

**To:** Mr. Glen Clark  
**From:** The Basel Action Network  
**Subject:** Carrier Disposal RFI; Solicitation Number: N00024-09-R-4224

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## **FORRESTAL Class Aircraft Carrier Scrapping and Dismantling Request for Information**

The Basel Action Network (BAN) is hereby responding to the Request for Information (RFI) solicited by the Inactive Ships Program (PMS 333) of the Naval Sea Systems Command (NAVSEA) regarding the dismantling and recycling of conventionally-powered FORRESTAL class aircraft carriers (CV 59 Class). While BAN itself is not making herein a proposal to dismantle and recycle ships, we note that this is a “request for information” and not a “request for proposal”. In any case, BAN is a serious stakeholder in the global recycling debate and has been active on the issue of ship disposal and recycling since our inception. We expect that the information we provide in brief herein will prove extremely useful for the government in its consideration of recycling options. Our response includes a rough order of magnitude estimate for Alternative (a) and Alternative (b) in terms of net cost to the environment, net cost to marine ecosystems and human health and net cost to the government.

### **ALTERNATIVE (a)**

*Alternative (a): In support of artificial reefing, partial dismantling and recycling of FORRESTAL from the top of the island superstructure to the hangar deck while maintaining stability and leaving the hangar deck intact with respect to watertight integrity for towing purposes. The environmental remediation of the FORRESTAL in conformance with the EPA Best Management Practices, found at this link: <http://epa.gov/owow/oceans/habitat/artificialreefs/finalguidance.html>, is completed with the exception of shipboard materials containing regulated concentrations of Polychlorinated Biphenyls (PCB) and some lighting remaining aboard for worker safety. This alternative also requires removal of all electrical cabling and ventilation gasket material from all spaces below the hangar deck, appropriate recycling of recoverable materials, and disposal of all regulated PCB waste in accordance with all applicable federal, state, and local regulations. This alternative is only applicable to the FORRESTAL (CV/AVT 59).*

### **RESPONSE TO ALTERNATIVE (a)**

As an environmental organization, BAN does not support using obsolete vessels in “artificial reefing”, particularly when they contain hazardous wastes, and stands strongly opposed to Alternative (a). BAN urges PMS 333 to consider the following information prior to making a final decision as to the disposal of the FORRESTAL class aircraft carriers:

- The act of sinking vessels at sea for the purposes of disposal is “ocean dumping” as defined by the London Convention of 1972 of which the United States has ratified and is obliged to uphold. Article 4 of that Convention prohibits the dumping of any Annex I substance; Annex I contains all organohalogen compounds (e.g. polychlorinated biphenyls [PCBs]).<sup>1</sup> Furthermore, the 1996 London Protocol which the U.S. has not ratified but has signed, acts

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<sup>1</sup> <http://www.austlii.edu.au/au/other/dfat/treaties/1985/16.html>

as an amendment to the Convention and only allows the dumping of vessels if the contaminants have been removed to the maximum extent possible.<sup>2</sup> Further, disposal of PCBs in any manner other than in a way where the persistent organic pollutant content is destroyed or irreversibly transformed is prohibited by the Stockholm Convention on Persistent Organic Pollutants,<sup>3</sup> which the U.S. has not ratified but has signed (indicating agreement). Sinking the FORRESTAL would clearly violate the United States' international obligations, and as described elsewhere in this document, also violates U.S. law and government best management practices.

- The U.S. Environmental Protection Agency (EPA) recognizes that sunken Navy vessels contain toxic materials including asbestos, PCBs, iron, lead paint and antifouling paint, even after remediation in accordance with EPA's Best Management Practices. Disposal of toxic materials in the ocean under Alternative (a) is a violation of the Marine Protection, Research and Sanctuaries Act of 1972 as amended by the Ocean Dumping Ban act of 1988, except in such cases where the EPA grants a toxic dumping exception to the law.
- PCBs leach into the marine environment from sunken vessels and accumulate in the bodies of reef fish; PCBs are transferred through the food web to humans as humans digest contaminated fish. PCBs are known carcinogens with no safe level of exposure as identified in the EPA's drinking water Maximum Contaminant Level Goals (MCLG) for PCBs, which is zero.<sup>4</sup>
- The ORISKANY was sunk off the coast of Florida in 2006 under a risk-based disposal permit from the EPA. According to an October 2008 study conducted by the Florida Fish and Wildlife Conservation Commission (FWC) as part of the post sinking monitoring program, PCB concentrations in fish caught at the ORISKANY site are nearly twice that of the Navy's forecasted levels. 15 of 30 fish sampled had total PCB levels exceeding 20 parts per billion (ppb), the EPA's Tier 1 maximum monitoring screening value, with the average total PCB concentration value at 34 ppb. 6 of 30 fish had PCB levels ranging from 68 to 110 ppb.<sup>5</sup> Since the EPA's Tier 1 maximum monitoring screening value was exceeded by nearly two fold, the FWC in consultation with the EPA and the Florida Department of Health will undertake a rigorous Tier 2 monitoring program. Dumping Navy vessels at sea places the public and vital fisheries at unreasonable risk.
- The Navy's \$3.74 million Prospective Risk Assessment Model (PRAM) that was developed in order to satisfy the EPA's PCB leaching requirements for the dumping of the ORISKANY was proved invalid and unreliable by the ORISKANY post sinking monitoring program. This model should be prohibited from use and should not be used again to justify the dumping of the FORRESTAL at sea.
- The Navy states in its 2008 Report to Congress, "The goal of this deepwater (FORRESTAL) reef project is to provide habitat for the protection and *enhancement* of deepwater snapper and grouper species."<sup>6</sup> The Navy's rationale for sinking the FORRESTAL contradicts the Gulf States Marine Fisheries Commission (GSMFC), which suggests artificial reefs attract species

