4. SPECIAL PROJECTS AND REPORTS

A. Environmental Windows for Dredging Projects (NRC)

The Marine Board/Transportation Research Board and the Oceans Studies Board, both of the National Research Council (NRC), have produced a report (special report 262) titled *A Process for Setting, Managing, and Monitoring Environmental Windows for Dredging Projects*. Environmental windows are those periods of the year when dredging and disposal activities may be carried out because regulators have determined that the adverse impacts associated with dredging and disposal can be reduced below critical thresholds at these times. Conversely, seasonal restrictions are applied during periods of the year when dredging and disposal activities are prohibited because of the increased potential for harm to aquatic resources. Environmental windows are one of a number of management and technological tools that can be used individually or in combination to reduce the environmental impacts of dredging and disposal operations on living resources, aesthetics, and recreation and tourism. The use of windows as a management tool, however, can have significant cost implications.

Sponsored by the U.S. Army Corps of Engineers (ACE), the report explores the decision-making process for establishing environmental windows and makes suggestions for improving the process. Report recommendations are as follows:

1. The decision-making process for managing dredging and disposal operations to achieve sustainable waterways and to protect natural resources, both living and nonliving, should be broadly based.

2. All tools, including windows, should be considered in designing a management plan for carrying out dredging and disposal operations.

3. The proposed process for assessing the need for windows and for managing and monitoring windows when selected should be pilot tested in a small number of districts.

4. All existing scientific data and information should be exploited in evaluating and setting windows as part of an overall management strategy for dredging and disposal operations.

5. Cross-training opportunities should be created for resource managers and dredging operators. For example, resource managers should be encouraged to observe the operations of a wide array of dredges in various weather and sea states. Opportunities should also be created for dredge owners and operators to observe, and perhaps even take part in, the public participation processes undertaken by resource managers and to learn about the biological constraints, natural history, habitat types, and issues related to dredging and its consequences for the natural environment.

6. A special effort should be made to identify existing tools for structured decision-making in complex sociopolitical situations and to evaluate their applicability to the process of setting, managing, and monitoring environmental windows for dredging. One or two of the most

promising tools should be selected for additional testing, research, and refinement aimed at enhancing their acceptability and use in the windows-setting process.

7. Additional funding should be allocated to resource agencies to ensure full, thorough, and active participation in the windows-setting process.

8. The windows-setting process should reflect the principle of adaptive management. That is, as new data and information are acquired and experience is gained, they should be fed back into the process.

For further information, contact Ms. Joedy W. Cambridge, Transportation Research Board, National Research Council, 2101 Constitution Avenue, NW, Washington, DC 20418, (telephone: (202) 334-2167, electronic mail: jcambrid@nas.edu).

B. Oils that Produce Non-Buoyant In Situ Burning Residues (API)

The American Petroleum Institute (API) has published a report (Publication Number DR145) dated February 2002 and titled *Identification of Oils that Produce Non-Buoyant In Situ Burning Residues and Methods of their Recovery*. This study investigates the potential for residues to sink following an *in situ* burn of spilled oil. The objectives were to identify oils that may produce residues that are likely to sink, and to evaluate options for dealing with non-buoyant residues in the field.

The study was initiated in response to the concern that the residue from an *in situ* burn could sink and cause environmental damage at the sea bottom. Previous *in situ* burning experiments failed to note the possibility of residue sinking because the starting oil slick was relatively thin, usually on the order of one or two centimeters. Concerns started to develop in the early 1990s when two separate tanker spills involving heavy crude oil accidentally caught fire, burned, and produced large quantities of residue that did indeed sink. More recent laboratory work has indicated that there is a large range of oils that may produce non-buoyant residues after an *in situ* burn involving thick slicks.

In this study, the results of small-scale burning experiments were used to develop correlations to predict burn residue densities for specific oils. When applied to more than 100 international crude oils, it was found that about half would tend to float, and the other half would tend to sink in seawater once the residue cooled to ambient temperatures. It should be noted that this finding is based on the assumption that the laboratory-scale burn experiments are scalable to large burns in the field, an assumption that should be verified through further tests with large-scale burns.

It was also concluded that no simple method exists for controlling the density of the residue. It may be possible to use skimmers or sorbents to recover the residue immediately following an *in situ* burn; however, surface countermeasures would only be applicable for a short period – a maximum of 30 minutes – before the residue cooled to ambient temperatures and began to sink. A more realistic countermeasure would be to suspend a fine-mesh net from the bottom of the

fire-containment boom, such that it extends across the apex of the burn area. This might allow the capture of burn residues as they cool, become more viscous, and start to sink.

There are two recommendations from the study: (1) large-scale *in situ* burn tests should be conducted to confirm the validity of the correlations developed in this study and (2) a prototype of the netting concept should be constructed and subjected to tank testing to confirm its viability for residue containment and to document its effect on boom performance.

