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

November 1, 2018

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

SUBJECT: WATTS BAR NUCLEAR PLANT – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 05000390/2018003 AND 05000391/2018003

Dear Mr. Shea:

On September 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant, Units 1 and 2. On October 24, 2018, the NRC inspectors discussed the results of this inspection with Mr. Tom Marshall and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented four findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

Further, inspectors documented three licensee-identified violations which were determined to be of very low safety significance in this report. The NRC is treating these violations as NCVs consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, 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 the Watts Bar Nuclear Plant.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC resident inspector at the Watts Bar Nuclear Plant.

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

Sincerely,

/RA/

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

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

Enclosure:
IR 05000390/2018003, 05000391/2018003

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SUBJECT: WATTS BAR NUCLEAR PLANT – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 05000390/2018003 AND 05000391/2018003 DATED NOVEMBER 1, 2018

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number(s):	50-390, 50-391
License Number(s):	NPF-90, NPF-96
Report Number(s):	05000390/2018003, 05000391/2018003
Enterprise Identifier:	I-2018-003-0036
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Watts Bar Nuclear Plant, Units 1 and 2
Location:	Spring City, TN 37381
Inspection Dates:	July 1 to September 30, 2018
Inspectors:	J. Nadel, Senior Resident Inspector J. Hamman, Resident Inspector M. Thomas, Resident Inspector M. Donithan, Reactor Inspector M. Kirk, Resident Inspector (Browns Ferry) S. Roberts, Resident Inspector (Saint Lucie) A. Butcavage, Reactor Inspector W. Loo, Senior Health Physicist A. Nielsen, Senior Health Physicist
Approved By:	Anthony D. Masters, Chief Reactor Projects Branch 5 Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee's performance by conducting a quarterly integrated inspection at Watts Bar Nuclear Plant, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. Self-revealed findings, violations, and additional tracking items are summarized in the table below. Licensee-identified non-cited violations are documented in report sections 71111.05AQ and 71153.

List of Findings and Violations

Configuration Control Error Results in Actual Auxiliary Building Internal Flooding Event			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green Non-cited violation (NCV) 05000390/2018003-01 Closed	[H.12] – Avoid Complacency	71111.06
A self-revealed Green finding and associated NCV of Technical Specification (TS) 5.7.1, "Procedures," was identified when the licensee failed to maintain adequate configuration control in the high pressure fire protection (HPFP) system in accordance with station configuration control procedure, NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy." Specifically, the licensee failed to restore HPFP system vent and drain valves to their appropriate configuration prior to returning the system to service which resulted in a significantly large amount of HPFP system water (on the order of 10,000 gallons) being introduced into many areas (including all levels) of the Unit 1 side of the auxiliary building and wetting numerous structures, systems, and components (SSCs) (including cables, ventilation ducts, motor-operated valves, etc.)			

Unauthorized Entry Into a High Radiation Area			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000391/2018003-02 Closed	[H.4] – Teamwork	71124.01
A self-revealed Green finding and associated NCV of TS 5.11.1.e was identified when the licensee failed to maintain current survey information and failed to inform a worker of increased dose rates in a high radiation area. As a result, a worker received an electronic dosimeter alarm on the Unit 2 pressurizer platform due to changing radiological conditions associated with a reactor mode change.			

Failure to Collect Compensatory Samples for an Out-of-Service Effluent Monitor			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Public Radiation Safety	Green NCV 05000390/2018003-03 Closed	[H.12] – Avoid Complacency	71124.06
The inspectors identified a Green finding and associated NCV of TS 5.7.2.3 when the licensee failed to take compensatory samples in accordance with Table 1.1-1 of the Offsite Dose Calculation Manual when the Unit 1 steam generator blowdown effluent monitor was out			

of service. Specifically, radiation monitor 1-RM-90-120/121 was inoperable from April 27 to May 27, 2018, and compensatory samples were not collected and analyzed within the required frequency of at least once per 24 hours.

Inadequate Sensitive Equipment Control Results in Unit 2 Reactor Trip on April 12, 2018			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000391/2018003-04 Closed	[H.5] – Work Management	71153
A self-revealed Green finding and associated NCV of Title 10 of the *Code of Federal Regulations* (CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, Drawings," was identified for the licensee's use of a procedure that was not appropriate to the circumstances, which led to the conduct of improperly planned maintenance on sensitive equipment, ultimately resulting in a reactor trip. Specifically, an inadequacy was identified in station procedure 0-TI-12.10, "Control of Sensitive Equipment," which lists the sensitive equipment defined, in part, as equipment that could cause a unit trip, on which work activities are required to be appropriately planned and conducted in a manner that will preclude a unit trip. The procedure did not list the high side reactor coolant system loop flow transmitter common drain line as sensitive equipment, which allowed the licensee to improperly perform maintenance on it without the appropriate planning and control necessary to preclude the Unit 2 reactor trip that occurred on April 12, 2018.			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
LER	05000390/2018001-00	Failure to replace capacitors results in inoperable 120 VAC vital inverter	71153	Closed
LER	05000390/2017006-00	Structural degradation of 161 kV line pole leads to condition prohibited by TS	71153	Closed
LER	05000390, 05000391/2017014-00	Main control room boundary door left open leading to a loss of safety function	71153	Closed
LER	05000391/2018001-00	Reactor trip on low reactor coolant system flow due to maintenance on flow instrumentation	71153	Closed

PLANT STATUS

Unit 1 operated at or near rated thermal power (RTP) from the beginning of the inspection period until September 15, 2018, when the unit shut down for a planned refueling outage. The unit remained shut down in a refueling outage for the remainder of the inspection period.

Unit 2 started the inspection period at approximately 45 percent power during power ascension from a previous trip. The unit achieved at or near RTP on July 3, 2018. The unit continued operating at or near rated thermal power until August 22, 2018, when the unit tripped due to a turbine trip. The unit returned to at or near RTP on August 30, 2018, and remained there throughout the rest 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

Seasonal Extreme Weather (1 Sample)

Inspectors evaluated site readiness for extreme high temperatures by walking down the 500kV switchyard and evaluating procedural checklists for summer readiness.

