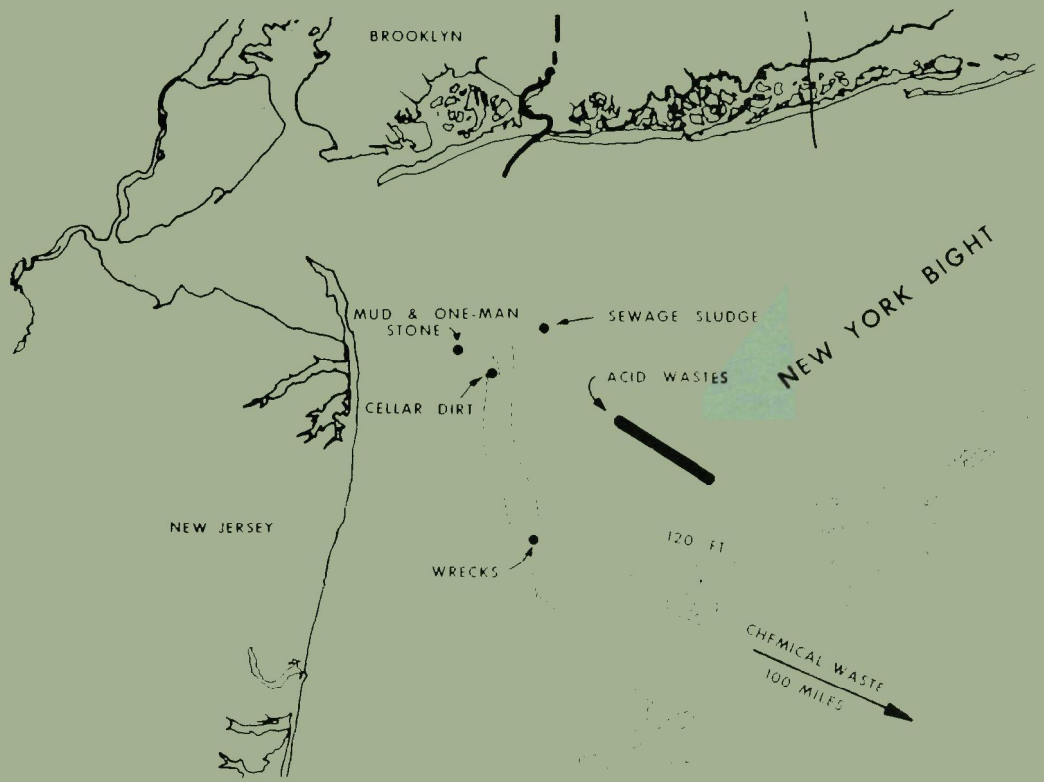
# OCEAN DISPOSAL

# IN THE NEW YORK BIGHT

# TECHNICAL BRIEFING REPORT

# NUMBER 2




U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION II
SURVEILLANCE & ANALYSIS DIVISION

APRIL 1975

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(Preliminary Data Subject to Revision)

## SUMMARY

The Environmental Protection Agency, Region II, has expressed its desire to halt indiscriminant dumping of waste materials in the marine environment on a number of occasions since assuming in April 1973 its mandate "to prevent or strictly regulate" ocean dumping under the Marine Protection, Research, and Sanctuaries Act of 1972 (Public Law 92-532). Over the past two years, the Region has implemented a series of programs (Table 8) with the stated ultimate goal for the phase out of ocean dumping of both industrial and municipal wastes in the New York Bight by 1981.

The initial phase of this comprehensive program was to establish a permit program which included the regulation of waste approved for dumping at designated sites, and the permit requirement for the submission of an implementation schedule or engineering studies leading to the phasing out of ocean dumping within a finite time period. A listing of the existing ocean disposal permits, and detailed descriptions of waste volumes and characteristics are included in this report for public review. These data indicate a decrease in volumes of both municipal sludges, from 5.6 million cubic yards in 1973 to 4.8 million in 1974, and industrial wastes, from 3.8 million cubic yards in 1973 to 3.6 million in 1974. Most of the reduction in sewage sludge volumes is attributable to construction and repair operations at several New York City treatment plants. The reduction in industrial wastes was small; however, under implementation schedules an additional 12 industrial dumpers will be phased out during 1975 resulting in a three hundred thousand cubic yard reduction.

An additional step in the Region's program to phase out ocean dumping was the initiation in 1974 of an EPA-funded investigation by the Interstate Sanitation Commission to identify environmentally acceptable, technically feasible, and viable alternatives to ocean disposal. The first quarterly report of this investigation titled, "New York-New Jersey Metropolitan Area Sewage Sludge Disposal Management Program", is included in this report. In this quarterly report is an outline of the technical investigation to be accomplished in this evaluation of alternatives.

A comprehensive sampling program was initiated in April 1974 to monitor the chemical and bacteriological quality of water and bottom sediments in the apex of the New York Bight and along the beaches of Long Island and New Jersey. Data collected in this sampling program is augmented by data collected by the National Oceanic and Atmospheric Administration (NOAA), State, and local agencies. Results of this monitoring program indicate that water along the Long Island and New Jersey beaches is safe for contact recreation and that the leading edge of the sludge mass associated with the sewage sludge dump site is still located approximately 5 1/2 - 6 miles from the Long Island shoreline. Plans are being formulated to expand this monitoring program to include the collection of samples for virological analyses.

The most recent phase was the decision to terminate use of the existing 12-mile sewage sludge dump site in 1976 and move to an alternate site(s). Although an alternate dump site(s) has not yet been selected, two areas designated by EPA and NOAA are being studied for interim use pending completion and implementation of an environmentally acceptable alternative. In accord with regional policy, a notice of intent to prepare an environmental impact statement (EIS) for the designation of an "interim" sewage sludge dump site or sites in the New York Bight was issued in January 1975. This notice reported that Dames and Moore of New York City had been awarded a contract in December 1974 to prepare the EIS. Documents relative to the decision to move the dump site and prepare an EIS are presented herein.

## INTRODUCTION

EPA, Region II has prepared this report entitled, "Ocean Disposal in the New York Bight, Technical Briefing Report Number 2" in continuance of its policy to maximize the distribution of information concerning its environmental programs to the public and other interested parties. The purpose of this report is to provide updated technical information gathered during the Region's monitoring program in the Bight and to supplement facts and figures released in earlier reports.

To date, the Region has released three similar reports containing information on implementing its mandated responsibilities under the Marine Protection, Research, and Sanctuaries Act of 1972. The titles and release dates of these earlier reports are as follows:

Ocean Dumping in the New York Bight - Facts & Figures - July 1973

Briefing Report - Ocean Dumping in the New York Bight Since 1973 - April 1974

Ocean Disposal in the New York Bight Technical Briefing Report Number 1 - July 1974

Any specific questions relative to data presented should be directed to Mr. Peter W. Anderson, Environmental Protection Agency, Region II, Surveillance and Analysis Division, Edison, N.J. 08817.

## VOLUMES AND CHARACTERISTICS OF WASTE MATERIALS DUMPED

A total of 14.6 million cubic yards of waste materials were disposed of in the New York Bight during 1974. Municipal sludges amounted to 4.9 million cubic yards, of which 49 percent was from New York City, 43 percent from sources in New Jersey, and the remainder from Nassau and Westchester Counties in New York State. Industrial wastes amounted to 3.6 million cubic yards. The remainder, 6.1 million cubic yards, resulted from the disposal of dredged spoils (84 percent) and construction debris (16 percent).

A graph summarizing the volumes of waste materials disposed of in the Bight during 1960-74 is presented in Figure 1. Also summarized in tabular form are the following:

Table 1 - Volumes of Waste Materials Dumped into the New York Bight (by dump site) -- 1960-74

Table 2 - Volumes of Waste Materials Dumped into the New York Bight (by permittee) -- 1973-74

Table 3 - Waste Characteristics (by permittee) - 1973

Table 4 - Waste Characteristics (by permittee) - 1974

Table 5 - List of Municipal Dumpers in New York

Table 6 - List of Municipal Dumpers in New Jersey

Table 7 - List of Industrial Dumpers

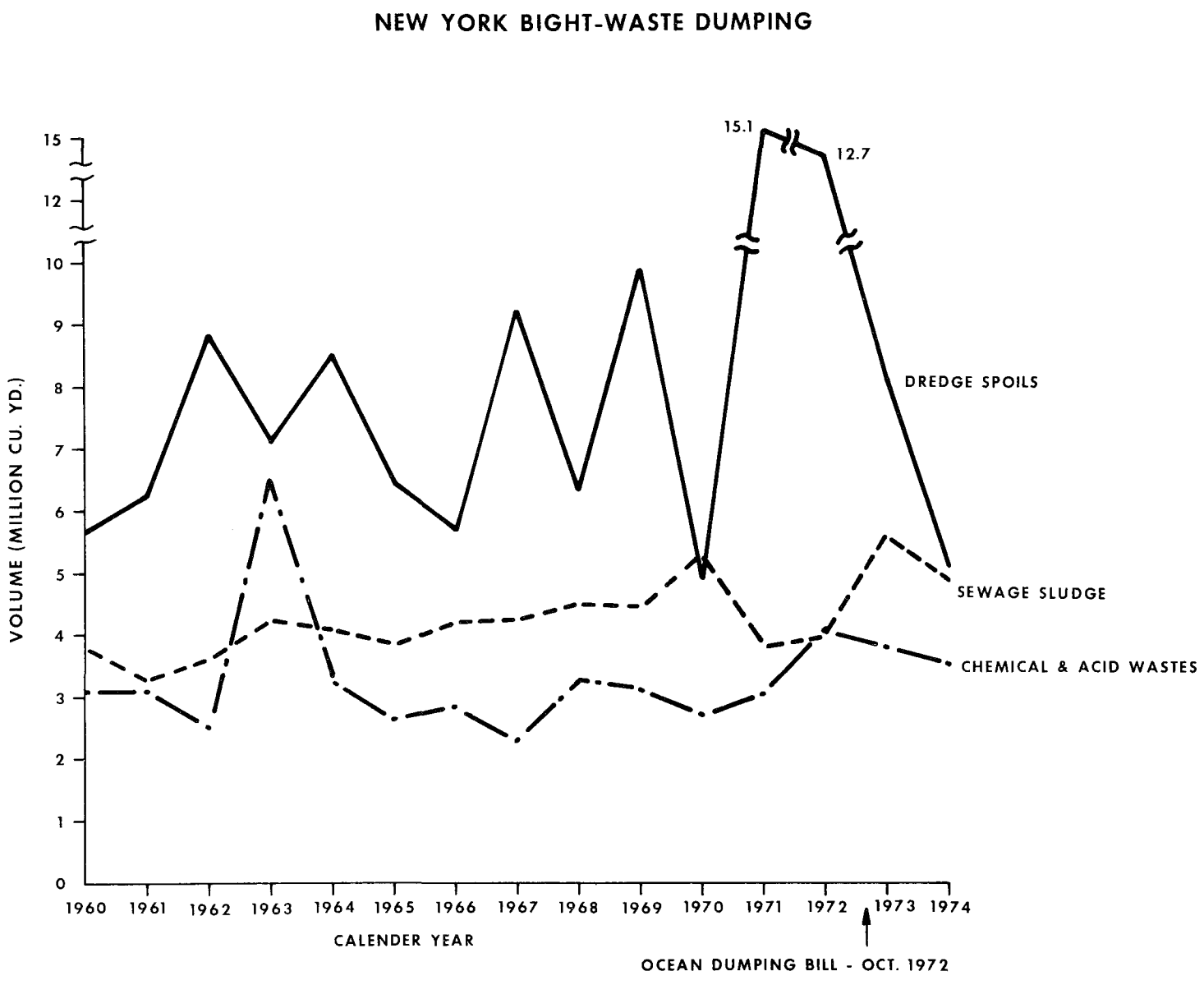

NEW YORK BIGHT-WASTE DUMPING
VOLUME (MILLION CU. YD.)
15
12
10
9
8
7
6
5
4
3
2
1
0
15.1
12.7
DREDGE SPOILS
SEWAGE SLUDGE
CHEMICAL & ACID WASTES
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
CALENDER YEAR
OCEAN DUMPING BILL - OCT. 1972

Figure 1

TABLE 1

VOLUMES OF WASTE MATERIALS DUMPED INTO THE NEW YORK BIGHT
(By Dump Site)

(Cubic Yards)

| | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
|---|---|---|---|---|---|---|---|---|
| Mud (Dredge Spoils) | 5,611,174 | 6,238,000 | 8,816,000 | 7,186,000 | 8,540,000 | 6,480,000 | 5,687,000 | 9,214,000 |
| Sewage Sludge | 3,819,855 | 3,354,000 | 3,626,000 | 4,259,000 | 4,078,000 | 3,863,000 | 4,201,000 | 4,265,000 |
| Chemical Wastes | - | 7,000 | 13,000 | 690,000 | - | - | - | 150 |
| Acid Wastes | 3,071,000 | 3,100,000 | 2,551,000 | 5,797,000 | 3,310,000 | 2,634,000 | 2,857,000 | 2,297,000 |
| Cellar Dirt | 738,000 | 810,000 | 807,000 | 988,000 | 756,000 | 912,000 | 319,000 | 509,000 |

| | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|---|---|---|---|
| Mud (Dredge Spoils) | 6,361,000 | 9,880,000 | 4,905,000 | 15,062,000 | 12,785,000 | 8,130,000 | 5,113,000 |
| Sewage Sludge | 4,481,000 | 4,455,000 | 5,287,000 | 3,830,000 | 3,955,000 | 5,600,000 | 4,860,000 |
| Chemical Wastes | 83,000 | 86,000 | 160,000 | 222,000 | 943,000 | 664,000 | 585,000 |
| Acid Wastes | 3,143,000 | 3,054,000 | 2,605,000 | 2,828,000 | 3,112,000 | 3,136,000 | 2,970,000 |
| Cellar Dirt | 400,000 | 632,000 | 796,000 | 676,000 | 969,000 | 827,000 | 1,048,000 |

TABLE 2

VOLUMES OF WASTE MATERIALS DUMPED INTO THE NEW YORK BIGHT
(By Permittee)

(Cubic Yards)

| | 1973 | 1974 |
|---|---|---|
| **N.J. MUNICIPALITIES** | | |
| Bergen County Sewer Authority | 285,000 | 237,000 |
| Joint Meeting of Essex & Union Counties | 121,000 | 138,000 |
| Joint Venture | 37,000 | 41,000 |
| Linden Roselle Sewerage Authority | 63,000 | 82,000 |
| Middlesex County Sewerage Authority | 402,000 | 427,000 |
| Middletown Sewerage Authority | 22,000 | 13,000 |
| Passaic Valley Sewerage Commissioners | 702,000 | 750,000 |
| Modern Transportation Company | 308,000 | 383,000 |
| | 1,940,000 | 2,071,000 |
| **N.Y. MUNICIPALITIES** | | |
| City of Long Beach | 24,000 | 24,000 |
| Nassau County | 293,000 | 295,000 |
| Westchester County | 100,000 | 100,000 |
| West Long Beach Sewer District | 4,000 | 4,000 |
| City of New York - | | |
| Bowery Bay | 448,000 | 225,000 |
| Coney Island | 146,000 | 113,000 |
| Hunts Point | 285,000 | 108,000 |
| Jamaica | 234,000 | 170,000 |
| Owls Head | 219,000 | 99,000 |
| Newtown Creek | 1,162,000 | 973,000 |
| Port Richmond | 28,000 | 32,000 |
| Rockaway | 35,000 | 59,000 |
| Tallman Island | 85,000 | 23,000 |
| Wards Island | 512,000 | 487,000 |
| 26th Ward | 77,000 | 83,000 |
| | 3,652,000 | 2,795,000 |
| **INDUSTRIES** | | |
| DuPont | 292,000 | 268,000 |
| Chevron | 41,000 | 32,000 |
| Hess Oil | 9,000 | -- |
| American Cyanamid | 151,000 | 167,000 |
| NL Industries | 3,136,000 | 2,970,000 |
| Allied Chemical | 68,000 | 69,000 |
| Modern Transportation Company | 100,000 | 49,000 |
| | 3,697,000 | 3,555,000 |

TABLE 3

WASTE CHARACTERISTICS
(By Permittee)

Concentration Averages
(ug/l)

1973

| | Hq | Cd | Oil (mg/l) | As | Pb | Cu | Zn | Se | V | Be | Cr | NI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Modern Trans (Munic) | 333 | 5,217 | 3,141 | 145 | 1,920 | 13,830 | 662,100 | 205 | 240 | 47 | 2,855 | 788 |
| Bergen County SA | 628 | 1,379 | 570 | 95 | 30,156 | 52,440 | 192,090 | <10 | 294 | 16 | 366,130 | 10,750 |
| Joint Meeting | 2,524 | 7,501 | 1,839 | 98 | 96,625 | 156,530 | 292,380 | 21 | <200 | 34 | 117,690 | 22,710 |
| Linden Roselle SA | 784 | 5,369 | 39,483 | 23 | 43,750 | 143,750 | 423,750 | 1,937 | <500 | 41 | 58,630 | 38,750 |
| Middlesex CSA | 1,225 | 5,304 | 1,502 | 132 | 20,893 | 40,560 | 135,380 | 9 | 919 | <17 | 14,610 | 6,439 |
| Middletown SA | 11 | 34 | - | 3 | 28 | 2,210 | 8,620 | - | - | - | 1,300 | 2,110 |
| Passaic Valley SC | 1,313 | 9,925 | 494 | 391 | 67,000 | 59,960 | 278,880 | 15 | <200 | 18 | 112,800 | 21,360 |
| City of Long Beach | 49 | 184 | 2,259 | 500 | 6,000 | 9,600 | 26,600 | 400 | 550 | <100 | 1,140 | 600 |
| Nassau County | .7 | 1,426 | 2,410 | 50 | 8,700 | 23,380 | 25,000 | 5 | 2,000 | <40 | 23,230 | 2,240 |
| Westchester County | 161 | 2,684 | 1,834 | <1 | 9,800 | 375,000 | 192,000 | 12,000 | <200 | <133 | 22,000 | 8,100 |
| West Long Beach SD | 580 | 340 | 128 | <10 | 11,800 | 13,500 | 48,400 | <10 | 500 | 12 | 1,920 | 10,000 |
| Bowery Bay - NYC | 413 | 1,103 | 1,149 | 300,250 | 31,750 | 64,380 | 87,310 | 182,500 | 1,131 | 22 | 43,130 | 7,900 |
| Coney Island - NYC | 566 | 493 | 1,817 | 168,750 | 46,500 | 70,130 | 167,000 | 140,630 | 1,062 | 22 | 16,280 | 8,240 |