For further information, contact Dr. Thomas Purcell, Senior Environmental Scientist, American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005, (telephone: (202) 682-8339, electronic mail: purcelltl@api.org).

C. Integrated Deepwater System Project (CG)

The Coast Guard (CG), U.S. Department of Transportation, has published a Final Programmatic Environmental Impact Statement (FPEIS) for the Integrated Deepwater System Project. Dated March 22, 2002, the document addresses the Coast Guard's proposal to replace its aging nation-wide system of assets used to execute its deepwater missions with an integrated system of surface, air, logistics, communication, and sensor systems over the next several decades. This FPEIS considers the effects of the proposed action and the effects of a No Action Alternative. As a programmatic document, it covers general issues in a broad, program-oriented analysis. Subsequent documentation under the National Environmental Policy Act (NEPA) will concentrate on specific implementing actions.

As discussed in the FPEIS, the Deepwater Project breaks with the traditional acquisition process to implement an innovative and unique mission performance-based acquisition approach. Industry teams were provided with the mission requirements, a system performance specification, and the different scenarios under which the Coast Guard is anticipated to operate in the future. These teams were then challenged to develop an integrated system of assets that can most effectively meet the deepwater mission requirements of the 21st century at the lowest cost to the taxpayer. The Deepwater Project focuses on the potential mission capability achieved from a complete system of assets and not on the capabilities of specific asset types. This strategy is often referred to as a "system of systems" approach. The Coast Guard will award a single, delivery/task order, award-term contract for a guaranteed minimum dollar value to one of the industry teams. The scope of this contract includes continued design, system asset integration, and the eventual delivery of the Integrated Deepwater System.

The project scope includes the entire range of these deepwater assets, including cutters, aircraft, logistics, and communication systems. The project area includes the areas where Coast Guard deepwater operations normally occur. These areas include the 200-mile Exclusive Economic Zones (EEZs) around U.S. coastlines, but some missions, such as search and rescue, law enforcement, alien migrant interdiction, and national defense, occur outside the EEZ in the Global Commons.

The Action Alternative may best be described as a mix of cutters, aircraft, communications equipment, and sensors consisting of the following:

1. A total number of cutters of more than 53 and fewer than 136, with conventional and commercially available equipment (no nuclear power plants), ranging in length from 80 feet to 500 feet, and ranging in gross weight from 100 tons to 5,000 tons.

2. A total number of aircraft of more than 87 and fewer than 201 rotary-wing and fixed-wing aircraft that are commercial aircraft variants (commercial-off-the-shelf), ranging in gross weight from 5,000 pounds to 175,000 pounds; and

3. Communications and surveillance equipment and sensors that are integral to the vessel and aircraft assets and that would use existing commercial and government systems and networks instead of new satellites or towers.

For further information, contact LCdr. Eric Johnson, Deepwater Program Office (G-D), U.S. Coast Guard, 2100 Second Street, SW, Washington, DC 20593, (telephone: (202) 267-1665, electronic mail: ejohnson@comdt.uscg.mil).

D. Aquatic, Nearshore, and Upland Confined Disposal Facilities (PIANC)

The International Navigation Association (PIANC) has published a guidance document titled *Environmental Guidelines for Aquatic, Nearshore, and Upland Confined Disposal Facilities for Contaminated Dredged Material*. A confined disposal facility (CDF) is an engineered construction for the containment of contaminated dredged material in order to control potential releases to the environment. Contaminated dredged material (CDM) is any sediment that is removed by dredging and that contains contaminants at levels and availability that can make the material environmentally unacceptable for unrestricted use.

According to this report, the management of dredged material is a key issue when infrastructure for canals, navigable inland waterways, and ports is being created. If this dredged material is contaminated, the management becomes more complicated. The starting point of these guidelines is that a decision has already been made to dredge the contaminated sediments. The selection of the best option to deal with CDM should be systematic and logical. The options are beneficial uses and aquatic or land-based disposal. If the material is too contaminated or the cost is too high to allow any of these alternatives, the options are confined disposal or, when necessary, treatment.

The purpose of this report is to provide state of the art guidance for planning, designing, constructing, operating, and managing a CDF. Topics addressed include: framework for planning, design, and implementation of a CDF; regulations and legislation; site and sediment characterization; processes and potential environmental impacts; design and construction of upland, island/nearshore, and subaquatic CDFs; management and operational aspects for CDFs; monitoring; and long-term management and subsequent site use. The report also contains both general and specific conclusions and recommendations.

The document's general conclusions and recommendations are as follows:

1. Effective control of sources of contamination to sediments is necessary to reduce the amount of CDM entering navigation projects and thereby reduce the costs for disposal, the need for additional CDFs, and negative impacts on the environment. The dredging of CDM represents a generally positive environmental benefit by removing the uncontrolled exposure of contamination to the water body.

