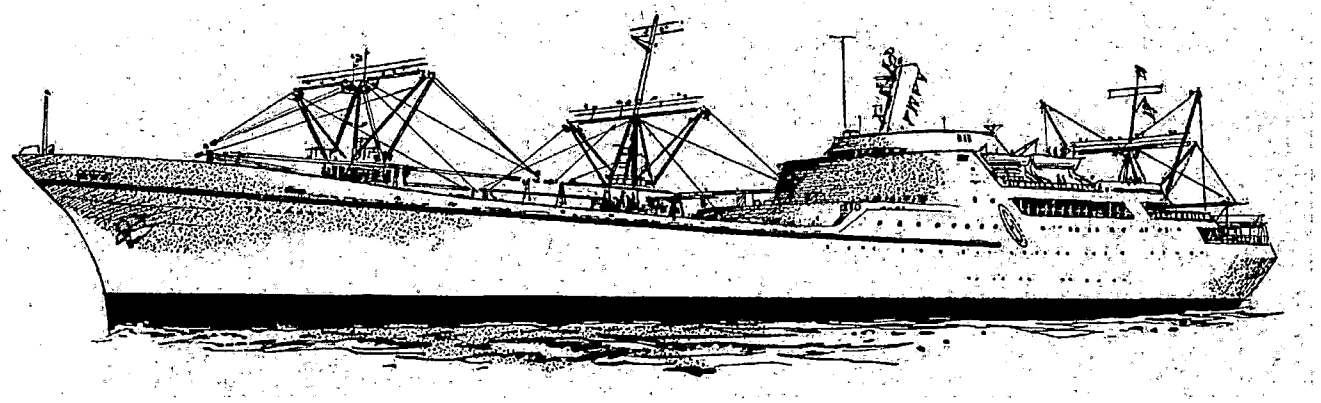
U.S. Department of Transportation
Maritime Administration



N.S. SAVANNAH

ANNUAL REPORT FOR CY2022

STS - 221
Revision 0

Approved: _____ Date: February 28, 2023

Manager, N.S. *SAVANNAH* Programs

Prepared by:
Nuclear Ship Support Services, LLC

RECORD OF REVISIONS

Revision	Summary of Revisions
0	The original version of the 2022 Annual Report License NS-1

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1.0 INTRODUCTION

This Annual Report is submitted by the Maritime Administration (MARAD) as licensee for the Nuclear Ship *SAVANNAH* (NSS) and covers the Calendar Year (CY) 2022 reporting period. This report is arranged into three sections following the introduction. Section 2.0 provides the discussion of the various reporting items required by the Technical Specifications (TSs). Section 3.0 includes other periodic reports required by the NRC, and issues of regulatory significance. Section 4.0 includes facility issues that MARAD believes may be of interest to the NRC, including the COVID-19 pandemic national emergency.

In accordance with the requirements of TS 3.4.2.1, the written annual report shall be submitted prior to March 1 of the following calendar year, and shall specifically include the seven (7) reporting items listed in that specification. These items are addressed in Sections 2.1 through 2.7 inclusive. In addition, TS 3.6.3 requires the Safety Review Committee (SRC) to review ten (10) items, one of which is this annual report. Section 2.1.3 includes the status of these ten (10) SRC review items.

2.0 ITEMS REQUIRED BY TECHNICAL SPECIFICATIONS

The seven (7)[1] TS 3.4.2.1 items specifically required to be included in the written annual report are as follows:

a. The status of the facility (see 2.1).

b. The results of the radiation surveys and monitoring station dosimeter readings (see 2.2).

c. The results of quarterly intrusion alarm system checks (see 2.3).

d. A description of the principal maintenance performed on the vessel (see 2.4).

e. Any unauthorized entry into radiation control areas by visitors or employees and corrective action(s) taken to improve access control (see 2.5).

f. Any degradation of one of the several boundaries which contain the radioactive materials aboard the NSS (see 2.6).

g. Results of occupational exposure indicated by personal dosimetry (see 2.7).

These TS items were reviewed by the Safety Review Committee at its annual meeting on December 20, 2022 and by the Executive Steering Committee members during its concurrence routing prior to submission of this annual report to the NRC.

2.1 TS 3.4.2.1.A. STATUS OF THE FACILITY

During CY2022, the ship was berthed at Pier 13, Canton Marine Terminal, 4601 Newgate Avenue, Baltimore, MD.

