



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

April 30, 2014

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000390/2014002**

Dear Mr. Shea:

On March 31, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant, Unit 1. On April 9, 2014, the NRC inspectors discussed the results of this inspection with Mr. Church and other members of the Watts Bar staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented two NRC-identified findings and one self-revealing finding of very low safety significance (Green) in this report. The findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violation or significance of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 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.

Additionally, as we informed you in the most recent NRC integrated inspection report, cross-cutting aspects identified in the last six months of 2013 using the previous terminology were being converted in accordance with the cross-reference in Inspection Manual Chapter 0310. Section 4OA5 of the enclosed report documents the conversion of these cross-cutting aspects which will be evaluated for cross-cutting themes and potential substantive cross-cutting issues in accordance with IMC 0305 starting with the 2014 mid-cycle assessment review. If you disagree with the cross cutting aspect assigned, 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 Plant.

J. Shea

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In accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding," 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 System (PARS) component of NRC's Agencywide Documents Access and Management 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/

Jonathan H. Bartley, Chief
Reactor Projects Branch 6
Division of Reactor Projects

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

Enclosure: NRC Inspection Report 05000390/2014002
w/Attachment: Supplemental Information

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Letter to Joseph Shea from Jonathan H. Bartley dated April 30, 2014

SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000390/2014002

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-390

License No.: NPF-90

Report No.: 05000390/2014002

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 1

Location: Spring City, TN 37381

Dates: January 1 through March 31, 2014

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

Approved by: Jonathan H. Bartley, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

SUMMARY

IR 05000390/2014-002; 01/01/2014 – 03/31/2014; Watts Bar, Unit 1; Problem Identification and Resolution, Post-Maintenance Testing.

The report covered a three-month period of inspection by the resident inspectors. Three Green non-cited violations 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) dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross-Cutting Areas," dated October 28, 2011. 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.

NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green: An NRC-identified non-cited violation (NCV) of 10 Code of Federal Regulations (CFR) 50 Appendix B, Criterion XVI, Corrective Action, was documented for the licensee's failure to correct a condition adverse to quality associated with the inadequate performance of a safety related maintenance instruction. Specifically, the licensee closed Problem Evaluation Report (PER) 858636 which documented the failure to perform step 6.3 of procedure 0-MI-0.007, without taking corrective actions to correct the condition. The licensee has entered this issue into their corrective action program as PER 867402.

The performance deficiency was determined to be more than minor because it adversely affected the objective of the Mitigating Systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correct a condition adverse to quality associated with the licensee's ability to trend valve degradation reduced the licensee's ability to ensure the reliability and capability of plant safety systems. Using the screening worksheet of IMC 0609, Appendix A, Exhibit 2 – Mitigating Systems Screening Questions, the inspectors determined that the finding was of very low safety significance (Green) because the essential air system remained functional following the maintenance activity. The cause of the finding was directly related to the cross-cutting aspect of Problem Identification and Resolution, Corrective Action Program, because the licensee did not thoroughly evaluate this problem, identify the causes, develop appropriate corrective actions, and evaluate the extent of condition. [P.2] (Section 40A2.2)

- Green: A self-revealing NCV of TS 3.7.5, Auxiliary Feedwater (AFW) System, was documented for the licensee's failure to ensure that three fully qualified, independent trains of AFW were operable in Modes 1, 2 and 3. Specifically, the licensee failed to ensure the safety-related air supply to 1- LCV-3-156 and 1-LCV-3-164, for the 1A AFW train was available, from October 22, 2012, until January 24, 2014. The licensee restored operability of the valves and entered this issue into their corrective action program as PER 838494.