71111.04 - Equipment Alignment

Partial Walkdown (5 Samples)

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

(1) The 2A containment spray pump while the 2B was out of service for a planned surveillance test, on July 18, 2018
(2) The B main control room (MCR) chiller while A MCR chiller was out of service for maintenance, on August 20, 2018
(3) Emergency diesel generators (EDGs) 1A, 2A, 1B, 2B, and the alternate feeder while C common station service transformer (CSST) was out of service for a planned outage, on August 20, 2018

(4) The 2A EDG while the 2B EDG was undergoing surveillance testing and engine analysis, on August 29, 2018
(5) The 1A and 1B motor driven auxiliary feedwater (MDAFW) pumps after construction of pre-outage scaffolds in mode 1, on September 27, 2018

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

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

(1) Missed entry into OR-14.10.4 when Unit 1 Pressurizer power operated relief block valve was closed, condition report (CR) 1432723 July 19, 2018
(2) EDG CO2 when CO2 tank developed a leak due to maintenance activities on refrigerant line on August 3, 2018
(3) Control building, elevation 708', Unit 1 and Unit 2 auxiliary instrument rooms and computer room on August 14, 2018
(4) Auxiliary building 772' Unit 1 and Unit 2, A and B, 480V board rooms, 480V transformer rooms, 125V vital battery rooms, and 5th vital battery and board room on September 12, 2018
(5) Unit 1 containment during U1R15 outage, on September 27, 2018

71111.06 - Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the auxiliary building on July 21, 2018.

Cables (1 Sample)

The inspectors evaluated cable submergence protection in:

(1) Manhole 3B, work order (WO) 119273871 on August 24, 2018

71111.07 – Heat Sink Performance

Heat Sink (Triennial) (3 Samples)

The inspectors evaluated heat exchanger and heat sink performance and maintenance on the following components from July 16 to July 20, 2018:

(1) Heat exchangers, cooled by service water, IP Section 02.02.b
- component cooling system heat exchangers A,B,C
- EDG heat exchangers 2A-A , 2B-B
- 1A-S, turbine driven auxiliary feedwater (TDAFW) pump alternate lube oil cooling water source

(2) Heat exchanger, closed loop or air cooled, IP Section 02.02.c
- Unit-1, residual heat removal heat exchanger 1A

(3) Ultimate heat sink, Sections 02.02.d.5, 02.02.d.6 and 02.02.d.7
- essential raw cooling water (ERCW) pumps in-service tests, train “A”, pumps C-A, D-A
- intake pumping station, pump bay train “A”, inspection /cleaning
- ERCW system buried piping train “A”, system leakage test
- break of downstream dam, abnormal operating instruction
- intake channel maintenance walk-down inspection
- intake structure and associated ERCW pumps, traveling screens, and strainer equipment walk-down inspections

71111.08 - Inservice Inspection Activities (1 Sample)

The inspectors evaluated pressurized water reactor non-destructive testing by reviewing the following examinations from September 24-28, 2018:

(1) Ultrasonic (UT)
   a) Ultrasonic Calibration/Examination Report No. R-013, Weld MRP-146-DR-2, RCS Drain Line, ASME Class 1 (Reviewed)
   b) Ultrasonic Calibration/Examination Report No. R-051, Component ID, RSGFW-4, Steam Generator 4, Feedwater Nozzle to Shell Weld, ASME Class 2, September 25, 2018 (Observed)

(2) Visual
   a) Summary Report, VT-2 of Class 1, Reactor Bottom Mounted Instrumentation Penetration Nozzles, 17, 22, 25, 32 and 49, IAW ASME Code Case N-722 (Video Review)
   b) Summary Report, VT-2 of Class 1, Reactor Upper Head Surface of CRDM Penetration Nozzles10,18, 38 and 73, IAW Code Case N729, Penetration Numbers (Video Review)
   c) Summary Report No 15097, In-service Inspection (ISI), VT-3 of Seismic Support plates for CRDM Upper End, (Reviewed)

(3) Eddy Current Testing (ECT)
   a) Reactor pressure vessel bottom mounted instrumentation, Class 1, In-core Instrumentation (ICI) Thimble Tubes, Examination Results. (Reviewed.)

(4) Weld Data Package
   a) Weld Number 1-003C-D0008-2AE, Auxiliary Feedwater Pump Discharge Venturi ASME Class 3, Weld Data Sheet (Reviewed.)
   b) Weld Number 1-003C-D0008-2AE, Auxiliary Feedwater Pump Discharge Venturi Weld, ASME Class 3, Record of Liquid Penetrant Examination (Reviewed.)
   c) Weld Number 1-003C-D0008-2AF, Auxiliary Feedwater Pump Discharge Venturi Weld, ASME Class 3, Data Sheet (Reviewed.)
   d) Weld Number 1-003C-D0008-2AF, Auxiliary Feedwater Pump Discharge Venturi Weld, ASME Class 3, Record of Liquid Penetrant Examination (Reviewed.)

(5) IWE Inspection Results
   a) Report Number R-043, ASME Section XI, Exam Category E-A and Appendix J, Containment Annulus, Azimuth 0-360 Degrees, Elevation 834’- Top, Visual Examination of IWE Surfaces
   b) Report Number R-054, ASME Section XI, Exam Category E-A and Appendix J, Containment Annulus All Elevations Azmoth180-270, Visual Examination of IWE Surfaces (Reviewed)
   c) Integrated Leak Rate Test Results Completed January 31, 2013 (Reviewed)

The inspectors also evaluated the licensee's boric acid control program performance, and performed a walk-down inspection of the reactor containment building with the boric acid program owner.

The NRC walk-down inspection also included accessible portions of the lower level of the containment raceway, at the inside surface of the steel containment interface with the concrete floor area.

The inspectors also included a review of the licensee response to a Westinghouse 10 CFR Part 21 associated with control rod drive mechanism (CRDM) thermal sleeve wear and the associated EPRI Materials Reliability Program Needed Interim Guidance for PWR CRDM thermal sleeve wear.

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

On July 10, 2018, inspectors observed simulator as-found exam per scenario 3-OT-SRE-1004, Revision 4, ERCW pump trip, anticipated transient without scram (ATWS), and main steam line break.

