United States Environmental Protection Agency

Enforcement And Compliance Assurance (2223A)

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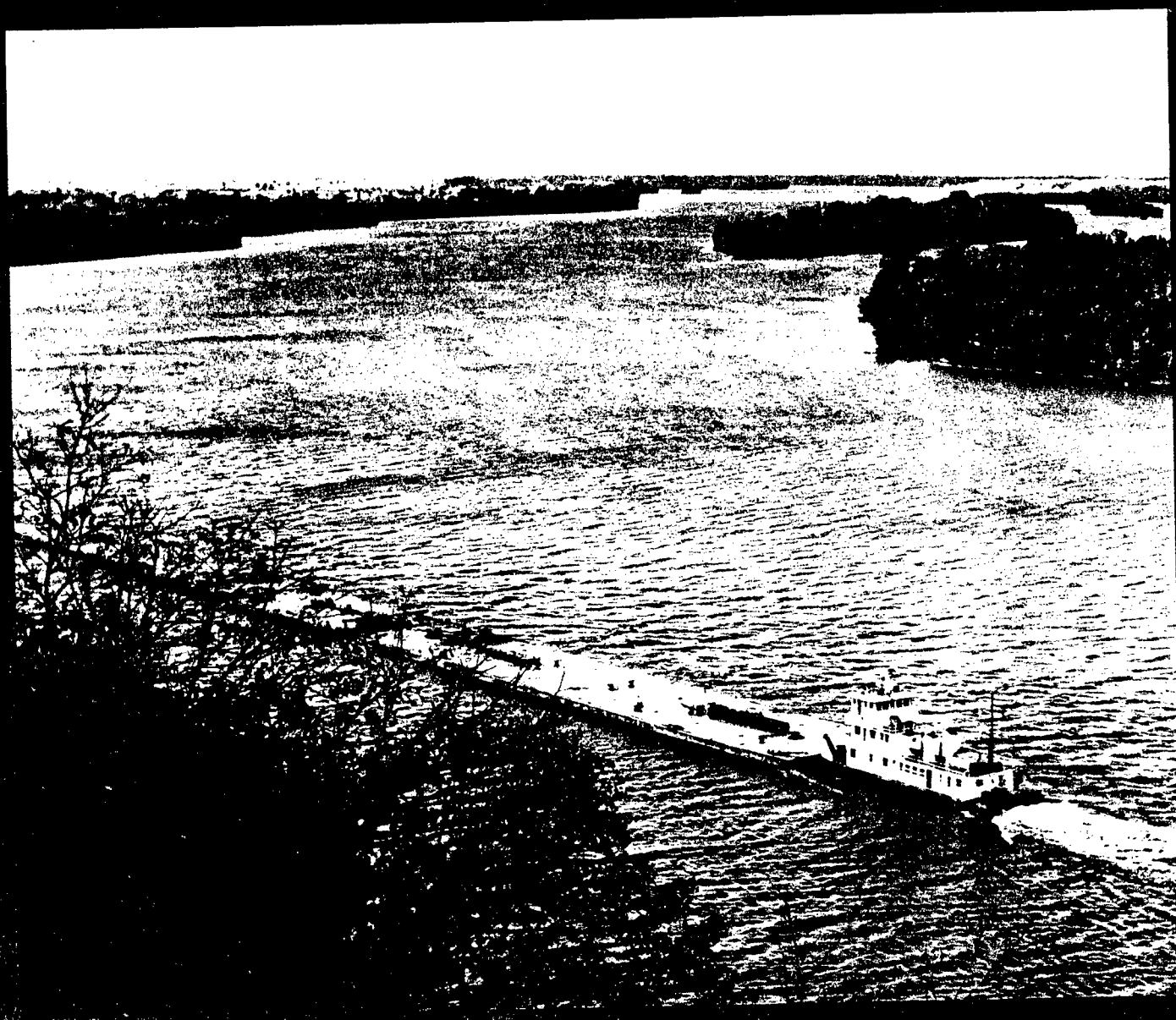
Profile Of The Water Transportation Industry



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SECTOR NOTEBOOKS

EPA Office Of Compliance Sector Notebook Project

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 18 1997

THE ADMINISTRATOR

Message from the Administrator

Since EPA's founding over 25 years ago, our nation has made tremendous progress in protecting public health and our environment while promoting economic prosperity. Businesses as large as iron and steel plants and those as small as the dry cleaner on the corner have worked with EPA to find ways to operate cleaner, cheaper and smarter. As a result, we no longer have rivers catching fire. Our skies are clearer. American environmental technology and expertise are in demand around the world.

The Clinton Administration recognizes that to continue this progress, we must move beyond the pollutant-by-pollutant approaches of the past to comprehensive, facility-wide approaches for the future. Industry by industry and community by community, we must build a new generation of environmental protection.

The Environmental Protection Agency has undertaken its Sector Notebook Project to compile, for major industries, information about environmental problems and solutions, case studies and tips about complying with regulations. We called on industry leaders, state regulators, and EPA staff with many years of experience in these industries and with their unique environmental issues. Together with an extensive series covering other industries, the notebook you hold in your hand is the result.

These notebooks will help business managers to understand better their regulatory requirements, and learn more about how others in their industry have achieved regulatory compliance and the innovative methods some have found to prevent pollution in the first instance. These notebooks will give useful information to state regulatory agencies moving toward industry-based programs. Across EPA we will use this manual to better integrate our programs and improve our compliance assistance efforts.

I encourage you to use this notebook to evaluate and improve the way that we together achieve our important environmental protection goals. I am confident that these notebooks will help us to move forward in ensuring that -- in industry after industry, community after community -- environmental protection and economic prosperity go hand in hand.

Carol M. Browner

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EPA Office of Compliance Sector Notebook Project

Profile of the Water Transportation Industry

September 1997

Office of Compliance
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
401 M St., SW (MC 2221-A)
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Electronic versions of all Sector Notebooks are available via Internet on the Enviroene World Wide Web. Downloading procedures are described in Appendix A of this document.

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APPENDIX A - INSTRUCTIONS FOR DOWNLOADING THIS NOTEBOOK

LIST OF ACRONYMS

AFS	AIRS Facility Subsystem (CAA database)
AIRS	Aerometric Information Retrieval System (CAA database)
BIFs	Boilers and Industrial Furnaces (RCRA)
BOD	Biochemical Oxygen Demand
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	CERCLA Information System
CFCs	Chlorofluorocarbons
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CSI	Common Sense Initiative
CWA	Clean Water Act
D&B	Dun and Bradstreet Marketing Index
ELP	Environmental Leadership Program
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FINDS	Facility Indexing System
HAPs	Hazardous Air Pollutants (CAA)
HSDB	Hazardous Substances Data Bank
IDEA	Integrated Data for Enforcement Analysis
LDR	Land Disposal Restrictions (RCRA)
LEPCs	Local Emergency Planning Committees
MACT	Maximum Achievable Control Technology (CAA)
MCLGs	Maximum Contaminant Level Goals
MCLs	Maximum Contaminant Levels
MEK	Methyl Ethyl Ketone
MSDSs	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards (CAA)
NAFTA	North American Free Trade Agreement
NCDB	National Compliance Database (for TSCA, FIFRA, EPCRA)
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEIC	National Enforcement Investigation Center
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	Nitrogen Dioxide
NOV	Notice of Violation
NO_X	Nitrogen Oxide
NPDES	National Pollution Discharge Elimination System (CWA)
NPL	National Priorities List

LIST OF ACRONYMS (CONTINUED)

NRC	National Response Center
NSPS	New Source Performance Standards (CAA)
OAR	Office of Air and Radiation
OECA	Office of Enforcement and Compliance Assurance
OPA	Oil Pollution Act
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
OSHA	Occupational Safety and Health Administration
OSW	Office of Solid Waste
OSWER	Office of Solid Waste and Emergency Response
OW	Office of Water
P2	Pollution Prevention
PCS	Permit Compliance System (CWA Database)
POTW	Publicly Owned Treatments Works
RCRA	Resource Conservation and Recovery Act
RCRIS	RCRA Information System
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SEPs	Supplementary Environmental Projects
SERCs	State Emergency Response Commissions
SIC	Standard Industrial Classification
SO_2	Sulfur Dioxide
SO_X	Sulfur Oxides
TOC	Total Organic Carbon
TRI	Toxic Release Inventory
TRIS	Toxic Release Inventory System
TCRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
TSS	Total Suspended Solids
UIC	Underground Injection Control (SDWA)
UST	Underground Storage Tanks (RCRA)
VOCs	Volatile Organic Compounds

WATER TRANSPORTATION INDUSTRY (SIC 44)

I. INTRODUCTION TO THE SECTOR NOTEBOOK PROJECT

I.A. Summary of the Sector Notebook Project

Integrated environmental policies based upon comprehensive analysis of air, water and land pollution are a logical supplement to traditional single-media approaches to environmental protection. Environmental regulatory agencies are beginning to embrace comprehensive, multi-statute solutions to facility permitting, enforcement and compliance assurance, education/ outreach, research, and regulatory development issues. The central concepts driving the new policy direction are that pollutant releases to each environmental medium (air, water and land) affect each other, and that environmental strategies must actively identify and address these inter-relationships by designing policies for the "whole" facility. One way to achieve a whole facility focus is to design environmental policies for similar industrial facilities. By doing so, environmental concerns that are common to the manufacturing of similar products can be addressed in a comprehensive manner. Recognition of the need to develop the industrial "sector-based" approach within the EPA Office of Compliance led to the creation of this document.

The Sector Notebook Project was originally initiated by the Office of Compliance within the Office of Enforcement and Compliance Assurance (OECA) to provide its staff and managers with summary information for eighteen specific industrial sectors. As other EPA offices, states, the regulated community, environmental groups, and the public became interested in this project, the scope of the original project was expanded to its current form. The ability to design comprehensive, common sense environmental protection measures for specific industries is dependent on knowledge of several inter-related topics. For the purposes of this project, the key elements chosen for inclusion are: general industry information (economic and geographic); a description of industrial processes; pollution outputs; pollution prevention opportunities; Federal statutory and regulatory framework; compliance history; and a description of partnerships that have been formed between regulatory agencies, the regulated community and the public.

For any given industry, each topic listed above could alone be the subject of a lengthy volume. However, in order to produce a manageable document, this project focuses on providing summary information for each topic. This format provides the reader with a synopsis of each issue, and

references where more in-depth information is available. Text within each profile was researched from a variety of sources, and was usually condensed from more detailed sources pertaining to specific topics. This approach allows for a wide coverage of activities that can be further explored based upon the citations and references listed at the end of this profile. As a check on the information included, each notebook went through an external review process. The Office of Compliance appreciates the efforts of all those that participated in this process who enabled us to develop more complete, accurate and up-to-date summaries. Many of those who reviewed this notebook are listed as contacts in Section IX and may be sources of additional information. The individuals and groups on this list do not necessarily concur with all statements within this notebook.

I.B. Additional Information

I.B.1. Providing Comments

OECA's Office of Compliance plans to periodically review and update the notebooks and will make these updates available both in hard copy and electronically. If you have any comments on the existing notebook, or if you would like to provide additional information, please send a hard copy and computer disk to the EPA Office of Compliance, Sector Notebook Project, 401 M St., SW, (2223-A), Washington, DC 20460. Comments can also be uploaded to the Enviroene World Wide Web for general access to all users of the system. Follow instructions in Appendix A for accessing this system. Once you have logged in, procedures for uploading text are available from the on-line Enviroene Help System.

I.B.2. Adapting Notebooks to Particular Needs

The scope of the industry sector described in this notebook approximates the national occurrence of facility types within the sector. In many instances, industries within specific geographic regions or states may have unique characteristics that are not fully captured in these profiles. The Office of Compliance encourages state and local environmental agencies and other groups to supplement or re-package the information included in this notebook to include more specific industrial and regulatory information that may be available. Additionally, interested states may want to supplement the "Summary of Applicable Federal Statutes and Regulations" section with state and local requirements. Compliance or technical assistance providers may also want to develop the "Pollution Prevention" section in more detail. Please contact the appropriate specialist listed on the opening page of this notebook if your office is interested in assisting us in the further development of the information or policies addressed within

this volume. If you are interested in assisting in the development of new notebooks for sectors not covered in the original eighteen, please contact the Office of Compliance at 202-564-2395.

II. Introduction to the Water Transportation Industry

This section presents the water transportation operations covered in this document and defines those operations in terms of their Standard Industrial Classification (SIC) code. It also provides background information on the size, geographic distribution, and economic condition of the water transportation industry.

II.A. Introduction, Background, and Scope of the Notebook

This notebook pertains to the water transportation industry as classified within Standard Industrial Classification (SIC) code 44 (Water Transportation). (Please note that this section provides both the SIC code and the new North American Industrial Classification System [NAICS] code [in parenthesis], which went into effect January 1, 1997. While the NAICS code is identified in this section, the remainder of the document still refers to the SIC codes for specific water transportation activities.) The transportation industry includes other modes of transport such as trucking, railroad, pipeline, and airplane. Although these are not addressed in this document, they make up an important portion of overall transportation activity in the United States.

The transportation industry affects nearly every American. Either through the necessity of traveling from one place to another, shipping goods and services around the country, or working in a transportation-related job, transportation's share of the national economy is significant. According to the Eno Transportation Foundation, for all transportation-related industries, total transportation expenditures in the U.S. accounted for 16.1 percent of the gross national product in 1993.

The water transportation industry (SIC 44, NAICS 44) includes establishments engaged in freight and passenger transportation on the open seas or inland waters and establishments furnishing such incidental services as lighterage, towing, and canal operations. This group also includes excursion and sightseeing boats, water taxis, and cargo handling operations. Specifically, this notebook includes the following groups:

SIC 4412 (NAICS 483111) - Deep Sea Foreign Transportation of Freight. Establishments primarily engaged in operating vessels for the transportation of freight on the deep seas between the United States and foreign ports. Establishments operating vessels for the transportation of freight that travel to foreign ports and also to noncontiguous territories are classified in this industry.

SIC 4424 (NAICS 483113)- Deep Sea Domestic Transportation of Freight. Establishments primarily engaged in operating vessels for the transportation of freight on the deep seas between ports of the United States, the Panama Canal Zone, Puerto Rico, and United States island possessions or protectorates. Also included are operations limited to the coasts of Alaska, Hawaii, or Puerto Rico.

SIC 4432 (NAICS 483113) - Freight Transportation on the Great Lakes--St. Lawrence Seaway. Establishments primarily engaged in the transportation of freight on the Great Lakes and the St. Lawrence Seaway, either between United States ports or between United States and Canadian ports.

SIC 4449 (NAICS 483211) - Water Transportation of Freight, N.E.C. Establishments primarily engaged in the transportation of freight on all inland waterways, including the intracoastal waterways on the Atlantic and Gulf coasts.

SIC 4481 (NAICS 483112 and 483114) - Deep Sea Transportation of Passengers, Except by Ferry. Establishments primarily engaged in operating vessels for the transportation of passengers on the deep seas.

SIC 4482 (NAICS 483114 and 483212) - Ferries. Establishments primarily engaged in operating ferries for the transportation of passengers or vehicles.

SIC 4489 (NAICS 483212 and 48721) - Water Transportation of Passengers, N.E.C. Establishments primarily engaged in furnishing water transportation of passengers, not elsewhere classified, such as airboats (e.g., swamp buggy rides), excursion boat operations, and sightseeing boats.

SIC 4491 (NAICS 48831 and 48832) - Marine Cargo Handling. Establishments primarily engaged in activities directly related to marine cargo handling, from the time cargo for or from a vessel arrives at shipside, dock, pier, terminal, staging area, or in-transit area until cargo loading or unloading operations are completed. Included in this industry are establishments primarily engaged in the transfer of cargo between ships and barges, trucks, trains, pipelines, and wharfs. Cargo handling operations carried on by transportation companies and separately reported are classified here. This industry includes the operation and maintenance of piers, docks, and associated buildings and facilities.

SIC 4492 (NAICS 483113, 483211, and 48833) - Towing and Tugboat Services. Establishments primarily engaged in furnishing marine towing and tugboat services in the performance of auxiliary or terminal services in harbor areas. The vessels used in performing these services do not carry cargo or passengers.

SIC 4493 (NAICS 71393) - Marinas. Establishments primarily engaged in operating marinas. These establishments rent boat slips and store boats, and generally perform a range of other services, including cleaning and incidental boat repair. They frequently sell food, fuel, and fishing supplies, and may sell boats.

SIC 4499 (532411, 48831, 48833, and 48839) - Water Transportation Services, N.E.C. Establishments primarily engaged in furnishing miscellaneous services incidental to water transportation, not elsewhere classified, such as lighterage; boat hiring, except for pleasure; chartering of vessels; canal operation; ship cleaning, except hold cleaning; and steamship leasing.

II.B. Characterization of the Water Transportation Industry

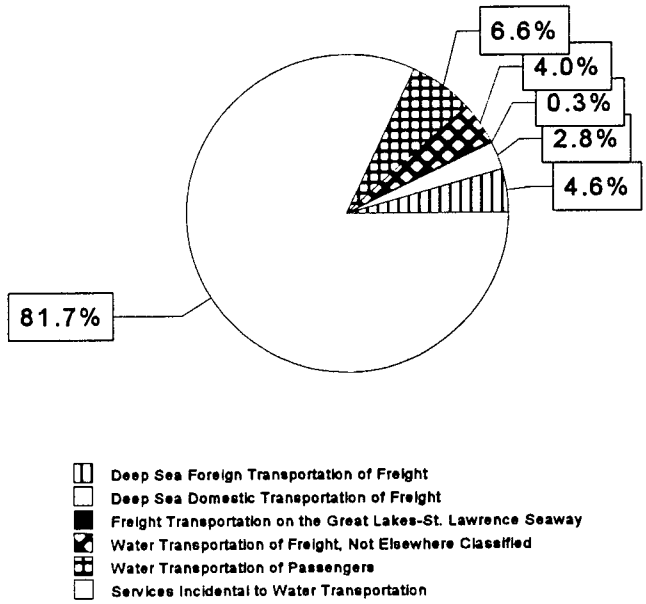
II.B.1. Industry Characterization

Ever since people learned that certain materials float on the water, they have used those materials as a means of moving goods and themselves from one place to another. What probably started as simple pieces of wood have now, through technology and science, grown into multi-million pound tankers and barges that transport literally millions of tons of goods and people across the United States and the world. With the creation of these huge, high-powered vessels came the need to service them and provide a place for loading and unloading their cargo. To support these huge vessels, marine facilities have sprung up in strategic locations across the country, such as at the mouths of bays and rivers. It is these two primary topics - vessels and marine facilities - and the activities and operations that occur within each of these areas that are the primary focus of this notebook.

Vessels

Generally, this sector can be divided into two distinct groups - self propelled vessels and barges. Self-propelled vessels have on-board propulsion systems that are either steam or diesel powered. Barges must rely on other means for movement (e.g., tugboats, pushboats). Within these two categories, the vessels can be defined by three general types:

Exhibit 1. Percentage of Establishments by SIC Code



- General cargo vessels are traditional multipurpose freighters that carry nonuniform items that are packaged as single parcels or assembled together on pallet boards. Cargo is typically lifted on and off the vessels using a crane and wire or rope slings.

- Bulk carriers are vessels that carry homogenous unpacked cargo, usually in shipload lots. There are two types of bulk carriers: 1) dry bulk carriers - designed to carry dry bulk commodities such as grain or ore, and 2) tankers - designed to carry liquid commodities such as oil or petroleum products.

- Intermodal vessels include container vessels and roll-on/roll-off (RO/RO) vessels. Container vessels are designed to carry cargo in standard size preloaded containers that permit rapid loading and unloading and efficient transportation of the cargo to and from the port. In many cases, these containers may be railroad cars or similar sized containers that are loaded or unloaded directly from railroad cars or trucks. RO/ROs allow cars or other vehicles to be driven directly on or off the vessel.

