fire damper 0-ISD-31-2777 has single fusible link instead of two as required

Section 1R06

- TI-50.023, Intake Pumping Station Strainer Room B Sump Pump A Performance Test
- TI-50.024, Intake Pumping Station Strainer Room B Sump Pump B Performance Test
- WO 04-822793-000, TI-50.023
- WO 04-822795-000, TI-50.024

Section 1R12

PERs

- PER 91597, RG 1.55 is not referenced in Topical Report
- PER 89025, HVAC - ABGTS damper found failed (TYPICAL)
- PER 12718, Raw water problems
- PER 75063, Auxiliary air micro switches
- PER 81176, Auxiliary air modification
- PER 02593, Residual heat removal inadequate work review
- PER 72620, ERCW cooling to CCP 1A
- PER 83266, EDG 1B exhaust fan failure
- PER 64947, RHR bearing oil contamination

Maintenance Rule Expert Panel - Meeting Minutes

- September 12, 2002
- December 15, 2004

- January 7, 2005
- August 19, 2005
- July 8, 2005

Site Working Procedures
- TI-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting - 10 CFR 50.65, Revisions 17 - 23

Work Orders
- 05-810852, replace auxiliary air micro switches (TYPICAL)
- 04-820526, radiation monitor filter movement modification

Miscellaneous
- Watts Bar System Health Report Card, 2nd period FYo4
- Watts Bar System Health Report Card, 3rd period FY04
- Watts Bar System Health Report Card, 1st period FY05
- Fourth Periodic Assessment Report, dated 9/13/2003

Audits and Self Assessments
- WBN-04-007, Engineering Self Assessment - Maintenance Rule and EPIX Report Programs
- Audit Report SSA0405, Maintenance Program

Section 1R19
- PER 90958, PMT requirements not specified in PMT section of WO 04-819796-000
- PER 91676, PMT specified did not verify corrective maintenance on A train auxiliary air compressor was successful

Section 1R22
- PER 91844, Personnel did not verify 72 hour wait time was met for continuing vital battery III surveillance test
- PER 92381, 1-SI-0-4, Monthly Surveillance incorrectly allowed the AFW flow channel operability check to be N/A'd if AFW not in service

Section 1R23
- PER91944, Test equipment installed under a WO exceeded the 90 day limit and a temporary alteration evaluation was not performed
- PER 93750, Temporary plastic shield placed on the TDAFW pump outboard packing without a TACF

Section 1EP4
- Radiological Emergency Plan, Revisions 77 and 79
- EPIL-1, Attachment 5, Plan Effectiveness Determination for Revision 77 to REP, Appendix C

Section 4OA1
- EPIL-15, Emergency Preparedness Performance Indicators, Revision 9
- Documentation package (scenario/time line/event notification forms/critique report) for ERO drills on 08/17/2004, 06/02/2005
- Documentation of DEP opportunities: Licensed operator simulator evaluations on 08/06/2004, 08/11/2004, 09/14/2004, 11/17/2004, 11/19/2004, 11/24/20004
- Documentation of ANS tests, 07/01/2004 - 09/30/2005
- Records of drill and exercise participation by selected key ERO personnel, 2004-2005

Section 4OA2
- Watts Bar Nuclear Plant Corrective Action Program Report dated December 19, 2005
- Watts Bar Nuclear Plant Integrated Trend Review - Site Report January through June 2005
- SMMMD-22, Planners Guide

Work Orders
- 05-812325-000, replace test tee for RHR flow indicator 1-FT-74-24
- 05-812477-000, replace test tee for SI flow transmitter 1-FT-63-173A
- 04-822271-000, replace test tee and tubing for CCP pressure indicator 1-PI-62-110
- 05-813941-000, replace tubing and fittings for main feed pump turbine low pressure stop valve drain 1-FCV-46-14A
- 05-810909-000, replace tubing for containment spray pressure indicator 1-PI-72-15
- 05-813960-000, replace tubing and fittings for condensate booster pump pressure indicator 1-PI-2-109
- 05-817882-000, replace tubing and fittings for main turbine extraction drain air operated valve 1-FCV-7-6