4. SPECIAL PROJECTS AND REPORTS

A. Ship Recycling (ICS)

In cooperation with other industry organizations, the International Chamber of Shipping (ICS) has produced a document titled *Industry Code of Practice on Ship Recycling*, outlining the measures that shipowners should be prepared to take prior to disposing of redundant ships. The Code is a response to concerns that have been raised about the working and environmental conditions present in some of the world's ship recycling facilities, most of which are located in developing countries. The Code incorporates the inventory of potentially hazardous materials on board vessels, which has been approved by the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO).

The organizations involved in the development of this Code are to encourage all shipping companies to:

1. Initiate and complete a program to identify and record, as far as is practicable, on each of their existing ships, any potentially hazardous materials inherent in each ship's construction or used in its equipment and machinery. Such a record should be passed to any subsequent owners of the vessel.

2. Make every effort to minimize the amount of potentially hazardous materials on board the ship, including those carried as stores.

3. Ensure that the ship reaches the recycling yard with the minimum quantities of fuel, diesel, lubricating, hydraulic, and other oils and chemicals consistent with the safe operation of the vessel.

4. Deliver the ship to the recycling yard in a gas-free condition, with all tanks, except the necessary fuel tanks for the final voyage, cleaned and certified to full hot work and entry standards.

5. Make every effort to ensure that an arrival inventory is prepared of asbestos, oils, toxic substances, ozone-depleting substances, and all other potentially hazardous materials, including those inherent in the structure of the vessel or used as coatings on the vessel, those contained in machinery, pipelines, or cylinders or carried as stores, or accumulations of operational residues, to be handed over, against receipt, to the recycling yard.

6. Ensure that any compartments on the ship that may contain an oxygen-deficient atmosphere are clearly marked as such, and that the yard is duly notified of these and other hazardous enclosed spaces and how to test them.

7. Take measures to facilitate the controlled drainage, by the recycling yard, of potentially harmful liquids from the ship.

The organizations involved in the development of this Code commit themselves to:

1. Encourage naval architects and shipbuilders to take due account of the ship's ultimate disposal when designing and constructing a ship, by: (a) using materials that can be safely recycled; (b) minimizing the use of materials known to be potentially hazardous to health and the environment; (c) limiting the use of composite materials such as sandwich panels; and (d) taking measures to facilitate the removal of such materials.

2. Encourage equipment suppliers, classification societies, and administrations to consider taking measures to facilitate an accurate inventory of hazardous materials used on board ships.

3. Encourage shipbuilders to consider providing a "green passport" for new ships, based on the inventory of materials used in the vessel's construction, including the identification and nature of potentially hazardous materials and their location and safe methods of demolition. The shipowner should maintain the accuracy of the "green passport" and incorporate into it all relevant design and equipment changes, with the final owner delivering it, with the vessel, to the recycling yard.

4. Encourage suppliers of equipment that contains hazardous substances to facilitate the safe removal of those substances, or give advice as to how such substances can be safely removed, at the end of the working life of the equipment.

The organizations involved in the development of this Code undertake to urge those entering into a contract of sale of a vessel to a recycling yard to consider the following, as far as is reasonable and practical:

1. The working practices and facilities in the ship recycling yard(s) in question, including: (a) their ability to handle safely, and dispose of properly, any potentially hazardous or environmentally harmful products that may be present in the ship such as asbestos, PCBs, halons, petroleum products, and other residues; (b) the provision of appropriate and sufficient personal protection and safety equipment; and (c) other information such as safety records, training programs for workers, and assessment of the work quality.

2. The environmental, health, and safety benefits of towing a vessel to the yard, fully cleaned and certified to be free of oil, tank residues, and other potentially hazardous and toxic material.

3. The possibility, prior to handing over the vessel for recycling, of: (a) the removal and safe disposal of asbestos prior to arrival; (b) the discharge of halon to an approved facility and the use of portable and returnable fire-fighting equipment for the final voyage to the recycling site; (c) the cleaning and certification of all tanks, except the necessary fuel tanks for the final voyage, to full hot work and entry standards; and (d) providing advice on the nature of any hazardous materials on board, as indicated in the inventory of hazardous materials, and on correct handling and disposal methods (if required).

A copy of this Code of Practice is available at the following Internet Web Site: http://www.marisec.org/recycling.

