



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

February 11, 2021

EA-19-092, EA-20-143

Mr. Jim Barstow
Vice President Nuclear Regulatory Affairs & Support Services
Tennessee Valley Authority
1101 Market Street, LP 4A-C
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR – INTEGRATED INSPECTION REPORT 05000390/2020004,
05000391/2020004, 07201048/2020002, AND EXERCISE OF ENFORCEMENT
DISCRETION**

Dear Mr. Barstow:

On December 31, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Watts Bar. On January 28, 2021, the NRC inspectors discussed the results of this inspection with Mr. Anthony Williams and other members of your staff. The results of this inspection are documented in the enclosed report.

Two findings of very low safety significance (Green) are documented in this report. Two of these findings involved violations of NRC requirements. One Severity Level IV violation without an associated finding is documented in this report. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance or severity of the violations documented in this inspection report, 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; and the NRC Resident Inspector at Watts Bar.

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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Thomas A. Stephen, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket Nos. 05000390, 05000391, and 07201048
License Nos. NPF-90 and NPF-96

Enclosure:
As stated

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SUBJECT: WATTS BAR – INTEGRATED INSPECTION REPORT 05000390/2020004, 05000391/2020004, 07201048/2020002, AND EXERCISE OF ENFORCEMENT DISCRETION dated February 11, 2021

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OFFICE	RII/DRP	TCC	RII/DRP	RII/DRP	
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DATE	02/10/2021	02/10/2021	02/10/2021	02/11/2021	

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Numbers: 05000390, 05000391, and 07201048

License Numbers: NPF-90 and NPF-96

Report Numbers: 05000390/2020004, 05000391/2020004, and 07201048/2020002

Enterprise Identifier: I-2020-004-0051 and I-2020-002-0082

Licensee: Tennessee Valley Authority

Facility: Watts Bar

Location: Spring City, TN 37381

Inspection Dates: September 01, 2020 to December 31, 2020

Inspectors: A. Butcavage, Reactor Inspector
P. Capehart, Senior Operations Engineer
W. Deschaine, Senior Resident Inspector
C. Fontana, Emergency Preparedness Inspector
N. Lacy, Operations Engineer
M. Magyar, Reactor Inspector
K. Miller, Resident Inspector
A. Nielsen, Senior Health Physicist
W. Pursley, Health Physicist
S. Sanchez, Senior Emergency Preparedness Insp
D. Simpkins, Sr. Tech Training Program Specialist
R. Taylor, Senior Project Engineer
J. Walker, Emergency Response Inspector

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

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Watts Bar, 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.

List of Findings and Violations

Failure to perform an 50.59 evaluation for a change in calculational methodology			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Not Applicable	NCV 05000391/2020004-01 Open/Closed	Not Applicable	71111.08P
The inspectors identified a Severity Level IV violation of 10 CFR 50.59 for the licensee's failure to perform a written 50.59 evaluation in order to determine acceptability of using an alternate Probability of Detection (POD) value to calculate Steam Generator (SG) tubing burst probabilities following the application of GL 95-05, Alternate repair criteria for SG tubing. This represented a change in calculational methodology and therefore should have been evaluated under 50.59.			

Failure to follow GOI 1-GO-1, during a reactor startup of Unit 1			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000390/2020012-03 Closed EA-19-092	None (NPP)	71152
The inspector identified a Green finding and associated non-cited Violation for the licensee's failure to follow Plant Operating Procedure 1-GO-1 when the Shift Manager authorized Watts Bar Unit 1 to transition from Mode 5 to Mode 4 without normal let-down in service and subsequently continued with 1-GO-1 start-up activities.			

Failure to follow GOI 1-GO-2, while conducting a start-up of Unit 1			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000390/2020012-01 Closed EA-19-092	None (NPP)	71152
The inspector identified a Green finding and associated non-cited violation for the licensee's failure to follow Plant Operating Procedure 1-GO-2, while conducting a start-up of Unit 1. Specifically, the Main Control Room (MCR) operators maintained the Steam Generator (SG) levels on program using the Standby Main Feedwater Pump, to facilitate performance testing and inspection of feedwater valves, instead of using the Auxiliary Feed Water (AFW) pumps as required by procedure.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
EDG	EA-20-143	Failure to Comply with 10 CFR 37 for the Protection of Disused Steam Generators Stored in a Concrete Mausoleum	71124.08	Closed
LER	05000390,05000391/2020-003-00	LER 2020-003-00 for Watts Bar, Unit 1, Control Room Emergency Ventilation System Inoperable due to Main Control Room Door Being Left Open	71153	Closed
LER	05000391/2020-001-00	LER 2020-001-00 for Watts Bar Nuclear Plant, Unit 2, Control Room Emergency Ventilation System Inoperable due to Main Control Room Door Being Left Open	71153	Closed
LER	05000390,05000391/2019-001-00	LER 2019-001-00 for Watts Bar, Unit 1, Control Room Emergency Ventilation System Inoperable due to Main Control Room Door Being Left Open.	71153	Closed
LER	05000390,05000391/2019-004-00	LER 2019-004-00 for Watts Bar Nuclear Plant, Units 1 and 2, Control Room Emergency Ventilation System Inoperable due to Main Control Room Door Being Left Open	71153	Closed
AV	05000390/2020012-01	AV No. 1 Failure to follow GOI 1-GO-2, while conducting a start-up of Unit 1	71152	Closed
AV	05000390/2020012-03	AV No. 3 Failure to follow GOI 1-GO-1, during a reactor startup of Unit 1	71152	Closed

PLANT STATUS

Unit 1 operated at or near rated thermal power (RTP) from the beginning of the inspection period until October 26, when it was reduced to 12 percent reactor thermal power (RTP) to repair the turbine governor valves. The unit was returned to 100 percent power on October 31, where it remained for the remainder of the inspection period.

Unit 2 operated at or near RTP from the beginning of the inspection period until October 25, when it was shut down for a planned refueling outage. The unit remained in the outage until it was restarted on November 19 and the unit was placed on hold at 90 percent RTP on November 26 due to steam generator degradation. The unit remained at 90 percent RTP for the remainder of the reporting 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.

Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time the resident inspectors performed periodic site visits each week, increasing the amount of time on site as local COVID-19 conditions permitted. As part of their onsite activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; observed risk significant activities; and completed on site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Seasonal Extreme Weather Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal cold temperatures for the following systems:
 - Battery Rooms
 - Main Steam Vault Rooms

Impending Severe Weather Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from impending severe weather of high winds and heavy rain on October 27-28, 2020.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

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

- (1) Unit 2 Residual Heat Removal System on October 28, 2020.
- (2) Spent Fuel Pool Cooling System during core empty period for U2R3 on November 4, 2020.
- (3) Unit 2 Safety Injection A Train on December 4, 2020.
- (4) Unit 2 Auxiliary Feedwater System on December 7, 2020.