TABLE 3 (Continued)
(ug/l)

| | Hg | Cd | Oil (mg/l) | As | Pb | Cu | Zn | Se | V | Be | Cr | Ni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hunts Point - NYC | 529 | 253 | 878 | 215,630 | 30,030 | 45,000 | 52,750 | 168,750 | 1,012 | 18 | 17,580 | 4,430 |
| Jamaica - NYC | 884 | 643 | 1,420 | 153,130 | 51,330 | 72,500 | 134,750 | 177,500 | 837 | 25 | 27,130 | 11,060 |
| Owl's Head - NYC | 336 | 959 | 846 | 143,750 | 41,500 | 48,000 | 65,630 | 143,750 | 419 | 14 | 20,350 | 5,750 |
| Port Richmond - NYC | 217 | 188 | 929 | 143,130 | 22,500 | 19,240 | 53,000 | 133,750 | 406 | 15 | 3,360 | 2,360 |
| Rockaway - NYC | 604 | 333 | 1,460 | 152,690 | 36,810 | 96,130 | 166,500 | 140,130 | 741 | 18 | 11,910 | 3,310 |
| Tallman Island - NYC | 449 | 560 | 1,159 | 177,500 | 23,780 | 49,380 | 112,688 | 130,000 | 819 | 17 | 29,750 | 23,000 |
| Wards Island - NYC | 223 | 195 | 883 | 200,000 | 33,580 | 66,750 | 60,313 | 156,250 | 1,203 | 14 | 26,975 | 2,500 |
| 26th Ward - NYC | 715 | 4,854 | 3,437 | 150,000 | 98,700 | 64,500 | 116,063 | 240,625 | 1,916 | 26 | 28,600 | 61,013 |
| Newtown Creek - NYC | 468 | 4,356 | 942 | 218,750 | 160,630 | 57,500 | 82,813 | 184,375 | 459 | 16 | 64,950 | 7,925 |
| Joint Venture | 104 | 442 | 4,803 | <7 | 1,475 | 6,226 | 1,472 | 313 | 76 | 123 | 1,304 | 617 |
| Modern (Ind) | 550 | 5,251 | 1,417 | 44 | 4,879 | 31,355 | 305,520 | 894 | 370 | 188 | 11,706 | 1,785 |
| E. I. DuPont | 15 | 93 | - | <3 | 540 | 434 | 462 | 592 | <200 | <14 | 380 | 720 |
| Chevron | 193 | <6 | 49 | 1,350 | 1,650 | 458 | 197 | 400 | 197 | <55 | 63 | 452 |
| Hess | <.25 | 113 | 31,542 | <3 | 1,100 | 220 | 1,180 | <50 | <200 | <20 | 580 | 200 |
| American Cyanamid | 71 | 5 | - | 827 | 442 | 113 | 1,595 | 47 | 166 | <11 | 1,117 | 3,433 |
| NL Industries | <2.4 | <390 | - | 30 | 1,648 | 7,297 | 24,650 | <5,000 | 74,507 | 11 | 14,236 | 5,840 |
| Allied Chemical | 10 | 17 | - | 8 | 23 | 83 | 93 | 102 | <200 | <17 | <20 | 160 |

TABLE 4

WASTE CHARACTERISTICS
(By Permittee)

Concentration Averages
(ug/l)

1974

| | Hg | Cd | Oil (mg/l) | As | Pb | Cu | Zn | Se | V | Be | Cr | Ni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Modern Trans (Munic) | 143 | 7,151 | 947 | <20 | 11,936 | 33,499 | 101,771 | <59 | <485 | <260 | 8,200 | 5,704 |
| Bergen County SA | 1,314 | 17,903 | 1,493 | <30 | 42,336 | 73,375 | 106,711 | 28 | <445 | <20 | 194,883 | 15,168 |
| Joint Meeting | 852 | 6,263 | 9,200 | 15 | 45,708 | 95,980 | 102,602 | 8 | <550 | <20 | 62,978 | 5,989 |
| Linden Roselle SA | 290 | 3,757 | 28,313 | <19 | 23,714 | 106,814 | 254,194 | <680 | <314 | <23 | 42,829 | 9,143 |
| Middlesex CSA | 170 | 2,621 | 720 | 46 | 97,950 | 52,953 | 233,998 | <8 | <560 | <20 | 33,358 | 9,730 |
| Middletown SA | 136 | 268 | 3,654 | <17 | 5,425 | 19,050 | 44,250 | <480 | <200 | <18 | 15,700 | 725 |
| Passaic Valley SC | 1,110 | 11,375 | 11,898 | 81 | 164,748 | 44,806 | 277,793 | <9 | <200 | <20 | 99,628 | 13,814 |
| City of Long Beach | 380 | 410 | 5,400 | <4,000 | - | - | - | - | - | - | - | - |
| Nassau County | <5 | 130 | 2,114 | <1 | 8,100 | 24,200 | 22,900 | <65 | 480 | <40* | - | 2,240 |
| Westchester County | 1,674 | 5,981 | 4,437 | 4,000 | 33,000 | 53,000 | 74,000 | <10 | <80 | <240 | 11,300 | 4,000 |
| West Long Beach SD | - | - | - | - | - | - | - | - | - | - | - | - |
| Bowery Bay | 465 | 1,230 | 4,465 | 2,400 | 56,000 | 119,000 | 143,000 | 9,900 | 1,800 | 40 | 64,000 | 17,000 |
| Coney Island | 310 | 380 | 6,735 | 2,400 | 66,000 | 106,000 | 101,000 | 5,030 | 2,000 | 40 | 10,000 | 9,900 |
| Hunts Point | <50 | 338 | 2,435 | 2,000 | 26,000 | 38,000 | 40,000 | 6,800 | 1,500 | 33 | 7,400 | 3,200 |
| Jamaica | 215 | 430 | 5,870 | 2,500 | 38,000 | 65,000 | 90,000 | 11,500 | 1,200 | 36 | 14,000 | 14,000 |

TABLE 4 (Continued)
(ug/l)

| | Hg | Cd | Oil (mg/l) | As | Pb | Cu | Zn | Se | V | Be | Cr | Ni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Owl's Head | 260 | 600 | 4,755 | 9,500 | 34,000 | 103,000 | 112,000 | 8,500 | 2,200 | 45 | 30,000 | 8,500 |
| Port Richmond | 260 | 88 | 9,560 | 1,500 | 16,000 | 16,000 | 46,000 | 6,900 | 1,000 | 36 | 1,700 | 2,100 |
| Rockaway | 315 | 435 | 2,815 | 1,400 | 64,000 | 173,000 | 134,000 | 6,300 | 2,600 | 54 | 14,500 | 6,000 |
| Tallman Island | 630 | 240 | 3,020 | 5,700 | 84,000 | 108,000 | 120,000 | 20,000 | 1,700 | 37 | 40,000 | 84,000 |
| Wards Island | 135 | 230 | 4,435 | 170 | 30,000 | 56,000 | 41,000 | 5,600 | 1,000 | 42 | 12,000 | 2,200 |
| 26th Ward | 475 | 1,185 | 14,050 | 6,800 | 100,000 | 79,000 | 111,000 | 6,500 | 2,800 | 46 | 34,000 | 7,200 |
| Newtown Creek | 145 | 1,465 | 4,300 | 960 | 284,000 | 65,000 | 76,000 | 13,100 | 1,400 | 36 | 95,000 | 13,500 |
| Joint Venture | 15.3 | 4.1 | 4.45 | 30 | 15,300 | 2,300 | 30,800 | 140 | <1,000 | <20 | 710 | 1,000 |
| Modern Trans. (Ind) | 45 | 33.5 | 249 | <20 | 38,740 | 23,725 | 410,500 | <100 | <500 | <500 | 1,462 | 4,800 |
| E. I. DuPont | 12.5 | 121 | 12.8 | 9.6 | 421 | 421 | 829 | <100 | <200 | 24 | 434 | 813 |
| Chevron | 26.3 | 158 | 107 | 487 | 2,386 | 1,143 | 2,557 | <50 | - | <50 | 557 | 457 |
| American Cyanamid | 18.3 | 2.0 | 435 | 324 | 70.5 | 38 | 257 | 5.8 | <200 | <20 | 360 | 487 |
| NL Industries | <5 | <500 | 2.4 | 31.0 | 1,498 | 3,848 | 22,923 | <5,000 | 74,465 | 20 | 14,517 | 7,713 |
| Allied Chemical | 10.3 | <20 | <1.0 | 780 | 123 | 83.1 | 104 | <20 | <200 | 20 | 41 | 104 |

TABLE 5

New York Municipal Permits

(Effective as of April 1, 1975)

| Permit No. | Waste Generator | Waste Transporter | Type | Dump Site | Expiration Date |
|---|---|---|---|---|---|
| NY007 | City of Long Beach | General Marine Transportation Corp. | Interim Special | Sewage Sludge | 7/30/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY009 | City of New York Wards Island Plant | City of New York | Interim Special | Sewage Sludge | 6/22/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY028 | County of Nassau Dept. of Public Works | General Marine Transportation & Ocean Disposal Co., Inc. | Interim Special | Sewage Sludge | 7/17/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY029 | County of Westchester, Dept. of Public Works | McAllister Brothers, Inc. | Interim Special | Sewage Sludge | 7/30/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY031 | West Long Beach Sewer District | General Marine Transportation Corp. | Interim Special | Sewage Sludge | 7/31/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY047 | City of New York Hunts Pt. Plant | City of New York | Interim Special | Sewage Sludge | 6/22/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY048 | City of New York 26th Ward Plant | City of New York | Interim Special | Sewage Sludge | 6/22/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |

TABLE 5 (Cont)

| Permit No. | Waste Generator | Waste Transporter | Type | Dump Site | Expiration Date |
|---|---|---|---|---|---|
| NY049 | City of New York Coney Is. Plant | City of New York | Interim Special | Sewage Sludge | 6/18/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY050 | City of New York Owls Head Plant | City of New York | Interim Special | Sewage Sludge | 6/28/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY051 | City of New York Newtown Creek Plant | City of New York | Interim Special | Sewage Sludge | 6/28/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY052 | City of New York Jamaica Plant | City of New York | Interim Special | Sewage Sludge | 7/17/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY053 | City of New York Tallman Island Plant | City of New York | Interim Special | Sewage Sludge | 7/17/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY054 | City of New York Bowery Bay Plant | City of New York | Interim Special | Sewage Sludge | 7/17/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY055 | City of New York Rockaway Plant | City of New York | Interim Special | Sewage Sludge | 7/20/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY056 | City of New York Port Richmond Plant | City of New York | Interim Special | Sewage Sludge | 7/20/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NY068 | City of Glen Cove | Modern Transportation Co. | Interim | Sewage Sludge | 4/14/75 |

TABLE 6

New Jersey Municipal Permits

(Effective as of April 1, 1975)

| Permit No. | Waste Generator | Waste Transporter | Type | Dump Site | Expiration Date |
|---|---|---|---|---|---|
| NJ002 | Twp. of Middletown Sewerage Auth. | General Marine Transportation Co. | Interim Special | Sewage Sludge | 7/22/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NJ003 | Passaic Valley Sewerage Commissioners | A&S Transportation Co. & Weeks Dredging & Contracting Corp. | Interim Special | Sewage Sludge | 6/28/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NJ008 | Middlesex County Sewerage Auth. | A&S Transportation Company | Interim Special | Sewage Sludge | 7/17/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NJ017 | Modern Transportation Co. | Modern Transportation Co. | Interim Special | Sewage Sludge | 8/3/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NJ019 | Bergen County Sewer Auth. | A&S Transportation Co. | Interim Special | Sewage Sludge | 7/20/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |
| NJ021 | The Linden Roselle Sewerage Auth. | A&S Transportation Co.- Ocean Disposal Co., Inc. | Interim Special | Sewage Sludge | 7/20/73 |
| | | | Interim Special | Sewage Sludge | 4/15/74 |
| | | | Interim | Sewage Sludge | 4/14/75 |

TABLE 6 (Cont)

| Permit No. | Waste Generator | Waste Transporter | Type | Dump Site | Expiration Date |
|---|---|---|---|---|---|
| NJ022 | The Joint Meeting of Essex & Union Counties | Ocean Disposal Co. Inc. & A&S Transportation Co. | Interim Special<br>Interim Special<br>Interim | Sewage Sludge<br>Sewage Sludge<br>Sewage Sludge | 7/30/73<br>4/15/74<br>4/14/75 |
| NJ069 | Borough of Fairfield | General Marine Transport Co. | Interim | Sewage Sludge | 4/14/75 |
| NJ092 | William Schaefer | General Marine Transport Co. | Interim | Sewage Sludge | 7/14/75 |
| NJ103 | Caldwell Trucking | General Marine Transport Co. | Interim | Sewage Sludge | 7/14/75 |

TABLE 7

Industrial Permits

(Effective as of April 1, 1975)

| Permit No. | Waste Generator | Waste Transporter | Type | Dump Site | Expiration Date |
|---|---|---|---|---|---|
| NJ001 | American Cyanamid Co. Warners Plant | Spentonbush Transport Service Co. Inc. | Interim Special | 106 Mile | 7/20/73 |
| | | | Interim Special | 106 Mile | 7/15/74 |
| | | | Interim | 106 Mile | 7/14/75 |
| NJ004 | Allied Chemical Corp. Specialty Chemicals Division | Allied Chemical Corp. | Interim Special | Acid Grounds | 7/20/73 |
| | | | Interim Special | Acid Grounds | 10/31/74 |
| | | | Interim | Acid Grounds | 7/14/75 |
| NJ006 | E.I.duPont De Nemours & Co.,Grasselli Plt. | Spentonbush Transport Service Co. Inc. | Interim Special | Acid Grounds | 6/28/73 |
| | | | Interim Special | Acid Grounds | 10/31/74 |
| | | | Interim | 106 Mile | 7/14/75 |
| NJ010 | Merck & Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ011 | Chevron Oil Co. | Spentonbush Transport Service Co. Inc. | Interim Special | 106 Mile | 7/30/73 |
| | | | Interim Special | 106 Mile | 7/15/74 |
| | | | Interim | 106 Mile | 7/14/75 |
| NJ014 | NL Industries Titanium Pigment Div. | Moran Towing & Transportation Co. Inc. | Interim Special | Acid Grounds | 10/31/74 |
| | | | Interim | Acid Grounds | 7/14/75 |
| NY023 | Moran Towing Corp. Disposal Div. | Moran Towing & Transportation Co. Inc. | Interim Special | Cellar Dirt | 5/15/74 |
| | | | Special | Cellar Dirt | 5/14/75 |

TABLE 7 (Cont)

| Permit No. | Waste Generator | Waste Transporter | Type | Dump Site | Expiration Date |
|---|---|---|---|---|---|
| NJ033 | Amerada Hess Corp. Hess Oil & Chem. Div. | Spentonbush Transport Service Co., Inc. | Interim Special<br>Interim Special<br>Interim | 106 Mile<br>106 Mile<br>106 Mile | 8/29/73<br>7/15/74<br>7/14/75 |
| NJ063 | Whippany Paper Board Co., Inc. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ065 | Sobin Chemicals Inc. Montrose Chem. Div. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ066 | International Wire Products Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NY067 | Water Tunnel Contractors (Joint Venture) | Moran Towing & Transport Co., Inc. | Special | Cellar Dirt | 5/14/75 |
| NJ070 | Mycalex Corp. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ071 | Arrow Group Industries, Inc. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ072 | Howmet Corp. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ073 | Worthington Biochemical Corp. | Modern Transportation Co. | Interim | 106 Mile | 5/31/75 |
| NJ074 | Reheis Chemical Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |

TABLE 7 (Cont)

| Permit No. | Waste Generator | Waste Transporter | Type | Dump Site | Expiration Date |
|---|---|---|---|---|---|
| NJ076 | M/M Mars | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ077 | The Coca-Cola Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ078 | Curtiss-Wright Corp. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ079 | Eagle Extrusion Corp. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ081 | Norda Inc. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ082 | S.B. Penick & Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ083 | Solvents Recovery Service of N.J.,Inc. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ084 | Tenco Division of Coca-Cola Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ085 | The Nestle Co.Inc. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ086 | U.S. Radium Corp. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ093 | Warner-Lambert Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ096 | Blue Ridge-Winkler Textiles | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ097 | Pfizer Inc. Leeming/ Pacquin Division | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |

TABLE 7 (Cont)

| Permit No. | Waste Generator | Waste Transporter | Type | Dump Site | Expiration Date |
|---|---|---|---|---|---|
| NJ098 | J.T. Baker Chemical Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ099 | Fritsche Dodge & Olcott | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ100 | Evor Phillips Leasing Co. Inc. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ101 | Riegal Products Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ102 | Keuffel & Esser Co. | Modern Transportation Co. | Interim | 106 Mile | 7/14/75 |
| NJ106 | American Cyanamid Co. Agricultural Div. | Modern Transportation Co. | Interim | Sewage Sludge | 7/14/75 |
| NJ107 | Modern Transportation Co. | Modern Transportation Co. | Interim | 106 Mile | 8/31/75 |
| NJ109 | S.B. Thomas, Inc. | General Marine Transport Inc. | Interim | 106 Mile | 8/31/75 |
| PA110 | Crompton & Knowles Corp. | Modern Transportation Co. | Interim | 106 Mile | 2/16/76 |

## LONG-RANGE GOAL FOR PHASE OUT OF OCEAN DISPOSAL IN NEW YORK BIGHT BY 1981

In accordance with its mandated responsibilities under the Marine Protection, Research, and Sanctuaries Act of 1972 "to prevent or strictly limit the dumping into ocean waters of any material which would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities," EPA, Region II has committed itself to an orderly and environmentally acceptable plan with the ultimate goal of phasing out ocean disposal of both industrial and municipal wastes by 1981. The programs initiated to date under this plan are contained in Table 8.