B. Climate Change Science (NRC)

The National Research Council (NRC) of the National Academy of Sciences has published a report, prepared by its Committee on the Science of Climate Change, titled *Climate Change Science: An Analysis of Some Key Questions.* This study originated from a White House request to help inform the Administration's ongoing review of U.S. climate change policy. In particular, the written request asked for "assistance in identifying the areas in the science of climate change where there are the greatest certainties and uncertainties," and "views on whether there are any substantive differences between the Intergovernmental Panel on Climate Change (IPCC) reports and the IPCC summaries." In addition, based on discussions with the Administration, the study addresses a number of specific questions regarding greenhouse gases and climate change.

Among the report's conclusions are the following:

1. Greenhouse gases are accumulating in the Earth's atmosphere as a result of human activities, causing surface air temperatures and subsurface ocean temperatures to rise. The changes observed over the last several decades are most likely due to human activities, but the committee cannot rule out that some significant part of these changes is also a reflection of natural variability. Human-induced warming and associated sea level rises are expected to continue through the 21st century. Secondary effects are suggested by computer model simulations and basic physical reasoning. These include increases in rainfall rates and increased susceptibility of semi-arid regions to drought. The impacts of these changes will be critically dependent on the magnitude of the warming, and the rate with which it occurs.

2. The mid-range model estimate of human-induced global warming by the IPCC is based on the premise that the growth rate of climate forcing agents, such as carbon dioxide, will accelerate. The predicted warming of 3°C (5.4°F) by the end of the 21st century is consistent with the assumptions about how clouds and atmospheric relative humidity will react to global warming. This estimate is also consistent with inferences about the sensitivity of climate drawn from comparing the sizes of past temperature swings between ice ages and intervening warmer periods with the corresponding changes in climate forcing. This predicted temperature increase is sensitive to assumptions concerning future concentrations of greenhouse gases and aerosols. Hence, national policy decisions made now and in the longer-term future will influence the extent of any damage suffered by vulnerable human populations and ecosystems later in this century. Because there is considerable uncertainty in current understanding of how the climate system varies naturally and reacts to emissions of greenhouse gases and aerosols, current estimates of the magnitude of future warming should be regarded as tentative and subject to future adjustments (either upward or downward).

3. Reducing the wide range of uncertainty inherent in current model predictions of global climate change will require major advances in understanding and modeling of both: (a) the factors that determine atmospheric concentrations of greenhouse gases and aerosols, and (b)

the so-called "feedbacks" that determine the sensitivity of the climate system to a prescribed increase in greenhouse gases. There also is a pressing need for a global observing system designed for monitoring climate.

4. The committee generally agrees with the assessment of human-caused climate change presented in the IPCC Working Group I scientific report, but seeks here to articulate more clearly the level of confidence that can be ascribed to those assessments and the caveats that need to be attached to them. This articulation may be helpful to policy makers as they consider a variety of options for mitigation and/or adaptation.

The committee also provides responses to the specific questions related to climate change science, including such issues as: (1) the range of natural variability in climate; (2) concentrations and rates of increases of greenhouse gases and other emissions that contribute to climate change; (3) human activity as the cause of increased concentrations of greenhouse gases and other emissions that contribute to climate change; (4) other emissions as contributing factors to climate change (e.g., aerosols, carbon monoxide, and black carbon soot) and their relative contribution to climate change; (5) the temperature changes over the next 100 years and the locations; (6) the contribution of climate feedback processes to expected climate change; and (7) the consequences of global warming (e.g., extreme weather, health effects) from increases of various magnitude.

The full NRC report is available at the following National Academy Press Internet Web Site: http://books.nap.edu/html/climatechange.

C. Marine Safety, Quality, and Environmental Management (ABS)

The American Bureau of Shipping (ABS) has published a *Guide for Marine Safety, Quality and Environmental Management*. This Guide was developed with the objective of improving safety and environmental performance in the management and operation of ships. ABS recognizes the positive impact that sound management practices have upon these areas of concern. This Guide provides the maritime industry with a model for implementation of management systems concerned with these issues. It is intended for the use of companies operating all types of ships. Its requirements have been stated in general terms in order to have application to a wide variety of ship operations and management styles.

The requirements of this Guide have been largely derived from the sound management system principles reflected in the International Management Code for the Safe Operation of Ships and for Pollution Prevention, also known as the International Safety Management Code (ISM Code). The ISM Code was developed by the International Maritime Organization (IMO) to provide the maritime community with an internationally recognized standard for the safe management and operation of ships and for pollution prevention. Initially adopted as resolution A.741(18), it later was incorporated into the International Convention for the Safety of Life as Sea (SOLAS) and became mandatory for oil tankers, chemical tankers, bulk carriers, and cargo high-speed craft of 500 tons gross tonnage and upwards and for passenger ships, including passenger high-speed craft, on July 1, 1998. Other cargo ships and self-propelled mobile offshore drilling units

(MODUs) of 500 tons gross tonnage and upwards, subject to SOLAS, are required to comply by July 1, 2002.

