Finding of No Significant Impact

PROPOSED FEDERAL ACTION

The Maritime Administration (MARAD) owns and maintains the Nuclear Ship *Savannah* (NSS), the world's first nuclear powered merchant ship. This ship was constructed under President Eisenhower's *Atoms for Peace* initiative, and placed into service in 1962. It is equipped with an 80 MW Pressurized Water Reactor (PWR), which remains on the ship. The nuclear facilities on the ship are licensed by the United States Nuclear Regulatory Commission (NRC), as license NS-1, docket number 50-238. This license and docket were originally established by the Atomic Energy Commission (AEC; predecessor to the NRC) in 1965.

MARAD has been evaluating the ship's status since 2002, and proposes to decommission the NSS' NRC-licensed nuclear facilities. Decommissioning as used herein is described by the NRC as the process by which a licensed nuclear facility is removed from service, and through a combination of decontamination, dismantlement and remediation, the facility (or site) is restored for re-use. In most cases this decommissioning process results in termination of the NRC license. The NRC allows three (3) decommissioning alternatives which are described later in this document; DECON, SAFSTOR and ENTOMB.

Background

The NSS was operated from 1962 to 1970, with one interim refueling in 1968. It was removed from service in November 1970, and the reactor was defueled in November 1971. The nuclear systems were maintained in a lay-up status, capable of refueling and restoration to service, until January 1973 when MARAD decided to permanently retire them. Subsequently, the agency and the AEC defined November 1971 as the *de facto* date of permanent cessation of operations, as described in MARAD's 2007 Updated Final Safety Analysis Report, Revision IV. This document, and all other docketed correspondence and publications, is available for public review online in the NRC Agencywide Documents Access and Management System (ADAMS). NRC-ADAMS is accessible from the NRC website at www.nrc.gov

Beginning in 1975 MARAD removed all high-level radioactive components and material from the ship's nuclear systems, and made certain physical modifications to render the nuclear power plant permanently inoperable. These actions were completed in early 1976, and the NRC amended the NS-1 license to a "possession-only" status. The collective process undertaken from defueling in 1971 to the issuance of the amended possession-only license in 1976 was called "Mothballing," and was governed by contemporary NRC regulations and guidance. The NSS was maintained in this condition until 2006, including the periods 1981 – 1994 when it was chartered to the state of South Carolina for public display at the Patriots Point Naval and Maritime Museum in Mount Pleasant, SC (near Charleston), and 1994 – 2006 when it was retained in the agency's James River Reserve Fleet, near Newport News, VA.

NRC regulations require that nuclear power reactors complete decommissioning (including license termination, if applicable) within 60 years of permanent cessation of operations. For the NSS, this 60-year date is November 2031. When MARAD mothballed the NSS in the mid-1970's, the agency's contemporary decommissioning plans envisioned a lay-up period of approximately 50 years before dismantlement and license termination. Through the natural process of radioactive decay, this 50-year mothball period would reduce the inventory of radioactive material remaining throughout the plant, and permit decommissioning at a reduced exposure risk to workers, the environment and the public.

After the NSS was mothballed, MARAD's licensed activities were greatly reduced, and devolved principally to radiological monitoring and surveillance of the various restricted-area boundaries within the ship and its immediate surrounding environment. The licensee organization that managed the operations

of the ship was disbanded, and the reduced activities were undertaken on a collateral basis by individuals within the agency who had experience in the previous organization. From 1981 to 1994 while the ship was chartered to South Carolina, the day-to-day management of the license was subrogated to the state, which served as a co-licensee under amendments issued by the NRC. When the NSS reverted to sole MARAD possession in May 1994, the license was again managed on a collateral basis, and assigned to the few remaining employees who had direct and relevant NSS experience.

MARAD received two cited license violations from the NRC in early 2001; coupled with the events of 9-11, these violations prompted a thorough reassessment of the NSS facility into early 2002. In February 2002 the Maritime Administrator approved a program to further investigate the possibility of advancing the NSS decommissioning, in part to take advantage of nuclear industry developments and trends, and in part to reduce the perceived vulnerability of the NSS nuclear facilities to external attack. This program included several distinct parts, and was executed generally from 2003 to 2006. The program parts included; a) correcting the license violations issued in 2001; b) undertaking an environmental and radiological scoping survey of the ship and nuclear facilities; c) updating the circa 1970-75 decommissioning plans and assumptions; and d) undertaking a comprehensive review of MARAD's licensed operations and licensee performance as a precursor to decommissioning.

