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

August 12, 2019

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, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT 05000390/2019002 AND 05000391/2019002

Dear Mr. Shea:

On June 30, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Watts Bar, Units 1 and 2. On July 23, 2019, the NRC inspectors discussed the results of this inspection with Mr. Tony Williams and other members of your staff. The results of this inspection are documented in the enclosed report.

Five findings of very low safety significance (Green) are documented in this report. Five of these findings involved violations of NRC requirements. Additionally, 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.a of the Enforcement Policy.

If you contest the violations or 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.

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 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 10 CFR 2.390, “Public Inspections, Exemptions, Requests for Withholding.”

Sincerely,

/RA/

Omar R. López-Santiago, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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

Enclosure:
Inspection Report 05000390/2019002 And 05000391/2019002

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SUBJECT: WATTS BAR, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT 05000390/2019002 AND 05000391/2019002

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000390 and 05000391
License Numbers:	NPF-90 and NPF-96
Report Numbers:	05000390/2019002 and 05000391/2019002
Enterprise Identifier:	I-2019-002-0024
Licensee:	Tennessee Valley Authority
Facility:	Watts Bar, Units 1 and 2
Location:	Spring City, TN
Inspection Dates:	April 01, 2019 to June 30, 2019
Inspectors:	A. Butcavage, Reactor Inspector W. Deschaine, Project Engineer J. Hamman, Resident Inspector M. Magyar, Reactor Inspector S. Monarque, Project Engineer J. Nadel, Senior Resident Inspector A. Nielsen, Senior Health Physicist W. Pursley, Health Physicist J. Rivera, Health Physicist A. Thomas, Resident Inspector
Approved By:	Omar R. López-Santiago, 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, 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.

List of Findings and Violations

Failure to Identify a Condition Adverse to Quality Associated with Inoperable Ice Condenser Intermediate Deck Doors.			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000391/2019002-01 Open/Closed	[H.12] - Avoid Complacency	71111.20
The inspectors identified a Green finding and associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, for the failure to identify a condition adverse to quality. Specifically, inspectors identified two inoperable intermediate deck doors in the Unit 2 ice condenser during a containment closure walkdown.			

Failure to Implement Work Hour Controls for Covered Workers			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000391/2019002-02 Open/Closed	[H.1] - Resources	71111.20
The inspectors identified a Green finding and associated non-cited violation (NCV) of 10 CFR 26.205(d)(4), Work Hours, which requires covered workers, working on outage activities, must have one day off in any (rolling) seven-day period. Specifically, the inspectors identified 31 individuals that worked for greater than seven days consecutively without having a day off.			

Failure to Perform Radiological Surveys Adequate to Identify a High Radiation Area			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000390, 391/2019002-03 Open/Closed	[H.1] - Resources	71124.01
The inspectors identified a Green finding and associated NCV of 10 CFR 20.1501 and Technical Specification (TS) 5.11, when the licensee failed to perform adequate radiological surveys. Specifically, the licensee failed to perform surveys sufficient to identify a high radiation area (HRA) in the waste packaging area following a nearby radiation monitor alarm.			

Failure to Maintain Records of Containment Breach Activities During Outages			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Not Applicable	NCV 05000390/2019002-04 Open/Closed	Not Applicable	71152

The inspectors identified an SL IV NCV of 10 CFR 50, Appendix B, Criterion XVII, Quality Assurance Records, for the licensee's failure to maintain sufficient records to furnish evidence of activities affecting quality. Specifically, the licensee failed to retain the required Quality Assurance (QA) records of containment penetration and closure control activities for the life of both units.

Failure to Follow Clearance Procedure Results in Inoperability of the Unit 2 Power Range Nuclear Instrument.			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000391/2019002-05 Open/Closed	[H.11] - Challenge the Unknown	71153
The inspectors identified a Green finding and associated NCV of Technical Specification (TS) 5.7.1.1.a, when the licensee failed to follow procedure NPG-SPP-10.2, Clearance Procedure to Safely Control Energy. Specifically, when developing the clearance for work on the source range and intermediate range instruments, the licensee failed to evaluate if the clearance would cause an undesired trip or actuation of another system. As a result, the power range channel N-42 was inadvertently de-energized when Breaker 45, 2-BKR-235-2/45, was opened to complete the planned work on the intermediate range and source range nuclear instruments.			

Failure to Follow System Status Control Procedure Results in a Gap in a Bellows Seal and Inoperability of the Unit 2 Shield Building.			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000391/2019002-06 Open/Closed	[H.8] - Procedure Adherence	71153
The inspectors identified a self-revealed Green finding and associated NCV of Technical Specifications 5.7.1.1.a, Procedures, for the failure to follow the requirements of Tennessee Valley Authority (TVA) procedure NPG-SPP-10.1, System Status Control, Revision 10. Specifically, on June 20, 2019, it was discovered that the Unit 2 shield building was inoperable due to a gap introduced into a bellows seal between the main steam valve vault room and the annulus.			

Additional Tracking Items

None.

PLANT STATUS

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

Unit 2 operated at or near RTP from the beginning of the inspection period until April 13, 2019, when it was shutdown for a planned refueling outage. The unit remained in the outage until it was restarted on May 14, 2019. Unit 2 continued power ascension until May 18, 2019, when the unit reached 83 percent power and then experienced an automatic runback to 55 percent power due to the 2A main feedwater pump tripping. The issue with the pump was corrected and power ascension resumed until May 22, 2019, when the unit was manually tripped from 95 percent power due to uncontrolled lowering of steam generator 2 level caused by the failure of an associated main feedwater regulation valve (MFRV). The unit was restarted from the forced outage to repair the MFRV on May 23, 2019. The unit reached at or near RTP on May 25, 2019, and remained there for the remainder of the 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 performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." 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

Summer Readiness Sample (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated summer readiness of offsite and onsite alternating current (AC) power systems.

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) Spent fuel pool cooling system with Unit 2 core off-loaded during U2R2 on May 7, 2019
(2) 2A train of safety injection system while in mode 3 following refueling outage U2R2 on May 13, 2019
(3) 2B train of safety injection system while in mode 3 following refueling outage U2R2 on May 13, 2019

(4) A train spent fuel cooling system while B train is out of service due to relief valve repair on component cooling system on June 24, 2019

71111.04S - Equipment Alignment

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

(1) Complete system walkdown of Unit 2 auxiliary feedwater on June 11, 2019

71111.05Q - Fire Protection

Quarterly Inspection (IP Section 03.01) (11 Samples)

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

(1) U2 Lower Containment on May 18, 2019
(2) U2 Lower Containment on May 30, 2019
(3) Diesel generator building; emergency diesel generator (EDG) 1A, air exhaust 480V room, board room, air intake room on June 19, 2019
(4) Diesel generator building; EDG 2A, air exhaust 480V room, board room, air intake room on June 19, 2019
(5) Diesel generator building; EDG 1B, air exhaust 480V room, board room, air intake room on June 19, 2019
(6) Diesel generator building; EDG 2B, air exhaust 480V room, board room, air intake room on June 19, 2019
(7) Diesel generator building, fuel oil transfer, toilet, pipe gallery, corridor on June 19, 2019
(8) Diesel generator building, conduit interface, lube oil storage, stairwell, CO2 storage, radiation shelter rooms on June 19, 2019
(9) Diesel generator building, cable chase rooms A and B on June 19, 2019
(10) 6.9 KV and 480 V shutdown board room A, including Unit 1 personnel and equipment access room on June 19, 2019
(11) 6.9 KV and 480 V shutdown board room B, including Unit 1 personnel and equipment access room on June 19, 2019

71111.06 - Flood Protection Measures

Inspection Activities - Underground Cables (IP Section 02.02c.) (2 Samples)

The inspectors evaluated cable submergence protection in:

(1) Manhole 9B, Work Order (WO) 119795479
(2) Manhole 8A, Work Order (WO) 119795479

71111.08P - Inservice Inspection Activities (PWR)

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

(1) The inspectors verified that the reactor coolant system boundary, steam generator tubes, reactor vessel internals, risk-significant piping system boundaries, and

containment boundary are appropriately monitored for degradation and that repairs and replacements were appropriately fabricated, examined and accepted by reviewing the following activities from April 22, 2019 to April 26, 2019:

03.01.a - Nondestructive Examination and Welding Activities.

1. Volumetric Exams
    a. Observation: Ultrasonic Examination (UT) of N15, Reactor Vessel (RV) Nozzle-to-Vessel Weld, ASME Class 1, Cat. B-D, Item B3.90
    b. Observation: UT of N18, RV Nozzle-to-Vessel Weld, ASME Class 1, Cat. B-D, Item B3.90
    c. Observation: UT of RCF-D144-01B, Reactor Coolant System (RCS) Elbow-to-Pipe Weld, ASME Class 1, Cat. R-A, Item R1.20
    d. Observation: UT of RCF-D144-01E, RCS Pipe-to-Pipe Weld, ASME Class 1, Cat. R-A, Item R1.20
    e. Observation: UT of RCF-D144-01F, RCS Elbow-to-Pipe Weld, ASME Class 1, Cat. R-A, Item R1.20
    f. Observation: UT of RCF-002, RCS Tee-to-Reducer, ASME Class 1, Cat. R-A, Item R1.20
2. Visual Exams
    a. Observation: Visual Examination (VT) of 2-47A465-2-79, RCS Rigid Pipe Support, ASME Class 1, Cat. F-A, Item F1.10A
    b. Observation: VT of N-15-IR, RV Nozzle Inner Radius Section, ASME Class 1, Cat. B-D, Item B3.100
    c. Observation: VT of N-18-IR, RV Nozzle Inner Radius Section, ASME Class 1, Cat. B-D, Item B3.100

03.01.b - Pressurized-Water Reactor Vessel Upper Head Penetration Examination Activities.

a. Observation: Visual Examination (VE) of Reactor Vessel Closure Head (RVCLHEAD) Outer Surface, ASME Class 1, Cat. N-729, Item B4.10

03.01.c – Pressurized-Water Reactor Boric Acid Corrosion Control Activities.

1. Reviewed: Five Boric Acid Evaluations associated with Corrective Action Records (PER 1405042, PER 1405042, PER 1405056, PER 1405108, PER 1405045)

03.01.d – Pressurized-Water Reactor Steam Generator Tube Examination Activities.