Operator Performance (1 Sample)

The inspectors observed and evaluated the U1RFO15 shutdown and cooldown of Unit 1 on September 15, 2018.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (1 Sample)

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

(1) CR 1402327, Intake pumping station strainer room B sump check valve 0-CKV- 40-598 stuck open

Quality Control (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance issues:

(1) Control of quality parts and quality control verifications for WO 119028006, Central processing unit installation in the main control board for design change notification (DCN) 66465, on September 20,2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (6 Samples)

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

(1) Risk assessment for July 18, 2018, with the 2B containment spray pump and auxiliary building gas treatment system train B out of service for surveillance testing
(2) Risk assessment for week of August 13, 2018, with the Unit 1 turbine driven auxiliary feedwater pump out of service for a pump component outage
(3) Risk review of CR 1433989 on August 15, 2018, for the failure of the Unit 2 turbine setter to 000.0 and associated adverse condition monitoring plan
(4) Risk assessment for week of August 20, 2018, with common station service transformer C (CSST C) out of service for planned outage
(5) Risk assessment for August 24, 2018, with Unit 2 shutdown in Mode 3 for a forced outage
(6) Risk assessment for September 15, 2018, with Unit 1 in Mode 3 during refuel outage U1R15

71111.15 - Operability Determinations and Functionality Assessments (8 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Prompt determination of operability (PDO) for CRs 1390880, 1391006, 1391009, 1391010, and 1391012, Improper determination of span adjustment for Rosemount transmitters used for Unit 2 steam generator wide and narrow range instruments
(2) Immediate determination of operability (IDO) for CR 1438627, Lower containment ventilation cooler 1B outlet temperature control valve 1-TCV-67-100 failed closed
(3) IDO and PDO for CR 1421234, Unit 1 and Unit 2 auxiliary feedwater system operability between 0 percent and 22 percent power
(4) Past operability determination (POE) for CR 1398085, Tornado dampers indicated closed when powered on
(5) POE for CRs 1383947, 1383948, Failure of penetration relief check valves to open
(6) IDO for CR 1439643, 1B-B EDG load swings during monthly surveillance causing FLEX diesel lockout
(7) IDO and Engineering Assessment for CRs 1433039, 1433048, and 1433192, Engineering evaluation of wetted components and cables due to auxiliary building flooding
(8) POE for CR 1430328, Water intrusion in Unit 1 turbine driven auxiliary feedwater pump oil system

71111.19 - Post Maintenance Testing (5 Samples)

The inspectors evaluated the following post maintenance tests:

(1) WO 119676976 and WO 119683422, 1-SOI-3.02, Turbine driven AFW pump run following maintenance to correct the water intrusion into oil issue, on June 27, 2018
(2) WO 119205758, 2-MVOP-003-0116B-A, MOV, ERCW header A isolation valve, maintenance of Limitorque actuator, on July 10, 2018
(3) WO 117745376, Water leak at 2-CKV-3-820, 2A MDAFWP discharge check valve, install new gasket and pipe dope to hinge pin plugs, on July 10, 2018

(4) WO 119716537, Replace small expansion valve, powerhead, and refrigerant lines on the B MCR chiller, on July 13, 2018
(5) WO 119812205, Replace digital reference unit for 1B-B diesel generator after load swings during monthly surveillance run on August 16, 2018

71111.20 - Refueling and Other Outage Activities (Partial Sample)

The inspectors evaluated Unit 1 refueling outage cycle 15 (U1R15) activities from September 15, 2018 to September 30, 2018.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (4 Samples)

(1) WO 119668048, 1-SI-99-10-B, One time only 1-SI-99-10-B 62 day functional test of SSPS train B and Rx trip breaker B, on July 5, 2018
(2) WO 119260715, 0-SI-82-11-A, Monthly diesel generator start and load test DG 1A-A, on July 13, 2018
(3) WO 119720997, 1-SI-63-10.1-A, Emergency Core Cooling System Venting Inside Containment, on August 28, 2018
(4) WO 119378650, 2-SI-68-28, Primary Radiochemistry Requirements, on September 7, 2018

In-service (1 Sample)

(1) WO 119539031, One time only 1-SI-3-923-S Auxiliary Feedwater Pump 1A-S Comprehensive Pump Test Credited for Quarterly Performance Test, on June 25, 2018

Containment Isolation Valve (1 Sample)

(1) WO 119064730, 1-SI-70-701, Containment Isolation Valve Local Leak Rate Test Component Cooling, on September 27, 2018

Ice Condenser (1 Sample)

(1) WO 119062458, 1-SI-61-1, Determination of Boron and pH on Ice Condenser Ice, on September 6, 2018

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (1 Sample)

The inspectors evaluated radiological hazards assessments and controls.

Instructions to Workers (1 Sample)

The inspectors evaluated worker instructions.

Contamination and Radioactive Material Control (1 Sample)

The inspectors evaluated contamination and radioactive material controls.

Radiological Hazards Control and Work Coverage (1 Sample)

The inspectors evaluated radiological hazards control and work coverage.

High Radiation Area and Very High Radiation Area Controls (1 Sample)

The inspectors evaluated risk-significant high radiation area and very high radiation area controls.

Radiation Worker Performance and Radiation Protection Technician Proficiency (1 Sample)

The inspectors evaluated radiation worker performance and radiation protection technician proficiency.

71124.06 - Radioactive Gaseous and Liquid Effluent Treatment

Walk Downs and Observations (1 Sample)

The inspectors evaluated the licensee's radioactive gaseous and liquid effluent treatment systems during plant walkdowns.

Calibration and Testing Program (Process and Effluent Monitors) (1 Sample)

The inspectors evaluated the licensee's gaseous and liquid effluent monitor instrument calibration and testing.

Sampling and Analyses (1 Sample)

The inspectors evaluated radioactive effluent sampling and analysis activities.

Instrumentation and Equipment (1 Sample)

The inspectors evaluated radioactive effluent instrumentation and equipment.

Dose Calculations (1 Sample)

The inspectors evaluated dose calculations.

71124.07 - Radiological Environmental Monitoring Program

Site Inspection (1 Sample)

The inspectors evaluated the licensee's radiological environmental monitoring program.

Groundwater Protection Initiative Implementation (1 Sample)

The inspectors evaluated the licensee's groundwater monitoring program.

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

Radioactive Material Storage (1 Sample)

The inspectors evaluated the licensee's radioactive material storage.

Radioactive Waste System Walk-down (1 Sample)

The inspectors evaluated the licensee's radioactive waste processing facility during plant walkdowns.

Waste Characterization and Classification (1 Sample)

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

Shipment Preparations (1 Sample)

The inspectors evaluated the licensee's radioactive material shipment preparation processes.