MARAD holds a Possession-only license for the NSS nuclear utilization facilities that was modified by License Amendment 15 (Reference a) to allow dismantlement and disposal. As a result of License Amendment 15, the status of the facility is "Dismantlement."

Dismantlement is defined in Regulatory Guide (RG) 1.86, "Termination of Operating Licenses for Nuclear Reactors," Reference (a). This 1974 RG describes the now outmoded Dismantling option of decommissioning. MARAD understands RG 1.86 was withdrawn as noticed in the Federal Register (81 FR 53507) on August 12, 2016 and that its withdrawal does not impact the

[1] There were originally nine (9) requirements lettered a thru i. Items c and e have been deleted through license amendments, and show as such in the TS. This report consolidates the remaining seven (7) requirements, and letters them a thru g.

NSS licensing basis. MARAD uses the words 'active decommissioning' and 'dismantlement' interchangeably.

Dismantlement is characterized by removal of radioactive fluids, radioactive wastes and other materials having activities above accepted unrestricted activity levels. Mothballed activities continue to be performed. These include active surveillance, monitoring and maintenance of the nuclear facilities housed onboard the ship, and custody and maintenance of the ship as the primary physical boundary and protective barrier of the licensed site.

Significant dismantlement activities were performed throughout the year as described in Section 2.4 below.

2.1.1 LICENSE ACTIVITIES

MARAD and NRC discussed dismantlement activities at monthly status meetings throughout the year. On August 24, 2022, the monthly meeting was held at the ship and allowed NRC attendees to tour the ship and view the current status of dismantlement. Following the tour, MARAD described planned activities that would be completed during the remainder of the year.

2.1.2 ORGANIZATION

There were no significant organizational changes during 2022. Staffing was changed as needed to support the five-year integrated services contract to Nuclear Ship Support Services (NSSSJV)[2], LLC, of Seabrook, New Hampshire.

2.1.3 REVIEW OF OTHER TECHNICAL SPECIFICATION REQUIREMENTS

In accordance with TS 3.6.3, the Safety Review Committee (SRC) is specifically required to review the following items with or without a formal meeting:

a. *Proposed changes to Technical Specifications*

There were no proposed changes to Technical Specifications in CY 2022.

b. *Evaluations required by 10 CFR 50.59*

Safety Evaluation Screenings were performed as required and forwarded for committee review for information. No screening determined that a 10 CFR 50.59 Evaluation was required; consequently, none were performed. Additional information regarding 10 CFR 50.59 Evaluations is found in Section 3.1 of this report.

c. *Proposed changes or modifications to a Radiologically Controlled Area entry alarm system or reactor containment vessel system*

The Safety Review Committee reviewed all changes to alarm systems and reactor containment vessel system prior to their implementation.

d. *Evaluations of substantive changes to the results of radiological surveys*

There were substantive changes to the results of radiological surveys as the ship was dismantled and radiological waste was processed prior to its shipment to Clive, UT. Surveys of areas where contaminated components were removed from their installed locations showed expected lower values. Areas where shipments of these components were handled and processed showed increased values prior to shipment and substantially lower values after shipment.

[2] Because the acronym NSSS is very close to the accepted three-letter-acronym NSS (for Nuclear Ship Savannah), MARAD will add the letters JV to more easily distinguish the contractor from the ship.

e. *Procedures and revisions per TS 3.5*

Procedures and their revisions were reviewed prior to approval.

f. *Evaluations of reported violations of Technical Specifications*

There were no NRC reportable violations to Technical Specifications in 2022.

Corrective Action Report 2022-129 described a security event where during the end of the day the security walkdown, the RC B-deck door was found shut but unlocked and unguarded. The event and corrective actions were discussed at the October All-hands Meeting and at the monthly NRC meeting in October.

g. *Evaluations of reportable events per TS 3.4.3.1*

There were no NRC reportable events in CY2022.

h. *Evaluations of deviations allowed by TS 3.7.1.7*

Three deviations were in effect, as needed, throughout the year.