As part of (d) above, MARAD completed a regulatory self-assessment in 2005 that was shared with the NRC; in it, numerous deficiencies, non-conformities and non-compliances with contemporary NRC regulations, guidelines, programs and procedures were identified; the significance of these were assessed; and appropriate corrective actions identified. MARAD's greatly diminished competency as a nuclear licensee was principally the result of the collateral nature of the license management, and the virtually complete depletion of knowledgeable staff through a combination of retirements, transfers, and deaths. Since that time, MARAD has pursued an aggressive program to restore its licensee competency, and to complete the corrective actions identified to the NRC. A first step was the establishment of a dedicated license management organization, the *Savannah* Technical Staff, in 2005. Other steps included developing and submitting fundamental license basis documents and programs, such as a Quality Assurance Plan (submitted 2007), and an Updated Final Safety Analysis Report (submitted 2007); in addition, two (2) license amendments have been approved by the NRC (2007 and 2008) that substantially upgrade the license Technical Specifications, and bring NSS license management into conformance with contemporary standards and practices appropriate for a non-operating power plant.

As noted previously, the initial Mothballing of the NSS completed in 1976 was performed under contemporary NRC regulations and guidelines. Since that time the NRC has replaced the prescriptive Mothballing process with a more performance-based process called SAFSTOR. SAFSTOR is one of three decommissioning options described in the NRC Generic Environmental Impact Statement (GEIS) on the decommissioning of nuclear facilities (published in 1988, and supplemented in 2002), all with less than significant impacts; the others are DECON and ENTOMB (NRC 1988, 2002). In 2007 MARAD completed a comparative evaluation of Mothballing and SAFSTOR, with a particular emphasis on identifying the actions necessary to bring the NSS into compliance with contemporary SAFSTOR criteria. A SAFSTOR Plan was developed, and certain engineering and programmatic elements of the plan are being executed as part of MARAD's larger license compliance effort.

Proposed Action

MARAD's Proposed Action under NEPA is to decommission the NSS. The purpose of this federal action is to reevaluate the status of the NSS and to select the appropriate decommissioning option(s) for the vessel. The need for this action arises because the NSS facility does not comply with certain contemporary NRC requirements and decommissioning addresses these deficiencies. Therefore, MARAD is ready to consider decommissioning of the NSS, and has prepared an Environmental Assessment (EA) to evaluate the potential impacts from the proposed action.

DESCRIPTION OF ALTERNATIVES

To accomplish the decommissioning, MARAD considered several alternatives: DECON, SAFSTOR, ENTOMB, and the No Action alternative. Through initial analysis it was determined that the ENTOMB alternative does not meet the purpose and need for action. Briefly, the ENTOMB alternative is designed for facilities that contain large quantities of high-level radioactive wastes that must be segregated from the environment for long periods of time. An example of a facility that has undergone ENTOMB is the Chernobyl nuclear power plant in Russia. The ENTOMB process employs massive concrete barriers, and would be an excessive action on the NSS. The No Action alternative does not address the facility deficiencies identified by MARAD, and cannot, therefore, have practical consideration. It was retained in the analysis per NEPA requirements, however.

DECON Alternative

According to the NRC's guidance on decommissioning (2000), completing DECON means removing or decontaminating the equipment, structures, and portions of the facility and site that contain radioactive contaminants to achieve a level that permits termination of the license. Therefore, completing DECON on the NSS would effectively remove the remaining systems, structures and components that comprise the ship's nuclear power plant, including any remaining low-level radioactive materials. After NRC approval and license termination, this decommissioning alternative would allow MARAD to proceed with final disposition of the ship.

If the DECON alternative were selected, appropriate facilities would be selected to complete the work (including waste removal, transport, disposal). At that time, the appropriate site-specific environmental review will take place. Decommissioning of the NSS would be completed in accordance with NRC Regulatory Guide 1.184, Decommissioning of Nuclear Power Reactors. This action would permanently remove the remaining low-level radioactive material to levels that would permit the termination of the NSS' NRC license (license number NS-1, docket number 50-238).

