

January 31, 1007

Mr. Erhard W. Koehler  
Senior Technical Advisor, N.S. SAVANNAH  
Office of Ship Operations  
U.S. Maritime Administration  
400 Seventh St., S.W.  
Washington, DC 20590

SUBJECT: ISSUANCE OF AMENDMENT NO. 13 (LICENSE AMENDMENT REQUEST NO. 2006-01) FOR NS SAVANNAH (DOCKET NO. 50-238, LICENSE NO. NS-1)

Dear Mr. Koehler:

The Commission has issued the enclosed Amendment No. 13 to Facility Operating License No. NS-1 for the Nuclear Ship Savannah (NSS). In accordance with your license amendment request dated August 7, 2006 (ADAMS No. ML062270587), the amendment consists of the following changes to the Technical Specifications:

- (1) Following 30 day notification to the U. S. Nuclear Regulatory Commission (NRC), the ship can be located at any appropriate U.S. domestic location to allow more efficient performance of pre-decommissioning activities;
- (2) Revising the membership of the Review and Audit Committee to be more consistent with activities associated with preparing for decommissioning;
- (3) Allowing the performance of radiological surveys and environmental surveillances by any appropriately qualified individual;
- (4) Revising the Access Control requirements into the Containment Vessel such that the 42 inch entrances are manned or secured;
- (5) Revising the Access Control requirements into the Reactor Compartment and Radiation Control Areas such that each door is manned or secured; and,
- (6) Correcting administrative errors in the Technical Specification (TS) format, and updating the TS to incorporate U. S. Department of Transportation, Maritime Administration, and NRC organizational title changes.

A copy of the related Safety Evaluation Report is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

**/RA/**

John Buckley, Senior Project Manager  
Reactor Decommissioning Branch  
Division of Waste Management  
and Environmental Protection  
Office of Federal and State Materials  
and Environmental Protection Programs

Docket No.: 50-238  
License No.: NS-1

Enclosures:

1. Amendment No. 13 to NS-1
2. Safety Evaluation Report

cc: NS Savannah Service List

A copy of the related Safety Evaluation Report is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

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U.S. DEPARTMENT OF TRANSPORTATION  
MARITIME ADMINISTRATION

DOCKET NO. 50-238

N. S. SAVANNAH

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment, Change No. 13  
License No. NS-1

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by the U.S. Department of Transportation, Maritime Administration (MARAD) (the licensee) dated August 7, 2006, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the rules and regulations of the Commission as set forth in 10 CFR Chapter I;
  - B. The facility will be maintained in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the regulations of the Commission as set forth in 10 CFR Chapter I;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and,
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the regulations of the Commission and all applicable requirements have been satisfied.
2. Accordingly, Facility Operating License No. NS-1 is amended by making changes to the Technical Specifications as indicated in the attachment to this license amendment.

3. This license amendment is effective as of the date of issuance and shall be implemented within **30** days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Keith I. McConnell, Deputy Director  
Decommissioning & Uranium Recovery  
Licensing Directorate  
Division of Waste Management and  
Environmental Protection  
Office of Federal and State Materials  
and Environmental Management Programs

Attachment:  
Changes to the Technical Specifications

Date of Issuance: January 31, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 13

FACILITY OPERATING LICENSE NO. NS-1

DOCKET NO. 50-238

Revise the license and technical specifications by removing the pages identified below and inserting the enclosed pages. All pages of the technical specifications have been revised, and thus, all pages are identified by the new amendment number indicating that text has changed.

Technical Specifications

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N.S. SAVANNAH  
Technical Specifications  
Docket No. 50-238

Appendix A to  
Facility License No. NS-1

U.S. Department of Transportation  
Maritime Administration

Amendment No. 13  
January 31, 2007

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## 1.0 GENERAL

The nuclear ship N.S. SAVANNAH is in a state of protective storage. All fuel assemblies, radioactive fluids, demineralizer resins and contaminated trash have been removed from the ship. Adequate radiation monitoring, environmental surveillance, access control and security procedures will be established under the possession-only license to ensure that the health and safety of the employees, visitors and the public are not endangered.

## 2.0 RADIOACTIVE RELEASES

### 2.1 Radioactive Liquid Waste Release

#### Applicability

Applies only to radioactive liquid waste disposal. No radioactive liquids will be produced as a result of any foreseen operations aboard the ship or from the ship's operation. Incidental amounts of liquid may be generated in the unlikely event decontamination is found necessary in controlled areas. All radioactive liquids have been removed from the primary and auxiliary systems.

#### Objective

To assure that liquid radioactive waste releases do not present an undue hazard to the general public or the environment.

#### Specification

Radioactive liquid waste releases shall be as low as reasonably achievable and shall not exceed ten-percent (10%) of limits specified in U.S. Nuclear Regulatory Commission (NRC) (10 CFR 20) or other applicable Federal regulations. Radioactive liquid waste shall be solidified in approved media and may be transferred to a properly licensed burial facility. All solidified liquid waste shall be transferred in accordance with applicable NRC (10 CFR 71) and U.S. Department of Transportation regulations; and the burial facility's license and acceptance criteria.

### 2.2 Radioactive Airborne Particulate Releases

#### Applicability

Applies only to radioactive airborne particulate releases that may occur due to maintenance requirements such as cutting and welding of contaminated components.

#### Objective

To assure that radioactive airborne particulate releases do not present an undue hazard to the general public or the environment.

