



U.S. Environmental Protection Agency



U.S. Maritime Administration

This document is one section from the “National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs,” published in May 2006. The reference number is EPA 842-B-06-002. You can find the entire document at <http://www.epa.gov/owow/oceans/habitat/artificialreefs/index.html>.

National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs

Introduction

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INTRODUCTION

Several options exist for managing obsolete and decommissioned military and commercial vessels. These options include re-use of the vessel or parts of the vessel, recycling or scrapping, creating artificial reefs, and disposal on land or at sea. This document discusses the vessel management option of artificial reefing. This guidance document was developed to satisfy the mandate of Section 3516 of the National Defense Authorization Act for Fiscal Year 2004, which requires that the Maritime Administration (MARAD) and the U.S. Environmental Protection Agency (EPA) jointly develop guidance recommending environmental best management practices (BMPs) to be used in the preparation of vessels for use as artificial reefs. It also responds to MARAD's request for the EPA to provide national environmentally-based best management practices for the preparation of vessels to be sunk with the intention of creating artificial reefs in permitted artificial reef construction areas.

An interagency workgroup, chaired by EPA, was established to develop the BMPs. The workgroup included representatives from the EPA, U.S. Coast Guard, U.S. Navy, MARAD, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service.

Although these best management practices are intended for use when preparing vessels to serve as artificial reef habitat, such best management practices may have applicability to other in-water uses of vessels, such as the creation of recreational diving opportunities. The best management practices presented in this document should be implemented for all permitted in-water uses of vessels; further diver safety preparations may be needed based on the intended in-water use, such as recreational diving.

Objectives of the Guidance Document

The BMPs, jointly developed by EPA and MARAD, are to serve as national guidance for federal agencies for the preparation of vessels for use as artificial reefs. Section 3516 of the National Defense Authorization Act for Fiscal Year 2004 provides that the BMPs are to (1) ensure that vessels prepared for use as artificial reefs "will be environmentally sound in their use as artificial reefs"; (2) "promote consistent use of such practices nationwide"; (3) "provide a basis for estimating the costs associated with the preparation of vessels for use as artificial reefs"; and (4) include measures that will "enhance the utility of the Artificial Reefing Program of the Maritime Administration as an option for the disposal of obsolete vessels." Appendix A provides further detail on Section 3516 and MARAD's authority to transfer obsolete vessels for artificial reefing. Below is a description of how this document addresses the four requirements of the statute.

- The use of this guidance will help ensure that vessels prepared for use as artificial reefs "will be environmentally sound in their use as artificial reefs." For each material of concern identified, this document provides a narrative clean-up performance goal and information on methods for addressing those goals in preparation of the vessel prior to sinking. The preparation of vessels in this manner will help ensure that their use as artificial reefs is environmentally sound. The purpose of creating an artificial reef is to benefit the environment by enhancing aquatic habitat and marine resources, as well as

providing an additional option for conserving, managing, and/or developing fisheries resources. This document describes appropriate vessel preparation that could achieve such benefits as an artificial reef and avoid negatively impacting the environment with pollutants. The narrative clean-up performance goals provided in this document, if implemented and complemented with strategic site selection (siting), will maximize the opportunity for these vessels to benefit the environment as artificial reefs.

- The use of this guidance document will “promote consistent use of such practices nationwide” and in turn will also provide measures that will “enhance the utility of the Artificial Reefing Program of the Maritime Administration as an option for the disposal of obsolete vessels.” The best management practices described in this document serve as national guidance for the preparation of vessels for use as artificial reefs. As the use of vessels as artificial reefs is becoming a more common management option for obsolete vessels, the development of this guidance document is timely. Currently, no guidance of this kind is available. The use of this guidance document can enhance the utility of MARAD’s Artificial Reefing Program, by establishing a national approach to cleaning and preparing candidate obsolete vessels, while also promoting consistent use of such practices for vessel-to-reef projects.
- The use of this document will “provide a basis for estimating the costs associated with the preparation of vessels for use as artificial reefs.” Although the best management practices were developed independent of costs associated with clean-up, the narrative clean-up performance goals in this document can be used as a basis for estimating the cost for appropriate vessel preparation. In order to determine the estimated cost to prepare a specific vessel for use as an artificial reef, the narrative clean-up performance goals, along with the vessel preparation BMPs, can be used to scope the volume of work to be accomplished based on a detailed ship-check and implementation of a representative PCB sampling protocol. There is wide variability of ships and associated kinds and amounts of material found on a particular ship, as well as wide variability of remediation and disposal costs in different geographic locations within the U.S. Therefore, it is not possible to provide in this document representative cost estimates associated with the preparation of a ship for reefing. A reasoned estimate of the actual cost of preparation will require a ship-by-ship analysis.