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated system configurations during a complete walkdown of the 125V DC system on December 29, 2020.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Unit 2 Reactor Building Lower/Upper Containment on October 29, 2020
- (2) Auxiliary Building, elevation 692', on November 12, 2020
- (3) Auxiliary Building, elevation 757', 125V Vital Battery Board Rooms I-IV on November 18, 2020
- (4) Auxiliary Building, elevation 757', Auxiliary Control Room & Aux Control Instrument Rooms 1A/B & 2A/B on November 18, 2020
- (5) Auxiliary Building, elevation 713', on November 13, 2020
- (6) Auxiliary Building, elevation 782', Unit 1 Control Rod Drive Equipment Room & Pressurizer Heater Transformer Room on November 18, 2020

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

- (1) Auxiliary Building on elevation 676' (Units 1 and 2 RHR pump rooms and Containment Spray pump rooms)

71111.08P - Inservice Inspection Activities (PWR)

PWR Inservice Inspection Activities Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated pressurized water reactor non-destructive testing by reviewing the following examinations from October 26 – 29, 2020:
 1. Ultrasonic Testing (UT)
 - a. MRP-146-CL-1, Pipe to Nozzle Configuration, ASME Class 1 (reviewed)
 - b. WP-01, Pressurizer Lower Head to Shell, ASME Class 1 (reviewed)
 2. Magnetic Particle Testing (MT)
 - a. 2-067G-TO44-33 C0R0, Pipe to Elbow, ASME Class 3 (reviewed)
 - b. 2-082C-T002-2 C0R0, Pipe to Reducer, ASME Class 3 (reviewed)
 3. Visual Examination (VT)
 - a. WBN-2-LOV-067-0936B-B, Valve and associated piping, ASME Class 3 (reviewed)
 - b. Reactor vessel closure head outer surface, Bare metal visual exam (reviewed)
 4. Pressurized-Water Reactor Steam Generator Examination Activities.

Tube Eddy Current Testing (ET)

- a. SG, ET, (Observed) Tubes in SG-4 SG- 3 ROW 12, COL 54, ASME Class 1
- b. Review of CR 1651444, U2 Steam Generator #3 Tube Indication

Secondary Side Examinations

- a. Reviewed CR's 1650366, 1649498 and 1648953, Secondary Side FOSAR Indications

The Inspectors also evaluated the licensee's boric acid corrosion control program performance.

71111.11A - Licensed Operator Requalification Program and Licensed Operator Performance

Requalification Examination Results (IP Section 03.03) (1 Sample)

- (1) The licensee completed the annual requalification operating examinations required to be administered to all licensed operators in accordance with Title 10 of the *Code of Federal Regulations* 55.59(a)(2), "Requalification Requirements," of the NRC's "Operator's Licenses." During the week of December 21, 2020, the inspector performed an in-office review of the overall pass/fail results of the individual operating examinations and the crew simulator operating examinations in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program." These results were compared to the thresholds established in Section 3.02, "Requalification Examination Results of IP 71111.11.

The inspectors reviewed and evaluated the licensed operator examination failure rates for the requalification annual operating exam completed on September 25, 2020.

71111.11B - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Requalification Program (IP Section 03.04) (1 Sample)

The licensee completed the annual requalification operating examinations required to be administered to all licensed operators in accordance with Title 10 of the *Code of Federal Regulations* 55.59(a)(2), "Requalification Requirements," of the NRC's "Operator's Licenses." During the week of September 28, 2020, the inspector performed an in-office review of the overall pass/fail results of the individual operating examinations, the crew simulator operating examinations, and the biennial written examinations in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program." These results were compared to the thresholds established in Section 3.02, "Requalification Examination Results," of IP 71111.11

(1) Biennial Requalification Written Examinations

The inspectors evaluated the quality of the licensed operator biennial requalification written examination administered on November 25, 2019.

Annual Requalification Operating Tests

The inspectors evaluated the adequacy of the facility licensee's annual requalification operating test.

Administration of an Annual Requalification Operating Test

The inspectors evaluated the effectiveness of the facility licensee in administering requalification operating tests required by 10 CFR 55.59(a)(2) and that the facility licensee is effectively evaluating their licensed operators for mastery of training objectives.

Requalification Examination Security

The inspectors evaluated the ability of the facility licensee to safeguard examination material, such that the examination is not compromised.

Remedial Training and Re-examinations

The inspectors evaluated the effectiveness of remedial training conducted by the licensee, and reviewed the adequacy of re-examinations for licensed operators who did not pass a required requalification examination.

Operator License Conditions

The inspectors evaluated the licensee's program for ensuring that licensed operators meet the conditions of their licenses.

Control Room Simulator

The inspectors evaluated the adequacy of the facility licensee's control room simulator in modeling the actual plant, and for meeting the requirements contained in 10 CFR 55.46.

Problem Identification and Resolution

The inspectors evaluated the licensee's ability to identify and resolve problems associated with licensed operator performance.

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the Control Room during Unit 2 reactor shutdown and start-up activities on October 23 and November 18, 2020.

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated the annual licensed operating exams in the simulator for Crew B on October 7th and 8th, 2020. Together, these observations make up one sample.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

- (1) System 63-D - Cold Leg Accumulators (Unit 2 CLA# 4)
- (2) System 88 - Primary Containment Integrity (Local Leak Rate Testing failures)

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Unit 2 Testing and Setpoint Adjustment of Main Steam Safety Valves on October 20-21, 2020.
- (2) Unit 2 ESF Blackout testing & Mode 5/6 activities during the week of October 25th, 2020.

- (3) Unit 2 risk assessment for performance of RCS drain down to mid-loop to support removal of steam generator nozzle dams and installation of steam generator primary manway covers. RCS level was restored above elevation 722 feet on November 10, 2020 at 1053, reducing Overall Station Risk from an Orange to a Yellow Risk Condition.

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (9 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) No oil in 2A Motor Driven Auxiliary Feedwater Pump Inboard Bearing (CR 1647083)
- (2) 2A Safety Injection Pump room cooler flow indicator failed (CR 1645791)
- (3) Pressurizer Level Indicator (1-LI-68-335A) is approaching Max Channel Deviation (CR 1646091)
- (4) Unit 2 Main Steam PORV failed stroke time testing (CR 1652141)
- (5) Unit 2 Turbine Driven AFW pump trip and throttle valve cannot be reset with electric controls (CR 1652929)
- (6) Unit 1 Evaluation of Silt found during performance of TI-67.004 Component Flow Debris testing on the B train ERCW system (CR 1657339)
- (7) Unit 1 Evaluation of borated water leak on a safety injection system isolation valve (1-ISIV-063-0307E/H) (CR 1658710)
- (8) Unit 2 Component Cooling Water leak on the 2A-A Centrifugal Charging Pump gear oil cooler (CR 1638175)
- (9) Unit 2 Unexpected alarm on the containment sump to 2B RHR valve (2-FCV-63-73) (CR 1629451)

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the following post maintenance test activities to verify system operability and functionality:

- (1) Work Order 121612977, Replaced the 2301A Woodward Governor Control Unit on DG 2B-B. During performance of monthly surveillance test 0-SI-82-12-B on November 1, 2020, DG 2B-B auto-tripped on protection actuation relays. The load sharing speed control unit was replaced on November 3, 2020 and PMT was completed (performance of fast-start surveillance test 0-SI-82-20-b) on November 4, 2020.
- (2) Work Order 120729130, Routine inspection and maintenance of the Limitorque motor actuator on 2-MVOP-067-0133A, Upper Containment Vent Cooler 2C Supply Isolation Valve. WO 120729136 (2-SI-67-701-A, Appendix D) was completed for the PMT on November 9, 2020.
- (3) Work Order 121711952, Corrective maintenance following a failure of the 1-IV Vital Inverter on November 5, 2020. The cause of the failure was determined to be a loose wire on the circuit that turns off the Gate circuit. The problem was corrected and a load bank test (using 1-SOI-235.4 and 0-MI-235.002) was completed for the PMT on November 5, 2020.

