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NPDES Compliance Summary Report Fiscal Year 1992

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NPDES Compliance Summary Report
Fiscal Year 1992

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EXECUTIVE SUMMARY

This report summarizes monitoring activities conducted by the Massachusetts Water Resources Authority (MWRA) between July 1991 to June 1992. We monitored facilities that serve the metropolitan Boston area including:

- two primary treatment plants, Deer Island and Nut Island;
- three Combined Sewer Overflow (CSO) Treatment Facilities including Cottage Farm, Prison Point and Somerville Marginal.

This report also includes limited monitoring data from the three new CSO facilities, Constitution Beach, Fox Point and Commercial Point. The latter three facilities are owned and operated by the MWRA but are currently included in the Boston Water and Sewer Commission (BWSC) National Pollutant Discharge Elimination System (NPDES) permit.

Monitoring was conducted in part to comply with requirements contained in our NPDES permit as well as to monitor plant performance and process control. In FY 1992, we also conducted several studies independent of NPDES monitoring activities. These studies, including the NPDES monitoring program are as follows:

- <u>NPDES monitoring for Toxicity and Toxics</u>, managed by NPDES Compliance Unit. Analyses were conducted by Aquatec, Inc. of Colchester, VT and Energy and Environmental Engineering of Somerville, MA;
- <u>Process Control and NPDES Monitoring</u>, conducted by the Deer Island and Nut Island Treatment Plant Laboratories;
- <u>Local Limits Study</u>, managed by the Toxic Reduction and Control Department (TRAC) and analytical procedures conducted by New England Testing, Inc. of Bedford, MA and;
- <u>Harbor Studies Effluent Characterization</u>, PAH and Pesticides/PCB Analyses using methods with lower detection levels, managed by Harbor Studies. Chemical analyses performed by Battelle, Inc. of Duxbury, MA.

The results from all studies agreed quite closely, even though the purposes and program monitoring protocols were slightly different.

As expected, the results from the analyses of Deer Island and Nut Island effluents were very similar:

- copper, lead and zinc were detected in both effluents at all times while mercury and silver were detected about 50 % of the time;
- cyanide, phenols and total petroleum hydrocarbons were detected most of the time;
- b-BHC was routinely detected at both plants. Endosulfan I was detected at both plants twice while chlordane was detected twice at Deer Island and only once at Nut Island;
- phthalates, 4-methylphenol, methylene chloride, chloroform, 2-Butanone, 1,1,1 trichloroethane, trichloroethene, tetrachloroethane and toluene were routinely detected in both effluents.

Tables 1 and 2 compare the metals analyses results of the monitoring data from the NPDES monitoring program, Local Limits study and Deer Island Plant Laboratory.

Table 1 Deer Island Effluent Metals, FY92 Mean Concentrations

	Geometric Mean Concentration		
Metals (ug/L)	**DI Laboratory**	**NPDES**	**Local Limits**
Arsenic	1.9	1.5	2.0
Cadmium	1.1	0.7	2.0
Chromium	3.8	3.9	4.0
Copper	59.3	59.3	70.0
Lead	13.0	11.4	7.0
Mercury	0.2	0.2	0.1
Nickel	6.0	8.3	8.0
Silver	4.9	3.1	4.6
Zinc	76.9	74.2	113.0

Table 2 Nut Island Effluent Metals, FY92 Mean Concentrations

Metals (ug/L)	Geometric Mean Concentration		
	NI Laboratory	NPDES	Local Limits
Cadmium	0.4	0.7	1.0
Chromium	6.1	4.5	4.0
Copper	51.4	55.5	63.0
Lead	29.7	7.2	6.0
Nickel	16.3	9.2	9.0
Silver	4.4	3.1	3.0
Zinc	109.5	63.2	85.0

The overall quality of the effluent from the Deer Island and Nut Island has improved dramatically since 1978, when the first set of priority pollutant scan of the treatment plant effluent were conducted (MDC, Application For a Secondary Waiver of Secondary Treatment of Nut Island and Deer Island Treatment Plants, Metcalf & Eddy, Inc., June 1984). Subsequent monitoring data has shown a steady decrease in the levels of pollutants in our discharge.

Much of the observed decrease of toxic pollutants through the years may be real reductions. These are due in part to increased industrial monitoring and compliance activities resulting in reduction of pollutants discharged into the system, improved methods of analyses, along with, the general economic slowdown.

The Fiscal Year 1992 data is encouraging because it indicates our toxic discharges to be much lower than those projected in 1987 (Supplemental Environmental Impact Statement, US EPA, 1988). Figure 1 compares the NPDES Monitoring data with the projected primary effluent contained in the SEIS document.

