



**A REPORT TO CONGRESS  
ON THE  
PROGRAM FOR SCRAPPING OBSOLETE  
NATIONAL DEFENSE RESERVE FLEET VESSELS**



**U.S. DEPARTMENT OF TRANSPORTATION  
Maritime Administration**

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**OBSOLETE NDRF VESSELS – CUSTODY, ALTERNATIVES AND COSTS**

**I. INTRODUCTION**

The Department of Transportation Maritime Administration (MARAD) submits this Report on the Program for Scrapping of Obsolete Vessels pursuant to Section 3502 of the Appendix to Public Law 106-398, The National Defense Authorization Act of 2001, enacted October 30, 2000 (the Act). The Act requires MARAD by September 30, 2006, to dispose of all vessels in the National Defense Reserve Fleet (NDRF) that are not assigned to the Ready Reserve Force or otherwise designated for a specific purpose:

*...in the manner that provides the best value to the Government, except in any case in which obtaining the best value would require towing a vessel and such towing poses a serious threat to the environment; and...through qualified scrapping facilities, using the most expeditious scrapping methodology and location practicable. Scrapping facilities shall be selected... on a best value basis consistent with the Federal Acquisition Regulation, as in effect on the date of the enactment of this Act, without any predisposition toward foreign or domestic facilities taking into consideration, among other things, the ability of facilities to scrap vessels--*

- (1) at least cost to the Government;*
- (2) in a timely manner;*
- (3) giving consideration to worker safety and the environment; and*

*(4) in a manner that minimizes the geographic distance that a vessel must be towed when towing a vessel poses a serious threat to the environment.*

Section 3502 (d)(1) of the Act requires MARAD, in consultation with the Secretary of the Navy (Navy) and the Administrator of the Environmental Protection Agency (EPA), to (a) develop a program for the scrapping of obsolete NDRF vessels; and, (b) submit a report on the program to Congress within six months after the date of enactment. Section 3502 (d)(2) of the Act further requires that the contents of the report include

*...the initial determination of scrapping capacity, both domestically and abroad, appropriate proposed regulations to implement the program, funding and staffing requirements, milestone dates for the disposal of each obsolete vessel, and long term cost estimates for the program...and shall consider all alternatives and available information, including—(A) alternative scrapping sites; (B) vessel donations; (C) sinking of vessels in deep water; (D) sinking vessels for development of artificial reefs; (E) sales of vessels before they become obsolete; (F) results from the Navy Ship Disposal Program under Section 8124 of the Department of Defense Appropriations Act, 1999; and (G) the Report of The Department of Defense Interagency Panel on Ship Scrapping issued in April 1998.*

In accordance with the Act's requirements, this report reflects the development of the program for the scrapping of obsolete NDRF vessels and the consideration of requisite alternatives and information. It includes the strategy to:

- (1) award fixed price contracts to the private sector for the scrapping of 140 obsolete vessels; and
- (2) transfer of 15 vessels to States for sinking as artificial fish reefs under Public Law 92-402, as amended, and donations pursuant to special legislation from Congress.

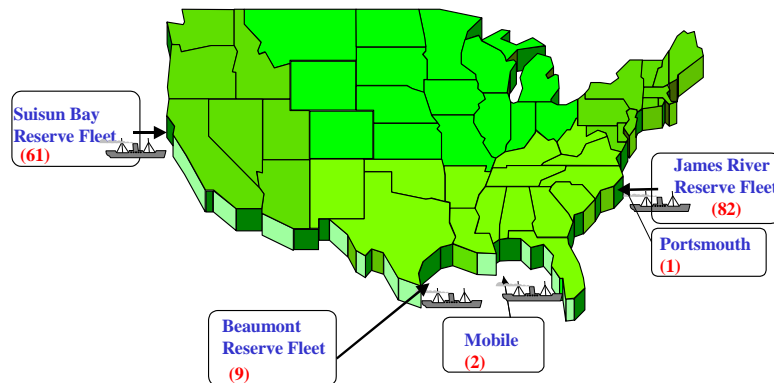
The disposal of the obsolete ships in the NDRF is one of the Department of Transportation's major management challenges. The General Accounting Office, in its January 2001 report to Congress on Major Management Challenges and Program Risks in the Department, indicated

that “the growing backlog of MARAD’s surplus ships awaiting disposal poses environmental threats and leads to continuing costs for storage, maintenance and security.” It also indicated that “if done improperly, ship scrapping can pollute the land and water surrounding the scrapping site and jeopardize the health and safety of the people involved in the scrapping process.”

Some of the vessels are in a state of advanced deterioration and the fleet sites are located in sensitive estuarine habitats, including wetlands, posing significant environmental risk and impact. Accelerated scrapping is needed to alleviate this risk. If the vessels are not disposed of in a timely manner, MARAD may need to begin drydocking the vessels to prevent environmental damage while they await disposal. Drydocking and fuel removal could cost \$900,000 or more per vessel.

**Background**

MARAD serves as the U.S. Government’s disposal agent for merchant type vessels of 1,500 gross tons or more [Federal Property and Administrative Services Act of 1949 (40 U.S.C. 484(i)]. Most of the ships scheduled for disposal are located at MARAD’s three anchorages: the James River near Ft. Eustis, Virginia (JRRF); Beaumont, Texas (BRF); and Suisun Bay near Benicia, California (SBRF). The following map shows the number of non-retention or obsolete ships that MARAD anticipates disposing from each NDRF anchorage by September 30, 2006.



Until 1994, the MARAD ship scrapping program was largely a sales program through which vessels were removed from the fleet sites on a regular basis. Ships were sold "as is/where is" to the highest bidder, generally an overseas entity. The sale of vessels for overseas scrapping was curtailed in 1994 because of concerns raised by the EPA regarding the discovery of Polychlorinated Biphenyls (PCBs) in various shipboard components. Section 6(e)(3) of the Toxic Substances Control Act (TSCA) and EPA's implementing regulations prohibit the processing or distribution in commerce (including export) of material from the United States with PCB concentrations equal to or greater than 50 parts per million (ppm). Most of the obsolete NDRF vessels contain PCBs in concentrations above 50 ppm.

With overseas sales curtailed in 1994 and halted in 1998 as a result of the Federal Government's moratorium on overseas ship scrapping, MARAD turned exclusively to the domestic market to sell ships for scrapping. However, only a few domestic facilities showed an interest in purchasing the vessels for scrapping. Since 1994, MARAD has sold 22 vessels, only eight of which have been scrapped. The purchasers did not accept the remaining vessels and most of the sales contracts were terminated. Key factors were the marginal profits stemming from ship scrapping, which were influenced by the constantly changing market prices for scrap metal versus the costs for removal and disposal of hazardous material.

MARAD continues to consult with EPA regarding the possibility of revitalizing a 1997 Agreement for overseas scrapping, subject to certain conditions. However, export at this time would require at a minimum the removal of **all** regulated PCBs, which may not be possible without dismantling portions of the vessel, as well as prior notice to and consent by the importing country.

Until October 2000, MARAD was prohibited by statute from paying for scrapping services. On October 30, 2000, Public Law 106-259 appropriated \$10 million for the accelerated scrapping of the vessels in worst condition. This was done in response to oil spills that required the removal of fuel on three vessels at a cost of over \$2.4 million. On December 6, 2000, under the urgent and compelling provisions of the Federal Acquisition Regulation (FAR), a \$1.6 million contract was awarded to scrap one vessel (BUILDER) because its deteriorated hull had started to leak.

Additionally, because of the urgent need to scrap some of the worst vessels, a prequalified commercial entity (General Agent) was tasked by MARAD to acquire ship scrapping services for FY 2001. The General Agent coordinates and contracts, through regular commercial procedures, with shipyards and shipbreakers for the scrapping of ships. Through the General Agent, it is expected that contracts for scrapping at least three vessels will be awarded in FY 2001. The assignment to the General Agent has options for additional vessels, subject to the availability of funds. Bids in response to the General Agent's Request for Proposal were submitted on April 27, 2001. Contract awards are expected in May 2001.

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## II. SHIP SCRAPPING PROGRAM DEVELOPMENT

In developing the ship scrapping program, the primary goal was to meet the statutory requirement to dispose of the vessels by September 30, 2006. Thus, a total of 140 ships are slated for scrapping. MARAD proposes a phased approach to scrapping awards and level-loading (an equal number of ships per year) the scrapping of the vessels during the FY 2003-2006 period. This approach permits MARAD to further refine cost estimates as additional data specific to merchant-type vessels is collected during the remainder of FY 2001 and FY 2002. It also allows sufficient time to develop acceptable standards for overseas scrapping and overall standards for artificial fish reefs. If the planned schedule were accomplished, long-term disposal needs would be reduced to approximately six ships per year after September 2006.

MARAD will solicit fixed price proposals from the private sector for the scrapping of ships. The contractor(s) will provide all scrapping services inclusive of personnel, equipment, tools, vehicles, materials, facilities, and other items and services necessary to tow, dismantle and dispose of the ships. During the first phase of the ship scrapping program (FY 2001- FY 2002), plans are to competitively award contracts for the scrapping of at least four of the worst condition vessels located in the JRRF site each year. The acquisition may be geographically restricted when a distant tow of the vessel would pose a serious potential environmental threat. During the second phase (FY 2003-FY 2006), competitive awards will be made subject to appropriations. With the exception of technical considerations, the program is unrestricted, allowing both domestic and foreign facilities to compete within the constraints set forth in FAR subpart 25.7, Prohibited Sources. The following discussion specifically addresses how the ship scrapping program will comply with the provisions set forth in Section 3502 (a) and (b) of the Act regarding scrapping facilities and best value to the Government.