Included in this section for general information are reproductions of the following correspondence:

1. A letter of modification to municipalities in the New York Metropolitan area that ocean dumping permits will not be renewed for the continued use of the existing sewage sludge dump site in the latter part of 1976.

2. The notice of intent to prepare an environmental impact statement for the designation of an "interim" sewage sludge dump site or sites in the New York Bight.

3. A letter of notification to the U.S. Army, Corps of Engineers concerning the continued use of the present dredged spoil dump site.

4. A letter of notification to existing ocean dumping permittees concerning the designation of the "most appropriate marine sensitive organism(s)" for use in the determination of waste toxicity.

5. Statement presented by EPA at the New York State Select Committee on Environmental Conservation hearing on February 20, 1975.

6. Statement presented by NOAA at the New York State Select Committee on Environmental Conservation hearing on February 20, 1975.

7. First quarterly report on Interstate Sanitation Commission's New York-New Jersey Metropolitan Area Sewage Sludge Disposal Management Program.

TABLE 8

PROGRAMS INITIATED

1970 - N.Y. BIGHT STUDY BY COE-NOAA

1971 - EPA CONDITIONS MUNICIPAL-FACILITIES CONSTRUCTION GRANTS

1972 - EPA-OCEAN COUNTY INITIATE "LAND RECYCLING" STUDY: $200,000, 3 YEARS

- EPA-NERC INITIATES EXPERIMENTAL MODELING STUDIES

1973 - OCEAN DUMPING BILL EFFECTIVE - EPA PERMIT PROGRAM STARTED

- EPA SEGREGATES INDUSTRIAL & MUNICIPAL WASTES AND ASSIGNS TO SPECIFIC SITES

1974 - EIGHT (8) INDUSTRIAL PERMITS/APPLICATIONS DENIED OR WITHDRAWN

- FORTY-SEVEN (47) INDUSTRIAL DUMPERS PHASED OUT

- TWELVE (12) INDUSTRIAL DUMPERS REQUIRED TO PHASE OUT BY 6/75

- MUNICIPALITIES NOTIFIED OF MOVING TO ALTERNATE SITE DURING SECOND HALF OF '76

- EPA INITIATES THREE-PHASE MONITORING PROGRAM IN N.Y. BIGHT

- NOAA INITIATES FIELD STUDIES OF ALTERNATE SITES FOR EIS

- EPA-ISC INITIATE "ENVIRONMENTALLY ACCEPTABLE ALTERNATIVE" STUDY: $200,000, 2 YEARS

- EPA NOTIFIES COE OF SITE CHANGE FOR DREDGE SPOIL

- EPA-RAYTHEON CORPORATION INITIATE THREE CRUISE BASELINE STUDY IN ALTERNATE SITE: $540,000, 2 YEARS

- FIVE (5) ENFORCEMENT PROCEEDINGS INITIATED

- INDUSTRIES REQUIRED TO SUBMIT IMPLEMENTATION PLANS OR ENGINEERING REPORTS FOR THE COMPLETE PHASE OUT OF OCEAN DUMPING

TABLE 8 (Cont)

1975 - EPA-DAMES AND MOORE INITIATE PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT FOR NEW INTERIM SEWAGE SLUDGE SITE: $150,000, 2 YEARS

- EPA DESIGNATES "MOST APPROPRIATE MARINE SENSITIVE ORGANISM(S)" FOR USE IN BIOASSAY REPORTS WITHIN REGION II

- EPA INITIATES VIROLOGY STUDIES IN N.Y. BIGHT

- EPA-NOAA-ISC INITIATE EXPANDED FIELD STUDIES OF ALTERNATE SITES FOR EIS: $130,000, 1 YEAR

- THREE (3) ENFORCEMENT PROCEEDINGS INITIATED

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

October 2, 1974

Earlier this year we notified you of our intention of moving the sewage sludge disposal site from its present location, 12 miles off the coast, to a new location approximately 65 miles from the apex of the New York Bight. Our position on the use of a site(s), within the designated areas is now firm; therefore, in 1976 your ocean disposal permit will not be renewed for the continued use of the present site. The specific location of the new "interim" site(s), will be designated in 1975, and will be used until such time as environmentally acceptable alternatives are implemented. The attached map provides specific details on the location of the new designated areas.

As you know, EPA and NOAA's monitoring studies still continue to indicate that use of the present sewage sludge site does not pose any immediate threat to the waters of Long Island or New Jersey. It is our opinion, however, that the existing site cannot accommodate the anticipated three-fold increase in the volume of sludge, which will result from an upgrading of treatment facilities in this area. Thus, until satisfactory alternate means of disposal are developed, a new "interim" ocean disposal site(s) must be used.

Studies to support an Environmental Impact Statement, which must be undertaken before any new site can be utilized, have already been initiated. Various sites within both designated areas are being investigated, thus, pending completion of these studies, the actual site(s) cannot be selected. If for some reason sites within these areas are found to be unsuitable for the disposal of sludge, sites outside of these areas, however within the same "steaming distance", will be selected and available by 1976.

A detailed study aimed at evaluating the possible alternatives to ocean disposal in the greater New York-New Jersey Metropolitan area has already been initiated. Should this investigation demonstrate that other alternatives are viable, technically feasible and environmentally acceptable, our goal will be to phase out ocean disposal by 1981.

If your agency plans on continuing ocean disposal in 1976, you should immediately make the necessary commitments in terms of funding, contracts and/or equipment, to meet this new requirement. Our position not to reissue permits for the present disposal site in 1976 is firm.

You are reminded that designations of a new disposal site in no way eliminates or reduces your responsibility —— financial or technical —— for monitoring the impact of your disposal operations, as required under Section 228 of the Ocean Dumping Regulations. This self-monitoring program will be implemented as soon as final regulations are promulgated.

If you have any questions concerning details of this decision, please contact Richard T. Dewling, Director, Surveillance & Analysis Division, Edison, N.J. at 201-548-3347, Ext. 401.

Sincerely yours,

Gerald M. Hansler, P.E.
Regional Administrator

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

JAN 17 1975

To All Interested Government Agencies and Public Groups:

In accord with the guidelines for the preparation of environmental impact statements, attached is a notice of intent to prepare such a statement for the proposed Agency action specified below:

Designation of a New Interim Sewage Sludge Disposal Site or Sites in the New York Bight of the Atlantic Ocean.

Under the Marine Protection, Research, and Sanctuaries Act of 1972, (P.L. 92-532), EPA is responsible for issuing permits authorizing the disposal of sewage sludge in oceanic waters. The following are major municipalities which currently hold interim ocean disposal permits for dumping sewage sludges at the existing disposal site:

| New York City | New Jersey | Nassau County |
|---|---|---|
| Bowery Bay Plant | Bergen County Sewer Authority | City of Glen Cove |
| Coney Island Plant | Borough of Fairfield | City of Long Beach |
| Hunts Point Plant | The Joint Meeting of Essex & Union Counties | County of Nassau |
| Jamaica Plant | Linden Roselle Sewerage Authority | West Long Beach Sewer District |
| Newtown Creek Plant | Middletown Sewerage Authority | |
| Owls Head Plant | Middlesex County Sewerage Authority | Westchester County |
| Port Richmond Plant | Passaic Valley Sewerage Commissioners | |
| Rockaway Plant | | County of Westchester |
| Tallman Island Plant | | |
| 26th Ward Plant | | |
| Wards Island Plant | | |

In addition, several smaller municipalities in New York and New Jersey have been issued interim ocean disposal permits by EPA-Region II as customers of the following barging companies: Modern Transportation Co. and General Marine Transport Co. Two industries in New Jersey also have been issued interim ocean disposal permits for their domestic sludges: American Cyanamid Co. and Whippany Paper Board Co.

Approximately 4.5 million cubic meters (6 million cubic yards) of sludge are dumped each year. Of this total volume, New York City accounts for approximately 60 percent, New Jersey communities approximately 33 percent, and Nassau and Westchester Counties approximately 7 percent. A

three fold increase in the total volume is expected over the next few years as municipalities in the New York-New Jersey area upgrade their sewerage systems to provide secondary treatment. This large increase in sewage sludge volume is the primary reason for abandoning the existing sewage sludge disposal site. (See Figure 1).

Ocean disposal permits will not be renewed for the continued use of the existing site after July 1, 1976. The areas being considered for the interim disposal site(s) are shown in Figure 1. These areas have been jointly designated by the EPA and the National Oceanic & Atmospheric Administration (NOAA). If for some reason a site(s) within these areas is found to be unsuitable for the disposal of sewage sludge, a site(s) outside of these areas, but within the same "steaming distance", will be selected, based on the ecological surveys and environmental impact statement currently underway.

Alternatives to the ocean disposal of sewage sludge are being studied under an EPA contract awarded to the Interstate Sanitation Commission (ISC). Should this investigation demonstrate that other disposal alternatives are viable, technically feasible, and environmentally acceptable, EPA's goal will be to phase out ocean disposal of such sludges by 1981.

EPA is preparing this environmental impact statement in accordance with the procedures for voluntary preparation on significant regulatory actions, dated October 15, 1974.1/ Under Section 1(c)(4)(B) of these procedures, EPA will prepare an environmental impact statement for the "Designation of sites for dumping under Section 102 (c)" of the Marine Protection, Research, and Sanctuaries Act of 1972. On December 23, 1974, after reviewing the merits of ten competing firms, EPA awarded a contract to Dames & Moore of New York City for the preparation of this environmental impact statement.

If your organization needs additional information or wishes to participate in the preparation of the draft environmental impact statement, please advise Daniel A. Sullivan, P.E., Senior Environmental Engineer, EPA-Region II at (212) 264-1892.

Sincerely yours,

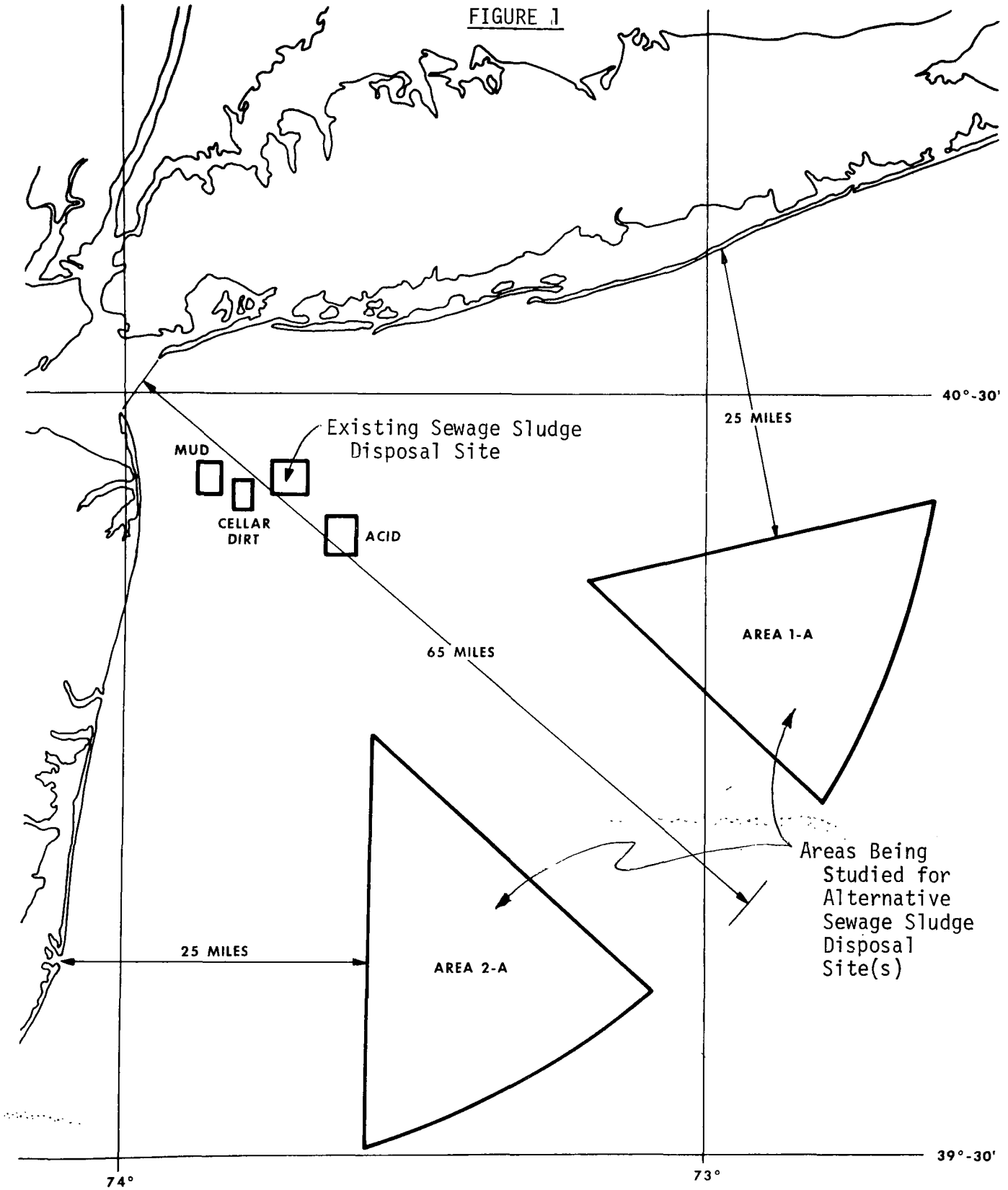
G. M. Hansler

Gerald M. Hansler, P.E.
Regional Administrator

1/Environmental Impact Statements, Procedures for the Voluntary Preparation. Section 1(c)(4)(B), as published in the Federal Register, Volume 39, Number 204, page 37419 on October 21, 1974.

NOTICE OF INTENT

FIGURE 1



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

October 9, 1974

Colonel Harry W. Lombard
District Engineer
New York District Corps of Engineers
26 Federal Plaza
New York, New York 10007

Dear Colonel Lombard:

As a follow-up to our discussion several weeks ago, we would like to reaffirm our position relative to resolving ocean dumping problems in the apex of the New York Bight.

As you well realize, the volume of sewage sludge will significantly increase over the next three years, and to the best of our knowledge, the present dredge spoil volume of approximately 11 million cubic yards per year, will not significantly decrease. Taking into consideration the level of pollutants contained in both dredge spoil and sewage sludge--in terms of pounds per year of contamination added to the ecosystem--it is difficult to separate the impact resulting from these individual disposal operations. Thus, it is our opinion, based on an assessment of the potential problems which logically might occur if the present disposal sites continue to be used, that the present sewage sludge and dredge spoil sites must be relocated as soon as possible.

In a letter dated October 2, 1974, copy attached, we reaffirmed our position to municipalities that their ocean disposal permits would not be renewed for the continued use of the present sludge site after 1976. Two new areas have been designated. (See attached map.) The specific location of the new "interim" site(s) within these areas, will be designated in 1975 pending completion of ongoing oceanographic and environmental studies.

This action has been taken in order to protect the existing high quality waters contiguous to the beach areas of New York and New Jersey. Similarly, it is our position, that the present dredge spoil site must also be relocated, since this operation, which at times occurs as close as three miles from the New Jersey coast, can also seriously jeopardize the present and future water quality of the bathing beaches.

On the basis of these decisions, therefore, it is requested that you submit to us, by December 1, 1974, a plan for phasing out the use of the present dredge spoil disposal site by 1976, and utilization of a new "interim" site(s) within Areas 1A or 2A. Naturally, any plan you submit should consider the basis for selection of alternate sites, alternatives to ocean disposal, navigational hazards associated with changing sites, the economic impact of this new requirement, and a timetable for implementation.

Even more important, cost estimates for moving to alternate sites should be incorporated in the Corps' Federal budget requests for fiscal years 1976 and 1977, as appropriate. This matter has been discussed with EPA Administrator Train, and EPA headquarters wishes to also immediately open discussions on the issue with Corps headquarters officials.

If you have any specific questions regarding this decision, please feel free to contact me.