Enclosure

The performance deficiency was determined to be more than minor because it would have the potential to lead to a more significant safety concern if left uncorrected, in that, isolation of control air from the level control valves left the nitrogen supply system as the motive force for the valves which did not meet all of the necessary design qualifications required to maintain operability of the 1A AFW train. This finding was evaluated using the SDP Phase 1 screening criteria and IMC 609 Appendix A, Exhibit 2 – Mitigating Systems Screening Questions, and was determined to be of very low safety significance because the finding did not involve the total loss of system or function and the affected 1A train valves fail to the open position. The cause of the finding was directly related to the cross-cutting aspect in the Work Practices component of the area of Human Performance, in that the licensee failed to provide adequate supervisory and management oversight to ensure that the control air valves were placed in the correct position. [H.2] (Section 4OA3.3)

Cornerstone: Barrier Integrity

- Green. An NRC-identified NCV of Technical Specification (TS) 5.7.1, Procedures, was documented for the licensee's failure to follow plant procedures which resulted in the undocumented modification of the upper NAMCO limit switch for valve 1-FCV-61-110-A, Glycol Outlet Containment Isolation Valve. The licensee planned replacement of the switch and entered this issue into their corrective action program as PER 857020.

This performance deficiency was determined to be more than minor because it was associated with the Design Control attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to follow the proper plant procedures led to an unauthorized plant modification which reduced the ability of the licensee to provide assurance that a containment isolation valve would perform as designed. Using the screening worksheet of IMC 0609, Appendix A, Exhibit 3 – Barrier Integrity Screening Questions, the inspectors determined that the finding was of very low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of reactor containment and did not involve an actual reduction in the function of the hydrogen igniters in the reactor containment. The cause of the finding was directly related to the cross-cutting aspect that the licensee define and effectively communicate expectations regarding procedural compliance and that personnel follow procedures in the Work Practices component of the cross-cutting area of Human Performance, in that the licensee failed to ensure that the proper limit switch was installed on 1-FCV-61-110-A. [H.8] (Section 1R19)

Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at essentially 100 percent power the entire reporting period until it was removed from service for refueling outage 1R12, on March 24, 2014, and remained in a shutdown condition until the end of the 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 6, 2014. 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 Fahrenheit. In addition, the inspectors performed a walkdown of the RWST freeze protection and feedwater transmitter enclosures to verify the adequacy of construction and the operation of the installed temporary lighting and temperature monitoring system. This activity constituted one inspection sample.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial System Walkdowns

a. Inspection Scope

The inspectors conducted the 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 (OOS). This also included that redundant trains were returned to service properly. The inspectors reviewed the functional system descriptions, the 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. This activity constituted three inspection samples. Documents reviewed are listed in the Attachment.

Enclosure

- Partial walkdown of 1A and 1B motor-driven auxiliary feedwater (MDAFW) pumps while turbine-driven auxiliary feedwater (TDAFW) pump OOS for preventive maintenance
- Partial walkdown of 1B auxiliary control air system (ACAS) while 1A ACAS OOS for modifications
- Partial walkdown of 1A residual heat removal (RHR) pump while 1B RHR OOS for preventive maintenance

b. Findings

No findings were identified.

1R05 Fire Protection

Fire Protection Tours

a. Inspection Scope

The inspectors conducted tours of the 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; and 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
- A 6.9 KV shutdown board room (SDBR)
- B 6.9 KV SDBR
- MDAFW pumps/component cooling system (CCS) pumps

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification

.1 Licensed Operator Requalification Review

a. Inspection Scope

On March 4, 2014, the inspectors observed the simulator evaluation for Operations Crew 4 per 3-OT-SRT-AOI-41-1, Loss of Condenser Vacuum, Rev. 4. The plant conditions led to a Notification of Unusual Event. Performance indicator credit was taken.

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

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of abnormal operating instructions and emergency operating instructions
- Timely and appropriate Emergency Action Level declarations per emergency plan implementing procedures
- 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. This activity constituted one inspection sample.

b. Findings

No findings were identified

.2 Observation of Operator Performance

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 procedures 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: This activity constituted one inspection sample.

- 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 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). This activity constituted three inspection samples.

- Reviewed expert panel decision to leave TDAFW pump in (a)(2) status following exceeding performance criteria
- Reviewed SDBR chiller handswitch a(1) action plan
- Reviewed expert panel decision for auxiliary feedwater (AFW) train B in (a)(2) status following two preventive functional failures

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated, as appropriate, for the 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 activity constituted four inspection samples.