### **Selection of Qualified Scrapping Facilities**

Qualified scrapping facilities will be determined based on the bidders' submissions in response to a Request for Proposal (RFP). The formal source selection will be conducted to make best value determinations and select the bidders in accordance with the provisions of FAR, the Transportation Acquisition Regulation (TAR), and the Transportation Acquisition Manual (TAM).

### **Consideration of Worker Safety and the Environment**

Appropriate safety and environmental protection measures are critical because ship scrapping is inherently dangerous and dirty. At this time, because of the international uncertainty surrounding these issues and the Act's requirement that there be no predisposition to domestic or foreign facilities, MARAD has concluded that in order to protect the environment and workers adequately, adherence to technical requirements based on identifiable U.S. standards is necessary.

Performance standards will require compliance with all United States statutes and regulations, regardless of where the vessels are scrapped. However, efforts to develop internationally acceptable standards will continue to be pursued. Once such standards are available, MARAD will implement modifications to its program. The complex multiple environmental and worker safety issues will be discussed further in the Other Alternatives and Information section of this report.

Each bidder will be required to submit a Safety and Health Management Plan and an Environmental Management Plan. Also, the scrapping facility will be responsible for compliance with all U.S. statutory and regulatory requirements including, but not limited to the:

- Toxic Substances Control Act of 1986, 15 U.S.C. §§ 2601-2629 (Act of October 11, 1976, 90 Stat.2003) [TSCA];
- Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901-6992k (Act of October 21, 1976, 90 Stat. 2795, as amended) [RCRA];
- Occupational Safety and Health Act of 1970 (29 U.S.C. §§ 651-678) Act of December 29, 1970, 84 Stat. 1590, as amended )[OSHAct]; and,
- international laws, treaties, conventions and agreements, as appropriate.

MARAD will make the proper award notifications to the EPA and OSHA in accordance with the Memorandum of Agreement (MOA) on Interagency Coordination and Cooperation for Ship Scrapping.

### **Expeditious Scrapping Methodology and Location**

Slightly more than 30 vessels will need to be scrapped per year between FY 2003 and FY 2006 to meet the goal of scrapping 140 vessels by the statutorily imposed deadline. Historical data indicates that the average disposal time per vessel is approximately six to seven months. Therefore, MARAD intends to use qualified contractors with the capability of scrapping a minimum of three vessels per year. In addition, prompt removal of vessels from the fleet sites (within 30 days of award) will be necessary in order to insure disposal in “a timely manner” as required by the statute.

Due to the location of obsolete NDRF vessels in three fleet sites, multiple scrapping facilities will be selected to expedite scrapping of the vessels. Vessels will be divided into Lot 1 (East Coast), Lot 2 (Gulf Coast) and Lot 3 (West Coast). Bidders submitting proposals for multiple lots must submit proposals for each lot bid.

### **Best Value Basis Consistent with the Federal Acquisition Regulation**

The factors for best value components in the acquisition for ship scrapping services are: technically acceptable plans, schedule, price and past performance. Given these best value considerations and because the technical aspects of the bidders’ operations, environmental, as well as safety and health management plans, are complicated and critical to the evaluation, it is essential to hold discussions. Therefore, a negotiated acquisition is appropriate. In addition, it provides the opportunity for MARAD and potential contractors to have a meaningful exchange regarding critical selection factors, such as scrapping schedule and past performance.

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## **No Predisposition toward Foreign or Domestic Facilities and Impact of Towing**

Specific common contract requirements that are consistent with prevailing U.S. worker safety and environmental standards will be stipulated in order that no predisposition for selection between U.S. and foreign facilities occurs. However, due to the severely deteriorated condition primarily of the Lot 1 (East Coast) vessels, it is anticipated that some vessels may be geographically restricted. This restriction limits the distance that the vessel may be towed because “towing the vessel could pose a serious threat to the environment.” This restriction is consistent with the Act.

### **Least Cost to the Government**

Available cost/pricing data indicate that the cost of scrapping a vessel ranges from \$1.5 million to \$5 million in part due to differing size, condition, and anticipated scrap value of recyclable metals and materials. Based on this data, it is expected that awards will average \$2.5 million per vessel (over the five-year period), with awards in the outyears of the program reduced through the realization of economies of scale. Scrapping costs are also dependent upon the scrapping methodology used, the location of the scrapping facility, the availability of trained labor and certified abatement facilities, and economies of scale savings for multiple awards.

The contract type MARAD intends to utilize is an Indefinite Delivery/Indefinite Quantity, Fixed Price contract award, under which each facility selected will receive a minimum award of one vessel for dismantling. Additional task orders will be competitively awarded among the facilities/contractors selected for each Lot, subject to availability of funds.

## **INITIAL DETERMINATION OF SCRAPPING CAPACITY**

### **Domestic Scrapping Capacity**

MARAD evaluated domestic capacity at both shipbuilding/repair yards and traditional shipbreaking yards (primarily located in Brownsville, Texas) to determine whether capacity is sufficient to meet program needs. An industry survey indicates that there are at least 12 domestic facilities capable of providing the services, to varying degrees. There are four East Coast facilities that indicated they can scrap 22 ships per year, six Gulf Coast facilities that can scrap 32 ships per year, and two West Coast facilities that can scrap 19 ships per year. Some of these facilities are involved in the Navy’s Ship Disposal Project under which the Navy plans to scrap an average of six ships per year through 2004.

In February 2001, the President of the Shipbuilders Council of America indicated that “the domestic capacity and expertise already exists to dismantle all of the surplus vessels in MARAD’s custody within a five-year period.” According to some shipyards, their interest is dependent, in part, on some continuity of work. The assignment of more than one or two ships to a facility is necessary to justify the capital and labor costs required to integrate scrapping into normal shipyard activities. Moreover, a regular supply of vessels should allow for long-term cost savings as shipyards become more experienced at scrapping.



**Foreign Scrapping Capacity**

There is significant shipbreaking capacity in the global market. The foreign ship scrapping industry is flourishing with major operations in China and the Indian sub-continent. Approximately 700 ships are scrapped annually throughout the world. As shown in the following table, in 1998, India, Bangladesh, Pakistan and China scrapped over 85 percent or over 21.2 million tons of the world’s vessel tonnage scrapped.

<b>MAJOR SHIPBREAKING NATIONS * TONNAGE SCRAPPED</b>						
	<b>1996</b>		<b>1997</b>		<b>1998</b>	
	Tons (millions)	World Tonnage %	Tons (millions)	World Tonnage %	Tons (millions)	World Tonnage %
<b>China</b>	0.2	1.1	0.2	1.2	2.0	8.2
<b>Pakistan</b>	2.0	11.2	0.8	5.2	3.4	13.9
<b>Bangladesh</b>	4.4	24.7	2.9	19.0	5.8	23.7
<b>India</b>	8.9	50.0	7.6	49.7	10.0	40.8

\* Mexico, because of its close proximity to the U.S., may also provide capacity for scrapping vessels, although it is not one of the major shipbreaking nations. The largest Mexican ship breaking facility (Demeresa) was founded in 1982. The yard capacity is 5,000 – 6,000 tons per month. Annual capacity is approximately 10 ships per year.

**PROPOSED REGULATIONS TO IMPLEMENT PROGRAM**

No MARAD regulations are anticipated to be necessary to implement the proposed program. However, there are three principal federal statutes that affect ship scrapping that require consideration – Occupational Safety and Health Act of 1970 (OSHAct), Resource Conservation and Recovery Act of 1976 (RCRA) and Toxic Substances and Control Act of 1986 (TSCA).

The OSHAct and implementing regulations govern workplace worker health and safety protections. When implemented and enforced, these measures provide significant protection to workers engaged in ship scrapping. In terms of ship scrapping operations, the primary rules include those governing asbestos, confined spaces and enclosed spaces (in shipyard facilities), and personal protective equipment. MARAD does not believe that changes to the OSHAct or its regulations are necessary to implement this program.

RCRA and implementing regulations govern the handling, management, transport, and disposal of hazardous and solid wastes. When properly implemented and enforced, RCRA protects the environment from uncontrolled releases of hazardous wastes. With respect to exporting vessels for scrapping, RCRA prohibits the export of hazardous waste before the exporter: (1) notifies the importing country; (2) receives the importing country’s consent to accept the waste; (3) attaches a copy of the importing country’s written consent to the shipment; (4) meets with EPA’s reporting requirements; and (5) where a valid international agreement regarding hazardous waste

exports exists between the U.S. and the receiving country, the shipments must conform with the terms of that agreement. MARAD does not believe that any changes to RCRA are necessary at this time for implementing this program.

TSCA governs a number of activities related to various specific toxic substances, most importantly, PCBs. TSCA currently bans the distribution in commerce of PCBs in certain quantities and that ban is applicable to the export of vessels for disposal because PCBs can be found in shipboard systems. In order for MARAD to pursue export of any vessels, three basic options exist for consideration: (1) remove all regulated PCBs from the vessels, (2) exercise EPA's enforcement discretion, or (3) modify TSCA or otherwise provide MARAD an exemption with respect to current law.

