UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD, SUITE 102
KING OF PRUSSIA, PA 19406-1415

January 10, 2023

Erhard W. Koehler
Senior Technical Advisor, N.S. Savannah
U.S. Department of Transportation
Maritime Administration (MAR-640.2)
1200 New Jersey Avenue, SE W25-209/212
Washington, DC 20590-0001

SUBJECT: U.S. DEPARTMENT OF TRANSPORTATION, N.S. SAVANNAH - NRC INSPECTION REPORT NO. 05000238/2022001

Dear Erhard Koehler:

On December 14, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection under Inspection Manual Chapter 2545, "Research and Test Reactor Inspection Program," at the Nuclear Ship (N.S.) Savannah berthed in Baltimore, Maryland. On-site inspections were performed April 20, July 6, and November 7-8, 2022. Additional inspection activities, (in office reviews), were conducted remotely during the inspection period. The inspectors examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and the conditions of your license. The inspection consisted of observations by the inspectors, interviews with ship personnel, a review of procedures and records, and ship walkdowns. The results of the inspection were discussed with you, and other members of the N.S. Savannah staff on December 14, 2022, and are described in the enclosed report.

No violations of safety significance were identified.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web Site at https://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Current NRC regulations and guidance are included on the NRC's website at www.nrc.gov; select **Radioactive Waste**; **Decommissioning of Nuclear Facilities**; then **Regulations, Guidance and Communications**. The current Enforcement Policy is included on the NRC's website at www.nrc.gov; select About NRC, Organizations & Functions; Office of Enforcement; Enforcement documents; then Enforcement Policy (Under 'Related Information'). You may also obtain these documents by contacting the Government Printing Office (GPO) toll-free at 1-866-512-1800. The GPO is open from 8:00 a.m. to 5:30 p.m. EST, Monday through Friday (except Federal holidays).

No reply to this letter is required. Please contact Steve Hammann of my staff at 610-337-5399 if you have any questions regarding this matter.

Sincerely,

Anthony M. Dimitriadis

Digitally signed by Anthony M. Dimitriadis
Date: 2023.01.10 14:35:04 -05'00'

Anthony Dimitriadis, Chief
Decommissioning, ISFSI, and Reactor Health Physics Branch
Division of Radiological Safety and Security

Docket No. 05000238
License No. NS-1

Enclosure:
Inspection Report No. 05000238/2022001

cc w/Enclosure: Art Paynter, QA Manager
John Osborne, Licensing and Compliance Manager

SUBJECT: U.S. DEPARTMENT OF TRANSPORTATION, N.S. SAVANNAH - NRC INSPECTION REPORT NO. 05000238/2022001, DATED JANUARY 10, 2023

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Docket No.	05000238
License No.	NS-1
Inspection No.	05000238/2022001
Licensee:	U.S. Department of Transportation Maritime Administration (MARAD) Washington, DC 20590
Facility:	N.S. Savannah
Location:	Pier 13, Canton Marine Terminal 4601 Newgate Avenue Baltimore, Maryland
Inspection Dates:	February 23 – December 14, 2022
Inspectors:	Steve Hammann, Senior Health Physicist Decommissioning ISFSI, and Reactor Health Physics Branch Division of Radiological Safety and Security Andrew Taverna, Health Physicist Decommissioning ISFSI, and Reactor Health Physics Branch Division of Radiological Safety and Security
Approved By:	Anthony Dimitriadis, Chief Decommissioning ISFSI, and Reactor Health Physics Branch Division of Radiological Safety and Security

Enclosure

EXECUTIVE SUMMARY

U.S. Department of Transportation
N.S. Savannah
NRC Inspection Report No. 05000238/2022001

A routine announced decommissioning inspection was completed on December 14, 2022, at the Nuclear Ship (N.S.) Savannah, currently berthed at Pier 13, Canton Marine Terminal, Baltimore, Maryland. On-site inspections were performed April 20, July 6, and November 7-8, 2022. The inspection included a review of the programs and activities associated with the N.S. Savannah while the vessel is undergoing decommissioning. The inspection consisted of observations by the inspectors, a review of procedures and records and ship walkdowns. The N.S. Savannah is classified by the NRC as a research and test reactor. The program for overseeing the decommissioning of research and test reactors is described in Inspection Manual Chapter (IMC) 2545, “Research and Test Reactor Inspection Program.”

Based on the results of this inspection, no violations of safety significance were identified.

REPORT DETAILS

1.0 Background

The N.S. Savannah is the property of the U. S. Department of Transportation (DOT), Maritime Administration (MARAD). The N.S. Savannah was designed, constructed, and operated as a joint research and development project of MARAD and the Atomic Energy Commission. The ship operated from 1961 until it was removed from service in 1970. In 1971, the ship was defueled, and various dismantling activities were conducted through 1976 to remove much of the radioactive material from the ship and to isolate radiologically contaminated systems. These activities included removing ion exchange systems and resins and most of the water from the primary, secondary, and auxiliary systems. A “Possession Only” license was issued in May 1976. The N.S. Savannah is a registered National Historic Landmark. At the time of this inspection, the N.S. Savannah was berthed in Baltimore, Maryland and was in active decommissioning. The program for overseeing the decommissioning of research and test reactors is described in IMC 2545.

