



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II

245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

May 14, 2018

Mr. Joseph W. Shea, Vice President
Nuclear Regulatory Affairs and
Support Services
Tennessee Valley Authority
1101 Market Street, LP 4A
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT – NUCLEAR REGULATORY COMMISSION
INTEGRATED INSPECTION REPORT 05000390/2018001 AND
05000391/2018001**

Dear Mr. Shea:

On March 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant Units 1 and 2. On April 17, 2018, the NRC inspectors discussed the results of this inspection with Mr. Thomas Marshall and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. The NRC is treating this violation as non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the 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, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II and the NRC Resident Inspector at the Watts Bar Nuclear Plant.

J. Shea

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This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Anthony D. Masters, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket Nos.: 50-390, 50-391
License Nos.: NPF-90, 96

Enclosure:
IR 05000390/2018001, 05000391/2018001

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SUBJECT: WATTS BAR NUCLEAR PLANT – NRC INTEGRATED INSPECTION
REPORT 05000390/2018001 AND 05000391/2018001 May 14, 2018

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U.S. NUCLEAR REGULATORY COMMISSION

Inspection Report

Docket Numbers: 50-390, 50-391

License Numbers: NPF-90, NPF-96

Report Numbers: 05000390/2018001, 05000391/2018001

Enterprise Identifier: I-2018-001-0068

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Units 1 and 2

Location: Spring City, TN 37381

Inspection Dates: January 1 through March 31, 2018

Inspectors: J. Nadel, Senior Resident Inspector
J. Hamman, Resident Inspector
W. Satterfield, Resident Inspector
S. Ninh, Senior Project Engineer
P. Braxton, Reactor Inspector
A. Goldau, Operations Engineer
J. Lizardi-Barreto, Construction Inspector
A. Matos-Marin, Construction Inspector
M. Toth, Project Engineer
S. Monarque, Project Engineer

Approved By: A. Masters, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee’s performance by conducting a quarterly integrated inspection at Watts Bar Nuclear Plant, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC’s program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. NRC and self-revealed findings, violations, and additional items are summarized in the table below.

List of Findings and Violations

Misapplication of Technical Specification Limiting Condition for Operation 3.0.6			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000390,391/2018001-01 Closed	H.6 – Design Margin	71111.15,
<p>Inspectors identified a Green finding and associated non-cited violation (NCV) of Title 10 of the Code of Federal Regulations Part 50 (10 CFR 50), Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” when the licensee failed to adhere to their current licensing basis (CLB) during the implementation of procedure 0-SOI-30.05, “Auxiliary Bldg HVAC Systems,” which governs the operation of the engineered safety feature (ESF) coolers serving as support systems for Technical Specification (TS) equipment. Specifically, based upon the documented CLB at the time, the licensee failed to enter the appropriate TS condition and action statement for the TS supported equipment when a single train of support ESF coolers was removed from service. With a single train of ESF coolers out of service, this rendered the TS supported equipment unable to meet the single failure criterion (SFC) requirement.</p>			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
VIO	05000390/2016-003-01	Falsified Fire Watch Records	71111.05AQ	Closed
URI	05000390/2017-004-01	Misapplication of Technical Specification Limiting Condition for Operation 3.0.6	71111.15	Closed
LER	05000390/2017-009-00	Unanalyzed Condition Related to Dual Unit Operation of the Essential Raw Cooling Water System During a Design Basis Accident	71153	Closed

LER	05000390/2017-005-00	Isolation of the 1B-B Safety Injection Pump Leads to Condition Prohibited by Technical Specifications	71153	Closed
LER	05000390/2017-004-00, 01	Manual Reactor Trips Due to Failed Reactor Coolant Pump Power Transfer During Plant Startup	71153	Closed
LER	05000390/2017-012-00, 01	Error in Plant Emergency Procedures Leads to a Condition Prohibited by the Technical Specifications	71153	Closed
LER	05000390/2016-009-00, 01	Failure to Complete Surveillance Requirements Causes Conditions Prohibited by the Technical Specifications	71153	Closed
LER	05000390/2017-008-00	Shield Building Inoperability and Potential Loss of Safety Function Resulting from Spurious Equipment Operation	71153	Closed
LER	05000390/2017-010-00	Actuation of Turbine-Driven Auxiliary Feedwater Pump Due to Loss of 6.9kV Shutdown Boards	71153	Closed
LER	05000390/2017-011-00	Failure to Enter Technical Specification 3.6.3 for Containment Isolation Valve	71153	Closed
LER	05000391/2017-005-00	Unplanned Emergency Core Cooling System Injection into Reactor Coolant System Due to Personnel Error	71153	Closed
LER	05000391/2016-002-00, 01	Turbine Driven Auxiliary Feedwater Pump Inoperable for Longer than Allowable Outage Time Due to Turbine Speed Control Failure	71153	Closed
LER	05000390/2017-015-00	Failure to Enter Limiting Condition of Operation Action Statements Results in a Condition Prohibited by Technical Specifications	71153	Closed
LER	05000390/2017-003-00	Inadequate Operability Determination Leads to a Condition Prohibited by the Technical Specifications	71153	Closed

PLANT STATUS

Unit 1 operated at or near rated thermal power for the entire inspection period.