- Risk assessment for 2B emergency diesel generator (EDG) OOS for preventive maintenance (PM) with extreme weather (snow) factored in
- Emergent risk assessment for failure of 1A ACAS with 2B EDG OOS
- Risk assessment for work week 0120 with 1A ACAS, 1A containment spray (CS) pump OOS
- Risk assessment for work week 0317 with 1A SI pump and 2A EDG OOS for PM and testing

b. Findings

No findings were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the 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 (LCO) 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. This activity constituted eight inspection samples.

- Prompt determination of operability (PDO) for PER 823492, 1B CS Hx supply valve 1-FCV-67-123B damaged conduit
- Functional evaluation (FE) for PER 809167, Inadequate App R fire barriers
- FE for PER 838931, Missed fire surveillance for TIR 14.10.C, Steam dump valve cycle
- FE for PER 842290, Unattended propped open high energy line break (HELB) door

- FE for PER 851020, Incorrect model NAMCO limit switch installed on 1-FCV-061-110-A, Glycol outlet isolation valve and undocumented design change
- FE for PER 850540, Missed ISI surveillance on dis-similar weld on reactor head upper injection nozzle
- FE for PER 856665, Failure of 1-FCV-63-73 to operate from the auxiliary control room per 1-SI-0-53.1, 18 month remote shutdown transfer switch
- FE for PER 858520, Orientation of two fire protection spray nozzles inside the containment purge 1B-B air exhaust plenum deviated from design requirement

b. Findings

No findings were identified.

1R18 Plant Modifications

a. Inspection Scope

The inspectors reviewed the permanent plant modifications listed below against the requirements of NPG-SPP-09.3, Plant Modifications and Engineering Change Control, 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 permanent 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. This activity constituted two inspection samples. Documents reviewed are listed in the Attachment.

- Temporary modification 0-2013-077-001, Connect mobile low pressure liquid trailer to 0-ISV-77-993, Nitrogen supply to auxiliary building
- Design Change Notice (DCN) 62860, Change of ACAS air dryer control circuits to operate air dryer only when the associated air compressors are operating

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the 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. This activity constituted six inspection samples.

- WO 115427102, Repair of cycling failure of A ACAS air dryer
- WO 115451665, 0-FOR-32-1-A, Quarterly auxiliary air compressor start/load valve exercising/position indication verification and check valve test (Train A) following DCN 62860, Control wiring change
- WO 115489603, Repair of 5CR high temp relay on B main control room chiller
- WO 115491591, 1-TRI-47-3, Main turbine steam inlet valve testing for repair of #2 Throttle Valve linkage
- WO 115525147, 1-SI-61-902-A for replacement of the open NAMCO limit switch on valve 1-FCV-61-110
- WO 115595478, Adjust interlock limit switch on 1-LCV-074-021 and retest per 1-SI-0-53.1B, 18 month remote shutdown transfer switch verification pre-outage performance – Train B

b. Findings

Introduction: A Green NRC-identified NCV of TS 5.7.1, Procedures, was documented for the licensee's failure to follow plant procedures which resulted in the undocumented modification of the upper NAMCO limit switch for valve 1-FCV-61-110-A, Glycol Outlet Containment Isolation Valve.

Description: Through the review of a WO for post maintenance test review, the inspectors identified that WO 114140095 was written to replace the upper limit switch on containment isolation valve 1-FCV-61-110-A on or about November 30, 2012. The safety function of this valve is to isolate on a containment isolation signal and to provide indication that it has done so to the post-accident monitoring system (PAMS). The incorrect, lower limit switch was specified in the WO, drawn from stock, and installed in the upper limit switch position. In order for this limit switch to function properly to pass its post maintenance test, it was modified by disassembling and shifting around internal parts. The applicable maintenance installation procedure 0-MI-0.037, Maintenance and Replacement of NAMCO Series EA180 Limit Switches, specifically prohibited removing the back cover of either environmentally qualified or Class 1E (safety related) NAMCO limit switches in the Precautions and Limitations section of the procedure. This switch is safety related. There was no direction in the WO or documentation of this modification activity. The licensee planned replacement of the switch during the April refueling outage. Inspectors reviewed the associated operability determination as documented in Section 1R15.