Other management system standards have been developed, non-specific to the maritime industry, which address management practices from the perspective of controlling quality and environmental impact. Notably, the International Organization for Standardization (ISO) 9000 series of standards and ISO 14001 address quality management and environmental management, respectively. These standards, though not specific to the maritime sector, provide useful guidance that can be employed in marine management and the operation of ships to further enhance management systems focused on safe operating practices and prevention of pollution.

The general management system principles embodied by the ISM Code, the ISO 9000 series, and ISO 14001 have been incorporated into this Guide. These principles, where appropriate, have been marinized in order to bring them within the context of the maritime industry. This Guide is designed to facilitate a progressive approach to a fully integrated management of safety, quality, and environmental concerns.

For further information, contact the American Bureau of Shipping, ABS Plaza, 16855 Northchase Drive, Houston, TX 77060, (telephone: (281) 877-6000, electronic mail: abs-worldhq@eagle.org), or visit the ABS Internet Web Site at http://www.eagle.org.

D. Marine Pollution in the United States (PEW)

The PEW Oceans Commission has issued a report titled *Marine Pollution in the United States: Significant Accomplishments, Future Challenges*. The PEW Oceans Commission is an independent group of U.S. leaders conducting a national dialogue on the policies needed to restore and protect living marine resources in U.S. waters. After reviewing the best scientific information available, the Commission will make its formal recommendations in a report to Congress and the nation in 2002.

According to this report on marine pollution prepared for the Commission, direct discharges of pollutants into the ocean and coastal waters from sewage treatment plants, industrial facilities, ships, and the at-sea dumping of sewage sludge and other wastes have been greatly reduced over the past 30 years as a result of the Clean Water Act and other statutes. Advances in waste treatment have kept ahead of increases in the volume of wastes, and that trend is likely to continue. Some persistent toxic pollutants, such as DDT and PCBs, were banned for manufacture or use in the United States, and ambient levels of these pollutants have been decreasing in most U.S. marine environments. On the other hand, pollution from land runoff went largely unabated during this period; in some cases it has increased. As a result, diffuse sources now contribute a larger portion of many kinds of pollutants than the more thoroughly regulated direct discharges.

Toxic pollutants, including pesticides, industrial organic chemicals, and trace metals, are widespread contaminants of the marine environment. But they produce discernible adverse effects on ecosystems only in limited areas around population centers and ports. Some of these

chemicals are known through experimental studies to affect the reproductive, immune, or endocrine systems of marine organisms at low concentrations, and may have subtle effects on marine organisms and populations over a broader area. While some of the most toxic substances have been banned for manufacture and use, material previously released may remain in the environment for decades to centuries. High concentrations of persistent contaminants in bottom sediments require careful consideration when removed by dredging or managed in place.

Overenrichment of coastal ecosystems by nutrients, particularly nitrogen, has emerged as the most widespread and measurable effect of pollution on living marine resources and biodiversity in U.S. coastal waters. Excessive nutrient levels (overenrichment or eutrophication) may result in serious depletion of the dissolved oxygen supplies needed by marine animals, loss of habitat (e.g., seagrasses and coral reefs), and algal blooms. Two-thirds of the surface areas of estuaries and bays in the conterminous United States suffers one or more symptoms of overenrichment. Because a majority of the nutrients in most regions now come from diffuse sources rather than direct discharges, reversing coastal eutrophication will require management strategies for watersheds reaching far inland from the coastal environment. Feasible measures include advanced treatment of municipal wastewaters, reduction of nitrogen oxide emissions from power plants and vehicles, control of ammonia emissions from animal feedlots, more efficient use of fertilizers and manure, and restoration of wetlands and floodplains that act as nutrient traps.

For further information, contact the PEW Oceans Commission, 2101 Wilson Boulevard, Suite 550, Arlington, VA 22201, (telephone: (703) 516-0624), or visit the Commission's Internet Web Site at http://www.pewoceans.org.

E. Effects of Oil and Chemically Dispersed Oil (API)

The American Petroleum Institute (API) has published a report (API Publication Number 4693) titled *Effects of Oil and Chemically Dispersed Oil in the Environment*. Crude oil is a complex, highly variable mixture of hydrocarbons and other trace compounds. Exposure may cause a variety of adverse effects, including narcosis, slowed growth, reduced reproduction, and death. Dispersants are mixtures of chemicals known as solvents and surfactants. Solvents reduce the viscosity of both the oil and the dispersant, and help surfactants penetrate into the oil. The surfactants then help the oil break up and disperse into the water column.

