



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

April 29, 2010

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  
05000390/2010002**

Dear Mr. Krich:

On March 31, 2010, 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, 2010, 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.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. The NRC has also identified two additional issues that were evaluated under the risk significance determination process as having a very low safety significance (Green). The NRC has determined that violations of NRC requirements are associated with these issues. However, because of the very low safety significance and categorization as Severity Level IV, and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A.1 of 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 Watts Bar. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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 05000390/2010002  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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 Watts Bar. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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Docket Nos.: 50-390  
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| NAME         | RMonk      | MPribish   | JHamman    | RBaldwin    | WDeschaine | CKontz     | EGuthrie   |
| DATE         | 04/16/2010 | 04/16/2010 | 04/28/2010 | 04/28/2010  | 04/23/2010 | 04/23/2010 | 04/29/2010 |
| E-MAIL COPY? | YES NO     | YES NO     | YES NO     | YES NO      | YES NO     | YES NO     | YES NO     |

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cc w/encl:

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TVA

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Letter to R. M. Krich from Eugene Guthrie dated April 29, 2010

SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT  
05000390/2010002

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: 05000390/2010002

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 1

Location: Spring City, TN 37381

Dates: January 1, 2010 – March 31, 2010

Inspectors: R. Monk, Senior Resident Inspector  
M. Pribish, Resident Inspector  
R. Baldwin, Senior Operations Engineer (1R11.2)  
J. Hamman, Project Engineer (1R04.2)  
W. Deschaine, Project Engineer (1R04.1)

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

Enclosure

## SUMMARY OF FINDINGS

IR 05000390/2010-002; 01/01/2010 – 03/31/2010; Watts Bar, Unit 1; Post Maintenance Testing, Problem Identification and Resolution, Other.

The report covered a three-month period of inspection by resident inspectors and announced inspections by two regional project engineers and one senior operations engineer. Two Green findings, which were determined to be non-cited violations (NCVs), and one Severity Level IV (SL-IV) NCV were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 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.

### A. NRC-Identified Findings and Self-Revealing Findings

#### Cornerstone: Mitigating Systems

- Green. The inspectors identified a violation of very low safety significance and an associated non-cited violation of 10 CFR 50 Appendix B Criterion XI, Test Control, for the licensee's failure to assure that test requirements were satisfied following a design change affecting the unit 2 channel III (2-III) safety-related vital AC board. As a result, the 2-III vital AC board was returned to service with post modification test (PMT) acceptance criteria not being met; leaving a non-conforming transfer switch on the 2-III vital AC board. The licensee entered this issue into the corrective action program as PER 215224.

The inspectors reviewed IMC 0612 and determined that the finding was more than minor because the finding would have the potential to lead to a more significant safety concern if left uncorrected, in that, failing to ensure that PMT acceptance criteria are met could allow risk significant equipment to unknowingly be returned to service in a degraded condition. This finding was evaluated using the significance determination phase 1 screening criteria and was determined to be of very low safety significance because the finding did not represent an actual loss of safety function of a single train of equipment for greater than its technical specification allowed outage time. 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 appropriately coordinating work activities by incorporating actions to address the impact of changes to the work scope on the plant [H.3(b)]. Specifically, when faced with an unexpected failure of the PMTI as written, the licensee failed to restore the 2-III transfer switch to its design basis condition following maintenance. As a result, a non-conforming switch, revealed during design change testing, was placed into service. (Section 1R19)

- Green. A self-revealing, non-cited violation (NCV) of TS 5.7.1, Procedures, was identified for the licensee's failure to properly implement SPP-2.2, Standard Programs and Processes Administration of Site Technical Procedures. Specifically, while performing vital inverter frequency verifications required by TS surveillance 3.8.7.1, the licensee failed to take the actions specified in SPP 2.2 to implement a

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procedure change or write a new procedure when the surveillance could not be performed as written. As a result, the output of the unit 2 channel II safety-related vital inverter was short-circuited when improperly selected test equipment was connected across the inverter's installed frequency meter. The short circuit condition damaged a power diode in the inverter circuit and caused annunciator fuses and the 600 amp inverter power fuse to blow. The inverter automatically transferred to its nonbattery-backed bypass supply. The licensee entered the issue into the corrective action program as PER 212143.