## Specification

No activities shall be conducted that would result in a release of radioactive airborne particulates in excess of 10% of limits specified in 10 CFR 20, Appendix B, or other applicable Federal regulations.

### 2.3 Radioactive Liquid Waste Release Surveillance

#### Applicability

Applies to the surveillance requirements for controlling radioactive liquid waste released to the hydrosphere.

#### Objective

To verify that liquid radioactive waste discharged to the hydrosphere will not exceed 10% of limits specified in 10 CFR 20 or other applicable Federal regulations.

#### Specification

Liquid wastes resulting from radiological decontamination shall be analyzed prior to discharge. Concentrations of radioactive liquid waste shall not exceed 10% of the applicable limits of 10 CFR 20 or prescribed by other applicable Federal regulations. Records of analyses and amounts of wastes discharged shall be maintained.

### 2.4 Solid Radioactive Waste Release

#### Applicability

Applies only to those solid radioactive wastes generated as the result of general decontamination of controlled areas, ship surveillance, and entry into controlled areas.

#### Objective

To assure that solid radioactive waste presents no undue hazard to the general public or environment.

#### Specification

All solid radioactive waste shall be maintained in appropriate containers in accordance with 10 CFR 20 and other applicable Federal regulations and secured in locked storage areas. Transfers of solid radioactive waste may be made to a licensed burial facility in accordance with applicable NRC (10 CFR 71) and U.S. Department of Transportation regulations; and the burial facility's license and acceptance criteria.

### 3.0 ADMINISTRATIVE CONTROLS

#### 3.1 Administrative Responsibility

The N.S. SAVANNAH NS-1 License is held by the Senior Technical Advisor, as the responsible official for the U.S. Maritime Administration, Washington, D.C.

At all times, the custody and responsibility for access control, security, environmental surveillance, radiological monitoring, reporting to the U.S. Nuclear Regulatory Commission and maintenance will be with the Senior Technical Advisor, U.S. Maritime Administration (MARAD), Washington, D.C.

The annual radiation surveys, semi-annual environmental sampling and surveillance, and laboratory analyses will be the responsibility of MARAD and performed by an individual who meets or exceeds the qualifications of ANSI N18.1-1971, paragraphs 4.3.2 or 4.5.2.

MARAD shall have a health physicist on duty or on call within two hours to provide health physics support for radiological emergencies or entry into radiation control areas. In addition to the services of a health physicist, MARAD shall provide an Emergency Radiological Assistance Team in the event of radiological emergencies.

#### 3.2 Records

In addition to the records required by applicable regulations, the Senior Technical Advisor, U.S. Maritime Administration, Washington, D.C., and other assigned personnel shall maintain the following records:

##### 3.2.1 Health Physics Records include:

- a. personnel exposure;
- b. ship's radiological surveys; and
- c. environmental surveillance and laboratory analyses.

##### 3.2.2 Radioactive Liquid Waste Disposal Log;

##### 3.2.3 Solid Radioactive Waste Disposal Log;

##### 3.2.4 Quarterly Inspections of Physical Barriers and Intrusion Alarms;

##### 3.2.5 Licensee Event Reports (LER);

##### 3.2.6 Records of Review and Audit Committee Meetings;

##### 3.2.7 File of Annual Reports to the NRC; and

##### 3.2.8 Drawings, prints, layouts and specifications for the ship.

### 3.3 Radiological Criteria for Radiation Control Areas

All entries into radiation control areas by visitors or employees shall be under the direction of a health physicist in accordance with the licensee's health physics procedures manual. However, in the event of fire, entry may be made into all radiation control areas except the reactor containment vessel, without the direction of a health physicist.

A radiation control area is defined as an area of the ship with radiation levels from reactor generated radioactive materials in excess of 0.25mR/hr above natural background as measured at one meter from any surface, and/or surface contamination in excess of those limits prescribed in Table I of NRC Reg. Guide 1.86.

#### 3.3.1 Radiological Criteria for Unrestricted Areas

An unrestricted area is defined as an area that is accessible to employees, contractor personnel, escorted guests and official visitors. These areas include those areas not previously defined as Radiation Control Areas (Section 3.3). The radiation levels from reactor generated radioactive materials for unrestricted areas shall be less than 5μR/hr above natural background as measured at one meter from any surface. All surfaces shall be decontaminated and maintained at levels less than those prescribed in Table I of NRC Reg. Guide 1.86.

The radiation levels from reactor generated radioactive materials for all areas of the ship identified as being restricted to only employees, contractor personnel, escorted guests and official visitors shall be less than 5μR/hr above natural background as measured at one meter from any surface except as discussed below. Surface contamination levels shall be less than those prescribed in Table I of NRC Reg. Guide 1.86 in all cases, however. Restricted areas of the ship with radiation levels in excess of 5μR/hr but less than 0.25mR/hr may be entered without health physics supervision under the following conditions:

- a. A health physicist has determined that potential exposures to any individual will not exceed five percent of 10 CFR 20.101 exposure limits.
- b. The Review and Audit Committee has reviewed and accepted the proposed use of the space.

Prior to any areas being opened for uncontrolled access, the licensee shall survey the areas for radiation levels with appropriate portable instrumentation and make a contamination survey of the areas in accordance with his established health physics procedures to determine that the areas meet the criteria for access. Records of these surveys shall be maintained for inspection and review by the Review and Audit Committee.