Marine Facilities

Marine facilities are much different than the wooden docks that once served the loading and unloading function for early America. Today, the shoreline contains sophisticated marine facilities that contain state-of-the-art technology and the latest in cargo-handling equipment. Computerized cargo equipment, such as cranes, load and unload vessels at a rapid pace;

computerized gates tell drivers which lanes and piers to go to; and remote intercoms send and receive messages from drivers to clerks to gatehouse guards. These marine facilities also include thousands of square feet of warehouse space, equipment storage yards, and grain elevators. In some cases, these facilities include maintenance and repair shops, including stripping/painting operations, engine repair shops, and machine shops.

Exhibit 1 provides information on the percentage of establishments in each of the SIC codes examined in this notebook; Exhibit 2 presents further information by SIC codes, including the number of establishments, total number of employees, and total annual sales.

Exhibit 2. SIC Code Major Group 44 Market Analysis

SIC Code	Number of Establishments	Total Numbers of Employees	Total Annual Sales (in millions)
4412	618	17,641	19,106
4424	367	7,429	4,917
4432	46	878	416
4449	531	17,548	3,598
4481	107	11,485	5,679
4482	130	2,855	149
4489	639	9,720	1,154
4491	1,198	23,767	3,627
4492	1,056	16,137	2,470
4493	6,334	29,931	1,858
4499	2,303	18,850	1,293
Totals	**13,329**	**156,241**	**44,267**

Source: *D&B Marketplace* (www.dnb.imarketinc.com), 1997

II.B.2. Industry Size and Geographic Distribution

Vessels

As of December 31, 1995, there were nearly 40,000 U.S.-flag vessels. Being a U.S.-flag vessel means the vessel is registered in the United States; it does not mean the vessel was built in the U.S., nor does it mean the vessel is owned or operated by a U.S. citizen. By being registered in the U.S., the vessel is subject to additional U.S. laws and regulations, including environmental laws and regulations, to which foreign-flag vessels are not subject. Of these nearly 40,000 vessels, 31,360 are barges (i.e., not self-propelled). Exhibit 3 provides a detailed breakdown of the vessels by type.

Exhibit 3. U.S.-flag Vessels as of December 31, 1995

Vessel Type	Number
Self-propelled (total)	**8,281**
Dry cargo	726
Tanker	178
Pushboat	1,328
Tugboat	3,799
Passenger	954
Offshore supply	1,288
Unknown	8
Barge (total)	**31,360**
Dry cargo	27,342
Tanker	3,985
Railroad car floats	33
Total self-propelled and barge	**39,641**

Source: U.S. Army Corps of Engineers, December 1995

Water transportation occurs in, and is defined by, three basic geographic areas: 1) coastal, which is from one coastal port to another and can be either domestic or foreign (e.g., New York to Miami, or New York to Hong Kong), 2) Great Lakes, which also can be either domestic or foreign, and 3) inland, which is riverways and lakes of the U.S. only. Exhibit 4

presents data on the activities that occur within each of these three geographic areas. Exhibit 5 identifies the top 15 states based on waterborne traffic, combined domestic and foreign, and provides quantitative data on the tons transported and the percent difference from the previous year.

Exhibit 4. Geographic Distribution of U.S. Waterborne Activities, 1995 [1]

Activity	Coastal [2]	Great Lakes	Inland
Number of ports handling more than 250,000 tons	120	51	23
Domestic traffic			
Tons (millions)	267	116	620
Ton-miles (billions)	440	59	306
Average haul (miles)	1,651	514	493
Foreign traffic [3]			
Tons (millions)	1,095	52	N/A
Ton-miles (billions)	75	32	N/A
Average haul (miles)	68	610	N/A

1. Source: U.S. Army Corps of Engineers, December 1996.
2. All deep draft (more than 12 feet), except Great Lakes and Columbia River
3. Ton-miles and average haul for coastal ports are based on the distance transported on U.S. waterways from entrance channels to ports and waterways. For Great Lakes ports, numbers are based on the distance transported on the Great Lakes and St. Lawrence River to the international boundary at St. Regis, Quebec, Canada.

Marine Facilities

According to the U.S. Army Corps of Engineers, there are more than 9,000 marine facilities in the United States (see Exhibit 6). Of these, the Corps has identified approximately 177 commercial cargo ports, which each handle more than 250,000 tons of cargo annually. (See Exhibit 6 for the geographic distribution of these ports.) Such ports are usually under the auspices of a city, county, or state taxing authority. The Maritime Administration reports there are 1,941 public and private ports in the U.S. with the capacity to berth 3,214 ships, and transport 95 percent of America's international trade. The remainder of the facilities includes

marinas and other water transportation services. Exhibit 6 presents information on the location and type of the more than 9,000 marine facilities.

Exhibit 5. U.S. Waterborne Traffic by State - Top 15 States, 1995 (Millions of Tons and Percent Change from 1994)

State	Domestic		Foreign	
	Million Tons	Percent Change	Million Tons	Percent Change
Louisiana	277	5.0	230	7.9
Texas	125	1.0	225	(2.4)
California	86	(6.8)	93	2.5
Ohio	103	(4.6)	20	13.3
Pennsylvania	76	(0.9)	46	4.0
Washington	57	5.0	65	28.6
Florida	72	(4.5)	45	(0.4)
Illinois	112	3.7	3	(17.3)
Alaska	90	(3.5)	9	5.7
New Jersey	58	(2.5)	40	4.3
New York	53	(6.5)	29	(13.0)
Indiana	77	(0.5)	4	42.7
Virginia	23	4.8	57	16.0
Kentucky	79	(9.5)	0	0
West Virginia	79	6.3	0	0
Source: U.S. Army Corps of Engineers, December 1996				

II.B.3 Economic Trends

Over the past 20 years, the amount of waterborne commerce conducted domestically has remained relatively constant. Since 1976, the total tons transported domestically has risen from 976 million tons to 1,086 million tons, or approximately 10 percent. Over that time, there have been no significant rises or falls. On the foreign side, total commerce has increased

Exhibit 6. Geographic Distribution of U.S. Marine Facilities

Type of Commercial Facility	Atlantic	Gulf	Pacific	Great Lakes	Inland	Total
Cargo	1219	1242	886	455	1706	5508
Service	820	893	775	214	467	3169
Unused	241	154	106	74	195	770
Total	**2280**	**2289**	**1767**	**743**	**2368**	**9447**

Source: U.S. Army Corps of Engineers, December 1996

more than 25 percent from 856 million tons in 1976 to 1,147 million tons in 1995. This increase occurs over the same period in which the total number of U.S.-flag ocean-going vessels decreased by more than half. This can be attributed to several things, including the increased size of ships. In total, waterborne commerce, domestic and foreign combined, has increased more than 20 percent since 1976. Exhibit 7 presents more data on waterborne commerce; Exhibit 8 presents this data graphically from 1986 to 1995.

Exhibit 7. Total Waterborne Commerce, 1976 - 1995 (in million tons)

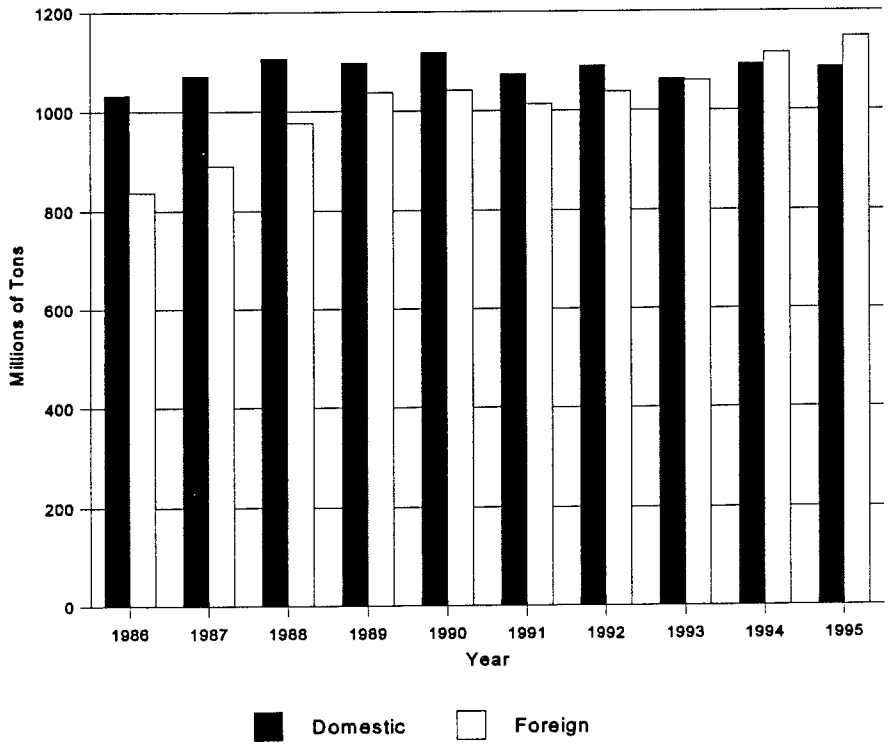
Year	Domestic	Foreign	Total
1976	976.1	856.0	1832.1
1977	969.3	935.3	1904.6
1978	1072.0	946.1	2018.1
1979	1076.3	993.4	2069.7
1980	1073.9	921.4	1995.3
1981	1051.3	887.1	1938.4
1982	954.2	819.7	1773.9
1983	953.4	751.1	1704.5
1984	1029.3	803.3	1832.6
1985	1010.7	774.3	1785
1986	1033.2	837.2	1870.4

Exhibit 7. Total Waterborne Commerce, 1976 - 1995 (in million tons)

Year	Domestic	Foreign	Total
1987	1071.8	891.0	1962.8
1988	1106.6	976.2	2082.8
1989	1097.3	1037.9	2135.2
1990	1117.8	1041.6	2159.4
1991	1074.0	1013.6	2087.6
1992	1090.4	1037.5	2127.9
1993	1063.2	1060.0	2123.2
1994	1093.1	1115.7	2208.8
1995	1086.2	1147.4	2233.6

Source: U.S. Army Corps of Engineers, 1996

Exhibit 8. Total Waterborne Commerce Both Foreign and Domestic, 1986 - 1995



As shown previously in Exhibit 2, the water transportation industry sector accounts for nearly $45 billion in annual sales. Of that $45 billion, nearly 43 percent of those annual sales are earned by the 618 establishments classified as SIC code 4412 (Deep Sea Foreign Transport). As a part of that SIC code, the Maritime Administration reports that the privately owned U.S. deep sea foreign transport fleet (371 vessels) is the ninth largest in the world by deadweight tonnage. This constitutes about 3 percent of the world fleet. Overall, U.S.-flag vessels carry only about 4 percent of all international cargo.

The U.S. is the world's largest trading nation, with more than $1 trillion in trade in 1993. Nearly 50 percent of this trade, by value, was transported by sea. Throughout much of this century, the U.S. merchant marine industry has struggled to compete effectively in the international market. This may be due to the fact that U.S.-flag ships are more expensive to use. The Maritime Administration reports that U.S. flag vessels generally have higher operating and capital costs than foreign-flag vessels and that crew costs are the primary reason for this. U.S. crews receive higher wages and other benefits, and U.S.-flag vessels have higher manning levels. In addition, U.S. shipyards charge more to build and maintain ships. To help the U.S. merchant marine industry compete, the U.S. Congress passed preference cargo laws, which state that most government-owned or financed cargo that is shipped internationally must be carried aboard U.S.-flag vessels. This is known as preference cargo. This promotes the U.S. industry because U.S.-flag vessels are required to be staffed by U.S. mariners, are generally required to be built in the U.S., and are encouraged to be maintained and repaired in the U.S.

III. Water Transportation Operations and Maintenance

This section provides an overview of commonly-employed operations and maintenance activities within the water transportation industry. This discussion is not exhaustive; it is intended to represent the major sources of environmental hazards from vessel and marine terminal operations. The following sections discuss both vessel operations, including on-board life, bilge pumping, tank cleaning, ballasting, power generation, fueling, and marine facility operations, including vessel maintenance, on-shore tanks, fueling, and cargo handling.

III.A. Vessel Operations

III.A.1. On-board Life

The routine, daily operation of any vessel results in the same types of domestic wastes that exist in any household. Sanitary wastes generated by humans are collected in toilets and other such receptacles. Domestic wastes consist of food remains, water from sinks and showers, and laundries. Both types of waste are pumped into holding tank(s) usually located at the bottom of the vessel.

Raw Material Input and Pollution Output

Sanitary and domestic wastes generated onboard a vessel are usually discharged into the water when the holding tank becomes full. Sewage can be very detrimental to the waterways because of its high content of coliform bacteria, low pH levels, and high BOD. However, because it is both economically beneficial and simple, the raw sewage is often discharged directly into the sea. The MARPOL Convention established limits (i.e., miles from shore) for such discharges. These requirements are discussed in more detail in Section V.B - Water Transportation Industry Specific Requirements.

III.A.2. Bilge Pumping

The bilge, which is a collection area located at the bottom of any vessel, collects fuel, oil, on-board spills, and wash waters generated during the daily operation of any vessel. Bilge water also may contain solid wastes, such as rags, metal shavings, paint, glass, and cleaning agents. Bilge waste is pumped to a bilge waste holding tank on the vessel when the level in the bilge gets too high for safe operation (usually one foot). Accumulation and rate of discharges of bilge vary from vessel to vessel.

Raw Material Input and Pollution Output

The pollutants in bilge contain high amounts of BOD, COD, dissolved solids, oil, and other chemicals that accumulate as a result of routine operation. Once in port, a vessel must discharge all bilge and other vessel tanks to onshore tanks usually supplied by the marine facility. Unfortunately, vessels sometimes discharge the contents of the bilge tank directly into the waterway.

III.A.3. Tank Cleaning

After a tanker has unloaded its cargo, all cargo tanks must be cleaned to remove any residue left by the cargo. The degree to which the tanks are cleaned usually depends on the nature of past and future cargos carried on the vessel. Cargos that are compatible (e.g., grains, ores, or petroleum products) may not require as strenuous a cleaning as those cargos that should not be mixed. A high-pressure water spray is the primary method for tank cleaning. Usually, the spray system uses a "Butterworth" nozzle, which releases the pressurized multidirectional spray in both a vertical and horizontal plane that allows the entire tank to be reached by the spray. The pressurized water spray system is either operated by a person, or some vessels are now equipped with automated systems. Upon completion of the high-pressure cleaning, the washwater is pumped into a "slop" tank where it is held until discharged on shore. On oil tankers, the slop tank is pumped back to the cargo tank prior to receipt of a new shipment of oil. This is called "load on top." In addition to cargo changes, other reasons for tank cleaning may include routine maintenance and control of residue buildup, preparation for repair or other maintenance, and preparation for ballast.

Raw Material Input and Pollution Output

Tank cleaning results in significant amounts of wash water that must be held in the "slop" tank until discharged on shore. In the case of oil tankers, this wash water is combined with oily residue. These wastes could be either directly discharged to the sea, or could spill during transfer or collection, or spill on the vessel and be included as part of bilge waste.

III.A.4. Ballasting

Ballasting is the use of water as "cargo" to give the ship maneuverability and stability at sea. In ballasting, seawater is used as a replacement to an off-loaded cargo (e.g., oil) and supplies the weight to place the vessel at the proper draft for its return trip (without cargo). In the case of oil tankers,

after the original cargo is unloaded at its final destination, the tanks that held the oil are filled with seawater to act as ballast. As the oil residue left in the tanks rises to the top, the seawater below the oil is discharged back to sea leaving only the oil residue in the tank. The new cargo is then "loaded on top" of the remaining oil residue. (In addition to new cargo, the vessel may discharge its slop tank into the cargo tank prior to receiving new cargo.) Some vessels are equipped with segregated ballast and able to bypass the entire process of disposing of dirty ballast water.

Raw Material Input and Pollution Output

During ballasting, the clean seawater mixes with the residue in the tanks to form dirty ballast. After the pollutants separate from the water (either rising to the top of the tanks in the case of oil, or settling to the bottom), the separated ballast water is discharged. There is a potential for spills of the dirty ballast if its release is not managed carefully and properly.

III.A.5. Power Generation

The self-propelled vessels of today are primarily powered by diesel engines. However, there are still numerous vessels that rely on steam to power their propulsion system. Approximately half of the U.S. ocean-going fleet is steam-powered. Steam-powered vessels are less efficient and use more fuel than the newer diesel-powered vessels that comprise virtually all of the foreign flag vessels.

Raw Material Input and Pollution Output

Vessel emissions consist primarily of suspended particulates, carbon monoxide, sulfur dioxide, and some nitrogen oxides from propulsion and auxiliary boilers and engines. Coal-fired boilers generate a significant amount of particulates. Heavy particulate emissions also are generated when carbon deposits are blown from the air preheater and superheated tubes in oil- and coal-fired boilers.

It is generally assumed that the pollution load from vessels in a metropolitan air shed is substantially lower than that from other sources such as stationary power-generating plants, automobiles, and industry ashore. At present, it appears boat and ship air emissions are not considered serious polluters because such emissions are minimal compared to the emissions of other sources.

III.A.6. Fueling

There are several ways vessels receive fuel. Many vessels are able to take on fuel directly from a marine facility. Others, because of their size and draft, are not able to pull into a port or other marine facility to refuel. This creates the need for the fuel to be taken to the vessels by specially-designed tanker vessels. This type of refueling occurs via a series of hoses that transport fuel from one vessel to the other.

Raw Material Input and Pollution Output

There are several types of fuel that are used to power vessels. These fuels, if spilled into the water or onto one of the decks of either vessel during a fueling operation, may result in significant environmental impacts if not properly contained. Air and water pollution resulting from fuel spillage are the major environmental concerns associated with fueling operations. The possibility of accidental spillage, however, is substantially reduced by maintaining fuel tanks, lines, and fueling systems.

III.B. Marine Facility Operations

III.B.1. Vessel Maintenance

Painting a vessel to improve appearance and performance and to prevent corrosion and marine organism growth is an important maintenance practice. Prior to applying new paint, however, the surface must be cleaned and the old paint removed. This usually occurs by using a chemical paint stripper to remove the old paint. The most common strippers are based on methylene chloride. Another option is abrasive blasting. Blasting is used primarily because the blasting medium is not hazardous; it may be garnet, flint grit, or steel shot.

The actual painting of a vessel is usually performed using a spray system, although some parts may be hand painted. Oil-based antifouling paints used on the hulls of vessels are toxic in nature to reduce marine organism growth and require solvents as propellants (if sprayed on) and for cleanup of painting equipment. For this reason, special handling of the paint and equipment is necessary. Water-based paints are commonly used on the parts of the vessel that do not come in contact with sea water.

Engine repairs and other types of vessel repairs also may be performed at the marine facilities. Engine repairs may vary from small automotive-type engines of smaller vessels to repairs on large boilers and turbines of tankers or other cargo vessels. These repairs result in the same types of waste as

those at any auto maintenance shop - spent lube and engine oils, solvents, batteries, and coolants. Other repairs may include sheet metal work, metal finishing, or other specialty operations.

Raw Material Input and Pollution Output

Many of the services provided through the marine facilities involve the use of materials and operations that are used in other service industries, including automobile repair, painting services, and body shops. Typical materials used and the resulting wastes are identified in Exhibit 9.

Exhibit 9. Vessel Maintenance Operations, Raw Material Inputs, and Pollution Outputs

Operation	Raw Material Input	Pollution Output
Paint removal	Chemical paint strippers, blast media	Wastewater containing blasting media, organic paint sludges, heavy metals, stripping chemicals, VOCs
Painting	Antifouling paints	Waste paints, thinners, degreasers, solvents, resins and gelcoat, VOCs
Engine repair	Degreasing solvents, carburetor cleaner	Waste turbine oil, lubricants, degreasers, mild acids, batteries, carburetor cleaners, VOCs
Machine shop	Solvents, cutting fluids, degreasing acids and alkalies,	Spent cutting and lube oils, scrap metal, degreasers, VOCs
Metal finishing	Cyanide, heavy metal baths, acids and alkalies.	Cyanide solutions, heavy metal sludges, corrosive acid, and alkali solutions

III.B.2. Onshore Tanks

Most marine terminals have holding tanks on site into which wastes from vessels are pumped. For example, the contents of a slop tank may be discharged to these onshore tanks once a vessel reaches shore. According to the Shipbuilders Council of America, a typical shipyard processes more than 1 million gallons of bilge slops a year. A large facility may generate significantly more. For example, Norfolk Shipbuilding and Drydock Corporation processed 6.6 million gallons of slops in 1990. In addition,

these tanks act as repositories for any liquid wastes generated at the marine terminal (e.g., wash water from painting and cleaning operations).