Analysis: The inspectors determined the licensee's failure to follow 0-MI-0.037, Maintenance and Replacement of NAMCO Series EA180 Limit Switches, was a performance deficiency. This performance deficiency was determined to be more than

minor because it was associated with the Design Control attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to follow the proper plant procedures led to an unauthorized plant modification which reduced the ability of the licensee to provide assurance that a containment isolation valve would perform as designed. Using the screening worksheet of IMC 0609, Appendix A, Exhibit 3 – Barrier Integrity Screening Questions, issued June 19, 2012, the inspectors determined that the finding was of very low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of reactor containment and did not involve an actual reduction in the function of the hydrogen igniters in the reactor containment. The cause of the finding was directly related to the aspect of procedure adherence in the cross-cutting area of Human Performance, that the licensee follows processes, procedures and work instructions; in that the licensee failed to ensure that the proper limit switch was installed on 1-FCV-61-110-A (H.8).

Enforcement: TS 5.7.1.1.a states, in part, that written procedures shall be established, implemented, and maintained covering the activities in the applicable procedures recommended by Regulatory Guide 1.33, Revision 2, Appendix A. Regulatory Guide 1.33, recommended procedures for performing maintenance. Procedure 0-MI-0.037, Precautions and Limitations, prohibited removing the back cover of either environmentally qualified or Class 1E (safety related) NAMCO limit switches. Contrary to this requirement, on November 30, 2012, the licensee removed the back cover of the Class 1E NAAMCO limit switch for 1-FCV-110-A to perform a field modification. Because this violation was of very low safety significance and was entered into the corrective action program as PER 857020, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000390/2014002-01, Failure to Follow Plant Procedures for Replacement of NAMCO Limit Switches)

1R20 Refueling and Outage Activities

a. Inspection Scope

The inspectors reviewed the outage risk control plan for the Unit 1 Cycle 12 (1R12) refueling outage (RFO) to assess whether the licensee had appropriately considered risk, industry experience, and previous site-specific problems, and to also confirm that the licensee had mitigation/response strategies for losses of key safety functions. Documents reviewed are listed in the Attachment.

The licensee began its 1R12 refueling outage on March 24, 2014. From that date through the end of this reporting period, the inspectors observed portions of the shutdown, cooldown, defueling, and maintenance activities to verify that the licensee maintained defense-in-depth (DID) commensurate with the outage risk plan and applicable TS.

The inspectors monitored licensee controls over the outage activities listed below. In addition, the inspectors reviewed the licensee's corrective action program to ensure that the licensee was identifying equipment alignment problems and that they were properly addressed for resolution.

- Licensee configuration management, including daily outage reports, to evaluate DID commensurate with the outage safety plan and compliance with the applicable TS when taking equipment OOS.
- Installation and configuration of reactor coolant instruments to provide accurate indication and an accounting for instrument error
- Controls over the status and configuration of electrical systems and switchyard to ensure that TS and outage safety plan requirements were met
- Decay heat removal processes to verify proper operation and that steam generators, when relied upon, were a viable means of backup cooling
- Controls to ensure that outage work was not impacting the ability to operate the spent fuel pool cooling system during and after core offload
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss
- Reactivity controls to verify compliance with TS and to verify that activities which could affect reactivity were reviewed for proper control within the outage risk plan

b. Findings

No findings were identified

1R22 Surveillance Testing

a. Inspection Scope

The inspectors witnessed the 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. This activity constituted nine inspection samples.

In-Service Test:

- WO 114932640, 1-SI-62-901-B, Centrifugal charging pump 1B-B quarterly performance test

Other Surveillances

- WO 114932597, 0-SI-82-11-B, Monthly diesel generator start and load test DG 1B-B
- WO 115432819, 1-SI-0-21, Excore QPTR and axial flux difference

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- WO 115123728, 1-SI-74-901-B, Residual heat removal pump 1B-B quarterly performance test
- WO 115124498, 0-SI-82-16, 24 hour load run – DG 2B-B
- WO 114846105, 0-SI-236-42, 125 Vdc vital battery II 18 month service test and 125 Vdc vital battery charger II test
- WO 115123972, 1-SI-3-901-A, Motor driven auxiliary feedwater pump 1A-A quarterly performance test
- WO 114472274, 1-SI-1-907, Testing and setpoint adjustment of main steam safety valves using treviteq equipment
- WO 114472253, 0-SI_82-3, 18 month loss of offsite power with safety injection DG 1A-A