1. SG 4 Outlet, Cal 40, Row 29 Column 79, Row 30 Col 79, Row 29 Col 75, Row 35 Col 75, Row 49 Col 61, including calibration standard review (Observed)
2. SG-3 Hot Leg Top of Tube Sheet, Cal 13, Row 49 Col 37, Cal 33, Row 17 col 6 and Row 9 Col 11, (Observed)
3. SG-4 Secondary Side Top Of Tube Sheet, Foreign Object Search and Retrieval (FOSAR) (Observed)
4. Tube Plugging SG-1 Hot and Cold Leg Plug Torque, Tubes: Row 7,Col 8 and Row 6 Col 74 (Reviewed)
5. Westinghouse NSAL-05-02, Steam Generator Non-Conformance (CR-1479540) (Reviewed)
6. Watts Bar U2R2 Steam Generator Condition Monitoring and Operational Assessment (Reviewed)
7. Watts Bar U2R2 Steam Generator Degradation Assessment (Reviewed)

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) On April 13, 2019 inspectors observed main control room during Unit 2 shutdown and cooldown for U2R2 refueling outage.

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

(1) On June 20, 2019 inspectors observed simulator scenario 3-OT-SRT-REP-SAMG-1, Revision 1, for a reactor coolant system leak followed by a large break loss of coolant accident.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness Inspection (IP Section 02.01) (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) CR 1512661, 2B Safety injection pump did not start on emergency safety feature actuation signal

71111.13 - Maintenance Risk Assessments and Emergent Work Control

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

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

(1) Risk assessment for April 17, 2019 with Unit 2 in Mode 6 Yellow Risk due to reduced decay heat removal capability from reactor coolant system water inventory at 725' (Reactor Vessel Flange)
(2) Risk assessment for week of June 10, 2019 with both trains of the control room envelope air temperature control system inoperable and missed surveillance for C-S component cooling system (CCS) pump
(3) Risk assessment for June 24, 2019, repair of 0-DRV-070-27B, SFP heat exchanger B CCS outlet relief valve

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 02.02) (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Engineering work request evaluation for CR 1510568, the max allowed unseating thrust criteria was exceeded for 2-FCV-74-2
(2) Engineering work request evaluation 19MEC078246, analysis of spent fuel pool cooling heat load with only one train of cooling in service

(3) Immediate determination of operability (IDO) and prompt determination of operability (PDO) for CR 15222957, 10 CFR 21 report for turbine driven auxiliary feedwater governor valve positioner failures
(4) Engineering work request evaluation for CR 1512661 for failure of 2B safety injection pump to start during blackout testing
(5) CR 1513752, hole in U2 steam generator power operated relief valve conduit seal

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

(1) U2 design equivalent change packages DCN 19-486 and DCN 19-491, install t-drains in containment spray and residual heat removal sump suction valves on June 24, 2019

71111.19 - Post-Maintenance Testing

Post Maintenance Test Sample (IP Section 03.01) (7 Samples)

The inspectors evaluated the following post maintenance tests:

(1) WO 120390465, 1-II 120 VAC vital inverter automatic transfer test following fan and fuse replacement on April 8, 2019
(2) WO 119528102, 2-SI-74-905-B, Residual Heat Removal Pump 2B-B Comprehensive Test during Refueling Outages, Revision 6, following breaker and valve outage maintenance on April 25, 2019
(3) WO 119528673, 2-SI-63-915-A, Safety Injection System - Valve Position Indication Verification and Full-Stroke Exercising (Train A) following maintenance to valve 2-FCV-63-152, 2A safety injection cold leg injection flow control valve on April 25, 2019
(4) WO 119527118, 2-SI-63-915-B, Safety Injection System - Valve Position Indication Verification and Full-Stroke Exercising (Train B), Revision 7, following valve outage maintenance on April 25, 2019
(5) WO 119528097, 2-SI-74-905-A, Residual Heat Removal Pump 2A-A Comprehensive Test during Refueling Outages, Revision 6, following breaker and valve outage maintenance on April 26, 2019
(6) WO 120436516, Functional check of 30RX relay for safety injection pump 2B-B, on May 2, 2019
(7) WO 120437595, 2-SI-99-625-B Response Time Test - Containment Isolation Phase B Slave Relay L625 - Train B, following broken wire repair, on May 28, 2019

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (2 Samples)

(1) The inspectors evaluated U2R2 activities from 4/13/19 - 5/13/19.
(2) The inspectors evaluated a Unit 2 forced outage due to a unit trip caused by the failure of a main feedwater regulating valve from May 22, 2019 to May 23, 2019.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Containment Isolation Valve Testing (IP Section 03.01) (2 Samples)

(1) WO 119526986, 2-SI-26-701, Containment Isolation Valve Local Leak Rate Test High Pressure Fire Protection, for 2-FCV-26-240, on April 25, 2019
(2) WO 119527147, 2-SI-67-701-C, Containment Isolation Valve Local Leak Rate Test Lower Compartment Essential Raw Cooling Water (ERCW), for 2-FCV-67-95, on April 25, 2019

Ice Condenser Testing (IP Section 03.01) (2 Samples)

(1) WO 119526848, 2-SI-61-3, 18 Month Ice Condenser Flow Passages Inspection, Revision 1, on April 29, 2019
(2) WO 119526904, 2-SI-61-2, 18 Month Ice Weighing, Revision 8, on April 29, 2019

Inservice Testing (IP Section 03.01) (2 Samples)

(1) WO 119888146, 1-SI-72-904-A, Check Valve 1-CKV-72-506 Testing During Operations - Containment Spray (Train A), on April 26, 2019
(2) WO 119888146, 1-SI-72-904-A Check Valve 1-CKV-72-524 Testing During Operations - Containment Spray (Train A), on April 26, 2019

Surveillance Tests (other) (IP Section 03.01) (2 Samples)

(1) WO 119527434, 0-SI-82-5, 18 Month Loss of Offsite Power with Safety Injection – DG 2A-A, Revision 47, on April 15, 2019
(2) WO 119238265, 2-SI-0-703, Containment Integrated Leak Rate Test, Revision 6, on May 9, 2019

71114.06 - Drill Evaluation

Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

(1) The residents observed the site emergency response organization's severe accident mitigation guideline (SAMG) training drill on May 29, 2019.

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

During facility tours, the inspectors directly observed radiological postings, dosimetry placement, container labeling, and radiological surveys for areas established within the restricted area, including the Independent Spent Fuel Storage Installation (ISFSI).

Contamination and Radioactive Material Control (IP Section 02.03) (1 Sample)

The inspectors evaluated licensee processes for monitoring and controlling contamination and radioactive material. The inspectors reviewed transactions for nationally tracked sources and evaluated inventory and leak testing records for the following sealed sources.

(1)
a. Corrosion Detector, Cm-244, Watts Bar ID 1541
b. JL Shepherd Calibrator, Cs-137, Watts Bar ID 177

High Radiation Area and Very High Radiation Area Controls (IP Section 02.05) (1 Sample)

(1) The inspectors evaluated risk-significant high radiation area and very high radiation area controls, including postings and physical controls.

Instructions to Workers (IP Section 02.02) (1 Sample)

The inspectors evaluated instructions to workers including, pre-job briefings, container labels, radiation work permits, and electronic dosimeter alarm setpoints used to access high radiation areas.

(1) Radiation work permits (RWP), including RWPs for airborne areas if available
a. 19250023, U2 Lower Containment All Elevations - LHRAs, Rev. 1
b. 19240003, U2 Auxiliary Building and U2 Annulus - LHRAs, Rev. 0
c. 19250063, U2 Lower Containment All Elevations - S/G Platforms, Rev. 0

Electronic alarming dosimeter alarms
a. CR 1451658
b. CR 1448913
c. CR 1477721

Labeling of containers in the following locations
a. U2 Lower Containment
b. Auxiliary Building
c. Waste Packaging Area

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 02.06) (1 Sample)

(1) The inspectors evaluated radiation worker awareness and performance and radiation protection technician proficiency.

Radiological Hazard Assessment (IP Section 02.01) (1 Sample)

The inspectors evaluated radiological hazards assessments and controls. Samples included the following:

(1) Radiological survey records
a. WBN-M-20190424-34, U2 Lower Containment Shiftly Routine, 4/24/19
b. WBN-M-20190423-14, U2 Lower Containment Shiftly Routine, 4/23/19
c. WBN-M-20190424-45, Auxiliary Building North General Area 757', 4/24/19
d. WBN-M-20190423-11, Auxiliary Building North General Area 757', 4/23/19
e. WBN-M-20190422-19, U2 RHR/Ctmt Spray HX Room 2A, 4/22/19

f. WBN-M-20190425-34, U2 RHR/Ctmt Spray HX Room 2A, 4/25/19
g. WBN-M-20190209-4, ISFSI - Dry Cask Storage Pad, 2/9/19
h. WBN-M-20181212-4, ISFSI - Dry Cask Storage Pad, 12/12/18
i. WBN-M-20190422-17, U2 S/G 1 & 4 Primary Platform, 4/22/19
j. WBN-M-20180821-5, U1/U2 Transfer Canal, 8/21/18

Air sample survey records
k. 230419215, U2 SG3 Primary Platform, 4/23/19
l. 130419204, U2 Lower Containment, 4/13/19
m. 170419203, U2 Pressurizer, 4/17/19

Radiological Hazards Control and Work Coverage (IP Section 02.04) (1 Sample)

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

(1) Risk significant radiological work activities

a. S/G Maintenance
b. Radioactive Waste Processing
c. Refuel Floor Activities

71124.02 - Occupational ALARA Planning and Controls

Implementation of ALARA and Radiological Work Controls (IP Section 02.03) (1 Sample)

The inspectors reviewed as low as reasonably achievable practices and radiological work controls.

(1) The inspectors reviewed as low as reasonably achievable practices and radiological work controls by reviewing the following activities:
a. U2R2 Steam Generator Maintenance Activities
b. U2R2 Refuel Floor Activities

Radiation Worker Performance (IP Section 02.04) (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance during:

(1) The inspectors evaluated radiation worker and radiation protection technician performance during U2R2 steam generator eddy current testing.

Radiological Work Planning (IP Section 02.01) (1 Sample)

The inspectors evaluated the licensee's radiological work planning.