In order to provide some insight into the costs that have been incurred for vessel-to-reef projects, some pertinent vessel-specific information is provided here. Two recent examples of vessels that have been prepared with the intent of serving as artificial reefs are the ex-USS Spiegel Grove and the ex-USS Oriskany. The total cost of reefing the ex-USS Spiegel Grove, which was a MARAD vessel, was \$1.3 million.¹ This total cost includes costs for both vessel clean-up/preparation, as well as costs other than vessel clean-up/preparation. Details of the project cost estimates are presented in Exhibit 2. Vessel specifications for the ex-USS Spiegel Grove are presented in Exhibit 3. The ex-USS Spiegel Grove was cleaned/prepared prior to the availability of the BMPs presented in this document. Further information regarding the ex-USS Spiegel Grove can be found

¹ Communication between Captain Spencer Slate, ex-USS Spiegel Grove vessel-to-reef project co-manager, and Laura S. Johnson, EPA.

at <http://www.fla-keys.com/spiegelgrove/>.

Exhibit 2. Ex-USS Spiegel Grove Total Project Costs

PCB sampling protocol and removal	\$75,000
Reorienting the vessel	\$550,000
Towing and berthing	\$125,000
Other clean-up and scuttling preparation and execution	\$550,000
Ship clean-up time	7 months
Project duration	8 years

Exhibit 3. Ex-USS Spiegel Grove Vessel Specifications

Type of vessel	Landing Ship Dock (LSD)
Overall length	510 feet
Extreme beam	84 feet
Keel date	Sept. 7, 1954
Launch date	Nov. 10, 1955
Decommission date	Oct. 2, 1989
Location of reefed vessel	6 miles off the Florida Keys in the Florida Keys National Marine Sanctuary



Photo courtesy of Andy Newman
Ex-USS Spiegel Grove, once a MARAD vessel, under way to Florida Keys for final sinking preparations.

The total cost of reefing the ex-USS Oriskany, which is a Navy vessel, was \$15.63 million. This total cost includes costs for both vessel clean-up/preparation, as well as costs other than vessel clean-up/preparation. Details of the project cost estimates are presented in Exhibit 4. As noted later in this document, the Navy is required to clean/prepare vessels intended for use as artificial reefs in accordance with this BMP guidance. The Draft BMP guidance was available for the ex-USS Oriskany vessel clean-up/preparation. Vessel specifications for the ex-USS Oriskany are presented in Exhibit 5. Further information regarding the ex-USS Oriskany can be found at <http://peos.crane.navy.mil/reefing/oriskany.htm>.

Exhibit 4. Ex-USS Oriskany Total Project Costs

Ship remediation (BMP-related)	\$8.28M
Flight deck remediation (BMP-related)	\$3.61M
PCB model and risk assessment development (BMP-related)	\$3.74M
Towing and berthing	\$3.07M
Scuttling preparation and execution	\$4.90M
Ship clean-up time	12 months
Project duration	3 years (FY03 through FY06)

Exhibit 5. Ex-USS Oriskany Vessel Specifications

Type of vessel	Essex Class aircraft carrier (CV-34)
Overall length	911 ft
Extreme beam	107 ft
Keel date	May 1, 1944
Launch date	Oct. 13, 1945
Decommission date	Sept. 30, 1976
Location designated for reefing this vessel	23 miles south off Pensacola, Florida



Photo courtesy of U.S. Navy

Ex-USS Oriskany arriving at NAS Pensacola, Florida. March 23, 2006.

If the narrative clean-up goals provided in this document cannot be economically achieved, for example because of very significant amounts of materials of concern on the vessel, then the vessel would not be a good candidate for reefing. The methods, approach, and level of effort for clean-up, as well as worker safety concerns, are directly dependent on the vessel's condition and the amount of materials of environmental concern that are found aboard. Vessels where clean-up could pose potential worker safety risks or could incur high costs may not be good candidate vessels for reefing.²

Some portions of a candidate vessel may be economically salvageable. Any such salvage operations should occur in a manner that will minimize debris and contamination with oils or other products that have to be cleaned up at a later date. This activity should allow for improved access for subsequent clean-up efforts, and the salvage proceeds may help offset some costs for vessel preparation.

Operations associated with salvage, clean-up, and diver access have the potential to adversely impact vessel stability. Failure to consider the impact of these activities on vessel stability before and during scuttling operations could result in premature and uncontrolled capsizing and/or sinking of the vessel. Therefore, vessel stability considerations should be an integral part of the salvage, clean-up, modification (for diver access), transport, and sinking plans of a vessel-to-reef project.

² The BMP guidance does not address worker safety issues. Readers with an interest in such safety issues and concerns should consult other relevant documents, such as those prepared by OSHA, State or local safety agencies, and other relevant EPA documents. For example, EPA's *A Guide for Ship Scrappers – Tips for Regulatory Compliance* presents important information related to environmental and worker safety and health issues for ship scrapping/ship breaking operations when handling specific hazardous materials. This document can be accessed via the World Wide Web at <http://www.epa.gov/oecaerth/resources/publications/civil/federal/shipscrapguide.pdf>.



Photo courtesy of U.S. Navy

Metal recovery and salvage operations onboard the ex-USS Oriskany while being cleaned.