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

On February 19, 2014, 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 licensee procedure EPIP-1, Emergency Plan Classification Flowchart, and making accurate and timely notifications and protective action recommendations in accordance with EPIP-2, Notification of Unusual Event; EPIP-3, Alert; EPIP-4, Site Area Emergency; EPIP-5, General Emergency; and the Radiological Emergency Plan. In addition, the inspectors verified that licensee evaluators were identifying deficiencies and properly dispositioning performance against the performance indicator criteria in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline.

- A steam leak occurred on #1 steam generator outside of containment upstream of the associated main steam isolation valve
- Notification of unusual event based on EAL 2.7, Unplanned rapid depressurization of the main steam system resulting in a rapid RCS cooldown and safety injection
- A fire affected RWST level indication resulting in escalating to an Alert classification based on EAL 4.1, Fire affecting safety related equipment.
- Loss of coolant accident (LOCA) occurs in reactor coolant system loop 1 cold leg
- The RWST level reaches the swap-over point and due to various equipment failures, swap over to sump recirculation is not achieved
- A General Emergency is declared based on EAL 1.1.1L, Core Cooling RED.
- SACRG-1, Severe Accident Control Room Guideline Initial Response procedure is entered.
- PAR #3 to shelter in place was made due to icy road conditions. This was later changed to PAR #2 to evacuate affected sector as road conditions had improved.

Enclosure

b. Findings

No findings were identified.

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 from January 1, 2013, through December 31, 2013, PI definitions and guidance contained in NEI 99-02, Regulatory Assessment Indicator Guideline, Revision 6, were used to verify the basis in reporting for each data element.

- Unplanned scrams
- Scrams with loss of normal heat removal
- RCS activity
- Unplanned power changes per 7000 critical hours

4OA2 Problem Identification and Resolution

.1 Review of Items Entered into the Corrective Action Program (CAP)

a. Inspection Scope

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: Review of Problem Identification and Resolution for PER 858636

a. Inspection Scope

The inspectors reviewed the plan and implementation of corrective actions configuration control during design changes, which was documented in PER 858636.

b. Findings and Observations

Introduction: A Green NRC-identified NCV of 10 *Code of Federal Regulations* (CFR) 50 Appendix B, Criterion XVI, Corrective Action, was documented for the licensee's failure to correct a condition adverse to quality associated with the inadequate performance of a safety-related maintenance instruction. Specifically, the licensee closed PER 858636 which documented the failure to perform step 6.3 of procedure 0-MI-0.007, without taking corrective actions to correct the condition.

Description: On January 30, 2014, licensee maintenance personnel performed disassembly and inspection of four one-inch check valves (0-CKV-032-0094A, B, C & D) in the essential air system, a system necessary to support the operability of a number of vital plant systems required to perform a safety function during postulated design basis events. Work order (WO) 114391131 provided instructions to disassemble the valves in accordance with 0-MI-0.007 and inspect in accordance with TI-50.014, Disassembly and Inspection of Control Air Check Valves – Train B, then reassemble the valves in accordance with 0-MI-0.007. Maintenance instruction procedure 0-MI-0.007, Check Valve, Revision 6, Step 6.3, Inspection of Parts, contained instructions for maintenance personnel to perform a visual inspection of as-found and as-left conditions for check valves.

A licensee inservice testing coordinator reviewed the work package on March 11, 2014, after work completion and identified a condition adverse to quality in that procedure 0-MI-0.007, Step 6.3, was not performed. PER 858636 was initiated to document the condition. Step 6.3 required performance of Appendix B to 0-MI-0.007 for this style of check valve, unless waived by the check valve engineer. The purpose of 0-MI-0.007, Appendix B, was to satisfy the requirements of the ASME OM code for condition monitoring by recording one or more critical dimensions during disassembly and inspection activities to support trending of valve degradation. The step had been marked "N/A" by the work performer. No waiver was granted and no documented justification was provided in the WO for not completing the step.