#### 3.3.2 Access Control and Security

The license holder shall control all access to the vessel through assignment of designated personnel with appropriate administrative procedures and physical security provisions.

Following 30 days written notice to the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 50.4, the vessel can be towed, berthed, moored or drydocked in any U.S. domestic

location having a U.S. Maritime Administration approved Port Operating Plan. Security for the vessel shall be provided by the license holder at all times.

### 3.4 Reports

The Senior Technical Advisor, U.S. Maritime Administration, Washington, D.C. shall make the following reports:

#### 3.4.1 Annual Report

Prior to March 1 of each year, a written annual report shall be submitted to the NRC in accordance with 10 CFR 50.4. The report shall include the following:

- a. The status of the facility;
- b. The results of the radiation surveys and monitoring station dosimeter readings;
- c. The results of environmental sample analysis surveys;
- d. The results of quarterly intrusion alarm system checks;
- e. The amount of radioactive materials removed from the N.S. SAVANNAH by releases, discharges, and shipments of radioactive waste material;
- f. A description of the principal maintenance performed on the vessel;
- g. Any unauthorized entry into radiation control areas by visitors or employees and corrective action taken to improve access control;
- h. Any degradation of one of the several boundaries which contain the radioactive materials aboard the N.S. SAVANNAH; and
- i. Results of occupational exposure indicated by personal dosimetry.

#### 3.4.2 Reportable Events

In addition to those events that are reportable in accordance with the regulations of the NRC, the following additional events are reportable:

- a. The entrance of an unauthorized person or persons into any controlled radiation area;
- b. A significant change in the radiation or contamination levels in the vessel;
- c. Any release of radioactive material to the environment in excess of 10% of the limits of applicable sections of 10 CFR Part 20;

- d. Any major damage to the vessel due to severe weather conditions or other causes; and
- e. Major floodings or sinking of the vessel.

Within four hours of discovery, the U.S. Nuclear Regulatory Commission will be notified of any reportable event, listed above, in accordance with 10 CFR 50.72.

Within 60 days of discovery, any reportable event, listed above, will be reported to the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 50.73(d).

### 3.5 Procedures and Operating Instructions

All modifications and maintenance of the vessel which may affect the safety of visitors, employees, or maintenance personnel shall be carried out in accordance with written procedures that cover the following:

- a. Emergency conditions involving potential or actual release of radioactivity, e.g., fire and flooding;
- b. Surveys in controlled areas;
- c. Access control; and
- d. Radiation protection.

These procedures and any subsequent revisions shall be reviewed and approved by the Senior Technical Advisor, U.S. Maritime Administration, Washington, D.C. or his designated alternate, and the Review and Audit Committee.

### 3.6 Review and Audit Committee

3.6.1 The Review and Audit Committee shall report to the Senior Technical Advisor. The Committee will consist of at least four members. Membership shall be approved of by the Senior Technical Advisor. In aggregate, the membership experience shall include an appropriate balance of both maritime and commercial nuclear (operating and/or decommissioning) expertise. The permanent members include the following:

- Senior Technical Advisor;
- Decommissioning Program Manager;
- Facility Site Manager; and,
- An individual who meets or exceeds the qualifications of ANSI N18.1-1971 paragraphs 4.3.2.

3.6.2 A two-thirds ( $\frac{2}{3}$ ) majority of the members shall constitute a quorum of which one shall be the Senior Technical Advisor or their designated representative and one shall be an individual that meets or exceeds the qualifications of ANSI N18.1-1971, paragraphs 4.3.2.

- 3.6.3 Members of the Committee shall conduct audits, on-the-spot checks, and evaluations to assure that all work is being done safely and in accordance with established procedures. If a deficiency is discovered, the Senior Technical Advisor, U.S. Maritime Administration, Washington, D.C., is to be notified immediately. The license holder is to take the necessary immediate corrective action, and a written report of the deficiency is to be prepared for review by the Committee.
- 3.6.4 The Committee will review all of the following, including the determination of whether any proposed change involves an unreviewed safety question as defined in 10 CFR 50.59. These reviews may be accomplished and concurred with by members of the Committee without a formal meeting:
- a. Proposed changes to Technical Specifications;
  - b. Proposed changes or modifications to the vessel's controlled radiation area entry alarm system or containment system;
  - c. Substantive changes to radiation surveys or security surveillance procedures;
  - d. Reported violations of Technical Specifications;
  - e. Licensee Event Reports; and
  - f. Annual reports to the NRC.
- 3.6.5 The Committee shall be convened by the Chairman and shall meet annually to review and discuss events of the preceding period. The Committee will meet when necessary in the event of grounding or sinking of the vessel. Written minutes of all meetings shall be prepared and distributed to all committee members.

### 3.7 Ship Access Control and Surveillance

#### Applicability

Applies to routine access control and surveillance of the ship.

#### Objective

To prevent unauthorized entry into radiation control areas by manning or securing their entrances and to determine change in radiation levels or integrity of the ship. An entrance is secured by bolting, welding, locking via a chain and/or hasp, or preventing access via an equivalent method.

