



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

July 24, 2023

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

SUBJECT: WATTS BAR NUCLEAR PLANT – QUADRENNIAL FOCUSED ENGINEERING
INSPECTION (FEI) COMMERCIAL GRADE DEDICATION REPORT
05000390/2023011 AND 05000391/2023011

Dear James Barstow:

On June 30, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Watts Bar Nuclear Plant and discussed the results of this inspection with Mr. Tony Williams Site Vice President and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC Resident Inspector at Watts Bar 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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

J. Barstow

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Sincerely,

A handwritten signature in black ink, appearing to read 'JB', with a horizontal line extending to the right.

Signed by Baptist, James
on 07/24/23

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

cc w/ encl: Distribution via LISTSERV

SUBJECT: WATTS BAR NUCLEAR PLANT – QUADRENNIAL FOCUSED ENGINEERING INSPECTION (FEI) COMMERCIAL GRADE DEDICATION REPORT
05000390/2023011 AND 05000391/2023011 Dated July 24, 2023

DISTRIBUTION:

T. Fanelli, RII
R. Fanner, RII
C. Franklin, RII
J. Baptist, RII
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ADAMS ACCESSION NUMBER: ML23202A171

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OFFICE	RII/DRS	RII/DRS	RII/DRS	RII/DRS	
NAME	T. Fanelli	R. Fanner	C. Franklin	J. Baptist	
DATE	07/24/23	07/24/23	07/24/23	07/24/23	

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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: 05000390/2023011 and 05000391/2023011

Enterprise Identifier: I-2023-011-0020

Licensee: Tennessee Valley Authority

Facility: Watts Bar Nuclear Plant

Location: Spring City, TN 37381

Inspection Dates: June 12, 2023 to June 30, 2023

Inspectors: T. Fanelli, Senior Reactor Inspector
R. Fanner, Reactor Inspector
C. Franklin, 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 Quadrennial Focused Engineering Inspection (FEI) Commercial Grade Dedication at Watts Bar Nuclear Plant, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

Failure to Control Embedded Digital Devices			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000390,05000391/2023011-01 Open/Closed	None	71111.21N.03
The NRC identified a Green Non-Cited Violation (NCV) of Title 10 of the Code of Federal Regulations (CFR) 50, Appendix B, Criterion IV," Procurement Document Control," with two examples, for the failure to ensure that purchase order requirements controlled unidentified embedded digital devices for safety related components, including commercial grade dedicated (CGD) components.			

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.

REACTOR SAFETY

71111.21N.03 - Commercial Grade Dedication

Commercial Grade Dedication (section 03.01) (14 Samples)

The inspectors reviewed the implementation of the licensee's processes for dedicating commercial-grade items/services as basic components and/or for procuring safety-related structures, systems, and components for the following samples:

- (1) PEG PKG NO. CKG876A, WO 120191302, Description:80-9210836-90 PCB 1 PH VOLT SENSE 120VAC SCI, (125V VITAL BATTERY CHARGER)
- (2) PEG PKG NO. CRE458A, WO 120277323, Description: 80-9215501-90 PCB ASSY UPS TROUBLE 140VDC, (DG 2A-A BATTERY CHARGER 1, NORMAL)
- (3) PEG PKG NO. DAP056L, WO 121461932, Description: HOSE, #4 HYDRAULIC. AQP, (DIESEL GENERATOR 1B-B)
- (4) PEG PKG NO. BWJ668N, WO 116534761, Description: Guide Spring Item# BWJ668N for .5, .75, & 1" Series 1500 Globe VLV, (CCP 1B-B DISCHARGE VENT)
- (5) PEG PKG NO. CAP374N, WO 119191200, Description: INDUSTRY GRADE ISO VG-46, TURBINE OIL, (SAFETY INJECTION PMP 2A-A)
- (6) PEG PKG NO. CKF478V, WO 122663423, Description: PHILLIPS66, MULTIPLEX 220 #2 GREASE, 1/14oz TUBE/CARTRIDGE, (RHR HEAT EXCHANGER 2A INLET ISOLATION)
- (7) PEG PKG NO. CWM252Fx`, WO 119909145, Description: BREAKER, CIRCUIT, THERMAL MAGNETIC, 480, 80, 3, 60, 3, 125 A, (125V DC Vital Power System)
- (8) PEG PKG NO. CWM252Fx`, WO 117648487, Description: BREAKER, CIRCUIT, MAGNETIC, 600, 5, 3, 25000-480, 125 A, (Safety Injection System)
- (9) PEG PKG NO. CXV589N, WO 121842856, Description: PUMP, AC CIRCULATING OIL PUMP, ASSEMBLY, W/ELECTRIC MOTOR, (Standby Diesel Generator System)
- (10) PEG PKG NO. AEQ777G, WO119145014, Description: CAPACITOR, FIXED (Solid State Protection System)
- (11) PEG PKG NO. CAY920W, WO122554382, Description: CAPACITOR, ELECTRICAL DEVICE, (Aux Feedwater)
- (12) PEG PKG NO. CDT158T, WO121998756, Description: Resistor, Variable (EDG-1B-B)
- (13) PEG PKG NO. CRE546B, WO120463676, Description: CAPACITOR, ELECTRICAL DEVICE, Q LEVEL (Battery Charger)
- (14) PEG PKG NO. DAJ426G, WO121041296, Description: SCR, Q LEVEL (125V Vital Battery Charger 8-S)