Raw Material Input and Pollution Output

Raw sewage, domestic waste, oily water waste, and contaminated water are discharged from vessels into onshore tanks. Wastes from onshore operations also may be disposed of in these tanks. Vacuum trucks are used to extract the waste from these tanks and transport it to a place for proper disposal so there are no pollution outputs. Or, in some cases, these tanks may be connected to a sewer or on-site waste treatment plant.

III.B.3. Fueling

An essential part of any marine facility operation is fueling the equipment used for cargo handling. These functions are usually accomplished either by tank trucks or a central underground fueling system and are similar to those at an automobile gas station.

Raw Material Inputs and Pollution Outputs

Air and water pollution resulting from fuel spillage are the major environmental concerns associated with fueling operations. The possibility of accidental spillage, however, is substantially reduced by maintaining fuel tanks, lines, and fueling systems. Fueling accomplished by large vehicular carriers can discharge oil and petroleum wastes into water bodies through spills. Fuel emissions from this type of fueling introduces pollutants into the air.

Underground fueling systems that are not maintained properly can leak and eventually contaminate groundwater. Large fuel spills present an extremely hazardous fire potential and are usually remediated by blanketing with foam and washing the material away with water. Any residue remaining is allowed to evaporate before the area is again used for normal operations. The substances in the wastewater are regulated water pollutants, so wash waters must be processed in a way that is consistent with Clean Water Act (CWA) requirements. In most cases, the State has authority for enforcement of CWA provisions and permit administration. Treatment of wash waters may be required before release to a local sewer system or an outfall regulated by a National Pollutant Discharge Elimination System (NPDES) permit.

III.B.4. Cargo Handling

Marine facilities provide most of the port side services shipping lines require including loading and unloading of general cargo, bulk cargo, and intermodal cargo. General cargo is usually loaded and unloaded using standard equipment such as cranes, forklifts, pallets, tractors, and rope and wire slings. General cargo vessels usually have several large hatches that provide access to the holds. There is separate equipment for each hatch--usually masts and booms or a rotating crane. At dock side, slings are attached to the cargo, which is then lifted aboard ship and transferred into the hold.

Bulk cargo operation terminals handle materials with advanced equipment, such as pneumatic continuous ship loaders and unloaders, belt conveyors, stockpiling and reclaiming machines, or use traditional methods of cranes with grab buckets and front-end loaders. A standard operation consists of conveyors running from the storage area to the shipping dock. The belt conveyors discharge to a conveyor running parallel to the dock, which discharges to a bucket conveyor that lifts the product up to the top of the loading crane and then out over the water. The product is then dropped from the crane conveyor into the loading chute extending down to the hold. The chute extends only to the vessel's hatch, where the product falls to the bottom of the hold. A slinger is located on the bottom of the hold and throws the product to far reaches of the hold. Dry bulk cargo is loaded and unloaded with little manpower, as longshoremen guide spouts and monitor equipment.

The pneumatic conveyor is a pipeline with an air mover located at one end. The air mover creates a current that moves the cargo through the pipeline to the receiver. Air-solids fluidized mixture is passed through a cyclone receiver that separates the solid particles from the air and then send the solids into the receiving storage facility. The advantages of a pneumatic conveyor include greater cleanliness; a very flexible suction and discharge hose; ability to safely handle explosives and corrosive material; and low labor costs and increased safety.

Containerized cargo is usually packed in large metal boxes and can weigh up to 30 tons when fully loaded. Cell guides direct the container during the loading and unloading process, and hold the container in place during shipping. Containers stowed on deck are lashed in place. The terminal operator moves incoming containers with straddle carriers, forklift trucks, or top loaders. Yard tractors and chassis are used to move the containers to the cranes. The containers are then lifted onto cell guides that are in place on the ship.

As the industry expands, the need to unload larger cargoes quicker and faster is more prevalent. There has been full implementation of intermodalism, which has led to more efficient use of storage areas; high-speed, larger capacity loading equipment; and entry gates that have a number of automated functions. New terminal designs have also been implemented to reduce time and cost. The container terminal design includes construction of new integrated intermodal container transfer facilities adjacent to or directly on terminal sites.

Roll-on/Roll-off cargo is driven on and off the vessel using ramps on the sides. These ships are able to handle any size cargo. Cargo unable to be driven onto the ship is put on flats and then loaded.

Hazardous cargo requires certain specifications, including separation from other cargo by cofferdam, void space, cargo pump room, or empty tanks. The cargo should also have pumping and piping systems separated from the other cargo, along with separate tank vent systems. The cargo should not be stored in either the fore or aft peaks.

Raw Material Input and Pollution Output

The majority of the raw materials and wastes associated with a marine facility are associated with the maintenance services that are provided to vessels. However, there are those environmental problems that occur as a result of cargo handling. A significant amount of diesel powered equipment is used in a typical marine facility, such as forklifts, tractors, and front-end loaders. Air emissions from these vehicles, when combined with those from vessels, as well as from trucks and trains that deliver and remove cargo, may contribute to nonattainment of certain air requirements.

As mentioned, there may be an abundance of tanks, both above and below ground, at marine facilities. These tanks present the possibility of leaks and spills, and may also release air emissions (e.g., VOCs) that are subject to air regulations. Excessive generation of particulate matter (e.g., dust or other particles) may occur as a result of cargo handling. Specifically, dry bulk cargo handling causes air, water, and solid waste pollution. The loading and unloading techniques used with this cargo produce high amounts of dust and solid waste accumulation.

IV. POLLUTION PREVENTION OPPORTUNITIES

The best way to reduce pollution is to prevent it in the first place. Some companies have creatively implemented pollution prevention techniques that improve efficiency and increase profits while at the same time minimizing environmental impacts. This can be done in many ways such as reducing material inputs, re-engineering processes to reuse by-products, improving management practices, and employing substitution of toxic chemicals. Some smaller facilities are able to actually get below regulatory thresholds just by reducing pollutant releases through aggressive pollution prevention policies.

The Pollution Prevention Act of 1990 established a national policy of managing waste through source reduction, which means preventing the generation of waste. The Pollution Prevention Act also established as national policy a hierarchy of waste management options for situations in which source reduction cannot be implemented feasiblely. In the waste management hierarchy, if source reduction is not feasible the next alternative is recycling of wastes, followed by energy recovery, and waste treatment as a last alternative.

To encourage these approaches, this section provides both general and company-specific descriptions of some pollution prevention advances that have been implemented within the water transportation industry. While the list is not exhaustive, it does provide core information that can be used as the starting point for facilities interested in beginning their own pollution prevention projects. This section provides summary information from activities that may be, or are being implemented by this sector. When possible, information is provided that gives the context in which the technique can be used effectively. Please note that the activities described in this section do not necessarily apply to all facilities that fall within this sector. Facility-specific conditions must be carefully considered when pollution prevention options are evaluated, and the full impacts of the change must examine how each option affects air, land and water pollutant releases.

IV.A. Water Transportation

Pollution prevention activities in the water transportation industry can be focused on three major areas: vessel maintenance, fueling, and discharges from on-board tanks. Fugitive dust emissions that occur as a result of cargo loading activities can also be reduced through pollution prevention techniques. These three areas are addressed in the following sections.

IV.A.1. Vessel Maintenance

Vessel maintenance is one of the water transportation sector's greatest environmental concerns. The major waste streams are chemical paint stripping wastes, abrasive blast and surface preparation wastes, painting and painting equipment cleaning wastes, solvent wastes, and engine overhauling and repair wastes. The wastes produced from these operations may take a liquid, gaseous, or solid form. Source reduction is the best pollution prevention approach for reducing the amount of wastes produced. Source reduction can be achieved through material substitution, process or equipment modification, recycling, or better operating practices.

Chemical Stripping Wastes

Chemical stripping wastes consist primarily of the stripping agent and paint sludges. Methylene chloride is the most commonly used paint stripping agent, although the industry increasingly is using less toxic agents such as dibasic esters, semi-aqueous terpene-based products, aqueous solutions of caustic soda, and detergent-based strippers that are currently available on the market. Although waste strippers other than methylene chloride are still hazardous, they are relatively less toxic and easier to treat on site.

Storing and reusing or recycling used strippers also are effective waste minimization techniques. Solvent strippers, particularly stripping baths can generally be reused several times before their effectiveness is diminished. Both spent caustic and organic stripping solutions can be treated to remove contaminants. Segregating the spent stripping wastes from other waste streams will help facilitate cost-efficient reuse and recycling of contaminated strippers.

Abrasive Blasting and Surface Preparation Wastes

Abrasive blasting is being used as an alternative for chemical paint stripping. Although blasting does not require disposal of chemical strippers, it does create a large amount of water runoff and air pollution, and the presence of paint chips containing hazardous metals and organometallic biocides can make abrasive blasting wastes potentially hazardous. Research and testing are underway on a number of innovative alternative paint removal and surface preparation techniques including: plastic media blasting, steel shot slingers, water jet stripping, thermal stripping, dry ice pellets, laser paint stripping, and cryogenic stripping. However, an alternative as economically viable and easy as chemical paint stripping has not been found.

- Plastic media blasting has had mixed results. The same types and quantities of solid wastes are generated as with grit blasting, but the plastic media tend to be more easily recyclable through the use of pneumatic media classifiers that are part of the stripping equipment. The abrasion eventually turns the plastic media to dust, making the waste paint the main waste to be disposed of. However, it will not work on epoxy or urethane paints, and the blasting equipment is more expensive and requires more highly trained operators.

- Cavitating water jet stripping systems remove most paints, separates the paint chips from the water, and treats the water to eliminate dissolved toxic materials. Although relatively little hazardous waste is generated by this process, it is not as efficient as conventional grit blasting, and the equipment has higher capital and operating costs.

- The thermal stripping process softens the paint so it can be peeled relatively easily. Although it generates only one waste stream (waste paint), it is more labor-intensive than other stripping methods, and can only be used on non heat-sensitive surfaces.

- Carbon dioxide pellets can be used as a blast medium leaving only paint chips that can be swept up and placed in containers for disposal (the dry ice evaporates). However, the cost of the dry ice, storage, and handling equipment can be substantial.

- A pulsed carbon dioxide laser controlled by an industrial robot to remove paint produces no residue. However, the method is complex, capital intensive, and requires highly skilled operators.

- Cryogenic stripping using liquid nitrogen baths followed by gentle abrasion or plastic shot blasting is useful for small parts or objects, but requires special equipment for handling the liquid nitrogen.

- The most promising technique to prepare the ship for painting is the use of steel shot slingers. The steel shot slingers produce fewer air emissions because the process lowers the amount of blasting required for a finished hull.

Painting and Painting Equipment Cleanup Wastes

Methods for minimizing paint and painting equipment cleanup wastes include tight inventory control, material substitution, and minimizing fugitive oversprays. Tight inventory control techniques such as monitoring

employee operations or limiting access to raw materials storage areas force employees to stretch the use of the raw materials. Use of less toxic cuprous oxide or copper flake types of antifouling paints, and non-toxic water-based paints for parts of the vessel not immersed in water can reduce the amount of hazardous paint waste as well as painting equipment cleanup waste (i.e., solvent wastes). Also, use of powder coatings based on finely pulverized plastics that are baked on at 400° F has been tried as a substitute for paint for some industrial applications.

Minimizing overspray has benefits in terms of both inventory control and elimination of surface water runoff. For inventory control, overspray in non-marine industries can be minimized by using air-assisted, airless, high volume, low pressure turbine, air atomized electrostatic, and airless electrostatic application techniques. In the marine industry, such techniques for overspray control may not be compatible, and their applications need to be evaluated. However, overspray in the marine industry can be minimized by maintaining a fixed distance from the surface while triggering the paint gun, and releasing the trigger when the gun is not aimed at the target. Overspray control for minimizing runoff can be achieved by using plastic sheeting under and around the vessel being painted, or using a paint booth for smaller parts.

Solvent Wastes

To minimize solvent waste generation, the best techniques are good housekeeping, reuse and recycling. Good housekeeping practices, including storage area leak control and containment, improvements in drum location, and product transfer leak collection, can provide very effective source reduction. Solvents can be reused until their effectiveness is compromised, and then they can be recovered and recycled. Processes for recycling thinners and solvents are well established and widely used in many industrial sectors. Waste segregation (i.e., placing different wastes into different containers) is critical to the success of both reuse and recycling programs. In addition, minimizing the use of raw or recycled solvents by materials substitution (such as using water-based paints whenever possible) will greatly reduce the volume of waste generated.

Machine Shop Wastes

The major hazardous wastes from metal machining are waste cutting oils, spent machine coolant, and degreasing solvents. However, scrap metal also can be a component of hazardous waste produced at a machine shop. Material substitution and recycling are the two best means to reduce the volume of these wastes.

The preferred method of reducing the amount of waste cutting oils and degreasing solvents is to substitute water-soluble cutting oils. Recycling of waste cutting oils also is possible, if non-water-soluble oils must be used. Machine coolant can be recycled, and a number of proprietary systems are available to recycle the coolant. Coolant recycling is most easily implemented when a standardized type of coolant is used throughout the shop. Reuse and recycling of solvents also is easily achieved, as mentioned above. Most shops collect scrap metals from machining operations and sell these to metal recyclers. Metal chips which have been removed from the coolant by filtration should be drained and included in the scrap metal collection. Wastes should be carefully segregated to facilitate reuse and recycling.

Engine Repair and Specialty Shop Wastes

Typical wastes from engine repair shops include solvents, waste turbine oils, and batteries. Of these, solvents are generally the only wastes suitable for recovery and recycling on site. However, lightly used waste turbine oil can be reused in some instances, or recycled. Some states operate portions of their motor fleet on this oil, and there are a number of recycling operations equipped to re-refine contaminated oil. In addition, there are several waste exchanges that use the oil as feedstock for other processes. Careful waste handling must be employed to facilitate this type of reuse or recycling.

Used Oil. Most water transportation maintenance facilities recycle or reclaim used oil. Recycling used oil requires equipment like a drip table with a used oil collection bucket to collect oil dripping off parts. Some facilities use absorbent materials (e.g., pigmat) to catch drips or spills during activities where oil drips may occur. Recycling used oil by sending it to a commercial recycling facility saves money and protects the environment. To encourage recycling, the publication "How To Set Up A Local Program To Recycle Used Oil" is available at no cost from the RCRA/Superfund Hotline at 1-800-424-9346 or 1-703-412-9810.

Spent petroleum-based fluids and solids should be sent to a recycling center whenever possible. Solvents that are hazardous waste must not be mixed with used oil, or, under RCRA regulations, the entire mixture may be considered hazardous waste. Non-listed hazardous wastes can be mixed with waste oil, and as long as the resulting mixture is not hazardous, can be handled as waste oil. All used drip pans and containers should be properly labeled.

Batteries. Facilities have many battery disposal options: recycling onsite, recycling through a supplier, or direct disposal. Facilities should explore all options to find one that is right for the facility. Many waste batteries must be handled as hazardous waste. Lead acid batteries are not considered hazardous waste as long as they are recycled. In general, recycling batteries may reduce the amount of hazardous waste stored at a facility, and thus the facility's responsibilities under RCRA. The following best management practices are recommended when sorting used batteries:

- Palletize and label them by battery type (e.g., lead, acid, nickel, and cadmium)
- Protect them from the weather with an acid-proof tarp, roof, or other means
- Store them on an open rack or in a water tight secondary containment unit to prevent leaks
- Inspect them for cracks and leaks as they come into the facility. If a battery is dropped, treat it as if it is cracked. Acid residue from cracked or leaking batteries is likely to be hazardous waste under RCRA because it is likely to demonstrate the characteristic of corrosivity, and may contain lead and other metals.
- Avoid skin contact with leaking or damaged batteries
- Neutralize acid spills, such as with baking soda, and dispose of the resulting waste as hazardous if it still exhibits a characteristic of a hazardous waste.

Equipment Maintenance Fluids. Equipment and motors require regular changing of fluid, including oil, coolant, and others. To minimize releases to the environment, these fluids should be drained and replaced in areas where there are no connections to storm drains or municipal sewers. Minor spills should be cleaned prior to reaching drains. Used fluid should be collected and stored in separate containers. Fluids can often be recycled. For example, brake fluid, transmission gear, and gear oil are recyclable. Some liquids are able to be legally mixed with used motor oil which, in turn, can be reclaimed.

During the process of engine and parts cleaning, spills of fluids are likely to occur. The "dry shop" principle encourages spills to be cleaned immediately, without waiting for the spilled fluids to evaporate into the air,

be transmitted to land, or to contaminate other surfaces. The following techniques help prevent spills from happening:

- Collect leaking or dripping fluids in designated drip pans or containers. Keep all fluids separated so they may be properly recycled.

- Keep a designated drip pan under the vehicle while unclipping hoses, unscrewing filters, or removing other parts. The drip pan prevents splattering of fluids and keeps chemicals from penetrating the shop floor or outside area where the maintenance is occurring.

- Immediately transfer used fluids to proper containers. Never leave drip pans or other open containers unattended.

Radiator fluids are often acceptable to antifreeze recyclers. This include fluids used to flush out radiators during cleaning. Reusing the flushing fluid minimizes waste discharges. Check ahead of time with a licensed recycler to see what types of coolants can be accepted for recycling. If a licensed recycler does not accept some spent flushing fluids, consider changing to another brand of fluid that can be recycled.

If the maintenance facility services air conditioners, special equipment must be used to collect the freon or other refrigerant because it is not permissible to vent the refrigerant to the atmosphere. Reusing the refrigerant on site is less costly than the only other legal alternative, sending the refrigerant to an off site recycler.

IV.A.2. Fueling

Pollution prevention opportunities for marine facility refueling operations primarily focus on the prevention of fuel spillage and the associated air, water, and hazardous waste pollution. Using color-coded dyes to identify fuel grades is a common used technique to prevent the mixtures of fuel and to find fuel leaks easily. One technique to prevent fuel spills is to install spill and overflow protection. All leaking pipe joints, nozzle connections, and any damage to the fueling hose (e.g., kinks, crushing, breaks in the carcass, bulges, blistering, soft spots at the coupling, deep cracks or cuts, spots wet with fuel, or excessive wear) should be reported immediately to reduce the amount of pollution to the environment. Using dry cleanup methods for the fuel area will prevent increased water-related pollution.

Pollution prevention techniques for refueling include the following:

- ✓ Inspect fueling equipment daily to ensure that all components are in satisfactory condition.
- ✓ Employ proper grounding and bonding techniques for a safe fueling operation.
- ✓ If refueling occurs at night, make sure it is carried out it in well lighted area.
- ✓ Do not refuel a vehicle during maintenance as it might provide a source of ignition to fuel vapors.
- ✓ While refueling, check for leaks and make certain that the fueling operator has a clear view of control panel.
- ✓ Never leave nozzle unattended during fueling or wedge or tie nozzle trigger in the open position.
- ✓ Discourage topping off of fuel tanks.

Self-locking fueling nozzles minimize the risk of both fuel spillage and air pollution by ensuring a secure seal between the fuel source and tank.

There are two ways to reduce emissions from vehicles; use battery-operated vehicles or switch to alternative fuels. Natural gas vehicles, for example, are a viable alternative to gasoline- and diesel-powered transportation. Almost any gasoline-powered vehicle can be converted to run on natural gas by installing a natural gas fuel system and storage tanks without removing any existing equipment. Diesel conversions are somewhat more complicated because they also involve reducing compression and adding a sparked-ignition system. Other fuels suitable for vehicles include methanol, ethanol, and propane. Some of the momentum to switch to alternative fuels such as natural gas is coming from legislation. Over the past few years, Congress has passed even stricter clean air laws, as well as incentives to encourage the use of alternative fuels. Federal (and in some areas State) tax deductions for Alternative Fuel Vehicles (AFVs) and related refueling equipment are available. The maximum tax deductions range from $2,000 to $50,000 for each AFV and up to $100,000 on refueling stations.