On March 17, 2013, the licensee closed PER 858636 without taking any corrective action to resolve this condition. During review of PER 858636, the inspectors identified the lack of corrective actions taken to resolve the condition adverse to quality and questioned the licensee about the closure of the PER. Following the inspectors questions, the licensee initiated PER 867402 to address the issue.

Analysis: The inspectors determined that the licensee's failure to correct a condition adverse to quality associated with the inadequate performance of a safety related maintenance instruction as required by 10 CFR 50 Appendix B, Criterion XVI, was a performance deficiency. The performance deficiency was determined to be more than minor because it adversely affected the objective of the Mitigating Systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correct a condition adverse to quality associated with the licensee's ability to trend valve degradation reduced the licensee's ability to ensure the reliability and capability of plant safety systems. Using the screening worksheet of IMC 0609, Appendix A, Exhibit 2 – Mitigating Systems Screening Questions, issued June 19, 2012, the inspectors determined that the finding was of very low safety significance (Green) because the essential air system remained functional following the maintenance activity. The cause of the finding was directly related to the aspect of evaluation in the Problem Identification and Resolution cross-cutting area because the licensee did not thoroughly evaluate this issue to ensure that the resolution addressed causes and extent of conditions commensurate with its safety significance. [P.2]

Enforcement: 10CFR50 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, on March 17, 2014, the licensee failed to correct a condition adverse to quality associated with the inadequate performance of a safety related maintenance instruction. Because this finding was of low safety significance (Green) and was entered into the licensee's corrective action program as PER 867402, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000390/2014002-02, Failure to Correct a Condition Adverse to Quality)

4OA3 Event Follow-up

.1 (Closed) LER 05000390/2012-003-01: Entry into Mode 4 Without Meeting LCO 3.4.12, Cold Overpressure Mitigation System (COMS)

On January 8, 2014, the licensee issued licensee event report (LER) 05000390/2012-003-01, which was revision 1 to the previous LER 05000390/2012-003-00. The original LER was reviewed and closed as a licensee-identified violation in integrated inspection report (IIR) 05000390/2013002. The inspectors reviewed the additional information added in LER 05000390/2012-003-01, relating to the cause of the event which resulted when LCO 3.4.12 was not met and the applicable required actions were not taken within their associated completion times. No findings or violations of NRC requirements were identified.

.2 (Closed) LER 05000390/2013-002-00: Two Trains of Emergency Gas Treatment System Inoperable

On May 2, 2013, at 0845, B-train emergency gas treatment system (EGTS) was removed from service for planned maintenance and operations declared TS LCO 3.6.9 not met and entered Condition A for one EGTS train inoperable. On May 3, 2013, at 0111, the main control room was notified that the A-A auxiliary air compressor air dryer was not purging due to failure of the auxiliary control air system (ACAS) A-A dryer central timing unit. Operations declared A-train ACAS and supported TS systems inoperable, including A-train EGTS.

WBN operations entered LCO 3.0.3 due to the inoperability of two trains of EGTS and began preparations to initiate an orderly shutdown within one hour. Operations initiated actions to restore B-train EGTS to standby in accordance with System Operating Instruction (SOI)-65.02, Emergency Gas Treatment System. At 0155, B-train EGTS was declared operable and the actions of LCO 3.0.3 exited. No action was taken to reduce reactor power while in LCO 3.0.3.

The A-A auxiliary air compressor air dryer central timing unit motor was replaced. The apparent cause of this event was that there were missed opportunities to identify the need for replacement preventive maintenance for the central timing unit. Change requests have been initiated for periodic replacement of the ACAS dryer central timing unit. Components in other systems which could be subject to the same failure mechanism will be reviewed and preventive maintenance activities initiated as necessary.

Enclosure

The licensee entered this problem into their corrective action program as PER 721151 and performed an apparent cause evaluation. Inspectors reviewed the event, PER 721151, the apparent cause evaluation, and licensee corrective actions taken and no findings or violations of NRC requirements were identified.