- (4) Work Order (WO) 120727742, SG 1 Main Steam Header Pressure Relief Control Valve, Replace Actuator Diaphragm and Regulator for 2-MVOP-001-0005-T, was field complete on 11/11/2020. WO 120742370 completed AOV Cat 1 diagnostic testing IAW MMTP-154 on November 13, 2020. WO 120739067, 2-SI-1-902-A, Valve Full Stroke Exercising During Cold Shutdown – Main Steam (Train A) was completed for the PMT on November 17, 2020.
- (5) Work Order (WO) 120738818, 2-SI-74-905-B Residual Heat Removal Pump 2B-B Comprehensive Test performed as a PMT on November 5, 2020, for RHR Pump 2B maintenance conducted during U2R3.
- (6) Work Order (WO) 120725088, Performed Static Diagnostic Testing (PM) of the Limitorque Motor Actuator on 2-MVOP-001-0051-S, AFW Pump Turbine Stop Valve. During this testing the thrust was determined to be approximately 35% lower than baseline data. CR 1651755 was initiated to address the condition. Troubleshooting determined that the cause of the problem was likely inadequate lubrication (grease) practices on the stem block coupling. New grease was pushed through the coupling block and retesting verified adequate stem torque and thrust. WO 120738575 (2-SI-3-902, Turbine Driven Auxiliary Feedwater Pump 2A-S Quarterly Performance Test) was completed for the PMT on November 19, 2020.

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated refueling outage U2R3 activities from October 23 to November 17, 2020.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

- (1) WO 120738856, 0-SI-82-5, Loss of Offsite Power with Safety Injection - DG 2A-A, Revision 55
- (2) 2-SI-63-917, Testing of Cold Leg Accumulator Check Valves, Revision 2, on October 28, 2020
- (3) 2-SI-74-905-A, Residual Heat Removal Pump 2A-A Comprehensive Test During Refueling Outages, on November 5, 2020

Inservice Testing (IP Section 03.01) (1 Sample)

- (1) 2-SI-63-907, Residual Heat Removal Hot Leg and Cold Leg Injection Check Valve Testing During Refueling Outages, Revision 14, on October 28, 2020

Containment Isolation Valve Testing (IP Section 03.01) (1 Sample)

- (1) Work Order 120739006, Surveillance Instruction 2-SI-52-701, Containment Isolation Valve Local Leak Rate Test System Test Facility, Revision 0002.

Ice Condenser Testing (IP Section 03.01) (1 Sample)

- (1) Work Order (WO) 120739006, Surveillance Instruction 2-SI-61-5, 18 Month Ice Condenser Lower Inlet Doors Inspection, Revision 0003

71114.02 - Alert and Notification System Testing

Inspection Review (IP Section 02.01-02.04) (1 Sample)

- (1) The inspectors evaluated the maintenance and testing of the alert and notification system during the week of November 16, 2020.

71114.03 - Emergency Response Organization Staffing and Augmentation System

Inspection Review (IP Section 02.01-02.02) (1 Sample)

- (1) The inspectors evaluated the readiness of the Emergency Response Organization during the week of November 16, 2020.

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

- (1) The inspectors evaluated submitted Emergency Action Level, Emergency Plan, and Emergency Plan Implementing Procedure changes during the week of November 16, 2020. This evaluation does not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness

Inspection Review (IP Section 02.01 - 02.11) (1 Sample)

- (1) The inspectors evaluated the maintenance of the emergency preparedness program during the week of November 16, 2020.

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated how the licensee identifies the magnitude and extent of radiation levels and the concentrations and quantities of radioactive materials and how the licensee assesses radiological hazards.

Instructions to Workers (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated radiological protection-related instructions to plant workers.

Contamination and Radioactive Material Control (IP Section 03.03) (3 Samples)

The inspectors evaluated licensee processes for monitoring and controlling contamination and radioactive material.

- (1) Observed radiation protection surveys of potentially contaminated material leaving the RCA at the control point during the unit 2 outage.
- (2) Observed RP surveys of materials being removed from lower containment at the step off pad during the unit 2 outage.
- (3) Observed workers exiting the contaminated areas at the upper and lower containment step off pads during the unit 2 outage.

Radiological Hazards Control and Work Coverage (IP Section 03.04) (4 Samples)

The inspectors evaluated in-plant radiological conditions during facility walkdowns and observation of radiological work activities.

- (1) Steam generator eddy current testing under RWP 20250067. This work involved Alpha Level II controls, high contamination levels and respiratory protection
- (2) Steam generator platform decontamination under RWP 20250062. This work involved Alpha Level II controls and high levels of beta/gamma contamination.
- (3) Decontamination efforts inside lower containment after flooding from upper containment on RWP #20250012. This work involved high contamination levels and wet conditions.
- (4) Reactor head work on top side on the canopy seal welds RWP #20260012. This work involved high dose rates and contamination levels.

High Radiation Area and Very High Radiation Area Controls (IP Section 03.05) (4 Samples)

The inspectors evaluated licensee controls of the following High Radiation Areas and Very High Radiation Areas:

- (1) Radwaste building High Rad Trash Cage.
- (2) Radwaste building LHRA access to demineralizer room.
- (3) Locked High Radiation Area access to the Tritiated Drain Collector Tank Room.
- (4) Locked High Radiation Area access areas on the Unit 2 steam generator manways.

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 03.06) (1 Sample)

- (1) The inspectors evaluated radiation worker and radiation protection technician performance as it pertains to radiation protection requirements.

71124.08 - Radioactive Solid Waste Processing & Radioactive Material Handling, Storage, & Transportation

Radioactive Material Storage (IP Section 03.01) (1 Sample)

- (1) Inspectors evaluated the licensee's performance in controlling, labelling and securing radioactive materials.

Radioactive Waste System Walkdown (IP Section 03.02) (1 Sample)

- (1) Inspectors walked down accessible portions of the solid radioactive waste systems and evaluated system configuration and functionality.

Waste Characterization and Classification (IP Section 03.03) (2 Samples)

The inspectors evaluated the licensee's characterization and classification of the following radioactive waste streams.

- (1) 2019 CVCS Resin
- (2) 2019 Filters

Shipping Records (IP Section 03.05) (3 Samples)

The inspectors evaluated the following non-excepted radioactive material shipments through a record review:

- (1) WBN-18-04, Type B, Resin
- (2) WBN-19-04, Type B, Filters
- (3) WBN-20-107, LSA, DAW

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

EP01: Drill/Exercise Performance (IP Section 02.12) (1 Sample)

- (1) EP01: Drill & Exercise Performance for the period October 1, 2019, through September 30, 2020.

EP02: ERO Drill Participation (IP Section 02.13) (1 Sample)

- (1) EP02: Emergency Response Organization Drill Participation for the period October 1, 2019, through September 30, 2020.

EP03: Alert & Notification System Reliability (IP Section 02.14) (1 Sample)

- (1) EP03: Alert & Notification System Reliability for the period October 1, 2019, through September 30, 2020.

MS05: Safety System Functional Failures (SSFFs) Sample (IP Section 02.04) (2 Samples)

- (1) Unit 1 (July 1, 2019 through September 30, 2020)
- (2) Unit 2 (July 1, 2019 through September 30, 2020)

MS06: Emergency AC Power Systems (IP Section 02.05) (2 Samples)

- (1) Unit 1 (April 1, 2019 through September 30, 2020)
- (2) Unit 2 (April 1, 2019 through September 30, 2020)

MS07: High Pressure Injection Systems (IP Section 02.06) (2 Samples)

- (1) Unit 1 (July 1, 2019 through September 30, 2020)
- (2) Unit 2 (July 1, 2019 through September 30, 2020)

MS08: Heat Removal Systems (IP Section 02.07) (2 Samples)

- (1) Unit 1 (April 1, 2019 through September 30, 2020)
- (2) Unit 2 (April 1, 2019 through September 30, 2020)

MS09: Residual Heat Removal Systems (IP Section 02.08) (2 Samples)

- (1) Unit 1 (April 1, 2019 through September 30, 2020)
- (2) Unit 2 (April 1, 2019 through September 30, 2020)

MS10: Cooling Water Support Systems (IP Section 02.09) (2 Samples)

- (1) Unit 1 (July 1, 2019 through September 30, 2020)
- (2) Unit 2 (July 1, 2019 through September 30, 2020)

BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 02.10) (2 Samples)

- (1) Unit 1 (January 1, 2019 through September 30, 2020)
- (2) Unit 2 (January 1, 2019 through September 30, 2020)

BI02: RCS Leak Rate Sample (IP Section 02.11) (2 Samples)

- (1) Unit 1 (July 1, 2019 through September 30, 2020)
- (2) Unit 2 (July 1, 2019 through September 30, 2020)

OR01: Occupational Exposure Control Effectiveness Sample (IP Section 02.15) (1 Sample)

- (1) 07/01/2019 - 09/30/2020

71152 - Problem Identification and Resolution

Semiannual Trend Review (IP Section 02.02) (1 Sample)

- (1) The inspectors reviewed the licensee's corrective action program for potential adverse trends in procedure use and adherence, temporary equipment control, configuration control that might be indicative of a more significant safety issue. None were identified during the past six months.