Unit 2 operated at or near rated thermal power for the entire inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards."

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Impending Severe Weather (1 Sample)

The inspectors evaluated readiness for impending adverse weather conditions for below freezing temperatures on January 3, 2018.

71111.04 - Equipment Alignment

Partial Walkdown (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Auxiliary air train B on January 10, 2018
- (2) Emergency raw cooling water (ERCW) at the intake pumping station, A train, on February 26, 2018
- (3) ERCW at the intake pumping station, B train, on February 26, 2018

Complete Walkdown (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the ERCW system on March 5, 2018.

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (2 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Intake pumping station on March 23, 2018
- (2) Auxiliary building 737 foot level on March 23, 2018

The inspectors reviewed the licensee's response to the Notice of Violation (NOV) in Inspection Report 05000390,391/2016003 dated December 6, 2016, and determined that the reason, corrective actions taken and planned to address recurrence, and the date when full compliance was achieved for this violation is adequately addressed and captured on the docket.

Severity Level IV VIO 05000390/2016003-01, Falsified Fire Watch Records, is considered closed.

Annual Inspection (1 Sample)

The inspectors evaluated fire brigade performance on February 26, 2018.

71111.06 - Flood Protection Measures

Cables (1 Sample)

The inspectors evaluated cable submergence protection in Manhole 8A on March 8, 2018.

71111.07 - Heat Sink Performance

Heat Sink (1 Sample)

The inspectors evaluated the 1A-A emergency diesel generator heat exchanger performance on February 6, 2018.

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated the simulator as-left exam per scenario 3-OT-SRT-E3-6, main feedwater pump trip, runback, and steam generator tube rupture on February 2, 2018.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (1 Sample)

The inspectors evaluated the Maintenance Rule Program Thirteenth Periodic Summary Assessment Report on March 19, 2018.

71111.13 - Maintenance Risk Assessments and Emergent Work Control (5 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Risk assessment for the removal of penetration room cooler 1-CLR-30-195 from service on February 1, 2018

- (2) Risk assessment for work week 0226 with B train of ERCW out of service for maintenance
- (3) Risk assessment for work week 0205 with the 1A EDG and the U2 Turbine Driven Auxiliary Feedwater (TDAFW) pump out of service for planned maintenance
- (4) Risk assessment for work week 0212 for 1B EDG component outage
- (5) Risk assessment for work week 0129 with the 2B Motor Driven Auxiliary Feedwater (MDAFW) pump out of service for planned maintenance

71111.15 - Operability Determinations and Functionality Assessments (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) 2B MDAFW pump packing smoke due to break-in period on February 16, 2018
- (2) 1A-A EDG following loss of power to fuel oil priming pump on February 16, 2018
- (3) Past operability evaluation for the misapplication of LCO 3.0.6 on January 31, 2018
- (4) Prompt determination of operability for CR 1362431, 2-FCV-032-0111 leaking by at 4.39 scfh during LLRT
- (5) IDO for CR 1388105, EDG 1B ERCW 1B supply header isolation valve leaks by at 150gpm

71111.18 - Plant Modifications (1 Sample)

The inspectors evaluated the following temporary or permanent modification:

- (1) Design Change Notice 65893, Replace ESF Room Cooler Coils with ASME Section III, Class 3, Seismic Category I Coils on March 22, 2018.

71111.19 - Post Maintenance Testing (6 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) WO 119260419, 2B MDAFW pump packing replacement, on February 21, 2018
- (2) WO 119313870, Replacement of limit switch 2-ZS-46-57C (LS-6) on the Unit 2 turbine driven auxiliary feedwater pump, on February 21, 2018
- (3) 0-SI-82-11-A, Monthly Diesel Generator Start and Load Test DG 1A-A after 1A-A Emergency Diesel Generator (EDG) component outage, on February 22, 2018
- (4) 2-SI-3-907-B, Valve Position Indication Verification (Train B) Auxiliary Feedwater System after scheduled maintenance on 2-FCV-3-126A, on February 14, 2018
- (5) WO 116928634, Air leaking from Unit 2 auxiliary building general supply fan isolation damper flow control, January 31, 2018
- (6) 0-SI-82-20-B, 184 Day Fast Start and Load Test DG 2B-B, fast start of diesel generator 2B-B following voltage regulator replacement on March 29, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (4 Samples)

- (1) 0-SI-82-2, 8 Hour Diesel Generator AC Power Source Operability Verification, on February 28, 2018
- (2) 2-SI-0-2B-01, 0700 - 1900 Shift and Daily Surveillance Log Mode One, on January 30, 2018
- (3) 0-SI-82-14 24 Hour Load Run - DG 1B-B, on March 15, 2018
- (4) WO 117979682, calibration of 1-IPS-82-322/1A1 1A1 emergency diesel generator low lube oil pressure alarm, on February 4, 2018

