



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
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ATLANTA, GEORGIA 30303-1200

July 24, 2023

Thomas Haaf
Site Vice President
Duke Energy Progress, LLC
5413 Shearon Harris Road
Mail Code HNP01
New Hill, NC 27562-9300

SUBJECT: SHEARON HARRIS NUCLEAR PLANT – INTEGRATED INSPECTION REPORT
05000400/2023002

Dear Thomas Haaf:

On June 30, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Shearon Harris Nuclear Plant. On July 13, 2023, the NRC inspectors discussed the results of this inspection with David Hoffman, Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

Two findings of very low safety significance (Green) are documented in this report. Two of these findings involved violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance or severity of the violations 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 Shearon Harris Nuclear Plant.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC Resident Inspector at Shearon Harris 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."

T. Haaf

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Sincerely,



Signed by Fannon, Matthew
on 07/24/23

Matthew S. Fannon, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket No. 05000400
License No. NPF-63

Enclosure:
As stated

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SUBJECT: SHEARON HARRIS NUCLEAR PLANT – INTEGRATED INSPECTION REPORT
05000400/2023002 Dated July 24, 2023

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Number: 05000400

License Number: NPF-63

Report Number: 05000400/2023002

Enterprise Identifier: I-2023-002-0017

Licensee: Duke Energy Progress, LLC

Facility: Shearon Harris Nuclear Plant

Location: New Hill, NC

Inspection Dates: April 01, 2023, to June 30, 2023

Inspectors: D. Bacon, Branch Chief
J. Bell, Senior Health Physicist
P. Boguszewski, Senior Resident Inspector
P. Gresh, Emergency Preparedness Inspector
S. Hedger, Senior Emergency Preparedness Inspector
B. Kellner, Senior Health Physicist
A. Rosebrook, Senior Reactor Analyst
J. Seat, Senior Project Engineer
C. Smith, Resident Inspector
G. Smith, Senior Resident Inspector
J. Tornow, Physical Security Inspector
J. Walker, Senior Emergency Preparedness Inspector

Approved By: Matthew S. Fannon, Chief
Reactor Projects Branch 4
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 Shearon Harris 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 Implement Appropriate Risk Management Actions			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000400/2023002-01 Open/Closed	[H.5] - Work Management	71111.13
An NRC-identified finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) 50.65(a)(4), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," was identified for failure to manage risk associated with performing maintenance on 480V motor control center (MCC) 1A36-SA. Specifically, the licensee failed to implement appropriate risk management actions (RMAs) for the scheduled maintenance by failing to protect 'B' train components associated with the control room emergency filtration system.			
Failure to Adequately Secure Radioactive Shipment to Prevent Shifting During Transport.			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Public Radiation Safety	Green NCV 05000400/2023002-02 Open/Closed	[H.11] - Challenge the Unknown	71124.08
A self-revealed finding of very low safety significance (Green) and an associated NCV of 10 CFR 71.5(a) and 49 CFR 173.427(a)(6)(iii) was identified when a Low Specific Activity (LSA II) shipment containing radioactive material from the licensee shifted during transport due to inadequate bracing.			

Additional Tracking Items

None.

PLANT STATUS

Unit 1 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 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 seasonal hot temperatures on May 5, 2023, for the following systems:
 - offsite AC power sources
 - onsite AC power sources

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

- (1) The inspectors evaluated readiness for impending severe weather from high winds and severe thunderstorms on June 26, 2023.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (5 Samples)

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

- (1) 'A' and 'B' auxiliary feedwater while the turbine-driven auxiliary feedwater pump was out of service for planned maintenance on April 4, 2023
- (2) 'B' emergency diesel generator during 'A' emergency diesel generator maintenance on May 15, 2023
- (3) 'B' essential services chill water the week of May 23, 2023
- (4) 'B' 480V motor control center while working on 'A' motor control center associated with control room ventilation on May 10, 2023
- (5) Turbine-driven auxiliary feedwater system on June 11, 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) Fuel handling building 286' elevation for spent fuel pool operating floor (fire zones 5-F-23-NFP1, 5-F-23-FTC1, 5-F-23-SFP1, 5-F-4-BAL, 5-F-23-SFP2, 5-F-23-NFP2, and 5-F-23-NF) on April 27, 2023
- (2) Flex building (fire zone: Diesel Balance) on May 4, 2023
- (3) Reactor auxiliary building elevation 286' for process instrumentation cabinets 17 and 19, and battery room (fire zone 1-A-5-COMA) on May 16, 2023
- (4) Reactor auxiliary building 236' elevation corridor for component cooling pumps (fire zone 1-A-3-PB) on June 13, 2023
- (5) Fuel handling building 236' elevation areas for spent fuel pool cooling pumps and heat exchangers (fire zones 5-F-2-FPC, 5-F-2-FPV1, and 5-F-2-FPV2) on June 14, 2023
- (6) Reactor auxiliary building 286' elevation 'A' and 'B' switchgear ventilation rooms (fire zones 1-A-5-HVA and 1-A-5-HVB) on June 21, 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 control room while the control rods were in manual control mode on June 13, 2023.

