



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

April 30, 2012

Mr. Joseph W. Shea
Manager, Corp. Nuclear Licensing Programs
Tennessee Valley Authority
1101 Market Street, LP 4B-C
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000390/2012002

Dear Mr. Shea:

On March 31, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant, Unit 1. The enclosed inspection report documents the inspection results which were discussed on April 4, 2012, with Mr. D. Gronek and other members of the Watts Bar 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.

Two NRC-identified findings and one self-revealing finding of very low safety significance (Green) were identified during this inspection.

All of these findings were determined to involve violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest these non-cited violations, 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 Nuclear Plant.

If you disagree with a cross-cutting aspect assignment 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.

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2

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/

Scott M. Shaeffer, Chief
Reactor Projects Branch 6
Division of Reactor Projects

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

Enclosure: NRC Inspection Report 05000390/2012002
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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DATE	04/27/2012	04/30/2012	04/30/2012	04/30/2012	4/30/2012		
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3

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4

Letter to Joseph Shea from Scott Shaeffer dated April 30, 2012

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05000390/2012002

Distribution w/encl:

C. Evans, RII EICS

L. Douglas, RII EICS

OE Mail

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PUBLIC

RidsNrrPMWattsBar1 Resource

RidsNrrPMWattsBar2 Resource

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-390

License No.: NPF-90

Report No.: 05000390/2012002

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 1

Location: Spring City, TN 37381

Dates: January 1 through March 31, 2012

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

Approved by: Scott M. Shaeffer, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000390/2012-002; 01/01/2012 – 03/31/2012; Watts Bar, Units 1 & 2; Fire Protection, Flood Protection Measures, Identification and Resolution of Problems.

The report covered a three-month period of inspection by resident inspectors and announced inspections by regional inspectors. Three Green findings were identified, each of which involved non-cited violations (NCVs) of NRC requirements. The significance of most findings is identified by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP); the cross-cutting aspect was determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. 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. A Green, self revealing NCV of Technical Specification (TS) 3.4.12 was identified for failure to ensure that no safety injection pump was capable of injecting into the reactor coolant system while in Mode 5. The finding was determined to be greater than minor because it was associated with the human performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. This finding was evaluated using the significance determination Phase 1 screening criteria in accordance with Inspection Manual Chapter (IMC) 0609 "Significance Determination Process," Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and was determined to require review in accordance with IMC 0609 Appendix G, Shutdown Operations Significance Determination Process.

This finding was determined to have a cross-cutting aspect in the area of human performance associated with the work practices component. The licensee failed to adequately implement human error prevention techniques, such as self and peer checking, to ensure that the work activity was being performed on the correct component. [H.4(a)]. (Section 4OA3).

- Green. A Green, NRC-identified NCV of TS 3.8.4, DC Sources Operating, was identified. The licensee's failure maintain TS operability by accurately identifying that vital battery III was approaching end-of-life was a performance deficiency. It is more than minor because, if left uncorrected, it could lead to a more serious safety concern, that of loss of functionality. Additionally, the finding was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Using IMC 0609, "Significance Determination Process," Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding was

determined to be of very low safety significance (Green), because subsequent functional testing by the licensee, witnessed by the inspectors, showed that vital batteries III and IV would meet all design basis analysis requirements.

This finding was determined to have a cross-cutting aspect in the area of human performance associated with the decision-making component. The licensee failed to use conservative assumptions in decision making and to adopt a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. [H.1(b)]. (Section 4OA3).

- Green. The inspectors identified an NCV of 10 *Code of Federal Regulations* (CFR) 50 Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to ensure that an operator manual action for fire safe shutdown (FSSD) could be feasibly performed under the current physical plant configuration. Specifically, post-fire safe shutdown procedure Abnormal Operating Instruction (AOI)-30.2 C.36, Fire Safe Shutdown Room 737-A1A, Revision 3, contained instructions for an operator manual action for FSSD that could not be feasibly performed following implementation of a plant design change. A temporary scaffold which was previously installed as a corrective action compensatory measure was removed without authorization. The licensee entered this issue into the corrective action program as Problem Evaluation Report (PER) 485043.