*Note: Modifying TSCA does not ensure that overseas scrapping can occur. Other external barriers based upon international treaties, agreements and policies, as well as RCRA and TSCA notification requirements and importing country acceptance, could prove difficult to overcome.*

## **FUNDING AND STAFFING REQUIREMENTS**

### **Funding Requirements**

Based on information from available sources, current experience through the Navy's Ship Disposal Project (NSDP) and MARAD's scrap award for the BUILDER, the cost for domestic dismantling will likely range from \$240-\$440 per ton or an average of \$2.5 million per ship. In order to achieve this average, competition must be maximized. As stated earlier in this report, scrapping costs are dependent upon the scrapping methodology used, the location of the scrapping facility and the availability of trained labor and certified abatement facilities, economies of scale savings for multiple awards, and offsets from the sale of reusables.

The NSDP reflects that the average contract cost at completion of the first four ships was \$1,150 per ton, offset by average scrap metal proceeds of \$130 per ton. FY 2000 awards averaged \$1,015 per ton (offsets for these awards have not been established). The FY 2001 task order awards translate to unit cost of between \$500-\$900 per ton, depending on the type of ship being scrapped and the contractor's price.

Warships, such as the guided missile frigates that were part of the NSDP, are compartmentalized for damage control and security purposes, and these compartments are, for the most part, loaded with equipment served by communication and power lines. Merchant vessels, in contrast, are larger vessels, and with the exception of the engineering spaces, are comprised of large open spaces designed for cargo carriage, which makes them easier to dismantle.

The cost of the MARAD FY 2001 negotiated contract award for the obsolete merchant vessel BUILDER was \$226 per ton. However, this cost is not considered representative of all future scrapping costs, because the contractor is using a dredged dismantling slip rather than the considerably more expensive drydock or graving dock. In addition, the location of the

contractor's facility provides access to lower cost labor and less costly abatement processes. Geographical locations of facilities will impact costs because of variances in state and local environmental requirements and labor costs. For example, responsive bids for the BUILDER, from entities planning to dispose of the vessel in different geographical locations, ranged from \$219 per ton to \$715 per ton.

The current MARAD cost projection of an average of \$2.5 million per ship is approximately \$340 per ton based on the average tonnage of the vessels in the NDRF slated for disposal (7,400 tons). However, the specific size and complexity of the vessel, location of the scrapping site, and the timing of scrapping play a large role in the cost per ton to dismantle it.

**Staffing Requirements**

Using the Navy Ship Disposal Project’s best practices, MARAD would establish oversight teams. These teams would ensure contractor compliance with statutory worker and environmental protection requirements, as well as other contract provisions.

**MILESTONE DATES FOR DISPOSAL OF SHIPS**

The Appendix to this report shows the milestone dates for disposal of each vessel, based on its condition. Priorities for disposal include: the condition of the vessel hulls; the amount, type, and location of potential pollutants onboard; and the vessel spill history. The vessels will be continually monitored as the program is implemented, and Congress will be advised periodically of the progress in meeting the statutory deadline. The following table summarizes the location and fiscal year time frame for disposal of the vessels by September 30, 2006.

	VIRGINIA - LOT 1		TEXAS - LOT 2		CALIFORNIA - LOT 3		TOTAL		
YEAR	SHIPS	TONS	SHIPS	TONS	SHIPS	TONS	SHIPS	TONS	YEAR
2001	7	64,315	0	0	0	0	7	64,315	2001
2002	8	49,742	0	0	0	0	8	49,742	2002
2003	15	94,160	4	28,364	16	105,981	35	228,505	2003
2004	18	113,803	4	26,617	13	75,848	35	216,268	2004
2005	19	124,433	3	21,078	13	96,896	35	242,407	2005
2006	16	186,178	0	0	19	151,939	35	338,117	2006
	83	632,631	11	76,059	61	430,664	<b>155</b>	<b>1,139,354</b>	

**LONG TERM COST ESTIMATES**

After disposal of the 155 ships (140 for scrap and 15 for fish reefs and donations) by the end of September 2006, an annual scrapping rate of about 6 ships per year is expected. Because few ships will be scrapped beyond FY 2006, MARAD expects to lose the benefits of economies of scale and anticipates that scrapping costs will gradually increase to \$3-4 million per vessel.

Consideration of program funding levels should be factored against the cost of increasing maintenance on obsolete ships if environmentally responsible disposal cannot be achieved. The annual cost of maintaining a non-retention ship, excluding drydocking and fuel removal, in any of the NDRF fleet sites is \$20,000. If disposal is not achieved in the near term, the ships would require a 15-year drydocking cycle whereby ships, once drydocked, would be scheduled for another drydocking 15 years later. Because ships currently in the NDRF have not been drydocked for quite some time, it is assumed that they would all need to be drydocked within the next 10 years. The expected work includes towing to a facility, raising on the drydock, sand blasting the hull, repairing and coating the hull, fuel removal, and returning the ship to its fleet anchorage. The cost of an initial drydocking is estimated to be \$900,000, plus \$200,000 for fuel removal.

Continued long-term storage without removal of the most deteriorated vessels could have catastrophic results. Recent incidents that have threatened the environment and a description of remedial actions and costs are shown in the following table.

**RECENT UNANTICIPATED EXPENDITURES  
RELATING TO HULL FAILURES**

<b>Vessel</b>	<b>Year</b>	<b>Action</b>	<b>Cost</b>
Savannah	1996	Drydocking to preserve hull	\$800,000
Export Challenger	1998	Spill cleanup and fuel removal	\$1,400,000
Donner	2000	Spill cleanup and fuel removal	\$250,000
Builder	2000	Hull patch, tow, fuel removal	\$708,000

In response to increasing concern over environmental risks at the NDRF sites, especially the JRRF, due to oil spills and/or ships starting to take on water which could result in sinking, there have been significant capital improvements to mitigate this threat. After Hurricane Floyd caused extensive damage to the JRRF vessel moorings in September 1999, MARAD began the installation of a multi-year plate anchoring system to prevent vessel movement in heavy weather at a cost of \$2.3 million. When completed in three years, the new anchoring system should prevent a vessel with a deteriorated hull from surging excessively or breaking loose from its moorings and running aground in heavy weather.

Each fleet maintains an up-to-date emergency response plan and first response capability with sufficient oil boom capacity to provide early spill control to mitigate environmental contamination. United States Coast Guard (USCG) approved oil spill clean-up kits are also kept on all RRF vessels including those at NDRF fleets. MARAD has also adopted, in every practicable situation, the USCG national oil spill drill requirement “Preparedness for Response Exercise Program.” The JRRF has also procured pumps for on-site storage to permit timely

response to possible incidents. The JRRF is in the vicinity of Norfolk, Virginia, and has more than 75 percent of the “worst” vessels.

Although prevention and response capabilities have been enhanced, there is the potential that an incident in severe weather or the future deterioration of the hulls may not be easily controlled. As a consequence of this perceived threat, the legislature of the Commonwealth of Virginia passed a resolution in February 2001, regarding the removal of oil from the obsolete vessels in the JRRF. Also, the Virginia Department of Environmental Quality proposed that MARAD enter into a judicial Consent Order subject to the Commonwealth jurisdiction formalizing a plan for oil removal. Notwithstanding the outstanding legal issues concerning sovereign immunity and MARAD’s authority to enter into a consent order, the cost to remove pumpable fuel from these obsolete ships has been estimated at \$15 million at the JRRF anchorage alone. MARAD believes that the most environmentally responsible and cost effective approach to eliminating the environmental threats associated with fuel in its vessels is to remove the vessels from the fleet through scrapping.

### III. OTHER ALTERNATIVES AND INFORMATION

#### ENVIRONMENTAL PROTECTION & WORKER SAFETY ISSUES

This section addresses the significant multiplicity of national and international environmental, worker safety and trade issues surrounding ship scrapping.

##### Hazardous Materials Aboard Ships

The following is an overview of the typical types of hazardous materials that are likely to be found in relatively small amounts in components and specific systems on many of the obsolete ships in MARAD's NDRF.

- **Polychlorinated Biphenyls (PCBs)** -- for fire resistant and insulation qualities in many electrical cables and system components, rubber and ventilation duct gaskets, adhesives, paint and insulation materials.
- **Asbestos** -- for insulation in bulkheads, floor and ceiling tiles, pipe, electrical cable, machinery, seals, and gaskets.
- **Petroleum products** -- fuels (No. 6 fuel oil (bunkers) or No.2 fuel oil (diesel)) and lubricants in storage tanks, double-bottom tanks, fuel oil settling tanks, tanks designated for the carriage of fuel as cargo, the sumps of machinery, and lubricating gears.
- **Surface coatings** -- on older ships may contain lead, chromium, and other metals.
- **Sodium Chromate** -- was used on some older ships as a corrosion inhibitor in ballast water tanks.
- **Mercury** -- temperature sensors, heat detectors, and gauges (The majority of these items have been removed from MARAD's obsolete vessels.) Mercury vapor may be found in some fluorescent light bulbs.
- **Ozone depleting substances (ODS)**, chlorofluorocarbons (CFCs) as refrigerant in a few shipboard applications.
- **Waste water** generated during the dismantling process from rainwater, fire hose water, and other water that tends to collect aboard the ship often contains metal particulates, paint chips, oil and miscellaneous materials that tend to collect on the decks, such as rubbish.