The inspectors reviewed IMC 0612 and determined that the finding was more than minor because the finding would have the potential to lead to a more significant safety concern if the licensee's failure to work within the established work control process was left uncorrected. The finding was evaluated using the significance determination phase 1 screening criteria and was determined to be of very low safety significance because the finding did not represent an actual loss of safety function of a single train of equipment for greater than its TS-allowed outage time. The cause of the finding had a cross-cutting aspect in the area of human performance associated with the decision-making component. It was directly related to licensee making safety-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained [H.1(a)]. Specifically, when it was determined the surveillance instruction could not be performed as written, the licensee did not use the established work control or procedure change processes in support of making the decision to substitute use of M&TE for the failed frequency meter. (Section 40A2.2)

Cornerstone: Barrier Integrity

- SL-IV. The inspectors identified an NCV of 10 CFR 50.9(a), Completeness and Accuracy of Information, when the licensee failed to submit complete and accurate information for License Amendment 77 (LA 77) related to the permeation of the Tritium Producing Burnable Absorber Rods (TPBARS) when pertinent information became available to the licensee prior to the issuance of LA 77. The licensee has entered this item into its corrective action program as PER 210845

This finding was considered as traditional enforcement because the failure to provide complete and accurate information impacted the regulatory process. This finding was determined to be minor because the licensee configured the core TPBAR loading in a conservative manner. However, due to a lack of completeness of information provided by the licensee to the NRC, the NRC approved LA 77 which gave the licensee allowance to change the configuration of core TPBAR loading which the NRC may not have otherwise allowed. The lack of completeness impeded the NRC regulatory process. Consistent with the guidance in Section IV.A.3 and Supplement VII, Paragraph D.1 of the NRC Enforcement Policy, this finding was determined to be a Severity Level IV non-cited violation. (Section 40A5.2)

B. Licensee-Identified Violations

None

Enclosure

## REPORT DETAILS

### Summary of Plant Status

On January 18, 2010, Unit 1 down-powered to approximately 20 percent to perform maintenance on the #2 feedwater regulating valve. Following maintenance, the unit was returned to full power on January 21, 2010. The unit operated at or near 100 percent power for the remainder of the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection

##### Readiness for Seasonal Extreme Weather Conditions

##### a. Inspection Scope

The inspectors reviewed the licensee's preparation for and response to an actual freezing condition on January 7, 2010. 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 inspection satisfied one sample of Readiness for Seasonal Extreme Weather Conditions

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment

##### .1 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.

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- 1A safety injection pump (SIP) while 1B SIP was removed from service
- 1A residual heat removal (RHR) train following system maintenance outage
- 1A motor-driven auxiliary feedwater (MDAFW) and turbine-driven auxiliary feedwater (TDAFW) pump while 1B MDAFW pump out of service for planned maintenance

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors conducted one detailed walkdown/review of the alignment and condition of the standby diesel generator system to verify proper equipment alignment and to 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) valves were correctly positioned and did not exhibit leakage that would impact the function(s) of any valve; (2) electrical power was available as required; (3) major portions of the system and components were correctly labeled, cooled, ventilated, etc.; (4) hangers and supports were correctly installed and functional; (5) essential support systems were operational; (6) ancillary equipment or debris did not interfere with system performance; (7) tagging clearances were appropriate; and (8) valves were locked as required by the licensee's locked valve program. 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 (WOs). In addition, the inspectors reviewed the licensee's corrective action program (CAP) to ensure that the licensee was identifying equipment alignment problems and to ensure they were properly addressed for resolution. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance 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, Standard Programs and Processes (SPP)-10.0, Control of Fire Protection Impairments, SPP-10.10, Control of Transient

Enclosure

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.