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<sup>2</sup> <http://www.austlii.edu.au/au/other/dfat/treaties/2006/11.html>

<sup>3</sup> [http://www.pops.int/documents/convtext/convtext\\_en.pdf](http://www.pops.int/documents/convtext/convtext_en.pdf)

<sup>4</sup> [http://www.epa.gov/safewater/contaminants/dw\\_contamfs/pcbs.html](http://www.epa.gov/safewater/contaminants/dw_contamfs/pcbs.html).

<sup>5</sup> <http://www.sdafs.org/FLAFS/PDF/October%202008%20issue.pdf>

<sup>6</sup> Report to Congress on the Progress of the Vessel Disposal Program, US Department of Transportation, Maritime Administration, January 2008, Pg. 26.

of fish,<sup>7</sup> not *enhance* populations. Artificial reefs act as fish-aggregating devices and provide concentrated fish populations. These concentrated populations increase commercial and recreational fishing opportunities, as was the purpose of the National Fishing Enhancement Act (NFEA) of 1984. But, according to the GSMFC, concentrated populations lead to overfishing and the decline of species within the vicinity of the reef site.<sup>8</sup> The attracting nature of the reef is actually detrimental to species populations, not *enhancement* of ecological resources as the Navy claims.

- The Navy stipulates that the FORRESTAL must be sunk in depths of 450 feet to maintain security on classified hull structure details. Specifically, the Navy states "...minimal hull security mitigation actions would be necessary if the ship is sunk in water depths of at least 450 feet." However, the Navy's justification is not supported by common knowledge which suggests the FORRESTAL will not be secure from foreign intelligence gathering at 450 feet as mixed gas (helium and oxygen) helmet divers with a bell-bouncer can dive to 600 feet, and saturation divers can dive as deep as 2,000 feet.<sup>9</sup> Remotely operated underwater vehicles are also highly capable of accessing a sunken vessel at 450 feet; this could lead to a potential breach in security.
- Disposing vessels at sea does not bring best value in comparison with the recycling option, as costly remediation requirements negate perceived cost advantages. The total cost of environmental remediation for the ORISKANY was \$11.89 million. Even at that cost, they were unable to remove all of the PCBs and other hazardous substances and thus real costs were externalized to the marine environment. Add to that \$3.07 million for towing and berthing; \$4.9 million for scuttling preparation and execution; and \$3.74 million to develop the Prospective Risk Assessment Model (PRAM) and the Navy incurred a total expense of \$23.6 million.<sup>10</sup> The Navy has spent a reported \$6.4 million to date<sup>11</sup> preparing the FORRESTAL for dumping at sea. This large expenditure is minimal when compared to the expected environmental remediation costs required of the Navy in order to appropriately address the PCBs and other contaminants within the ships interior, which PMS 333 admits has yet to be done, not to mention the additional costs of preparation, towing and scuttling
- Dumping vessels at sea removes valuable scrap metal from recirculation within the domestic marketplace and necessitates far more environmentally damaging primary metals mining, refining and manufacture. Such primary production requires far more consumption of energy and greenhouse gas emissions, air and water pollution than secondary metals recovery. Scrap metals include steel, aluminum, copper, and copper nickel alloy, amongst others. These metals are valuable commodities. According to the ship recycling industry, the FORRESTAL contains approximately \$20 million in recyclable material that can reenter the U.S. market and offset primary production.
- The U.S. Government is the world's largest consumer,<sup>12</sup> which also correlates to the world's largest waste producer. In 1998, President Clinton issued Executive Order 13101: Greening the Government through Waste Prevention, Recycling and Federal Acquisition. The Preamble

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<sup>7</sup> Lukens, R.R. and Selberg, C. February 2004. Guidelines for Marine Artificial Reef Materials, Second Edition. GSMFC. Ocean Springs, MS.