Sincerely yours,

Gerald M. Hansler, P.E.
Regional Administrator

Enclosures

cc: Administrator Russell E. Train
U.S. Environmental Protection Agency

Brigadier-General James L. Kelly
U.S. Army Engineer Division, North Atlantic

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
EDISON, NEW JERSEY 08817

February 21, 1975

Gentlemen:

Special Condition No. 5 of your Ocean Disposal Permit # requires you to perform "a bioassay, using the organism Artemia salina or suitable organisms designated to be more appropriate by EPA, Region II."

As you know, Artemia has been used by EPA for ranking or comparing one waste with another, and not as a measure of environmental impact. After considerable discussions and consultations with our research staff, we are now in a position to recommend and require testing with organisms that will allow us to relate laboratory findings to environmental response. The "appropriate sensitive marine organisms" selected are as follows:

a) phytoplankton —— Skeletonema costatum
b) zooplankton —— Acartia tonsa or A. clausii
c) finfish —— Menidia menidia

Special conditions of your new permit will require the use of these new organisms, along with Artemia, in your bioassay analysis. If your permit expires after April 1975, you are required to implement the use of these organisms under conditions of your existing permit.

Recognizing you will probably have questions about the organisms and/or the test procedures to be followed —— copies of which are attached —— we have scheduled a meeting for March 10, 1975 at 10:00 AM in our Main Conference Room, Building 209, GSA Raritan Depot, Edison, New Jersey. Representatives of our research staff will be available to answer your questions; therefore, it's requested that you come prepared to discuss the procedures provided.

If you have any questions, please feel free to contact me at 201-548-3347, X401.

Sincerely yours,

Richard T. Dewling
Director
Surveillance & Analysis Division

Enclosure

# Ocean Disposal —— EPA Actions

By

Richard T. Dewling, P. E.
Director, Surveillance & Analysis Division
U. S. Environmental Protection Agency, Region II
Edison, N. J. 08817

In October 1974, EPA notified municipalities in the New York Metropolitan area, including communities in New Jersey, Nassau and Westchester Counties, of its goal to phase out ocean disposal by 1981, and of its intention not to renew ocean disposal permits for the continued use of the present sewage sludge disposal site after July 1976. This latter decision was based on an anticipated three-fold increase in the volume of sludge —— resulting from an upgrading of treatment plants in the bi-state area —— and the potential adverse effects this increase might have on the waters along the New Jersey and Long Island shores. This action has been taken now in order to protect the future use of our recreational waters.

## Two New Areas Considered

EPA has not at this time designated any new disposal site(s); rather areas under consideration have been announced. The actual choice of an interim site(s) within one, or both of the areas, will completely depend upon the results of detailed environmental studies now being conducted by EPA and the National Oceanic & Atmospheric

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Prepared for New York State Select Committee on Environmental Conservation: February 20, 1975

Administration (NOAA). These investigations are scheduled to be completed by August 1975 and a decision regarding the specific interim site(s) location will be made during the latter part of this year.

It is important to understand that the "interim" site(s), which will be used only until such time as acceptable environmental alternatives are developed and implemented, cannot be utilized for any dumping until an Environmental Impact Statement (EIS) is prepared and made public. We are not interested in simply translocating the present problem to a new area; rather, we are trying to minimize the environmental impact, while at the same time protecting the high quality water along our beaches.

EIS Initiated

The consulting firm of Dames and Moore, New York, N. Y. has been retained by Region II to prepare the EIS. The report will include, but not necessarily be limited to, background information on the Bight, ocean dumping practices, federal control programs and international legal implications; a presentation of sewage sludge disposal methods other than ocean dumping; alternatives to the proposed interim disposal site(s) including that of "no action" on moving the existing site; a detailed description of the proposed interim site(s); an evaluation of the primary and secondary environmental impact in terms of the physical, chemical and biological characteristics; analyses of

the adverse environmental effects which cannot be avoided should use of the proposed site(s) be implemented; the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and the irreversible of irretrievable commitment of resources which would be involved in the proposed action, should it be implemented.

The final draft of this EIS should be completed by early 1976 and a public hearing held before April of that year.

Alternatives Being Evaluated

With regard to the development of ocean disposal alternatives, and our need to meet our goal of phasing out the present practice by 1981, Camp, Dresser & McKee, Boston, Mass., under the auspices of the Interstate Sanitation Commission and EPA, has already completed about 30 percent of their "Alternative-Evaluation Study". A final decision on the availability, acceptability and practicability of an environmentally suitable alternative(s), which depends upon the results of the EIS, as well as a thorough engineering and scientific evaluation of the many technical approaches for handling sludge, is not expected until July 1976. The five year "gap" between 1976 and 1981, is the time needed to implement the alternatives recommended.

All of our studies and activities are progressing concurrently, and are presently on schedule; therefore, we feel confident that we will meet our 1976 deadline for decision making, i.e., to move to a new "interim" disposal site(s) and to recommend and implement environmentally acceptable alternatives to the present practice of ocean disposal.

Statement of

Dr. R. Lawrence Swanson
Manager
New York Bight Marine EcoSystems Analysis (MESA) Project
Environmental Research Laboratories
National Oceanic and Atmospheric Administration
United States Department of Commerce
before the

New York State Select Committee on Environmental Conservation

20 February 1975

Mr. Chairman and members of the Select Committee:

I am Dr. R. Lawrence Swanson, Manager of the New York Bight Project of the National Oceanic and Atmospheric Administration's Marine EcoSystems Analysis (MESA) Program.

I appreciate this opportunity to testify before your Select Committee on Environmental Conservation concerning the implications of ocean disposal in the New York Bight. As a preface to doing so, I would like to take a few minutes to describe to you what the National Oceanic and Atmospheric Administration is doing in the New York Bight, and what some of the problems are in studying such a complex ecosystem.

Then, I will address specific physical, chemical, biological, and sedimentary aspects of the present condition of the Bight, as regards present and projected sludge dumping, and will try to answer questions you may have.

NOAA's activities in the New York Bight are being conducted under our Marine EcoSystems Analysis, or MESA, program, which is managed by the Environmental Research Laboratories. The MESA New York Bight Project, which began in July 1973, is a seven-year study, designed to yield certain important information tools for managers of the coastal environment. These include:

- Determining the fate and effect of pollutants on the New York Bight ecosystem, with priority on ocean dumping, and
- Identifying and describing the important ecological subsystems, processes, and driving forces operating in the New York Bight, and defining their interrelationships and rates of change.

The area encompassed by the MESA Project here is bounded on the offshore side by the edge of the continental shelf, and on the inshore side by the Long Island and New Jersey coasts to the Apex of the Bight, where the Lower New York Bay meets the coastal waters.

MESA's reason for being is that environmental scientists understand the interactions between human civilization and the marine environment in only a general way. It is obvious, for example, that some 20 million human neighbors, great cities, and large industries impact the coastal environment and ocean waters they border and use. But it is not at all obvious whether such impact is totally adverse, or how much use can be accommodated by an ecosystem such as the New York Bight without irreversibly damaging it. We know it has been heavily stressed. We do not know much about the recuperative powers of the Bight and its marine life.

Through the MESA Program we hope to improve our understanding of and ability to predict events which control the condition of the Bight's marine life and environment.

The primary near-term emphasis of our research in the New York Bight Project is the delineation of the environmental effects of ocean dumping. NOAA, on behalf of the Secretary of Commerce, has research responsibilities for ocean dumping under the Marine Protection, Research and Sanctuaries Act of 1972, and we are using the Bight, which is the site of most of the nation's ocean dumping, as a laboratory.

We are studying the characteristics of material disposed at individual dump sites in the Bight, dimensions and dispersal rates of dumped materials, long-and-short-term chemical, biological, and geophysical interactions which govern the fates and effects of such dumping, including the ability of dump sites to recover. Our investigators are measuring currents at various depths and locations in the Bight, examining sediments and their transport rates and processes, and sampling bottom-dwelling and other organisms to determine the existence and extent of the biological and pathological impact of man's activities in the Bight.

The technical information I will give you today comes primarily from these ocean-dumping related studies. Despite the fact that this is a highly populated corner of the United States, insufficient historical data are available on those aspects of the New York Bight waters, sea

floor, and marine life we need to understand. In a few areas, most of the useful data available are what we were able to obtain this past year and a half.

To date, most of our field activities (the first of which began in July 1973) have been concentrated in the 625-square mile rectangular area with landward boundaries defined roughly by the New Jersey and Long Island coasts, from the mouth of the Hudson River. Our activities there have accomplished the following:

1. Ocean water depths and small-scale terrain features of the sea floor have been mapped with precision navigation and depth-measuring systems.

2. The distribution and thickness of sea floor sediments has been mapped, using precision navigation and acoustic subbottom profiling equipment. In addition, more than 750 surficial sediment samples and 50 sediment cores have been collected to aid in sediment mapping and chemical analyses.

3. Sea floor materials have been sampled on a quarterly schedule at selected sites to detect short-term changes in the sediments and associated microrelief. Sediment movement has also been studied using direct measurement techniques.

4. Current meter arrays have been deployed at various locations for intervals as long as two and a half months.

5. Twenty-six water-column stations have been sampled repeatedly at 18-day or 36-day intervals for water and suspended-material analyses.

6. Intensive and continuous programs of biological sampling and analysis have been conducted, including studies of bacterial roles in the ecosystem, oxygen-consumption by bottom-dwellers and sediments, distribution of fin-fish diseases in and around the Bight, and marine population distribution in Bight waters.

Now, Mr. Chairman, let me summarize for the Select Committee what this first year and a half's work has taught us that can be applied to comprehending the environmental impact of sewage sludge dumped in the New York Bight.

Sewage sludge is one of the products resulting from the treatment of wastewater, a mixture of human, animal, and industrial wastes. The material, although it varies with source and treatment plant, is about five percent solids and 95 percent liquid. In 1973, some 4.4 million cubic meters of this material, and 2.85 million cubic meters of industrial wastes, were dumped in ocean waters from 10 to more than 160 kilometers offshore.

Where does it go? When sludge is dumped, the mixture disperses, some of it swept laterally by Bight currents, and some of it sinks toward the sea floor. A small portion may float, and other waste constituents dissolve or remain suspended in the water column.

Based on core and grab samples, we know that the portions of sewage sludge which sink to the bottom have not formed a massive lens of material.

In fact the bathymetry at the dump site is essentially the same as it was in 1936. On the other hand, roughly 8m of material has accumulated in the same period of time at the dredge spoil dump site. Generally, however, the sea floor near the sewage sludge dump site is an admixture of natural fine sands, natural muds of high organic material content, and sewage sludge materials at different stages of degradation. The surface layers of samples taken at the dump site have a consistency which ranges from sand to black organic material. An appreciable amount of sludge material extends beyond the sludge dumping site in all directions, but primarily to the north into Christiaensen Basin. The concentration of sludge in the Christiaensen Basin may be caused by short dumping or by deposition of transported or resuspended sewage sludge materials in the water column. The bottom of the basin is essentially covered with a mixture of muds rich in organic matter (1) transported into the area from the Hudson River, (2) and produced in the area by marine organisms, primarily plankton, and (3) disposed as sewage sludge.

It is generally accepted by oceanographers that the overall movement of water on the continental shelf off southern New England and the Middle Atlantic States is to the west, southwest, and south, parallel to the continental margin. However, the overall pattern is quite thoroughly masked at particular locations and times by high variability. This variability in the New York-New Jersey area specifically the Bight Apex, has been the prime focus to date of the water current observation effort

of the MESA Project. The major features of the spatial structure of circulation that relate to disposal of waste materials in shelf waters of the New York Bight are as follows:

• In the immediate vicinity of the entrance to Lower New York Bay, the oceanographic regime is dominated by the influence of discharges from the Hudson and Raritan Rivers. There is a seaward flow of brackish water, from the estuary where the rivers meet, in surficial layers. At sea, this discharge turns to flow southward, paralleling the New Jersey shoreline. Lower in the water column, there is return flow of external water into the estuary. In spite of its importance to the oceanographic and ecological systems of the estuary and the Bight, this superposed flow system is recognized in measurements only as a slight imbalance of the much stronger ebb and flood tidal currents in the respective layers.

• There is strong evidence from recent results of the MESA Project that outside the region of strongest influence of river discharges, there is a persistent, at least in a statistical sense, clockwise circulation or gyre. In its most inshore portion, off New Jersey and Long Island, flow in this eddy runs counter to the general flow over the continental shelf adjacent to this part of the coast. Although its existence in some sections of critical interest to the dumping question has been established, its horizontal extent and vertical structure, are imperfectly known at present. Evidence for the existence of this clockwise circulation or gyre comes from current meter measurements, studying where "drifters" dropped

into the ocean at various locations go, and studying the red colored iron hydroxide particles introduced into the Bight waters from the acid waste dump site. The drifter study, for example, shows that approximately 3% of those drifters released at the sewage sludge dump site were recovered within ten days following their release.

Material that becomes entrained in the Inner Bight circulation —— and this refers to suspended, dissolved, and floatable portions of sewage sludge as well as naturally occurring organic matter —— tends to move generally in a clockwise manner northward toward Long Island, then eastward out to sea, and then southward toward the open sea. In its travels, suspended material tends to be deposited in topographic lows, like the Christiaensen Basin and the area east of Cholera Bank, because of reduced wave and current action there.

The New York Bight is also marked by a characteristic nearshore flow, a result of which is that bottom water moves toward the beach. When this circulation enters the surf zone near the beach, natural hydraulic processes related to the breaking of waves permit suspended particles to be deposited on the bottom. The mud deposits formed in this way in depths of less than 20 meters are a common occurrence along the Atlantic coast, usually forming patches in small topographic lows.

In the nearshore zone, these organic rich mud patches tend to be small in extent, usually less than ten meters in diameter and less than 15 centimeters thick. SCUBA divers off Long Beach in July 1974 found that such patches covered less than 10 percent of the bottom. Most of these mud patches are probably modified by the strong wave action

associated with winter storms.

Continental shelf floor muds are invariably rich in organic matter as a result of hydraulic sorting processes which tend to group finely divided inorganic particles and organic matter. Clays occur here, and characteristically contain about five percent, by weight, of iron oxide, which usually veneers a shelf mud with a thin reddish-brown layer. Depletion of oxygen by decaying organic matter several millimeters below the bottom surface has its effect on these muds, producing a black color. This type of material can be found along both heavily populated and virtually deserted stretches of the Atlantic coast. This, gross color and texture of mud patches near the Long Island coast are no guides as to whether or not they contain sewage sludge. Descriptive terms such as "sludge" or "black greasy stuff" or "black mayonnaise" do not indicate whether the organic mixture consists of degraded organic material of natural origin or of human waste.

Analyses of these muds for their natural and man-introduced constituents is not a straightforward procedure. There is no "litmus paper test" which differentiates sewage sludge from natural sea floor muds. Sewage sludge produced by one treatment plant differs in composition from that produced by another, and even material produced at one treatment plant varies greatly over time. Once dumped, the material is acted on by decomposition, interactions with various components of the marine biota, reaction with inorganic portions of the environment, and dilution due to mixing with water and sediment. A simple test or two will not differentiate transported or migrated portions of sewage sludge from organic

material, raw sewage emanating from rivers, harbors, outfalls, and passing vessels, or from sewage sludge which is dumped short of the existing dump site. At best, a series of tests on a sample containing "sludge-like material" may exclude one or more sources, but not all possible sources. Positive identification of sewage sludge, especially after it has been in the marine environment for any length of time, is not possible at this time.

MESA scientists have filtered and then microscopically analyzed bottom mud samples to sort out the fraction of the particles in the mud that could be identified as of human origin. Near the sewage sludge dump site about 15 percent of the mud grains were found to be processed cellulose fibers or soot-like particles considered to be of human origin. Near the Long Island beach roughly one percent of the grains were considered to be of human origin. Clearly, any dumped, sewage-sludge-related materials which move in suspension toward Long Island must be tremendously diluted by natural particles during transport.

Preliminary studies have been made to compare the chemistry of sewage sludge with that of shelf floor muds. These indicate that sewage sludge is rich in heavy metals and organic matter; however, so are Bight floor muds, including many natural muds. Thus, while certain inorganic analyses, including heavy metal ratios, may eventually prove to be indicators of sewage sludge derived material, they are not considered to be an adequate means of differentiating sewage sludge from other muds at this time. This was again verified, in our estimation, by analysis of heavy metals and

samples collected at a series of stations south of Long Beach and Atlantic Beach, including the sewage sludge dump site and inside Rockaway Inlet.

Similarly, total organic matter is not a suitable indicator of sludge derived material because in an area such as the New York Bight, marine plants produce more than twice as much organic matter than is dumped in the form of sewage sludge.

However, some fractions of organic matter, such as carbohydrates (including cellulose), may provide a crude means of differentiating muds. When sewage sludge is dumped into sea water, the organic matter decreases with time because of microbial degradation. Most carbohydrates decompose less rapidly than many other organics; therefore, the ratio of carbohydrates to total organic carbon should increase with the age of the sludge.

Analysis of sediment samples shows that the highest total organic carbon values of about five percent by dry weight occurred in the Christiaensen Basin, a few miles north and west of the dump site. This is about one-tenth the total organic content that is found directly in sewage sludge. High total organic content and also high carbohydrates occur all along the Hudson Shelf Canyon. Mud samples from within one mile of Long Island beaches show relatively high carbohydrate content, indicating that some of this mud may be partly derived from sewage —— raw sewage from the harbor, or from ships or from sewage sludge. But sediment samples from Rockaway Inlet and Jones Inlet showed rather low carbohydrate content, indicating mainly a natural origin.