## Specification

### 3.7.1 Access Control

- 3.7.1.1 The 42 inch containment vessel entrances shall be manned or secured.
- 3.7.1.2 All radiation control area entrances will be manned or secured.
- 3.7.1.3 All radiation control areas entrances will be posted with appropriate caution and warning signs.
- 3.7.1.4 All entrances to the ship not in use will be secured at all times.
- 3.7.1.5 The B Deck Reactor Compartment entrance at Frame 122 will be fitted with an intrusion alarm with audible and visual signals that will alert a manned security guard post.
- 3.7.1.6 Security personnel will patrol the vessel at least once during a twenty-four (24) hour period.
- 3.7.1.7 Deviations from the above access control conditions will be in accordance with appropriate parts of Section 3 of these Technical Specifications, Administrative Controls.

### 3.7.2 Surveillance

- 3.7.2.1 Periodically and at least once a quarter, MARAD's designated personnel will inspect the radiation control area entrances they are properly secured and test the intrusion alarm in Item 3.7.1.5.
- 3.7.2.2 Radiation surveys of the ship shall be made annually, and environmental surveillance shall be made semi-annually by an individual who meets or qualifications of ANSI N18.1-1971, paragraphs 4.3.2 or 4.5.2.
- 3.7.2.3 Radiological surveys will be made:
  - a. In unrestricted and restricted employee areas of the ship;
  - b. In the compartment below the containment vessel for radiation levels and water leakage;
  - c. In the Port and Starboard Stabilizer rooms;
  - d. In the Forward control areas;
  - e. In Charge pump rooms;
  - f. In the Hot Chem. Lab. in the control room area; and



- g. In the accessible areas adjacent to the entries to the controlled areas.

3.7.2.4 In addition to the periodic radiological surveys, thermoluminescent dosimeters (TLDs) or equivalent monitoring devices shall be placed at strategic locations throughout the vessel to monitor the radiation from reactor generated materials. MARAD shall determine these locations on the vessel and shall require dosimeter readings at least semi-annually.

3.7.2.5 Semi-annually, water samples and bottom sediment will be taken adjacent to the ship and analyzed by a qualified laboratory for radioactivity.

3.7.3 Two draft level stripes will be painted fore and aft (at the draft markers), one will be just above the water level and the upper stripe will be one foot above the lower. These will be observed daily to check if the draft has increased. Both stripes must always be visible. If the lower stripe is not visible, the ship shall be surveyed and the water leakage located. The source of leakage will be determined, the ship pumped out, and repairs made as may be required, including drydocking if determined necessary, in order to assure that the integrity of the hull is maintained.

3.7.4 A cathodic protection system will be provided and properly maintained to protect the underwater areas of the vessel's hull to minimize corrosion damage to the hull.

3.7.5 An underwater inspection of the hull will be conducted at least every four (4) years. The vessel will be drydocked if the inspection determines that such action is necessary due to localized severe pitting, underwater plate thinning in excess of 40 percent, or other damage that would require corrective action and/or removal of the vessel to an off-site ship repair facility.

3.7.6 An inspection will be conducted at least annually by MARAD's designated personnel to determine any degradation of the primary and secondary systems

SAFETY EVALUATION  
OFFICE OF FEDERAL AND STATE MATERIALS &  
ENVIRONMENTAL PROTECTION PROGRAMS  
RELATED TO AMENDMENT NO. 13 TO FACILITY OPERATING LICENSE NO. NS-1  
U.S. DEPARTMENT OF TRANSPORTATION, MARITIME ADMINISTRATION  
N.S. SAVANNAH  
DOCKET NO. 50-238

## 1.0 INTRODUCTION

By letter, dated August 7, 2006, the U.S. Department of Transportation, Maritime Administration (MARAD) requested that the U. S. Nuclear Regulatory Commission (NRC) amend Facility Operating License No. NS-1. In general, the amendment consists of the following changes to the Technical Specifications (TSs):

- (1) Following 30 day notification to the NRC, the ship can be located at any appropriate U.S. domestic location to allow more efficient performance of pre-decommissioning activities;
- (2) Revising the membership of the Review and Audit Committee to be more consistent with activities associated with preparing for decommissioning;
- (3) Allowing the performance of radiological surveys and environmental surveillances by any appropriately qualified individual;
- (4) Revising the Access Control requirements into the Containment Vessel such that the 42 inch entrances are manned or secured;
- (5) Revising the Access Control requirements into the Reactor Compartment and Radiation Control Areas such that each door is manned or secured; and,
- (6) Correcting administrative errors in the TS format, and updating the TS to incorporate MARAD and NRC organizational title changes.

## 2.0 BACKGROUND

MARAD is the owner and licensee of the Nuclear Ship Savannah (NSS), the world's first nuclear powered merchant ship. Conceived in the 1950's as part of President Eisenhower's "Atoms for Peace" program, the NSS was designed, constructed and operated as a joint research and development project of the MARAD and the Atomic Energy Commission (AEC). MARAD's contribution was the ship while the AEC's was the reactor and related nuclear systems. The reactor was first brought to power in 1961. Seagoing trials followed in 1962.

The AEC ended its participation in the project in about 1965, transferring liability and title of the reactor to MARAD. NSS was operated in experimental and commercial demonstration service throughout the 1960's. The ship was removed from service in 1970. In 1971, when alternative uses for the ship failed to materialize, its nuclear power plant was defueled, partially decommissioned and prepared for long-term lay-up under contemporary best practices. By April 1976, additional decommissioning activities such as removing the three primary

purification system ion-exchangers, their resins and dewatering the primary, auxiliary and secondary systems had been performed. The NSS possession-only license was issued on May 19, 1976. The NSS is a registered National Historic Landmark.