<sup>8</sup> IBID.

<sup>9</sup> <http://www.skin-diver.com/departments/crosstalk/commdiving.asp?theID=150>

<sup>10</sup> <http://www.epa.gov/OWOW/oceans/habitat/artificialreefs/documents/introduction.html>

<sup>11</sup> Kathleen Roberts, Public Affairs Specialist, Naval Sea Systems command

<sup>12</sup> New Rules Project, A Program of the Institute of Local Self-Reliance

<http://www.newrules.org/environment/rules/environmental-preferable-purchasing>

states: "Consistent with the demands of efficiency and cost effectiveness, the head of each executive agency shall incorporate waste prevention and recycling in the agency's daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products. It is the national policy to prefer pollution prevention, whenever feasible. Pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should be employed only as a last resort."<sup>13</sup> If PMS 333 chooses to dump the FORRESTAL or any such vessel as a means of disposal, as described in Alternative (a), this act is a violation of Executive Order 13101. Alternative (b), on the other hand, is feasible on all accounts, prevents ocean pollution and is fully consistent with EO 13101.

### **COST TO THE ENVIRONMENT: Ocean Dumping**

In 2001, the U.S. Environmental Protection Agency's (EPA) Office of Pollution, Prevention, Pesticides and Toxics program changed the classification of artificial reefing from *continued use* to *disposal*. This change raised the acceptable level of PCBs for artificial reefs from 2 parts per million (ppm) to 50 ppm.<sup>14</sup> This act eliminates all doubts that this activity is disposal as defined by the London Convention, and thus dumping any level of organohalogenes other than trace contaminants into the marine environment is a violation of international law.

With MARAD and the Navy under pressure to eliminate all non-retention vessels, the PCB requirement was lessened to 50 ppm to allow MARAD and the Navy to dispose of all vessels *in a timely manner*.<sup>15</sup> Yet if it was the government's intent to loosen the threshold level and allow more ocean dumping, this is an incorrect interpretation as it ignores the obligations under the London Convention which sets no threshold levels.

The EPA has ignored its obligations under the London Convention in allowing MARAD and the Navy to engage in ocean dumping:

1. The Navy in the past has sought to avoid the London Convention obligations implemented in the Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA) to suggest the term *ocean dumping* does not apply to a vessel when it is placed in the ocean for a purpose other than *disposal*. Clearly, as the Navy articulates, vessels have an intended *continued use as an artificial reef*, that of enhancing fishery resources and thus the argument has long been that this is not disposal. Additionally, the EPA states in the Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs (BMP) "...the ship itself is being reused or recycled as an artificial reef..."<sup>16</sup>

- a) If artificial reefing is considered *disposal under the terms of the London Convention*, then it does not serve an alternative purpose and can be characterized as ocean dumping. Ocean dumping of vessels containing PCBs of any concentrations other than trace amounts is a violation of the London Convention and should be subject

<sup>13</sup> [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=1998\\_register&docid=fr16se98-113](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=1998_register&docid=fr16se98-113)

<sup>14</sup> Lukens, R.R. and Selberg, C. February 2004. Guidelines for Marine Artificial Reef Materials, Second Edition. GSMFC. Ocean Springs, MS.

<sup>15</sup> Public Law 106-398, Section 3502 (2)(B)(b)(2); National Defense Authorization, 2001.

<sup>16</sup> National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs, May 2006, Pg. 37.

to ocean dumping laws described in the Marine Protection Research and Sanctuaries Act as amended by the Ocean Dumping Ban Act.

- b) If a sunken vessel serves an alternative purpose (i.e. artificial reef, fisheries enhancement) as the Navy argues, the EPA would have to redefine the scuttling action as *continued use* or *reuse*. Reuse is defined by the EPA as “Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste.”<sup>17</sup> This adjustment would require remediation of PCBs to levels below 2 parts per million (PPM), as opposed to the 50 ppm under the current *disposal* designation.

2. It must also be born in mind that vessels have expected life spans as artificial reefs for only 60 years.<sup>18</sup>

- a) The limited 60 year expected lifespan of a vessel can constitute future ocean cleanup obligations when life as a reef expires. Current disposal policy does not address cleanup issues.