The finding was determined to be more than minor because it affected the protection against external events attribute of the Mitigating Systems cornerstone, in that it affects the objective of ensuring reliability and capability of systems that respond to initiating events. This finding was evaluated using, IMC 0609, Appendix F, Fire Protection Significance Determination Process, Attachment 1, and was determined to be of very low safety significance because the procedure step in question was not a time-critical step. The cause of the finding was directly related to the cross-cutting aspect of work activity coordination in the work control component of the area of human performance, in that the licensee failed to appropriately coordinate work activities, consistent with nuclear safety, to ensure that changes to the physical plant configuration would not adversely affect the feasibility of operator manual actions (H.3 (b)). (Section 1R05)

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 January 3, 2012. 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

.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. Documents reviewed are listed in the attachment.

- Partial walkdown of alignment for auxiliary feedwater (AFW) pumps 1A-A and 1B-B while the turbine-driven auxiliary feedwater (TDAFW) pump was out of service (OOS) for maintenance

- Partial walkdown of 1A residual heat removal (RHR) pump following a maintenance outage
- Partial walkdown of alignment for safety injection (SI) pump 1B-B while SI pump 1A-A was OOS for maintenance

b. Findings

No findings were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors conducted one detailed walkdown/review of the alignment and condition of the flood mode boration 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, to verify 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 and 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. See attached for references reviewed.

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 eight inspection samples.

- Control room emergency 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 an NCV of 10 *Code of Federal Regulations* (CFR) 50 Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to maintain post-fire safe shutdown procedure Abnormal Operating Instruction (AOI)-30.2 C.36, Fire Safe Shutdown Room 737-A1A, following a plant modification. Specifically, an operator manual action for fire safe shutdown (FSSD) contained in AOI-30.2 C.36 could not be feasibly performed due to a change in physical plant configuration. A temporary scaffold which was previously installed as a corrective action compensatory measure was removed without authorization.

Description: On December 30, 2011, with the plant in Mode 1 Power Operation, the inspectors identified that in the Unit 2B 480 volt transformer room (Room 772.0-A11), a temporary scaffold which was previously installed as a corrective action compensatory measure for an NRC-identified non-feasible operator manual action, was removed. This scaffolding was necessary since the installation of new electrical conduits prevented the use of an "emergency operating procedure use only" eight-foot step ladder necessary to perform the operator manual action. The conduit was installed per design change notice 53334-A in support of Unit 2 construction activities. The action required an operator to access a valve near the ceiling to perform an operator manual action in the event of a fire in Analysis Volume 36 (i.e., Room 737-A1A). AOI-30.2 C.36, Fire Safe Shutdown Room 737-A1A, was an implementing procedure for the facility fire protection program as described in the FPR which specified the manual actions which may be required for fires potentially affecting safety equipment necessary to achieve and maintain post-fire safe shutdown. AOI-30.2 C.36, Fire Safe Shutdown Room 737-A1A, Attachment 4, Local Area Operator (AUO) #4 Actions, specifies the required operator manual action to open room ventilation damper 2-FCO-30-246A. Outside fresh air cooling is necessary for operation of the air-cooled 480 volt transformers contained in the room. The operator manual action requires closing an instrument air valve (2-ISV-32-3434) near the ceiling in the event of a fire to fail open the associated damper. The inspectors notified TVA Fire Operations of the observation and verified that compensatory measures were still required to be in place for the condition. TVA Fire Operations took immediate action to

establish compensatory measures, including the re-erection of temporary scaffolding providing operator access to the instrument air valve.

Analysis: The inspectors determined that the licensee's failure to ensure that an operator manual action for FSSD could be feasibly performed under the current physical plant configuration was a performance deficiency. The performance deficiency was determined to be more than minor because it affected the protection against external events attribute (i.e., fire) of the Mitigating Systems cornerstone, in that, it affected the objective of ensuring availability, reliability, and capability of systems that respond to initiating events. Because the finding adversely affected the ability to carry out local operator actions required to achieve and maintain a FSSD condition following a severe fire, the inspectors completed a Significant Determination Process (SDP) Phase 1 analysis. The finding was not considered a major degradation of FSSD capability and, therefore, was of very low significance. The conclusion of degradation significance was based on the procedure step in question was not a time-critical step. The cause of the finding was directly related to the cross-cutting aspect of work activity coordination in the work control component of the area of human performance, in that the licensee failed to appropriately coordinate work activities, consistent with nuclear safety, to ensure that changes to the physical plant configuration would not adversely affect the feasibility of operator manual actions (H.3 (b)).

