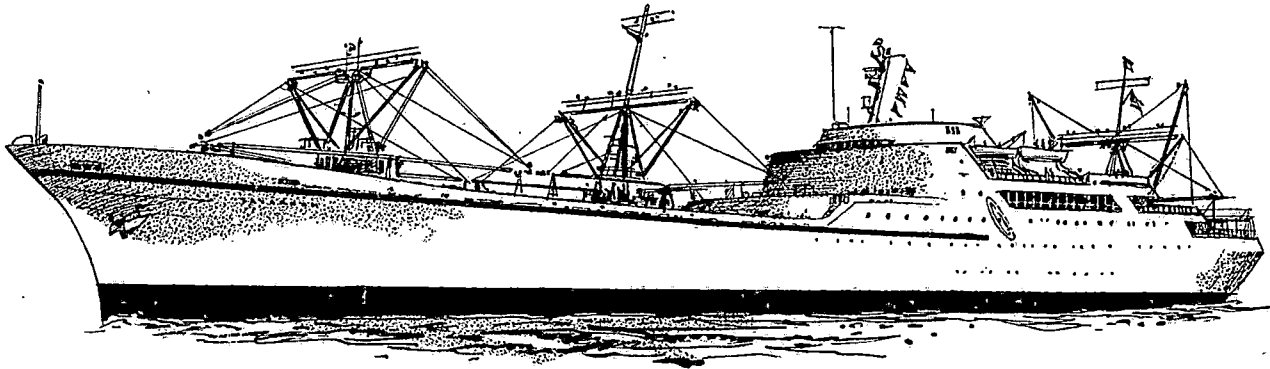




**U.S. Department of Transportation
Maritime Administration**



N.S. SAVANNAH

**ANNUAL REPORT
FOR CY2018**

STS - 204
Revision 0

Approved:

Date: February 27, 2019

Manager, N.S. *SAVANNAH* Programs

Prepared by:
TOTE Services, Inc.

RECORD OF REVISIONS

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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) 2018 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.

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 nine (9) reporting items listed in that specification. These items are addressed in Sections 2.1 through 2.9 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 nine (9) 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 environmental sample analysis surveys (see 2.3).
- d. The results of quarterly intrusion alarm system checks (see 2.4).
- e. The amount of radioactive materials removed from the N.S. *SAVANNAH* (NSS) by releases, discharges, and shipments of radioactive waste material (see 2.5).
- f. A description of the principal maintenance performed on the vessel (see 2.6).
- g. Any unauthorized entry into radiation control areas by visitors or employees and corrective action taken to improve access control (see 2.7).
- h. Any degradation of one of the several boundaries which contain the radioactive materials aboard the NSS (see 2.8).
- i. Results of occupational exposure indicated by personal dosimetry (see 2.9).

The status of these subject items were reviewed by the Safety Review Committee at its annual meeting on December 6, 2018 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 CY2018, 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 changed from "Mothballed" to "Dismantlement."

Dismantlement is defined in Regulatory Guide (RG) 1.86, "Termination of Operating Licenses for Nuclear Reactors," Reference (b). 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 NSS licensing basis. MARAD uses the words 'active decommissioning' and 'dismantlement' interchangeably.

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Amendment 15 removed the license condition (LC) 2.C.(2), which prevents dismantling and disposing of the ship without prior approval of the Nuclear Regulatory Commission. In 1976, the NSS license was revised to prohibit operation, dismantlement and disposal of the facility. This version of the Possession-only license was in effect from 1976 until April 23, 2018 when Amendment 15 was issued. The amendment also allows use of 10 CFR 50.59 to evaluate decommissioning activities.

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.

The Consolidated Appropriations Act for FY 2018 was signed on March 23, 2018. It provides \$107 million to MARAD for N.S. SAVANNAH decommissioning. This amount is in addition to the \$24 million provided by the Consolidated Appropriations Act for FY 2017 that was reported in Reference (c). The total amount appropriated equals the \$131 million estimated to complete decommissioning and terminate the NSS license.

Decommissioning activities conducted during the reporting period are described in Sections 2.1.1 and 2.1.4 below.

2.1.1 LICENSE ACTIVITIES

License Amendment 15 (Reference a) was issued on April 23, 2018. It allows dismantling and disposing of the ship. It was submitted to NRC as License Amendment Request (LAR) 2017-001.