Annual Follow-up of Selected Issues (IP Section 02.03) (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

- (1) The inspectors conducted safety culture interviews with individuals from security, radiation protection, emergency preparedness, and maintenance during and prior to the most recent refueling outage on Unit 2. The inspectors concluded that employees interviewed appeared willing to raise nuclear safety concerns through at least one of the several means available without fear of retaliation.

71153 - Followup of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (4 Samples)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 390/2019-001-00 for Watts Bar Nuclear Plant, Units 1 and 2, Control Room Emergency Ventilation System Inoperable due to Main Control Room Door Being Left Open (ADAMS accession: ML19140A091.) The inspectors reviewed the LER and determined that the licensee complied with applicable requirements, Technical Specifications, and 50.73 reporting criteria. Therefore, no violation of NRC requirements occurred.
- (2) LER 390/2019-004-00 for Watts Bar Nuclear Plant, Units 1 and 2, Control Room Emergency Ventilation System Inoperable due to Main Control Room Door Being Left Open (ADAMS accession: ML20013D726.) The inspectors reviewed the LER and determined that the licensee complied with applicable requirements, Technical Specifications, and 50.73 reporting criteria. Therefore, no violation of NRC requirements occurred.
- (3) LER 391/2020-001-00 for Watts Bar Nuclear Plant, Unit 2, Control Room Emergency Ventilation System Inoperable due to Main Control Room Door Being Left Open (ADAMS accession: ML20197A177.) The inspectors reviewed the LER and determined that the licensee complied with applicable requirements, Technical Specifications, and 50.73 reporting criteria. Therefore, no violation of NRC requirements occurred.
- (4) LER 390/2020-003-00 for Watts Bar Nuclear Plant, Units 1 and 2, Control Room Emergency Ventilation System Inoperable due to Main Control Room Door Being Left Open (ADAMS accession: ML20254A015.) The inspectors reviewed the LER and determined that the licensee complied with applicable requirements, Technical Specifications, and 50.73 reporting criteria. Therefore, no violation of NRC requirements occurred.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

60855.1 - Operation of an Independent Spent Fuel Storage Installation at Operating Plants

Operation of an Independent Spent Fuel Storage Installation at Operating Plants (1 Sample)

- (1) The inspectors evaluated the licensee's activities related to long-term operation and monitoring of their independent spent fuel storage installation.

INSPECTION RESULTS

Failure to perform a 50.59 evaluation for a change in calculational methodology			
Cornerstone	Severity	Cross-Cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000391/2020004-01 Open/Closed	Not Applicable	71111.08P
<p>The inspectors identified a Severity Level IV violation of 10 CFR 50.59 for the licensee's failure to perform a written 50.59 evaluation in order to determine acceptability of using an alternate Probability of Detection (POD) value to calculate Steam Generator (SG) tubing burst probabilities following the application of GL 95-05, Alternate repair criteria for SG tubing. This represented a change in calculational methodology and therefore should have been evaluated under 50.59.</p>			
<p><u>Description:</u> On or about November 5, 2020, the Watts Bar Unit 2 (WB-2) responsible engineer for the Steam Generator (SG) Program contacted the NRC inspectors to discuss the preliminary evaluation of the most recent SG tube inspection results that failed to meet the condition monitoring requirements of the SG Inspection Program. The degradation mechanism of interest in the affected SG tubes was axially oriented outer diameter stress corrosion cracking located at the tube-to-tube support plate (TSP) intersections. For this type of degradation, the licensee's evaluation to determine how long the plant can operate prior to the tubes exceeding the applicable performance criteria is based on the application of voltage-based repair criteria using the methodology described in GL 95-05. During a discussion on the application of GL 95-05, the inspector was informed that the licensee intended to use a value of 1.0 for the Probability of Detection (POD) of outside diameter stress corrosion cracking (ODSCC) flaws in order to produce more satisfactory results.</p> <p>Following additional review of the applicable GL-95-05 documents, the NRC inspector noted that the GL 95-05 criteria, incorporated into the WB-2 SG Program by LAR No. 28, stipulated a POD of 0.6 is to be used in the probability of burst calculations unless an alternate value was developed and approved for use by the NRC. As noted by the WB-2 personnel, an alternate value of POD 1.0 was approved for use by the NRC at another facility, therefore WB-2 interpreted the approval at that facility to be generic to all similar licensees, including WB-2. Following additional discussions with the licensee and a review of Engineering Change EC-121736078, the inspectors identified that the licensee did not perform a 50.59 review for EC 121736078, which was initiated to support the use of a POD of 1.0 instead of 0.6, and therefore missed the opportunity to determine if NRC approval was required for use of an alternate value of the POD of 1.0 when calculating the probability of SG tube rupture during MSLB conditions.</p> <p>On or about November 10, the inspectors contacted subject matter experts in the NRC Office of Nuclear Reactor Regulation (NRR) to obtain clarification on the acceptability of the licensee's use of the alternate POD value of (1.0). Following additional reviews and discussions with the licensee concerning inspection specific details on the inspection results, for example, signal to noise ratios, the subject matter expert advised that the use of a POD of 1.0 would have been acceptable from a technical perspective, however, it would be based on a reduced operating cycle of approximately 180 days. At the request of the NRC Project Manager, the inspectors also received a preliminary legal opinion from the NRC Office of General Counsel on November 18 concerning the licensee's use of an alternate POD value</p>			

based on approval of the same value used at another licensee site. The legal opinion concluded that Watts Bar Unit 2 indeed need prior NRC approval via a license amendment for use of a POD of 1.0.

At the NRC exit meeting held on November 24, the inspectors identified a violation of 10 CFR 50.59 associated with the issue described above. After the NRC exit meeting, the licensee provided additional information on their rationale as to why a 50.59 was not required in this case. The rationale was because the use of the alternate value of POD of 1.0 had been previously approved at another similar facility. The licensee also quoted a section of IMC-0326, Section 08.04, "Use of Alternative Analytical Methods in Operability Determinations", which essentially allowed engineering judgment to be used for interim operability evaluations, provided that the final corrective action restored the component or deficiency to its required design basis condition. However, the NRC inspector noted that IMC 0326, Section 08.04(b)(1), states that if the analytic method in question is described in the CLB, the licensee should evaluate the situation-specific application of this method, including the differences between the CLB-described analyses and the proposed application in support of the OD process. IMC 0326 also states, in Section 08.04 (b)(2), that utilizing a new method because it has been approved for use at a similar facility does not alone constitute adequate justification. Inspectors also noted that the licensee was performing the evaluations of burst probabilities under the umbrella of the Steam Generator Program as part of required evaluations for probability of SG tubing burst probabilities following application of GL 95-05 Alternate Repair Criteria as part of the required Operational Assessment which has its own specific methodology and acceptance criteria, not an Operability Determination of IMC 0326.