(1) The inspectors evaluated the licensee's radiological work planning by reviewing the following activities:
a. U2R2 removal and installation of reactor pressure vessel head
b. U2R2 installation, inspection, modification, and removal of scaffolding

c. U2R2 steam generator nozzle dam installation and removal, and eddy current testing

Verification of Dose Estimates and Exposure Tracking Systems (IP Section 02.02) (1 Sample)

The inspectors evaluated dose estimates and exposure tracking.

(1) The inspectors evaluated dose estimates and exposure tracking. The inspectors reviewed the following as low as reasonably achievable planning documents:
   a. ALARA Plan Number 2017-221, U2R1 SG Eddy Current Testing
   b. ALARA Plan Number 2019-216, U2R2 Scaffolding
   c. ALARA Plan Number 2019-219, U2R2 Steam Generators
   d. ALARA Plan Number 2019-223, U2R2 Rx Disassembly / Assembly
   e. ALARA Plan Number 2019-242, U2R2 Maintenance Services Associated Work

71124.03 - In-Plant Airborne Radioactivity Control and Mitigation

The Inspectors evaluated the licensee's performance in mitigating airborne radioactive material and use of respiratory protection equipment.

Engineering Controls (IP Section 02.01) (1 Sample)

The inspectors evaluated equipment used to mitigate and monitor airborne radioactivity. Samples included the following:

(1) Installed ventilation system maintenance records
   a. Work Order 117130765, Control Room Emergency Ventilation System Filter Train B Test, 3/1/17
   b. Work Order 118562387, Control Room Emergency Ventilation System Filter Train B Test, 1/24/18

Temporary ventilation system maintenance records
   c. HEPA 2000-3, Certification of In-place leak Testing Results, 12/19/18
   d. HEPA 1000-18, Certification of In-place leak Testing Results, 7/24/18

Portable or installed monitoring systems
   e. AMS-4 Continuous Air Monitors in Auxiliary Building

Self-Contained Breathing Apparatus for Emergency Use (IP Section 02.03) (1 Sample)

The inspectors evaluated the licensee's storage and maintenance of SCBA for emergency use. This included review of SCBA qualification records and the following samples:

(1) Periodic Inspection records for staged SCBAs (ready-for-use)

   a. Work Order 119595170, Clean, Maintain, Inventory, and Storage of Positive Pressure MSA SCBA, 1/18/19
   b. Work Order 119569413, Clean, Maintain, Inventory, and Storage of Positive Pressure MSA SCBA, 12/24/18

SCBA maintenance records

c. Posi3 USB Test Results Complete SCBA Test, Regulator S/N JAC043237, 7/17/18
d. Posi3 USB Test Results Complete SCBA Test, Regulator S/N JAC043256, 7/17/18
e. Posi3 USB Test Results Complete SCBA Test, Regulator S/N JAC043242, 7/17/18

Use of Respiratory Protection Devices (IP Section 02.02) (1 Sample)

The inspectors evaluated the licensee's use and maintenance of respiratory protection equipment. This included review of respirator qualification records, and the following samples:

(1) TEDE-ALARA evaluations for the use of respiratory protection equipment
   a. TEDE ALARA Evaluation Worksheet No. 2019-219, Installation / Removal of SG Nozzle Dams

Respiratory protection used during work activities
   b. None were available to observe during the weeks of inspection.

Periodic Inspection records for staged respirators (ready-for-use)
   c. Respirator Inspection, 2/21/19
   d. Respirator Inspection, 3/21/19

71124.04 - Occupational Dose Assessment

External Dosimetry (IP Section 02.02) (1 Sample)

(1) The inspectors evaluated the external dosimetry program implementation.

Internal Dosimetry (IP Section 02.03) (1 Sample)

The inspectors evaluated the internal dosimetry program implementation.

(1) The inspectors evaluated the internal dosimetry program implementation. For select individuals, the inspectors reviewed records of whole body counts, in-vitro internal monitoring, and dose assessments performed using air sampling and derived air concentration-hour monitoring.

Source Term Categorization (IP Section 02.01) (1 Sample)

(1) The inspectors evaluated the licensee's characterization of the source term and use of scaling factors for the use of hard-to-detect radionuclide activity.

Special Dosimetric Situations (IP Section 02.04) (1 Sample)

The inspectors evaluated the following special dosimetric situation:

(1) The inspectors evaluated special dosimetric situations. For select individuals, the inspectors reviewed records of declared pregnant workers, effective dose equivalent exposures, shallow dose equivalent, and neutron dose assessment.

71124.05 - Radiation Monitoring Instrumentation

Calibration and Testing Program (IP Section 02.02) (1 Sample)

The inspectors evaluated the calibration and testing program implementation.

(1) The inspectors evaluated the calibration and testing program implementation.

Alarm setpoint and calibration method check of personnel contamination monitors, portal monitors and small article monitors

a. GEM 5 TVA#848578 Calibration 02/13/2019 Security Exit Building
b. Thermo Scientific SAM-12 TVA#848507 Calibration 11/27/2018 RP Control Point RCA Exit
c. Canberra ARGOS-5AB TVA#860781 Calibration 02/25/2019, RP Control Point RCA Exit

Failure to meet calibration or source check acceptance criteria

d. Mirion Telepole TVA #860997, 01/31/2018
e. Ludlum 12-4 TVA #951093, 09/25/2017
f. Thermo Radeye B20-ER TVA #951317, 02/22/2018
g. Thermo Radeye B20-ER TVA #951093, 02/28/2018

Walk Downs and Observations (IP Section 02.01) (1 Sample)

The inspectors evaluated radiation monitoring instrumentation during plant walkdowns.

(1) The inspectors evaluated radiation monitoring instrumentation during plant walkdowns.

Portable survey instruments

a. Ludlum 3 Frisker TVA #860520, Calibration 09/09/2018
b. F&J HV-1 TVA#848571 Calibration 10/01/2018
c. Eberline AMS-4 TVA #860400 Calibration 04/19/2019
d. Mirion Telepole TVA #951049, Calibration 12/06/2018
e. Ludlum 9-3 Ion Chamber TVA #951067 Calibration 10/06/2018
f. Mirion AMP-100 Model BAK-0180 TVA#860627, Calibration 12/06/2018
g. SAIC RADECO Air Sampler TVA#556563 Calibration, 05/02/2019
h. Ludlum 12-4 REM Ball TVA #835515, Calibration 08/08/2018
i. Thermo Scientific Rad Eye TVA #951315, Calibration 11/03/2018

Source check demonstration

j. Mirion Telepole TVA#951049, Calibration 12/06/2018
k. Ludlum 9-3 Ion Chamber TVA #951067 Calibration 10/06/2018
l. Mirion AMP-100 Model BAK-0180 TVA#860627, Calibration 12/06/2018
m. Ludlum 12-4 REM Ball TVA #835515, Calibration 08/08/2018

Area radiation monitors and continuous air monitors

n. Eberline AMS 4, TVA#842741, 713' Elevation of Auxiliary Building (AB), Calibration
o. Eberline AMS 4, TVA#842470, 692' Elevation of Auxiliary Building (AB)
p. Eberline AMS 4, TVA#860614, Waste Packaging Area (Railroad Bay) Calibration 03/25/2019
q. Area Radiation Monitors 1RI-90-1B, 1RI-90-2B, in the U1 Personnel Air Lock, 1-RE-90-1 Spent Fuel Pool Area, 0-RE-90-3, Waste Packaging Area (see notes), 2-RE-90-271, 272, 273 and 274 in the U1 Reactor Building and 0-RE-90-135 in the Main Control Room.

Personnel contamination monitors, portal monitors and small article monitors

r. PM-7 TVA#848512, Calibration 03/19/2019, Dosimetry Office (Sensitivity at least 65 nCis)
s. PM-7 TVA#8424454 Calibration 12/27/2018 Security Exit Building
t. Thermo Scientific SAM-12 TVA#848505 Calibration 08/03/2018 RP Control Point RCA Exit
u. Thermo Scientific SAM-12 TVA#848506 Calibration 08/03/2018 RP Control Point RCA Exit
v. Canberra ARGOS-5AB TVA#860781 Calibration 02/25/2019

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

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

(1) Unit 1 (April 1, 2018 – March 31, 2019)
(2) Unit 2 (April 1, 2018 – March 31, 2019)

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

(1) Unit 1 (April 1, 2018 – March 31, 2019)
(2) Unit 2 (April 1, 2018 – March 31, 2019)

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

(1) Unit 1 (April 1, 2018 – March 31, 2019)
(2) Unit 2 (April 1, 2018 – March 31, 2019)

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

(1) (September 15, 2018 - May 1, 2019)

PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences Sample. (IP Section 02.16) (1 Sample)

(1) (July 1, 2018–May 1, 2019)

71152 - Problem Identification and Resolution

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

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

(1) Condition Reports (CRs) 1263417 and 1370133, NRC Identified SLIV NCV for incomplete and inaccurate information.

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

(1) The inspectors reviewed the licensee's CAP for trends in procedure use and adherence, temporary equipment control, configuration control, and security that might be indicative of a more significant safety issue.

71153 - Followup of Events and Notices of Enforcement Discretion

Event Followup (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated a Unit 2 trip and licensee's response on May 22, 2019.

INSPECTION RESULTS

Failure to Implement Work Hour Controls for Covered Workers			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000391/2019002-002 Open/Closed	[H.1] - Resources	71111.20
The inspectors identified a Green finding and associated non-cited violation (NCV) of 10 CFR 26.205(d)(4), Work Hours, which requires covered workers, working on outage activities, must have one day off in any (rolling) seven-day period. Specifically, the inspectors identified 31 individuals that worked for greater than seven days consecutively without having a day off.			
Description: During the most recent refueling outage for Unit 2, the inspectors reviewed TVA's implementing procedure NPG-SPP-03.21, Fatigue Rule and Work Hour Limits, Revision 21, for managing fatigue and controlling work hours in accordance with 10 CFR 26, Subpart I, Managing Fatigue. This procedure defines what work will be considered "covered work" under 10 CFR 26, Subpart I during outages, which is when maintenance is performed on risk significant systems such as the ice condenser system and the reactor coolant system (RCS). Covered work is defined by NPG-SPP-03.21 as "personnel performing maintenance or on-site directing of the maintenance of System, Structures, or Components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety". The risk-informed evaluation process that TVA uses at Watts Bar to show what SSCs are			

significant to public health and safety is captured in TI-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10 CFR 50.65, Revision 10.