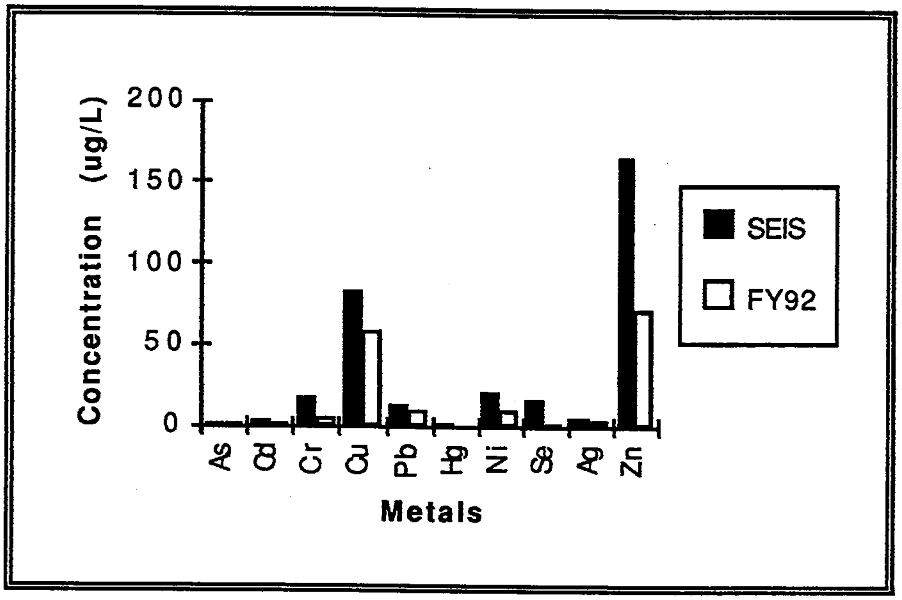


Figure1. FY92 Effluent Metals Compared With Earlier Projections

In addition, projected primary effluent and secondary effluent concentrations using the 1992 Local Limits influent data and applying the theoretical removal efficiencies used in the SEIS study are also compared with the SEIS data. This comparison is illustrated in Table 3.

The assumption that the measured reduction of influent toxic loadings contributed largely to the reduction of toxics in the harbor is supported by the results of the 1991 Bioaccumulation Study.

Table 4 compares the results of similar studies done in 1987 and 1991 and shows a general decrease in contaminants bioaccumulating in mussels. Further reductions of toxic loadings into Boston Harbor resulted from the cessation of sludge discharge in December 1991.

Table 3 Primary and Secondary Effluent Projections Based on FY92 Data

Metals (ug/L)	SEIS(1) Primary Effluent	SEIS(1) Secondary Effluent	New Estimates (2) Primary Effluent	New Estimates (2) Secondary Effluent
Arsenic	1.810	1.170	1.560	1.04
Cadmium	2.277	1.290	1.624	1.0
Chromium	16.890	6.530	4.794	1.9
Copper	82.265	22.130	57.629	16.0
Lead	11.940	9.190	5.886	4.7
Mercury	1.242	0.380	0.187	0.1
Nickel	21.380	16.540	9.631	7.7
Selenium	15.260	8.190	1.548	0.9
Silver	4.010	0.550	4.424	0.6
Zinc	165.300	63.910	81.870	32.7

(1) Supplement Environmental Impact Statement (SEIS), EPA, 1988.
(2) Based on influent data collected during FY92, and applying removal efficiencies used in the SEIS document.

As shown, the earlier estimates are much higher than present projections.

In September 1991, the Authority submitted its application for a permit renewal for its existing facilities. In the application, we proposed some modifications to our existing monitoring program based on the results of monitoring conducted over the past five years. Until the MWRA is issued a new permit, we will continue to operate under the court ordered interim limits and the NPDES permit issued in December 1986.

Table 4. Comparison of Mussel Bioaccumulation Study Results

	Concentration			
	1987		1991	
Metals (ug/L)	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Total PAHs	2363.0	236.0	1543.0	376.0
Total PCBs	630.0	264.0	200.0	49.0
Total DDTs	62.6	33.7	45.9	12.8
Dieldrin	11.4	3.9	2.5	0.6
Alpha Chlordane	21.5	5.6	10.0	3.2
Trans-nonachlor	18.0	3.7	8.3	2.3
Lead	7.2	2.0	6.1	1.2
Copper	9.6	1.9	9.7	1.4
Zinc	171.0	68.6	145.0	20.3

(1) Organics concentrations expressed in ug/Kg, metals in mg/Kg.
(2) Organics measured after 30 days, all other parameters measured after 60 days.

For the coming years, we again need to conduct several studies:

- The secondary treatment pilot plant, scheduled to be on-line in September 93, will not only provide us with valuable opportunity to gather data on secondary treatment plant process control and operations, but it will allow us to conduct effluent characterization and whole effluent toxicity testing;

- The Detailed Effluent Characterization Study, Task 18 of the Harbor and Outfall Monitoring under contract with Battelle, Inc., should provide us with a better estimate of discharge loads. It will measure concentrations of trace metals and organic contaminants by employing methodologies with lower detection limits;

- The NPDES monitoring program analyzes data consistent with methodologies employed since 1988, and, therefore, will provide a good historical perspective.

- The Local Limits Study will provide us with valuable influent loading characterization, and the effluent data should validate data collected by the NPDES program.

I. Introduction

This report summarizes the monitoring activities conducted by the Massachusetts Water Resources Authority (MWRA) during the period July 1991 to June 1992. We monitored the two treatment plants and six permitted Combined Sewer Overflow (CSO) facilities, to gather operational data, and, to comply with the requirements contained in our NPDES permit. Other wastewater characterization studies conducted during this fiscal year are also included in this report as a means of validating our monitoring efforts.

I.A. Monitoring Programs

There were several monitoring programs in fiscal year 1992, however, this report will only cover the following influent and effluent quality monitoring:

- Treatment Plants Process Control and NPDES Monitoring Program
- NPDES Monitoring Program
- Local Limits Monitoring Program
- Harbor Studies Effluent Characterization, PAH and Pesticides/PCBs.

Sampling and analyses were conducted in accordance with established standard procedures and methodologies contained in 40 CFR 136, except for the analytical methods used by the Harbor Studies characterization, where the method detection limits were much lower than those of the Environmental Protection Agency's (EPA) established methodologies.