In-service (3 Samples)

- (1) 2-SI-3-902, Turbine Driven Auxiliary Feedwater Pump 2A-S, quarterly performance test, on February 21, 2018
- (2) 1-SI-70-914-A, 2A component cooling system comprehensive test on January 27, 2018
- (3) 1-SI-3-903-B, Valve Full Stroke Testing for Auxiliary Feedwater (Train B) on January 30, 2018

Reactor Coolant System Leak Detection (1 Sample)

- (1) 1-SI-68-32, RCS leakage Unit 1, on February 23, 2018

71114.06 - Drill Evaluation

Emergency Planning Drill (1 Sample)

The inspectors evaluated an emergency planning drill for a fuel failure resulting from a reactor coolant pump failure. This failure, combined with reactor coolant leak and a power-operated relief valve sticking open, led to a General Emergency declaration. The drill was evaluated on January 9, 2018.

Drill/Training Evolution (1 Sample)

The inspectors evaluated an emergency planning drill for a loss of coolant accident (LOCA) combined with a failure of reactor building sump recirculation capability. The LOCA and sump recirculation failure led to a General Emergency declaration. The drill was evaluated on March 21, 2018.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below for the period from January 1, 2017, through December 31, 2017 (8 Samples)

- (1) Unit 1 Unplanned Scrams
- (2) Unit 2 Unplanned Scrams
- (3) Unit 1 Complicated Scrams
- (4) Unit 2 Complicated Scrams

- (5) Unit 1 Unplanned Power Changes
- (6) Unit 2 Unplanned Power Changes
- (7) Unit 1 Reactor Coolant System Specific Activity
- (8) Unit 2 Reactor Coolant System Specific Activity

71153 - Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (16 Samples)

The inspectors evaluated the following licensee event reports which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

- (1) Licensee Event Report (LER) 390/2017-004-00, Manual Reactor Trips Due to Failed Reactor Coolant Pump Power Transfer During Plant Startup, June 29, 2017; the NRC reviewed LER 390/2017-004-00 and identified a finding that was documented in quarterly integrated inspection report 05000390, 391/2017002, dated August 11, 2017 (ML17223A026).
- (2) Licensee Event Report (LER) 390/2017-004-01, Manual Reactor Trips Due to Failed Reactor Coolant Pump Power Transfer During Plant Startup, August 31, 2017; the NRC reviewed LER 390/2017-004-01 and identified a finding that was documented in quarterly integrated inspection report 05000390, 391/2017002, dated August 11, 2017 (ML17223A026).
- (3) LER 390/2017-005-00, Isolation of the 1B-B Safety Injection Pump Leads to Condition Prohibited by Technical Specifications, July 10, 2017; the NRC reviewed LER 05000390/2017-005-00 and identified a violation that was documented in quarterly integrated inspection report 05000390, 391/2017-002, dated August 11, 2017 (ML17223A026).
- (4) LER 05000390/2017-009-00, Unanalyzed Condition Related to Dual Unit Operation of the Essential Raw Cooling Water System During a Design Basis Accident, September 11, 2017; the NRC reviewed LER 05000390/2017-09-00 and identified a violation that was documented in quarterly integrated inspection report 05000390, 391/2017003, dated November 22, 2017 (ML17326A222).
- (5) LER 05000390/2017-012-00, Error in Plant Emergency Procedures Leads to a Condition Prohibited by the Technical Specifications, October 23, 2017; the NRC reviewed LER 05000390/2017-012-00 and identified a violation that was documented in quarterly integrated inspection report 05000390, 391/2017003, dated November 22, 2017 (ML17326A222).
- (6) LER 05000390/2017-012-01, Error in Plant Emergency Procedures Leads to a Condition Prohibited by the Technical Specifications, January 30, 2018; the NRC reviewed LER 05000390/2017-012-01 and identified a violation that was documented in quarterly integrated inspection report 05000390, 391/2017003, dated November 22, 2017 (ML17326A222).
- (7) LER 05000390/2016-009-00, Failure to Complete Surveillance Requirements Causes Conditions Prohibited by the Technical Specifications, July 15, 2016; the NRC reviewed LER 05000390/2016-009-00, and identified a violation that was documented in quarterly integrated inspection report 05000390, 391/2016002, dated August 12, 2016 (ML16228A005).