INSPECTION RESULTS

Failure to Control Embedded Digital Devices			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000390,05000391/2023011-01 Open/Closed	None	71111.21N.03
<p>The NRC identified a Green Non-Cited Violation (NCV) of Title 10 of the Code of Federal Regulations (CFR) 50, Appendix B, Criterion IV, "Procurement Document Control," with two examples, for the failure to ensure that purchase order requirements controlled unidentified embedded digital devices for safety related components, including commercial grade dedicated (CGD) components.</p>			
<p><u>Description:</u> The inspectors reviewed TVA-NQA-PLN89-A, "Nuclear Quality Assurance Plan (NQAP)," Rev 41, to determine the quality requirements for purchasing safety related components. The inspectors noted that Section 8, Procurement and Material Control, required in part, that procurement documents shall specify or reference design basis technical requirements and inspection and test requirements (including acceptance criteria) that shall be prepared under the requirements of Section 7, Design Control. Section 7, specified, in part, that Measures shall be established and implemented to provide test requirements in design output documents for the following tests as appropriate:</p> <ol style="list-style-type: none"> 1. Design qualification. 2. Product acceptance (proof). <ol style="list-style-type: none"> 1. The licensee purchased commercial grade replacement parts for AMETEK battery chargers and inverters as basic components from AMETEK. In approximately 2015, AMETEK changed their sub-vendor (Carlo Gavazzi) for commercial grade timing relays to be CGD as basic components. Neither the licensee, AMETEK nor the sub-vendor documentation identified embedded digital devices associated with the timing relay functions. Based on a walkdown observation and review of the relay capabilities, the team identified that these timing relays contained unidentified embedded digital devices that controlled the timer functionality. The licensee and AMETEK substantiated the condition. The licensee purchase order for these timing relays did not include requirements to assure that any embedded digital devices were identified and controlled as criteria for qualification and acceptance. As a result, uncontrolled Carlo Gavazzi timing relays with unidentified embedded digital devices have been installed in the plant since approximately 2015. 2. In 2016, the site received Information Notice (IN) 2016-01, "Recent Issues Related to the Commercial Grade Dedication of Allen Bradley 700-RTC Relays," ML15295A173. The site review of IN 2016-01 failed to ensure that established purchase order requirements included specifications to assure that any unidentified embedded digital devices were identified and controlled. The IN 2016-01 identified that embedded digital devices went unidentified during the CGD of Allen Bradley timing relays which was causing anomalous behavior, under certain conditions, in safety related equipment. The Allen Bradley model number did not change to reflect a design change that embedded the digital device to control the timing circuits. The site screening (CR 1163578) addressed the specific make and model of relay identified in 			

IN 2016-01, but not the issue implications that unidentified embedded digital devices could affect any number of commercial grade manufacturers. The screening of IN 2016-01 was a failure to identify purchase order requirements were necessary to address unidentified embedded digital devices and thus was a condition adverse to quality. As a result, the site has received new orders of Carlo Gavazzi relays with unidentified digital devices. In addition, the licensee purchase orders for other control devices did not include requirements to assure that any unidentified embedded digital devices were identified and controlled as criteria for qualification and acceptance, which have not been screened for embedded digital devices.

Corrective Actions: The licensee entered the issue into the corrective action program and perform an operability evaluation.