3. (Closed) LER 05000/2014-001-00: Loss of Air to Train A Motor Driven Auxiliary Feedwater Pump Level Control Valves

a. Inspection Scope

On January 24, 2014, at 3:25 p.m., with Watts Bar Nuclear (WBN) Unit 1 at 100 percent rated thermal power, two Train A motor-driven auxiliary feedwater (MDAFW) pump level control valves (LCV) failed open due to loss of air. The valves 1-LCV-3-156-A and 1-LCV-3-164-A failed open following removal of the backup nitrogen control system. Upon investigation two essential air isolation valves 0-ISV-32-371 and 0-ISV-32-373, which are normally open to supply essential air from the ACAS to MDAFW LCVs, were found closed. Valves 0-ISV-32-371 and 0-ISV-32-373 were immediately opened which restored essential air to 1-LCV-3-156-A and 1-LCV-3-164-A.

b. Findings

Introduction: A Green self-revealing NCV of TS 3.7.5, Auxiliary Feedwater (AFW) System, was documented for the licensee's failure to ensure that three fully qualified, independent trains of AFW were operable in Modes 1, 2 and 3. Specifically, the licensee failed to ensure the safety-related air supply to 1- LCV-3-156 and 1-LCV-3-164, for the 1A AFW train was available from October 22, 2012, until January 24, 2014.

Description: On January 24, 2014, operations personnel vented the nitrogen supply system in the auxiliary building for maintenance activities. Subsequent to this action, two AFW level control valves, 1-LCV-3-156 and 1-LCV-3-164 stroked to their failed position, open. Investigation by operations personnel determined that the manual isolation valves from the control air system, 1-ISV-32-3761 and 1-ISV-32-3765, were closed and that backup nitrogen had been for the motive force for operating these valves. Isolation of the nitrogen supply in conjunction with the unavailability of control air allowed the AFW level control valves to travel to their failed position (Open). Additional investigation determined that the last record of operation of the air isolation valves was associated with WO 114007265 on October 22, 2012. The WO was completed and identified the valves as being left in the Open position.

Analysis: The licensee's failure to maintain plant configuration control to support operability of the 1A AFW train as required by T.S. 3.7.5 was determined to be a performance deficiency. Specifically, the licensee failed to ensure the safety-related air supply to 1- LCV-3-156 and 1-LCV-3-164, for the 1A AFW train was available. The inspectors determined that the performance deficiency was more than minor because it would have the potential to lead to a more significant safety concern if left uncorrected, in that, isolation of control air from the level control valves left the nitrogen supply system as the motive force for the valves which did not meet all of the necessary design

qualifications required to maintain operability of the 1A AFW train. This finding was evaluated using the SDP Phase 1 screening criteria and IMC 609 Appendix A, Exhibit 2 – Mitigating Systems Screening Questions, issued on June 19, 2012, and was determined to be of very low safety significance because the finding did not involve the total loss of system or function and the affected 1A train valves fail to the open position. The cause of the finding was directly related to the field presence aspect in the cross-cutting area of Human Performance, in that the licensee failed to provide adequate supervisory and management oversight to ensure that the control air valves were maintained in the correct position. {H.2}

Enforcement: TS 3.7.5, Auxiliary Feedwater (AFW) System, requires three independent trains of AFW to be Operable during Modes 1, 2 and 3. LCO 3.7.5 required that with one train inoperable then restore the AFW train to operable status within 72 hours or be in Mode 3 within 6 hours and Mode 4 within 18 hours. Contrary to the above, between October 22, 2012, and January 24, 2014, one train of AFW was inoperable and was not restored to an operable status within 72 hours and the unit was not placed in Mode 3 within 6 hours and Mode 4 within 18 hours. Specifically, the licensee failed to ensure the safety-related air supply to 1- LCV-3-156 and 1-LCV-3-164, for the 1A AFW train was available. The licensee took immediate corrective actions to restore the 1A AFW system to an Operable status. Because this finding is of very low safety significance and was entered into the licensee's corrective action program as PER 838494, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy Section 2.3.2. (NCV 05000390/2014002-03, Failure to Comply with Technical Specification 3.7.5, Auxiliary Feedwater System)

40A5 Other Activities

The table below provides a cross-reference from the 2013 and earlier findings and associated cross-cutting aspects to the new cross-cutting aspects resulting from the common language initiative. These aspects and any others identified since January 2014, will be evaluated for cross-cutting themes and potential substantive cross-cutting issues in accordance with IMC 0305 starting with the 2014 mid-cycle assessment review.