- (8) LER 05000390/2016-009-01, Failure to Complete Surveillance Requirements Causes Conditions Prohibited by the Technical Specifications, November 30, 2016; the NRC reviewed LER 05000390/2016-009-01, and identified a violation that was documented in quarterly integrated inspection report 05000390, 391/2016002, dated August 12, 2016 (ML16228A005).
- (9) LER 05000390/2017-008-00, Shield Building Inoperability and Potential Loss of Safety Function Resulting from Spurious Equipment Operation, August 14, 2017; the NRC reviewed LER 05000390/2017-008-00, and no findings were identified.
- (10) LER 05000390/2017-010-00, Actuation of Turbine-Driven Auxiliary Feedwater Pump Due to Loss of 6.9kV Shutdown Board, October 16, 2017; the NRC reviewed LER 05000390/2017-010-00, and no findings were identified.
- (11) LER 05000390/2017-011-00, Failure to Enter Technical Specification 3.6.3 for Containment Isolation Valve, October 23, 2017; the NRC reviewed LER 05000390/2017-011-00 and identified a minor violation that was documented in this quarterly inspection report (see the inspection results section of this report).
- (12) LER 05000391/2017-005-00, Unplanned Emergency Core Cooling System Injection into Reactor Coolant System Due to Personnel Error, January 25, 2018; the NRC reviewed LER 05000391/2017-005-00 and identified a minor violation that was documented in this quarterly integrated inspection report (see the inspection results section of this report).
- (13) LER 05000391/2016-002-00, Turbine Driven Auxiliary Feedwater Pump Inoperable for Longer than Allowable Outage Time due to Turbine Speed Control Failure, July 11, 2016; the NRC reviewed LER 05000390/2016-002-00 and identified two violations that were documented in quarterly integrated inspection report 05000390, 391/2016002, dated August 12, 2016 (ML16228A005).
- (14) LER 05000391/2016-002-01, Turbine Driven Auxiliary Feedwater Pump Inoperable for Longer than Allowable Outage Time due to Turbine Speed Control Failure, September 2, 2016; the NRC reviewed LER 05000390/2016-002-01 and identified two violations that were documented in quarterly integrated inspection report 05000390, 391/2016002, dated August 12, 2016 (ML16228A005).
- (15) LER 05000390/2017-015-00, Failure to Enter Limiting Condition of Operation Action Statements Results in a Condition Prohibited by Technical Specifications, January 8, 2018; the NRC reviewed LER 05000390/2017-015-00 and identified a violation that was documented in this quarterly integrated inspection report (see the inspection results section of this report).
- (16) LER 05000390/2017-003-00, Inadequate Operability Determination Leads to a Condition Prohibited by the Technical Specifications, March 3, 2017; the NRC reviewed LER 05000390/2017-003-00 and identified a violation that was documented in quarterly integrated inspection report 05000390, 391/2017001, dated May 12, 2017 (ML17132A004).

INSPECTION RESULTS

71153 - Follow-up of Events and Notices of Enforcement Discretion

Minor Performance Deficiency	71153
Minor Performance Deficiency: Failure to follow operation plant procedures NPG-SPP-22.205, Technical Human Performance Tools, and NPG-SPP-22-.206, Verification Program, resulted in unplanned ECCS injection into the RCS. This was a performance deficiency (PD)	

Screening: The PD was determined to be a minor because it did not adversely affect the Initiating Events Cornerstone objective in that decay heat removal, inventory control, power availability, reactivity control, and containment closure capability were not impacted during shutdown conditions.

Minor Violation	71153
<p>Minor Violation: On August 23, 2017, the licensee identified Technical Specification (TS) 3.6.3, Containment Isolation Valves, was not entered on May 17, 2017, for maintenance on an isolation valve (1-FCV-31-330) associated with the incore instrument room air handler unit 1B chilled water system. The licensee determined the in-place clearance over this time period met the required actions of TS 3.6.3 Condition A.1. However, the licensee's failure to enter TS 3.6.3 Condition A.2 was a performance deficiency, because the licensee did not verify the penetration flow path was isolated every 31 days.</p> <p>Screening: The inspector determined the performance deficiency was minor because the in-place maintenance clearance satisfactorily met the required actions of TS 3.6.3 Condition A.1 and did not have an impact on safety equipment and caused no safety consequences. The licensee's failure to meet Condition A.2 was verified to be administrative in nature because the licensee was able to confirm the clearance had been in place over the entire duration.</p> <p>Enforcement: Upon discovery, the licensee restored compliance with TS 3.6.3 and conducted an investigation. The failure to comply with TS 3.6.3 Condition A.2 constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy.</p>	

71111.15 - Operability Determinations and Functionality Assessments

Misapplication of Technical Specification Limiting Condition for Operation 3.0.6			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000390,391/2018001-01 Closed	H.6 – Design Margin	71111.15
<p>Description: During a review of control room logs in October 2017, NRC inspectors identified a deficiency associated with procedure 0-SOI-30.05, which governs the operation of ESF coolers located in various areas at the Watts Bar facility. The ESF coolers serve as support equipment for TS systems, and for maintenance purposes, TVA routinely removes one train of the ESF coolers from service without entering the TS condition and action statement for the affected TS supported equipment as directed by 0-SOI-30.05. After a review of TVA's CLB, inspectors determined this operating approach to be contradictory with the SFC requirements located in 10 CFR 50, Appendix A, "General Design Criteria [GDC]", also found in Chapter 3 of the licensee's Updated Final Safety Analysis Report, due to the vulnerability created by only one train of ESF coolers being available to contend with the thermal load exposure during a design basis accident. The GDC that pertain to systems such as emergency core cooling, containment spray, and component cooling all contain a requirement that the system safety function be accomplished <i>assuming a single failure</i>. Inspection Manual Chapter (IMC) 0326, "Operability Determination & Functionality Assessments for Conditions Adverse to Quality or</p>			