In general, U.S. laws and regulations exist to protect worker safety and the environment during the process of handling and disposing of hazardous materials. They also address occupational hazards inherent in ship scrapping. Most major foreign countries engaged in ship recycling do not have the same level of protection or enforcement.

##### U.S. Regulatory and Policy Considerations

Beginning in 1994, a number of developments brought a halt to overseas sales for scrapping. In 1994, the EPA first raised concerns about the export of vessels because PCBs at or above allowable levels were being found in various components of the vessels. TSCA and EPA's implementing regulations prohibit the processing or distribution in commerce (including export from the U.S.) of PCBs equal to or greater than 50 parts per million.<sup>1</sup> In addition, issues were raised regarding the application of the RCRA, under which the EPA requires prior notice and

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<sup>1</sup> As a matter of Executive Branch policy, embodied in Executive Order 12088, all of the Agencies of the Executive Branch comply with TSCA.

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consent for exports of hazardous wastes, and the operation of numerous overlapping multilateral and bilateral treaties on hazardous materials, hazardous wastes, and trade.<sup>2</sup>

Beginning in mid-May 1997 and running through mid-December 1997, the *Baltimore Sun* published a series of Pulitzer Prize winning articles depicting the environmental and worker safety and health conditions in domestic as well as foreign scrapping facilities. The articles documented poor working conditions, worker exposures to numerous hazardous materials, injuries and deaths, and incidents of environmental contamination. In addition, the articles raised public policy issues regarding the appropriateness of the U. S. and other nations putting workers and the environment at risk in less developed countries where most scrapping occurs. As a result of the articles, both national and international attention on environmental and worker health and safety concerns attendant to ship scrapping increased dramatically. Members of both the Administration and Congress voiced concerns and objections, particularly to overseas scrapping.

MARAD and EPA entered into an Agreement on November 7, 1997, under EPA's discretionary enforcement authority, concerning the export of NDRF vessels that may contain PCBs for scrapping. This was to be the interim solution for the export issue, pending EPA's publication of that portion of its PCB MegaRule<sup>3</sup> dealing with, among other things, continuous and authorized use issues related to ship disposal, which EPA had been developing since June 1991 (56 FR 26738, June 10, 1991). Although the MegaRule was published in June 1998, these particular issues were not addressed. EPA now estimates that the provisions dealing with authorized use and continuous use will not be in a final rule until sometime in January 2002.

Before the 1997 Agreement could be implemented, an Interagency Panel on Ship Scrapping, commonly referred to as the Blue Ribbon Panel, was established to review the Navy and MARAD ship scrapping programs. Both the Navy and MARAD suspended foreign scrapping efforts, pending the recommendations of the Panel. The Panel, consisting of MARAD, Navy, EPA, OSHA, Defense Logistics Agency (DLA), National Oceanographic and Atmospheric Administration, Department of Justice, and Department of State issued a report in April 1998.

Although the Panel made recommendations for improving existing domestic ship disposal programs, it was unable to agree on a comprehensive approach to overseas disposal. The Panel did, however, recommend that the option of overseas disposal be retained and suggested that a number of issues be explored further. Those recommendations included:

- (1) expanding notification to importers regarding specific ships with detailed information on the materials commonly found on those ships;

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<sup>2</sup> Some examples are: The Basel Convention; North American Free Trade Agreement's Environmental Side Agreement; the Organization for Economic Cooperation and Development's 1988 Decision of the Council Concerning the Control of Transfrontier Movements of Wastes; London Convention, 1972 - Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter; Agreement Between the Government of the United States of America and the Government of Canada Concerning the Transboundary Movement of Hazardous Waste; and Agreement Between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area

<sup>3</sup> See generally 40 C.F.R. Part 761—Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.

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- (2) revising the official notification to the importing country to include tacit agreement, if the importing country does not object within 30 days of notification;
  - (3) exploring how to use enforceable contract terms to promote environmental protection and worker safety, including consideration of:
    - (a) requiring the bidders to submit technical compliance plans to demonstrate how they plan to comply with local environmental, health, and safety rules and regulations;
    - (b) requesting available information from the U.S. State Department on the qualifications and past performance of the scrappers;
    - (c) incorporating technical compliance plans in the terms and conditions of the contract; and
    - (d) requiring a performance bond that protects the U.S. Government's interests in the event that a scrapping contractor fails to perform and which maximizes the contractors' incentive to scrap ships in an environmentally sound, safe, and economical manner;
  - (4) developing an oversight program;
  - (5) evaluating the possibility of providing technical assistance; and
  - (6) promoting improvements in environmental protection and worker health and safety.

While the Panel's recommendations were being evaluated, a moratorium on overseas scrapping was issued in September 1998. Although the moratorium expired in 1999, efforts to explore further the Panel's recommendations and options for overseas scrapping continued for some time without satisfactory resolution. This was due, in large part, to difficulties in harmonizing a multitude of conflicting domestic and international policies, treaties, agreements, and conventions related to trade, and environmental and worker safety issues.

### **International Policy Considerations**

The International Maritime Organization, the Conference of the Parties to the Basel Convention, and the International Labour Organization (ILO) all have begun to address ship scrapping (internationally referred to as "ship recycling").

#### **International Maritime Organization (IMO)**

In March 2000, the IMO Marine Environmental Protection Committee (IMO/MEPC) established a correspondence group to: (1) gather information on current ship dismantling practices; (2) identify safety and environmental risks associated with current practices; (3) collect information regarding procedures by governments and industry to reduce environmental and safety risks; (4) collate information from the ILO, the Basel Convention, the London Convention '72 and industry on their activities and perceived responsibilities associated with the recycling of ships; and (5) prepare a report for discussion at the April 2001 meeting of the IMO/MEPC. MARAD is the lead agency for the U.S. delegation on ship recycling issues.

The Report of the Correspondence Group has been prepared. Among the options identified for reducing risks from hazardous materials are:



- cleaning the vessels or removing hazardous substances before the vessels arrive at recycling facilities;
- ensuring that ship recyclers can safely and responsibly handle the materials involved;
- taking measures to facilitate the disposal of potentially hazardous materials; and
- providing the recyclers with a list of potentially hazardous materials on board showing quantity and location.

The Report suggests that, while the ILO may be able to provide guidance, general worker health and safety issues should be the responsibility of (a) the legislators in countries of employment; (b) employers; and (c) administrations which monitor and enforce compliance.

### **Basel Convention and OECD Agreement**

The Conference of the Parties to the Basel Convention in Spring 2000 began addressing ship recycling because of allegations that selling ships for disposal contravenes the 1989 Convention.<sup>4</sup> The Basel Convention prohibits the export of certain wastes from Organization for Economic Cooperation and Development (OECD) signatories to non-OECD countries. While the Convention does not list ships as hazardous wastes, many of the hazardous materials on the vessels are listed.

The main regulatory mechanisms of Basel are: notice, consent, and either reshipment to the exporter or proper on-site disposal of waste paid for by the exporter when so requested by the country of import. “Notice” and “consent” consists of a mechanism whereby transboundary movements of hazardous wastes or other wastes can take place only upon prior written notification by the State of export to the competent authorities of the States of import and transit (if appropriate).

The Conference of the Parties has established a technical working group to develop environmental guidelines for ship recycling facilities. However, that process will take a number of years to complete. MARAD is a member of the U.S. Delegation to the Conference of the Parties and has been part of the technical working group.

The Basel Convention and the OECD are related. In March 1992, the OECD Member countries resolved to create and fully implement an international mechanism to control transfrontier movements of wastes destined for recovery operations within the OECD area. The 1992 Council Decision was adopted as a multilateral agreement under Article 11 of the Basel Convention. Certain hazardous wastes are subject to notification and consent (which may be tacit) procedures, whereas other hazardous wastes are subject to notification and written consent controls virtually equivalent to the Basel Convention.

### **International Labour Organization (ILO)**

The IMO and Conference of the Parties to the Basel Convention asked the ILO to consider worker health and safety issues related to ship recycling. The ILO has agreed to review

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<sup>4</sup> The United States is a signatory to the Basel Convention, but is not a party as the Convention has not been ratified by the Senate.

measures that could be taken to address worker safety issues. As a first step, the ILO expects to identify existing international health and safety documents that apply to the type of practices encountered in ship recycling yards. Thereafter, the ILO expects to determine whether a ship recycling specific document is appropriate.

In exploring various alternative approaches to the export problems, it has become clear that in addition to the IMO, Basel Convention, and ILO issues, a number of overlapping multilateral and bilateral treaties, dealing with both environmental and trade issues, raise potential problems for various approaches. For example, international trade agreements must be considered in attempts to restrict exports to particular countries. Exports to Canada and Mexico would potentially involve the North American Free Trade Agreement, the Agreement Between the Government of the United States of America and the Government of Canada Concerning the Transboundary Movement of Hazardous Waste, and the Agreement Between the United States of America and the United Mexican States on cooperation for the Protection and Improvement of the Environment in the Border Area (the "La Paz Agreement").