- *STS-004 Deviation - Radiologically Controlled Area doors unlocked and unguarded during Reactor Compartment and Containment Vessel entry.*
- *STS-004 Deviation - Loss of Alarm Coverage of Technical Specification 3.7.1.5 Doors.*
- *STS-004 Deviation - Severe Weather prevents daily security patrols.*

All deviations were reviewed for continued applicability as required. *STS-004 Deviation - Radiologically Controlled Area doors unlocked and unguarded during Reactor Compartment and Containment Vessel entry* was revised to Rev. 2.

i. *Audits and self-assessments to verify the effectiveness of the Decommissioning Quality Assurance Plan*

Audits

- QAU-2022-001 Job Hazards Analysis Audit

Assessments were performed in the following functional areas in the reporting period:

- QSA-2022-001, 1st Quarter, 2022 First Quarter Radiation Protection Program Assessment
- QSA-2022-001, 2nd Quarter, 2022 Second Quarter Radiation Protection Program Assessment
- QSA-2022-001, 3rd Quarter, 2022 Third Quarter Radiation Protection Program Assessment
- QSA-2022-001, 4th Quarter, 2022 Fourth Quarter Radiation Protection Program Assessment
- QSA-2022-002, License Termination Plan/Acceptance Criteria Review Matrix Assessment
- QSA-2022-003, Procedure Annual Review 2021
- QSA-2022-004, Fire Protection Plan
- QSA-2021-005, Technical Specification 3.7.1.7 Deviations Review 2022
- QSA-2022-006, Commitment Periodic Review 2022
- QSA-2022-007, Confined Space Inventory

j. *Annual reports to the NRC*

During CY2022, the following reports were reviewed prior to their submission to the NRC:

- Annual Report for CY2021 (STS-217).
- Decommissioning Funds Status Report for CY2021 (STS-218).
- Annual Radiological Environmental Monitoring and Radioactive Effluent Release Reports for CY2021 for CY2021 (STS-219).

2.2 TS 3.4.2.1.B. RADIATION SURVEYS AND MONITORING STATION DOSIMETER READINGS

2.2.1 RADIATION SURVEYS

A routine radiological survey program continued to be followed in CY2022. Radiological survey measurements were taken in various RCAs and non-RCAs. All readings in non-RCAs were insignificant as compared to background radiation levels.

The results of the CY2022 Radiation Survey Results in RCAs are listed in Appendix A.

2.2.2 MONITORING STATION DOSIMETER RESULTS

Fifty-eight (58) permanently placed thermo-luminescent dosimeter (TLD) monitoring stations are dispersed throughout the non-RCAs of the NSS and in those areas of the NSS that are routinely occupied. Fixed point radiation surveys are performed during TLD change outs. Results from the TLDs from all monitoring stations indicated that readings were insignificant as compared to the background radiation levels.

2.3 TS 3.4.2.1.D. QUARTERLY INTRUSION ALARM SYSTEM CHECKS

Routine security surveillances were conducted as required by TS 3.7.2.1. On a quarterly basis, the staff performed SIC-TS-Q-1, RCA Entrances Secured, Lock, Key and Seal Number Verification Inspection. Other monitored doors were tested.

2.4 TS 3.4.2.1.F. PRINCIPAL DECOMMISSIONING AND MAINTENANCE ACTIVITIES

The following principal maintenance activities were completed in CY 2022:

- Performed ship husbandry and custodial care, including maintenance of mooring systems and equipment; minor steel and equipment repairs; and, hull preservation and painting.
- Maintained and repaired lighting and electrical distribution systems.
- Performed American Bureau of Shipping Annual Survey of Lay-up.

The decommissioning activities completed in CY2022 include removing and disposing of the following:

- Small bore piping, components and interferences in way of large component removal in the Containment Vessel and Reactor Compartment Lower Level. Additional ancillary interferences remain.
- Control Rod Drive Tower and components on the Reactor Pressure Vessel Head.
- Reactor Pressure Vessel Head and internals (Belleville Spring, Upper Flow Baffle).
- Reactor Pressure Vessel.
- Port and Starboard Steam Generator U-Tubes.
- Pressurizer heaters and other internals.

The magnitude of decommissioning activities is best illustrated by listing the amount of waste disposed from the NSS in 2022.