Shipment Records (1 Sample)

The inspectors evaluated the licensee's non-excepted package shipment records.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below for the period from July 1, 2017, through June 30, 2018. (8 Samples)

(1) Unit 1 and Unit 2 High Pressure Safety Injection
(2) Unit 1 and Unit 2 Cooling Water
(3) Unit 1 and Unit 2 Safety System Functional Failures
(4) Unit 1 and Unit 2 Reactor Coolant System Leak Rate

The inspectors verified licensee performance indicators submittals listed below for the period from April 1, 2017, through June 30, 2018. (2 Samples)

(1) Occupational Exposure Control Effectiveness
(2) Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences

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

Events and Personnel Performance (1 Sample)

The inspectors evaluated both the plant and licensee's response to an automatic trip of the Unit 2 reactor on August 22, 2018, caused by a failed manual U/D counter card in the main turbine.

Licensee Event Reports (4 Samples)

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

(1) 05000390/2018001-00, Failure to Replace Capacitors Results in Inoperable 120 VAC Vital Inverter
(2) 05000390, 05000391/2017014-00, Main Control Room Boundary Door Left Open Leading to a Loss of Safety Function
(3) 05000391/2018001-00, Reactor Trip on Low Reactor Coolant System Flow Due to Maintenance on Flow Instrumentation
(4) 05000390/2017006-00, Structural Degradation of 161 kV Line Pole Leads to Condition Prohibited by TS

INSPECTION RESULTS

Licensee Identified Non-Cited Violation	71111.05AQ – Fire Protection Annual/Quarterly
This violation of very low safety significance was identified by the licensee and has been entered into the licensee's corrective action program and is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: Watts Bar Nuclear Plant (WBN) Unit 1 Operating License Number NPF-90, Condition 2.F, requires, in part, that TVA shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the Fire Protection Report for the facility, as approved in Appendix FF Section 3.5 of Supplement 18 and Supplement 29 of the SER (NUREG-0847). The WBN Fire Protection Report was developed for WBN to ensure compliance with the requirements of this license condition. Fire Protection Report, Part II, is the Fire Protection Plan. The Fire Protection Plan, Section 14, "Fire Protection Systems and Features Operating Requirements (ORs)," Subsection 14.10, "Fire Safe Shutdown Equipment," paragraph 14.10.4, requires a fire watch to be established in auxiliary building room 757-A10 within one hour of closing pressurizer block valve 1-FCV-68-332-B. Contrary to the above, on July 19, 2018, the licensee failed to establish a fire watch in auxiliary building room 757-A10 within one hour of closing pressurizer block valve 1-FCV-68-332-B. Significance/Severity Level: This violation is of very low safety significance (Green) based on the results of the IMC 0609, Appendix F, "Fire Protection Significance Determination rocess," Phase I Screening Approach. Specifically, the licensee's failure to establish a fire watch within one hour of closing the pressurizer block valve did not increase the likelihood of a fire, did not delay detection of a fire, nor did it result in a more significant fire than previously analyzed in auxiliary building room 757-A10 (IMC 0609, Appendix F, Step 1.4.1, Question 1.4.1-A). Corrective Action Reference(s): This issue is being tracked in the licensee's corrective action program by CR 1432723.	

Configuration Control Error Results in Actual Auxiliary Building Internal Flooding Event			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000390/2018003-01 Closed	[H.12] – Avoid Complacency	71111.06 – Flood Protection Measures

A self-revealed Green finding and associated NCV of TS 5.7.1, "Procedures," was identified when the licensee failed to maintain adequate configuration control in the HPFP system in accordance with station configuration control procedure, NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy." Specifically, the licensee failed to restore HPFP system vent and drain valves to their appropriate configuration prior to returning the system to service which resulted in a significantly large amount of HPFP system water (on the order of 10,000 gallons) being introduced into many areas (including all levels) of the Unit 1 side of the auxiliary building and wetting numerous structures, systems, and components (SSCs) (including cables, ventilation ducts, motor-operated valves, etc.)

Description:

On July 21, 2018, the licensee repaired a leak in a 3 inch HPFP pipe located in the Unit 1 713' pipe chase upstream of standpipe isolation valve 1-ISV-026-0639 and downstream of the 6" HPFP supply header. Prior to beginning the work to repair the leak, the licensee generated a clearance order to isolate and tag out the affected portion of the system. In the "Remarks" section of the clearance order two vent valves, 1-SPV-26-671 and 1-SPV-26-672, were identified to be used to drain the appropriate section of piping. These vent valves were not written into the clearance order via a tag (i.e., no-tag/info tag/danger tag).

The licensee was not able to adequately drain the system using only 1-SPV-26-671 and 1-SPV-26-672. The fire marshal, via email, identified additional drain locations that were to be used to adequately drain the system; however, the clearance order was never changed to include these additional drains.

NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy," Section 3.2.3.I.1, requires that "an adequate number of devices, such as, vents, drains, and dump valves, used to depressurize or drain components are identified to be tagged in the open position or appropriate controls are in place in accordance with Attachment 5, Paragraph G." NPG-SPP-10.2, Attachment 5, Paragraph G, stipulates what is to be done to protect employees when suitable means are not available to depressurize or control hazardous energy. Contrary to this procedural requirement, the licensee did not appropriately identify which vents and drains were to be tagged in the open position.

After draining the appropriate section of piping and completing repair of the leak, the licensee commenced restoration of the system. During restoration, licensee personnel did not realize that the vents identified in the clearance order's "Remarks" section nor the drains identified in the Fire Marshal's email were still open and needed to be closed. Consequently, the licensee released the clearance order with vent and drain locations still open. Upon returning the system to operation, HPFP water was discharged through the open vent and drain paths which flooded portions of the Unit 1 auxiliary building and the Unit 1 auxiliary equipment building.

NPG-SPP-10.2, Section 3.4.4.B, requires that "the [responsible employee] ensures components inside the clearance boundary are restored to their proper configuration based upon the work performed and the controls imposed by the work documents." Contrary to this

procedural requirement, the licensee did not ensure components inside the clearance boundary were restored to their proper configuration.

Operators first became aware of the condition when alarm 159-B, additional equipment building floor and equipment sump level LO, illuminated on panel 1-M-15. Subsequently, a report from an auxiliary operator indicated water coming into the auxiliary building. Shortly thereafter, source range (SR) and intermediate range (IR) nuclear instruments (NI) alarmed in the control room and showed erratic indications, which was caused from HPFP water intrusion into electrical equipment associated with the NIs. Both the SR and IR NIs were declared inoperable as a result. Unit 1 also experienced alarms in the control room due to grounds on the Unit 1 vital battery boards 1 and 2.