- Control room emergency ventilation system
- Vital DC Boardroom I
- Vital DC Boardroom II
- Vital DC Boardroom III
- Vital DC Boardroom IV
- A 6.9 KV Shutdown board (SDBR)
- B 6.9 KV SDBR
- MDAFW pumps/Component Cooling System (CCS) pumps

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

.1 Requalification Activities Review by Resident Staff

a. Inspection Scope

The inspectors performed one quarterly licensed operator requalification program review. On January 12, 2010, the inspectors observed the simulator evaluations for operations staff per 3-OT-SRT-E1-8, Revision 0, Loss of Coolant Accident/Transfer to Containment Sump. The plant conditions led to a Site Area level classification. Performance Indicator (PI) credit was not taken due to staff crew not filling on-shift assignments.

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 abnormal operating instructions and emergency operating instructions
- 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.

b. Findings

No findings of significance were identified.

.2 Biennial Review by Regional Specialist

a. Inspection Scope

On December 18, 2009, the licensee completed the comprehensive biennial requalification written examinations and annual requalification operating tests required to be administered to all licensed operators in accordance with 10 CFR 55.59(a)(2). The inspectors performed an in-office review of the overall pass/fail results of the written examinations, individual operating tests and the crew simulator operating tests. These results were compared to the thresholds established in IMC 609 Appendix I, Operator Requalification Human Performance Significance Determination Process.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

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

- Classification of Ronan power supplies as 10 CFR 50.65(a)(1)
- Air-operated valve maintenance

b. Findings

No findings of significance were identified.

### 1R13 Maintenance Risk Assessments and Emergent Work Control

#### a. Inspection Scope

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

- Risk associated with planned maintenance on 1A RHR pump and emergent work on the 1A centrifugal charging pump (CCP) room cooler
- Risk associated with emergent work on A-train hydrogen igniters and B-train MDAFW level control valve
- Risk associated with planned maintenance on TDAFW pump and 1A-A 480v board room chiller
- Risk associated with planned maintenance on the 1A MDAFW pump and D-A essential raw cooling water (ERCW) pump replacement

#### b. Findings

No findings of significance were identified.

### 1R15 Operability Evaluations

#### a. Inspection Scope

The inspectors reviewed six 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 SPP-3.1, Corrective Action Program.

- Problem Evaluation Report (PER) 211722, Revised probable maximum flooding (PMF) elevation is in excess of Updated Final Safety Analysis Report (UFSAR)
- PER 203818, Splitter vane failure in common ductwork elbow of control rod drive mechanism coolers C-A and B-B
- PER 213615, RCP seal bypass flow control valve 1-FCV-62-53 is leaking by its seat

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- PER 214379, CST vulnerability to natural phenomenon generated missiles
- Per 216571, Air leakage on 1B-B MDAFW pump level control valve to #3 S/G, 1-LCV-3-148
- PER 217590, Broken stem thread on 1-FCV-003-0173B

b. Findings

No findings of significance were identified.

1R18 Plant Modifications

a. Inspection Scope

The inspectors reviewed one temporary plant modification 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 modification did not affect system operability or availability as described by the TS and 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 1-09-006-070, R0, Temporary flood protection barrier for the Unit 1 thermal barrier booster pump motors

b. Findings

No findings of significance 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 SPP-8.0, Testing Programs; SPP-6.3, Pre-/Post-Maintenance Testing; and SPP-7.1, Work Control Process.