2.0 Research and Test Reactor Decommissioning

a. Inspection Scope (Inspection Procedure 69013)

The inspectors reviewed the licensee’s organization and staffing to determine if they satisfy the license and technical specification requirements, and licensee commitments for the current phase of decommissioning and reviewed the status of activities related to ship decommissioning to determine if activities were in accordance with licensed requirements. The inspectors observed decommissioning activities for segmentation, storage, and transportation of radioactive components. The inspectors interviewed workers and reviewed work packages, plans, and procedures for the activities observed. The inspectors attended select pre-job briefs to assess the staff’s ability to identify critical steps of an evolution, potential failure scenarios, and human performance tools to prevent errors. The inspectors reviewed the decommissioning schedule to determine if the schedule was consistent with the post shutdown decommissioning activities report (PSDAR).

The inspectors reviewed radiation work permits (RWP’s), and As Low As Reasonably Achievable (ALARA) work plans to determine if radiation work activities were pre-planned effectively to limit worker exposure. The inspectors observed radiation protection (RP) technicians performing work activities to determine if implementation of radiological work controls, training and skill level were sufficient for the activities being performed. The inspectors reviewed radiological waste transportation records to ensure compliance with DOT and NRC regulations. The inspectors reviewed the site dosimetry program and radiological dose records to determine if they were in compliance with the regulations. The inspectors walked down the ship’s effluent monitoring system and reviewed effluent release reports to determine compliance with the regulations.

The inspectors reviewed documents and interviewed N.S. Savannah personnel to evaluate if management performed audits and self-assessments, and to determine if issues were identified and corrected in accordance with the site’s corrective action program (CAP). The inspectors reviewed a representative selection of CAP documents to determine if a sufficiently low threshold for problem identification existed, follow-up

evaluations were of sufficient quality, and MARAD assigned timely and appropriate prioritization for issue resolution commensurate with the significance of the issue. The inspectors reviewed site assessments for the past year to determine if assessments were thorough and that corrective actions were initiated if necessary.

b. Observations and Findings

The inspectors determined the site had adequate staffing for the current phase of decommissioning and that training programs had been maintained. The inspectors verified activities were performed in accordance with site programs and procedures. The inspectors determined that pre-job briefings were thorough and identified the significant potential hazards and management maintained a sufficient level of involvement. The inspectors determined the activities were performed safely and in accordance with work plans and site procedures. The inspectors verified the activities and schedule were consistent with license requirements and the site PSDAR.

The inspectors verified that RWP's and ALARA plans were implemented as needed and were effective in limiting worker exposure and occupational dose was acceptable for the scope of the radiological activities performed. The inspectors determined that RP staff effectively controlled work activities, used appropriate instruments for the surveys, and survey records were clear and complete. The inspectors verified technician training and qualifications were up to date. The inspectors determined the site dosimetry program was adequate and worker exposures were within regulatory limits. The inspectors also determined radioactive waste shipped was properly classified, described, packaged, marked, and labeled, and was in proper condition for transportation. Additionally, the inspectors determined that radioactive waste shipments were conducted in accordance with DOT and NRC regulations.

The inspectors determined that issues had been identified and entered into the CAP in a timely manner and the issues were effectively screened, prioritized, and evaluated commensurate with their safety significance. The inspectors verified audits were being performed by qualified individuals independent of the organization being audited and that management reviewed the audits and associated corrective actions.

c. Conclusions

No violations of safety significance were identified.

3.0 Exit Meeting Summary

On December 14, 2022, the inspectors presented the inspection results to Erhard Koehler, Senior Technical Advisor, N.S. Savannah. No proprietary information was retained by the inspectors or documented in this report.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee and contractors

Erhard Koehler, Senior Technical Advisor, MARAD
Soeuth Caleb Soeun, Decommissioning Program Manager, MARAD
Matthew Arsenault, Project Manager, NSSS
Nick Walts, Nuclear Advisor, NSSS
Art Paynter, Quality Assurance Manager, NSSS
Scott Ginter, Radiation Safety Officer, NSSS
John Osborne, Licensing and Compliance Manager, NSSS
Ron Thurlow, Senior Director of Operations, RSCS

PARTIAL LIST OF DOCUMENTS REVIEWED

Drawings -165095-EN-DWG-003, Rev D – RPV Handling Sequence, Edwards RPV 22RD717
ALARA Review Committee Minutes 10/12/2022
Corrective Action Reports – 2021-109, 112; 2022-020, 023, 025, 039, 066, 067, 108, 128
CR-150, NSS Reactor Pressure Vessel and Internals Radionuclide Content for Transportation and Disposal
Plan of the Week, August 29 – November 6, 2022
QSA-2022-001, 2022 Annual Radiation Protection Program Assessment
QSA-2022-005, Technical Specification 3.7.1.7 Deviations Review
QSA-2022-006, Commitment Periodic Review 2022
STS-003-001, Decommissioning Quality Assurance Plan
STS-217, Annual Report for 2021
STS-219, Annual Radiological Environmental Monitoring and Radioactive Effluent Release Reports for CY2021
Survey Number 110220221330
Transportation Package NSS-22-13
Work Package 2021-203, Prepare RPV Head and Reactor Pressure Vessel for Removal
Work Package 2021-203-002, Grout Reactor Pressure Vessel Internally and Externally
Work Package 2021-203-003, Crane Lift Reactor Pressure Vessel from CV for Shipment to Disposal Facility

ITEMS OPEN, CLOSED, AND DISCUSSED

None

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CAP	Corrective Action Program
CFR	*Code of Federal Regulations*
DOT	U. S. Department of Transportation
IMC	Inspection Manual Chapter
MARAD	U. S. Maritime Administration
NRC	Nuclear Regulatory Commission
N.S.	Nuclear Ship
PSDAR	Post Shutdown Decommissioning Activities Report
RP	Radiation Protection
RWP	Radiation Work Permit