If DECON is selected it will provide the vehicle for full regulatory compliance. DECON in the near-term can be accomplished at the lowest total cost during a period of mature and available industrial decommissioning capacity, and with at least two available Low Level Waster (LLW) disposal sites suitable for the full range of projected NSS waste.

SAFSTOR Alternative

The SAFSTOR decommissioning process places a facility in a safe, stable condition and maintains that state until the facility is subsequently decontaminated and dismantled to levels that permit license termination. The SAFSTOR process is required if a licensee elects to use any or all of the 60 years allowed between cessation of operations and license termination. During SAFSTOR, a facility is left substantially intact, but the fuel is removed from the reactor vessel and radioactive liquids are drained from systems and components and then processed. Radioactive decay occurs during the SAFSTOR period, thus reducing the levels of radioactivity in and on the material and potentially reducing the quantity of material that must be disposed of during decontamination and dismantlement. During the prolonged period of storage, the facility undergoes continued maintenance, security, and surveillance. Following the storage period, the facility would need to be decontaminated and dismantled to radiological levels that allow termination of the license. Activities during this last stage would be the same activities that occur for DECON (NRC 2002).

MARAD effectively completed many of the steps to prepare the vessel for SAFSTOR during its initial mothballing in 1975; however, the facility does not presently comply with current SAFSTOR criteria necessary for extended retention if the DECON alternative is not chosen (see discussion at the end of the

Background section above). To meet current NRC regulations for license termination (i.e., 2031), MARAD estimates a SAFSTOR retention period out to 2025. If SAFSTOR were selected, the NSS would be towed via an established maritime route to a layberth and a facility for subsequent decommissioning.

The amount of low-level radioactive material required to be removed under this alternative would be less than that is required under DECON. All activities for SAFSTOR would be accomplished in accordance with NRC regulations and guidelines. Current best practices include using *Multi-Agency Radiation Survey and Site Investigation Manual* for planning and evaluating compliance with NRC regulations. Any low-level radioactive material that is removed in compliance with SAFSTOR guidelines will be transported and disposed of as described under the DECON alternative.

Typical ongoing preventive and corrective maintenance activities would need to continue for the safe keeping of the NSS during SAFSTOR storage. These activities will take place at the vessel's retention site. Certain maintenance activities during the SAFSTOR period may need to be performed at industrial facilities, in which case the NSS would be towed to the appropriate port facility. Any maintenance completed would be performed according to NRC guidance and in compliance with all relevant regulations to protect safety and the environment.

The SAFSTOR alternative represents the minimum activity required for full compliance with all NRC license requirements. There are several advantages to selecting the SAFSTOR option of decommissioning at this time. Most predominantly, pursuing this action will bring the NSS up to current safety standards under NRC regulation. A SAFSTOR effort will also significantly improve the quality and capacity of MARAD to function as a competent and compliant licensee. The range of SAFSTOR activities identified is substantially a prerequisite to a full DECON effort, meaning that selection of SAFSTOR now does not preclude a later adjustment to DECON.

The significant disadvantages to implementing a full SAFSTOR program that defers license termination to 2031 include the substantial increase to the cost of DECON activities, with the introduction of cost uncertainties related to future industrial decommissioning capacity and LLW disposal site availability. This also requires MARAD to maintain a full licensee capability over the retention period, and defers the ultimate disposition of the ship.

No Action Alternative

As required by NEPA, the No Action alternative was analyzed in the document as the basis for comparison with the other alternatives. Under this alternative, the remaining low-level radioactive materials would not be removed from the NSS. The NSS would be returned and moored at the JRRF or similar anchorage until decommissioning can occur at a later date. Although previous monitoring, surveillance, security and radiological testing activities for the NSS would resume, the facility deficiencies identified during 2002-2006 would not be corrected, and MARAD would fail to remain compliant with the terms and conditions of its NRC license.