License Amendment 16 (Reference d) was issued on June 12, 2018. It revises the Technical Specifications to establish controls for all accesses to the Containment Vessel (CV) in support of two structural modifications. One modification constructed a horizontal access portal to the CV that will be secured by a new D Deck CV Door. The other modification restored the original forward access between the Cold Chemistry Laboratory (CCL) at D Deck and the Reactor Compartment (RC) Lower Level. It was submitted to NRC as LAR 2018-001.

MARAD submitted LAR 2018-002 (Reference e) on June 19, 2018. The proposed license amendment will revise all of Technical Specification (TS) Section 2.0, *Radioactive Releases from nuclear power reactors*. The content of the proposed Technical Specification is consistent with those of plants in advanced stages of decommissioning.

2.1.2 ORGANIZATION

In 2018, MARAD made changes to its licensee organization based on the implementation of decommissioning activities. The organization continues to be made up of MARAD direct employees, contractors, and consultants.

On September 28, 2018, MARAD awarded a bridge contract to TOTE Services, Inc. (TOTE), of Jacksonville, FL. This contract is based on the prior integrated technical support that provided radiological protection and radiological emergency response; ship husbandry and custodial care; and core nuclear competencies and proficiencies. The bridge contract expands the prior contract to include decommissioning services, for the period October 1, 2018 through December 31, 2019.

TOTE, the prime contractor under the prior contract, continues as the lead partner of a three-company team. It is responsible for the Facility Management (vessel custody and husbandry) services; acts as the integrator of all contract services; and provides Federal Acquisition

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Regulation (FAR) procurement authority under its MARAD approved commercial procurement procedures. Mega-Tech, LLC continues to provide the License Technical Support (LTS) tasks. The LTS task provides a cadre of nuclear professionals who collectively possess experience and expertise in core nuclear disciplines and knowledge areas, including an augmented cadre of work planning and oversight professionals. Radiological protection and radiological emergency response has been assumed by Radiation Safety and Control Services (RSCS), Inc. from Radiation Services Organization (RSO), Inc.

Changes include filling following 26 new positions with single individuals:

- Decommissioning Program Manager (MARAD)
- Facility Site Manager (MARAD)

The remaining new positions are filled by contractors:

- Project Manager (replaces former Integrated Support Manager)
- Project Controls/Finance and Budget
- Port Engineer (2)
- Port Engineer/Work Planner-Marine Systems (2)
- Work Planner-Marine Systems (2)
- Engineer/Work Planner-Nuclear Systems (3)
- Work Planner-Nuclear Systems
- Procedures Program Manager
- HP Technicians (4)
- Environment, Safety & Health Engineer
- Scheduler
- Quality Control Inspector
- Licensing and Compliance Specialist
- Procurement Specialist/Buyer
- Document Control Specialist
- Administrative Assistant (2)

2.1.3 REVIEW OF OTHER TECHNICAL SPECIFICATION REQUIREMENTS

In accordance with the 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*

Two changes (LARs 2018-001 and 2018-002) proposed to the NS-1 License and Technical Specifications were reviewed by the Safety Review Committee prior to their submittal. They are described in Section 2.1.1 of this report.

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. These are summarized in Section 2.6 of this report.

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

Low Level Radiological Waste storage areas were created as needed to support on-going decommissioning activities.

Two existing radiologically controlled areas (RCAs) were cleaned, surveyed and de-posted. Specifically, the contaminated sink drains in the Health Physics Laboratory and the Hot Chemistry Laboratory were removed. Subsequently, the rooms were surveyed to confirm all radioactive material has been removed, after which the spaces were de-posted.