Corrective Action References: CR 1864898-unidentified embedded device, CR 1865139-part 21 tracker, and CR 1864568-CR 1163578 did not address all concerns. (IN2016-01 and Part 21)

Performance Assessment:

Performance Deficiency: The failure to ensure that purchase order requirements controlled unidentified embedded digital devices for safety related components, including CGD components was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to control embedded digital devices through commercial grade dedication adversely affected the reliability and capability of basic components.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Exhibit 2 – Mitigating Systems Screening Questions, Item A. Mitigating SSCs and PRA Functionality (except Reactivity Control Systems), specified that if the finding affected the design or qualification of a mitigating SSC, but it maintained its operability or PRA functionality then it screens to GREEN.

Cross-Cutting Aspect: None

Enforcement:

Violation: Title 10 Code of Federal Regulations (CFR) Part 50 Appendix B, Criterion IV, "Procurement Document Control," required in part, measures shall be established to assure that applicable regulatory requirements, design bases, and other requirements which are necessary to assure adequate quality are suitably included or referenced in the documents for procurement of material, equipment, and services, whether purchased by the applicant or by its contractors or subcontractors.

Contrary to the above, since 2015, the date of installation, the licensee failed to assure measures that applicable regulatory requirements, design bases, and other requirements which are necessary to assure adequate quality are suitably included or referenced in the documents for procurement of material such as measures to ensure the control of

unidentified embedded digital devices in the design and testing of commercial grade basic components.

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

EXIT MEETINGS AND DEBRIEFS

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

- On June 30, 2023, the inspectors presented the Quadrennial Focused Engineering Inspection (FEI) Commercial Grade Dedication results to Mr. Tony Williams Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21N.03	Corrective Action Documents	1860913, 1860914		
	Corrective Action Documents Resulting from Inspection	CR 1857481	Motors stored in warehouse from info gathering	05/18/2023
		CR 1857483	Circuit boards from info gathering	05/18/2023
		CR 1860913	WO Issue ticket missing	06/14/2023
		CR 1860914	WO 116534761 does not contain an issue ticket	06/06/2023
		CR 1860915	WO 120463676 does not contain an issue ticket for CRE546B	06/06/2023
		CR 1862619	Update to TVA-NQA-PLN89-A, Update Reference to NP-5652	06/14/2023
		CR 1862808	NESSD DOC Only Discrepancy	06/15/2023
		CR 1863460	Capacitor Shelf Life Discrepancy	06/20/2023
		CR 1864568	CR 1163578 did not address all concerns.(IN2016-01 and Part 21)	06/26/2023
		CR 1864854	AMETEK Relay Unidentified Embedded Digital Device	06/27/2023
		CR 1864898	AMETEK Relay Unidentified Embedded Digital Device	06/27/2023
		CR 1865139	Part 21 tracker	06/28/2023
		CR 1865502	2023 NRC Commercial Grade Dedication Inspection - Green NCV: PEG Procedures	06/29/2023
		CR 1865505 Rev 1	2023 NRC Commercial Grade Dedication Inspection - Minor Violation - Shelf Life	06/29/2023
		CR 1865507	2023 NRC Commercial Grade Dedication Inspection - Observation - ASL restrictions	06/29/2023
		CR 1865510 Rev 1	2023 NRC Commercial Grade Dedication Inspection - Observation - Shelf Life notes	06/29/2023
		CR 1865512 Rev1	2023 NRC Commercial Grade Dedication Inspection - Observation - Shelf Life guidance	06/29/2023
	Drawings	1-45W709-2 CWM252F	Wiring Diagrams, Charger, Inverter and Misc. Equipment Sheet 2	Rev 0
		1-45W760-211-17	Wiring Diagram 6900 Shutdown Power-Train A&B Schematic Diagram	R21
		1-45W760-63-6	Wiring Diagrams, Safety Injection System Schematic	Rev 10