Based on the above considerations, the inspector determined that the licensee was in violation of 10 CFR 50.59(d)(1) because the licensee had not performed an evaluation for EC-121736078. A 50.59 review and evaluation would have provided the licensee the opportunity to identify the need for NRC approval for use of an alternate value of the POD. The inspectors considered the failure of the licensee to perform a 50.59 review of EC121736078 as an apparent root cause of the performance deficiency.

Corrective Actions: The licensee entered the above concern in its corrective action program through:
CR 1654445, NRC Proposed violation of 10 CFR 50.59 related to use of POD of 1.0, 11/24/2020

Corrective Action References: CR- 1651444, U2 Steam Generator #3 Tube Indications, 11/11/2020
Event Notification 54994, 8-hour non-emergency notification was made to the NRC

Performance Assessment: The inspectors determined this violation was associated with a minor performance deficiency. In accordance with IMC 0612 Appendix B, all issues of concern are evaluated for applicability for both the Traditional Enforcement Process and Reactor Oversight Process (ROP).

This performance deficiency screens into traditional enforcement process because it adversely impacted the regulatory process.

Under the ROP, the performance deficiency involved the condition of the plant after the flaws were identified and repaired, and it did not result in a challenge to operability before the issue was identified and addressed. Also, the NRC agreed that the methodology used was technically appropriate for this application. Therefore, this issue screens out as a minor performance deficiency under the ROP.

Enforcement:

Severity: In accordance with the NRC Enforcement Policy a violation of 10 CFR 50.59 is characterized by evaluating the underlying condition using the ROP Significance Determination Process and then compared with the examples in the enforcement policy. The condition would be evaluated using IMC 0609 Appendix A, Significance Determination Process at Power.

The condition influences the likelihood of a Steam Generator Tube Rupture event; therefore, the initiating events cornerstone would be affected per IMC 0609 attachment 4 table 2 and would be routed to IMC 0609 Appendix A per table 4. Using IMC 0609 Appendix A Exhibit 1 Section D, questions D1 and D2 would be answered NO and the issue would screen to very low safety significance (Green). This is because the issue only affected accident condition calculations and acceptance criteria (question D2) and when the new probability of detection (POD) value is applied the operational assessment supported plant operation, albeit for less than a full cycle of operation as proposed by the licensee.

Following additional discussions with NRR subject matter experts, on several site specific issues, such as signal to noise ratios for specific WB-2 inspection parameters, the subject matter experts concluded that the NRC would have mostly likely approved the licensee use of the proposed alternate value of the POD of 1.0, (when combined with the later identified shorter run cycle) from a technical perspective had the licensee requested it. Therefore, the use of alternate value of POD of 1.0 results can be applied in this case when evaluating actual plant risk.

As such the condition is determined to be of very low safety significance and therefore meets the enforcement policy example of a Severity Level IV NCV.

Enforcement Action: This violation is being treated as an non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Enforcement Discretion	Enforcement Action EA-20-143: Failure to Comply with 10 CFR 37 for the Protection of Disused Steam Generators Stored in a Concrete Mausoleum	71124.08
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Description:

From September 11, 2006 to November 30, 2006, during a Unit 1 steam generator replacement outage, the licensee moved contaminated steam generators into a large concrete storage mausoleum outside the Protected Area. Although this waste material exceeded the threshold for a Category 1 quantity of radioactivity, it did not contain discrete radioactive sources, ion-exchange resins, or activated material that weighs less than 2,000 kg. Therefore, the steam generator waste is exempt from 10 CFR 37 Subparts B, C, and D, but must comply with the requirements of 10 CFR 37.11(c)(1) - 10 CFR 37.11(c)(4) instead. The inspectors noted that there was no monitored alarm system at the access point to the concrete mausoleum.

Corrective Actions:

The licensee entered the issue into their corrective action program.

Corrective Action References: CR 1650185

Enforcement:

Violation:

10 CFR 37.11(c)(2) requires that a Category 1 quantity of radioactive waste, that is exempt from Subparts B, C, and D, must be secured with a monitored alarm at the access control point. Contrary to this, from November 30, 2006 to the present, the licensee has stored a Category 1 quantity of exempt waste in a concrete mausoleum with no monitored alarm system at the access control point.

Basis for Discretion: This violation met the criteria for Enforcement Discretion as described in Enforcement Guidance Memorandum (EGM) 14-001, "Interim Guidance for Dispositioning 10 CFR Part 37 Violations with Respect to Large Components or Robust Structures Containing Category 1 or Category 2 Quantities of Material at Power Reactor Facilities Licensed Under 10 CFR Parts 50 and 52." For tracking purposes, this Enforcement Discretion is being documented as a Minor violation with associated Enforcement Action number EA-20-143.

Failure to follow GOI 1-GO-1, during a reactor startup of Unit 1

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000390/2020012-03 Closed EA-19-092	None (NPP)	71152

The inspector identified a Green finding and associated non-cited Violation for the licensee's failure to follow Plant Operating Procedure 1-GO-1 when the Shift Manager authorized Watts Bar Unit 1 to transition from Mode 5 to Mode 4 without normal let-down in service and subsequently continued with 1-GO-1 start-up activities.

Description: On May 17, 2019, the NRC's Office of Investigations completed an investigation into the circumstances of a Watts Bar Nuclear Plant (WBN) Unit 1 reactor startup occurring on November 11, 2015. The purpose of the investigation was to determine whether TVA employees deliberately submitted incomplete and inaccurate information to the NRC, and whether TVA employees deliberately violated plant procedures.

At the beginning of the dayshift (06:00) on November 11, 2015, WBN Unit 1 was in Mode 5 and in the process of a start-up in accordance with TVA General Operating Instruction (GOI) 1-GO-1 "Unit Startup from Cold Shutdown to Hot Standby." During the night shift on November 10-11, 2015, the WBN Unit 1 Main Control Room (MCR) operators had taken normal letdown out of service to allow repair of Valve 1-FCV-62-70. The Chemical and Volume Control System (CVCS) was in an abnormal line-up due to a clearance (1-62-0584-FO) governing this repair being issued and hung on the valve at 00:09 on November 11. The clearance contained a Mode 5/6 restriction, which was a safety precaution that was necessary for the valve repair work.

Per GOI 1-GO-1, "Unit Startup from Cold Shutdown to Hot Standby," the Shift Manager (SM) authorizes the change from Mode 5 to Mode 4. GOI 1-GO-1, Section 5.3, Step [22], states, "COMPLETE APPENDIX B, Mode 5-To-4 Review and Approval, to ensure all restraints to Mode 4 entry are resolved, and approvals for Mode change granted." The SM must initial that this step has been completed as a prerequisite for the MCR staff to continue with the startup procedure.

Step [3] of APPENDIX B, "Mode 5-To-4 Review and Approval," requires the operators to "ENSURE Checklist 1 COMPLETE for entry into Mode 4." Checklist 1, "System Alignment Verifications," refers to, among others, the Eves Charging and Letdown Valve Checklist (1-62.01-1V). Checklist 1-62.01-1V indicates that Valve 1-FCV-62-70 is normally in the "OPERABLE" position. While that valve was under repair, it was not "OPERABLE," and Clearance 1-62-0584-FO was in effect for status control during that time. As stated above, that clearance contained a Mode 5/6 restriction that prohibited entry into Mode 4.

On November 11, the SM initialed GOI 1-GO-1, Section 5.3, Step [22], indicating that all restraints to Mode 4 were resolved. At 09:30 the SM made the following entry in the Main Control Room (MCR) logs:

Completed a walkdown of the Main Control Room Control Boards IAW [in accordance with] OPDP-1 and Standing Order 15 8. All alarms are understood for current plant conditions. There are no issues identified from the board walkdown that precludes entry into M[ode] 4.