This process has defined the ice condenser system and the RCS as risk significant SSCs that fall under the requirements of 10 CFR 26, Subpart I.

The inspectors then reviewed containment entry logs for WOs 120306793 and 119473026 to determine which individuals had entered the Unit 2 ice condenser during the most recent refueling outage. These WOs were used during refueling outage U2R2 to conduct maintenance in the Unit 2 ice condenser.

The inspectors identified 24 individuals that were not considered covered as defined by NPG-SPP-03.21 and 10 CFR 26, Subpart I, but were conducting maintenance in the ice condenser.

The inspectors reviewed all the time sheets for these 24 non-covered individuals and determined that at least seven individuals violated 10 CFR 26.205(d)(4) -Work Hours, which requires that a covered individual working on outage activities must have one day off in any (rolling) seven-day period. Contrary to this requirement all seven individuals exceeded the seven-day period without having a day off.

The inspectors then reviewed containment entry logs for WOs 119317306, 1195501127, 119559696, 119559722, 119560630, 119561042, and 119562955 to determine which individuals had entered the Unit 2 containment and worked on RCS insulation activities during U2R2. These WOs were used during U2R2 to conduct maintenance on the RCS by removing and installing insulation on the primary side of the steam generators.

The inspectors identified 25 individuals that were not considered covered as defined by NPG-SPP-03.21 and 10 CFR 26, Subpart I, but were conducting maintenance on the RCS by removing and installing insulation for the primary side of the steam generators.

The inspectors reviewed all the time sheets for these 25 non-covered individuals and determined that at least 24 individuals violated 10 CFR 26.205(d)(4) -Work hours, which requires that a covered individual working on outage activities must have one day off in any (rolling) seven-day period. Contrary to this requirement all 24 individuals exceeded the seven-day period without having a day off.

After interviewing TVA managers about these issues the inspectors discovered that current site practice was to designate entire groups of workers as non-covered based on their craft association, such as insulators, painters, etc., and not the specific task or SSC on which they were working. Inspectors noted this practice likely means there are far more workers in violation of Part 26 than discovered directly as part of the inspection.

These issues were brought to the attention of the licensee and they entered them into their corrective action program as CR 1515224. The licensee also performed an extent of condition review of Part 26 violations during U2R2 and discovered 67 additional violations solely within the insulator and painter craft categories.

During their review of NPG-SPP-03.21, Fatigue Rule and Work Hour Limits, Revision 21, the inspectors also noted that the procedure defines maintenance as: “For the purposes of 10 CFR 26.4(a)(4), "Maintenance" is defined as maintenance activities, repair, modification, or

calibration that are intrusive to SSCs and where errors could produce consequences to risk significant SSCs."

This differs from how Part 26 defines maintenance: "Maintenance means, for the purposes of § 26.4(a)(4), the following onsite maintenance activities: Modification, surveillance, post-maintenance testing, and corrective and preventive maintenance."

The inspectors identified that it appears TVA may have used NEI 06-11 Rev. 1 Section 6.2 to define 'maintenance' in NPG-SPP-03.21. However, the NRC did not agree with all the guidance of NEI 06-11 Rev. 1 Section 6.2 as noted in NRC Reg Guide 5.73.

This issue was entered into their CAP as CR 1515364.

Corrective Actions: The licensee documented these issues in their CAP and is in the process of conducting an apparent cause evaluation. Corrective actions that are planned include updating the Part 26 implementing procedures for both TVA and contractors and provide training.

Corrective Action References: The licensee documented these issues in CRs 1515224 and 1515364.

Performance Assessment:

Performance Deficiency: The inspectors determined the failure to control work hours as required by NPG-SPP-03.21, "Fatigue Rule and Work Hour Limits," and 10 CFR Part 26, Subpart I, "Managing Fatigue," was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the failure to control work hours as required by NPG-SPP-03.21, Fatigue Rule and Work Hour Limits, and 10 CFR Part 26, Subpart I, Managing Fatigue, could result in performance of work while impaired from fatigue, which could lead to human errors that damage safety related equipment. Inspectors also determined that work practices associated with the covered/uncovered designation, the number of violations, and the procedural issues indicated that these problems were programmatic at Watts Bar and potentially the TVA fleet.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Although the likelihood of human error increased the likelihood of an initiating event or adverse impact on mitigation equipment, the finding was determined to be of very low significance because no significant event, reactor trip, or loss of mitigation equipment occurred because of personnel fatigue linked to the hours worked.

Cross-Cutting Aspect: H.1 - Resources: Leaders ensure that personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety. The finding had a cross-cutting aspect in the resources attribute of the human performance area as defined in IMC 0310, Aspects Within the Cross-Cutting Areas, because leaders did not ensure personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety. Specifically, NPG-SPP-03.21 - Fatigue Rule and Work Hour Limits, had an inadequate definition of what was considered maintenance under 10 CFR 26.4(a)(4), which led to confusion on which individuals were considered covered employees.

Enforcement:

Violation: 10 CFR 26.205(d)(4) requires:

"During the first 60 days of a unit outage, licensees need not meet the requirements of § 26.205(d)(3) or (d)(7) for individuals specified in § 26.4(a)(1) through (a)(4), while those individuals are working on outage activities. However, the licensee shall ensure that the individuals specified in § 26.4(a)(1) through (a)(3) have at least 3 days off in each successive (i.e., non-rolling) 15-day period and that the individuals specified in § 26.4(a)(4) have at least 1 day off in any 7-day period;"

Contrary to the above, from April 13, 2019, until May 16, 2019, 31 individuals specified in § 26.4(a)(4) did not have at least one day off in any seven-day period.

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

Failure to Identify a Condition Adverse to Quality Associated with Inoperable Ice Condenser Intermediate Deck Doors.

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000391/2019002-01 Open/Closed	[H.12] - Avoid Complacency	71111.20

The inspectors identified a Green finding and associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, for the failure to identify a condition adverse to quality. Specifically, inspectors identified two inoperable intermediate deck doors in the Unit 2 ice condenser during a containment closure walkdown.

Description: On May 30, 2019, inspectors conducted a containment closure walkdown in Unit 2 upper containment in accordance with inspection procedure 71111.20, Refueling and other Outage Activities. Unit 2 was in mode 1 at the time following refueling outage U2R2. As part of the inspection activities the inspectors checked the status of some intermediate deck doors and also inspected the ice baskets and flow channels underneath the doors. Inspectors identified that Bay 21 doors 3 and 7 were both frozen shut and could not be opened, despite no visible ice on or around the doors. The senior reactor operator accompanying the inspectors immediately notified the main control room of the condition and they declared the doors inoperable and entered technical specification limiting condition for operation (TS LCO) 3.6.12, Ice Condenser Doors, condition B.

There are two technical specification surveillance requirements (TSSR) relevant to this condition. TSSR 3.6.12.2 requires a visual inspection of each intermediate deck door every seven days to verify they are not impaired by ice, frost, or debris and it is implemented by TVA procedure 2-SI-61-6, Weekly Ice Condenser Intermediate Deck Doors Visual Inspection, Revision 5. TSSR 3.6.12.6 requires, in part, verification of free movement of each intermediate deck door every 18 months and it is implemented by TVA procedure 2-SI-61-7, 18 Month Ice Condenser Intermediate Deck Door Operational Check, Revision 1. When doors are found with visible ice, frost, or debris potentially impairing their free movement during weekly performances of 2-SI-61-6, a digital force gauge is used to assess any degradation in the free movement of the door and acceptance criteria for force-to-open from

2-SI-61-7 are used to verify both as found and as left operability. Acceptance criteria in 2-SI-61-7 ranges from 30.5 lbs to 36.9 lbs depending on a door's location.

After the inspectors identified two frozen doors with no visible ice, frost, or debris, the licensee performed an extent of condition that tested all 192 intermediate deck doors for free movement with a digital force gauge and the acceptance criteria in 2-SI-61-7. The licensee found 33 additional doors with no indications of ice, frost, or debris that failed the 2-SI-61-7 acceptance criteria. One of the doors identified by the inspectors (bay 21 door 7) maxed out the force gauge at 50 lbs, confirming its inoperability. The other door (bay 21 door 3) was unstuck by the senior reactor operator (SRO) during the NRC inspection, preventing an as found test. As a result, both doors were considered to be inoperable. Though they were higher than the acceptance criteria, none of the additional 33 doors maxed out the force gauge. The licensee performed an operability determination that relied on a Westinghouse letter from 1998 to accept higher force-to-open values than were allowed by 2-SI-61-7 for the additional 33 doors. The operability determination concluded that all doors, except the two found by inspectors, were ultimately operable and therefore the safety function of the ice condenser was maintained.

Inspectors noted that the TS 3.6.12 bases specifically mentions that the 18 month frequency of TSSR 3.6.12.6 is based, in part, on the "fact that SR 3.6.12.2 confirms on a 7 day Frequency that the doors are not impaired by ice, frost, or debris, which are ways a door would fail the opening force test (i.e., by sticking or from increased door weight)." Inspectors noted that significant numbers of doors were not found to be inoperable during previous performances of 2-SI-61-7, including the most recent on May 3, 2019 and during period of the first year after receipt of the operating license, 2015-2016, where the surveillance test was required to be performed every 3 months. In fact, the 2-SI-61-7 performance on May 3, 2019 found all doors met the as found acceptance criteria. The licensee wrote CR 1527359 to address this issue.

Corrective Actions: The immediate corrective actions taken by the licensee following identification of the frozen doors included as found force-to-open tests of all 192 intermediate deck doors, application of lubricant to the door seating surfaces, and verification of satisfactory as-left testing. Subsequent actions and monitoring are currently being evaluated.

Corrective Action References: CRs 1521497, 1520769, 1521049, 1521069, 1521317, 1521319, 1521497, 1527359, 1529382

Performance Assessment:

Performance Deficiency: The failure to identify a condition adverse to quality associated with two inoperable intermediate deck doors in the Unit 2 ice condenser, as required by 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, was a performance deficiency. Specifically, inspectors identified two inoperable intermediate deck doors in the Unit 2 ice condenser during a containment closure walkdown.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Human Performance 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, inspectors identified two inoperable intermediate deck doors in the Unit 2 ice condenser during a containment closure walkdown.