IV.A.3. On-Board Tank Discharges

Sewage, domestic wastewater, bilge, oil tanker ballast and vessel cleaning wastes may be retained, in various concentrations, in on-board tanks until the vessel returns to port, or they may be discharged to the water body the vessel is operating in. If the wastes are discharged at the port or maintenance yard, the yard or port is the generator of record, and there is little the yard can do to reduce their generation.

With respect to sewage, progress is being made toward increasing discharge and treatment onshore and reducing the volume of sewage wastes carried by vessels. The common solution is to equip the vessels with larger holding tanks and limit the amount of flushing water required. Flushing water adds significantly to the amount of sewage; therefore, limiting its need will lower the quantity of sewage on board vessels. Increasing the size of tanks will help increase the number of onshore discharges.

The deliberate discharge of oily wastes from vessels via bilge pumping, deballasting, and tank washing operations is believed to add more oil to the seas than does the more spectacular, but less frequent, accident-related discharge. Most pollution control techniques for these types of discharges have been aimed at minimization of oily waste discharge. Segregated ballast tanks also will prevent release of oil and associated contaminants into the water.

IV.B. Cargo Handling Operations

Cargo handling operations do generate wastes and hazardous air emissions. Dry bulk-transfer operations generally have dust control problems because dust is generated each time the cargo is transferred. Liquid bulk-transfer operations can be a source of hydrocarbon emissions that are readily converted into photochemical smog by ultraviolet radiation from the sun.

Pneumatic conveyors and slurry pipelines have been used to reduce the amount of dust emissions. Additional steps to control air emissions include enclosing the conveyor transfer points in buildings, using steam or spray as a sealant over the open end of the hopper, placing the loading chute as close as possible to the cargo pile in the hold, and installing telescoping chutes which eliminate the need for slingers.

V. Summary of Applicable Federal Statutes and Regulations

This section discusses the Federal regulations that may apply to this sector. The purpose of this section is to highlight and briefly describe the applicable Federal requirements, and to provide citations for more detailed information. The three following sections are included:

- Section V.A. contains a general overview of major statutes
- Section V.B. contains a list of regulations specific to this industry
- Section V.C. contains a list of pending and proposed regulations

The descriptions within Section VI are intended solely for general information. Depending upon the nature or scope of the activities at a particular facility, these summaries may or may not necessarily describe all applicable environmental requirements. Moreover, they do not constitute formal interpretations or clarifications of the statutes and regulations. For further information, readers should consult the Code of Federal Regulations and other state or local regulatory agencies. EPA Hotline contacts are also provided for each major statute.

V.A. General Description of Major Statutes

V.A.1. Resource Conservation and Recovery Act

The Resource Conservation And Recovery Act (RCRA) of 1976 which amended the Solid Waste Disposal Act, addresses solid (Subtitle D) and hazardous (Subtitle C) waste management activities. The Hazardous and Solid Waste Amendments (HSWA) of 1984 strengthened RCRA's waste management provisions and added Subtitle I, which governs underground storage tanks (USTs).

Regulations promulgated pursuant to Subtitle C of RCRA (40 CFR Parts 260-299) establish a "cradle-to-grave" system governing hazardous waste from the point of generation to disposal. RCRA hazardous wastes include the specific materials listed in the regulations (commercial chemical products, designated with the code "P" or "U"; hazardous wastes from specific industries/sources, designated with the code "K"; or hazardous wastes from non-specific sources, designated with the code "F") or materials which exhibit a hazardous waste characteristic (ignitability, corrosivity, reactivity, or toxicity and designated with the code "D").

Regulated entities that generate hazardous waste are subject to waste accumulation, manifesting, and record keeping standards. Facilities generally must obtain a permit either from EPA or from a State agency

which EPA has authorized to implement the permitting program if they store hazardous wastes for more than 90 days before treatment or disposal. Facilities may treat hazardous wastes stored in less-than-ninety-day tanks or containers without a permit. Subtitle C permits contain general facility standards such as contingency plans, emergency procedures, record keeping and reporting requirements, financial assurance mechanisms, and unit-specific standards. RCRA also contains provisions (40 CFR Part 264 Subpart S and §264.101) for conducting corrective actions which govern the cleanup of releases of hazardous waste or constituents from solid waste management units at RCRA treatment, storage, and disposal facilities.

Although RCRA is a Federal statute, many States implement the RCRA program. Currently, EPA has delegated its authority to implement various provisions of RCRA to 47 of the 50 States and two U.S. territories. Delegation has not been given to Alaska, Hawaii, or Iowa.

Most RCRA requirements are not industry specific but apply to any company that generates, transports, treats, stores, or disposes of hazardous waste. Here are some important RCRA regulatory requirements:

- **Identification of Solid and Hazardous Wastes** (40 CFR Part 261) lays out the procedure every generator must follow to determine whether the material in question is considered a hazardous waste, solid waste, or is exempted from regulation.

- **Standards for Generators of Hazardous Waste** (40 CFR Part 262) establishes the responsibilities of hazardous waste generators including obtaining an EPA ID number, preparing a manifest, ensuring proper packaging and labeling, meeting standards for waste accumulation units, and recordkeeping and reporting requirements. Providing they meet additional requirements described in 40 CFR 262.34, generators may accumulate hazardous waste for up to 90 days (or 180 or 270 days depending on the amount of waste generated and the distance the waste will be transported.

- **Land Disposal Restrictions** (LDRs) (40 CFR Part 268) are regulations prohibiting the disposal of hazardous waste on land without prior treatment. Under the LDRs program, materials must meet LDR treatment standards prior to placement in a RCRA land disposal unit (landfill, land treatment unit, waste pile, or surface impoundment). Generators of waste subject to the LDRs must provide notification of such to the designated TSD facility to ensure proper treatment prior to disposal.

- **Used Oil Management Standards** (40 CFR Part 279) impose management requirements affecting the storage, transportation, burning, processing, and re-refining of the used oil. For parties that merely generate used oil, regulations establish storage standards. For a party considered a used oil processor, re-refiner, burner, or marketer (one who generates and sells off-specification used oil directly to a used oil burner), additional tracking and paperwork requirements must be satisfied.

- **RCRA** contains unit-specific standards for all units used to store, treat, or dispose of hazardous waste, including **Tanks and Containers**. Tanks and containers used to store hazardous waste with a high volatile organic concentration must meet emission standards under RCRA. Regulations (40 CFR Part 264-265, Subpart CC) require generators to test the waste to determine the concentration of the waste, to satisfy tank and container emissions standards, and to inspect and monitor regulated units. These regulations apply to all facilities that store such waste, including large quantity generators accumulating waste prior to shipment off-site.

- **Underground Storage Tanks** (USTs) containing petroleum and hazardous substances are regulated under Subtitle I of RCRA. Subtitle I regulations (40 CFR Part 280) contain tank design and release detection requirements, as well as financial responsibility and corrective action standards for USTs. The UST program also includes upgrade requirements for existing tanks that must be met by December 22, 1998.

- **Boilers and Industrial Furnaces** (BIFs) that use or burn fuel containing hazardous waste must comply with design and operating standards. BIF regulations (40 CFR Part 266, Subpart H) address unit design, provide performance standards, require emissions monitoring, and restrict the type of waste that may be burned.

EPA's RCRA, Superfund and EPCRA Hotline, *at (800) 424-9346, responds to questions and distributes guidance regarding all RCRA regulations. The RCRA Hotline operates weekdays from 9:00 a.m. to 6:00 p.m., ET, excluding Federal holidays.*

V.A.2. Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a 1980 law known commonly as Superfund, authorizes EPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. CERCLA also enables EPA to force parties responsible for environmental contamination to clean it up or to reimburse the Superfund for response costs (including remediation costs) incurred by EPA. The Superfund Amendments and Reauthorization Act (SARA) of 1986 revised various sections of CERCLA, extended the taxing authority for the Superfund, and created a free-standing law, SARA Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

The CERCLA hazardous substance release reporting regulations (40 CFR Part 302) direct the person in charge of a facility to report to the National Response Center (NRC) any environmental release of a hazardous substance which equals or exceeds a reportable quantity. Reportable quantities are listed in 40 CFR §302.4. A release report may trigger a response by EPA, or by one or more Federal or State emergency response authorities.

EPA implements hazardous substance responses according to procedures outlined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). The NCP includes provisions for permanent cleanups, known as remedial actions, and other cleanups referred to as removals. EPA generally takes remedial actions only at sites on the National Priorities List (NPL), which currently includes approximately 1300 sites. Both EPA and states can act at sites; however, EPA provides responsible parties the opportunity to conduct removal and remedial actions and encourages community involvement throughout the Superfund response process.

EPA's RCRA, Superfund and EPCRA Hotline, at (800) 424-9346, answers questions and references guidance pertaining to the Superfund program. The CERCLA Hotline operates weekdays from 9:00 a.m. to 6:00 p.m., ET, excluding Federal holidays.

V.A.3. Emergency Planning And Community Right-To-Know Act

The Superfund Amendments and Reauthorization Act (SARA) of 1986 created the Emergency Planning and Community Right-to-Know Act (EPCRA, also known as SARA Title III), a statute designed to improve community access to information about chemical hazards and to facilitate

the development of chemical emergency response plans by State and local governments. EPCRA required the establishment of State emergency response commissions (SERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs).

EPCRA and the EPCRA regulations (40 CFR Parts 350-372) establish four types of reporting obligations for facilities which store or manage specified chemicals:

- **EPCRA §302** requires facilities to notify the SERC and LEPC of the presence of any extremely hazardous substance (the list of such substances is in 40 CFR Part 355, Appendices A and B) if it has such substance in excess of the substance's threshold planning quantity, and directs the facility to appoint an emergency response coordinator.

- **EPCRA §304** requires the facility to notify the SERC and the LEPC in the event of a release equaling or exceeding the reportable quantity of a CERCLA hazardous substance or an EPCRA extremely hazardous substance.

- **EPCRA §311 and §312** require a facility at which a hazardous chemical, as defined by the Occupational Safety and Health Act, is present in an amount exceeding a specified threshold to submit to the SERC, LEPC and local fire department material safety data sheets (MSDSs) or lists of MSDS's and hazardous chemical inventory forms (also known as Tier I and II forms). This information helps the local government respond in the event of a spill or release of the chemical.

- **EPCRA §313** requires manufacturing facilities included in SIC codes 20 through 39, which have ten or more employees, and which manufacture, process, or use specified chemicals in amounts greater than threshold quantities, to submit an annual toxic chemical release report. This report, known commonly as the Form R, covers releases and transfers of toxic chemicals to various facilities and environmental media, and allows EPA to compile the national Toxic Release Inventory (TRI) database.

All information submitted pursuant to EPCRA regulations is publicly accessible, unless protected by a trade secret claim.

EPA's RCRA, Superfund and EPCRA Hotline, at (800) 424-9346, answers questions and distributes guidance regarding the emergency planning and community right-to-know regulations. The EPCRA Hotline operates weekdays from 9:00 a.m. to 6:00 p.m., ET, excluding Federal holidays.

V.A.4. Clean Water Act

The primary objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's surface waters. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority.

The CWA regulates both direct and indirect discharges. The National Pollutant Discharge Elimination System (NPDES) program (CWA §502) controls direct discharges into navigable waters. Direct discharges or "point source" discharges are from sources such as pipes and sewers. NPDES permits, issued by either EPA or an authorized State (EPA has authorized 42 States to administer the NPDES program), contain industry-specific, technology-based and/or water quality-based limits, and establish pollutant monitoring requirements. A facility that intends to discharge into the nation's waters must obtain a permit prior to initiating its discharge. A permit applicant must provide quantitative analytical data identifying the types of pollutants present in the facility's effluent. The permit will then set the conditions and effluent limitations on the facility discharges.

A NPDES permit may also include discharge limits based on Federal or State water quality criteria or standards, that were designed to protect designated uses of surface waters, such as supporting aquatic life or recreation. These standards, unlike the technological standards, generally do not take into account technological feasibility or costs. Water quality criteria and standards vary from State to State, and site to site, depending on the use classification of the receiving body of water. Most States follow EPA guidelines which propose aquatic life and human health criteria for many of the 126 priority pollutants.

Storm Water Discharges

In 1987 the CWA was amended to require EPA to establish a program to address storm water discharges. In response, EPA promulgated the NPDES storm water permit application regulations. These regulations

require that facilities with the following storm water discharges apply for an NPDES permit: (1) a discharge associated with industrial activity; (2) a discharge from a large or medium municipal storm sewer system; or (3) a discharge which EPA or the State determines to contribute to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

The term "storm water discharge associated with industrial activity" means a storm water discharge from one of 11 categories of industrial activity defined at 40 CFR 122.26. Six of the categories are defined by SIC codes while the other five are identified through narrative descriptions of the regulated industrial activity. If the primary SIC code of the facility is one of those identified in the regulations, the facility is subject to the storm water permit application requirements. If any activity at a facility is covered by one of the five narrative categories, storm water discharges from those areas where the activities occur are subject to storm water discharge permit application requirements.

Those facilities/activities that are subject to storm water discharge permit application requirements are identified below. To determine whether a particular facility falls within one of these categories, consult the regulation.

Category I: Facilities subject to storm water effluent guidelines, new source performance standards, or toxic pollutant effluent standards.

Category ii: Facilities classified as SIC 24-lumber and wood products (except wood kitchen cabinets); SIC 26-paper and allied products (except paperboard containers and products); SIC 28-chemicals and allied products (except drugs and paints); SIC 291-petroleum refining; and SIC 311-leather tanning and finishing; SIC 32 (except 323) - stone, clay, glass, and concrete; SIC 33 - primary metals; SIC 3441 - fabricated structural metal; and SIC 373 - ship and boat building and repairing.

Category iii: Facilities classified as SIC 10-metal mining; SIC 12-coal mining; SIC 13-oil and gas extraction; and SIC 14-nonmetallic mineral mining.

Category iv: Hazardous waste treatment, storage, or disposal facilities.

Category v: Landfills, land application sites, and open dumps that receive or have received industrial wastes.

Category vi: Facilities classified as SIC 5015-used motor vehicle parts; and SIC 5093-automotive scrap and waste material recycling facilities.

Category vii: Steam electric power generating facilities.

Category viii: Facilities classified as SIC 40-railroad transportation; SIC 41-local passenger transportation; SIC 42-trucking and warehousing (except public warehousing and storage); SIC 43-U.S. Postal Service; SIC 44-water transportation; SIC 45-transportation by air; and SIC 5171-petroleum bulk storage stations and terminals.

Category ix: Sewage treatment works.

Category x: Construction activities except operations that result in the disturbance of less than five acres of total land area.

Category xi: Facilities classified as SIC 20-food and kindred products; SIC 21-tobacco products; SIC 22-textile mill products; SIC 23-apparel related products; SIC 2434-wood kitchen cabinets manufacturing; SIC 25-furniture and fixtures; SIC 265-paperboard containers and boxes; SIC 267-converted paper and paperboard products; SIC 27-printing, publishing, and allied industries; SIC 283-drugs; SIC 285-paints, varnishes, lacquer, enamels, and allied products; SIC 30-rubber and plastics; SIC 31-leather and leather products (except leather and tanning and finishing); SIC 323-glass products; SIC 34-fabricated metal products (except fabricated structural metal); SIC 35-industrial and commercial machinery and computer equipment; SIC 36-electronic and other electrical equipment and components; SIC 37-transportation equipment (except ship and boat building and repairing); SIC 38-measuring, analyzing, and controlling instruments; SIC 39-miscellaneous manufacturing industries; and SIC 4221-4225-public warehousing and storage.

Pretreatment Program

Another type of discharge that is regulated by the CWA is one that goes to a publicly-owned treatment works (POTWs). The national pretreatment program (CWA §307(b)) controls the indirect discharge of pollutants to POTWs by "industrial users." Facilities regulated under §307(b) must meet certain pretreatment standards. The goal of the pretreatment program is to protect municipal wastewater treatment plants from damage that may occur when hazardous, toxic, or other wastes are discharged into a sewer system and to protect the quality of sludge generated by these plants. Discharges to a POTW are regulated primarily by the POTW itself, rather than the State or EPA.

EPA has developed technology-based standards for industrial users of POTWs. Different standards apply to existing and new sources within each category. "Categorical" pretreatment standards applicable to an industry on a nationwide basis are developed by EPA. In addition, another kind of pretreatment standard, "local limits," are developed by the POTW in order to assist the POTW in achieving the effluent limitations in its NPDES permit.

Regardless of whether a State is authorized to implement either the NPDES or the pretreatment program, if it develops its own program, it may enforce requirements more stringent than Federal standards.

Spill Prevention, Control and Countermeasure Plans

The 1990 Oil Pollution Act requires that facilities that could reasonably be expected to discharge oil in harmful quantities prepare and implement more rigorous Spill Prevention Control and Countermeasure (SPCC) Plan required under the CWA (40 CFR §112.7). There are also criminal and civil penalties for deliberate or negligent spills of oil. Regulations covering response to oil discharges and contingency plans (40 CFR Part 300), and Facility Response Plans to oil discharges (40 CFR §112.20) and for PCB transformers and PCB-containing items were revised and finalized in 1995.

EPA's Office of Water, at (202) 260-5700, will direct callers with questions about the CWA to the appropriate EPA office. EPA also maintains a bibliographic database of Office of Water publications which can be accessed through the Ground Water and Drinking Water resource center, at (202) 260-7786.

V.A.5. Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) mandates that EPA establish regulations to protect human health from contaminants in drinking water. The law authorizes EPA to develop national drinking water standards and to create a joint Federal-State system to ensure compliance with these standards. The SDWA also directs EPA to protect underground sources of drinking water through the control of underground injection of liquid wastes.

EPA has developed primary and secondary drinking water standards under its SDWA authority. EPA and authorized States enforce the primary drinking water standards, which are, contaminant-specific concentration limits that apply to certain public drinking water supplies. Primary

drinking water standards consist of maximum contaminant level goals (MCLGs), which are non-enforceable health-based goals, and maximum contaminant levels (MCLs), which are enforceable limits set as close to MCLGs as possible, considering cost and feasibility of attainment.

The SDWA Underground Injection Control (UIC) program (40 CFR Parts 144-148) is a permit program which protects underground sources of drinking water by regulating five classes of injection wells. UIC permits include design, operating, inspection, and monitoring requirements. Wells used to inject hazardous wastes must also comply with RCRA corrective action standards in order to be granted a RCRA permit, and must meet applicable RCRA land disposal restrictions standards. The UIC permit program is primarily State-enforced, since EPA has authorized all but a few States to administer the program.

The SDWA also provides for a Federally-implemented Sole Source Aquifer program, which prohibits Federal funds from being expended on projects that may contaminate the sole or principal source of drinking water for a given area, and for a State-implemented Wellhead Protection program, designed to protect drinking water wells and drinking water recharge areas.

EPA's Safe Drinking Water Hotline, at (800) 426-4791, answers questions and distributes guidance pertaining to SDWA standards. The Hotline operates from 9:00 a.m. through 5:30 p.m., ET, excluding Federal holidays.

V.A.6. Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) granted EPA authority to create a regulatory framework to collect data on chemicals in order to evaluate, assess, mitigate, and control risks which may be posed by their manufacture, processing, and use. TSCA provides a variety of control methods to prevent chemicals from posing unreasonable risk.

TSCA standards may apply at any point during a chemical's life cycle. Under TSCA §5, EPA has established an inventory of chemical substances. If a chemical is not already on the inventory, and has not been excluded by TSCA, a premanufacture notice (PMN) must be submitted to EPA prior to manufacture or import. The PMN must identify the chemical and provide available information on health and environmental effects. If available data are not sufficient to evaluate the chemicals effects, EPA can impose restrictions pending the development of information on its health and environmental effects. EPA can also restrict significant new uses of

chemicals based upon factors such as the projected volume and use of the chemical.