2. CDFs are an effective and commonly used management option for contaminated dredged material worldwide. Several options are available for on-land, nearshore, and sub-aquatic sites, and no single option is preferred above the others.

3. Selection of a particular type of CDF depends upon each situation, and each option must be considered on its merits. A site specific or case-by-case approach is needed.

4. A generic framework for planning a CDF has been developed for worldwide use. The CDF Technical Framework can be adapted to relevant national circumstances and legislative requirements because it is both comprehensive and flexible.

5. Consultation with stakeholders and the public is very important and can be mutually beneficial. Consultation will provide relevant information and will serve to involve all parties from an early stage of project planning. The consultation process should continue throughout the lifetime of the facility as needed.

6. Adequate time should be considered for planning, consultation, designing, and implementing a CDF.

For further information, contact the PIANC General Secretariat, Graaf de Ferraris-gebouw – 11th floor, Boulevard du Roi Albert II 20, B.3, B-1000 Brussels, Belgium, (Internet Web Site: http://www.pianc-aipcn.org).

E. Oil in the Sea (NRC)

The Ocean Studies Board and the Transportation Research Board/Marine Board, both of the National Research Council (NRC), have completed a report titled *Oil in the Sea: Inputs, Fates, and Effects*. According to the report, nearly 85 percent of the 29 million gallons of petroleum that enter North American ocean waters each year as a result of human activities comes from land-based runoff, polluted rivers, airplanes, and small boats and jet skis, while less that 8 percent comes from tanker or pipeline spills. Oil exploration and extraction are responsible for only 3 percent of the petroleum that enters the sea. Another 47 million gallons seep into the ocean naturally from the seafloor. Worldwide, about 210 million gallons of petroleum enter the sea each year from extraction, transportation, and consumption of crude oil and the products refined from it, with an additional 180 million gallons coming from natural seepage. Oil spills can have long-lasting and devastating effects on the ocean environment.

Among the report's findings, conclusions, and recommendations are the following:

1. It is the consumers of oil – not the ships that transport it – that are responsible for most of the oil that finds its way into the ocean. Oil runoff from cars and trucks is increasing in coastal areas where the population is growing and roads and parking lots are expanding to accommodate this growth. Rivers polluted by oil in wastewater or the improper disposal of petroleum products are a significant source of oil in the sea as well. In addition, older two-stroke engines still found on many recreational boats and jet skis were purposely designed to discharge gasoline and oil. Land runoff and recreational boating account for nearly three-quarters of the 25 million gallons of petroleum released into the sea annually through the consumption of petroleum. Other sources of oil from human activities include military and commercial jets that occasionally jettison excess fuel over the ocean and ships that release oil from their engines while in port or at sea.

2. The U.S. Coast Guard and the U.S. Maritime Administration should work with ship owners domestically and internationally through the International Maritime Organization (IMO) to expand and enforce shipping standards that already have contributed to a decline in oil spills and operational discharges. Annually, about 2.7 million gallons of petroleum spill into North American waters while being transported to market. However, large tanker spills are still possible, especially in areas without stringent safety procedures and inspections. The U.S. Department of Transportation and the U.S. Environmental Protection Agency should continue to work with state environmental agencies and industry to assess and minimize the potential for a significant spill from pipelines and other coastal facilities.

3. The exploration and extraction of oil and natural gas introduces about 880,000 gallons of petroleum to North American waters each year. These leaks are concentrated where oil-drilling rigs are at work in the Gulf of Mexico and in waters off southern California, northern Alaska, and eastern Canada. The amount of petroleum released during extraction has dropped significantly, but the threat of a spill cannot be ignored. To that end, the U.S. Minerals Management Service should continue to work with state environmental agencies and industry to promote extraction techniques that minimize accidental or intentional releases of petroleum.

4. In addition, federal ocean-management agencies should try to develop more accurate techniques for estimating the amount of oil that seeps into the ocean from geologic formations beneath the seafloor. This would help researchers distinguish the effects of petroleum released by natural processes versus human activities, and study how marine life responds to the introduction of oil.

5. Even a small oil spill in an ecologically sensitive area can have long-term adverse effects. A spill's influence also depends on the type and amount of toxins present in the petroleum product being released. The riskiest toxins are a class of organic compounds known as polycyclic aromatic hydrocarbons, or PAHs. Growing evidence suggests that PAHs and other toxic compounds can have adverse effects on marine species even at very low concentrations. This means that chronic releases from runoff and recreational boating may inflict more damage than previously thought, and that the effects of large spills may last as

long as residual oil persists in the area. Significant research has been conducted in recent years confirming that large oil spills can be devastating to the marine environment. They kill fish, mammals, birds, and their offspring; destroy plant life; and reduce the food supply for organisms that survive. Spills also disrupt the structure and function of marine communities and ecosystems, although more research is needed to better understand how spills affect overall populations. To aid this research, a federal rapid-response team should be created to rush to oil spills and collect real-time data.