Significance: The inspectors determined that the finding screened to Green in accordance with IMC 0609, Appendix A, Exhibit 2, Mitigating Systems Screening Questions, Section A, Mitigating SSCs and Functionality, because the finding did not represent a loss of system function or a loss of a single train for greater than its TS allowed outage time.

Cross-Cutting Aspect: H.12 - Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. Specifically, detailed and thorough walkdowns of the ice condenser were not being performed to check and monitor system function beyond the required TSSR.

Enforcement:

Violation: 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires, in part, that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. Contrary to the above, on March 30, 2019, the licensee failed to promptly identify a condition adverse to quality associated with two inoperable intermediate deck doors in the Unit 2 ice condenser.

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

Failure to Perform Radiological Surveys Adequate to Identify a High Radiation Area			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000390, 391/2019002-03 Open/Closed	[H.1] - Resources	71124.01

The inspectors identified a Green finding and associated NCV of 10 CFR 20.1501 and Technical Specification (TS) 5.11, when the licensee failed to perform adequate radiological surveys. Specifically, the licensee failed to perform surveys sufficient to identify a high radiation area (HRA) in the waste packaging area following a nearby radiation monitor alarm.

Description: On May 1, 2019, main control room operators received an alarm on radiation monitor 0-RE-90-3 indicating higher than normal radiation levels in the waste packaging area and contacted radiation protection (RP) to have them assess the situation. Operator logs showed that RP responded one hour later with the comment “RadPro reports rad level in waste packaging are elevated due to water processing”. On May 6th and again on May 8th the inspectors walked down the waste packaging area and noticed that 0-RE-90-3 was still in alarm and that the area was posted as a radiation area. Independent NRC surveys showed that dose rates near the liquid waste processing equipment were substantially higher than those displayed on the most recent routine survey posted outside the room and dated February 25, 2019. The inspectors requested survey records showing the initial and continued followup to the area radiation monitor alarm, however the licensee could not produce any relevant documented surveys. The inspectors also noted that there was no procedural guidance that would have required more frequent surveys in the area, other than the initial response, as a result of the ongoing alarm. On May 9th, at the request of NRC

inspectors, the licensee performed a thorough survey of the waste packaging area and found dose rates up to 110 mrem/hr at 30 cm, thereby exceeding the threshold for an HRA.

Corrective Actions: The licensee took immediate corrective actions including posting and controlling the area as an HRA.

Corrective Action References: CR 1515390, CR 1516841, CR 1515204

Performance Assessment:

Performance Deficiency: The failure to perform surveys adequate to identify an HRA in the waste packaging area, as required by 10 CFR 20.1501, was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Program & Process attribute of the Occupational Radiation Safety cornerstone and adversely affected the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. Failure to perform adequate surveys, and subsequently barricade and post HRAs, could lead to unplanned radiation exposures.

Significance: The inspectors assessed the significance of the finding using Appendix C, "Occupational Radiation Safety SDP." The finding was not related to ALARA planning, nor did it involve an overexposure or substantial potential for overexposure, and the ability to assess dose was not compromised. Therefore, the inspectors determined the finding to be of very low safety significance (Green).

Cross-Cutting Aspect: H.1 - Resources: Leaders ensure that personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety. Licensee procedures did not provide guidance on how to deal with a prolonged area radiation monitor alarm.

Enforcement:

Violation: 10 CFR 20.1501 requires that licensees perform surveys, that may be necessary to comply with the regulations in this part, to evaluate the magnitude of radiation levels. Technical Specification 5.11, in-lieu of the requirements of 10 CFR 20.1601, requires HRAs with dose rates not exceeding 1 rem/hr at 30 cm be barricaded and conspicuously posted as a HRA. Contrary to this, from May 1, 2019 to May 9, 2019, the licensee failed to perform surveys necessary to identify and subsequently barricade and conspicuously post a HRA in the waste packaging area. The licensee took immediate corrective actions including barricading the entrance and posting the area as an HRA.
Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Maintain Records of Containment Breach Activities During Outages			
Cornerstone	Severity	Cross-Cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000390/2019002-04 Open/Closed	Not Applicable	71152

The inspectors identified an SL IV NCV of 10 CFR 50, Appendix B, Criterion XVII, Quality Assurance Records, for the licensee's failure to maintain sufficient records to furnish evidence of activities affecting quality. Specifically, the licensee failed to retain the required Quality Assurance (QA) records of containment penetration and closure control activities for the life of both units.

Description: In the second quarter of 2019, the inspectors chose to perform an annual review sample of containment closure controls during past outages in accordance with NRC Inspection Procedure 71152, Identification and Resolution of Problems. This sample was chosen, in part, due to recent NRC violation 05000390/2019-002, Failure to Meet Acceptance Criteria of Containment Closure in Mode 6. When inspectors attempted to retrieve QA records of containment closure forms from prior refueling outages, none could be found.

The licensee investigated and determined, with the exceptions listed below, all records associated with both Unit 1 and Unit 2 TI-68.002 procedures were irretrievably lost. This prevented the inspectors from completing their inspection. The only records subsequently identified were from a Unit 1 outage in 2002 and several examples of partial records from Unit 2 after the license was issued in October 2015, but prior to the completion of construction and testing in November 2016. Thus, the Unit 1 refueling outage in 2002 was the only retained record of containment closure activities during a past refueling outage that could be retrieved since commercial operation began for Unit 1 in 1996 and Unit 2 in 2016.

TVA procedure 1-TI-68.002, Containment Penetrations and Closure Control, Revision 1 and 2-TI-68.002, Revision 4 each require the retention of certain QA records in section 8.1, QA Records. Section 8.1 requires, specifically, that the following procedure sections be retained as quality records, "Attachment A and B Data Sheets" and "Attachment C and D Data Sheets as required." Attachment A is "Breach Closure Time Form" and outlines the specific calculation for the minimum breach closure time at different points throughout a refueling outage. Attachment B is "Containment Closure Exceptions" and includes specific information on each actively breached penetration during the time period of a refueling outage where containment closure controls are in effect. Attachments C and D are related to various time to core boiling calculations. The TI-68.002 procedures and associated records are the quality process used to ensure continued operability of the reactor containment during ongoing maintenance activities for a refueling outage.

The inspectors reviewed other records associated with outage activities and found further discrepancies. These included missing or incomplete records for seven different general operating (GO) procedures across both units. Inspectors also noted that the GO procedures had ambiguous record retention requirements, with most requiring that the "Completed Data Package" be retained as a QA record. However, it was unclear to both the inspectors and the licensee what sections of the GO procedures constituted a "Completed Data Package." Over 75 additional examples were identified of completed technical specification surveillance procedures that were not available in the licensee's records management system. These procedures were later located and retained as required.

Corrective Actions: The licensee documented this issue in their corrective action program. The records from the most recent Unit 1 outage (U1R15) were physically located prior to disposal so they could be properly retained.

Corrective Action References: The licensee documented these issues in CRs 1498802, 1506470, 1508361, and 1525666.

Performance Assessment: The inspectors determined this violation was associated with a minor ROP performance deficiency. The inspectors identified an SL IV NCV 10 CFR 50,

Appendix B, Criterion XVII, Quality Assurance Records, for the licensee's failure to maintain sufficient records to furnish evidence of activities affecting quality.

Enforcement: The ROP's significance determination process does not specifically consider the regulatory process impact in its assessment of licensee performance. Therefore, it is necessary to address this violation which impedes the NRC's ability to regulate using traditional enforcement to adequately deter non-compliance.

Severity: The failure to maintain sufficient records was more than minor under traditional enforcement because it prevented the NRC from completing the chosen inspection sample and was consistent with Enforcement Policy section 6.9.d.1 for a SL IV violation. Cross-cutting aspects are not assigned to traditional enforcement violations.

Violation: 10 CFR 50, Appendix B, Criterion XVII, Quality Assurance Records, requires in part, that sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include at least the following: operating logs and the results of reviews, inspections, tests, audits, monitoring of work performance, and materials analyses. These requirements are implemented, in part, by TVA procedures 1-TI-68.002 and 2-TI-68.002. Section 8.1, QA Records, of the above procedures requires the following procedure sections be retained as quality records, "Attachment A and B Data Sheets" and "Attachment C and D Data Sheets as required."

Contrary to the above, prior to March 13, 2019, the licensee failed to maintain sufficient records to furnish evidence of activities affecting quality associated with the monitoring of work performance during refueling outages. Specifically, complete records of "Attachment A and B Data Sheets" and "Attachment C and D Data Sheets as required" were not retained in accordance with TVA procedures 1-TI-68.002 and 2-TI-68.002, Section 8.1, QA Records.

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

Observation: Annual Review of Corrective Actions Associated with NRC NCV 05000390/391 2016013-02, Failure to Provide Accurate Information	71152

The inspectors performed an annual review of issues relating to the licensee providing complete and accurate information to the NRC. Specifically, the inspectors reviewed condition reports 1271306 and 1257821. CR 1271306 was written on March 10, 2017 for a violation of 10 CFR 50.9, Completeness and Accuracy of Information that was documented in inspection report 2016013 as NCV 05000390, 391/2016013-002. The violation was issued for inaccurate information provided by TVA in a response letter to the NRC's "Chilled Work Environment for Raising and Addressing Safety Concerns at the Watts Bar Nuclear Plant," dated March 23, 2016.

In their response letter, TVA indicated that an effectiveness review of the prior implementation of Confirmatory Order (EA-09-009/203) had been completed when, in fact, it had not been completed. Additionally, CR 1257821 was written on February 2, 2017 to perform a common factors or common cause analysis of a number of recent issues or proposed NRC violations against 10 CFR 50.9.

The residents reviewed the corrective actions associated with each of these CRs. The licensee created the following corrective actions for CR 1271306: 1 - create gap analysis,

2 – site licensing review after completion of gap analysis, and 3 – closure review. The licensee did not identify any gaps or deficiencies. The residents noted that CR 1257821 was closed to a recommendation of no action. The licensee wrote CR 1370133, on December 19, 2017, to address the lack of corrective actions. This resulted in a revision to TVA procedure NPG-SPP-03.10, Managing TVA's Interface with the NRC, to address the need for additional ownership and rigor in the NRC submittal process.

