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

July 28, 2023

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

SUBJECT: MCGUIRE NUCLEAR STATION – INTEGRATED INSPECTION REPORT 05000369/2023002 AND 05000370/2023002

Dear Edward Pigott:

On June 30, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at McGuire Nuclear Station. On July 24, 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,

Signed by Stamm, Eric
on 07/28/23

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

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SUBJECT: MCGUIRE NUCLEAR STATION – INTEGRATED INSPECTION REPORT 05000369/2023002 AND 05000370/2023002

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DATE	07/25/2023	07/28/2023	07/28/2023		

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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:	05000369/2023002 and 05000370/2023002
Enterprise Identifier:	I-2023-002-0019
Licensee:	Duke Energy Carolinas, LLC
Facility:	McGuire Nuclear Station
Location:	Huntersville, North Carolina
Inspection Dates:	April 1, 2023, to June 30, 2023
Inspectors:	C. Safouri, Senior Resident Inspector F. Young, Resident Inspector J. Diaz-Velez, Senior Health Physicist B. Kellner, Senior Health Physicist
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

Type	Issue Number	Title	Report Section	Status
URI	05000369,05000370/ 2022002-02	Technical basis for changes to calibration frequency of radiation monitors EMF-36, EMF-44, and EMF-49 LOW and HIGH channels and SLC respective update/ clarification	71124.05	Closed

PLANT STATUS

Unit 1 began the inspection period at 100 percent rated thermal power (RTP) and remained at or near 100 percent RTP for the remainder of the inspection period.

Unit 2 began the inspection period in mode 3 as part of refueling outage M2R28 and returned to 96 percent RTP on April 6, 2023. On April 6, 2023, the unit experienced a turbine runback to approximately 57 percent RTP in response to a loss of 'B' busline and 2B generator circuit breaker lockout. On April 8, 2023, the unit was down powered to 36 percent RTP to secure isophase duct cooling to perform troubleshooting. On April 9, 2023, the unit was raised to 55 percent RTP but closure of the 2B generator circuit breaker was unsuccessful and resulted in a 2B generator circuit breaker lockout. On April 9, 2023, the unit was returned to 36 percent RTP to perform additional troubleshooting and conduct repairs. The unit was returned to 100 percent RTP on April 12, 2023, and remained at or near 100 percent RTP for the remainder 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 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

Seasonal Extreme Weather Sample (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of hot weather for the following systems:
- Auxiliary building ventilation
- Units 1/2 containment ventilation systems

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (3 Samples)

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

(1) Unit 2 train A and train B motor driven auxiliary feed water pumps and discharge flow paths, on April 5, 2023

(2) Unit 1 main steam isolation and power operated relief valves for 1A, 1B, 1C, and 1D steam generators, on May 2, 2023
(3) Unit 2 train A nuclear service water system while standby nuclear service water pond remote level indication was unavailable, on May 4, 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) Auxiliary building 716' elevation, on April 14, 2023
(2) Auxiliary building 767' elevation, including the main control room, on April 26, 2023
(3) Auxiliary and service building cable spreading rooms, on May 11, 2023
(4) Unit 1 auxiliary feedwater pump room, on May 16, 2023
(5) Unit 1 emergency diesel generator rooms, on May 25, 2023
(6) Unit 1 emergency switchgear and electrical penetration rooms, on June 15, 2023

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 main control room during Unit 2 mode 4 to mode 3 heat up activities, on April 1, 2023, as well as Unit 2 zero power physics testing following refueling outage M2R28, on April 3, 2023.

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (3 Samples)

(1) The inspectors observed and evaluated an active simulator exam on May 23, 2023. The first scenario involved a steam generator power operated relief valve failing open and a loss of all AC power. The second scenario involved an unexpected turbine driven auxiliary feedwater pump start, followed by a failure of the running charging pump, followed by a non-isolable steam line rupture inside containment.
(2) The inspectors observed and evaluated an active simulator exam on May 30, 2023. The first scenario involved a failure of power range N-42, 1A steam generator power operated relief valve failing open, and an inadvertent turbine trip with an anticipated transient without scram followed by a steam line break outside containment. The second scenario involved a digital electrohydraulic turbine runback due to loss of a 1B busline with a stuck control rod, followed by a loss of coolant accident caused by a control rod ejection event.
(3) The inspectors observed and evaluated an active simulator exam on June 13, 2023. The first scenario involved a failure of intermediate range N-35 and source range N-31, excessive reactor coolant pump vibration requiring a manual reactor trip, and a loss of coolant accident inside containment with subsequent engineered safety features actuation failures. The second scenario involved a loss of component cooling water, loss of spent fuel pool cooling, and a steam generator fault inside containment with a stuck open main steam isolation valve.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (3 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