Further, it can in general be concluded that the effect of dredge spoil and sewage sludge dump sites on nutrient concentration in the Bight Apex is rather localized, and secondary in importance to that of the nutrient-rich Lower Bay outflow.

MESA scientists have observed reduced abundance and diversity of benthic invertebrates in the vicinity of the sewage sludge and dredge spoil dump sites. Increased incidences of fin erosion have been observed in the Inner Bight, although positive identification of cause and effect has not been made. These findings, however, argue strongly against contamination of new areas by moving the existing sewage sludge dump site.

In sum, Mr. Chairman, we have no evidence of a massive general movement of sewage sludge toward Long Island beaches. On the contrary, evidence we have suggests that milennia of natural discharges and 40 years of dumping sewage sludge have produced a well-established, rather stable distribution of organic-rich muds in the New York Bight. We do not believe that the distribution patterns of these muds is likely to change appreciably with time except as the muds may be temporarily resuspended in the water column by the action of storm waves. Pockets of mud near beaches are a common natural occurrence and in this case appear to be mainly of natural origin with, perhaps, small admixtures of material derived from sewage. These patches have almost certainly existed for a long time.

NOAA does not believe that an immediate change in the New York Bight sewage sludge dump site is required; in fact, we believe that more harm

to the environment than good would come from such a precipitous act. However, in view of the increasing quantity of sewage sludge to be dumped in the Bight over the next few years, plans should be made now to change the dump site should future conditions warrant.

Based on the evidence in hand, these are NOAA's recommendations:

1. That the present sewage sludge dump site continue in use for the next year or two, unless a situation develops that truly indicates an endangerment to public health.

2. That intensive ecological studies be conducted as a prelude to selecting an alternative dumping site for sewage sludge capable of assimilating the greatly increased volume anticipated for the near future. MESA is doing this now, and has a three-week cruise, commencing today, to continue our examination of two suggested areas.

3. That a new dump site, if necessary, be selected upon completion and on the basis of these studies so that we can be assured that contamination of shoreline areas will not occur and that deleterious effects on fish and benthic communities will be minimized.

4. That a new ocean dumping site be regarded only as an interim measure and that every effort be made to avoid long-term use of the New York Bight for disposal of sewage sludge.

5. That we not forget that ocean disposal, while worthy of public concern, is very likely of secondary importance, when compared to other contaminant sources such as the Upper and Lower Bays and their associated waters.

That completes my testimony Mr. Chairman. I am leaving several of our recent publications with you that pertain to our overall investigation. Our office will be glad to assist you with any additional information that you may deem necessary.

# INTERSTATE SANITATION COMMISSION

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## FIRST QUARTERLY REPORT (July-September)
## NEW YORK-NEW JERSEY METROPOLITAN AREA
## SEWAGE SLUDGE DISPOSAL MANAGEMENT PROGRAM

Since this is the First Quarterly Report of the program, background information and an outline of the scope of work are presented to provide a better understanding of the overall program.

### General Background

Much of the sewage sludge in the New York-New Jersey Metropolitan Area is presently disposed of by barging to sea. The current uncertainties about the future of this means of disposal and the tripling of sewage sludge volume expected within the next several years because of the construction of secondary wastewater treatment plants pose a tremendous problem. There is a real need to focus on how to dispose of this sewage sludge on a regional basis. Based upon meetings between the States of New York and New Jersey, the U.S. EPA-Region II, and the Interstate Sanitation Commission, it was agreed that EPA-Region II would fund a $500,000 two-year three-phase program for the Commission to be responsible for developing a viable and coordinated system for

sewage sludge disposal for the New York-New Jersey Metropolitan Area by June 1976. In developing the program, the following EPA-Region II policies are being kept in mind:

(1) New sludge incinerators in each individual waste treatment plant are not to be considered;

(2) Disposal techniques must not contaminate groundwaters;

(3) It is to be assumed that the heavy metals and toxic chemical contents of sludges will be reduced to levels consistent with EPA pretreatment guidelines.

The land area that the program encompasses is the New York-New Jersey Metropolitan Area which includes all of the counties in the States of New Jersey and New York with all or any part of their tidal waters within the Interstate Sanitation District, plus the Counties of Passaic and Somerset in the State of New Jersey.

Briefly, the overall program consists of three phases: Phase 1 (10 months duration) will be a State-of-the-Art investigation of alternatives to ocean disposal of sludge and the recommendation of a limited number of the most feasible alternatives for an in-depth investigation in Phase 2 (12 months duration). These alternatives will then be compared with controlled ocean disposal. Concurrently with these two phases, a legal-institutional Phase 3 investigation is being undertaken to determine the requirements for the administration of the coordinated sludge management system for the region.

Phase 1 - Scope of Work (condensed)

The Scope of Work for Phase 1 is to perform a State-of-the-Art investigation of alternative means of ultimate disposal of sludge in the New Jersey-New York Metropolitan Area. This investigation defines the problem in terms of the present and projected sources and volumes of sludges produced and their chemical, physical, and biological properties. It includes sludges presently barged to sea and sludges now disposed of by other methods with identification of how each of the public waste treatment systems in the area now disposes of its sludge. The contractor is to identify the entire spectrum of feasible alternatives and make preliminary estimates of disposal costs and environmental impact of each. Each of the methods is to be analyzed from the point of view of efficacy and desirability or undesirability. Each of the methods is also to be compared with each of the others. Among the factors to be considered will be environmental impact; energy conservation; convenience; cost of collection, treatment, transportation and disposal either as a waste or as usable or marketable products. This phase is to include but not be limited to investigation of the following disposal techniques:

(1) Land disposal alternatives: (a) sanitary landfill, (b) spreading as soil conditioner and fertilizer, (c) various sludge solidification processes, (d) drying and selling for fertilizer and soil conditioner.

(2) Disposal by combustion (incineration): (a) incineration of raw sludge, (b) incineration in combination with solid wastes, (c) incineration to include power or steam generation.

(3) Disposal as a salable product: (a) activated carbon, (b) oil, (c) natural gas; each of the above through pyrolysis, (d) building products.

Phase 2

Phase 2 of the program is scheduled to begin in July of 1975 and will conclude in June 1976. The in-depth study will include:

(1) Good cost estimates;

(2) Thorough assessment of the environmental impact;

(3) Recommendations relative to New York-New Jersey Metropolitan Sludge Management Plan.

Concurrently with Phases 1 and 2, the National Oceanographic and Atmospheric Administration (NOAA) is conducting a study in the New York Bight which will include the impact of ocean disposal. EPA will provide the Commission with input on the environmental consequences of ocean disposal so that a comparison can be made between controlled ocean disposal (taking into account of economic and environmental impact) and the in-depth study of the alternatives investigated in Phase 2 in order for the Commission to recommend the best overall sewage sludge disposal program.

Phase 3 - Scope of Work (condensed)

Phase 3 (undertaken concurrently with Pases 1 and 2) is an in-house investigation of legal and institutional requirements. It includes:

(1) Analyses of New York and New Jersey environmental control statutes and administrative regulations and examination of relative statutory and operational authorizations and responsibilities to existing state and local agencies and governments in New York and New Jersey.

(2) An examination of sludge collection disposal as a state level function in New York and New Jersey.

(3) Drafting of sample statutes and/or interlocal and interstate agreements and contracts needed to implement the recommended legal and institutional approach to the problem.

Management of the Program

In order for the program to be successful and so that all sectors affected or potentially affected by the results of the program can be kept informed and be able to make an input to the program, the management of the program was developed for two-way communication. While the Commission is responsible for overall management of the development program, an Executive Committee composed of a representative from the State of New York, the State of New Jersey, the Environmental Protection Agency-Region II, the

waste treatment agencies operating in New Jersey, the waste treatment agencies operating in New York, and the Interstate Sanitation Commission has been established. This Committee advises the Interstate Sanitation Commission concerning the conduct of the investigation. Technical advisory sub-committees have been established both by New Jersey and New York waste treatment agencies. A legal sub-committee has also been established in New Jersey. These sub-committees advise and present their views to the waste treatment agencies representative on the Executive Committee and thus provide an input to the entire program. With this program structure, information is able to flow both ways.

## PROGRESS DURING FIRST QUARTER

### Phase 1

Proposals for Phase were received from eight Contractors and were narrowed to three Consultants. A representative of the States of New York and New Jersey, the U.S. EPA, and the Commission held oral interviews and selected Camp, Dresser & McKee for the Phase 1 project. Camp, Dresser & McKee commenced work on July 1, 1974. The Interstate Sanitation Commission is responsible for the overall management of the development program and for conducting Phase 3 Legal-Institutional investigation.

The following work plan was adopted with completion dates of subsections as indicated:

I. Compilation of Data on Sludges Produced in Area at Present and in Future: Complete by September 15, 1974.

A. Locate existing and planned wastewater treatment plants on large map of area including sludge storage and transport facilities.

B. Collect information on treatment plant capacities and type of treatment.

1. Obtain information on future capacities and treatment.

C. Sludges produced at present.

1. Volume/day.
2. Type: raw, digested, chemical precipitates.
3. Concentration of solids in sludge.
4. Concentration of heavy metals.
5. Concentration of toxic organics: pesticides.

D. Sludges produced in future.

1. Select "design" year.
2. Volume/day and concentration.
3. Type: raw, digested, chemical precipitates due to treatment.
4. Predicted changes in concentration of toxic metals and organics.

E. Identify plants having existing sludge disposal methods other than to ocean.

II. Preliminary Investigations Relating to Disposal Methods: Complete by September 15, 1974.

A. Check on any studies that may have been made for land-based sludge disposal methods for N.Y.-N.J. area.

B. Check on solid waste disposal studies for area.

1. Identify solid waste disposal systems in area.

C. Investigate possible land disposal sites: Consult with Rutgers University Environmental Sciences and Agriculture Departments.

1. Agricultural land.
2. Waste Land.
3. Landfill sites.

D. Update information on some newer disposal methods.

1. Pyrolysis: Baltimore solid wastes plant; Twin Cities, Minnesota studies.
2. Drying: Blue Plains plant at Washington, D.C.
3. Composting: USDA studies, Beltsville, Maryland.

E. Investigate important differences in treatment and dewatering methods and establishment of site requirements.

III. General Study of Major Alternatives: Complete by November 15, 1974. Each of the following three basic disposal systems should be considered for disposing of all the sludges produced at regional facilities. The studies should include such items as: site location, transportation, environmental assessments, technical feasibility, permanance and long-term use, total cost estimates, energy usage, energy recovery.

A. Land: Evaluate Rutgers University Report.

1. Agricultural.
2. Waste Land.
3. Landfill.
4. Consider sludge stabilization methods required.

B. Thermal Processing

1. Incineration.
2. Pyrolysis.
3. Wet Oxidation.
4. Disposal of residues from above processes.
5. Air pollution control requirements.

C. Recovery of Useful Materials

1. By drying.

2. By composting.

3. Consider recovery of materials from pyrolysis and wet oxidation.

4. Investigate disposal or sale of products.

D. Develop Basic Cost Data for Sludge Dewatering and Transportation.

IV. Evaluation and Comparison of Specific Alternatives: Complete by January 15, 1975.

A. Identify obviously unfeasible disposal methods due to unavailability of sites, excessive costs, unacceptable environmental factors, specific sludge characteristics, specific location of sludge production and transportation problems.

B. Consider use of sub-regional facilities with possible different disposal methods for different sub-regions.

C. Identify the technical and economic differences for various sludge treatments (chemical and heat conditioning) and dewatering methods as required for different disposal systems.

D. Indicate capacity and type of treatment facilities needed for liquid sidestreams produced at sludge disposal sites

in connection with dewatering and other processing: sidestreams such as filtrates, centrates, overflows, scrubber water, etc.

E. Identify specific possibilities of disposal with solid wastes.

1. By incineration.
2. By pyrolysis.
3. In landfills.

V. Make Recommendations of Alternatives for In-Depth Study: By February 15, 1975.

A. Have proposed recommendations reviewed for environmental impact.

B. Integrate proposed recommendations with Phase 3 studies of ISC.

VI. Draft of Final Report: By April 15, 1975.

VII. Make Revisions in Report as Required by ISC: By May 15, 1975.

VIII. Submit Final Report: By June 15, 1975.

Items I and II are completed except for the land disposal study which is not due (under a subcontract with Rutgers University)

until the end of October.

Phase 3

Work on the legal-administrative investigation of regional sludge management possibilities in the New York-New Jersey Metropolitan Area began on July 1, 1974 (the effective contract date). One item was performed in advance of the aforementioned date. When it was ascertained that the investigation would proceed, Dr. Wendell met with representatives of the State of New Jersey and the New Jersey municipalities to receive from them indications as to their concerns and to discuss the conduct of the work. Since July 1, a similar discussion has been held in connection with the CDM August Progress Report on the technical investigations which are proceeding concurrently with this contract. Further discussions with New York and New Jersey state and local interests will be held as the work proceeds.

The work during this first quarter has consisted largely of research and analysis of the statutes of New Jersey and New York relating to water quality management and relevant aspects of intergovernmental relations. The purpose has been to provide a basis for determining what legal authority now exists for sludge management, either by the separate jurisdictions or on a regional or subregional basis. These preliminary analyses are now complete.

They show that the legal bases for interlocal cooperation and liquid waste treatment in the two states is substantially different. New York has a state-level agency (the Environmental Facilities Corporation) which can assist, and under some circumstances operate or manage, municipal or county waste treatment and collection systems. New Jersey has no counterpart agency. In New Jersey, there is legislation being developed under which each county would be required to have a sewage collection and treatment authority. Existing regional authorities would be absorbed or converted to this county base. However, there is presently much doubt as to whether one of the largest of these entities in the New York Metropolitan Area (the Passaic Valley Sewerage Commissioners) would be affected. At the present writing, the New Jersey portion of the area is organized into several districts serving groups of municipalities and into some smaller units which treat their own wastes.

However, it should be pointed out that these differences are more in the legal authority for waste management than in the actual patterns of operation in the New York and New Jersey portions of the Metropolitan Area. At the present time, on each side of the state line, substate regional and local agencies perform the liquid waste collection and treatment function. They handle sludge disposal as part of that task, each making its own arrangements.

The New York interlocal cooperation statutes are broad enough to permit as many communities as might wish to do so to establish

joint arrangements for the handling of sludge. Authorization even exists for them to do so in conjunction with political subdivisions of the State of New Jersey. In New Jersey, however, there is no similar piece of legislation. Consequently, sludge management on an interjurisdictional basis, except by the existing district systems, would require additional legal basis. When the study is further along, a detailed examination will be made of what could be done on the New Jersey side short of legislation, but preliminary study indicates that additional legislation might be desirable, if not absolutely necessary.

No work has yet been done on Connecticut statutes. Because the study area has been delineated to include only the New York-New Jersey portion of the Greater New York Metropolitan Area, it has seemed appropriate to postpone such attention as can be paid to the Connecticut portion until the work is further along. As presently envisaged, the only consideration of Connecticut will be in order to ascertain and attempt to make sure that such arrangements as are recommended for sludge management would not be so constructed as to preclude Connecticut participation.

It has been necessary to await information from CDM relative to the identity of public systems generating sludge, their volumes and present methods of disposal. This information was received on September 15 and is now undergoing analysis. It is anticipated at an early date it will be possible to begin developing alternative

sludge management arrangements based on the statutory analysis and the data concerning the present agencies involved in sludge generation and disposal.

TECHNICAL FINDINGS
(July 1974 - March 1975)

In April 1974, EPA, Region II, initiated a comprehensive monitoring program to investigate the quality of the water and bottom sediments in the New York Bight and along the Long Island and New Jersey beaches. A summary of the data from April to July 1974 appeared in "Ocean Disposal in the New York Bight Technical Briefing Report Number 1". A summary of subsequent data appears in this report in Tables 10-19.

