

# OIL SLUDGE DUMPING OFF THE FLORIDA COAST

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HEARING  
BEFORE THE  
SUBCOMMITTEE ON  
AIR AND WATER POLLUTION  
OF THE  
COMMITTEE ON PUBLIC WORKS  
UNITED STATES SENATE  
NINETY-FIRST CONGRESS  
SECOND SESSION

DECEMBER 7, 1970

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# OIL SLUDGE DUMPING OFF THE FLORIDA COAST

MONDAY, DECEMBER 7, 1970

U.S. SENATE,  
SUBCOMMITTEE ON AIR AND WATER POLLUTION  
OF THE COMMITTEE ON PUBLIC WORKS,  
*Washington, D.C.*

The subcommittee met at 10 a.m., pursuant to call, in room 4200, New Senate Office Building, Senator Thomas F. Eagleton presiding.

Present: Senators Muskie (chairman of the subcommittee), Eagleton, Cooper, Boggs, Baker, and Gurney.

Also present: Richard B. Royce, chief clerk and staff director; J. B. Huyett, Jr., assistant chief clerk and assistant staff director; Barry Meyer, counsel; Tom C. Jorling, minority counsel; and professional staff members: Leon G. Billings, Richard W. Wilson, Philip T. Cummings, Harold H. Brayman, and Adrien Waller.

Senator EAGLETON. Good morning, ladies and gentlemen.

The Subcommittee on Air and Water Pollution of the Senate Committee on Public Works is holding this hearing on the oil slick off the Florida coast.

Our first and only scheduled witness is the Secretary of the Navy, the Honorable John Chafee.

Will you come forward, please, Mr. Secretary?

You may have accompanying you, if you so desire, any other members of your staff that you wish to join you at the head table.

I have a brief preparatory statement that I would like to read to you and then will ask other members of the subcommittee for such statements as they may wish to put in the record at the outset; then we will hear from the Secretary.

On Wednesday, December 2, a major oil spill was reported off the north coast of Florida. Later reports clarified this situation. The Navy, following procedures which it had been using for some time, had dumped, not spilled, an undetermined number of gallons of oil 50 miles out to sea in the Atlantic Ocean.

Today's hearing is to explore the circumstances which surrounded that discharge, the basis for the decision to intentionally dump large quantities of oil sludge, the authority for such a discharge, and the relationship of this action to national policy.

These questions are important because the spirit and intent of legislation signed by the President only 8 months ago have been violated. They are important because the President's stated policy on ocean dumping apparently has been ignored. They are important because the position of the United States at recent NATO meetings where Secretary Volpe called for an end to intentional dumping of oil on the high seas has been made a farce.

I, along with other members of this committee, look forward to whatever explanation the Navy may have for this action.

Now, before hearing the Secretary, I will yield to the chairman of the Air and Water Pollution Subcommittee, Senator Muskie of Maine.

Senator MUSKIE. Thank you very much, Mr. Chairman.

I would like to express my appreciation to Senator Eagleton for his willingness to chair this hearing this morning. Because of previous commitments, I can be here only for a few moments, at the outset.

I did want to come for those few moments to express my concern about the incident which is the subject of this hearing.

It seems incredible to me that a public policy which has been so clearly enunciated—first by the Congress in legislation signed into law this year, and second, by the President in a policy which he announced independent of that legislation but which conforms to it—should have had so little impact upon an operating department of the U.S. Government.

It raises questions as to our ability to implement the policy of such serious public concern in the Federal establishment. It raises questions as to the responsiveness of high-ranking officials in this department of the Government to a public policy which has been stated so clearly, which has been enunciated so widely in the public press and in the news media over a period of months.

I simply cannot understand how there could have been such a foul-up as this one. It is important that we answer these questions.

What we are concerned about is not so much the culpability of individuals—although that is always of concern to the Congress—but the question of whether we are doing anything that is meaningful here in the Congress in writing public policy only to see it fall flat on its face because of the failure of an executive establishment to respond.

This is harsher language than I think we customarily use in these hearings, but I think it is the kind of language that is fully merited by those responsible for what has happened here. So, I will follow your testimony, Mr. Secretary, this morning and will certainly read all of it.

I again express my appreciation to Senator Eagleton for his willingness to chair this hearing this morning.

Senator EAGLETON. Thank you, Senator.

Senator Boggs, do you have a statement?

Senator BOGGS. Thank you Mr. Chairman. I will be brief. I wish to welcome Secretary Chafee. We appreciate your testimony, although I am sorry for the circumstances of your visit. I know that you will do everything possible to help and assist our committee in regard to this unfortunate situation.

The record should show, I believe, that President Nixon last April sent a message on ocean dumping to the Congress. In it, he said:

We are only beginning to find out the ecological effects of ocean dumping and current disposal technology is not adequate to handle waste of the volume now being produced.

Subsequently, the President's Council on Environmental Quality issued a report on ocean dumping.

Mr. Chairman, I ask that a copy of that report "Ocean Dumping, A National Policy" be included as a part of this hearing record.

Senator EAGLETON. Without objection, that may be included.

(The document referred to follows:)

# OCEAN DUMPING

## **A National Policy**

A Report to the President  
prepared by the  
Council on Environmental Quality

October 1970

## Foreword

**O**CEANS—140 million square miles of water surface—cover over 70 percent of the earth. They are critical to maintaining the world's environment, contributing to the oxygen-carbon dioxide balance in the atmosphere, affecting global climate, and providing the base for the world's hydrologic system. Oceans are economically valuable to man, providing, among other necessities, food and minerals.

The coastlines of the United States are long and diverse, ranging from the tropical waters of Florida to the Arctic coast of Alaska. These areas, as biologically productive as any in the world, are the habitat for much of our fish and wildlife. They also provide transportation, recreation, and a pleasant setting for more than 60 percent of the Nation's population.

These waters are also the final receptacle for many of our wastes. Sewage, chemicals, garbage, and other wastes are carried to sea through the watercourses of the Nation from municipal, industrial, and agricultural sources or directly by barges, ships, and pipelines.

Industrial liquid wastes are the largest source of pollution in coastal and estuarine regions, followed by municipal liquid wastes. Agricultural pollutants from land runoff, animal wastes, pesticides, and fertilizers add to the load of wastes ultimately reaching the ocean. Sewage from vessels and spilled oil are two highly visible sources of marine pollution. And a large part of air pollutants eventually end up in the ocean, directly or through runoff from the land.

The amount of wastes transported and dumped in the ocean is small in terms of the total volume of pollutants reaching the oceans. But in the future the impact of ocean dumping will increase significantly relative to other sources. Although Federal laws on oil and vessel pollution and Federal-State

water quality standards for land-based discharges will reduce the contribution of wastes from these sources, uncontrolled dumping in the ocean could increase greatly.

Recognizing the importance of this problem, the President directed the Council on Environmental Quality to study ocean dumping. In his April 15, 1970, message to the Congress,<sup>1</sup> he asked the Council to work with other Federal agencies and with State and local governments on a comprehensive study that would result in research, legislative, and administrative recommendations.

The Council is grateful to members of a Federal Task Force and individuals from their agencies<sup>2</sup> for preparing material for consideration at meetings of the Task Force, for their review of report drafts, and most important of all, for providing guidance in formulating the recommended policy. Helpful assistance was also received from agencies and individuals in State and local government and from scientists and academicians, including the National Academy of Sciences and the National Academy of Engineering.

The Council is also indebted to a number of excellent studies. These include the studies on the New York Bight, one initiated by the Corps of Engineers and another prepared by an Ad Hoc Committee for the Secretary of the Interior; the 20-city survey of barged wastes, prepared by the Dillingham Corporation under contract to the Bureau of Solid Waste Management; the study of Waste Management Research Needs, by the National Academy of Sciences Committee on Oceanography-National Academy of Engineering Committee on Ocean Engineering; the National Estuarine Pollution Study, by the Federal Water Quality Administration; and an economic study of marine solid wastes disposal, by the Massachusetts Institute of

<sup>1</sup> See Appendix A.

<sup>2</sup> See Appendix B.

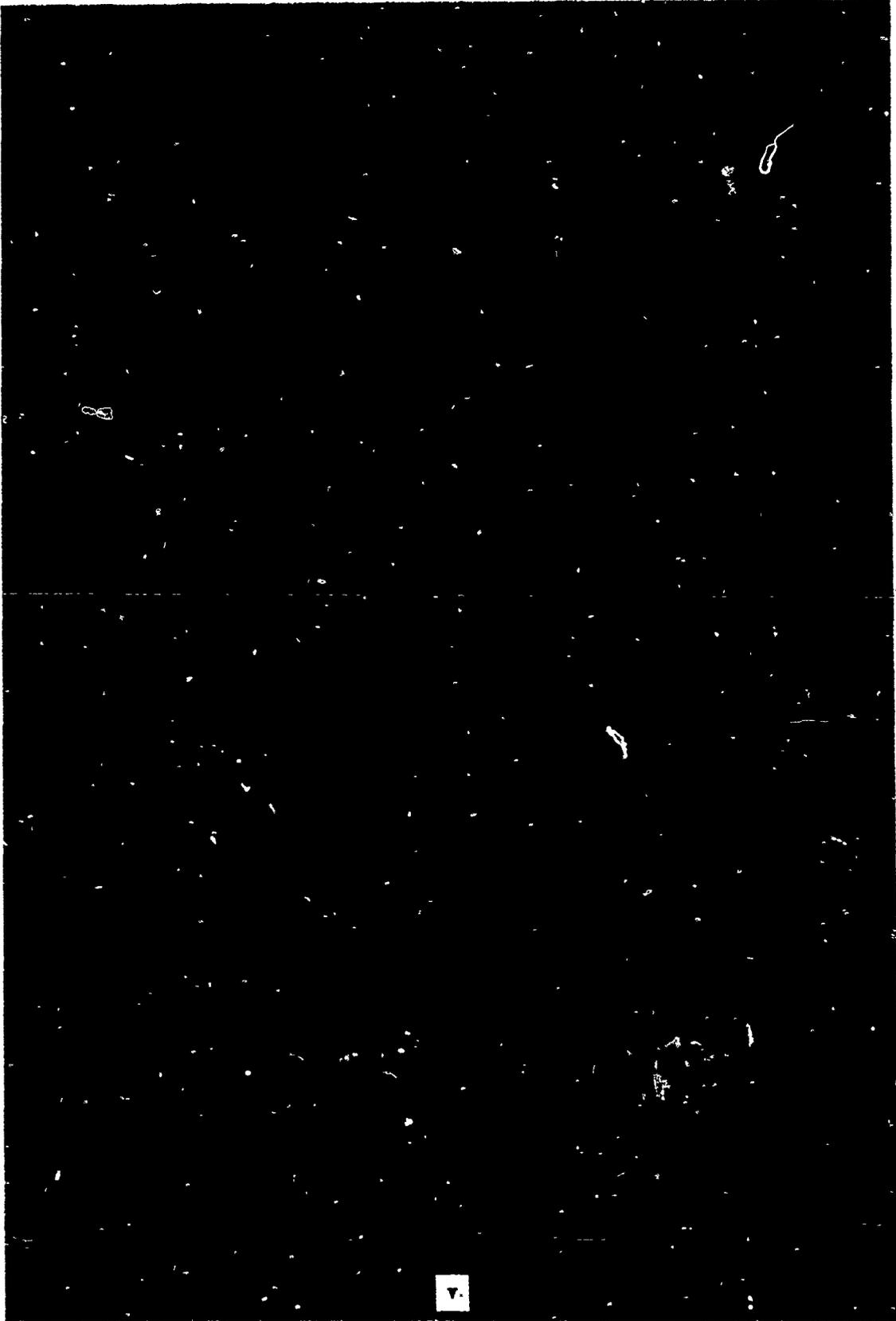
Technology under contract to the National Council on Marine Resources and Engineering Development.

Sources of ocean dumping discussed in this report deserve definition:

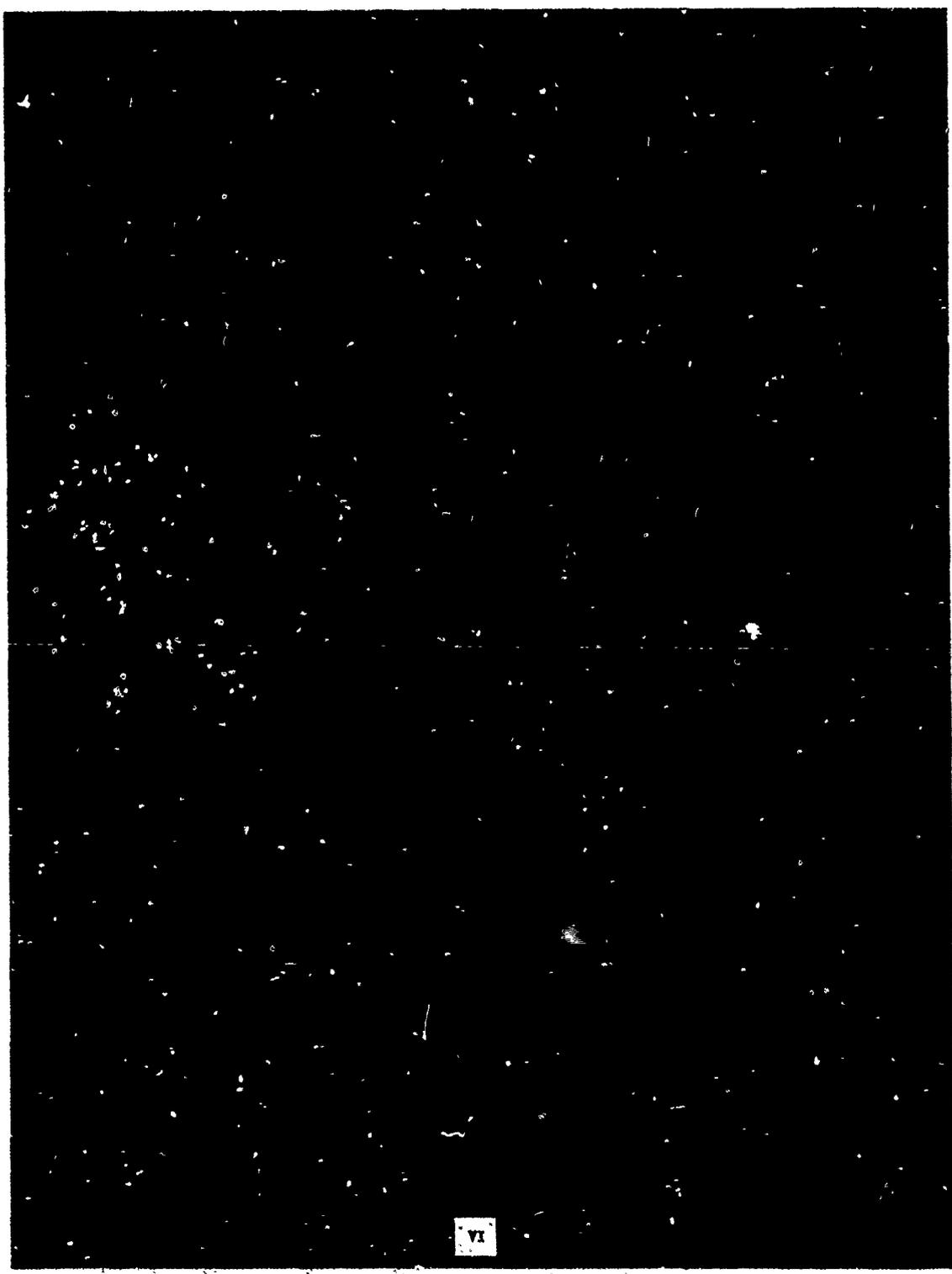
- *Dredge spoils*—the solid materials removed from the bottom of water bodies generally for the purpose of improving navigation: sand, silt, clay, rock, and pollutants that have been deposited from municipal and industrial discharges.
- *Sewage sludge*—the solid material remaining after municipal waste water treatment: residual human wastes and other organic and inorganic wastes.
- *Solid waste*—more commonly called refuse, garbage, or trash—the material generated by residences; commercial, agricultural, and industrial establishments; hospitals and other institutions; and municipal operations: chiefly paper, food wastes, garden wastes, steel and glass containers, and other miscellaneous materials.
- *Industrial wastes*—acids; refinery, pesticide, and paper mill wastes; and assorted liquid wastes.

- *Construction and demolition debris*—masonry, tile, stone, plastic, wiring, piping, shingles, glass, cinderblock, tar, tarpaper, plaster, vegetation, and excavation dirt.
- *Radioactive wastes*—the liquid and solid wastes that result from processing of irradiated fuel elements, nuclear reactor operations, medical use of radioactive isotopes, and research activities and from equipment and containment vessels which become radioactive by induction.

In this report, the Council first summarizes its findings and recommendations for action to control ocean dumping. Chapter I inventories the sites, amounts, and composition of wastes dumped in the ocean and analyzes trends. The effects of these waste materials on the marine environment and man are outlined in Chapter II. Chapter III discusses alternatives to ocean dumping in terms of costs, availability, and effectiveness. The State and Federal agencies and authorities that deal with specific aspects of dumping are discussed in Chapter IV. Chapter V considers the international implications of ocean dumping.

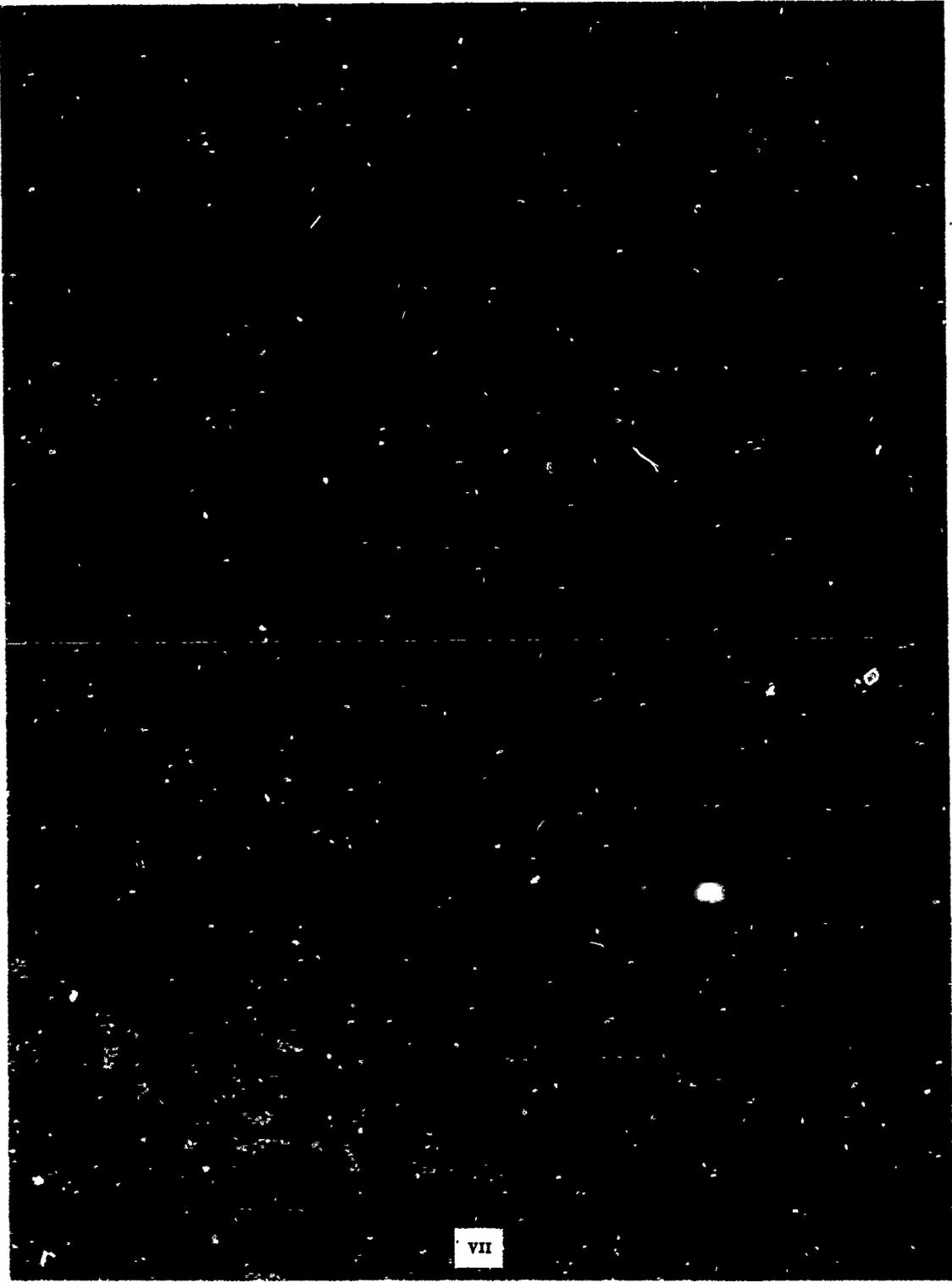


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## *Ocean Dumping: Location, Quantities, Composition, and Trends*

**A**BOUT 48 million tons of wastes were dumped at sea in 1968. These wastes included dredge spoils, industrial wastes, sewage sludge, construction and demolition debris, solid waste, explosives, chemical munitions, radioactive wastes, and miscellaneous materials. This chapter indicates rapid increases in ocean dumping activity over the last two decades and the potential for great increases in the future. At the same time, ocean dumping of wastes from other sources should decrease through implementation of water quality standards and new Federal laws dealing with control of sewage from vessels and with oil pollution.

### DISPOSAL SITE LOCATIONS

Data on disposal sites are still incomplete, with little definitive information on sites off Alaska and Hawaii and outside the U.S. contiguous zone (more than 12 miles offshore). There are almost 250 disposal sites off U.S. coasts. Fifty percent are located off the Atlantic Coast, 28 percent off the Pacific Coast, and 22 percent in the Gulf of Mexico. Table 1 summarizes the number of sites for each major area and the number of permits issued for their use. The locations of the disposal sites are indicated in Figure 1.

TABLE 1.—*Ocean Dumping: Site Location  
Summary (22, 66)*

Coastal area	Number of sites	Active Corps disposal permits
Atlantic Coast.....	122	136
Gulf Coast.....	86	30
Pacific Coast.....	66	71
Total.....	266	237

Not included in Table 1 are some 100 artificial reefs constructed by private concerns under permits issued by the U.S. Army Corps of Engineers. (66) These reefs, sometimes formed of old car hulks or tires, are intended to provide artificial shelters for fish.

### QUANTITIES AND TYPES OF WASTES

The categories of wastes covered in this report are used because of the large quantities of materials currently dumped, their potential for increase, or their special characteristics, such as toxicity. The quantities for each category are summarized by coastal region in Table 2. Radioactive wastes and chemical munitions are not included in the table because weight is not a meaningful descriptor. Each, however, will be discussed later.

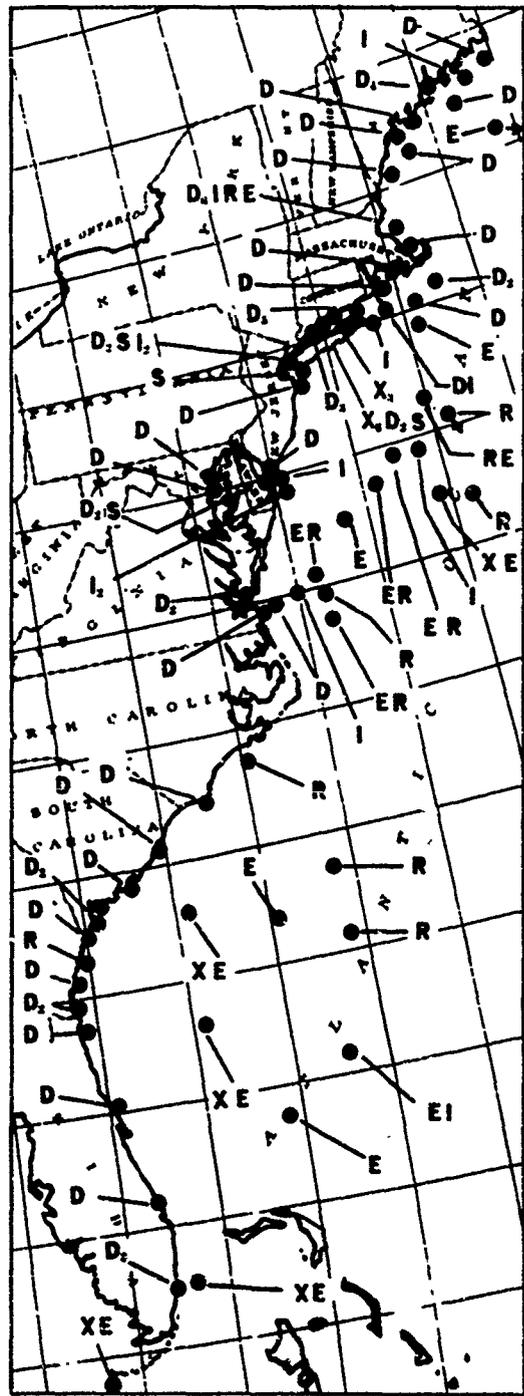
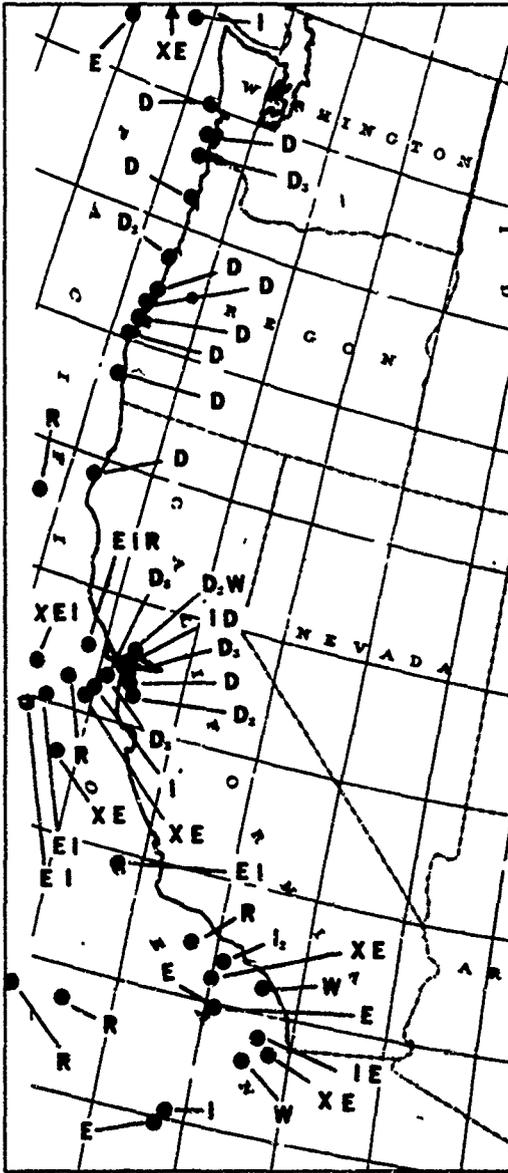
The Bureau of Solid Waste Management estimates that the data in Table 2 represent about 90 percent of ocean dumping. However, the data undoubtedly underestimate the size and scope of the problem because of the time lapse and the possibility of many small community operations or illicit operations by private firms. Also not included in the table are those wastes that are piped to sea.

Each major category of ocean dumping sources is now discussed and the possible chemical composition of the wastes delineated as an aid in evaluating their present and potential effects on the marine environment.

### *Dredge Spoils*

A large percentage of dredging is done directly by the Corps. The remainder is done by private contractor under Corps permit. Spoils are generally disposed of in open coastal waters less than 100 feet deep.

LEGEND	
D	DREDGE SPOILS
I	INDUSTRIAL WASTES
S	SEWAGE SLUDGE
E	EXPLOSIVES
R	RADIOACTIVE WASTES
W	SOLID WASTE
X	INACTIVE SITE





areas are not available. An analysis by the Federal Water Quality Administration (FWQA) of polluted spoils from Lake Erie indicates that a total of 82,091 tons of spoils created 10,500 tons of chemical oxygen demand (COD). (23) These large quantities of oxygen-demanding materials can reduce the oxygen in the receiving waters to levels at which certain fish and other aquatic populations cannot survive. Also present were toxic heavy metals. Even with substantial dilution, the levels of heavy metals in the spoils may deleteriously affect marine life, as shown in Table 4.