While privately owned ships continue to be recycled overseas despite the uncertainties, the fact that the vessels are U.S. Government-owned adds significantly to the challenge of exports in the current environment. Indeed, during the U.S. Government's efforts to develop an export agreement that would have permitted MARAD to export overseas, the governments of both Mexico and India raised concerns about accepting U. S. Government-owned vessels without prior remediation of at least PCBs. In the case of Mexico, the Government raised concerns regarding the La Paz Agreement. The government of India asked for additional time to consider the issue, but has not yet consented to take U.S. Government ships. Moreover, both India and Mexico are Basel parties, which may have affected their responses.

TSCA and RCRA require the removal of **all** regulated PCBs and notice to and consent from the country importing the vessel. Even if PCBs were removed prior to export (which may not be possible without the significant expense of partially dismantling the vessel and then repairing it before towing), it is not clear that an importing country would consent to receiving the vessel. Moreover, removal of regulated PCBs and notice ignores the numerous other worker safety and environmental protection issues that have been raised both domestically and internationally.

MARAD estimates the cost of the limited removal of "readily removable PCBs"<sup>5</sup> in the U.S. would be approximately \$300,000. To remove **all** regulated PCBs could be significantly more expensive ranging from approximately \$800,000 to \$1 million (this assumes that PCBs are not found throughout paint and that all regulated PCBs are accessible without dismantling significant portions of the ship). If asbestos must be removed, the estimated cost would increase by approximately \$250,000 to \$900,000. Removal of oil/fuel would add approximately \$200,000. Removal of lead paint would be an additional significant cost.

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<sup>5</sup> The term "[readily removable](#)" means the PCBs or PCB item can be removed in a cost effective and efficient fashion without significant risks to human health and the environment. Objects are not readily removable if the objects must be removed by heat, chemical stripping, abrasive blasting, or similar process.

Thus, it is clear that the international policy issues and uncertainties must be resolved. How and when they are resolved will determine the extent to which MARAD achieves cost savings from the export of vessels for scrapping.

### **ALTERNATIVE SCRAPPING SITES**

Recently, traditional shipbuilding and repairing yards, which did not choose to participate in the ship scrapping sales program in the past, have expressed an interest in MARAD's proposed program. Under a fee-for-services approach, MARAD believes that shipyards will engage in ship scrapping; it is assumed from a technical standpoint that if a facility can construct and repair a vessel, it has the capability to reverse engineer or "deconstruct" it.

Although scrapping sites, other than traditional shipbuilding and repair yards, may not be available or economically feasible at this time, alternative scrapping methodologies may prove beneficial over time. Last year, MARAD and the Department of Energy (DOE) began discussions on the potential applications of new technologies (i.e., PCB paint analyzer to determine the amount of PCBs in paint) to the ship scrapping program in an effort to lower costs and reduce worker and environmental risks. Much of DOE's focus in this area has been related to decommissioning and dismantling of nuclear facilities, where worker safety and environmental issues are similar to those encountered in the ship scrapping industry. MARAD and DOE will continue these efforts.

### **VESSEL DONATIONS AND ARTIFICIAL FISH REEFS**

During FY 2001-FY 2006, approximately 15 vessels are expected to be disposed under the authority for artificial fish reefs or through special legislation by Congress for donations or sales for the non-transportation use of ships.

MARAD's artificial reef program was established in 1972 by Public Law 92-402, and was amended in 1984 by Public Law 98-623. Under the program, obsolete NDRF vessels may be transferred to States for sinking as artificial fish reefs upon application by the State. The transfers must be at no cost to the Federal Government, and the States must take custody of the vessel "as is, where is." The States strip and salvage the vessels to offset some costs of towing and preparation for sinking.

The process of obtaining a ship involves coordination with various Government agencies, such as the U.S. Army Corps of Engineers (ACE), the USCG, and EPA. It typically takes the State approximately nine months to complete the agency coordination. In recent years, planning and vessel preparation have been complicated by the lack of consistent standards. However, in 2000, the EPA established requirements for the most recently approved fish reef project for the State of Florida. The requirements mandate removal of all PCBs, asbestos in those areas that could be disturbed by setting off explosives for the sinking and loose asbestos-containing material. In addition, all petroleum products must be removed and the vessel must be cleaned of all debris. The cost of vessel preparation varies depending on the extent of PCBs, asbestos, petroleum and debris on board the vessel, and the sinking method and location.

While use as artificial fish reefs may be an attractive option for disposal of some vessels, it is unlikely to succeed with a large number of vessels. Since 1995, MARAD has received only two requests for vessels for use as fish reefs. Moreover, it is unclear whether the ACE, USCG and EPA would permit large-scale efforts at this time because of the lack of long-term environmental data and the potential for navigation hazards.

Special legislation enacted by Congress delegates authority to the Secretary of Transportation to convey certain NDRF vessels to particular entities. Specific conditions are imposed with each conveyance. Typically, the recipient is responsible for all PCBs and other hazardous materials. Further, the vessel may not be used for commercial transportation purposes or for the carriage of cargoes reserved to U. S. flag commercial vessels under section 901(b) and 901b of the Merchant Marine Act, 1936 [46 U.S.C. App. 1241(b) and 1241f].

Examples of recent legislative authorizations include the donation of vessels for use as memorials, or as a monument to the accomplishments of members of the Armed Forces of the United States, civilians, scientists, and diplomats in exploration of the Arctic and the Antarctic. Also, there have been limited instances of special legislation that authorized the sale of a few obsolete vessels for specific uses, such as humanitarian relief efforts, oilers or non-transportation purposes (i.e., stationary barges).

### **SINKING OF VESSELS IN DEEP WATER**

Consultations were held with DOD on its program for the sinking of vessels in deep water. The Navy's program, Sinking Exercise (SINKEX), is the deep water sinking of ships by the Navy for weapons development testing and evaluation and fleet training exercises on ship sinking.

In 1996, the EPA agreed to allow the Navy to continue with its SINKEX program. This program is administered under a permit issued by the EPA under the Marine Protection, Research, and Sanctuaries Act (MPRSA). Even though the agreement has no limit to the number of ships that can be sunk in this manner, the Navy has used this authority only for its stated purpose of experimentation and training. The Navy has sunk 29 ships since the EPA agreement, which averages about 7 per year.

Vessels must be cleaned of materials that may degrade the environment. The Navy is monitoring sediments and fish in and around some sites to ensure that no degradation to existing sediments and water quality has occurred.

This alternative is not considered viable because the Navy has an adequate supply of its own vessels through 2006, and because of the preparation costs and the uncertainty of follow-on costs that MARAD could incur. However, it is possible that once the Navy has exhausted its ex-combatants for SINKEX, MARAD can utilize this program as an alternative to scrapping. However, there are a number of potential barriers. First, the Navy and EPA reached agreement, in part, because of the Navy's need for training and readiness; the same rationale does not exist for general ocean disposal of ships. Moreover, the Navy/EPA agreement was implemented

through regulation under the MPRSA. Ocean disposal of excess material has had mixed reactions from the environmental community in the past, including concerns from some of the parties to the London Convention. Thus, MARAD would need to confer with EPA to determine appropriate clean-up and monitoring standards, and possibly consider new regulations. Further, until sufficient environmental data is obtained, it is unlikely that a significant number of vessels would be approved for deep water sinking.

### **SALES OF VESSELS BEFORE BECOMING OBSOLETE**

A statutory prohibition against placing the vessels in commercial service for transportation or commerce limits the Agency's sales of pre-obsolete vessels from the NDRF. The sensitivity to potential unfair impacts on U.S. shipyards and competing U.S.-flag operators was reflected in the Merchant Marine Act, 1936, as amended. The prohibition on the use of obsolete vessels (age 25 years or more) for commercial operation was reiterated in Sec. 510(g), Acquisition of Obsolete Vessels (46 U.S.C. App. 1160 (g)) (1999). After World War II, when there were commercially useful vessels in the fleet, Congress made provisions for their sale in a manner that would not unfairly disadvantage U.S. shipyards.

### **RESULTS OF THE NAVY SHIP DISPOSAL PROJECT (NSDP)**

The NSDP demonstrated that the risks of removal, handling and disposal of hazardous materials are mitigated and manageable, when performed in compliance with acceptable written environmental management plans. Also beneficial was the use of on-site Government project managers and experienced environmental and safety personnel.

- In September 1999, the Navy awarded contracts to four entities for the scrapping of four Knox-class frigates. The four frigates were successfully and completely demilitarized, dismantled, and recycled within one year of arrival at contractor facilities, which was "a significant improvement in productivity compared to ship dismantling under the sales contracting approach previously used."
- The NSDP incurred high initial costs in "reestablishing" ship scrapping capabilities in the U. S. in an occupationally safe and environmentally sensitive manner on a fixed, relatively quick time schedule. This resulted because certain non-recurring costs for facility improvements were required, leading to an initial net cost per ship that ranged from a low of \$3.01 million to a high of \$5.31 million. Contributing substantially to variances in costs incurred were the amount of hazardous wastes (by type) generated by each of the four contractors. The average cost of environmental remediation and management was approximately 25 percent of the total cost of dismantling each ship.
- Average contract cost at completion for the first four ships was \$1,150 per ton, offset by an average scrap metal sales revenue of \$130 per ton. Reductions in unit cost have been obtained for the scrapping of follow-up ships awarded. Also, since its Report to Congress was issued in December 2000, the Navy has awarded 13 additional ships and found

substantial unit cost reductions. The FY 2001 task order awards translate to unit costs of between \$550 and \$900 per ton, depending on the type of ship being scrapped and the contractor's price.