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

- (1) The inspectors observed and evaluated a licensed operator simulator training exercise involving circulating water system leakage on May 30, 2023.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 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) Outer equipment airlock door seal (Nuclear Condition Report (NCR) 2469317) on June 23, 2023
- (2) Auxiliary reservoir dam structural monitoring on June 5, 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) Elevated risk due to planned maintenance on the turbine-driven auxiliary feedwater pump on April 4, 2023
- (2) Elevated (yellow) risk due to 'A' emergency diesel generator thermocouple inspection on May 15, 2023
- (3) Elevated green risk during turbine-driven auxiliary feedwater pump speed oscillations on June 7-8, 2023
- (4) Elevated risk due to 480V motor control center supply breaker maintenance on May 10, 2023

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (6 Samples)

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

- (1) Elevated charging safety injection pump seal leakage impeding reactor coolant system leak rate data collection (NCR 2468035) reviewed on April 13, 2023
- (2) 'B' safety related battery cell 26 found with low voltage (NCR 2471032) on May 2, 2023
- (3) Failure of inverter associated with emergency preparedness and security equipment (NCR 2474506) on May 31, 2023
- (4) Process instrumentation control cabinet 18 power failure alarm (NCR 2474861) during the week of May 29, 2023
- (5) Location of valve motor drains on 1MS-72, 'C' main steam line to steam driven auxiliary feedwater turbine, (NCR 2476000) on June 14, 2023
- (6) 'B' cold leg accumulator level deviation (NCR 24776286) on June 22, 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) Temporary modification (engineering change 421968), "'B' Reactor Coolant Pump Lower Oil Reservoir High Level Setting Change," on April 14, 2023

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) OST-1411, "Auxiliary Feedwater Pump 1X-SAB Operability Test Quarterly Interval," after an oil filter change and oil cooler inspection on April 4, 2023

- (2) EPT-283, "Local Start of the Auxiliary Feedwater Turbine Using the Trip and Throttle Valve," following emergent maintenance due to failed surveillance testing on June 9, 2023
- (3) OP-177, "Diesel Generator Building Ventilation System," following maintenance on the 'A' emergency diesel generator room fan on June 25, 2023

Surveillance Testing (IP Section 03.01) (3 Samples)

- (1) OST-1861, "Remote Shutdown: Individual Component Tests," on April 25, 2023
- (2) PIC-I709, "Radar/Waveguide System Spent Fuel Pool Level Instrumentation," on May 5, 2023
- (3) OST-1013, "'A' Emergency Diesel Generator Operability Test," on May 17, 2023

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

- (1) The inspectors evaluated submitted Emergency Action Level, Emergency Plan, and Emergency Plan Implementing Procedure changes during the week of April 24, 2023. This evaluation does not constitute NRC approval.

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

- (1) An emergency preparedness drill involving the loss of two fission product barriers on May 22, 2023

71114.07 - Exercise Evaluation - Hostile Action (HA) Event

Inspection Review (IP Section 02.01 - 02.11) (1 Sample)

- (1) The inspectors evaluated the biennial emergency plan exercise during the week of April 24, 2023. The exercise scenario began with a simulated airborne threat which met the conditions for declaration of an Alert. After impact to the fuel handling building, the conditions were met for declaration of a Site Area Emergency. Concurrent with the onsite conditions from the impact, an active shooter is discovered outside the site boundary. As emergency responders engage, water level in the spent fuel pool drops below emergency action level threshold. The operating crew is not able to recover level, which led to a General Emergency classification. This allowed the Offsite Response Organizations to demonstrate their ability to implement emergency actions during a hostile action event.