### **COST TO MARINE ECOSYSTEMS: Depleting Fishery Resources**

Artificial reefs have lasting effects on marine ecosystems, but as Dr. James Bohnsack, a research fisheries biologist with the National Oceanic and Atmospheric Administration, points out “...little direct scientific evidence exists to properly guide building efforts [of artificial reefs] and show long-term beneficial or detrimental impacts.”<sup>19</sup> Even with this lack of scientific evidence, the Navy claims “artificial reefs *enhance* ecological resources by increasing the amount of productive hard bottom habitat.”<sup>20</sup> The Navy further elaborates in its 2008 Report to Congress, “The goal of this deepwater (USS FORRESTAL) reef project is to provide habitat for the protection and *enhancement* of deepwater snapper and grouper species.”<sup>21</sup> The Navy’s rationale for sinking vessels contradicts the Gulf States Marine Fisheries Commission (GSMFC), which suggests artificial reefs attract species of fish,<sup>22</sup> not *enhance* populations.

Artificial reefs act as fish-aggregating devices [attract] and provide concentrated fish populations. These concentrated populations increase commercial and recreational fishing opportunities, as was the purpose of the NFEA. But, according to the GSMFC, concentrated populations lead to overfishing and the decline of species within the vicinity of the reef site.<sup>23</sup> The attracting nature of the reef can actually be detrimental to species populations, not *enhancement* of ecological resources as the Navy claims.

The real benefit of artificial reefs is that they aggregate wide-ranging fish so they can be easily harvested, thus increasing the economic benefit to the region. However, the economic benefit is short

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<sup>17</sup> EPA, Terms of Environment: Glossary, Abbreviations, and Acronyms.

<sup>18</sup> Lukens, R.R. and Selberg, C. February 2004. Guidelines for Marine Artificial Reef Materials, Second Edition. GSMFC. Ocean Springs, MS.

<sup>19</sup> American Institute of Fishery Research Biologists Briefs, 1987.

<sup>20</sup> Navy Inactive Ships Program, Frequently Asked Questions, Artificial Reefing.

<sup>21</sup> Report to Congress on the Progress of the Vessel Disposal Program, US Department of Transportation, Maritime Administration, January 2008, Pg. 26.

<sup>22</sup> Lukens, R.R. and Selberg, 2004.

<sup>23</sup> Lukens, R.R. and Selberg, C. February 2004. Guidelines for Marine Artificial Reef Materials, Second Edition. GSMFC. Ocean Springs, MS.

lived as overfishing leads to the depletion of fish resources and permanent destruction of natural habitat.

There are 14 Gulf and Atlantic States with active artificial reefing programs. Florida alone has 2,400 artificial reefs comprised of sunken cars, buses, tanks, tires, oil rigs and ex-military vessels.<sup>24</sup> Artificial reefs continue to be popular amongst U.S. state fisheries, even with strong evidence that artificial reefs do not rebuild fisheries.

### **Case Example:**

Japan sought to rebuild their fisheries and spent \$4.2 billion between 1976 and 1987 to construct over 6,000 artificial reefs, covering 9% of the ocean floor from shore to a depth of 200 m.<sup>25</sup> This is the largest artificial reef installation in the world.

Result: The Japanese long-term investigations have not documented any significant increases in fish production that can be attributed to the artificial reefs.<sup>26</sup>

With the world's most extensive artificial reef project failure, it is surprising to see U.S. state fisheries expanding their artificial reefing programs and it is equally surprising that the U.S. Maritime Administration and U.S. Navy continue to aid state reefing programs without environmental justification.

### **COST TO THE MARINE ECOSYSTEMS AND HUMAN HEALTH: Toxic Contamination**

All vessels sunk as artificial reefs must undergo remediation activities in accordance with the EPA's Best Management Practices (BMP). However, the EPA still acknowledges environmental degradation as an impact of sunken vessels, noting, "...some materials of concern may still remain on items used as artificial reef material [even after remediation]. Such materials include: asbestos, polychlorinated biphenyls (PCBs), iron, lead paint, and antifouling paint."<sup>27</sup>

The toxic materials that remain onboard sunken vessels are identified in the EPA's BMP and are described below:

#### **Asbestos**

Studies have investigated the effects of asbestos on fish, and indicate that asbestos may cause epidermal lesions, epithelial hypertrophy, kidney damage, decreased orientation and swimming ability, degradation of the lateral line, reduced growth, and increased mortality.<sup>28</sup> The BMP only requires the removal of *loose* asbestos and asbestos that may become *loose* during sinking. Large amounts of asbestos are allowed to remain onboard the vessel during

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<sup>24</sup> Jon Dodrill, Artificial Reef Program Administrator, Florida Fish and Wildlife Conservation Commission, ARTIFICIAL REEF PROGRAM SUMMARY OVERVIEW, September 2007

<sup>25</sup> Yamane, T. Status and future plans of artificial reef projects in Japan. Bull. Mar. Sci. 43.