Safety” (Agencywide Documents Access & Management System [ADAMS] Accession Number ML15328A099) contains guidance for inspectors to assist their review of licensee determination of operability and resolution of degraded or nonconforming conditions. IMC 0326 specifies that failure to meet a GDC is a nonconforming condition and an entry point for an operability determination. Also, based on the definition of operability, IMC 0326 states: “The operability requirements for an SSC [structure, system, and component] encompass all necessary support systems (per the TS definition of operability) regardless of whether the TS explicitly specify operability requirements for the support functions.” Therefore, since the SFC is a requirement for systems as described above and is only relaxed when a TS LCO condition and action statement is entered, procedure 0-SOI-30.05 was not in conformance with 10 CFR 50, Appendix B, Criterion V, due to explicit direction provided in the procedure to not enter the supported system condition and action statement when the associated ESF cooler function was incapable of meeting the SFC.

The genesis of this operational approach at the Watts Bar facility began in April 2010 when TVA revised the bases for the Watts Bar Unit 1 TS by adding language to expand the scope of Limiting Condition for Operation (LCO) 3.0.6. The licensee evaluated this TS bases revision against the 10 CFR 50.59 criteria and incorrectly determined a license amendment was not required for the change. The licensee wrote CR 1357258 to capture this deficiency.

Prior to the TS bases revision, LCO 3.0.6 provided an exception for entering a supported system’s conditions and required actions due to the inoperability of a TS support system (i.e., a support system that has an associated LCO in the TS). Following the TS bases revision, the scope of LCO 3.0.6 was expanded to allow another exception pertaining to non-TS support systems (i.e., support systems with no associated LCO) that are 100 percent redundant and have the capability of individually supporting both TS trains. Specifically, the revision allowed both of the supported TS trains to be considered operable when one of the 100 percent redundant, non-TS support system trains is declared non-functional, which translates into the non-TS support systems not having to meet the SFC and by extension the TS systems not meeting the SFC. These TS bases revisions were based, inappropriately as described above, on a similar exception the NRC had previously granted to another facility (ADAMS Accession No. ML020950074).

In addition to the incorrect 10 CFR 50.59 evaluation that allowed the TS bases revision without Nuclear Regulatory Commission (NRC) approval, a more recent opportunity to correct this issue occurred during the revision of 0-SOI-30.05 in November 2016 where TVA updated pertinent information concerning operation of the redundant ESF coolers for Unit 2 shortly after it came online.

The issuance of this NCV closes out and provides resolution to unresolved item (URI) 05000390/2017004-01 identified in the fourth quarter integrated inspection report for Watts Bar (ADAMS Accession number ML18044A031). This issue is also related to Licensee Event Report 39012017-015-00 (ADAMS Accession number ML18008A215) and the subsequent withdrawal letter submitted by TVA dated February 28, 2018.

Corrective Actions: In response to this inspection discovery, the licensee took two actions. First, in the near-term, TVA revised the ESF cooler operating procedure to require entrance into the appropriate LCO condition and required action statement when one of the ESF cooler trains was nonfunctional. Secondly, TVA performed engineering evaluations to determine if the ESF coolers were necessary for the TS-supported equipment to perform its specified

safety function under worse case environmental conditions (i.e., design basis LOCA). The result of the evaluations determined that the two trains of ESF coolers in an area were not required for operability of supported equipment although, in some areas, if both ESF cooler trains were non-functional, other coolers in adjacent areas had to be functional for operability to be maintained. Based on these results, TVA determined through a past operability evaluation (POE) that during the previous three years from the point of discovery on November 9, 2017, the supported TS equipment would have been in an operable but nonconforming condition based on the historical configuration of the plant. Also, the ESF cooler operating procedure was revised to reflect the outcome of the engineering evaluations.

Corrective Action References: This issue is being tracked in TVA's corrective action program by Condition Reports 1357258, 1390171, and 1391745.

Performance Assessment:

Performance Deficiency: The failure to ensure procedure 0-SOI-30.05 provided instructions appropriate to the circumstances concerning the impact of non-functional ESF coolers on the operability of the supported TS equipment, was a performance deficiency. Specifically, Appendix B from the procedure stated, "For rooms with one or two trains of TS equipment served by two 100 percent capacity ESF Coolers, an LCO action is not required upon loss of one cooler," which translates to the supported TS system not meeting the SFC required by the GDC based upon the licensee's documented design bases at the time the issue was discovered. This deficiency represents a non-compliance with 10 CFR 50, Appendix B, Criterion V, which requires activities affecting quality to be accomplished in accordance with procedures that are appropriate to the circumstances.