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 2018. The following Technical Specification violations were documented in the corrective action system:

CAR #	Title
2018-004	Alarm Call Center (BFPE) Not Receiving Alarm from A-Deck Sideport.
2018-018	Contractor badge issued to individual with expired General Employee Training level 1 (GET 1 training).
2018-024	Promenade Deck doors left unlocked.
2018-028	Procedure OI-RCA-1, Reactor Compartment (RC), Containment Vessel and RC Lower Level Entry and Exit changed without using the normal process.
2018-030	SIC-TS-D-4 Attachment 2 missing from Controlled Copy Manual STS-006.
2018-047	Radiological Control barrier /fence in Cargo Hold #4, D Deck STBD, was removed without proper authorization from the RSO.
2018-074	Containment Vessel Collision Mat Non-Conformance with Construction Drawings.
2018-095	Cathodic protection system (CAPAC) disconnected in violation of Technical Specification requirements.
2018-101	CAPAC forward electrode cell (via cable CP-7) not functioning.

g. *Evaluations of reportable events per TS 3.4.3.1*

There were no NRC reportable events in 2018.

h. *Evaluations of deviations allowed by TS 3.7.1.7*

One deviation was approved in 2018. It was associated with establishing security requirements during construction of the CV horizontal access portal, prior to installation of the new D Deck CV Door. Specifically, it addressed the situation created after the first "wedge" of collision mat, concrete and CV shell was removed, leaving an opening in the Reactor Compartment boundary bulkhead whose cross section was greater than 144 square inches. During this period of construction, it was impossible to meet the verbatim requirements of three Technical Specifications (TSs). From the time when this first wedge is sufficiently clear of the opening and continuing until the time the D deck CV door is installed with a locking device on the outside and fitted with an intrusion alarm, the deviation established appropriate security requirements. The deviation expired when construction was completed on September 21, 2018.

Both existing deviations were reviewed in 2018 and found correct for the situations they address.

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- STS-004 Deviation - STS-004 Deviation - Loss of Alarm Coverage of Technical Specification 3.7.1.5 Doors, Rev. 0. Note that this deviation was developed following the issuance of License Amendment 16.
- STS-004 Deviation - Severe Weather prevents daily security patrols, Rev. 2.

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

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

- QSA-2018-002 2017 Annual Radiation Protection Program Assessment
- QSA-2018-003 Technical Specification 3.7.1.7 Deviations Review
- QSA-2018-004 Commitment Periodic Review
- QSA-2018-005 Training Database 2018
- QSA-2018-006 Dose Assessment at CV portal
- QSA-2018-007 Assessment Atmospheric Testing of Enclosed Spaces
- QSA-2018-008 Procedure Review for Bridge Contract
- QSA-2018-009 Vessel Security Assessment
- QSA-2018-010 Corrective Action Process Review
- QSA-2018-011 Procedure Annual Review 2018

j. *Annual reports to the NRC*

During the reporting period, the CY2017 Annual Report (STS-202) and the CY2017 Decommissioning Funds Status Report (STS-203) were reviewed prior to their submission to the NRC.

2.1.4 **SAVANNAH EMERGENCY RADIOLOGICAL ASSISTANCE TEAM (SERAT)**

All SERAT members are located within a 2-hour response radius of the ship's current location.

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

A routine radiological survey program continued to be followed in 2018. Radiological survey measurements were taken in various RCAs and non-RCAs. Evaluations of all surveys over the course of the year found no significant changes in 2018. All readings in non-RCAs were insignificant as compared to background radiation levels. The Hot Chemistry Laboratory and Health Physics Laboratory were cleaned surveyed and de-posted in late 2018.

The results of the 2018 Radiation Survey Results in RCAs are listed in Appendix A.

2.2.1 **MONITORING STATION DOSIMETER RESULTS**

Forty-five (45) 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. No fixed point radiation dose rate exceeded 5 mR/hr (milli-R/hr).

2.3 TS 3.4.2.1.C. ENVIRONMENTAL SAMPLE ANALYSIS SURVEYS

Environmental water and sediment samples were taken adjacent to the ship at various times during the calendar year as required by TS and potential ship's movement to new piers. The environmental sample results indicate that any changes in the radiological conditions in the environment surrounding NSS are

insignificant as compared to the samples taken shortly before the NSS arrived at Pier 13. Therefore, based on the results of the radiological environmental monitoring program, NSS operations did not have any adverse effects on the health and safety of the public or on the environment in 2018.

The results of the 2018 Radiological Environmental Sampling Results are listed in Appendix B.

2.4 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.

2.5 TS 3.4.2.1.E. RADIOACTIVE MATERIALS REMOVED BY RELEASES, DISCHARGES AND WASTE SHIPMENTS

No radioactive materials were removed from the ship by any of the methods described below:

2.5.1 RELEASES

There were no releases.

2.5.2 DISCHARGES

There were no discharges.