<sup>26</sup> Kawasaki, T. 1984. The distribution and behavior of fishes in the artificial reef fishing grounds; IJI, *Biological* process in the ocean; R. Marushige, ed. Koseisha Koseikaku, Tokyo, pp. 197-200. (Engl. transl. by T. Otsu, 1987, 7 p., Transl. No. 109)

<sup>27</sup> National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs, May 2006, Pg. 65.

<sup>28</sup> Batterman, A.L. and P.M. Cook. 1981; Belanger, S.E., et al 1986; Belanger, S.E., et al 1990; Woodhead, A.D., et al 1983.

sinking, this asbestos enters the marine environment with great potential to harm marine wildlife.

### **Polychlorinated Biphenyls (PCBs)**

PCBs can leach into a marine or aqueous environment from both solid and liquid materials where they can be taken up by organisms in the food web. PCBs bioaccumulate in fish and other animals and bind to sediments. As a result, people who ingest fish may be exposed to PCBs that have been released into the environment and bioaccumulated in the fish they are ingesting.<sup>29</sup>

PCBs have been implicated in: reduced primary productivity in phytoplankton, reduced hatchability of contaminated fish and bird eggs, reproductive failure in seals, reproductive impairment in fish, and reduced fertilization efficiency in sea urchins.<sup>30</sup> The BMP requires all liquid PCBs to be removed and all manufactured materials containing more than 50 parts per million (ppm) of solid PCBs. However, materials containing less than 50 ppm remain onboard for sinking. And it is likely, as in the case of the ORISKANY, that EPA will grant a waiver to allow the Navy to avoid cleaning all of the 50 ppm or greater PCB materials, as some are lodged between bulkheads and are very difficult to remove without completely dismantling the ship.

The Navy examined the ORISKANY artificial reef to determine the effects PCB leaching has on marine habitat and human health. The ORISKANY was environmentally cleaned in accordance with EPA requirements, yet an estimated 700 pounds of pure PCBs (above 50 ppm concentration) still remain onboard.<sup>31</sup> The study determined PCB concentrations released into the waters surrounding the reef accumulated in the bodies of reef fish and digested by recreational anglers and their families from eating fish caught at the reef.<sup>32</sup>

The EPA notes "PCBs have been shown to cause cancer in animals and have also been shown to cause a number of serious non- cancer health effects...including effects on the immune system, reproductive system, nervous system, endocrine system, and other health effects. Studies in humans provide supportive evidence for potential carcinogenic and non-carcinogenic effects of PCBs."<sup>33</sup>

The Navy acknowledges, as stated above, that humans will be exposed to PCBs as a result of artificial reefs, however this evidence has not urged the Navy to halt the reefing of vessels containing PCB's like the ORISKANY.

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<sup>29</sup> National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs, May 2006, Pg. 35.

<sup>30</sup> Adams, J.A. and S. Slaughter-Williams. 1988; Brouwer, A., et al 1989; Clark, R.B. 1992.; den Beston, et al 1991.

<sup>31</sup> The Navy's New Ships to Reef Program: Teaming up to make Reefs from Decommissioned Ships, Summer 2006

<sup>32</sup> Leach Rate Study, Prospective Risk Assessment Model for ex-ORISKANY, US Navy.

<sup>33</sup> National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs, May 2006, Pg. 35.

## Iron

Iron can leach into the environment from steel hulls of sunken vessels. Studies on phytoplankton and macroalgae indicate that in areas where plant nutrients such as nitrate and phosphate are abundant, the availability of iron is actually a limiting factor in growth and biomass.<sup>34</sup>

## Lead Paint

Lead is a well known toxic heavy metal which can harm the nervous systems of animals and humans. It is known to bioaccumulate. Corals have been shown to incorporate lead into their skeletons and growth inhibition has been observed in algae species and sea urchins exposed to lead.<sup>35</sup>

The EPA notes that lead paint has been used on the interiors of some vessels; however the BMP does not require intact lead paint to be removed.<sup>36</sup>

## Antifouling Paint

Antifouling paints containing tributyltin (TBT) were used to paint vessel hulls to inhibit the growth of organisms below the water line. In 2001, an International Maritime Organization Convention was enacted prohibiting the use of antifouling paints containing TBT. The EPA states in the BMP, "Scientific investigations by governments and international organizations have shown that certain anti-fouling systems used on vessels pose a substantial risk of both acute and chronic toxicity and other adverse impacts to ecologically and economically important non-target marine organisms. Because this document [BMP] addresses vessels that would be sunk for the creation of artificial reef habitat, the presence of biocides and other anti-fouling systems that inhibit marine growth are antithetical to this purpose. Furthermore, because anti-fouling systems can be reactivated via physical disturbance and/or biological degradation (e.g., scouring during a storm event or burrowing caused by marine organisms) over time, anti-fouling systems that retain potency may become harmful or be reactivated following the sinking."<sup>37</sup> Antifouling paints containing TBT are present on vessels sunk as artificial reefs. The above EPA statements are merely cautionary.