Screening: The performance deficiency was determined to be more than minor because if left uncorrected, defense-in-depth could be compromised during the response to a design basis accident leading to a more significant safety concern. Specifically, though the licensee was able to show through a complex engineering effort that operability could be maintained in cases where both redundant train coolers in the same area are non-functional, they also found that if both ESF cooler trains were non-functional, other coolers in adjacent areas had to be functional for operability to be maintained. These unfavorable combinations were avoided by chance in the three year time period evaluated by the POE, but this would not necessarily have been the case going forward if the procedure was left uncorrected.

Significance: The finding affected the Mitigating Systems Cornerstone, and inspectors determined the finding was of very low safety significance (Green) since the four questions from Exhibit 2, "Mitigating Systems Screening Questions," from IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power" were answered "No".

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the Design Margin attribute of the Human Performance area as defined in IMC 0310, "Aspects Within the Cross-Cutting Areas," because the licensee did not operate the facility in a manner that would place special attention on maintaining defense-in-depth (i.e., not adhering to the SFC).

Enforcement:

Violation: 10 CFR 50, Appendix B, Criterion V, states, in part, that "activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances, and shall be accomplished in accordance with these

instructions, procedures, or drawings.” Contrary to the above, from April 2010 to November 2017, it was determined that the ESF cooler operating procedure was not appropriate to the circumstances because it allowed removal of ESF coolers from service without entering the appropriate supported system TS in accordance with the documented CLB at the time.

Enforcement Actions: This violation is being treated as an NCV consistent with Section 2.3.2 of the Enforcement Policy.

This finding closes URI 05000390/2017004-01.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

On April 17, 2018, the inspector presented the quarterly resident inspector inspection results to Mr. Thomas Marshall and other members of the licensee staff.

DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

0-PI-OPS-1-FP, Freeze Protection, Rev. 0016
CRs 1373869, 1373840, 1372963
CRs 1372964, 1372977, 1373002
CRs 1373085, 1373228

Section 1R04: Equipment Alignment

Procedures

1-PI-OPS-1-PE, Protected Equipment, Revision 0020
0-SOI-32.02 ATT 1P, Auxiliary Air System Power Checklist 0-32.02 IP, Rev. 0002
0-SOI-32.02 ATT 2V, Auxiliary Air System Train B Valve Checklist 0-32.02 2V, Rev. 0003
0-SOI-67.01, Essential Raw Cooling Water System, Rev. 0024
0-SOI-67.01 ATT 1V, Train A Common Equipment & IPS Valve Alignment Checklist 67.01-1V,
Rev. 0023
0-SOI-67.01 ATT 2V, Train B Common Equipment & IPS Valve Alignment Checklist 0-67.01-2V,
Rev. 0021
0-SOI-67.01 ATT 3V, Essential Raw Cooling Water System Supply Header 1A Valve Alignment
Checklist 0-67.01-3V, Rev. 0017
0-SOI-67.01 ATT 4V, Essential Raw Cooling Water System Supply Header 1B Valve Alignment
Checklist 0-67.01-4V, Rev. 0017
0-SOI-67.01 ATT 5V, Essential Raw Cooling Water System Supply Header 2A Valve Alignment
Checklist 0-67.01-5V, Rev. 0022
0-SOI-67.01 ATT 6V, Essential Raw Cooling Water System Supply Header 2B Valve Alignment
Checklist 0-67.01-6V, Rev. 0013
0-SOI-67.01 ATT 2P, Train B Common & IPS Power Alignment Checklist 67.01-2P, Rev. 0003
0-SOI-67.01 ATT 1P, Train A Common & IPS Power Alignment Checklist 67.01-1P, Rev. 0005
0-SOI-67.01 ATT 7P, Essential Raw Cooling Water System Supply Header 2A Power Alignment
Checklist 0-67.01-7P, Rev. 0008
0-SOI-67.01 ATT 8P, Essential Raw Cooling Water System Supply Header 2B Power Alignment
Checklist 0-67.01-8P, Rev. 0008
0-SOI-67.01 ATT 3P, ECCS Flow Indicator Power Supply Checklist 67.01-3P, Rev. 0000
0-SOI-67.01 ATT 5P, Supply Header 1A Power Alignment Checklist 67.01-5P, Rev. 0000
0-SOI-67.01 ATT 6P, Supply Header 1B Power Alignment Checklist 67.01-6P, Rev. 0000

Drawings

0-47W848-1, R0
0-47W845-1, R9
0-47W845-5, R0

Section 1R05: Fire Protection

CR 1392503
CR 1394364
CR 1391280
CR 1391282
CR 1391315
CR 1391318

Section 1R06: Flood Protection Measures

WO 119213987

Nameplate/Location Data Update Request for WO 119213987

Section 1R07: Heat Sink Performance

CR 1381083

WO 118070153

1-TI-79.821, Diesel Generator 1A-A Jacket Water Cooler Performance Test, Rev. 0000