71114.08 - Exercise Evaluation - Scenario Review

Inspection Review (IP Section 02.01 - 02.04) (1 Sample)

- (1) The inspectors reviewed and evaluated in-office, the proposed scenario for the biennial emergency plan exercise at least 30 days prior to the day of the exercise.

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated how the licensee identifies the magnitude and extent of radiation levels and the concentrations and quantities of radioactive materials and how the licensee assesses radiological hazards.

Instructions to Workers (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated how the licensee instructs workers on plant-related radiological hazards and the radiation protection requirements intended to protect workers from those hazards.

Contamination and Radioactive Material Control (IP Section 03.03) (2 Samples)

The inspectors observed/evaluated the following licensee processes for monitoring and controlling contamination and radioactive material:

- (1) Licensee surveys of potentially contaminated material leaving the radiologically controlled area (RCA) during a non-outage period.
- (2) Workers exiting the RCA at during a non-outage period.

Radiological Hazards Control and Work Coverage (IP Section 03.04) (4 Samples)

The inspectors evaluated the licensee's control of radiological hazards for the following radiological work:

- (1) Radiation Work Permit (RWP) #11, Routine Spent Fuel Pool Area Activities used for fuel shuffling in the spent fuel pool.
- (2) RWP #5000, Self Brief for Work Areas < 25 mr/hr for routine entry into radiologically controlled areas.
- (3) RWP # 2, Entry for Routine Surveillance (E.G. as low as reasonably achievable [ALARA], Planning, Walk Downs, etc.)
- (4) Harris Nuclear Plant H1R24 RP Refueling Post Outage Report

High Radiation Area and Very High Radiation Area Controls (IP Section 03.05) (3 Samples)

The inspectors evaluated licensee controls of the following High Radiation Areas and Very High Radiation Areas:

- (1) Waste Holdup Tank Room - Waste Processing Building 211' elevation (Locked High Radiation Area (LHRA))
- (2) Drum storage room 144A - Waste Processing Building 261' elevation (LHRA)
- (3) Spent Fuel Transfer Tube Hatch - Waste Processing Building 261' elevation (Very High Radiation Area - Grave Danger)

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 03.06) (1 Sample)

- (1) The inspectors evaluated radiation worker and radiation protection technician performance as it pertains to radiation protection requirements.

71124.08 - Radioactive Solid Waste Processing & Radioactive Material Handling, Storage, & Transportation

Radioactive Material Storage (IP Section 03.01) (3 Samples)

The inspectors evaluated the licensee's performance in controlling, labeling and securing the following radioactive materials:

- (1) Old steam generator mausoleum
- (2) Old reactor vessel head storage building
- (3) Hopewell and Shepard irradiators in the RCA

Radioactive Waste System Walkdown (IP Section 03.02) (2 Samples)

The inspectors walked down the following accessible portions of the solid radioactive waste systems and evaluated system configuration and functionality:

- (1) Spent resin storage and transfer systems
- (2) Modular Fluidized Transfer Demineralization System (MFTDS)

Waste Characterization and Classification (IP Section 03.03) (3 Samples)

The inspectors evaluated the following characterization and classification of radioactive waste:

- (1) 2022 Dry Active Waste (DAW) Part 61 analysis, sample #D-24
- (2) 2021 Tri-Nuke filters Part 61 analysis, sample #F-30
- (3) 2023 Spent Resin Storage Tank (SRST) Low 'A' resin Part 61 analysis, Sample #R-77

Shipping Records (IP Section 03.05) (4 Samples)

The inspectors evaluated the following non-excepted radioactive material shipments through a record review:

- (1) Shipment # 21-114, LSA-II, 4 Granulated Activated Charcoal (GAC) vessels inside sealand
- (2) Shipment # 21-083, LSA-II, Sealand with 4 GAC vessels
- (3) Shipment # 23-002, SCO-II, Sealand containing mechanical equipment
- (4) Shipment # 23-025, LSA-II, Dewatered bead resin

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) (1 Sample)

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

BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 02.10) (1 Sample)

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

BI02: RCS Leak Rate Sample (IP Section 02.11) (1 Sample)

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

OR01: Occupational Exposure Control Effectiveness Sample (IP Section 02.15) (1 Sample)

(1) September 1, 2022, through May 16, 2023

EP01: Drill/Exercise Performance (DEP) Sample (IP Section 02.12) (1 Sample)

(1) July 1, 2022, through December 31, 2022.