(1) Nuclear condition report (NCR) 02463522, loss of power on 6.9kV switchgear, 2TA, on March 8, 2023
(2) NCR 02416694, Unit 2 turbine control system plant level event, on May 12, 2023
(3) NCR 02474389, Unit 1 train A emergency diesel generator indication anomaly, on June 15, 2023

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (6 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 on safety injection to Unit 2 train A cold leg check valve reactor coolant pressure isolation valve, 2NI-171, repair/rebuild with a freeze seal application, on March 30, 2023
(2) Emergent work and condition monitoring plan for steam leak on main feedwater drain valve, 2CF-88, on April 25, 2023
(3) Equipment protection plan during Unit 1/2 train B chilled water system planned maintenance outage, on May 8, 2023
(4) Equipment protection plan during Unit 2 spent fuel pool time to 200 degrees Fahrenheit being less than 72 hours, on May 11, 2023
(5) Equipment protection plan during Unit 2 train A component cooling water system planned maintenance outage, on June 12, 2023
(6) Emergent work and operational risk mitigation plan for loss of the backup power supply for Unit 1 protection channel 2, on June 28, 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) NCR 02470033, Unit 2 non-isolable feedwater drain valve, 2CF-88, leaking through pipe cap, on April 25, 2023
(2) NCR 02471954, Unit 2 train B emergency diesel generator fuel oil piping contact with barring gear motor, on May 8, 2023
(3) NCR 02472536, Unit 1 train B component cooling water motor cooler heat exchanger water leak, on May 16, 2023
(4) NCR 02474839, Unit 1 train A emergency diesel generator time delay relay anomaly, on June 20, 2023

(5) NCR 02477449, Unit 1 loss of backup power supply to protection cabinet channel 2, on June 28, 2023

71111.20 - Refueling and Other Outage Activities

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

(1) The inspectors evaluated Unit 2 refueling outage (M2R28) activities from April 1, 2023, to April 4, 2023. The inspectors completed inspection procedure Sections 03.01.d through 03.01.e.

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) (7 Samples)

(1) Work order (WO) 20246240, post maintenance testing following resolution of Unit 2 main turbine throttle valve #3 suspect indications, on April 5, 2023
(2) WO 20543966, Unit 1 train A nuclear service water system flow discharge calibration, on April 18, 2023
(3) WO 20472030, low level intake supply to nuclear service water system isolation valve, 1RN-1, electrical and mechanical inspection of Limitorque actuator, on April 19, 2023
(4) PT/2/A/4350/002B, "Diesel Generator B Operability Test," on Unit 2 train B emergency diesel generator following cylinder fluid checks, on May 3, 2023
(5) PT/0/A/4457/001A, "A Chilled Water System Pump Performance Test," on Unit 1/2 train A chilled water pump following motor replacement and pump rebuild, on May 19, 2023
(6) WO 20542923, Unit 2 train B auxiliary feedwater pump discharge to Unit 2 loop C steam generator isolation valve diagnostic test and lubrication, on May 31, 2023
(7) WO 20383899, Unit 2 train A component cooling water pump #1 breaker and auxiliary switches replacement, on June 12, 2023

Surveillance Testing (IP Section 03.01) (2 Samples)

(1) PT/2/A/4200/001A, “Containment Integrated Leak Rate Test,” on March 26, 2023
(2) PT/2/A/4350/004, “4kV Loss of Voltage Trip Actuating Device Operational Test,” on June 1, 2023

Ice Condenser Testing (IP Section 03.01) (1 Sample)

(1) PT/0/A/4200/032, “Periodic Inspection of Ice Condenser Lower Inlet Doors,” during Unit 2 refueling outage M2R28, on March 31, 2023

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 (April 1, 2022, through March 31, 2023)
(2) Unit 2 (April 1, 2022, through March 31, 2023)

MS06: Emergency AC Power Systems (IP Section 02.05) (2 Samples)

(1) Unit 1 (April 1, 2022, through March 31, 2023)
(2) Unit 2 (April 1, 2022, through March 31, 2023)

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

(1) Unit 1 (April 1, 2022, through March 31, 2023)
(2) Unit 2 (April 1, 2022, through March 31, 2023)

71152S - Semiannual Trend Problem Identification and Resolution

Semiannual Trend Review (Section 03.02) (1 Sample)

(1) The inspectors reviewed the licensee's corrective action program for potential adverse trends associated with water leakage in auxiliary building elevation 767', near the Unit 2 fuel building ventilation air handling unit, that might be indicative of a more significant safety issue.