- Work order (WO) 10-811483-000, 1A CCP room cooler motor and sheave replacement
- WO 09-812414-003, B-train control room emergency ventilation system filter charcoal replacement
- WO 10-815617-000, TDAFW LCV for # 2 SG for diaphragm replacement
- WO 08-812562-000, Implement DCN 52285 Channel III, stage 7, Testing and Placing In Service Vital Inverter 2-INV-235-F in accordance with PMTI 52285-07
- WO 06-821803-000, Replacement of heater flow interlock card on A-train EGTS
- WO 110736182, Replacement of multiplex relay in 1BD rod control power cabinet

b. Findings

Introduction: A Green, NRC-identified, non-cited violation of 10 CFR 50, Appendix B, Criterion XI, "Test Control," was identified as a result of the licensee's failure to assure that test requirements were satisfied during a design change affecting the unit 2 channel III (2-III) safety-related vital AC board. The 2-III vital AC board was returned to service with post-modification test acceptance criteria not met; leaving a non-conforming transfer switch on the 2-III vital AC board.

Description: The inspectors found that the licensee issued design change notice (DCN) 52285 to install vital inverters for the unit 2 vital AC system. Along with the physical installation of new inverters, the DCN included the reconfiguration of electrical connections on the manual transfer switches located on each of four vital distribution boards, allowing the manual transfer switches to be used to transfer the power source between the new vital inverters and existing spare inverters. The vital board manual transfer switches were designed to be make-before-break switches.

The inspectors found that, in accordance with licensee procedure SPP-8.3, Post-Modification Testing, a post-modification test instruction (PMTI) for DCN 52285 was written to demonstrate conformance with the as-designed requirements of the DCN modifications to ensure that overall system integrity was not adversely affected and that no new deficiencies were created. PMTI-52285-07 Revision 2, Step 6.17.NN for the 2-III inverter specified that power must be "continuous (not interrupted)" when transferring power from the new vital inverter to the spare inverter using the associated board's manual transfer switch. Step 6.17.NN was designated as acceptance criteria for the PMTI.

The licensee identified that on October 6, 2009, during performance of PMTI-52285-07, the 2-III inverter manual transfer switch did not operate as designed (momentary power interruption) and determined the switch required replacement. PER 204038 was initiated for the test deficiency and work order 09-819893-000 was initiated to replace the switch. The switch was replaced on October 7, 2009; on October 8, 2009, while performing the retest of the 2-III inverter manual transfer switch using Step 6.17.NN of PMTI-52285-07, there was another momentary interruption of power during the transfer; the acceptance criteria of the step was not met, and the WO post-maintenance test failed. No PERs were initiated for the second failure.

The NRC determined that the PMTI chronological test log, dated October 8, 2009, incorrectly stated that because the manual transfer switch test (Step 6.17.NN) was not acceptance criteria in the PMTI, the test was being closed as complete with the rework transferred to WO 09-819893-000 and problem resolution tracked by PER 204038. The 2-III inverter associated transfer switch and the vital board were returned to service. To increase awareness of the abnormal switch operation, a caution order was placed on the manual transfer switch to alert operators of a possible break-before-make operation.

After questioning by the inspectors about the operability status of the 2-III manual transfer switch, the licensee initiated PER 215224 to perform an operability evaluation of the 2-III manual transfer switch. The licensee determined the 2-III manual transfer switch was operable, but non-conforming, in accordance with licensee procedure NEDP-22, Functional Evaluations, since Section 8.3 of the UFSAR states that the manual transfer switch provides a means "so that the inverters may be taken out of service for maintenance without interrupting power to the loads." Additionally, a limitation was given that switching operation with the plant on-line should be limited to restoration of a board if the connected inverter were to fail or be declared inoperable.

Analysis: The licensee's failure to ensure all post-modification test acceptance criteria was met was determined to be a performance deficiency. The inspectors reviewed IMC 0612 and determined that the finding was more than minor because the finding would have the potential to lead to a more significant safety concern if left uncorrected, in that, failing to ensure that PMT acceptance criteria are met could allow risk significant equipment to unknowingly be returned to service in a degraded condition. This finding was evaluated using the significance determination phase 1 screening criteria and was determined to be of very low safety significance because the finding did not represent an actual loss of safety function of a single train of equipment for greater than its TS-allowed outage time. 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 appropriately coordinating work activities by incorporating actions to address the impact of changes to the work scope on the plant [H.3(b)]. Specifically, when faced with an unexpected failure of the PMTI as written, the licensee failed to restore the 2-III transfer switch to its design basis condition following maintenance. As a result, a non-conforming switch, revealed during design change testing, was placed into service.