TABLE 2-1 WASTE DISPOSED FROM SHIP

Container	Amount	Liquid Content	Solid Content	Volume	Generated	Hazard Classification
Intermodal	11		Dry Active Waste / Metal	7425 ft^3	Phrase II	Radioactive
Intermodal	5		Dry Active Waste / Metal	3375 ft^3	Phrase I	Radioactive
Intermodal	3		Lead (Pb)	21200 lbs	Phrase I/II	Recycle
Sealand	1		Reactor Internals	312 ft^3	Phrase II	Radioactive
Reactor Head	1		Reactor Head	168 ft^3	Phrase II	Radioactive
Reactor Pressure Vessel	1		RPV	2424 ft^3	Phrase II	Radioactive
Control Rod Drive Tower	1		Metal	1600 ft^3	Phrase II	Radioactive
Tanker	4	Water		18124 gal.	Phrase II	Radioactive
Control Rod Drive Oil Drum	2	Oil	Personal Protective Equipment / Lead fines	70 gal. and 280 ft^3	Phrase II	EPA Code D007 and D008

2.5 TS 3.4.2.1.G. UNAUTHORIZED ENTRY INTO RADIOLOGICALLY CONTROLLED AREAS (RCAS)

No unauthorized entries were made into any RCAs in CY2022.

2.5.1 EVENT DISCUSSION

Not Applicable

2.5.2 IMPROVEMENTS TO ACCESS CONTROL

Not Applicable

2.6 TS 3.4.2.1.H. INSPECTION OF PRIMARY, SECONDARY AND AUXILIARY SYSTEMS DEGRADATION

The annual inspection required by TS 3.7.3.4 was completed on December 13, 2022, and is used to identify any degradation of boundaries containing radioactive material aboard the NSS as required by TS 3.4.2.1.h. It is documented in SIC-TS-A-2 R0 Structures, Systems and Components Annual Inspection 2022. For those primary, secondary or auxiliary systems that that remain installed and/or are awaiting dismantlement, there was no notable degradation since the last inspection in 2021. TS 3.4.2.1.i. Summary of Occupational Exposure

In 2022, approximately 223 individuals were monitored, and the Project Dose for CY 2022 was approximately 1960 mrem.

The Annual Report for 2021 reported that "No individual received more than 10 mrem from occupational sources during the monitoring period." The TLD data for the 4th Quarter of 2021 was received in March 2022 after the CY 2021 Annual Report had been submitted. Review of that data indicated six (6) individuals received more than 10 mrem during CY 2021. This discrepancy was documented on CAR 2022-039 and reviewed with the NRC during the monthly progress meeting.

3.0 OTHER NRC REPORTS

3.1 10 CFR 50.59(D)(2) REPORT OF CHANGES, TESTS OR EXPERIMENTS

The regulations require each power reactor licensee to submit, at intervals not to exceed 24 months, a report containing a brief description of any changes, tests, and experiments, including a summary of the evaluation of each.

No Changes, Tests or Experiments were proposed in CY2022 that would require a 10 CFR 50.59 evaluation, and, consequently, no evaluations were completed.

Screenings are forwarded to Safety Review Committee members for information.

3.2 10 CFR 50.54(W)(3) INSURANCE ANNUAL REPORT

The regulations require each power reactor licensee to obtain insurance available at reasonable costs and on reasonable terms from private sources or to demonstrate to the satisfaction of the NRC that it possesses an equivalent amount of protection covering the licensee's obligation. MARAD adheres to the Federal rules of self-insurance as a matter of established policy.

3.3 COMMITMENT MANAGEMENT

No Regulatory Commitments were made or revised in CY 2022.

4.0 SIGNIFICANT MARAD ISSUES

4.1 REMAINING DECOMMISSIONING TIMELINE

The license termination deadline for the NSS is December 3, 2031[3], based on the Permanent Cessation of Operations milestone date of December 3, 1971. Decommissioning is on schedule to be complete well within the allowed 60-year license termination period.

4.2 PUBLIC EVENTS, VISITATION AND TRAINING

As described in Section 4.5, the COVID-19 pandemic access restrictions were lifted beginning in April 2022. Visitation resumed that month. In May, MARAD hosted its traditional National Maritime Day public open house, with some 450 visitors attending. Small group tours and invitational events (e.g., for the Reactor Head and Reactor Pressure Vessel removal activities) continued to the end of the calendar year. No other public events were conducted, nor was the ship employed for training purposes. Overall visitation was in excess of 500 persons for the reporting period.

4.3 HISTORIC STEWARDSHIP

The NSS was designated as a National Historic Landmark (NHL) in 1991, and is the only directly-owned, managed and maintained NHL property in the Department of Transportation inventory. Under the provisions of the National Historic Preservation Act (NHPA) of 1966, as amended, the highest standard of care for historic objects falls upon federal owners of NHLs. MARAD maintains a continuous focus on its historic stewardship responsibilities when conducting activities on the NSS site. All work on the ship, whether radiological or not, is sensitive to maintaining the historic fabric and appearance of the ship. MARAD's Federal Preservation Officer (FPO) provides expert advice and guidance to licensee staff in these matters, particularly with respect to the implementation of the Secretary of the Interior's Standards for the Treatment of Historic Properties and Historic Vessel Preservation Projects.

