



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

May 5, 2011

Mr. R. M. Krich
Vice President, Nuclear Licensing
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000390/2011002**

Dear Mr. Krich:

On March 31, 2011, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant, Unit 1. The enclosed integrated inspection report documents the inspection results which were discussed on April 7, 2011, with Mr. D. Grissette and other members of your staff.

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

This report documents two NRC-identified findings which were determined to be of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington 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 addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the Watts Bar Nuclear Plant. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) 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/

Eugene F. Guthrie, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos.: 50-390
License No.: NPF-90

Enclosure: NRC Inspection Report 05000390/2011002
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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cc w/encl: (See page 3)

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Letter to R. M. Krich from Eugene Guthrie dated May 5, 2011

SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000390/2011002

Distribution w/encl:

C. Evans, RII

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RidsNrrPMWattsBar1 Resource

RidsNrrPMWattsBar2 Resource

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 50-390

License No: NPF-90

Report No: 05000390/2011002

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 1

Location: Spring City, TN 37381

Dates: January 1 – March 31, 2011

Inspectors: R. Monk, Senior Resident Inspector
M. Schweg, Resident Inspector
K. Miller, Resident Inspector

Approved by: Eugene F. Guthrie, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000390/2011-002; 01/01/2011 – 03/31/2011; Watts Bar, Unit 1; Fire Protection and Flood Protective Measures

The report covered a three-month period of routine inspection by resident inspectors. Two NRC identified findings, each of which were non-cited violations (NCVs), were 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 4, dated December 2006.

A. NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a NCV of the Unit 1 Operating License Condition 2.F for the licensee's failure to establish adequate compensatory measures for an impaired sprinkler system in accordance with the approved Fire Protection Plan (FPP). Specifically, a solid scaffold platform had been erected below the preaction sprinkler system protecting the 1B Charging Pump oil system without establishing compensatory measures, as required by the FPP. As a result, the capabilities of the sprinkler system protecting the 1B Charging Pump oil system were impaired from performing their designed function. The licensee entered this issue into the corrective action program as PER 332853.

The finding was determined to be more than minor because it affected the Protection Against External Factors attribute of the Mitigating Systems cornerstone, in that it impacted automatic fire suppression capability and affected the cornerstone objective of ensuring the availability of systems that respond to external events. This finding was evaluated using IMC 0609, Appendix F, Attachment 1, and was determined to be of very low safety significance because it represented a low degradation of the fixed fire suppression systems. The cause of the finding had a cross-cutting aspect in the area of human performance associated with the work control component. It was directly related to the licensee's not planning and coordinating work activities consistent with nuclear safety to ensure that adequate compensatory actions were established for a degraded sprinkler system (H.3 (a)).
Section 1R05

- Green. The inspectors identified a NCV of Technical Specification 5.7.1, Procedures, for the licensee failure to establish and implement an adequate Abnormal Operating Instruction (AOI) to address flooding in the Auxiliary Building from a pipe break in the Essential Raw Cooling Water System (ERCW). As a result, the inadequate procedure would have resulted in the increased flooding from an ERCW header leak. The licensee entered this issue into the corrective action program as PER 339112.

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The inspectors determined that the performance deficiency was more than minor, and therefore a finding, because it would have the potential to lead to a more significant safety concern if left uncorrected, in that, use of the inadequate procedure could have resulted in increased flooding from an ERCW pipe break. This finding was evaluated using the significance determination phase 1 screening criteria in accordance with IMC 0609, Attachment 4 and was determined to be of very low safety significance because the finding did not involve the total loss of any safety function, identified by the licensee through a PRA, IPEEE, or similar analysis, that contributes to the external event initiated core damage accident sequences. No cross-cutting aspect was assigned to this finding because it was not determined to be indicative of current licensee performance. (Section 1R06)