The strong language of the EPA clearly identifies their concerns for the expected toxic leaching from vessels sunk as artificial reefs. Yet the EPA merely cautions those choosing to sink toxic vessels rather than prohibiting their actions. Caution only causes alarm for those aware of the affects, but does not protect the unaware citizen who inadvertently feeds their family fish that is saturated with toxic chemicals. The EPA and the Navy are falling short of their commitment to protect human health and the environment.

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<sup>34</sup> Coale *et al.* 1996; Frost 1996; Matsunaga *et al.* 1994; Takeda 1998; Wells *et al.* 1995.

<sup>35</sup> Thompson, D.R. 1990. Metal levels in marine vertebrates. In R.W. Furness and P.S. Rainbow (eds.), *Heavy Metals in the Marine Environment*. CRC Press, Inc., Boca Raton, pp 143- 183.

<sup>36</sup> National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs, May 2006, Pg. 42.

<sup>37</sup> National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs, May 2006, Pg. 41.

### **Case Example:**

In October 2008, 2.5 years after the ocean dumping of the ORISKANY, the Florida Fish and Wildlife Conservation Commission sampled fish of legal size at the reef site as part of the post sinking monitoring program. 15 of 30 fish sampled had total PCB levels exceeding 20 ppb (the EPA's Tier 1 monitoring screening value) with the average total PCB concentration value at 34 ppb. 6 of 30 fish had PCB levels ranging from 68 to 110 ppb.<sup>38</sup> Since the EPA's Tier 1 monitoring screening value was exceeded by nearly two fold, the FWC in consultation with the EPA and the Florida Department of Health will undertake a rigorous Tier 2 monitoring program. It is important to note that PCBs are transferred through the food web to humans as humans digest contaminated fish. PCBs are known carcinogens with no safe level of exposure as identified in the EPA's drinking water Maximum Contaminant Level Goals (MCLG) for PCBs, which is zero.<sup>39</sup>

The ORISKANY site is a popular diving and recreational fishing destination. Fish caught at this site clearly contain elevated PCB levels, of which the families of these divers and anglers are digesting without warning. The Florida Department of Health (DOH) only releases a PCB fish consumption advisory when fish tissue saturation is 50 ppm or above. The public remains unaware of the toxins they are digesting and the health risks associated, yet the Navy, the EPA and the DOH sit idle.

This new data also suggests the Navy's \$3.74 million PRAM model, which is the established process to forecast PCB leaching from sunken vessels, is incorrectly calibrated. The EPA granted the risk-based disposal permit for the ORISKANY on the basis of the PRAM model. It remains to be seen whether the EPA will make the same mistake again and approve a risk-based disposal permit for the FORRESTAL based on such a model given its blatant failure.

### **COST TO THE GOVERNMENT: Best Value Considerations**

The Navy and MARAD may share (with the recipient coastal reefing state) the significant costs associated with remediation as long as the costs are comparable to other disposal methods and as long as the vessel is considered to be of high disposal priority. However, MARAD recognizes that "higher priority ships, generally, are not good reefing candidates." MARAD also recognizes "the requirements in the BMP to remove all solid PCBs above the regulated limits...for purposes of creating an artificial reef could negate potential cost advantages of artificial reefing compared to conventional dismantling."<sup>40</sup>

PMS 333 clearly indicates that the FORRESTAL aircraft carrier contains concentrations of PCBs in excess of 50 parts per million (ppm). PMS 333 also stipulates that environmental remediation must be conducted prior to dumping the vessel at sea as required by the U.S. Environmental Protection Agency's (EPA) national guidance document entitled Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs (BMP). Remediation activities include the removal and disposal of fuels and oils throughout the ship, removal and disposal of any loose or detached friable asbestos containing material and removal of PCB containing components above 50 ppm.

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<sup>38</sup> <http://www.sdafs.org/FLAFS/PDF/October%202008%20issue.pdf>

<sup>39</sup> [http://www.epa.gov/safewater/contaminants/dw\\_contamfs/pcbs.html](http://www.epa.gov/safewater/contaminants/dw_contamfs/pcbs.html).