This API report provides information on: (1) concepts necessary for understanding the potential sources of oil and dispersed oil contamination that can cause adverse effects; (2) effects of undispersed oil; (3) how chemically dispersing oil changes exposure and effects to marine animals and plants; (4) tradeoffs of various decisions; and (5) conducting an ecological risk assessment.

Among the report's conclusions are the following:

1. Although the public has traditionally viewed the use of dispersants as ecologically risky, scientific evidence indicates the reverse. There are situations where the use of dispersants is an appropriate and ecologically beneficial response. This idea is supported by data from both

scientific testing and real world spills. Dispersants and their use can have some environmental drawbacks, but, in certain cases, the ecological benefits outweigh the risks.

2. Research has shown that within the normal range of operating dosages, ecological effects are often due to the dispersed oil and not the dispersant itself. The dispersant alone is unlikely to contribute significantly to adverse effects, even in multiple applications.

3. In general, dispersants provide the greatest benefits and fewest environmental costs when used in deep offshore waters. When dispersants are used in waters close to shore, the likelihood of impacts to some organisms may increase. This is especially true in bays or restricted water bodies. However, the impacts caused by such dispersant use are sometimes an acceptable tradeoff, considering the damage that may be caused by undispersed oil to waterfowl and marine mammals, or when it washes ashore in sensitive and productive habitats.

For further information, contact Mr. Tom Purcell, American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005-4070, (telephone: (202) 682-8000), or visit the API Internet Web Site at http://www.api.org.

F. Invasive Species (GAO)

The U.S. General Accounting Office (GAO) has published a report (GAO-01-724) titled *Invasive Species: Obstacles Hinder Federal Rapid Response to Growing Threat*. Invasive species – harmful, nonnative plants, animals, and microorganisms – are found throughout the United States, causing billions of dollars of damage annually to crops, rangelands, and waterways. A concept basic to invasiveness is that these species have been introduced into an environment in which they did not evolve; thus, they usually have no natural enemies to limit their spread. For example, zebra mussels are a widely known aquatic invasive. Transported into the Great Lakes in ships' ballast water, zebra mussels have clogged the water pipes of electric companies and other industries. Invasive species have also had a devastating effect on natural areas, where they have strangled native flora, taken over wetland habitats, and deprived waterfowl and other species of food sources.

This report reviews federal efforts to provide rapid response to invasive species. Specifically, GAO examined the extent to which the federal government rapidly responds to new invasive species, the obstacles that impede rapid response, and how rapid response can be improved.

Among the report's results are the following:

1. Federal rapid response to invasive species varies. Species that threaten agricultural crops or livestock are far more likely to elicit a rapid response than those primarily affecting forestry or other natural areas, including rangelands and aquatic areas. The U.S. Department of Agriculture's Animal and Plant Health Inspection Service provided the preponderance of rapid response funding – about $126 million of the estimated $149 million in federal rapid response funding in fiscal year 2000. Department of the Interior officials estimated that they

spent about $1.4 million on rapid response activities directed at invasive species whose primary threat was to natural areas.

2. A major obstacle to rapid response is the lack of a national system to address invasive species. Such a system could provide: (a) integrated planning to encourage partnerships, coordinate funding, and develop response priorities; (b) technical assistance and other resources; and (c) guidance on effective response measures. Without such a system, obstacles to rapid response are less likely to be addressed, and invasive species will continue to fall through the cracks. Obstacles to rapid response include the need for: (a) additional detection systems to identify new species; (b) improved partnerships among federal, state, and local agencies; and (c) enhanced technologies to eradicate invasive species. A national system would also help ensure that invasive species affecting natural areas receive a level of attention commensurate with their risks. Currently, federal rapid response depends largely on whether invasive species are central to an agency's mission.

3. The National Invasive Species Council's Management Plan has several recommendations for improving rapid response, including developing a program of coordinated rapid response and pursuing increases in discretionary spending to support the program. GAO believes a concerted effort to improve rapid response is clearly needed, and, if properly implemented, the Council's recommendations will go a long way toward developing a national system to address this pressing need. GAO is recommending that the Council, among other things, develop criteria for what constitutes a rapid response and work with its member agencies to develop information on current federal rapid response funding.

For further information, contact Mr. Lawrence J. Dyckman, U.S. General Accounting Office, Washington, DC 20548, (telephone: (202) 512-3841), or visit the GAO Internet Web Site at http://www.gao.gov.