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near 100 percent rated thermal power (RTP) for the entire reporting period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed the licensee's preparation for and response to an actual freezing condition on February 10, 2011. The inspectors verified performance and reviewed the data associated with temperature monitoring of the refueling water storage tank (RWST), which is required per licensee procedure 1-PI-OPS-1-FP, Freeze Protection, for outside air temperature less than 25 degrees F. In addition, the inspectors performed a walkdown of the RWST freeze protection enclosures to verify the adequacy of construction and the operation of the installed temporary lighting and temperature monitoring system. This activity constituted one inspection sample.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial System Walkdowns

a. Inspection Scope

The inspectors conducted three equipment alignment partial walkdowns, listed below, to evaluate the operability of selected redundant trains or backup systems 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. Documents reviewed are listed in the attachment.

- Partial walkdown of 1A safety injection pump with 1B safety injection pump out of service (OOS) for routine maintenance.
- Partial walkdown of 1B centrifugal charging pump (CCP) while 1A (OOS) for maintenance

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- Partial walkdown of 1A containment spray pump with the 1B containment spray pump (OOS) for routine maintenance

b. Findings

No findings were identified.

1R05 Fire Protection

Fire Protection Tours

a. Inspection Scope

The inspectors conducted tours of the eight areas important to reactor safety, listed below, to verify the licensee's implementation of fire protection requirements as described in the Fire Protection Program, Nuclear Power Group Standard Programs and Processes (NPG-SPP)-18.4.6, Control of Fire Protection Impairments, NPG-SPP-18.4.7, Control of Transient Combustibles, NPG-SPP-18.4.8, 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. This activity constituted 8 inspection samples.

- Control room ventilation system
- Vital DC Boardroom I, II, III, IV (4 samples)
- A 6.9 KV shutdown board room (SDBR)
- B 6.9 KV SDBR
- Motor-driven auxiliary feedwater (MDAFW) pumps/component cooling water system (CCS) pumps

b. Findings

Introduction: The inspectors identified a Green NCV of the Unit 1 Operating License Condition 2.F for the licensee's failure to establish adequate compensatory measures for an impaired sprinkler system in accordance with the approved Fire Protection Plan (FPP). Specifically, a solid scaffold platform greater than 4 feet in both directions (length and width) had been erected below the preaction sprinkler system protecting the 1B Charging Pump oil system without establishing a compensatory measure, as required by the FPP.

Description: On 3/2/2011 with the plant in Mode 1 at 100 percent power, the inspectors noted that no fire impairment permit was established for a sprinkler system in a safety-related charging pump room where a scaffolding platform greater than 4 feet in both directions (length and width) was installed obstructing the sprinkler coverage. Per the approved Fire Protection Report (FPR), Section 14.3, Water Based Fire Suppression, the water based fire suppression system for this area and the associated fire detectors

shall be operable whenever the protected safety-related or Fire Safe Shutdown (FSSD) equipment is required to be operable. The platform obstructed the NFPA code required suppression coverage of the fire hazard. Thus the scaffolding platform degraded the operability of the installed suppression system. The inspectors notified TVA Fire Operations of the observation and verified that no previous compensatory measures were in place for the condition. TVA Fire Operations took immediate action to establish compensatory actions and modify the platform size to comply with the Fire Protection Plan.

Analysis: The inspectors determined that the licensee's failure to establish adequate compensatory measures for a degraded sprinkler system in accordance with the approved FPR, Section 14.3, Water Based Fire Suppression, was a performance deficiency. The finding was determined to be more than minor because it affected the Protection Against External Factors attribute of the Mitigating Systems cornerstone, in that it impacted automatic fire suppression capability; and affected the cornerstone objective of ensuring the availability of systems that respond to external events. The inspectors completed a Phase 1 and Phase 2 screening of the finding in accordance with IMC 0609, Appendix F, Attachment 1, Part 2, Fire Protection SDP Phase 1 and Phase 2 Worksheets, and concluded that the finding was of very low safety significance (Green) in accordance with Step 2.3, Task 2.3.4 of the Worksheet, because it represents a low degradation of the fixed fire suppression systems. The cause of the finding had a cross-cutting aspect in the area of human performance associated with the work control component. It was directly related to the licensee planning and coordinating work activities consistent with nuclear safety to ensure that adequate compensatory actions were established for a degraded sprinkler system (H.3 (a)).