Enforcement: 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that conditions adverse to quality such as nonconformances are promptly identified and corrected. Contrary to the above, by removal of the scaffolding erected as a result of NCV 3905000/2011003-02, the licensee failed to ensure that an operator manual action for FSSD could be feasibly performed in accordance with AOI-30.2 C.36.

Because this finding was of low safety significance (Green) and was entered into the licensee's CAP as Problem Evaluation Report (PER) 485043, this violation is being treated as an NCV consistent with the NRC Enforcement Policy and is identified as NCV 05000390/2012002-01, Procedure AOI-30.2 C.36, Fire Safe Shutdown Room 737-A1A, Non-feasible Operator Manual Action.

1R06 Flood Protection

Cables in Underground Manholes

a. Inspection Scope

Inspectors directly observed one underground bunker/manhole 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 the bunker/manhole inspected.

- Manhole 26 (south)

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification

.1 Quarterly Review

a. Inspection Scope

On March 9, 2012, the inspectors observed the simulator evaluations for Operations Crew 1 per 3-OT-SRT-E2-3, Main Steam Line Break Design Basis, Revision 6. The plant conditions led to a Notification of Unusual Event level classification. Performance Indicator 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
- 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 were identified.

.2 Control Room Observations

a. Inspection Scope

Inspectors observed and assessed licensed operator performance in the plant and main control room, particularly during periods of heightened activity or risk and where the activities could affect plant safety. Inspectors reviewed various licensee policies and procedures such as OPDP-1, Conduct of Operations, NPG-SPP-10.0, Plant Operations and GO-4, Normal Power Operation.

Inspectors utilized activities such as post maintenance testing, surveillance testing and refueling and other outage activities to focus on the following conduct of operations as appropriate;

- Operator compliance and use of procedures.
- Control board manipulations.
- Communication between crew members.
- Use and interpretation of plant instruments, indications and alarms.
- Use of human error prevention techniques.
- Documentation of activities, including initials and sign-offs in procedures.
- Supervision of activities, including risk and reactivity management.
- Pre-job briefs.

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).

- Review of the (a)(3) annual summary assessment report
- Review of the basis to re-classify 1B AFW pump and TDADF pump from a(1) to

a(2)

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated, as appropriate, for the five work activities listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors verified that the licensee was complying with the requirements of 10 CFR 50.65 (a)(4); NPG-SPP-07.0, Work Control and Outage Management; NPG-SPP-07.1, On Line Work Management; and TI-124, Equipment to Plant Risk Matrix. This inspection satisfied five inspection samples for Maintenance Risk Assessment and Emergent Work Control.

- Risk assessment for work week 212 with 1B safety injection (SI) pump and 2B emergency diesel generator (EDG) OOS for planned maintenance
- Risk assessment for work week 303 with 1B EDG 1B CCS pump and yellow grid risk
- Risk assessment for work week 305 with 1A EDG, 1A thermal barrier booster pump, and F-B essential raw cooling water pump OOS for maintenance
- Risk assessment for work week 309 with 1A SI pump, 1A thermal barrier booster pump and A main control room chiller OOS for planned maintenance
- Emergent failure of 1A emergency board room chiller with planned maintenance in progress on the 1B main control room chiller

b. Findings

No findings were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed five 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.

- Functional Evaluation (FE) for PER 334192, Error in mass/energy calculation
- FE for PER 241580, RHR sump strainer impacts, Revision 1
- Evaluation of TS impacts of 1A pressurizer being disabled by Unit 2 work
- FE for PER 447803, Impacts of additional containment dome coating area on containment sump strainer
- FE for PER 495057, Unexpectedly lower flow rates on A auxiliary building gas treatment system

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. Additional documents reviewed are listed in the attachment.