Enforcement: 10 CFR 50, Appendix B, Criterion XI, Test Control, states, in part, that testing is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents and that the results shall be documented and evaluated to assure that test requirements have been satisfied. Contrary to the above, on October 8, 2009, the licensee failed to evaluate the test results to assure the test requirements of PMTI 52285-07 were satisfied prior to returning the 2-III inverter, its associated transfer switch and vital board to service. Because this finding is of very low safety significance and was entered into the licensee's CAP as PER 215224, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000390/2010002-01, Failure to Assure That Test Requirements Were Satisfied Following a Design Change.

Enclosure

1R22 Surveillance Testinga. Inspection Scope

The inspectors witnessed five 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.

In-Service Tests:

- WO 09-818626-000, 1-SI-3-902, TDAFW Pump 1A-S Quarterly Performance Test
- WO 09-819663-000, 1-SI-74-901-B, RHR 1B-B Pump Quarterly Performance Test

Routine Surveillance Tests:

- WO 10-811191-000, 1-SI-92-1, NIS Daily Comparison
- WO 09-818998-000, 0-SI-82-18-B, 184-Day Fast Start And Load Test DG 1B-B
- WO 09-818819-000, 1-SI-99-10-A, 62-day Functional Test Of SSPS And Reactor Trip Breaker A

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluationa. Inspection Scope

On January 21, 2010, 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 with site area emergency declared due to failure of the containment spray system

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b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

40A1 Performance Indicator Verification

a. Inspection Scope

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.

Initiating Events Cornerstone PI

- Unplanned scrams per 7000 critical hours
- Unplanned scrams with complications
- Unplanned power changes per 7000 critical hours

The inspectors reviewed selected licensee event reports and portions of the operator logs from the period of January 1, 2009, to December 31, 2009, to verify that the licensee had accurately identified the number of scrams and unplanned power changes greater than 20 percent that occurred during the previous four quarters. The inspectors also reviewed the accuracy of the number of critical hours reported and the licensee's bases for including or excluding each scram in the unplanned scrams with complications PI.

Barrier Integrity Cornerstone PI

- RCS activity

The inspectors reviewed portions of the operator and chemistry logs from the period of January 1, 2009, to December 31, 2009, to verify that the licensee had accurately determined and reported the RCS maximum dose equivalent iodine-131 activity during the period reviewed.

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

### .2 Annual Sample: Inadvertent Transfer of Vital Inverter 2-II Due to Incorrect Measuring and Test Equipment, PER 212143

#### a. Inspection Scope

The inspectors reviewed the root cause and planned corrective actions for the inadvertent transfer of vital inverter 2-II due to use of incorrect measuring and test equipment (M&TE) as documented in PER 212143.

#### b. Background

On December 27, 2009, while attempting to determine vital inverter frequency using test equipment, the output of the unit 2 channel II inverter was short-circuited through incompatible M&TE when test leads were connected across the installed inverter frequency meter. The short circuit condition damaged a power diode in the inverter circuit and caused annunciator fuses and the 600 amp inverter power fuse to blow. The inverter automatically transferred to its nonbattery-backed bypass supply. LCO 3.8.7 was entered due to the inverter transfer to the bypass supply. The LCO was exited when the licensee manually transferred the affected board to the battery-backed spare inverter.

The licensee initiated PER 212143 to determine the cause of the inverter transfer and corrective actions to prevent recurrence. PER 212143 was classified as an A-level (highest classification) PER requiring root cause analysis. The licensee's causal analysis utilized an event and causal factors chart and determined there were two root causes for the vital inverter transfer to its bypass supply: (1) inadequate implementation of the current work management process in that workers and operators failed to properly evaluate the risk of an evolution and utilize work instructions to complete a task not directed in a procedure; and (2) a lack of defined guidance for M&TE selection resulted in a failure of the technician to identify that the test equipment used would result in an adverse system response and damage to equipment.