Enforcement: Watts Bar Unit 1 Operating License Condition 2.F requires that the licensee implement and maintain in effect all provisions of the approved Fire Protection Program (FPP) as described in the Fire Protection Report (FPR) for the facility, as approved in Supplements 18 and 19 of the SER (NUREG-0847). The FPR, Section 14.3, Water Based Fire Suppression, requires that the water based fire suppression system and the associated fire detectors for the Coolant Charging Pump 1B-B Pump Room shall be operable whenever the protected safety-related or Fire Safe Shutdown (FSSD) equipment is required to be operable.

Contrary to the above, the licensee failed to implement and maintain in effect all provisions of the approved Fire Protection Program (FPP) as described in the Fire Protection Report for the facility, as approved in Supplements 18 and 19 of the SER (NUREG-0847). Specifically, the licensee failed to implement the requirements of the Fire Protection Report, Section 14.3, Water Based Fire Suppression, by failing to establish adequate compensatory measures for a degraded sprinkler system from February 15, 2011 to March 2, 2011. The licensee took immediate action on March 2, 2011 to modify the scaffold by reducing the platform width to less than 4 feet restoring the suppression system to full compliance with the FPR. Because this finding was of low safety significance (Green), and was entered into the licensee's corrective action program, as PER 332853, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy and is identified as NCV 05000390/2011002-01, Failure to

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Establish Adequate Compensatory Measures for a Degraded Sprinkler system in Accordance with the Approved Fire Protection Plan.

1R06 Flood Protection Measures

.1 Auxiliary Building

a. Inspection Scope

The inspectors reviewed internal flood protection barriers associated with a CCS pipe break, and essential raw cooling water (ERCW) pipe break in the auxiliary building to verify that the flood protection barriers and equipment were being maintained consistent with the Updated Final Safety Analysis Report (UFSAR). The licensee's corrective action documents and open WOs were reviewed to verify that flood-related items in the auxiliary building were being corrected. The inspectors walked down the auxiliary building 676' elevation, which contains risk-important equipment located below design flood levels, to evaluate the adequacy of flood barriers, doors, floor drains, and passive sump level switches, as well as their overall material condition. Additional documents reviewed are listed in the attachment. This activity constituted one inspection sample.

b. Findings

Introduction: A Green NCV of Technical Specifications (TS) 5.7.1, Procedures, was identified by the inspectors for the licensee's failure to establish and implement an adequate Abnormal Operating Instruction (AOI) to address a Loss of Essential Raw Cooling Water (ERCW) from a pipe break in the Essential Raw Cooling Water System. Specifically, Abnormal operating instruction (AOI)-13, Loss of Essential Raw Cooling Water, Revision 0038 was inadequate to isolate flooding in the Auxiliary Building from a pipe break in the Essential Raw Cooling Water System (ERCW).

Description: The component cooling system (CCS) heat exchangers can each be supplied from two different ERCW headers. Abnormal operating instruction (AOI)-13, Loss of Essential Raw Cooling Water, Revision 0038, for a pipe break in the normally on-service A CCS heat exchanger, directs the operator to establish flow from the alternate header, thus cross-connecting the trains and then isolating water from the normal header. This would cause break flow to continue. Guidance for isolating the now in-service alternate train directs the operator to ensure the normal train is in service. Continuing to follow the procedure would not isolate the break flow. Similar circumstances exist for three other heat exchangers' common piping. As a result, procedural adherence would not isolate some ERCW pipe breaks.