- Temporary Alteration Control Form (TACF) 0-11-0005-067, Revision 0

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed seven 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 112932200, Change oil in safety injection pump 1B-B
- WO 112410344, 2-COND-031-0289-B, 480V board room air cooled condensing unit 2B-B, inspect, clean, and lubricate per PM M3822V
- WO 111928107, Fan bearing replacement on B ABGTS pump per 0-SI-30-8B
- WO 112590307, 0-CHR-31-36/2, Shutdown board room chiller A-A, York centrifugal liquid chiller inspection per master PM 2679F
- WO 113283338, 2-COMP-082-0271, DG 2B-B air start compressor 2, calibration check of pressure switch 2-PS-082-0271
- WO 113288687, 2-ISV-082-0554B2-B, DG 2B-B, Engine 2B2, air start motor supply isolation valve replacement
- WO 112081538, 1A auxiliary charging pump capacity test after rebuild per TI-50.048, Flood Mode Auxiliary Charging Pump 1a Performance Test

b. Findings

No findings were identified

1R22 Surveillance Testing

a. Inspection Scope

The inspectors witnessed seven 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; NPG-SPP-06.9, Testing Programs; NPG-SPP-06.9.2, Surveillance Test Program; and NPG-SPP-09.1, 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 112529524, 1-SI-63-901-B, Safety injection pump 1B-B quarterly performance test
- WO 112529470, 1-SI-62-901B, Centrifugal charging pump 1B-B quarterly performance test
- WO 112529837, 1-SI-3-901-B, Motor-driven AFW pump 1B-B quarterly performance test

Other Surveillances

- WO 112941020, 0-SI-236-44, 125 VDC vital battery IV 18-month service test and 125 VDC vital battery charger IV test
- WO 112529929, 1-SI-72-901-B, Containment spray pump 1B-B quarterly performance test
- WO 112032800, 0-SI-31-56-A, Main control room pressure test A-train
- WO 112086810, 1B auxiliary charging pump, TI-50.049, Flood mode auxiliary charging pump 1B performance test

b. Findings

No findings were identified

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluationa. Inspection Scope

On March 27, 2012, 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.

- A steam generator tube rupture requires a manual reactor trip and an Alert emergency classification
- A stuck-open power operated relief valve on the steam line off the ruptured steam generator resulted in containment bypass requiring a Site Area emergency classification

b. Findings

No findings were identified

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) 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
- Reactor coolant system (RCS) Activity

4OA2 Identification & Resolution of Problems

.1 Review of Items Entered into the CAP

As required by Inspection Procedure (IP) 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 periodically attending daily PER review meetings.

.2 Annual Sample: Corrective Actions Associated with NCV 05000390/2009005-01, Failure to Implement Analysis for Failed Auxiliary Charging Pumps

a. Inspection Scope

The inspectors reviewed the CAP and the completed actions for NCV 05000390/2009005-01, Failure to Implement Analysis for Failed Auxiliary Charging Pumps.

b. Findings and Observations

Introduction: The inspectors identified a lack of documentation to verify proper implementation of testing necessary to verify the corrective action requirements of the Augmented Inservice Test (AIST) Program.

Description: During the review of corrective actions related to previous December 2009 NCV 05000390/2009005-01, Failure to Implement Analysis for Failed Auxiliary Charging Pumps, the inspectors determined that no documentation of acceptable testing could be found which verified the functionality of the auxiliary charging pumps (ACPs) 1A and 1B until March 23, 2012. During that testing, which was observed by the inspectors, only the 1B ACP met its acceptance criteria, 1A ACP failed. The flood mode boration makeup system relies on the capability of these pumps to support Technical Requirement 3.7.2, Flood Mode Protection Plan.

Pending additional information from the licensee which can verify the adequacy of the AIST program corrective action for the auxiliary charging pumps, this item is identified as unresolved item (URI) 050000390/2012002-04, Failure to Demonstrate Corrective Actions for the Auxiliary Charging Pumps.

