



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
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October 30, 2019

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

SUBJECT: WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2 – INTEGRATED INSPECTION  
REPORT 05000390/2019003 AND 05000391/2019003

Dear Mr. Barstow:

On September 30, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Watts Bar, Units 1 and 2. On October 17, 2019, the NRC inspectors discussed the results of this inspection with Mr. Anthony Williams and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspectors did not identify any finding or violation of more than minor significance.

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:  
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2 – INTEGRATED INSPECTION  
REPORT 05000390/2019003 AND 05000391/2019003

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ADAMS:  Yes   ACCESSION NUMBER: **ML19303A006**    SUNSI REVIEW COMPLETE    FORM 665 ATTACHED

OFFICE	RII/DRP	RII/DRP	RII/DRP	RII/DRP	RII/DRP	RII/DRP	RII/DRP	RII/DRP
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DATE	10/25/2019	10/28/2019	10/25/2019	10/28/2019	10/25/2019	10/28/2019	10/28/2019	10/29/2019

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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: 05000390/2019003 and 05000391/2019003

Enterprise Identifier: I-2019-003-0024

Licensee: Tennessee Valley Authority

Facility: Watts Bar, Units 1 and 2

Location: Spring City, TN 37381

Inspection Dates: July 01, 2019 to September 30, 2019

Inspectors: N. Childs, Senior Resident Inspector  
W. Deschaine, Senior Resident Inspector  
J. Hamman, Resident Inspector  
S. Janicki, Resident Inspector  
R. Mathis, Test Inspector  
J. Nadel, Senior Resident Inspector

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

## **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**

No findings or violations of more than minor significance were identified.

### **Additional Tracking Items**

None.

## PLANT STATUS

Unit 1 began the inspection period at rated thermal power. On August 31, 2019, the unit was manually tripped due to a main feedwater regulating valve (MFRV) failure. Repairs were made to the MFRV and on September 3, 2019, the unit reached 12%. On September 5, 2019, the licensee noted some turbine repairs that were necessary and shutdown the unit. The unit remained offline for the remainder of the inspection period.

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

## INSPECTION SCOPES

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

### 71111.04Q - 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) 1B train charging system while 1A centrifugal charging pump (CCP) was out of service (OOS) for a component outage on July 8, 2019
- (2) 2B train of containment spray while 2A train was OOS for planned maintenance on July 9, 2019
- (3) 1A-A emergency diesel generator (EDG) while 1B-B EDG was OOS for planned maintenance
- (4) 1A, 1B and 2A 480V electric board room (EBR) chillers while 2B EBR chiller was OOS for repairs on August 22, 2019

### 71111.05A - Fire Protection (Annual)

#### Annual Inspection (IP Section 03.02) (1 Sample)

- (1) Inspectors observed an announced fire drill for a fire in the 1B-B containment spray pump room on August 14, 2019.

#### 71111.05Q - Fire Protection

##### Quarterly Inspection (IP Section 03.01) (1 Sample)

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

- (1) Control building elevation 741', Unit 1 and 2 cable spreading rooms on August 20, 2019.

#### 71111.06 - Flood Protection Measures

##### Inspection Activities - Internal Flooding (IP Section 02.02a.) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

- (1) Unit 1 and 2 auxiliary building elevation 757', shutdown board rooms

#### 71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

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

- (1) The inspectors observed and evaluated licensed operator performance in the Control Room during a Unit 1 start-up following a forced outage due to the failure of the #2 main feedwater regulating valve on September 2, 2019.

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

- (1) The inspectors observed simulator scenario 3-OT-SRT-H1-6, Revision 2, for a loss of ultimate heat sink following a rapid load reduction due to high turbine bearing temperature on September 19, 2019.