Analysis: The licensee's failure to establish and implement an adequate AOI was determined to be a performance deficiency. The inspectors determined that the performance deficiency was more than minor and, therefore, a finding because it would have the potential to lead to a more significant safety concern if left uncorrected, in that, use of the inadequate procedure could have resulted in increased flooding from an ERCW pipe break. This finding was evaluated using the SDP Phase 1 screening criteria and was determined to be of very low safety significance because the finding did not

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involve the total loss of any safety function and was not identified by the licensee through a probabilistic risk assessment, IPEEE or similar analysis that contributes to the external event initiated core damage accident sequences. No cross-cutting aspect was assigned to this finding because it was not determined to be indicative of current licensee performance.

Enforcement: TS 5.7.1, Procedures, states, in part, that procedures recommended in Regulatory Guide 1.33, specifically paragraph 5, Procedures for Abnormal, Off normal, or Alarm Condition, be established and implemented. Contrary to the above, on March 8, 2011, inspectors determined that the licensee failed to establish and implement an abnormal procedure to adequately address a Loss of Essential Raw Cooling Water (ERCW) from a pipe break in the Essential Raw Cooling Water System. Specifically, Abnormal operating instruction (AOI)-13, Loss of Essential Raw Cooling Water, Revision 0038 was inadequate to isolate flooding in the Auxiliary Building from a pipe break in the Essential Raw Cooling Water System (ERCW). Because this finding is of very low safety significance and was entered into the licensee's corrective action program as PER 339112, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy and is identified as NCV 05000390/2011002-02, Failure to Ensure Adequacy of AOI-13, Loss of Essential Raw Cooling Water, Revision 0038.

.2 Cables in Underground Manholes

a. Inspection Scope

Inspectors directly observed three underground bunkers/manholes subject to flooding that contained cables whose failure could disable risk-significant equipment. Specific attributes evaluated were: (1) the cables were not submerged in water; (2) the cables and/or splices appeared intact and the material condition of cable support structures was acceptable; and (3) dewatering devices (sump pump) operation and level alarm circuits were set appropriately to ensure that the cables would not be submerged or were in an environment for which they were qualified. Below is a list of bunkers/manholes inspected.

- 1E 6.9Kv manhole 22
- 1E 6.9Kv manhole 25
- 1E 6.9Kv manhole 28

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification.1 Quarterly Reviewa. Inspection Scope

On March 1, 2011, the inspectors observed the annual simulator examinations for Operations Crew 3 per 3-OT-SRT-E1-7, Loss of Coolant Accident, Revision 2. The plant conditions led to a Notification of Unusual Event and, upon further degradation, to an Alert level classification. Performance Indicator (PI) credit was taken.

The inspectors specifically evaluated the following attributes related to the operating crew's performance:

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of AOs and emergency operating instructions (EOIs)
- Timely and appropriate Emergency Action Level declarations per emergency plan implementing procedures (EPIP)
- Control board operation and manipulation, including high-risk operator actions
- Command and Control provided by the unit supervisor and shift manager

The inspectors also attended the critique to assess the effectiveness of the licensee evaluators and to verify that licensee-identified issues were comparable to issues identified by the inspector.

The inspectors attended the post exam critique to assess the effectiveness of the licensee evaluators and to verify that performance issues identified by the evaluators were comparable to issues identified by the inspector.

b. Findings

No findings were identified.

.2 Operating Experience Smart Sample (OpESS) FY 2010-02, Sample Selections for Reviewing Licensed Operator Examinations and Training Conducted on the Plant-Reference Simulatora. Inspection Scope

On March 1, 2011, the inspectors observed a specially prepared complex scenario for Operations Crew 3 per 3-OT-SRT-ECA-0.0-1A, RTD Failure, Fire Induce Loss of 1B-B 6.9kV Shutdown Board and 1A-A 6.9 kV Shutdown Board, Revision 0. The plant conditions led to a Site Area Emergency level classification. Performance Indicator credit was taken.