Upon review of the earlier data, the sample collection frequency was changed to the following:

Type I - Surf Zone - biweekly (summer)
- six-week intervals (Oct - May)

Type II - Near Shore - monthly (summer)
- bimonthly for water column (Oct - May)
- trimonthly for sediments (Oct - May)

Type III - Transects - quarterly

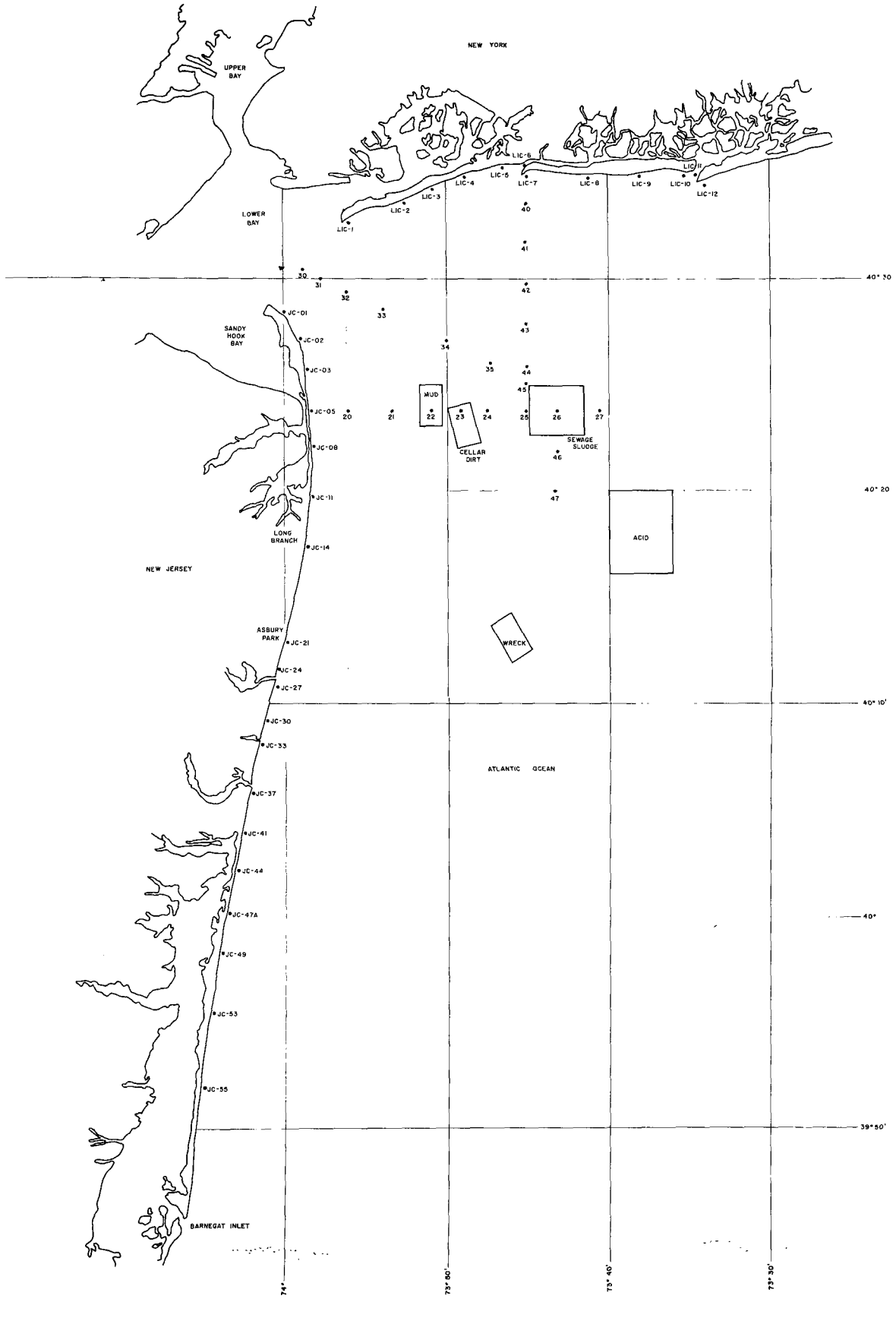
Station locations are shown in Figure 2 and listed in Table 9.

Based on data from the surf and near shore waters along the Long Island and New Jersey beaches, it is evident that the water quality remains excellent with respect to coliform density and is acceptable for contact recreation (see Figs. 3-4). Elevated coliform counts do appear at random, but this does not constitute any violation of standards nor does it indicate any systematic change or degradation of water quality.

A review of near shore sediment data (Tables 14 & 17) indicate slightly elevated bacterial counts at certain near shore sampling stations. These elevated counts can be attributed to inland runoff or wastewater outfalls.

Two sampling runs were conducted on the Long Island Transect. The data obtained (Tables 18 & 19) are consistent with data reported earlier in "Technical Briefing Report Number 1." Specifically, a "clean water-sediment" zone of about 5-1/2 - 6 miles separates the leading edge of the sludge mass from the Long Island coast. Based on our data there is no massive movement of sewage sludge towards the Long Island coast.

Sediment samples were collected and analyzed for Salmonella Group organisms at 20 sampling locations. Members of this Group were not detected in 100g of sediment sample.


NEW YORK
UPPER BAY
LOWER BAY
LIC-1
LIC-2
LIC-3
LIC-4
LIC-5
LIC-6
LIC-7
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JC-21
JC-24
JC-27
JC-30
JC-33
JC-37
JC-41
JC-44
JC-47A
JC-49
JC-53
JC-55
SANDY HOOK BAY
MUD
CELLAR DIRT
SEWAGE SLUDGE
ACID
WRECK
LONG BRANCH
NEW JERSEY
ASBURY PARK
ATLANTIC OCEAN
BARNEGAT INLET
40° 30'
40° 20'
40° 10'
40°
39° 50'
74°
73° 50'
73° 40'
73° 30'

**Figure 2**

TABLE 9

STATION LOCATIONS

| Station | Latitude | Longitude | Loran 3H4 (Brown) | Loran 3H5 (Green) | Visuals |
|---|---|---|---|---|---|
| **N. Y. Bight** | | | | | |
| NYB20 | 40°23'54" | 73°56'03" | 4560 | 3294 | |
| NYB21 | 40°23'54" | 73°53'30" | 4575 | 3274 | |
| NYB22 | 40°23'54" | 73°51'00" | 4590 | 3253 | |
| NYB23 | 40°23'54" | 73°49'12" | 4600 | 3237 | |
| NYB24 | 40°23'54" | 73°47'30" | 4609 | 3223 | |
| NYB25 | 40°23'54" | 73°45'00" | 4624 | 3200 | |
| NYB26 | 40°23'54" | 73°43'15" | 4634 | 3185 | |
| NYB27 | 40°23'54" | 73°40'32" | 4649 | 3161 | |
| NYB30 | 40°30'25" | 73°58'42" | | | South of Fl "5" |
| NYB31 | 40°30'00" | 73°57'36" | | | South of Fl "3" |
| NYB32 | 40°29'25" | 73°56'00" | | | South of Fl "1A" WHIS |
| NYB33 | 40°28'36" | 73°53'45" | | | South of BW Mo (A) WHIS |
| NYB34 | 40°27'15" | 73°50'00" | | | South of Ambrose Horn |
| NYB35 | 40°26'10" | 73°47'12" | 4629 | 3220 | |
| NYB40 | 40°33'36" | 73°45'00" | 4699 | 3182 | |
| NYB41 | 40°31'39" | 73°45'00" | 4684 | 3188 | |
| NYB42 | 40°29'42" | 73°45'00" | 4669 | 3193 | |
| NYB43 | 40°27'45" | 73°45'00" | 4654 | 3197 | |
| NYB44 | 40°25'54" | 73°45'00" | 4640 | 3200 | |
| NYB45 | 40°25'00" | 73°45'00" | 4633 | 3200 | |
| NYB46 | 40°22'00" | 73°43'15" | 4619 | 3183 | |
| NYB47 | 40°20'00" | 73°43'15" | 4603 | 3182 | |
| **N. J. Beaches** | | | | | |
| JC01A | 40°28'05" | 73°59'50" | | | Sandy Hk. Parking Area |
| JC02 | 40°27'05" | 73°59'10" | | | Sandy Hk. Radome |
| JC03 | 40°25'40" | 73°58'55" | | | Sandy Hk. St. Pk. Beach |
| JC05 | 40°23'47" | 73°58'35" | | | Highland Beach |
| JC08 | 40°21'50" | 73°58'25" | | | Sea Bright |
| JC11 | 40°19'49" | 73°58'26" | | | Monmouth Beach |
| JC14 | 40°17'28" | 73°58'55" | | | Long Branch |
| JC21 | 40°13'20" | 73°59'47" | | | Asbury Park |
| JC24 | 40°12'05" | 74°00'24" | | | Ocean Grove |
| JC27 | 40°11'06" | 74°00'36" | | | Belmar |
| JC30 | 40°09'25" | 74°01'11" | | | Spring Lake |

## STATION LOCATIONS (CONT'D.)

| Station | Latitude | Longitude | Loran 3H4 (Brown) | Loran 3H5 (Green) | Visuals |
|---|---|---|---|---|---|
| **N. J. Beaches Cont'd.** | | | | | |
| JC33 | 40°08'03" | 74°01'39" | | | Sea Girt |
| JC37 | 40°05'57" | 74°02'03" | | | Point Pleasant |
| JC41 | 40°03'45" | 74°02'38" | | | Bay Head |
| JC44 | 40°01'42" | 74°03'55" | | | Mantaloking Beach |
| JC47A | 39°59'42" | 74°03'36" | | | Silver Beach |
| JC49 | 39°57'08" | 74°03'37" | | | Lavallette |
| JC53 | 39°55'14" | 74°04'32" | | | Seaside Park |
| JC55 | 39°53'45" | 74°04'48" | | | Is.Beach St. Park |
| **Long Island Beaches** | | | | | |
| LIC01 | 40°32'52" | 73°56'05" | | | Rockaway Point |
| LIC02 | 40°33'43" | 73°51'48" | | | Fort Tilden |
| LIC03 | 40°34'24" | 73°50'47" | | | Rockaway Beach |
| LIC04 | 40°34'58" | 73°48'50" | | | Holland Area |
| LIC05 | 40°35'28" | 73°46'19" | | | Edgemere |
| LIC06 | 40°35'35" | 73°44'55" | | | Off Light Fl G"4" |
| LIC07 | 40°35'07" | 73°45'05" | | | Atlantic Beach |
| LIC08 | 40°35'00" | 73°41'05" | | | Long Beach |
| LIC09 | 40°35'00" | 73°38'28" | | | Long Beach |
| LIC10 | 40°35'07" | 73°35'16" | | | Point Lookout |
| LIC11 | 40°35'22" | 73°34'19" | | | 100 yd. SW of Buoy "C9" |
| LIC12 | 40°34'50" | 73°33'52" | | | Short Beach |

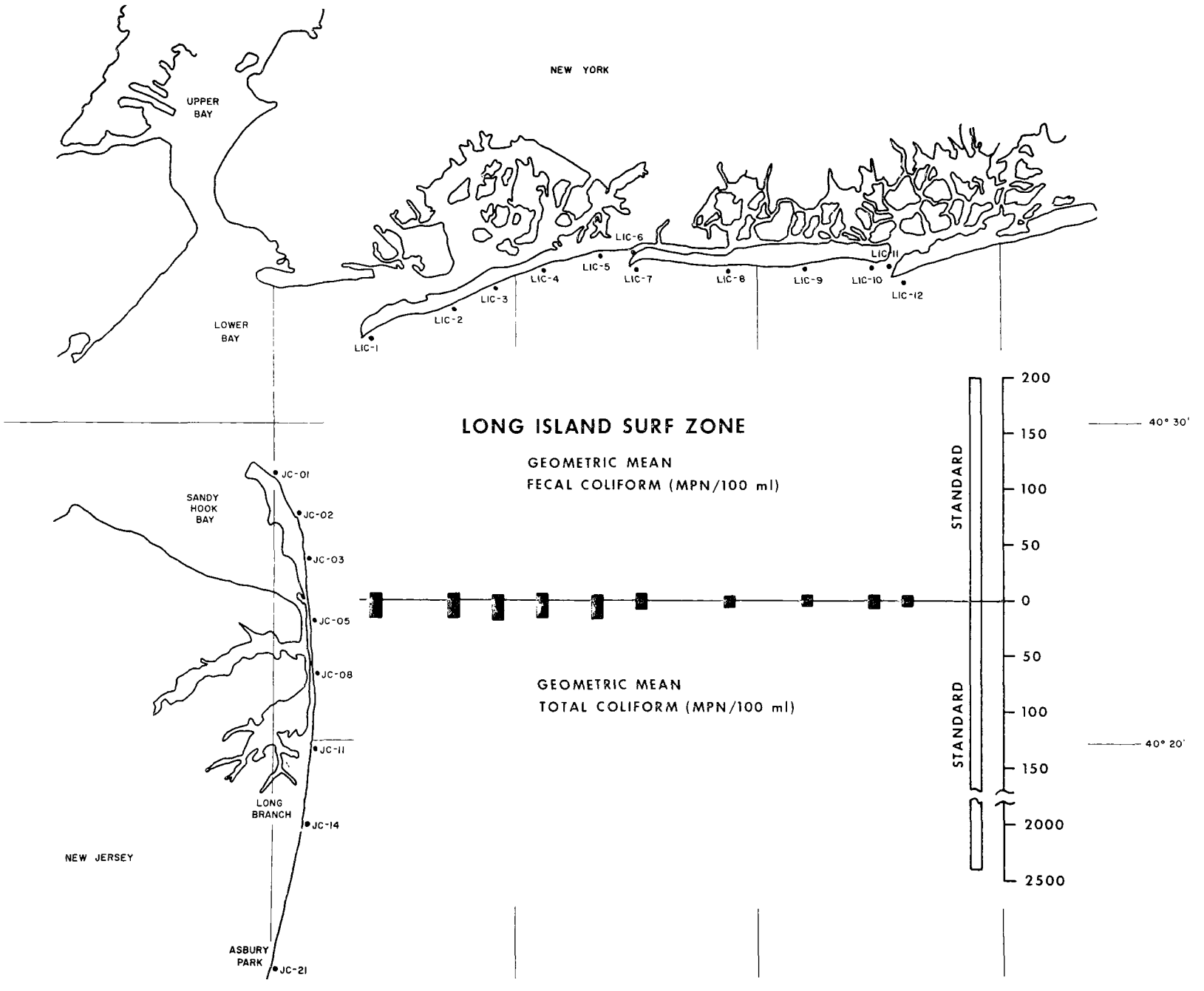
NEW YORK
UPPER BAY
LOWER BAY
LIC-1
LIC-2
LIC-3
LIC-4
LIC-5
LIC-6
LIC-7
LIC-8
LIC-9
LIC-10
LIC-11
LIC-12
LONG ISLAND SURF ZONE
GEOMETRIC MEAN
FECAL COLIFORM (MPN/100 ml)
GEOMETRIC MEAN
TOTAL COLIFORM (MPN/100 ml)
STANDARD
STANDARD
200
150
100
50
0
50
100
150
2000
2500
40° 30'
40° 20'
SANDY HOOK BAY
JC-01
JC-02
JC-03
JC-05
JC-08
JC-11
LONG BRANCH
JC-14
NEW JERSEY
ASBURY PARK
JC-21

Figure 3

TABLE 10

Long Island Coast, Surf Zone Bacterial Count

Total Coliform (TC) and Fecal Coliform (FC) per 100 ml

| Date | Station | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LIC01 | | LIC02 | | LIC03 | | LIC04 | | LIC05 | |
| | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 7/23/74 | 20 | 8 | 64 | 14 | 14 | 4 | 12 | 3 | 84 | 6 |
| 8/2/74 | 8 | <1 | 7 | 4 | 12 | <1 | 8 | 2 | 8 | 1 |
| 8/20/74 | 12 | 5 | 8 | 5 | 16 | 1 | 20 | 5 | 28 | 1 |
| 9/5/74 | 32 | 4 | 88 | 14 | 32 | 4 | 116 | 40 | 124 | 10 |
| 10/17/74 | 26 | 10 | 140 | 24 | 171 | 67 | 800 | 304 | 480 | 45 |
| 11/19/74 | 17 | 15 | 9 | 5 | 37 | 4 | 19 | 11 | 11 | 2 |
| 12/17/74 | - | - | 24 | 7 | 8 | 2 | 82 | 14 | 64 | 12 |
| 1/23/75 | 55 | 28 | 56 | 11 | 69 | 14 | - | - | 3 | 2 |
| Summary, all data to date | | | | | | | | | | |
| Total Samples | 13 | 13 | 15 | 15 | 15 | 15 | 14 | 14 | 15 | 15 |
| Geometric Mean | 15 | 6 | 14 | 5 | 18 | 4 | 15 | 5 | 17 | 3 |
| Max | 55 | 28 | 140 | 24 | 171 | 67 | 800 | 304 | 480 | 45 |
| Min | 5 | <1 | 2 | <1 | 2 | <1 | 1 | <1 | <1 | <1 |

Long Island Coast, Surf Zone Bacterial Count

Total Coliform (TC) and Fecal Coliform (FC) per 100 ml

| Date | Station | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LIC07 | | LIC08 | | LIC09 | | LIC10 | | LIC12 | |
| | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 7/23/74 | 7 | <1 | <1 | <1 | 5 | <1 | 8 | 3 | 20 | 2 |
| 8/2/74 | 4 | <1 | 8 | 2 | <1 | <1 | 5 | 2 | 1 | <1 |
| 8/20/74 | 28 | 2 | 4 | 2 | 32 | 5 | 48 | 7 | 2 | 1 |
| 9/5/74 | 36 | 6 | 20 | 10 | 48 | 7 | 28 | 3 | 36 | 8 |
| 10/17/74 | 55 | 22 | 196 | 124 | 460 | 140 | 21 | 2 | 16 | 3 |
| 11/19/74 | 2 | <1 | 8 | 5 | 1 | <1 | 14 | 8 | 9 | 5 |
| 12/17/74 | 24 | 5 | 68 | 8 | <1 | <1 | 2 | <1 | 2 | <1 |
| 1/23/75 | 168 | 96 | 5 | 1 | 6 | 2 | 15 | 13 | 6 | 5 |
| Summary, all data to date | | | | | | | | | | |
| Total Samples | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 14 | 14 |
| Geometric Mean | 9 | 3 | 6 | 2 | 5 | 3 | 7 | 4 | 4 | 2 |
| Max | 168 | 96 | 196 | 124 | 460 | 140 | 48 | 13 | 20 | 8 |
| Min | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | <1 |