A.1 Plant Monitoring Program

The treatment plants monitor plant performance, process control and NPDES compliance daily. This report, however, will only present monitoring data addressing NPDES permit compliance concerns.

Sampling of influent and effluent is conducted daily by Laboratory personnel, and, in some instances, by Operations staff. Samples are delivered to the laboratory and are analyzed within prescribed holding times and in accordance with the Plant's Standard Operating Procedures (SOP).

Grab samples are collected at each sampling site at approximately the same time and almost always, by the same personnel. Daily composite samples are collected by a 24-hour time-composite sampler. For metals analyses, aliquot portion of a composite sample is measured-out and stored in a properly preserved container until the last day's aliquot portion is collected. The preserved composite portions constitute the month's metal sample.

The Deer Island Laboratory, in addition to testing Deer Island samples, also analyzes CSO samples. During each activation, grab samples are collected by facility personnel and transported to the Deer Island laboratory for analyses of conventional pollutants. Samples are collected during the first four hours of discharge or any portion of discharges that are less than four hours duration. The samples are collected every fifteen minutes during the first hour, after one and one half hour, two hours, three hours and four hours from the onset of the discharge. Samples are flow-weighted to make a composite sample.

A list of parameters, sampling frequency, analytical procedures and other relevant information is presented in Table I-A.1.

A.2. NPDES Compliance Monitoring Program

The NPDES Monitoring program conducts monthly priority pollutant scans and whole effluent toxicity tests (WET) on the Deer Island and Nut Island effluents and chemical analyses on the Cottage Farm, Prison Point and Somerville Marginal CSO facility overflows. The chemical analyses were conducted by Energy and Environmental Engineering of Somerville, MA. and the WET were performed by Aquatec, Inc. of Colchester, VT.

Sampling for NPDES compliance is conducted by the Monitoring Section of TRAC. Sampling at the treatment plants is normally scheduled on the second full week of the month over a period of six days partly to respond to the requirements of the chronic 7-day renewal test.

Two automatic samplers are set up three times to collect Day 2, Day 4, and Day 6 samples during each sampling period. One sampler will collect samples for chemical analysis, and the other will collect samples for toxicity tests. Both grab and composite samples are collected during each sampling event. For the chemistry portion, except for volatile organic analysis, the three discrete 24-hour daily composite samples are further composited at the laboratory to make the month's composite sample. This laboratory composited sample is analyzed for priority pollutant metals, acid/base/neutral organic compounds, total phenols, and pesticides.

Grab samples are collected for cyanide, hexavalent chromium and petroleum hydrocarbons (PHC) analyses. PHC analysis are performed weekly. All other analyses are conducted monthly.

Sampling at the three permitted CSO facilities is conducted at the first activation of each month for selected priority pollutant analyses, and at every activation for conventional parameters analyses.

A list of parameters, sampling frequency, analytical procedures and other relevant information is presented in Table I-A.2.

A.3 Local Limits Monitoring Program

The Local Limits Monitoring program design is very similar to the NPDES program. Mandated by the Pretreatment Program of the NPDES Permit, samples are collected from Deer Island and Nut Island during the same time period as the NPDES program for priority pollutant analyses.

Three major differences between the NPDES and Local Limits program that, for the latter are:

- both influent and effluent samples are collected
- no toxicity tests are conducted
- each of the three daily composite samples is analyzed separately.

A list of parameters, sampling frequency, analytical procedures and other relevant information is presented in Table I-A.3.

A.4 Harbor Studies Effluent Characterization

Since the majority of priority pollutants in the effluents were not detected using EPA-approved methodologies, the Harbor Studies Characterization was designed to give a better estimate of the concentration of constituents in our wastestreams. The Battelle methodologies provide much lower analytical detection levels than those employed by the NPDES and TRAC laboratories.

Sampling for this study was undertaken during three days in November 1991 and repeated again in June, 1992. Influent and effluent samples were collected from both the Deer and Nut Island treatment plants. The samples were analyzed for polynuclear aromatic hydrocarbons (PAH) and Pesticides/Polychlorinated Biphenyls (PCBs).

Table I.A.1
Deer Island and Nut Island Treatment Plants
Monitoring Program

Parameter	Type[1]	Frequency	Analytical Method [2]
Conventional			
pH	Grab	Daily	150.1
Settleable Solids	Grab	Daily	160.5
Biochemical Oxygen Demand	Composite	Daily	405.1
Total Suspended Solids	Composite	Daily	160.2
Total Coliform	Grab	3 times Daily	9222 D [3]
Fecal Coliform	Grab	3 times Daily	9222 B [3]
Oil and Grease	Grab	Daily	413.1
Total Chlorine Residual	Grab	Daily	330.5
Chlorides	Grab	Daily	4500 B [3]
Metals [4]			
Arsenic	Composite	Monthly	206.2
Cadmium	Composite	Monthly	213.1
Chromium	Composite	Monthly	218.1
Copper	Composite	Monthly	220.1
Lead	Composite	Monthly	239.1
Mercury	Composite	Monthly	245.1
Nickel	Composite	Monthly	249.1
Silver	Composite	Monthly	272.1
Zinc	Composite	Monthly	289.1
Nutrients			
Total Kjeldahl Nitrogen	Composite	Monthly	351.3
Ammonia	Composite	Monthly	350.2
Nitrates	Composite	Monthly	353.3
Nitrites	Composite	Monthly	354.1
Orthophosphorus	Composite	Monthly	365.2
Total Phosphorus	Composite	Monthly	365.2

Notes:
[1] Composite samples are 24-hour time composite except for samples for metals analyses.
[2] EPA methods
[3] Standard Methods
[4] laboratory-composited aliquot portions of the daily 24-hour daily composites.