The inspectors specifically evaluated the following attributes related to the operating crews' performance:

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of AOIs and EOIs
- Timely and appropriate Emergency Action Level declarations per EPIP
- Control board operation and manipulation, including high-risk operator actions
- Command and Control provided by the unit supervisor and shift manager
- Minimum available resources (control room and field operator staffing)
- Require prioritization of multiple alarms or instrument readings
- Coordination and concurrent use of multiple procedures
- Events that could require mitigation to a degree that is not normally demonstrated in the simulator (e.g., a fire that requires de-energizing plant equipment and using dedicated shutdown procedures rather than merely notifying the fire brigade)

The inspectors also attended the critique to assess the effectiveness of the licensee evaluators and to verify that licensee-identified issues were comparable to issues identified by the inspectors.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the two performance-based problems listed below. A review was performed to assess the effectiveness of maintenance efforts that apply to scoped structures, systems, or components (SSCs) and to verify that the licensee was following the requirements of TI-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65, and NPG-SPP-03.4, 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 reclassification; and (8) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1).

- Ice condenser a(1) action plan
- 6.9 kV shutdown board expert panel approval to return to (a)(2)

1R13 Maintenance Risk Assessments and Emergent Work Controla. Inspection Scope

The inspectors evaluated, as appropriate, for the six work activities listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors verified that the licensee was complying with the requirements of 10 CFR 50.65 (a)(4); SPP-7.0, Work Control and Outage Management; NPG-SPP-07.1, One Line Work Management; and TI-124, Equipment to Plant Risk Matrix. This inspection satisfied six inspection samples for Maintenance Risk Assessment and Emergent Work Control.

- Risk assessment with A-train auxiliary control air out of service OOS coincident with 1-FCV-1-14, #2 Steam Generator Blowdown Isolation valve failed open
- Risk assessment with 1A-A emergency diesel generator (EDG) OOS and 1A-A CCP scheduled for maintenance
- Risk assessment for removal of 2B EDG from service coincident with 1B containment spray (CS) pump outage extension
- Risk assessment for removal of CS CCS pump from service coincident with the B-A ERCW pump removed from service
- Risk assessment for removal of 1B MDAFW pump from service while G ERCW pump OOS
- Risk assessment to remove 1B main control room (MCR) chiller from service with 1B electric board room (EBR) chiller OOS for emergent work and 1A EBR chiller degraded (yellow risk)

b. Findings

No findings were identified.

1R15 Operability Evaluationsa. Inspection Scope

The inspectors reviewed four operability evaluations affecting risk-significant mitigating systems, listed below, to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether the compensatory measures, if involved, were in place, would work as intended, and were appropriately controlled; (4) where continued operability was considered unjustified, the impact on TS Limiting Conditions for Operation (LCOs) and the risk significance in accordance with the significant determination process (SDP). The inspectors verified that the operability evaluations were performed in accordance with NPG-SPP-03.1, Corrective Action Program. Documents reviewed are listed in the attachment.

- FE for PER 320932, Failed stroke time for 1-PCV-3-132, B MDAFW discharge Pressure Control Valve
- FE for PER 272563, Throughwall leak on CCS pipe
- FE for PER 311503, Inconsistency between the acceptance criteria for ABSCE isolation dampers and assumptions in Chapter 15, Fuel Handling Accident
- FE or PER 324063, Cracked weld on the RCCA handling tool

b. Findings

No findings were identified.

1R18 Plant Modifications

a. Inspection Scope

The inspectors reviewed one temporary plant modification against the requirements of NPG-SPP-09.5 Temporary Alterations and NPG-SPP-09.4 10 CFR 50.59 Evaluation of Changes, Tests, and Experiments, and verified that the modification did not affect system operability or availability as described by the TS or the UFSAR. In addition, the inspectors determined whether: (1) the installation of the temporary modification was in accordance with the work package; (2) adequate configuration control was in place; (3) procedures and drawings were updated; and (4) post-installation tests verified operability of the affected systems.