0-TI-79.000, Program for Implementing NRC Generic Letter 89-13, Rev. 0003

Section 1R12: Maintenance Effectiveness

Maintenance Rule Program Thirteenth Periodic Summary Assessment Report dated

February 2, 2018

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

NPG-SPP-09.11.1, Equipment Out of Service Management, Rev. 0012

0-SOI-30.05, Auxiliary Bldg HVAC Systems, Rev. 0015

Operations Log dated January 13, 2018 (day shift)

WO 118860661

WO 118860669

Nameplate/Location Data Update Request dated February 27, 2018

0-MI-67.01-B, Essential Raw Cooling Water – Removal of the Entire B Train from Service in Support of Maintenance, Rev. 0001

PRA Evaluation Response WBN-0-17-119 R2 dated February 27, 2018

Operator's risk report for February 12, 2018

Section 1R15: Operability Determinations and Functionality Assessments

CR 1387664

CR 1387896

SDD-N3-82-4002, Standby Diesel Generator System Unit 1 / Unit 2 QA Record, Rev. 0025

Past Operability Evaluation Documentation for PER 1357258 dated January 13, 2018

Calculation MDQ0020262008-0219, Documentation of Design Basis Review, Required

Thrust Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-26-0243, Rev. 003

DS-M18.2.21, Motor Operated Valve Thrust and Torque Calculations, Rev. 24

Calculation EPMDL072992, Documentation of Design Basis Review, Required Thrust Torque Calculations and Valve and Actuator Capability Assessment for Valve 1-FCV-63-22, Rev. 007

NPG-SPP-09.26.14, Motor Operated Valve Program, Rev. 0003

Calculation MDN-000-999-2011-0178, WBN Probabilistic Risk Assessment – Risk Ranking of Motor Operated Valves (MOV), Rev. 002

Calculation QDQ0029992014000504, Material Aging Calculation for Units 1 and 2 Mechanical Equipment Qualification (Binder WBN-MEQ-001), Rev. 007

WBNEQ-MOT-001, Environmental Qualification Binder, Rev. 34

CR 1362431

0-TI-100.006, Inservice Testing Program, Rev. 0006

SDD-N3-32-4002, Compressed Air System Unit 1 & Unit 2 (QA Record), Rev. 0013

NPG-SPP-09.1.20, Inservice Testing Program Requirements, Rev. 0001

Calculation MDQ1032000056, Determination of Containment Pressure Versus Time Due to Control Air Line Breaks Inside Containment After a LOCA, Rev. 009

Prompt Determination of Operability Documentation for CR 1362431, Rev. 1
Drawing 0-47W848-1, Rev. 0

Section 1R19: Post Maintenance Testing

WO 119260419
WO 119313870
WO 119313859
WO 118740257
0-SI-82-11-A, Monthly Diesel Generator Start and Load Test DG 1A-A, Rev. 0051
CR 1385366
WO 119390050
2-SI-3-907-B, Valve Position Indication Verification (Train B) Auxiliary Feedwater System, Rev. 0007
PM Work Instructions, Unit 0, 1, & 2, Routine Inspection and Maintenance of Limitorque Motor Actuators; PM # M1380V, Rev. 3
WO 116928634
0-MI-0.013, Air Operated Valve Maintenance and Setup, Rev. 0005
WO 05-823363-000
WO 05-815300-000
CR 1402954
0-SI-82-20-B, 184 Day Fast Start and Load Test DG 2B-B, Rev. 0028

Section 1R22: Surveillance Testing

WO 118720015
WO 119314628
WO 119421321
0-SI-82-2, 8 Hour Diesel Generator AC Power Source Operability Verification, Rev. 0026
2-SI-0-2B-01, 0700-1900 Shift and Daily Surveillance Log Mode One, Rev. 0017
CR 1368504
0-SI-82-14, 24 Hour Load Run - DG 1B-B, Rev. 0023
0-SI-82-14, 24 Hour Load Run - DG 1B-B, Urgent Change 1, March 14, 2018
WO 117979682
0-IMI-200, Periodic Calibration of Plant Instrumentation and Control Equipment, Rev. 0001
WO 118802128
WO 118801903
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WO 118801904
WO 119408665
WO 118802130
WO 118121543
2-SI-70-915-A, Component Cooling System Pump 2A-A Preservice Pump Test, Rev. 0007
NPG-SPP-09.1.21, Inservice Testing Program Evaluations and Reference Valves, Rev. 0000
WO 118121543
2-SI-70-914-A, Component Cooling System Pump 2A-A Comprehensive Pump Test, Rev. 0004
2-SI-70-914-A, Component Cooling System Pump 2A-A Comprehensive Pump Test, Rev. 0006
2-SI-70-914-A, Component Cooling System Pump 2A-A Comprehensive Pump Test, Rev. 0003
2-SI-70-914-A, Component Cooling System Pump 2A-A Comprehensive Pump Test, Rev. 0005
2-SI-70-914-A, Component Cooling System Pump 2A-A Comprehensive Pump Test, Rev. 0007
WO 118721501