#### 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) Condition Report (CR) 1526540, A and B Emergency Gas Treatment System functional failure due to a tear in penetration seal 0-SLV-304-R2S065

#### 71111.13 - Maintenance Risk Assessments and Emergent Work Control

##### Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

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

- (1) Risk assessment for week of August 12, 2019 with 1B-B emergency diesel generator OOS for planned maintenance
- (2) Risk assessment for August 29, 2019, with the 2B-B emergency diesel generator OOS for planned maintenance
- (3) Risk assessment for September 9, 2019, with Unit 1 shutdown for a forced outage
- (4) Risk assessment for September 25, 2019 with 2B-B emergency diesel generator OOS due to load swings during a surveillance

#### 71111.15 - Operability Determinations and Functionality Assessments

##### Operability Determination or Functionality Assessment (IP Section 02.02) (2 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Operability determination for CR 1539213, auxiliary building gas treatment system 1A-A fan motor high vibrations
- (2) Operability determination for CR 1534088, Engineering Work Request EWR-19-ELE-030-284, low margin to maximum limit for Unit 1 lower containment temperature.

#### 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) Temporary Modification WBN-0-2019-031-004, temporary chillers installed to provide chilled water to the B-B shutdown board room chiller loads on August 22, 2019

#### 71111.19 - Post-Maintenance Testing

##### Post-Maintenance Test Sample (IP Section 03.01) (2 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Post maintenance test of 1A-A auxiliary building gas treatment system exhaust fan motor after preventive maintenance on August 8, 2019
- (2) WO 120614655, 0-SI-82-12-B, Monthly Diesel Start and Load Test DG 2B-B, following 2B-B emergency diesel generator repairs on September 25, 2019

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

##### Inservice Testing (IP Section 03.01) (1 Sample)

- (1) Work Order (WO) 120163013, 1-SI-3-901-B, Motor Driven Auxiliary Feedwater Pump 1B-B Quarterly Performance Test on August 2, 2019

## **OTHER ACTIVITIES – BASELINE**

### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

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

- (1) Unit 1 (July 1, 2018 - June 30, 2019)
- (2) Unit 2 (July 1, 2018 - June 30, 2019)

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

- (1) Unit 1 (July 1, 2018 - June 30, 2019)
- (2) Unit 2 (July 1, 2018 - June 30, 2019)

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

- (1) Unit 1 (July 1, 2018 - June 30, 2019)
- (2) Unit 2 (July 1, 2018 - June 30, 2019)

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

- (1) Unit 1 (July 1, 2018 - June 30, 2019)
- (2) Unit 2 (July 1, 2018 - June 30, 2019)

### 71152 - Problem Identification and Resolution

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

- (1) The inspectors reviewed the licensee's corrective action program for trends that might be indicative of a more safety significant issue.

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

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

- (1) The inspectors conducted safety culture interviews in the Watts Bar Site Projects organization as a result of several safety culture related condition reports. The inspectors concluded that individuals in the Watts Bar Site Projects organization understood the various methods of reporting safety concerns and were willing to use them without fear of retaliation.



## INSPECTION RESULTS

Observation: Review of Condition Reports Related to Tritium Production in Unit 1 Reactor	71152
<p>During their regular review of the licensee's corrective action program, the inspectors identified eleven condition reports written between February and September 2019 relating to tritium production using tritium producing burnable absorber rods (TPBAR) in the Unit 1 reactor. The inspectors evaluated this as a possible trend. The technical issues described in ten of the condition reports had insignificant impact on plant operations. Condition report 1521541, related to airborne tritium concentration in lower containment, received a detailed review by the inspectors. Specifically, increased tritium concentration in unit 1 reactor coolant sometimes resulted in increased airborne tritium in lower containment. This is because reactor coolant is collected in the reactor building equipment drain system, which is open to the lower containment atmosphere, and is present in the reactor coolant drain tank, which is vented to the lower containment atmosphere. The inspectors found that the licensee had procedures in place to monitor lower containment tritium concentrations and to ensure protection for personnel working in lower containment. Additionally, the licensee monitored gaseous releases from Unit 1 containment to ensure that those releases are below regulatory requirements. Overall, the inspectors concluded that none of the condition reports reviewed were indicative of a more significant safety issue.</p>	

## EXIT MEETINGS AND DEBRIEFS

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

- On October 17, 2019, the inspectors presented the integrated inspection results to Mr. Anthony Williams and other members of the licensee staff.