Table I.A.2
NPDES Compliance Monitoring Program

Parameter	Type [1]	Frequency	Analytical Method [2]
Metals			
Antimony	Composite	Monthly	204.2
Arsenic	Composite	Monthly	206.2
Beryllium	Composite	Monthly	200.7
Cadmium	Composite	Monthly	213.1
Chromium	Composite	Monthly	200.7
Copper	Composite	Monthly	200.7
Lead	Composite	Monthly	239.2
Mercury	Composite	Monthly	245.1
Molybdenum	Composite	Monthly	200.7
Selenium	Composite	Monthly	270.2
Silver	Composite	Monthly	200.7
Thallium	Composite	Monthly	279.2
Zinc	Composite	Monthly	200.7
Cyanide	Composite [3]	3 x Monthly	335.2
Total petroleum hydrocarbon	Grab	Weekly	418.1
Pesticides/PCBs	Composite	Monthly	Modified 608
Semi-volatiles	Composite	Monthly	Modified 625
Volatiles	Composite [3]	3 x Monthly	Modified 624

Notes:
1 Composite samples are 24-hour time composite except for samples for cyanide and volatile organics analyses.
2 EPA methods
3 laboratory-composited aliquot portions of the (3) 24-hour daily composites.

Table I.A.3
Local Limits Monitoring Program

Parameter	Type [1]	Frequency	Analytical Method [2]
Metals			
Antimony	Composite	3 x Monthly	204.2
Arsenic	Composite	3 x Monthly	206.2
Beryllium	Composite	3 x Monthly	200.7
Cadmium	Composite	3 x Monthly	213.1
Chromium	Composite	3 x Monthly	200.7
Copper	Composite	3 x Monthly	200.7
Lead	Composite	3 x Monthly	239.2
Mercury	Composite	3 x Monthly	245.1
Molybdenum	Composite	3 x Monthly	200.7
Selenium	Composite	3 x Monthly	270.2
Silver	Composite	3 x Monthly	200.7
Thallium	Composite	3 x Monthly	279.2
Zinc	Composite	3 x Monthly	200.7
Cyanide	Composite	3 x Monthly	335.2
Pesticides/PCBs	Composite	3 x Monthly	608
Semi-volatiles	Composite	3 x Monthly	625
Volatiles	Composite	3 x Monthly	624

Notes: 1 24-hr composite
2 EPA Methods

II. The Facilities

Currently, the Authority is permitted to discharge effluent from the two primary treatment plants, Deer Island and Nut Island, and three combined sewer overflow treatment facilities, Cottage Farm, Prison Point, and Somerville Marginal. The Deer Island plant discharges through outfalls 001 through 005 to Boston Harbor. The Nut Island plant discharges through outfalls 101 through 103 to Boston Harbor and 104 to Quincy Bay. The Cottage Farm (201), Prison Point (203), and Somerville Marginal (205) CSO facilities discharge to the Charles River, Inner Harbor, and Mystic River respectively.

Three new CSO facilities, Constitution Beach, Fox Point, and Commercial Point are owned and operated by the Authority. The effluent pipes from these facilities discharge to BWSC lines and the outfall pipes to the receiving water are currently permitted to BWSC.

Table II.1 lists the MWRA treatment facilities and relevant information pertaining to each facility. The table also includes the outfall number, with the three letters indicating the permittee. The MWR outfalls signify MWRA permitted outfalls and the BOS signifies BWSC outfalls.

A. Deer Island

The Deer Island treatment plant, in operation since June of 1968, serves 22 communities and portions of Boston, Brookline, Newton, and Milton, encompassing an area of approximately 168.03 sq. miles.

Six MWRA pumping stations are located throughout the contributing area. Three remote headworks, Chelsea Creek, Ward Street, and Columbus Park are connected to the Deer Island main pumping station by deep rock tunnels. Wastewater from the various pumping stations arrives at the treatment plant via these headworks. Wastewater from the town of Winthrop arrives at the plant via the Winthrop terminal.

Construction activities for the new secondary treatment plant continue. In 1995, the new primary plant should be in full operation and should be discharging through the new outfall location. In 1996, secondary treatment will begin and will reach full capacity in 1999. Figure II.A.1 is a process flow diagram of the Deer Island facility.

Current treatment processes include:

- screening and grit removal at all headworks;
- pre-aeration
- primary settling, and
- disinfection of the effluent.