Under TSCA §6, EPA can ban the manufacture or distribution in commerce, limit the use, require labeling, or place other restrictions on chemicals that pose unreasonable risks. Among the chemicals EPA regulates under §6 authority are asbestos, chlorofluorocarbons (CFCs), and polychlorinated biphenyls (PCBs).

EPA's TSCA Assistance Information Service, at (202) 554-1404, answers questions and distributes guidance pertaining to Toxic Substances Control Act standards. The Service operates from 8:30 a.m. through 4:30 p.m., ET, excluding Federal holidays.

V.A.7. Clean Air Act

The Clean Air Act (CAA) and its amendments, including the Clean Air Act Amendments (CAAA) of 1990, are designed to "protect and enhance the nation's air resources so as to promote the public health and welfare and the productive capacity of the population." The CAA consists of six sections, known as Titles, which direct EPA to establish national standards for ambient air quality and for EPA and the States to implement, maintain, and enforce these standards through a variety of mechanisms. Under the CAAA, many facilities will be required to obtain permits for the first time. State and local governments oversee, manage, and enforce many of the requirements of the CAAA. CAA regulations appear at 40 CFR Parts 50-99.

Pursuant to Title I of the CAA, EPA has established national ambient air quality standards (NAAQSs) to limit levels of "criteria pollutants," including carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, volatile organic compounds (VOCs), and sulfur dioxide. Geographic areas that meet NAAQSs for a given pollutant are classified as attainment areas; those that do not meet NAAQSs are classified as non-attainment areas. Under section 110 of the CAA, each State must develop a State Implementation Plan (SIP) to identify sources of air pollution and to determine what reductions are required to meet Federal air quality standards. Revised NAAQSs for particulates and ozone were proposed in 1996 and may go into effect as early as late 1997.

Title I also authorizes EPA to establish New Source Performance Standards (NSPSs), which are nationally uniform emission standards for new stationary sources falling within particular industrial categories. NSPSs are

based on the pollution control technology available to that category of industrial source.

Under Title I, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants (NESHAPs), nationally uniform standards oriented towards controlling particular hazardous air pollutants (HAPs). Title I, section 112(c) of the CAA further directed EPA to develop a list of sources that emit any of 189 HAPs, and to develop regulations for these categories of sources. To date EPA has listed 174 categories and developed a schedule for the establishment of emission standards. The emission standards will be developed for both new and existing sources based on "maximum achievable control technology" (MACT). The MACT is defined as the control technology achieving the maximum degree of reduction in the emission of the HAPs, taking into account cost and other factors.

Title II of the CAA pertains to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms EPA uses to regulate mobile air emission sources.

Title IV of the CAA establishes a sulfur dioxide nitrous oxide emissions program designed to reduce the formation of acid rain. Reduction of sulfur dioxide releases will be obtained by granting to certain sources limited emissions allowances, which, beginning in 1995, will be set below previous levels of sulfur dioxide releases.

Title V of the CAA of 1990 created a permit program for all "major sources" (and certain other sources) regulated under the CAA. One purpose of the operating permit is to include in a single document all air emissions requirements that apply to a given facility. States are developing the permit programs in accordance with guidance and regulations from EPA. Once a State program is approved by EPA, permits will be issued and monitored by that State.

Title VI of the CAA is intended to protect stratospheric ozone by phasing out the manufacture of ozone-depleting chemicals and restrict their use and distribution. Production of Class I substances, including 15 kinds of chlorofluorocarbons (CFCs) and chloroform, were phased out (except for essential uses) in 1996.

EPA's Control Technology Center, at (919) 541-0800, provides general assistance and information on CAA standards. The Stratospheric Ozone Information Hotline, at (800) 296-1996, provides general information

about regulations promulgated under Title VI of the CAA, and EPA's EPCRA Hotline, at (800) 535-0202, answers questions about accidental release prevention under CAA §112(r). In addition, the Clean Air Technology Center's website includes recent CAA rules, EPA guidance documents, and updates of EPA activities (www.epa.gov/ttn then select Directory and then CATC).

V.B. Water Transportation Industry Specific Requirements

The water transportation industry is regulated by several different Federal, State, and local agencies. As noted earlier, several government entities regulate specific transportation sectors. The water transportation industry is primarily regulated by the U.S. Coast Guard and EPA. In addition, there are several international treaties and conventions that also impose regulations on the water transportation sector.

Currently, the Coast Guard regulates all sea-going vessels and ensures they comply with U.S. law, as well as international treaties and conventions. The primary regulatory framework for vessels is contained in the MARPOL Convention. MARPOL is an international agreement designed to address the problem of marine pollution from vessels. It consists of five annexes, each of which addresses a different type of marine pollution:

- Annex I - This annex forbids the discharge at sea of oil in certain "special areas" and limits other discharges to 1/30,000 of the cargo. Discharge from machinery spaces (e.g., bilge water) must occur more than 12 miles from land and the oil content must be less than 100 ppm. In addition, Annex I requires that all parties to the convention ensure that adequate facilities are provided for the reception of residues and oily mixtures at marine facilities.

- Annex II - This annex contains regulations for discharges of noxious liquid substances (i.e., bulk liquid chemicals). To date, more than 250 substances have been evaluated and regulated. Such substances can only be discharged to reception facilities, unless certain requirements are met.

- Annex III - This annex requires the issuing of detailed standards on packaging, marking, labeling, documentation, stowage, quantity limitations, exceptions, and notifications for preventing or minimizing pollution by harmful substances.

- Annex IV - Annex IV states that vessels are not permitted to discharge sewage within 4 miles of the nearest land, unless they

have an approved treatment plant. Between 4 and 12 miles from land, sewage must be comminuted and disinfected before discharge.

- Annex V - This annex establishes specific minimum distances for the disposal of garbage at sea. The most important component of this annex is the complete prohibition on the disposal of plastics into the sea.

These annexes are mandatory and all signatory nations, including the United States, are subject to them. The Coast Guard has published regulations imposing requirements implementing these annexes at 33 CFR Part 151.

While the Coast Guard basically regulates vessels and sea-related activities, EPA has responsibility for regulating the marine facilities. EPA has traditionally relied on delegation to States to meet environmental standards, in many cases without regard to the methods used to achieve certain performance standards. This has resulted in States with more stringent air, water, and hazardous waste requirements than the Federal minimum requirements. This document does not attempt to discuss State standards, but rather highlights relevant Federal laws and proposals that affect the water transportation industry.

It is important to remember there is no one specific definition or design for a marine facility. Each consists of various operations and will be subject to regulation based on those operations. The following discussion focuses on some of the regulatory programs that may be applicable to a marine facility.

V.B.1. Ocean Dumping Act

The basic purpose of the Ocean Dumping Act is to regulate intentional ocean disposal of materials. The act consists of the first two titles of the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA). The act basically prohibits all ocean dumping, except that allowed by permits, in any ocean waters under U.S. jurisdiction, by any U.S. vessel, or by any vessel sailing from a U.S. port. The dumping of certain materials is exclusively banned, including radiological, chemical, and biological warfare agents, any high-level radioactive waste, medical wastes, sewage sludge, and industrial waste. Permits for dumping other materials may be obtained from EPA if EPA determines there is no unreasonable danger to human health or the environment.

Four federal agencies have authority under the Ocean Dumping Act: EPA, Corps of Engineers, NOAA, and the Coast Guard. EPA has primary authority for regulating ocean disposal of all substances except dredged spoils, which are under the authority of the Corps of Engineers.

Currently, all ocean disposal of wastes must occur at a site at least 106 miles offshore. Recently, the act was amended giving the states authority to adopt dumping standards that are more stringent than federal requirements and to require that permits conform with long-term management plans for designated dumpsites to ensure permitted activities are consistent with expected uses of the site. Permits issued under the Ocean Dumping Act specify:

- Type of material to be dumped
- Amount to be transported for dumping
- Location of the dumpsite
- Length of time the permit is valid
- Any special provisions for surveillance.

The act requires EPA to make binding the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters. This convention, which is signed by 80 countries, prohibits the dumping of mercury, cadmium, and other substances, such as DDT and PCBs, solid wastes and persistent plastics, oil, high-level radioactive wastes, and chemical and biological warfare agents. The convention also requires special permits for other heavy metals, cyanides and fluorides, and medium- and low-level radioactive wastes.

V.B.2. Clean Water Act

NPDES Requirements. Wastewater from marine facilities discharging to surface waters is regulated under the Federal Water Pollution Control Act (FWPCA). National Pollutant Discharge Elimination System (NPDES) permits must be obtained to discharge wastewater into navigable waters. In some cases, the individual facilities within a larger structure (e.g., within a port or under a port authority) may not have individual NPDES permits, but may discharge to a larger, portwide system that has a permit. As mandated by Section 304(m) of CWA, EPA develops effluent limitation guidelines for certain industrial wastewater discharges from operations. At this time, there are no specific effluent limitation guidelines established for marine operations, although other wastewater discharge restrictions may apply. For example, EPA is in the process of establishing effluent limitation guidelines for the transportation equipment cleaning sector, which will include operations such as ship painting or cleaning. The

guidelines are scheduled to be proposed in 1996 and promulgated in 1998. (Contact: Gina Matthews or Jan Goodwin, Office of Water, 202-260-6036 and 202-260-7152, respectively).

Storm Water Requirements. As discussed under the general description of the Clean Water Act, EPA published storm water regulations on November 16, 1990, which require certain dischargers of storm water to waters of the U.S. to apply for NPDES permits. According to the final rule, facilities with a "storm water discharge associated with industrial activities" are required to apply for a storm water permit. The rule states that transportation facilities classified in SIC 44 that have vehicle maintenance shops or equipment cleaning operations are considered to have a storm water discharge associated with industrial activity. However, only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication) and equipment cleaning operations, or which are otherwise identified under paragraphs (b)(14)(I)-(xi) of Section 122.26 are considered to be associated with industrial activity.

Facilities covered by this rule must submit one of the following permit applications:

- Individual permit application
- Group permit application. A group permit application can be filed by facilities with like operations and discharges.
- Notice of Intent for general permit coverage.

Storm water discharges associated with industrial activity that reach waters of the U.S. through municipal separate storm sewer systems are also required to obtain NPDES storm water permit coverage. Discharges of storm water to a combined sewer system or to a POTW are excluded.

SPCC. The CWA requires facilities to develop Spill Prevention, Control, and Countermeasure (SPCC) plans for petroleum products, such as oil or any substance that cause a sheen on water, if they are stored in large quantities at a particular site. The SPCC program requires reporting spills to navigable waters and the development of contingency plans that must be kept onsite. SPCC plans document the location of storage vessels, types of containment, dangers associated with a major release of material from the tanks, types of emergency equipment available at each site, and procedures for notifying the appropriate regulatory and emergency

agencies. No SPCC plan is considered complete until it has been reviewed and certified by a Registered Professional Engineer.

V.B.3. Resource Conservation and Recovery Act

Water transportation facilities generate a variety of RCRA-regulated wastes in the course of normal operations and utilize underground storage tanks for fuel storage. Vessel refurbishing and maintenance operations generate hazardous wastes such as spent solvents and caustics, and paints and paint sludges. Additional common materials from marine facilities that may be hazardous include:

- Rechargeable nickel-cadmium batteries and lead-acid motor vehicle batteries
- Vehicle maintenance fluids
- Used oil
- Fluorescent light bulbs
- Scraps of metals (cadmium, chromium, lead, mercury, selenium, and silver) and materials containing these metals (e.g., high-grade stainless steel or paint waste)
- Waste solvents
- Near-empty paint cans and spray cans
- Paint stripping residue.

Note that petroleum products and petroleum-containing wastes (e.g., waste oil, contaminated fuel, or fuel spill clean-up wastes) are specifically exempted from RCRA regulations, unless they exhibit any of the hazardous waste characteristics. Many water transportation facilities qualify as hazardous waste generators under RCRA law. Under RCRA, it is the facility's responsibility to determine whether a waste is hazardous. A full list of EPA hazardous wastes can be found at 40 CFR §162.31 - §162.33. RCRA listed wastes are subject to the hazardous waste regulations of 40 CFR Parts 124, 261 through 266, 270, 271, and 302.

Whether or not RCRA regulations apply to on-board vessel wastes has been a question debated among EPA, the Coast Guard, and industry for several years. Currently, on-board oily wastes, such as bilge water, and used oil

are exempt from RCRA Subtitle C regulation, and vessels are not considered hazardous waste generators. The generators of this waste are considered to be those facilities that remove the wastes from the ships and manage it onshore.

V.B.4. Oil Pollution Act

The 1990 Oil Pollution Act (OPA) establishes strict, joint and several liability against facilities that discharge oil or which pose a substantial threat of discharging oil to navigable waterways. OPA imposes contingency planning and readiness requirements on certain facilities defined to include motor vehicles. These requirements affect water transportation establishments. Regulations covering response to oil discharges and contingency plans (40 CFR Part 300), and facility response plans to oil discharges (40 CFR Part 112) were revised and finalized in 1994.

V.B.5. Emergency Planning and Community Right-to-Know Act

CERCLA/EPCRA (SARA Title III) Reporting. CERCLA Section 103(a) requires any person in charge of a vessel or facility to immediately notify the National Response Center of a release of a hazardous substance if, in a 24-hour period, the release is of a quantity equal to or greater than the quantity specified in 30 CFR § 302.

Federally Permitted Release Exemption. CERCLA Section 103(a) exempts those persons in charge of vessels or facilities from reporting releases that are federally permitted.

Emergency Planning. Under EPCRA, marine facilities must notify authorities if they have onsite at any time a listed hazardous substance in an amount over the substance's threshold planning quantity.

Emergency Notification. Marine facilities must also notify authorities of leaks, spills, or other releases to the environment of certain hazardous substances above a designated "reportable quantity." These substances include extremely hazardous substances, as well as CERCLA hazardous substances. Many materials commonly used in the water transportation industry fall into this category of CERCLA hazardous substances, including solvents, ethylene glycol, methanol, methylene chloride, and 1,1,1-trichloroethane.

V.B.6. Clean Air Act

Air Quality Standards - Ozone Non-Attainment Areas. The most important pollutant affected by air quality standards is ozone. Most States regulate "major sources" of air emissions. A major source emits or has the potential to emit more than 100 tons per year of any pollutant or 10 tons per year of any hazardous pollutant. Large vessel maintenance facilities performing painting or using large amounts of solvents may exceed these limits. Emission rates are dependent on the types of chemicals and methods used and the types of air emission control equipment used. Some regulations apply to substances (e.g., solvent degreasers) regardless of the size of the source. These regulations are designed to reduce emissions from solvent evaporation.

Marine facilities located in ozone non-attainment areas may be subject to restrictions applicable to motor vehicles. These restrictions may affect the type and use of vehicles.

NESHAPs. National emission standards for hazardous air pollutants (NESHAP) attempt to control several hundred compounds, the most notable being asbestos. All marine facilities must comply with the NESHAP requirements for asbestos when demolishing, or significantly remodeling, a building or vessel containing asbestos. Asbestos is commonly found in ceiling tile, floor tile, boiler room insulation, and sprayed-on insulation installed more than 20 years ago.

Final Rule for Marine Tank Vessel Loading Operations (40 CFR 63, Subpart Y). Under the authority of the Clean Air Act Amendments of 1990, EPA issued a final rule to reduce emissions of air toxics and volatile organic compounds that result from marine tank vessel loading operations. Under the rule, terminals with an annual marine bulk loading throughput greater than or equal to 10 million barrels per year of gasoline or 200 million barrels of crude oil are required to control emissions of VOCs and HAP resulting from the loading of gasoline or crude oil. These facilities are required to apply reasonably available control technology (RACT).

Facilities that are not subject to RACT but have annual HAP emissions exceeding 10 tons or more or 25 tons or more of aggregate HAP are required to control emissions of HAP. These facilities are subject to the national emission standard for hazardous air pollutants (NESHAP) and are required to apply maximum achievable control technology (MACT) (i.e., 95 percent emission limit).

Facilities controlling loading emissions under RACT or MACT using a combustion device are required to operate the device at 98 percent efficiency. Facilities controlling loading emissions under RACT using a recovery device are required to operate the device at 95 percent efficiency or, for gasoline vapors, reduce the control device outlet concentration to 1,000 parts per million or less. Vessels loading at an affected facility must pass one or two vapor tightness tests or be loaded at less than atmospheric pressure.

Specific monitoring, recordkeeping, and reporting requirements are also required under the regulations

New Source Performance Standards (NSPS). Some facilities subject to NSPS may be found at marine facilities, including industrial and utility boilers, vehicle maintenance facilities, and fuel storage and delivery facilities.

State Implementation Plans (SIPs). SIPs regulate stationary sources, such as buildings and other permanent installations, and mobile sources, such as automobiles. Typical marine facilities and activities that may be subject to stationary source regulations include heating and refrigeration plants; fueling systems; fuel storage facilities; maintenance facilities; roadways, garages, and parking lots; landside development; building demolition; building construction; and capacity enhancing projects. SIPs may also control mobile sources such as fleet vehicles and other vehicles using the marine facility. Marine facilities handle significant traffic and are oftentimes parking areas for other vehicles. SIPs may have to limit motor vehicle emissions through "transportation control measures" (TCMs). TCMs are designed to reduce congestion and the number of vehicle miles traveled in a region. TCMs that affect marine facilities include improved public transit, measures to encourage uses of buses and other high occupancy vehicles, mandatory trip-reduction, and traffic flow improvements.

Ozone-Depleting Substances. The amended CAA is phasing out the production and restricting the use and distribution of ozone-depleting chemicals. EPA has established requirements for servicing and disposal of air conditioning and refrigeration equipment containing regulated ozone-depleting refrigerants. Certified, self-contained recovery equipment must be available during refrigeration equipment servicing. Additional recordkeeping and reporting requirements apply for appliance owners/operators and technicians. Facilities with refrigeration equipment containing ozone-depleting chemicals must comply with the provisions in 40 CFR Part 82.

V.B.7. Federal Insecticide, Fungicide, and Rodenticide Act

FIFRA regulations are applicable to water transportation facilities and operations where herbicides are used to control weeds and brush, insecticides are used to control insect populations, or when other pesticides are used for pest control in buildings. If using such pesticides, marine facility operators should ensure compliance with the label instructions. Certification is required for application of restricted use herbicides.

V.B.8. Hazardous Materials Transportation Act

The transport of hazardous materials is regulated by the DOT under the Hazardous Materials Transportation Act (HMTA). Materials covered by the Act include all RCRA listed wastes and some additional materials deemed by DOT to be dangerous to transport. The HMTA regulations (49 CFR Parts 174-177, and §§171.15 and 171.16) cover packaging, labeling, shipping papers, emergency planning, incident notifications, and liability insurance. Because there is some overlap between the DOT regulation under HMTA and EPA regulations under RCRA, DOT personnel have been active on the committee formed to look at manifesting of tank residues under RCRA.

V.B.9. Coastal Zone Management Act

The Coastal Zone Management Act of 1972 (CZMA) established a program for States and Territories to voluntarily develop comprehensive programs to protect and manage coastal resources (including the Great Lakes). There are 29 federally approved State and Territorial programs. Despite institutional differences, each program must protect and manage important coastal resources, including wetlands, estuaries, beaches, dunes, barrier islands, coral reefs, and fish and wildlife and their habitats. Resource management and protection are accomplished in a number of ways through State laws, regulations, permits, and local plans and zoning ordinances.

While water quality protection is integral to the management of many of these coastal resources, it was not specifically cited as a purpose or policy of the original statute. The Coastal Zone Act Reauthorization Amendments of 1990 specifically charged State coastal programs, as well as State nonpoint source programs, with addressing nonpoint source pollution affecting coastal water quality.

