



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

May 1, 2023

Edward Pigott
Site Vice President
Duke Energy Carolinas, LLC
McGuire Nuclear Station
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

SUBJECT: MCGUIRE NUCLEAR STATION – INTEGRATED INSPECTION REPORT
05000369/2023001 AND 05000370/2023001

Dear Edward Pigott:

On March 31, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at McGuire Nuclear Station. On April 12, 2023, the NRC inspectors discussed the results of this inspection with you 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,

A handwritten signature in black ink, appearing to read "Eric Stamm".

Signed by Stamm, Eric
on 05/01/23

Eric J. Stamm, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos. 05000369 and 05000370
License Nos. NPF-9 and NPF-17

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: MCGUIRE NUCLEAR STATION – INTEGRATED INSPECTION REPORT
05000369/2023001 AND 05000370/2023001 Dated May 01, 2023

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NAME	C. Safouri	D. Jackson	E. Stamm		
DATE	04/28/23	04/28/23	05/01/23		

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers: 05000369 and 05000370

License Numbers: NPF-9 and NPF-17

Report Numbers: 05000369/2023001 and 05000370/2023001

Enterprise Identifier: I-2023-001-0025

Licensee: Duke Energy Carolinas, LLC

Facility: McGuire Nuclear Station

Location: Huntersville, North Carolina

Inspection Dates: January 1, 2023, to March 31, 2023

Inspectors: C. Safouri, Senior Resident Inspector
F. Young, Resident Inspector
D. Ray, Reactor Inspector
M. Schwieg, Senior Reactor Inspector

Approved By: Eric J. Stamm, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at McGuire Nuclear Station, 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 operated at or near 100 percent rated thermal power (RTP) for the entire inspection period.

Unit 2 began the inspection period at or near 100 percent RTP. On February 18, 2023, the unit was shut down for the remainder of the inspection period for a scheduled refueling outage (M2R28).

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 activities described in IMC 2515, Appendix D, "Plant Status," observed risk-significant activities, and completed on-site portions of IPs. 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

Impending Severe Weather Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from impending severe weather tornado watch, tornado warning, and severe thunderstorm warning, on January 12, 2023.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

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

- (1) Unit 2 train B emergency diesel generator (EDG) while Unit 2 train A EDG was out of service for planned maintenance, on January 10, 2023
- (2) Unit 2 train A and train B spent fuel cooling system, on March 6, 2023
- (3) Unit 1 train A nuclear service water system (RN), on March 14, 2023
- (4) Unit 2 low temperature overpressure protection system while Unit 2 was in mode 4, on March 29, 2023

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

- (1) The inspectors evaluated system configurations during a complete walkdown of the Unit 2 train A and train B residual heat removal (ND) system while the reactor coolant system was in lowered inventory, on February 23, 2023.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Standby shutdown facility, on January 30, 2023
- (2) Unit 2 safety-related emergency switchgear and associated HVAC rooms, on February 1, 2023
- (3) Units 1 and 2 auxiliary building elevation 733' vital battery area, on March 8, 2023
- (4) Unit 1 train A and train B EDG rooms, on March 17, 2023
- (5) Unit 2 upper containment building, on March 28, 2023
- (6) Unit 2 lower containment building, on March 28, 2023

Fire Brigade Drill Performance Sample (IP Section 03.02) (2 Samples)

- (1) The inspectors evaluated the onsite fire brigade training and performance during an unannounced fire drill, on January 8, 2023. The fire scenario involved a fire in the Unit 1 lube oil purifier in the Unit 1 turbine building basement.
- (2) The inspectors evaluated the onsite fire brigade training and performance during an announced fire drill, on January 12, 2023. The fire scenario involved a fire in the Unit 2 generator seal oil pump system.