Planned corrective actions for PER 212143 include training on the requirements for work instructions and procedure use and adherence, development of a site M&TE selection instruction to provide guidance on methods for selection of M&TE on plant equipment to prevent the recurrence of improper selection of M&TE for a specific task or system, and briefings for personnel on the use of questioning attitude as it relates to abnormal evolutions not included in procedures and situations when further guidance is

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appropriate to accomplish a directed task to ensure that these personnel adequately question their actions and what impact they will have on the task or system.

c. Findings

Introduction: A Green, self-revealing, non-cited violation of TS 5.7.1.1, Procedures, was identified for the licensee's failure to properly implement SPP-2.2, Standard Programs and Processes Administration of Site Technical Procedures. Specifically, while performing vital inverter frequency verifications required by TS surveillance 3.8.7.1, the licensee failed to take the actions specified in SPP 2.2 to implement a procedure change or write a new procedure when the surveillance could not be performed as written.

Description: TS surveillance requirement 3.8.7.1 verified proper vital inverter voltage and frequency on a 7-day basis. Licensee procedure 0-SI-0-3, Weekly Log, provided the detailed steps to satisfy SR 3.8.7.1 by reading frequency on the installed inverter frequency meter.

On October 21, 2009, the licensee determined the frequency meter on the 2-II inverter had failed and was reading high. WO 09-820278-000 was initiated to determine the cause of the failed frequency meter. SPP 2.2 section 5.d requires that when a procedure cannot be completed as written, one of the following is required; initiate a procedure change to allow use of the procedure under the current circumstances or develop a new procedure for the existing conditions. During the performance of 0-SI-0-3 on October 25, 2009, the licensee verbally directed the use of M&TE to determine inverter frequency. The inverter's frequency was measured weekly, without a procedure or instruction, using M&TE from October 25 to December 27, 2009.

During the performance of 0-SI-0-3 on December 27, 2009, the output of the inverter was short-circuited through the M&TE when the test leads were connected across the installed inverter frequency meter. The short circuit condition damaged a power diode in the inverter circuit and caused annunciator fuses and the 600 amp inverter power fuse to blow. The inverter automatically transferred to its nonbattery-backed bypass supply. LCO 3.8.7 was entered due to the inverter transfer to the bypass supply. The LCO was exited when the licensee manually transferred the affected board to the battery-backed spare inverter.

The licensee entered the issue into the CAP as PER 212143. Licensee investigation revealed that the M&TE selected on December 27, 2009, was rated for 5 volts, whereas the inverter's installed frequency meter test points were at 120 volts. Further review noted that if higher voltages were applied to the M&TE, the M&TE would default into a short circuit condition.

Analysis: The licensee's failure to implement a procedure change for the performance of TS surveillance 3.8.7.1 using M&TE was determined to be a performance deficiency. The inspectors reviewed IMC 0612 and determined that the finding was more than minor because the finding would have the potential to lead to a more significant safety concern if the licensee's failure to work within the established work control process was left

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uncorrected. This finding was evaluated using the significance determination phase 1 screening criteria and was determined to be of very low safety significance because the finding did not represent an actual loss of safety function of a single train of equipment for greater than its TS-allowed outage time. The cause of the finding had a cross-cutting aspect in the area of human performance associated with the decision-making component. It was directly related to licensee making safety-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. Specifically, when it was determined the surveillance instruction could not be performed as written, the licensee did not use the established work control or procedure change processes in support of making the decision to substitute use of M&TE for the failed frequency meter [H.1(a)].

Enforcement: TS 5.7.1, Procedures, states in part that written procedures shall be established, implemented and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Contrary to the above, from October 25, 2009 to December 27, 2009, the licensee failed to properly implement SPP-2.2, Standard Programs and Processes Administration of Site Technical Procedures by failing to implement a procedure change or write a new procedure when a surveillance could not be performed as written. Because this finding is of very low safety significance and was entered into the licensee's CAP as PER 212143, this violation is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000390/2010002-02, Failure to Establish Adequate Instructions or Procedure for Determining Vital Inverter Frequency.