4OA3 Event Followup

.1 (Closed) Licensee Event Report (LER) 05000390/2011-000-01, Safety Injection Pump Capable of Injecting into Reactor Coolant System in Mode 5

a. Inspection Scope

The inspectors reviewed the circumstances surrounding the event described in the LER.

b. Findings

Introduction: A Green, self-revealing NCV of TS 3.4.12, Cold Overpressure Mitigation System (COMS) was indentified due to the failure of the licensee to ensure that the safety injection pump (SIP) 1A-A was incapable of injecting water into the RCS while in Mode 5. Specifically, the impact of the performance deficiency was a violation of TS 3.4.12, "Cold Overpressure Mitigation System," which required that no SIP be capable of injecting water into the RCS.

Description: On May 9, 2011, at 15:17 Eastern Standard Time (EST) with Watts Bar Nuclear Plant Unit 1 in Mode 5, and the RCS in a near-water solid condition, the licensed operator started SIP 1A-A to fill and vent the cold leg accumulators (CLAs) in accordance with System Operating Instruction (SOI)-63.01. Following startup of SIP 1A-A, RCS pressure immediately began to rise and reached a maximum indicated pressure of 328 psig before the operators secured the pump. The RCS pressure transient during this event did not exceed the cold overpressure mitigation system (COMS) setpoint. The unexpected pressure transient was due to improper alignment of the safety injection system (SIS) when used to fill and vent the CLAs. Specifically, the SIP 1A-A crosstie valve (1-FCV-63-152) was opened when it should have been closed. Misalignment of the SIS was due to a failure to follow procedures for a temporary clearance lift.

Analysis: The licensee's failure to properly control the configuration of the SIS, specifically the position of valve 1-FCV-63-152, was a performance deficiency. The finding was determined to be greater than minor because it was associated with the human performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the impact of the performance deficiency was a violation of TS 3.4.12, "Cold Overpressure Mitigation System," which required that no SIP be capable of injecting water into the RCS.

Using IMC 0609, "Significance Determination Process," Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding was determined to be a

shutdown issue since it represented an effect on safety during a refueling outage. The inspectors determined that IMC 0609, Appendix G, "Shutdown Operations," was applicable and categorized this issue as requiring a Phase 3 analysis because the finding involved low temperature/over pressure concerns. The regional senior risk analyst (SRA) performed a Phase 3 analysis, with the concurrence of shutdown-risk experts in Headquarters.

The SRA performed a bounding event assessment by creating an event tree to model the possible permutations of this event and calculated a conditional core damage probability. The dominant accident sequence was a case where early action to stop the increasing pressure transient does not occur and the COMS system fails to relieve the pressure buildup. Subsequently a residual heat removal (RHR) relief valve lifts, but does not reseal, thus creating a loss of inventory event. The increase in core damage frequency (Δ CDF) for this event was determined to be 1.1×10^{-7} . Therefore, this condition was treated as very low safety significance (Green).

This finding was determined to have a cross-cutting aspect in the area of human performance associated with the work practices component. The licensee failed to adequately implement human error prevention techniques, such as self and peer checking, to ensure that the work activity was being performed on the correct component. [H.4(a)].

Enforcement: Unit 1 TS requires, in part, that each of the SIPs is incapable of injecting into the RCS. Contrary to this, the licensee lost configuration control of the emergency core cooling system which allowed injection into the RCS by the SIP 1A-A while in Mode 5. Because this failure to comply with TS is of very low safety significance and has been entered into the licensee's CAP as PER 366905, this violation is being treated as an NCV, consistent with NRC Enforcement Policy: NCV 05000390/2012002-02, Failure to Comply with Technical Specification 3.4.12 by Allowing a Safety Injection Pump to Inject into the RCS in Mode 5.

.2 (Closed) LER 05000390/2012-000-01, Failure to Meet Technical Specifications due to Issues Associated with Vital Battery Surveillance Program

a. Inspection Scope

The inspectors reviewed the circumstances surrounding the event described in the LER.

b. Findings

Introduction: A Green, NRC-identified NCV of TS 3.8.4, DC Sources Operating, was identified. The licensee failed to accurately identify that vital battery III was approaching end-of-life. As a result, vital battery III was found to have passed beyond end-of-life as measured by TS-required performance testing.