Corrective Actions: The immediate corrective actions were to isolate portions of the fire protection header to arrest the flooding. The licensee generated numerous condition reports documenting equipment that was affected by the flooding event. It initiated a prompt investigation of the event to document what happened, current conditions, extent of condition, and planned actions, which included an operations stand down to discuss recent human performance errors, and to reinforce proper configuration control/tagging methods and log keeping practices. The licensee also verified that no other hold orders in their system exhibited similar inappropriate configuration control characteristics. Lastly, the licensee completed walkdowns to identify all SSCs that were wetted or submerged and completed assessments of their functionality/operability through engineering evaluations and/or performance tests (valve strokes, etc.).

Corrective Action Reference: This issue is being tracked in TVA's corrective action program by CR 1433039.

Performance Assessment:
Performance Deficiency: The failure to maintain adequate configuration control of the HPFP system when returning it to service, as required by station procedure NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy," was a performance deficiency.

Screening: The performance deficiency was determined to be more than minor because it is associated with the configuration control attribute of the initiating events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, both the SR and IR NIs were declared inoperable due to water intrusion from the flooding event.

Significance: In accordance with IMC 0609, Attachment 4, the inspectors determined the initiating events cornerstone was affected due to the occurrence of an internal flooding event and used IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power" to determine the significance of the finding. The inspectors determined that a detailed risk evaluation was required in accordance with IMC 0609, Appendix A, Exhibit 1, "Initiating Events Screening Questions," Section E, "External Event Initiators," because the finding impacted the frequency of an internal flooding initiating event. A regional SRA performed the detailed risk evaluation using SAPHIRE Version 8.1.8 and Version 8.50 of the Watts Bar Unit 1 & 2 combined SPAR model. The SRA developed a scenario to model the flooding from the HPFP header described in the finding. The result was an increase in core damage frequency of less than 1E-6/year for Unit 1, which would be a finding of very low significance (Green). The dominant sequences involved the flood leading to a reactor trip

with a consequential LOOP (not caused by the flood) and failure of auxiliary feed water along with failure to feed and bleed. This was mitigated by the low likelihood of a reactor transient given the flood location.

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the avoid complacency (H.12) attribute of the human performance area as defined in IMC 0310, "Aspects Within the Cross-Cutting Areas," because the licensee failed to recognize and plan for the possibility of mistakes, latent issues, and inherent risk when controlling the configuration of a HPFP header.

Enforcement:
Violation: Technical Specification 5.7.1, "Procedures," requires that written procedures covering activities that are recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, which include equipment control activities (e.g., locking and tagging), be established, implemented, and maintained. Contrary to the above, on July 21, 2018, the licensee failed to adequately implement its station equipment control procedure, NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy," when it performed work on the HPFP system which led to a loss of configuration control and an internal flooding event.

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

Unauthorized Entry Into a High Radiation Area			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000390/391/2018003-02 Closed	[H.4] – Teamwork	71124.01

A self-revealed Green finding and associated Non-cited Violation (NCV) of TS 5.11.1.e was identified when the licensee failed to maintain current survey information and failed to inform a worker of increased dose rates in a high radiation area (HRA). As a result, a worker received an electronic dosimeter (ED) alarm on the Unit 2 (U2) pressurizer platform due to changing radiological conditions associated with a reactor mode change.

Description:
On November 25, 2017, a worker was briefed on radiological conditions on the Unit 2 pressurizer platform. At this time Unit 2 was in Mode 5 and general area dose rates were less than 25 mrem/hr in the work area. However, the worker actually entered the pressurizer platform area on December 2, 2017, and did not receive an updated briefing from radiation protection (RP) prior to entry. By that time the reactor was in Mode 3 and dose rates had increased substantially. While working on the platform the worker received a dose rate alarm of 189 mrem/hr, which exceeded the ED setpoint of 150 mrem/hr, and exited the area. A follow up survey found that general area dose rates had increased to 360 mrem/hr. In addition to the worker's failure to stop by the RP desk and receive an updated briefing prior to entry, the inspectors noted that the licensee's ability to provide an accurate briefing at that time would have been impaired, since RP had not updated their survey data to account for the change in modes.

Corrective Action(s): The licensee's corrective actions included updating the survey documents for that area, evaluation of training needs related to changing plant conditions, a review of outage routine survey frequencies, and revising checklists used for HRA briefings.

Corrective Action Reference(s): CR 1364197, 1364213 and 1394740

Performance Assessment:
Performance Deficiency: The failure to maintain current survey data and to inform a worker of changing radiological conditions prior to entry into a HRA, as required by TS, was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the occupational radiation safety cornerstone attribute of program and process for exposure/contamination control and monitoring and adversely affected the cornerstone objective of ensuring the adequate protection of worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. Failing to inform workers of current radiological conditions prior to entry into HRAs removes a barrier within the exposure control program and could lead to unintended doses.

Significance: The inspectors assessed the significance of the finding using the Occupational Radiation Safety Significance Determination Process (SDP), Appendix B. The inspectors determined the finding to be of very low safety significance because the performance deficiency was not an as low as reasonably achievable planning issue, there was not an overexposure nor substantial potential for an overexposure, and the licensee's ability to assess dose was not compromised.

Cross-cutting Aspect: The finding involved the cross-cutting aspect of human performance, teamwork, because the event was a result of poor individual and work group communications and coordination of activities within and across organizational boundaries.

Enforcement:
Violation: Technical Specification 5.11.1.e states that entry into HRAs shall be made only after dose rates in the area have been determined and entry personnel are knowledgeable of them. Contrary to the above, on December 2, 2017, a worker entered a HRA prior to dose rates being determined and prior to being made knowledgeable of them.

Disposition: This violation is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Collect Compensatory Samples for an Out-of-Service Effluent Monitor.			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Public Radiation Safety	Green NCV 05000390/391/2018003-03 Closed	[H.12] – Avoid Complacency	71124.06
The inspectors identified a Green finding and associated NCV of TS 5.7.2.3 when the licensee failed to take compensatory samples in accordance with Table 1.1-1 of the Offsite Dose Calculation Manual (ODCM) when the Unit 1 steam generator blowdown effluent monitor was out of service. Specifically, radiation monitor 1-RM-90-120/121 was inoperable			

from April 27 to May 27, 2018, and compensatory samples were not collected and analyzed within the required frequency of at least once per 24 hours.