2.5.3 SHIPMENTS

There were no shipments.

2.6 TS 3.4.2.1.F. PRINCIPAL DECOMMISSIONING AND MAINTENANCE ACTIVITIES

In 2018, MARAD's increased focus was on preparation for and active decommissioning. MARAD maintained its past focus on occupational and visitor safety, TS-required equipment, routine preventative maintenance, repairs and upgrades, preservation of the ship's structural integrity, and restoration of ship systems and equipment necessary for husbanding the ship. The following significant discrete activities were performed in 2018:

- Completed access improvements to the Containment Vessel (CV). The modification created the new D Deck CV entrance on D deck starboard at Frame 112. The entrance is a watertight double door.
- Completed access improvements between the D Deck CV entrance and Cargo Hold 4 at C and D decks by installing watertight double doors.
- Removed primary and auxiliary system components that interfered with installing the new D Deck CV entrance.
- Repaired CH4 hatch cover on A deck.
- Installed an interim HEPA ventilation system for the CV, Reactor Compartment and Cold Chemistry Laboratory.
- Replaced the control units for the Impressed Current Cathodic Protection system and returned the system to automatic function. This action also addressed the violation of the Technical Specification requirement noted in 2.1.3.f above. The system was fully functional after September 21, 2018.
- Performed underwater inspection of the hull in October 27, 2018. The inspection findings were consistent with previous inspections; the hull is coated with a thin, easily removable layer of marine growth, and the underlying paint coatings are in an acceptable condition. The visual survey of the hull structure, including the condition of hull pitting and welds, is satisfactory.
- Removed asbestos in numerous spaces.
- Abated lead in numerous areas.

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- Removed contaminated drains in the A deck Health Physics Laboratory and Hot Chemistry Laboratory. Both spaces are no longer RCAs.
- Relocated and upgraded the shorepower (electrical) connection in preparation for added load requirements during decommissioning, and to remove a personnel safety concern at the former location.
- Upgraded lighting in numerous spaces.
- Removed numerous legacy fire hazards from Cargo Holds 2, 3 and 4.
- Painted and improved habitability in numerous work spaces.
- Upgraded the Camera Surveillance System.

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

No unauthorized entries were made into any RCAs in 2018.

2.7.1 EVENT DISCUSSION

None

2.7.2 IMPROVEMENTS TO ACCESS CONTROL

None

2.8 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 November 9, 2018. It is documented in SIC-TS-A-2 R0 Structures, Systems and Components Annual Inspection 2018. There was no notable degradation of the primary, secondary and auxiliary systems since the last inspection in 2017.

2.9 TS 3.4.2.1.I. SUMMARY OF 2018 OCCUPATIONAL EXPOSURE

As a result of the NSS being in the early stages of moving from the Mothballed state of protective storage, to Active Decommissioning, no individual is expected to receive in one year from sources external to the body, a dose in excess of 10 percent of the limits specified in 10 CFR 20.1201. Through the 3rd quarter, the number of individuals monitored with TLD and self-reading dosimetry during their entries into RCAs was 68. Based on results of the 1st through 3rd quarter dosimetry records, no individual received more than 50 mRem from occupational sources during the monitoring period. The 4th quarter results were not received from the vendor prior to finalizing this report. Based on the available results, MARAD has no requirement under 10 CFR 20.1502, "Conditions requiring individual monitoring of external and internal occupational dose," to reasonably anticipate that there is a need to "monitor exposure to radiation and radioactive materials at levels sufficient to demonstrate compliance with the occupational of dose limits." Likewise, MARAD has no requirement under 10 CFR 20.2106, "Records of individual monitoring results," to maintain records of doses when an individual is not required to be monitored.

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 2018 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

One Regulatory Commitments was revised using the process required by STS-004-011, Commitment Management which is based on NEI 99-04, Revision 0, "Guidelines for Managing NRC Commitment Changes."

The original commitment was revised as follows:

NRC COMMITMENT LAR 2006 #2 -- Security seals are only required on RCA entrances when the ship is PLANNED not to be manned for greater than 30 CONSECUTIVE days. The seals to those doors will be maintained by MARAD or their designee. A log of the seals will be maintained by MARAD or their designee. Seals may be removed the first day that routine manning is reestablished. If routine manning is not reestablished within 90 days, the seals shall be inspected every quarter until routine manning is reestablished. [Continuing action]

Source: Letter from Mr. E. W. Koehler (Maritime Administration) to Document Control Desk (NRC), dated December 15, 2006, License Amendment Request No. 2006-01, Response to Request for Additional Information.

