



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

October 20, 2020

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 – DESIGN BASIS  
ASSURANCE INSPECTION (PROGRAMS) INSPECTION REPORT  
05000390/2020011 AND 05000391/2020011

Dear Mr. Barstow:

On September 24, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Watts Bar Nuclear Plant, Units 1 and 2 and 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.

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

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

Sincerely,

/RA/

James B. Baptist, Chief  
Engineering Branch 1  
Division of Reactor Safety

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

Enclosure:  
As stated

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SUBJECT: WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2 – DESIGN BASIS  
 ASSURANCE INSPECTION (PROGRAMS) INSPECTION REPORT  
 05000390/2020011 AND 05000391/2020011 Dated October 20, 2020

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OFFICE	DRS	DRS	DRS	DRS	
NAME	M. Greenleaf	N. Morgan	P. Carmen	J. Baptist	
DATE	10/16/2020	10/19/2020	10/19/2020	10/20/2020	

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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: 05000390/2020011 and 05000391/2020011

Enterprise Identifier: I-2020-011-0042

Licensee: Tennessee Valley Authority

Facility: Watts Bar Nuclear Plant, Units 1 and 2

Location: Spring City, TN

Inspection Dates: August 31, 2020 to September 24, 2020

Inspectors: P. Carman, Senior Reactor Inspector  
M. Greenleaf, Reactor Inspector  
N. Morgan, Reactor Inspector

Approved By: James B. Baptist, Chief  
Engineering Branch 1  
Division of Reactor Safety

Enclosure

## **SUMMARY**

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a design basis assurance inspection (programs) 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.

### **List of Findings and Violations**

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

### **Additional Tracking Items**

None.

## INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards. Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), inspectors were directed to begin telework. In addition, regional baseline inspections were evaluated to determine if all or portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

## REACTOR SAFETY

### 71111.21N.02 - Design-Basis Capability of Power-Operated Valves Under 10 CFR 50.55a Requirements

#### POV Review (IP Section 03) (9 Samples)

The inspectors:

- a. Evaluated whether the sampled POVs are being tested and maintained in accordance with NRC regulations along with the licensee's commitments and/or licensing bases.
- b. Evaluated whether the sampled POVs are capable of performing their design-basis functions.
- c. Evaluated whether testing of the sampled POVs is adequate to demonstrate the capability of the POVs to perform their safety functions under design-basis conditions.
- d. Evaluated maintenance activities including a walkdown of the sampled POVs (if accessible).

- (1) 1-FCV-1-51-S, Turbine-Driven Auxiliary Feedwater Pump Trip and Throttle Valve
- (2) 1-FCV-67-67-B, Diesel Generator Heat Exchanger 1B1/1B2 Essential Raw Cooling Water Supply Header 1B Isolation Valve
- (3) 1-FCV-72-2-B, Containment Spray Header (Train B) Isolation Valve
- (4) 2-FCV-63-93-A, Residual Heat Removal to Cold Leg 2 & 3 Injection Isolation Valve
- (5) 2-FCV-68-332-B, Pressurizer Power-Operated Relief Valve (PORV) Block Valve
- (6) 2-LCV-62-135-A, Refueling Water Storage Tank Chemical and Volume Control System Supply Header Isolation Valve
- (7) 1-FCV-1-22-T, Main Steam Loop 3 Isolation Valve
- (8) 1-PCV-1-5-T, Steam Generator Loop 1 PORV Valve
- (9) 2-FCV-1-25-B, Steam Generator 3 Blowdown Isolation Valve

## **INSPECTION RESULTS**

No findings were identified.