Description: During review of 0-SI-236-54, 125 VDC Vital Battery IV 60 month Performance Test and 125 VDC Vital Battery Charger IV Test, performed in February 2011, as part of the Watts Bar Unit 2 electrical distribution system functional inspection in November 2011, the inspectors noted that the battery capacity had significantly degraded unexpectedly. Further investigation by the resident inspectors identified further indications of potential operability concerns related to additional testing performed on vital battery IV per 0-SI-236-44, 125 VDC Vital Battery IV 18 month Service Test and Vital Battery Charger IV Test in June 2011. Based on similarities in age and manufacture of vital battery III and IV, the inspectors questioned the operability of vital battery III. Follow-on testing by the licensee determined that this battery was inoperable on November 21, 2011. Due to the relatively slow change in battery capacity and a very short limiting condition for operation (LCO) required action time, two hours, it is reasonable to conclude that vital battery III had been inoperable in excess of the required action time.

As part of the root cause analysis of the vital battery III failure in January 2012, further review of the testing results of the vital battery IV 60 month performance test indicated that it did not meet its TS requirements, as of February 2011, rendering it inoperable related to the end-of-life testing requirement.

The licensee modified the 18-month service test load profile for each battery to include only Unit 1 loads and Unit 2 loads that were connected during the period in question. The reason that this modification is permissible is that Unit 2 is not yet operational and does not require these loads to be powered. Therefore, this test is a functional test showing the batteries would perform their design basis function. This modified test was performed on vital battery III successfully. The modified test was also performed on vital battery IV, in two different configurations to account for some individual cells which had been replaced in July 2011.

Unit 1 performed a refueling outage during the inoperability time frame of vital battery IV. Therefore, in addition to failure to meet TS 3.8.4, they also failed to meet TS 3.8.5 during the outage. Also, due to required mode changes to transition from an outage condition to an operational condition, LCO 3.0.4 was also violated.

Also, with vital battery IV being determined by the licensee's recalculation of the data as being inoperable, concurrent with the past inoperability of vital battery III, the licensee was in violation of LCO 3.0.3 for an indeterminate time.

Analysis. The licensee's failure to maintain TS operability by accurately identifying that vital battery III was approaching end-of-life was a performance deficiency. As a result, vital battery III was found to have passed beyond end-of-life as measured by TS-required performance testing. It is more than minor because, if left uncorrected, it could lead to a more serious safety concern. Additionally, the finding was associated with the equipment performance attribute of the Mitigating Systems objective cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Using IMC 0609, "Significance Determination Process," Attachment 4, "Phase 1 - Initial Screening

and Characterization of Findings,” the finding was determined to be of very low safety significance (Green), because subsequent functional testing by the licensee, witnessed by the inspectors, showed that vital batteries III and IV would meet all design basis analysis requirements.

This finding was determined to have a cross-cutting aspect in the area of human performance associated with the decision-making component. The licensee failed to use conservative assumptions in decision making and to adopt a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. [H.1(b)].

Enforcement: Unit 1 TS requires, in part, that each of the vital batteries be trended to predict end-of-life conditions based on the results of the 60-month performance test. The licensee failed to identify a degrading trend by misinterpreting test results, resulting in vital batteries III and IV exceeding end-of-life TS testing requirements. Because this failure to comply with TS is of very low safety significance and has been entered into the CAP as PER 468950, this violation is being treated as an NCV, consistent with NRC Enforcement Policy: NCV 05000390/2012002-03, Failure to Comply with Technical Specification 3.8.4, 3.8.5 and 3.0.3 by failing to recognize and address Vital Batteries III and IV degradation.

