UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

January 8, 2020

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: NRC INSPECTION REPORT NO. 05000238/2019002, U.S. DEPARTMENT OF TRANSPORTATION, N.S. SAVANNAH, BALTIMORE, MARYLAND

Dear Mr. Koehler:

On December 17, 2019, Katherine Warner and Jennifer England of this office conducted a safety inspection at the Nuclear Ship (N.S.) Savannah berthed in Philadelphia, Pennsylvania. The safety inspection reviewed programs and activities associated with the N.S. Savannah while the vessel is in a long-term safe storage status. The enclosed inspection report documents the inspection results, which were discussed with you at the conclusion of the inspection on December 17, 2019. Based on the results of this inspection, no findings of safety significance were identified.

In accordance with 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).

No response to this letter is required. If you have any questions, please contact Katherine Warner of my staff at Katherine.Warner@nrc.gov or (610) 337-5389.

Sincerely,

/RA SHammann for/

Anthony Dimitriadis, Chief
Decommissioning, ISFSI, and Reactor Health Physics Branch
Division of Nuclear Materials Safety

Docket No. 05000238
License No. NS-1

Enclosure:
Inspection Report No. 05000238/2019002

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

No response to this letter is required. If you have any questions, please contact Katherine Warner of my staff at Katherine.Warner@nrc.gov or (610) 337-5389.

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Docket No.	05000238
License No.	NS-1
Inspection No.	05000238/2019002
Licensee:	U.S. Department of Transportation Maritime Administration (MARAD) Washington, DC 20590
Facility:	N.S. Savannah
Location:	Philadelphia Ship Repair, LLC 5195 S 19th Street Philadelphia, PA 19112
Inspection Dates:	December 17, 2019
Inspectors:	Jennifer England, Reactor Engineer Projects Branch 5 Division of Reactor Projects Region I Katherine Warner, Health Physicist Decommissioning ISFSI, and Reactor Health Physics Branch Division of Nuclear Materials Safety Region I
Approved By:	Anthony Dimitriadis, Chief Decommissioning ISFSI, and Reactor Health Physics Branch Division of Nuclear Materials Safety Region I

Enclosure

EXECUTIVE SUMMARY

U.S. Department of Transportation
N.S. Savannah
NRC Inspection Report No. 05000238/2019002

A routine announced safety inspection was conducted on December 17, 2019, by a Region I inspector at the Nuclear Ship (N.S.) Savannah, currently berthed at Drydock 3 at the Philadelphia Ship Yard in Philadelphia, PA. NRC oversight of the decommissioning project is managed by staff from the NRC's Reactor Decommissioning Branch, Division of Decommissioning, Uranium Recovery, & Waste Programs (DUWP), Office of Nuclear Material Safety and Safeguards (NMSS) with inspection support from the NRC Region I office.

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.” 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 and tours by the inspectors, interviews with N.S. Savannah personnel, and a review of procedures and records. Based on the results of this inspection, no findings 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. In May 2008, the ship was towed from Norfolk, Virginia to Baltimore, Maryland. In September 2019 the ship was towed to Philadelphia Ship Repair, LLC, in Philadelphia, Pennsylvania for drydocking and will return to Baltimore at the completion of the work. 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)

In an October 31, 2017 letter, MARAD representatives submitted a license amendment request to modify the license to remove the License Condition that prohibited dismantling and disposal of the facility without prior approval of the Commission. This was a hold-over from when the license was under an earlier regulatory framework and did not reflect the current language of Title 10 of the Code of Federal Regulations, Chapter 50.82. DUWP, NMSS staff approved this action via a letter and associated safety evaluation on April 23, 2018 (ML18081A134). The licensee is currently in the process of planning for decommissioning and are performing certain dismantlement activities under the 10 CFR 50.59 process.

The inspection consisted of observations and tours by the inspectors, interviews with N.S. Savannah personnel, and a review of procedures and records to evaluate the organization and staffing and work controls. The inspectors reviewed the status of activities related to the site decommissioning to verify activities are in accordance with licensed requirements. The inspectors conducted document reviews and interviews with plant personnel to verify procedures and processes conform to the regulations and guidance associated with 10 CFR 50.59 and changes made under 10 CFR 50.59 did not require prior NRC approval. The inspectors reviewed documents and interviewed site personnel to verify that management performed audits and self-assessments, and ensured issues were identified and corrected in accordance with the site's corrective action program (CAP).

b. Observations and Findings

N.S. Savannah was allocated funds from congress for decommissioning starting fiscal year 2017. The licensee has developed a three phase plan for decommissioning. These include two years for DECON planning and engineering, four years for industrial dismantlement activities, and one year for license termination. It should be noted that

these phases will overlap as work progresses. Currently, the licensee has begun Phase 1 and are working towards eliminating all current radiologically controlled areas (RCAs) outside the reactor compartment and cold chemistry laboratory. These RCAs include the hot chemistry laboratory, the port and starboard buffer seal charging pump rooms, the port and starboard stabilizer rooms, the A deck health physics laboratory and the B-1 stateroom. Additionally, Phase 1 activities include removing the buffer charging pumps from their compartments and relocating them to cargo hold 4 for storage. At the time of the inspection, many of the auxiliary RCAs were ready for release. The inspector observed the removal of several charging pump components out of the port charging pump room and noted that the work was conducted in accordance with the licensee's procedures.