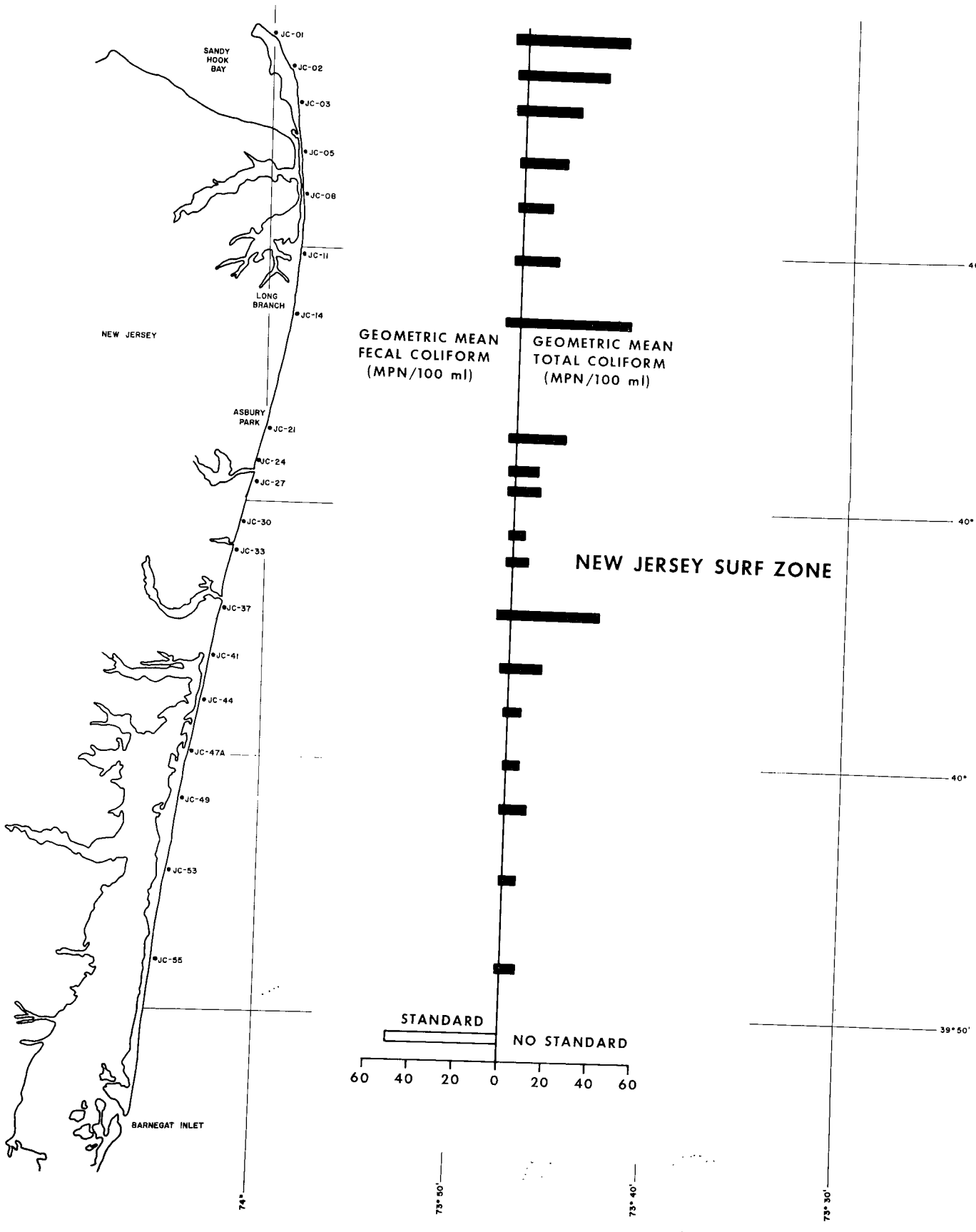
JC-01
SANDY HOOK BAY
JC-02
JC-03
JC-05
JC-08
JC-11
LONG BRANCH
JC-14
NEW JERSEY
ASBURY PARK
JC-21
JC-24
JC-27
JC-30
JC-33
JC-37
JC-41
JC-44
JC-47A
JC-49
JC-53
JC-55
BARNEGAT INLET
74°
GEOMETRIC MEAN FECAL COLIFORM (MPN/100 ml)
GEOMETRIC MEAN TOTAL COLIFORM (MPN/100 ml)
NEW JERSEY SURF ZONE
STANDARD
NO STANDARD
60 40 20 0 20 40 60
73° 50'
73° 40'
73° 30'
40°
40°
39° 50'

Figure 4

TABLE 11

New Jersey Coast, Surf Zone Bacterial Count

Total Coliform (TC) and Fecal Coliform (FC) per 100 ml

| Date | Station | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | JC01A | | JC02 | | JC03 | | JC05 | | JC08 | |
| | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 7/22/74 | 68 | 19 | 52 | 4 | 60 | 2 | 12 | 1 | 12 | <1 |
| 8/1/74 | 96 | 2 | 108 | 6 | 12 | <1 | 10 | 2 | 7 | 2 |
| 8/19/74 | 44 | 1 | 24 | 5 | 32 | 3 | 92 | 6 | 20 | 1 |
| 9/4/74 | 144 | 7 | 80 | 4 | 216 | 7 | 112 | 1 | 54 | 2 |
| 10/24/74 | 32 | 1 | 33 | <1 | 39 | 3 | 39 | 2 | 25 | <1 |
| 11/20/74 | 49 | 11 | 53 | 12 | 22 | 9 | 14 | 3 | <1 | <1 |
| 12/18/74 | 172 | 84 | 152 | 40 | 120 | 46 | 48 | 18 | 35 | 11 |
| 1/22/75 | 136 | 25 | 184 | 19 | 96 | 8 | 33 | 8 | 32 | 8 |
| Summary, all data to date | | | | | | | | | | |
| Total Samples | 14 | 14 | 15 | 15 | 14 | 13 | 15 | 15 | 15 | 15 |
| Geometric Mean | 45 | 5 | 37 | 4 | 25 | 4 | 19 | 2 | 13 | 2 |
| Max | 172 | 84 | 184 | 40 | 216 | 46 | 112 | 18 | 54 | 11 |
| Min | 6 | <1 | 4 | <1 | 3 | <1 | 1 | <1 | 1 | <1 |

New Jersey Coast, Surf Zone Bacterial Count

Total Coliform (TC) and Fecal Coliform (FC) per 100 ml

| Date | Station | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | JC11 | | JC14 | | JC21 | | JC24 | | JC27 | |
| | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 7/22/74 | 2 | <1 | 88 | <1 | 12 | <1 | 5 | <1 | 1 | <1 |
| 8/1/74 | 5 | <1 | 28 | <1 | 44 | 2 | 3 | <1 | 22 | <1 |
| 8/19/74 | 36 | 4 | 25 | 5 | 36 | 5 | 44 | 8 | 36 | 6 |
| 9/4/74 | 36 | 1 | 660 | 25 | 160 | 9 | 180 | 15 | 88 | 5 |
| 10/24/74 | 6 | <1 | 4 | <1 | 26 | <1 | 2 | <1 | 1 | <1 |
| 11/20/74 | 12 | 5 | 9 | 2 | 38 | 28 | 14 | 8 | 84 | 28 |
| 12/18/74 | 340 | 92 | 2200 | 420 | 96 | 4 | 108 | 5 | 96 | 5 |
| 1/22/75 | 52 | 9 | 132 | 14 | 13 | 6 | 26 | 11 | 25 | 5 |
| Summary, all data to date | | | | | | | | | | |
| Total Samples | 15 | 15 | 15 | 15 | 14 | 14 | 15 | 15 | 15 | 15 |
| Geometric Mean | 16 | 3 | 50 | 6 | 22 | 3 | 11 | 3 | 11 | 3 |
| Max | 340 | 92 | 2200 | 420 | 160 | 28 | 180 | 17 | 96 | 28 |
| Min | 2 | <1 | 3 | <1 | 2 | <1 | 2 | <1 | <1 | <1 |

New Jersey Coast, Surf Zone Bacterial Count

Total Coliform (TC)and Fecal Coliform (FC) per 100 ml

| Date | Station | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | JC30 | | JC33 | | JC37 | | JC41 | | JC44 | |
| | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 7/22/74 | <1 | <1 | 2 | 1 | 19 | 19 | 6 | <1 | 5 | 1 |
| 8/1/74 | 1 | <1 | 2 | <1 | 58 | 1 | 3 | <1 | 1 | <1 |
| 8/19/74 | 21 | 6 | 40 | 17 | 16 | 1 | 20 | 3 | 2 | <1 |
| 9/4/74 | 120 | 5 | 192 | 9 | 400 | 27 | 312 | 22 | 108 | 8 |
| 10/24/74 | 7 | 6 | 4 | <1 | 16 | 2 | 17 | 3 | <1 | <1 |
| 11/20/74 | 14 | 11 | 15 | 3 | 21 | 12 | 9 | 2 | 15 | 7 |
| 12/18/74 | 80 | 8 | 88 | 14 | 84 | 15 | 15 | 2 | 6 | 4 |
| 1/22/75 | 18 | <1 | 19 | 5 | 52 | 15 | 180 | 34 | 100 | 34 |
| Summary, all data to date | | | | | | | | | | |
| Total Samples | 15 | 15 | 15 | 15 | 15 | 15 | 13 | 13 | 13 | 13 |
| Geometric Mean | 5 | 2 | 11 | 3 | 40 | 6 | 15 | 4 | 6 | 2 |
| Max | 120 | 11 | 192 | 17 | 400 | 46 | 420 | 71 | 108 | 34 |
| Min | <1 | <1 | <1 | <1 | 8 | 1 | 1 | <1 | <1 | <1 |

New Jersey Coast, Surf Zone Bacterial Count

Total Coliform (TC) and Fecal Coliform (FC) per 100 ml

| Date | Station | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | JC47A | | JC49 | | JC53 | | JC55 | |
| | TC | FC | TC | FC | TC | FC | TC | FC |
| 7/22/74 | 8 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| 8/1/74 | 12 | <1 | <1 | <1 | 7 | <1 | 88 | 2 |
| 8/19/74 | 11 | 6 | <1 | <1 | <1 | <1 | 5 | 5 |
| 9/4/74 | 192 | 1 | 160 | 1 | 23 | 4 | 52 | 4 |
| 10/24/74 | <1 | <1 | <1 | <1 | 4 | <1 | 1 | <1 |
| 11/20/74 | 17 | 8 | 23 | 1 | 14 | 6 | 13 | 9 |
| 12/18/74 | 27 | 5 | 8700 | 5 | 180 | 4 | 272 | 4 |
| 1/22/75 | 21 | 4 | 17 | 2 | 15 | 3 | 26 | 11 |
| Summary, all data to date | | | | | | | | |
| Total Samples | 13 | 13 | 15 | 15 | 15 | 15 | 15 | 15 |
| Geometric Mean | 6 | 1 | 10 | 2 | 6 | 1 | 7 | 2 |
| Max | 192 | 8 | 8700 | 9 | 180 | 6 | 272 | 11 |
| Min | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |

TABLE 12

SUMMARY OF WATER QUALITY DATA (WATER COLUMN) COLLECTED ALONG LONG ISLAND SHORELINE

(Samples collected by boat approximately 100 yards from beach)

| Date | Top/Bottom | Station Identification Number | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LIC01 | | LIC02 | | LIC03 | | LIC04 | | LIC05 | | LIC06 | |
| | | TEMP | DO | TEMP | DO | TEMP | DO | TEMP | DO | TEMP | DO | TEMP | DO |
| 07/20/74 | T | 17.8 | 5.3 | - | - | - | - | 16.7 | 4.5 | 15.4 | 4.5 | - | - |
| 07/20/74 | B | 16.6 | 6.0 | - | - | - | - | 16.2 | 4.1 | 15.3 | 4.0 | - | - |
| 09/23/74 | T | 18.1 | 7.1 | 18.1 | 5.4 | 18.8 | 4.6 | 18.0 | 4.8 | 18.4 | 5.8 | 18.3 | 5.4 |
| 09/23/74 | B | 18.2 | 4.5 | 17.7 | 3.8 | 18.8 | 3.3 | 18.0 | 4.2 | 18.0 | 5.9 | 18.4 | 5.2 |

| Date | Top/Bottom | Station Identification Number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LIC07 | | LIC08 | | LIC09 | | LIC11 | | LIC12 | |
| | | TEMP | DO | TEMP | DO | TEMP | DO | TEMP | DO | TEMP | DO |
| 07/20/74 | T | 15.4 | 4.6 | 15.2 | 4.4 | 15.9 | 3.5 | - | - | - | - |
| 07/20/74 | B | 15.0 | 4.2 | 14.8 | 4.2 | 15.7 | 3.1 | - | - | - | - |
| 09/23/74 | T | 18.1 | 3.5 | 18.2 | 6.1 | 18.7 | 2.7 | 17.9 | 5.9 | 17.6 | 4.3 |
| 09/23/74 | B | 18.1 | 7.4 | 18.1 | 6.2 | 18.7 | 4.1 | 17.9 | 5.9 | 17.5 | 3.3 |

TEMP = Water temperature $^{o}C$
DO = Dissolved Oxygen mg/l

TABLE 13

SUMMARY OF BACTERIOLOGICAL DATA (WATER COLUMN) COLLECTED ALONG LONG ISLAND SHORELINE

(Samples collected by boat approximately 100 yards from beach)

| Date | Top/Bottom | Station Identification Number | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LIC01 | | LIC02 | | LIC03 | | LIC04 | | LIC05 | | LIC06 | |
| | | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 07/20/74 | T | 4 | < 4 | - | - | - | - | < 4 | < 4 | < 4 | < 4 | - | - |
| 07/20/74 | B | < 4 | < 4 | - | - | - | - | 100 | < 4 | < 4 | < 4 | - | - |
| 08/05/74 | T | 8 | < 2 | 14 | 2 | 8 | 2 | 5 | 5 | 7 | 2 | 8 | < 2 |
| 08/05/74 | B | 8 | < 2 | 5 | < 2 | 13 | < 2 | 2 | < 2 | 4 | < 2 | 4 | < 2 |
| 09/23/74 | T | 8 | 2 | 2 | 2 | 5 | < 2 | 7 | 7 | 23 | 13 | 17 | 2 |
| 09/23/74 | B | 5 | < 2 | < 2 | < 2 | 2 | < 2 | 8 | 2 | 8 | 2 | 7 | 2 |
| 02/11/75 | * | 90 | 172 | 22 | 11 | 5 | < 2 | 4 | < 2 | 8 | 5 | - | - |

| Date | Top/Bottom | LIC07 | | LIC08 | | LIC09 | | LIC11 | | LIC12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 07/20/74 | T | 4 | < 4 | < 4 | < 4 | 4 | < 4 | - | - | - | - |
| 07/20/74 | B | 4 | < 4 | < 4 | < 4 | < 4 | < 4 | - | - | - | - |
| 08/05/74 | T | 7 | 2 | 4 | < 2 | < 2 | < 2 | - | - | 13 | 8 |
| 08/05/74 | B | 8 | < 2 | 5 | < 2 | 2 | < 2 | - | - | 2 | 2 |
| 09/23/74 | T | 8 | < 2 | 8 | < 2 | 2 | 2 | 5 | 2 | 5 | 2 |
| 09/23/74 | B | 2 | < 2 | 5 | 2 | 2 | < 2 | 2 | 2 | < 2 | < 2 |
| 02/11/75 | * | 70 | 11 | 2 | < 2 | 17 | 17 | - | - | 5 | 5 |

TC = Total Coliform (MPN/100ml)
FC = Fecal Coliform (MPN/100ml)
< = Less than
T = Top - Approximately 2 ft. from surface
B = Bottom - Approximately 2 ft. from bottom
* = 10 ft. from surface