Finding	Old Cross-Cutting Aspect	New Cross-Cutting Aspect
05000390/2013008-01	P.1(d)	P.3
05000390/2013005-01	H.4(b)	H.8

40A6 Meetings, including Exit

On April 9, 2014, the resident inspectors presented the quarterly inspection results to members of the licensee staff. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

G. Arent, Licensing Manager
R. Bankes, Chemistry/Environmental Manager
L. Belvin, QA Manager
M. Bottorff, Operations Superintendent
M. Casner, Site Engineering Director
C. Church, Site Vice President
S. Connors, Operations Manager
T. Detchemende, Emergency Preparedness Manager
K. Dietrich, Engineering Programs Manager
C. Glover, Security Manager
D. Gronek, Plant Manager
W. Hooks, Radiation Protection Manager
T. Morgan, Licensing Engineer
D. Murphy, Maintenance Manager
J. O'Dell, Site Licensing Supervisor
W. Prevatt, Work Control Manager
R. Stroud, Site Licensing

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000390/2014002-01	NCV	Failure to Follow Plant Procedures for Replacement of NAMCO Limit Switches (Section 1R19)
05000390/2014002-02	NCV	Failure to Correct a Condition Adverse to Quality (Section 4OA2.2)
05000390/2014002-03	NCV	Failure to Comply with Technical Specification 3.7.5, Auxiliary Feedwater System (Section 4OA3.3)

Closed

05000390/2012-003-01	LER	Entry into Mode 4 Without Meeting LCO 3.4.12, Cold Overpressure Mitigation System (COMS) (Section 4OA3.1)
05000390/2013-002-00	LER	Two Trains of Emergency Gas Treatment System Inoperable (Section 4OA3.2)
05000390/2014-001-00	LER	Loss of Air to Train A Motor Driven Auxiliary Feedwater Pump Level Control Valves (Section 4OA3.3)

Attachment

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

1-PI-OPS-1-FP, Freeze Protection
PER 740086

Section 1R04: Equipment Alignment

SOI-3.02, Auxiliary Feedwater System Power Checklist 3.02-1P
SOI-3.02, Auxiliary Feedwater System Valve Checklist 3.02-1V
SOI-32.02, Auxiliary Air System Power Checklist 32.02-1P
SOI-32.02, Auxiliary Air System Valve Checklist 32.02-1V
Dwg. 1-47W848-1
SOI-74-01, Residual Heat Removal System Power Checklist 74.01-3P
SOI-74-01, Residual Heat Removal System Valve Checklist 74.01-3V

LIST OF ACRONYMS

ACAS	auxiliary control air system
AFW	auxiliary feedwater
CAP	Corrective Action Program
CCS	component cooling system
CFR	<i>Code of Federal Regulations</i>
CS	containment spray
DCN	Design Change Notice
DID	defense-in-depth
EGTS	emergency gas treatment system
FE	functional evaluation
IMC	Inspection Manual Chapter
LCO	limiting condition for operation
LCV	level control valve
LER	licensee event report
LOCA	loss of coolant accident
MDAFW	motor-driven auxiliary feedwater
NCV	non-cited violation
NPG-SPP	nuclear power group standard programs and processes
NRC	Nuclear Regulatory Commission
OOS	out of service
PAMS	post-accident monitoring system
PER	problem evaluation report
PDO	prompt determination of operability
PI	performance indicator
PM	preventive maintenance
RCS	reactor coolant system
RFO	refueling outage
RHR	residual heat removal
RWST	refueling water storage tank
SDP	Significance Determination Process
SSC	structures, systems, or components
TDAFW	turbine-driven auxiliary feedwater
TS	technical specifications
TVA	Tennessee Valley Authority
UFSAR	Updated Final Safety Analysis Report
WBN	Watts Bar Nuclear Plant
WO	work order