- TACF 0-09-0003-090, Revision 0, Limit the sample flow to either RE 134 or RE 141, but not both due to restriction

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed six post-maintenance test procedures and/or test activities, (listed below) 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 NPG-SPP-

06.9, Testing Programs; NPG-SPP-06.3, Pre-/Post-Maintenance Testing; and NPG-SPP-07.1, On Line Work Management.

- WO 09-813067, TDAFW pump level control
- WO 111742804, 1A-A Diesel fuel pressure switch
- WO 09-812865-000, MDAFW to SG #4 LCV bypass (1-LSV-3-148)
- WO 111591200, 1-SI-74-902-B Quarterly valve full stroke exercising – RHR system
- WO 112012269, 0-SI-67-922-A, ERCW pump B-A pre-service test
- WO 111729303, SOI-3.02, Rev. 48, Auxiliary Feedwater System following Unit 1 TDAFW Outboard packing adjustment

b. Findings

No findings 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; NPG-SPP-06.9.2, 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.

In-Service Test:

- WO 111546724, 1-SI-3-902, Turbine Driven Auxiliary Feedwater Pump Quarterly Performance Test
- WO 111591196, 1-SI-74-901-B, 1B-B RHR Pump Quarterly Performance Test
- WO 111591400, 1-SI-3-901-A, 1A Motor Driven Aux Feedwater Pump Quarterly Performance Test

Other Surveillances

- WO 111554467, 1-SI-82-11-A, Monthly Diesel Generator Start and Load Test DG 1A-A
- WO 111555286, 1-SI-82-12-A, Monthly Diesel Generator Start and Load Test DG 2A-A
- WO 111547329, 0-FOR-228-3A, Quarterly Inspection and Testing of Emergency Light Battery Packs Elevation above 737 A train and Common Areas.

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluationa. Inspection Scope

On January 13, 2011, the inspectors observed a licensee-evaluated emergency preparedness drill, listed below, to verify that the emergency response organization was properly classifying the event in accordance with 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.

- Small reactor coolant system (RCS) leak increases in size requiring an Alert emergency classification followed by a Site Area Emergency declaration due to failure of both trains of the containment spray system

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

The inspectors sampled licensee submittals for the four PIs listed below. To verify the accuracy of the PI data reported during the periods listed, PI definitions and guidance contained in NEI 99-02, Regulatory Assessment Indicator Guideline, Revision 5, were used to verify the basis in reporting for each data element.

- Unplanned scrams
- Scrams with complications
- Transients
- RCS Activity

4OA2 Identification & Resolution of Problems.1 Review of Items Entered into the Corrective Action Program (CAP)

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

b. Observations

No findings were identified.

.2 Annual Sample: Corrective actions 1B MDAFW Pump discharge pressure control valve PCV-132

a. Inspection Scope

The inspectors reviewed the plans and implementation of corrective actions for the 1B MDAFW Pump discharge pressure control valve, which are documented in PERs 140305, 144420, 203806, 231297, 246447, 294604, 295647, 320302, 320932, and 321200.

b. Assessment and Observations

No findings were identified. However, the inspectors identified several observations which were discussed with the licensee. The function of this valve is to control the differential pressure of the 1B MDAFW pump to ensure the pump experiences no run out conditions. The ASME O&M code requires trending of the valve's functionality. This trending is performed by 1-SI-903-B, Motor Driven Auxiliary Feedwater Pump 1B-B Quarterly Performance Test. It consists, in part, timing the valve stroke upon pump startup. On two occasions the valve has failed to open on pump start. The first occurred on March 18, 2008, when Unit 1 was ending a refueling outage. The failure was in a plant Mode in which operability of the 1B MDAFW was not required and therefore no PER was written. The second failure of the valve to open was on May 21, 2010, following a reactor trip. This functional failure is documented in the licensee's Maintenance Rule Program. As this failure did not cause the system function to exceed its performance criteria, the function remained in Maintenance Rule category a(2) status.