Description:
On April 27, 2018, in order to support leak repair work, a jumper was installed that disabled the automatic closure of isolation valve 1-FCV-15-44 on a high radiation signal from 1-RM-90-120/121, Unit 1 steam generator blowdown effluent monitor. Upon completion of the work the effluent monitor was returned to service, however the jumper was mistakenly left in place and not removed as required by procedure 0-PI-OPS-1.1. As a result, the effluent monitor would not have been able to perform its function of isolating blowdown on a high radiation signal and was therefore out of service until the error was discovered during a jumper audit on May 27, 2018. During the time 1-RM-90-120/121 was out of service, the ODCM requirements for compensatory sampling were not being performed. However, the CR written during the jumper audit was closed without addressing the missed compensatory samples and without identifying the need to include this issue in the 2018 Annual Radiological Environmental Release Report. The inspectors pointed out the ODCM compliance aspects of this issue to the licensee and another CR was written. The inspectors noted that, although effluent monitor 1-RM-90-120/121 was out of service and no compensatory samples were taken, the licensee maintained the capability to account for effluents released via this pathway due to weekly sampling of secondary side condensate. No abnormal effluent concentration levels were identified in the condensate during the time 1-RM-90-120/121 was out of service.

Corrective Action(s): The licensee's immediate corrective actions included removal of the jumper to return the effluent monitor to service. Subsequent to this, additional actions were taken including plans to document the missed compensatory samples in the 2018 Annual Radiological Effluent Release Report and validating the time and date of the jumper removal for the inoperable period.

Corrective Action Reference(s): CRs 1418308 and 1430810

Performance Assessment:
Performance Deficiency: The failure to remove a jumper as required by procedure 0-PI-OPS-1.1, was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the public radiation safety cornerstone attribute of plant facilities/equipment and instrumentation for process radiation monitors and adversely affected the cornerstone objective of ensuring 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 collect and analyze compensatory samples within the required frequency of 24 hours could degrade the ability to identify high effluent concentrations that might indicate the need to isolate the steam generator blowdown pathway.

Significance: The inspectors assessed the significance of the finding using the Public Radiation Safety SDP, Appendix D. The inspectors determined the finding to be of very low safety significance because it was associated with the effluent program; however, it was not a substantial failure to implement the effluents program and it did not result in a public dose greater than an Appendix I to 10 CFR Part 50 or 10 CFR 20.1301(e) dose value.

Cross-cutting Aspect: The finding involved the cross-cutting aspect of human performance, avoid complacency, because the event was the direct result of a worker's failure to remove the jumper.

Enforcement:
Violation: Technical Specification 5.7.2.3 requires implementation of the ODCM. Table 1.1-1 in the ODCM, Radioactive Liquid Effluent Monitoring Instrumentation, requires that grab samples be collected and analyzed for principal gamma emitters at least once per 24 hours when 1-RM-90-120/121 is out of service and when the specific activity of the secondary coolant is less than 0.01 microcuries per gram dose equivalent Iodine-131.

Contrary to the above, from April 27 to May 27, 2018, grab samples were not collected and analyzed once per 24 hours when 1-RM-90-120/121 was out of service and the specific activity of the secondary coolant was less than 0.01 microcuries per gram dose equivalent Iodine-131.

Disposition: This violation is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Inadequate Sensitive Equipment Control Results in Unit 2 Reactor Trip on April 12, 2018			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000391/2018003-04 Closed	[H.5] – Work Management	71153 – Follow-up of Events and Notices of Enforcement Discretion

A self-revealed Green finding and associated NCV of Title 10 of the *Code of Federal Regulations* (CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, Drawings," was identified for the licensee's use of a procedure that was not appropriate to the circumstances, which led to the conduct of improperly planned maintenance on sensitive equipment, ultimately resulting in a reactor trip. Specifically, an inadequacy was identified in station procedure 0-TI-12.10, "Control of Sensitive Equipment," which lists the sensitive equipment defined, in part, as equipment that could cause a unit trip, on which work activities are required to be appropriately planned and conducted in a manner that will preclude a unit trip. The procedure did not list the high side reactor coolant system (RCS) loop flow transmitter common drain line as sensitive equipment, which allowed the licensee to improperly perform maintenance on it without the appropriate planning and control necessary to preclude the Unit 2 reactor trip that occurred on April 12, 2018.

Description:
On April 12, 2018, the licensee implemented minor maintenance WO 119245800 inside Unit 2 containment to repair a wet boron leak on a common drain header associated with the RCS Loop 1 low flow reactor trip instrumentation.

Procedure 0-TI-12.10, "Control of Sensitive Equipment," Section 2.1, "General Requirements," subsection D states, that "Appendix A lists systems and equipment requiring sensitive equipment control." Procedure 0-TI-12.10, Appendix A, did not list the high side RCS loop flow transmitter common drain line as a sensitive component requiring special control. As a result of this procedural inadequacy, the licensee did not properly plan nor appropriately conduct the maintenance activity affecting the high side RCS loop flow transmitter common drain line. Upon performing work on the RCS loop flow transmitter

common drain line, the workers created a disturbance in the system which, when sensed by the RCS Loop 1 low flow reactor trip instrumentation, caused a reactor trip on low RCS flow.

The licensee first became aware of the inadequate procedure as a result of the U2 reactor trip on April 12, 2018, which prompted the licensee to perform an apparent cause analysis to determine the cause and contributing causes of the trip. As a result of this investigation, the licensee determined that the RCS Loop 1 flow transmitters and associated equipment should have been identified in 0-TI-12.10. The residents noted that procedure NPG-SPP-07.3, "Work Activity Risk Management Process," Revision 22, Attachment 2, contains requirements for planning and risk characterization of work activities. Step 1.4 of Attachment 2 requires physical activity performed on or near trip sensitive equipment to be considered a high risk classification, which would not be allowed for a minor maintenance WO when the unit is online. Since the RCS Loop 1 flow transmitters and associated equipment were not designated as trip sensitive equipment, the risk was characterized as low in accordance with NPG-SPP-07.3, and the work was allowed to be implemented through a minor maintenance work order inside Unit 2 containment while online.

The licensee determined that not including the RCS Loop 1 flow transmitters and associated equipment in 0-TI-12.10 removed the only physical barrier that would have prevented the reactor trip and contributed to the risk assessment being classified as low risk in accordance with NPG-SPP-07.3.

Corrective Actions: The licensee generated corrective actions which included briefing site personnel on the event and its causes, revising 0-TI-12.10 to add newly identified sensitive equipment, revising NPG-SPP-07.3 to reference 0-TI-12.10 in the work order risk characterization process, and requiring the work controls center to challenge all work orders/requests coming through their shop per NPG-SPP-07.3 requirements in order to provide additional opportunities for ensuring work is appropriately planned and implemented.