Failure to Follow System Status Control Procedure Results in a Gap in a Bellows Seal and Inoperability of the Unit 2 Shield Building.

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000391/2019002-005 Open/Closed	[H.8] - Procedure Adherence	71153

A self-revealed Green finding and associated NCV of TS 5.7.1.1.a, Procedures, was identified for the failure to follow the requirements of TVA procedure NPG-SPP-10.1, System Status Control, Revision 10. Specifically, on June 20, 2019, it was discovered that the Unit 2 shield building was inoperable due to a gap introduced into a bellows seal between the main steam valve vault room and the annulus.

Description: On June 20, 2019, radiation protection personnel were performing surveys in the Unit 2 annulus (the space between the concrete shield building and the reactor containment) when they felt air flow coming from outside the shield building into the annulus. The licensee investigation found that rubber bellows seal R2S065 pulled off from its associated penetration through the shield building, leaving an approximate one inch by ten inch gap. The licensee determined that the bellows was most likely pulled off of the penetration by having been stepped on during work that was previously performed in the area. This represented a change of the status of the shield building (i.e. it became inoperable), and was neither authorized, nor documented, in accordance with site procedures.

Inspectors reviewed the requirements of NPG-SPP-10.1, System Status Control, Revision 10. Section 3.2.6, Work Documents, states in part that work activities that change the status of components must be authorized and documented by one of the following: NPG-SPP-10.2, Clearance Program, NPG-SPP-06.1, Work Order Process Initiation, Approved plant procedures, or NPG-SPP-09.5, Temporary Modifications Temporary configuration changes.

Additionally, the pulling off of the bellows was not reported when it occurred, but was found later by radiation protection technicians who were in the area doing preliminary radiation surveys to determine if the annulus could be down-posted from a high radiation area. The technicians were performing an activity, not specifically looking for air leaks or other degradation, but felt warm air which was readily detectable when they stepped off the ladder at their work location and therefore this issue is considered self-revealed.

Corrective Actions: The immediate corrective actions taken by the licensee was to declare the shield building inoperable and enter technical specification limiting condition for operation 3.6.15 Condition A. The licensee documented this issue in their CAP as CR 1526540.

Corrective Action References: CR 1526540 and CR 1527618

Performance Assessment:

Performance Deficiency: The failure to follow TVA procedure NPG-SPP-10.1, System Status Control, Revision 9, Section 3.2.6.A was a performance deficiency. Specifically, Section 3.2.6.A required that work activities that change the status of components must be authorized and documented by one of the following: NPG-SPP-10.2, Clearance Program, NPG-SPP-06.1, Work Order Process Initiation, Approved plant procedures, or NPG-SPP-09.5, Temporary Modifications Temporary configuration changes. Contrary to this requirement, during work in the area of the penetration the bellows seal was removed without being authorized and documented by one of the procedures and resulted in shield building inoperability.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the Shield Building was inoperable due to the performance deficiency.

Significance: The inspectors used the SDP Appendix Router to arrive at IMC 0609, Appendix A. The SDP for Findings At-Power. The inspectors determined that the finding screened to Green in accordance with IMC 0609, Appendix A, Exhibit 3, Barrier Integrity Screening Questions, Section C, Control Room, Auxiliary, Reactor, or Spent Fuel Pool Building, because the finding only represented a degradation of the radiological barrier function provided for the auxiliary building.

Cross-Cutting Aspect: H.8 - Procedure Adherence: Individuals follow processes, procedures, and work instructions. Cross-Cutting Aspect: The finding had a cross-cutting aspect in the Procedure Adherence attribute of the Human Performance area as defined in IMC 0310, Aspects within the Cross- Cutting Areas, because the licensee failed to comply with their Conduct of Maintenance procedure by stepping on plant equipment and this resulted in the loss of configuration control.

Enforcement:

Violation: TS 5.7.1, Procedures, in subsection 5.7.1.1.a, requires written procedures covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, which includes equipment control activities (e.g. locking and tagging) in section 1.c, be established, implemented, and maintained. Contrary to the above, on June 20, 2019, the licensee failed to adequately implement procedure, NPG-SPP-10.1, System Status Control, when it was discovered that the work activities that change the status of components were not authorized and documented in accordance with NPG-SPP-10.1, System Status Control.

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 Clearance Procedure Results in Inoperability of the Unit 2 Power Range Nuclear Instrument.			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section

Initiating Events	Green NCV 05000391/2019002-06 Open/Closed	[H.11] - Challenge the Unknown	71153

The inspectors identified a Green finding and associated NCV of TS 5.7.1.1.a, when the licensee failed to follow procedure NPG-SPP-10.2, Clearance Procedure to Safely Control Energy. Specifically, when developing the clearance for work on the source range and intermediate range instruments, the licensee failed to evaluate if the clearance would cause an undesired trip or actuation of another system. As a result, the power range channel N-42 was inadvertently de-energized when Breaker 45, 2-BKR-235-2/45, was opened to complete the planned work on the intermediate range and source range nuclear instruments.

Description: On March 17, 2019, the licensee hung clearance 2-92-0105 in order to proceed with work related to the Channel II shutdown monitor. The clearance identified that the Intermediate Range Drawer Instrument Power, 2-NI-92-136; the Source Range Drawer Instrument Power, 2-NI-92-132E; the Shutdown Monitor, 2-NI-92-134; the Local Source Range Neutron Monitor, 2-NM-92-132; and the Amplifier I-R Pulse Output, Source Range Output, and Intermediate Range Campbell Mode Output, 2-NM-92-136, would all be affected by the clearance, which opened the 120V AC Vital Instrument Power Board 2-II, Breaker 45, 2-BKR-235-2/45. However, the clearance did not appropriately identify that power would also be removed from the Power Range Monitor, N-42.

Following the opening of 2-BKR-235-2/45, the Power Range Monitor, N-42, de-energized and the operators entered the applicable TS LCO and completed the applicable actions within the required time.

During the clearance writing, the licensee did not recognize that the Power Range Monitor, N-42, was wired to the 2-BKR-235-2/45 circuit.

NPG-SPP-10.2, Rev. 0021, Clearance Procedure to Safely Control Energy, Attachment 15, Checklist for Preparing and Reviewing Clearance, requires the licensee to “evaluate if work or clearance affects any logic or interlocks that could cause undesired trip or actuation of other systems.” Attachment 15 also requires the licensee to “identify actions to prevent trip/actuation,” if the licensee has, in fact, identified undesired trip or actuations of other systems as a result of the clearance.

The licensee failed to ensure that all affected components were adequately identified in the clearance in accordance with NPG-SPP-10.2, Attachment 15. Subsequently, on March 17, 2019, at approximately 1603, the licensee inadvertently de-energized the Power Range Nuclear Instrument, N-42, and entered the applicable TS LCO and abnormal operating instruction (AOI). At approximately 1711 on March 17, 2019, the licensee restored operability of N-42, by powering it back up, and subsequently exited the applicable TS LCO and AOI.

Corrective Actions: The immediate corrective actions taken by the licensee, following the inadvertent de-energization, was to restore its operability by restoring power to N-42. The licensee documented this issue in their CAP.

Corrective Action References: CR 1499812 and CR 1507301

Performance Assessment:

Performance Deficiency: The failure to adequately identify the Power Range Nuclear Instrument, N-42, as an affected component of the clearance work, as required by station

procedure NPG-SPP-10.2, Revision 0021, Clearance Procedure to Safely Control Energy, Attachment 15, Checklist for Preparing and Reviewing Clearance, was a performance deficiency. Specifically, NPG-SPP-10.2, Attachment 15 requires the licensee to evaluate if work or clearance affects any logic or interlocks that could cause undesired trip or actuation of other systems, and if so, to also identify actions to prevent trip/actuation.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance 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, the performance deficiency resulted in the inoperability of N-42, one of four power range channels, thereby inserting a power range high flux trip for that channel. This adversely affected the availability of the reactor protection system to respond to a spurious trip on another channel thereby increasing the likelihood of a reactor trip.

Significance: The inspectors screened the finding using IMC 0609, Appendix A. The SDP for Findings At-Power, Exhibit 2, Mitigating Systems Screening Questions, Section C, Reactivity Control Systems. The inspectors answered "no" to the three screening questions located in IMC 0609, Appendix A, Exhibit 2, Section C; and therefore, determined the significance of this finding to be Green.

Cross-Cutting Aspect: H.11 - Challenge the Unknown: Individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding. Specifically, reference drawings used for the clearance were not consistent in identifying that the power range nuclear instrument, N-42, was also powered from breaker 2-BKR-235-2/45. As documented in CR 1499812, the clearance preparer requested assistance from the maintenance instrument group and the Westinghouse subject matter expert (SME). The SME confirmed there were no connections to the power range drawer, however, this was an incorrect conclusion. Additionally, 2-BKR-235-2/45 is labeled as "Nuclear Instrument System Power Channel II to Panel 2-M-13." The nuclear instrument system includes source, intermediate, and power range instruments. Panel 2-M-13 identified NIS Channel II with a placard, under which are the Channel II source, intermediate, and power range drawers. Therefore, the fact that the breaker also powered the power range could have been recognized during a thorough review of the work site if drawing accuracy was in question.

Enforcement:

Violation: TS 5.7.1, Procedures, in subsection 5.7.1.1.a, requires that written procedures covering activities that are recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, which includes properly pre-planning maintenance that can affect performance of safety-related equipment in section 9.a, be established, implemented, and maintained. Contrary to the above, on March 17, 2019, the licensee failed to adequately implement NPG-SPP-10.2, Clearance Procedure to Safely Control Energy, Attachment 15, Checklist for Preparing and Reviewing Clearance, when it failed to identify and evaluate the effects on the power range nuclear instrument, N-42, which led to the inadvertent de-energization and inoperability of N-42.