71111.07A - Heat Exchanger/Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

- (1) PT/2/A/4403/007, "RN Train A Flow Balance," on March 9, 2023

71111.08P - Inservice Inspection Activities (PWR)

PWR Inservice Inspection Activities Sample - Nondestructive Examination and Welding Activities (IP Section 03.01) (1 Sample)

The inspectors verified that the following nondestructive examination and welding activities were performed appropriately:

- (1) Ultrasonic Examination
 - reactor head thermal sleeve inspection

Visual Examination

- reactor head bare metal inspection

Welding Activities

- cold leg check valves 2NI-21 and 2NI-349

PWR Inservice Inspection Activities Sample - Vessel Upper Head Penetration Inspection Activities (IP Section 03.02) (1 Sample)

The inspectors verified that the licensee conducted the following vessel upper head penetration inspections and addressed any identified defects appropriately:

- (1)
 - reactor head bare metal inspection
 - reactor head thermal sleeve inspection

PWR Inservice Inspection Activities Sample - Boric Acid Corrosion Control Inspection Activities (IP Section 03.03) (1 Sample)

The inspectors verified the licensee is managing the boric acid corrosion control program through a review of the following evaluations:

- (1)
 - threaded fittings associated with flow transmitter 2-NI-FT-5450, action request (AR) 2419116
 - threaded fitting associated with flow transmitter 2-FW-FT-5250, AR 2424371
 - packing gland associated with valve 2-NV-VA-0060, AR 2437743
 - containment boric acid walkdown

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

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

- (1) The inspectors observed and evaluated licensed operator performance in the control room during reactor shutdown and plant cooldown for Unit 2 refueling outage, on February 18, 2023.

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

- (1) The inspectors observed and evaluated just in time training associated with refueling outage preparations, specifically on startup and zero power physics testing, on February 9, 2023.

71111.13 - Maintenance Risk Assessments and Emergent Work Control

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

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Emergent work and protected equipment plan associated with the failure of the 120VAC nonsafety-related auxiliary control power panelboard inverter (KXA), on January 4, 2023
- (2) Equipment protection plan for Unit 1 train A component cooling water (KC) during preventive maintenance on Unit 1 train B KC auxiliary building non-essential header isolation valve (1KC-53B), on January 5, 2023

- (3) Equipment protection plan for Unit 2 while in yellow shutdown risk for decay heat removal and inventory control due to lowered inventory, on February 23, 2023
- (4) Unit 2 high risk evolution associated with core fuel offload during the refueling outage, on February 26, 2023

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (5 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) Nuclear condition report (NCR) 02454406, Unit 2 upper airlock volumetrics failure - Airlock Operability Test (PT/2/A/4200/020A) failed acceptance criteria, on January 18, 2023
- (2) NCR 02458167, oil leak on the isolation valve for Unit 2 train B steam generator power operated relief valve (2SV-28), on January 24, 2023
- (3) NCR 02457570, water found in Unit 1 train B diesel fuel oil storage tank, on January 26, 2023
- (4) NCR 02462518, several ice condenser baskets weighed less than expected during end of cycle surveillance, on February 27, 2023
- (5) NCR 02463633, thermal sleeve wear discovered on locations F06 and K10, on March 6, 2023

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) Engineering change 101501, implementation of an alternative wiring method for the close torque bypass switch on Rotork actuators for Unit 2 train A ND reactor coolant system (NC) isolation valve (2ND-19A), on January 17, 2023

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Partial)

- (1) (Partial)
The inspectors evaluated Unit 2 refueling outage (M2R28) activities from February 18, 2023, to March 31, 2023. The inspectors completed inspection procedure Sections 03.01.a through 03.01.c

71111.24 - Testing and Maintenance of Equipment Important to Risk

The inspectors evaluated the following testing and maintenance activities to verify system operability and/or functionality:

Post-Maintenance Testing (PMT) (IP Section 03.01) (3 Samples)