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TS as part of the license. The Commission's regulatory requirements related to the content of TS are set forth in 10 CFR 50.36. The regulation, however, does not specify particular items to be included in TS.

Section 50.36(c)(2) provides four criteria to be used in determining whether particular items are required to be included in the TS. While the four criteria apply specifically to Limiting Conditions for Operation (LCOs), in adopting the revision to the rule, the Commission indicated that the intent of these criteria can be used to identify the optimum set of TS administrative controls. Addressing administrative controls, 10 CFR 50.36(c)(5) states that they "are the provisions relating to organization and management, procedures, record keeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner." The particular administrative controls to be included in the TS, therefore, are the provisions that the Commission deems essential for the safe operation of the facility that are not already covered by other regulations.

Accordingly, the staff has determined that administrative control requirements that are not specifically required under 10 CFR 50.36(c)(5), and that are not otherwise necessary to obviate the possibility of abnormal situation or event giving rise to an immediate threat to the public health and safety, may be relocated to more appropriate documents (e.g., Quality assurance Plan (QAP), Security Plan, or Emergency Plan), which are subject to regulatory controls. Similarly, while the required content of TS administrative controls is specified in 10 CFR 50.36(c)(5), particular details may be relocated to licensee-controlled documents, where other regulations provide adequate regulatory control.

The QAP is a logical candidate for relocations of administrative controls due to the controls imposed by such regulations as Appendix B to 10 CFR Part 50, the existing NRC-approved QAP and commitments to industry QA standards, and the established QA program change control process of 10 CFR 50.54(a).

NRC Administrative Letter (AL) 95-06, "Relocation of Technical Specification Administrative Controls Related to Quality Assurance," provides guidance to licensees requesting amendments that relocate administrative controls to NRC-approved QAP descriptions, where subsequent changes are controlled pursuant to 10 CFR 50.54(a). AL 95-06 provides specific guidance in the areas of: (1) independent safety engineering group, (2) reviews and audits, (3) procedure review process, and (4) records and record retention.

Some relocations are specifically discussed in AL 95-06, while others are similar in nature. Relocations not specifically discussed in AL 95-06 are evaluated with respect to the appropriateness of the relocation. Editorial changes are allowed without basis by 10 CFR 50.54(a)(3) and are not explicitly evaluated.

### 3.0 EVALUATION

MARAD is taking steps to actively decommission the NSS. To prepare for decommissioning, MARAD must complete a number of preparatory activities. These activities include surveys, system walkdowns, inspections, etc. required to develop a detailed decommissioning plan, schedule and cost estimate. In order to complete these activities in a safe and efficient manner, MARAD has proposed a number of changes to its TSs to prepare for decommissioning the NSS. Each of the proposed changes is evaluated below.

#### 3.1 Technical Specification Changes

##### 3.1.1 NSS Location

In order to most efficiently prepare for decommissioning, MARAD is proposing to move the NSS from its James River Reserve Fleet, Fort Eustis, VA (JRRF) location. When the ship is located at the JRRF, access to the ship is extremely limited and not conducive to efficiently performing these pre-decommissioning activities. The actual process of embarking and disembarking the ship can be challenging especially when each individual has more than a single large item (computer, notebooks, lunch, etc.) to carry on board. When significant equipment is required, these challenges are multiplied. As the need for numerous individuals to access to the ship for pre-decommissioning activities increases, the inherent inefficiencies and challenges become greater.

MARAD is proposing to make changes to TS 3.1 and 3.3.2. These TSs require the NSS to layup at the JRRF except when it is "off-site for infrequent required ship maintenance ...". MARAD is proposing that the ship will no longer be limited to layup at JRRF. Specifically, MARAD is proposing that "following 30 day notice to NRC, the ship can be towed, berthed, moored or drydocked in any U.S. domestic location having a MARAD approved Port Operating Plan."

During the ship's operating period, the acceptability of a docking location was dependent on establishing the low-population zone such that following the Maximum Credible Accident, the dose to members of the public would not exceed established limits. Prior to permanent defueling in 1971, the Maximum Credible Accident was a loss of coolant accident assuming continuous operation at 100% for two years. Following defueling in 1971, there has been no possibility of any reactor/criticality accident.

Following the final shutdown on November 8, 1970 and the subsequent defueling, the remaining radioactive material is primarily the activated pressure vessel and other primary system components. The activation estimates have dropped dramatically in the subsequent years: 108,496 Ci (1976), 13,000 Ci (1994) and 452 Ci (2005). Note that the 2005 estimate used actual power history.

General area dose rates measured during the 2005 radiological and environmental characterization scoping survey are as follows:

- In non-radiological areas, general area dose rates were at or below background, with one exception in Cargo Hold 4, where "shine" from the Cold Water Chemistry Lab, upper level [originally the Radiation Monitoring Room (C-deck level, forward of the

reactor compartment Frames 99 - 102), later this room became known as Forward Control] produces approximately 0.250 mR/hr at the Cargo Hold 4 aft bulkhead. Shine is radiation emanating from another location on the ship but being measured remotely;

- For radiological areas outside of containment and the reactor compartment, general area dose rates ranged from background to 0.050 mR/hr. Contact readings on some pipes reached 2mR/hr;
- Inside the reactor compartment, dose rates in the upper levels were essentially background. In the lower reactor compartment levels, general area dose rates varied 0.3–1.6 mR/hr, with contact readings of up to 221 mR/hr;
- Inside containment, general area dose rates varied 0.1–10 mR/hr, with the highest contact reading around the “U” tube end of the steam generators of 35 mR/hr.