#### 4OA3 Event Followup

##### (Closed) LER 05000390/2006-007-01 and 02: High Range Radiation Monitors – Temperature Induced Current

Revision 0 of LER 2006-007 reported an issue involving temperature induced currents that affected the containment high range radiation monitors during containment temperature changes during a loss of coolant accident or a main steam line break. The proposed corrective action from the LER was a modification to replace the affected cables with cables that would minimize the temperature induced current phenomenon.

Based on cable testing performed by the licensee, revision 1 of the LER provided an alternate corrective action to resolve the identified issue. The testing used an actual radiation monitor and detector connected to a representative cable sample. The radiation monitor output was collected by a data acquisition system while the cable was subjected to the expected temperatures of containment during postulated accidents. The results of the testing determined that the temperature induced current error would last for less than one minute. The licensee implemented procedural guidance to ensure the operating staff understand that the high range radiation monitors will initially experience inaccurate readings during postulated accidents, but the monitors will provide accurate indication of post accident radiation once containment temperatures stabilize. The procedural guidance conservatively estimated the temperature induced current effects would last for two minutes versus the less than one minute revealed

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through testing. The containment high range radiation monitors were returned to service following the cycle 8 refueling outage in March of 2008. This LER is closed.

Revision 2 of the LER corrected an administrative error regarding the Revision 1 LER number. The LER was reviewed by the inspectors and no violations of NRC requirements occurred. This LER is closed.

#### 40A5 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 of significance were identified.

##### .2 Review of Amendment Request for the Number of Tritium Producing Burnable Absorber Rods (TPBARS)

###### a. Inspection Scope

The inspectors reviewed the license amendment request and NRC License Amendment 77 regarding an increase in the number of tritium producing burnable absorber rods.

###### b. Findings

Introduction: The inspectors identified an NCV of 10 CFR 50.9(a), Completeness and Accuracy of Information, when the licensee failed to submit complete and accurate information for License Amendment 77 (LA 77) related to the permeation of the Tritium Producing Burnable Absorber Rods (TPBARS) when pertinent information became available to the licensee prior to the issuance of LA 77. The licensee has entered this item into its corrective action program as PER 210845.

Description: By letter dated December 31, 2008, the licensee submitted a license amendment request that resulted in the NRC approving LA 77 "Watts Bar Nuclear Plant, Unit 1 – Tritium Producing Burnable Absorber Rods (TAC No. ME2775)." This NRC license amendment increased the number of TPBARs which could be loaded into the core from 400 to 704 commencing with Cycle 10 of operation. This request was based

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in part on a lower expected tritium permeation rate and also stated the planned number of TPBARs to be loaded was to be 576. The December 31, 2008, request was approved by License Amendment No. 77 transmitted by NRC letter dated May 4, 2009. While LA 77 was still in review in February of 2009, the licensee learned that performance data during Cycle 9 indicated that tritium permeation values were observed to be higher than expected and possibly higher than those in Cycles 6, 7, and 8. The licensee made a conservative decision to load only 240 TPBARs for Cycle 10, but allowed the request to continue in the review process. On December 7, 2009, after the issuance of LA 77, the NRC learned that in the current WBN Unit 1 Cycle-10, that the number of TPBARs being irradiated was 240

Analysis: The performance deficiency involved the licensee's failure to submit complete and accurate information to support a license amendment request. This performance deficiency was screened per the guidance of Manual Chapter 0612, Appendix B and the inspectors determined it to be minor because the licensee configured the core TPBAR loading in a conservative manner. The NRC concluded that the licensee's actions impacted the regulatory process due to incomplete information that caused the NRC to issue a license amendment based on this information. Because the NRC's ability to perform its regulatory function was affected, this issue was additionally evaluated with the traditional enforcement process. Consistent with the guidance in Section IV.A.3 and Supplement VII, Paragraph D.1, of the NRC Enforcement Policy, this finding was determined to be a Severity Level IV non-cited violation.