V.B.10. OSHA Safety Rules

Worker safety is regulated by the Occupational Safety and Health Administration (OSHA) (29 CFR §1910.1028) at truck, rail and marine facilities. Safety rules specific to the management of hazardous materials deal with occupational exposure limits, personal protective equipment, materials handling procedures, safety training requirements, and confined space entry procedures.

V.C. Pending and Proposed Regulatory Requirements

V.C.1. Intermodal Surface Transportation Efficiency Act of 1991

The Clinton Administration recently submitted a proposal to reauthorize this act. Under the proposal, state and metropolitan transportation planning would consider the economic viability of the state or metropolitan area. It also addresses how to enhance the integration and connectivity of transportation across and between modes for people and freight. The proposal also provides that state transportation plans be developed in consultation with freight shippers as well as other interested parties.

V.C.2. Clean Water Act

Storm Water. EPA's five-year old baseline general permit for industrial storm water dischargers is set to expire on September 30, 1997, and may not be renewed. A case is being made to allow the baseline permit to expire and cover existing permittees under a modified Multi-Sector General Permit. EPA suggests that industries covered by the baseline permit should explore their options. Most State five-year industrial permits will expire along with the EPA Baseline General Permit on September 30, 1997. Most permits contain a provision stating that the expired permit remains effective and enforceable until replaced. However, the permits also contain a provision requiring permittees to submit a new Notice of Intent (NOI) prior to permit expiration to remain covered. Once a marine terminal is without a permit, it generally cannot reapply for coverage under the expired permit. Contact the permitting authority for more information.

Storm Water Phase II. The Phase II storm water permitting program is currently being developed by EPA and is intended to regulate many of the discharges not covered under the Phase I program. Such discharges include:

- Construction activities between 1 and 5 acres (unless it is part of a larger plan of development or sale

- Discharges composed entirely of storm water.

Although the Phase II regulations have not yet been finalized, there is a requirement that dischargers covered under this phase must apply for permits within 6 years of the date (October 1, 1994) the Phase II regulations were intended to be finalized. The 6-year requirement still remains in effect. EPA also prioritized the discharges to determine a tiered approach to the Phase II permitting process. The following requirements currently apply to the Phase II program:

- Discharges identified by the permitting authority as contributing to a water quality impairment or are a significant contributor of pollutants will be notified of their requirement to apply for an NPDES storm water permit under Phase II

- The notified dischargers have 180 days to apply, unless a later date is approved

- Those dischargers not notified, but who fall under the requirements of the finalized regulations, must apply before October 1, 2000.

Effluent Limitation Guidelines. Presently, there are no effluent limitation guidelines specific to the water transportation industry. Effluent guidelines are currently being developed for the industry (tank interior cleaning only) by the Office of Water (Contact: Gina Matthews or Jan Goodwin, Office of Water, 202-260-6036 and 202-260-7152, respectively). These guidelines will apply to facilities that clean the interiors of tank trucks, rail tank cars, intermodal tank containers, intermediate bulk containers, ocean/sea tankers, and tank barges. EPA is under a court-ordered deadline to propose and promulgate wastewater effluent guidelines for the industry by the end of 1996 and 1998, respectively.

Regulating Discharges of Vessel Sewage. Section 312 of the Clean Water Act entitled Marine Sanitation Devices was established in the Federal Water Pollution Control Act of 1972 to regulate discharges of vessel sewage. A technical amendment to clarify the regulations implementing Section 312 is being developed by the Office of Water (Contact: Deb Lebow, Office of Water, (202) 260-6419). This amendment is expected to be promulgated in September 1997. This proposed regulatory amendment to 40 CFR Part 140.4(b) would clarify the information required in a State application requesting EPA to designate State-specified surface water as a

drinking water intake zone, thereby making it unlawful for vessels to discharge sewage within that zone. This amendment would provide guidance to EPA Regions and States on the specific information necessary for the designation of a drinking water intake zone.

Shore Protection Act, Section 4103(b) Regulations. This rule will implement the Shore Protection Act (SPA) and is designed to prevent the deposit of municipal and commercial waste into U.S. Coastal Waters. This rule establishes minimum waste handling practices for vessels and waste handling facilities involved in the transport of municipal or commercial wastes in the coastal waters of the U.S. Certain vessels or facilities may be required to develop an operation and maintenance manual that identifies procedures to prevent, report, and clean up deposits of waste into coastal waters. (Contact: Deb Lebow, Office of Water, (202) 260-6419).

VI. Compliance and Enforcement History

VI.A. Background

Until recently, EPA has focused much of its attention on measuring compliance with specific environmental statutes. This approach allows the Agency to track compliance with the Clean Air Act, the Resource Conservation and Recovery Act, the Clean Water Act, and other environmental statutes. Within the last several years, the Agency has begun to supplement single-media compliance indicators with facility-specific, multimedia indicators of compliance. In doing so, EPA is in a better position to track compliance with all statutes at the facility level, and within specific industrial sectors.

A major step in building the capacity to compile multimedia data for industrial sectors was the creation of EPA's Integrated Data for Enforcement Analysis (IDEA) system. IDEA has the capacity to "read into" the Agency's single-media databases, extract compliance records, and match the records to individual facilities. The IDEA system can match Air, Water, Waste, Toxics/Pesticides/EPCRA, TRI, and Enforcement Docket records for a given facility, and generate a list of historical permit, inspection, and enforcement activity. IDEA also has the capability to analyze data by geographic area and corporate holder. As the capacity to generate multimedia compliance data improves, EPA will make available more in-depth compliance and enforcement information. Additionally, sector-specific measures of success for compliance assistance efforts are under development.

VI.A.1. Compliance and Enforcement Profile Description

Using inspection, violation and enforcement data from the IDEA system, this section provides information regarding the historical compliance and enforcement activity of this sector. In order to mirror the facility universe reported in the Toxic Chemical Profile, the data reported within this section consists of records only from the TRI reporting universe. With this decision, the selection criteria are consistent across sectors with certain exceptions. For the sectors that do not normally report to the TRI program, data have been provided from EPA's Facility Indexing System (FINDS) which tracks facilities in all media databases. Please note, in this section, EPA does not attempt to define the actual number of facilities that fall within each sector. Instead, the section portrays the records of a subset of facilities within the sector that are well defined within EPA databases.

As a check on the relative size of the full sector universe, most notebooks contain an estimated number of facilities within the sector according to the Bureau of Census (See Section II). With sectors dominated by small businesses, such as metal finishers and printers, the reporting universe within the EPA databases may be small in comparison to Census data. However, the group selected for inclusion in this data analysis section should be consistent with this sector's general make-up.

Following this introduction is a list defining each data column presented within this section. These values represent a retrospective summary of inspections and enforcement actions, and reflect solely EPA, State, and local compliance assurance activities that have been entered into EPA databases. To identify any changes in trends, the EPA ran two data queries, one for the past five calendar years (April 1, 1992 to March 31, 1997) and the other for the most recent twelve-month period (April 1, 1996 to March 31, 1997). The five-year analysis gives an average level of activity for that period for comparison to the more recent activity.

Because most inspections focus on single-media requirements, the data queries presented in this section are taken from single media databases. These databases do not provide data on whether inspections are state/local or EPA-led. However, the table breaking down the universe of violations does give the reader a crude measurement of the EPA's and states' efforts within each media program. The presented data illustrate the variations across EPA regions for certain sectors.[1] This variation may be attributable to state/local data entry variations, specific geographic concentrations, proximity to population centers, sensitive ecosystems, highly toxic chemicals used in production, or historical noncompliance. Hence, the exhibited data do not rank regional performance or necessarily reflect which regions may have the most compliance problems.

VI.A.2. Compliance and Enforcement Data Definitions

General Definitions

Facility Indexing System (FINDS) -- this system assigns a common facility number to EPA single-media permit records. The FINDS identification number allows EPA to compile and review all permit,

[1] EPA Regions include the following states: I (CT, MA, ME, RI, NH, VT); II (NJ, NY, PR, VI); III (DC, DE, MD, PA, VA, WV); IV (AL, FL, GA, KY, MS, NC, SC, TN); V (IL, IN, MI, MN, OH, WI); VI (AR, LA, NM, OK, TX); VII (IA, KS, MO, NE); VIII (CO, MT, ND, SD, UT, WY); IX (AZ, CA, HI, NV, Pacific Trust Territories); X (AK, ID, OR, WA).

compliance, enforcement and pollutant release data for any given regulated facility.

Integrated Data for Enforcement Analysis (IDEA) -- is a data integration system that can retrieve information from the major EPA program office databases. IDEA uses the FINDS identification number to link separate data records from EPA's databases. This allows retrieval of records from across media or statutes for any given facility, thus creating a "master list" of records for that facility. Some of the data systems accessible through IDEA are: AIRS (Air Facility Indexing and Retrieval System, Office of Air and Radiation), PCS (Permit Compliance System, Office of Water), RCRIS (Resource Conservation and Recovery Information System, Office of Solid Waste), NCDB (National Compliance Data Base, Office of Prevention, Pesticides, and Toxic Substances), CERCLIS (Comprehensive Environmental and Liability Information System, Superfund), and TRIS (Toxic Release Inventory System). IDEA also contains information from outside sources such as Dun and Bradstreet and the Occupational Safety and Health Administration (OSHA). Most data queries displayed in notebook sections IV and VII were conducted using IDEA.

Data Table Column Heading Definitions

Facilities in Search -- are based on the universe of TRI reporters within the listed SIC code range. For industries not covered under TRI reporting requirements (metal mining, nonmetallic mineral mining, electric power generation, ground transportation, water transportation, and dry cleaning), or industries in which only a very small fraction of facilities report to TRI (e.g., printing), the notebook uses the FINDS universe for executing data queries. The SIC code range selected for each search is defined by each notebook's selected SIC code coverage described in Section II.

Facilities Inspected -- indicates the level of EPA and state agency inspections for the facilities in this data search. These values show what percentage of the facility universe is inspected in a one-year or five-year period.

Number of Inspections -- measures the total number of inspections conducted in this sector. An inspection event is counted each time it is entered into a single media database.

Average Time Between Inspections -- provides an average length of time, expressed in months, between compliance inspections at a facility within the defined universe.

Facilities with One or More Enforcement Actions -- expresses the number of facilities that were the subject of at least one enforcement action within the defined time period. This category is broken down further into federal and state actions. Data are obtained for administrative, civil/judicial, and criminal enforcement actions. Administrative actions include Notices of Violation (NOVs). A facility with multiple enforcement actions is only counted once in this column, e.g., a facility with 3 enforcement actions counts as 1 facility.

Total Enforcement Actions -- describes the total number of enforcement actions identified for an industrial sector across all environmental statutes. A facility with multiple enforcement actions is counted multiple times, e.g., a facility with 3 enforcement actions counts as 3.

State Lead Actions -- shows what percentage of the total enforcement actions are taken by state and local environmental agencies. Varying levels of use by states of EPA data systems may limit the volume of actions recorded as state enforcement activity. Some states extensively report enforcement activities into EPA data systems, while other states may use their own data systems.

Federal Lead Actions -- shows what percentage of the total enforcement actions are taken by the United States Environmental Protection Agency. This value includes referrals from state agencies. Many of these actions result from coordinated or joint state/federal efforts.

Enforcement to Inspection Rate -- is a ratio of enforcement actions to inspections, and is presented for comparative purposes only. This ratio is a rough indicator of the relationship between inspections and enforcement. It relates the number of enforcement actions and the number of inspections that occurred within the one-year or five-year period. This ratio includes the inspections and enforcement actions reported under the Clean Water Act (CWA), the Clean Air Act (CAA) and the Resource Conservation and Recovery Act (RCRA). Inspections and actions from the TSCA/FIFRA/ EPCRA database are not factored into this ratio because most of the actions taken under these programs are not the result of facility inspections. Also, this ratio does not account for enforcement actions arising from non-inspection compliance monitoring activities (e.g., self-reported water discharges) that can result in enforcement action within the CAA, CWA, and RCRA.

Facilities with One or More Violations Identified -- indicates the percentage of inspected facilities having a violation identified in one of the following data categories: In Violation or Significant Violation Status

(CAA); Reportable Noncompliance, Current Year Noncompliance, Significant Noncompliance (CWA); Noncompliance and Significant Noncompliance (FIFRA, TSCA, and EPCRA); Unresolved Violation and Unresolved High Priority Violation (RCRA). The values presented for this column reflect the extent of noncompliance within the measured time frame, but do not distinguish between the severity of the noncompliance. Violation status may be a precursor to an enforcement action, but does not necessarily indicate that an enforcement action will occur.

Media Breakdown of Enforcement Actions and Inspections -- four columns identify the proportion of total inspections and enforcement actions within EPA Air, Water, Waste, and TSCA/FIFRA/EPCRA databases. Each column is a percentage of either the "Total Inspections," or the "Total Actions" column.

VI.B. Water Transportation Industry Compliance History

This section examines the historical enforcement and compliance data on the water transportation sector. As noted earlier, these data were obtained from EPA's IDEA system. The exhibits within this section provide both a 5-year and a 1-year review of the data from the sector and also provide data from other sectors for comparison purposes. It should be noted that the data are accessed in the IDEA database system through SIC codes. Therefore, these numbers represent the combined total for all the SIC codes presented in Section II of this notebook.

Exhibit 10 provides an overview of the reported compliance and enforcement data for the water transportation sector over the past 5 years (March 7, 1992 - March 6,1997) by EPA region. As shown, there were 514 facilities identified through IDEA with water transportation SIC codes. Of these, 37 percent (192) were inspected in the last 5 years. Other points of interest include:

- Over the 5 years, 816 inspections were conducted at those 192 facilities. On average, each facility was inspected about 4 times over the course of the 5 years. Approximately 60 percent of these inspections were led by the states.

- The 816 inspections resulted in 36 facilities having enforcement actions taken against them. At those 36 facilities, there were a total of 70 enforcement actions, meaning each facility averaged nearly 2 enforcement actions over the past 5 years.

Exhibit 10. Five-Year Enforcement and Compliance Summary for the Water Transportation Industry

A	B	C	D	E	F	G	H	I	J
Region	Facilities in Search	Facilities Inspected	Number of Inspections	Average Months Between Inspections	Facilities with 1 or More Enforcement Actions	Total Enforcement Actions	Percent State Lead Actions	Percent Federal Lead Actions	Enforcement to Inspection Rate
I	26	2	8	195	1	1	100%	0%	0.13
II	51	12	201	15	5	20	45%	55%	0.10
III	54	12	61	53	1	1	100%	0%	0.02
IV	77	47	167	28	6	9	100%	0%	0.05
V	51	35	153	20	2	4	75%	25%	0.03
VI	94	34	118	48	14	22	73%	27%	0.19
VII	15	10	24	38	1	1	0%	100%	0.04
VIII	3	2	2	90	0	0	0%	0%	--
IX	9	6	22	25	0	0	0%	0%	--
X	134	32	60	134	6	12	33%	67%	0.20
TOTAL	514	192	816	38	36	70	61%	39%	0.09

- The average enforcement-to-inspection rate is 0.09. This average rate means that for every 10 inspections conducted, there is approximately 1 resulting enforcement action taken. Across the regions, this rate ranged from 0.02 to 0.2.

VI.B.1. Comparison of Enforcement Activity Between Selected Industries

Exhibits 11 and 12 provide both the 5-year and 1-year enforcement and compliance data for all the industries covered by the sector notebooks. These data allow the reader to compare the enforcement and compliance history of the sectors and identify trends across sectors and over the past 5 years. Overall, the water transportation sector had the sixth (out of 29) fewest number of facilities inspected (192), compared to all the other sectors over the past 5 years. It also had the fewest number of inspections (816) over that same period. Other points of interest from the 5-year comparison include:

- This sector was third lowest among all sectors regarding facilities with 1 or more enforcement actions. The lowest was shipbuilding and repair.

- The total number of enforcement actions was the third lowest among all sectors, following shipbuilding and repair and dry cleaning.

- The enforcement-to-inspection rate over the past 5 years is 0.09; the average for all sectors for the same period is 0.08.

In Exhibit 12, when compared to all sectors over the last year, the water transportation sector had the third fewest number of facilities inspected (84) and the fewest number of inspections (141). The enforcement-to-inspection rate was 0.08; the average for all sectors was 0.06.

Exhibits 13 and 14 provide a more in-depth comparison between the water transportation sector and others by organizing inspection and enforcement data by environmental statute. Exhibit 13 provides inspection and enforcement data from the past 5 years, while Exhibit 14 provides data for the past year only.

As shown, over the past 5 years, inspections and enforcement actions have been divided fairly equally among the CAA, CWA, and RCRA. The numbers from the 1-year summary are consistent with those from the 5-year summary. It should be noted that although no inspections were conducted under the FIFRA/TSCA/EPCRA/Other category, it did account for 9 percent of all enforcement actions.

Exhibit 11. Five-Year Enforcement and Compliance Summary for Selected Industries

A	B	C	D	E	F	G	H	I	J
Industry Sector	Facilities in Search	Facilities Inspected	Number of Inspections	Average Months Between Inspections	Facilities with 1 or More Enforcement Actions	Total Enforcement Actions	Percent State Lead Actions	Percent Federal Lead Actions	Enforcement to Inspection Rate
Metal Mining	1,232	378	1,600	46	63	111	53%	47%	0.07
Coal Mining	3,256	741	3,748	52	88	132	89%	11%	0.04
Oil and Gas Extraction	4,676	1,902	6,071	46	149	309	79%	21%	0.05
Non-Metallic Mineral Mining	5,256	2,803	12,826	25	385	622	77%	23%	0.05
Textiles	355	267	1,465	15	53	83	90%	10%	0.06
Lumber and Wood	712	473	2,767	15	134	265	70%	30%	0.10
Furniture	499	386	2,379	13	65	91	81%	19%	0.04
Pulp and Paper	484	430	4,630	6	150	478	80%	20%	0.10
Printing	5,862	2,092	7,691	46	238	428	88%	12%	0.06
Inorganic Chemicals	441	286	3,087	9	89	235	74%	26%	0.08
Resins and Manmade Fibers	329	263	2,430	8	93	219	76%	24%	0.09
Pharmaceuticals	164	129	1,201	8	35	122	80%	20%	0.10
Organic Chemicals	425	355	4,294	6	153	468	65%	35%	0.11
Agricultural Chemicals	263	164	1,293	12	47	102	74%	26%	0.08
Petroleum Refining	156	148	3,081	3	124	763	68%	32%	0.25
Rubber and Plastic	1,818	981	4,383	25	178	276	82%	18%	0.06
Stone, Clay, Glass and Concrete	615	388	3,474	11	97	277	75%	25%	0.08
Iron and Steel	349	275	4,476	5	121	305	71%	29%	0.07
Metal Castings	669	424	2,535	16	113	191	71%	29%	0.08
Nonferrous Metals	203	161	1,640	7	68	174	78%	22%	0.11
Fabricated Metal Products	2,906	1,858	7,914	22	365	600	75%	25%	0.08
Electronics	1,250	863	4,500	17	150	251	80%	20%	0.06
Automobile Assembly	1,260	927	5,912	13	253	413	82%	18%	0.07
Shipbuilding and Repair	44	37	872	3	21	38	84%	16%	0.04
Ground Transportation	7,786	3,263	12,904	36	375	774	84%	16%	0.06
Water Transportation	514	192	816	38	36	70	61%	39%	0.09
Air Transportation	444	231	973	27	48	97	88%	12%	0.10
Fossil Fuel Electric Power	3,270	2,166	14,210	14	403	789	76%	24%	0.06
Dry Cleaning	6,063	2,360	3,813	95	55	66	95%	5%	0.02