In 1976 MARAD conducted decommissioning activities to remove the three primary purification system ion-exchangers, their resins and dewatering the primary, auxiliary and secondary systems, which further reduced the inventory of radioactive material onboard the NSS. Given the reduced the inventory of radioactive material onboard, and the low activation estimates and general area dose rates, there is no Credible Accident that could cause the dose to the public to approach the established dose limit. As a result, the acceptability of the ship's location should be dependent on MARAD safety analysis and prior notification to the NRC. Because MARAD has initiated and directed the towing of hundreds of vessels to layberths, repair yards and the reserve fleets, towing operations incident to relocating the NSS are straightforward and essentially routine.

The proposed TS requires that the NSS be towed, berthed, moored or drydocked in a U.S. domestic location having a MARAD approved Port Operating Plan. On May 17, 2006, NRC approved the Port Operating Plans for Charleston, SC, Hampton Roads and Norfolk, VA, and Tampa Bay, FL. Previously, NRC approved the Port Operating Plan for Savannah, GA, on December 15, 1971. Approval of these Port Operating Plans allows the NSS to be towed, berthed and drydocked at these locations.

Given that there is little possibility that any event could lead to a dose approaching the established limit to the public, any difference between the ship being at JRRF or any domestic location with an approved Port Operating Plan is negligible. Therefore, the staff has determined that revising TS 3.1 and 3.3.2 is an acceptable administrative change.

### 3.1.2 Review and Audit Committee Membership

MARAD is proposing to make changes to TS 3.6.1. TS 3.6.1 describes the membership of the Review and Audit Committee. The current membership of the Review and Audit Committee consists of two members associated with the JRRF and one who is associated with the U.S. Army, Center for Public Works, Humphries Engineering Center (HEC). MARAD is proposing new membership requirements for the Review and Audit Committee since the ship will no longer be required to be in layup at JRRF and “alongside or in close proximity to the decommissioned U.S. Army MH-1A Floating Nuclear Power Plant STURGIS.” Specifically, MARAD is proposing the following:

The Review and Audit Committee shall report to the Senior Technical Advisor. The Committee will consist of at least four members. Membership shall be approved by the Senior Technical Advisor. In aggregate, the membership experience shall include an appropriate balance of both maritime expertise and commercial nuclear (operating and/or decommissioning) expertise. The permanent members of the Review and Audit Committee include the following:

- Senior Technical Advisor;
- Decommissioning Program Manager;
- Facility Site Manager; and
- An individual who meets or exceeds the qualifications of ANSI N18.1-1971, paragraph 4.3.2.

In addition, MARAD is proposing to add a new TS 3.6.2;

A two-thirds (2/3) majority of the members shall constitute a quorum of which one shall be the Senior Technical Advisor or their designated representative and one shall be an individual who meets or exceeds the qualifications of ANSI N18.1-1971, paragraph 4.3.2.

The TS requires that the makeup of the Review and Audit Committee would include individuals whose aggregate experience include extensive maritime experience as well as extensive commercial nuclear decommissioning and/or operating experience. To ensure that issues involving health physics continue to be appropriately considered by the committee, the quorum requirements include an individual that meets or exceeds the qualifications of ANSI N18.1-1971, paragraph 4.3.2.

Since the Review and Audit Committee will include individuals with extensive maritime experience, extensive commercial nuclear decommissioning and/or operating experience, and health physics experience, the staff has determined that revising TS 3.6.1, and adding TS 3.6.2, will not reduce the capability or effectiveness of the Review and Audit Committee to conduct audits, spot checks, and evaluations to assure that all work is being done safely and in accordance with established procedures. Therefore, the staff finds that revising TS 3.6.1 and adding TS 3.6.2 are administrative changes and acceptable.

### 3.1.3 Qualifications Required to Perform Surveys and Surveillances

Since the ship will no longer be required to be in layup at JRRF and “alongside or in close proximity to the decommissioned U.S. Army MH-1A Floating Nuclear Power Plant STURGIS,” MARAD has determined that it is no longer appropriate that the TSs should limit performance of annual radiation surveys and semi-annual environmental surveillances to designated representatives of the U.S. Army, Center for Public Works, Humphries Engineering Center (HEC).

MARAD is proposing to make changes to TSs 3.1 and 3.7.2.2. These TSs require that annual radiation surveys and semi-annual environmental surveillances be performed by “the designated representatives of HEC.” Specifically, MARAD is proposing that these surveys and surveillances will be performed by an individual who meets or exceeds the qualifications of ANSI N18.1-1971, paragraphs 4.3.2 or 4.5.2.

The underlying basis for limiting the performance of annual radiation surveys and semi-annual environmental surveillances to representatives of HEC was based on utilizing an existing contract with HEC. The Federal Acquisition Regulations and the Economy Act (31 U.S.C. 1535), References (d) and (e), allow for using an interagency acquisition when the acquisition is in the best interest of the Government and more economical. Until now, it has been more economical to use the existing contract than it would have been to solicit a new contract with either the same or another entity. However, in preparation for decommissioning, MARAD needs the flexibility to procure survey and surveillance services from any appropriate qualified source. MARAD has concluded that any individual who meets or exceeds the qualifications of ANSI N18.1-1971, paragraphs 4.3.2 or 4.5.2 can adequately perform the annual radiation surveys and semi-annual environmental surveillances.