Because the function of this valve is to control differential pressure across the pump, there is no direct correlation between variation in full stroke time and pressure control due to the small amount of motion required to perform its function. However, the PER's listed in the scope section span approximately 3 years. In this timeframe, numerous hours of trouble shooting and subcomponent replacement have not improved the performance. Frequently, the PERs result in work orders which result in functional evaluations to accept performance as is. The licensee's plan, during the current outage, was to do additional, invasive trouble shooting in the controllers in both the Main Control Room and Auxiliary Main Control Room, including wiring harnesses, switch connections, etc.

4OA3 Event Follow-up.1 (Closed) Licensee Event Report (LER) 05000390/2010-001: Reactor/Turbine Trip

On May 21, 2010 at 1936 hours with Watts Bar Nuclear Plant, Unit 1 at 100 percent rated thermal power, the reactor tripped automatically in response to a turbine trip signal generated by closure of the Main Turbine Throttle/Stop Valves. The licensee has concluded that the most probable cause was an intermittent failure of a circuit card in the Westinghouse Mark IV Analog Electro-Hydraulic (AEH) turbine control system that caused the servo control valves for all four Main Turbine Throttle Valves to close their respective valves. This conclusion is based on a thorough Root Cause investigation and a series of tests. The corrective action for that most probable cause was to replace each of the cards that were in the signal path that was in use at the time of the trip. The LER was reviewed by the inspectors, and no findings were identified. This LER is closed.

.2 (Closed) Licensee Event Report (LER) 05000390/2010-002: Valid Auxiliary Feedwater Actuation During Power Reduction for Planned Maintenance

On August 15, 2010, Watts Bar Nuclear Plant (WBN) Unit 1 was at 20 percent rated thermal power. The Main Feedwater (MFW) pump B was manually tripped as part of a power reduction in preparation for taking the Main Turbine offline to perform planned repairs. The plant operators observed an unplanned isolation of the Intermediate Pressure Heater string following the planned Main Turbine trip and responded by manually starting the Auxiliary Feedwater (AFW) System and tripping the MFW pump A before it experienced a loss of suction. Reactor power was quickly reduced to within the capacity of the AFW system and Mode 2 was entered. The cause of this event was a procedural inadequacy in the Operations procedure for low power manual turbine trips. The procedure did not contain information to address the time critical nature of manually placing the heater drain tank level control valves in bypass, which led to the unplanned heater string isolation. Corrective actions for this event include revising the procedure to include time constraints. The LER was reviewed by the inspectors, and no findings were identified. This LER is closed.

.3 (Closed) LER 05000/2010-003-00: Manual Reactor Trip Due to High Main Bank Transformer Temperature

On November 14, 2010, with Unit 1 operating near 100 percent rated thermal power, the reactor was manually tripped as a result of the A Main Bank Transformer alarming due to a loss of control power to the cooling fans and pumps resulting in a loss of oil cooling which resulted in an uncontrolled increase in the transformer's winding temperatures. All systems/ components behaved as expected except the #1 main feedwater bypass valve isolation which indicated mid-position. This was later determined to be a limit switch issue and the valve was actually shut. The LER was reviewed by the inspectors, and no findings were identified. This LER is closed.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings were identified.