At 09:38, the SM made another log entry stating, "All requirements have been met for entry into M4. Permission granted to proceed from M5 to M4." Less than a minute later, the MCR operators entered GOI 1-GO-1, Section 5.4 and began to raise reactor coolant temperature to 205-210°F. At 09:54, the reactor reached Mode 4 (200°F) operation. At the time, the CVCS was not in the alignment prescribed in Checklist 1-62.01-1V and was not under the control of an approved alternate method of system status control valid for operation in Mode 4.

The SM had worked at WBN since 2000, had been licensed as a Senior Reactor Operator (SRO) at WBN since 2003, and had been a qualified shift manager since 2008. He had received training on TVA procedure NPG-OPDP-1, "Conduct of Operations," and TVA's clearance procedures numerous times, and described himself as a "subject matter expert on operations." When he came on duty on the morning of November 11, he received a shift turnover briefing from the outgoing SM, who told the incoming SM that the night shift crew did not move from Mode 5 to Mode 4 because normal letdown was out of service due to the valve repair. The incoming SM did a walkdown of the MCR boards with the outgoing SM, who was aware of the mode limitation that had been added to the clearance. After the walkdown, the incoming SM made a log entry indicating that he understood all plant conditions.

When Unit 1 entered Mode 4 on November 11, Residual Heat Removal (RHR) train B was in operation. Therefore, with the normal letdown flow path unavailable due to the valve repair, pressurizer level control was initially provided by excess letdown and RHR letdown. A log entry at 10:08 indicated that the crew was preparing for performance of 1-SI-0-905, "RHR Return Valve Leak Testing," which was listed as a critical path evolution for that day. Prior to performing that test, Section 5.4 of GOI 1-GO-1, Step [8.3], required the crew to place the RHR system in Emergency Core Cooling System (ECCS) Standby mode. Given the plant configuration that day, this step would remove RHR letdown from service and leave only excess letdown for pressurizer level control.

Log entries indicate that the MCR crew placed RHR in ECCS-Standby mode, securing the RHR pump and RHR suction Valves 1-FCV-74-1 and 1-FCV-74-2. With only excess letdown in service, the pressurizer level began to rise uncontrollably. The MCR operators attempted to control pressurizer level using secondary steam from the steam generators and concurrently reducing seal water flow to the reactor coolant pumps but were unsuccessful in arresting the pressurizer level rise. When the level reached 79 percent, the MCR operators reopened the RHR suction valves and placed RHR letdown back in service, which allowed the crew to

regain control of pressurizer level. When the crew took these steps, they did not restart the RHR pump.

TVA Acknowledged this violation during pre-decisional enforcement conference held between July 22-24, 2020.

Corrective Actions: TVA has taken extensive corrective actions to improve procedure use and adherence at WBN. In addition, TVA has completed Corrective Action to Preclude Repetition (CAPR) 1127691-028, which included the following:

- 1) Conducted case studies regarding the RHR event and other recent significant plant events and operational decisions with managers and supervisors. The case studies included the consequences of decisions and effects on nuclear safety culture and a discussion about the circumstances leading to the entry into Mode 4 with a Mode 5/6 restraint in place to familiarize personnel with the weaknesses that led to this mistake.
- 2) Revised OPS-SM-VP1 and OPS-SM-LM2 shift manager job familiarization guides to require WBN individuals to review root cause CR 1127691 and a discussion with the site vice president (OPS-SM-VP1) and operations manager (OPS-SM-LM2) regarding the need to use decision making that emphasizes prudent choices over those that are allowable. These discussions also emphasized that a proposed action is determined to be safe in order to proceed, rather than unsafe in order to stop.

TVA also revised WBN Operations Directive Manual (ODM) - 15, Operations Work Control Process, Appendix F, Clearance Development and Placement. In the Section, "Clearances That Will Result in Operational Limitations," the following requirements are now in place: For clearances which result in Operational limitations that are not directly controlled by clearance tags (i.e., clearance relies on a maintaining temperature, pressure, level, etc.):

*The required condition will be documented in the narrative logs.

*Operations will ensure that the WO is updated appropriately to reflect mode/condition restriction.

Corrective Action References: CR 1624008

Performance Assessment:

Performance Deficiency: The licensee's failure to follow 1-GO-1 was a performance deficiency. Specifically, the licensee transitioned from Mode 5 to Mode 4 when clearance 1-62-0584-FO, which contained a Mode 5/6 restriction, was still in effect.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Configuration Control attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, procedural requirements to ensure plant configuration for reactor startup were not followed and not otherwise properly deviated from. This resulted in an uncontrolled rise in pressurizer level with the operators taking actions outside of procedures to prevent the plant from inadvertently going solid.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Using the Initiating Events screening questions, it was determined to be of very low safety significance (Green) because the finding could not have resulted in exceeding the reactor coolant system (RCS) leak rate

for a small LOCA or likely affected other systems used to mitigate a LOCA, resulting in a total loss of their function.

Cross-Cutting Aspect: Not Present Performance. No cross-cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" 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.

TVA General Operating Instruction (GOI) 1-GO-1, "Unit Startup from Cold Shutdown to Hot Standby," Rev 4, provides instructions to perform a unit startup from Cold Shutdown Mode 5 (less than or equal to 200°F) to Hot Standby Mode 3 normal operating temperature and pressure.

GOI 1-GO-1, Section 5.3, Step [17.1] states, in part, "PRIOR to RCS heat-up above 200°F, PERFORM the following: ENSURE...any other clearance that would prohibit entry into Mode 4 has been restored as required."

GOI 1-GO-1, Section 5.3, Step [22], states, "COMPLETE APPENDIX B, Mode 5-To-4 Review and Approval, to ensure all restraints to Mode 4 entry are resolved, and approvals for Mode change granted." The SM must initial that this step has been completed as a prerequisite for the MCR staff to continue with the startup procedure.

GOI 1-GO-1, Step [3] of APPENDIX B, "Mode 5-To-4 Review and Approval," requires the operators to, "ENSURE Checklist 1 COMPLETE for entry into Mode 4." Checklist 1, "System Alignment Verifications," refers to, among others, the Chemical and Volume Control System (CVCS) Charging and Letdown Valve Checklist (1-62.01-1V). Checklist 1-62.01-1V indicates that Valve 1-FCV-62-70 is normally in the "OPERABLE" position.

Contrary to the above, on November 11, 2015, the licensee failed to follow GOI 1-GO-1 during a reactor startup by not ensuring Section 5.3 Steps [17] and [22] were properly completed prior to entering Mode 4. Specifically, Step [17] was marked as "N/A" without explanation or independent verification when, in fact, Clearance 1-62-0584-FO, which contained a Mode 5/6 restriction, was still in effect. Additionally, the Shift Manager initialed Section 5.3, Step [22], indicating that all restraints to Mode 4 entry had been resolved, when in fact all such restraints had not been resolved. In this case, Valve 1-FCV-62-70 was under repair and not in the "OPERABLE" position. As a result, the CVCS was in an abnormal line-up controlled by Clearance 1-62-0584-FO. The clearance contained a Mode 5/6 restriction, which was a safety precaution that was necessary for the valve repair work.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to follow GOI 1-GO-2, while conducting a start-up of Unit 1