Table II.1 List of Treatment Facilities and Discharge Locations

Facility Name	Location	First year of Operation	Treatment Process	Design Flow (MGD)	Conduit Size At Facility In	Conduit Size At Facility Out	Outfall Number	Receiving Water
POTW								
Deer Island	Deer Island Boston, MA (North System)	1968	Screening Sedimentation Chlorination	343		9'x 10' 6'x 6.5' BLOCKED 9' Dia 9' Dia	MWR001 MWR002 MWR003 MWR004 MWR005	Boston Harbor
Nut Island	147 Sea St. Quincy, MA (South System)	1952	Screening Sedimentation Chlorination	112		5'Dia 5'Dia 5'Dia 5'Dia	MWR101 MWR102 MWR103 MWR104	Boston Harbor
CSO FACILITIES								
Cottage Farm	Memorial Dr. near Boston University Bridge, Cambridge	1971	Screening Settling Chlorination Detention (1.3 MG)	233	72" N. Charles Relief 42" S. Charles Relief 54" Brookline	96" Outfall	MWR201	Charles River
Prison Point	Near Museum of Science Bridge, Cambridge	1980	Screening Settling Chlorination Detention (1.2 MG)	385	10' Conduit	8' Conduit	MWR203	Inner Harbor
Somerville Marginal	McGrath Highway under Route I-93, Somerville	1973*	Screening Chlorination	245	7' x 7.5' Conduit 84" Conduit	6' x 8' Conduit	MWR205	Mystic River
Constitution Beach	Off Shore St. East Boston	1987	Screening Chlorination	20	36" Conduit	36" Conduit	BOS002	Boston Harbor
Fox Point	Freeport Street near Southeast Expressway, Dorchester	1989	Screening Chlorination	119	10' x 12' Conduit	10' x 12' Conduit	BOS089	Dorchester Bay
Commercial Point	Victory Road Dorcester	1991	Screening Chlorination	194	15' x 11' Conduit	15' x 11' Conduit	BOS090	Dorchester Bay

* Rehabilitated in 1988

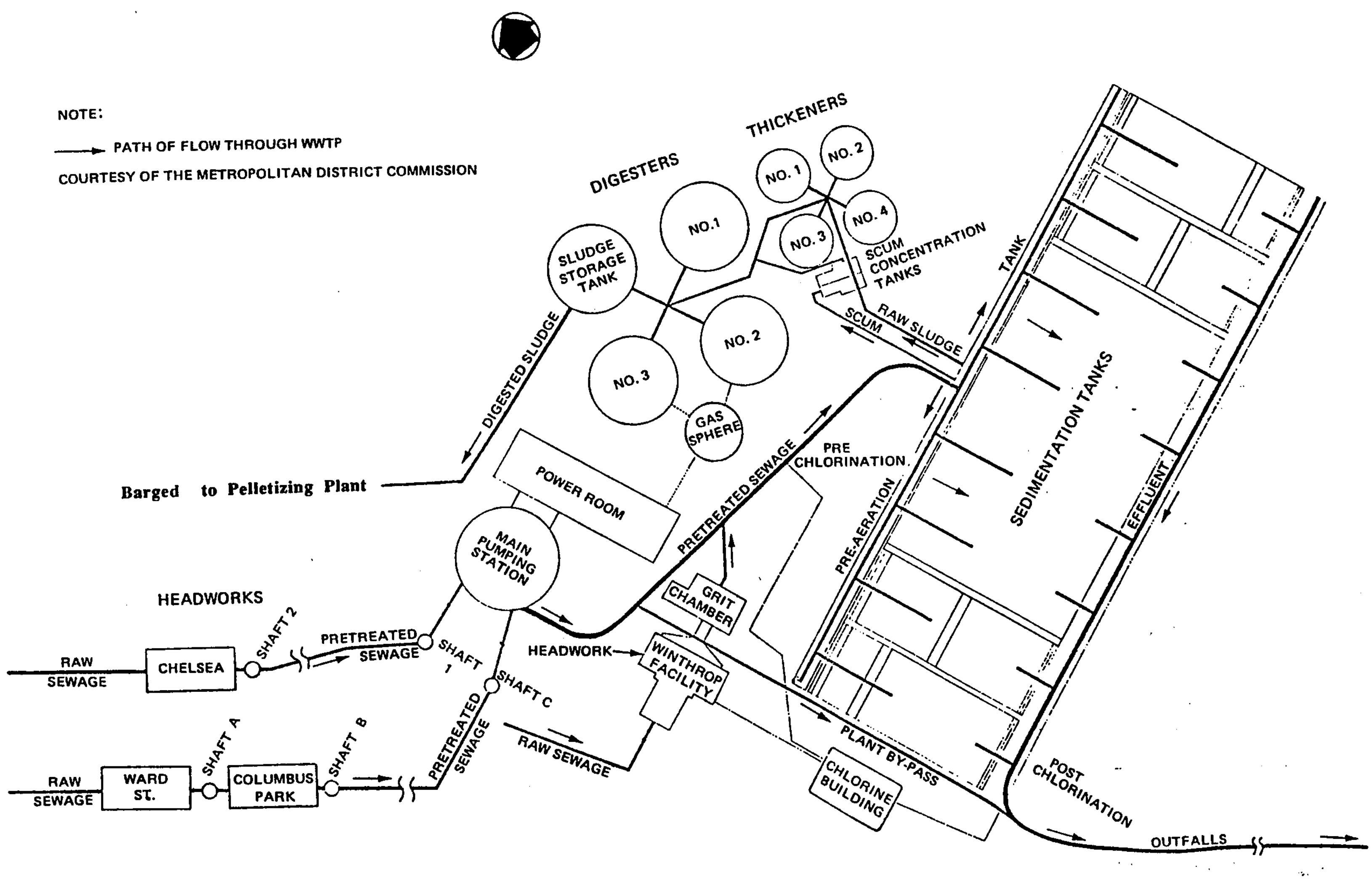


Figure II.A.1 Deer Island Process Flow Diagram

Raw sludge from the sedimentation tanks is pumped to the thickeners prior to treatment at the anaerobic digesters. From July to December 1991, digested sludge was discharged into the harbor with each outgoing tide. Since then, digested sludge is barged to the Fore River pelletizing plant where the digested sludge is converted into fertilizer pellets for beneficial reuse.