Exhibit 12. One-Year Enforcement and Compliance Summary for Selected Industries

A	B	C	D	E		F		G	H
Industry Sector	Facilities in Search	Facilities Inspected	Number of Inspections	Facilities with 1 or More Violations		Facilities with 1 or more Enforcement Actions		Total Enforcement Actions	Enforcement to Inspection Rate
				Number	Percent*	Number	Percent*		
Metal Mining	1,232	142	211	102	0.48	9	4%	10	0.05
Coal Mining	3,256	362	765	90	12%	20	3%	22	0.03
Oil and Gas Extraction	4,676	874	1,173	127	11%	26	2%	34	0.03
Non-Metallic Mineral Mining	5,256	1,481	2,451	384	16%	73	3%	91	0.04
Textiles	355	172	295	96	33%	10	3%	12	0.04
Lumber and Wood	712	279	507	192	38%	44	9%	52	0.10
Furniture	499	254	459	136	30%	9	2%	11	0.02
Pulp and Paper	484	317	788	248	31%	43	5%	74	0.09
Printing	5,862	892	1,363	577	42%	28	2%	53	0.04
Inorganic Chemicals	441	200	548	155	28%	19	3%	31	0.06
Resins and Manmade Fibers	329	173	419	152	36%	26	6%	36	0.09
Pharmaceuticals	164	80	209	84	40%	8	4%	14	0.07
Organic Chemicals	425	259	837	243	29%	42	5%	56	0.07
Agricultural Chemicals	263	105	206	102	50%	5	2%	11	0.05
Petroleum Refining	156	132	565	129	23%	58	10%	132	0.23
Rubber and Plastic	1,818	466	791	389	49%	33	4%	41	0.05
Stone, Clay, Glass and Concrete	615	255	678	151	22%	19	3%	27	0.04
Iron and Steel	349	197	866	174	20%	22	3%	34	0.04
Metal Castings	669	234	433	240	55%	24	6%	26	0.06
Nonferrous Metals	203	108	310	98	32%	17	5%	28	0.09
Fabricated Metal	2,906	849	1,377	796	58%	63	5%	83	0.06
Electronics	1,250	420	780	402	52%	27	3%	43	0.06
Automobile Assembly	1,260	507	1,058	431	41%	35	3%	47	0.04
Shipbuilding and Repair	44	22	172	20	12%	3	2%	4	0.02
Ground Transportation	7,786	1,585	2,499	681	27%	85	3%	103	0.04
Water Transportation	514	84	141	53	38%	10	7%	11	0.08
Air Transportation	444	96	151	69	46%	8	5%	12	0.08
Fossil Fuel Electric Power	3,270	1,318	2,430	804	33%	100	4%	135	0.06
Dry Cleaning	6,063	1,234	1,436	314	22%	12	1%	16	0.01

Exhibit 13. Five-Year Inspection and Enforcement Summary by Statute for Selected Industries

Industry Sector	Facilities Inspected	Total Inspections	Total Enforcement Actions	Clean Air Act		Clean Water Act		RCRA		FIFRA/TSCA/ EPCRA/Other	
				% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions
Metal Mining	378	1,600	111	39%	19%	52%	52%	8%	12%	1%	17%
Coal Mining	741	3,748	132	57%	64%	38%	28%	4%	8%	1%	1%
Oil and Gas Extraction	1,902	6,071	309	75%	65%	16%	14%	8%	18%	0%	3%
Non-Metallic Mineral Mining	2,803	12,826	622	83%	81%	14%	13%	3%	4%	0%	3%
Textiles	267	1,465	83	58%	54%	22%	25%	18%	14%	2%	6%
Lumber and Wood	473	2,767	265	49%	47%	6%	6%	44%	31%	1%	16%
Furniture	386	2,379	91	62%	42%	3%	0%	34%	43%	1%	14%
Pulp and Paper	430	4,630	478	51%	59%	32%	28%	15%	10%	2%	4%
Printing	2,092	7,691	428	60%	64%	5%	3%	35%	29%	1%	4%
Inorganic Chemicals	286	3,087	235	38%	44%	27%	21%	34%	30%	1%	5%
Resins and Manmade Fibers	263	2,430	219	35%	43%	23%	28%	38%	23%	4%	6%
Pharmaceuticals	129	1,201	122	35%	49%	15%	25%	45%	20%	5%	5%
Organic Chemicals	355	4,294	468	37%	42%	16%	25%	44%	28%	4%	6%
Agricultural Chemicals	164	1,293	102	43%	39%	24%	20%	28%	30%	5%	11%
Petroleum Refining	148	3,081	763	42%	59%	20%	13%	36%	21%	2%	7%
Rubber and Plastic	981	4,383	276	51%	44%	12%	11%	35%	34%	2%	11%
Stone, Clay, Glass and Concrete	388	3,474	277	56%	57%	13%	9%	31%	30%	1%	4%
Iron and Steel	275	4,476	305	45%	35%	26%	26%	28%	31%	1%	8%
Metal Castings	424	2,535	191	55%	44%	11%	10%	32%	31%	2%	14%
Nonferrous Metals	161	1,640	174	48%	43%	18%	17%	33%	31%	1%	10%
Fabricated Metal	1,858	7,914	600	40%	33%	12%	11%	45%	43%	2%	13%
Electronics	863	4,500	251	38%	32%	13%	11%	47%	50%	2%	7%
Automobile Assembly	927	5,912	413	47%	39%	8%	9%	43%	43%	2%	9%
Shipbuilding and Repair	37	872	38	78%	29%	9%	26%	12%	39%	1%	5%
Ground Transportation	3,263	12,904	774	59%	41%	12%	11%	29%	45%	1%	3%
Water Transportation	192	816	70	39%	29%	23%	34%	37%	33%	1%	4%
Air Transportation	231	973	97	25%	32%	27%	20%	48%	48%	0%	0%
Fossil Fuel Electric Power	2,166	14,210	789	57%	59%	32%	26%	11%	10%	1%	5%
Dry Cleaning	2,360	3,813	66	56%	23%	3%	6%	41%	71%	0%	0%

Exhibit 14. One-Year Inspection and Enforcement Summary by Statute for Selected Industries

Industry Sector	Facilities Inspected	Total Inspections	Total Enforcement Actions	Clean Air Act		Clean Water Act		RCRA		FIFRA/TSCA/ EPCRA/Other	
				% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions
Metal Mining	142	211	10	52%	0%	40%	40%	8%	30%	0%	30%
Coal Mining	362	765	22	56%	82%	40%	14%	4%	5%	0%	0%
Oil and Gas Extraction	874	1,173	34	82%	68%	10%	9%	9%	24%	0%	0%
Non-Metallic Mineral Mining	1,481	2,451	91	87%	89%	10%	9%	3%	2%	0%	0%
Textiles	172	295	12	66%	75%	17%	17%	17%	8%	0%	0%
Lumber and Wood	279	507	52	51%	30%	6%	5%	44%	25%	0%	40%
Furniture	254	459	11	66%	45%	2%	0%	32%	45%	0%	9%
Pulp and Paper	317	788	74	54%	73%	32%	19%	14%	7%	0%	1%
Printing	892	1,363	53	63%	77%	4%	0%	33%	23%	0%	0%
Inorganic Chemicals	200	548	31	35%	59%	26%	9%	39%	25%	0%	6%
Resins and Manmade Fibers	173	419	36	38%	51%	24%	38%	38%	5%	0%	5%
Pharmaceuticals	80	209	14	43%	71%	11%	14%	45%	14%	0%	0%
Organic Chemicals	259	837	56	40%	54%	13%	13%	47%	34%	0%	0%
Agricultural Chemicals	105	206	11	48%	55%	22%	0%	30%	36%	0%	9%
Petroleum Refining	132	565	132	49%	67%	17%	8%	34%	15%	0%	10%
Rubber and Plastic	466	791	41	55%	64%	10%	13%	35%	23%	0%	0%
Stone, Clay, Glass and Concrete	255	678	27	62%	63%	10%	7%	28%	30%	0%	0%
Iron and Steel	197	866	34	52%	47%	23%	29%	26%	24%	0%	0%
Metal Castings	234	433	26	60%	58%	10%	8%	30%	35%	0%	0%
Nonferrous Metals	108	310	28	44%	43%	15%	20%	41%	30%	0%	7%
Fabricated Metal	849	1,377	83	46%	41%	11%	2%	43%	57%	0%	0%
Electronics	420	780	43	44%	37%	14%	5%	43%	53%	0%	5%
Automobile Assembly	507	1,058	47	53%	47%	7%	6%	41%	47%	0%	0%
Shipbuilding and Repair	22	172	4	83%	0%	6%	50%	12%	50%	0%	0%
Ground Transportation	1,585	2,499	103	64%	46%	11%	10%	26%	44%	0%	1%
Water Transportation	84	141	11	38%	9%	24%	36%	38%	45%	0%	9%
Air Transportation	96	151	12	28%	33%	15%	42%	57%	25%	0%	0%
Fossil Fuel Electric Power	1,318	2,430	135	59%	73%	32%	21%	9%	5%	0%	0%
Dry Cleaning	1,234	1,436	16	69%	56%	1%	6%	30%	38%	0%	0%

VII. Review of Major Legal Actions

This section provides summary information about major cases that have affected this sector and contains information on Supplemental Environmental Projects (SEPs) negotiated in some of those cases. As indicated in EPA's Enforcement and Compliance Assurance Accomplishments Reports from 1992 to 1996, several significant enforcement actions were resolved involving the water transportation industry. Those cases are discussed in more detail below.

VII.A. Review of Major Cases

As shown in the previous tables, there have been only 86 enforcement actions taken against water transportation industries over the past 5 years. Stemming from those 86 actions are at least 50 cases, some of which are discussed in more detail below. The 50 cases can be categorized as follows:

- 2 Clean Air Act cases
- 16 Clean Water Act cases
- 14 RCRA
- 6 CERCLA
- 4 TSCA
- 2 multimedia (Clean Air Act/Clean Water Act, Clean Water Act/Oil Pollution Act)
- 6 other (Ocean Dumping Ban Act, various international treaties).

Of these 50 cases, 16 were against federal facilities and 14 were criminal cases. Supplemental environmental projects were negotiated in 3 of the cases. (These are discussed in more detail in the following section.) The following cases are examples of EPA's enforcement against water transportation industries.

In 1993, the first criminal prosecution ever to enforce the provisions of an international treaty that prohibits the disposal of plastics at sea was taken against the operators of a large "fish-factory" vessel. The *Michelle Irene* Joint Venture, doing business as Golden Age Fisheries pleaded guilty to a charge of knowingly disposing of plastics into the sea and was sentenced

to pay $150,000. The dumping of plastics by American flag vessels was outlawed on December 31, 1988, with the implementation of Annex V of the International Convention for the Pollution of Ships, known as the MARPOL Protocol. Former crew members provided information to EPA that they had dumped plastics overboard under orders from management. The vessel is a 253-foot fish-processor that uses large quantities of plastic bags, liners, straps, and containers. Although the vessel was equipped with a state-of-the-art incinerator capable of burning plastic, a fire while at sea rendered the incinerator virtually inoperable, thus the vessel dumped the plastics.

Also in 1993, two shipping executives, William Reilly and J. Patrick Dowd, were sentenced to prison for ocean dumping and perjury regarding a voyage of the *Khian Sea*. The voyage began in 1986 when approximately 15,000 tons of Philadelphia's municipal incinerator ash were shipped on the vessel to an intended disposal location in the Bahamas. However, the ship was refused permission to dispose of the ash and in various other locations. After seeking a disposal location without success, the ship returned to the lower Delaware Bay. While there, the ship slipped away against the orders of the Coast Guard, dumped its cargo in the Atlantic and Indian Oceans, and arrived empty in Singapore. By that time, the ship had been sold at least once to off-shore companies and its name had changed.

Reilly and Dowd were executives or affiliated with several companies that acted as the charterer, agent, and owner of the *Khian Sea*. Their trial in June 1993 featured testimony of three crewmen, including the captain, and a photograph taken by a crew member of ash being bulldozed off the ship. Reilly was convicted of one count of ocean dumping, one count of lying to a federal judge, and one count of lying to a federal grand jury over the ash's disappearance. Reilly was sentenced to a total of 37 months in prison, a $7,500 fine, and 36 months of supervised probation. Dowd, convicted on one count of lying to a federal grand jury concerning the disappearance of the ash, was sentenced to a total of five months of imprisonment, five months of home detention, a $20,000 fine, and 36 months of supervised probation.

A case of national significance to federal facilities occurred in 1994 when EPA issued a complaint against the U.S. Coast Guard Kodiak Support Center, Kodiak, Alaska. The complaint was the first action brought against a civilian federal agency under the Federal Facility Compliance Act of 1992. This act is an amendment to RCRA that allows EPA to assess civil penalties against federal agencies in the same way it does against private companies. The complaint resulted from two major violations of RCRA -- failure to properly monitor groundwater in an area where cleaning solvents

had been dumped on the ground, and the illegal storage of hazardous waste without a proper permit from EPA. In the complaint, EPA sought penalties of more than $1 million.

In a case taken against a cruise ship company, Palm Beach Cruises, the corporate owner of the cruise ship *MV Viking Princess*, was sentenced in 1994 on two felony counts of having knowingly violated the CWA and the OPA. The basis for the prosecution was the deliberate dumping of waste oil from the cruise ship into the ocean off the coast of Florida. The discharge created a visible sheen that was detected during a joint operation conducted by the Coast Guard, EPA, the Federal Bureau of Investigation and the Department of Justice. The corporation entered its guilty pleas and was sentenced to 5 years probation and a fine of $500,000.

EPA regulates not only activities that occur in salt water areas, but also those that occur in inland waterways. For example, M/G Transport Services, Inc., a former officer of the firm, and two tugboat captains were convicted in 1995 of polluting the Ohio and Mississippi Rivers over a 30-year period. The charges alleged that M/G ships, based in Ohio, dumped oily bilge slops, burned waste and garbage including plastic, kitchen waste, metal, glass and paint chips into the rivers from 1971 until 1992. The jury convicted the four defendants on various charges ranging from felony conspiracy to dump oil to misdemeanor charges of dumping garbage overboard from tugboats operated by the company. In a similar case, Bruce D. McGinniss was sentenced for also dumping pollutants into the Ohio River over a period of years. McGinniss was sentenced to probation for two years and fined $25,000. McGinniss, Inc. (the company) was also placed on probation for two years and fined $120,000. The defendant admitted he had operated barge services on the Ohio River from which residues of ammonium nitrate, sewage, magnetite, coke, pig iron, lime, grain, salt, sand, gravel, coal, iron ore, fuel and other pollutants were routinely washed into the river.

VII.B. Supplemental Environmental Projects

Supplemental Environmental Projects (SEPs) are compliance agreements that reduce a facility's stipulated penalty in return for an environmental project that exceeds the value of the reduction. Often, these projects fund pollution prevention activities that can significantly reduce the future pollutant loadings of a facility. The following are examples of three SEPs negotiated with water transportation facilities.

In 1995, EPA announced that the U.S. Coast Guard Academy in New London, Connecticut, agreed to spend $259,254 on pollution prevention

SEPs as part of an enforcement settlement for hazardous waste violations. During an inspection of the facility, the Region cited the Coast Guard Academy for violations ranging from failure to maintain adequate records to improper storage of incompatible waste. The Coast Guard agreed to a SEP to remove two underground storage tanks and one aboveground tank. The Coast Guard also will replace its current waste storage modular building with a permanent concrete block container storage building. The new building will be used for the management of hazardous and other regulated wastes. The SEP will directly decrease the likelihood of pollution migrating into the Thames River, with which members of the community regularly come into contact for fishing and recreational purposes.

In another SEP, the Port of Portland agreed to two SEPs to analyze and remove contaminated sediments from the port waters. The SEPs stemmed from an action against the port for unpermitted toxic discharges. The port was also required to pay a penalty of $92,000.

In 1994, the State of North Carolina took action against the North Carolina Department of Transportation Ferry Division for a variety of violations, including open containers of waste paint thinner; failure to conduct weekly inspections; failure to train personnel involved in hazardous waste management, complete annual training updates, and maintain training records; and failure to maintain and operate the facility so as to minimize releases. For these violations, the Department of Transportation was to pay a penalty of $10,000 and conduct two SEPs, which included:

- Waste reduction, including:
  - Replacing conventional oil filters with a reusable oil filter screening system and use of filtration units on coolant systems
  - Using a filter system in parts cleaning machines to cut down on replacement of solvent
  - Implementing a solvent distillation system.
- Recycling program, including:
  - Further development of a ferry customer newsletter on recycled paper
  - Aluminum/cardboard/plastic collection operation at four additional ferry sites; reuse of plastic dredge piping as chafing gear on piling clusters
  - Public awareness through use of posters and distributing brochures to ferry customers.

VIII. Compliance Assurance Activities and Initiatives

This section highlights the activities undertaken by this industry sector and public agencies to voluntarily improve the sector's environmental performance. These activities include those independently initiated by industrial trade associations. In this section, the notebook also contains a listing and description of national and regional trade associations.

VIII.A. Sector-related Environmental Programs and Activities

Environmental compliance assurance activities have been conducted by the major trade associations for the water transportation industry. The following examples represent some of the industry initiatives that promote compliance, or assess methods to reduce environmental contamination.

Florida Clean Marina Program

Currently in Florida, the regulatory process for existing marinas and boatyards is viewed as strictly reactive. Th Florida Clean Marina Program is proposing a proactive approach that is non-confrontational and non-adversarial and provides a level of compliance not available under the current regulatory program. The goal of the program is to assist marinas in improving the environmental quality of Florida's waterways. Four program components are being developed:

- Education and Awareness - Includes a series of community-based strategies promoting the other three components and the use of best management practices specific to the marina and the ecosystem in which it is located.

- Award Recognition - Recognizes those marinas that adopt multimedia BMPs over and above the minimum and result in net positive environmental impact.

- Incentive Grants - Encourages marinas to adopt BMPs that may be financially difficult in the short term. Technical assistance, loans, and grants will be explored as mechanisms to assist BMP adoption and implementation.

- "Clean Marina" Designation - Provides a voluntary means by which marinas and boatyards will actively adopt site-specific, ecosystem-based, multimedia BMPs.

Clean Water Trust

The Clean Water Trust is sponsoring three voluntary programs, including:

- "Stash Trash" program - encourages boaters, marina operators, and waterfront business owners to help keep the waters of the Gulf of Mexico clean. Dockside signs and a brochure will describe the problems caused by marine debris.

- Investigating alternative fuels - In conjunction with the Maryland Soybean Board, currently studying the possibilities of soydiesel fuel use in recreational boats.

- "Help Stop the Drop" - This program works toward cleaner water and air in the Gulf of Mexico by reducing pollution caused by fuel spills and refueling of marine engines.

VIII.B. EPA Voluntary Programs

VIII.B.1. Environmental Leadership Program

The Environmental Leadership Program (ELP) is a national initiative developed by EPA that focuses on improving environmental performance, encouraging voluntary compliance, and building working relationships with stakeholders. EPA initiated a one year pilot program in 1995 by selecting 12 projects at industrial facilities and federal installations that demonstrate the principles of the ELP program. These principles include: environmental management systems, multimedia compliance assurance, third-party verification of compliance, public measures of accountability, pollution prevention, community involvement, and mentor programs. In return for participating, pilot participants received public recognition and were given a period of time to correct any violations discovered during these experimental projects.