EP02: Emergency Response Organization (ERO) Drill Participation (IP Section 02.13) (1 Sample)

(1) July 1, 2022, through December 31, 2022.

EP03: Alert And Notification System (ANS) Reliability Sample (IP Section 02.14) (1 Sample)

(1) July 1, 2022, through December 31, 2022.

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 (CAP) for potential adverse trends that might be indicative of a more significant safety issue.

INSPECTION RESULTS

Failure to Implement Appropriate Risk Management Actions			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000400/2023002-01 Open/Closed	[H.5] - Work Management	71111.13
An NRC-identified finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) 50.65(a)(4), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," was identified for failure to manage risk associated with performing maintenance on 480V motor control center (MCC) 1A36-SA. Specifically, the licensee failed to implement			

appropriate risk management actions (RMAs) for the scheduled maintenance by failing to protect 'B' train components associated with the control room emergency filtration system.

Description: The Harris Nuclear Plant control room emergency filtration system (CREFS) provides a habitable environment from which control room operators can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. The CREFS consists of two independent, redundant trains that recirculate and filter the air in the control room envelope. Each CREFS train consists of a prefilter or demister, a high efficiency particulate air filter, an activated charcoal adsorber section for removal of gaseous activity, and a fan. Upon receipt of the actuating signal(s), normal air supply to the control room envelope is isolated, and air is recirculated through the system filter trains. The CREFS is designed to maintain a habitable environment in the control room envelope after a design basis accident.

On May 10, 2023, the licensee placed MCC 1A36-SA out of service to perform planned breaker maintenance on the MCC 1A36-SA supply breaker. The electrical maintenance resulted in planned inoperability and unavailability of the 'A' train of CREFS. The licensee implemented RMAs by protecting MCC 1B36-SB and its associated supply breaker.

The inspectors reviewed the identified protected equipment list, AD-OP-ALL-0201, "Protected Equipment," and the licensee's risk assessment of the maintenance and noted that the 'B' emergency filtration fan (R-2B), 'B' control room ventilation supply fan (AH-15B), and reactor auxiliary building (RAB) ventilation fan (AH-16B) were not identified to protect as an RMA. The inspectors also identified three previous instances of similar electrical maintenance in January 2023, June 2016, and October 2016. During each previous maintenance window, in addition to the respective supply breaker and respective 480V MCC being protected; AH-15, AH-16, and R-2 fans were also identified to be protected as an RMA.

During the electrical maintenance, if the 'B' train of CREFS became inoperable, this would result in a potential loss of safety function of the CREFS and entry into Technical Specification (TS) 3.0.3, requiring the unit to shut down.

Per AD-OP-ALL-0201, "Protected Equipment," section 5.4, discusses when to post equipment protected and in part states, "posting of Protected Equipment on redundant equipment shall be performed ... [when] inoperability of the redundant component results in a shutdown [limiting condition of operation] LCO action statement of less than 1 hour (e.g. 3.0.3)." During the maintenance on MCC 1A36-SA, the 'A' train CREFS was inoperable. If AH-15B, AH-16B or R-2B became inoperable during the aforementioned maintenance window; this would have resulted in both trains of CREFS being inoperable and an entry in TS 3.0.3, which is a shutdown LCO action statement of less than 1 hour.

Additionally, AD-OP-ALL-0201 also states the following: "If a conditional vulnerability preparation plan is required in accordance with AD-OP-ALL-0210, "Operational Risk Management," then the redundant equipment being relied upon to prevent an Operational Event shall always be posted as Protected Equipment." In preparation for the maintenance on 480V MCC 1A36-SA, a conditional vulnerability (CV) plan was completed. An operational event is defined as a unit trip, operational transient or entry into a short-term shutdown TS. As previously mentioned, if the 'B' train of CREFS became inoperable during the maintenance; the safety function of the CREFS would be impacted and the unit would enter TS 3.0.3 action statement, requiring shutdown which is considered a short-term shutdown TS.

Corrective Actions: The inspectors notified the licensee of the failure to implement the appropriate RMAs. The licensee issued a standing instruction to operations to review future protected equipment schemes to ensure the appropriate RMAs were identified. Additionally, the licensee entered the issue into the corrective action program (CAP).