Treatment plant effluent is discharged into the harbor through two long submerged lines with five outfall pipes. Of the five permitted outfall pipes, designated 001 to 005, only three are now currently used. Outfall 003 is permanently blocked and outfall 005 is temporarily blocked by sand and debris. Outfall 005 can be activated, if the need ever arises, by just cleaning the line. The two main outfalls used are 001 and 002. Outfall 004 is used only during extreme high flows. Figure II.A.2 is the plant's outfall system schematic.

A.1 Influent Characteristics

A.1.1 Flow

In FY92, the average flow into Deer Island was 257 million gallons per day (MGD) with a minimum flow recorded at 166 MGD. The maximum flow was measured at 582 MGD and occurred during a two-day total rainfall of 3.61 inches on September 25 and 26.

Figure II.A.3 is a graphical presentation of the average, minimum and maximum flows observed in 1992 and it suggests only slight seasonal variability. Figure II.A.4 compares the average daily flows by month during fiscal years 1989 to 1992. Very little variability is evident in the monthly data except in the month of February, where a greater spread is apparent. This larger spread could be attributed to a varying amount of snowfall and consequently snowmelt. High flows are observed in the Fall and again in late Winter.

A.1.2 Conventional Parameters

Results of monitoring for influent conventional pollutants are presented in Appendix A, Table A-1, Deer Island Treatment Plant Operations Summary and is summarized in Table II.A.1, Deer Island Treatment Plant Influent Characterization, Fiscal Year 1992.

The monitoring data suggest, based on previously published materials, a "weak" to "medium" strength wastewater entering the treatment facility.