The inspectors determined that 10 CFR 50.59 screenings and evaluations are being performed and that the licensee has trained and qualified individuals to perform the evaluations. The inspectors determined that changes under 10 CFR 50.59 did not require prior NRC approval and safety reviews were performed for design changes and modifications in accordance with applicable regulatory requirements, and license conditions.

Based on the areas of the ship accessed, there have been no issues identified with the material condition of any of the ship's boundaries that contain radioactive materials. All radioactive material is currently being stored on the ship so there has been no release of radioactive material as effluents or as radioactive material. The inspector confirmed that the waste generated from recent dismantlement activities is currently being stored on the ship and the area is posted appropriately.

The inspectors verified audits were being performed by qualified individuals independent of the organization being audited. The inspectors determined that issues were being identified and entered into the corrective action program (CAP) in a timely manner and the issues were effectively screened, prioritized and evaluated commensurate with their safety significance. The site appropriately assigned significance levels to the corrective action reports (CARs). The site has three significance levels: Levels 1, 2, and 3 with level 1 CARs being of the highest significance. The inspector notes that all the CARs reviewed were of Level 3 significance, which is typical for this site. The inspectors noted that while STS-003-002, Corrective Action Program does not prescribe a timeliness for CAR resolution due dates for CARs of significance level 3, most of the CAR resolutions reviewed were written beyond any reasonable idea of timeliness despite the site having taken the actions in what appeared to be a timely manner. The inspectors noted that timeliness of CAR resolutions was a weakness identified in QSA-2018-010, Corrective Action Process Review 2018, but the recommendation to identify and implement procedural changes to ensure a more timely completion of CAR resolution and closeout has not been implemented. The site documented this issue in CAR 2019-074 and this weakness will be followed up during future inspections to provide reasonable assurance that the site has a robust corrective action program prior to the start of major deactivation and demolition activities.

Although the N.S. Savannah is not open for general public visitation, the vessel is often available for public visitation for special open house events or in response to specific requests from organizations. Prior to boarding the vessel, visitors are provided with a briefing that covers safety and general information about the ship. During public access events or tours, routine work is suspended and access to certain areas is restricted by

ropes or physical barriers per N.S. Savannah procedures. N.S. Savannah Technical Staff representatives are positioned in strategic areas to direct visitors.

c. Conclusions

While there were no findings of significance identified during this inspection, it appears that the while the site is appropriately identifying issues and correcting them, the site is not closing out issues within a reasonable time frame for Level 3 CARs. CAR resolution timeliness will be reviewed during the next inspection.

3.0 Exit Meeting Summary

On December 17, 2019, the inspectors presented the inspection results to Erhard Koehler, Senior Technical Advisor, N.S. Savannah. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee and contractors

J. Bowen, Project Manager, TOTE
E. Koehler, Senior Technical Advisor, MARAD
F. Litterrer, Project Manager, RSCS
J. Osborne, Licensing and Compliance Manager, Savannah Technical Staff
A. Paynter, Quality Assurance Manager, Savannah Technical Staff
D. Wallace, Radiation Safety Officer, RSCS

PARTIAL LIST OF DOCUMENTS REVIEWED

10 CFR 50.59 Screening Form, 2018-023, Add low level radioactive waste (LLRW) Storage Location – Cargo Hold 4 C Deck, Port and Starboard, October 31, 2018
10 CFR 50.59 Screening Form, 2018-024, Remove contaminated Sink Drains in the Health Physics Laboratory and Hot Chemistry Laboratory, November 2, 2018
10 CFR 50.59 Screening Form, 2018-028, Remove contaminated components in Port Buffer Seal Charge Pump Room, and remove interference as needed, December 12, 2018
Charging Pump Removal Training Plan – WO#2018-349, DD Spec. Item 8.08
N.S. Savannah Organization Chart, October 12, 2019
QMR 2019-004, QA/QC Observation of WO 2018-030 System Drain Down, February 5, 2019
QMR 2019-014, Verification of the vendor's current accreditations and certifications, May 2-3, 2019
QSA-2018-005, Training Database 2018, Revision0
QSA-2018-010, Corrective Action Process Review 2018, Revision 0
SIC-TS-A-2, Structures, Systems, and Components Annual Degradation Inspection, Revision 2
STS-003, Decommissioning Quality Assurance Plan, Revision 2
STS-003-002, Corrective Action Program, Revision 9
WO-2018-282, Remove Contaminated Piping and Components in the Port and Starboard Charging Pump (Buffer Seal Pumps) Rooms, Excludes the Removal of the Pump, Motor, and Gear Reducers, Revision 4

Corrective Action Reports and Resolutions
2019-037
2019-047
2019-048
2019-052
2019-055
2019-058
2019-087

ITEMS OPEN, CLOSED, AND DISCUSSED

None

LIST OF ACRONYMS USED

CAP	Corrective Action Program
CAR	Corrective Action Reports
CFR	Code of Federal Regulations
DOT	U. S. Department of Transportation
DUWP	Division of Decommissioning, Uranium Recovery, & Waste Programs
IMC	Inspection Manual Chapter
MARAD	U. S. Maritime Administration
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	Nuclear Regulatory Commission
N.S.	Nuclear Ship
RCA	Radiologically Controlled Area