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 July 23, 2019, the inspectors presented the integrated inspection results to Mr. Tony Williams and other members of the licensee staff.
- On April 25, 2019, the inspectors presented the Exit Meeting to Anne E. Robinson-Givens 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-1-500KV	Main Control Room Voltage Monitoring	17
71111.01	Procedures	0-TI-12.15	Offsite Power Requirements	3
71111.04	Drawings	0-47W8-1	Auxiliary and Reactor Building Units 1 and 2 Mechanical - Flow Diagram Fuel Pool Cooling and Cleaning System	0
71111.04	Miscellaneous	2-SOI-63.01 ATT 1V	Safety Injection System Valve Checklist 2-63.01-1V	0005
71111.04	Procedures	0-SOI-78.01	Spent Fuel Pool Cooling And Cleaning System	Revision 26
71111.04	Procedures	0-SOI-78.01	Spent Fuel Pool Cooling and Cleaning System	26
71111.04	Procedures	1-PI-OPS-1-PE	Protected Equipment	21
71111.04	Procedures	2-SOI-63.01 ATT 1H	Safety Injection System Handswitch Checklist 2-63.01-1H	0000
71111.04	Procedures	2-SOI-63.01 ATT 1P	Safety Injection System Power Checklist 2-63.01-1P	0010
71111.04	Procedures	WBN-SDD-N3-78-4001	Spent Fuel Pool Cooling and Cleaning System Unit 1 / Unit 2	Revision 24
71111.04S	Drawings	0-47W-803-2	Flow Diagram, Auxiliary Feedwater	8
71111.04S	Miscellaneous		Unit 2 Auxiliary Feedwater Health Report Scorecard 10/01/2018 - 03/31/2019	03/31/2019
71111.04S	Miscellaneous	SDD-N3-3B-4002	Auxiliary Feedwater System Unit 1/Unit 2	28
71111.04S	Procedures	2-SOI-3.02 Attachment 1H	Auxiliary Feedwater System Handswitch Checklist 2-3.02-1H	0005
71111.04S	Procedures	2-SOI-3.02 Attachment 1P	Auxiliary Feedwater System Power Checklist 2-3.02-1P	0006
71111.04S	Procedures	2-SOI-3.02 Attachment 1V	Auxiliary Feedwater System Valve Checklist 2-3.02-1H	0007
71111.05Q	Drawings	0-47W240-4	Figure 11-31A	
71111.05Q	Drawings	0-47W240-8	Figure 11-35A	
71111.05Q	Procedures	Fire Protection Report Volume 1	Fire Protection Report Volume 1	55
71111.08P	Corrective Action Documents	Condition Report 1479540	NSAL-05-02 Steam Generator Non-Conformance	01/03/19

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.08P	Corrective Action Documents	CR-1510749	Review CR-1479540 disposition for NRC identified inconsistencies in the action items associated with CR 1479540 that is related to Westinghouse NSAL-05-02	4/24/19
71111.08P	Engineering Evaluations	SG-CDMP-19-1	Watts Bar U2R2 Steam Generator Degradation Assessment	Rev. 0
71111.08P	Engineering Evaluations	SG-CDMP-19-10	Watts Bar U2R2 Steam Generator Condition Monitoring and Operational Assessment	5/6/2019
71111.08P	Miscellaneous	ETSS # 10013.1	Eddy Current Examination Technique Specification Sheet for I-600MA Tubing Material, 0.75, 0.875 in. OD, with 0.043, 0.05 in. Wall, for Detection of Axial ODSCC at Support Plates	
71111.08P	Miscellaneous	Roll No. 76463-055 (12), File: R006_C074.txt	Steam Generator 1, Hot Leg Plug Installation, Rolling Torque vs. Time Chart, Tube Row 6 Column 74	4/28/19
71111.08P	Miscellaneous	B. Calvery	Visual Acuity Exam Record	08/27/18
71111.08P	Miscellaneous	B. Calvery	Certificate of Method Qualification: VT-3	10/04/17
71111.08P	Miscellaneous	B. Clem	IHI Certificate of Qualification: VT-II	02/22/19
71111.08P	Miscellaneous	B. Clem	IHI Visual Acuity Examination Record	02/22/19
71111.08P	Miscellaneous	EDM # L18 190109801	Watts Bar Nuclear Plant Unit 2, Steam Generator Eddy Current Guidelines	4/8/19
71111.08P	Miscellaneous	Employee ID, D4825	Curtiss-Wright, Personnel Certification Summary, Eddy Current Technology, Level III	2/15/19
71111.08P	Miscellaneous	Employee ID, D4825	Curtiss-Wright, Visual Examination Certification	1/15/19
71111.08P	Miscellaneous	Employee ID, D8661	NDE Technology Inc. Personnel Certification Summary, Eddy Current Level IIIA	1/15/18
71111.08P	Miscellaneous	Employee ID, D8661	NDE Technology Inc. Personnel Visual Certification	6/26/19
71111.08P	Miscellaneous	H. Kim	SAE-AN Engineering Corp. Certificate of Qualification: UT-II	05/16/18
71111.08P	Miscellaneous	H. Kim	IHI Visual Acuity Examination Record	04/20/19
71111.08P	Miscellaneous	J. Judkins	IHI Certificate of Qualification: UT-I	02/06/19
71111.08P	Miscellaneous	J. Judkins	IHI Visual Acuity Examination Record	02/01/19
71111.08P	Miscellaneous	LTR-CDMP-19-18-	Watts Bar U2R2 Spring 2019 Steam Generator Secondary	3/1/19

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		P	Side Visual Inspection Plan	
71111.08P	Miscellaneous	LTR-CECO-19-036	Assessment of Watts Bar Unit-2 Steam Generator, 2.6-Inchand 2.0 Inch Un-Reinforced Port Covers for NSA-05-2 Issue.	5/1/19
71111.08P	Miscellaneous	M. Kleinjan	IHI Certificate of Qualification: UT-III*	02/25/19
71111.08P	Miscellaneous	M. Kleinjan	IHI Visual Acuity Examination Record	02/25/19
71111.08P	Miscellaneous	Roll 76463-055 (14), File: R007_C008.txt	Steam Generator 1, Hot Leg Plug Installation, Rolling Torque vs. Time Chart, Tube Row 7 Column 8	4/28/19
71111.08P	Miscellaneous	Roll No. 055 (6), File:Roo7_C008.txt	Steam Generator 1, Cold Leg, Plug Installation vs. Rolling Torque Time Chart, Tube Row 7 Column 8	4/28/19
71111.08P	Miscellaneous	Roll No. 055 (8), File: R006_C074.txt	Steam Generator 1, Cold Leg, Plug Installation vs. Rolling Torque Time Chart, Tube Row 6 Column 74	4/28/19
71111.08P	Miscellaneous	VC0111	IHI Visual Procedure Demonstration Card Verification	06/20/09
71111.08P	Miscellaneous	Watts Bar Unit 2, Technical Specification 5.7.2.12	Steam Generator (SG) Program	Amendment 2
71111.08P	Miscellaneous	Watts Bar Unit 2, Technical Specification, 3.4.17	Steam Generator (SG) Tube Integrity	Amendment 0
71111.08P	NDE Reports	R-024	Watts Bar Unit 2 Cycle 2 Reactor Pressure Vessel Closure Head Remote VE Examination	04/26/19
71111.08P	NDE Reports	R-066	Visual Examination Record (2-47A465-2-79)	04/25/19
71111.08P	NDE Reports	R-090	Automated Examination of Selected Reactor Vessel Outlet Nozzles at Watts Bar Nuclear Plant Unit 2	04/27/19
71111.08P	NDE Reports	R-102	UT Calibration/Examination Report (RCF-D144-01B)	04/28/19
71111.08P	NDE Reports	R-109	UT Calibration/Examination Report (RCF-D144-01F)	04/28/19
71111.08P	NDE Reports	R-110	UT Calibration/Examination Report (RCS-002)	04/28/19
71111.08P	NDE Reports	R-111	UT Calibration/Examination Report (RCF-D144-01E)	04/28/19
71111.08P	Procedures	2-MI-3.015	Steam Generator Secondary Side Maintenance Activities	2/4/19
71111.08P	Procedures	2-SI-68-907	Watts Bar Unit 2, Surveillance Instruction, Steam Generator Tubing In-service and Augmented Inspections	Rev. 3

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.08P	Procedures	EPRI-PIPE-MPA-1	Procedure for Manual Phased Array Ultrasonic Examination of Austenitic and Ferritic Pipe Welds	Rev. 2
71111.08P	Procedures	ISwT-PDI-AUT4	Automated Inside Surface Ultrasonic Examination of Pressure Vessel Nozzle-to-Shell Welds using Phased Array	Rev. 3
71111.08P	Procedures	ISwT-VT1	Remote Visual Examination of Reactor Pressure Vessel Interior and Components	Rev. 3
71111.08P	Procedures	MRS-SSP-2448-WBT	Remote Examination and Removal of Foreign Objects from Steam Generator Secondary Side	Rev. 4
71111.08P	Procedures	MRS-SSP-3366	Roll Expanded Mechanical Tube Plugging and Stabilizer Installation at Watts Bar Unit 1&2 and Sequoyah Units 1 & 2	Rev. 1
71111.08P	Procedures	N-UT-84	Procedure for Phased Array Ultrasonic Examination of Austenitic and Ferritic Pipe Welds	Rev. 0005
71111.08P	Procedures	N-VT-1	Visual Examination Procedure for ASME Section XI Preservice and Inservice	Rev. 0048
71111.08P	Procedures	N-VT-17	Visual Examination for Leakage of PWR Reactor Head Penetrations	Rev. 0010
71111.08P	Work Orders	118933523	Implement DCN 66408 STG-2 Install 2-RFV-70-0698	Rev. 0
71111.11Q	Miscellaneous	3-OT-SRT-REP-SAMG-1		1
71111.12	Corrective Action Documents	CR 1512661		
71111.12	Drawings	2-45W760-63-1	Wiring Diagrams Safety Injection System Schematic Diagram	12/15/2008
71111.12	Miscellaneous	CDE Record Number 1631	Safety Injection Pump 2B-B Breaker	04/30/2019
71111.12	Miscellaneous	CDE Record Number 1631	Safety Injection Pump 2B-B Breaker	04/30/2019
71111.12	Procedures	0-SI-82-6	18 Month Loss of Offsite Power with Safety Injection Test - DG 2B-B	49
71111.12	Procedures	0-TI-119	Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting - 10 CFR 50-65	10
71111.12	Procedures	NPG-SPP-3.4	Maintenance Rule Performance Indicator Monitoring,	3