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		BVB012C		
		45W1766-2 BVB012C	Wiring Diagrams,480V Reactor MOV Board 1A1-A Connection Diagram Sheet 2	Rev 11
		WBN-1-45W751- 2 BVB012C	Wiring Diagrams,480V Reactor MOV Board 1A1-A Single Line Sheet 2	Rev 37
		WBN-1-45W751- 5-CC CWM252F	Wiring Diagrams,480V Reactor MOV Board 1A2-A Single Line Sheet 2	Rev 38
		WBN-45B1767- 13B-AC 004296917 CWM252F	Wiring Diagrams,480V Reactor MOV Board 1A2-A, Connection Diagram Compartment 13B	Rev 3
		WBN-TVDD9954	¾" Series Y Type Globe Valve	Rev. 11
	Miscellaneous	2016N-72 VAS	NUPIC JOINT UTILITIES AUDIT of AMETEK SOLIDSTATE CONTROLS AUE # VA16-003 / NUPIC # 24149 COLUMBUS, OH, 11/06/2016	11/06/2016
		PO 2234885	GE Industrial Solutions Inc., Lubricant, Oil, QA 2, Drum	Rev. 1
		PO 3140696	Flowserve Corp., Guide, Valve, QA 1, SS	Rev. 1
		PO 4895928	Ametek Solidstate Controls, Board, Circuit, QA 1, Voltage Sensing, 120, 1 PH	Rev. 1
		PO 5573688	Ametek Solidstate Controls, Board, Circuit, QA 1, Assembly	Rev. 1
		PO 6673375	Engine Systems Inc., Fitting, Connection, QA 1	Rev. 1
		PO 6929387	GE Industrial Solutions Inc., Lubricant, grease, QA 2, Lithium complex, NLGI grade 2, 14oz, paste, tube	Rev. 0
		TVA Receiving Report PO 3227610 - 2	Vendor QUAL TECH NP, Gould Inc, Circuit Breaker	9/29/2017
		TVA Receiving Report PO 6200052 - 1	Vendor QUAL TECH NP, Siemens Energy & Automation, Circuit Breaker	4/22/2020
		TVA Receiving Report PO 6679142 – 1	Vendor Engine Systems Inc , Circulating Oil Pump Assembly 1" NPT, W/Electric Motor TEFC 460V, 3 phase, 60 Hz	4/13/2021
	TVA Supply	BREAKER,CIRCUIT, QA 1, THERMAL MAGNETIC, 480,	4/29/2020	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Chain Review (SCR) 102990	80, 3, 60, 3, 125 A	
		WBN-VTD-A998-0040	AMETEK SOLIDSTATE CONTROLS INSTRUCTION & OPERATING MANUAL WITH DRAWINGS DUAL 20 AMP BATTERY CHARGERS IN SINGLE ENCLOSURE	Rev. 1
	Procedures	0-MI-57.034	Agastat Time Delay Relays	Rev 4
		0-SI-236-63	125V DC Vital Battery Charger III Test	Rev. 13
		CEB-SS-5.10	Seismic Qualification of Electrical, Mechanical, and I&C Devices	Rev. 3
		CEB-SS-5.10	Seismic Qualification of Electrical, Mechanical, and I&C Devices	Rev. 4
		DS-M18.2.18	Std Procurement Notes	Rev 30
		DS-M18.2.18	Standardized Procurement Notes	Rev 30
		NEDP-8.0	Evaluations for Procurement of Materials, Items, and Services	Rev. 8
		NEDP-8.0	Evaluations for Procurement of Materials, Items, and Services	Rev. 0
		NEDP-8.2	Technical Evaluation for Procurement of Safety Related and Quality Related Materials, Items, and Services	Rev 1
		NEDP-8.3	Supplier Submittals	Rev. 4
		NEDP-8.3	Supplier Submittals	Rev. 4
		NEDP-8.4	Equivalency Evaluation for Procurement and Use of Replacement Materials and Items	Rev. 0007
		NEDP-8.4	Equivalency Evaluation for Procurement and Use of Replacement Materials and Items	Rev. 7
		NEDP-8.5	Other Evaluations	Rev. 7
		NEDP-8.5	Other Evaluations	Rev. 0007
		NEDP-8.5	Other Evaluations	Rev 7
		NPG-SPP-03.16	Supplier Audits, Surveys, Source Surveillances and ASL Maintenance	Rev. 16
		NPG-SPP-04.001	Procurement of Material, Labor and Services	Rev. 0014

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		NPG-SPP-04.001	Procurement of Material, Labor, and Services,	Rev 14
		NPG-SPP-04.002	Material Receipt and Inspection	Rev. 4
		NPG-SPP-04.002	Material Receipt and Inspection	Rev. 0
		NPG-SPP-04.004	Material Issue, Control and Return	Rev. 1
		NPG-SPP-09.3	Plant Modifications and Engineering Change Control	Rev. 0038
		P.S.4.M.1.5	CLASSIFICATION, PROCUREMENT, RECEIPT AND USE OF LUBRICANTS	Rev. 5
	Work Orders	119909145, 117648487, 121842856, 119684290, 120277320, 119190332, 122663418, 121461932, 115700387		