Regulatory Guide 1.8 conditionally endorses both ANSI/ANS N18.1-1971, and ANSI/ANS-3.1-1981, "Selection and Training of Nuclear Power Plant Personnel, " as industry standards which provide acceptable methods to the NRC staff for meeting the applicable regulatory requirements in 10 CFR 50.34 (b)(6) (i). Therefore, NRC accepts that the annual radiation surveys and semi-annual environmental surveillances can be adequately performed by any individual who meets or exceeds the qualifications of ANSI N18.1-1971, paragraphs 4.3.2 or 4.5.2. The staff has determined that revising TSs 3.1 and 3.7.2.2 is an administrative change and is acceptable.

### 3.1.4 Containment Vessel Entry Shield Plugs

There are six openings to the Containment Vessel (CV) which can be used for access or equipment removal. All but one (the 42 inch double-door air lock) of these openings are bolted closures. The 42 inch double-door air lock permits entering the containment without breaking containment integrity. In addition to the 42 inch air lock, a 42 inch diameter bolted hatch is located forward of the cupola. This hatch can also be used for access and servicing of small equipment when the plant is shutdown. A 13.5 foot, full-diameter hatch at the top of the cupola was provided for major maintenance and refueling operations. A 5.5 foot diameter hatch is located in the top of the cupola for control rod drive removal. Two combination, 18 inch x 24 inch manways and flooding hatches are located on the starboard side in the lower quarter of each hemispherical head. A CV entry shield plug is currently located on top of the 42 inch double-door airlock and on top of the 42 inch bolted hatch.

TS 3.7.1.1 requires the CV Entry Shield Plugs to be in place, sealed and their lifting equipment partially disassembled. However, TS 3.7.1.7 allows MARAD to open the CV when appropriate administrative controls are in place. In the near future, MARAD expects to be routinely performing many decommissioning planning activities that will require frequent entries into the CV. Enabling, then disabling the chain hoist and removing, then replacing the shield plugs on a frequent basis for numerous routine CV entries is inefficient. MARAD has determined it is no longer appropriate or efficient to utilize administrative controls to remove the CV Entry Shield Plugs to perform activities such as surveys, system walkdowns and inspections required for developing a detailed decommissioning plan, schedule and cost estimate.

To reduce its resource burden, MARAD is proposing to make changes to TS 3.7.1.1. In place of using the shield plugs to prevent unauthorized access to the CV, MARAD proposes that the 42 inch entrances will be manned or secured. Further, MARAD defines "secured" as allowing entrances to be bolted, welded, locked via a chain and/or hasp, or another equivalent means to

prevent access. As an alternate to securing entrances, MARAD proposes manning entrances to prevent unauthorized access.

When License Amendment No. 8 instituted the TS requirements for the CV Entry Shield Plugs, the CV general area dose rates were significantly higher than those of today. NRC's Safety Evaluation Report (SER) for License Amendment No. 8 states that a maximum of 900 mR/hr was detected inside the containment vessel near the starboard steam generator with average exposure inside the containment vessel at less than 100 mR/hr. Today the dose rates are much lower. Per the 2005 radiological and environmental characterization scoping survey, general area dose rates inside the CV, varied from 0.1–10 mR/hr, with the highest contact reading around the "U" tube end of the steam generators (35 mR/hr).

Requiring shield plugs to be in place to avoid unauthorized entry into the CV was technically justified in 1976 due to the significantly higher dose rates. For areas with lower dose rates, a less rigorous barrier is justified. Since the current dose rates in the CV have been reduced to a maximum of 10 mR/hr, access control to the CV can be reduced to be consistent with access control for other radiation control areas on-board the NSS. Proposed TS 3.7.1.1 requires that the 42 inch containment vessel entrances be manned or secured, which is consistent with access control requirements for other radiation control areas on-board.

Since the dose rates in the CV have been significantly reduced from the levels in 1976 and are consistent with the levels in the radiation control areas, and the proposed requirements for the 42 inch manways provide an effective deterrent to unauthorized access to the CV, the staff has determined that revising TS 3.7.1.1 is an administrative change and is acceptable.

### 3.1.5 Reactor Compartment and Radiation Control Area (RCA) Entrances

Current TSs, 3.3, 3.7.1.2, 3.7.1.3, 3.7.1.5 and 3.7.2.1 provide controls for Reactor Compartment (RC) and Radiation Control Area (RCA) entrances. RC entrances are required to be secured from the outside except for B Deck entry at Frame 122, which must be chained, posted, sealed, and double locked. RCA entrances must be posted, locked and sealed. In 2007, MARAD expects to be routinely performing many decommissioning planning activities that will require frequent entries into the RC and other RCAs. MARAD has determined the administrative burden and inefficiencies associated with deviating from TSs 3.3, 3.7.1.2, 3.7.1.3 and 3.7.1.5 as allowed by 3.7.1.7 is no longer appropriate when numerous RCA entries are anticipated. Further, MARAD would like to eliminate the separate, yet duplicative, TS for the RC when the RC is an RCA.