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
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Mitigating Systems	Green NCV 05000390/2020012-01 Closed EA-19-092	None (NPP)	71152
<p>The inspector identified a Green finding and associated non-cited violation for the licensee's failure to follow Plant Operating Procedure 1-GO-2, while conducting a start-up of Unit 1. Specifically, the Main Control Room (MCR) operators maintained the Steam Generator (SG) levels on program using the Standby Main Feedwater Pump, to facilitate performance testing and inspection of feedwater valves, instead of using the Auxiliary Feed Water (AFW) pumps as required by procedure.</p>			
<p><u>Description:</u> On October 21, 2015, Watts Bar Unit 1 used the Standby Main Feed-water Pump (SBMFP) to supply feedwater during a reactor startup into Mode 2 contrary to the unit operating license and operating procedures. This was done to facilitate the performance of plant testing and continue unit start-up.</p> <p>Based on log entries and plant data, the following activities/events took place on October 21, 2015:</p> <ul style="list-style-type: none"> • 0100 - IAW 1-SOI-2&3.01 section 5.5 feed pump pressure up stream of check valves 1-CKV-3-669 AND 1-CKV-3-678 was established to allow System Engineer walkdown activities • 0101, all shutdown banks were withdrawn IAW 1-GO-2, Reactor Startup • 0320 - Withdrew all control banks IAW 1-GO-2, Reactor Startup, and 1-PET-201, Initial Criticality and Low Power Physics Testing • 0346 - Unit 1 in Mode 2 • 0357 – Operators commenced dilution of Unit 1 Reactor Coolant System to critical • 0510 - The SBMFP was secured and secondary side returned to modified long cycle <p>Use of the SBMFP during the 1-GO-2 startup of Watts Bar Unit 1 was performed over the objection of a MCR operator. The operator initially refused and stated it was not safe to perform the reactor startup using the SBMFP but was eventually given direction to proceed with the plant operation by the Shift Manager. 1-GO-2 has no allowance or procedural guidance for use of the SBMFP during reactor startup. 1-GO-2 prerequisites specifically require the Auxiliary Feed-water Pumps be used to maintain SG levels. Specific changes were made in years prior to GO-2, Reactor Startup, to prevent the SBMFP from being used during normal plant start-up or shutdown and no procedure changes were processed, or special procedures approved to facilitate the use of the SBMFP while performing this reactor start-up. Additionally, system design documents and training were correspondingly changed to identify that the SBMFP was not to be used during normal startup and shutdown.</p> <p>TVA Acknowledged this violation during a pre-decisional enforcement conference held between July 22-24, 2020.</p> <p>Corrective Actions: During the Watts Bar Unit 2 refueling outage in the spring of 2019, the need for additional guidance to establish the test conditions was identified during the pre-job briefing, and Watts Bar initiated CR 1516431, "U2R2 LL - 2-TRI-3-903 Contains Inadequate Guidance to Obtain System Test Alignment." As the initial response to the CR, a one-time procedure change was made to allow conduct of the surveillance in Mode 2, using the Turbine Driven Main Feed Pump to establish the test conditions for the system leakage test.</p> <p>CR 1516431 identifies two corrective steps that will resolve the issue of insufficient guidance</p>			

for the surveillance alignment:

1) Action 1516431-001, "Revise 1-TRI-3-903 to provide Guidance to Obtain System Test Alignment, and recover from, the correct system alignment in Mode 3 using the Standby Main Feedwater Pump."

2) Action 1516431-002 is to perform the similar revision to 2-TRI-3-903.

Corrective Action References: CR 1516431

Performance Assessment:

Performance Deficiency: The licensee's failure to follow 1-GO-2 was a performance deficiency. Specifically, operators maintained the SG levels on program using the SBMFP, to facilitate performance testing and inspection of feedwater valves, instead of using the AFW pumps as required.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Configuration Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, procedural requirements to ensure plant configuration for reactor startup were not followed and not otherwise properly deviated from. This resulted in the plant operating outside the requirements of GOI 1-GO-2. Additionally, this performance deficiency was associated with the Human Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective because even after the use of the SBMFW pump was objected to by a licensed operator and raised to supervisors, the prohibition of its use was not identified and properly addressed.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Using the Mitigating Systems screening questions, the finding was determined to be of very low safety significance (Green) because the AFW system was available during the subject time period.

Cross-Cutting Aspect: Not Present Performance. No cross-cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Watts Bar Nuclear (WBN) Plant Unit 1 Technical Specification (TS), Section 5.7.1, "Procedures," requires, in part, that written procedures shall be established, implemented, and maintained covering the following activities: "a. The applicable procedures recommended in Regulatory Guide 1.33, Revision 2." Nuclear Regulatory Commission (NRC) Regulatory Guide 1.33, Revision 2, "Quality Assurance Program Requirements," requires in Appendix A, 2., "General Plant Operating Procedures," a written procedure for plant operations for "Hot Standby to Minimum Load (nuclear startup)." WBN General Operating Instruction (GOI) 1-GO-2, "Reactor Startup," Revision 6, Section 4, "Prerequisites" [8], states, "MAINTAIN SG [Steam Generator] levels on program with AFW [Auxiliary Feedwater] pumps." Contrary to the above, on October 21, 2015, the licensee failed to follow GOI 1-GO-2, while conducting a start-up of Unit 1. Specifically, the Main Control Room (MCR) operators maintained the SG levels on program using the Standby Main Feedwater Pump, to facilitate performance testing and inspection of feedwater valves, instead of using the AFW pumps.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

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

- On January 28, 2021, the inspectors presented the integrated inspection results to Mr. Anthony Williams and other members of the licensee staff.
- On November 5, 2020, the inspectors presented the RP Inspection Exit meeting inspection results to Beth Jenkins and other members of the licensee staff.
- On November 17, 2020, the inspectors presented the ISI Exit Meeting inspection results to Anthony Williams, Site VP and other members of the licensee staff.
- On November 19, 2020, the inspectors presented the Emergency Preparedness Program inspection results to Mr. Anthony Williams and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Procedures	0-PI-OPS-1-FP	Freeze Protection	Revision 27
	Work Orders	121100281	Procedure 0-PI-OPS-1-FP, Freeze Protection	11/01/2020
		121161898	Procedure 0-PI-OPS-1-FP, Freeze Protection	12/02/2020
71111.04	Drawings	0-47W803-2	Flow Diagram auxiliary Feedwater	Revision 10
		0-47W855-1	Mechanical Flow Diagram Fuel Pool Cooling and Cleaning System	
		2-47W811-1	Flow Diagram - Safety Injection System	Revision 55
	Miscellaneous	SDD-N3-74-4001	Residual heat Removal System Description	Revision 19
		SDD-N3-79-4001	System Description - Fuel Handling and Storage System	
	Procedures	0-AOI-45	Loss of Spent Fuel Pool Level or Cooling	
		0-SOI-78.01	SFPCCS Valve Checklist	
		2-AOI-14	Loss of RHR Shutdown Cooling	Revision 0
		2-SOI-3.02	Auxiliary Feedwater System	Revision 11
		2-SOI-3.02 ATT 1H	Auxiliary Feedwater System Hand switch Checklist 2-3.02-1H	Revision 11
		2-SOI-3.02 ATT 1P	Auxiliary Feedwater System Power Checklist 2-3.02-1P	Revision 10
		2-SOI-3.02 ATT 1V	Auxiliary Feedwater System Valve Checklist 2-3.02-1V	Revision 11
		2-SOI-63.01	System Operating Instruction - Safety Injection System	Revision 20
		2-SOI-74.01	Residual Heat Removal System	Revision 17
71111.05	Fire Plans	AUX-0-692-02	WBN-PrefirePlan - Auxiliary Building, elevation 692'	
		AUX-0-757-02	WBN-PrefirePlan - Auxiliary Building, elevation 757'	
		AUX-0-757-02	WBN-PrefirePlan - Auxiliary Building, elevation 757', Auxiliary Control Room & Aux Control Instrument Rooms 1A/B & 2A/B	
		RXN-2-702-01	Reactor Building Lower Containment (702' EL)	Revision 3
		RXN-2-713-01	Reactor Building Lower Containment (724' and 744' EL)	Revision 1
		RXN-2-757-01	Reactor Building Upper Containment (763', 782', 801' EL)	Revision 2
		RXN-2-GENERAL	FCV/MOV Chart	Revision 1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.08P	Corrective Action Documents	CR-1447532	WBN-CEM-SA-18-003, Learning Opportunity Concerning Total Suspended Solids Sampling	10/26/18
	Corrective Action Documents Resulting from Inspection	CR- 1654445	NRC Proposed violation of 10 CFR 50.59 related to use of POD of 1.0	11/24/20
	Engineering Evaluations	LTR-CDMP-20-30	"Watts Bar U2R3 Fall 2020 Steam Generator Secondary Side Visual Inspection Plan," October 2020.	Rev. 0
		SG-CDMP-19-10	Watts Bar U2R2 Steam Generator Condition Monitoring and Operational Assessment	Rev. 0
		WB-2 Unit 2 Degradation Assessment	Watts Bar U2R3 Steam Generator Degradation Assessment	FINAL DRAFT NEED SIGNED
	Miscellaneous	CRP-ENG-SA-18-011	Self-Assessment Report	7/12/2018
		MRS-SSP, Appendix "A"	Procedure Acknowledgment Form, Equipment operators, Initial Procedure Review (prior to beginning acquisition activities)	11/1/20
		SGMS 2.2.1 GEN-011, Appendix 13.1	Inspection Criteria Summary	10/31/20
		SGMS 2.2.1 GEN-011, Appendix 13.2	Repair Criteria Summary	10/31/20
		SGMS 2.2.1 GEN-011, Appendix 13.3	Customer Approval Of Base Scope Inspection Plans	10/31/20
		TVA Watts Bar Unit-2	Technical Specifications	Amendment 41
		Watts Bar Nuclear Plant,	NRC Letter Regarding Technical specifications for Steam Generator Tube Repair Sleeve (EPID L-2019-LLA-0209)	8/10/2020