1-SI-3-903-B, Valve Full Stroke Exercising During Plant Operation Auxiliary Feedwater (Train B), Rev. 0026
Drawing 0-47W803-2, Flow Diagram Auxiliary Feedwater, R3
0-47W848-10, Mechanical Flow Diagram Control Air, R0
NPG-SPP-03.4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting, 10CFR50.65, Rev. 0003
0-TI-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10CFR50.65, Rev. 0008
Tennessee Valley Authority Watts Bar Technical Specifications Bases, Rev. 141
Tennessee Valley Authority Watts Bar Technical Specifications, Amendment 118

Section 1EP6: Drill Evaluation

2018 Watts Bar Nuclear Training Drill Binder dated January 9, 2018
2018 Watts Bar Nuclear Training Drill Binder dated March 21, 2018
CRs 1399122, 1399123, 1399124, 1399126, 1399128, 1398427

Section 4OA1: Performance Indicator Verification

NPG-SPP-02.2, Performance Indicator Program, Rev. 0010
1-SI-68-28, Primary Radiochemistry Requirements, Rev. 0026
2-SI-6828, Primary Radiochemistry Requirements, Rev. 0003
CM-7.17, Preparation of Samples for Degassed Liquid Activity Determination, Rev. 0011
CM-9.81, Operation of the ORTEC Countroom Computer System, Rev. 0008

Section 4OA3: Followup of Events, LERs, and NOEDs

CR 1291140
CR 1202231
CR 1294133
0-SI-82-6, 18 Month Loss of Offsite Power with Safety Injection Test-DG 2B-B, Rev. 47
NPG-SPP-22.205, Technical Human Performance Tools, Rev. 3
CR 1362001-004
CR 1362001-005
2-GO-1, Unit Startup from Cold Shutdown to Hot Standby, Rev. 20
NPG-SPP-22.206, Verification Program, Rev. 4
2-GO-6, Unit Shutdown from Hot Standby to Cold Shutdown, Rev. 10
CR 1362001
Unit 2 Bit Flow During 2B BO Test Prompt Investigation
Unit 2 Operations Log dated November 26, 2017
CRs 131639, 1319469, 1331422
DCN 62151
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ERCW Log Review OCR
CRs 1174000, 1172114, 1131256, 1164837, 1169297
Training and Development Attendance Record for 3-OT-TSO300
Case Study Training 3-OT-TSO3000, TS 3.0 Limiting Condition for Operation Applicability
CR 1174000
Validation Document Package for LER 2016-009-00, -01
CRs 1307486, 1307365, 1335984
CR 1163431

Leonard D Wert, Jr., Watts Bar Nuclear Plant, Unit 2 – Full Transition to the Reactor Oversight Process and Assessment Letter – Docket Number 50-0391, dated November 21, 2016, ADAMS Accession Number ML16326A210
0-SI-82-6, 18 Month Loss of Offsite Power with Safety Injection Test- DG 2B-B, Rev. 47
NPG-SPP-22.205, Technical Human Performance Tools, Rev. 3
CR 1362001-004, BIT Human Performance Alert dated November 26, 2017
CR1362001-005, Formal Disciplinary Action
2-GO-1, Unit Startup from Cold Shutdown to Hot Standby, Rev. 20
NPG-SPP-22.206, Verification Program, Rev.4
2-GO-6, Unit Shutdown from Hot Standby to Cold Shutdown, Rev. 10
CR 1362001, Unexpected BIT flow during performance of 0-SI-82-6
Unit 2 Bit Flow During 2B BO Test Prompt Investigation
Unit 2 Operations Log dated November 26, 2017
Letter from TVA to NRC documenting the cancellation of LER 390/2017-015-00 dated February 28, 2018
Past Operability Evaluation Documentation for PER 1357258 dated January 31, 2018
CR 1335791, WO to Correct 2-FCO-30-108 Not Fully Closing dated September 6, 2017
TI-65, Breaching the Containment Annulus, ABSCE, or MCRHZ Pressure Boundaries, Rev. 27
Control Room Log Entries from June 28, 2017; August 10, 2017; and September 4-7, 2017
WO 19015649
0-MI-0.038, Maintenance and Rework of NAMCO Series EA740 Limit Switches, Rev. 4
Equipment Apparent Cause Evaluation (EACE) for CR 1247701
TRM 3.4.5, Piping System Structural Integrity
CR 1247701
Operating Logs dated January 4, 2017, and January 5, 2017
CR 1294133
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Performance Analysis Worksheet dated June 1, 2017
Organizational Effectiveness Checklist dated June 7, 2017
TS Surveillance Requirements ECCS – Operating 3.5.2, Amendment 43