In the process of preparing a vessel for reefing, there are requirements and regulations, including permit processes, appropriate disposal of waste generated during vessel clean-up/preparation, and vessel inspections by appropriate authorities to consider that are not discussed in great detail in this document, with the exception of TSCA requirements applicable to PCBs. Appendix B does provide, however, an overview of principal federal environmental statutes potentially affecting preparation or placement of a vessel for use as an artificial reef. Further, other than siting considerations that would affect how a vessel is prepared for use as an artificial reef, this document does not detail the legal requirements applicable to transfer, siting, or sinking of vessels as artificial reefs in vessel-to-reef projects, except for the overview offered in Appendix B. The information in Appendix B is intended only for the convenience of the reader in order to provide a useful starting point for identifying the principal environmental statutes of interest. On a case-by-case basis, additional federal statutes also may apply, though the federal statutes identified in Appendix B would be most relevant for the preparation of a vessel for use as an artificial reef. The final preparation plan for any particular artificial reef project will necessarily be vessel-specific, and will depend on the characteristics of the vessel and final permitted artificial reef construction site, as well as regulatory considerations. In addition, State and local laws also may apply to vessel preparation, but the document does not attempt to identify such laws in Appendix B.

This guidance identifies materials or categories of materials of concern that may be present aboard vessels, indicates where these materials may be found, and describes their potential adverse impacts if released into the marine environment (Appendix C provides related information). The materials of concern include, but are not limited to: fuels and oil, asbestos, polychlorinated biphenyls (PCBs), paints, debris (e.g., vessel debris, floatables, introduced material), and other materials of environmental concern (e.g., mercury, refrigerants). With the

exception of materials containing PCBs, this document does not comprehensively discuss applicable legal requirements, although those requirements that are directly applicable to vessel preparation must also be met prior to vessel sinking and placement. Because the best management practices described in this document are directed at the environmental concerns associated with using vessels as artificial reefs, other sources of information should also be used with regard to preparation of the vessel from a diver safety perspective or for any other potential in-water uses.

A detailed description and characterization of the potential sources of contamination from a vessel intended for use as an artificial reef should be conducted and a plan developed. The purpose of this plan is to assure that materials potentially contributing to pollution of the marine environment are addressed. Appendix D of this document presents information regarding the development of workplans; Appendix E provides information regarding general principles for clean-up operations.

When preparing a vessel that is intended to serve as an artificial reef, documenting the clean-up procedures used and the contaminants that will remain onboard the vessel is a key element of the BMPs. More specifically, a description of how the BMP narrative clean-up performance goals were achieved, and a visual inspection, are needed to determine whether and how the vessel has been cleaned to the level recommended in this guidance document so the vessel can be managed appropriately. A recommended checklist for documenting vessel clean-up using this guidance can be found in Appendix F. A vessel inspection by qualified personnel should be conducted to confirm satisfactory clean-up/preparation. It also should be noted that applicable regulatory regimes may require such an inspection.

Achieving and verifying satisfaction of the BMP clean-up goals could help support permit applications under the Clean Water Act Section 404 (33 U.S.C. 1344) or Rivers and Harbors Act Section 10 (33 U.S.C. 403), if a permit application is submitted to the U.S. Army Corps of Engineers. Further, robust BMP documentation might prove useful for demonstrating consistency with Coastal Zone Management Act programs (16 U.S.C. 1452, et seq.), as well as for any other State or local certifications necessary to carry out a vessel-to-reef project. Also, EPA officials may find BMP documentation useful as part of their review under EPA certification authority pursuant to the Liberty Ship Act. (Note: this Act only applies to DOT/MARAD-owned obsolete vessels intended for use as an artificial reef for the conservation of marine life.)

This guidance does not substitute for any statute or regulation, nor is it a regulation itself. The document recommends environmental best management practices for use in the preparation of vessels for use as artificial reefs. Associated with the recommended environmental best management practices are narrative environmental clean-up performance goals, as well as recommendations and suggestions in furtherance of those goals. By its terms, the guidance itself does not impose binding requirements on any federal agency, States, other regulatory or resource management authorities, or any other entity. Among other things, the document includes mechanisms to enhance the utility of the Artificial Reefing Program of the Maritime Administration as an option for the disposal of obsolete vessels. It should be noted that under 10 U.S.C. 7306b(c), the Secretary of the Navy must ensure that the preparation of a vessel (that is stricken from the Naval Vessel Register) for use as an artificial reef is conducted in accordance

with the environmental best management practices in this guidance. This latter statutory requirement, not today's guidance document itself, governs the Navy's application and use of this document.

Organization of this Guidance Document

This document describes guidelines for the preparation of vessels in a manner that will help ensure that the marine environment will benefit from their use as artificial reefs. Strategic siting is an essential component of a successful artificial reef project. Before the discussion of vessel preparation is presented, a cursory description of reef site selection recommendations is provided.

For each material or category of material of concern identified, this document provides a narrative clean-up performance goal and information on methods for addressing those goals in preparation of the vessel prior to sinking. Additional information for each material includes a description of its shipboard use and where it may be found on a vessel, as well as its expected impacts if released into the marine environment.

Although the best management practices presented in this document are intended for use when preparing a vessel to serve as artificial reef habitat, it is recommended that these best management practices be implemented for other in-water uses of vessels such as recreational diving. This potential obsolete vessel management option is briefly described in this document.