



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION I
475 ALLENDALE ROAD, SUITE 102
KING OF PRUSSIA, PA 19406-1415

September 06, 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. 05000238/2023001

Dear Erhard Koehler:

On August 10, 2023, 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. 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 August 10, 2023, and are described in the enclosed report.

Based on the results of this inspection, 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).

E. Koehler

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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 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. 05000238/2023001, DATED SEPTEMBER 06,
2023

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DATE	08/30/2023		09/06/2023		09/06/2023			

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Docket No. 05000238

License No. NS-1

Inspection No. 05000238/2023001

Licensee: U.S. Department of Transportation
Maritime Administration (MARAD)
Washington, DC 20590

Facility: N.S. Savannah

Location: Canton Marine Terminal
Pier 13
4601 Newgate Avenue
Baltimore, Maryland

Inspection Dates: January 1 – August 10, 2023

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. 05000238/2023001

A routine announced decommissioning inspection was completed on August 10, 2023, at the Nuclear Ship (N.S.) Savannah, currently berthed at Pier 13, Canton Marine Terminal, Baltimore, Maryland. On-site inspection activities were performed March 6 -9, 2023. 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 performed on-site decommissioning inspection activities March 6-9, supplemented by in-office reviews and periodic meetings and calls during the inspection period. The inspection consisted of observations by the inspectors, discussions and interviews with site personnel, a review of procedures and records, and ship walk-downs.

The inspectors reviewed the licensee's organization and staffing to determine if they satisfy the license and technical specification requirements. The inspectors attended select meetings, including station management review committee meetings and plan-of-the-day meetings. Inspectors reviewed documentation and met with site personnel to discuss status of decommissioning and upcoming activities to determine if the site had conducted activities in accordance with regulatory and license requirements. The inspectors performed several site walkdowns to assess field conditions and decommissioning activities by evaluating material condition of structures, systems, and components, housekeeping, system configurations, and worker level of knowledge and procedure use and adherence. Additionally, inspectors conducted site walk-downs of radiologically controlled areas, to examine and evaluate radiological postings, and airborne and contamination controls. The inspectors observed select pre-job briefings and associated work activities, including but not limited to cutting of the reactor coolant system (RCS) piping, hot work, and movement of intermodal containers.

The inspectors reviewed radiation work permits (RWP's), As Low As Reasonably Achievable (ALARA) work plans, work packages, plans, and procedures to determine if radiation work activities were effectively pre-planned 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 observed radiation protection staff perform work activities and coverage including but not limited to: (1) the transfer of materials from the CV to storage areas; (2) control of individuals entering and exiting

contaminated areas; (3) intermodal container movement. The inspectors reviewed calibration records and observed daily checks of the site's radiological instruments to determine if they were being used and maintained in accordance with the site's plan and procedures. Additionally, the inspectors observed staff donning and doffing protective clothing and using portal exit monitors out of the RCA. The inspectors reviewed the site dosimetry program and radiological dose records to determine if they were performed in accordance with the requirements.

The inspectors reviewed the site's self-assessment of the radiation protection program for the quarterly 2023 and annual 2022 reports. This was to determine if the program met the requirements by 10 CFR 20.1101(c) and recorded as required by 10 CFR 20.2102. Additionally, to assess if the review of the program was being implemented along with any improvements cited.

The inspectors reviewed radiological waste transportation records to determine compliance with DOT and NRC regulations. The inspectors reviewed an inventory of radioactive materials for site and walk-down waste storage areas to determine controls and labeling practices at the staging and storage areas. Inspectors observed intermodal containers being prepared and moved with use of the crane for waste shipment. The inspectors observed the RP controls and safety associated with the crane movement of the intermodal containers from the ship to the flatbed trucks. The inspectors also observed radiological surveys being performed on the intermodal containers.