Figure II.A.2 Deer Island Outfall System Schematic

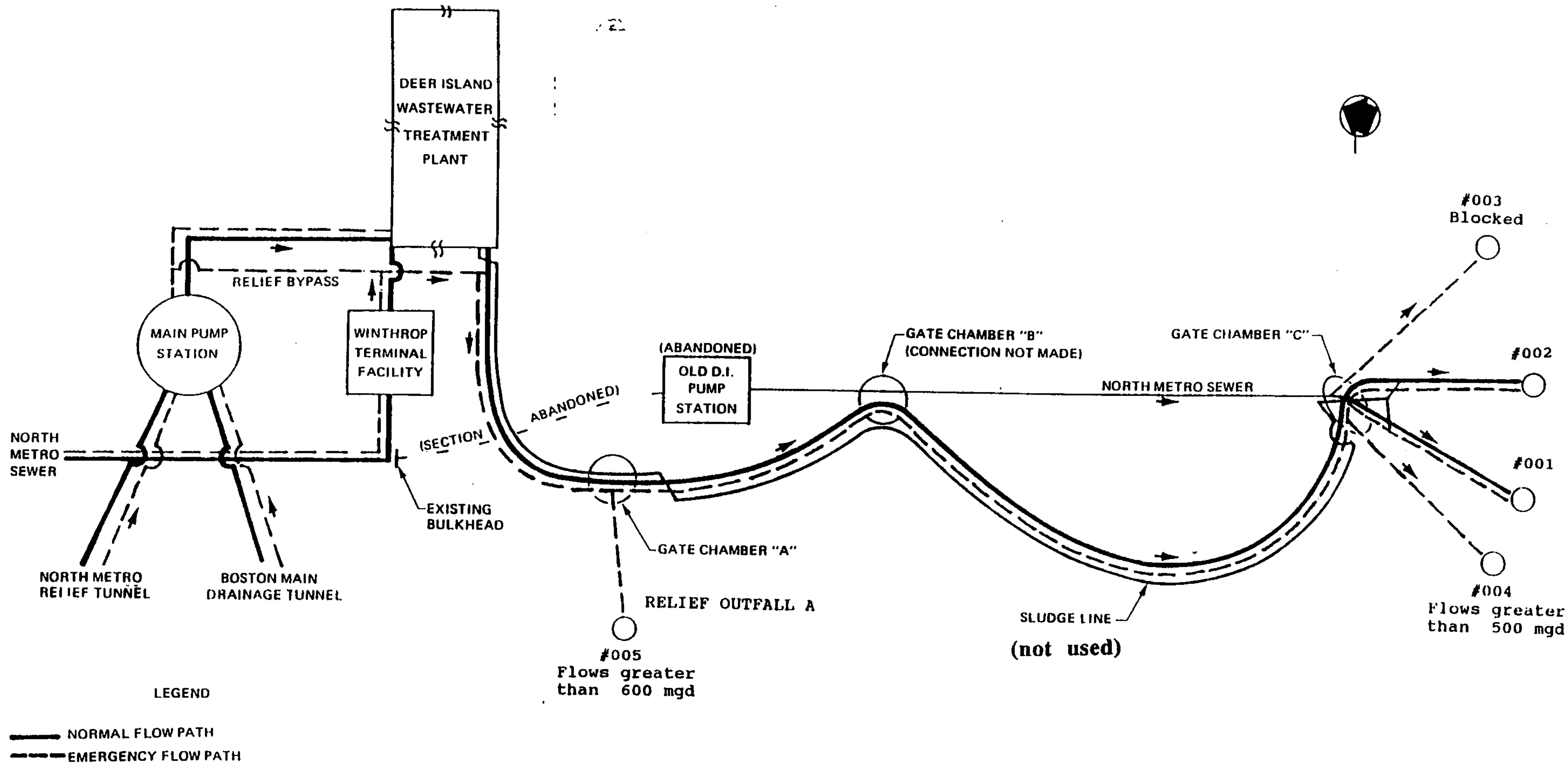


Figure II.A.3 Average Daily Flows, Deer Island Treatment Plant, Fiscal Year 1992

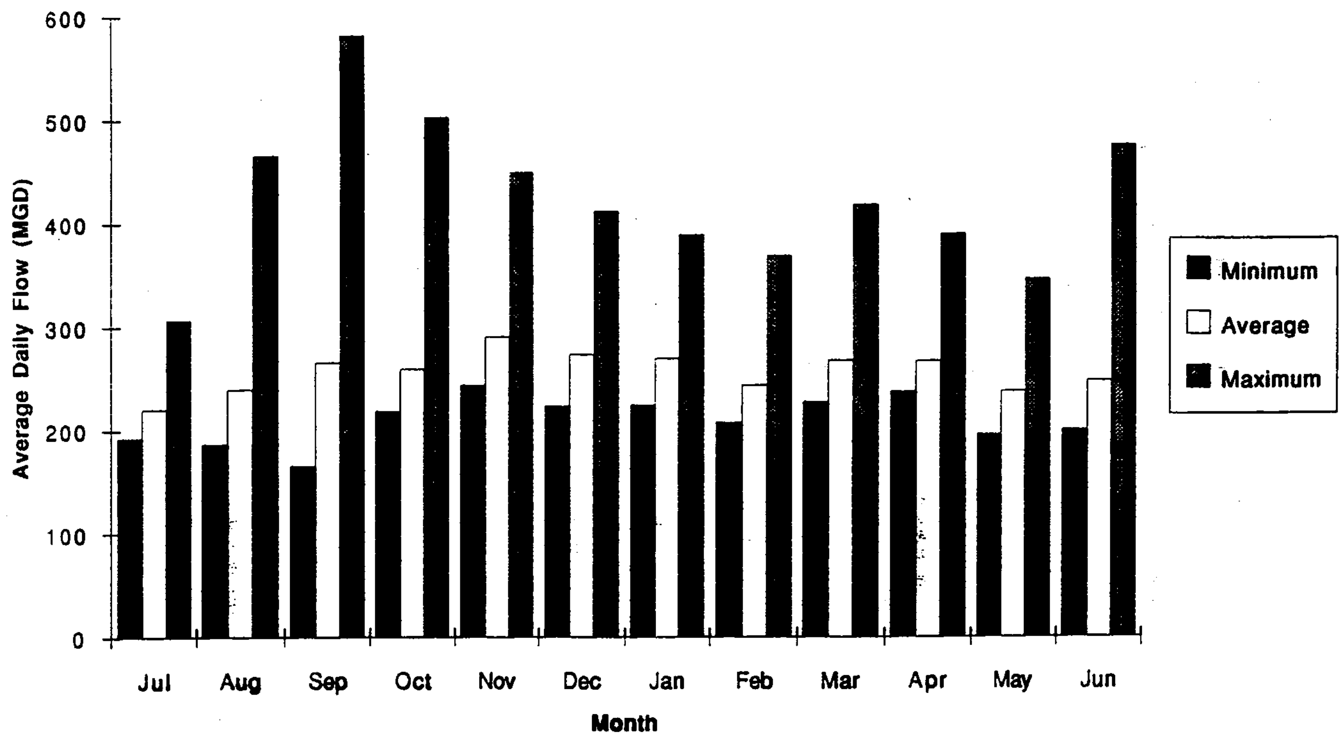


Figure II.A.4 Deer Island Plant Average Daily Flows, Fiscal Years 1988 to 1992

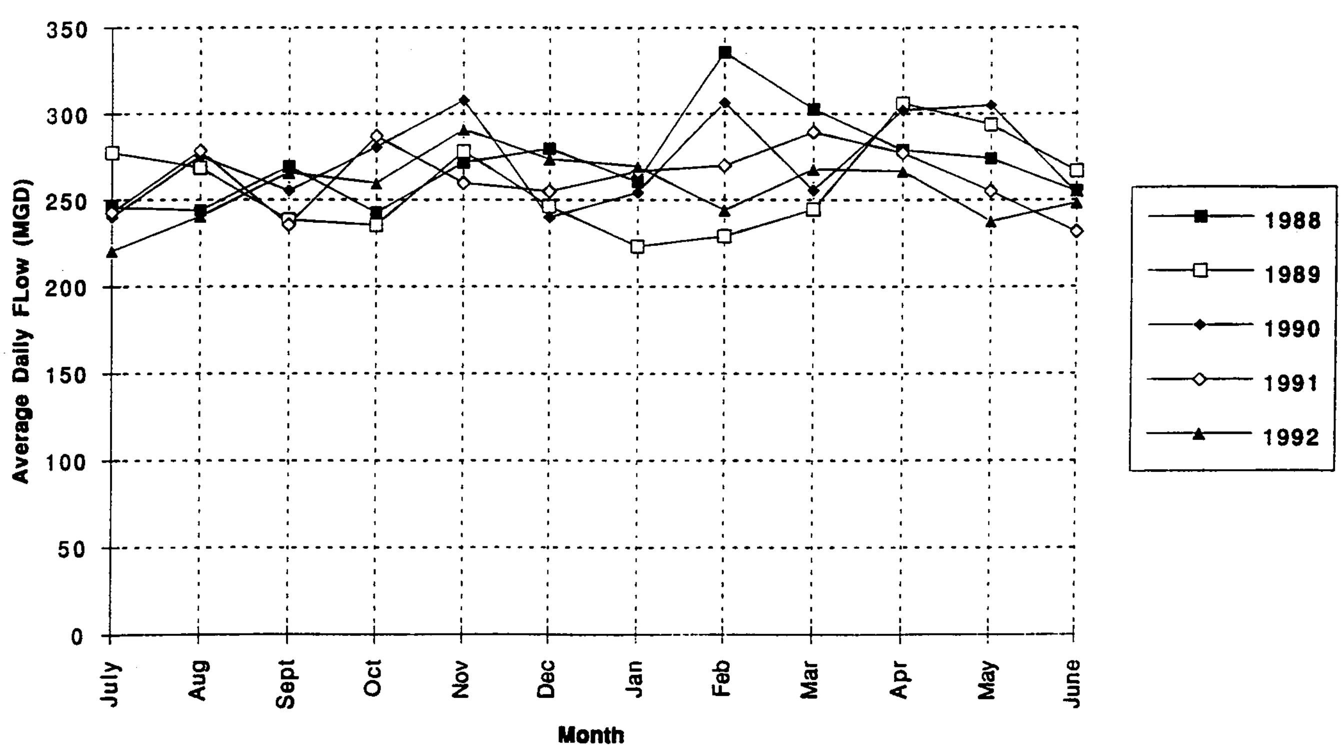


Table II.A.1 Deer Island Influent Characterization, Fiscal Year 1992				
	Concentration (1)			
Constituent	Deer Island Influent	Classification (2) Strong	Medium	Weak
Total Suspended Solids	132	300	200	100
Biochemical Oxygen Demand	146	300	200	100
Settleable Solids	3	20	10	5
Oil & Grease	64	150	100	50

(1) All values expressed in mg/l except for settleable solids, ml/l.
(2) McGraw HIll, Metcalf & Eddy Inc., Wastewater Engineering, 1972.

A.1.3 Priority Pollutants

There are three sets of influent priority parameters data: Deer Island Laboratory, the Local Limits study, and the Harbor Studies effluent characterization.

The Deer Island Laboratory measured the concentration of selected metals, the Local Limits Study conducted a priority pollutant scan and the Harbor Studies characterization analyzed for pesticides, PCBs, and PAHs. The results of these analyses are presented in Appendix A, Tables A-1, A-2, and A-3 respectively and are compared in Table II.A.2, Deer Island Influent Characterization Compared.

Metals

The influent shows measurable amounts of copper, lead and zinc, and very low concentrations of the other metals in both the Deer Island and the Local Limits data.

All three metals measured in appreciable concentration are substantially different. This is probably due to the differences in sample preparation, type of sample, and analytical methods employed. The Local Limits data are appreciably higher for copper and zinc. The Deer Island lab data are much higher for lead.

Pesticides

There were no pesticides/PCBs detected in the Local Limits samples. The Harbor Studies characterization, however, measured lindane, DDD, DDE, DDT, chlordane, dieldrin, and several PCB congeners using analytical methodologies providing lower detection levels.

Polynuclear Aromatic Hydrocarbons (PAH)