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		Unit Amendment 40 To Facility Operating License		
		WBN-CEM-SA-18-003	Self-Assessment Report	9/25/2018
	Procedures	2-MI-3.015	Steam Generator Secondary Side Maintenance Activities	Rev. 5
		Chapter 3.01	WBN, Chemistry Manual	Rev. 0126
		MRS-GEN-1127	Guideline for Steam Generator Eddy Current Data Quality Requirements	Rev. 16
		MRS-SSP-2448-WBT	Remote Examination and Removal of Foreign Objects from Steam Generator Secondary Side	Rev. 5
		SGMS 2.2.1 GEN-011	Steam Generator Data Management	Rev. 21
SGMS 2.2.1 GEN-011	Multifrequency Eddy Current Examination of Non-Ferromagnetic Steam Generator Tubing at Watts Bar Units 1 & 2 and Sequoyah Units 1 & 2	Rev. 2		
71111.11Q	Miscellaneous	3-OT-1039M	LOR Annual Operating Exam	Revision 0
		3-OT-SRE-1018	LOR Annual Operating Exam	Revision 7U1
71111.13	Miscellaneous	2-GO-10	Reactor Coolant System Drain and Fill Operations	16
		Safety Plan	Unit 2 Refuel Outage 3 Outage Safety Plan, Outage Start Date October 23, 2020	2
	Procedures	NPG-SPP-07.3	Work Activity Risk Management Process	Revision 26
		NPG-SPP-10.6	Infrequently Performed Test or Evaluations	2
	Work Orders	119317274, 120742647	Unit 2 Testing and Setpoint Adjustment of Main Steam Safety Valves Using Trevitest Equipment	10/21/2020
71111.15	Corrective Action Documents	1454816		
		1647083	No oil in 2A Motor Driven Auxiliary Feedwater Pump Inboard Bearing	
		1652929		
	Procedures	2-SI-3-902	Auxiliary Feedwater Pump 2A-S Quarterly Performance Test	Revision 14
	Work Orders	120739428	2-SI-1-906-A, Main steam valves position indication verification - train A	Revision 7

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71111.19	Corrective Action Documents	1648864	Condition Report	
		Condition Report	1649150, 1649756, 1644999	
	Drawings	2-47W810-1	Flow Diagram Residual Heat Removal System	
	Miscellaneous	0-MI-235.002	120 VAC Vital Inverter Automatic Transfer Test	8
		Surveillance Task Sheet	Surveillance Task Sheet WO (121720193, for 0-SI-82-20-B, 184 Day Fast Start and Load Test DG 2B-B (PMT completed November 2, 2020)	
	Procedures	2-SI-74-905-A	Residual Heat Removal Pump 2A-A Comprehensive Test During Refueling Outages	11/15/2020
	Work Orders	120729130	Routine Inspection and Maintenance of the Limitorque Motor Actuator on 2-MVOP-067-0133A, Upper Containment Vent Cooler 2C Supply Isolation Valve	
		120729136	2-SI-67-701-A, Appendix D, Containment Isolation Valve Local Leak Rate Test Train 2A Upper Compartment ERCW	2
		121612977	Replace the 2301A Woodward Governor Control Unit on DG 2B-B.	
		121711952	Troubleshoot the tripping of Inverter 1-INV-235-4-G	
71111.20	Procedures	1-TI-68.002	Containment Penetrations and Closure Control	Revision 3
		2-GO-1	Unit Startup from Cold Shutdown to Hot Standby	
		2-GO-2	Reactor Startup	
		2-GO-5	Unit Shutdown From 30% Reactor Power to Hot Standby	Revision 5
71111.22	Corrective Action Documents		CRs 1652053, 1652132, 1652281, 1652763, 1652721	
			CRs 1647252, 1647442, 1647585, 1647290	
			CR 1645949	
	Procedures	0-SI-82-5	Loss of Offsite Power with Safety Injection - DG 2A-A	Revision 55
		2-SI-63-907	Residual Heat Removal Hot Leg and Cold Leg Injection Check Valve Testing During Refueling Outages	Revision 14
		2-SI-63-917	Testing of Cold Leg Accumulator Check Valves	Revision 2
	Work Orders	120738856	Surveillance Instruction 0-SI-82-5, Loss of Offsite Power with Safety Injection - DG 2A-A,	55
		120739006	Surveillance Instruction 2-SI-61-5, 18 Month Ice Condenser Lower Inlet Doors Inspection	Revision 3

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		12742645	Surveillance Instruction 2-SI-52-701, Containment Isolation Valve Local Leak Rate Test System Test Facility	2
71124.01	Corrective Action Documents	CR 1206556		08/24/2016
		CR 1408474		04/24/2019
		CR 1649755		11/04/2020
		CR 1650039		11/04/2020
	Corrective Action Documents Resulting from Inspection	CR 1650010		11/04/2020
		CR 1650268		11/04/2020
	Procedures	NISP-RP-002	Radiation and Contamination Surveys	Rev. 0001
		NISP-RP-008	Use and Control of HEPA Filtration and Vacuum Equipment	Rev. 0001
		NPG-SPP-05.1	Radiological Controls	Revision 12
		NPG-SPP-22.207	Procedure Use and Adherence	Revision 8
		RCI-177	RADIOLOGICAL SUPPORT OF PRIMARY SIDE STEAM GENERATOR ACTIVITIES	Revision 0002
	Radiation Surveys	Air Sample Survey #021120214	Unit 2 steam generator work platform general area air sample	11/02/2020
		Survey map # 20201104-3	Post decon survey of Unit 2 steam generator 2 and 3 primary platforms	11/04/2020
		Survey wbn-M-20201103-49	Pre decon survey Unit 2, steam generators 2 and 3 primary platform	11/03/2020
71124.08	Corrective Action Documents	CR 1649687		
		CR 1650185		
	Procedures	RCDP-101	10-CFR-61 Waste Characterization	Revision 0000