Corrective Action References: Nuclear Condition Report (NCR) 02472408

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to manage risk, in accordance with 10 CFR 50.65(a)(4), was a performance deficiency. Specifically, the licensee failed to protect the AH-15B, AH-16B, and R-2B fans during the electrical maintenance. The performance deficiency was within Duke Energy's ability to foresee and correct.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the licensee failed to follow established processes when identifying protected equipment prior to maintenance and failed to implement all appropriate RMAs prior to the given maintenance. This failure to implement appropriate RMAs could have resulted in inappropriate work being authorized in the area, potentially impacting the function of the CREFS to maintain a habitable environment in the control room envelope following a design basis accident. Example 8.f from IMC 0612, Appendix E, "Examples of Minor Issues," provided a similar scenario to this issue. Example 8.f details that a performance deficiency is more than minor if operations staff were unaware that the components should have been considered protected and thus may have authorized inappropriate work in the area, which is applicable to this instance.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix K, "Maintenance Risk Assessment and Risk Management SDP." A regional Senior Reactor Analyst calculated incremental core damage probability (ICDP) for the maintenance using SAPHIRE 8 Version 8.2.6 and the Sheron Harris Unit 1 SPAR model version 8.81 dated November 15, 2021. The maintenance activity was conservatively modeled as 480 VAC bus 1A3-SA out of service for an exposure period of one day. Bus 1A36-SA is not directly modelled in SPAR however bus 1A3-SA supplies bus 1A36-SA and can be conservatively used as a surrogate. Because the performance deficiency was related to inadequate RMAs, the inspectors were directed to IMC 0609, Appendix K, Flowchart 2, Assessment of RMAs. The inspectors determined the finding screened to very low safety significance (Green) since ICDP was less than 10^{-6} and the incremental large early release probability (ILERP) was less than 10^{-7} .

Cross-Cutting Aspect: H.5 - Work Management: The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. The CV plan that was developed failed to identify the full scope of appropriate RMAs for the associated maintenance, which was inconsistent with the licensee's established processes. Additionally, prior to the electrical maintenance, reviews of work scope and operational risk were completed and failed to identify the deficiency.

Enforcement:

Violation: 10 CFR 50.65(a)(4), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," states, in part, that before performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, for approximately six hours on May 10, 2023, Duke Energy failed to manage the risk associated with maintenance on MCC 1A36-SA by failing to implement RMAs by protecting various components on the 'B' train of CREFS.

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

Failure to Adequately Secure Radioactive Shipment to Prevent Shifting During Transport.

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Public Radiation Safety	Green NCV 05000400/2023002-02 Open/Closed	[H.11] - Challenge the Unknown	71124.08

A self-revealed finding of very low safety significance (Green) and an associated NCV of 10 CFR 71.5(a) and 49 CFR 173.427(a)(6)(iii) was identified when a Low Specific Activity (LSA II) shipment containing radioactive material from the licensee shifted during transport due to inadequate bracing.

Description: On July 22, 2021, the licensee shipped radioactive shipment # 21-083 to Energy Solutions Bear Creek in Oak Ridge, Tennessee. The shipment was classified as LSA II and contained four (4) Granulated Activated Charcoal (GAC) vessels. The GAC vessels are steel shielded pressure vessels containing charcoal which acts as a filtering medium in the licensee's liquid radioactive waste processing system. Each GAC vessel weighs roughly 3,200 pounds. These four GAC vessels were placed within a Sealand container which was loaded onto the carrier's flatbed truck. During transportation between the licensee's site and the destination in Oak Ridge, Tennessee, the shoring and bracing holding the GAC vessels in place within the Sealand container failed when the vehicle experienced a combination of a pot hole due to road construction and heavy braking. When this occurred, the four GAC vessels broke free of their shoring, moved from the rear of the Sealand container to the front, damaging the doors of the container, which were oriented toward the front. At that time, the driver of the truck stopped and contacted the licensee. After discussion, the truck driver secured the doors of the Sealand with heavy chains and performed a radiation survey to ensure no regulatory limits for radiation and radioactive contamination had been exceeded. The driver then returned to the licensee site where the shipment was returned to the licensee. At that time, the licensee performed a radiological survey to confirm that no regulatory limits had been exceeded.

Corrective Actions: The licensee documented this condition in their corrective action program in NCR 02390806. The shipment was returned to licensee, surveys were performed, and the shipment was unloaded. The Radiation Protection department performed an OR (Organizational and Programmatic) checklist.

