U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

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June 9, 2009

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Coast Guard and Maritime Transportation

FROM: Subcommittee on Coast Guard and Maritime Transportation Staff

SUBJECT: Hearing on "Control of Anti-Fouling Systems on Ships"

PURPOSE OF THE HEARING

The Subcommittee on Coast Guard and Maritime Transportation will meet on Wednesday, June 10, 2009, at 2:00 p.m., in room 2167 of the Rayburn House Office Building to receive testimony regarding the control of anti-fouling systems on ocean-going vessels. This hearing will examine anti-fouling systems that have been applied to ships in the past and discuss the contamination that some of these systems have released into the marine environment. The hearing will examine the International Convention on the Control of Harmful Anti-fouling Systems on Ships, which establishes a comprehensive regulatory framework to enable assessments of the safety of new anti-fouling systems to be made before they are approved for use.

BACKGROUND

Biological fouling is defined by the International Maritime Organization (IMO) as the unwanted accumulation of microorganisms, algae, mussels, plants, or other "biological material" on structures that are "immersed in water."[1] There are more than 4,000 species of biological organisms that can foul an immersed surface.

The fouling of a vessel's surface can produce many serious consequences. For example, fouling on a vessel's hull increases the ship's weight and slows its progress through the water, causing the vessel to burn additional fuel. Untreated, a deep draft tank vessel's hull can accumulate

[1] IMO, "Anti-Fouling Systems," at 3 (2002).

up to 6,000 tons of fouling material in less than six months of exposure to sea water.[2] Such fouling can increase a vessel's fuel consumption by up to 40 percent, causing significant economic and environmental impacts.[3] In 2000, if untreated, the cost of biological fouling could have cost the shipping industry $7.5 billion a year in extra fuel costs.[4]

The presence of biological fouling on a vessel's hull can also cause deterioration or damage to a vessel's hull through such processes as premature corrosion. Biological fouling has caused buoys to sink and accelerated the corrosion on coastal and offshore marine structures. Coastal industries and facilities that rely on seawater for cooling, firefighting, and potable water have also experienced reduced performance efficiency in their systems due to the growth of biological species in their piping. Extensive fouling can even lead to equipment failures.

Additionally, as biological material accumulates on a vessel, the vessel's hull becomes a vector (similar to ballast water) for the transport and introduction of these species into waters where they are not native. Invasive species spread from biological fouling have been observed in ecosystems worldwide including the United States, Australia, New Zealand, Port Phillip Bay and the North Sea, often having significant impact on native population ecosystems.[5]

Anti-fouling is the process of removing or preventing the accumulation of biological fouling organisms. There are many systems available to treat a vessel's hull to try to prevent fouling, including coatings that are applied like paint, underwater cleaning processes, non-stick coatings, and electricity-based systems. The Advanced Nanostructured Surfaces for Control of Biofouling (AMBIO) estimates that total expenditures on anti-fouling applications for commercial and recreational vessels exceeds $700 million a year.[6]

Throughout history, some of the substances commonly used as anti-fouling substances were lime, pesticides, and compounds containing arsenic or mercury. As with any substance applied to surfaces submersed in water, these substances "leached" their constituent compounds into sea water. Many of these substances were found to be harmful to marine life.

I. Tributylin

In the 1960s, anti-fouling coatings based on tributyltin (TBT) were developed. The TBT system appeared to be far more effective than earlier systems in preventing hull fouling, and later scientific advances yielded a product that leached very slowly and at such a consistent pace, that ships needed new applications of TBT-based coatings only at five-year intervals. This product was so successful that by the 1970s, it was the standard anti-fouling application throughout the shipping industry.

When introduced as an anti-fouling coating, TBT was known as a bactericide and fungicide. Originally, mariners believed that TBT was less harmful to the marine environment than other chemicals that had been used on anti-fouling coatings. As the number of vessels using anti-fouling

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[2] IMO, "Anti-Fouling Systems," at 3 (2002).
[3] AMBIO, "What is Biofouling and How Will the AMBIO Project Help to Solve it Through Nanotechnology," at 2.
[4] Id.
[5] IIPC Marine Anti-fouling Coatings Task Force "Invasive Species and Biofouling," at 1.
[6] AMBIO, "What is Biofouling and How Will the AMBIO Project Help to Solve it Through Nanotechnology," at 2.

paints containing TBT increased, scientists began to find high concentrations of TBT in marinas, ports, and harbors. Eventually, high TBT levels were discovered in the open seas and oceanic waters. TBT was also shown to have significant harmful effects on marine life, from small micro-organisms to shelled creatures to marine mammals – and there is some evidence that it is bio-accumulative. As larger animals consumed smaller animals, they ingested and began to accumulate the TBT present in the bodies of the smaller animals. In this way, TBT pervasively spread to all types of marine animals and their environment.

Environmental studies conducted in the 1970s and 1980s began to identify the specific impact that TBT was having on the marine environment in general, and on marine animals, in particular. TBT was identified as the cause of shell deformations in oysters off the coast of France, and of the deformation of sexual characteristics in certain populations of marine life.[7]

As new concentrations of TBT began to be identified in numerous marine ecosystems, several countries, including France and Japan, began to unilaterally ban the use of TBT – first on recreational vessels, and then on all vessels.