### **REPORT ON THE DOD INTERAGENCY PANEL**

The Report on Ship Scrapping (April 1998) by DOD's Interagency Panel recommended several improvements to MARAD's and Navy's domestic ship scrapping programs. The major recommendations applicable to MARAD's domestic program included the following:

- MARAD should add a requirement for submission of a safety and occupational health plan in its invitation for bids;
- EPA, OSHA, DLA, and MARAD should develop a compliance manual that outlines for ship scrappers the relevant environmental and occupational safety and health requirements of their contracts and applicable statutes;
- The DLA, Navy, MARAD, OSHA and EPA should enter into a Memorandum of Agreement that sets out responsibilities for coordination; and
- Navy and MARAD should continue to look for innovative ways to improve the ship scrapping process, both domestically and internationally, to minimize environmental and occupational risks.

Each of these recommendations has been addressed and is incorporated into the ship scrapping program strategy. MARAD worked with EPA, OSHA, DLA, and Navy to develop a compliance guidance document for ship scrappers, which was published in the Summer of 2000. Also, a Memorandum of Agreement addressing coordination of activities and information sharing was entered into among the Navy, MARAD, OSHA and EPA. MARAD will continue to explore innovative ways to improve the ship scrapping process.

#### IV. CONCLUSION

The urgency to remove obsolete ships from MARAD's NDRF anchorages, especially many in the JRRF in Virginia, has been documented by the Department of Transportation (DOT) Inspector General Audit Report (March 2000) and the General Accounting Office's Report to Congress on Major Management Challenges and Program Risks in DOT (January 2001). Public attention has been elevated by recent news publications (National Geographic Discovery series and ABC Nightline news). The urgency is in part due to the location of the three fleet sites in areas bordering on sensitive estuarial wetlands where the release of petroleum products or hazardous materials could generate significant clean up costs and have lasting negative environmental impact.

The ability of MARAD and Navy to sell obsolete vessels either foreign or domestic has essentially been eliminated in recent years, creating a backlog of planned disposals. Navy's ship disposal program, which pays four domestic dismantling companies to dispose of former military combatants, has proven to be a safe and environmentally responsible approach, albeit relatively costly at the outset, compared to the former sales methods. The domestic ship dismantling industry, while not robust, responded to Navy's ship dismantling program and existing shipyards have expressed considerable interest in participating and supporting a MARAD scrapping program. A survey of domestic ship scrappers and shipyards reveals an overall capacity to handle Navy and MARAD ship disposal requirements through 2006.

Notwithstanding the overall domestic capacity to safely and environmentally scrap ships, the level of competition necessary to help control overall program costs and achieve "best value" as defined by the legislation is unclear. MARAD projects a \$2.5 million (FY 01 average) cost per ship through the program. Factors impacting competition are not only the overall capacity of various facilities, but also the location of the ship and the ability for unrestricted tows. If program delays are encountered and vessel conditions deteriorate to the point where significant towing limitations occur due to serious environmental risks, costs may increase dramatically.

Most commercial and foreign government ship scrapping occurs in foreign facilities. The status of worker safety and environmental disposal of hazardous materials during vessel scrapping in worldwide facilities seems to be changing, albeit slowly. Few, if any, foreign scrapping countries have anything near the level or degree of worker safety requirements or environmental safeguards as the U.S. Lacking internationally accepted standards, the "best value" considerations of worker safety and environmental concerns have resulted in MARAD utilizing a scrapping acquisition strategy that sets specific contract requirements in these areas consistent with prevailing U.S. standards. A set of common dismantling contract requirements is necessary in order that no predisposition for selection between U.S. and foreign facilities occurs.

As the U.S. Government grapples with decisions affecting its ship dismantling needs over the next few years, the rest of the world will likely attempt to identify and adopt some basic and acceptable international standards. How the U.S. Government disposes of its own obsolete vessels will help frame the issue. To assist in achieving this goal, MARAD will focus on the

development of standards and guidelines for an environmental training program that can be adapted to varying conditions worldwide.

MARAD is improving its monitoring of obsolete vessels under its custody to assure that disposal priorities accurately reflect vessel condition and circumstances at each fleet site. The work involves coordination with the USCG and cognizant state/local environmental authorities. With the urgency of removing high-risk vessels from NDRF sites, especially the ones located on the James River in Virginia, MARAD is using a commercial contractor (General Agent) in FY 2001 to execute the \$10 million appropriations transfer from Navy. MARAD plans to establish teams dedicated to the ship disposal effort and to position itself to make awards for ship disposal directly with scrapping yards.

MARAD will establish a procurement strategy for ship scrapping that considers the “best value” objective by maximizing competition while assuring full consideration of environmental and safety compliance. While not discounting foreign recycling and disposing through sinking as artificial reefs, MARAD recognizes that the immediate threat these ships pose at the NDRF sites, in all likelihood, will result in a domestic solution in the near-term. Even if some remedial efforts are temporarily successful in reducing the greatest current risks, MARAD will continue to seek innovative solutions to the challenging issue of ship disposal.



**APPENDIX**

**OBSOLETE NDRF VESSELS  
CUSTODY, ALTERNATIVES AND COSTS**

**OBSOLETE NDRF VESSELS  
CUSTODY, ALTERNATIVES AND COSTS**

RANK	VESSEL	CUSTODY		SCRAPPING		OTHER			DISPOSAL		
		MAINTENANCE/Year	DRYDOCKING (*) 15-Year Cycle	DOMESTIC	INTERNATIONAL (**)	DONATIONS & FISH REEFS (***)	SINKING IN DEEP WATER	SALE BEFORE OBSOLETE	VESSEL TONNAGE	YEAR/MONTH	LOCATION
1	BUILDER	\$20,000	\$900,000	\$ 1,600,000	N/A				7,000	Dec-00	JRRF
2	EXPORT CHALLENGER	\$20,000	\$900,000	\$ 2,407,200	\$ 2,442,600				7,080	May-01	JRRF
3	GEN ALEX M PATCH	\$20,000	\$900,000	\$ 4,261,900	\$ 4,324,575				12,535	May-01	JRRF
4	GEN NELSON M WALKER	\$20,000	\$900,000	\$ 4,233,340	\$ 4,295,595				12,451	May-01	JRRF
5	SPIEGEL GROVE	\$20,000				X			6,553	Sep-01	JRRF
6	BENJAMIN ISHERWOOD	\$20,000				X			9,348	Sep-01	JRRF
7	HENRY ECKFORD	\$20,000				X			9,348	Sep-01	JRRF
8	GEN WILLIAM O. DARBY	\$20,000	\$900,000	\$ 4,303,380	\$ 4,366,665				12,657	Dec-01	JRRF
9	SANTA ISABEL	\$20,000	\$900,000	\$ 3,393,880	\$ 3,443,790				9,982	Dec-01	JRRF
10	MORMACDAWN	\$20,000	\$900,000	\$ 2,565,300	\$ 2,603,025				7,545	Mar-02	JRRF
11	LYNCH	\$20,000	\$900,000	\$ 408,000	\$ 414,000				1,200	Mar-02	JRRF
12	LORAIN COUNTY	\$20,000				X			3,000	Jun-02	JRRF
13	GEN HOYT S VANDENBERG	\$20,000				X			11,342	Jun-02	JRRF
14	CRANDALL	\$20,000				X			2,018	Sep-02	JRRF
15	CRILLEY	\$20,000				X			1,998	Sep-02	JRRF
16	WAYNE VICTORY	\$20,000	\$900,000	\$ 1,510,280	\$ 1,532,490				4,442	Dec-02	JRRF
17	LAUDERDALE	\$20,000	\$900,000	\$ 2,244,000	\$ 2,277,000				6,600	Dec-02	JRRF
18	OPPORTUNE	\$20,000	\$900,000	\$ 520,200	\$ 527,850				1,530	Dec-02	JRRF
19	WOOD COUNTY	\$20,000	\$900,000	\$ 1,415,760	\$ 1,436,580				4,164	Dec-02	JRRF
20	DONNER	\$20,000	\$900,000	\$ 1,809,820	\$ 1,836,435				5,323	Dec-02	JRRF
21	MARSHFIELD	\$20,000	\$900,000	\$ 2,278,000	\$ 2,311,500				6,700	Dec-02	JRRF
22	GETTYSBURG	\$20,000	\$900,000	\$ 3,352,740	\$ 3,402,045				9,861	Dec-02	SBRF
23	POINT LOMA	\$20,000	\$900,000	\$ 3,201,100	\$ 3,248,175				9,415	Dec-02	SBRF
24	TEXAS CLIPPER I	\$20,000				X			7,662	Mar-03	BRF
25	GLACIER	\$20,000				X			5,050	Mar-03	SBRF
26	PROTECTOR	\$20,000	\$900,000	\$ 1,190,000	\$ 1,207,500				3,500	Mar-03	Portsmouth, VA
27	GEN EDWIN D PATRICK	\$20,000	\$900,000	\$ 4,284,000	\$ 4,347,000				12,600	Mar-03	SBRF
28	GEN JOHN POPE	\$20,000	\$900,000	\$ 4,363,220	\$ 4,427,385				12,833	Mar-03	SBRF
29	AMERICAN RANGER	\$20,000	\$900,000	\$ 2,565,300	\$ 2,603,025				7,545	Mar-03	JRRF
30	SANTA ELENA	\$20,000	\$900,000	\$ 3,030,080	\$ 3,074,640				8,912	Mar-03	JRRF
31	AMERICAN BANKER	\$20,000	\$900,000	\$ 3,416,320	\$ 3,466,560				10,048	Mar-03	JRRF