Enforcement: Title 10 of the Code of Federal Regulations 50.9(a) requires, in part, that information provided to the NRC by a licensee be complete and accurate in all material respects. Contrary to the above, TVA failed to provide complete and accurate information in February 2009 to the NRC when it was discovered that information previously provided in support of a license amendment request was discovered to be inaccurate. This impeded the regulatory process. This violation is characterized as a Severity Level IV non-cited violation consistent with Section IV.A.3 and Supplement VII, Paragraph D.1, of the NRC Enforcement Policy. Because this finding is of very low safety significance and has been entered into the corrective action program as PER 210845, this violation is being treated as a non-cited violation consistent with the NRC Enforcement Policy: NCV 05000390/2010002-03, Failure to Submit Complete and Accurate Information for a Requested License Amendment.

#### 4OA6 Meetings, including Exit

On April 7, 2010, the inspectors presented the inspection results to Mr. Don Grissette, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

#### 4OA7 Licensee-Identified Violations

None

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## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee personnel

K. Bayles, Security Manager  
M. Brandon, Licensing Manager  
G. Boerschig, Plant Manager  
S. Connors, Maintenance Manager  
T. Detchemende, Emergency Preparedness Manager  
D. Grissette, Site Vice President  
W. Hooks, Radiation Protection Manager  
B. Hunt, Operations Superintendent  
G. Mauldin, Director, Engineering  
M. McFadden, Operations Manager  
R. Mende, Director, Safety and Licensing  
T. Rose, Chemistry Manager  
A. Scales, Work Control Manager  
D. Voeller, Director, Project Management

#### ITEMS OPENED, CLOSED, AND DISCUSSED

##### Opened

None

##### Opened and Closed

|                     |     |   |
|---------------------|-----|---|
| 05000390/2010002-01 | NCV | Failure to Assure That Test Requirements Were Satisfied Following a Design Change (Section 1R19)                  |
| 05000390/2010002-02 | NCV | Failure to Establish Adequate Instructions or Procedure for Determining Vital Inverter Frequency (Section 4OA2.2) |
| 05000390/2010002-03 | NCV | Failure to Submit Complete and Accurate Information for a Requested License Amendment (Section 4OA5.2)            |

##### Closed

|                      |     |   |
|----------------------|-----|---|
| 05000390/2006-007-01 | LER | High Range Radiation Monitors – Temperature Induced Currents, Revision 1 (Section 4OA3) |
|----------------------|-----|---|

05000390/2006-007-02      LER      High Range Radiation Monitors – Temperature Induced Currents, Revision 2 (Section 4OA3)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

System Operating Instruction 82.01, Diesel Generator (DG) 1A-A, Rev. 0068  
System Operating Instruction 82.02, Diesel Generator (DG) 1B-B, Rev. 0067  
System Operating Instruction 82.03, Diesel Generator (DG) 2A-A, Rev. 0071  
System Operating Instruction 82.04, Diesel Generator (DG) 2B-B, Rev 0070  
PER 162595, Air Dryers  
PER 200892, Diesel Generator K1 Exciter Relays  
PER 211586, Self Assessment on Diesel Generator Loading Calculation  
PER 213442, Diesel Fuel Leak  
Diesel Generator Loading Calculation, EDQ000-999-2008-0014, Rev 2.  
WBN Technical Specifications, Section 3.8.1, AC Sources – Operating  
WBN Technical Specifications, Section 3.8.3, Diesel Fuel Oil, Lube Oil, and Starting Air  
System Health Report, Emergency Diesel Generators, 06/01/2009 – 09/30/2009  
N3-82-4002, Rev. 0015 – System Description for the Standby Diesel Generator System  
WBN UFSAR Chapter 8.3, Onsite (Standby) Power System