6. Where oil seeps naturally into the ocean, local marine ecosystems have been significantly altered. In seepage areas in the Santa Barbara Channel off California, there is little diversity among organisms, which consist mainly of bacteria and a few invertebrate species.

7. Less is known about how chronic releases from sources such as land runoff and inefficient two-stroke engines on boats and jet skis affect marine ecology. The federal government, in cooperation with academia and industry, should launch a major research effort aimed at better understanding how chronic releases of petroleum affect the marine environment, especially when organisms in already polluted waters are exposed to the multiple toxins found in oil. Studying the small, chronic releases that occur at oil-drilling sites may aid this effort.

For further information, contact Mr. Bill Kearney, Media Relations Officer, National Academies/National Research Council, 2101 Constitution Avenue, NW, Washington, DC 20418, (telephone: (202) 334-2138).

F. Ballast Water Management (CG/DOT)

During June 2002, the Secretary of Transportation and the Coast Guard (CG), U.S. Department of Transportation (DOT), released the *Report to Congress on the Voluntary National Guidelines for Ballast Water Management*. Spurred by the negative environmental and social impacts of the zebra mussel invasion of the Great Lakes and by evidence of an increasing number of biological invasions of other aquatic ecosystems by nonindigenous species, the U.S. Congress enacted the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646) and the National Invasive Species Act of 1996 (NISA)(P.L. 104-332) to prevent and control infestations of the U.S. coastal and inland waters by nonindigenous aquatic nuisance species (ANS). As directed by these two laws, the Secretary of Transportation, acting through the U.S. Coast Guard, established mandatory ballast water management (BWM) regulations for the Great Lakes ecosystem and voluntary guidelines for the remainder of U.S. waters. Section 1101(d) of NISA directed the Secretary to assess and report on the effectiveness of the voluntary guidelines to Congress and, if necessary, take appropriate regulatory actions to ensure the legislative intent is realized. This report is provided to meet this requirement.

The primary data used in this report are from the National Ballast Survey, which was developed and implemented by the Coast Guard and the National Ballast Information Clearinghouse (NBIC). The NBIC was collaboratively established by the Coast Guard and the Smithsonian Environmental Research Center to collect and analyze information and data regarding

compliance with ballast water reporting requirements and patterns of ballast water delivery and management throughout the nation.

Analysis of the information received under the voluntary guidelines indicates that:

1. Only 30.4% of regulated ships submitted reports during the first 24 months that reporting requirements were in effect. Over the 2-year period, the monthly compliance rate increased gradually from about 20% initially to a final rate of about 40%.

2. About one half (51.2%) of the reporting ships that discharged ballast water performed some degree of ballast water exchange. Over the 2-year period, there was little change in the proportion of the reporting vessels that conducted an exchange of ballast water. The reasons for not performing ballast water exchange were varied and included constraints posed by the vessels itinerary, as well as ship and crew safety concerns.

Due to the low reporting, the resulting inability to make valid program assessments, and the broad support for a mandatory national program, the Secretary, as directed by NISA, will issue regulations making the requirements of the voluntary program mandatory and provide the necessary enforcement. Balancing the ecological, social, and economic concerns of the affected parties, the Coast Guard will implement a robust national ballast water management (BWM) program that maximizes the use of existing BWM techniques by all vessels, while fostering the development of new ballast water treatment (BWT) technologies. To accomplish this, the following steps will be taken by the Coast Guard:

1. Develop regulations to require all vessels equipped with ballast tanks that enter U.S. waters after operating beyond the Exclusive Economic Zone (EEZ), or that are engaged solely in voyages between U.S. ports, to perform appropriate record keeping and reporting.

2. Issue regulations requiring vessels equipped with ballast tanks that enter the waters of the United States after operating beyond the EEZ to conduct active BWM.

3. Enforce the sanctions established in section 1101(g) of NISA for failing to comply with the program's requirements. The "safety exemption" provided for in section 1101(k) of NISA will remain a central tenant in implementation and enforcement of the BWM program, but its use will be monitored and verified to thwart abuse.

4. Continue its efforts to establish a quantitative BWT performance standard; protocols for testing, verifying, and reporting on BWT technologies; and a program to facilitate experimental shipboard installation and operation of promising BWT technologies.

For further information, contact Cdr. Scott Newsham, Chief, Environmental Standards Division, Office of Operating and Environmental Standards (G-MSO), U.S. Coast Guard, 2100 Second Street, SW, Washington, DC 20593, (telephone: (202) 267-1354, electronic mail: snewsham@comdt.uscg.mil).