Corrective Action Reference: This issue is being tracked in TVA's corrective action program by CR1404737.

Performance Assessment:
Performance Deficiency: The failure to ensure that procedure 0-TI-12.10 provided an adequate list of sensitive equipment to be appropriately controlled was a performance deficiency. Specifically, Appendix A of the procedure lists systems and equipment requiring sensitive equipment control; however, the RCS Loop 1 low flow reactor trip instrumentation and associated equipment, which meets the definition of sensitive equipment as defined in 0-TI-12.10, was not listed in Appendix A.

Screening: The performance deficiency was determined to be more than minor because it is associated with the procedure quality attribute of the initiating events cornerstone and adversely affects the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure to ensure that procedure 0-TI-12.10 provided an adequate list of sensitive equipment resulted in the approval of work in the vicinity of trip sensitive equipment while the unit was online, which resulted in a unit trip.

Significance: In accordance with IMC 0609, Attachment 4, the inspectors determined the initiating events cornerstone was affected due to the occurrence of a reactor trip and used IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-

Power" to determine the significance of the finding. The inspectors determined that the finding screened to Green in accordance with IMC 0609, Appendix A, Exhibit 1, "Initiating Events Screening Questions," Section B, "Transient Initiators," because the finding caused a reactor trip but did not result in the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the work management attribute of the human performance area as defined in IMC 0310, "Aspects Within the Cross-Cutting Areas," because the licensee did not identify and manage risk commensurate with the work on the RCS Loop 1 low flow reactor trip instrumentation and associated equipment.

Enforcement:
Violation: 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," Criterion V, "Instructions, Procedures, and Drawings," requires, in part, activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Contrary to the above, on April 12, 2018, the licensee failed to ensure its station sensitive equipment control procedure, 0-TI-12.10, "Control of Sensitive Equipment," was adequate for identifying and controlling RCS Loop 1 low flow reactor trip instrumentation and associated equipment, which led to improperly planned work being conducted on sensitive equipment resulting in a reactor trip.

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

Licensee Identified Non-Cited Violation	71153 – Follow-up of Events and Notices of Enforcement Discretion

This violation of very low safety significance was identified by the licensee and has been entered into the licensee corrective action program and is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Violation: Watts Bar Unit 1 TS 3.8.1, "AC Sources - Operating," Condition A, requires, in part, that an inoperable required offsite circuit be restored to operable status within 72 hours. Contrary to the requirements of Technical Specification 3.8.1, a required offsite circuit was determined to be inoperable from May 27, 2017, to June 2, 2017.

Severity/Significance: This violation was characterized using traditional enforcement because the NRC determined that this violation was not reasonably foreseeable and preventable by the licensee and, therefore, was not a performance deficiency. This was because the degraded 161 kV power pole was owned and controlled by a separate entity, TVA Transmission. The violation was assessed using Sections 2.2.4 and 6.1.d.1 of the NRC's Enforcement Policy and determined to be a SL IV violation.

Corrective Action Reference(s): CRs 1302767 and 1301565

This violation closes LER 05000390/2017-006-00.

Licensee Identified Non-Cited Violation	71153 – Follow-up of Events and Notices of Enforcement Discretion
This violation of very low safety significance was identified by the licensee and has been entered into the licensee corrective action program and is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: Watts Bar Unit 1 TS LCO 3.8.7, “Inverters-Operating,” requires that two inverters in each of the four channels shall be operable. Contrary to the above, the licensee failed to ensure that two inverters in each of the four channels were operable. Specifically, from April 9, 2017 to January 10, 2018 inverter 1-II was inoperable due to an unqualified class 1E capacitor associated with the inverter. Severity/Significance: Using Chapter 0609, Appendix A, “The Significance Determination Process for Findings At-Power,” Exhibit 2, “Mitigating Systems Screening Questions,” the issue screened as having very low safety significance (Green) because it did not represent an actual loss of function of at least a single train for greater than its technical specification allowed outage time. Two vital AC busses as a minimum remained operable at all times, therefore a loss of safety function did not occur. Corrective Action References: CR 1376221 This violation closes LER 05000390/2018-001-00.	

EXIT MEETINGS AND DEBRIEFS

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

- On July 20, the heat sink inspector presented the inspection results to Mr. Tom Marshall, Plant Manager, and other members of the licensee staff.
- On September 28, 2018, the inservice inspector presented the inspection results to Mr. Paul Simmons, site vice-president and other members of the licensee staff. The inspectors confirmed that all proprietary information reviewed during the inspection was returned or will be destroyed following report completion and that none of the potential report input discussed was considered proprietary.
- On August 10, 2018, and September 14, 2018, the radiation protection inspectors presented the radiation protection inspection results to P. Simmons, Site Vice-President, and other members of the licensee staff.
- On October 24, 2018, the resident inspectors presented the quarterly resident inspection results to Mr. Tom Marshall and other members of the licensee staff.

LIST OF DOCUMENTS REVIEWED

Section 71111.01: Adverse Weather Protection

0-PI-OPS-1-SO, Summer Operation, Rev. 0014
CR 1418580
CR 1418584
CR 1418586

Section 71111.04: Equipment Alignment

Procedures

2-SOI-72.01, Containment Spray System, Valve Checklist 2-72.01-1V, ATT 1V, Rev. 0001
2-SOI-72.01, Containment Spray System, Power Checklist 2-72.01-1P, ATT 1P, Rev. 0000
0-SOI-82.03, Diesel Generator (DG) 2A-A, Rev. 0014
0-SOI-82.03 ATT 1), Diesel Generator (DG) 2A-A Power Checklist 82.03-1P, Rev. 0000
0-SOI-82.03 ATT 1V, Diesel Generator (DG) 2A-A Valve Checklist 82.03-1V, Rev. 0010
0-SOI-67.01 ATT 3V. Essential Raw Cooling Water System Supply Header 1A Valve Alignment Checklist 0-67.01-3VG, Rev. 0017
0-PI OPS-17.0, 18 Month Locked Valve Verification Rev. 0084
1-PI-OPS-1-PE, Protected Equipment, Rev. 0021
MMTP-102, Erection of Scaffolds/Temporary Work Platforms and Ladders, Rev. 0015
WO 119103380
WO 119103377
CRs 1450590, 1450594, 1450601, 1450608, 1450612, 1450618, 1446913, 1449656, 14506252