71153 - Follow Up of Events and Notices of Enforcement Discretion

Personnel Performance (IP Section 03.03) (1 Sample)

(1) The inspectors evaluated the turbine runback transient associated with Unit 2 loss of bus line B and licensee's performance, on April 6, 2023.

INSPECTION RESULTS

Unresolved Item (Closed)	Technical basis for changes to calibration frequency of radiation monitors EMF-36, EMF-44, and EMF-49 LOW and HIGH channels and SLC respective update/clarification. URI 05000369,05000370/2022002-02	71124.05
Description: Site Technical Specification (TS) 5.5, "Programs and Manuals," Section 5.5.5 a. "Radioactive Effluent Controls Program," states, "This program conforms to 10 CFR 50.36a for the control of radioactive effluents and for maintaining the doses to members of the public from radioactive effluents as low as reasonably achievable. The program shall be contained in Chapter 16 of the Updated Final Safety Analysis Report (UFSAR), shall be implemented by procedures, and shall include remedial actions to be taken whenever the program limits are exceeded. The program shall include the following elements:		

1. Limitations on the functional capability of radioactive liquid and gaseous monitoring instrumentation including surveillance tests and setpoint determination in accordance with the methodology in the ODCM;"

Additionally, Section 5.5.5 b. states that licensee-initiated changes to the Radiological Effluent Controls of the UFSAR:

1. Shall be documented and records of reviews performed shall be retained. This documentation shall contain:
    - Sufficient information to support the change(s) together with the appropriate analyses or evaluations justifying the change(s), and
    - A determination that the change(s) maintain the overall conformance of the solidified waste product to existing requirements of Federal, State, or other applicable regulations or a determination that the change will maintain the level of radioactive effluent control required by 10 CFR 20.1302, 40 CFR Part 190, 10 CFR 50.36a, and Appendix I to 10 CFR Part 50, and not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations

Chapter 16 of the UFSAR, "Selected Licensee Commitments" (SLCs) states that, "Changes to these Selected Licensee Commitments shall be considered a change in an NRC commitment and shall be made only in accordance with the approved Nuclear Operating Fleet Administrative Procedure for the Control of Selected Licensee Commitments and by use of the 10 CFR 50.59 Process." SLC section 16.11.2, "Radioactive Liquid Effluent Monitoring Instrumentation," identified the surveillance frequency requirements and compensatory actions which included channel calibration Testing Requirement (TR) 16.11.2.7 on a 24-month periodicity. SLC section 16.11.7, "Radioactive Gaseous Effluent Monitoring Instrumentation," identified the surveillance frequency requirements and compensatory actions which included channel calibration TR 16.11.7.7 on an 18-month periodicity.

The inspectors noted that calibration intervals of site effluent radiation monitors used for making decisions related to emergency action levels declarations in case of an event were changed from the expected frequencies described in Chapter 16 of the UFSAR. Specifically, effluent monitors EMF-36, EMF-44, and EMF-49 High channels were found calibrated at 6-year intervals. The inspectors opened an unresolved item (URI 05000269,270/2022002-02) to review the licensee's technical basis/justification for the change in calibration frequency.

The inspectors reviewed the information provided by the licensee to address the URI. Based on review of historical licensing actions, the inspectors verified that the low range channels of EMF-36, EMF-44, and EMF-49 were removed from TSs, and relocated to the SLC manual, following NRC approval (ADAMS Accession Number ML013200186) of the license amendment request dated February 7, 1990, and its supplement dated May 7, 1990. Also, EMF-36 (High High range) was removed from TSs, and relocated to the SLC manual, following NRC approval (ADAMS Accession Number ML013230218) of the license amendment request dated February 25, 1994. There were no other TS requirements for High range channels. Inspectors noted that once removed from TSs, changes to the emergency plan radiation monitors can be made without prior NRC approval provided such changes do not reduce the effectiveness of the Emergency Plan, do not require a license amendment pursuant to 10 CFR 50.90, or do not otherwise satisfy requirements for prior NRC approval.

Also, NRC inspectors confirmed that the Low and High range channels of EMF-36, EMF-44, and EMF-49 do not meet any of the four criteria specified in 10 CFR 50.36 for inclusion in the TSs.

The licensee amended SLC sections 16.7.6, 16.11.2, and 16.11.7 to clarify that calibration frequencies stated therein are applicable to the specific instrument channels (e.g., Low Range, High Range, High High Range) and not for the entire set of channels available.