\* Multiple drydockings at 15-year intervals may be required based on the scrapping rate  
 \*\* The scrapping costs were based on a range per ton of \$240 - \$440 for an average of \$340 per ton, however, the estimated cost of international scrapping is slightly higher primarily because of multiple tows. The international estimates are based on the assumption of U.S. removal of PCBs, asbestos, and fuel and assumes lead-based paint would not be removed prior to export. Changes in the assumptions will affect estimates. Other variables such as worker safety must be considered when using this alternative.  
 \*\*\* Authorized by Public Laws 92-402, 98-623, 103-451, 105-261, 105-383 and 106-398

**OBSOLETE NDRF VESSELS  
CUSTODY, ALTERNATIVES AND COSTS**

32	BEAUJOLAIS	\$20,000	\$900,000	\$ 2,520,760	\$ 2,557,830				7,414	Mar-03	BRF
33	SIOUX FALLS VICTORY	\$20,000	\$900,000	\$ 1,526,600	\$ 1,549,050				4,490	Jun-03	SBRF
34	ALBERT J. MYER	\$20,000	\$900,000	\$ 1,774,460	\$ 1,800,555				5,219	Jun-03	JRRF
35	CATAWBA VICTORY	\$20,000	\$900,000	\$ 1,536,120	\$ 1,558,710				4,518	Jun-03	JRRF
36	BARNARD VICTORY	\$20,000	\$900,000	\$ 1,567,060	\$ 1,590,105				4,609	Jun-03	SBRF
37	COMPASS ISLAND	\$20,000	\$900,000	\$ 1,530,000	\$ 1,552,500				4,500	Jun-03	JRRF
38	CANOPUS	\$20,000	\$900,000	\$ 4,080,000	\$ 4,140,000				12,000	Jun-03	JRRF
39	HANNIBAL VICTORY	\$20,000	\$900,000	\$ 1,568,080	\$ 1,591,140				4,612	Jun-03	SBRF
40	WAHIAKUM COUNTY	\$20,000	\$900,000	\$ 913,240	\$ 926,670				2,686	Jun-03	SBRF
41	SANTA CRUZ	\$20,000	\$900,000	\$ 3,093,660	\$ 3,139,155				9,099	Jun-03	JRRF
42	SPERRY	\$20,000	\$900,000	\$ 3,309,560	\$ 3,358,230				9,734	Sep-03	SBRF
43	OCCIDENTAL VICTORY	\$20,000	\$900,000	\$ 1,552,780	\$ 1,575,615				4,567	Sep-03	SBRF
44	JASON	\$20,000	\$900,000	\$ 3,107,600	\$ 3,153,300				9,140	Sep-03	SBRF
45	NAECO	\$20,000	\$900,000	\$ 2,842,060	\$ 2,883,855				8,359	Sep-03	BRF
46	PVT FRED C. MURPHY	\$20,000	\$900,000	\$ 1,675,860	\$ 1,700,505				4,929	Sep-03	BRF
47	QUEENS VICTORY	\$20,000	\$900,000	\$ 1,552,440	\$ 1,575,270				4,566	Sep-03	SBRF
48	PAN AMERICAN VICTORY	\$20,000	\$900,000	\$ 1,638,800	\$ 1,662,900				4,820	Sep-03	SBRF
49	NEMASKET	\$20,000	\$900,000	\$ 679,320	\$ 689,310				1,998	Sep-03	SBRF
50	MISSION SANTA YNEZ	\$20,000	\$900,000	\$ 1,700,000	\$ 1,725,000				5,000	Sep-03	SBRF
51	RIDER VICTORY	\$20,000	\$900,000	\$ 1,570,800	\$ 1,593,900				4,620	Dec-03	SBRF
52	EARLHAM VICTORY	\$20,000	\$900,000	\$ 1,530,000	\$ 1,552,500				4,500	Dec-03	SBRF
53	NEPTUNE	\$20,000	\$900,000	\$ 1,785,340	\$ 1,811,595				5,251	Dec-03	JRRF
54	WINTHROP VICTORY	\$20,000	\$900,000	\$ 1,538,840	\$ 1,561,470				4,526	Dec-03	SBRF
55	PRESERVER	\$20,000	\$900,000	\$ 520,200	\$ 527,850				1,530	Dec-03	JRRF
56	THOMASTON	\$20,000	\$900,000	\$ 2,339,200	\$ 2,373,600				6,880	Dec-03	SBRF
57	POINT DEFIANCE	\$20,000	\$900,000	\$ 2,339,200	\$ 2,373,600				6,880	Dec-03	SBRF
58	MARINE FIDDLER	\$20,000	\$900,000	\$ 2,787,660	\$ 2,828,655				8,199	Dec-03	JRRF
59	MONTICELLO	\$20,000	\$900,000	\$ 2,339,200	\$ 2,373,600				6,880	Mar-04	SBRF
60	WABASH (EX AOG 4)	\$20,000	\$900,000	\$ 673,200	\$ 683,100				1,980	Mar-04	SBRF
61	TIOGA COUNTY	\$20,000	\$900,000	\$ 893,520	\$ 906,660				2,628	Mar-04	SBRF
62	CANISTEO	\$20,000	\$900,000	\$ 3,400,000	\$ 3,450,000				10,000	Mar-04	JRRF
63	PETREL	\$20,000	\$900,000	\$ 562,020	\$ 570,285				1,653	Mar-04	JRRF
64	AMERICAN RACER	\$20,000	\$900,000	\$ 2,742,780	\$ 2,783,115				8,067	Mar-04	SBRF
65	ROBERT D. CONRAD	\$20,000	\$900,000	\$ 408,000	\$ 414,000				1,200	Mar-04	JRRF
66	CALOOSAHATCHEE	\$20,000	\$900,000	\$ 3,400,000	\$ 3,450,000				10,000	Mar-04	JRRF
67	ALBERT E. WATTS	\$20,000	\$900,000	\$ 3,060,000	\$ 3,105,000				9,000	Mar-04	Mobile, AL
68	TALUGA	\$20,000	\$900,000	\$ 2,834,580	\$ 2,876,265				8,337	Jun-04	SBRF

**OBSOLETE NDRF VESSELS  
CUSTODY, ALTERNATIVES AND COSTS**

69	CLAMP	\$20,000	\$900,000	\$ 520,200	\$ 527,850				1,530	Jun-04	SBRF
70	SPHINX	\$20,000					X		1,625	Jun-04	JRRF
71	MAINE	\$20,000	\$900,000	\$ 2,418,080	\$ 2,453,640				7,112	Jun-04	BRF
72	DUTTON	\$20,000					X		5,056	Jun-04	BRF
73	HUNLEY	\$20,000	\$900,000	\$ 3,570,000	\$ 3,622,500				10,500	Jun-04	JRRF
74	MIZAR	\$20,000	\$900,000	\$ 692,240	\$ 702,420				2,036	Jun-04	JRRF
75	EMPIRE STATE	\$20,000	\$900,000	\$ 2,801,600	\$ 2,842,800				8,240	Jun-04	JRRF
76	MORMACWAVE	\$20,000	\$900,000	\$ 2,811,120	\$ 2,852,460				8,268	Jun-04	JRRF
77	ORION	\$20,000	\$900,000	\$ 3,309,560	\$ 3,358,230				9,734	Sep-04	JRRF
78	FURMAN	\$20,000					X		5,449	Sep-04	BRF
79	PONCHATOULA	\$20,000	\$900,000	\$ 3,248,020	\$ 3,295,785				9,553	Sep-04	SBRF
80	MORMACMOON	\$20,000	\$900,000	\$ 2,565,300	\$ 2,603,025				7,545	Sep-04	JRRF
81	SAUGATUCK	\$20,000	\$900,000	\$ 1,785,680	\$ 1,811,940				5,252	Sep-04	JRRF
82	TULARE	\$20,000	\$900,000	\$ 3,218,780	\$ 3,266,115				9,467	Sep-04	SBRF
83	HOWARD W. GILMORE	\$20,000	\$900,000	\$ 3,309,560	\$ 3,358,230				9,734	Sep-04	JRRF
84	MIRFAK	\$20,000	\$900,000	\$ 692,240	\$ 702,420				2,036	Sep-04	JRRF
85	WACCAMAW	\$20,000	\$900,000	\$ 3,740,000	\$ 3,795,000				11,000	Sep-04	JRRF
86	SUNBIRD	\$20,000	\$900,000	\$ 562,020	\$ 570,285				1,653	Dec-04	JRRF
87	TRUCKEE	\$20,000	\$900,000	\$ 3,196,000	\$ 3,243,000				9,400	Dec-04	JRRF
88	BOLSTER	\$20,000	\$900,000	\$ 520,200	\$ 527,850				1,530	Dec-04	SBRF
89	NEOSHO	\$20,000	\$900,000	\$ 3,196,000	\$ 3,243,000				9,400	Dec-04	JRRF
90	ARTHUR M. HUDDALL	\$20,000	\$900,000	\$ 1,185,240	\$ 1,202,670				3,486	Dec-04	JRRF
91	GAGE	\$20,000	\$900,000	\$ 2,284,800	\$ 2,318,400				6,720	Dec-04	JRRF
92	NEREUS	\$20,000	\$900,000	\$ 3,309,560	\$ 3,358,230				9,734	Dec-04	SBRF
93	KITTIWAKE	\$20,000	\$900,000	\$ 562,020	\$ 570,285				1,653	Dec-04	JRRF
94	FLORENCE	\$20,000	\$900,000	\$ 2,648,260	\$ 2,687,205				7,789	Mar-05	SBRF
95	MEACHAM	\$20,000	\$900,000	\$ 2,827,100	\$ 2,868,675				8,315	Mar-05	BRF
96	CONNECTICUT	\$20,000	\$900,000	\$ 3,351,040	\$ 3,400,320				9,856	Mar-05	SBRF
97	VULCAN	\$20,000	\$900,000	\$ 3,107,600	\$ 3,153,300				9,140	Mar-05	JRRF
98	PROTEUS	\$20,000	\$900,000	\$ 3,309,560	\$ 3,358,230				9,734	Mar-05	SBRF
99	ESCAPE	\$20,000	\$900,000	\$ 582,080	\$ 590,640				1,712	Mar-05	JRRF
100	FLORIKAN	\$20,000	\$900,000	\$ 520,200	\$ 527,850				1,530	Mar-05	SBRF
101	APL 57	\$20,000	\$900,000	\$ 884,000	\$ 897,000				2,600	Mar-05	JRRF
102	RECLAIMER	\$20,000	\$900,000	\$ 520,200	\$ 527,850				1,530	Mar-05	SBRF
103	PAWCATUCK	\$20,000	\$900,000	\$ 3,225,240	\$ 3,272,670				9,486	Jun-05	JRRF
104	MISSISSINEWA	\$20,000	\$900,000	\$ 3,196,000	\$ 3,243,000				9,400	Jun-05	JRRF
105	SURIBACHI	\$20,000	\$900,000	\$ 3,317,720	\$ 3,366,510				9,758	Jun-05	JRRF