II. International Laws

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Convention) was one of the first and most important international conventions that focused on regulating and protecting the marine environment from man-made activities. The purpose of the London Convention was to encourage the control of sources of marine pollution and take the necessary steps to prevent the dumping of wastes and other matter into the sea. Currently, there are 85 parties to the London Convention, including the United States.

In 1996, the London Convention was amended and renamed the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Protocol) to modernize the London Convention, and eventually replace it. The London Protocol was entered into force on March 24, 2006, and there are 32 parties to the Protocol.

In 1990, after several years of close scientific study of TBT's effects on the marine environment, the IMO's Marine Environment Protection Committee adopted a resolution called "Measures to Control Potential Adverse Impacts Associated with Use of Tributylin Tin Compounds in Anti-Fouling Paints." This resolution called on national governments to ban some uses of TBT, particularly in coatings that had rapid leaching rates.

In October 2001, the IMO adopted the International Convention on the Control of Harmful Anti-fouling Systems on Ships (Convention), which was written to enter into force 12 months after 25 States representing 25 percent of the international commercial shipping tonnage adopted the Convention. By January 1, 2003, Countries that became parties to the Convention were required to ban the new application of TBT coatings, and to ensure that all vessels that had a TBT-based coating remove the coating or cover it with a barrier through which it could not leach by January 1, 2008. Parties to the Convention must also ensure that no vessel of a party using anti-fouling paint containing TBT will be allowed in their ports, shipyards, or offshore terminals.

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[7] IMO, "Anti-Fouling Systems," at 6 (2002).

By September 17, 2007, 25 States (Antigua and Barbuda, Australia, Bulgaria, Cook Islands, Croatia, Cyprus, Denmark, France, Greece, Japan, Kiribati, Latvia, Lithuania, Luxembourg, Mexico, Nigeria, Norway, Panama, Poland, Romania, Saint Kitts and Nevis, Slovenia, Spain, Sweden and Tuvalu) had ratified the Convention, and on September 17, 2008, the Convention came into force.

On December 12, 2002, the United States signed the Convention; however, the Senate did not give its consent to the Convention until September 26, 2008. The United States must enact legislation to bring our laws into compliance with the requirements of the Convention to complete the ratification process.

The Convention was written so that additional anti-fouling systems can be listed among prohibited systems over time if they are harmful to the marine environment. If there is a proposal to add an anti-fouling system to the Convention, a technical group will be established by the IMO's Maritime Environmental Protection Committee to review the proposal and to assess the harmfulness and effects to the marine environmental system to determine if the anti-fouling system should be added to the list of prohibited anti-fouling systems.

III. United States Legislation

In the United States, anti-fouling systems containing organotins, which include TBT, are currently regulated under Organotin Anti-Fouling Paint Control Act of 1988 (OAPCA), 33 U.S.C. 2401-2410. In the OAPCA, organotin-based anti-fouling paints are prohibited on vessels less than 25 meters (excluding aluminum hulls, outboard motors, and external drive units) and limits the leaching rate of anti-fouling paints on larger vessels.[8] Under the OAPCA, the sale, purchase, and application of anti-fouling paint containing organotins were banned.[9] In 2008, the Bush Administration submitted draft legislation to implement the requirements of the Convention for purposes of U.S. law. The draft legislation would ultimately replace the OAPCA.

The Environmental Protection Agency has authority under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), 7 U.S.C. §§ 136-136y, to impose additional requirements to the OAPCA, including training and certification requirements for persons who apply anti-fouling paints containing organotin to vessel hulls.

IV. Alternative Anti-Fouling Systems

Several working groups have been established to assist in the research and development of alternate anti-fouling systems. AMBIO is an integrated project funded by the European Union to develop non-toxic anti-fouling coatings that do not release biocides into the environment. There are approximately 31 European organizations participating in the project including universities, companies, and research institutes.

The International Paint and Printing Ink Council was formed in 1992 to facilitate international collaboration on issues affecting paint and printing ink worldwide. The United States is a participant in this Council, which researches biological fouling and invasive species.

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[8] Message from the President of the United States to the Senate Transmitting the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001, January 22, 2008, page 7.

[9] 33 U.S.C. § 2403 (2008).

As TBT has been eliminated from use in anti-fouling coatings, copper has re-emerged as a key component of such coatings. It is a naturally occurring element that is considered far less toxic to the marine environment than TBT. Copper has been used in anti-fouling for over 200 years.[10]

Non-stick coatings containing non-toxic silicone or polyurethane are also available for vessels that travel at less than 30 knots. These coatings are intended to prevent fouling by making a hull surface so slick that biological materials cannot attach to the surface or are washed off as the vessel moves through the water. Silicone-based products are, however, expensive, and they can easily be damaged through the regular travels of a ship.

PREVIOUS COMMITTEE ACTION

The Subcommittee on Coast Guard and Maritime Transportation has not held a hearing on anti-fouling systems.

WITNESSES

Mr. Jeffery G. Lantz
Director of Commercial Regulations and Standards
U.S. Coast Guard

Mr. James Jones
Acting, Assistant Administrator
Office of Prevention, Pesticides and Toxic Substances
Environmental Protection Agency

[10] International Council of Marine Industry Associations, "Fact Sheet on Copper-Based Antifouling," at 2 (2006).