TABLE 4.—Heavy Metals Concentrations in Dredge Spoils (23, 36)

(In parts per million)

Metal	Concentrations in dredge spoils	Natural concentrations in sea water	Concentrations toxic to marine life
Cadmium.....	130	.08	.01-10.0
Chromium.....	180	.00008	1.0
Lead.....	310	.00008	.1
Nickel.....	610	.0064	.1

### Industrial Wastes

Industrial wastes were the second largest category of pollutants dumped at sea in 1968 (4.7 million tons, or 10 percent of the total). (66)

Most industrial wastes are commonly transported to sea in 1,000- to 5,000-ton-capacity barges. Sites are 4 to 125 miles off the Atlantic Coast, from 25 to 125 miles off the coast of the Gulf of Mexico, and from 5 to 75 miles off the Pacific Coast. Most of the sites are at the nearshore end of the range.

Highly toxic industrial wastes are sometimes contained in 55-gallon drums and are jettisoned from either merchant ships or disposal vessels at least 300 miles from shore. The containers are sometimes weighted and

sunk. More frequently, they are ruptured at the surface, either manually with axes or by small arms or rifle fire. (66)

The breakdown for disposal methods by geographic area is shown below.

TABLE 5.—Industrial Wastes by Method of Disposal (66)

(In tons)

Coastal area	Number of sites	Bulk wastes	Containerized wastes	Total
Atlantic Coast.....	10	3,011,000	2,300	3,013,300
Gulf Coast.....	6	600,000	6,000	606,000
Pacific Coast.....	7	987,000	300	987,300
Total.....	23	4,602,000	3,000	4,605,000

Table 6 shows the relative quantities of major industrial wastes found in a survey of 50 producers in 20 cities.

TABLE 6.—Industrial Wastes by Manufacturing Process (66)

Type of waste	Estimated tonnage	Percent
Waste acids.....	2,730,000	58
Refinery wastes.....	802,000	13
Pesticide wastes.....	208,200	7
Paper mill wastes.....	146,700	3
Other wastes.....	908,100	20

The types of contaminants in industrial wastes dumped at sea vary greatly because of the diversity of industries and production processes involved. Many of the wastes are toxic—some highly toxic. For example, refinery wastes, which are 12 percent of the total ocean-disposed industrial wastes, can include cyanides, heavy metals, mercaptides, and chlorinated hydrocarbons. Pulp and paper mill wastes may contain "black liquor" and various organic constituents which are toxic to the marine environment. Chemical manufacturing and laboratory wastes that are dumped include arsenical and mercuric compounds and other toxic chemicals. (66)

### *Sewage Sludge*

Sewage sludge is the waste solid byproduct of municipal waste water treatment processes. These solids can be further treated by digestion, a process which allows accelerated decomposition of the sludge to control odors and pathogens. Most sewage sludge is disposed of on land or is incinerated. Relatively small amounts (4.5 million tons on a wet basis) are currently dumped at sea, of which almost 4.0 million tons are dumped off New York harbor. (66) As of 1968, there were no similar operations on either the Gulf or Pacific Coasts, although sludge is being discharged from Los Angeles by pipeline.

Sewage sludge in digested or undigested form contains significant quantities of heavy metals. A study by the FWQA indicated that copper, zinc, barium, manganese, and molybdenum are present in sewage sludge. (9) The concentrations and types of toxic materials vary because sludge is the residual of waste water treatment and contains whatever domestic and industrial contaminants have entered the system. Table 7 shows the minimum, average, and maximum values for three heavy metals found in one analysis of sewage sludge.

TABLE 7.—*Heavy Metals Concentrations in Sewage Sludge (8, 9, 36)*

(In parts per million)

Metal	Concentrations in sewage sludge			Natural concentrations in sea water	Concentrations toxic to marine life
	Min.	Avg.	Max.		
Copper.....	315	64*	1,980	.003	.1
Zinc.....	1,350	2,490	3,700	.01	10.0
Manganese..	30	262	790	.002	.....

Sewage sludge also contains significant amounts of oxygen demanding materials. In 1969, sludge dumped in the New York Bight, encompassing the New York harbor and

some adjacent coastal areas, had an oxygen demand of about 70,000 tons. (15) These wastes also include some bacteria that cause diseases in man.

### *Construction and Demolition Debris*

Only New York City disposes of debris at sea in significant quantities because of the lack of nearby available landfill. Sea disposal is conducted with 3,000- to 5,000-ton capacity barges that are towed some 9 miles offshore. These materials are generally inert and non-toxic.

### *Solid Waste*

Solid waste, the byproducts and discards of our society, amounts to approximately 5.5 pounds per capita per day collected by municipal and private agencies. (28) Although these wastes total approximately 190 million tons per year, ocean disposal accounted for only about 26,000 tons. (66) Ocean dumping of solid waste occurred exclusively on the Pacific Coast, where they were generated by cannery operations and commercial and naval shipping operations. Other sources no doubt exist, but the overall magnitude of the current problem is minor.

The composition of solid waste, ascertained by sampling, is shown in Table 8. It is presented here to indicate the materials that would be introduced into the marine environment if ocean dumping of solid waste becomes a common practice.)

Solid waste disposed of in the ocean interacts with the water, but the resultant chemical products are difficult to determine. Studies have been done on the interaction between solid waste and fresh water in sanitary landfills as the water percolates through the waste materials. (The resultant mixture of water and chemicals is called leachate.)

TABLE 8.—Composition of Solid Waste (28)

Type of waste	Average (percent)
Paper products.....	43.8
Food wastes.....	12.2
Metals.....	9.1
Glass and ceramics.....	9.0
Garden wastes.....	7.9
Rock, dirt, and ash.....	3.7
Plastics, rubber, and leather.....	3.1
Textiles.....	2.7
Wood.....	2.5
Total.....	100.0

The percentage of pollutants in solid waste is not nearly as high as in sewage sludge or dredge spoils, but it does contain nutrients, oxygen-demanding materials, and heavy metals. Laboratory studies of water contaminated by solid waste have shown significant quantities of heavy metals, with zinc, nickel, and magnesium present in concentrations of 13, 27, and 378 parts per million respectively. (29) These concentrations are well above toxic levels for marine life.

Up to 50 percent of solid waste is usually paper, wood, plastics, and rubber, all of which can float to the surface. Particularly significant are the plastics which will not become water soaked and will not degrade for many, perhaps even hundreds, of years. Even if baled before ocean disposal, it is almost certain that over time the bales will disintegrate and the floatables will rise to the surface. The potential esthetic problems of large quantities of solid wastes floating to the surface and then being carried to shore are staggering.

#### **Explosives and Chemical Munitions**

Unserviceable or obsolete shells, mines, solid rocket fuels, and chemical warfare agents have been disposed of in deep water for many years. In 1963, the Navy initiated Operation

“CHASE,” in which munitions were disposed of by sinking them in obsolete hulks. Since then, 19 gutted World War II Liberty ships containing munitions have been scuttled. In the last six operations, the weapons were to detonate, but the S.S. ROBERT LOUIS STEVENSON failed to do so as planned and is located on the continental shelf near Alaska in 2,200 feet of water.

Since 1964 at least 18,342 tons of ammunition and explosives have been dumped in this manner. Additional cargoes of approximately 35,000 tons containing an unknown proportion of net explosives were also scuttled. A detailed listing of the ships scuttled, their cargoes, and disposition are shown in Table 9.

Detonation of explosives can result in trace amounts of lead, nickel, bronze, and other metals in the water, depending on corrosion processes and the materials used in the munitions.

#### **Radioactive Wastes**

Most nuclear waste products are liquid and of low radioactivity. They consist mostly of decontaminated process and cooling waters from reactors, fuel processing, and other operations. Small amounts of liquid wastes are highly radioactive; they result from the reprocessing of reactor fuel elements.

Solid radioactive wastes are produced by contamination of equipment and other materials during nuclear power plant operations, from medical use, and by research and development activities.

Solid radioactive wastes have been buried in carefully controlled landfill sites. Low-level liquid nuclear wastes are treated and/or stored to reduce radioactivity before disposal. High-level liquid wastes are stored exclusively in tanks at land-based sites.

TABLE 9.—Explosives and Chemical Munitions, 1964-1970 (30)

Year	Name	Total cargo (in tons)	Nature of cargo	Net explosives (in tons)	Disposition
1964	S.S. John F. Shaferth.....	9,799	A&E	Unknown	SDW
	S.S. Village.....	7,836	A&E	Unknown	SDW
1965	M.V. Coastal Mariner.....	4,040	A&E	512	D at 1,000'
	S.S. Santiago Iglesias.....	8,715	A&E	408	D at 1,000'
1966	S.S. Insee Van Zandt.....	7,800	A&E	1,626	D at 4,000'
	S.S. Horace Greely.....	6,088	A&E	442	D at 4,000'
1967	S.S. Robt. L. Stevenson.....	6,800	A&E	2,327	S
	S.S. Corporal Eric G. Gibson.....	9,006	Chem.	None	SDW
	S.S. Monahan.....	963	A&E	Unknown	SDW
1968	S.S. Mormacfern.....	7,788	Chem.	N.A.	SDW
	S.S. Richardson.....	7,487	A&C	188	SDW
1969	S.S. Cape Tryon.....	7,628	A&E	1,148	DU
	S.S. Cape Catoche.....	6,348	A&E	1,280	DU
	S.S. Cardinal O'Connell.....	6,481	A&E	2,144	DU
1970	S.S. Frederick E. Williamson.....	5,245	A&E	478	DU
	S.S. Cape Comfort.....	6,200	A&E	N.A.	DU
	S.S. Walker D. Hines.....	6,500	A&E	N.A.	DU
	S.S. David Hughes.....	5,000	A&E	N.A.	DU
	S.S. LeBaron Russell Briggs.....	2,664	Chem.	N.A.	SDW

Definitions: A&E—ammunition and explosives; N.A.—not available; DU—Detonated unintentionally; SDW—sunk in deep water; D—detonated; S—sunk at less than 4,000 feet and did not detonate

as planned; A&C—ammunition and cylinders contaminated with residues of GB nerve gas.

Liquid and solid radioactive wastes which have been dumped in the ocean are usually in concrete-filled metal drums or containers. Table 10 summarizes the amounts of these wastes disposed of at sea.

The quantities of radioactive materials disposed of at sea have decreased dramatically for several reasons. First, in 1960 the Atomic Energy Commission placed a moratorium on new licenses for disposal of radioactive wastes in the ocean. Only one commercial organization (which has never conducted any sea disposal), two Government agencies, and one university are still authorized to dispose of radioactive wastes in the ocean. Second, the major contractors of the AEC have not disposed of any wastes at sea since 1962. And for economic reasons, those firms with licenses

are phasing out sea disposal of radioactive wastes in favor of land disposal.

TABLE 10.—Radioactive Wastes: Historical Trends, 1946-1970 (70)

Year	Number of containers	Estimated activity at time of disposal (in curies)
1946.....		
1950.....	76,201	93,600
1961.....	4,087	275
1962.....	6,120	478
1963.....	129	9
1964.....	114	20
1965.....	24	5
1966.....	43	105
1967.....	12	63
1968.....	0	0
1969.....	26	26
1970.....	2	3
Total.....	89,786	94,673

Two sites have been used for disposal of most of the wastes in the Pacific Ocean. These sites are approximately 48 nautical miles west of the Golden Gate Bridge. One commercial firm has disposed of wastes in the Pacific Ocean farther than 150 miles from the U.S. coast; these disposals, 11 in number, were at depths greater than 6,000 feet. In the Atlantic Ocean, the major sites for disposal were in the area of Massachusetts Bay, approximately 12 to 15 miles from the coast; approximately 150 miles southeast of Sandy Hook, N.J.; and approximately 105 miles from Cape Henry, Va. With the exception of the Massachusetts Bay site, disposal was at depths greater than 6,000 feet. The Massachusetts Bay site was in 300 feet of water.

### PAST TRENDS

Figure 2 shows significant increases in ocean dumping activities during the years 1951-1968. These data do not include dredge spoils or explosives because historical data could not be readily reconstructed. Radioactive wastes are also excluded because of their negligible weight contribution.

Table 11, on which Figure 2 is based, shows a fourfold increase in tonnage dumped at sea from 1949 to 1968. The 28 percent increase

between the 1959-1963 period and the 1964-1968 period is largely attributable to dramatic increases in industrial wastes and sewage sludge disposal. In 1959, industrial wastes disposed of at sea approximated 2.2 million tons. By 1968, the amount had increased to over 4.7 million tons, a 114 percent increase in 9 years. The amount of sewage sludge disposed of at sea increased by 61 percent in the same period, from 2.8 million tons to 4.5 million tons. (66)

### FUTURE TRENDS

Assessing future trends in ocean dumping requires analysis of basic population trends. Population growth is accompanied not only by increased amounts of wastes but also by decreased space available for their disposal.

Between 1930 and 1960 the coastal population increased by 78 percent, compared with a 48 percent increase nationwide. (86) The figures below (25) indicate the population growth in the coastal region projected through the year 2000:

1930	57,946,000
1970	68,397,000
1990	76,007,000
1990	92,940,000
2000	106,900,000

TABLE 11.—Ocean Dumping: Historical Trends, 1949-1968<sup>1</sup> (66)

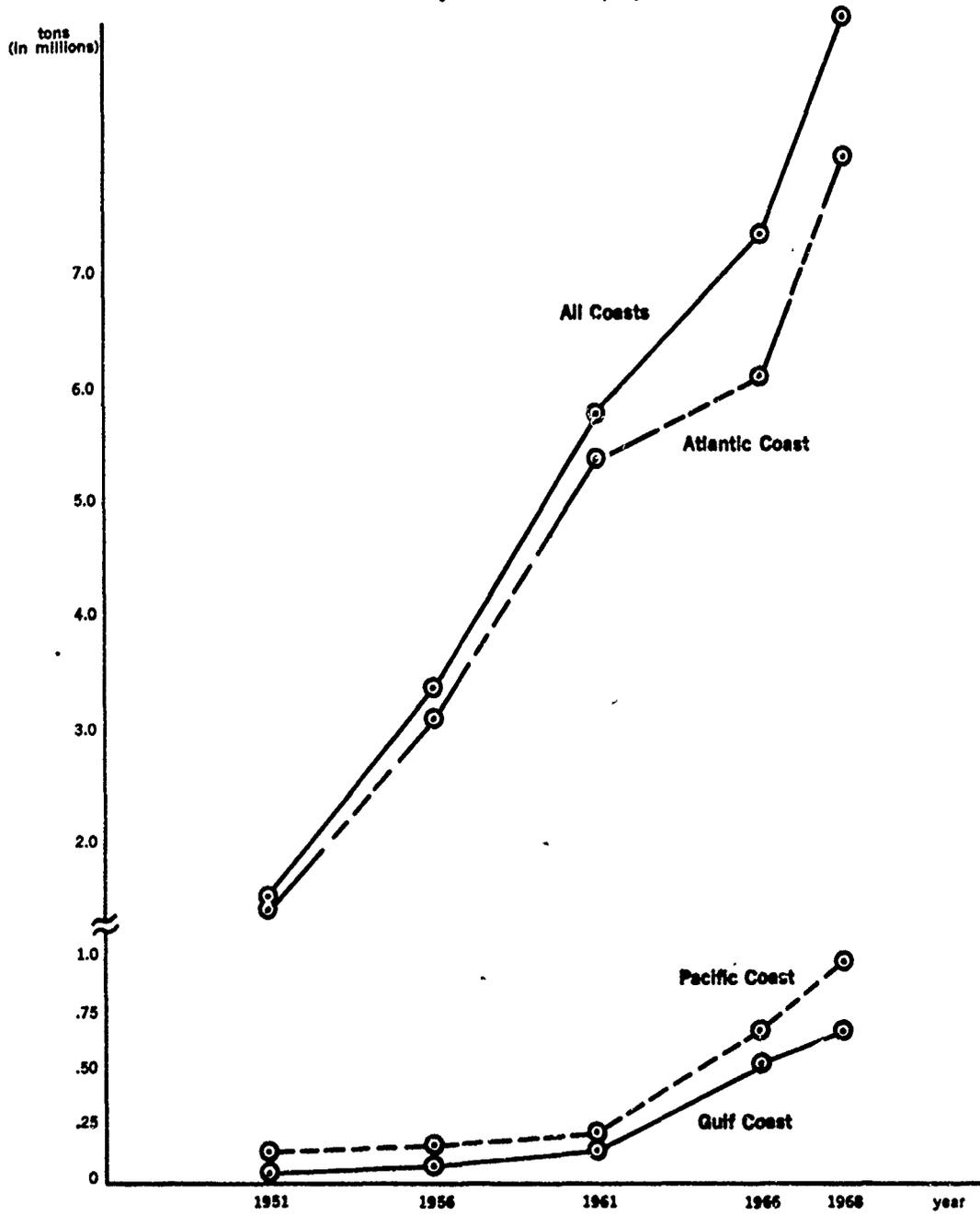
Coastal area	1949-1952		1954-1958		1959-1963		1964-1968	
	Total	Avg./Yr.	Total	Avg./Yr.	Total	Avg./Yr.	Total	Avg./Yr.
Atlantic Coast.....	2,000,000	1,000,000	16,000,000	3,200,000	27,370,000	5,474,000	31,100,000	6,220,000
Gulf Coast.....	40,000	8,000	263,000	53,000	380,000	76,000	2,600,000	520,000
Pacific Coast.....	487,000	97,000	350,000	70,000	943,000	189,000	3,410,000	682,000
Total.....	2,527,000	1,263,000	17,123,000	3,426,000	28,693,000	5,739,000	37,110,000	7,422,000

<sup>1</sup> Figures do not include dredge spoils, radioactive wastes, and military explosives.

<sup>2</sup> Estimated by fitting a linear trend line between data for preceding period and data for succeeding period.

<sup>3</sup> Disposal operations in the Gulf of Mexico began in 1962.

Figure 2.—Average Annual Tonnage Dumped at Sea—  
by Coastal Area (66)



### ***Solid Waste***

About 65 million tons of solid waste are generated annually in the coastal region. Based on a conservative estimate of 8 pounds of waste generated per person per day in the year 2000—the generation rate which will be reached by 1980—over 150 million tons will need to be disposed of for that one year. (28) If 10 pounds per person per day are generated, total wastes in the coastal area will be close to 200 million tons, more than triple current levels. The pressure to use the ocean for waste disposal will increase as land disposal sites become more scarce, costs increase, and metropolitan areas face political problems in obtaining new land disposal sites. Several cities are currently exploring the use of the ocean as a solid waste disposal site, and this interest is expected to increase. In some cases operations may begin within a year. If even a small percentage of the solid waste annually generated in the coastal area were disposed of at sea, the quantities entering the marine environment would be many orders of magnitude greater than all solid waste disposed of at sea to date.

### ***Sewage Sludge***

Based on an average of .119 pounds of sludge generated per person per day, potential sludge disposal quantities for the coastal region can be roughly estimated. (37) In 1970, approximately 1.4 million tons of sludge will be disposed of in the coastal areas, and in the year 2000, approximately 2.1 million tons will be generated, an increase of 50 percent in 30 years. If anything, these figures may underestimate future quantities of sludge. For example, between 1960 and 1980, 20-year period, the sludge generated by the Baltimore-Washington area is expected to increase from 70,000 tons to 166,000 tons, or about a 140 percent increase. New

York City's sludge barged to sea is expected to increase from 99,000 tons in 1960 to about 220,000 tons in 1980, a 120 percent increase in 20 years. (66)

### ***Industrial Wastes***

The volume of industrial production, which gives rise to waste production, is increasing at a rate of 4.5 percent annually, or three times the population growth rate. Additionally, the FWQA estimates that the manufacturing industry is responsible for three times as much waste as that produced by the Nation's population. And about 40 percent of the Nation's industrial activity is concentrated in the estuarine economic region. (36) Given increasingly stringent water quality standards and the ever expanding level of industrial waste generation in the coastal zone, the potential for increased industrial waste dumping at sea is great.

### ***Radioactive Wastes***

The amount of liquid and solid radioactive wastes will rise with projected increases in nuclear power generation. The amount of high-level liquid radioactive wastes will increase from 100,000 gallons in 1970 to 6,000,000 gallons by the year 2000 and radioactive solid wastes, from approximately 1 million cubic feet in 1970 to 3 million cubic feet by 1980. (70) As mentioned earlier, however, ocean dumping has been virtually nonexistent since the early 1960's because of the AEC moratorium and the economic advantage of land disposal.

Large radioactive structures, an additional source of radiation, are not yet a significant problem. In the past, the few that became obsolete have been decontaminated, dismantled, and kept under surveillance on land—with the exception of parts of one nuclear sub-

marine, which were disposed of in the ocean. Currently, however, there are 16 nuclear power plants in operation, 55 under construction, and 25 for which construction permit applications are pending with the Atomic Energy Commission. (70) If current forecasts are realized, by the year 2000, the equivalent of up to 1,000 nuclear power units, each with a capacity of some 1,000 megawatts, may be operating. In addition, the Navy has about 90 nuclear-powered submarines and surface ships, and many more may be built in the next 30 years as a large portion of the current naval fleet is replaced. Commercial nuclear ships—currently the N.S. SAVANNAH is the only one—may become economically feasible in the future.

A lifetime of 10 to 30 years for the power plants' and ships' reactor vessels is reasonable in terms of physical or technological obsolescence. Their radiation levels vary considerably, up to 50,000 curies of induced radiation in each structure. (70)

Individually none of these sources adds significant amounts of radioactivity to the ocean. Taken together, however, the increases could be of significant concern.

### *Dredge Spoils*

In the long run, the reduction of polluted discharge from municipal and industrial sources, brought about by water quality standards, will lessen the problem from dredge spoils. However, they will remain a problem for at least the next 5 to 10 years. During this period, there will be pressures for more dredging to deal with increasing marine commerce, to meet the desire of cities

for new deep-water harbors, and to provide draft for larger vessels (including the supertankers used to transport oil). These needs will all increase total dredging and hence dredge spoils.

### *Explosives and Chemical Munitions*

The following are Department of Defense estimates of conventional munitions planned for disposal: in 1970, 108,777 tons; in 1971, 88,835 tons; and in 1972, 80,000 tons. (26) These quantities are several times larger than the total volume of these wastes disposed of at sea in the last two decades. They indicate the quantities which would enter the marine environment if no other disposal technique were employed.

Chemical munitions have also been disposed of at sea in three deep-water disposal operations, but actual quantities involved are not known. No future ocean disposal operations are planned. Biological agents have not previously been disposed of at sea, and no future disposal is projected.

### SUMMARY

The data indicate that the volume of wastes dumped in the ocean is increasing rapidly. Many are harmful or toxic to marine life, hazardous to human health, and esthetically unattractive. In all likelihood, the volume of ocean-dumped wastes will increase greatly due to decreasing capacity of existing disposal facilities, lack of nearby land sites, higher costs, and political problems in acquiring new sites.

## CHAPTER II *Ocean Pollution*

**C**HAPTER II deals with the effects of ocean dumping in terms of the broader problem of ocean pollution. This view is necessary because wastes affect marine ecosystems no matter where or how the pollutants originate and because pollutants tend to interact, sometimes synergistically, in the environment.

Marine pollution has seriously damaged the environment and endangered humans in some areas. Shellfish have been found to contain hepatitis, polio virus, and other pathogens; pollution has closed at least one-fifth of the Nation's commercial shellfish beds; beaches and bays have been closed to swimming and other recreational use; lifeless zones have been created in the marine environment; there have been heavy kills of fish and other organisms; and identifiable portions of the marine ecosystem have been profoundly changed.

### THE PATHWAYS OF POLLUTION

In order to understand the effects of pollutants on marine ecosystems, one needs to understand how pollutants are dispersed and concentrated. The dispersal of wastes depends on the material involved. Most wastes, but far from all, sink to the bottom. Others, such as solid waste, oil, and garbage, contain many floatable materials. Floating wastes can be transported great distances by current and wind. Early in 1970, the Heyerdahl expedition encountered wastes over large areas of water in mid-ocean, reporting that the ocean was "visibly polluted by human activity." (55)

Suspended materials, such as fine particles, are also transported by currents over great distances. For example, horizontal currents flush the 500 square miles of the New York Bight, completely exchanging the water in

less than 1 week. (42) Vertical movement is considerably slower, and pollutants may remain in layers of water for quite some time.

Pollutants enter living systems through biological concentration. Billions of tiny phytoplankton organisms act as a great biological blotter, picking up nutrients, trace metals, and other materials. Organisms feed on the phytoplankton and successively pass the pollutants on to higher organisms. As this process moves through the food chain, concentrations reach their highest levels in predators such as marine mammals, birds, and man. An example of the food chain may be seen in the North Atlantic—1,000 pounds of phytoplankton produces:

- 100 pounds of zooplankton or shellfish
- 50 pounds of anchovies and other small fish
- 10 pounds of the smaller carnivores
- 1 pound of the carnivores harvested by man. (41)

The concentration of chemicals by phytoplankton and subsequent further concentration within the food chain have lethal and sublethal effects on organisms.

Heavy metals have been found in toxic concentrations in plankton, seaweed, and shellfish, although levels of concentration in the surrounding water were not high. The ability of biota to concentrate materials varies from a few hundred to several hundred thousand times the concentrations in the surrounding environment. (8, 42, 48) Table 1 shows phytoplankton concentration factors for selected metals.

### EFFECTS ON MARINE LIFE

Pollution affects marine life directly through toxicity, oxygen depletion, biostimulation, and habitat changes.

TABLE 1.—*Phytoplankton Concentration of Some Heavy Metals.* (45)

Metal	Concentration factor
Aluminum.....	100,000
Cobalt.....	1,500
Copper.....	30,000
Iron.....	45,000
Lead.....	40,000
Radium.....	12,000
Zinc.....	20,000

### Toxicity

Although plants and animals are sometimes killed by toxic wastes, organisms may be affected by concentrations far below the lethal level. Sublethal effects include reduced vitality or growth, reproductive failure, and interference with sensory functions.

Copper was found in the waters of the New York Bight in concentrations greater than 0.120 milligrams per liter. (8) These concentrations, found throughout the water column, indicate widespread copper contamination.

With even lower concentrations of copper, laboratory experiments have shown that:

- Concentrations of 0.1 milligrams per liter killed soft clams in 10–12 days. (62)
- Concentrations of 0.05 milligrams per liter killed polychaete worms in 4 days. (63)
- Concentrations of 0.1 milligrams per liter inhibited photosynthesis in kelp 70 percent in 9 days. (16, 17)

Pesticides and other toxic materials are a major cause of fish kills in fresh water. Although there are few recorded fish kills in the ocean resulting from pesticides, pesticide concentrations are rising every year. They reduce the size and strength of mollusk shells. Reduced growth rate and reproductive activity in fishes exposed to sublethal doses of pesticides and copper have also been shown. (54)

Pesticides endanger higher predators because of biological concentration. For example, pesticides amplified through the food chain damage birds' reproductive capability and in some cases seriously reduce their populations. The peregrine falcon is the most dramatic example; pesticide accumulation through the food chain has led to drastic reduction and projected extinction in the coterminous United States.

Oil introduced into the marine environment produces several adverse effects: Reproduction and other behavior is altered. Direct contact with respiratory organs weakens or kills animals. And oil clogs their filtering mechanisms. (67) Experiments with oysters have shown that when water-soluble fractions of oil were introduced into water, the amount of water filtered by the oysters decreased from between 207 and 310 liters per day to between 2.9 and 1.0 liters after 8 to 14 days. (13)

Cancer in fishes is very likely a result of contact with certain waste products. Cancerous growths on the lips of croakers have been found in areas of the Pacific Ocean polluted by oil refinery wastes. (65) Growths on several species including White Seabass and Dover Sole caught in oil polluted areas have been reported. (72) Oysters and barnacles are also known to concentrate cancer-producing agents.

Laboratory tests with "black liquor" from a paper mill showed that 0.05 grams per liter affected photosynthesis and 1 gram per liter killed the four species of phytoplankton tested. (66)

In laboratory experiments with polluted sediments from the New York Bight disposal area, the following sublethal effects were shown:

- Serious infections were found in native species.

- Bottom waters inhibited phytoplankton cell growth and division. (34)

Lethal and sublethal effects from toxic wastes are complex and not well understood. But evidence is mounting that these effects may be widespread and very harmful to the marine environment. Their potential for deferred and long-range ecological damage must be taken into account in any program to control ocean dumping.

### ***Oxygen Depletion***

Oxygen supports marine and aquatic life and is necessary to the biological degradation of organic materials. Organic wastes dumped or discharged into water bodies demand oxygen to decompose. If waste loads are too heavy, the oxygen levels become depleted and the diversity of marine organisms is altered.

Many of the Nation's rivers, estuaries, and harbors are in this condition. In the Potomac estuary, severely polluted by municipal wastes, dissolved oxygen levels approach zero in some reaches during low flow periods of warm summer months. (33)

When all the oxygen is depleted, organisms die, and anaerobic bacteria produce hydrogen sulfide and methane gas, which are malodorous. Large amounts of oxygen are required to decompose some materials. The dissolved oxygen in 220,000 gallons of air-saturated sea water is required to oxidize 1 gallon of crude oil completely. (64) If the oxygen level is already low, damage from oil spills may increase.

Dumping undigested sewage sludge in the ocean can create a significant demand on the dissolved oxygen. And oxygen depletion can develop rapidly. In the New York Bight waste disposal area, where sludge has been dumped for 40 years, the oxygen concentration as a percent of saturation declined from 61 percent in 1949 to 59 percent in 1964. It

then dropped to 29 percent in 1969 and was as low as 10 percent in the center of the dump. (42) This may indicate that a threshold was reached and that the water quality then deteriorated rapidly.

Oxygen levels fell below those necessary to sustain life in species of lobster and crab normally found in the area. Researchers have noted that:

the most striking effect observed was the *extreme depletion of dissolved oxygen* in the bottom waters over the disposal areas during the summer months. Levels frequently fell below 2 parts per million during the period from July to mid-September . . . This condition is undoubtedly caused by the heavy oxygen demand of the organic-rich waste materials coupled with the reduced mixing rates normally found during the summer. (48)

Oxygen deficit in a waste disposal area may be self-perpetuating. The accumulation of organic matter, sulfides, and some metals can act as a reservoir of future oxygen demand. Even after the disposal of the organic matter is stopped, it may be a long time before the area recovers.

### ***Biostimulation***

Some wastes, such as sewage sludge, are particularly rich in nutrients, such as phosphates and nitrates. These nutrients can cause biostimulation—the accelerated fertilization of plant life. When the plants die, oxygen necessary to support marine life is used in their decomposition. And when dead algae are carried to beaches, they rot and produce unpleasant odors.

By creating excessive blooms of algae, biostimulation indirectly changes the nature of bottom sediments and thus whole communities of bottom organisms. For example, areas

which formerly supported surf clams in sand may become covered with an algal mud to which the surf clams cannot adapt. Sediments adjacent to disposal areas show greatly increased concentrations of organic matter. Some come directly from the wastes, but other material filters down from algal blooms. (2)

In the past, biostimulation has been recognized as a major problem of fresh waters, but not of the oceans. Increasingly, however, biostimulation is affecting estuaries and bays and even some portions of the continental shelf.

### *Shock*

Explosions from dumping of munitions cause death in marine organisms surrounding the explosion point. The Department of Defense calculates that detonation of 1,000 tons of explosives—the approximate amount contained in the September 4, 1970, "Deep Water Dump" off Washington State—generates a shock wave that will kill most marine animals within 1 mile of the explosion and will probably kill those fish with swim bladders<sup>1</sup> out to 4 miles from the explosion.

### *Habitat Changes*

Evidence indicates that waste disposal practices drastically alter certain marine communities. Habitat changes are the most common change that can affect entire ecosystems.

The most pronounced ecological changes, caused by dumping sewage sludge and polluted dredge spoils, have been found in the New York Bight. The consistency of bottom sediments changed from sand or hard mud to muddy ooze. Nematode worms, normally tolerant of pollution, were completely

<sup>1</sup> A large group of fish with respiratory organs that adjust to different depths.

absent from the center of the dredge spoil dump and were found in very low numbers in the center of the sewage sludge dump. (2)

Changes in the kinds and quantities of sediments deposited may alter ecosystems. The plague of starfish in the Pacific may be an example of this effect. In recent years, the numbers of Crown of Thorns starfish have multiplied. This coral-eating starfish has devastated large areas of the coral reefs off many Pacific islands and the Great Barrier Reef of Australia. The population explosion may be linked to sediment protecting the larval starfish from their predators, which normally keep the population in balance. The sediment results from blasting, dredging, and dumping.

Significant changes in the benthic ecology of the Southern California coast have been caused by wastes from several municipalities. (11) These wastes brought about a shift in the marine population. Large numbers of sea urchins replaced other organisms and grazed off most of the giant kelp beds near the sewer outfalls. Because of the commercial value of giant kelp and the habitat it provides for many marine animals, the changes were an economic and an ecologic loss.

Habitat changes may be quite subtle. Near a sewer outfall off San Diego, species variety declined an average of 30 percent. Populations of remaining species sometimes overran their food supply. The loss of species diversity made the ecosystem less stable. (71)

## HUMAN IMPACTS

Public health problems are created by toxic agents and pathogens that find their way into the human food chain through seafood. Floating refuse and surface films reduce recreation opportunities and damage esthetic values. Economic losses are incurred when seafood

species are killed or are rendered inedible by pollution.

### **Public Health**

The standard method for determining the potential public health hazard of fish is the coliform bacteria count. (These harmless bacteria are rough indicators of pathogens.) If the count exceeds Food and Drug Administration (FDA) standards, shellfish beds are closed to harvesting.

Effluents from land-based sewage outfalls are the major source of coliform bacteria, but ocean dumping of sewage sludge is also significant. The FDA found that ocean bottom sediments up to 6 miles from the New York Bight sludge dump contained coliform counts that exceeded permissible levels. On May 1, 1970, this area, 12 miles in diameter, and a similar area off Delaware Bay were closed to shellfishing. Clams harvested for sale in the New York Bight contained coliform bacteria 50 to 80 times higher than the standards set by FDA. (2)

Hepatitis virus are carried by shellfish. A 1961 outbreak of infectious hepatitis was traced to raw shellfish taken from Raritan Bay, N.J. (36) Shellfish have been collected with polio virus concentrated to at least 60 times that of surrounding waters. (52)

White perch have become actively infected with human pathogens by exposure to human wastes, and they may transmit these pathogens over considerable distances. Exposure is sufficient for them to develop antibodies to such human diseases as pseudo-tuberculosis, paratyphoid fever, bacillary dysentery, and a variety of chronic infections. (40)

Aquatic and marine organisms are capable of concentrating radioactivity to high levels (45). In a study near Oak Ridge National Laboratory, dead embryos and abnormalities appeared in irradiated broods of killifish.

This is the only example of a natural marine or aquatic population subjected to high-level irradiation over many generations. (68)

Hydrocarbons of the type known to cause cancer in man and animals are concentrated by oysters and mussels in polluted areas. These substances remain invisible and odorless in seafood tissues, even after frying. (28) Cancer in humans has not yet been traced to consumption of carcinogens from seafood, but public health officials do not discount the possibility.

Between 1953 and 1960, 111 persons were reported to have been killed or to have suffered serious neurological damage near Minamata, Japan, as a result of eating fish and shellfish caught in areas contaminated by mercury. Among these were 19 congenitally defective babies whose mothers had eaten the fish and shellfish. Subsequently, at Niigata 26 more cases of mercury poisoning were noted. (1) The fish eaten by the affected Japanese contained from 5 to 20 parts per million of methyl mercury.

Mercury pollution recently discovered in 33 States and in Canada caused many fishing areas to be closed. Concentrations of as high as 5 parts per million have been found in fish in the Great Lakes. (1)

### **Loss of Amenities**

The coastal zones provide recreation and beauty for the 60 percent of the Nation's people dwelling there. Oceans afford swimming, boating, water skiing, sport fishing, and wildlife viewing opportunities,<sup>2</sup> and they are some of the most scenic areas of the United States.

Many beaches have been closed to swimming because of the high coliform content of the water. Most closed beaches are near large

<sup>2</sup> The Bureau of Sport Fisheries and Wildlife estimates that as many as 100 million people observe the wildlife of the U.S. estuarine zones.

metropolitan areas, such as San Francisco and New York. Floating materials, such as solid waste and oil, pose a major threat to amenity values. Rotting algae and anaerobic waters cause unpleasant odors and visual pollution. And debris are often a hazard to small boats.

### ***Economic Loss***

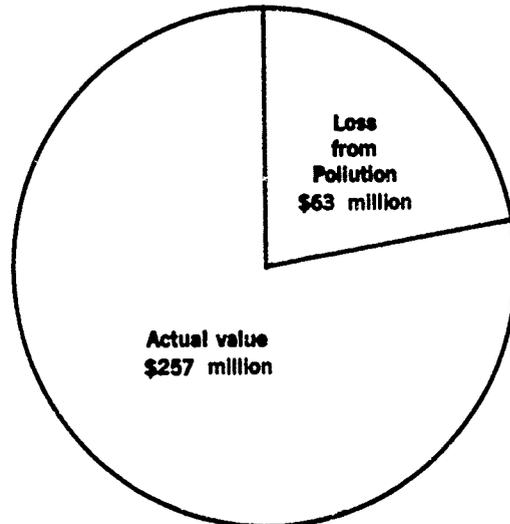
Significant economic losses result from ocean pollution. A major loss is the commercially valuable fish or other seafood species killed directly or indirectly or rendered inedible. They represent serious social and financial losses because of the near subsistence level of many fishermen.

In 1969, the total catch of crabs, lobsters, shrimp, oysters, clams, and scallops was 729 million pounds. Because one-fifth of the Nation's 10 million acres of shellfish beds are closed due to contamination, it can be estimated that the total catch would have been 181 million pounds higher. This estimate is probably low, since the closed areas are particularly productive—in lush estuarine systems in close proximity to large cities where they would have been harvested intensively. Figure 1 indicates the financial impact assuming a loss of one-fifth the potential catch.

The loss is well documented in San Francisco Bay. (36) Prior to 1935, the annual commercial harvest of soft shell clams was between 100,000 and 300,000 pounds. Today clam-digging is virtually nonexistent because of pollution. The annual commercial landings of the shrimp fishery prior to 1936 were as high as 6.5 million pounds; landings in 1965 were only 10,000 pounds.

Contamination by pesticides or mercury has rendered nine species of fish unfit for consumption by humans. Many States have

**Figure 1.**  
**Potential Value of U.S. Shellfish Catch, 1969**  
**\$320 million**



banned fishing and impounded fish because of mercury poisoning, and the FDA impounded coho salmon due to high levels of DDT.

Even where contaminant levels do not prevent safe consumption, the food may be discolored or tainted. Sludge decay can result in the production of hydrogen sulfide, which blackens the shells of clams and oysters and affects their taste and odor. (36) In even very small amounts, oil can taint the flesh of fish. The discharge residue from burning 2.6 gallons of a gasoline-oil mixture in an outboard motor was sufficient to taint fish in 1 acre-foot of water. (67)

A further ocean dumping cost is that of cleaning up or rehabilitating polluted beaches and other shores. If projected increases in solid waste are dumped at sea, continuous and expensive clean-up operations will be required.

**SUMMARY**

The information presented in this chapter is necessarily incomplete. Knowledge of ocean pollution is rudimentary, and generally it has not been possible to separate the effects of ocean dumping from the broader issue of

ocean pollution. Yet one general conclusion is apparent: There is reason for significant concern. Dealing with ocean pollution requires that all sources be greatly reduced. If no action is taken and ocean dumping continues to increase, the long-term damage to the marine environment will be great.

**T**HE critical or potentially critical sources of ocean pollution and their effects on the marine environment are described in Chapters I and II. Based on these findings, a strong national policy has been recommended to stop or limit ocean dumping substantially. The extent to which the recommended policy can now be implemented depends on existing alternatives for handling wastes.

This chapter sets forth alternatives, both interim and longer term. The interim alternatives discussed are practical, available disposal techniques which can be used now to reduce or prevent damage to the marine environment without shifting the problem to another part of the environment. Long-term alternatives look toward recycling, resource conservation, and more economic and environmentally safe techniques of waste management. Costs and capacity are estimated to indicate the impact of the alternatives.

The types of wastes for which alternatives are presented include: solid waste, sewage sludge, dredge spoils, industrial wastes, construction and demolition debris, radioactive wastes, and explosive and chemical munitions.

Although dredge spoils and industrial wastes are the two largest sources of ocean dumping, solid waste is discussed first because the alternatives are largely applicable to the other wastes dumped in the ocean.

### **SOLID WASTE<sup>1</sup>**

The amount of solid waste dumped in the ocean is not yet significant, less than 1 percent of all wastes disposed of in the ocean. Only about 26,000 tons were dumped in the ocean in 1968, (66) compared to the 190 million tons of municipal solid waste collected and dis-

<sup>1</sup> Includes residential, commercial, industrial, institutional, and agricultural solid wastes.

posed of on land. (28) However, many communities are beginning to look to the ocean as a place to dispose of solid waste in light of increasing population; increasing per capita rates of solid waste generation; and the declining capacity, increasing costs, and lack of nearby land disposal sites. If many coastal cities were to dump solid waste in the ocean, many millions of tons would be introduced annually into the marine environment. Although little research has been done on how solid waste affects marine ecology, it is known that improper disposal of solid waste on land seriously contaminates ground water. Further, floating materials from the solid waste dumped in the ocean would be unattractive, especially when carried to shore. Accordingly, the policy recommended would prohibit new sources of solid waste in the ocean and call for phasing out existing sources.

### *Interim Alternatives*

Nationwide, landfill capacity is generally adequate. The average time remaining for currently used landfills in all metropolitan areas is 16 years, although some large metropolitan areas will soon exhaust their current sites. (28) Only 10 percent of land disposal operations are sanitary landfills, in which the wastes are covered daily by soil. The other 90 percent are open dumps, which create many health and esthetic problems. Rodents and insects breed and carry infectious diseases, and ground water often becomes polluted. Esthetically, open dumps are unattractive and malodorous. Converting open dumps to sanitary landfills can be accomplished relatively quickly and inexpensively.

There are two alternatives to ocean dumping of solid waste. New sites can be developed, but often at a considerably increased distance. Or incinerators can be constructed. By reducing the volume, possibly up to 90

percent, they can prolong the use of existing sites by many years.

The barriers to acquiring new sites are political and financial. Communities are reluctant to be the dumping ground for the wastes of large metropolitan areas, and transport to distant sites increases costs. Transfer stations and rail or transfer truck operations make these longer hauls more costly than collection vehicles' traveling only a few miles to the disposal area. But they provide more flexibility in site selection. The barriers to the construction of new incinerators are largely financial. They are expensive to build and to operate. More stringent air pollution standards will add to both capital and operating costs.

Comparative costs for various alternative methods of disposal are shown in Table 1. As it indicates, the additional costs for use of rail haul and land disposal instead of ocean dumping are not so high when the distances are comparable. For example, when the wastes are transported 50 or 100 miles by either method, the costs of land disposal are less than 10 percent higher.

If conducted correctly, rail haul and land disposal offer an economically attractive method of disposing of solid waste. However, the political problems are a significant bar-

rier to a good economic and environmental solution. A stronger regional approach to waste management, better disposal operations, and adequate payment for the use of land could well overcome these barriers.

One possible alternative deals with the problems of both solid waste disposal and abandoned strip mines. Because of the small incremental costs involved in rail haul, large coastal cities could haul their wastes to these mines economically.

Available acreage within range of the three coastal areas has been estimated. In the mid-Atlantic States of Ohio, Pennsylvania, West Virginia, Virginia, New York, and New Jersey, over 660,000 acres of unreclaimed surface-mined land are available. Over 300,000 additional unreclaimed acres are available in the Gulf Coast States, Texas, Alabama, Mississippi, Louisiana, and Florida. On the West Coast, California and Nevada have approximately 150,000 acres of available, unreclaimed surface-mined land.

Nationwide, surface mining has disturbed over 3.2 million acres of land. The Department of the Interior estimates that over two-thirds of this acreage is completely unreclaimed. This 2 million acres represents 3,300 square miles of potential solid waste disposal sites. (31)

TABLE 1.—Comparison of Estimated Solid Waste Disposal Costs (23, 47)

[On a cost-per-ton basis]

Unit process	Sanitary landfill at nearby site	Incineration at central city site	Rail haul and landfill			Baling and ocean dumping			Incineration ship-based
			50 mi.	100 mi.	150 mi.	20 mi.	50 mi.	100 mi.	
Collection <sup>1</sup> .....	\$15.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00
Transfer operation <sup>2</sup> .....	0	0	4.05	4.05	4.05	4.20	4.20	4.20	0
Haul.....	0	0	2.65	3.00	3.45	.60	1.30	2.25	0
Disposal <sup>3</sup> .....	1.25	10.50	.65	.65	.65	0	0	0	10.50
Total.....	16.25	24.50	21.35	21.70	22.15	18.80	19.50	20.45	24.50

<sup>1</sup> Higher cost of collection for nearby landfill due to leak of central city site.

<sup>2</sup> Higher cost of ocean baling due to higher density requirements.

<sup>3</sup> Lower cost of landfill operation due to baling.

These figures do not consider suitability of terrain, amount of cover material, volume in need of fill, or other limiting factors. Nevertheless, there are access roads and rail lines to almost all this land, and if legal and social barriers can be removed, the problems both of providing large disposal areas and of reclaiming the land would be solved.

Containerizing wastes—that is, enclosing them in plastic or other material to prevent interaction with the sea—raises a number of potential problems. First, any containment system will still allow leaching of the wastes, some of which are toxic. Second, containment systems will probably not isolate the wastes from the ocean environment indefinitely. Plastics and other floatables are likely to be released eventually. As indicated in Table 1, the economics of containerizing wastes are not significantly better than for land disposal, assuming that solid waste would have to be dumped some distance from shore.

Ship-based incineration has also been suggested as an alternative disposal technique. It appears, however, to have little economic or environmental advantage. As Table 1 indicates, the costs are higher than for rail haul or land-based incineration. And difficulties of systematically locating and using sea dump sites may be a problem compounded by the difficulties of operating during bad weather. Further, many of the materials are noncombustible, and the effects of large amounts of ash residue on the ocean environment are not clearly known.

### ***Longer-Term Alternatives***

Although ship-based incineration may not be practical, other advances in incineration may have long-term benefits for solid waste man-

agement. A new type of incinerator, the CPU-400, is being developed under a Bureau of Solid Waste Management contract. Shredded and dried refuse is burned in a fluidized bed reactor to produce gas for turboelectric power generation. A 400-ton-per-day modular unit will produce up to 15,000 kilowatts of electric power. Total annual cost is projected at between \$4.27 per ton for a municipal utility and \$5.99 per ton for private ownership; the difference is a function of the interest rate. (18) (Current incineration costs are \$10.50 per ton.) Depending on revenues from the sale of electricity and residue byproducts, the net cost could be reduced. Soon in the pilot plant stage, this incinerator may provide a low-cost, environmentally sound method of dealing with solid waste.

Recycling may also become general practice. Technology exists to recycle many types of paper, glass, aluminum, and ferrous metals, among others. Currently, 19 percent of the materials used to manufacture paper products in the United States are recycled rather than virgin materials. (28) Eighty-five percent of all automobiles taken out of service are recycled and used in steelmaking, and tires and aluminum cans are beginning to be recycled. (28) The problems and associated costs of separation; transportation; poor secondary markets; and other legal, economic, and social barriers have limited recycling. However, with new approaches to these barriers, new technology, and the need to conserve resources, recycling may become practical on a broad scale in the future. And as more materials are reused, disposal needs will lessen. It is important to note that inexpensive but environmentally unsound practices such as ocean dumping discourage waste reuse and recycling, which are desirable in the long term.

## SEWAGE SLUDGE

In 1968, about 200,000 tons of sewage sludge on a dry basis were disposed of at sea, compared to about 3 million tons disposed of by other means. Increasing population and the higher levels of treatment required to meet water quality standards will generate even more sludge. Given the difficulty of sludge disposal and the high costs involved, pressures to use the oceans will necessarily increase. The environmental problems from sludge disposal in the ocean are significant, in terms both of volume and of the toxic and sometimes pathogenic materials involved. Accordingly, the policy recommended would phase out ocean disposal of sewage sludge and prevent new sources.

### *Alternatives (Interim and Longer Term)*

Sewage sludge is primarily disposed of by using it as a soil conditioner or landfill and, to a much lesser degree, by incineration. The costs of present ocean disposal operations are generally far below costs for land-based disposal. Ocean disposal a few miles from shore costs an average \$1 per ton. (66) Table 2 contains more detailed data on the per-ton-mile costs for longer hauls.

TABLE 2.—*Barge Haul Costs for Sewage Sludge Disposal (\$7)*

City	Distance (miles)	Cost per ton-mile	Cost per ton
New York City.....	25	\$0.30	\$7.50
Elizabeth, Md.....	30	.23	6.90
Baltimore, Md.....	230	.08	18.40
Philadelphia, Pa.....	300	.04	12.00

Depending on distance, actual barge haul costs range from \$1 to \$12 per ton. Thickening, a process preparatory to barging, can add \$2 to \$6. Digestion can raise total ocean

disposal costs by \$5 to \$18 per ton. Total ocean dumping costs can range from \$3 for undigested sludge deposited nearshore to perhaps \$40 per ton for digested sludge dumped several hundred miles offshore. The current average is low because most communities that use the ocean for disposal dump undigested sludge nearshore. Table 3 summarizes costs for land and ocean disposal of sewage sludge.

TABLE 3.—*Estimated Costs of Land-Based Sewage Sludge Disposal (\$7, 50)*

Location	Method	Cost per ton
Land.....	Digestion and lagoon storage (Chicago).....	945
	Digestion and land disposal <sup>1</sup> .....	22
	Composting.....	35-45
	Processing into granular fertilizer (not cost).....	35-50
	High temperature incineration.....	35-60
Ocean.....	Barging undigested sludge.....	2-18
	Barging digested sludge.....	3-36
	Piping disposal.....	12-30

<sup>1</sup> At Chicago, with a 7-mile pipeline to the land disposal site.

These data indicate that land-based sewage sludge disposal is more expensive than near-shore ocean disposal. But when sewage is digested and barged a distance from shore, the costs become comparable, and land-based disposal may even be cheaper. As indicated in the discussion on solid waste disposal alternatives, the capacity does exist to handle more sewage sludge. But current land-based operations are often not adequate to protect the environment.

Pipeline disposal of treated sewage sludge, used by Los Angeles, has been proposed for other areas. Because piped and barged sludge materials are the same, the same policy is recommended. Further, the potential savings for piping are not significant in light of the potential environmental impact.

Piping digested sewage sludge 7 miles from Los Angeles costs an estimated \$1.55

per ton. (87) FWQA estimates that current costs on the East Coast would double the net cost—a function of both increasing costs since the Los Angeles pipeline was constructed and the higher construction costs on the East Coast. Costs for longer pipelines to limit environmental damage would increase at a linear rate, and perhaps even faster, as the distance increased because of construction and pumping difficulties. A 30-mile pipeline might raise the cost to \$12 per ton and a 50-mile pipeline to perhaps \$20 to \$30 per ton.

More promising is the use of digested sludge for land and strip mine reclamation and for a supplemental crop fertilizer. As discussed earlier, many strip mines are in need of reclamation. Sewage sludge is high in nutrient value and can be used to improve lands low in organic matter.

The Metropolitan Sanitation District of Chicago has intensively researched the environmental impact and potential of using digested sewage sludge as a crop fertilizer and in land reclamation. Their studies document the nutrient value, lack of odor, and safety when used on all types of land, including clay, sand, and acid strip mine tailings. Depending on crops and soil condition, other nutrients may be needed, but the sludge can supply much of the needed nutrients and moisture. Chicago now spends over \$20 million annually to dispose of 900 tons (on a dry weight basis) of sewage sludge per day, using incineration, lagoon storage, and other methods. (50) The District is prepared to initiate a program of rail or barge haul for sludge disposal and land reclamation within a year. The program should cost approximately the same amount as current operations and has potential for large savings if pipe transport becomes feasible. Use of sludge for land reclamation looks promising, but it must be carefully controlled and monitored to assure no environmental harm.

In this discussion of land-based sewage sludge disposal, the alternatives to ocean dumping do not involve significantly greater costs. However, a phase-out period is required because of substantial commitments by some communities and the lead time necessary to develop the alternatives.

## DREDGE SPOILS

Disposal of dredge spoils—38 million tons—represents 80 percent of all ocean dumping in 1968. (66) Removed primarily to improve navigation, spoils are usually redeposited only a few miles away. About one-third is highly polluted from industrial and municipal wastes deposited on the bottom. (22) Their disposal at sea can be a serious source of ocean pollution. The recommended policy to phase out ocean disposal of polluted dredge spoils recognizes that the speed of implementation depends almost entirely on available alternatives.

### *Interim Alternatives*

Disposing of all dredge spoils on land is not possible simply because of the vast tonnage. The Corps of Engineers estimates that of the total dredge spoils removed from each coastal region, 45 percent, or approximately 7,120,000 tons, on the Atlantic Coast are polluted; 31 percent, or 4,740,000 tons, on the Gulf Coast, are polluted; and 19 percent, or 1,890,000 tons, on the Pacific Coast are polluted.

Until land-based disposal facilities can handle these quantities, the following interim operational techniques are recommended: First, the pollutant level of dredge spoils should be determined by sampling and analysis for such key factors as BOD and concentration of heavy metals. If the spoils are not polluted, they can be disposed of in the ocean.

However, care must be taken in the location of disposal sites and in the method of disposal in order to minimize turbidity and to protect marine life.

For polluted dredge spoils, current disposal practices are not adequate, but mitigation of damage to the environment is possible without recourse to sophisticated and/or expensive processing techniques. The estimated cost increases for hauling polluted spoils farther from the dredging site are presented in Table 4.

TABLE 4.—Estimated Dredging Costs Per Cubic Yard (24)

Method	1 mile	3 miles	10 miles	20 miles	50 miles
Hydraulic pipeline dredging.....	\$0.95	\$1.30	(1)	(1)	(1)
Dipper dredging and dump scoops.....	1.10	1.25	\$1.50	\$1.80	\$2.00
Hopper dredging.....	0.25	0.34	0.54	0.81	1.05

(1) Pipeline dredging operations beyond 3 miles are usually not practical because of problems in handling long floating pipelines and the extra pumping equipment involved.

Most spoils are now deposited within a few miles from shore in less than 100 feet of water. Table 5 summarizes the additional costs for disposing of polluted dredge spoils farther out to sea using a hopper dredge.

As the table indicates, the additional cost for dumping polluted dredge spoils 10 miles rather than 3 miles out is \$2.7 million annually. For 20 miles, the additional cost is \$6.3 million; for 50 miles, it is \$17.5 million.

Diking is another interim alternative for disposing of polluted dredge spoils. Briefly, a

dike is constructed to hold the dredge spoils nearshore or at the shoreline. Its effectiveness depends on the prevention of contaminated spoils' interaction with surrounding waters. At Cleveland, diking was successful in containing over 99 percent of the contaminants in dredge spoils removed from Lake Erie. (23)

Estimates for 85 dike projects on the Great Lakes indicated that the costs of diking and depositing dredge spoils vary greatly—from \$0.35 to over \$5 per cubic yard. (23) The increased cost for disposal by diking over open-lake disposal ranged from \$0.03 to almost \$5.50 per cubic yard, with an average increase of \$1.50 per cubic yard.

Diking is not without environmental problems. Dredge spoils would not provide fill of sufficient strength to allow use of the diked area for many years. Hence, areas of the coastal zone, already in high demand, would be unusable. Further, diking is unattractive and may cause greater environmental problems than controlled dispersal of pollutants.

### Longer-Term Alternatives

Reduction in the volume of sediments requiring dredging and higher levels of treatment of wastes will both lessen the problem of polluted dredge spoils. Erosion control through improved construction, highway, forest, and farm planning and management will reduce future dredging needs. One example is the recently completed stream bank stabilization project on the Buffalo River,

TABLE 5.—Estimated Costs for Disposal of Polluted Spoils Using Hopper Dredge

Coastal area	Tons	3 miles	10 miles	20 miles	50 miles
Atlantic Coast.....	7,120,000	\$2,421,000	\$3,945,000	\$5,787,000	\$11,519,000
Gulf Coast.....	4,740,000	1,612,000	2,590,000	3,885,000	7,805,000
Pacific Coast.....	1,360,000	473,000	751,000	1,126,000	2,307,000
Total.....	13,220,000	4,506,000	7,186,000	10,798,000	21,631,000

which reduced maintenance dredging requirements 40 percent. (23) The level of pollution in dredge spoils will be reduced by the higher levels of treatment of municipal and industrial wastes required by Federal-State water quality standards within a few years.

High-temperature incineration of contaminated dredge spoils is a longer-term alternative requiring further development and testing. Such incineration can render spoils an inert ash, safe for land disposal. Processing costs are a function of the size of the plant, the percent of total solids, and the percent of volatile solids. Figure 1 illustrates disposal costs per cubic yard for incinerating

dredge spoils whose total solid content ranges between 30 percent and 45 percent (a normal range) and volatile solids between 10 percent and 20 percent (a normal range). Also shown are costs for aerobic stabilization, a process similar to that used for sewage treatment. These costs can range from \$2 to \$12 per cubic yard or roughly 4 to 24 times current ocean disposal costs. Compared to disposal 20 miles out to sea, however, incineration is 3 to 15 times as costly. But compared to disposal at 50 miles, incineration may cost the same or it may be as much as 8 times more costly.

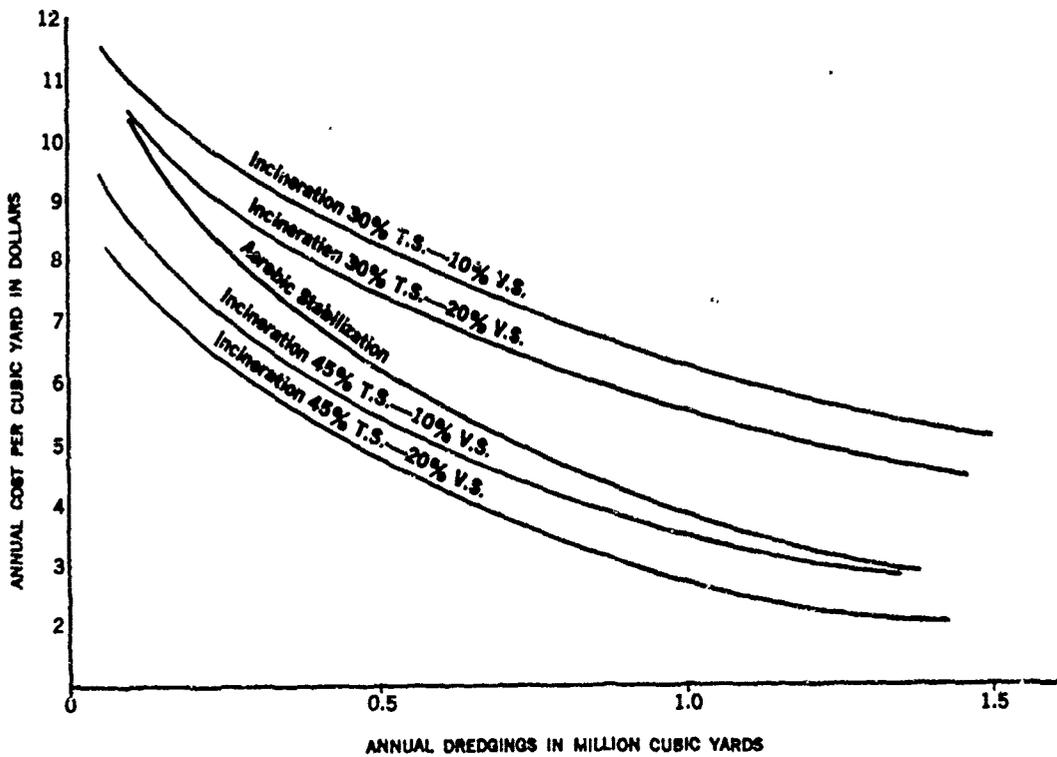


Figure 1.—Total Annual Cost Per Cubic Yard for Complete Treatment Using Incineration and Aerobic Stabilization (23)

T.S.—TOTAL SOLIDS  
V.S.—VOLATILE SOLIDS

Special treatment to remove toxic materials so that the sludge may be used as a fertilizer either on arid lands or for ocean farming is possible. An approach similar to that discussed for use of digested sewage sludge as a fertilizer may be feasible.

## INDUSTRIAL WASTES

Industrial wastes vary widely, but they usually contain nutrients, heavy metals, and/or other substances toxic to marine biota. Although the volume of industrial wastes is 10 percent of all wastes disposed of in the ocean, it is minor compared to the quantities of industrial wastes treated at land-based facilities.

The policy recommended would call for termination of ocean dumping of industrial wastes as soon as possible. Ocean dumping of toxic industrial wastes should be terminated immediately, except in those cases in which no alternative offers less harm to man or the environment.

### *Interim Alternatives*

Many industries utilize ocean disposal because it is cheaper and easier than other disposal processes. Table 6 shows costs for bulk and containerized wastes.

TABLE 6.—*Industrial Wastes Disposal Costs (66)*

Method	Average cost/ton	Range of cost/ton
Bulk wastes.....	\$1.79	\$0.00-02.50
Containerized wastes.....	24.00	\$5-61.00

The costs of discharging bulk wastes directly into the sea are significantly lower than for other disposal techniques. Contain-

erization, used mainly for toxic materials, is much more costly than dumping bulk wastes.

Industrial wastes can be treated and disposed of on land, or they can be incinerated. Whichever technique is used, it is necessary to assure that the environment is protected. Treatment of wastes should not add to stream pollution, and incineration should not add to air pollution. Deep-well disposal of toxic wastes is generally undesirable because of the danger of ground water pollution.

Unlike the other categories discussed, industrial wastes are not homogeneous. Hence, interim disposal methods will vary not only among the different types of wastes but also according to process, location, local practices, and other factors. The costs of using some alternatives will be significantly higher than for ocean dumping, but as a portion of total production costs, generally they will not be great. Total industrial pollution control costs, as a percentage of gross sales, are well under 1 percent, although costs for some industries are much higher.

### *Longer-Term Alternatives*

In the long term, changes in industrial production processes and recycling offer great promise for reducing or reusing industrial wastes. For example, the average waste from modern sulfate paper plants is only 7 percent of wastes in the older sulfite process. In some cases, recycling will be an alternative to ocean disposal. Two West Coast refineries are now recycling oil wastes instead of disposing of them at sea.

Toxic wastes present a more difficult problem. They cannot be stored indefinitely, but allowing ocean disposal is a disincentive to development of adequate detoxification and recycling techniques and of production processes with fewer toxic byproducts. But highly toxic wastes will continue to be produced,

and many will not be amenable to land disposal.

One alternative worthy of further study is the establishment of regional disposal, treatment, and control facilities. Federally or privately operated, the facilities could conduct research on and provide for waste detoxification and storage. Complicated disposal processes that are too expensive or complex for a single company could be used jointly to dispose of wastes. Fees would need to be sufficiently high to encourage development of private solutions, except in the most troublesome cases or when significant economies would result from shared use of facilities.

### **CONSTRUCTION AND DEMOLITION DEBRIS**

Construction and demolition debris, less than 1 percent of all wastes dumped in the ocean, (66) are composed mainly of dense and inert materials. Because of the small amounts dumped and their character, these wastes are not a threat to the marine environment. Moreover, amounts dumped in the ocean are not expected to increase significantly because of their high value as landfill. The recommended policy assumes continued ocean dumping, but with care to prevent damage to the marine ecosystem.

### **RADIOACTIVE WASTES**

Since 1962, no significant quantities of radioactive wastes have been dumped at sea. Rather, they have been stored at several sites operated or regulated by the Atomic Energy Commission or at sites regulated by the States. Increasing demands for electricity and for use of nuclear power portend a dramatic

increase in the amounts and kinds of nuclear wastes produced. Hence, it is important to develop policy to prevent contamination of the ocean.

The policy recommended would continue the practice of prohibiting high-level radioactive wastes in the ocean. Dumping other radioactive materials would be prohibited, except in a very few cases for which no practical alternative offers less risk to man and his environment.

### **Alternatives (Interim and Longer Term)**

The quantity of nuclear wastes is not large, and the technology for storing and treating them is well developed. However, the AEC estimates that the amount of high-level liquid radioactive wastes will increase, approximately sixtyfold between 1970 and the year 2000. High-level wastes, usually liquid, are now stored on an interim basis in large, well-shielded tanks. In the long run, the wastes will be solidified, reducing their volume by a factor of ten, for eventual storage in special geological formations, such as salt mines. As new nuclear facilities are constructed, provision is being made for parallel construction of storage tanks and treatment facilities to handle the wastes.

Solid radioactive wastes have been buried in carefully controlled landfill sites. In 1970, about 40,000 cubic yards of solid radioactive wastes will be buried in approximately 15 acres. (70) The increase in the amount of these wastes in the next decade will require about 300 acres. This figure could be reduced with compaction and incineration, which are currently being used or planned.

Low-level liquid wastes from nuclear power generation, medical facilities, etc. are treated and/or stored to reduce radioactivity. A small amount is eventually released to the environment under controlled conditions.

Large radioactive structures, chiefly reactor vessels and associated parts, have heretofore not presented a significant problem. With the exception of ocean disposal of the SEA-WOLF submarine reactor vessel, obsolete reactor vessels and associated parts have been decontaminated, dismantled, and stored on land. Sixteen nuclear power plants are now operating, and 80 are either under construction or permit applications are pending. There may be as many as 1,000 plants by the year 2000. When reactor vessels are taken out of service, each used structure is a source of high-level induced radiation.

There are three alternative ways to dispose of these vessels and associated parts: ocean disposal; entombment in place, with final disposition after radioactive decay; and dismantling and burial. Ocean disposal is the cheapest method when the facility is on the coast or when waterborne transportation is available. Entombment provides an opportunity to monitor disposal operations carefully but occupies valuable land during the period of radioactive decay. Dismantling and burial is the most expensive of the alternatives.

Because of the need to keep all sources of radioactivity at the lowest possible level, ocean disposal of the wastes should be avoided except when no alternative offers less harm to man or the environment. These cases should be carefully examined to assure that no safe and practical alternatives do exist. If ocean disposal is necessary, it should be carefully controlled.

## **EXPLOSIVES AND CHEMICAL MUNITIONS**

Large quantities of explosives and some chemical warfare agents have been disposed of at sea. No biological warfare agents have been

disposed of at sea. The policy recommended would prohibit ocean disposal of chemical and biological warfare agents and phase out disposal of explosive munitions.

### *Alternatives (Interim and Longer Term)*

Ocean disposal of munitions was developed as an alternative to burning them in the open. That practice is often hazardous, is noisy, and creates air pollution.

Other alternatives to ocean dumping are available and should be used. In some cases weapons can be dismantled and critical components, such as gunpowder, lead, etc., either disposed of safely or sold for reuse. Centralizing the disposal of obsolete munitions may be desirable to provide efficient dismantling. Alternatively, portable disposal facilities, under development by the Department of Defense, offer promise. When salvage value is significant, commercial contracting for disposal services may be possible. Mass underground burial or detonation is another alternative.

The alternatives used for disposal of munitions will depend on ability to train people for disposal operations, relative costs, available sites, and their environmental impact. Dismantling and recycling the materials is the preferable alternative from an environmental point of view, but facility and manpower constraints may dictate the use of other alternatives to ocean dumping.

For chemical warfare agents and munitions, the alternatives to ocean disposal are neutralization and incineration. Toxic chemical warfare agents can be separated from munitions or containers and then treated. Facilities are currently being modified at the Rocky Mountain Arsenal near Denver, Colo., for disposal of toxins. Similar facilities for treatment of chemical warfare agents are needed elsewhere. (26)

**SUMMARY**

Interim alternatives exist to mitigate the environmental damage of ocean dumping. Land capacity can be expanded by use of rail haul, and strip mines and other lands can be reclaimed. In the long run, technological ad-

vances and new methods of recycling should help reduce pressures for ocean disposal. The major conclusion is that a program of phasing out all harmful forms of ocean dumping and prohibiting new sources is feasible without greatly increased costs.

**T**HE previous chapters indicate the need for a national policy to control ocean dumping. This chapter examines the adequacy of State and Federal regulatory authorities to implement that policy.

#### STATE CONTROL ACTIVITIES

Although by tradition and Federal law the States have primary responsibility for water pollution control, the response of the coastal States to ocean dumping has not been extensive. Where the Federal Government has assumed authority over ocean dumping—in New York, Baltimore, Boston, and Hampton Roads, Va.—States have subordinated their activities to Federal control.

In some circumstances States exercise regulatory authority. California, for example, through State and regional agencies, has provided the leading role in control of ocean dumping of such materials as municipal garbage and industrial chemicals and solid waste. In the San Francisco Bay area and in the San Diego area, regional water quality control boards regulate ocean dumping operations and provide for monitoring and surveillance to enforce the regulations. Disposal operators are required to file detailed trip reports and a monthly summary of the volume and types of wastes dumped. In the San Diego area, prior notification of ocean dumping is required so that a board staff member can accompany the dumping vessel. In the Los Angeles area, the California Department of Fish and Game is the lead agency. In Oregon, the State Board of Health regulates ocean dumping, with special emphasis on chemicals. No other States regulate ocean dumping to a greater extent than California and Oregon.

State regulation has not established a basis for an extensive and comprehensive meth-

od of controlling ocean dumping. Besides general lack of authority and programs, State jurisdiction would generally be limited to the 3-mile territorial sea.

#### FEDERAL CONTROL ACTIVITIES

Four Federal agencies have some responsibilities for ocean dumping: the Corps of Engineers, the Federal Water Quality Administration, the Atomic Energy Commission, and the Coast Guard.

##### *Corps of Engineers*

The Corps of Engineers is the only agency with regulatory authority to control dumping of a broad class of materials. This authority stems from Corps responsibility for maintaining navigation in U.S. territorial waters. In general, the Corps has no power other than in internal navigable waters and in the territorial sea.

Special authority for the port areas of New York, Baltimore, and Hampton Roads, Va., was given to the Corps of Engineers under the Supervisory Harbors Act of 1888 (33 U.S.C. 441-451b). Under that Act, the Corps exerts jurisdiction over ocean dumping beyond the territorial sea by controlling transit through the territorial sea. The Act provides for the appointment of a harbor supervisor to control ocean dumping, authorizing him to issue permits for the transportation and dumping of materials into the ocean. For ocean-dumping in territorial seas, the Corps relies on both section 4 of the Rivers and Harbors Act of 1905 (33 U.S.C. 419) and section 13 of the Rivers and Harbors Act of 1890 (33 U.S.C. 407). Through the regulatory and permit authority conferred by the Supervisory Act, logs and fathometer charts are required of tugboat operators

transporting material for dumping to provide surveillance of their operations. Infrequent ship and aircraft patrols are made for the same purpose. The permit operation has three steps: application by the prospective dumper according to the type of waste, issuance or rejection of a permit by the Corps after review, and monitoring of operations by the Corps as waste materials are transported to the designated dumping grounds.

The Corps has cautiously exercised its power under the 1899 and 1905 Acts. Its policy on enforcing these authorities can be attributed largely to emphasis on navigation in the enabling statutes. Until recently there was considerable doubt whether the Corps could deny a permit to a prospective waste disposal applicant for any reason other than obstruction to navigation. These doubts were dispelled only on July 16, 1970, when, in *Zabel v. Tabb*, — F. 2d — (5th Cir.), a Federal circuit court reversed a district court ruling. The district court disputed Corps authority to consider environmental as well as navigational factors in denying a permit and directed that the permit be granted. The circuit court, relying on the Fish and Wildlife Coordination Act (16 U.S.C. 661-666c) and the National Environmental Policy Act of 1969 (42 U.S.C. 4331-4347), held that the Corps does have this authority and could deny the permit.

Despite jurisdictional limitations, the Corps has occasionally concurred in ocean dumping outside the territorial seas when its direction was requested. For example, dumping areas have been established off Boston Harbor by the Corps, but with full recognition that authority was lacking. In such instances the action is taken at the request of the user. Often when the Corps receives a request to dump in areas beyond the territorial sea, it simply issues a letter of no objection. Prior to issuing such a letter, the Corps consults other governmental agencies

such as the Fish and Wildlife Service of the Department of the Interior and the fish and game department of the affected State.

In the New York Bight area, the Corps has designated areas for the deposit of rock, dredged material other than rock, cellar dirt, sewage sludge, chemicals, and other substances. Specific regulations define the areas in which dumping can take place. Special permits, usually of 3 months' duration, are issued for the transit of material to the dumping areas.

Criminal penalties are authorized to punish violations of the various Corps authorities. Fines of up to \$2,500 may be levied, or imprisonment up to 1 year may be imposed. Under the Supervisory Harbors Act, when dredged matter is illegally dumped, a fine of \$5 per cubic yard of material can be prescribed.

Corps authority over ocean dumping has several limitations: First, with the exception of three harbors, it is restricted to the 3-mile territorial sea; yet most waste disposal sites lie outside the territorial sea. Second, its authority originates from responsibility for the navigability of waterways, not for their ecology. Third, while operational authority is lodged in an agency with responsibility to promote navigation, the water quality agency has no direct control over actions of the operating agency. In fact, the Corps could conceivably issue permits for activities that FWQA believes damage the quality of marine waters. Fourth, to a large extent the Corps regulates itself because it is a major producer of dredge spoils, the material most commonly dumped at sea. This is the type of conflict of interest that the creation of the Environmental Protection Agency was designed to prevent. Nonetheless, the Corps has capabilities which could be effectively used to implement the recommended policy on ocean dumping. It possesses a large field organization strategically located in areas

where ocean dumping regulatory action is important.

### ***Federal Water Quality Administration***

The Federal Water Quality Administration (FWQA), in the Department of the Interior, administers section 10 of the Federal Water Pollution Control Act, as amended (38 U.S.C. 466g). Under this section, States develop water quality standards for interstate and coastal waters within their jurisdiction. The standards require Federal approval, thus becoming joint Federal-State standards.

These standards consist of water quality criteria (e.g., 5 parts per million of dissolved oxygen) to meet designated water uses (e.g., water supply, recreation, etc.). The standards must also include an enforcement and implementation plan in which remedial measures are to be taken in accordance with a schedule for achieving the water quality levels established. The Federal Water Pollution Control Act provides procedures for abating pollution which violates water quality standards, endangers health or welfare, or interferes with the marketing of shellfish in interstate commerce.

The Administration has proposed amendments to the Federal Water Pollution Control Act (S. 3471) that would authorize the Secretary of the Interior to establish water quality standards for the contiguous zone when pollution in these waters is likely to cause pollution in the territorial sea and to set standards for discharge beyond the contiguous zone of substances transported from territory under U.S. jurisdiction. The legislation would also call for specific effluent discharge requirements for all discharges into waters covered under the Act.

The authority of FWQA under the Federal Water Pollution Control Act, even with

the proposed new amendments, would not be adequate to control ocean dumping. First, there is no authority for requiring permits to dump wastes in the oceans—authority essential to enforcement of any effective control program. Second, the Act's general thrust is control of continuous discharges that clearly violate the water quality standards, rather than control of intermittent dumping.

Other sections of the Federal Water Pollution Control Act deal with ocean disposal of specific materials or classes of materials. Section 11 of the Act prohibits discharge of harmful quantities of oil into the navigable waters of the United States and the contiguous zone, but it deals only with oil and is aimed chiefly at spills, rather than at purposeful dumping.

Section 12 of the Act provides authority for Federal agencies to clean up and to prevent discharge of hazardous substances into the navigable waters of the United States and the contiguous zone. Hazardous substances are those that present an imminent and substantial danger to the public health and welfare. Many materials now dumped in the oceans could be classified as hazardous: solid waste containing heavy metals, DDT, or other persistent pesticides and sewage sludge from limited-treatment facilities. But regulating intentional ocean disposal of materials is beyond the scope of section 12.

Section 13 of the Act provides for control of sewage from vessels, chiefly by requiring the installation of marine sanitation devices.

Although FWQA lacks authority for issuing permits to control ocean dumping, it has several related responsibilities. These include approval, and in some circumstances establishment, of water quality standards in interstate and coastal waters; enforcement; research; technical assistance; monitoring; and other water quality functions.

### *Atomic Energy Commission*

The Atomic Energy Act of 1954 authorizes the AEC to regulate the receipt, transfer, and possession of nuclear source, byproduct, and special materials (42 U.S.C. 2077, 2092, 2111); these include most radioactive substances. In addition, the AEC has authority to regulate and control contractually the use of radioactive materials for its own activities, such as AEC-supported research and development programs. These authorities cover ocean disposal of radioactive materials but not other wastes.

### *Coast Guard*

The Coast Guard is the principal maritime law enforcement agency. It enforces or assists in the enforcement of all Federal laws on the high seas and waters subject to the jurisdiction of the United States and has authority to make inspections, searches, seizures, and arrests. In addition, the Coast Guard can assist other Federal agencies and State and local governments in carrying out their responsibilities. The Coast Guard's law enforcement capability can be an effective means of enforcing controls and standards set by other agencies, but it has no independent authority to control ocean dumping.

## RECOMMENDATIONS

Authority to control ocean dumping is currently dispersed among several agencies. Jurisdiction is generally confined to the territorial sea, where most material is currently not dumped. Authority that is now used for control is not lodged in agencies responsible

for environmental control. Conflicts of interest exist in that some regulatory powers are exercised by agencies with operational responsibilities in the same area.

These problems must be resolved before a national policy on ocean dumping can be implemented. Full regulatory responsibility—involving both setting standards and issuing permits—should be placed in one organization. The Council recommends that this agency be the Environmental Protection Agency.

The organization charged with implementation of the national policy should have as its chief purpose the protection of the environment. It should also command sufficient research and monitoring resources for evaluating the environmental effects of the broad spectrum of materials currently dumped in the oceans.

Authority to control ocean dumping must be tied closely to efforts to abate other sources of pollution in the marine environment. Municipal and industrial discharge in rivers and harbors, urban and rural runoff, and other sources are important components of marine pollution. A regulatory program for ocean dumping should be defined to complement the efforts in these other areas.

Most of the wastes now dumped in the oceans originate in the United States and are transported to sea for dumping. Accordingly, primary jurisdictional emphasis should shift from a territorial basis to regulation of the transportation of materials from the United States for dumping.

The Environmental Protection Agency will have the broad responsibility as well as the necessary supporting programs to protect the marine environment. To give it the power to regulate ocean dumping, legislation is required.

**T**HE oceans of the world are a truly international resource, forming a vast environmental system through which its components circulate or are dispersed by currents and the migrations of organisms. They are critical to maintaining the world's environment, contributing to the oxygen-carbon dioxide balance in the atmosphere, affecting global climate, and providing the base for the world's hydrologic system.

Within the oceans, fish may travel great distances during their lifetimes. Although the oceans are important to all nations, they are particularly significant for many developing countries, which increasingly depend on fisheries for essential protein. A disturbance in the chemistry of the oceans which could be multiplied in the food chains would have a major impact on food-deficient nations. Hence, pollutants from one country may ultimately affect the interests of many other nations.

#### **WORLDWIDE CHEMISTRY OF THE OCEANS**

Of the materials entering the oceans through natural processes, the amounts of two, mercury and lead, have probably been doubled by man's activities. In addition, man has introduced new chemical compounds, such as chlorinated hydrocarbons (including DDT), gasoline, dry cleaning solvents, and other organic materials, whose biological significance is unknown.

The rate of transfer of mercury from land to oceans by natural weathering is estimated at 5,000 tons per day. (38) This amount, about one-half the total world production of mercury, is used by agriculture and industry in such a way that it eventually enters the oceans. As yet, this approximate doubling has not been chemically measured, but it is

thought responsible for the 10 to 20 times increase in mercury found in sea birds off Sweden between prewar years and the 1950's (5) and for additions to the high mercury content of fish off Japan.

Natural weathering introduces into the oceans about 150,000 tons of lead each year. Man introduces about 250,000 tons in the Northern Hemisphere alone (69). Most of this lead is derived from the washout into the oceans of atmospheric lead produced by burning gasoline enriched with tetraethyl lead. Industrial waste products further contribute lead. Over the last 45 years these additions have raised the average lead content of ocean surface waters from 0.01-0.02 to 0.07 micrograms per kilogram of sea water. (19) Slow mixing within the oceans keeps the lead within the upper layers, the region where biological productivity is greatest and the chances of biological enrichment highest. However, the biological effects of this changing lead concentration remain unknown.

Industrial wastes and sewage sludge also introduce large quantities of such metals as vanadium, cadmium, zinc, and arsenic. Man's contribution relative to nature's is not known, but civilization may well be close to matching nature's contribution of these materials to the oceans.

The fact that man is changing the chemical composition of the oceans focuses attention on the need for international action to control the introduction of wastes into the ocean.

#### **INTERNATIONAL LAW ON WASTE DISPOSAL**

In an environmental sense there are no subdivisions within the oceans. The highly productive coastal waters are continuous with and contribute to the biologic activity of the deepest trenches. Legally, the oceans are di-

vided into the seabed and the superjacent waters, and further subdivided into distinct zones with particular legal characteristics. International law governing ocean waste disposal must take into account these legal characteristics and the material to be dumped.

Four conventions, referred to as The Law of the Sea Conventions, were adopted at Geneva in 1958 codifying existing international law and establishing new rules governing the law of the sea. The Convention on the Territorial Sea and the Contiguous Zone sets out three zones—the territorial sea, the high seas, and the contiguous zone between them.

Narrow bays, estuaries, and other semi-enclosed areas are classed as internal waters. Seaward of the internal waters and of the low-water line along uninterrupted coasts is the territorial sea, extending for 3 miles. Between 3 and 12 miles from the shore is the contiguous zone. The contiguous zone, together with the waters lying seaward of it, comprise the high seas. Each has distinct legal characteristics affecting rights to dispose of materials in it and to control such disposal.

A coastal state (nation) has exclusive control over its internal waters and its territorial sea. In these areas, the coastal state has exclusive power to determine dumping sites and to enact necessary sanitary and pollution laws to protect its citizens and their property. These laws can be enforced against ships of both the coastal state and of foreign registry. In addition, a coastal state may control the transport of waste products from its ports. However, in its territorial sea, the coastal state must permit the innocent passage of foreign vessels that do not prejudice its peace, good order, or security. As discussed in Chapter IV, Congress has enacted legislation that covers ocean disposal of oil and sewage wastes from vessels.

Within the contiguous zone, 3 to 12 miles out to sea, the coastal state may exercise some control necessary to prevent pollution. The right to exercise these controls in the contiguous zone, however, does not change the high seas status of those waters. Under the terms of the Convention on the Territorial Sea and the Contiguous Zone, a coastal state cannot act to prevent dumping in the contiguous zone unless such action is necessary to prevent infringement of sanitary regulations within its territorial sea.

The international law governing the high seas, the largest jurisdictional zone, is codified in the 1958 Geneva Convention on the High Seas. This Convention provides for freedom of navigation and of fishing, freedom to lay submarine cables and pipelines, freedom to fly over the high seas, and other freedoms recognized by international law, such as dumping.

The Convention sets forth two fundamental concepts: It declares the high seas as an area not subject to sovereignty, and it states that the freedoms of the seas which are recognized in international law must be exercised by states with reasonable regard to the interests of all other states in their exercise of freedom of the high seas. Inasmuch as one use may interfere with another current or potential use of the high seas, the reasonable regard standard holds that there must be an accommodation of the various and possibly conflicting uses of the high seas.

The right to dispose of waste materials in the high seas is a traditional freedom of the seas. However, under the standards set out in the Geneva Convention on the High Seas, this freedom—like all other freedoms of the seas—must be exercised with reasonable regard to other states' use of the oceans. It is not possible to say that any particular waste disposal or dumping project will meet the requirements of international law. Only after careful consideration can it be determined

that a particular ocean dumping proposal meets the reasonable regard standard set out in the Convention. For example, a project for disposal of unpolluted dredge spoil may be suitable for an area of the high seas in which disposal of chemical waste would neither be suitable nor legal.

Unfortunately, the law of the sea conventions do not establish a hierarchy of ocean uses. However, international law places paramount importance on the protection of human life. It allows destruction of property to save human life or to prevent greater property damage. Clearly, any dumping activity that threatens life or directly damages property violates international law.

It is important to recognize that the law of the sea is based primarily on conventions or other agreements which were concluded prior to current understanding of the actual and potential impacts of dumping on the marine environment. Consequently, present international law appears inadequate to deal with possible long-term environmental effects of various actions.

### INTERNATIONAL ACTIVITIES

Many international organizations engage in activities related in some way to marine pollution. Most of these activities are designed to exchange ideas and/or to coordinate national efforts. It is important to recognize, however, that in most cases, their concern with ocean pollution and particularly with ocean dumping is only incidental or peripheral. Although efforts such as the International Decade of Ocean Exploration will provide useful data, the IDOE does not give the highest priority to ocean pollution. Combined annual expenditures on activities designed to improve environmental quality, of which ocean waste disposal problems con-

stitute but a small part, probably do not exceed \$5 million, a small sum compared with the \$100 million of the FWQA in fiscal year 1970 for water pollution control and research alone.

Research concerned with ocean pollution and establishment of controls on waste disposal is undertaken mainly through national efforts, rather than by the intergovernmental agencies. Even national efforts are limited. Basic studies of the character of the oceans and the seabeds have dominated U.S. oceanographic research. There has been little or no emphasis on such questions as the capacity of the oceans to absorb wastes.

Several countries have begun to search for solutions. Canada is developing regulations governing the disposal of garbage and sewage from vessels. As now drafted, the regulations would apply to non-pleasure craft within the territorial sea and inland waters of Canada and would require new vessels in Canadian inland waters to carry sewage treatment equipment. The regulation would also prohibit discharge of garbage in all Canadian waters. Israeli scientists have been studying pollution of the Mediterranean coast off Tel Aviv since 1963. All new vessels constructed for the Argentine Merchant Marine are required to meet international standards on waste disposal, including holding tanks and oil-water separation tanks. Argentinian law also requires all foreign ships to be similarly equipped or access to Argentina ports will be denied. Similar legislation is contemplated for pleasure craft.

### NEED FOR INTERNATIONAL ACTION

International cooperation is essential to preservation of the oceans. The quantities of wastes dumped in the oceans are increasing

rapidly in this country and will increase internationally as other countries experience similar waste disposal pressures. Consequently, control of ocean dumping necessitates action.

Recognition of the need for international cooperation is an initial step toward reaching worldwide agreements to control ocean pollution. There will be obstacles. Nations' interests in the oceans vary, as do their ideas on the controls that may be required.

## RECOMMENDATIONS

The United States should assist in finding a solution to the international problem of ocean dumping through a twofold approach. First, it must systematically attack its own problems. As a significant polluter of the ocean and at the same time a technologically advanced nation, the United States must show its serious intention to meet its responsibility as a matter of urgent national priority. In demonstrating determination to preserve the marine environment, the Nation will develop valuable information on costs, effects, and technology associated with ocean dumping and its alternatives.

Second, the U.S. should take the initiative to achieve international cooperation on ocean

dumping. The Council on Environmental Quality recommends that at the outset the Federal Government develop proposals to control ocean dumping for consideration at international forums such as the 1972 U.N. Conference on the Human Environment at Stockholm. U.S. initiative should suggest a basis for international control over ocean dumping similar to the policy recommended in this report. Provision should be made for:

- Cooperative research on the marine environment and on the impacts of ocean dumping of materials;
- Development of a worldwide monitoring capability to provide continuing information on the state of the world's marine environment;
- Development of technological and economic data on alternatives to ocean disposal.

Domestic and international action is necessary if ocean dumping is to be controlled. The United States must show its concern by strong domestic action through implementation of recommended policy. But unilateral action alone will not solve a global problem. International controls, supported by global monitoring and coordinated research, will be necessary to deal effectively and comprehensively with pollution caused by ocean dumping.

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*The President's Message on Waste Disposal**To the Congress of the United States:*

The first of the Great Lakes to be discovered by the seventeenth century French explorers was Lake Huron. So amazed were these brave men by the extent and beauty of that lake, they named it "The Sweet Sea".

Today there are enormous sections of the Great Lakes (including almost all of Lakes Erie) that make such a title ironic. The by-products of modern technology and large population increases have polluted the lakes to a degree inconceivable to the world of the seventeenth century explorers.

In order to contribute to the restoration of these magnificent waters, this Administration will transmit legislation to the Congress which would stop the dumping of polluted dredged spoil into the Great Lakes. This bill would:

—Discontinue disposal of polluted dredged materials into the Great Lakes by the Corps of Engineers and private interests as soon as land disposal sites are available.

—Require the disposal of polluted dredged spoil in containment areas located at sites established by the Corps of Engineers and approved by the Secretary of the Interior.

—Require States and other non-Federal interests to provide one-half the cost of constructing containment areas and also provide needed lands and other rights.

—Require the Secretary of the Army, after one year, to suspend dredging if local interests were not making reasonable progress in attaining disposal sites.

I am directing the Secretary of the Army to make periodic reports of progress under this program to the Chairman of the Council on Environmental Quality.

This bill represents a major step forward in cleaning up the Great Lakes. On the other hand, it underlines the need to begin the task of dealing with the broader problem of dumping in the oceans.

About 48 million tons of dredging, sludge and other materials are annually dumped off the coastlands of the United States. In the New York area alone, the amount of annual dumping would cover all of Manhattan Island to a depth of one foot in two years. Disposal problems of municipalities are becoming worse with increased population, higher per capita wastes, and limited disposal sites.

We are only beginning to find out the ecological effects of ocean dumping and current disposal technology is not adequate to handle wastes of the volume now being produced. Comprehensive new approaches are necessary if we are to manage this problem expeditiously and wisely.

I have therefore directed the Chairman of the Council on Environmental Quality to work with the Departments of the Interior, the Army, other Federal agencies, and State and local governments on a comprehensive study of ocean dumping to be submitted to me by September 1, 1970. That study will recommend further research needs and appropriate legislation and administrative actions.

Specifically, it will study the following areas:

—Effects of ocean dumping on the environment, including rates of spread and decomposition of the waste materials, effects on animal and plant life, and long-term ecological impacts.

—Adequacy of all existing legislative authorities to control ocean dumping, with recommendations for changes where needed.

—Amounts and areas of dumping of toxic wastes and their effects on the marine environment.

—Availability of suitable sites for disposal on land.

—Alternative methods of disposal such as incineration and re-use.

—Ideas such as creation of artificial islands, incineration at sea, transporting material to fill in strip mines or to create artificial mountains, and baling wastes for possible safe disposal in the oceans.

—The institutional problems in controlling ocean dumping.

Once this study is completed, we will be able to take action on the problem of ocean dumping.

The legislation being transmitted today would control dumping in the Great Lakes. We must now direct our attention to ocean dumping or we may court the same ecological damages that we have inflicted on our lands and inland water.

RICHARD NIXON

The White House,  
April 15, 1970

## APPENDIX B *Task Force Membership*

### Council on Environmental Quality

Atomic Energy Commission	Department of State
Division of Waste and Scrap Management	Bureau of International Scientific and Technological Affairs
Department of the Army	Office of Environmental Affairs
Office of Chief of Engineers	
Department of Commerce	Department of Transportation
Environmental Science Services Administration	U.S. Coast Guard
Coast and Geodetic Survey	
Department of Defense	Executive Office of the President
Office of the Assistant Secretary for Health and Environment	Office of Management and Budget
Department of Health, Education, and Welfare	Executive Office of the President
Public Health Service	Office of Science and Technology
Environmental Control Administration	National Council on Marine Resources and Engineering Development
Bureau of Solid Waste Management	
Department of the Interior	National Science Foundation
Bureau of Commercial Fisheries	Office of the Director
Department of the Interior	Smithsonian Institution
Federal Water Quality Administration	Oceanography and Limnology Program

Senator Boggs. Again, Mr. Chairman, I want to thank Secretary Chafee for joining us today. I look forward to his testimony and I know it will be of assistance to this committee.

Senator EAGLETON. Thank you, Senator Boggs.

Senator Gurney of Florida.

Senator GURNEY. Thank you, Mr. Chairman. I will echo Senator Boggs's statement and say, good morning to the Secretary. I am glad to have you here. I am sure you will help us out on this thing and have some answers for us.

I will also emphasize that we certainly hope that oil pollution in our oceans has become a matter of great concern during the last 2 years following the Santa Barbara spill as well as those incidents in the Gulf of Mexico. So, it has been surprising to see this incident off the Florida coast. As one of the Senators from Florida, I am, of course, intensely interested and concerned, because our beaches are one of our greatest resources. They were put in jeopardy by this action of the Navy. We want to assure Florida that this will not occur again.

You are welcome and we are anxious to hear your testimony.

Senator EAGLETON. Thank you, Senator Gurney.

Senator Cooper of Kentucky, do you have any statement you wish to make?

Senator COOPER. No; I do not at this time. I will listen to the testimony.

Senator EAGLETON. Senator Baker of Tennessee.

Senator BAKER. Thank you, Mr. Chairman. I have no statement at this time.

Senator MUSKIE. Mr. Chairman, may I interrupt for a moment to welcome a fellow New Englander to the hearing this morning? It was a breach of courtesy on my part in not saying hello to Secretary Chafee, a distinguished former Governor of the State of Rhode Island. It is always a pleasure to welcome you, Mr. Secretary, even though it is an occasion of an unpleasant subject matter.

Secretary CHAFEE. Thank you. I wish I could say I am glad to be here.

Senator EAGLETON. I would like to include at an appropriate point a statement by Senator Muskie of Maine, made on the floor of the Senate on December 3, 1970, respecting the events we are inquiring into this morning. Unless there is objection, it will be made part of the record.

(The statement referred to follows:)

STATEMENT BY SENATOR EDMUND S. MUSKIE

Mr. President, I am astonished by the news that the Navy is dumping oil sludge into the Atlantic Ocean off the north coast of Florida.

According to dispatches, the sludge has formed an oil slick 40 miles long and 19 miles wide at a point fewer than 25 miles from the Atlantic beaches.

The slick endangers at least 50 miles of shoreline between south Georgia and St. Augustine. An official of the Florida Marine Patrol calls it the biggest oil spill he has ever seen.

The Navy does not deny it. Its spokesman says the Mayport Naval Station at the mouth of the St. Johns River has been using this procedure for the past two years.

He claims the Navy is judicious with its dumping. The barges go out to sea only twice every three months, and they do not dump until they are more than 50 miles from land.

Mr. President, I am appalled. The Navy's dumping blatantly violates the Nixon Administration's stated policy on ocean dumping. It blatantly violates a Federal

law on oil spills enacted just eight months ago today. It blatantly violates Interior Department regulations published only two months ago.

The President's position on the protection of our environment is well-known. Only last February, in his environmental message to the Congress, he made it clear:

"... the damage done to our environment has not been the work of evil men, nor has it been the inevitable by-product either of advancing technology or of growing population.

"It results not so much from choices made, as from choices neglected; not from malign intention, but from failure to take into full account the full consequences of our actions."

The Federal law on oil spills, P.L. 91-224 signed on April 3 by the President, is equally clear. It flatly prohibits the discharge of oil in harmful quantities into or upon the navigable waters, the adjoining shorelines, and the contiguous zone.

The Interior Department regulations issued September 11 just as clearly define what harmful quantities are. Any spill that violates applicable water quality standards or causes a film or sheen or discoloration of the water is a harmful quantity.

Only yesterday in New Orleans, three major oil companies were fined more than \$500,000 by a Federal court for safety violations at offshore wells, the kind of violations that have resulted in oil spills. But the Navy, dumping oil—not spilling oil—into the Atlantic Ocean goes scot-free.

Where does the Navy get its authority to dump oil sludge into the Atlantic, or any other ocean? The Navy's defense rests upon the most incredible claim of this continuing disaster. The Navy says it is acting under the Oil Pollution Act of 1924.

Mr. President, I read in their entirety two lines from the Water Quality Improvement Act of 1970, signed on April 3, 1970, by President Nixon:

"Sec. 108. The Oil Pollution Act, 1924 (43 Stat. 604), as amended (80 Stat. 1246-1252), is hereby repealed."

Senator EAGLETON. Without any further ado, the Secretary of the Navy, the Honorable John Chafee.

#### **STATEMENT OF HON. JOHN HUBBARD CHAFEE, SECRETARY OF THE NAVY**

Secretary CHAFEE. Thank you, Mr. Chairman, and members of the subcommittee.

I have a statement here that I thought it would be best to read. I believe you have copies of it. I have divided it into four different parts. The first part deals with the description of the dumping incident off the coast of Florida.

The description which I shall give you of the dumping incident last Monday, November 30, off Mayport, Fla., is based upon reports which I have received, my personal visit to Mayport yesterday, and my interviews with those involved.

Last Thursday, I ordered a complete investigation which is now underway. That detailed investigation could produce some variations from the facts as I present them here.

It is important to bear in mind that Mayport, although originally built in World War II, has been kept on a very modest scale—by Mayport, of course, I am referring to the naval station there—and is without many of the facilities that its older and larger counterparts have.

For example, Mayport is the only U.S. Navy base that has been dumping its sludge at sea. All the other bases have obtained or developed facilities over the years which give them a method of disposing of their sludge such as special tanks for storing it until the water settles and the oil can be sold.

There are only seven fuel storage tanks at the Mayport base as compared to other bases where we have many more. These tanks that

I have described in Mayport—the seven tanks—have been required for clean oil and aviation fuels.

We will be using the term “sludge” here quite extensively. It is a combination of water, emulsifier, and oil. In Mayport, it comes largely from the bilges and fuel tanks of ships in port that come in for restricted availabilities.

Mayport is the home port for three carriers. We also have destroyers down there, some tugs, and a cruiser on occasion.

When the ships come in for a restricted availability or are in port for some time, the sludge is pumped from the bilges and fuel tanks of the ships into two sludge barges which are brought up alongside. These two sludge barges each have eight compartments. They have no method of propulsion. They are 165 feet long, 33 feet wide, with up to 10 foot draft. One has a capacity of 357,000 gallons; the other has a capacity of 280,000; making a total of 637,000 gallons.

Up to March of 1968, the sludge was sold to local dealers who paid the Navy from 3 to 4 cents a barrel, and the sludge was delivered to their facilities. The dealers or their customers would separate the oil from the water—that is, let the water settle, then take the oil off the top—and sell it for road oil and for other purposes, and dump the water. Unfortunately, these dealers discontinued this service.

In March 1968, the Defense Surplus Sales Office in Jacksonville contracted to pay a dealer a penny and a half per barrel to dispose of the sludge; but in February 1969 this dealer defaulted because he, himself, was getting into pollution trouble when he disposed of the surplus water into a local sewer after separating it from the oil.

Contracts were then entered into with two other dealers who were to pay the Defense Surplus Sales Office a penny a barrel and dispose of the sludge but both of these dealers defaulted and never picked up any of the sludge.

The Navy then commenced towing the barges out to sea more than 50 miles offshore, and there pumping out the contents of the tanks.

From March 1969 to December 1970, five dumpings occurred at sea, the dumping being predicated on how full the barges were and the weather conditions. The tugs that tow the barges are not seagoing tugs, but rather small yard tugs and require calm weather to make the trip more than 50 miles out in the open seas.

Since March 1969, various prospective dealers have been contacted regarding the removal of the sludge, but no interested parties could be located. The most recent efforts in this regard were taken less than 2 months ago, during the week of October 10.

In late October, we had a civilian representative contact the salvage office about the availability of the sludge. He came to the base and took some soundings in the various compartments of the barges. He didn't take any samples, but felt the sludge with his fingers.

On November 9, this civilian returned and filled two fruit jars with samples from two compartments. These samples were taken from the surface of the compartments where the oil was most heavily concentrated. He was informed by the Navy that if he could take the sludge, the barges would deliver it to him.

He informed us that he could not use the sludge as the sulfur content was too high. He had had it analyzed in Jacksonville.

On November 30, he called and stated he was going to Georgia to see

if he could locate a buyer. He was asked if he had a buyer, and he replied that he did not and would not know until he returned. Apparently he did not indicate too much optimism about finding a buyer. I discussed this with him yesterday. He has made other trips to Georgia to sell fuel oil. His total sales have been 1,800 gallons as a result of his several trips. He never made an offer to buy the sludge.

He did talk of a separate service contract—that is, the Navy paying him to remove the sludge—and was referred to a separate office, the Navy contracting office; but he didn't follow it up. Because his trip to Georgia was so indefinite as to possible results and because the barges were getting full and the weather was favorable—it is very important that they have the right weather—the tugs and barges departed Mayport Naval Station at 12:30 p.m. on the 30th. They proceeded to a location due east 55 miles where similar disposal operations had taken place in the past.

Commencing about 30 miles out and while underway, the pumps were started and pumped out the water in the bottom of the tanks. This took approximately 2 hours and was stopped as soon as traces of oil appeared.

Upon reaching the disposal zone, the remaining sludge was pumped out. This took approximately two and a half hours.

Since we know the exact time that each pumping action took—it was logged—and the capacity of the pumps, we were able to compute with some accuracy that the overall content of the barges was approximately 45 percent water and 55 percent oil. However, the exact oil content in each of the eight separate compartments of the barges varied due to the fact that the contents of these compartments came from a number of different ships. The pumping was completed at 11 p.m. on the 30th, and the tugs and barges returned to Mayport on December 1 at 5:55 a.m.

Yesterday I personally flew over the area where any traces of the slick would have been. The weather conditions were excellent. We flew over the area for approximately 20 minutes or more, much of the time at 1,000 feet altitude, and could not locate any remains of the sludge slick.

Now the laws and regulations involved.

From the reports and correspondence we have received, it appears that there may be an impression that the Navy was in direct violation of the law in dumping these oily wastes in the ocean 55 miles off Florida. We may have been at fault and, of course, I think we were in this instance—but I would like to discuss the exact laws pertaining to oil dumping.

The Oil Pollution Act of 1961, which is our Government's implementation of the 1954 International Convention for the Prevention of Pollution of the Sea by Oil, forbids the discharge of oil within the so-called prohibited zones. These prohibited zones vary for different countries. For the United States, they extend 50 miles from the coast. By the express terms of the statute, our naval vessels are exempt from the application of this law—but the Navy has itself issued a blanket prohibition against the discharge of oil by its ships within any such prohibited zone. The following article was inserted in U.S. Navy Regulations, 1948, one of our most basic publications which is on all ships and stations:

1272. *Discharge of Oil or Refuse.* Except as authorized by law or by regulations issued by competent authority, no refuse or oil shall be discharged into U.S. inland or coastal navigable waters, nor shall oil be discharged within any prohibited zone specified in the Oil Pollution Act, 1961, and any amendments thereto.

Although the Navy is exempt from that law, we have voluntarily complied with the letter and spirit of it, as amended. It was to avoid conflict with that law that our local naval authorities in Florida sent the sludge barges out to a dumping point 55 miles off the coast.

I should also mention the Water Quality Improvement Act of 1970, approved last April. This new law is a vast and much-needed improvement over the old Oil Pollution Act of 1924, which it displaced and repealed. Its prohibition of the discharge of oil is still limited, however, to the navigable waters of the United States, adjoining shorelines, or waters of the so-called contiguous zone—in other words, going out 12 miles from shore. Of course, that law does not apply in this particular instance, where we were more than 50 miles from shore.

The one requirement which the Navy did not meet in this instance is the requirement of the National Environmental Policy Act of 1969 that a Federal agency shall prepare and file an environmental impact statement in connection with "major Federal actions significantly affecting the quality of the human environment."

Since the Navy is now investigating all of the circumstances of this entire incident, and in fairness to individuals who may have been involved, I ask that you permit me simply to assume, for the purpose of this hearing, that last week's oil dump off Florida was such an action and should have been the subject of an environmental impact statement.

The reason I say that is that if there is any disciplinary action resulting from this investigation, then I am a reviewing authority in the chain of command.

The National Environmental Policy Act was approved last January. After that, an Executive order was issued and a set of interim guidelines for Federal agencies, governing the submission of environmental impact statements, was published. These were amplified and applied within the Department of Defense, and the Navy's further promulgation to its senior commanders in the field occurred on October 30.

If I were to attempt to trace this process any further, I would be getting into areas which our investigation is now examining, on which I do not yet have detailed information, and on which I would like to reserve judgment for the present.

What have we done since the November 30 incident to prevent any more occurrences such as this?

I have issued an order to cease immediately the discharge in open waters of sludges, industrial wastes, oily wastes, trash, or rubbish collected in port.

I have also reemphasized to all naval ships and stations the content of the Chief of Naval Operations' instruction which was issued last October. This instruction implements the Environmental Policy Act that I mentioned a few minutes ago and requires the preparation and approval of an environmental impact statement prior to the initiation of any action which significantly affects the environment or is potentially controversial.

I have also ordered that a formal investigation be convened to inquire into all the circumstances and to determine the facts of this particular oil dumping. This investigation is being headed by Rear Adm. Daniel F. Smith, who is the commander of the Fleet Air Forces, Key West. In addition to amplifying and clarifying the facts, this investigation will be looking into what we can do in Mayport immediately and in the long run to dispose of our waste products. We will obviously have to find new procedures and could do so initially by such emergency measures as providing extra barges in the port. For the long term, we will probably use two settling tanks which are presently being used for aviation jet fuel. These have a 210,000 gallon capacity each. We will have to make some arrangement to pump the oil into barges—the remaining oil—and see if we can sell it.

Additionally, we have sent technical assistance teams to Mayport to assist in any possible cleanup actions required by the dumping. As it turned out, such action fortunately has not been required in that no beach pollution resulted.

We have also sent other technical teams to the local command in Mayport to advise and assist in the development of new procedures for handling the problem of waste disposal.

I want to assure you gentlemen that we will continue to work on this situation very diligently in the weeks and months ahead.

I would like to close by talking a little bit about what the Navy has done. There has been some concern here whether the efforts of Congress in this area have any effect and whether, when Congress passes an act, anything happens. I think it is quite important for us to give some consideration to the effort that the Navy has made—and, I might say, long before this problem was so widely recognized.

In the past 4 fiscal years, because of the Navy's early efforts to identify its requirements and because of the fine support of Congress in funding our requests, particularly in our military construction budget, the Navy has received more funds for pollution abatement projects than any other Federal agency—a total of over \$100 million. These funds have been used to abate pollution from shore installations, ships and aircraft.

For example, one of our most extensive pollution improvement efforts is underway at Pearl Harbor where we are constructing facilities for secondary treatment of sanitary and industrial waste waters from the 70,000 people who live and work in that area. We are spending \$15 million on this effort.

Perhaps even more interesting is the solid waste disposal plant we have built in Norfolk. This is the first complete water-cooled incinerator furnace built in the United States of America and is capable of taking 360 tons of refuse per day, thereby eliminating the former open burning method of disposal. Now, this results in a double-barreled positive effect, because the heated water from the refuse combustion is converted into steam which is used to help meet the requirements of the Navy ships and buildings in the area, which makes a further contribution to protecting the environment by saving on the burning of other fuels.

We make every effort to cooperate with the local communities in joint solutions to waste disposal projects, while at the same time achieving better pollution control. For example, the Naval Air Station at

Miramar, Calif., had a requirement to dispose of 38 tons of refuse daily but didn't want to open burn it.

The nearby city of San Diego needed a disposal site for its refuse, so the city agreed to develop some air station land into a sanitary land-fill area while the Navy was given the right to use it without charge.

In Newport, R.I., we are prepared to combine Navy funds with local funds to build an incinerator for joint use by the Navy and the local community to the mutual financial and ecological benefit of both parties.

We are in the process, at the cost of \$13 million, of making 17 connections into municipal sewerage systems in Norfolk, New London, Charleston, Philadelphia, Beeville, Tex., Yuma, Ariz., Seattle, San Francisco, San Diego, Long Beach, and Pearl Harbor.

An essential requirement in the training of our sailors is the technique of fighting shipboard fires. Unfortunately the practice fires we have at our firefighting schools produce large quantities of dense black smoke. I might say that this is intentional, so that we can make the exercise more difficult. In 1968, the Navy installed a prototype system to eliminate smoke discharge from the advanced firefighting school at Treasure Island in San Francisco Bay. The first of its kind anywhere in the world, this system proved to be a big success and we are installing the second model at the San Diego school.

Reducing discharges from ships has proven an even more difficult job. Starting in 1967, the Navy developed a new type of fuel oil called Navy distillate fuel. This has taken some time to develop and is a radical departure from the standard naval fuel we have been using in the past.

This fuel reduces smoke and sulphur dioxide emissions very significantly. It is a clean-burning fuel, and we are engaged in an intensive program to convert all our conventionally powered steamdriven ships to this new type of fuel. Currently we have 13 ships burning it, with another 70 ships to be converted in the next 6 months. All of our some 700 ships are scheduled for conversion by mid-1973.

Ship sewage disposal is the hardest of our problems to solve. We have investigated a variety of different methods to reduce pollution from sewage from ships. Currently, we have 24 different proposals under evaluation and are encountering many problems of performance and equipment reliability. We hope to award a contract for prototype development by next February. We have to be absolutely certain that we have a completely reliable system before we start installing this equipment on our naval ships at a cost we now estimate will be more than \$300 million.

In regard to air pollution from jet engines, present efforts toward reduction of air pollution are being directed along two channels: Improvement of engines and removal of particulate matter from engine test cell exhausts.

To date, the Navy has spent \$4.6 million on development of smokeless combustors and the retrofitting of new combustor cans in certain engines. Replacement of combustor cans in two major engines has been completed. During this fiscal year, another \$1.5 million will be spent to develop acceptable designs and prototypes to eliminate smoke from other engines. All new engines will be so equipped.

I think this brief recitation of the record of your Navy in the anti-pollution field is one we can all be proud of. The entire Navy is work-

ing diligently and enthusiastically in support of the President's program. I am personally committed, as is everyone else in the Department, to meet or beat every requirement and deadline that has been established to protect and preserve the environment. We are committed to the spirit as well as the letter of these laws.

Mr. Chairman, I thought in that final summary it was important to recognize that the intent of Congress in passing these laws is being met—the problem that Senator Muskie raised in his statement.

Thank you very much.

Senator EAGLETON. Thank you, Mr. Secretary.

While I believe the intent of our hearing here this morning was not to indict the Navy for being totally and grossly remiss in the field of environment, and I acknowledge some of the items mentioned in the last several pages of your statement which indicate an awareness and concern and interest on the part of the Navy in environmental and pollution matters—but the instant matter and sole matter, as it were, before us today is this discharge off the Florida coast which took place in early December.

So as to put this in its proper legal and policy context, I would like to read into the record at this point a series of both policy statements and rules, regulations and appropriate statutes, not in their entirety but pertinent excerpts therefrom, which have come down in this calendar year 1970.

If we could go back beyond 1970 insofar as additional material is concerned but 1970 is the immediate year, I think it is particularly pertinent.

First, I would like to read into the record an Executive order from the President of the United States on the protection and enhancement of environmental quality, dated March 5, 1970, where in section 1 it is stated that it is the policy of the Federal Government that it shall—

Provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national and environmental goals. The Council on Environmental Quality through the chairman shall advise and assist the President in leading this national effort.

Further on in this same Executive order, it states as follows:

Consonant with the National Environmental Policy Act of 1969 the heads of Federal agencies, including the Department of Defense and various Secretaries thereunder shall monitor, evaluate and control on a continuing basis their agency's activities so as to protect and enhance the quality of the environment. Such activities shall include those directed to controlling pollution and enhancing the environment and those designed to accomplish other program objectives which may affect the quality of the environment. Agencies shall develop programs and measures to protect and enhance the environmental quality and shall assess progress in meeting the specific objectives of such activities. Heads of agencies shall consult with appropriate Federal, State and local agencies in carrying out their activities as they affect the quality of the environment.

That was March 5, 1970.

An excerpt from the Water Quality Improvement Act of 1970, April 3, 1970, declares Congress's intent with respect to this area:

The Congress hereby declares that it is the policy of the United States that there should be no discharges of oil into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone.

The discharge of oil into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone in harmful quantities as determined by the President under paragraph (3) of this sub-

section, is prohibited, except (A) in the case of such discharges into the waters of the contiguous zone, where permitted under Article IV of the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended . . .

In May 1970, going on to the next month, we have a message from the President of the United States to the Congress, setting forth his recommendations as to amendments to conventions relating to pollution of the sea by oil. In his recommendations, he recommends that existing conventions dating back, I believe, to 1954, be amended so as to prohibit the discharge of oil, subparagraph (iii) "unless the oil content of the discharge is less than 100 parts per one million parts of the mixture", and subparagraph (iv), "the tanker is more than 50 miles from the nearest land."

So, if these amendments were to become law, it would be prohibited under that convention to discharge oil even beyond the now defined 50-mile limit previously mentioned in the Secretary's testimony.

Senator Boggs has already put in in its entirety a report to the President of the United States, prepared by the Council on Environmental Quality, dated October 1970, and since it is in the record in its entirety I will just read a brief excerpt that I think is particularly pertinent to the instant matter :

The Administrator of the Environmental Protection agency will be guided by the following principles in exerting his authority :

"Ocean dumping of materials clearly identified as harmful to the marine environment or man should be stopped.

That excerpt is from page vi of the aforesaid Council on Environmental Quality report dated October 1970.

The next document in sequential order is a communique or directive from the Department of the Navy, Office of Chief of Naval Operations, dated October 30, 1970, from the Chief of Naval Operations, subject "Environmental Impact Statements; Policy Regarding and Assignment of Responsibilities For", and this directive or these instructions from the Chief of Naval Operations were distributed according to the carbon copies noted, widely diffused through the Navy command including NAVDISTCOMDTS which, I am told, includes the Mayport operation in Florida. It is a lot of letters in capitals. It is dated October 30, 1970, from the Chief of Naval Operations.

It is the policy of the Department of Defense that: a. At the inception of a major action, including preparation of recommendations on reports or proposals for legislation, the probable ecological and environmental impacts of that action shall be assessed .

In fairness, Mr. Secretary, you mentioned this particular item in your prepared statement and the environmental impact statement is further discussed on page 2 of that directive from the Chief of Naval Operations, as I said, dated October 30, 1970.

Two or three days later comes a statement from the Secretary of Transportation, Mr. Volpe, delivered to NATO, in which Secretary Volpe states in part, and I shall quote :

My government proposes that NATO officials resolve to achieve by mid-decade a complete halt to all intentional discharges of oil and oily wastes into the oceans by tankers and other vessels. This is a fundamental and major goal. It may involve steps such as improved ship design aimed at clean ballast operations and the development of adequate port facilities to receive waste, oily bilge and ballast waters. This is a major goal and an essential goal, well worthy of the effort required. There is no doubt that the burden of achieving this goal will require a major effort by the United States.

He goes on to elaborate further on deleterious effects of pollution of the waters on the high seas.

Finally, just to have it reasonably complete in terms of chronological history, I will read an excerpt into the record from the directive of Mr. Chafee dated December 3, 1970, after the events that are here before us today, in which he states:

The U.S. Government, both domestically and internationally, is committed to take action to protect the oceans against pollution. Accordingly, the discharge to open waters of sludges, industrial wastes, oily wastes, trash or rubbish in port will cease immediately.

I read those into the record, Mr. Secretary, to try to make the point that the occurrence which took place off the coast of Florida in late November or early December is to be considered with the backdrop of a very substantial declaration of national policy both from the executive branch, the President of the United States, and from the Congress, that the pollution of the waters, whether it be inland waterways or high seas, is a matter of serious concern and that intentional discharges into the water which may have deleterious effect on human life, sea life, or what have you, are to stop.

Now as to your prepared statement, let me ask this question. It says, "For example, Mayport is the only U.S. base that has been dumping its sludge at sea."

As you read it, I think the text had been edited to strike out "in the United States".

Had you in mind that perhaps there were other dumping operations by the U.S. Navy at other bases other than those in the continental limits of the United States?

Secretary CHAFEE. That is the reason we changed it, so that there would not be that ~~confusion~~.

Senator EAGLETON. To make it more precise so far as you can ascertain, the only U.S. Navy base is the Mayport base. Taking into account the fact that Mayport is, by your testimony, not as old and not as elaborate as many other naval bases, if you had apparently, and your predecessors as well, established a nonsludge dumping policy at all the other U.S. naval bases but Mayport, why did Mayport remain the singular exception to what seemingly was an overall Navy policy?

Secretary CHAFEE. I think that is one of the things that will come out, Mr. Chairman, in the investigation we have convened.

From what I know to date, it is the facility problem that I mentioned before, plus the efforts that had been made, and then the failures that had taken place.

For instance, apparently in the Jacksonville area only just recently have they had tighter air pollution control laws. The organization that this civilian wanted to sell the sludge oil to was the Jacksonville Electric Authority, to run their generating plants. The content of sulfur permitted in the Jacksonville area is apparently 1 percent, and the Navy sludge oil figured out at 1.6 percent. It would formerly have been acceptable, but it wasn't then.

So, I think that Mayport found itself with a problem. Their former channel to get rid of it had disappeared, and they took this action. I am not condoning it; I am just reporting it.

Senator EAGLETON. Going on further in your statement you said, "From March 1969 to December 1970, five dumpings occurred at sea."

Do I take it, then, since no other U.S. Naval base anywhere in the world was dumping at sea other than Mayport, during that period mentioned in your prepared statement all of these five dumpings originated and emanated from the Mayport station?

Secretary CHAFFEE. Yes, sir; that is correct.

Senator EAGLETON. What has your investigation revealed to date, and I sympathize with the fact that your investigation is, A, at this time not complete from a factual point of view, and B, I also acknowledge that you are in a position as a reviewing officer, Secretary of the Navy, somewhat constrained perhaps in your ability to fully comment, but taking those two caveats for what they are, what can you tell us insofar as to what instruction the commanding officers at Mayport, if any, were following insofar as the dumping of sludge on the high seas or in the ocean?

Secretary CHAFFEE. I think, Mr. Chairman, that is one of the things that will come out. I didn't ask the commanding officer that yesterday for a good reason. I saw him yesterday. I didn't think it was proper for me to ask, so I didn't. There will, as you say, be an investigation.

Senator EAGLETON. You take it as being pertinent, a pertinent and vital part of your investigative process to ascertain what rules and orders the commanding officer was implementing and if these rules and orders were in any way at variance with national policy or other overall orders that will be made part of your report or findings?

Secretary CHAFFEE. Yes, sir. That is the crux of it as far as he is concerned.

Senator EAGLETON. I yield to Senator Muskie.

Senator MUSKIE. I apologize for interrupting and do so for one question at this time because I have to leave.

You referred in your testimony, Mr. Secretary, to the Oil Pollution Act of 1961, to an exemption provided in that law which implements the international agreement for naval ships. There is such an exemption. Let me read the language of this exemption:

The term "ship" means a sea-going ship of American registry except (1) ships for the time being used as naval auxiliaries.

Then, in addition, there is an exemption, I think, from the penalties of the act, of public vessels owned by the U.S. Government.

Now, my question is this: In other legislation, including, I think, pollution legislation over the years, the Congress has written in exemptions for vessels or activities operated by the Department of Defense. These have also been called the National Security Exemptions. Since I have been in the Senate, I have always interpreted those exemptions as providing not a blanket exemption which frees the Department of Defense from any obligation whatsoever to conform to the policy involved but, rather, as authority to the President in instances that clearly involve the security interests of the United States to make use of that exemption.

In other words, what I think the Congress has had in mind since I have been following this legislation is not an on-going exemption but, rather, the rare kind of situation in which that exemption can be invoked so that an activity related to the national security would not be violating the meaning or letter or spirit of the law.

I am interested in knowing which way the Department of the Navy interprets such exemptions, the Pollution Act of 1961, or any other of the national security exemptions which have been written into law.

Secretary CHAFEE. We interpret it as you do, Senator, and I think that has been verified by the fact that we disregarded that exemption and went ahead and put in our own prohibition which is just as stiff as the 1961 law. In other words, we don't choose to lean on that, or take advantage of it. As I cited there, the rule from Navy regulations—

Senator MUSKIE. Is the Navy taking the position, then, that these five dumpings were necessitated by something more than the convenience of the Navy, that they were necessitated by a real security problem of the United States?

Secretary CHAFEE. No, sir; we have never taken that position. I cited the law. The law which you referred to, as you know, the 1961 act, deals with the area out to 50 miles. This exemption for naval vessels the Navy has not chosen to use. As a matter of fact, it has forbidden the use of it.

Senator MUSKIE. In case of these five dumpings, it has used that exemption?

Secretary CHAFEE. No, sir; we were outside the 50-mile limit.

Senator MUSKIE. You think five more miles is sufficient to exonerate the Navy?

Secretary CHAFEE. I am not seeking to exonerate the Navy in this instance.

Senator MUSKIE. Or does the Navy think that the 5 miles is sufficient?

Secretary CHAFEE. No. If you want to know what we believe we are in violation of, it is the failure to file the impact statement in accordance with the Environmental Policy Act.

Senator MUSKIE. You have made that clear. I am interested in the interpretation that the Navy places upon these national security exemptions. You made it quite clear in your statement that in your judgment the Navy, notwithstanding such exemptions, ought to comply voluntarily with the spirit and letter of the law.

Secretary CHAFEE. I think we should.

Senator MUSKIE. Your position on that is reassuring because I take it that you applied the same interpretation to other national security exemption provisions. Yet, notwithstanding that, there were five dumpings which were not dictated by our national security interests and which in my judgment clearly violated the spirit of the law.

Secretary CHAFEE. I won't argue that in the present climate. Within the Environmental Policy Act, it is clear. Now, whether we were in violation before that, it seems to me, gets into a very "iffy" question. I don't see that there is much to be gained from—

Senator MUSKIE. That is one point I want to clarify.

Senator COOPER. Will you yield?

Senator MUSKIE. Yes; I will be happy to.

Senator COOPER. As I understand it, you look solely to the 1961 law which provided that no dumping could be done within 50 miles of the shore.

Secretary CHAFEE. That is correct.

Senator COOPER. That law provided an exemption for Navy ships. Under it you could dump within the 50-mile limit without violating the law?

Secretary CHAFEE. That is right.

Senator COOPER. You have never done that?

Secretary CHAFEE. No, sir.

Senator COOPER. Since 1961, there have been enacted a set of laws which were developed in this committee and passed by the Congress. But these later actions have not repealed that 1961 act; is that correct?

Secretary CHAFEE. That is correct.

Senator COOPER. The National Environmental Policy Act provided that before any action shall be taken of this nature there shall be filed an impact statement.

Secretary CHAFEE. That is where we erred.

Senator COOPER. The Navy has issued guidelines requiring that that be done?

Secretary CHAFEE. Yes, sir.

Senator COOPER. But it wasn't done in this case?

Secretary CHAFEE. No, sir; it wasn't.

Senator COOPER. There is another question, I think, Senator Muskie, as to whether or not, even though exemption is provided under the 1961 act for dumping within the 50-mile limit, whether as a matter of policy the Navy should prohibit any dumping within or beyond the 50-mile limit. Now, that is what we understand you propose to do.

Secretary CHAFEE. That has been done, Senator.

Senator COOPER. I don't know where the violation occurred but I say in all justice to the testimony of the Secretary he has committed no violation.

Senator MUSKIE. It is true, as Senator Cooper has brought out, that the letter of the 1961 law has not been violated in this instance by the Navy; at least it does not appear to have been. The question, it seems to me, is this: From time to time, when Congress has felt it necessary to provide a national defense exemption to be exercised within the executive branch, the President and those operating under the authority delegated by him determine whether those exemptions ought to be so applied as to permit activities by the Defense Establishment which are prohibited by law for others. This is the question that disturbs me.

Now, if the Navy, for instance—and I will quote this as a “for instance”—if the Navy, for instance, regards dumping 55 miles off the coast as sufficient conformity with the spirit of the law, that is a disturbing thought in my judgment, especially today. It might not have been in 1961. I concede the point the Secretary has made. But it is a disturbing thought now.

The interpretation entertained by the Navy in the light of all the policy which has been enacted into law and announced by the President is a disturbing question. Whether or not or to what extent, exemptions of this kind are used to justify on-going activities is another question which I think is appropriately raised in these hearings and which we would like answered.

If the tendency of the Navy and the Defense Establishment is to interpret these policies or these laws in such a way that it is given the widest possible, rather than the narrowest possible, latitude in prohibiting things to others, then the Congress ought to consider modifying the exemptions written in this field. This is my only point. I am thinking more of the future than I am of the past in raising the question.

Secretary CHAFEE. Senator, it would seem to me that you would take confidence from the Navy's actions under the 1961 law, by the very fact that we specifically refused to accept those exemptions that you permitted us in the 1961 law.

Senator MUSKIE. Until it became inconvenient.

Secretary CHAFEE. No.

Senator MUSKIE. What is the justification for the five dumpings?

Secretary CHAFEE. I am not trying to bring a justification for the five dumpings. But you, as I understand your point, are saying you are concerned about the exemptions that are granted the Defense Establishment. I am pointing out that the Navy refused to take those exemptions.

Senator MUSKIE. Except in those five instances.

Secretary CHAFEE. No, sir; because if you look at the law, the Navy was not in violation of the 1961 law.

Senator MUSKIE. I conceded that, but you have said the Navy was not required to observe the 1961 law because of the exemption. So you did not violate the letter of the law. We are in no disagreement on that. You went on to say that notwithstanding the exemption, the Navy voluntarily complied with the 1961 law, except that it did not in the case of the five dumpings, did it?

Secretary CHAFEE. We did comply with the 1961 law.

Senator MUSKIE. How?

Secretary CHAFEE. You may object to our complying with the spirit of it, which I won't argue; but the law says a 50-mile limit.

Senator MUSKIE. I made that point, Mr. Secretary, in my concern. You said if you go 5 miles further that you are complying with the law. You were complying with the letter of the law. You would have been complying with the letter of the law by dumping within 50 miles. If we have to be concerned with whether you interpret these exemptions to permit the widest possible latitude in dumping, then we have to tighten up the exemptions.

If, on the other hand, you interpret the laws permitting the narrowest kind of latitude, then I doubt 55 miles would be considered as sufficient compliance. After all, the nature of the wind and the tides and the natural circumstances could make dumping 55 miles offshore just as dangerous potentially to a given stretch of shoreline as 50 miles. I don't really think that 5 miles is that much of a voluntary compliance with the spirit of the law. That is my only point. That you didn't violate the letter of the law is conceded—the letter of the law, in both respects, the 50 miles and the specific exemption. I concede that you did not violate the letter of the law.

Secretary CHAFEE. Senator Muskier, the reason I don't want to pursue this is that the public impression might be that the Navy is very satisfied that they went 5 miles beyond the limit. We are not. We feel that we were in violation of the spirit of the law, plus the impact statement; so I certainly wouldn't want the public to get that impression. However, it had nothing to do with the exemptions that were granted the Defense Establishment when the law was written.

Senator MUSKIE. Let me ask one other question with respect to the 1961 law. Perhaps other members of the committee will pursue it.

Is it your interpretation, or the Navy's interpretation, that the exception for naval vessels contemplates the dumping of such gross quantities of oil as was involved in this last occurrence?

Secretary CHAFEE. No, sir. As a matter of fact, our contemplation was that there would be no dumping by naval vessels. That is why we put out the Navy regulations to that effect. We didn't give a thought to permitting such type of dumping as this.

Senator MUSKIE. You see, the definition of oil in the 1961 act is this:

The term "oil" means persistent oil such as crude oil, fuel oil, heavy diesel oil, lubricating oil. For the purpose of this legislation the oil in an oily mixture of less than 100 parts of oil in one million parts of the mixture shall not be deemed to foul the surface of the sea.

And then the prohibition relates to the dumping into the sea of oily ballast water or tank washes.

Secretary CHAFEE. Senator, what law are you citing there?

Senator MUSKIE. The 1961 act, Public Law 87-167, the law you referred to in your testimony.

It would seem to me that that act could not be interpreted to permit these kinds of discharges even by naval auxiliaries. But that is a question that perhaps the committee can pursue.

Thank you very much.

Senator EAGLETON. Thank you, Senator.

Mr. Secretary, I would like to try to expand in the record a bit the point that Senator Muskie just made.

Your reading of the various conventions as well as the 1961 act relating to discharges at sea, isn't the thrust of those terms of the quantitative limits defined in the act related to flushing or cleaning operations and they do not give an authority for a rather sizable dumping or massive dumping such as we are talking about here which is in the hundreds of thousands of gallons wherein an intentional dumping is made vis-a-vis flushing out the bilges or what-have-you. Isn't there a distinction?

Secretary CHAFEE. There is a distinction. I am not sure that it has been drawn in the act.

Senator EAGLETON. I believe it is insofar as what it relates to in parts per million and what have you which has at least the implication it is to be almost an emergency minor operation as opposed to a willful transportation of huge quantities of oil refuse to be intentionally dumped within 50 miles or beyond 50 miles.

Secretary CHAFEE. If I might take a look at this 1961 law——

Senator EAGLETON. Surely.

Secretary CHAFEE. Senator, I am very uncomfortable trying to defend up to 50 miles, because the Navy forbids that. As a matter of fact, in the Navy regulations, it says, "no oil of any sort."

Senator EAGLETON. Could you give me the regulation number?

Secretary CHAFEE. Article 4221 of the Navy manual on Shipboard Procedures, which is on all the ships, NWP50(a).

Senator EAGLETON. Effective what date, Mr. Secretary?

Secretary CHAFEE. It has read the same since August 1961.

Senator EAGLETON. It has been several years and is still in effect?

Secretary CHAFEE. Yes. "No oil of any sort, including sludge from bilges, fuel tanks, lube oil tanks, or waste oil or oily rags shall be thrown or pumped overboard within 50 miles of any coastline." I am confident the Navy has not taken the position to dump this stuff within 50 miles.

Senator EAGLETON. Insofar as your investigation thus far reveals, what was the urgency or emergency that necessitated taking the barges out on November 30? Why couldn't alternative methods of disposal, without dumping in the open sea, have been pursued further? Was

there a crisis situation that indicated these barges had to be dumped then and time was of the essence?

Secretary CHAFEE. I think, Senator, I would be going too far to say it was an emergency; but the barges were getting full, and weather conditions—as I mentioned before with these tugs—were such that they felt they had to proceed. They have two big carriers in there which they are working on currently, and it is the carriers that produce the greatest part of the sludge for which bilge pumping has to be done. With them there, they felt they had to make room.

Senator EAGLETON. Were there no other additional barges available?

Secretary CHAFEE. Not there; no, sir. In Charleston or Norfolk they could have gotten other barges, but there weren't others there.

Senator EAGLETON. How far is Charleston from Mayport?

Secretary CHAFEE. About 200 miles. Mayport is right next to Jacksonville.

Senator EAGLETON. Of course, hindsight is always perfect but on a hindsight basis would it not have been possible for the Navy to have dispatched other additional barges to Mayport to handle this sludge?

Secretary CHAFEE. No question about it. If we had known this was going on, it would not have been going on.

Senator EAGLETON. What purpose did these barges that were at Charleston and at Norfolk serve there if they are not dumping barges. Your previous testimony is that there is no dumping that goes on at other bases. What are they used for at Norfolk?

Secretary CHAFEE. Collection to take it to different settling tanks that they use.

Senator EAGLETON. We have an extensive telegram running at least three pages from Mr. Mike Wenzel who, as I take it, is the civilian referred to in your prepared statement as to contacts he had with the base insofar as the disposal of this sludge. Your statement is that because Mr. Wenzel's trip to Georgia was so indefinite as to possible results and because the barges were getting full and the weather was favorable, the tugs and barges departed Mayport 12:30 p.m. on November 30.

Was it the commander's, or whoever was carrying on the negotiations and discussions with Mr. Wenzel, judgment that the negotiations were at an end, that there was no chance, viable chance, that Mr. Wenzel would purchase or could be contracted with to dispose of the sludge?

Secretary CHAFEE. Yes, sir; it was that. Mr. Wenzel had been in twice. The first time he just fingered the material, as I say. The next time he took fruit jars back with samples, and then reported back that he couldn't take it. So that ended that. At that time he talked about a service contract—that is, being paid to take it—but he didn't follow that up.

Then, the day of the incident, the day of the departure, he called on the telephone and said he was going to Georgia, but that seemed vague as to results, as I say. I talked to Mr. Wenzel yesterday. He said that he had made several trips to Georgia, and his total sales in Georgia had been 1,800 gallons. In this instance, we are talking of 500,000 gallons.

Senator EAGLETON. The telegram will speak for itself and I will ask that it be inserted in the record.

(The telegram referred to follows:)

DECEMBER 4, 1970.

Senator THOMAS F. EAGLETON,  
New Senate Office Building,  
Washington, D.C.:

1. In early November I was contacted by Ben Hash of disposal office, Mayport, who asked if I could dispose of more than 500,000 gallons of contaminated fuel. I found two barges with capacity of 672,000 gallons full of oil NSFO and No. 2 fuel. After making every effort to find a buyer in Jacksonville I notified Mr. Hash that I could do nothing with it because the sulfur content was too high; I could dispose of it at a charge of 1 cent per gallon in a pollution-free manner on a service contract. Mr. Hash said they weren't interested. On November 30 I called to see if the oil was still there since I wanted to try selling it in Georgia. I was told by someone in the harbor office that it was being dumped because they had another barge full to take off another ship. On December 1 I reached State Legislator Earl Dixon who alerted Florida Marine Patrol and other agencies and I also informed the Florida Times-Union who gave the information to other news media.

2. The Navy has been dumping bilge cleanings at sea for years but previously there was only 5 to 10 percent emulsified oil content which wouldn't show up as a slick of any size.

3. Highly conflicting stories in the news media because some went with a State marine patrol plane which flew over the slick for 20 minutes at 175 m.p.h. without seeing the end of it and others went aboard a Navy Constellation and saw only small patches. The marine patrol said a destroyer was running around in the slick trying to break it up and that marine patrol officers were refused entry into the base for the first time. The barges have also been moved to parts unknown to prevent taking samples for comparison analysis.

4. Offshore dumping is unnecessary in that this oil could have been dried out and used by the Navy saving about \$10,000 per bargeload and fuel replacement costs. I believe junior officers may have been told "Get rid of it we need the room" and they had exhausted all other possibilities they could think of.

MIKE WENZEL.

Senator EAGLETON. As I read the telegram, it gives a somewhat different interpretation of how Mr. Wenzel views the factual situation at the time the barges went out to sea. It indicates that he thought negotiations were still in an ongoing stage and he was prepared, it would indicate, for the payment of \$5,000 to dispose of this surplus sludge.

Secretary CHAFEE. I talked to Mr. Wenzel yesterday pretty directly on this matter. As far as getting any offers or bids or anything like that, he, himself, admitted to me that there were no definite offers or proposals on his part.

Senator EAGLETON. Mr. Boggs.

Senator BOGGS. Mr. Chairman, I have no objection to the telegram being made part of the record, but I would like to look at it.

Senator EAGLETON. Surely.

Secretary CHAFEE. Mr. Chairman, I asked Mr. Wenzel, "What would you do with the stuff?"

He had a proposal—two proposals, as I understand it. One was to dump it on a dump, but the city of Jacksonville told him he couldn't do that; he had a private dump he was negotiating with. The second was that he has a method that he indicates is somewhat secret, of burying it in the sand. He didn't want to go into the details of that. That is how he proposed to do it.

Mr. Chairman, I would just like to make one other comment, if I might, in connection with my trip yesterday to Mayport. It was very

relieving; I might say, to find that not only was the oil slick all broken up, but none of it ever did come ashore on the beaches. This does not excuse us for the dumping, but I must say I was considerably relieved to see that it had dissipated.

Senator EAGLETON. I am sure we all share in that relief.

It has been brought to the committee's attention, Mr. Secretary, that this is not the first oil pollution problem with respect to the Mayport Naval Station.

Your prepared testimony relates the fact that from March 1969 to December 1970 there were five at-sea dumpings. Also, in addition to that, the Florida Department of Air and Water Pollution Control issued a citation to the Chamblee Construction Co. of Chamblee, Ga., for dumping 20,000 gallons of corrosive liquids in Florida waterways. This was done in connection with contracts with carriers berthing at the Mayport Naval Station in Florida.

Are you familiar with that citation?

Secretary CHAFEE. I am not, Mr. Chairman. This is the first I have heard of that one.

Senator EAGLETON. Could I ask, then, that—I wouldn't ask that you broaden your inquiry as Secretary of the Navy into the instant matter that took place on November 30 and December 1, but ancillary thereto, since there is a possibility that other dumping and pollution problems over and above those previously brought to your attention relate to the Mayport Naval Base, could you make an ancillary examination of this complaint of the Florida Department of Air and Water Pollution?

The case number is IW-351-70. It has been referred to the Florida attorney general's office for further action. We will be glad to supply your staff with such specific case numbers, et cetera, as they may desire.

(Information relative to the above-mentioned case follows:)

STATE OF FLORIDA,  
DEPARTMENT OF  
AIR & WATER POLLUTION CONTROL,  
Tallahassee, Fla., December 7, 1970.

Hon. EDMUND S. MUSKIE,  
Senate Office Building,  
Washington, D.C.

DEAR SENATOR MUSKIE: Kaminer Construction Company, a contractor doing work for the U.S. Navy at the Naval Station, Mayport, Florida was cited August 21, 1970 Case # IW-351-70 by the Florida Department of Air & Water Pollution Control for dumping some twenty thousand gallons of raw corrosive chemical solutions into the St. Johns River. Our investigations indicate that Kaminer discharged said pollutants to Florida state waters under protest and as directed by the Navy. The Department of the Navy, Southern Division Engineering Command, has admitted said directions in letter dated August 27, 1970 to wit: "In fulfilling the contract requirements and as directed by the Navy, the Kaminer Construction Company discharged solutions of sulfuric acid and sodium hydroxide."

We feel these actions indicated total disregard by the Navy for environmental consequences of such actions.

In conclusion, attached is a Xerox copy of Captain Jones' letter of August 27, 1970.

Sincerely,

VINCENT D. PATTON,  
Executive Director.

DEPARTMENT OF THE NAVY,  
SOUTHERN DIVISION,  
NAVAL FACILITIES ENGINEERING COMMAND,  
CHARLESTON, S.C., August 27, 1970.

Subject: Contract N62467-67-C-0463, Utilities for Carrier Berthing, Naval Station, Mayport, Florida

THE FLORIDA DEPARTMENT OF AIR AND WATER POLLUTION CONTROL,  
Tallahassee, Fla.

GENTLEMEN: This will confirm telephone conversation with your Messrs. Patton and deCastro on 27 August 1970 concerning Notice of Violation, Case No. IW-351-70, against Kaminer Construction Company of Chamblee, Georgia.

The Kaminer Construction Company is constructing by Government contract a boiler plant and other facilities required by the Navy. *In fulfilling the contract requirements and as directed by the Navy, the Kaminer Construction Company discharged solutions of sulfuric acid and sodium hydroxide.* Future direct discharge of these solutions into the St. Johns River is not planned.

The quantity and quality of material discharged into the St. Johns River during the testing procedures on the demineralization equipment was as follows:

(a) Cation exchanger, 3 each:	Gallons
Backwash 15 min @ 100 gpm-----	1,500
Acid wash (66° Bé @ 0.63 gpm) 17 min @ 53 gpm-----	900
Acid wash (66° Bé @ 1.30 gpm) 16 min @ 53.7 gpm-----	860
Slow rinse 20 min @ 52.4 gpm-----	1,048
Rapid rinse 30 min @ 100 gpm-----	3,000
<b>Total discharge-----</b>	<b>7,308</b>
(b) Anion exchanger, 3 each:	
Backwash 15 mins @ 50 gpm-----	750
Caustic wash (50% @ 0.50 g.p.m.) 60 min @ 8.7 gpm-----	520
Slow rinse 20 min @ 52.4 gpm-----	1,048
Rapid rinse 20 min @ 100 gpm-----	2,000
Final rinse 20 min @ 100 gpm-----	2,000
<b>Total discharge-----</b>	<b>5,926</b>

The first acid wash was a 2% concentration, followed by a 4% solution in the second acid wash. Also, caustic concentration was a 4% solution.

The cation and anion exchangers were tested on August 20, 1970. The anion exchangers failed to meet established levels and the anion exchangers only, were regenerated on August 21, 1970. To date, no further tests have been conducted.

In view of the Notice of Violation, a holding pond is being constructed which will be lined with an impervious material. The acid and caustic solutions, used in the regeneration in the water treatment unit for the boiler plant, will be discharged into the holding pond. The solutions will be tested and when equilibrium is reached, will be pumped from the pond into the St. Johns River.

The referenced telephone conversation and this letter will serve as the formal report in this matter. Further, the holding pond concept and pumping of the neutralized solutions into the St. Johns River will not violate your Department rules.

As noted in the conversation, we plan to continue testing the boiler on 31 August 1970 and your representative is invited should you desire.

Very truly yours,

WHITNEY B. JONES,  
Captain, USN, Commanding Officer.

Secretary CHAFEE. Senator, as I understand your presenting that, that was a private construction company? That wasn't the Navy?

Senator EAGLETON. What is that?

Secretary CHAFEE. That incident involved a private construction company, and not the Navy, as I understand it.

Senator EAGLETON. The matters and the liquids being dealt with were liquids gathered at the Mayport Naval Base. It relates insofar as a disposal problem created on or about that particular naval base.

Secretary CHAFEE. Yes, sir; we will look into it.

(The information requested was subsequently supplied and follows herewith:)

A project for a new boiler plant and other utilities for the United States Naval Station, Mayport, Florida, was authorized in the Fiscal Year 1968 Military Construction Program. The new boiler plant included an "ion exchange" water-treatment process to remove water constituents undesirable for boiler water. This type of treatment process requires the intermittent use of caustic and acid solutions to regenerate the ion-exchange media. During the regeneration process, partially-spent acid and caustic are discharged to waste.

The contractor for the project was the Kaminer Construction Company of Chamblee, Georgia. The contract included the construction of the boiler plant as well as the requirement to place the plant in operation.

On August 20, 1970, the boiler plant was placed in operation by the contractor as required in the Navy contract. On August 21, 1970, the Florida Department of Air and Water Pollution Control advised the Kaminer Construction Company that the discharge of water-treatment regeneration solutions to the St. Johns River was a violation of that Department's Rules. Operation of the water-treatment process was immediately halted, and interim neutralization facilities, acceptable to the State of Florida, were installed. Permanent facilities for treatment of the regeneration solutions have recently been placed into operation, and it is anticipated that their use will provide a permanent solution to the problem and preclude any pollution.

Senator BOGGS. Mr. Chairman, I want to yield to the Senator from Florida, who is very much concerned about this matter.

Senator EAGLETON. Senator Gurney.

Senator GURNEY. Thank you, Senator Boggs, and Mr. Chairman. I think we have probed into this thing fairly deeply. I would like to get one matter settled, though, during this questioning.

However, I do want to also compliment you, Mr. Secretary, on your leadership here and your prompt reaction to this affair. As I recall, the news media carried reports of this story on December 3. And you took action on that day, I do know, as you are aware, that I sent you a telegram requesting that this practice be stopped and, also that an investigation be made, and that you answered the telegram the next day. So, I do want to compliment you on your swift and prompt action in this regard.

Of course, we cannot overlook the fact that only by sheer luck was a major disaster diverted. I was informed the oil slick had come in about halfway to shore from the original dumping ground. There were two slicks. One was 3 miles square, as I recall, and the other was even more. It was a 10-mile square oil slick.

There is little doubt that if this had come ashore anywhere on the Florida east coast, since all of it is beach, we really would have had a major disaster on our hands. Maybe it was a blessing in disguise because it did point out something that had gone on and now we can stop that and perhaps probe more deeply into these environmental problems.

One question I do want to pin down here once and for all. As I understand it, you have issued orders that there will be no more dumping of any sludge from Mayport at all, any time in the future; is that right?

Secretary CHAFFEE. Yes, sir; that is right—or any place. Not that it is being done any place, but, so no one will misunderstand it, that order went everywhere—everywhere that I have jurisdiction.

Senator GURNEY. I certainly share the concern of the other States too, but I am mostly concerned right now about Mayport.

Secretary CHAFFEE. I am sure they understand it now at Mayport.

Senator GURNEY. Let me ask this: has any dumping been done from Pensacola or Key West?

Secretary CHAFEE. No, sir; at least not in recent years.

Senator GURNEY. I understood that probably was true, from your blanket testimony that this was the only installation engaged in this practice. How do they handle the bilge sludge at those two naval stations?

Secretary CHAFEE. Key West must present a real problem and I frankly don't know how they do it there. The standard way is just the way I have mentioned: the settling tanks, the draining off of the water, and the reuse of the oil for different purposes, such as oiling roads, usually through a private contractor. In other words, the Navy does not do it itself. In some instances, apparently, you can get a high enough quality out of it even to run furnaces and heating plants.

Senator GURNEY. That was the question I had too. Part of your investigation is going to probe into whether this oil can be used at Mayport or near there in a useful capacity, isn't that right?

Secretary CHAFEE. That is right. I talked with Mayport yesterday. Their plans currently are to get the jet aviation fuel out of two of their tanks and store it there. It is right close to the water where the barges can come up. I think their plans are to let it settle and then find a buyer for it somewhere.

Senator GURNEY. I followed very closely your discussion with the chairman, Senator Eagleton, about the affair involving a private construction company in Florida. I would certainly hope and request that in any contract the Navy may make, in Florida or elsewhere for that matter, to dispose of waste products, that they also find out what the private contractor is going to do with the waste in order to approve or disapprove the intended disposal method. Because that certainly is important. It surely does not provide adequate environmental protection to contract for the disposal of the wastes without knowing what the individual who buys them is going to do with them.

Secretary CHAFEE. In the ALNAV I sent out on the third, we have this paragraph:

"Contractor service. Contractor either disposes of oil or refines. Depending on oil content and quality the contractor service may require Navy expenditures of funds or be a source of income. Navy must ascertain that disposal by the contractor meets all applicable pollution control requirements."

So, we are doing that.

Senator GURNEY. I am certainly reassured by that statement. Now let me ask one other question. Obviously you did not know, Mr. Secretary, this was going on and I guess probably some of the other people in the Pentagon didn't either. As a result of this incident, are you going to require an environmental analysis done by your base commanders as to how they are going to deal with some of these environmental problems? Is that being done?

Secretary CHAFEE. Yes, it is, Senator. We have, of course, this rule out. At all our bases we have been spending considerable time on the smoke pollution problem and on the sewage problem. These are the things that have occupied our principal attention—plus these fire-fighting schools that we have everywhere; they are a problem.

Every base is receiving a lot of attention. When the military con-

struction requirements come forward from these bases, we have always given priority to the military construction devoted to pollution abatement.

Senator GURNEY. I certainly followed that testimony and certainly I am glad to hear that, but I do think that if there had been a policy within the Navy of base commanders being required to inform you or your people in the Pentagon how they were handling these waste disposal problems, then this incident would have been avoided. That is what my question was directed to.

Secretary CHAFEE. Yes. Well, we have set up a special office, and Commander D'Emidio here is sort of the focal point for that within our Office of the Chief of Naval Operations in the Pentagon. Of course, there are different sections of the Navy working on it. The Facilities Engineering Command is working on a disposal device for our ships. That does not fall on Commander D'Emidio, but he knows about it.

The smoke pollution control facilities, particularly pertaining to jet aircraft, fall into another section, the Naval Air Systems Command. Commander D'Emidio is what you call the focal point for all these environmental actions, so, we keep tabs on them through his organization.

Senator GURNEY. I have one other question. I wasn't sure from following the questions and answers what the answer to this was: as I understand it, the Navy was observing the law cited which was agreed to on an international basis in 1961. As far as the United States is concerned, this law forbids dumping of oil within 50 miles of the land. Let me ask you this. When our Navy vessels discharge oil at sea—and I suppose they do sometimes, in cleaning bilges—what is the policy of the Navy in this regard now?

Secretary CHAFEE. The policy is for them to be well offshore, and certainly not within the 50 miles. But, of course, on these long voyages, when they get well out to sea, you are right—sometimes they do have to clean their bilges. They just can't save the stuff up until they complete these long transits.

As you know, Senator, we are involved now in a mid-decade effort, and we are going out to our ships throughout the Navy to plan for it. That is what the President and Secretary Volpe were talking about before NATO. This gives us a real challenge, because this bilge water just accumulates. It is going to affect, of course, the merchant marine; but it is going to affect us more, because our ships stay out on far longer patrols than the merchant marine ships that go from point to point, and when they get to shore they can pump it off. So this gives us a good problem.

Senator GURNEY. It seems to me, Mr. Secretary, this is an area that we must investigate. Let me say to you I swim on Florida beaches a whole lot, almost all year around, and I can't recall any time now when you can go on any Florida beach, at least on the east coast, without seeing oil and tar mixed in with the sand. It is almost impossible to go in swimming without having to clean your feet off after having gone in swimming.

I am not blaming this on the Navy. I am simply saying obviously it is caused by oil dumping or bilge blowing or whatever ships do at sea. This problem is going to increase rather than decrease. I would hope that the Navy, which certainly is by far the the largest operator of seagoing vessels in our gulf, would take a lead here in trying to resolve

this problem and reestablishing beaches that we can enjoy being on and swimming from again.

I say that to you because I know that it is going on. I see it every day in my State.

Secretary CHAFEE. Yes, but I certainly wouldn't want to leave the impression that the Navy is responsible for these beaches. There are a lot of ships traveling the ocean.

Senator GURNEY. Neither do I.

Secretary CHAFEE. You are right, we have a big job to do. We have a big job to do as we go toward this mid-decade goal—not only with the bilge water, but just with plain garbage, boxes, crates, and everything else that accumulates.

Senator GURNEY. Thank you.

Senator EAGLETON. Senator Cooper.

Senator COOPER. I think I should yield to Senator Baker, but I won't for a moment. Just for the record, I am going to follow up the line of questions I asked a few minutes ago after the statement of Senator Muskie. I don't often disagree with Senator Muskie, but I do disagree with his interpretation of the convention.

I don't do this to say that dumping is a good thing. I think it ought to be stopped and I am pleased that you have stopped it. After reading of this incident, I thought it was a violation of the law and I wrote a telegram to the chairman of this committee to that effect.

After reading the record and looking at the laws which are applicable, you have been a lot stricter than we have in our own legislative proposals, in even our latest act of 1970. I think that ought to be made a part of the record. We have an obligation now to do something. As I understand it, your activities outside the inland waters and the coastal waters of the United States, could only be governed by international law, and that is the convention of 1954. Is that right?

Secretary CHAFEE. Yes, as applied into law. The 1961 law reflected that.

Senator COOPER. Yes, the 1961 law was an act of Congress which implemented the 1954 convention. The convention itself and the law provide an exception for naval ships. In other words, the Navy could have dumped any place between the 50-mile limit and the 12-mile limit without violating the law.

Secretary CHAFEE. Yes, sir.

Senator COOPER. And without violating any law. You were exempted from it. You at least obeyed the convention that applied to all vessels.

Secretary CHAFEE. Yes, sir; we did. I think the Navy is deserving of some credit for that.

Senator COOPER. Now I want to bring it down to our act of 1970. It is correct that it should only apply to coastal waters because we have no jurisdiction beyond that. Our act included this exemption. I call attention to section 11, subsection (b), paragraph 2, where we included in our act the very exceptions which are in the 1961 act. In other words, our 1970 act would have permitted the Navy to continue to dump between the 12-mile limit and the 50-mile limit. In fact, it would permit you to dump within the 12-mile limit.

I just want to make that clear. We can now amend our act and we could, as the Navy has for its ships, prohibit dumping anyplace.

I might say also the convention which is now before the Congress for ratification is supposed to be an improvement on the last convention,

which also has this exception. The point I am making is, that as far as any violation of the law is concerned the Navy has not violated either the international convention or the last water pollution control act which we enacted in 1970, in April. And, we put that same exemption in that act. So I think as a matter of the law that we have an obligation now, if we want to give further protection to the environment, to correct this act of 1970, and make it stricter.

I want to get that in, because I think there has been some misunderstanding that there has been some violation of the law. There has not been. Under your present policy, you have stopped the dumping itself. We have to look at our own actions.

Thank you, Mr. Chairman.

Senator EAGLETON. Do you wish to respond to this, Mr. Secretary?

Secretary CHAFEE. We of course have followed this policy, law or no law, prohibiting dumping within the 50 miles, exempting the Navy, as the Senator pointed out. We have refused to accept that exemption. We have just gone ahead and forbidden any dumping in that area, regardless of the loophole, as it were, or the exception that was given by the Congress. We intend to abide by the rules we put out to forbid the dumping.

Senator EAGLETON. Senator Baker.

Senator BAKER. Mr. Chairman, I thank you.

And, Mr. Secretary, thank you for your statement and your response to inquiries so far. I want to take this opportunity to commend you for your candor and for your thoroughness in preparation for this testimony.

Secretary Chafee, one particular feature that emerges from the several questions and your statement, it seems to me, is that you are clearly not in violation of the law, but that, clearly, an undesirable result almost obtained from the dumping of the oil.

It occurs to me that it might be helpful to focus the attention of the committee and this record on what to do about it, both from your standpoint and from ours. I think we both have been pretty lucky that there wasn't a disastrous result as Senator Gurney pointed out. As Senator Cooper pointed out, the Navy is not only not in violation and not culpable from the legal standpoint, but probably exceeded the requirements that the statute made upon it. But still all the problem is there. What do we do about the prevention of this or other similar or dissimilar events that might create a potential insult to the environment?

All that is preparation for saying that I think you have done a good job with your testimony and with your activity since the event. But looking to the future, I wonder what is next. I have today written a letter to Mr. Ruckelshaus, who is the recently confirmed head of the Environmental Protection Agency, suggesting that he might detail from his staff to each of the major agencies of the Federal Government a liaison officer to work in connection with the ordinary activities of the Navy Department, the Air Force, the Army, the Department of Agriculture, the Atomic Energy Commission, the Department of Commerce, TVA, and other major Federal agencies that have some potential for violation of the environment unintentionally, so that not only the letter but the spirit of the law and the objectives we all seek might be better and more expeditiously accomplished.

I surmise this is a new idea. I have just today written a letter which, without objection, I would like to place in the record.

Senator EAGLETON. The letter will be received for the record.

U.S. SENATE,  
COMMITTEE ON COMMERCE,  
Washington, D.C., December 7, 1970.

Mr. WILLIAM D. RUCKELSHAUS,  
Administrator, Environmental Protection Agency,  
Washington, D.C.

DEAR MR. RUCKELSHAUS: Today the Senate Committee on Public Works is hearing Secretary Chafee on the recent oil spill off the Florida coast. While the incident is, most regrettable, the emphasis of the hearing will not be to establish culpability but to explore ways to prevent such an occurrence in the future. Secretary Chafee has already offered strong assurances that such steps are being taken by the Navy, and that is highly commendable.

The incident does raise serious questions about the present ability of the Federal establishment to police itself effectively in the pollution field. The questions we must answer are these: how can agencies inventory their own activities for possible pollution effects? How can agencies come to know and respond to Federal pollution law and regulations?

It appears that the Navy's action has violated either the spirit or the letter of at least three provisions of recently enacted federal law: section 211 of the Resources Recovery Act, section 21 of the Water Quality Improvement Act, and section 102 of the Environmental Policy Act. We must find effective ways of providing that agencies are aware of these laws, are able to objectively evaluate the potential of their activities to pollute, are able to prevent pollution where possible, and to quickly abate and control pollution where it inadvertently occurs.

At a time when government is tooling up to demand much of the private sector, it is essential that the federal establishment clean its own house.

One possible approach to existing inadequacies might be the detailing of an EPA employee to each major federal agency, such as the Departments of the Navy, Army, and Air Force; the Department of Agriculture, the Department of the Interior, the Department of Commerce, the Tennessee Valley Authority and the Atomic Energy Commission. In this way a qualified person would be assigned full-time to make objective judgments about instances in which pollution might occur and to advise the agency to which he is assigned. Such a person could carry out meaningful liaison between EPA and the agency involved, as well as with the Council on Environmental Quality.

I only offer this as one suggestion, and I would be interested in your view of it and any other suggestions that you might have. If additional legislative authority is needed, I am confident that this Committee would be prepared to consider any proposal with dispatch.

Sincerely,

HOWARD H. BAKER, Jr.

Senator BAKER. Would you be in a position to state whether or not you think the Navy might view with favor such a liaison with the new Environmental Protection Agency?

Secretary CHAFEE. Yes. I think the closer we can work with that agency, the better off we will be. I think that would be helpful for us.

Senator BAKER. Would you be agreeable to apprising this committee or the Congress, either directly or through the executive department, of suggestions and ideas as to how we might strengthen or tighten the statute so that we could prevent situations like we are exploring here? Because, after all, you are on the front line, so to speak, certainly in the case of seagoing vessels, and you have a better opportunity to judge where the possibility of danger is and what we might do to correct it.

Would you be willing to, in effect, advise this committee on what we might do in writing new statutes?

Secretary CHAFEE. Advise right now, Senator?

Senator BAKER. No, in the future from time to time.

Secretary CHAFEE. Oh, yes, sir; we would be glad to send it up through the Defense Department to you. That is our normal route. As I said before, some of these problems, as you well know, are extremely difficult. The problem that we are running into is that the mechanical equipment that we had hoped would be there to solve them just does not seem to be coming along.

For instance, we have a very large submarine tender which we keep in Holy Loch, Scotland. It is called the *Canopus*. It has just gone over there—about 6 months ago. Now on this submarine tender we installed an antipollution device for sewage. It is Fairbanks-Morse, the first one we have had in a big ship. It is really our test bed, as it were. We are very anxious to have it; and I have corresponded with my counterpart in the British Navy and he has indicated their interest in having this there. As you know, we want to keep good relations over there in Holy Loch, so we put it in and sent the *Canopus* over. Unfortunately, it just plain has not worked. There have been problems in performance. It simply does not work properly; then, when we get it tuned up, we have problems in reliability—it does not keep working properly.

Our mechanical difficulties in that area are substantial, so I would urge that, in any laws that we pass, there be adequate leadtime. Of course, we are getting the jump on this—we have been working on it for quite a while; but for Congress to pass a law that on the high seas you could not throw any refuse over, for instance, would put us in a real bind.

But, in direct answer to your question—yes, we will be glad to work with this committee.

Senator BAKER. Mr. Chairman, thank you very much.

Senator EAGLETON. Thank you, Senator Baker.

I would like to make one point clear, if I could, from my own personal point of view. Senator Cooper has indicated his unusual disagreement with Senator Muskie.

Senator COOPER. Just on policy.

Senator EAGLETON. On policy, and his interpretation of the 1961 act.

Senator COOPER. On his interpretation of the act.

Senator EAGLETON. Yes, the 1961 act. I have reread certain portions of the 1961 act. I am of the mind to frankly agree with Senator Muskie. What is encompassed and envisaged by the 1961 act, insofar as it deals with discharges that can be made within certain mile limits, and so forth, is relatively minor bilge cleaning discharges. The matter before us is not of that type.

These were not vessels on the high seas going between long-distance ports. Rather, this was a dumping operation of surplus oil products gathered on shore, stored on shore, and then put on barges and taken out a miles into the ocean and dumped, in the thousands of gallons.

I don't think there is any authorization, either explicit or implicit in the 1961 act for that kind of operation. I think that the factual situation determines the applicability of the 1961 act. Be that as it may, the Secretary has indicated in his very candid testimony—and I commend him for his candor—that whether there be a dispute as to the violation of the 1961 act, 1970 Environmental Act, and so forth, in terms of the letter of those conventions and statutes, he takes it to be that the spirit of those acts and the Presidential pronouncements that have come forth this year have been violated. And thus he sent out his directive of

December 3 which categorically prohibits the repetition of another dumping operation of this type. Is that correct?

Secretary CHAFEE. Absolutely; yes, sir. We don't want to rely on any 1961 act or other acts.

Senator EAGLETON. In terms of the detail, it appears from your statement that the pumping actually began within a 30-mile limit. From your testimony you said that was mostly water or basically water—I don't want to misquote your testimony. But what is the point of return insofar as where it becomes basically a water substance and presumably nondeleterious, not dangerous to the environment, and becomes a predominantly oily product which is potentially dangerous?

Secretary CHAFEE. As you know, this whole settling process, which is a part of the procedure for getting rid of it, involves water going down and the oil coming up to the surface, so it does separate, and you end up with the water at the bottom.

Now, how did these barge tenders know when to start and when to turn off the tap to keep the oil from coming out? The report that comes to me is that they looked and saw it. When it looked like it was oil—and they can tell by watching it—then they turned it off.

There is one point. Some people might say, "Well, those slicks that were close to the shore resulted from these people pumping oil too soon." I don't think so, because the slicks that were at the mouth of the St. Johns River or offshore there, were parallel to the shore. The pumping that they were doing was when they were going at right angles, which would have left the slick at right angles. There were no slicks at right angles to the shore within the 55 miles.

Later, as Senator Gurney pointed out, the slick came closer; but in the beginning it didn't.

Senator EAGLETON. One other question on a related matter, Mr. Secretary. Once again, Senator Boggs has put in the record, and I think properly so, the entire report of the Council on Environmental Quality with respect to ocean dumping. On page 11 of that report, it indicates that the Department of Defense estimates for the disposal of conventional munitions at sea are as follows:

In the year 1970, some 100,000-odd tons; 1971, 88,000 tons; 1972, 80,000 tons.

I would like to ask you two questions based on that. Are such disposals in any way circumscribed by your directive of December 3 that has previously been referred to in the record?

Secretary CHAFEE. We had previously forbidden any dumping of munitions or any chemical agents. However, if other dumpings of this type have to take place, then we will go through the impact statement procedure to the Council on Environmental Quality.

Senator EAGLETON. That was my next question. Your present policy is certainly no more oil dumping. That is an across-the-board blanket prohibition?

Secretary CHAFEE. Right.

Senator EAGLETON. Your policy is also for the present no munitions dumping of any kind?

Secretary CHAFEE. Or chemical agents.

Senator EAGLETON. If unforeseen or future events, in your mind, should determine that there might be a munitions dumping, you will then follow the environmental procedures with an impact statement and the like?

Secretary CHAFEE. Yes, sir.

Senator EAGLETON. Let me say that the record of this hearing will remain open for an indeterminate period of time so as to receive from the Secretary the results of his investigation, his findings, recommendations, conclusions, etc., so that they may be made a part of this record. (The material supplied by Secretary Chafee appears on p. 87.)

Senator Gurney has indicated he wishes to add some material to the record. Any other Senator so desiring has ample time to do so.

(The material from Senator Gurney follows:)

[Telegram]

DECEMBER 3, 1970.

HON. JOHN H. CHAFEE,  
Secretary of the Navy, Department of the Navy,  
Washington, D.C.:

The news media this morning carried reports of a massive oil slick off the coast of north Florida which according to the reports is a result of the Navy dumping waste oil into the ocean. If this is true, I request an explanation of why this is the practice of disposing of the wastes and I urge you to halt this practice immediately. In times when we are trying to find solutions to air and water pollution and making every effort to preserve our beaches and shorelines, it is extremely discouraging and incredible to learn that one of our own governmental departments is engaged in dumping sludge oil into the ocean causing massive pollution, and posing a threat to our beaches along the coast of north Florida. I urge you to halt this practice at once. Other methods must be found at once to dispose of this waste and I urge this be done immediately. Regards.

EDWARD J. GURNEY,  
U.S. Senator.

DEPARTMENT OF THE NAVY,  
OFFICE OF THE SECRETARY,  
Washington, D.C., December 4, 1970.

HON. EDWARD J. GURNEY,  
U.S. Senate,  
Washington, D.C.

DEAR SENATOR GURNEY: In reply to your telegram of 3 December 1970 concerning the recent oil dump off the east coast of Florida, please be advised that we are taking every effort to protect and enhance the environment in response to Federal Legislation and Executive Orders. To that end, the Navy, through the support of the Congress, has received over \$89 million for the construction and the purchase of pollution abatement facilities and equipment.

I have directed that a formal investigation be conducted to inquire into the circumstances involving the oil slick off the coast of Florida. In the meantime, I have determined that at about 9:30 p.m., 30 November, the contents of two barges from the Naval Station, Mayport, were pumped into the ocean about 55 miles east of the mouth of the St. Johns River. The quantity of waste was about 500,000 gallons of mixed oily-water. This waste water consisted of oily wastes from ships bilges, as well as residue from stripped fuel tanks.

I deeply share your concern about this situation. Navy authorities in Florida are keeping the area under constant surveillance and stand ready to assist should the oil become a threat to the coast line. At the present time, this does not appear likely. Additionally, Navy aircraft from Jacksonville have been made available to fly Florida state officials and representatives of the news media over the scene.

I have taken the necessary steps to preclude the occurrence of a similar incident in Florida, or anywhere else, by forbidding the barging of any waste materials to sea for disposal.

I regret that this situation has developed along the Florida coast. I am prepared to provide additional information, if desired.

Sincerely yours,

JOHN H. CHAFEE,  
Secretary of the Navy.

## AMPLIFICATION OF REMARKS OF SENATOR EDWARD J. GURNEY

Gentlemen, I believe that most of us here are aware of the basic facts which have compelled the distinguished chairman of the Subcommittee on Air and Water Pollution of the Senate Public Works Committee to call this emergency session.

On November 30, at 9:30 in the evening, 500,000 gallons of oil sludge was pumped from two barges dispatched by the naval station at Mayport into the Atlantic Ocean, 55 miles off the Florida coast, east of the St. Johns river. I have been informed by the Department of the Navy that, for the past 2 years, such action has been routine. Weather conditions were less cooperative on this occasion, and this maneuver almost turned into a major disaster. It was a classic case of spitting into the wind.

Florida State officials have tried to pursue all effective courses of action open to them in attempts to stave off the disaster which would result if this massive sludgy slick reached the mainland near Jacksonville. We heard on Friday that the two major areas of this deliberate act of ocean pollution had drifted to a location only 29 miles off the Florida beaches; in extent, they were impressive: one slick was estimated at 3 miles by 3 miles square, and it was the smaller of the two. I am informed that the larger blanket of oil stretched unbelievably in a square, 10 miles to each side.

This morning I have been informed by officials within the Florida Department of Natural Resources that, mercifully, this particular slick has dissipated and continues to move away from shore, and that our beaches and wildlife have escaped destruction. The beaches were saved, by an accident of the weather.

On December 3, I requested in a telegram to Secretary of the Navy Chafee that the Department of the Navy explain their apparent dereliction in the deliberate discharge of this sludge into Florida's offshore waters. I have further expressed in the strongest terms, my interest in preventing any further harm to Florida waters. We expect answers to these questions; we expect a full report: We expect an immediate cessation to such activity.

It is hard to believe, so soon after President Nixon's October 7 endorsement of the program proposed by the Council on Environmental Quality to severely curtail ocean dumping, that such potentially hazardous oil dumping was carried out. Initially, the Department of the Navy responded that the discharge of the oil bilge was taken pursuant to the Oil Pollution Act of 1924, which is no longer on the books. I would like to observe that this discharge was not in the spirit of the far more recent and better known Water Quality Improvement Act of 1970, so recently hammered out by this very subcommittee, passed by this Congress, and signed into law on April 3 of this year. The incident was, indeed, not even a spillage in any usual sense of the word since the oil was pumped into Florida's offshore waters.

I suggest it is not good enough to continue to act after the fact. I have been reassured of the good judgment shown by this committee in its endorsement of the nomination of Mr. Ruckelshaus to the post of administration of the Environmental Protection Agency. Mr. Ruckelshaus has asked Secretary Chafee to cease all such operations; I understand that such a directive has been issued. I know that 27 members of the Florida Department of Natural Resources have recently received special training in controlling oil spills. At this point in time, only stopgap measures to partially control limited oil discharges within the calm of harbor waters has any effect whatsoever on such "black tides." As residents of Tampa learned to their great sorrow earlier this year, such efforts are only marginally successful.

As we sit here today, I can't help confessing a feeling of futility—a feeling that we are at the mercy of the elements in such cases—and that a large segment of the beaches of my State can be jeopardized and their fate totally out of our hands. Last week, a portion of the Florida Keys was lucky; oil discharged by a passing tanker threatened for a while a fragile underwater preservation area within the John Pennekamp State Park and then broke up and sank offshore.

Ineffectual action after the fact is not a satisfactory response or solution to the problem of oil spillage on our oceans and waterways. Our job in this hearing today is to determine what action is necessary to prevent the possibility of yet another tarry mass oozing its way towards inundation and devastation of yet another shoreline.

Senator EAGLETON. Mr. Secretary, I want to thank you and your associates for being with us this morning. I commend you on your candor and in not trying to make light of a matter that is obviously a

serious one. I further commend you for taking prompt and precise action by regulation prohibiting the repetition of such an event, whether technically authorized by law or not, and acknowledging that the spirit of the law, if not the letter, has in your judgment been violated, and also in acknowledging that based on your investigation to date, at the very least, an environmental impact statement should have been filed.

The reason we on this committee think this is a very important matter and this event is particularly grievous is the fact that all of us are hoping for a better environment, not only hoping but trying to legislate toward it. If leadership is to come in this area, it has to come primarily from the Government itself. If we are to expect private carriers and private ship operators, and others to keep in mind the environmental impact of either their negligent or intentional acts, we have to expect that the ships at sea controlled by the U.S. Navy will be even more impeccable so far as their activities are concerned.

I take it your statement today and the recitation of what the Navy has done in other areas of pollution and environment with your new directive of December 3 to be an acknowledgment on your part, and a vigorous acknowledgment, that you too recognize this role of leadership that the Defense Department has in this area and that, insofar as you can do so humanly, you will see to it that the event of November 30 and December 1 is not repeated.

Secretary CHAFFE. Yes, sir. Thank you.

Senator EAGLETON. Thank you.

The committee is adjourned.

(Whereupon, at 11:50 a.m., the committee adjourned subject to the call of the Chair.)

(The following information was supplied for inclusion in the record:)

SNELLING OIL OF MCGREGOR, INC.,  
McGregor, Minn., December 23, 1970.

Hon. EDWARD MUSKIE,  
New Senate Office Building,  
Washington, D.C.

DEAR SIR: Enclosed is a proposal which I presented to Commander Joseph D. Emidio of the Navy regarding the dumping of waste oil off the coast of Florida. He gave all indications that he would like to see this system run as a civilian operation rather than a Naval operation. Also, the Navy spoke of their larger problems at the Naval bases on Guam and Hawaii. I understand that they have an extreme and mounting sludge and waste oil problem.

If you have any further questions regarding our system, please feel free to call or write.

Congressman John A. Blatnik has a quite complete file on me and I am sure he, too, would be more than willing to give you any information you may request.

Sincerely yours,

DUANE SNELLING,  
President.

SNELLING OIL OF MCGREGOR, INC.,  
McGregor, Minn., December 16, 1970.

Re summary of the Snelling Oil of McGregor, Inc., proposal to the U.S. Navy by its President Duane Snelling.

Comdr. JOSEPH D. EMIDIO,  
Pentagon Building,  
Washington, D.C.

DEAR COMMANDER EMIDIO: The Snelling Oil of McGregor, Inc. is acquired in the field of ecology. The waste product or drain oil from automobiles, trucks, buses

and diesel locomotives is reclaimed by the process derived by the Snelling Oil of McGregor, Inc. Proving that a useful heavy-type fuel oil can be made from these waste products, the reclaiming of these waste oils aid in checking water pollution, as they formerly were discharged into our rivers and dumped elsewhere eventually getting into our water waves.

Our system also helps in air pollution control, in that the finished product has most of the sulfur content removed. Tests have shown that the sulfur content is approximately .05%, far below present accepted standards. Sulfur in the fuel monoxide fumes and sulfur dioxide SO<sub>2</sub> attacks fuming, vegetation, etc. By reclaiming oil and making a useful product out of the waste oil material, we are actually preserving one of our natural resources.

This entire system has patents pending on it at the present time with all hopes and indications of being completed in the early part of 1971.

My first thoughts of proposal to the Navy were that the Navy would be interested in putting in these plants on the Navy bases and operating as a Naval operation. We are in the process of putting our plants on a nationwide scale. These plants are going to be put into heavily populated areas to where I would imagine at the present time all Naval bases are in heavy populated areas. Then, these plants could be run by civilians in private enterprise. Either way, the Navy would have a nationwide disposal of their waste products.

If this were to be put into a private or civilian enterprise near a Naval base, there would be a charge of 3¢ per gallon for the picking up and disposing of this waste product. This would be taking all products such as whether the water is water and oil or other contaminated products. We are at the present time taking some from the Air Force and different Air Force bases in our area.

If the Navy would decide to have this plant to be operated by the Navy personnel and to have these plants in their Naval bases, the Snelling Oil Company would work as an advisory and install the entire plant and machinery, etc., to work out all details determining where the plant sites should be located. Duane Snelling will stay on as a personal advisor and to train all personnel for the running of these plants. Also, the royalty rates will be charged at one-half percent on a gallon for this system. In installing all of these plants, the Snelling Oil Company would provide all personnel. This personnel will be reimbursed for their time and expenses and travel, or anything that might arise at a later date.

If there are any questions concerning the above, please feel free to ask or call or write me.

Sincerely yours,

DUANE SNELLING,  
*President.*

UNIVERSITY OF WASHINGTON,  
*Seattle, Wash., January 13, 1971.*

HON. EDMUND S. MUSKIE,  
*Chairman, Subcommittee on Air and Water Pollution,  
U.S. Senate,  
Washington, D.C.*

DEAR SENATOR MUSKIE: At Mr. Billings' suggestion, I would like to submit this information for possible inclusion in the record of the hearings your subcommittee has conducted recently on oil sludge dumping off the Florida coast. In a letter to each member of the Washington State legislature on January 7, 1971, I outlined the problem here reiterated and recommended several legislative steps that could be taken to deal with what only can be called a waste oil disposal dilemma of shocking dimensions. Though my data is confined to the State of Washington, I am confident that the situation I describe prevails throughout the nation.

#### 1. DISPOSAL OF OIL AND OTHER INDUSTRIAL WASTES

The dumping incident that gave rise to your hearings, it would appear, represents no isolated aberration. The news media faithfully reports the occasional oil spill that comes to their attention. The bigger story is the story of the perpetual spill, amounting to millions of gallons annually, that assures a continuing and enormous pollution wasteland for this country.

A little-publicized consultant's report prepared for several governmental entities in the Seattle area in August 1969 disclosed that the annual volume of oil wastes

from tank and ship cleaning operation in the Snohomish-King-Pierce County region is approximately two million gallons, of which perhaps 60 per cent is water.<sup>1</sup> Some 40 per cent of this waste is barged out to sea to be dumped beyond the 50 mile limit by Foss Launch and Tug Company. A representative load includes 8,000-9,000 barrels or as much as 378,000 gallons. The most recent occasion for this accepted disposal technique took place in the fall of 1970, well after passage of the amendments to the federal water quality act imposing sharp new restrictions on oil pollution.<sup>2</sup>

The primitive service such as Foss provides is becoming too expensive for many. Some of these ship-cleaning wastes that are not barged to sea are used to oil private roads for dust control. "The remainder is either being stored temporarily or dispersed in an unknown manner."<sup>3</sup>

An estimated six million gallons of crankcase oil alone is sold in the Snohomish-King-Pierce County region annually.<sup>4</sup> Of this supply, less than half (2.5 million gallons) is re-refined at two facilities in the Seattle area. What remains is disposed of illegally in the sewers, into the waters and onto the landscape of the state. Participants in these incredible practices range from the do-it-yourself mechanic who deposits a few quarts of oil behind his garage to destroyers of the United States Navy which pump oil wastes into the facilities of tank-cleaning outfits, who in turn dump the cargo into the nearest field. Service stations, of which there are over 1,000 in the King County area alone, are significant sources. Most of these are individually operated by proprietors who make their own "arrangements" for disposal of wastes.

Difficulties in disposing of other toxic industrial wastes are equally complex if less well documented. Hundreds of thousands of gallons of acids, solvents, cyanides and the like are disposed of annually by industry in the Puget Sound region. Persons knowledgeable in the field are the first to admit that the permit procedures of Washington State law are utterly inadequate to identify the surreptitious dumper responsible for a substantial volume of toxic wastes. Few are in the business of chemical garbage collection, fewer still in the business of doing it right.

The oil re-refining industry, in particular, is in a depressed condition.<sup>5</sup> The total capacity of reprocessing plants has decreased almost 50% since 1965-66.<sup>6</sup> Service station operators are experiencing increasingly difficulty in disposing of used crankcase oil. The competitive advantage unquestionably lies with the waste hauler whose own disposal practices—dumping it in somebody else's backyard—cost him nothing. The economics aggravate the problem.

The situation will get worse before it gets better. The current drive against oil pollution in the next few years will impose additional stress on a disposal and re-refining system already proven in these hearings to be woefully inadequate. The popular response to oil pollution outrages has been less than comprehensive: "don't dump it here" is the universally preferred solution. Illustrative is the State of Washington's admittedly imposing strict liability statute, passed last year,<sup>7</sup> which of course makes it easier to hold liable for damages and clean-up costs the culprit who gets caught disposing of oil on the waters of the state. Also encouraged by the same strict statute, however, are endeavors to avoid getting caught. Most polluters don't get caught.

The intense enforcement pressure being applied at the federal level will be felt keenly in the re-refining industry. Obviously, sweeping prohibitions against discharging oil appearing in the 1970 amendments to the water quality act, now in the process of implementation,<sup>8</sup> will have a vast impact on shore disposal facilities and practices. Of similar effect will be legislation responsive to the recommendations of the President's Council on Environmental Quality against ocean dumping.<sup>9</sup> Nor can a different result be expected from implementation of the Administration's proposal, initiated by Secretary Volpe before a meeting in Brussels recently of the North Atlantic Treaty Organization, for an international

<sup>1</sup> Cornell, Howland, Hayes and Merrifield, Seattle Area Oil Waste Disposal Facility, p. 11 [hereafter cited as Oil Waste Disposal Study].

<sup>2</sup> 84 Stat. 91 (1970).

<sup>3</sup> Oil Waste Disposal Study at 11.

<sup>4</sup> *Id.* at 8.

<sup>5</sup> See Federal Water Pollution Control Administration, *The Cost of Clean Water* 226 (1968).

<sup>6</sup> See Bureau of National Affairs, Inc., *Environmental Reporter* 360 (July 31, 1970) (reporting findings of the American Petroleum Institute Task Force on Used Oil Disposal).

<sup>7</sup> 1970 Extraordinary Session, ch. 88, amending RCW 90.48.

<sup>8</sup> USDI, News Release No. 27918-70, Sept. 11, 1970, announcing new oil regulations.

<sup>9</sup> A Report to the President on a National Policy for Ocean Dumping (October, 1970).

agreement to prohibit by 1975 the flushing of oil wastes onto the high seas.<sup>10</sup>

Despite these across-the-board crackdowns on dumping oil and other industrial wastes here, there and everywhere, very little thought has been given to what can be considered proper waste disposal. In the State of Washington, which I believe to be typical, it is illegal to dump industrial wastes into the water without a permit.<sup>11</sup> For the reasons indicated, it is thus a common occurrence for these wastes to be dumped into the water illegally or dumped onto the land. It goes without saying that drenching dry land with oil contaminates watershed areas in ways usually associated with oil pollution. Let me suggest legislative initiatives, both state and federal, that might be helpful in combating this increasing onslaught of oil and other industrial refuse.

## 2. LIQUID INDUSTRIAL WASTE TRANSPORTATION AND DISPOSAL RESPONSIBILITY LAW

Almost invariably, under present state and federal law no one is responsible for what happens to wastes once they are given to another for disposal. Further, those in the business often answer to no one and are limited in their disposal techniques only by their own ingenuity and ability to avoid detection. Responsible firms are at a severe competitive disadvantage since it costs more to discard or reprocess wastes properly than to dump them into a field.

Consequently, it would make sense to require at the state level that (1) *persons or firms in the business of transporting or disposing of liquid industrial wastes register with water pollution authorities*. Typically, state permits are required of those who transport radioactive wastes.<sup>12</sup> Similarly, states may require registration of the proprietors of junk yards.<sup>13</sup> One would suppose that dealers in liquid industrial junk should be no less identifiable than the easily detected proprietor of a scrap metal lot. Concurrently with registration should come further disclosures about disposal sites, methods and equipment. Those who are not equipped to handle the job should be barred from participation under the threat of appropriate penalties.

(ii) *Persons or firms with significant quantities of industrial liquid wastes to discard should be required to report to water pollution authorities the method of disposal or person or firm retained to effectuate disposal*. Most states require permits from sources who discharge wastes directly into the water. What is needed is a logical extension of authority over the firm which, although not directly discharging into the waters, hires another who may dump the oil or acids onto the land or into the water or a sewer system where it can inflict heavy damage. This step already has been taken in California, which now requires the registration of liquid industrial waste haulers.<sup>14</sup> Information and instructions concerning registration recently have been issued by the State Water Resources Control Board.<sup>15</sup>

## 3. PLANNING FOR INDUSTRIAL WASTE DISPOSAL

Cracking down on one who dumps where he shouldn't is an exercise in hypocrisy if no disposal site is acceptable. Chasing out the fly-by-night operators might assist the responsible firms in the field by eliminating illicit competition. It is thus possible that the private enterprise system could be revived slightly to take up some of the slack. In Seattle, for example, overtures have been made by the Liquid Industrial Disposal Company of America (LIDCOA), which engages in the re-refining of oil, to lease from the Port of Seattle facilities for operation of a marine terminal waste petroleum complex.<sup>16</sup>

Under any analysis, government involvement is inevitable. For the Seattle region, the already mentioned consultant's report recommended that the Metropolitan sewage districts, the City, King County, the Port of Seattle, and possibly the State join together in establishing an oil waste disposal facility at an estimated annual cost of \$105,000. That this proposal has been virtually ignored is an indication of lack of enthusiasm and commitment by these authorities and

<sup>10</sup> See New York Times, November 3, 1970; New York Times, November 5, 1970: Cost of changes in ship design and shore facilities could run as high as five billion dollars. See *id.*, November 8.

<sup>11</sup> RCW 90.48.160; WAC ch. 372-74.

<sup>12</sup> See, e.g., WAC, tit. 402.

<sup>13</sup> E.g., RCW 46.80.020.

<sup>14</sup> Porter-Cologne Water Quality Control Act §§ 14000 et seq., added by 1970 Calif. Stats. ch. 902.

<sup>15</sup> Emergency Order on the Registration and Regulation of Liquid Waste Haulers, Dec. 17, 1970.

<sup>16</sup> Letter from Warren L. Bennett, President of LIDCOA, to Captain George Lofink, Port of Seattle, October 26, 1970.

probably also a lack of funds to handle wastes that everyone hopes will be disposed of privately or otherwise will disappear.

Federal planning initiatives have just begun, which means that a great deal more has been done than in many parts of the country. Section 212 of the Resource Recovery Act of 1970 of course calls for the completion within two years of a "comprehensive report and plan for the creation of a system of national disposal sites for the storage and disposal of hazardous wastes including radioactive, toxic, chemical, biological and other wastes which may endanger public health or welfare."<sup>17</sup> This report, no doubt, will document rampant illegalities and hazards in disposal practices, gross inadequacies in the functioning of the free markets for disposal and reuse and unforgivable dereliction in enforcing responsibility and planning at the state and local level. My guess is that an in-depth examination of the present system for disposing of toxic wastes, which is no system at all, will prompt vigorous federal initiatives a few years hence. Since most locales do not even have the functional equivalent of an identifiable dump for industrial wastes, we can anticipate a system of national disposal sites for many wastes, including oil, apart from the expected categories of nerve gas and radioactive wastes.

#### 4. PAYING FOR DISPOSAL

Outlawing the firm who disposes of oil and other industrial wastes most cheaply—by dumping—and constructing facilities to dispose of and reuse wastes responsibly will cost money, by anyone's analysis. The question is who should pay.

It is conventional wisdom that internalizing the costs of pollution or safety control in the process of manufacturing the product is a desirable end. The reason why many people dump waste oil today is that the costs are borne by somebody else—the fisherman, sightseer or taxpayer who shoulders the burden of a scrambled sewer system. That the generator of the product bears some responsibility for what happens to it is an opinion shared by the State of Maine, among others, which, over constitutional objections, last year enacted a law imposing a fee of up to 2½ cents per barrel of oil transferred within the state.<sup>18</sup> Funds collected are earmarked for surveillance, clean-up, and compensatory purposes. Serious consideration is being given to similar legislation in other states.

I understand that the administration is considering initiatives in the nature of effluent charges on the sulfur content of certain fuels, which sounds like a close relative to the Maine tax on oil transfers. I would urge your subcommittee, which has been the leader in the field, to come to the rescue of the states and give consideration to similar proposals which I think are essential to rectify that perpetual imbalance between responsible authority and that fifty billion dollar-plus heavyweight, the American oil industry. No industry has been more heavily subsidized by the federal government, none has abused the forces of competition so thoroughly. It is time we stopped paying for new exploration by the oil industry and started subsidizing that segment of our economy which is attempting to clean up the effluent.

Respectfully submitted.

WILLIAM H. RODGERS, Jr.,  
Associate Professor of Law.

DEPARTMENT OF THE NAVY,  
OFFICE OF THE SECRETARY,  
Washington, D.C., March 1, 1971.

Hon. EDMUND S. MUSKIE,  
Chairman, Subcommittee on Air and Water Pollution, Committee on Public Works, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: In response to the Subcommittee's request made during my testimony on December 7, 1970, I am enclosing an interim summary of the results of the investigation of the oil dumping incident which occurred off Mayport, Florida, on November 30, 1970. While this document addresses all the essential facts and circumstances surrounding the incident, review of the report is continuing within the Navy Department in order to ensure that it receives the thorough and comprehensive analysis it warrants. A copy of the final summary will be forwarded upon completion of the review of the investigative process.

Sincerely yours,

JOHN H. CHAFFE,  
Secretary of the Navy.

<sup>17</sup> Pub. L. 91-512, 84 Stat. 1283 (1970).

<sup>18</sup> Maine Rev. Stat., tit. 38, ch. 3, subchapter II-A.

INTERIM SUMMARY OF RESULTS OF NAVY INVESTIGATION TO INQUIRE INTO THE CIRCUMSTANCES SURROUNDING THE DISCHARGE OF WASTE MATERIAL WHICH OCCURRED OFF THE COAST OF JACKSONVILLE, FLORIDA, ON NOVEMBER 30, 1970

I. BACKGROUND

A. Seepage from fuel-oil tanks, used lubricating oil, drippings from machinery, leakages from hydraulic lines, etc.—together with fresh and salt water from leaks and seepage—collect in the bilges of ships and must be periodically emptied. Because Article 1272 of U.S. Navy Regulations, 1948, and Article 4221 of Shipboard Procedures, NWP 50 (A), prohibit the discharging of refuse or oil within a fifty-mile distance off any coast, provisions must be made for the in-port collection of the bilge contents of ships returning from sea and those generated by ships berthed in port during periods of tender or restricted availability. These bilge contents, together with sediment from fuel tanks and contaminated fuel, are collectively called "sludge" and are accumulated in tanks aboard ships. When these tanks become full, the contents are transferred to barges which are moved from ship to ship on demand.

B. Prior to 1964, small quantities of sludge accumulated by the U.S. Naval Station, Mayport (NAVSTA MAYPORT), estimated at about 4,000 barrels per month, were sold under disposal contracts let by the Defense Surplus Sales Office, Jacksonville, Florida (DSSO JAX). During the years 1964, 1965, and 1966, NAVSTA MAYPORT, unable to sell or give away similar amounts of sludge, disposed of it by having it removed from its barges by the J. H. COPPEDGE CO. of Jacksonville. This operation required Navy movement of the barges 16 miles up the St. Johns River to the COPPEDGE facility. Payment for this removal service was made from SIXTH Naval District Charter and Hire Funds. The regular assignment of aircraft carriers to NAVSTA MAYPORT for periods of restricted availability, commencing in 1966, resulted in an increase in accumulation of sludge from an average of 4,000 barrels per month to 8,000 barrels per month. This increase resulted in an unsatisfactory performance by the COPPEDGE firm which was noted in the report of an Administrative Inspection of NAVSTA MAYPORT conducted by Commander Naval Air Force, U.S. Atlantic Fleet, (COMNAVAIRLANT) in 1967. This problem, which existed at the beginning of 1967, was temporarily resolved on 9 March 1967 by the awarding of a sales contract by DSSO JAX to the Florida Towing Corporation of Jacksonville which netted the Government 3 cents per barrel. On 9 September 1967 and 9 March 1968, successive contracts were awarded to the same firm for the amounts of 4 and 1.5 cents per barrel, respectively. Default on the latter contract for reasons of nonperformance occurred in February 1969. In the same month a sales contract was awarded to C. M. THOMAS, Continental Oil Inc., North Mantako, Minnesota, upon acceptance of that firm's bid to purchase the oil at 1.67 cents per barrel. This contract was defaulted for nonperformance in the same month. An invitation to bid issued on 27 February 1969 resulted in the award of a contract to RENROH RESINS of New Bern, North Carolina, upon acceptance on 24 June 1969 of their bid to purchase the sludge for 1 cent per barrel. No performance was experienced under this contract because of the contractor's failure to perform. Invitations to bid issued by DSSO JAX for the period 15 September 1969 to 30 June 1970, which were mailed to some 28 bidders, met with a negative response.

C. During the period commencing with the initial contract default in February 1969, through succeeding defaults and the inability to obtain contract bidders, NAVSTA MAYPORT had been averaging one sea disposal every two months. The method employed involved the towing of two barges with a cargo of about 7,600 barrels each out beyond the 50-mile limit and disposing of their contents into the open sea. These disposals, together with the disposal which is the subject of this investigation, were conducted openly as indicated by the fact that NAVSTA MAYPORT, in a May 1970 response to a requirement to submit an "Oil Pollution Control Questionnaire" to the Naval Fuel Support Office, reported "sludge consisting of 90% water or more disposed of at sea." For some time prior to 30 November 1970, NAVSTA MAYPORT was providing berthing facilities for 20 to 22 ships on a daily basis. In the preceding year it had responded to 334 requests from ships for sludge-barge service.

D. Among alternative methods of disposal considered by NAVSTA MAYPORT in the past were use of the sludge as a spray for mosquito control, burning, conversion into an asphalt base for road surfacing, and other dispositions. These alternatives were ultimately rejected as unacceptable means of disposal either because of their economic unfeasibility or because they were self-contaminating. (The sulfur content of Navy Special Fuel Oil is 3.5%, whereas the air-pollution

regulations for the State of Florida limit the sulfur content of fuels to 1%). No provision had been made in the Fiscal Year 1971 budget for payment for disposal services under a service contract. The Charter and Hire funds formerly available from the SIXTH Naval District, which were used from 1964 through 1966, were no longer available after 1 July 1967 when, under the unilinear concept, the management control of NAVSTA MAYPORT was transferred from the Naval Air Systems Command to Commander in Chief, U.S. Atlantic Fleet, through COM-NAVAIRLANT. The advantageous sale of the sludge which was found possible from 1967 until the first contract nonperformance occurred in February 1969 precluded provision for disposal services in the Fiscal Year 1971 budget.

E. In mid-September 1970, a Jacksonville waste-oil dealer named Mike Wenzel contacted the Supply Department Deputy Planning Director at the Naval Air Station, Jacksonville, (NAS JAX) and expressed an interest in obtaining waste-oils and other materials generated at NAS JAX. Mr. Wenzel's equipment consisted of one 1,400-gallon-capacity truck. He represented that he could rent additional trucks. He was advised that used engine lubricating oils were sold under annual contract let by DSSO JAX, that he should request that office to add his name to the list of bidders, that NAS JAX had no requirement for the removal of other types of waste solvents and oils, and that he should contact NAVSTA MAYPORT concerning the sludge generated there.

F. During the second week of October 1970, the Supply Department, NAVSTA MAYPORT, made several unsuccessful efforts to dispose of the station's accumulated sludge oil. The J. H. COPPEDGE Company was no longer in the business; the Wood Hopkins Company advised that they had no facilities to dispose of the product; and the Oliver Towing Service of Palatka, Florida, after analyzing the contents and finding 90% water below the half-way marks of the barges, recommended that the water content of the barges be pumped into the harbor basin with no damaging effects and advised that they had no facility to dump the residual oil contents. Lack of dumping facilities accounted for the lack of interest in the sludge by local truck-septic-tank operators.

G. In early November 1970, Mr. Wenzel contacted the Disposal Branch of the Supply Department, NAVSTA MAYPORT, and expressed an interest in disposing of the sludge. He was referred to the Harbor Operations Office where arrangements were made for him to inspect the contents of the two nonself-propelled barges which were used as sludge barges. Mr. Wenzel took samples of the contents for analysis and subsequently advised that he could not use the contents because the water and sulfur content were excessive and he therefore could not find a buyer for the product. On 30 November 1970, Mr. Wenzel telephoned the Harbor Operations Office and advised that he was going to Georgia in an attempt to obtain a buyer. He was advised that, under the circumstances—with the barges full and calm seas predicted for the next 48 hours—the station could not wait until he returned from Georgia. The station's arrangements for disposal at sea therefore continued.

H. Mr. Wenzel, in a telegram of 3 December 1970 to Senator Eagleton, claims to have informed Mr. Hash of the Disposal Branch, Supply Department, NAVSTA NEWPORT, that he could dispose of the sludge in a pollution-free manner under a service contract at a cost to the Navy of 1 cent per gallon. During Mr. Wenzel's interview with the Secretary of the Navy on 6 December 1970, he was specifically asked whether he had made a flat offer on the cost of his proposed service contract. He replied, "I said it would be about a penny a gallon. I did not make any specific price." In his telegram to Senator Eagleton, Mr. Wenzel contended that the sludge "could have been dried out and used by the Navy, saving about \$10,000.00 per barge load and fuel replacement costs." That contention, whether it refers to dollar or gallon savings in Navy Special Fuel Oil, is unfounded in fact.

## II. THE DISCHARGE OF 30 NOVEMBER 1970

A. On 30 November 1970, two barges under separate tow departed NAVSTA MAYPORT for a predetermined point, in excess of 50 miles east of the coast, for the purpose of discharging their cargo which was estimated to contain 600,000 gallons of sludge. Although the composition of the contents of each of the eight tanks on each barge differed, subsequent computations, based upon pumping capacity and the time expended to strip off the water content enroute to the disposal area, indicate that the total cargo content of both barges consisted of about 55% oil and 45% water. Enroute to the discharge site, at a point about 30 miles east from land, discharging of the water content of each of the barge tanks commenced and was terminated as soon as oil was observed in the dis-

charge. The purpose of discharging this water content was to increase the speed of approach, enhance the maneuverability of the tow, and lessen the on-site discharge time of the remaining waste-oil contents. Once the discharge point was reached, at a point estimated to be 56 miles from land due east of Mayport, and while continuing on an easterly heading, pumping of the remaining contents commenced and continued for two hours until completed, at which time the tugs and tows reversed course and returned to Mayport. Although the exact course of the tugs and the position of discharge were not established with the definitive accuracy of long-range navigational devices, which both tugs lacked, subsequent computation of the dead reckoning employed by the Craft Master in the lead tug determined his courses and positions to be accurate.

B. The oil slick which resulted from the discharge was first observed and plotted by naval aircraft at 1000 local time, 3 December 1970. The slick was observed to be oval-shaped, on a northeast-southwest axis, with a width of 8 to 9 miles and a length of 25 miles. The western edge of the slick, the part closest to land, was plotted as being 34 miles from the Mayport channel on a heading of 075 degrees magnetic. The center of the slick was 49 miles from land. Several patches of concentrated black oil were observed within the slick, the heaviest being 30 feet long and two or three feet wide. The center of the patch with the blackest oil concentration was 18 miles north of the tugs' track to the discharge site. The final sighting, at noon on 5 December 1970, revealed that the slick had broken into four separate areas with the edge of the most western area 51 miles from land and the edges of two eastern areas appearing to have entered the Gulf Stream. Subsequent searches by Navy aircraft on 6 December 1970 failed to locate any slicks. This, together with the absence of any further sighting or complaints, supports the fact that the slicks dissipated and disappeared.

C. A second oil slick, much heralded by the press, was reported to be some 12 miles east of Ponte Vedra, Florida, but was actually observed only on 3 December 1970 at a point some 19 miles due east of Ponte Vedra. At the time of sighting it was observed to consist of a hazy film on the water with a slight blue tinge and to be 100 yards long and 50 yards wide, with two circles each 50 yards in diameter within a quarter-mile of the main body. This slick, or slicks, was, at the time of sighting, some 30 miles to the south of the major slick on a heading of 210 degrees magnetic. This slick off Ponte Vedra cannot be traced to Navy sources.

### III. LAWS AND REGULATIONS VIOLATED

A. The only law which was violated by the discharge of 30 November 1970 was the National Environmental Policy Act of 1969, 42 USC 4331-4347. This violation was not in the act of the sludge discharge itself, but in the failure to file the Impact Statement required by that act. Neither NAVSTA MAYPORT, the Commander of Fleet Air Jacksonville (COMFAIRJAX) as the designated Sub Area Coordinator for the Mayport area in the SIXTH Naval District, nor COMNAVAIRLANT, however, was included on the distribution list of the instruction (OPNAV Instruction 6240.2 of 30 October 1970) which promulgated that law. The message from the Chief of Naval Operations of 17 September 1970 to all Navy commands, enjoining them to review procedures to prevent an incident such as this, had been received in the NAVSTA MAYPORT Communications Department but was not internally routed to the Commanding, Executive, Administrative, or Operations Officers. This was a breakdown in internal communications and is presently the subject of a separate inspection being conducted by COMFAIRJAX.

B. Although NAVSTA MAYPORT personnel were not conversant with all details of the Pollution of the Sea by Oil Act of 1961, they were aware of the prohibition against discharging within 50 miles of the coast and made a conscientious and successful effort to effect any discharges beyond that limit. With the determination that any discharge must occur outside the 50-mile limit, the primary concern of NAVSTA MAYPORT in this operation became the safety of the crews aboard the nonocean-going tugs and barges.

### IV. CURRENT METHOD OF DISPOSAL

A. The following interim solution has been informally approved by the Florida pollution control authorities and is now in operation:

1. Oily waste waters are collected in three barges with a total capacity of 20,000 barrels, and discharged into a 5,000 barrel tank ashore for gravity separation of oil and water.

2. Water stripped from the lower levels of the 5,000 barrel tank passes through smaller retention tanks and is leached through a sand filter into the soil.

3. Oil (with traces of water) removed from the top of the tank is transferred to a second 5,000 barrel tank to further gravity separation of oil and water. Oil removed from this second tank may be sold, or transported to a 50,000 barrel tank at the Navy Fuel Depot, Jacksonville for storage and sale.

4. On 1 February 1971 a five-year disposal contract was awarded to Wilson Oil Service of Tampa, Florida. The terms of the contract call for the removal of 1500 barrels of oil per month (plus or minus 50%). The Navy will be paid 46 cents (1.1 cents per gallon). At this point, the contractor has already removed over 2,000 barrels of oil.

B. Costs connected with the use of this interim facility are: \$8,000.00 for construction; \$10,000.00 per year for salary of an additional employee; an estimated \$3,000.00 per year for recurring Operation and Maintenance costs; and an estimated \$10,000.00 for an annual service contract to remove the sediment from Mayport.