[3] December 3, 1971 is the de facto date of permanent cessation of operations date based on completing the reactor defueling that date by tensioning the reactor vessel head with six studs.

4.4 NATIONAL HISTORIC PRESERVATION ACT CONSULTATION

As discussed in previous annual reports, MARAD initiated consultation under Section 106 of the NHPA in April 2018 to address the potential adverse effects and harm to the NSS as a NHL arising from decommissioning and license termination activities. The Programmatic Agreement (PA) describing these effects was released for public comment in December 2022. The comment period ends on January 31, 2023. NRC is one of four federal agencies and state organizations that are parties to the PA. The other entities include the Advisory Council on Historic Preservation (ACHP), the National Park Service (NPS) and the Maryland Historic Trust (MHT), acting as the State Historic Preservation Officer.

4.5 COVID-19 PANDEMIC NATIONAL EMERGENCY

Significant revisions to the NSS COVID-19 pandemic access controls and other return to work (RTW) conditions were implemented based on revisions to the Department of Transportation Workplace Safety Plan and the U.S. Coast Guard (USCG) Marine Safety Information Bulletin (MSIB) 02-21 throughout CY2022. The shipboard complement restriction of forty-five (45) persons was removed in April of 2022 and the vaccination-related executive orders promulgated by the President were paused in August of 2022. Other controls, such as medical screening, mask use and physical distancing, remain in effect and are dependent on the Centers for Disease Control and Prevention published COVID-19 community levels.

5.0 REFERENCES

a. Regulatory Guide 1.86, *Termination of Operating Licenses for Nuclear Reactors*, June 1974

APPENDIX A. CY2022 RADIATION SURVEY RESULTS IN RADIOLOGICALLY CONTROLLED AREAS

Area	General Area Radiation levels mrem/hr (milli-rem/hr)	Highest Radiation Level mrem/hr (milli-rem/hr)	General Area Contamination Level (DPM/100cm^2)	Highest Contamination Level (DPM/100cm^2)
Reactor Compartment Cupola Level A Deck	<1.0	<1.0	<1000	<1000
Reactor Compartment Upper Level B Deck	<1.0	<1.0	<1000	<1000
Reactor Compartment Middle Level C Deck	<1.0	<1.0	<1000	<1000
Reactor Compartment Middle Level D Deck	<1.0	<1.0	<1000	<1000
Reactor Compartment Lower Level	<1.0	<1.0	<1000	<1000
Containment Vessel 1st Level	<1.0	<1.0	<1000	<1000
Containment Vessel 2nd Level	1.0	1.6	<1000	<1000
Containment Vessel 3rd Level	1.7	2.5	<1000	<1000
Containment Vessel 4th Level	<1.0 4.5 between U tube of both steam generators	<1.0	<1000	<1000
Cold Chemistry Lab and Rad Monitoring Rm C-Deck	Down posted (CCL Door locked per Technical Specifications)			
Radiation Sampling Room D-Deck	<1.0	<1.0	<1000	15200 loose surface on floor at Stbd corner
Gas Adsorption Room D-Deck	Down posted (Encompassed within CCL Door, locked per Technical Specifications)			
Cargo Hold 4 D-Deck LLRW Storage	<1.0	<1.0	<1000	<1000

Appendix A CY2022 Radiation Survey Results in Radiologically Controlled Areas

Area	General Area Radiation levels mrem/hr (milli-rem/hr)	Highest Radiation Level mrem/hr (milli-rem/hr)	General Area Contamination Level (DPM/100cm^2)	Highest Contamination Level (DPM/100cm^2)
Sugar and Flour Stores	<1.0	<1.0	<1000	<1000
Hull Survey (Dry dock 2019)	<1.0	<1.0	<1000	<1000
Port Stabilizer Rooms posted as a Rad Material Area	<1.0	<1.0	5000 loose surface	<1000 loose surface 2000 fixed on tank top
Starboard Stabilizer Room posted as a Rad Material Area (A)	<1.0	<1.0	<1000	<1000

Table Data Notes

(A) Posted as Rad Material Area due to the common tunnel connecting the two stabilizer rooms, due to survey identifying fixed contamination on port side on 1/8/2021.