The No Action Alternative requires MARAD to maintain its NRC license, as well as to continue the regular maintenance and surveillance of the NSS. This alternative would allow MARAD the option to reconsider DECON, SAFSTOR and other options at a later date. However, under the No Action Alternative, MARAD would fail to comply with current NRC requirements for the safe keeping of nuclear facilities. Future decommissioning costs would be substantially increased, and non-compliance would likely result in increased frequency and scope of NRC inspections and oversight. Consequently, the No Action Alternative does not meet MARAD's purpose and need for action.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

As discussed in the EA, no significant adverse impacts are expected as a result of the alternatives. Based on the analysis, implementing the proposed action would produce minimal to negligible adverse

impacts to air quality, water quality, navigation, hazardous materials, public health and safety, socioeconomics and environmental justice, coastal resources, wildlife and vegetation, Section 106 resources and Section 4(f) resources (see table below). No significant cumulative impacts on the environment were found to occur through the interaction with other ongoing and proposed actions.

Impact Category	No Action Alternative	DECON Alternative	SAFSTOR Alternative
Air Quality	Minimal short-term adverse impacts	Minimal short-term adverse impacts	Minimal short-term adverse impacts
Water Quality	Minimal adverse impacts	Negligible adverse impacts	Minimal adverse impacts
Navigation	Negligible to no adverse impacts	Negligible to no adverse impacts	Negligible to no adverse impacts
Hazardous Materials	Minimal adverse impacts	Minor adverse impacts	Minimal adverse impacts
Public Health and Safety	Negligible adverse impacts	Minor adverse impacts	Negligible adverse impacts
Socioeconomics and Environmental Justice	No disproportionate impacts	No disproportionate impacts	No disproportionate impacts
Coastal Resources	Minimal adverse impacts	Minimal adverse impacts	Minimal adverse impacts
Wildlife and Vegetation	Minimal adverse impacts	Minimal adverse impacts	Minimal adverse impacts
Section 106 Resources	No impacts	Minor adverse impacts, potential beneficial impacts	Minimal adverse impacts
Section 4(f) Resources	No impacts	Minor adverse impacts, potential beneficial impacts	Minimal adverse impacts

Because no significant adverse impacts are foreseeable, no specific mitigation measures are required. Should the DECON or SAFSTOR alternative be selected for implementation by MARAD after the NEPA process is completed, best management procedures may be followed to minimize all adverse impacts during decommissioning. The potential for some adverse impacts to Section 106/110 and Section 4(f) resources has been identified in relation to the decommissioning work. MARAD is committed to considering and incorporating future preservation requirements for the NSS into its decommissioning efforts. Toward that end, MARAD has contracted with the National Park Service to conduct a documentation and recording project of the NSS nuclear facilities under the aegis of the Historic American Engineering Record (HAER). The HAER field surveys are scheduled for completion in June - August 2008, regardless of the decommissioning action eventually taken. Through continued consultation with the appropriate agencies, MARAD may identify other mitigation measures to pursue, such as the replacement of removed components with training replicas.

CONCLUSION AND APPROVAL

After careful and thorough consideration of the facts contained herein and in the EA, the undersigned finds that the proposed federal action is consistent with existing national environmental policies and

objectives set forth in Section 101(a) of the National Environmental Policy Act of 1969 (NEPA) and that it will not significantly affect the quality of the human environment or otherwise include any condition requiring consultation pursuant to Section 102(2)(c) of NEPA. Therefore, a Finding of No Significant Impact (FONSI) is warranted, and preparation of an Environmental Impact Statement, pursuant to NEPA is not required. This FONSI is based on the attached EA, which has been independently evaluated by MARAD and determined to adequately and accurately discuss the environmental issues and impacts of the proposed project. MARAD takes full responsibility for the accuracy, scope, and content of the attached EA.

David E. Yuska II — Reviewer
Environmental Specialist — Title
5/6/08 — Date

I have considered the information contained in the EA, which is the basis for this FONSI. Based on the information in the EA, and this FONSI document, I agree that the Proposed Action as described above, and in the EA, will have no significant impact on the environment.

Michael L. Carter — Authorizing Signature
Director Office of Environment — Title
5/6/08 — Date

No Legal Objection:

Elizabeth R. Megginson, Chief Counsel