Corrective Action References: NCR 02390806

Performance Assessment:

Performance Deficiency: Licensee shippers failed to adequately secure a radioactive material load for shipment pursuant to 49 CFR 173.427(a)(6)(iii) to prevent shifting during transport. Specifically, the shoring that was built to secure the four GAC vessels failed when varied road conditions were encountered.

Screening: The inspectors determined the performance deficiency was more than minor because it could reasonably be viewed as a precursor to a significant event. Specifically, heavy radioactive material shipments not adequately shored to prevent shifting during transport could lead to external dose rates exceeding Department of Transportation (DOT) limits or could damage their container causing a spread of radioactivity outside of the transport package.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix D, "Public Radiation Safety SDP." Specifically, the finding was found to be of very low safety significance because (1) incorrect packaging was not used, (2) no radiation or contamination limits were exceeded, (3) no package breach occurred, (4) the finding was not related to a certificate of compliance, (5) the finding was not related to a near surface disposal nonconformance, and (6) the finding was not associated with a failure to make notifications or provide emergency information.

Cross-Cutting Aspect: H.11 - Challenge the Unknown: Individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding. Specifically, licensee radwaste shippers had opportunities to stop and involve management or qualified material handlers for input on the adequacy of the shoring and bracing associated with the shipment and did not.

Enforcement:

Violation: 10 CFR 71.5 states, in part, that each licensee who transports licensed material outside the site of usage shall comply with the applicable requirements of the DOT regulations in 49 CFR parts 171 through 180. 49 CFR 173.427(a)(6)(iii) states, in part, that packaged and unpackaged Class 7 (radioactive) materials must be braced so as to prevent shifting of lading under conditions normally incident to transportation. Contrary to the above, on July 22, 2021, the licensee offered to a carrier for transport a package containing licensed material which was not properly secured to prevent shifting during transport. Specifically, the four GAC vessels within the Sealand container were able to break free of their shoring and bracing and move from the back of the container to the front, damaging the doors of the container.

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 July 13, 2023, the inspectors presented the integrated inspection results to David Hoffman, Plant Manager, and other members of the licensee staff.
- On April 27, 2023, the inspectors presented the emergency preparedness exercise inspection results to Thomas Haaf, Site Vice President, and other members of the licensee staff.

- On July 13, 2023, the inspectors presented the radiation protection inspection results to David Hoffman, Plant Manager, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71124.01	Miscellaneous		Site ALARA Committee Meeting - 2nd Quarter 2023	06/28/2023
		Form HPP-800-19-60	Fuel Handling Building Underwater Material Storage Log	Various
	Procedures	AD-RP-ALL-0007	Control of Radioactive Material	Revision 4
		HPP-800	Handling Radioactive Material	Revision 65
Self-Assessments	Self-Assessment Number: 02449738	10CFR20 Radiation Protection program content and implementation	03/14/2023	
71124.08	Corrective Action Documents	NCR #02390806	Sealand container damaged during transport	07/22/2021
	Corrective Action Documents Resulting from Inspection	NCR #02477082	Lost Record	06/22/2023
		NCR #02477991	10CFR37 Radioactive Material Inventory and Accountability Not Completed	06/29/2023
	Procedures	AD-RP-ALL-5000	Preparation and Shipment of Radioactive Material and Radioactive Waste	Rev. 6
		AD-RP-ALL-5006	10 CFR 37 Accountability for Category 1 and Category 2 Radioactive Material Quantities of Concern	Rev. 1
	Radiation Surveys	HNP-M-20210722-2	Survey for Damaged Sealand	07/22/2021
	Shipping Records	21-083	Sealand with 4 GAC Vessels	07/22/2021
21-114		4 GAC Vessels inside Sealand	11/09/2021	
71151	Corrective Action Documents	AR 02444713	Poor rad worker practices during LRT (PCE)	10/10/2022
		AR 02446591	Failure to respond to an RP monitor alarm	10/21/2022
		AR 02446664 and AR 02447125	Unanticipated Dose Rate Alarm	Various
	Miscellaneous		Electronic Dosimeter Doe and Dose Rate alarm logs - September 1, 2022 through May 16, 2023	Various
	Procedures	AD-RP-ALL-1101	Performance Indicators (PI) for Occupational and Public Radiation Safety Cornerstones	Revision 2