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

Exit Meeting Summary

On April 4, 2012, the resident inspectors presented the quarterly inspection results to Mr. Dave Gronek, Plant Manager, 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

D. Gronek, Plant Manager
T. Detchemende, Emergency Preparedness Manager
K. Dutton, Engineering Director
D. Grissette, Site Vice President
D. Guinn, Licensing Manager
E. Higgins, Mechanical/Civil Design Manager
W. Hooks, Radiation Protection Manager
D. Hughes, Training Supervisor
B. Hunt, Operations Superintendent
A. Jenkins, Chemistry Manager
R. Kirkpatrick, Design Engineering Manager
D. Murphy, Maintenance Manager
A. Phillips, Operations Support
W. Prevatt, Operations Manager
A. Scales, Work Control Manager
S. Sweet, Licensing Engineer
D. Jacques, Security Manager

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

050000390/2012002-04	URI	Failure to Demonstrate Corrective Actions for the Auxiliary Charging Pumps. (Section 40A2)
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Opened and Closed

05000390/2012002-01	NCV	Procedure AOI-30.2 C.36, Fire Safe Shutdown Room 737-A1A, Non-feasible Operator Manual Action. (Section 1R05)
05000390/2012002-02	NCV	Failure to Comply with Technical Specification 3.4.12 by Allowing a Safety Injection Pump to inject into the RCS in Mode 5. (Section 40A3)

05000390/2012002-03	NCV	Failure to Comply with Technical Specification 3.8.4, 3.8.5 and 3.0.3 by failing to recognize Vital Batteries III and IV degradation. (Section 4OA3)
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Closed

05000390/2011-000-01	LER	Safety Injection Pump Capable of Injecting into Reactor Coolant System in Mode 5 (Section 4OA3)
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05000390/2012-000-01	LER	Failure to Meet Technical Specifications due to Issues Associated with Vital Battery Surveillance Program (Section 4OA3)
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Discussed

None.

LIST OF DOCUMENTS REVIEWEDSection 1R01: Adverse Weather Protection

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

Section 1R04: Equipment Alignment

WO 08-823804-000

WO 09-812366-000

WO 09-813537-000

WO 09-817466-000

WO 1122753100

WO 10-813201

WO 10-814798

WO 112081538

WO 112086810

WO 111197093

WO 111591894

WO 112275310

FSAR 9.3.6 Auxiliary Charging System

N3-84-4001 Flood Mode Boration Makeup System

Dwg 1-47W809-7

SOI-74.01 Residual Heat Removal System

Dwg 1-47W810-1

Dwg 1-47W811-1

SOI-63.01, Safety Injection System

Dwg 1-47W811-1

SOI-03.02 Auxiliary Feedwater System

Dwg 1-47W803-2

Section 1R018: Plant Modifications

WO 112245854

Section 4OA2: Problem Identification and Resolution

OPDP-1, Conduct of Operations

DC-40-29, Flood Protection Provisions

PER's 211724, 160811, 253912, 277300, 165897, 277300, and 371260

TI-100.006, IST Program

TI-100.007, Augmented IST Program

AOI 7.01 Maximum Probable Flood

FSAR 9.3.6 Auxiliary Charging System

TI-50.048, Flood mode auxiliary charging pump 1A performance test

TI-50.049, Flood mode auxiliary charging pump 1B performance test

LIST OF ACRONYMS

ACP	auxiliary charging pump
AFW	auxiliary feedwater
AIST	augmented inservice test
AOI	abnormal operating instruction
CAP	corrective action program
CCS	component cooling system
CFR	<i>Code of Federal Regulations</i>
COMS	cold overpressure mitigation system
DCN	design change notice
EDG	emergency diesel generator
EPIP	emergency plan implementing procedure
ERCW	essential raw cooling water
FE	functional evaluation
FPR	fire protection report
FSSD	fire safe shutdown
IMC	inspection manual chapter
IP	inspection procedure
LCO	limiting condition for operation
MDAFW	motor-driven auxiliary feedwater
NCV	non-cited violation
NEI	Nuclear Energy Institute
NPG-SPP	nuclear power group standard programs and processes
NRC	Nuclear Regulatory Commission
OOS	out of service
PER	problem evaluation report
PI	performance indicator
RCS	reactor coolant system
RHR	residual heat removal
RTP	rated thermal power
RWST	refueling water storage tank
SDBR	shutdown board room
SDP	Significance Determination Process
SI	safety injection
SIP	safety injection pump
SIS	safety injection system
SSC	structures, systems, or components
TDAFW	turbine-driven auxiliary feedwater
TI	temporary instruction
TS	technical specifications
TVA	Tennessee Valley Authority
URI	unresolved item
UFSAR	Updated Final Safety Analysis Report
WO	work order