4OA6 Meetings, including Exit

.1 Exit Meeting Summary

On April 7, 2011, the inspectors presented the inspection results to Mr. Don Grissette, Site Vice President, and other members of the licensee staff. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

4OA7 Licensee Identified Violations

None

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

G. Boerschig, Plant Manager
J. Bushnell, Licensing Engineer
R. Crews, Operations Training Manager
T. Detchemende, Emergency Preparedness Manager
D. Grissette, Site Vice President
W. Hooks, Radiation Protection Manager
D. Hughes, Training Supervisor
B. Hunt, Operations Superintendent
D. Hutchinson, Chemistry Manager
K. Dutton, Director, Engineering
M. McFadden, Operations Manager
J. Milner, Technical Support Superintendent, Radiation Protection
D. Murphy, Maintenance Manager
M. Pope, Licensing Engineer
C. Riedl, Licensing Manager (Interim)
A. Scales, Work Control Manager
D. Voeller, Director, Project Management
J. Wilcox, Security Manager

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

05000390/2011002-01	NCV	Failure to Establish Adequate Compensatory Measures for a Degraded Sprinkler system in Accordance with the Approved Fire Protection Plan (Section 1R05)
05000390/2011002-02	NCV	Failure to Ensure Adequacy of AOI-13, Loss of Essential Raw Cooling Water, Revision 0038 (Section 1R06)

Closed

05000390/2010-001-00	LER	Reactor / Turbine Trip (Section 4OA3)
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05000390/2010-002-00	LER	Valid Auxiliary Feedwater Actuation During Power Reduction for Planned Maintenance (Section 4OA3)
05000390/2010-003-00	LER	Manual Reactor Trip Due to High Main Bank Transformer Temperature (Section 4OA3)
05000390/2010003-03	URI	B-Train Main Control Room Chiller Temperature Control Valve Failure (See Inspection Report 390/2010005)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

1-PI-OPS-1-FP, Freeze Protection

Section 1R04: Equipment Alignment

SOI-62.01 ATT 1P, CVCS Charging and Letdown Power Checklist 62.01 P

SOI-62.01 ATT 1V, CVCS Charging and Letdown Valve Checklist 62.01 V

SOI-72.01-Attachment 1P, Containment Spray Power Checklist

SOI-72.01-Attachment 1V, Containment Spray Valve Checklist

SOI-63.01-Attachment 1P, Containment Spray Power Checklist

SOI-63.01-Attachment 1V, Containment Spray Valve Checklist

Section 1R06: Flood Protection Measures

Updated Final Safety Analysis Report (UFSAR) Sections 3.6A.2, 3.4

WO 09-88193388-000, 001, 0-SI-77-1, 18 month channel calibration auxiliary building passive sump loop 0-LPL-77-134

WO 09-819332-000, 001, 0-SI-77-2, 18 month channel calibration auxiliary building passive sump loop 0-LPL-77-135

AOI-13, Rev. 0038, Loss of Essential Raw Cooling Water

AOI-17, Rev. 0032, Loss of Component Cooling Water System

WBNOSG4099, Moderate Energy Line Break Flooding Study

LIST OF ACRONYMS

ANS	Alert and Notification System Testing
ARERR	Annual Radiological Effluent Release Report
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CY	calendar year
DEP	Emergency Response Organization Drill/Exercise Performance
EAL	Emergency Action Level
ED	electronic dosimeter
ERO	Emergency Response Organization
HPT	Health Physics Technician
HRA	high radiation area
IP	Inspection Procedure
LHRA	locked high radiation area
LSC	liquid scintillation counter
NEI	Nuclear Energy Institute
No.	Number
NSTS	National Source Tracking System
ODCM	Offsite Dose Calculation Manual
PCM	personnel contamination monitor

PERs	Problem Evaluation Report
PI	Performance Indicator
PM	portal monitor
PS	Planning Standard
QA	Quality Assurance
RCA	radiologically controlled area
RG	Regulatory Guide
REMP	Radiological Environmental Monitoring Program
Rev.	Revision
RS	Radiation Safety
RWP	radiation work permit
SAM	small article monitor
TBSS	Turbine Building System Sump
TI	Temporary Instruction
TLDs	thermoluminescent dosimeters
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
U1	Unit 1
U2	Unit 2
VHRA	very high radiation area
WBC	whole body count