The inspectors reviewed documents and discussed with ship 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 assessed the implementation and effectiveness of site's CAP by reviewing a sampling of issues, and conditions adverse to quality entered in the CAP. Additionally, 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.

b. Observations and Findings

The inspectors determined the site had adequate staffing for the current phase of decommissioning and that training programs had been effectively maintained. The inspectors verified that 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 noted that during this inspection period, the site continued decommissioning and dismantlement activities in the containment vessel (CV). The inspectors noted that for the areas toured, the material condition and housekeeping was adequate. The inspectors noted through ship tours, document reviews, and observations of activities that the site conducted activities in accordance with the regulatory requirements. The inspectors noted that workers were knowledgeable of and adhered to plant procedures and work plans, and pre-job briefings were thorough and highlighted specific safety concerns.

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 work 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 that the site provided General Employee Training (GET) and instructed personnel in radiation safety. 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 verified that the annual review of the radiation protection program was performed in accordance with 10 CFR 20.1101(c) and recorded as required by 10 CFR 20.2102.

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.

c. Conclusions

No violations of safety significance were identified.

3.0 Exit Meeting Summary

On August 10, 2023, 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 Arsenaault, 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

Miscellaneous

Reactor Coolant System (RCS) Piping Removal - A01377-MONORAIL, A01377-EP01-001, A01377-EP01-002, A01377-RCP CUT LINES, A01377-RCP PUMP, A01377-16 GATE VALVE, A01377-STD LIFTING LUG, STS-002-011
STS-221, Annual Report for CY2022
STS-223, Annual Radiological Environmental Monitoring and Radioactive Effluent Release Report for CY2022
QSA-2023-002, 2023 First Quarter Radiation Protection Program Assessment, Revision 0
QSA-2022-001, 2022 Annual Radiation Protection Program Assessment, Revision 0
AMS-4 Response Check, SIC-MA-M-8 Revision 3
Radiation Work Permit RWP# 23-S-015

Procedures

STS-005-001, Radiation Protection Plan, Revision 3
STS-005-013, Radioactive Material Shipping and Handling, Revision 3
STS-005-002, Radioactive Waste Process Control Program
STS-008-007, Hot Work Permit, Revision 6
WP-2021-196-005, Transport Intermodals from Cargo Hold #4 to Waste Disposal Site 6th Lift
STS-005-0027, SET UP AND USE OF AMS-4, Revision 1
STS-005-008, Radiological Instrumentation and Survey Documentation, Revision 6

Radiological Surveys

021320231319, 021320231508, 022220231516, 020820231035, 020720231400, 022820231315, 022720230800, 022720230845, 022820231315

Air Samples

ENV02150745, ENV02080745, ENV02010730, ENV02150700, ENV01180700, ENV01110700, ENV12210730

Shipping Manifests

0633-01-0005, 0633-01-006, 0633-02-0008, 0633-02-0009

Corrective Action Reports (CAR)

2023-11, 2023-12, 2023-13, 2023-08, 2023-36, 2023-31, 2023-33, 2023-27, 2023-26, 2023-23

Calibration Records

Rad Alert Model Inspector SN10221; Ludlum Model 3-084R SN143373; Ludlum Model 3 SN165973; Ludlum Model 12-356C SN209592; Rad Alert Model Inspector SN10219; Ludlum Model 3-002C SN59480; Ludlum Model 19 SN 142858; Ludlum 3002 SN 25017679; Ludlum 3030E SN 336609; Tele 6112B SN 104900; RO-2 SN 3645; F&J Low Vol LV-1D SN 004765

ITEMS OPEN, CLOSED, AND DISCUSSED

None

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CAP	Corrective Action Program
CAR	Corrective Action Report
CFR	<i>Code of Federal Regulations</i>
CV	Containment Vessel
DOT	U. S. Department of Transportation
GET	General Employee Training
GPO	Government Printing Office
IMC	Inspection Manual Chapter
MARAD	U. S. Maritime Administration
NRC	Nuclear Regulatory Commission
N.S.	Nuclear Ship
RCS	Reactor Coolant System
RP	Radiation Protection
RWP	Radiation Work Permit