<sup>40</sup> Report to Congress on the Progress of the Vessel Disposal Program, US Department of Transportation, Maritime Administration, January 2008

Contrary to standard procedures, and at excessive cost to taxpayers, the Navy commenced environmental cleaning of the FORRESTAL for reefing in 2004 prior to the vessel's reefing designation, spending \$6.4 million to date.<sup>41</sup> However, even this large expenditure is minimal when compared to the expected environmental remediation costs required of the Navy in order to appropriately address the PCBs within the ships interior, which PMS 333 admits has yet to be done. Then there will be further costs associated with this action involving the actual preparation, towing and scuttling costs.

### **Case Example:**

The total cost of environmental remediation for the ORISKANY was \$11.89 million. Add to that \$3.07 million for towing and berthing; \$4.9 million for scuttling preparation and execution; and \$3.74 million to develop the Prospective Risk Assessment Model (PRAM) and the Navy incurred a total expense of \$23.6 million.<sup>42</sup>

It is important to note that the \$11.89 million cost for environmental remediation left intact 700 pounds of pure PCBs (far more PCB contaminated material) that sampled above 50 ppm. The Navy identified remediation of these PCBs as cost prohibitive and sought an exception to the Toxic Substances Control Act (TSCA) and the BMP via a risk-based disposal permit from the EPA. This permit was granted and the ORISKANY was sunk with 700 pounds of unregulated PCBs that sampled above 50 ppm. Some material sampled as high as 19,000 ppm with an average of 1,500 ppm. If the vessel was properly remediated in accordance with law, the remediation costs would have been well above the incurred \$11.89 million.

Also consider the Texas Clipper (7,970 tons) which was scuttled 17 nautical miles off South Padre Island in the Gulf of Mexico in November 2007. According to the Texas Parks and Wildlife, the reefing operation was conducted at a cost of \$4 million,<sup>43</sup> (\$500/ton). The extensive remediation activities took one year to complete.

Compare the Texas Clipper reefing costs with the 2007 scrapping costs of two vessels of comparable size. The Maumee (7,626 tons) was scrapped at a cost of \$405,726 or \$52/ton, while the Maryland (8,000 tons) was scrapped at a cost of \$400,000, or \$50/ton. The company that conducted the remediation activities for the Texas Clipper also scrapped and recycled the Maumee and the Maryland.

Due to the remediation requirements, which do not remove all contamination, artificial reefing is unable to offer a best value disposal solution against the clear alternative – FULL RECYCLING.

### **ALTERNATIVE (b)**

*Alternative (b): Full dismantlement and recycling of the vessel in accordance with all applicable federal, state and local regulations. This alternative is applicable to a minimum of two and a maximum of six inactive CV 59 Class aircraft carriers.*

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<sup>41</sup> Kathleen Roberts, Public Affairs Specialist, Naval Sea Systems command

<sup>42</sup> <http://www.epa.gov/OWOW/oceans/habitat/artificialreefs/documents/introduction.html>

<sup>43</sup> Shively, Dale, Texas Parks and Wildlife, *Texas Clipper: A New Artificial Reef in the Gulf of Mexico*

## RESPONSE TO ALTERNATIVE (b)

Ever since the 1998 moratorium on export of US government ships to the infamous beach shipbreaking operations of South Asia, domestic ship recycling has been the dominant disposal practice of Federal Government owned vessels. In fact, despite inappropriate attempts to find export avenues for the National Defense Reserve Fleet, “the Maritime Administration continues to consider domestic dismantling [recycling] as the predominant means of vessel disposal...”<sup>44</sup>

Strict domestic regulations and strong oversight of the recycling industry are able to ensure that hazardous materials such as PCBs and asbestos are disposed of in order to protect worker health and safety and the environment. Recycling International, an independent worldwide publication said in 2006, “Visits to shipbreaking yards around the world confirm that nobody upholds environmental and safety measures as stringently as the Americans.” The publication goes on to say, “...the USA has become the world’s leading ‘green’ recycler of marine ships...”

Additionally, the domestic recycling of government owned vessels helps circulate valuable scrap metal into the domestic marketplace. Scrap metals include steel, aluminum, copper, and copper nickel alloy, amongst others. These metals are valuable commodities and help to lessen demand on virgin materials. When comparing lifecycle impacts of 100% steel recycling versus 100% new steel production from virgin materials, recycling operations reduce energy use by 33% and CO<sub>2</sub> emissions by 32%. The primary energy required to produce one metric ton of steel from purely virgin materials is 79 gigajoules and produces 5.3 metric tons of CO<sub>2</sub>, compared to 26 gigajoules and 1.6 metric tons of CO<sub>2</sub> for full recycling.<sup>45</sup> It is clear that recycling obsolete vessels lessens the demand on natural resources and minimizes energy consumption and air pollution.