MARAD has also proposed to broaden the surveillance requirement of 3.7.2.1 to "inspect the seals on RCA doors" to ensure any means of securing an entrance is adequate (i.e., bolted, welded, chained and/or hasped or other equivalent means).

MARAD is proposing to revise TSs, 3.3, 3.7.1.2, 3.7.1.3, 3.7.1.5 and 3.7.2.1 as follows:

#### TS 3.3

TS 3.3, Paragraph 1, requires that any authorized visitor aboard the ship will be accompanied by representatives of the license holder until all radiation control areas are locked and sealed. MARAD proposes to revise TS 3.3, Paragraph 1 by removing the first sentence.



TS 3.3, Paragraph 3, requires that all RCA entrances will be posted with appropriate caution and warning signs, locked and secured with chains, and sealed with numbered seals. Further, it requires that keys and seals will be maintained by a designated representative of the license holder, and a log maintained. MARAD proposes to delete TS 3.3, Paragraph 3. The requirements for keys, and maintaining a log will be relocated to an administrative procedure, as necessary.

TS 3.3, Paragraph 4, requires that an intrusion alarm with an interlock will be maintained on the B Deck entry door into the reactor compartment with audible and visual signals located at a manned security guard post. These signals shall be both seen and heard by the security guard on duty. MARAD proposes to delete TS 3.3, Paragraph 4 and include its requirements in proposed TS 3.7.1.5.

#### TS 3.7.1.2

TS 3.7.1.2 requires that all RC entrances will be secured from the outside except the B Deck entry at Frame 122, which will be chained, posted, sealed, and double-locked. MARAD proposes to revise the Objective of TS 3.7 to state, "To prevent unauthorized entry into radiation control areas by manning or securing their entrances, and to determine change in radiation levels or integrity of the ship. An entrance is secured by bolting, welding, locking via a chain and/or hasp, or preventing access via an equivalent method." In addition, MARAD proposes to delete the wording in TS 3.7.1.2, and replace it with "All radiation control area entrances will be manned or secured."

#### TS 3.7.1.3

TS 3.7.1.3 requires that all RCAs will be posted, locked and sealed. MARAD proposes to delete TS 3.7.1.3 and replace it with "All radiation control area entrances will be posted with appropriate caution and warning signs."

#### TS 3.7.1.5

TS 3.7.1.5 requires that the B-deck RC entrance will be fitted with an intrusion alarm with audible and visual signals located at a location that is manned by a guard or security officer.

MARAD proposes to revise TS 3.7.1.5 to require, "The B Deck Reactor Compartment entrance at Frame 122 will be fitted with an intrusion alarm with audible and visual signals that will alert a manned security guard post."

#### TS 3.7.2.1

TS 3.7.2.1 requires that periodically and at least once a quarter, MARAD's designated personnel will inspect the seals on the control area doors and test the intrusion alarm in Item 3.7.1.5. MARAD proposes to revise TS 3.7.2.1 to require, "Periodically and at least once a quarter, MARAD's designated personnel will inspect the Radiation Control Area entrances to verify they are appropriately secured and test the intrusion alarm in Item 3.7.1.5."

The purpose of the TSs identified above is to prevent unauthorized entry into the RC and RCAs given that in 1976, MARAD anticipated no decommissioning activity in the foreseeable future.

Frequent entries into the RCAs to perform decommissioning planning activities makes it impractical to have RCA entrances chained, locked, and sealed. However, sufficient security is required to prevent unauthorized entry.

As discussed in Section 3.1.1 above, given the reduced the inventory of radioactive material onboard, and the low activation estimates and general area dose rates, the staff finds that securing RCAs by manning or securing their entrances will provide sufficient security to prevent unauthorized entry. Further, the staff agrees that access control requirements for the RC and RCA should be consistent since the RC is an RCA. Since no reduction in security will result from manning or securing RCA entrances, the staff has determined this is an administrative change and is acceptable.

### 3.1.6 Editorial Revisions

MARAD submitted its license amendment request on August 7, 2006. NRC transmitted a request for additional information (RAI) on December 6, 2006. As a result of NRC's RAI, MARAD proposed the following additional TS revisions in a letter dated December 15, 2006;

- Revise TSs 3.1, 3.6.1, 3.7.2.2, to reference ANSI N18.1-1971, instead of ANSI N18.8-1971;
- Revise TS 2.1 and TS 2.4 reference to U.S. Department of Transportation, Hazardous Materials Branch, by referring to the U.S. Department of Transportation;
- Revise TS 3.4 by replacing "Office of Nuclear Reactor Regulation" with "U.S. Nuclear Regulatory Commission in accordance with 10 CFR 50.4";
- Revise the time frames for reportable events and LERs to be consistent with those in 50.72 and 50.73, respectively. In addition, immediate notifications for events specified in TS 3.4.2 will be made to the NRC Operations Center and LERs will be submitted as required by in accordance with 10 CFR 50.4;
- "Clean" version of Amendment 13 version of TS. The revised TS will include all changes made in Amendment 13 as well as revisions to all pages to incorporate consistent page format and section numbering.

These changes are considered to be editorial administrative changes and are acceptable.

## 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of Virginia was consulted regarding the proposed issuance of the amendment. Copies of the draft license amendment and SER were provided to the State for information and comment. The State had no comments.

## 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes recordkeeping, reporting, or administrative procedures or requirements. The amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10)(ii). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; (2) such activities will be conducted in compliance with the Commission's regulations; and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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