EPA is making plans to launch its full-scale Environmental Leadership Program in 1997. The full-scale program will be facility-based with a 6-year participation cycle. Facilities that meet certain requirements will be eligible to participate, such as having a community outreach/employee involvement programs and an environmental management system (EMS) in place for 2 years. (Contact: http://es.inel.gov/elp or Debby Thomas, ELP Deputy Director, at 202-564-5041)

VIII.B.2. Project XL

Project XL was initiated in March 1995 as a part of President Clinton's *Reinventing Environmental Regulation* initiative. The projects seek to achieve cost effective environmental benefits by providing participants regulatory flexibility on the condition that they produce greater environmental benefits. EPA and program participants will negotiate and sign a Final Project Agreement, detailing specific environmental objectives that the regulated entity shall satisfy. EPA will provide regulatory flexibility as an incentive for the participants' superior environmental performance. Participants are encouraged to seek stakeholder support from local governments, businesses, and environmental groups. EPA hopes to implement fifty pilot projects in four categories, including industrial facilities, communities, and government facilities regulated by EPA. Applications will be accepted on a rolling basis. For additional information regarding XL projects, including application procedures and criteria, see the May 23, 1995 Federal Register Notice. (Contact: Fax-on-Demand Hotline 202-260-8590, Web: http://www.epa.gov/ProjectXL, or Christopher Knopes at EPA's Office of Policy, Planning and Evaluation 202-260-9298)

VIII.B.3. Climate Wise Program

EPA's ENERGY STAR Buildings Program is a voluntary, profit-based program designed to improve the energy-efficiency in commercial and industrial buildings. Expanding the successful Green Lights Program, ENERGY STAR Buildings was launched in 1995. This program relies on a 5-stage strategy designed to maximize energy savings thereby lowering energy bills, improving occupant comfort, and preventing pollution -- all at the same time. If implemented in every commercial and industrial building in the United States, ENERGY STAR Buildings could cut the nation's energy bill by up to $25 billion and prevent up to 35% of carbon dioxide emissions. (This is equivalent to taking 60 million cars of the road). ENERGY STAR Buildings participants include corporations; small and medium sized businesses; local, federal and state governments; non-profit groups; schools; universities; and health care facilities. EPA provides technical and non-technical support including software, workshops, manuals, communication tools, and an information hotline. EPA's Office of Air and Radiation manages the operation of the ENERGY STAR Buildings Program. (Contact: Green Light/Energy Star Hotline at 1-888-STAR-YES or Maria Tikoff Vargas, EPA Program Director at 202-233-9178 or visit the ENERGY STAR Buildings Program website at http://www.epa.gov/appdstar/buildings/)

VIII.B.4. Green Lights Program

EPA's Green Lights program was initiated in 1991 and has the goal of preventing pollution by encouraging U.S. institutions to use energy-efficient lighting technologies. The program saves money for businesses and organizations and creates a cleaner environment by reducing pollutants released into the atmosphere. The program has over 2,345 participants which include major corporations, small and medium sized businesses, federal, state and local governments, non-profit groups, schools, universities, and health care facilities. Each participant is required to survey their facilities and upgrade lighting wherever it is profitable. As of March 1997, participants had lowered their electric bills by $289 million annually. EPA provides technical assistance to the participants through a decision support software package, workshops and manuals, and an information hotline. EPA's Office of Air and Radiation is responsible for operating the Green Lights Program. (Contact: Green Light/Energy Star Hotline at 1-888-STARYES or Maria Tikoff Vargar, EPA Program Director, at 202-233-9178 the)

VIII.B.5. WasteWi$e Program

The WasteWi$e Program was started in 1994 by EPA's Office of Solid Waste and Emergency Response. The program is aimed at reducing municipal solid wastes by promoting waste prevention, recycling collection and the manufacturing and purchase of recycled products. As of 1997, the program had about 500 companies as members, one third of whom are Fortune 1000 corporations. Members agree to identify and implement actions to reduce their solid wastes setting waste reduction goals and providing EPA with yearly progress reports. To member companies, EPA, in turn, provides technical assistance, publications, networking opportunities, and national and regional recognition. (Contact: WasteWi$e Hotline at 1-800-372-9473 or Joanne Oxley, EPA Program Manager, 703-308-0199)

VIII.B.6. NICE^3

The U.S. Department of Energy is administering a grant program called The National Industrial Competitiveness through Energy, Environment, and Economics (NICE^3). By providing grants of up to 45 percent of the total project cost, the program encourages industry to reduce industrial waste at its source and become more energy-efficient and cost-competitive through waste minimization efforts. Grants are used by industry to design, test, and demonstrate new processes and/or equipment with the potential to reduce pollution and increase energy efficiency. The program is open

to all industries; however, priority is given to proposals from participants in the forest products, chemicals, petroleum refining, steel, aluminum, metal casting and glass manufacturing sectors. (Contact: http//www.oit.doe.gov/access/ nice3, Chris Sifri, DOE, 303-275-4723 or Eric Hass, DOE, 303-275-4728)

VIII.B.7. Design for the Environment (DfE)

DfE is working with several industries to identify cost-effective pollution prevention strategies that reduce risks to workers and the environment. DfE helps businesses compare and evaluate the performance, cost, pollution prevention benefits, and human health and environmental risks associated with existing and alternative technologies. The goal of these projects is to encourage businesses to consider and use cleaner products, processes, and technologies. For more information about the DfE Program, call (202) 260-1678. To obtain copies of DfE materials or for general information about DfE, contact EPA's Pollution Prevention Information Clearinghouse at (202) 260-1023 or visit the DfE Website at http://es.inel.gov/dfe.

VIII.C. Trade Association/Industry Sponsored Activity

The trade associations that represent the water transportation industry are a valuable source of economic and environmental compliance data. The following subsections list major water transportation trade organizations and highlight environmental initiatives sponsored by some of these groups.

VIII.C.1. Global Environmental Management Initiative

The Global Environmental Management Initiative (GEMI) is made up of a group of leading companies dedicated to fostering environmental excellence by business. GEMI promotes a worldwide business ethic for environmental management and sustainable development to improve the environmental performance of business through example and leadership. In 1994, GEMI's membership consisted of about 30 major corporations.

VIII.C.2. National Pollution Prevention Roundtable

The National Pollution Prevention Roundtable published *The Pollution Prevention Yellow Pages* in September 1994. It is a compilation of information collected from mail and telephone surveys of state and local government pollution prevention programs. (Contact: Natalie Roy 202-543-7272). State programs listing themselves as having expertise in pollution prevention related to water transportation were not identified in

The Pollution Prevention Yellow Pages; however, areas of expertise are listed as SIC categories which do not include a specific category for water transportation.

VIII.C.3. ISO 14000

ISO 14000 is a series of internationally-accepted standards for environmental management. The series includes standards for environmental management systems (EMS), guidelines on conducting EMS audits, standards for auditor qualifications, and standards and guidance for conducting product life cycle analysis. Standards for auditing and EMS were adopted in September 1996, while other elements of the ISO 14000 series are currently in draft form. While regulations and levels of environmental control vary from country to country, ISO 14000 attempts to provide a common standard for environmental management. A strength of ISO 14000 is that it provides a common standard for evaluating a company's environmental management system. A weakness is that the standard does not require a company to achieve a standard of environmental performance (e.g., level of pollution or regulatory compliance) in order to be registered as ISO 14000 conformant. The governing body for ISO 14000 is the International Organization for Standardization (ISO), a worldwide federation of more than 110 country members based in Geneva, Switzerland. The American National Standards Institute (ANSI) is the United States representative to ISO.

VIII.D. Summary of Trade Associations

American Association of Port Authorities
1010 Duke Street
Alexandria, VA 22314-3512
703-684-5700

The American Association of Port Authorities (AAPA) is the alliance of ports of the Western Hemisphere. The Association promotes the common interests of the port community and provides leadership on trade, transportation, environmental and other issues related to port development and operations. AAPA furthers public understanding of the essential role fulfilled by ports within the global transportation system. The Association serves as a resource to help members accomplish their professional responsibilities. APPA produces a bi-monthly newsletter and other publications, as well as conducts several seminars and conferences.

American Bureau of Shipping
Two World Trade Center
106th Floor
New York, New York 10048
212-839-5000

The American Bureau of Shipping (ABS) establishes standards for the design and construction of ships and other marine structures. By administering these standards, ABS also determines the structure and mechanical fitness of a vessel for its intended service.

American Institute of Marine Underwriters
14 Wall Street
Suite 820
New York, New York 10005
212-233-0550

The American Institute of Marine Underwriters (AIMU) is an association of insurance companies that write the majority of ocean marine insurance in the United States.

The American Society of Naval Engineers
1452 Duke Street
Alexandria, VA 22314-3458
703-836-6727

The American Society of Naval Engineers (ASNE) serves all engineers engaged in the design, construction, operation, and repair of ships and their installed systems. ASNE members are concerned with research, logistics support, the management of ship acquisition, and all other disciplines involved in the naval engineering field.

American Waterways Operators
1600 Wilson Boulevard
Suite 1000
Arlington, VA 22209
703-841-9300

The American Waterways Operators (AWO) is the national association representing the inland and coastal tugboat, towboat, and barge industry. Organized in Washington, D.C. in 1944 as the national trade association representing the inland barge and towing industry, AWO expanded its mission and scope in 1969 to include the coastal sector of the community. AWO is now comprised of more than 350 member companies, including

bulk commodities transporters; shipdocking and harbor services operators; fueling, bunkering, and lighting services operators; shipyards; and affiliated service members.

Independent Liquid Terminal Association
1133 15th Street, NW
Suite 204
Washington, DC 20005
202-659-2301

Members operate deepwater and barge terminals for the storage of chemicals, petroleum, fertilizers, and basic bulk liquid food products, such as animal fats and vegetable oils, molasses, and spirits. Objectives of the association are to: 1) advise members of pending legislation and regulations and to respond to these proposals, 2) provide and facilitate the exchange of information among operators, and 3) promote the safe and efficient handling of an increasing variety of liquid products.

Intermodal Association of North America
7501 Greenway Center Drive
Suite 720
Greenbelt, MD 20770-3514
(301) 982-3400

The Intermodal Association of North America is the leading industry trade association representing the combined interests of intermodal freight transportation companies. Its 680 member companies include railroads, intermodal truckers and highway motor carriers, intermodal marketing companies, water carriers and stacktrain operators, and industry equipment and service suppliers.

Lake Carriers' Association
614 Superior Avenue, West
915 Rockefeller Building
Cleveland, OH 44113-1383
216-621-1107

The Lake Carriers' Association is the trade association representing U.S.-flag vessel operators on the Great Lakes. The association is made up of 14 American companies that operate 59 U.S.-flag self-propelled vessels and integrated tug/barge units. In promoting the common interests of its members and their customers, LCA places special importance on legislative and regulatory matters. To facilitate a broad-based understanding of U.S.-

flag shipping and its role in the nation's economy, LCA compiles statistical information on ships in service and the volume of cargo movement.

National Association of Waterfront Employees
2011 Pennsylvania Ave., NW
Suite 301
Washington, DC 20006
(202) 296-2810

The National Association of Waterfront Employees (NAWE), formerly the National Association of Stevedores, is a Washington, D.C.-based trade association whose purpose is to promote, further, and support the privately-owned (non-government) stevedoring, marine terminal, and related industries of the United States, its territories and possessions. Member companies do business at over 110 U.S. ports on the Atlantic and Pacific coasts, the Gulf of Mexico, the Great Lakes, the States of Alaska and Hawaii, and the Commonwealth of Puerto Rico.

NAWE serves as a clearinghouse for industry information; provides a forum for members to exchange ideas and discuss mutual concerns; gives legal and technical help and advice to members; and acts as a spokesman to explain the industry, its concerns and its interests before Congress, federal agencies, and other groups and associations.

National Cargo Bureau, Inc.
30 Vesey Street
New York, New York 10007
212-571-5000

The National Cargo Bureau, Inc. promotes the safety of life at sea through the inspection and certification of shipboard cargo handling gear and the safe loading, stowage, securing, and unloading of cargo on all vessels. NCB promotes and enforces the application of uniform standards designed to protect cargo, vessels, and personnel.

The National Industrial Transportation League
1700 N. Moore Street
Suite 1900
Arlington, VA 22209-1904
703-524-5011

The National Industrial Transportation League (NITL) is a shippers' association that represents businesses of all sizes and commodities using all

modes of transportation to move their goods in interstate and international commerce.

National Waterways Conference, Inc.
1130 17th Street, NW
Washington, DC 20036
(202) 296-4415

The National Waterways Conference, Inc. works to ensure the wisest management of America's waterways. The Conference brings together farming, mining, manufacturing, refining, shipping, and other economic sectors that rely on ports, waterway transportation, and flood protection. Leaders of nearly 400 businesses, industries, cooperatives, state and local public agencies, utilities, ports, and terminals actively participate in the conference.

Passenger Vessel Association
808 17th Street, NW
Suite 200
Washington, DC 20006
202-785-0510

The Passenger Vessel Association (PVA) is comprised of the operators and suppliers of U.S. flagged commercial vessels that carry passengers for hire. PVA has an active government relations program, conducts an annual convention and regional meetings, and produces a newsletter and other publications.

Transportation Institute
5201 Auth Way
Camp Springs, MD 20746
301-423-3335

The Transportation Institute is dedicated to maintaining a strong American merchant marine and a fully integrated national transportation network. The institute is composed of American-flag shipping companies engaging in the nation's foreign and domestic shipping trades and in barge and tugboat operations.

United States Chamber of Shipping
900 19th, Street, NW
Suite 850
Washington, DC 20006
(202) 775-4399

The United States Chamber of Shipping (USCS) represents 21 U.S.-based companies which own, operate, or charter oceangoing tankers, container ships, and other merchant vessels engaged in both the domestic and international trades. USCS also represents other entities which maintain a commercial interest in the operation of such oceangoing vessels.

IX. Resource Materials/Bibliography

For further information on selected topics within the water transportation industry, a list of publications is provided below.

General Profile

American Waterways Operators, and the National Association of the Inland and Coastal Tug and Barge Industry. *Some Facts You should Know From America's Inland and Coastal Barge and Towing Industry.*

Dun & Bradstreet. Market Marketing Center. www.dnb.imarketinc.com/anly/reports. April 1997

Eno Transportation Foundation, Inc. *Transportation in America.* 1994.

U.S. Corps of Engineers. The U.S. Waterway System-Facts. December 1996

U.S. Corps of Engineers. Waterborne Commerce Statistics Center. www.usace.army.mil.

U.S. Department of Transportation. *Report to Congress on the Status of the Public Ports of the United States 1990-1991.* Maritime Administration. December 1992.

U.S. Environmental Protection Agency. *1993 Screener Questionnaire of the Transportation Equipment Cleaning Effluent Guidelines.* Office of Water, Engineering and Analysis Division. Washington, D.C. 1994.

U.S. Environmental Protection Agency. *Enforcement and Compliance Assurance Accomplishments Report, FY 1995.* Office of Enforcement and Compliance Assurance (EPA-300-R-96-006). 1996.

U.S. Environmental Protection Agency. *Enforcement and Compliance Assurance Accomplishments Report, FY 1994.* Office of Enforcement and Compliance Assurance (EPA-300-R-95-004). 1995.

U.S. Environmental Protection Agency. *Enforcement Accomplishments Report, FY 1993.* Office of Enforcement (EPA/300-R94-003). 1994.

U.S. Environmental Protection Agency. *Enforcement Accomplishments Report, FY 1992.* Office of Enforcement (EPA/230-R93-001). 1993.

U.S. Environmental Protection Agency. *Preliminary Data Summary for the Transportation Equipment Cleaning Industry.* Office of Water Regulations and Standards. Washington, DC. September 1989.

U.S. Office of Management and Budget. *Standard Industrial Classification Manual.* Executive Office of the President. Washington, DC. 1987.

Process Descriptions

Anonymous. "Types of Pollutants Encountered." In *Oil Transportation by Tankers: An Analysis of Marine Pollution and Sanitary Waste.* Office of U.S. Congress.

Brummage, K.G. "What is Marine Pollution?" In *Symposium on Marine Pollution.* The Royal Institution of Naval Architects. 1973.

Clean Water Trust. "Current Clean Water Trust Projects." www.boatus.com/cwtcurr.htm.

Florida Department of Environmental Protection. *Florida "Clean Marina:" Draft Best Management Practices (Version 3).* Office of Waterway Management. www.dep.state.fl.us/law/clean-marina/bmps/bmpbk3.html.

Florida Department of Environmental Protection. *Florida Clean Marina Program Development.* Office of Waterway Management. www.dep.state.fl.us/law/clean-marina/papers/imipaper.html.

International Maritime Organization. *Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.* London, England. 1980

Kemp, P. (Editor). *Encyclopedia of Ships and Seafaring.* Crown Publishers, Inc. New York. 1980.

National Research Council. *MRIS Report: A Synthesis of Current Information on Treatment and Disposal of Vessel Sanitary Wastes.* National Academy of Sciences--National Academy of Engineering. Washington, DC. July 1971.

Rhode Island Coastal Resources Center. *Environmental Guide for Marinas: Controlling Nonpoint Source and Storm Water Pollution in Rhode Island --Best Management Practices for Marinas.* www.seagrant.gso.uri.edu/riseagrant/waste-source.html.

U.S. Department of Transportation. *Report on Port and Shipping Safety and Environmental Protection (Quarterly Report Number 36).* Maritime Administration. July 1995.

U.S. Department of Transportation. *The U.S. Stevedoring and Marine Terminal Industry.* Maritime Administration. January 1993.

U.S. Environmental Protection Agency. *Guides to Pollution Prevention: The Marine Maintenance and Repair Industry.* Office of Research and Development (EPA/625/7-91/015). October 1991.

U.S. Government Accounting Office. *Maritime Industry: Cargo Preference Laws--Estimated Costs and Effects* (Chapter Report, November 30, 1994, GAO/RCED-95-34).

Unknown.. *Marine Environmental Engineering Handbook.*

Unknown. "Safety Guidelines for Tank Vessel Cleaning Facilities." American Waterways Shipyard Conference. Arlington, Virginia. June 1992.

Regulatory Profile

Congressional Research Service. *CRS Report for Congress: Summaries of Environmental Laws Administered by the Environmental Protection Agency*. 93-53 ENR. January 14, 1993.

Environmental Law Institute. *Environmental Law Deskbook*. Washington, DC. 1989.

International Maritime Organization. *The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978.* hanara.kmaritime.ac.kr/~soonkap/imo/Marpol.htm#Bkground.

Additional Pollution Prevention Resources

Fact Sheet - FCAD-1. California, Plus Fact Sheet - Minnesota and Michigan FM10-2-9. Office of Research and Development, 1990.

Guides to Pollution Prevention - The Mechanical Equipment Repair Industry, Office of Research and Development, EPA/625/R-92/008. September, 1992.

Guide to Cleaner Technologies - Cleaning and Degreasing Process Changes, Office of Research and Development, EPA/625/R-93/017, February 1994.

Guide to Cleaner Technologies - Alternatives to Chlorinated Solvents for Cleaning and Degreasing, Office of Research and Development, EPA/625/R-93/016, February 1994.

Project Summary - Onsite Solvent Recovery, Office of Research and Development, EPA/600/SR-94/026, March 1994.

Guide to Cleaner Technologies - Organic Coating Replacements, Office of Research and Development, EPA/600/R-94/006, September 1994.

Guide to Cleaner Technologies - Alternative Metal Finishes, Office of Research and Development, EPA/625/R-94/007, September 1994.

Project Summary - Pollution Prevention Opportunity Assessment, U.S. Coast Guard Aviation Training Center, Mobile, AL. Office of Research and Development, EPA/600/SR-94/156, September 1994.

Project Report - NASA Langley Research Center and Tidewater Interagency Pollution Prevention Project Program. Office of Research and Development, EPA/600//R-94/171, September 1994.

Project Summary - Pollution Prevention Opportunities Assessment, U.S. Naval Base, Norfolk Naval Air Station, Office of Research and Development, EPA-600/SR-95/135, September 1995.

Environmental Research Brief - Pollution Prevention Assessment of Manufacturing of Aircraft Landing Gear. Office of Research and Development, EPA 600-S-95/032, August 1995.

Program Summary - Parts Washing Alternatives Study, U.S. Coast Guard, Office of Research and Development. EPA-600-SR-95/006, February 1995.

Demonstration of Alternative Cleaning Systems, Office of Research and Development, EPA/600/R-95-120, August 1995.

APPENDIX A
INSTRUCTIONS FOR DOWNLOADING THIS NOTEBOOK

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This Notebook is available on the Internet through the World Wide Web. The Enviroene Communications Network is a free, public, interagency-supported system operated by EPA's Office of Enforcement and Compliance Assurance and the Office of Research and Development. The Network allows regulators, the regulated community, technical experts, and the general public to share information regarding: pollution prevention and innovative technologies; environmental enforcement and compliance assistance; laws, executive orders, regulations, and policies; points of contact for services and equipment; and other related topics. The Network welcomes receipt of environmental messages, information, and data from any public or private person or organization.

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