BAN strongly supports Alternative (b) and urges PMS 333 to consider the following information prior to making a final decision as to the disposal of the FORRESTAL class aircraft carriers:

- The Navy stipulates in the RFI that dismantling of FORRESTAL class aircraft carriers must be accomplished in a dry dock. However, the Navy also states in an April 2009 Report to Congress, that “opportunities for ship dismantling facilities are challenged on the west coast as there are no existing facilities for ship dismantling, nor are there any commercial dry docks on the west coast large enough to dock a FORRESTAL Class aircraft carrier. While the Navy accomplishes the dismantling of its inactive nuclear powered ships and submarines at Puget Sound Naval Shipyard in Bremerton, WA, the one carrier-capable certified dry dock that is large enough for tank and hull work is dedicated for active aircraft carrier maintenance and repairs. Further, there is insufficient work force available, both private and public, to support additional ship dismantling work without impacts to scheduled active carrier and submarine repair availabilities. There are five commercial firms on the east and gulf coasts that have dry docks capable of docking a FORRESTAL Class aircraft carrier, all of which are dedicated to new ship construction and ship repair.”<sup>46</sup> *Thus it appears that the Navy has established a requirement that they fully accept cannot be fulfilled.* Since the primary concern is facility security clearance and personnel facility security clearance, we ask that the Navy remove the dry dock requirement from consideration and allow the exploration of other means to maintain

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<sup>44</sup> U.S. Maritime Administration, Notice of Assessment, June 2008

<sup>45</sup> Jeremiah Johnson, B.K. Reck, T. Wang and T.E. Graedel, The energy benefit of stainless steel recycling, Energy Policy. Volume 36, Issue 1, January 2008, Pages 181-192.

<sup>46</sup> Report to Congress, Report on Plan for Disposal of Certain Vessels Stricken from the Naval Vessel Register (NVR), April 2009

national security during dismantlement other than the assumption that only dry docks can fulfill this level of control. Indeed the construction of tenting and canopy material over and around sensitive areas to preclude espionage are quite feasible and ultimately complete dismantlement provides far more security than laying the national secrets on the ocean floor.

- Cost benefit analysis clearly indicates that recyclable material aboard the FORRESTAL, with an estimated \$20 million market value, can more than compensate for dismantling and environmental remediation costs. However, if the vessel is dumped in the ocean, remediation costs will not be recovered and the Navy will not uphold their commitment to “minimize the size of the inactive fleet in the manner most advantageous to the Navy.”<sup>47</sup>
- The recycling of the Forrestal class air craft carriers could feasibly provide a thousand jobs and infuse millions of dollars into local economies. Providing jobs with federal tax payer dollars through recycling would be consistent with current Federal actions and would complement the Resource Conservation and Recovery Act of 2009. A successful domestic recycling industry relies greatly on MARAD and the Navy to provide a consistent supply of vessels to keep skilled labors in the workforce. Dumping the vessel at sea does not stimulate local economies nor does it provide much needed jobs.
- As mentioned earlier, complete recycling of the FORRESTAL, as described in Alternative (b), fulfills Executive Order 13101: Greening the Government through Waste Prevention, Recycling and Federal Acquisition by fully incorporating waste prevention procedures in recycling efforts and providing a means for material reuse. Scuttling these aircraft carries, violates that order.

## CONCLUSION

BAN strongly recommends the Navy and all other government agencies owning vessels, establish a policy of only allowing domestic ship recycling for disposing of ships. In the case of the FORRESTAL and other ships in its class referred to in this RFI, Alternative (b) is the only acceptable option from both an economic, legal and environmental standpoint. Domestic ship recycling is economically and environmentally sound; it creates local jobs, provides materials for construction, stimulates local economies and provides the government with economic incentive and a *best value* solution.

For further information or clarification on the Basel Action Network response to Solicitation Number N00024-09-R-4224, FORRESTAL Class Aircraft Carrier Scrapping and Dismantling Request for Information, please contact:

Basel Action Network  
Attn: Colby Self  
122 S. Jackson Street, Suite 320  
Seattle, WA 98104

Phone: 206.250.5652  
E-mail: colby.self@gmail.com

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<sup>47</sup> Report to Congress, Report on Plan for Disposal of Certain Vessels Stricken from the Naval Vessel Register (NVR), April 2009