The NRC inspectors evaluated the 6-year calibration frequency for EMF-36, EMF-44, and EMF-49 High channels, in accordance with licensee's procedure AD-EG-ALL-1202, "Preventive Maintenance [PM] and Surveillance Testing Administration," and the information described above, and no performance deficiency was identified. This URI is closed.

Corrective Action References: NCRs 02427036, 02452188, 02452190

EXIT MEETINGS AND DEBRIEFS

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

- On July 24, 2023, the inspectors presented the integrated inspection results to Ed Pigott and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04	Corrective Action Documents	Nuclear Condition Report(s)	02468556	
	Drawings	MCFD-1574-01.00	Flow Diagram of Nuclear Service Water System (RN)	35
		MCFD-2574-01.01	Flow Diagram of Nuclear Service Water System (RN)	44
		MCFD-2574-02.00	Flow Diagram of Nuclear Service Water System (RN)	30
		MCFD-2574-02.01	Flow Diagram of Nuclear Service Water System (RN)	13
		MCFD-2574-03.00	Flow Diagram of Nuclear Service Water System (RN)	23
		MCFD-2574-03.01	Flow Diagram of Nuclear Service Water System (RN)	13
		MCFD-2574-04.00	Flow Diagram of Nuclear Service Water System (RN)	34
		MCFD-2574-05.00	Flow Diagram of Nuclear Service Water System (RN)	7
	Procedures	OP/1/A/6400/006	Nuclear Service Water System	256
		PT/1/A/4600/003B	Daily Surveillance Items	183
71111.11Q	Procedures	PT/0/A/4150/021	Post Refueling Controlling Procedure for Criticality, Zero Power Physics, and Power Escalation Testing	124
		PT/0/A/4150/028	Initial Criticality and Zero Power Physics Testing	81
71111.13	Corrective Action Documents	Nuclear Condition Report(s)	02477616, 02477449	
	Corrective Action Documents Resulting from Inspection	Nuclear Condition Report(s)	02467389	
		Procedure Revision Request(s)	02467345	
		Training Request Form(s)	02469205	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Drawings	2NI-201	MCSRD - NI System Reactor Building (Sh. 2 of 2)	5
		2NI-211	MCSRD - NI System Reactor Building (Sh. 3 of 3)	1
	Procedures	AD-OP-ALL-0106	Conduct of Infrequently Performed Tests or Evolutions: 2NI-171	4
		AD-OP-ALL-0200	Clearance and Tagging	21
		TE-MN-ALL-0410	Freeze Seals	0
71111.15	Corrective Action Documents	NCR 02477616	Channel 2 of Unit 1 7300 reverted to test condition	
71111.20	Miscellaneous		Maintenance Outage Work Schedule, 2/13/2023 - 4/9/2023	
			Maintenance Outage Work Exceptions, 2/13/2023 - 4/9/2023	
			Operations Outage Work Schedule, 2/13/2023 - 4/9/2023	
			Operations Outage Work Exceptions, 2/13/2023 - 4/9/2023	
			Chemistry Outage Work Schedule, 2/13/2023 - 4/9/2023	
			Chemistry Outage Work Exceptions, 2/13/2023 - 4/9/2023	
71111.24	Corrective Action Documents	Procedure Revision Request(s)	02467956	
	Drawings	MC-1760-01.03	Connection Diagram - Nuclear Service Water - Motor Operated Valves	21
		MCEE-138-00.01	Elementary Diagram - Low Level Intake Isolation - Valve 1RN1	4
		MCFD-1574-01.00	Flow Diagram of Nuclear Service Water System (RN)	35
	Procedures	IP/0/A/3066/002D	Rotork Actuator Preventative Maintenance	47
		IP/0/A/3066/013	Using Crane VIPER to Obtain Data for Trending Valve Performance	9
		IP/0/A/4971/007	ITE 27N and Time Delay Relay Calibration	22
		IP/0/A/4971/010	Brown Boveri ITE27D Relay Calibration	14
		PT/2/A/4252/002B	CA Valve Stroke Timing - Quarterly 2B Motor Driven Pump Flowpath	38
		PT/2/A/4350/004	4 kV Loss of Voltage Trip Actuating Device Operational Test	20
	Work Orders		20246240	
	Miscellaneous		Selected Licensee Commitment Manual	200

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71151	Corrective Action Documents Resulting from Inspection	Nuclear Condition Report(s)	02479658	
71152S	Corrective Action Documents	Nuclear Condition Report(s)	02471224	
	Work Orders	Work Request(s)	20245243, 20247792, 20247965	
71153	Corrective Action Documents	Nuclear Condition Report(s)	02468097	
	Miscellaneous	MCS-1465.00-00-0023	Design Basis Specification for Plant and Offsite Power Protective Relaying	29