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Trending and Reporting - 10 CFR 0.65	
71111.12	Work Orders	120436516		
71111.12	Work Orders	120436516		
71111.13	Corrective Action Documents	CR1524221		06/12/2019
71111.13	Drawings	0-47W8-1 RO 9.1-3	Powerhouse Aux & Reactor Building Units 1 & 2 Mechanical - Flow Diagram Fuel Pool Cooling and Clean System	
71111.13	Drawings	0-47W859-1	Mechanical Flow Diagram Component Cooling System	09/18/2015
71111.13	Miscellaneous		Operator's Risk Report	06/24/2019
71111.13	Miscellaneous	Operator's Risk Report		06/11/2019
71111.13	Miscellaneous	TVA-41394	Defense-In-Depth Summary Sheet Night Shift	April 17, 2019
71111.13	Miscellaneous	Unit 1 Operations Log		06/12/2019
71111.13	Procedures	NPG-SPP-07.3	Work Activity Risk Management Process	0028
71111.13	Procedures	NPG-SPP-09.1.11.1	Equipment Out of Service Management	12
71111.13	Procedures	NPG-SPP-09.11.1	Equipment Out of Service Management	0012
71111.13	Procedures	NPG-SPP-09.11.1	Risk Assessment Methods for Technical Specifications	0003
71111.15	Corrective Action Documents	CR 1513752	Conduit Seal 2VC3064B had a hole	5/3/2019
71111.15	Corrective Action Documents	CR 1522957		06/26/2019
71111.15	Corrective Action Documents Resulting from Inspection	CR 1514706	NRC questioned Past Operability associated with CR 1513752	5/7/2019
71111.15	Miscellaneous	EWR19MEC074244	Engineering Work Request for Engineering Evaluation for CR150568	April 23, 2019
71111.15	Miscellaneous	EWR19MEC078246	Calculation for CCS requirements vs. current SFP heat load	May 24, 2019
71111.15	Work Orders	119526487		March 7, 2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.18	Drawings	0-47E235-77	Environmental Data Environment - Harsh EL 685.0	12/17/2014
71111.18	Drawings	2-47-w-76-100	Mechanical Motor Operated Valve Orientation and T-Drain Requirements	06/06/2016
71111.18	Drawings	2-47W76-101	Mechanical Motor Operated Valve Orientation and T-Drain Requirements	06/10/2016
71111.18	Miscellaneous	WBN 19-486	Add T-Drain to Unit 2 Containment Sump MOV 2-FCV-063-0072-A	0
71111.18	Miscellaneous	WBN 19-491	Add T-Drain to 2-FCV-063-0073, 2-FCV-72-44 and 2-FCV-72-45	0
71111.19	Drawings	1-45W700-1	Key Diagram 120V AC & 125V DC Vital Plant Control Power System	Rev. 36
71111.19	Miscellaneous		Functional check of 3ORX relay for SIP 2B-B	0000
71111.19	Miscellaneous	WBN-VTD-W120-5030	Gate and Check Valve Instruction Manual	1
71111.19	Procedures	0-MI-0.002	Valve Maintenance	9
71111.19	Procedures	0-MI-0.16.02	Limitorque Motor Operator Repair and Adjustment Guidelines for SMB-00, SB-00, and SBD-00 (10 CFR 50.49)	3
71111.19	Procedures	0-MI-0.29	Enhanced Valve Packing	9
71111.19	Procedures	0-MI-235.002	120 VAC Vital Inverter Automatic Transfer Test	Rev. 0008
71111.19	Procedures	0-MI-57.029	HFA Relay Maintenance - New Relay	0001
71111.19	Procedures	0-MI-57.029	HFA Relay Maintenance - Old Relay	0001
71111.19	Procedures	2-BKR-063-0015-B	CM Work Instructions	0
71111.19	Procedures	2-SI-63-915-A	Safety Injection System - Valve Position Indication Verification and Full-Stroke Exercising (Train A)	7
71111.19	Procedures	2-SI-74-905-A	Residual Heat Removal Pump 2A-A Comprehensive Test during Refueling Outages	Revision 6
71111.19	Procedures	2-SI-74-905-B	Residual Heat Removal Pump 2B-B Comprehensive Test during Refueling Outages	6
71111.19	Procedures	2-SI-74-905-B	Residual Heat Removal Pump 2B-B Comprehensive Test during Refueling Outages	Revision 6
71111.19	Procedures	2-SI-99-625-B	Response Time Test - Containment Isolation Phase B Slave Relay L625 - Train B, One Time Only	A

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.19	Procedures	3-OT-SYS235A	120VAC Distribution	Rev. 17
71111.19	Procedures	MMTP-144	Motor Operated Valve Diagnostic Testing	0002
71111.19	Procedures	SI-63-915-B	Safety Injection System - Valve Position Indication Verification and Full-Stroke Exercising (Train B)	7
71111.19	Work Orders	119474938	**MULT EQUIP** INSP/LUBE OF VALVE STEMS FOR MOV'S, EQ AND 89-10, IAW PM INSTRUCTION	04/30/2019
71111.19	Work Orders	119550496	Generate a U2R2 corrective maintenance WO to lower the packing to within the existing design.	04/20/2019
71111.19	Work Orders	120014486	As-found/As-left MOVATS testing, IAW MMTP-144	04/17/2019
71111.19	Work Orders	120416807		04/23/2019
71111.19	Work Orders	120418321	Remove/install valve operator to support valve disassembly via WO 120416807	04/22/2019
71111.19	Work Orders	120436516	Functional check of 30RX relay for safety injection pump 2B-B	05/02/2019
71111.19	Work Orders	120437595		05/28/2019
71111.22	Procedures	0-SI-82-5	18 Month Loss of Offsite Power with Safety Injections	47
71111.22	Procedures	1-SI-72-904-A	Check Valve Testing During Operations - Containment Spray (Train A)	0028
71111.22	Procedures	1-SI-72-904-A	Check Valve Testing During Operations - Containment Spray (Train A)	0028
71111.22	Procedures	2-SI-0-703	Containment Integrated Leak Rate Test	0006
71111.22	Procedures	2-SI-26-701	Containment Isolation Valve Local Leak Rate Test Lower Compartment ERCW	0002
71111.22	Procedures	2-SI-26-701	Containment Isolation Valve Local Leak Rate Test High Pressure Fire Protection	0002
71111.22	Procedures	2-SI-61-2	18 Month Ice Weighing	Revision 8
71111.22	Procedures	2-SI-61-3	18 Month Ice Condenser Flow Passages Inspection	1
71111.22	Procedures	2-TI-120	CILRT Support Functions	0005
71111.22	Work Orders	119238265		04/22/2019
71111.22	Work Orders	119526986	2-SI-26-701, Containment Isolation Valve Local Leak Rate Test High Pressure Fire Protection for 2-FCV-26-240	04-25-2019
71111.22	Work Orders	119527147	2-SI-26-701, Containment Isolation Valve Local Leak Rate	04/25/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Test Lower Compartment Essential Raw Cooling Water (ERCW), for 2-FCV-67-95 on April 25,2019	
71111.22	Work Orders	11988146	1-SI-72-904-A, Check Valve Testing During Operations - Containment Spray Train A	04/25/2019
71111.22	Work Orders	119888146		04/25/2019
71111.22	Work Orders	120249489		05/02/2019
71114.06	Miscellaneous	2019 WBN May SAMG Drill	EP Drill (SAMGs)	05/29/2019
71124.01	Miscellaneous		Unit 1 Operations Log	5/1/19
71124.01	Procedures	1-ARI-173-179	U-1 Radiation Detectors	Rev. 10
71124.01	Procedures	RCI-104	Radiological Response to Abnormal Plant Conditions	Rev. 19
71124.01	Radiation Surveys	WBN-M-20190225-13	Waste Packaging Area 729'	2/25/19
71124.01	Radiation Surveys	WBN-M-20190423-35	U2 Raceway 702'	4/23/19
71124.01	Radiation Surveys	WBN-M-20190509-8	Waste Packaging Area 729'	5/9/19
71124.01	Radiation Surveys	WBN-O-20180123-5	Auxiliary Building 713' Overhead	1/23/18
71124.01	Radiation Surveys	WBN-O-20190423-9	Overhead scaffold ladder survey	4/25/19
71124.01	Radiation Surveys	WBN-O-20190501-1	Waste Packaging Area 729'	5/1/19
71124.01	Radiation Work Permits (RWPs)	19250012	U2 Lower Containment - HRAs	Rev. 1
71124.02	Corrective Action Documents	CR 1335841		
71124.02	Corrective Action Documents	CR 1357731		
71124.02	Procedures	NPG-SPP-05.2	ALARA Program	Rev. 10
71124.02	Procedures	NPG-SPP-05.2.1	Operational ALARA Planning & Controls	
71124.03	Miscellaneous		Grade D Breathing Air Analysis	10/9/18
71124.03	Miscellaneous		Grade D Breathing Air Analysis	2/28/19
71124.04	Corrective Action	CR 1355637		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Documents			
71124.04	Corrective Action Documents	CR 1452137		
71124.04	Miscellaneous		Tennessee Valley Authority Radiation Protection Fleet Position Paper, Prospective Determination for Occupational Exposure (2011 - 2018)	Rev. 2
71124.04	Procedures	RCDP-15	Dosimetry Operations	Rev. 4
71124.04	Procedures	RCI-111	Special Exposure Monitoring	Rev. 16
71124.05	Calibration Records	Work Order# 117969491	U2 Containment Upper Compartment High Range Post Accident Area Radiation Monitor Loop 2-LPR-90-271-A	06/16/2017
71124.05	Calibration Records	Work Order# 119318356	U2 Containment Upper Compartment High Range Post Accident Area Radiation Monitor Loop 2-LPR-90-271-A	08/29/2018
71151	Corrective Action Documents	CR 1487405		
71151	Miscellaneous	T25180118098	Mitigating System Performance Index (MSPI) Basis Document for Watts Bar	Revision 14
71152	Corrective Action Documents	1482829, 1427240, 1453127, 1457146, 1461395, 1494434, 1497704, 1501568, 1502772		
71152	Miscellaneous	Common Factor Analysis for CR 1461395		