The original commitment was developed as part of License Amendment Request 2006-001. That amendment requested revising the Technical Specification to remove the requirement to seal RCA entrances. It kept the requirement to lock or guard all RCA entrances. The requirement to seal entrances was replaced with a commitment. In the years since that change and coupled with insufficient funds to perform decommissioning, RCA entrances were only opened for routine surveys and alarm testing. Typically, they were opened quarterly. Following receipt of full decommissioning funding, RCAs are entered daily to perform a variety of decommissioning planning, preparation and support tasks.

The basis for and approval of the change are documented in STS-004-011, Commitment Evaluation Form, "Regulatory Commitment Tracking (CATS Issue) Number: 810 (related 174, 214)." The evaluation determined there was little value added by sealing doors that are also required to be locked or guarded. The process concluded the commitment could be revised and the NRC would be notified of the revision in the Annual Report.

4.0 SIGNIFICANT MARAD ISSUES

4.1 REMAINING DECOMMISSIONING TIMELINE

The license termination deadline for the NSS is December 3, 2031,¹ based on the Permanent Cessation of Operations milestone date of December 3, 1971.

As of March 23, 2018, when NRC approved changing the Possession-only license to allow dismantlement and disposal, 46.3 years of protective storage had elapsed. Decommissioning is scheduled to be complete well within the allowed 60-year license termination period.

¹ 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.

4.2 PUBLIC EVENTS, VISITATION AND TRAINING

Similar to past years, MARAD continued its program of public access and training support during 2018. Major activities included the annual commemoration of National Maritime Day (observed on May 21) and open houses and educational tours in support of Baltimore Fleet Week and Air Show (October). A variety of training and meeting events were conducted throughout the year. Public access was curtailed as needed during significant decommissioning and maintenance activities.

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.² 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.

4.4 NATIONAL HISTORIC PRESERVATION ACT CONSULTATION

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. NRC was one of four agencies and organizations that was invited to join the consultation; all accepted. 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. The first consultation meeting was held in November 2018. The NHPA undertaking is defined as the combination of decommissioning-license termination and subsequent disposal of the vessel. The parties began to develop a Programmatic Agreement to cover the aspects of the undertaking; the activities were incomplete at the end of the CY 2018 reporting period.

² The NHL Washington (DC) Union Station is owned by the DOT, acting through the Federal Railroad Administration. The station complex, including air rights above the tracks, is managed and maintained by the independent Union Station Redevelopment Corporation, a public-private quasi-governmental entity established in 1983.

5.0 REFERENCES

- a. Letter from Mr. John B. Hickman (NRC) to Mr. Erhard W. Koehler (MARAD), dated April 23, 2018, *Nuclear Ship SAVANNAH - Issuance Of Amendment 15 to revise the License to allow Dismantlement and Disposal*
- b. Regulatory Guide 1.86, *Termination of Operating Licenses for Nuclear Reactors*, June 1974
- c. Letter from Mr. Erhard W. Koehler (MARAD) to U.S. Nuclear Regulatory Commission (NRC), dated May 30, 2017, *Availability of Funds for Decommissioning*
- d. Letter from Mr. John B. Hickman (NRC) to Mr. Erhard W. Koehler (MARAD), dated June 12, 2018, *Nuclear Ship SAVANNAH - Issuance Of Amendment 16 to revise the Technical Specifications to establish controls for all Accesses to the Containment Vessel in Support of Two Structural Modifications*
- e. Letter from Mr. Erhard W. Koehler (MARAD) to U.S. Nuclear Regulatory Commission (NRC), dated June 19, 2018, *License Amendment Request No. LAR 2018-02, Technical Specification Changes to Revise Section 2.0, Radioactive Releases*