TABLE 14

SUMMARY OF DATA (BOTTOM SEDIMENTS) COLLECTED ALONG LONG ISLAND COAST
(Samples collected by boat approximately 100 yards from beach)

| Parameter | Date | Station Identification Number LIC01 | LIC02 | LIC03 | LIC04 | LIC05 | LIC06 | LIC07 | LIC08 | LIC09 | LIC11 | LIC12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Coliform | 07/20/74 | 230 | -- | -- | 330 | 230 | -- | 50 | 20 | 700 | -- | -- |
| (MPN/100g) | 08/05/74 | 50 | < 20 | < 20 | 130 | 50 | 130 | 130 | < 20 | 50 | -- | 40 |
| | 09/23/74 | 330 | 20 | 130 | 330 | 490 | 2,210 | 80 | 50 | 70 | 50 | 20 |
| | 12/11/74 | 34,800 | 1,300 | 7,900 | 34,800 | 1,090 | -- | 3,300 | 790 | 3,300 | -- | 80 |
| Fecal Coliform | 07/20/74 | 80 | -- | -- | 40 | 20 | -- | < 20 | < 20 | 2 | -- | -- |
| (MPN/100g) | 08/05/74 | 20 | < 20 | < 20 | 20 | < 20 | < 20 | < 20 | < 20 | 20 | -- | 20 |
| | 09/23/74 | 20 | < 20 | < 20 | < 20 | 80 | 490 | < 20 | < 20 | < 20 | < | < 20 |
| | 12/11/74 | 1,720 | 230 | 1,090 | 7,900 | 330 | -- | 490 | 70 | 330 | -- | < 20 |
| Salmonella | 07/20/74 | -- | -- | -- | -- | -- | -- | Neg. | Neg. | -- | -- | -- |
| (Qualitative) | 08/05/74 | -- | -- | -- | Neg. | -- | -- | -- | -- | -- | -- | -- |
| | 09/23/74 | Neg. | -- | -- | -- | Neg. | -- | -- | -- | -- | -- | -- |
| | 12/11/74 | -- | -- | -- | -- | -- | -- | -- | -- | Neg. | -- | -- |
| Total Organics | 07/20/74 | 5,340 | -- | -- | 2,380 | 2,180 | -- | 1,580 | 2,740 | 24,700 | -- | -- |
| (mg/kg) | 08/05/74 | 4,220 | 1,360 | 1,480 | 3,270 | 2,460 | -- | 5,230 | 3,690 | 3,450 | -- | 3,840 |
| | 09/23/74 | 7,540 | 4,870 | 4,770 | 7,590 | 4,900 | 4,200 | 4,150 | 5,170 | 1,790 | 410 | 4,360 |
| | 12/11/74 | 5,920 | 2,910 | 5,950 | 14,300 | 2,230 | -- | 2,900 | 4,600 | 5,220 | -- | 4,660 |
| Cadmium | 07/20/74 | < 3 | -- | -- | < 3 | < 3 | -- | < 3 | < 3 | < 3 | -- | -- |
| (mg/kg) | 08/05/74 | < 3 | < 3 | < 3 | < 3 | < 3 | -- | < 3 | < 3 | < 3 | -- | < 3 |
| | 09/23/74 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Chromium | 07/20/74 | 6.0 | -- | -- | 9.0 | 9.0 | -- | 7.0 | 12.0 | 6.0 | -- | -- |
| (mg/kg) | 08/05/74 | 5.0 | 6.0 | 7.0 | 8.0 | 8.0 | -- | 8.0 | 8.0 | 8.0 | -- | 8.0 |
| | 09/23/74 | 3.9 | 6.3 | 5.8 | 9.0 | 6.9 | 4.6 | 5.0 | 8.0 | 6.1 | < 2 | 5.7 |
| | 12/11/74 | 5.2 | 7.7 | 9.9 | 15.0 | 6.8 | -- | 4.5 | 6.3 | 9.1 | -- | 7.5 |
| Copper | 07/20/74 | 6.0 | -- | -- | 9.0 | 5.0 | -- | 5.0 | 6.0 | 6.0 | -- | -- |
| (mg/kg) | 08/05/74 | < 5 | 7.0 | 9.0 | < 5 | 5.0 | -- | 49.0 | 14.0 | < 5 | -- | < 5 |
| | 09/23/74 | 3.5 | < 2 | 2.0 | 4.3 | 4.8 | 3.5 | 3.0 | 3.5 | 4.3 | < 2 | 2.0 |
| | 12/11/74 | 1.8 | < 1 | 1.4 | 5.9 | < 1 | -- | 1.7 | 1.1 | 2.1 | -- | < 1 |
| Lead | 07/20/74 | <50 | -- | -- | <50 | <50 | -- | <50 | <50 | <50 | -- | -- |
| (mg/kg) | 08/05/74 | <50 | <50 | <50 | <50 | <50 | -- | <50 | <50 | <50 | -- | <50 |
| | 09/23/74 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 |
| | 12/11/74 | 3.5 | 6.0 | 11.3 | 16.1 | 4.8 | -- | 2.4 | 4.7 | 5.2 | -- | 9.8 |

TABLE 14 (Cont)

SUMMARY OF DATA (BOTTOM SEDIMENTS) COLLECTED ALONG LONG ISLAND COAST
(Samples collected by boat approximately 100 yards from beach)

| Parameter | Date | Station Identification Number | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LIC01 | LIC02 | LIC03 | LIC04 | LIC05 | LIC06 | LIC07 | LIC08 | LIC09 | LIC11 | LIC12 |
| Nickel | 07/20/74 | < 10 | -- | -- | < 10 | < 10 | -- | < 10 | < 10 | < 10 | -- | -- |
| (mg/kg) | 08/05/74 | < 10 | < 10 | < 10 | < 10 | < 10 | -- | < 10 | < 10 | < 10 | -- | < 10 |
| | 09/23/74 | 3.9 | < 0.5 | 1.0 | 1.1 | 0.7 | < 0.5 | 0.8 | 1.0 | 1.3 | < 0.5 | < 0.5 |
| | 12/11/74 | 1.9 | < 1 | < 1 | 2.25 | < 1 | -- | < 1 | < 1 | < 1 | -- | < 1 |
| Mercury | 07/20/74 | 0.73 | -- | -- | 1.2 | 0.67 | -- | 0.43 | 0.77 | 1.4 | -- | -- |
| (mg/kg) | 08/05/74 | 0.2 | 0.9 | 3.7 | 2.0 | 0.5 | -- | 0.1 | 0.5 | < 0.1 | -- | 1.2 |
| | 09/23/74 | 0.2 | 0.3 | 0.2 | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.6 |
| Arsenic | 07/20/74 | 0.6 | -- | -- | < 0.5 | 0.8 | -- | < 0.5 | 1.1 | 0.5 | -- | -- |
| (mg/kg) | 08/05/74 | 0.6 | 0.9 | 0.6 | 1.7 | 0.6 | -- | 0.8 | 1.8 | 1.6 | -- | 0.5 |
| | 09/23/74 | 0.8 | < 0.5 | 1.3 | 2.4 | 1.6 | < 0.5 | 1.3 | 4.0 | 2.0 | < 0.5 | 0.9 |

Neg. - Sought but not detected

TABLE 15

Summary of Water Quality Date (Water Column) Collected Along New Jersey Shoreline

(Samples Collected By Boat Approximately 100 Yards from Beach)

| Date | Top/Bottom | Station Identification Number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JC01A | | JC02 | | JC03 | | JC05 | | JC08 | |
| | | Temp | DO | Temp | DO | Temp | DO | Temp | DO | Temp | DO |
| 8/6/74 | T | 22.0 | 7.9 | 21.9 | 7.4 | 21.4 | 9.5 | 21.5 | 9.5 | 21.7 | 9.4 |
| 8/6/74 | B | 21.0 | 7.1 | 20.5 | 7.1 | 21.4 | 9.5 | 20.2 | 9.5 | 19.1 | 8.8 |
| 9/12/74 | T | - | 4.9 | - | 4.9 | - | 6.5 | - | 7.3 | - | 8.2 |
| 9/12/74 | B | - | 5.2 | - | 5.0 | - | 6.0 | - | 5.2 | - | 4.2 |
| | | JC11 | | JC14 | | JC21 | | JC24 | | JC27 | |
| | | Temp | DO | Temp | DO | Temp | DO | Temp | DO | Temp | DO |
| 8/6/74 | T | 21.6 | 10.0 | 21.5 | 10.4 | 19.0 | 6.1 | 17.1 | 5.0 | 17.6 | 4.5 |
| 8/6/74 | B | 19.6 | 6.4 | 20.6 | 10.0 | 17.6 | 6.0 | 16.1 | 4.9 | 14.4 | 2.8 |
| 9/12/74 | T | - | 7.6 | - | 5.8 | - | 6.4 | - | 6.3 | - | 5.9 |
| 9/12/74 | B | - | 4.1 | - | 6.1 | - | 5.7 | - | 5.4 | - | 5.4 |

Temp = Water Temperature $^{o}C$
DO = Dissolved Oxygen mg/l

TABLE 16

SUMMARY OF BACTERIOLOGICAL DATA (WATER COLUMN) COLLECTED ALONG NEW JERSEY SHORELINE

(Samples collected by boat approximately 100 yards from beach)

| Date | Top/Bottom | Station Identification Number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JC01A | | JC02 | | JC03 | | JC05 | | JC08 | |
| | | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 08/06/74 | T | 130 | < 2 | 49 | 2 | 22 | 4 | 2 | < 2 | 5 | < 2 |
| 08/06/74 | B | 46 | 4 | 33 | 2 | 17 | < 2 | 8 | 2 | 8 | 2 |
| 09/12/74 | T | 1,300 | 49 | 790 | 221 | 109 | 14 | 230 | 22 | 79 | 23 |
| 09/12/74 | B | 230 | 79 | 172 | 23 | 79 | 17 | 49 | 2 | 23 | 2 |
| 02/27/75 | T | 172 | 70 | 230 | 22 | 79 | 8 | 49 | 2 | 49 | < 2 |
| 02/27/75 | B | 172 | 30 | 70 | 5 | 109 | 11 | 26 | 4 | 17 | 5 |

| Date | Top/Bottom | Station Identification Number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JC11 | | JC14 | | JC21 | | JC24 | | JC27 | |
| | | TC | FC | TC | FC | TC | FC | TC | FC | TC | FC |
| 08/06/74 | T | 7 | 2 | 114 | 70 | 230 | 79 | 23 | 5 | 49 | 49 |
| 08/06/74 | B | 31 | 8 | 330 | 79 | 330 | 49 | 49 | 14 | 33 | < 2 |
| 09/12/74 | T | 33 | 2 | 8 | 2 | 141 | 109 | 490 | 230 | 49 | 22 |
| 09/12/74 | B | 23 | 8 | 7 | 2 | 3,480 | 330 | 490 | 70 | 2 | < 2 |
| 02/27/75 | T | 33 | 2 | 11 | 5 | 49 | 33 | 130 | 22 | 13 | < 2 |
| 02/27/75 | B | 17 | < 2 | 63 | 8 | 33 | 2 | 49 | 7 | | |

TC = Total Coliform (MPN/100ml)
FC = Fecal Coliform (MPN/100ml)
< = Less than
T = Top - Approximately 2 ft. from surface
B = Bottom - Approximately 2 ft. from bottom

TABLE 17

Summary of Data (Bottom Sediments) Collected Along the New Jersey Coast

(Samples Collected by Boat Approximately 100 Yards from Beach)

| Parameter | Date | Station Identification Number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JC01 | JC02 | JC03 | JC05 | JC08 | JC11 | JC14 | JC21 | JC24 | JC27 |
| Total Coliform | 08/6/74 | 80 | 170 | 70 | 50 | 230 | 790 | 24,000 | 490 | 230 | 170 |
| (MPN/100g) | 09/12/74 | 1,090 | 330 | 50 | 130 | 130 | 50 | 170 | 940 | 490 | 110 |
| | 12/12/74 | 1,300 | 1,090 | 790 | 230 | 330 | 790 | 7,000 | 80 | 4,900 | 4,600 |
| Fecal Coliform | 08/6/74 | <20 | < 20 | < 20 | < 20 | 20 | 170 | 7,900 | 110 | 130 | 20 |
| (MPN/100g) | 09/12/74 | 130 | 330 | < 20 | 20 | < 20 | 20 | 20 | 130 | 220 | 50 |
| | 12/12/74 | 70 | 170 | 230 | 50 | 70 | 50 | 490 | < 20 | 210 | 220 |
| Salmonella | 08/6/74 | Neg | - | - | - | - | - | - | - | - | - |
| (qualitative) | 09/12/74 | - | - | Neg | - | - | - | Neg | - | - | - |
| Total Organics | 08/6/74 | 8,220 | 3,070 | 8,940 | 7,640 | 14,900 | 12,400 | 9,980 | 14,100 | 12,200 | 13,550 |
| (mg/kg) | 09/12/74 | 8,840 | 5,150 | 4,310 | 10,460 | 23,040 | 22,300 | 15,700 | 16,200 | 14,800 | 9,430 |
| | 12/12/74 | 11,900 | 17,500 | 11,900 | 11,400 | 24,300 | 22,800 | 16,500 | 14,700 | 3,150 | 4,170 |
| Cadmium | 08/6/74 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 | < 3 |
| (mg/kg) | 09/12/74 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Chromium | 08/6/74 | 14.0 | 5.0 | 18.0 | 11.0 | 30.0 | 20.0 | 32.0 | 23.0 | 15.0 | 6.0 |
| (mg/kg) | 09/12/74 | 9.2 | 5.1 | 5.1 | 6.9 | 30.3 | 23.1 | 32.9 | 16.4 | 12.3 | 4.6 |
| | 12/12/74 | 18.0 | 24.0 | 18.0 | 13.0 | 27.0 | 36.0 | 46.0 | 24.0 | 3.6 | 7.5 |
| Copper | 08/6/74 | < 5 | < 5 | 5.0 | 5.0 | 5.0 | < 5 | 5.0 | < 5 | 5.0 | < 5 |
| (mg/kg) | 09/12/74 | 3.0 | < 2 | < 2 | < 2 | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | < 2 |
| | 12/12/74 | 1.2 | 1.7 | 1.5 | 1.5 | 1.4 | 1.4 | 2.6 | 1.8 | < 1 | < 1 |
| Lead | 08/6/74 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| (mg/kg) | 09/12/74 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| | 12/12/74 | 8.7 | 8.4 | 10.7 | 23.6 | 37.0 | 16.5 | 23.4 | 30.9 | 4.6 | 9.6 |
| Nickel | 08/6/74 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| (mg/kg) | 09/12/74 | 6.0 | 2.0 | < 2 | 3.0 | 7.0 | 7.0 | - | 5.0 | 4.0 | < 2 |
| | 12/12/74 | 2.7 | 4.0 | 2.2 | 2.2 | 4.0 | 3.1 | 4.2 | 3.8 | 0.5 | 0.9 |
| Mercury | 08/6/74 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.2 | < 0.1 | 0.1 | < 0.1 | 1.0 | 0.1 |
| (mg/kg) | 09/12/74 | < 0.2 | 0.3 | < 0.2 | < 0.2 | < 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 |
| Arsenic | 08/6/74 | 1.7 | 1.3 | 2.1 | 3.0 | 2.9 | 4.7 | 2.7 | 3.4 | 2.7 | 3.7 |
| (mg/kg) | 09/12/74 | 3.0 | 3.2 | 0.8 | 3.0 | 13.2 | 15.9 | 7.55 | 7.0 | 4.1 | 9.0 |

Neg. - Sought but not detected

TABLE 18

SUMMARY OF WATER QUALITY DATA (WATER COLUMN) COLLECTED ALONG LONG ISLAND TRANSECT

| Date | Top/Bottom | Station Identification Number | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NYB40 | | | NYB41 | | | NYB42 | | | NYB43 | | |
| | | TC | FC | DO | TC | FC | DO | TC | FC | DO | TC | FC | DO |
| 10/23/74 | T | 5 | 2 | 8.3 | 172 | 49 | 8.1 | 141 | 70 | 8.2 | 31 | 8 | 8.8 |
| 10/23/74 | B | 5 | 2 | 8.0 | 5 | < 2 | 6.4 | 330 | 109 | 8.3 | 5 | < 2 | 7.1 |
| | | NYB44 | | | NYB45 | | | NYB46 | | | NYB47 | | |
| | | TC | FC | DO | TC | FC | DO | TC | FC | DO | TC | FC | DO |
| 10/23/74 | T | 8 | 2 | 8.3 | - | - | - | - | - | - | - | - | - |
| 10/23/74 | B | < 2 | < 2 | 8.0 | - | - | - | - | - | - | - | - | - |

TC = Total Coliform (MPN/100ml)
FC = Fecal Coliform (MPN/100ml)
DO = Dissolved Oxygen (mg/l)
< = Less than

TABLE 19

SUMMARY OF DATA (BOTTOM SEDIMENTS) COLLECTED ALONG LONG ISLAND TRANSECT

| Parameter | Date | Station Identification Number | | | | | |
|---|---|---|---|---|---|---|---|
| | | NYB40 | NYB41 | NYB42 | NYB43 | NYB44 | NYB45 |
| Total Coliform | 10/23/74 | 87 | 2,300 | 110 | 170 | 790 | 10,900 |
| (MPN/100g) | 12/05/74 | 1,410 | 460 | < 20 | 20 | 330 | 790 |
| Fecal Coliform | 10/23/74 | 20 | 40 | < 20 | 50 | 130 | 4,900 |
| (MPN/100g) | 12/05/74 | 230 | 50 | < 20 | < 20 | 80 | 50 |
| Salmonella | 10/23/74 | - | - | - | Neg. | - | - |
| (Qualitative) | 12/05/74 | - | - | Neg. | - | - | - |
| Total Organics | 10/23/74 | 7,390 | 6,130 | 16,400 | 30,900 | 18,500 | - |
| (mg/kg) | 12/05/74 | 8,370 | 15,700 | 27,100 | 35,600 | 25,000 | 32,400 |
| Cadmium | 10/23/74 | < 0.1 | < 0.1 | 0.1 | 1.9 | 1.7 | - |
| (mg/kg) | 12/05/74 | - | - | - | - | - | - |
| Chromium | 10/23/74 | 6.1 | 5.3 | 14.8 | 74.6 | 34.1 | - |
| (mg/kg) | 12/05/74 | 11.0 | 10.0 | 16.0 | 65.0 | 30.0 | 67.0 |
| Copper | 10/23/74 | 12.0 | 11.0 | 12.0 | 65.0 | 53.0 | - |
| (mg/kg) | 12/05/74 | 3.0 | 2.0 | 6.0 | 65.0 | 30.0 | 50.0 |
| Lead | 10/23/74 | < 4 | < 4 | 6.0 | 10.0 | 20.0 | - |
| (mg/kg) | 12/05/74 | <20 | 20.0 | 30.0 | 80.0 | 60.0 | 170.0 |
| Nickel | 10/23/74 | 2.3 | 1.3 | 4.4 | 15.0 | 5.4 | - |
| (mg/kg) | 12/05/74 | 2.0 | 3.0 | 7.0 | 19.0 | 10.0 | 20.0 |
| Mercury | 10/23/74 | 0.2 | 0.2 | 0.1 | 3.3 | 2.8 | - |
| (mg/kg) | 12/05/74 | - | - | - | - | - | - |
| Arsenic | 10/23/74 | < 0.5 | 4.1 | 18.9 | 9.9 | 5.4 | - |
| (mg/kg) | 12/05/74 | - | - | - | - | - | - |

Neg. - Sought but not detected