- (1) PT/1/A/4350/002B, "Diesel Generator 1B Operability Test," following Unit 1 train B EDG governor booster servomotor replacement, on January 3, 2023
- (2) PT/0/A/4350/030, "Nordberg Diesel Engine 6 year Periodic Maintenance," on Unit 2 train B EDG, on March 14, 2023
- (3) PT/2/A/4200/008B, "NC Pressure Isolation Valve Test," following repairs on safety injection to Unit 2 train A cold leg check valve (2NI-171), on March 31, 2023

Surveillance Testing (IP Section 03.01) (4 Samples)

- (1) IP/1/A/3000/006C, "OTDT Channel Calibration Protection III," on January 11, 2023
- (2) PT/1/A/4201/001A, "RWST Level Auto-Switchover Analog Channel Operational Test," on January 24, 2023
- (3) PT/2/A/4200/009A, "Engineered Safety Features Actuation Periodic Test Train A," Section 12.3, Unit 2 train A EDG load testing and engineered safety features valve stroking upon safety injection, phase A isolation, phase B isolation, and blackout signals, on February 19, 2023
- (4) PT/2/A/4200/009A, "Engineered Safety Features Actuation Periodic Test Train A," Section 12.4, Unit 2 train A EDG response testing with offsite power available upon safety injection signal, on February 19, 2023

Inservice Testing (IST) (IP Section 03.01) (2 Samples)

- (1) PT/0/A/4250/037, "Main Steam Safety Valve Setpoint Test Using Set Pressure Verification Device (SPVD)," on Unit 2 valves 2SV-8, 2SV-9, 2SV-10, 2SV-11, and 2SV-12, on February 15, 2023
- (2) PT/2/A/4204/004C, "A and B ND Pump Head Curve Verification," on February 27, 2023

Containment Isolation Valve (CIV) Testing (IP Section 03.01) (1 Sample)

- (1) PT/2/A/4200/001C, "Isolation Valve Leak Rate Test," Enclosure 13.11, "Test Sheet for Penetration M-278 (NI)," for Unit 2 train B emergency core cooling system sump piping drain reservoir and associated isolation valves, on February 28, 2023

Reactor Coolant System Leakage Detection Testing (IP Section 03.01) (1 Sample)

- (1) PT/1/A/4150/001B, "Reactor Coolant Leakage Calculation," due to Unit 1 elevated NC unidentified leakage, on January 6, 2023

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (2 Samples)

The inspectors evaluated:

- (1) A simulator exam consisting of a failure of an intermediate range instrumentation; inadvertent start of the turbine driven auxiliary feedwater pump; and steam generator tube rupture requiring a reactor trip and safety injection, on January 20, 2023

- (2) A technical support center qualification tabletop drill consisting of a failure of all three fission product barriers, on January 23, 2023

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (2 Samples)

- (1) Unit 1 (January 1, 2022, through December 31, 2022)
- (2) Unit 2 (January 1, 2022, through December 31, 2022)

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (2 Samples)

- (1) Unit 1 (January 1, 2022, through December 31, 2022)
- (2) Unit 2 (January 1, 2022, through December 31, 2022)

IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (2 Samples)

- (1) Unit 1 (January 1, 2022, through December 31, 2022)
- (2) Unit 2 (January 1, 2022, through December 31, 2022)

71152A - Annual Follow-up Problem Identification and Resolution

Annual Follow-up of Selected Issues (Section 03.03) (1 Sample)

- (1) NCR 02462518, several ice condenser baskets weighed less than expected during end of cycle surveillance, on February 27, 2023

INSPECTION RESULTS

No findings were identified.