**OBSOLETE NDRF VESSELS  
CUSTODY, ALTERNATIVES AND COSTS**

106	MAUNA KEA	\$20,000	\$900,000	\$ 2,539,800	\$ 2,577,150				7,470	Jun-05	SBRF
107	FORT FISHER	\$20,000	\$900,000	\$ 2,962,760	\$ 3,006,330				8,714	Jun-05	SBRF
108	STATE OF MAINE	\$20,000	\$900,000	\$ 2,801,600	\$ 2,842,800				8,240	Jun-05	Mobile, AL
109	PYRO	\$20,000	\$900,000	\$ 2,539,800	\$ 2,577,150				7,470	Jun-05	SBRF
110	CAPE CHARLES	\$20,000	\$900,000	\$ 1,997,840	\$ 2,027,220				5,876	Jun-05	JRRF
111	MISPELLION	\$20,000	\$900,000	\$ 3,225,240	\$ 3,272,670				9,486	Jun-05	SBRF
112	KAWISHIWI	\$20,000	\$900,000	\$ 3,248,020	\$ 3,295,785				9,553	Sep-05	SBRF
113	HATTIESBURG VICTORY	\$20,000					X		4,523	Sep-05	BRF
114	CAPE CANSO	\$20,000	\$900,000	\$ 1,997,840	\$ 2,027,220				5,876	Sep-05	JRRF
115	WABASH (EX AOR 5)	\$20,000	\$900,000	\$ 4,250,000	\$ 4,312,500				12,500	Sep-05	SBRF
116	IX 509 (EX UEB 1)	\$20,000	\$900,000	\$ 999,600	\$ 1,014,300				2,940	Sep-05	JRRF
117	PATRIOT STATE	\$20,000	\$900,000	\$ 3,592,100	\$ 3,644,925				10,565	Sep-05	JRRF
118	ORTOLON	\$20,000	\$900,000	\$ 1,141,040	\$ 1,157,820				3,356	Sep-05	JRRF
119	YELLOWSTONE	\$20,000	\$900,000	\$ 4,527,100	\$ 4,593,675				13,315	Sep-05	JRRF
120	RIGEL	\$20,000	\$900,000	\$ 2,752,980	\$ 2,793,465				8,097	Sep-05	JRRF
121	KALAMAZOO	\$20,000	\$900,000	\$ 4,631,480	\$ 4,699,590				13,622	Dec-05	JRRF
122	MONONGAHELA	\$20,000	\$900,000	\$ 3,879,740	\$ 3,936,795				11,411	Dec-05	JRRF
123	MOUNT HOOD	\$20,000	\$900,000	\$ 2,963,780	\$ 3,007,365				8,717	Dec-05	SBRF
124	PIGEON	\$20,000	\$900,000	\$ 1,020,000	\$ 1,035,000				3,000	Dec-05	SBRF
125	PLATTE	\$20,000	\$900,000	\$ 3,903,880	\$ 3,961,290				11,482	Dec-05	JRRF
126	VANGUARD	\$20,000	\$900,000	\$ 4,719,880	\$ 4,789,290				13,882	Dec-05	JRRF
127	RANGE SENTINEL	\$20,000	\$900,000	\$ 3,010,020	\$ 3,054,285				8,853	Dec-05	JRRF
128	HASSAYAMPA	\$20,000	\$900,000	\$ 3,248,020	\$ 3,295,785				9,553	Dec-05	SBRF
129	NITRO	\$20,000	\$900,000	\$ 3,077,000	\$ 3,122,250				9,050	Mar-06	JRRF
130	HOLLAND	\$20,000	\$900,000	\$ 3,570,000	\$ 3,622,500				10,500	Mar-06	SBRF
131	SYLVANIA	\$20,000	\$900,000	\$ 3,349,680	\$ 3,398,940				9,852	Mar-06	JRRF
132	WICHITA	\$20,000	\$900,000	\$ 4,250,000	\$ 4,312,500				12,500	Mar-06	SBRF
133	MILWAUKEE	\$20,000	\$900,000	\$ 4,831,400	\$ 4,902,450				14,210	Mar-06	JRRF
134	KANSAS CITY	\$20,000	\$900,000	\$ 4,250,000	\$ 4,312,500				12,500	Mar-06	SBRF
135	SAVANNAH (EX AOR 4)	\$20,000	\$900,000	\$ 4,148,000	\$ 4,209,000				12,200	Mar-06	JRRF
136	ROANOKE	\$20,000	\$900,000	\$ 4,420,000	\$ 4,485,000				13,000	Mar-06	SBRF
137	CIMARRON	\$20,000	\$900,000	\$ 2,791,400	\$ 2,832,450				8,210	Mar-06	SBRF
138	WILLAMETTE	\$20,000					X		8,210	Jun-06	SBRF
139	CAPE COD (AD 43)	\$20,000	\$900,000	\$ 4,583,880	\$ 4,651,290				13,482	Jun-06	JRRF
140	YOSEMITE	\$20,000					X		11,205	Jun-06	JRRF
141	SHENANDOAH	\$20,000	\$900,000	\$ 4,636,580	\$ 4,704,765				13,637	Jun-06	JRRF
142	SAMUEL GOMPERS	\$20,000	\$900,000	\$ 4,575,720	\$ 4,643,010				13,458	Jun-06	JRRF

**OBSOLETE NDRF VESSELS**  
**CUSTODY, ALTERNATIVES AND COSTS**

143	WHITE PLAINS	\$20,000	\$900,000	\$ 3,330,980	\$ 3,379,965				9,797	Jun-06	SBRF
144	VANCOUVER (LPD2)	\$20,000	\$900,000	\$ 2,941,000	\$ 2,984,250				8,650	Jun-06	SBRF
145	WYMAN	\$20,000	\$900,000	\$ 657,900	\$ 667,575				1,935	Jun-06	SBRF
146	BARBOUR COUNTY	\$20,000	\$900,000	\$ 1,693,880	\$ 1,718,790				4,982	Jun-06	SBRF
147	CONSERVER	\$20,000	\$900,000	\$ 508,980	\$ 516,465				1,497	Sep-06	SBRF
148	DENVER	\$20,000	\$900,000	\$ 3,293,580	\$ 3,342,015				9,687	Sep-06	SBRF
149	DIXON	\$20,000	\$900,000	\$ 4,748,780	\$ 4,818,615				13,967	Sep-06	JRRF
150	DULUTH	\$20,000	\$900,000	\$ 3,086,860	\$ 3,132,255				9,079	Sep-06	SBRF
151	HOIST	\$20,000	\$900,000	\$ 511,700	\$ 519,225				1,505	Sep-06	JRRF
152	L. Y. SPEAR	\$20,000	\$900,000	\$ 4,883,080	\$ 4,954,890				14,362	Sep-06	JRRF
153	OGDEN	\$20,000	\$900,000	\$ 3,387,080	\$ 3,436,890				9,962	Sep-06	SBRF
154	PEORIA	\$20,000	\$900,000	\$ 1,751,680	\$ 1,777,440				5,152	Sep-06	SBRF
155	SCHENECTADY	\$20,000	\$900,000	\$ 1,702,720	\$ 1,727,760				5,008	Sep-06	SBRF