**DOCUMENTS REVIEWED**

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04Q	Drawings	2-47W812-1		36
	Miscellaneous	SDD-N3-30AB-4001	Auxiliary Building Heating, Ventilation, Air Conditioning System (30, 31, 44) Unit1/Unit 2	45
	Procedures	0-SI-82-2	8 Hour Diesel Generator AC Power Source Operability Verification	27
		1-PI-OPS-PE	Protection Equipment	21
		2-PI-OPS-1-PE	Protected Equipment	7
71111.05A	Fire Plans	AUX-0-676-01	WBN Prefire Plan	3
	Miscellaneous		Watts Bar Nuclear Plant Fire Protection Report	55
71111.05Q	Corrective Action Documents	CR	1542582	
	Fire Plans	CON-0-729-01	Pre-Fire Plan	2
71111.06	Calculations		Flooding Calculation WBN0SG4009, Appendix J, Backflow Through Floor Drains	09/25/1987
		MDN-000-999-2008-0146	WBN Probabilistic Risk Assessment - Internal Flooding Analysis Notebook	3
		WBN-DC-40-31.51	Evaluating the Effects of Flooding due to Moderate Energy Pipe Failures Inside and Outside of Containment	5
		WBN-DC-40-61	Equipment and Floor Draining System	5
	Corrective Action Documents	CR	1542885, 1539120	
71111.11Q	Corrective Action Documents	CR	1526540	
	Miscellaneous	1-GO-2	Reactor Startup	19
		1646, 1647	Cause Determination Evaluation	
	Procedures	0-TI-119	Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting - 10CFR50.65	6
Work Orders	120536836			
71111.13	Miscellaneous		Operator's Risk Report	08/12/2019
			WBN Defense in Depth Assessment	09/09/2019
			Operator's Risk Report	09/25/2018
	Procedures	0-SI-82-2	8 Hour Diesel Generator AC Power Source Operability	27

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Verification	
71111.15	Corrective Action Documents	CR	1534088, 1535612, 1536108, 1539213	
	Miscellaneous	EWR-19-ELE-030-284	Evaluate the impact of one or more failed temperature sensors on the determination of the average lower containment temperature for WBN 1	07/23/2019
	Procedures	0-TI-31.02	Plant Equipment Monitoring & Vibration Diagnostics Program	2
		1-T-30-210	Setpoint and Scaling Document	2
		NEDP-10, Attachment 4	Site Engineering Setpoint and Scaling Documents	23
		NEDP-2	Safety/Quality-Related Setpoint Establishment and Validation Process	23
		NEDP-4, Attachment 5	Quality-related Processes-Augmented QA	26
		NPG-SPP-06.7	Instrumentation Setpoint, Scaling, and Calibration Program	4
	NPG-SPP-09.0	Conduct of Engineering	10	
Work Orders	119904284			
71111.18	Miscellaneous	C19-0447, C19-0454	Fire Protection Impairment Permit	
		WBN-0-2019-031-004	Temporary Chiller to Support Replacement of B-Train Shutdown Board Room (SDBR) Chiller	
71111.19	Corrective Action Documents	CR	1539213	
	Procedures	0-SI-82-12-B	Monthly Diesel Start and Load Test B2-B	57
		0-TI-31.02	Plant Equipment Monitoring & Vibration Diagnostics Program	2
Work Orders	119904284		0	
71111.22	Procedures	1-SI-3-901-B	Motor Driven Auxiliary Feedwater Pump 1B-B Quarterly Performance Test	34
71152	Corrective Action Documents	1494503, 1521541, 1522992, 1524508,	Condition Reports	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		1526913, 1529480, 1531261, 1533009, 1549445, 1549467, 1549912		