Drawings

2-47W812-1, Containment Spray System

Section 71111.05AQ: Fire Protection

CR 1438825
CR 1439553
WBN PFP CON-0-708-01, Pre fire plan for control building, elevation 708, Rev. 3
WBN Fire Protection Report, Part VI, Fire Hazard Analysis, Rev. 54
NPG-SPP-18.4.7, Control of Transient Combustibles, Rev. 0011
NPG-SPP-18.4.6-6, WBN Fire Watch Route Sheet, Rev. 008
NPG-SPP-18.4.6-3, NPG Fire Watch Briefing and Turnover Form, 12-10-2010
Fire Protection Plan, Part II, Rev. 54
0-AOI-30.1, Plant Fires, Rev. 005
CR 1436656
CRs 1447078, 1447087, 1447089. 1447261
WBN PFP AUX-0-772-01, Pre fire plan for auxiliary building 772 (general), Rev. 1
WBN-PFP-AUX-0-772-02, Pre fire plan for auxiliary building 772 (Unit 2), Rev. 4
WBN PFP AUX-0-772-03, Pre fire plan for auxiliary building 772 (Unit 1), Rev. 4
WBN Fire Protection Report, Part II, Fire Protection Plan, Rev. 54
WBN Fire Protection Report, Part X, NFPA Code Evaluation, Rev. 54
NPG-SPP-18.4.7, Control of Transient Combustibles, Rev. 0011
Drawing 0-45W883-5
MMTP-102, Erection of Scaffolds/Temporary Work Platforms and Ladders, Rev. 0016
NPG-SPP-18.4.6-6, WBN Fire Watch Route Sheet, Rev. 008
NPG-SPP-18.4.6-3, NPG Fire Watch Briefing and Turnover Form, December 10, 2010
Fire Protection Plan, Part II, Rev. 54
0-AOI-30.1, Plant Fires, Rev. 0005

CR 1432723
WBN PFP RXN-1-757-01, Pre fire plan: Unit 1 reactor building el 757, 763, 782, 801, Rev. 1
WBN PFP RXN-1-713-01, Pre fire plan: Unit 1 reactor building el 713, 724, 744, Rev. 2
WBN PFP RXN-1-702-01, Pre fire plan: Unit 1 reactor building el 702, Rev. 1
WBN Fire Protection Report, Part II, Fire Protection Plan, Rev. 54
WBN Fire Protection Report, Part VI, Fire Hazard Analysis, Rev. 54
WBN Fire Protection Report, Part X, NFPA Code Evaluation, Rev. 54
NPG-SPP-18.4.7, Control of Transient Combustibles, Rev. 0011
MMTP-102, Erection of Scaffolds/Temporary Work Platforms and Ladders, Rev. 0016

Section 71111.06: Flood Protection Measures

WO 119273871
CR 1433039
WO 119097815
Clearance Order 0-TO-2018-0072, 0-26-0898
NPG-SPP-18.4.6-6, WBN Fire Watch Route Sheet, Rev. 008
Operator Logs
WBNOSG4099, Moderate Energy Line Break Flooding Study, Rev. 16
WB-DC-40-31.51, Evaluating the Effects of Flooding Due to Moderate Energy Pipe Failures Inside and Outside Containment, Rev. 5
Watts Bar Nuclear Plant Unit 1 Probabilistic Risk Assessment Individual Plant Examination, Volume 4, Rev. 0, Appendix E.1, "Watts Bar Internal Flood Analysis"
WB-DC-40-61, Equipment and Floor Drainage System, Rev. 5
NPG-SPP-10.1, System Status Control, Rev. 9
NPG-SPP-10.2, Clearance Procedure to Safely Control Energy, Rev. 20
WBN Level 2 Evaluation Report for CR 1433039
WBN Prompt Investigation Report Out for CR 1433039

Section 71111.07: Heat Sink Performance

Work Orders
114559486, Preventative Maintenance (PM) Work Order, Intake Pumping Station Pump Bay Train "A", Inspection /Cleaning, PM-600110059, Rev 9, 9/18/14
116154000, PM, P1429, Component Cooling System Heat Exchanger "C" Performance Test, 6/1/16
117400453, PM 600112124 Work Order, Monitoring of Silt Accumulation in Intake Channel, 9/13/16
117761176, PM, P1430, Component Cooling System Heat Exchanger "A" Performance Test, 3/20/17
117761938, PM, P1533, Surveillance Task, 0-TRI-67-902-A, System Leakage Test, Essential Raw Cooling Water (ERCW) System Buried Piping, Train "A", 8/11/17
118086210, PM, P4430, Component Cooling System Heat Exchanger "B" Performance Test, 10/28/17
118121517, PM, P1231, TI-79.824, Diesel Generator 2A-A Jacket Water Cooler Performance Test, 7/29/17
118630001, Task 200, Obtain Bids for EDG Jacket Water Heat Exchanger Replacement, 3/28/17
119002300, PM, P1458, TI-79.824, Diesel Generator 2B-B Jacket Water Cooler Performance Test, 6/20/18
119150948, PM P0023, 0-SI-67-901-A, ERCW Train "A" Pumps Performance Test, 5/13/18
119651562, Unit-1, Implement DEC 66688-Replace the 1A1 EDG Jacket Water Heat Exchangers, HTX-082-0720A1-A, 6/15/18

Action Requests

CR 1277211, Generate Parent Work Order for Watts Bar Nuclear (WBN) Project FP612858, Ultimate Heat Sink/ Essential Raw Cooling Water (ERCW) Margin Recovery, 3/28/17
CR 1381083, Diesel Generator Heat Exchanger Performance Testing, 1/26/18
CR 1393145, Oil leak on the ERCW Pump H-B, 3/9/18
CR 1417305, Error in CCS Heat Exchanger C, Cleaning Alignment, 5/25/18
CR 1423468, Implement Design Engineering Change (DEC) 66688, Replace the Emergency Diesel Generator (EDG) Jacket Water Heat Exchangers, 6/15/18
CR 1432254, NRC Identified, Clarification needed for 0-AOI-22, 7/19/18
CR 1432578, NRC Identified, UFSAR and N3-67-4002 ERCW Pump Submergence Inaccuracies, 7/19/18
CR 1432581, NRC Identified, Abnormal Operating Instruction 0-AOI-22, Contains Errors in the Discussion Section, 7/19/18

Calculations

CDQ000020080081, Loss of Chickamauga Reservoir-Drain Down Analysis, 3/17/14
EPMJFL120285, ERCW System Flow Requirements, 3/28/18
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