## **EXIT MEETINGS AND DEBRIEFS**

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

- On September 24, 2020, the inspectors presented the design basis assurance inspection (programs) 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
71111.21N.02	Calculations	048-018-MSS	System Level Review for Watts Bar Main Steam Supply System Air Operated Valves	Rev. 1
		048-018-PIL	Evaluation of Required Thrust for MSIVs and SG-PORVs (Pilot-Operated Balanced Disk Globe AOVs) at Watts Bar Nuclear Power Station	Rev. 1
		25402-011-V1E-SS00-00001-002	EPRI MOV PPM Analysis for 4 Butterfly MOVs for Compliance with GL 89-10 MOV Program Requirements for Units 1 and 2, Document No. 2914C	Rev. 2
		CGACQ1304	Weak Link Analysis for 8"-150# Posi Seal Butterfly Valves Mark# 17W586-1	Rev. 1
		EDQ00099920070002	AC Auxiliary Power System Analysis	Rev. 73
		EPMCPH060292	Documentation of MOV Design Basis Review and Thrust/Torque Requirements and Valve and Actuator Capability Assessment for Valve 1-FCV-72-2	Rev. 6
		EPMDTN051192	Documentation of Design Basis Review, Required Torque Calculations, and Valve and Actuator Capability Assessment for Valve 1-FCV-67-67	Rev. 6
		EPMTSS117091	Generic Letter 89-10 MOV Population at Watts Bar (Unit 1)	Rev. 28
		EPTMSS100292	Documentation of Design Basis Review, Required Thrust/Torque Calculations, and Valve and Actuator Capability Assessment for Valve 1-FCV-01-051	Rev. 7
		MDN-000-999-2011-0178	WBN Probabilistic Risk Assessment – Risk Ranking of Motor Operated Valves	Rev. 2
		MDN-000-999-2011-0179	WBN Probabilistic Risk Assessment - Risk Ranking of Air Operated Valves (AOV)	Rev. 1
		MDQ00099920010063	Categorization of the Air Operated Valves (AOVs)	Rev. 7
		MDQ00100120020072	Component Level Review Calculation for Watts Bar Main Steam Supply (MSS) System Pilot-Operated Balanced Disk Globe Air Operated Valves (AOVs)	Rev. 5

Inspection Procedure	Type	Designation	Description or Title	Revision or Date	
		MDQ00199920100167	Watts Bar Nuclear Plant JOG MOV Periodic Verification Classification	Rev 5	
		MDQ0020622008-0226	Documentation of Design Basis Review Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-LCV-62-135	Rev. 5	
		MDQ0020632008-0244	Documentation of Design Basis Review, Required Thrust/Torque Calculations and Actuator Capability Assessment for Valve 2-FCV-63-093	Rev. 9	
		MDQ0020682008-0274	Documentation of Design Review Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-68-332	Rev. 4	
		MDQ0029992009-0310	Generic Letter 89-10 MOV Population for Watts Bar (Unit 2)	Rev. 10	
		MDQ0029992015000687	Watts Bar Nuclear Plant Unit 2 JOG MOV Periodic Verification Classification	Rev. 0	
		QDC0029992014000504	Material Aging Calculation for Unit 1 and 2 Mechanical Equipment Qualification (Binder WBN-MEQ-001)	Rev. 11	
		WAT-D-8584	Maximum Allowable Thrusts	06/25/1991	
		WBN-EM-59	Essentially Mild Calculation for Limitorque Actuators	Rev. 9	
		WBNOSG4159	Thermal Transient of Target Rock Solenoid Valves Located in the Valve Vaults During a MSLB	Rev. 6	
		WBT-D-4037	Summary of Seismic Analysis of 8GM78FN Built to Drawing 115E012 at Watts Bar Unit 2	08/29/2012	
		Corrective Action Documents	CRs 1093165, 1195979, 1601458, 1624132, 1625963		
		Corrective Action Documents Resulting from Inspection	CR 1639485	2020 NRC POV Inspection - PM frequency change needed	09/23/2020
			CR 1634592	2020 NRC POV Inspection - procedure typo in rev.log reference	09/03/2020
CR 1634666	2020 NRC POV Inspection – Correct reference in Section 7.1.9 of calculation EPMDTN051192		09/03/2020		



Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		CR 1634871	2020 NRC POV Inspection – Administrative Error in EDQ00099920070002 Appendix 10.9	09/03/2020
		CR 1635223	2020 NRC POV Inspection – Calculation EPMTSS100292 reference omission and input clarification	09/08/2020
		CR 1636100	2020 POV NRC Inspection - Correct typographical error for Reference 3 on pdf page 730 (actual calcul	09/08/2020
		CR 1636444	2020 NRC POV Inspection - Document critical thinking associated with Section XI repairs	09/14/2020
		CR 1637673	2020 NRC POV Inspection - Additional Documentation of Critical Thinking for Section XI Repairs.	09/17/2020
		CR 1638837	2020 NRC POV Inspection - MOV PV thrust test data for 1-FCV-1-51 suspected unreliable	09/21/2020
		CR 1639066	2020 NRC POV Inspection - missing evaluation/justification of not obtaining AF torque values	09/21/2020
		CR 1639626	2020 NRC POV Inspection - QMDS requirements do not match Vendor Manual	09/23/2020
		CR 1639697	2020 NRC POV Inspection Performance Deficiency	09/24/2020
		CR 1639749	2020 NRC POV Inspection - Delete o-ring replacement	09/24/2020
	Drawings	0-47W845-1	Mechanical Flow Diagram-Essential Raw Cooling Water System	Rev. 19
		1-47A595-3	Set-Up Parameters for Air Operated Valves Setup Box for 1-FCV-001-0022-T	Rev. 2
		1-47A8910-72-01	Mechanical Table of Motor-Operated Valve Requirements	Rev. 3
		1071240-7	Solenoid Operated Valve Energize to Open (FC) - ON/OFF 2 1/2 - 4 Inch	Rev. G
		1167E80	Motor Op Gate Valve, MOD 10000GM82FBB00B	Rev. 903
		2-47W813-1	Flow Diagram Reactor Coolant System	Rev. 39
		302607	Electrical Assy	Rev. E
		O-47W803-2		Rev. 9

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Miscellaneous	ESBU/WOG-96-022	Summary of January 4 & 5, 1996 Pressure Locking & Thermal Binding (PLTB) Task Team Meeting (MUHP-6050)	01/19/1996
		SDD-N3-1-4002	Main Steam System	Rev. 22
		SDD-N3-15-4002	Steam Generator Blowdown System Unit 1 / Unit 2	Rev. 19
		SDD-N3-3B-4002	Auxiliary Feedwater System	Rev. 30
		SDD-N3-68-4001	Reactor Coolant System	Rev. 43
		WB-DC-30-15	Motor Operated Valve Thermal Overload and Torque Switch Bypass	Rev. 6
		WBN-SDD-N3-63-4001	Safety Injection System (Unit 1 / Unit 2)	Rev. 36
		WBN-SDD-N3-67-4002	Essential Raw Cooling Water System, System 67	Rev. 38
		WBN-VTD-C994-0010	Equipment Inaccuracy Summary for Motor Operated Valves	Rev. 7
		WBN-VTD-T020-0520	Target Rock Technical Manual for Calve Models 82AB-001-4BB, 82AB-001-5BB	Rev. 1
		WBN-VTD-T401-0010	Teledyne Test Services Quiklook II Valve Diagnostic Test Equipment Description, Safety Related Status, Accuracy & Calibration Periodicity Summary	Rev. 1
		WBNEQ-MOV-003	Limitorque Actuators with Class B Motors	Rev. 37
		WBNEQ-SOL-002	Target Rock Solenoid Valves	Rev. 40
		WBNMEQ-001-53006	Mechanical Equipment Qualification Package	Rev. 2
		WOG-05-87	Addendum to Verification of Pressure Locking Analysis Program - PRESLOK (CN-SEE-01-141)	02/28/2005
	Procedures	0-TI-100.006	Inservice Testing Program	Rev. 9
		1-SI-1-906-A	Main Steam Valves Position Indication Verification - Train A	Rev. 13
		1-SI-3-902	Turbine Driven Auxiliary Feedwater Pump 1A-S Quarterly Performance Test	Rev. 59
		2-SI-68-901-B	Valve Full Stroke Exercising During Plant Operation: Reactor Coolant B-Train	Rev. 3
		2-TRI-0-4	18 Month B Train MOV Thermal Overload Relay Bypass Circuit Functional Test	Rev. 7
		DS-M18.2.21	Motor Operated Valve Thrust and Torque	Rev. 25

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Calculations	
		G-50	Torque, Thrust and Control Switch Settings for Motor-Operated Valves	Rev. 12
		NPG-SPP-09.26.13	Air Operated Valve Program	Rev. 0
		NPG-SPP-09.26.14	Motor Operated Valve Program	Rev. 4
	Work Orders	114900760, 115264274, 116646007, 116986101, 117325065, 117404329, 117758092, 117625369, 117943531, 118294730, 118720661, 119064218, 119064767, 119473916, 119475391, 119526855, 119528673, 120241095, 120241347, 120295031, 120295726, 120498998, 120555952, 120557231, 120850611, 120850804, 121027350		