APPENDIX A. 2018 RADIATION SURVEY RESULTS IN RADIOLOGICALLY CONTROLLED AREAS

Area	General Area Radiation levels mR/hr (milli-R/hr)	Highest Radiation Level mR/hr (milli-R/hr)	General Area Contamination Level (DPM/100cm ²)	Highest Contamination Level (DPM/100cm ²)
Reactor Compartment Cupola Level	<1.0 (A)	<1.0 (A)	<1000 (A)	<1000 (A)
Reactor Compartment Upper Level	<1.0	<1.0	<1000	<1000
Reactor Compartment Forward Middle Level	<1.0	<1.0	<1000	<1000
Reactor Compartment Aft Middle Level	<1.0	<1.0	<1000	<1000
Reactor Compartment Lower Level	<1.0	40 on contact with pipe 8 ft in overhead; 2.0 @ 30 cm. (A)	<1000	4041 inside drum Outside drum surface <1000 (B)
Containment Vessel 1st Level	<1.0	<1.0	<1000	<1000
Containment Vessel 2nd Level	<1.0	3.0 By RCP bowls, over RC line (A)	<1000	<1000
Containment Vessel 3rd Level	<1.0	4.0 Under S/G Hx (A)	<1000	<1000
Containment Vessel 4th Level	<1.0	2.0 Under S/G Hx (A).	<1000	<1000
Port Charge Pump Room	<1.0	<1.0	<1000	<1000
Starboard Charge Pump Room	<1.0	<1.0	<1000	<1000
Port Stabilizer Room	<1.0	<1.0	<1000	<1000
Port Booster Pump Area	<1.0	<1.0	<1000	<1000
Starboard Stabilizer Room	<1.0	<1.0	<1000	<1000
Cold Chemistry Lab Area C-Deck	<1.0	<1.0	<1000	<1000

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Appendix A 2018 Radiation Survey Results in Radiologically Controlled Areas

Area	General Area Radiation levels mR/hr (milli-R/hr)	Highest Radiation Level mR/hr (milli-R/hr)	General Area Contamination Level (DPM/100cm²)	Highest Contamination Level (DPM/100cm²)
Sample Room D-Deck	<1.0	3.0 on contact with overhead line (A)	<1000	1586 inside sample sink (A)
Gas Absorber Room D-Deck	<1.0	<1.0	<1000	<1000
Cargo Hold D-Deck	<1.0	<1.0	<1000	<1000
Hold Deck Aft of Reactor space port side	<1.0	<1.0	<1000	<1000
NEWS D Deck Rad Storage	<1.0	<1.0	<1000	<1000
D Deck Low Level Rad Storage	<1.0	<1.0	<1000	<1000

Table Data Notes

(A) Historical High value since 2013

Hot Chemistry and Health Physics Laboratories were deposited in late 2018.

APPENDIX B. 2018 RADIOLOGICAL ENVIRONMENTAL SAMPLING RESULTS

Sample Location	Sample Date	Type of sample	Co-60 (B)	Cs-137 (B)
Pier #13 Canton Marine Terminal, Baltimore, MD NSS Stbd Side (AFT)	04/03/2018	Sediment (A)	<MDC (minimum detectable concentration)	2.57E-02 pCi/g MDC = 1.63E-02
Pier #13 Canton Marine Terminal, Baltimore, MD NSS Stbd Side (FWD)	09/28/2018	Sediment (A)	<MDC	<MDC
Pier #13, Canton Marine Terminal, Baltimore, MD NSS Port Side (FWD)	4/03/2018	Sediment (A)	<MDC	2.44E-02 pCi/g MDC = 1.47E-02
Pier #13, Canton Marine Terminal, Baltimore, MD NSS Port Side (AFT)	9/28/2018	Sediment (A)	<MDC	3.32E-02 pCi/g MDC = 1.45E-02
Pier #13 Canton Marine Terminal, Baltimore, MD NSS Stbd Side (AFT)	4/03/2018	Water	<MDC	<MDC
Pier #13 Canton Marine Terminal, Baltimore, MD NSS Stbd Side (FWD)	9/28/2018	Water	<MDC	<MDC
Pier #13, Canton Marine Terminal, Baltimore, MD NSS Port Side (FWD)	4/03/2018	Water	<MDC	<MDC
Pier #13, Canton Marine Terminal, Baltimore, MD NSS Port Side (AFT)	9/28/2018	Water	<MDC	<MDC

Table Data Notes

- (A) Sediment samples are reported on a dry weight basis and are decay corrected to the Sample Collect date
- (B) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma)