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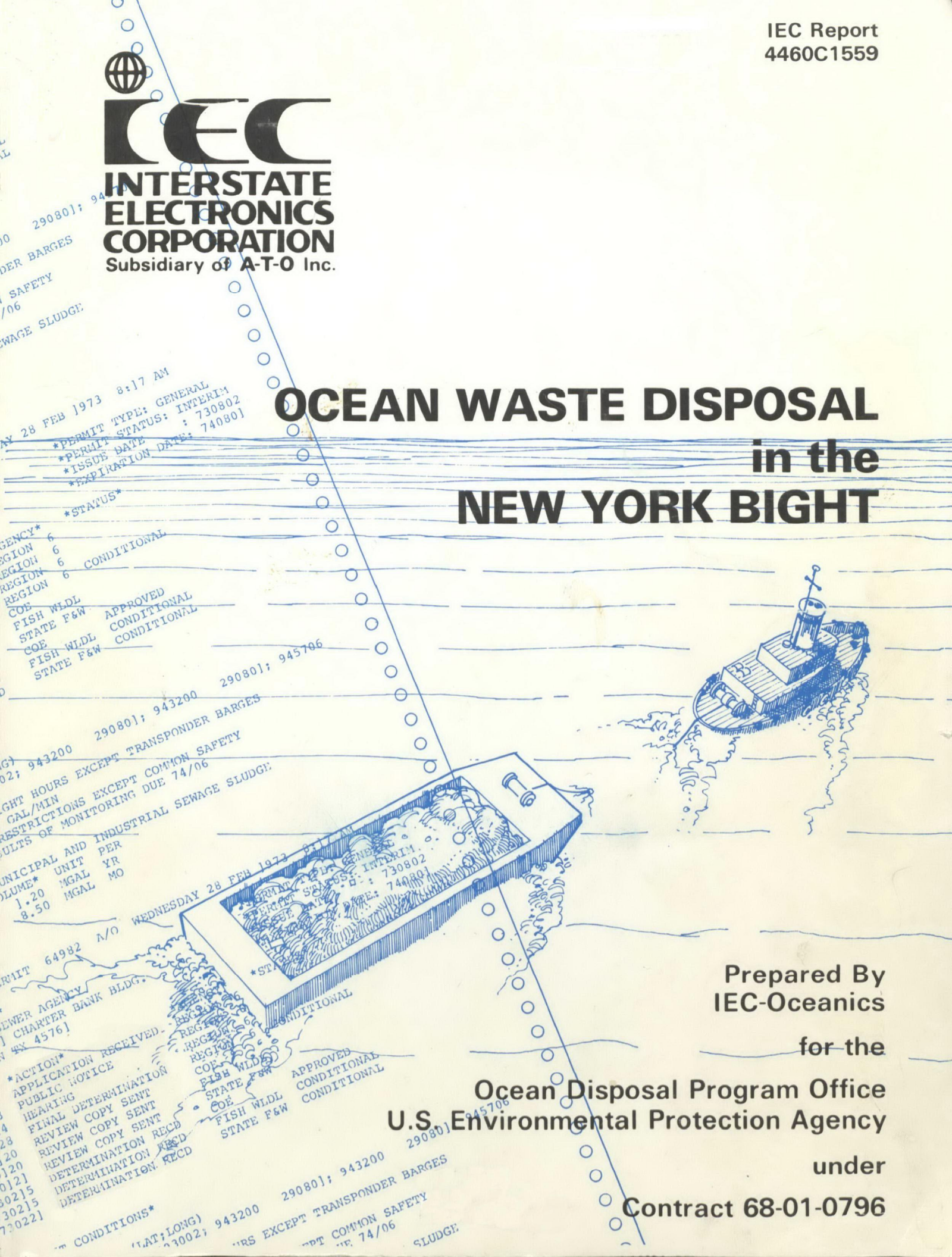
OCEAN WASTE DISPOSAL in the NEW YORK BIGHT



Prepared By
IEC-Oceanics

for the

Ocean Disposal Program Office
U.S. Environmental Protection Agency

under

Contract 68-01-0796

INTERSTATE
ELECTRONICS
CORPORATION
Subsidiary of ATO Inc.
Oceanics Division

REPORT 4460C1559

August, 1973

OCEAN WASTE DISPOSAL IN THE NEW YORK BIGHT

By

T. J. Achrem

Prepared for the

U.S. ENVIRONMENTAL PROTECTION AGENCY
OCEAN DISPOSAL PROGRAM OFFICE
Under Contract 68-01-0796

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ABSTRACT

Ocean Waste Disposal in the New York Bight

This report is an extract from a comprehensive study on ocean waste disposal in selected geographic areas. The study was conducted under contract with the Environmental Protection Agency, Ocean Disposal Program. Its purpose was to provide information to assist in the development of criteria for the control of ocean waste disposal.

As part of the study, an intensive field survey was conducted in the New York city metropolitan region during the spring of 1973. The purpose was to establish personal contact with agencies and persons cognizant of ocean disposal practices in the New York Bight.

This report presents the findings of that survey. It includes specific sections on ocean dump site characteristics; their geographic location; type and volume of material dumped; method of disposal; description of disposal sites; current monitoring procedures; local regulating agencies; estuarine economics; an extensive chronology of related major events; and, alternatives and recommendations for ocean disposal in the New York Bight.

FOREWORD

The Oceanics Division of Interstate Electronics Corporation, Anaheim, California, under contract 68-01-0796 to the U. S. Environmental Protection Agency, for the Ocean Disposal Program, undertook an intensive study of ocean waste disposal practices in six geographic areas of the United States. During this study, it was concluded that the major area of prime significance was the New York Bight (NYB). Therefore, the findings of that field study are presented as a separate document, to assist managers, engineers and scientists in their continuing study of the NYB pollution problem. This report includes additional cartographic data and a bibliography pertinent to this specific survey. The EPA Ocean Disposal Program encourages comments on the findings presented in this document. To facilitate communication, we have provided a comment form at the back of the document.

Other documents prepared under contract 68-01-0796 for the Ocean Disposal Program are:

1. A Bibliography on Ocean Waste Disposal. Report 4460C1542, May, 1973.

2. Directory of Managers, Engineers and Scientists in Ocean Waste Disposal and Related Environmental Science Fields. Report 4460C1543, August, 1973.

3. Ocean Waste Disposal in Selected Geographic Areas. Report 4460C1541, August, 1973

4. An Atlas of Ocean Waste Disposal Sites. Report 4460C1545, August, 1973.

5. Guidelines for Development of Criteria for Control of Ocean Waste Disposal. Report 4460C1544, September, 1973.

These reports are available through the National Technical Information System and the EPA.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTERSTATE
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ACKNOWLEDGMENTS

This study was made possible only through a high degree of cooperation provided by the managers, scientists and engineers (listed in Section 5) in the case study area and the U. S. Environmental Protection Agency's Ocean Disposal Program Staff. A special note of thanks is expressed to Mr. T. A. Wastler, Chief, Ocean Disposal Program, and his scientific and technical staff including in particular, William Musser and BarBara Wygal.

This volume was written by Mr. T. J. Achrem as part of a comprehensive study of ocean waste disposal in selected geographic areas. The overall project was under the direction of Mr. Sam Kelly. Scientific liaison in the Washington, D. C. area was provided by Mr. D. D. Fryberger, Manager of Advanced Programs.

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Section 1

AN INTRODUCTION TO THE NEW YORK BIGHT OCEAN DISPOSAL STUDY

1.1 INTRODUCTION

The Oceanics Division of Interstate Electronics Corporation, under contract 68-01-0796 to the Ocean Disposal Program Office of the U.S. Environmental Protection Agency, undertook an intensive survey of ocean waste disposal practices in six geographic areas. These areas are shown in Figure 1.1-1. They are: the New York Bight; Charleston, South Carolina; selected areas of the Gulf Coast; the Southern California Area; San Francisco; and the Pacific Northwest (Puget Sound). Sites within these areas were selected to provide a representative cross section of ocean disposal practices. Field surveys were made in these areas by members of the scientific and technical staff of IEC Oceanics. The purpose of the study was to obtain accurate, timely information on ocean waste disposals at selected disposal sites in these areas for establishment of an accurate data base. This data base will be used by the Ocean Disposal Program for developing criteria for the control of ocean waste disposal.

FIGURE 1.1-1 OCEAN DISPOSAL CASE STUDY AREAS

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Under a previous contract with the Environmental Protection Agency (68-01-0160), IEC Oceanics had collected extensive information concerning location of existing disposal sites and characteristics of material being disposed of. The first step in this ocean disposal study was to expand this existing data base to provide more detailed and current information. This included accurate geographic descriptions of the selected dumping sites, a summary of site physical characteristics, description of existing control and monitoring programs, activities, and a catalog of available site environmental data. It had been previously determined that the most practical method of obtaining the information was by personal contact with personnel and agencies in the area. Field investigators experienced in personal contact and interviewing were used. These investigators had, in addition to their interviewing skills, scientific training in environmental sciences and engineering. As part of this survey, in-house research was done on existing literature pertinent to the ocean disposal field. A research bibliography and annotated bibliography were generated as part of this effort and are presented in a separate volume.[1] A directory of Personnel in Ocean Waste Disposal and Related Environmental Science Fields was also compiled and is presented as a separate document.[2]

Figure 1.1-2 illustrates the ocean region associated with the coastal environment regions of the United States. Detailed cross

indexes and supporting environmental data is provided in A National Overview of Existing Coastal Water Quality Monitoring.[3]

1.2 OCEAN WASTE DISPOSAL PROBLEMS

Lying just south of the Tropic of Cancer, about 750 miles below the U.S. Border on Mexico's west coast is the city of Mazatlan. The city was burned to the ground during an epidemic of bubonic plague in 1902. After burning their homes and public buildings, the townspeople dumped 4000 bodies into the Sea of Cortez (Gulf of California) and fled by canoe.

The thought of bubonic plague dumping is no more esthetically revolting than the problems associated with the dramatic increases in the level of ocean wastes heavily concentrated with materials toxic to human and marine life. As an example, during the last year, 674,868 cubic yards of toxic chemicals were dumped south of the Hudson Canyon, in an area just beyond the 1000-fathom contour of the continental slope off New York. An ecological data base of this dumping area has never been established, and the development of an adequate monitoring system requiring an array of sophisticated automatic instruments is still in the "planning" stage.

FIGURE 1.1-2 COASTAL ENVIRONMENTAL REGIONS

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For economic reasons, almost all dumping in the New York Bight is committed to areas in water depths less than the 15-fathom contour off New York Harbor. The effects of ocean dumping to the economy of the survey area is discussed in section 2.

The problems associated with more than 85 years of dumping practices cannot be solved overnight. A realistic approach would be a case-by-case evaluation of each dumping site to assess the impact of these practices on the estuarine and ocean environment.

Case-by-case evaluation of the problems associated with ocean waste disposal should include:

a. Expansion of marine organism sampling programs, especially shellfish, to assess the potential health hazard from bacteria, viruses, and toxic metals. One-fifth of the nation's 10-million acres of shellfish beds are closed because of contamination. A loss, due to pollution, of $63 million from a potential of $320 million (1969).

b. Comprehensive beach sampling programs in all areas in proximity to disposal sites to provide bacteriological data. This most likely will be a Federal or state program, as local agencies tend to minimize the seriousness and potential hazards of polluted waters.

c. Adequate surveillance of ocean disposal operations to assure that permittees observe the conditions of the permit as issued. The permit must include the necessary restrictions and specify the exact location of the disposal site. The captain of a disposal vessel should be required to demonstrate his knowledge of navigation to determine the center of the disposal site accurately. Necessary precautions should include inspection and checkout of proper equipment and documentation.

d. Use of professional divers and submersibles to perform the chores of environmental monitoring. The diver is the most effective means of data collection. Almost every sampling device now used by ocean scientists is controlled from on board a research vessel and, as a result, blind samples are collected. An analogy to this problem might be to compare the ocean to a dense jungle, canopied with tall trees so dense that it is impossible to investigate it on foot. In order to collect the vegetation growing on the jungle floor, it would be necessary to hover over the trees with a helicopter and drop a bucket through the bush to the jungle floor. It would be difficult to believe that the investigators in that helicopter could collect all of the types of vegetation on that jungle floor.

Underwater photographic services should be evaluated for on-site surveys in this context.

e. Establish a close liaison with the U.S. Army Corps of Engineers on the dredge spoil problem. The Corps of Engineers estimates that, of the total dredge spoils removed from each coastal region, 45 percent on the Atlantic Coast, 31 percent on the Gulf Coast, and 19 percent on the Pacific Coast are "polluted".(4)

f. Alternative methods of disposal. Sewage sludge disposed of in the coastal areas will increase by 50 percent in 30 years. Although our center of population is in southwestern Illinois, more than half of the people live in counties which lie within 50 miles of our coasts. The disposal practices of the other half should be investigated, as well as those of our coastal populations.

g. Oceanic monitoring by spacecraft (NASA). Earth Resources Technology Satellite (ERTS) data should be used to supplement the EPA Ocean Disposal Program. Such a monitoring system will receive ERTS images of critical disposal areas, annotated to show data, time, location of dumper, type of material and desirable oceanographic data. Figure 1.1-3 is an enlargement of an ERTS image of the New York Bight. Figure 2.1-1

(page 2-9) indicates the locations of the disposal areas.

The image shows a plume which represents the offshore Hudson River effluent which is pushed onto the New Jersey coast by the prevailing winds. The plume indicated by arrow number 1 resulted from the disposal of waste acid. The diffuse circular patch to the north indicated by arrow number 2 is the surface vestige of sewer sludge, which is less noticeable than the waste acid. Since only a gray-brown slick (a persistent surface feature) remains, the reflected light is of lower intensity than that from the waste acid making it possible to accurately differentiate the materials. The monitoring system would be particularly useful for spotting unauthorized dumping, and short dumping. Evidence of a short dump is shown by arrow number 1.

1.3 SUMMARY

This report does not provide specific detailed meteorological, biological, or chemical information on the New York Bight. The vast amount of complex data (often conflicting) on these and other scientific parameters is well beyond the scope of this report. Section 2 reports the past and present activities related to ocean dumping in the Bight, and guides the reader to the references used. The references cited in section 4 is the

material which was obtained during the field survey, March 1973, through the efforts and cooperation of the personnel listed in section 5.

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FIG.1.1-3
ERTS-1 IMAGE, NEW YORK BIGHT

Section 2

FIELD STUDY REPORT

2.1 NEW YORK BIGHT OCEAN DISPOSAL STUDY

2.1.1 Background

The Ocean Dumping Act (Public Law 92-532, "Marine Protection Research, and Sanctuaries Act of 1972") specifically charges the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce with responsibility for monitoring of dumping areas and for comprehensive research on effects of ocean dumping. The Middle Atlantic Coastal Fisheries Center is one of a series of seven centers established recently by the National Marine Fisheries Service (NMFS), an organization of NOAA. The Center is a consolidation and integration of the Sandy Hook Marine Laboratory, the Oxford Biological Laboratory, the Milford Biological Laboratory, and the former Ann Arbor Technological Laboratory (now based at Milford).

The mission of the Center is to develop and establish a cooperative multidisciplinary research program on the biology and ecology of the living marine coastal organisms of the North Atlantic Ocean, especially in the zoo-geographic area known as the Middle Atlantic Bight (MAB).

The MAB includes the coastal and shelf areas between Nantucket Shoals, off the Massachusetts coast, to Cape Hatteras, North Carolina, and thus, falls outside the study area of this report. The New York Bight constitutes one of the most intensively used coastal environments in the world and this area is the major immediate responsibility of the Ecosystems Investigations section of the Sandy Hook Marine Laboratory.

Field and laboratory studies concerned with the effects of ocean disposal of sewage sludges, dredging spoils, industrial wastes, and thermal additions have been carried on at the Sandy Hook Laboratory. Cooperative cruises with personnel from other NMFS or NOAA facilities, or academic institutions or organizations, have been part of the recent and ongoing research programs.

Comprehensive biological reports/data have been prepared by the NMFS at Sandy Hook; U.S. Army Corps of Engineers at the Coastal Engineering Research Center (CERC); EPA, Edison, N.J.; the FDA Region II; the New Jersey DEP; and the New York State Dept. of Environmental Conservation. Studies of typical biological parameters have considered population trends of phytoplankton, zooplankton, nekton, benthos, and tests of coliform bacteria and other pathogenic organisms. Additional tests included bioassay and toxicity, biomass, primary productivity, chlorophyll, BOD and nature-type of detritus material. Surveys also include

statistical data on commercial and sport fisheries, indicator organisms, as well as radiological monitoring of the biota. A number of the larger crustaceans, such as crabs and lobsters, collected from the disposal area have been found to be diseased. Diseased (Finrot) finfish have been retrieved from inside the disposal areas. The large number of coliform bacteria found in the New York Bight indicates the presence of pathogenic bacteria. Coliform bacteria was present in high concentrations throughout the areas receiving dredging spoils and sewage sludges. High concentrations have even been found outside the actual dumping areas. Additional studies are continuing in order to determine the effects of known disposal amounts of heavy metals on the physiology of larval and adult crustaceans.

Species diversity and total number of organisms was markedly reduced in those areas directly affected by sewage sludge and dredge spoil disposal. Dumping characterized a reduction in the number of species present, as well as reduced numbers of individuals of particular species.

Prolonged detrimental effect on the zooplankton and benthic organisms by ocean disposal of industrial acid wastes was not substantiated. Existing sewage sludge and dredge spoil practices in the New York Bight have:

a. degraded the marine benthic communities,

b. produced large amounts of floatable materials, and

c. resulted in deteriorated waters and marine sediments.

A complete assessment of the environmental studies conducted in the New York Bight was prepared by CERC[5]. Interdisciplinary, short-term investigations related to the effects of ocean dumping in the New York Bight were contracted by CERC as directed by the Office of the Chief of Engineers. Studies made by the Sandy Hook Laboratory of the NMFS, the State University of New York at Stonybrook, the Woods Hole Oceanographic Institution, and the Sperry Rand Corporation were reviewed by the Smithsonian Institution and CERC. The studies included hydrographic, geological, chemical, biological investigations, and a feasibility study for a remote-controlled electronic sensing system that could assist regulating agencies in detecting the location and dump status of waste disposal vessels operating in the Bight.

2.1.2 Introduction

The New York Harbor complex and the nearby offshore disposal sites rank as one of the largest grossly polluted areas in the United States. Contrary to popular opinion, the problem has not been ignored, as demonstrated by the extensive bibliography collected on the physical, chemical, and biological studies conducted in the New York Bight (NYB). Federal, state, and local

agencies, along with educational institutions, have for years conducted water quality monitoring and sampling studies in the harbor and the offshore dumping grounds. The basic obstruction to a solution has been lack of communication. Failure to integrate these efforts into a viable program for interagency coordination and the exchange of water quality data has contributed to the belief that not enough is known about the effects of waste disposal in the NYB.

The EPA Water Quality Protection Branch, Division of Water Quality and Non-Point Source Control, through a contract with IEC, (68-01-0160) developed an Initial Network[6] to provide assistance, coordination and indoctrination of local users in the philosophy of the EPA National Computer and Data Processing System. Under this proposed plan, all monitoring in the NYB would be coordinated to stimulate establishment of Information Centers at local, state and regional levels, in support of improved information exchange and use by all agencies involved.

The liaison established between the key contacts of the various agencies in formulating the NYB Initial Network established communications exchange which provided the main body of information contained in this report.

The U.S. Army District Engineer, New York, was designated Supervisor of New York Harbor under the River and Harbor Act approved by Congress in 1888. Pursuant to the provisions of that Act, the Supervisor designated certain areas off the entrance to the New York Harbor as waste disposal grounds, and conducted a program of issuing permits to towing firms that transported the waste materials. During the period from July 1, 1972 to February 28, 1973, 349 dumping permits were issued which permitted 12,160,464 cubic yards of material to be dumped in the designated areas.(7)

Effective April 23, 1973, the Marine Protection Research and Sanctuaries Act of 1972 authorized the Administrator of the EPA to issue permits for ocean dumping and to establish and apply criteria for reviewing and evaluating permit applications. The U.S. Army Corps of Engineers will continue to issue permits or regulations for federal projects for ocean dumping of dredge materials upon concurrence by EPA to ensure that the criteria have been complied with.

Under this Act, the United States Coast Guard is authorized to conduct surveillance and enforcement activities to prevent unlawful dumping. EPA is also authorized to designate recommended sites and times for dumping, protect critical areas,

and designate sites and times within which certain materials may not be dumped. Under interim regulations, permits for dumping will be issued for the sites currently in use. Final regulations will be issued within one year, based upon comments made about the interim regulations and the information collected while they are in effect.[8] The information collected from New York will be correlated with other regional inputs by the EPA Headquarters staff in an extensive review and evaluation of the existing problems on a national level, which will assist in establishing a plan for the implementation of final regulations to control ocean dumping.

2.1.3 Disposal Areas

Disposal areas have been established by the Supervisor of New York Harbor in three major localities: Hudson River, Long Island Sound, and the Atlantic Ocean off the entrance to the New York Harbor. Seven areas in the Hudson River and nineteen areas (seven presently active) in the Long Island Sound are designated primarily for the disposal of materials dredged from local harbors and waterways. An area off Eatons Neck in Long Island Sound has been used for the disposal of clean cellar dirt and wrecks, particularly when inclement weather and rough seas make trips to the ocean disposal sites too hazardous.

The scope of this report concerns the six separate dumping grounds in the Atlantic Ocean, which provide for the disposal of mud and one-man stone, cellar dirt, sewer sludge, wrecks, waste acid, and chemical (toxic) wastes.

2.1.4 Disposal Site Geography and Uses

The disposal sites are located in a part of an area called the New York Bight (NYB). The NYB is the shallow ocean area shoreward off the limits of the continental shelf, along an indentation of the Atlantic Coast extending about 200 miles from Cape May, New Jersey, to Montauk Point (the eastern end of Long Island), New York. The five dumping areas nearest to shore, shown in Figure 2.1-1, vary from about 10 to 22 miles south of the Long Island shore, and from about 5 to 14 miles east of the New Jersey shore. The chemical dumping ground is located 106 miles offshore on the edge of the continental shelf. The descriptions that follow are referenced to the Ambrose Channel Light.(9)

2.1.4.1 Mud Dumping - A mud dumping ground is located at a point not less than 4 nautical miles, bearing 198°00' true from Ambrose Light in not less than 60 feet of water. Substances to be dumped in this area consist of material dredged from vessel berths, anchorage grounds, and channels; clean earth; and steam ashes from fossil-fueled electric power generating stations. Most of

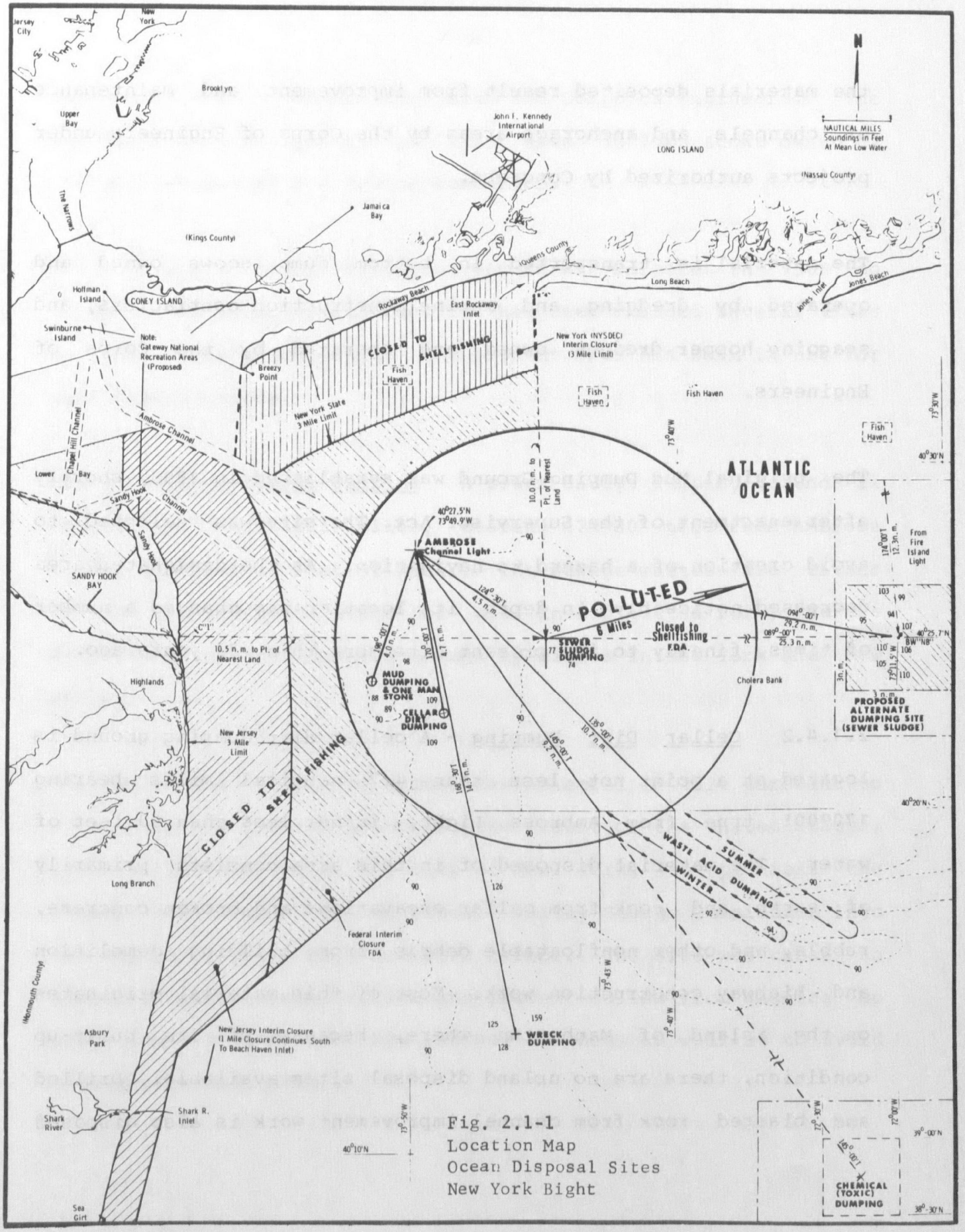


Fig. 2.1-1
Location Map
Ocean Disposal Sites
New York Bight

the materials deposited result from improvement and maintenance of channels and anchorage areas by the Corps of Engineers under projects authorized by Congress.

The material is transported in bottom dump scows owned and operated by dredging and marine construction contractors, and seagoing hopper dredges owned and operated by the Corps of Engineers.

The original Mud Dumping Ground was established in 1888, shortly after enactment of the Supervisor Act. The site was selected to avoid creation of a hazard to navigation. As the designated area decreased noticeably in depth, its location was changed a number of times, finally to its present site more than 33 years ago.

2.1.4.2 Cellar Dirt Dumping - A cellar dirt dumping ground is located at a point not less than 4.7 nautical miles bearing 170°00' true from Ambrose Light, in not less than 90 feet of water. The material disposed of in this area consists primarily of earth and rock from cellar excavations and broken concrete, rubble, and other nonfloatable debris from building demolition and highway construction work. Most of this material originates on the island of Manhattan where, because of its built-up condition, there are no upland disposal sites available. Drilled and blasted rock from channel improvement work is also disposed

of in this area under contract with the Corps of Engineers. The material is transported to this area in dump scows owned by marine contractors and towing companies.

The original Cellar Dirt Dumping Ground was selected in 1908 so as not to endanger navigation, but has been changed several times as the depths decreased. The present area has been in use for more than 33 years.

2.1.4.3 Sewer Sludge Dumping - A sewer sludge dumping ground is located 4.5 nautical miles, bearing 124°30' true from Ambrose Light, in about 72 feet of water. The sewage wastes are either in raw or treated state or are in a digested form, and are disposed of at this dumping ground by cities in New York and New Jersey.

The Sewage Sludge Dumping Ground was selected in 1924 pursuant to a stipulation reached by the Supreme Court of the United States, in an action brought by the City of New York, to prohibit the deposit of sewage by the Passaic Valley Sewage Commission into the waters of Upper Bay, New York Harbor. The site was chosen to avoid offensive discoloration and prevent solids from washing up onto Long Island and New Jersey beaches, as well as to avoid endangering navigation.

2.1.4.4 Wreck Dumping - A wreck dumping ground is located at a point 14.3 nautical miles bearing 168°30' true from Ambrose Light, in not less than 200 feet of water. This area is utilized for the disposal of obsolete vessels, wrecks, and other submerged obstructions to navigation. The Corps of Engineers carries out its obligation under the law to remove and dispose of sunken vessels and other obstructions to navigation and contracts for their disposal in this area.

2.1.4.5 Waste Acid Dumping - During the winter season, a waste acid dumping ground is located with its northwesterly corner at a point not less than 9.2 nautical miles, bearing 145°00' true from Ambrose Light. The area extends south of latitude 40°20'N and east of longitude 73°43'W. During the summer season, the area is located with its northwesterly corner at a point not less than 10.7 nautical miles bearing 135°00' true from Ambrose Light, and extends south of latitude 40°20'N and east of longitude 73°40'W. Depths in both dumping areas are about 90 feet.

The Waste Acid Dumping Ground was established in 1948 and is used for the disposal of dilute acid wastes containing various dissolved solids, including iron compounds. These wastes originate in a number of industries, principally in New Jersey, and are transported in specially constructed, rubber lined tank barges. The wastes are released under water while the vessel is

underway to attain maximum dilution and dispersion. The vessels, after reaching the dumping ground, head on a southeasterly course (refer to Figure 2.1-1) while discharging half of their cargo and, after a wide U-turn, proceed on a northwesterly course discharging the balance of their cargo in the dumping ground.

2.1.4.6 Waste Chemical (Toxic) Dumping - A waste chemical (toxic) dumping ground is located at the edge of the Continental Shelf with its northwesterly corner approximately 106 nautical miles, bearing 145°00' true from Ambrose Light. It is defined as the area lying south of latitude 39°00'N; west of longitude 72°00'W; north of latitude 38°30'N; and east of longitude 72°30'W. Depths are greater than 7000 feet.

The Waste Chemical Dumping Ground was established in 1965 following the receipt of requests from industries to dispose of chemical wastes which State health authorities refused to allow to be disposed of in sanitary land fills or into streams because of possible contamination of the potable ground water supplies. The actual limits of the area were recommended by the U.S. Fish and Wildlife Service, which was one of several Federal agencies consulted in determining where disposal of such wastes should be permitted in open waters. Because of its distance offshore, the cost of disposal is high, which limits the use of this area.

2.1.4.7 Radioactive Waste Dumping - A radioactive waste dumping ground is located at a point not less than 141 nautical miles, bearing 145° true from Ambrose Light, in not less than 200 fathoms of water.

2.1.4.8 High Explosives and Chemical Dumping - A high explosive and chemical dumping ground is located at a point not less than 110 nautical miles, bearing 130° true from Ambrose Light. Small quantities of toxic wastes and high explosives have been disposed of intermittently in past years; however, data on quantities of the wastes and their sources are not readily available.

2.1.4.9 Alternative Sewage Sludge Dumping - A proposed alternative sewer sludge dumping site is tentatively located at latitude 40°25.7'N, longitude 73°11.5'W, which is a point 29.2 nautical miles bearing 094° true from Ambrose Light, in about 100 feet of water. This area is 3 nautical miles square, centered at the lighted whistle buoy BW "NB" which is 12.3 nautical miles, bearing 174° true from Fire Island Light (12.1 nautical miles, from Great South Beach at Fire Island) and 25.3 nautical miles, bearing 089° true from the center of the present sewer sludge dumping ground (See Figure 2.1-1)

This site was tentatively selected as an experimental location where a selected amount and type of digested domestic sewage

sludge will be discharged under varying controlled conditions. The overall direction of this research project is provided by the staff of the National Coastal Pollution Research Program of EPA, who also are the principal scientific participants in the field and laboratory work. The NOAA Sandy Hook Marine Laboratory is providing assistance as a base of operations for field studies and some vessel time. Additional vessel time, sampling assistance, analytical service, and liaison with the Corps of Engineers and the City of New York are being provided by the Surveillance and Analysis Division of EPA at Edison, New Jersey.(10)

2.1.5 Regional Economy

2.1.5.1 Population - The population of the 31-county New York Region is approximately 20 million. It is expected that by 1980, the population will be 23 million and by 1995, approximately 29 million. The distribution of population shown in Table 2.1-1 represents the 5 counties that border the dumping areas described in Section 2.1-4. A reasonable estimate by the Tri-State Regional Planning Commission in New York City indicates a projected increase of more than 668 thousand by 1985.(11)

TABLE 2.1-1

STATISTICAL DATA - COUNTY POPULATION

County	Population 1970 Census	1985 (Projected)
Nassau	1,428,080	1,700,000
Queens	1,986,473	2,090,000
Kings	2,602,012	2,470,000
Richmond	295,443	480,000
Monmouth	459,379	700,000
Totals	6,771,387	7,440,000

2.1.5.2 Estuarine Economics

Beach Recreation

Approximately 5 nautical miles west of the mud dump ground and 10 nautical miles north of the sewer sludge dumping ground is the shoreline of the New York-Northern New Jersey estuarine region which supports an annual $2 billion recreation industry. The shoreline is mostly fronted by low sandy beaches and the shore development is primarily recreational and residential with some commerce and industry. Shore ownership is Federal, public, and private. The shoreline provides 47.8 miles of public beaches where more than 65 million visits were recorded during the 1970 beach season which begins in the last week of May and ends the second week in September (approximately 113 days). Statistics are shown in Table 2.1-2.

TABLE 2.1-2

STATISTICAL DATA BEACH RECREATION

County	Shore Ownership (Miles)			Total Shore Length (Miles)	1970 Beach Attendance
	Federal	Private	Public		
Monmouth	6.1	9.4	11.3	26.8	6,940,000
Richmond	.3	3.7	9.0	13.0	698,000
Kings	.02	1.6	3.5	5.12	21,818,100
Queens	1.0	2.0	7.0	10.0	22,372,000
Nassau*			17.0	17.0	13,900,000
Totals	7.42	16.7	47.8	71.92	65,728,100

*Includes Jones beach, and approximately 10 miles of beaches in Suffolk County including Captree State Park at Fire Island Inlet.(12)

The National Park Service has proposed setting aside five areas totaling 20,000 acres of land and water (shown in Figure 2.1-1) for the Gateway National Recreation Area. When completely developed, this area would be capable of serving more than 50 million visitors annually.(13)

Commercial Fishing and Shellfishing

The continental shelf extends from the New York-New Jersey region, offshore to the 100-fathom (600 foot) contour. Off New Jersey, the 100-fathom contour ranges between 60 and 105 miles off shore. Commercial fishing and shellfishing for much of the northeast coast of the United States relies heavily on the continental shelf. Surf clams, lobsters, and 40 species of fish are commercially important to New Jersey. Table 2.1-3 represents

the New Jersey dockside weights. They do not include foreign or out-of-state landings of fish and shellfish caught off the New Jersey coast. Values, likewise, are representative of New Jersey only, and are dockside prices as opposed to generated values. Generated values often reach three to five times the dockside values.(14)

TABLE 2.1-3

STATISTICAL DATA - NEW JERSEY COMMERCIAL FISHING

Year	Total Weight	Total Value	Species - Greatest Value
1956	513,807,546 lbs.	$15,238,931	Menhaden & Surf Clams
1957	464,924,418 lbs.	$12,224,923	" " "
1968	126,369,000 lbs.	$10,609,000	Surf clams & lobsters
1969	92,529,380 lbs.	$10,893,371	" " "

Sport Fishing

The New York Bight is an important hatchery and nursery ground for numerous fish (33 species) of recreational importance. Many of these fish do not spawn in the Bight, but the eggs and larvae are transported there by currents. Some of the former dumping grounds for dredged materials, cellar dirt, garbage, and other wastes are now favorite fishing spots, locally known as "The Mud Hole", "The Tin Can Grounds", "The Subway Rocks", and "The Acid Grounds". Thousands of private and party charter boats fish for migratory species that move through these areas at different times of the year. The most important sport fish (food fish) are Bluefish, Weakfish, Codfish, Atlantic Mackerel, and Scup (Porgy).

Winter Flounder, Striped Bass, Whiting, Summer Flounder (Fluke) and Blackfish (Tautog) are found inshore.

The State of New Jersey in 1954 estimated that in the months of April through September, 44.28 percent of the total catch was by sportsmen, or 13,302,154 pounds (sport) versus 16,735,033 pounds (commercial). Sport fishing in the deeper waters has been limited to the catching of sailfish, tuna, marlin, and dolphin.

2.1.6 Permit System

To assure that waste materials are disposed of in the approved dumping grounds, permits are issued on a routine quarterly basis to towing firms that transport the waste materials to sea. This permit system was one of the functions of the New York District Corps of Engineers under provisions of the River and Harbor Act of 1888. The Corps of Engineers Deputy Supervisor of New York Harbor, during January 1973, advised the current permittees that under the new Marine Protection Research and Sanctuaries Act of 1972 (Ocean Dumping Act), requests for dumping permits to cover the period after 23 April 1973 should be addressed to the EPA Region II Administrator in New York City, who became the authorized official to issue permits for dumping or transporting for dumping of all materials, except dredged material, into the NYB. Applications for deposit of dredge material will continue to be processed by the Corps of Engineers.

The following is a description of the program which was conducted by the Corps of Engineers as related to dumping of waste materials in the Atlantic Ocean.

2.1.6.1 Supervisor of New York Harbor - The permit program required by the Act of 1888, as amended 12 July 1952, is an ongoing activity of the Supervisor of the Harbor, administered by the Harbor Supervision and Compliance Section. During the three-month period ending 30 June 1971, 127 individual permits were issued for the disposal of material in the designated dumping areas. During the period 1 July 1972 to 28 February 1973, 349 dumping permits were issued. The Compliance Section maintains the permit records and forms. Data is directly extracted from the permit application and entered into a ledger. The permittee mails a supplemental sheet which certifies that the scows have delivered or discharged materials at the location and time specified on the permit. Supplemental sheets are usually returned after the expiration date of the permit (issued quarterly) and, at that time, the amount (cubic yards) is entered into the ledger.

Surveillance of the dumping operations is undertaken by a 65-foot patrol boat with inspectors aboard who note the time a vessel leaves and the time of its return in order to determine whether

the intervening elapsed time was sufficient to go to the approved site. The patrol boat checks the actions of the vessels at the dump site on a spot-check basis depending on weather conditions. The patrol boat is used primarily for inspections of waterways in lower New York Bay and patrols the entrance channels to keep them clear of interference by fishing craft or other boats in order to ensure safe navigation of deep-draft vessels. Other patrol boats operate in upper New York Bay and Long Island Sound. Inspections of shorefront facilities, such as industrial plants, oil refineries and shipyards, are conducted by Inspectors utilizing government vehicles equipped with two-way radios to ensure that industrial waste or refuse is not being discharged or deposited into the navigable waters. Table 2.1-4 describes the activities of the Harbor Supervision and Compliance Section, which maintains field offices in Jersey City, New Jersey; Fort Totten in Bayside, New York; Fort Tilden at Rockaway, New York; and upstate offices in Kingston and Troy, New York.

TABLE 2.1-4

SUPERVISOR OF NEW YORK HARBOR
Statement of Activities
(1 July 72 to 28 Feb 73)

1.	Number of Patrols.		
	a. Shore		846
	b. Vessel		832
		Total	1,678
2.	Number of Inspections.		
	a. Shore		3,527
	b. Vessel		7,722
		Total	11,249
3.	Number of Investigations.		
	a. Unfounded Complaints and Unknown Violators		27
	b. Number of Violations		227
		Total	254
4.	Number of Warning Letters Issued.		55
5.	Cases Referred to U.S. Attorneys for Legal Proceedings.		
	a. Number Pending as of 1 July 72		285
	b. Number Referred (1 July 72 to 28 Feb 73)		+49
	c. Number Closed (1 July 72 to 28 Feb 73)		-31
	Total Number Pending as of 28 Feb 73		*303
6.	Total amount of Fines		$26,300
7.	Number of Dumping Permits Issued.		349
8.	Amount (Cubic Yards) of material deposited in designated dumping grounds		12,160,464

*Includes 161 cases on dilapidated piers and bulkheads on which corrective action is being taken by the owners.

2.1.6.2 Dumping Permit Data - A series of ledgers were maintained by the Harbor Supervisior and Compliance Section to record the information pertaining to the permit program. Ledger

No. 14, which was initiated in 1965 (FY66), and is entitled COE Dredging Schedule File - Records of Continued Permits Issued, was the source of the data listed in Table 2.1-5. Data extracted from ledger No. 14 is for the calendar year 1972 (January through December). Corps of Engineers statements of activities are based on the fiscal year beginning July 1 and ending June 30. A total of 463 permits was issued for the year 1972. One hundred and eighty-six permits were returned to the Corps of Engineers by the towing companies who endorsed a total of 4870 trips to the designated dumping areas in the Atlantic Ocean where 15,728,560 cubic yards of material were dumped. Supplemental information for Table 2.1-5 follows:

a. Permit numbers in Column 1 are not in sequential order. Towing companies apply for several permits in advance, anticipating future work. In many cases, the permits are not used because the work was not performed or the material was disposed of at a land dump. If an entry to the ledger did not include the amount of material dumped, it was not listed in Table 2.1-5.

b. Permits are issued for towing and/or dumping. The material transported within the rivers and harbors for fill between piers and backfill trenches was not listed.

c. Permits issued for materials dumped in the Hudson River and the Long Island Sound are not listed, except for

the wrecks dumped at Eatons Neck (204-72 and 208-72) and the Fermentation Residue(33-72 and 107-72). Chas. Pfizer & Co., Inc. of Groton, Connecticut produces antibiotics and organic chemicals and the resulting fermentation residues consisting of Mycelium and Filteraid are transported by barge and dumped 1½ miles north of Little Gull Island in Long Island Sound. Records indicate that 74,100 cubic yards of this material were dumped at this location from January 1 through December 31, 1970, and Table 2.1-5 indicates that 36,000 cubic yards were dumped in 1972. These figures are not included in the grand total for ocean disposal (last sheet Table 2.1-5).

d. Towing and/or dumping permits may be issued for a single trip, but are usually issued routinely on a continuous basis which terminates on a quarterly date.

e. The permit number is entered into the ledger along with the permittee's name at the time of issuance. The permit, along with the supplemental sheet (indicating number of trips and amount dumped), is usually returned after the expiration date, and a three to four month period transpires before the amount of material is recorded. The permit specifically requires that the form be returned to the Corps of Engineers within four days after the expiration date, but this does not seem

to be a consistent practice. No entries were made for the first quarter in 1973, hence are not listed in Table 2.1-5.

f. The volume of material, in cubic yards, listed as being dumped must be concluded as approximate; e.g., amount and type of material to be dumped indicated on the face of the permit 1-72 was "approx. 3200 to 4700 cu. yds. waste acid". The supplemental sheet subsequently certified that the scows made 150 trips to the waste acid dumping ground during the period 1 January through 31 March 1972. Based on the lower figure of 3200 cubic yards, 150 trips would equal 480,000 cubic yards; and based on the higher figure of 4700 cubic yards, 150 trips would equal 705,000 cubic yards. (a difference of 225,000 cubic yards). Only 110 trips and 506,000 cubic yards were recorded in the ledger. The supplemental sheet also indicated that on 2 January, the scow was at the disposal area at 10:30 and then again at 11:30 the same morning. Records of the actual vessel transit time, which would indicate that the vessel's intervening elapsed time was sufficient to travel to the waste acid dumping ground, were not available. It was reported that not enough ships and inspectors were available to conduct an adequate 24-hour surveillance. Towing companies occasionally

provide 24-hour advance notice, but this is not a consistent practice and prescribed sailing times are not specified. Usually, when scows are loaded, they leave on the outgoing tide. Corps of Engineers patrol boats operate 24 hours per day, 6 days per week, and one shift on Sunday, from 8 am to 4 pm. The dumping permit supplemental sheets certify that scows often arrive at the disposal areas during all hours of the day and night, seven days a week, including holidays.

Permit 322-72 indicated 29 trips were made, but the amount dumped was not recorded.

Permit 400-72 specified that approximately 1500 cubic yards of sewer sludge each trip must be dumped at the toxic chemical dumping ground, 106 nautical miles from Ambrose Light, instead of at the regular sewer sludge dump ground, 4.5 nautical miles from Ambrose Light. Table 2.1-5 indicates that one trip was made, and 1500 cubic yards were dumped, but the supplemental sheet certified that three trips were made which would total 4500 cubic yards and records were not available to affirm this sludge was toxic. Ocean dumping is believed to be occurring in locations other than the prescribed dump areas. The extent and type of the

violations are not known because of the present lack of a suitable monitoring system. Early dumping is attributable to rough seas, inclement weather, and possibly faulty navigation.

Applications for dumping permits are usually made by the towing companies who perform work for various industries that manufacture chemicals, dyes, and paint pigments. These products contain various nontoxic and toxic materials which are usually delivered to large holding tanks provided by the towing company. When the tanks are full, the material is disposed of at the dumping ground. Records are not available to verify the actual contents of these holding tanks, except what is indicated on the permit application and the type and amount recorded in the ledger.

Applicants may apply for a permit on material that would assure approval, and later proceed to dump non-approved material, taking advantage of the inadequate surveillance program.

The original dumping permit form may become detached, for various reasons, from the supplemental sheet which becomes lost from a file folder; consequently the amount recorded in the ledger

cannot be verified with the supplemental sheet and the amount actually dumped. The missing forms may also indicate that possibly the supplemental sheets were never returned, hence, the amounts were not recorded.

Permit 257-72 indicates 34 trips were made dumping 70,500 cubic yards of cellar dirt. Because of different size scows, Permit 258-72 indicates the same amount of material was dumped requiring 43 trips.

The supplemental sheet provides for number of pockets loaded and empty. (A number 6 would indicate 6 sections of the scow were loaded). Permit number 29-72 specified that approximately 1500 cubic yards of sewer sludge would be dumped each trip. Table 2.1-5 indicates that 60 trips were made for a total of 90,000 cubic yards. Permit 177-72 specified 5000 cubic yards of effluent waste must be dumped at the 106-nautical mile site. Table 2.1-5 indicates 20 trips were made, dumping 102,220 cubic yards at the toxic chemical dumping ground. The supplemental sheet, attached to three extensions of this permit issued 1 April through 30 June 1972, indicated 1 pocket was loaded on two trips and 2 pockets were loaded on 14 trips, for a total of 16 trips. The permit, by itself, does not certify how much of this effluent waste was actually dumped.

In conclusion, the volume of material dumped in the NYB, as totaled in Table 2.1-5, is made up of approximate figures. It is estimated that 2,230,000 cubic yards of sludge are added annually to the New York Harbor complex because of the discharge of 480 MGD of raw sewage from the east and west side of Manhattan, Red Hook, Brooklyn, and Staten Island. These sludge accumulations are dredged along with the other bottom materials and deposited in the mud dumping ground. For the past 40 years, it has been the common practice of 15 New Jersey coastal communities to store accumulated sludge during the summer season, and discharge this sewage sludge into the Atlantic Ocean via effluent outfall pipes approximately 1000 feet from the shoreline (less than 5 miles from the mud dumping ground). In February 1972, the Federal Court issued a permanent injunction discontinuing this practice. Consequently, 5,764,000 gallons of sludge is barged to sea until an adequate technical solution for an alternative method of disposal can be achieved.

2.1.7 Analysis of Dumping Operations

2.1.7.1 Problems of Dumping - The six-mile radius sludge dump closure area in the NYB (shown in Figure 2.1-1), and the six-mile radius dump closure off Cape May, are the two areas in the Atlantic Ocean off the New York-New Jersey coastlines that are officially closed (since 1970) to shellfishing by the Food & Drug

Administration (FDA), under the National Shellfish Sanitation Program (NSSP). This program requires that all shellfish growing areas not remote from pollution sources be classified for sanitary quality. The classification must be made on the basis of a comprehensive sanitary survey and laboratory analysis in accordance with the NSSP Manual of Operations provisions. During 1971-1972, such a study was planned and initiated by the FDA Region II, and was conducted jointly with the FDA Northeast Technical Services Unit, Davisville, Rhode Island; the Sandy Hook Marine Laboratory; the New Jersey Department of Environmental Protection; and the New York State Department of Environmental Conservation. Based on the survey's bacteriological data, the offshore areas between land and the six-mile radius sludge dump were closed to shellfishing (shown in Figure 2.1-1). The pollution sources that have made this interim closure necessary are as follows:

a. Thirty-three sewage treatment plants discharging through ocean outfalls between Sandy Hook and Beach Haven Inlet.

b. One large chemical firm discharging industrial wastes 3500 feet offshore.

c. The combined storm-sanitary wastes and untreated sanitary wastes from the New York City metropolitan area flowing along the coastlines (400 MGD untreated

and 1100 MGD treated but not chlorinated during the nonsummer months).

d. The sewage and dredge spoil dump sites which have an undetermined impact on the water quality outside the six-mile closure. Exceptions were noted during the last survey to several bottom water samples which exceeded the surface water sample results. Other than the possibility of short dumping and errors in navigation by sewage sludge barges, a ready explanation of this data is not available.(15)

2.1.7.2 Mud Dumping - It is estimated that 45 percent of the dredge spoil deposited is polluted from industries, municipalities, and other sources near the harbors and channels being dredged. Pollution factors include biochemical and chemical oxygen demand, volatile solids, oil and grease, phosphorous, nitrogen, iron, silica, color, and odor. In dredge spoil deposited at the mud dump, average concentrations are estimated as follows: copper - 200 parts per million (ppm); silver - 143 ppm; tin - 570 ppm; and chromium - 400 ppm.

2.1.7.3 Sewer Sludge Dumping - About 90 percent of the national total of sewage sludge dumped in the ocean is disposed of at this locality. The material contains significant quantities of heavy metals and oxygen-demanding materials. Preliminary analysis of

sludge samples indicate heavy metals, chromium, copper, lead, tin, and zinc. Samples of clams taken up to three miles from the center of this dump contained coliform counts that exceeded permissible levels, and the area six miles in radius is closed to the harvesting of shellfish for human consumption. Slightly less than 4 million cubic yards were dumped in 1972. Upgrading the present treatment facilities to secondary treatment, plus treatment of the present 480 MGD of raw sewage will significantly increase the volume of sludge to be disposed of. It is estimated that the total sludge volume will increase to approximately 15 million cubic yards. Unless alternative sludge disposal methods are developed, the additional sludge will be dumped at this site.

2.1.7.4 Waste Acid Dumping - The material dumped at this site (3,050,414 cubic yards in 1972) is difficult to identify, considering the extreme variation in physical and chemical properties of these liquid wastes. Not enough data is available to characterize and identify the various types of waste liquids.

2.1.7.5 Conclusions

a. The 1972 final report[16] on the effects of waste disposal in the NYB concluded, from the data accumulated during that study, that disposal of dredge spoils and sewage sludges has had a significant, and often deleterious, effect on the living resources of the NYB.

b. The wastes from the New York metropolitan area are now the largest source of sediments discharged directly into the North Atlantic Ocean from the North American Continent.

c. The potential danger of highly polluted and toxic wastes disposed of less than five miles from the bathing beaches could cripple the estuarine tourist industry. Because of the wide publicity given to dumping, it is estimated that if only 10 percent of the potential visitors believe the waters polluted and avoid the shore areas, the cost to the estuarine economy would exceed $20 million per year.

d. New York fish and shellfish landings amounted to 40,800,000 pounds, valued at $14 million and the New Jersey surf clams and lobster landings exceeded $10 million in 1969. Data indicates that there are higher concentrations of fecal coliform in sediments and shellfish adjacent to the dump areas. Finfish feed at

the periphery of the waste disposal areas and are exposed to the toxic and pathogenic contents of these wastes.(16) A potentially valuable resource has been affected by present dumping practices, as evidenced by the FDA six-mile closure and the more recent interim three-mile closure to shellfish harvesting.

e. It would be imprudent to shift dumping locations because evidence is not given to indicate that it would be less harmful to dump the sewage sludge and dredge spoil elsewhere than where these wastes are presently dumped.(17)

f. Harbor dredgings dumped at the mud disposal site are finding their way to the New Jersey coastline and the invasion of red tide (a proliferation of toxic micro-organisms) at the beaches may have its genesis in the nutrient materials at the dump site. During 1970, a labor strike of tugboat operators forced the Governor of New Jersey to proclaim a state of emergency. The state was obliged to commandeer three ocean-going barges and their crews to effect the disposal of sludge from six of the state's largest sewage treatment plants to prevent the release of 500 MGD of untreated sewage and industrial wastes into the rivers and bays. During 1972, the New Jersey State Department of Environmental Protection held a public hearing on a proposed New

Jersey Ocean Disposal Control Regulation. The Governor has proposed that dumping of waste products on the continental shelf be prohibited and should require a minimum distance of 100 miles offshore for dumping. The ocean disposal control regulation was not adopted and the original transcription of the hearing and recommendations were turned over to the EPA Region II.[18]

2.1.8 Water Quality Monitoring and Sampling

2.1.8.1 Introduction - Water quality monitoring is defined as having three major components: (1) The acquisition of data at approximately the same location at some repeat time frequency (arbitrarily established as at least once per year); (2) The processing of data into a usable format; and (3) the use of that data/information for a purpose. The agencies that maintain a monitoring program in the NYB are detailed in the IEC report, Coastal Zone Water Quality Monitoring in the New York Bight.[6] These agencies conduct water quality surveillance programs in the adjacent waters of the New York Metropolitan region. The ocean disposal areas were excluded from the routine monitoring programs because of territorial jurisdictions and the lack of funds for personnel and ocean-going vessels.

Sampling is considered to be a one-time occurrence of the collection of information, and storage of that information in the form of reports. Comprehensive studies and extensive water quality sampling in the dumping areas have been conducted by many federal agencies and research institutions. The major studies, conclusions and recommendations of these studies, and the ongoing and proposed programs related to the dumping areas are summarized in this section. Most of these studies were restricted because of limited funds, and additional follow-up surveys to obtain synoptic data over a comparatively long period were not performed for the same reason.

2.1.9 Chronology of the Major Events Related to NYB Dumping Practices

1888 The Office of the Supervisor of the New York Harbor was established by the Act of 1888 - the original authority for the Corps of Engineers to control the dumping of wastes in the NYB. The original mud dumping ground was established.

1899 The Refuse Act was passed which generally prohibited dumping of solid wastes in navigable waters. It also provided for the controlled dumping of solid wastes in designated areas.

1908 Original cellar dirt dumping ground was established.

1924 The sewer sludge dumping ground was established. Passaic Valley Sewage Authority began sewer sludge dumping.

1925 Following the oyster-borne typhoid outbreak during the winter of 1924-25 in the United States, the national shellfish certification program was initiated by the states, the Public Health Service, and the shellfish industry.

1935 New York City began dumping sewer sludge.

1946 The Fish and Wildlife Service advised the Supervisor of New York Harbor that "from the standpoint of maintaining the aquatic resources of the Nation, the agency offers no objections to the disposal of wastes at sea, subject to proper control."(19)

1948 The waste acid dumping ground was established. The National Lead Company of Sayreville, New Jersey began the disposal of acid wastes.

1949 Studies on the disposal of chemical wastes at sea were made by the U.S. Fish and Wildlife Service and Woods Hole Oceanographic Institution, sponsored by the National Research Council with funds supplied by the National Lead Company. This study resulted in the conclusion that under the conditions prevailing during the period of investigation "the procedure employed by the National Lead Company in disposing of wastes from

its titanium plant is entirely proper" and "the operations should not be discouraged unless some new facts justify a contrary opinion."

1956 A diving survey of the acid disposal area was made by the Woods Hole Oceanographic Institution during the fall of 1956. With the exception of a greenish ooze found on the bottom in some sections of the disposal area, there were no detrimental effects to the ocean floor or to marine life. The iron content of samples taken in conjunction with the diving studies showed no indication that there was any buildup of iron in the disposal area.(20)

1957 The State of New York Department of Health and the Governor's office continue to receive complaints alleging serious pollution of ocean waters by industrial wastes dumped at sea. The Commissioner of Health requested the Public Health Service to explore the possibilities of a restudy of acid waste disposal in the NYB, in the light of continuing complaints from the Sportsmen's Council of the New York Marine District which represented 125 different fishing and boatmen's clubs. Sport and party-boat fisherman strongly objected to the dumping of sulfuric acid in their fishing grounds.

1958 Public meeting on waste disposal in the NYB.

1960 A summary of information on waste disposal in the NYB was prepared by the Public Health Service Sanitary Engineering Center. This report[19] indicated that the acid dumping area was moved twice in response to complaints of the fisherman. The various dumping areas designated for the National Lead Company waste were as follows:

a. April 1948 to April 1949. A two-mile square area around latitude 40°15'24"N; longitude 73°46'24"W. The waste was discharged while circling in this area.

b. March 1949 to December 1949. South of latitude 40°20'N and east of longitude 73°40'W, the waste being discharged during southeast and northwest passes about 6 to 6½ miles in length.

c. January 1950 to present. South of latitude 40°20'N and east of longitude 73°43'W, approximately 12 miles east of New Jersey and 15 miles south of Long Island was finally selected.

d. On the basis of scientific evidence presented and on the basis of professional opinions expressed by scientific people, there is no conclusive evidence that the acid dumping in the NYB has had a deleterious effect on fish population. Such

dumping does cause discoloration of a large area in the Bight and, for this reason, and the poor fishing alleged by the party, charter, and private fishermen, this area has been eliminated as a sports fishing area. On the other hand, it is the writer's hypothesis that the canopy of iron floc - i.e. the acid grounds - creates a shadowed and relatively darkened area in the ocean that is attractive to bluefish.[21]

1961 During a conference[22] on pollution of the interstate waters of the Raritan Bay and adjacent waters it was pointed out that as an indication of the magnitude of the disposal problem, it has been estimated that all of the material which has been disposed of under permits issued by the Corps of Engineers since 1888 would cover Manhattan Island to a depth of 73 feet, or at an average rate of one foot per year.

1965 Waste chemical (toxic) dumping ground was established.

1967 The Supervisor of New York Harbor provided a description of the disposal areas and their uses. Latitude and longitude coordinates and approximate distances and bearings were referenced to the Sandy Hook Light and the Sea Girt Light. (Revised 1969[23], with reference to Ambrose Light - Refer to Section 2.1.4.)

The 1967 description[24] of the disposal areas and their use is as follows:

a. Mud Dumping Ground is located at a point not less than 7 nautical miles bearing 120° true from Sandy Hook Light at latitude 40°23'48"N and longitude 73°51'21"W. Material dredged from the channels, anchorages, and vessel berths is disposed of in this area. The material is transported in dump scows owned and operated by dredging and marine construction contractors, and in seagoing hopper dredges owned and operated by the Corps of Engineers.

b. Cellar Dirt Dumping Ground is located at a point not less than 9 nautical miles bearing 118°30' True from Sandy Hook Light at latitude 40°22'53"N and longitude 73°48'40"W. Materials are primarily of earth and rock from cellar excavations and broken concrete, rubble, and other nonfloatable debris from building demolition and highway construction work originating in the Borough of Manhattan. The material is transported to this area in dump scows owned by marine contractors and towing companies.

c. Sewer Sludge Dumping Ground is located offshore of a point not less than 11 nautical miles, 103° True

from Sandy Hook Light at latitude 40°25'04"N and longitude 73°44'53"W. The sewage wastes are either in raw or treated state or are in a digested form. Sewage wastes are disposed of at this dumping ground by the City of New York; the cities of Glen Cove and Long Beach, New York; the counties of Nassau and Westchester, New York; the Passaic Valley Sewerage Commission; the Linden-Roselle Sewerage Authority; the Joint Meeting Sewage Disposal Commission, Elizabeth, New Jersey; and the Middlesex County Sewerage Authority.

d. Wreck Dumping Ground is located at a point not less than 13 miles 66° True from Sea Girt Light, at latitude 40°13'32"N and longitude 73°46'02"W. Wrecks of vessels are intermittently disposed of in this area by marine contractors for the owners of vessels or for the Federal Government in cases where the removal of sunken vessels is undertaken in navigable waters by the Corps of Engineers under Section 19 or 20 of the River and Harbor Act of 3 March 1899 (33 USC. 414 and 415).

e. Waste Acid Dumping Ground is located southeast of a point about 16.3 nautical miles, 120° True from Sandy Hook Light. During the summer season, the area is south of latitude 40°20'N and east of

longitude 73°40'W and during the winter season, the area is south of latitude 40°20'N and east of longitude 73°43'W. The chemical wastes deposited in this area originate at the National Lead Company, Sayreville, New Jersey; the General Chemical Division of Allied Chemical Corporation, Elizabeth, New Jersey; and several smaller industries in the vicinity of South Amboy, New Jersey.

f. Chemical Dumping Ground is located approximately 120 nautical miles southeast of New York within an area bounded on the north by latitude 39°N, on the south by latitude 38°30'N, on the east by longitude 72°W and on the west by longitude 72°30'W. Because of the excessive cost of transporting the material to this area, it has not been used, and other means of disposal of the wastes have been utilized. Small quantities of toxic wastes and high explosives have been disposed of intermittently in past years at a point 115 nautical miles 127° True from Sandy Hook Light, at latitude 39°17'30"N and longitude 72° W; however, the nature and quantities of the wastes and their sources are not readily available.

1968 A preliminary report[25] of the investigation of waste disposal in the NYB was published. Requests by Region II, Water Supply and Sea Resources Program, coupled with those of state and industry interested in shellfish sanitation and production, were responsible for the Northeast Marine Health Sciences Laboratory undertaking an investigation of the waters of the NYB utilized as a sewage sludge disposal ground. During this study, vessels were observed discharging in the general designated disposal area, but covered a range of at least two miles north or south because the designated point was without stationary markers to indicate the point to begin discharge. The study recommended an area of six miles in radius (shown in Figure 2.1-1) be classified off limits to shellfishing. Such an area would permit adequate dispersion, alteration, and dilution of contaminated material. The bottom in the area of the mud, rubble-excavation, and sewage sludge dump is so badly fouled that changing of dump locations would be of little help to this immediate area; however, consideration must be given to the possibility of these deposits, from long-term dumping, drifting into the Hudson Canyon, and causing harm to certain marine populations.

1968 The FWPCA, DOI, New Jersey, conducted a survey and sampling run to the ocean disposal grounds. The run originated in Upper New York Harbor, proceeded through the Narrows, and out Ambrose Channel to the sewer sludge and acid dumping grounds. The purpose of this survey was: (1) to evaluate instrumentation for use in offshore sampling studies, and (2) to collect data on distribution of certain pollutants from New York Harbor to the Bight area. Results of this survey indicated that the accurate locations of predetermined sampling points can become extremely difficult. Very little difficulty was encountered through Ambrose Channel up to and slightly beyond Ambrose Light. Beyond this last fixed marker, radar and dead reckoning could be used with considerable accuracy for a range of approximately four miles. Beyond this distance, the inability to position fix objects accurately by radar was complicated by the presence of other vessels. A plan to evaluate the present dump areas was formulated and the location of new dumping grounds was considered. Sandy Hook Marine Laboratory was awarded a contract to conduct a study of the New York Bight.

1968 A Corps of Engineer survey report considered the engineering and economic feasibility of eliminating the sources of drift and debris that constituted possible

obstacles or hazards to navigation in New York Harbor. The total disposal volume was 29,202,300 cubic feet of deteriorated piers, wharves, and derelict vessels. The considered plan provided for burning 20 miles out at sea, which was a current practice under the air pollution regulations of the City of New York.[26]

1969 The Marine Sciences Research Center, State University of New York, published a technical report[27] on a major source of marine sediment - New York City. The available data indicated that no U.S. Atlantic river has a natural sediment load approaching the mass of solids dumped into the ocean annually by the New York metropolitan region. The waste solids from the New York area exceed the sediment discharge of all rivers emptying into the Atlantic Ocean between the U.S. - Canadian border and Chesapeake Bay.

1969 The Naval Oceanographic Office, Washington, DC published an informal report[28] on the Hudson Canyon area. An ocean bottom survey of an 8 by 30 mile area encompassing portions of the continental shelf and slope northeast of Hudson Canyon was conducted. Included in the investigation were ocean floor mapping, subbottom reflection studies, sediment studies, bottom photography, and near-bottom ocean current and temperature measurements.

1970 Preliminary analyses were made of sewage sludge samples from sewage treatment plants in the New York metropolitan Area. Initial emphasis was on the development of sample handling techniques and evaluation of screening techniques for later development of analytical procedures necessary to obtain a more complete characterization of these wastes.[29]

1970 Chemical and physical properties were determined on wastes commonly transported by barge for disposal in coastal waters offshore from New York Harbor. This report[30] indicated that dredged wastes are a major source of oxygen-demanding substances and potentially troublesome metals. Additional work is needed to characterize waste chemicals discharged in the ocean.

1970 An Ad Hoc Committee[31] was appointed to review the practices of ocean disposal in the NYB and to make appropriate recommendations. The following is a partial assessment of the relative impact of dumping:

a. In the Bight sludge disposal areas, the sewage sludge has spread out in a northerly direction from the designated sewage dumping grounds over an area of 14 square miles. Throughout this area, bottom fauna has been severely reduced or has been eliminated.

b. It appears that the impoverishing effect of the dredge spoil is at least as serious as the sewage sludge, reflecting heavy contamination of the harbor sediments with petrochemicals and other toxic compounds.

c. A large area east of the sewage grounds is covered with organic matter whose origin has not yet been determined. Judging from hydrographic studies, it may have originated from the sewage sludge.

d. A potential health hazard exists in contamination of surf clam and sea quahog grounds, and accumulation of heavy metals by fish and shellfish.

e. Preliminary studies suggest a potential threat to beaches of Long Island from the dredge and sludge disposal sites.

1971 A report by the Woods Hole Oceanographic Institution was submitted to the Coastal Engineering Research Center (CERC) Corps of Engineers. The dumping of sewer sludge and dredge spoil in the NYB, and the effect on the marine environment, were reviewed. At the center of the sludge dump, the bearing capacity of the waters has been exceeded and the bottom is an anoxic area devoid of life. Both spoil and sludge contain large quantities of toxic heavy metals, petrochemicals, and

pesticides. The possibility of removing the present dump grounds to the Hudson Canyon (300-600 ft.) is worthy of objective consideration.[32]

1971 The Marine Sciences Research Center, State University of New York, completed a survey of marine waste deposits in the New York metropolitan area. Major sources of wastes and large waste deposits in the NYB were surveyed to determine their properties. The various waste deposits were sampled and approximate boundaries determined. Results are reported in technical report No. 8.[33]

1971 The New York District Corps of Engineers authorized the Sperry Systems Management Division to evaluate and recommend an instrument system which will provide for surveillance and monitoring of ocean dumping operations. Evaluation of all candidate systems demonstrated that the preferred system for monitoring ocean dumping operations should utilize LORAN A for position fixings, electronically activated dump detection subsystems, and an on-board printer subsystem.[34] The Corps of Engineers did not implement this proposed plan because of the relatively high cost of such a system.

1971 The Grumman Ecosystems Corporation presented the results of the work undertaken for the NY District

Corps of Engineers under Contract No. DACW51-71-C0031.[35] The objective of the study by Grumman was to evaluate the feasibility of the utilization of aerial remote sensing (stereo color photography and infrared imagery) as an effective technique in detecting outfalls into navigable waterways of the NY District. A proposed major outfall detection and surveillance program was not implemented because the cost was prohibitive. It was recommended that CERC allocate research funds to evaluate alternative remote sensors employing principles of spectrography, reflectivity, radiometry, radar, and passive microwaves.[36]

1971 The Perry Oceanographics support vessel (Undersea Hunter) and the company submarine (PC-8) were chartered for one day by the New York District, Corps of Engineers, to be used in an investigation of the ocean dumping grounds. The primary objectives were:

a. to determine whether waste sediment from the dumping grounds advanced towards the New Jersey shore,

b. to determine the extent of lateral spreading and direction of movement of waste sediments, and

c. to observe the existence and density of marine life.

Because of adverse weather conditions, areas closer to the New Jersey coast were chosen where wave and wind conditions were more favorable. Five dives were made and important observations were:

Dive 1 - (approximately 1.3 nautical miles from NJ) indicated an abundance of marine life and the absence of polluted sediment on the bottom.

Dive 2 - was made at the exact mud dumping ground. A great amount of fine sediment - the result of a recent dump was still in suspension and slowly settling, bottom currents were weak and visibility was two to three feet. Some marine life apparently exists.

Dive 3 - (approximately 3.4 nautical miles from NJ) indicated abundance of marine life and no mud or fine sediment.

Dive 4 - (approximately 1.5 nautical miles from NJ) benthic life was thriving and the sand was relatively clean.

Dive 5 - (approximately 2.1 nautical miles from NJ) visibility in this area was very poor due to a large quantity of suspended material in the water. Benthic population was greatly impoverished.[37]

This investigation was not conclusive and it was recommended that the overall future program of research

on ocean dumping and dumping sites in the NYB include studies from a submersible.

1972 The National Marine Fisheries Service, Sandy Hook Laboratory, published a report on the effects of waste disposal in the NYB. During the course of this investigation, 150 cruises were made to the three principal disposal areas in the NYB with a variety of measurements made and samples taken at 307 stations in the Bight and Hudson Canyon. Present disposal practices have (1) degraded the marine benthic communities of the NYB, (2) produced large amounts of floatable materials, and (3) resulted in generally deteriorated waters and marine sediments.[16]

1972 The New Jersey Department of Environmental Protection proposed an Ocean Disposal Control Regulation[18] which required that undigested sewage sludge, chemical wastes, and polluted dredge spoil be disposed of in waters deeper than 1000 fathoms.

1972 Based on the available data, cooperative State-Federal shellfish closed areas were established.[15] Refer to Section 2.1.7.1.

1972 The Marine Sciences Research Center published a report on the results obtained from three oceanographic cruises to investigate the physical characteristics of the shelf and slope waters of the NYB. The report

provides some insight into the dynamic processes involving the seasonal movement of the waters of the continental shelf, especially with regard to the spillover of shelf waters onto the slope and the mixing of fresh, shelf, slope, and North American Basin waters. It was concluded that much more data will be needed to gain full insight into the detailed hydrography of this complex region of the coastal Atlantic Ocean.[38]

1972 The Smithsonian Advisory Committee selected by the Oceanography and Limnology Program of the Smithsonian Institution met at the Smithsonian Institution, Washington, D.C., June 1972. The purpose was to discuss and critically evaluate the final reports concerning the disposal of wastes in the NYB area. The six reports reviewed and evaluated are references (16), (29), (30), (32), (33), and (34). Their report [17] evaluated the results of ongoing studies and recommended modifications and further studies.

1972 The National Coastal Pollution Research Program, one of EPA's major marine research organizations, initiated a research project consisting of a number of interrelated studies of domestic sewage sludge dumping in the NYB.[10] (Refer to Section 2.1.4.9 - Proposed Alternative Sewage Sludge Dumping Site.)

1972 The President's Water Pollution Control Advisory Board on ocean disposal practices and effects held a meeting in New York City on September 26 through 29. Conclusions and recommendations were formulated following a comprehensive briefing to the Board by representatives of Federal, state, and local government, a flyover by helicopter to view dumping practices in the NYB, and a full day of public testimony by experts in the field of ocean disposal.(39)

1972 A cooperative venture involving all NMFS biological laboratories to study contaminants in marine ecosystems. The Sandy Hook Laboratory conducted ecological studies of the New York, Barnegat Bay, and Delaware Bay sites and collected faunal samples for chemical, pathological, and laboratory analyses and sediment samples for chemical analyses. The Marine Contaminants Program of the Middle Atlantic Coastal Fisheries Center is a natural extension of the NYB waste disposal site studies begun in 1968 at the Sandy Hook Laboratory under contract from the Corps of Engineers. The objective of the Hudson Shelf Valley study is to define the role of the shelf valley, which runs from the entrance of New York Harbor to the Hudson Canyon at the slope break, in the ecology of the NYB.

As part of this study, samples of sediments, benthos, bacteria, malacostracans, and fish are being collected. The ultimate goal of the long-range study was to identify the impact of contaminants in relation to the abundance and distribution of living marine resources, to provide essential baselines for regulatory enforcement, and to provide specific information to balance waste disposal and economically valuable resources. The referenced report[40] describes these efforts and recommendations for future studies.

1972 The Final Report[41] - Program Development Plan for the Mesa-New York Bight Regional project was published by Westinghouse Electric Corporation and submitted to the U.S. Department of Commerce. A five-year pilot Marine Ecosystem Analyses program of the National Oceanic and Atmospheric Administration for the NYB to establish an environmental baseline; to monitor, predict, and support efforts to control conditions that degrade the environment; and to alert responsible officials to the onset of environmental change.

1973 On-going projects of the Marine Sciences Research Center State University of New York, Stonybrook, are to determine the distribution of heavy metals dissolved in the pore-waters of the waste sediment present in the NYB; to determine the methyl mercury content in dredge

spoils which are dumped into local waters (polluted sediments of New Haven Harbor); and to explore the possibility of using Ambrose Channel Tower as a coastal oceanographic reference station, to determine the dissolved and particulate load which flows from the Harbor into the NYB. An oceanographic study conducted for Suffolk County Southwest Sewage District to determine the impact of an ocean outfall off Fire Island had just been completed and details were not available.

1973 The New York Ocean Science Laboratory published Technical Report No. 0017[42]. This report presents data collected from two cruises into the NYB south of East Rockaway Inlet. This program was designed to observe the spatial and temporal distribution of phytoplankton, zooplankton, fish, and benthic fauna, as well as various chemical and physical parameters, over a complete tidal cycle, around a proposed offshore airport site (off J.F. Kennedy International Airport).

1973 The National Environmental Satellite Service under management by NOAA proposed an aerospace remote sensing study for the NYB marine environment (dump sites). The project will use two satellites, five aircraft, and ten surface vessels which will collect surface

oceanographic data. This experiment was prepared for the Marine Ecosystem Analyses program.

Conclusion

This completes the chronology of major events, and only includes the data/information that was provided by the various agencies contacted. The Bibliography On Ocean Waste Disposal[1] lists the reports and publications of other projects conducted in the past that relate to the NYB.

2.1.10 Alternatives and Recommendations for Ocean Dumping in the New York Bight

2.1.10.1 Alternatives - The public alternative plan for ocean dumping is - no dumping. After careful review of the comments of various Federal, state, and local agencies, it appears that such an alternative, at this time, is impractical. The ramifications to the economy of this region associated with an immediate halt to disposal at sea must be carefully weighed. Misinformation and misunderstanding are the causes of much of the criticism on ocean dumping. These mistaken impressions will continue to distort the true impact and block the path of future progress. The preceding information in this report was presented for careful study and analysis and, hopefully, will be used as a basis to achieve the no-dumping concept. It is estimated that, for the NYB area, this goal could possibly be achieved in 10 to 15 years. A thorough

evaluation of all alternatives is beyond the scope of this report, and the following information presents several alternatives to ocean dumping that have been proposed and studied for the NYB.

Re-Evaluation of Ocean Dumping by the NY District Corps of Engineers

The economics, design problems, and the time needed to implement alternatives to dumping at sea have been submitted by the chemical companies to the New York District Corps of Engineers, under an evaluation program conducted during 1971, on the effects of disposal activities on water quality and water chemistry in the NYB. As part of this analysis, it was requested that the various chemical companies applying for dump permits provide the following information:

a. Hypothetical analysis of behavior of waste materials subsequent to dumping in proposed locations, including specifically:

   (1) Fractions of load which would float, would sink immediately, or would dissolve immediately, and the composition of each fraction.

   (2) Rate of hydrolysis.

   (3) Rate and pattern of dispersal from time of release until no longer identifiable.

   (4) Particle size of insoluble fraction.

(5) Kinds and amounts of substances that would leach out of insoluble fraction, and rate of leaching.

b. Operational data, including:

(1) Volume and weight loaded per ship.

(2) Volume and weight dumped per ship.

(3) Number of trips per year and frequency.

(4) Total amount of material to be disposed of annually.

(5) Description of dumping mechanism and procedures to be followed during dumping operation (i.e., movement of ship, one release, or a series, etc).

Dumping permits were held in abeyance by the Corps of Engineers pending submittal of the requested information. The companies responding during 1971 emphasized that alternative procedures will require time as well as large expenditures, and are working diligently on alternative means of disposal. In the meantime, the companies will continue the practice of disposal at sea. (More than 3 million cubic yards of chemical wastes were dumped at the acid grounds in 1972.)

Alternative to Dumping of Spent Caustic at Sea The alternative methods studied[43] for disposal of spent caustic at sea were:

a. Build a sulfide oxidizer to convert spent caustic into waste products harmless to the environment. The

sulfide oxidizer process converts spent caustic with high oxygen demand sulfides to low oxygen demand waste water. Thirty-four hundred barrels per day of odorless waste water, having a 1 ppm sulfur concentration and a 7.0 pH, would be produced. The sulfide oxidizer converts sulfides to thiosulfates and mercaptans to disulfides. In nature, oxidation of thiosulfates to sulfates proceeds very slowly; hence, process conversion of sulfides to thiosulfates is sufficient to meet oxygen demand requirements for a waste water stream. An initial investment of $1 million, and an operating cost of $250,000 per year has been estimated.

b. Build a sulfide saturation plant to convert spent caustic to an unfinished product for sale. Spent caustic disposal in any form would be eliminated entirely because all spent caustic would be converted to a useful product for use in other industry. Initial investment would involve $500,000 and an operational cost of $100,000 per year.

c. Contract with an outside company with facilities to dispose of the spent caustic. Operation costs per year would be approximately $825,000.

Alternative to Dumping of Acid-Iron Industrial Waste at Sea

The principal wastes disposed of at the waste acid dump ground are gangue solids, iron (Fe), and sulfate (SO4); these wastes represent substantial quantities of the elemental materials, iron and sulfur. Recovery of these elements for reuse presents attractive possibilities: iron for steelmaking or powder metallurgy, and sulfur for recycling in the manufacture of sulfuric acid in the captive facilities used to produce the acid required for extracting titanium. Extraction and separation of titanium from the complex titanium-iron crystal, ilmenite, is accomplished inorganically by dissolving the ore in concentrated sulphuric acid to form a solution of titanium and iron sulfates with the insoluble gangue residue or "mud" to be filtered off for disposal. The original process (1934) included concentrating, dehydrating, and roasting facilities for recovery and recycling of waste sulfate materials. However, there were many technological difficulties in the large scale operation which proved to be technically and feasibly insurmountable. The low efficiency of the recovery process, and the inherent liquid and atmospheric emissions, necessitated finding alternate means of handling the wastes from the manufacture of titanium dioxide. The plan with the least objectionable environmental impact was to dispose of the waste materials at sea. Ocean dispersal of the acid-iron wastes began in April 1948, and has continued on a daily basis with only minor interruption.

Studies have been conducted through the years on the waste dispersal operation and its effects. These studies concluded that "repeated industrial acid-iron waste disposal off the New Jersey coast has not appreciably affected the marine environment in the acid dump ground area."[44]

There are no known alternative methods for disposal of these wastes that would offer as ecologically acceptable a solution as the present method of ocean dispersal.[45] The usual practice for small quantities of such materials would be neutralization, precipitation, and removal of all solids to a landfill operation. The tremendous volume of solids generated (48 acre feet per year) by such a treatment of these wastes would present a landfill problem that would result in a minor ecological disaster; therefore, efforts have been directed toward reducing the amount of waste generated, and to recovery of elemental values from the wastes. A great amount of effort has been expended through consultants and by support of research in various institutions. In these efforts, principal developments have included: (1) beneficiation of ilmenite ore, (early 1950's), to remove a substantial portion of the iron before the sulfate extraction process, and (2) the chloride extraction process (late 1950s) which requires an initially high grade ore (rutile), and permits recycling the chlorine used to extract titanium. Neither of these developments provide a total answer to the waste

problem; there are unresolved technological problems in each, as well as long-term questions regarding their feasibility. As a result, there are no immediate plans to eliminate the present method of ocean dispersal. Until a feasible method is developed, any requirement to change the present practice substantially will necessitate a major production curtailment with its resultant profound economic impact on the plant and community.(45)

Alternative Methods of Disposal of Fermentation Residue

The end products from the manufacture of penicillin are two solids, mycelium and filteraid. Mycelium was trucked from the Pfizer plant to an open dump, filling in a swamp from June 1948, until 1952. Nutrients from the mycelium leached into the swamp and finally into a creek causing biclogical growth which became odorous and led to many complaints. An alternative method of disposal was sought at that time resulting in the present method, barging to the Long Island Sound. By 1957, the Pfizer Company (Groton, Connecticut), was dumping approximately 100,000 cubic yards of wet mycelium a year (36,000 cubic yards in 1972 - refer to Section 2.1.6.2-c). Results of laboratory analysis indicated that the residue from the fermentation process consisted of a gray-brown, putty-like mass, with an oily texture and a decidedly disagreeable, sour-mash, nauseous odor. Chemical analysis indicated percentages of copper, chromium, and zinc. Spectrographic analysis also showed evidence of aluminum,

calcium, iron, magnesium, manganese, and silica. Bioassay result of a 0.1 percent solution was not lethal to fish in a 48-hour observation. Results of the laboratory examination show that this material is probably safe for landfill disposal.

During the 19-year period (1952-1971), there has never been any evidence that the mycelium was harmful to fish life; on the contrary, the growth of bluefish and fishing in general in the Sound has been tremendous, a commonly known fact in this area.(46)

Alternative methods of disposal that could be utilized in the Connecticut area are sanitary landfill or incineration. Landfill disposal would increase Pfizer's annual disposal costs by approximately $250,000; in addition, it would involve a number of serious problems. The high water content of the material makes conventional covering operations difficult, if not impossible. It would be necessary to study the use of specialized methods and equipment.

Incineration would involve a capital expenditure in the order of $1.5 million, in addition to approximately $500,000 annual operating expenses. This method also involves environmental problems.

Longer range possible solutions involve development of useful products for animal feed or fertilizer use, but such solutions are nebulous at this point.[46]

Alternative Methods of Sludge Disposal

The various disposal areas in the NYB have had a measurable effect on the New York-Northern New Jersey estuarine region, but sludge disposal effects are possibly of little consequence when compared with the present justification of disposing sludge at sea, still the most dependable and economical method. Because of the conclusions of many recent studies (some noted in Section 2.1.7.5), it is evident that alternatives to sludge disposal must be studied and proposed methods must be carefully examined for their environmental impacts and costs. The following information presents three major alternatives studied (since 1970) by the New York City Environmental Protection Administration (NYCEPA).

Sludge Disposal 100 Nautical Miles Offshore - The purpose of the study[47] during 1970 was to examine the problems and ramifications associated with disposing of sludge 100 miles offshore in self-propelled sludge vessels, and to determine the costs of such operations. It was estimated that two Owls Head class vessels with a capacity of 60,000 cubic feet, and four Newtown Creek class vessels with a capacity of 95,000 cubic feet would be needed to transport approximately 7-million cubic feet

of sludge 100 miles offshore each month. The estimated annual operating costs would be more than $5 million, which represents a 456 percent increase above present operating costs. In addition to this increase in annual operating costs, it would require a redesign and construction time of 3 1/2 years for three additional Newtown Creek vessels at a cost of $18 million. No attempt has been made to estimate the cost of modifying the existing fleet of vessels for 100-mile-offshore operations.

Sludge Disposal 25 Nautical Miles Offshore - Sludge vessels currently off-load their cargos at not less than 11 nautical miles from the nearest point of land. An extension of the dump area to a point 25 nautical miles from the nearest point of land would require the vessels to steam 3.5 to 5 hours longer (depending on speed of vessel and sea/weather conditions) for each trip to sea. Round trip transit time will be increased to an average of 9 1/2 hours. The present complement of 58 marine personnel would be increased to 94. Based on 1968-1969 price criteria, the increase in annual operating costs is an estimated $704,761, utilizing present equipment.(48)

Sludge Incineration - A minimum lead time of 5 years is envisioned for the budgeting, planning, design, and construction of sludge incineration to serve all New York City facilities. On the assumption that existing means of sludge disposal at sea are

abandoned, incinerators will be designed to adjoin every existing pollution control plant utilizing a fluidized-solids methodology for on-site sludge incineration.[49] At the Red Hook plant now under design in New York City, consideration is being given to installation of equipment which would prepare the sludge for incineration in a very large adjacent municipal refuse incinerator, also under design. If such an installation is decided upon, it will be the first New York City plant not dependent on ocean disposal, and may be used as a process evaluation center, aided by the availability of huge furnaces almost within the same structure.[50]

Estimates of total costs range from $5 million to $11 million and make no provision for solution of such problems as disposal of incinerated residue, which would present scrubber liquor problems. Other operating problems include odor production and the necessity for difficult sludge dewatering techniques, such as vacuum filtration.

Conclusion - The total sludge disposal costs would increase by a factor of 1.5 to 1 for 25 nautical mile disposal at sea, 4.8 to 1 for 100 nautical mile, and 3.4 to 1 for sludge incineration, within the near future if such plans are implemented. By the year 2015, the relative cost for 25 nautical mile disposal would increase to 2.4 to 1, but other ratios would remain constant.

The absolute costs, however, would increase in the year 2015 by an increment of $14.5 million for 100 nautical mile disposal, $5.5 million for 25 nautical mile disposal, and $9.3 million for sludge incinerations, compared with an increment of $2.6 million if present methods are continued.(51)

2.1.10.2 Recommendations - Studies into alternative methods for ocean disposal will require many years, and most of the reports cited in the bibliography contain recommendations for long-term changes to solve the complex problem of ocean disposal in the NYB. Utilizing these reports, and the information gathered during the field study, this section will review the major problems associated with each of the dump grounds and recommend the actions that may be implemented in a realistic and reasonable time scale.

Sludge Disposal

Facilities for incineration of municipal sewage sludge do not exist, and landfill areas are not readily available; therefore, it is recommended that barging of sludge to the existing site be continued, under certain provisions.

Problem:

Sewer sludge presently dumped contains heavy metals and other toxic materials.

Action:

The Surveillance and Analysis Division of EPA Region II must intensify the existing surveillance and enforcement of industrial and commercial facilities that allow the heavy metals and other toxic materials to enter the municipal sewage systems of New York and New Jersey. The Interstate Sanitation Commission, and the Bureau of Sanitary Engineering, structured within the New York City Department of Health are two agencies active in industrial waste control monitoring. An initial network[6] to integrate the present water quality monitoring system for the NYB is being implemented by the Applied Technology Division of EPA. This initial network will serve as a basis for a data collection system that will become an integral part of the surveillance and enforcement operations of EPA Region II. The Surveillance and Analysis Division should conduct toxicity studies on samples collected from behind a dumping barge and at the center of the sludge dump site. (Location of the center will be discussed later.) This study should continue until the source of the heavy metals and toxic materials are known.

Problem:

New York City's waste water treatment plants presently discharge effluents at the rate of 1550 MGD. Minimum secondary treatment is given 1150 MGD to an average of 73

percent removal of BOD. Because of delays in construction of additional sewage treatment plants, approximately 480 MGD of raw sewage continues to be discharged into the New York Harbor complex. Along the New Jersey shore, from Sandy Hook to Long Beach Island, there are 30 municipal waste treatment plants which provide only minimum primary treatment. During 1971, members of the Surveillance and Analysis Division of EPA at Edison, New Jersey, visited these facilities to study the sludge disposal practices and collect samples. Results of this study showed that, during the sludge dumping operation, water quality standards were violated for coliform bacteria, floating solids, and odor-producing substances. In addition, pathogenic organisms and viruses were isolated in the ocean receiving waters during sludge dumping. The total contribution to the sludge dumping grounds in 1971 included 60.5 percent of undigested, and 39.5 percent digested sludge. (Digestion reduces the BOD of sludge by 83 percent.)

Action:

Accelerate the program of upgrading present treatment plants in order to treat waste water to a high degree of secondary treatment of 90 percent reduction of BOD and suspended solids for ultimate disposal at the sludge dump ground.

Problem:

Negotiations have not yet been initiated with the City of New York to assist the National Coastal Pollution Research Program in a project consisting of a number of interrelated studies of domestic sewage sludge dumping in the NYB. The purpose of the project is to aid in understanding and predicting both the fate of sewage sludge discharged into a near-shore ocean environment, and the ecosystem alterations which result. A selected amount and type of digested sewage sludge will be discharged under varying controlled conditions in a designated location off the NYB (Refer to Section 2.1.4.9). This project is an expensive operation which will last a year or more. Earliest date for commencement is October 1973. Doubts have been expressed as to the tentative location of the site to be selected.

Action:

The time frame for commencement of this project can be stepped up by support from the ODPO. Assistance of the Department of Water Resources of the NYCEPA is a key factor. The Surveillance and Analysis Division at Edison should initiate a routine monitoring program of the water quality in this area for baseline data, possibly with the assistance of the U.S. Coast Guard. An environmental impact study of this area is recommended, along with a comprehensive study to determine if the poor quality of the water in the NYB

results from offshore sludge disposal, or from the poor quality of water emanating from New York Harbor. The initial step for such a study would be to conduct a beach sampling program at all the beaches. This baseline data will be valuable in assessing water quality when the North River treatment plant becomes operational in 1979.

Mud Dumping

Mud dumping consists of material dredged from vessel berths; anchorage grounds and channels; clean earth; and steam ashes from fossil-fueled, electric-power generating stations.

Problem:

It is estimated that more than 2 million cubic yards of sludge are added annually to the New York Harbor complex because of the discharge of 480 MGD of raw sewage. These sludge accumulations are dredged along with other bottom materials and deposited in the mud dumping ground.

Action:

It is recommended that sludge samples be subjected to a thorough analysis, and the material be restricted to dumping at the waste chemical (toxic) dumping ground or beyond.

The Cooperative Offshore Water Quality studies conducted by the FDA under the National Shellfish Sanitation Program

(refer to Section 2.1.7.1) should be continued to study the effect of this sludge dumping on shellfish in the NYB and to possibly conclude whether this sludge is the cause of the six six-mile shellfish closure area and recent additional three-mile closure.

The New York District Corps of Engineers is authorized to issue permits or regulations for Federal projects for ocean dumping of dredged materials upon concurrence from EPA that the criteria and any restrictions concerning areas have been complied with. Close liaison between the Corps of Engineers and the EPA Surveillance and Analysis Division at Edison is required on the dredge spoil problem.

In summary, close cooperation is required by all agencies to coordinate the suggested activities. The role of the EPA ODPO is clearly defined in this respect. The first implementation of the proposed initial network by the EPAATD should be the stepping stone for the EPA plans to control ocean dumping in the NYB.

Cellar Dirt Disposal

The material disposed of consists primarily of earth and rock from cellar excavations and broken concrete, rubble, and other nonfloatable debris from building demolition and highway construction work.

Problem:

The original dump ground was selected in 1908 so as not to endanger navigation, and has been changed several times as the depths decreased. The present disposal area has been in use for more than 33 years. In 1972, 694,950 cubic yards were dumped.

Records were not available to ascertain the last time studies were performed on the possibility that the accumulation of this material on the bottom (100 ft) will soon endanger deep-draft vessels using the Ambrose-Barnegat traffic lanes.

Action:

It is recommended such a study be performed by the Corps of Engineers, including deep core samples to study the impact of 65 years of dumping in this general area, and to ascertain if future spreading out of this material might be environmentally acceptable for the creation of fish havens. Again, it would take close cooperation with the FDA, NJDEP, NYSDEC, and research institutions.

Wreck Disposal

The Corps of Engineers carries out its obligation under the law to remove and dispose of sunken vessels and other obstructions to navigation, and contracts for their disposal in the wreck dumping ground.

Problem:

Same as for cellar dirt disposal.

Action:

Diving studies, including hand-held and TV underwater cameras should be performed to ascertain: (1) the impact of this disposal practice to this general area and (2) the possibility of changing the location, especially if studies indicate that this practice creates an ideal fish haven or has created a hazard to navigation.

Waste Acid and Toxic Chemical Disposal

More than 3 million cubic yards of waste acid materials were dumped at the acid disposal site, and 674,868 cubic yards of toxic chemicals were dumped at the 106-mile dump site during 1972.

Problem:

Records were not available to ascertain the results of the re-evaluation program conducted by the Corps of Engineers (refer to Section 2.1.10). The companies continue the practice of disposal at sea, as evidenced by the figures in Table 2.1-5.

Action:

The records of the Corps of Engineers should be submitted to the EPA for evaluation, and it is recommended that another such study be initiated. Each company must provide an

Environmental Impact Statement as a prerequisite to the issuance of a dump permit.

Overall Disposal Problems

There are numerous overall problems associated with ocean disposal and the general water quality of the NYB.

Problem:

Records are not available to ascertain the impact created to the water quality of the NYB by the thousands of ocean-going vessels that utilize the Ambrose-Nantucket-Hudson Canyon-Barnegat traffic lanes (204,000 vessel trips projected for the year 2015).

Action:

A study should be initiated to investigate the following: (1) the present traffic of commercial vessels and recreational vessels utilizing the waters of the NYB; (2) the present dumping practices of these vessels; and (3) the type of surveillance that would be required to control discharges.

Problem:

Dumping has been observed in the general designated disposal area, but covered a range of at least two miles north or south because the designated point was without stationary markers to indicate the point to begin discharge.

Action:

The U.S. Coast Guard, with the concurrence of EPA, should provide a lighted buoy containing a large radar reflector to mark the exact center location of designated disposal sites. The Coast Guard should approve the proposal of utilizing the Ambrose tower as a water quality monitoring station.

Problem:

Very little information exists on the Hudson Canyon; the possible effects of present ocean dumping practices in this area are not known.

Action:

The present studies being conducted on the Hudson Canyon by NOAA-NMFS should be coordinated with the present activities of EPA in the NYB to determine the possibility of relocating disposal sites to the Hudson Canyon or beyond.

2.1.11 Conclusion

During 1971, the EPA Applied Technology Division, initiated a study to develop a plan for a National Coastal Water Quality Monitoring Network. Field surveys were conducted in six selected coastal zones to provide specific information about water quality sampling, laboratory analyses, data management, and program administration. The NYB was one of the coastal zones studied. During 1973, a field survey was conducted to update, expand, and improve the data base accumulated on ocean dumping during the

1971 field survey. These two surveys have shown that there is a communication gap between the political and professional organizations in the area. This communication gap is becoming more critical due to the importance of two programs now being conducted simultaneously in the NYP by the EPA and NOAA (MESA). It is essential that the valuable information obtained under these programs become integrated into a national network.

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
1-72	Moran Towing Co.	Waste Acid				506,000		110
4-72	Moran Towing Co.	Cellar Dirt & Rock		16,500				11
12-72	Moran Towing Co.	Cellar Dirt & Rock		67,500				30
23-72	Moran Towing Co.	Mud, Sand & Gravel		84,000				46
24-72	Moran Towing Co.	Mud, Sand & Gravel		12,000				5
27-72	General Marine Transp.	Sewer Sludge			6,000			4
29-72	General Marine Transp.	Sewer Sludge			90,000			60
30-72	General Marine Transp.	Sewer Sludge			3,000			2
(33-72)	Pfizer Inc., Groton	Fermentation Residue (Little Gull Island)				(16,000)		(16)
34-72	Dept. of Water Resources	Sewer Sludge			20,696			10
35-72	Dept. of Water Resources	Sewer Sludge			6,072			3
36-72	Dept. of Water Resources	Sewer Sludge			21,960			9
37-72	Dept. of Water Resources	Sewer Sludge			6,072			3
38-72	Dept. of Water Resources	Sewer Sludge			2,024			1
39-72	Dept. of Water Resources	Sewer Sludge			52,800			22
40-72	Dept. of Water Resources	Sewer Sludge			22,320			9
41-72	Dept. of Water Resources	Sewer Sludge			14,168			7
43-72	Dept. of Water Resources	Sewer Sludge			44,528			22
45-72	A & S Transportation	Sewer Sludge			139,500			21
46-72	A & S Transportation	Sewer Sludge			30,500			5
47-72	A & S Transportation	Sewer Sludge			12,960			4
48-72	Modern Transp. Co.	Sewer Sludge			3,240			1
50-72	Modern Transp. Co.	Sewer Sludge			80,000			10
51-72	Modern Transp. Co.	Sewer Sludge			22,480			4
52-72	Modern Transp. Co.	Sewer Sludge			8,000			1
53-72	A & S Transportation	Sewer Sludge			120,000			15
55-72	Allied Chemical	Muriatic Acid			23,969			11
59-72	Modern Transp. Co.	Aluminum Hydro					24,000	3
63-72	Weeks Dredging	Mud	10,675					4

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5a

January 1, 1972

INTERSTATE ELECTRONICS CORPORATION

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
65-72	Weeks Dredging	Wheat & Mud	1,875					1
67-72	American Dredge	Silt, Sand & Mud	537,700					199
68-72	American Dredge	Mud	131,100					55
69-72	American Dredge	Rock, Hardpan Clay		45,600				22
71-72	Great Lakes Dredge	Broken Concrete		22,500				10
72-72	Great Lakes Dredge	Mud	5,840					4
73-72	Great Lakes Dredge	Mud	98,250					105
74-72	Great Lakes Dredge	Mud	126,880					---
75-72	Great Lakes Dredge	Mud	908,800					95
77-72	Weeks Dredging	Sludge			42,700			7
82-72	Spentonbush Transport	Spent Caustic					10,000	2
83-72	Spentonbush Transport	Spent Caustic					20,000	4
84-72	Spentonbush Transport	Spent Caustic					65,000	13
85-72	Spentonbush Transport	Spent Caustic					50,000	10
86-72	Weeks Dredging	Mud	6,275					2

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5b

January 1, 1972

INTERSTATE ELECTRONICS CORPORATION

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
89-72	R. H. Goode	Sand, Gravel &Rock		900				1
91-72	Great Lakes Dredge	Mud	76,520					24
92-72	Great Lakes Dredge	Mud	12,600					4
94-72	Weeks Dredging	Mud	28,600					17
95-72	Weeks Dredging	Mud	61,600					22
96-72	American Dredge	Mud	139,725					69
97-72	Weeks Dredging	Mud	14,750					6
98-72	Weeks Dredging	Mud	4,400					2
101-72	Weeks Dredging	Mud	15,075					6
102-72	Weeks Dredging	Sewer Sludge					6,100	1
106-72	Weeks Dredging	Sludge			36,600			6

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5c

January 25, 1972

INTERSTATE ELECTRONICS CORPORATION

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
(107-72)	Pfizer Inc., Groton	Fermentation Residue (Little Gull Island)				(20,000)		(20)
108-72	Dept. of Water Resources	Sludge (26 Ward)			15,750			7
109-72	Dept. of Water Resources	Sludge (Idlewild)			166,160			67
110-72	Dept. of Water Resources	Sludge (Owlshead)			133,920			54
111-72	Dept. of Water Resources	Sludge (Coney)			29,760			12
112-72	Dept. of Water Resources	Sludge (Huntspoint)			36,232			17
113-72	Dept. of Water Resources	Sludge (Tallman)			28,136			13
114-72	Dept. of Water Resources	Sludge (Port Richmond)			2,480			1
115-72	Dept. of Water Resources	Sludge (Rockaway)			12,400			5
116-72	Dept. of Water Resources	Sludge (Newtown Creek)			123,520			59
117-72	Dept. of Water Resources	Sludge (Bowery)			53,648			23
118-72	Dept. of Water Resources	Sludge (Wards)			114,512			55
142-72	Moran Towing Co.	Mud, Sand & Gravel		76,500				43
144-72	Moran Towing Co.	Rock		36,000				24
145-72	Moran Towing Co.	Waste Acid				749,800		163
148-72	Modern Transp. Co.	Sludge			16,000			2
152-72	Modern Transp. Co.	Sludge			16,000			2
157-72	A & S Transportaxion	Sludge			95,300			15
158-72	A & S Transportation	Sludge			3,240			1
160-72	A & S Transportation	Sludge			158,600			26
161-72	A & S Transportation	Sludge			12,200			2
162-72	A & S Transportation		5,700					6
171-72	Great Lakes Dredge	Mud	310,000					97
176-72	Great Lakes Dredge	Mud	214,000					44
177-72	Spentonbush Transport	Chemical					102,220	20
181-72	Allied Chemical	Muriatic Acid				26,148		12
191-72	American Dredging		5,750					3
194-72	Weeks Dredging		35,200					16
197-72	Weeks Dredging	Silt	37,400					17

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5d

April 1, 1972 thru June 30, 1972

INTERSTATE ELECTRONICS CORPORATION

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
200-72	Sound Towing		420					1
202-72	Great Lakes Dredge		564,000					141
(204-72)	Ocean Salvage Inc.	Wreck		60 x 16 x 8(Eatons Neck)				---
(208-72)	Harbor Const. Co.	Wreck		Trawler (Eatons Neck)				---
215-72	Weeks Dredging	Mud	4,400					2
218-72	Weeks Dredging	Mud	77,000					27

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5e

April 1, 1972 thru June 30, 1972

INTERSTATE ELECTRONICS CORPORATION

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
231-72	Modern Transportation	Sludge			16,200			5
232-72	A & S Transportation	Sludge			12,960			4
233-72	A & S Transportation	Sludge			97,600			16
235-72	A & S Transportation	Sludge			12,960			4
236-72	A & S Transportation	Sludge			122,000			20
237-72	A & S Transportation				6,480			3
238-72	McAllister Towing				14,220			6
239-72	Weeks Dredging				24,400			4
240-72	Dept. of Water Resources				87,828			39
241-72	Dept. of Water Resources				31,558			14
242-72	Dept. of Water Resources				67,560			30
243-72	Dept. of Water Resources				146,380			65
244-72	Dept. of Water Resources				22,520			10
245-72	Dept. of Water Resources				135,120			60
246-72	Dept. of Water Resources				94,584			42
247-72	Dept. of Water Resources				144,128			64
248-72	Dept. of Water Resources				24,772			11
249-72	Dept. of Water Resources				2,480			1
250-72	Dept. of Water Resources				45,040			20
253-72	Moran Towing Co.	Cellar Dirt & Mud		21,000				12
255-72	Moran Towing Co.		7,500					5
256-72	Moran Towing Co.		46,500					28
257-72	Moran Towing Co.			70,500				34
258-72	Moran Towing Co.			70,500				43
259-72	Moran Towing Co.					861,400		170
281-72	American Dredging		568,300					331
282-72	American Dredging		8,300					6
283-72			8,100					2
284-72			24,000					11
285-72			41,600					10

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5f

July 1, 1972 thru September 30, 1972

INTERSTATE ELECTRONICS CORPORATION

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
286-72	Great Lakes Dredge		306,000					87
288-72	Great Lakes Dredge		4,650					3
289-72	Great Lakes Dredge		12,000					4
290-72	Great Lakes Dredge		27,000					9
292-72	Great Lakes Dredge		137,600					36
293-72			15,150					7
294-72			45,000					15
296-72	Weeks Dredging		24,775					8
299-72	General Marine Transp.				1,500			1
305-72	Allied Chemical					30,506		14
306-72	Spentonbush Transport	Chemical Waste				127,760		20
307-72	Spentonbush Transport						127,760	20
311-72	Spentonbush Transport	Spent Caustic					25,552	4
312-72	Spentonbush Transport	Spent Caustic					19,164	3
313-72	Weeks Dredging	Mud	6,275					5
314-72	Great Lakes Dredge	Mud	31,200					7
315-72	Weeks Dredging		28,600					7
317-72	Weeks Dredging		151,800					47
318-72	Great Lakes Dredge		81,900					16
321-72	Great Lakes Dredge	Rock		7,750				5
322-72	Great Lakes Dredge	Mud			(Shows 29 trips, but no amount)			29
328-72	Weeks Dredging	Mud	14,425					7
331-72	Weeks Dredging		6,275					2
334-72	American Dredge		40,500					14
335-72	Great Lakes Dredge		19,600					5
336-72	Weeks Dredging				6,100			1

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5g

July 1, 1972 thru September 30, 1972

INTERSTATE ELECTRONICS CORPORATION

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
338-72	Moran Towing Co.	Cellar Dirt		136,500				79
344-72	Moran Towing Co.	Waste Acid				731,400		159
365-72	Moran Towing Co.	Rock	75,000					50
366-72	Moran Towing Co.	Rock	3,000					2
368-72	Dept. of Water Resources	Sludge			38,284			17
369-72	Dept. of Water Resources	Sludge			45,040			20
370-72	Dept. of Water Resources	Sludge			22,520			10
371-72	Dept. of Water Resources	Sludge			67,560			30
372-72	Dept. of Water Resources	Sludge			15,764			7
373-72	Dept. of Water Resources	Sludge			123,860			55
374-72	Dept. of Water Resources	Sludge			13,512			6
375-72	Dept. of Water Resources	Sludge			146,380			65
376-72	Dept. of Water Resources				54,048			24
377-72	Dept. of Water Resources				88,028			39
378-72	Dept. of Water Resources				6,756			3
383-72	Modern Transp. Co.				60,804			27
387-72	A & S Transportation				6,100			1
388-72	A & S Transportation				25,600			16
390-72					140,300			23
393-72	Great Lakes Dredge	Rock		27,200				17
398-72	Great Lakes Dredge	Mud	226,200					97
399-72		Mud	1,053,000					274
400-72	General Marine Transp.	Sludge					1,500	1
403-72	General Marine Transp.				6,000			4
405-72	General Marine Transp.				75,000			50
406-72	General Marine Transp.				6,000			4
407-72	Spentonbush Transport	Spent Caustic					44,716	7
408-72	Spentonbush Transport	Spent Caustic					38,320	6
410-72	Spentonbush Transport	Effluent Waste					140,536	22
414-72	American Dredge		338,350					---

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5h

October 1, 1972 thru December 31, 1972

INTERSTATE ELECTRONICS CORPORATION

Permit No.	Permittee (Name of Applicant)	Kind of Material	DISPOSAL AREAS (CUBIC YARDS)					No. Trips
			Mud	Cellar	Sludge	Acid	Toxic Chemical (106 Mile)	
420-72	Weeks Dredging				30,500			5
421-72	Weeks Dredging		2,200					1
424-72	Dunbar Sullivan		203,400					62
428-72	Allied Chemical	Muriatic Acid				17,400		8
433-72	Weeks Ocean Disposal	(Wards)			-------			---
434-72	Weeks Ocean Disposal	(Tallman)			6,100			1
435-72	Weeks Ocean Disposal	(Bowery)			24,400			4
436-72	Weeks Ocean Disposal	(Huntspoint)			6,100			1
437-72	Weeks Ocean Disposal	(Newtown Creek)			24,400			4
438-72	Great Lakes Dredge		206,500					80
439-72	Bayonne Ind. (Weeks)		4,400					2
440-72	Great Lakes Dredge		30,000					10
448-72	Great Lakes Dredge		78,000					25
450-72	Weeks Dredging		19,800					9
		TOTALS	7,331,435	694,950	3,976,893	3,050,414	674,868	4870

GRAND TOTAL 15,728,560 CUBIC YARDS DUMPED IN 1972, 186 PERMITS, 4870 TRIPS

CORPS OF ENGINEERS PERMIT SCHEDULE FILE FOR YEAR 1972

TABLE 2.1-5i

October 1, 1972 thru December 31, 1972

INTERSTATE ELECTRONICS CORPORATION

Section 3

APPROVED INTERIM DUMPING SITES NEW YORK BIGHT

3.1 INTERIM OCEAN DISPOSAL SITES

3.1.1 Retrospect

The coordinates and approximate distances and bearings of the disposal areas designated for the New York Bight were originally referenced to the Sandy Hook Light and the Sea Girt Light. In 1969, the Supervisor of the New York Harbor revised the coordinates, and the Ambrose Light became the reference, as reported in section 2 and shown in Figure 2.1-1. The locations of the various sites vary approximately 1/2 to 1 1/2 nautical miles depending on which reference is used.

During a 1968 study of waste disposal in the New York Bight, vessels were observed discharging in the general designated disposal area, but covered a range of at least two miles north or south because the designated point was without stationary markers to indicate the point to begin discharge.

The Federal Register, Volume 38, No. 94, Wednesday, May 16, 1973, published the EPA rules and regulations pertaining to ocean

dumping. This interim criteria designated locations of the approved interim dumping sites for the EPA regions.(52)

3.1.2 Approved Interim Dumping Sites EPA Region II

Table 3.1-1 is an excerpt from the criteria and lists the sites approved for the New York Bight.

TABLE 3.1-1

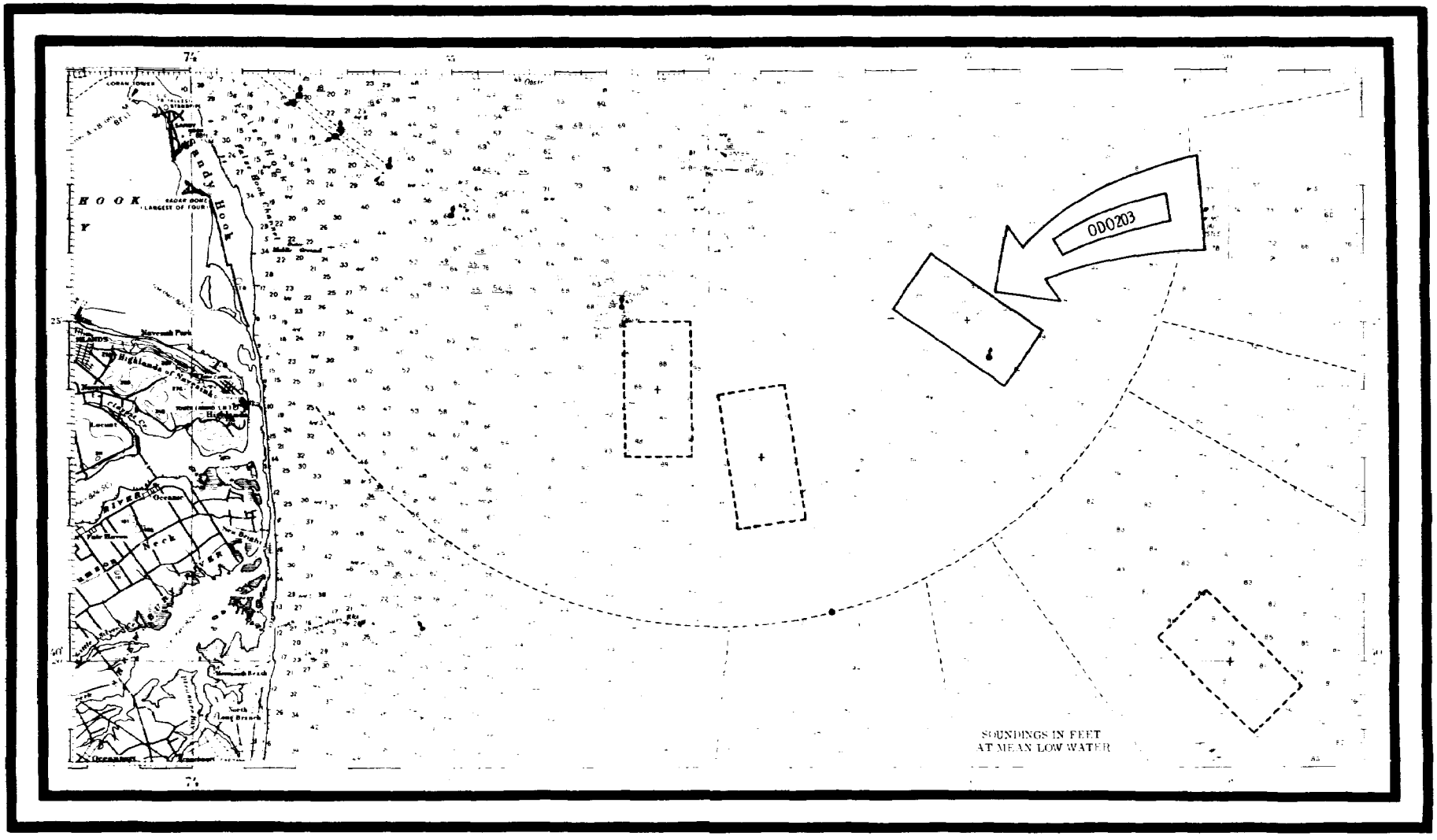
Item	Location Latitude & Longitude	Size Sq. Miles	Depth Feet	Primary Use
1.	40°24', 73°51'	2.0	88	Mud
2.	40°23', 73°49'	2.0	103	Cellar Dirt
3.	40°25', 73°45'	2.0	90	Sludge
4.	40°20', 73°40'	2.0	80	Waste Acid
5.	40°13', 73°46'	2.0	200	Wreck dumping
6.	106 NMI, 145° true, from ambrose light, 38°45' 73°,15'	624	6,000	Toxic chemical waste
7.	Approximately 123 NMI Southeast of Ambrose Light, south of 39°0' north of 38°30', west of 72°0', east of 72°30'		6,000	Toxic chemical waste

Editor's Note:

1. Item 6 should read 106 NMI, 145° true, from Ambrose Light, 38°45', 72°15'.
2. Item 7 is a duplication of item 6. The 106 NMI distance is to the outer edge of the dump site (NW corner), while the 123 NMI distance is to the center of the rectangle described by the coordinates. The center coordinate is 38°45' N, 72°15' W. Actual chart measurements indicate distances of 108 NMI and 127 NMI respectively.

3.1.3 An Atlas of Ocean Waste Disposal Sites

IEC Report 4460C1545 presents an Atlas of Ocean Waste Disposal Sites in the United States.[53] This atlas uses a series of National Ocean Survey charts published by the U.S. Department of Commerce to accurately locate the center coordinates of each disposal site listed in the Federal Register. The atlas contains information on the area, chart number, navigation aids, type of material dumped and a site number. The sites relevant to the New York Bight study are presented in the following figures.



Center Coordinates	40° 25' 00" N, 73° 45' 00" W
Area	2.0 Square Nautical Miles
Navigation Chart No.	NOS 1215
Local Navigation Aids	Decca, Loran A & C, Omega, RDF, CG Radar
Material Type	Sewage Sludge
Primary Management	EPA

INTERIM DISPOSAL SITE

September 1973

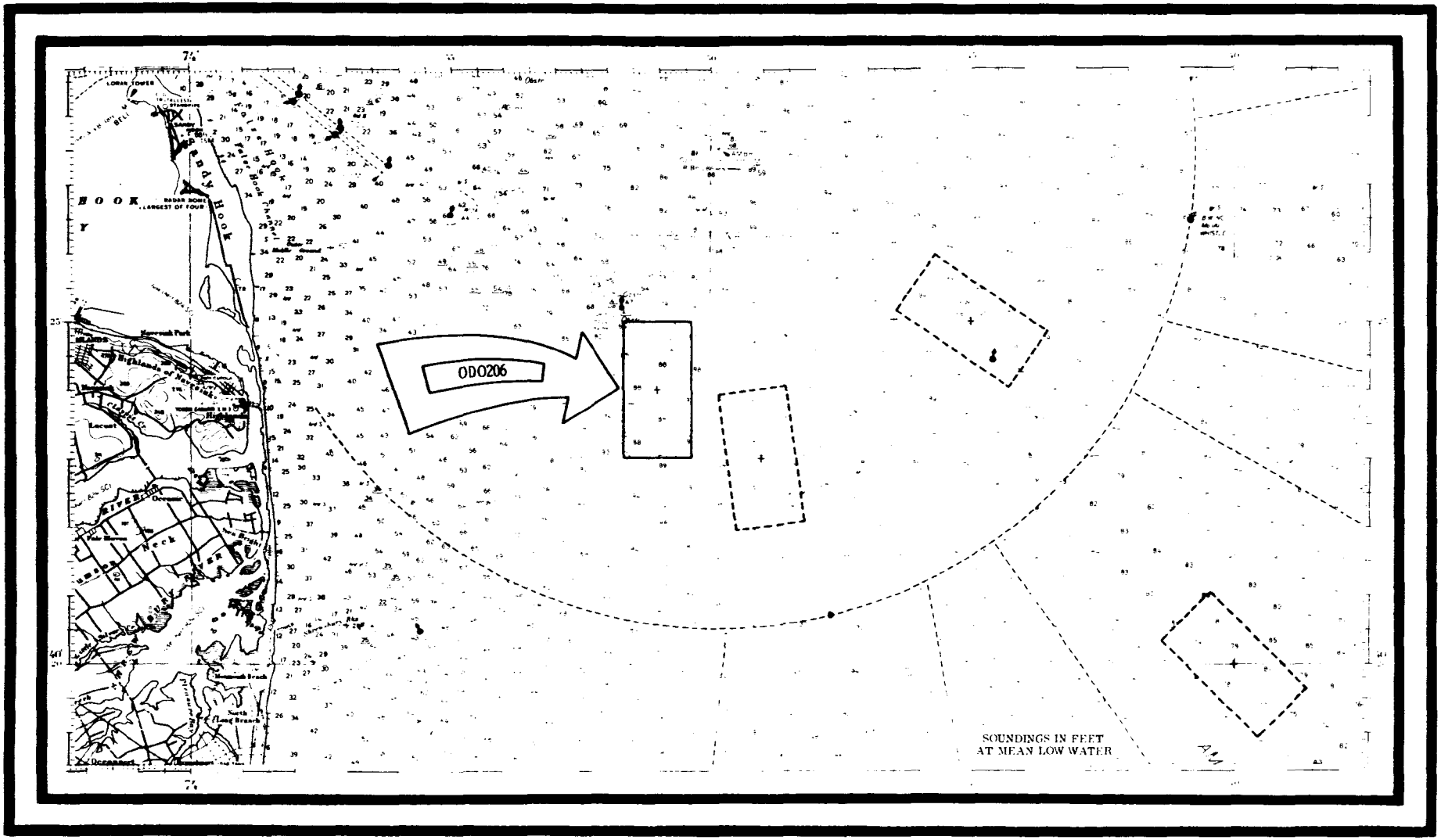
SITE NO. ODO203

Figure 3.1-1

INTERSTATE ELECTRONICS CORPORATION

4460C1559

4460C1559



Center Coordinates	40^0 24' 00" N, 73^0 51' 00" W
Area	2.0 Square Nautical Miles
Navigation Chart No.	NOS 1215
Local Navigation Aids	Decca, Loran A & C, Omega, RDF, CG Radar
Material Type	Mud
Primary Management	EPA

INTERIM DISPOSAL SITE

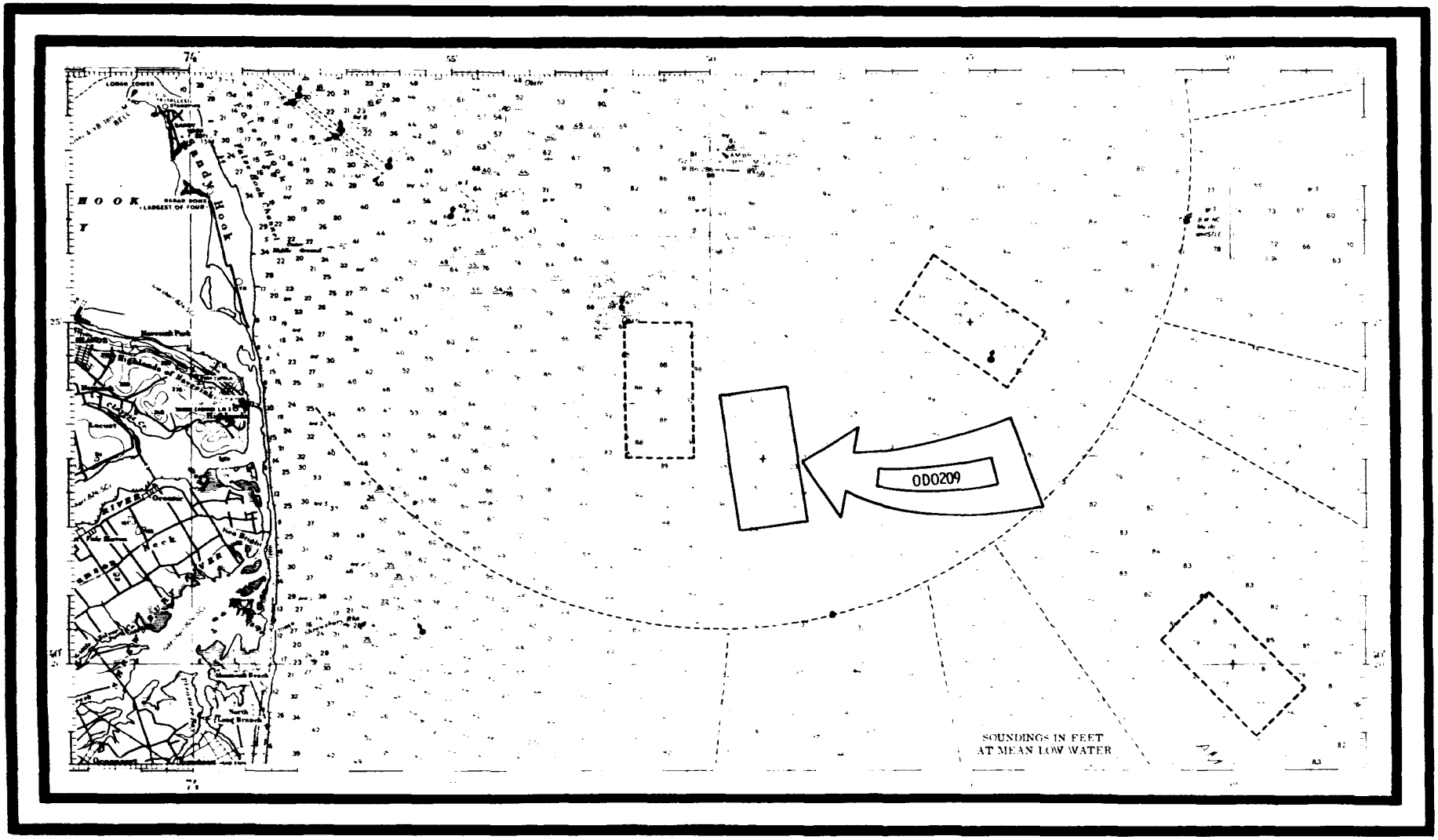
September 1973

3 1 5

SITE NO. ODO206

Figure 3.1-2

INTERSTATE ELECTRONICS CORPORATION



Center Coordinates	40^{0} 23' 00" N, 73^{0} 49' 00" W
Area	2.0 Square Nautical Miles
Navigation Chart No.	NOS 1215
Local Navigation Aids	Decca, Loran A & C, Omega, RDF, CG Radar
Material Type	Cellar Dirt
Primary Management	EPA

INTERIM DISPOSAL SITE

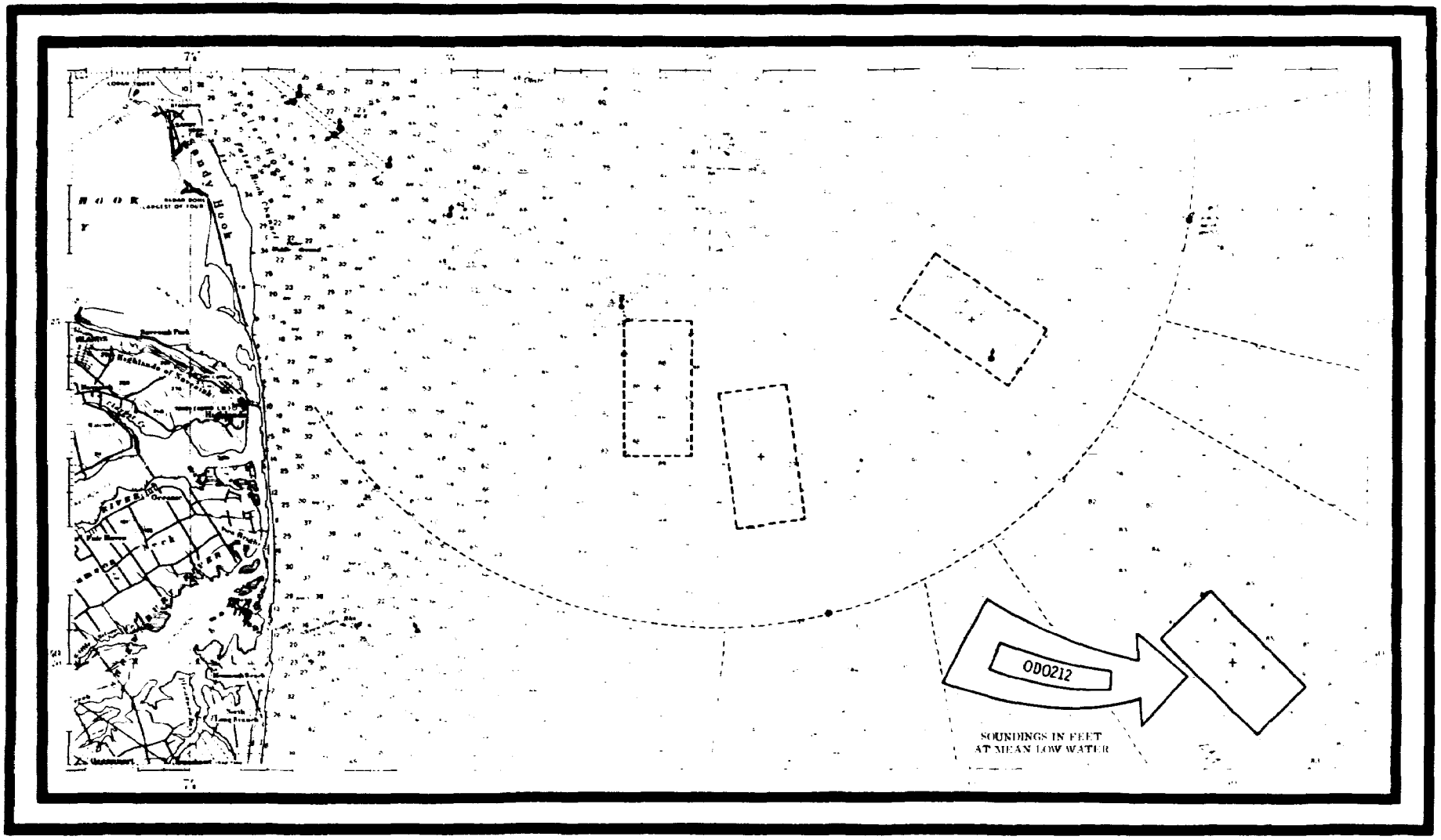
September 1973

SITE NO. OD0209

Figure 3.1-3

INTERSTATE ELECTRONICS CORPORATION

4460C1559



Center Coordinates	40° 20' 00" N, 73° 40' 00" W
Area	2.0 Square Nautical Miles
Navigation Chart No.	NOS 1215
Local Navigation Aids	Decca, Loran A & C, Omega, RDF, CG Radar
Material Type	Waste Acid
Primary Management	EPA

INTERIM DISPOSAL SITE

September 1973

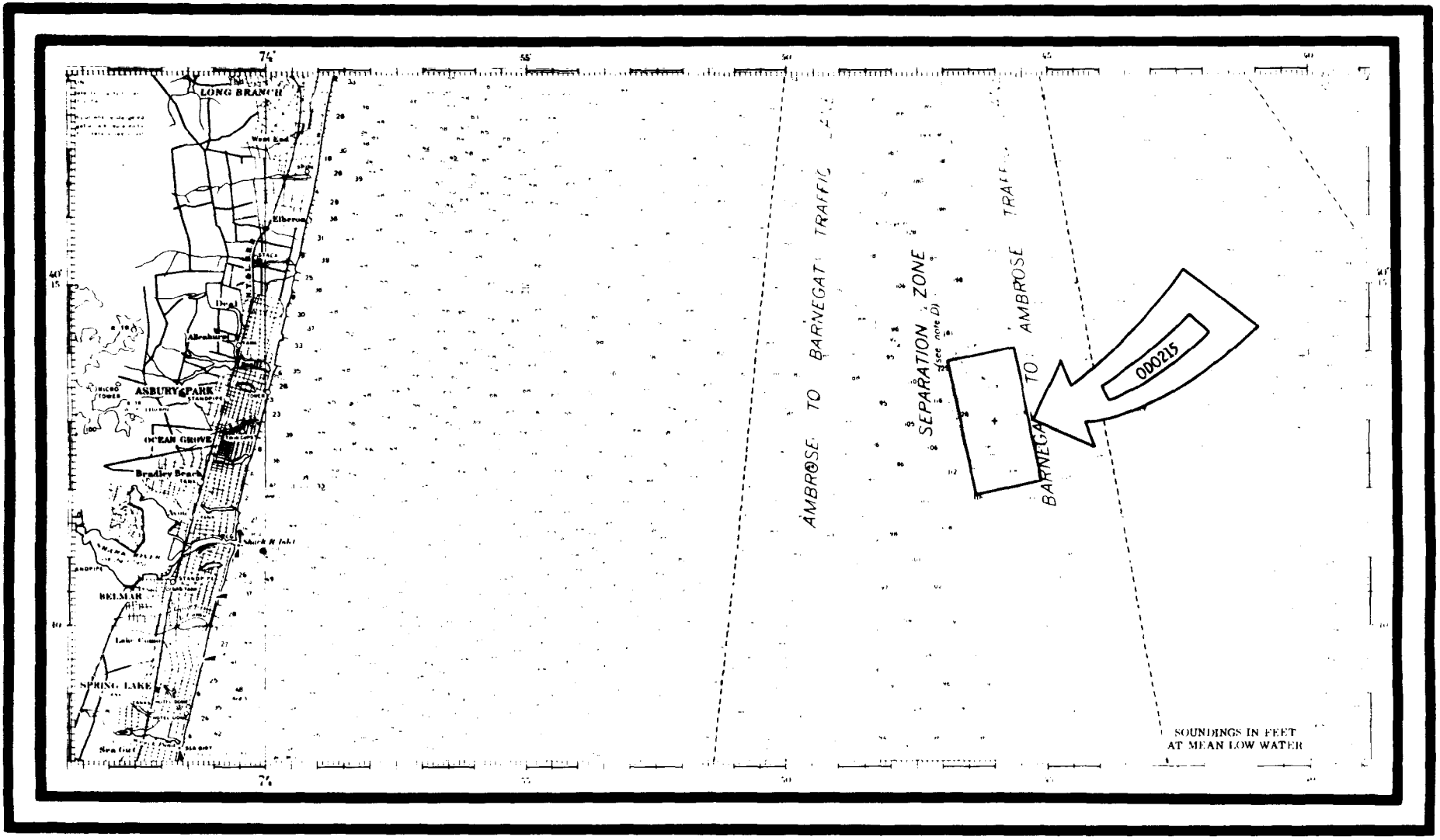
3.1-7

Figure 3.1-4

SITE NO. OD0212

INTERSTATE ELECTRONICS CORPORATION

U.S. ENVIRONMENTAL PROTECTION AGENCY
Ocean Disposal Program Office



Center Coordinates	40° 13' 00" N, 73° 46' 00" W
Area	2.0 Square Nautical Miles
Navigation Chart No.	NOS 1215
Local Navigation Aids	Decca, Loran A & C, Omega, RDF, CG Radar
Material Type	Wrecks
Primary Management	EPA

INTERIM DISPOSAL SITE

September 1973

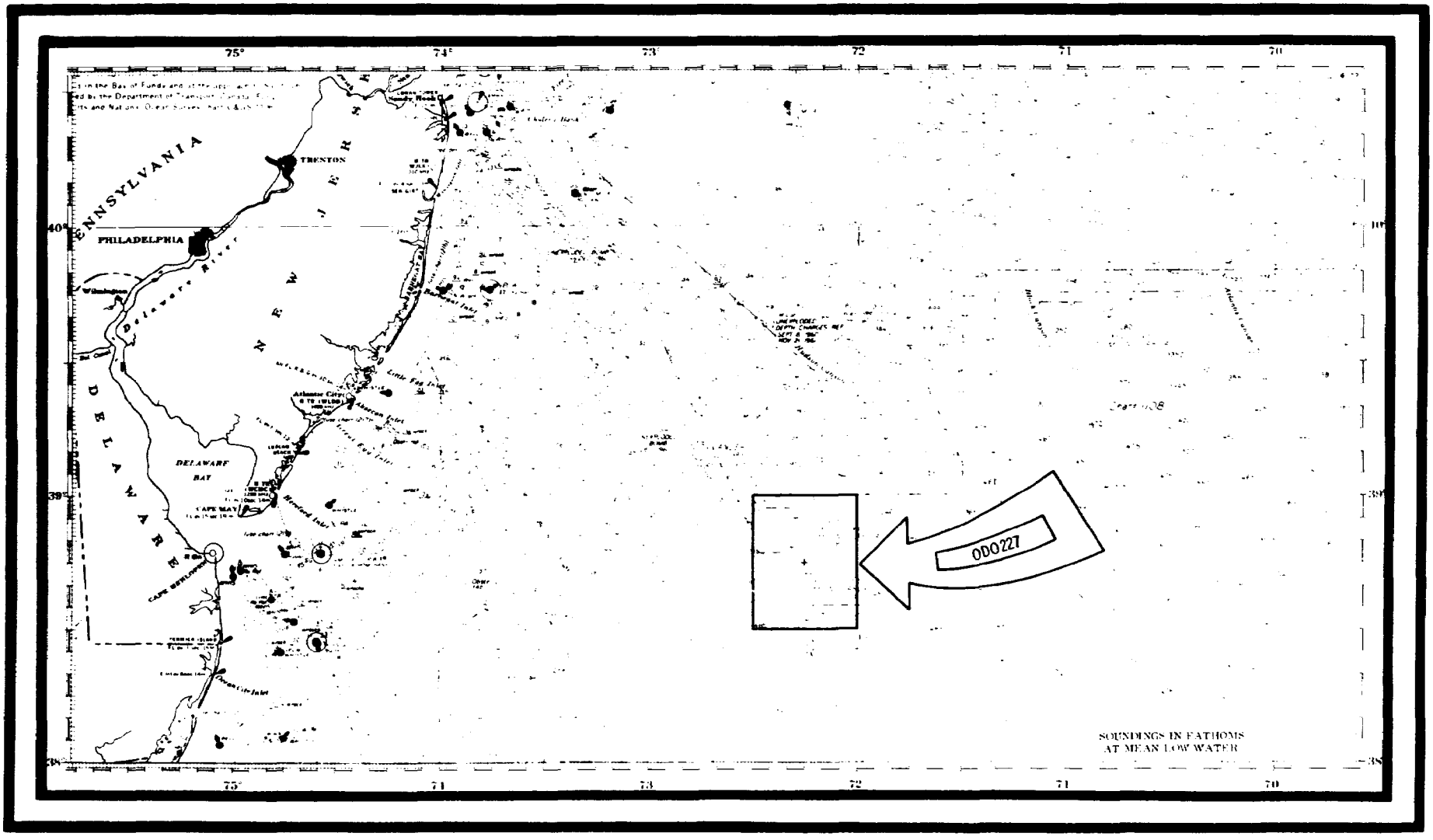
Figure 3.1-5

SITE NO. OD0215

INTERSTATE ELECTRONICS CORPORATION

4460C1559

4460C1559



Center Coordinates	38° 45' 00" N, 72° 15' 00" W
Area	701.9 Square Nautical Miles
Navigation Chart No.	NOS 1000
Local Navigation Aids	Loran A & C, Omega, Decca
Material Type	Toxic Chemicals
Primary Management	EPA

INTERIM DISPOSAL SITE

September 1973

Figure 3.1-6

SITE NO. ODO227

INTERSTATE ELECTRONICS CORPORATION

Section 4

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