EXIT MEETINGS AND DEBRIEFS

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

- On March 6, 2023, the inspectors presented the Unit 2 inservice inspection results to Edward Pigott and other members of the licensee staff.
- On April 12, 2023, the inspectors presented the integrated inspection results to Edward Pigott and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Procedures	RP/0/A/5700/006	Natural Disasters	36
		RP/0/B/5700/027	Severe Weather Preparation	13
71111.04	Drawings	MCFD-2551-02.00	Flow Diagram of Chemical and Volume Control System (NV)	21
		MCFD-2554-01.02	Flow Diagram of Chemical and Volume Control System (NV)	13
		MCFD-2554-03.00	Flow Diagram of Chemical and Volume Control System (NV)	21
		MCFD-2554-03.01	Flow Diagram of Chemical and Volume Control System (NV)	32
		MCFD-2561-01.00	Flow Diagram of Residual Heat Removal (ND)	29
	Procedures	OP/2/A/6200/004	Residual Heat Removal System	102
		OP/2/A/6350/002	Diesel Generator	119
71111.05	Corrective Action Documents Resulting from Inspection	Nuclear Condition Report(s)	02456811	
	Fire Plans	CSD-MNS-PFP-AB-0733-001	Auxiliary Building Elevation 733 Pre-Fire Plan	1
	Procedures	AD-OP-ALL-0207	Fire Brigade Administrative Controls	5
71111.07A	Procedures	PT/2/A/4403/007	RN Train 2A Flow Balance	102
71111.08P	Procedures	NDE-NE-ALL-7301	VT-3 VISUAL EXAMINATION	2
		TE-MN-PWR-0006	INSPECTION, ASSESSMENT, AND CLEANUP OF BORIC ACID ON PLANT MATERIALS	1
71111.11Q	Miscellaneous		Licensed Operator - Just in Time Training - Startup - Simulator Exercise Guide	02/24/2021
			Licensed Operator - Just in Time Training - Simulator Exercise Guide - Initial Criticality and Zero Power Physics Testing	09/01/2020
	Procedures	OP/2/A/6100/003	Controlling Procedure for Unit Operation	203

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.13	Corrective Action Documents	Nuclear Condition Report(s)	02454401, 02467113	
	Corrective Action Documents Resulting from Inspection	Nuclear Condition Report(s)	02462559	
	Procedures	AD-OP-ALL-0201	Protected Equipment	9
		AP/1/A/5500/15	Loss of Vital of Aux Control Power	30
71111.15	Corrective Action Documents	Nuclear Condition Report(s)	02457570, 02406930, 02401057, 02458167	
	Miscellaneous	MCS-1593.SM-00-0001	Design Basis Specification for the SM, SV and SB Systems	33
		MCTC-1593-SM.V006-01	SG PORV Isolation 1/2SV-25, -26, -27 and -28, Testing and Acceptance Criteria, Units 1 & 2	0
71111.24	Drawings	2NI-201	MCSR - NI System Reactor building	5
		2NI-211	MCSR - NI System Reactor Building (Sh. 3 of 3)	1
	Miscellaneous	AD-OP-ALL-0106	2NI-171 Repair - Freeze Seal - Conduct of Infrequently Performed Tests of Evolutions	03/30/2023
	Procedures	AD-OP-ALL-0200	Clearance and Tagging	21
		IP/1/A/3000/006C	OTDT Channel Calibration Protection III	10
		PT/0/A/4250/037	Main Steam Safety Valve Setpoint Test Using Set Pressure Verification Device (SPVD)	15
		PT/0/A/4350/030	Nordberg Diesel Engine 6 Year Periodic Maintenance	29
		PT/1/A/4150/001B	Reactor Coolant Leakage Calculation	105
		PT/1/A/4150/055	NC System Unidentified Leakage OAC Point Determination	2
		PT/2/A/4200/008B	NC Pressure Isolation Valve Leak Test	65
		PT/2/A/4204/004C	2B ND Pump Comprehensive Test	16
		TE-MN-ALL-0410	Freeze Seals	0
71114.06	Procedures	CSD-EP-MNS-0101-01	EAL Technical Basis Document	2
71152A	Corrective Action Documents Resulting from Inspection	Nuclear Condition Report(s)	02457706	