The Local Limits study only detected 2-methyl naphthalene, naphthalene, and phenanthrene in the influent. The Harbor Studies characterization detected other PAH compounds. When the results are compared, fluorene, phenanthrene, pyrene, and naphthalene appear to be slightly higher in the Harbor Studies data.

Other Organic Compounds

A number of semivolatile and volatile organic compounds were also found in the influent. Of the semi-volatile group, the Local Limits study detected dichlorobenzene, phthalates and phenols. Of the volatile compounds, acetone, methylene chloride, trichlorethenes, tetrachloroethenes, and xylenes are the most commonly detected.

Historical Metals Loadings

Historical metal loadings from the Deer Island laboratory data are presented on Figure II.A.5. As shown, the metal loadings to the facility were high in the late 80s, coinciding with economic boom times. Metal loadings from later years appear to have decreased. Much of the noticeable decrease may be attributed to real reductions of toxic pollutants in the wastestream, to better analytical methods, to increased industrial monitoring, and probably partly to general economic slowdown.

A.2 Effluent Characteristics

A.2.1 Conventional Parameters

The effluent characteristics for conventional parameters are also included in Appendix A, Table A-1. Table II.A.3 compares Deer Island effluent quality with our court-ordered interim limits.

The interim limit for treatment plant removal efficiency is a 12-month running average, the monthly average is the calculated monthly concentration, and the daily maximum is the maximum allowable discharge concentration for the day.

TABLE II.A.2 DEER ISLAND INFLUENT CHARACTERIZATION COMPARED

	Geometric Mean Concentrations		
	Deer Island Laboratory Data (1)	Local Limits Data (2)	Harbor Studies Data (2)
Metals, Cyanide, Surfactants and TPH (mg/l)			
Arsenic	0.0019	0.002	
Chromium	0.0051	0.007	
Copper	0.0615	0.086	
Cadmium	0.001	0.002	
Lead	0.014	0.008	
Mercury	0.0002	0.0002	
Nickel	0.011	0.009	
Silver	0.005	0.006	
Zinc	0.1	0.128	
Cyanide		0.005	
Surfactants		4.487	
TPH		0.23	
Pesticides/PCBs (ug/l)			
Aldrin		<.01	<.001
Chlordane		<0.041	0.0063
DDD		<.01	0.0124
DDE		<.01	0.0062
DDT		<.01	0.0095
Dieldrin		<.01	0.076
Endrin		<.01	<.001
Heptachlor		<.01	0.0004
Heptachlor epoxide		<.01	0.0015
Hexachlorobenzene		<.01	0.0036
Lindane		<.01	0.0267
Transnonachlor			0.0034

Table II.A.2 (Con't)

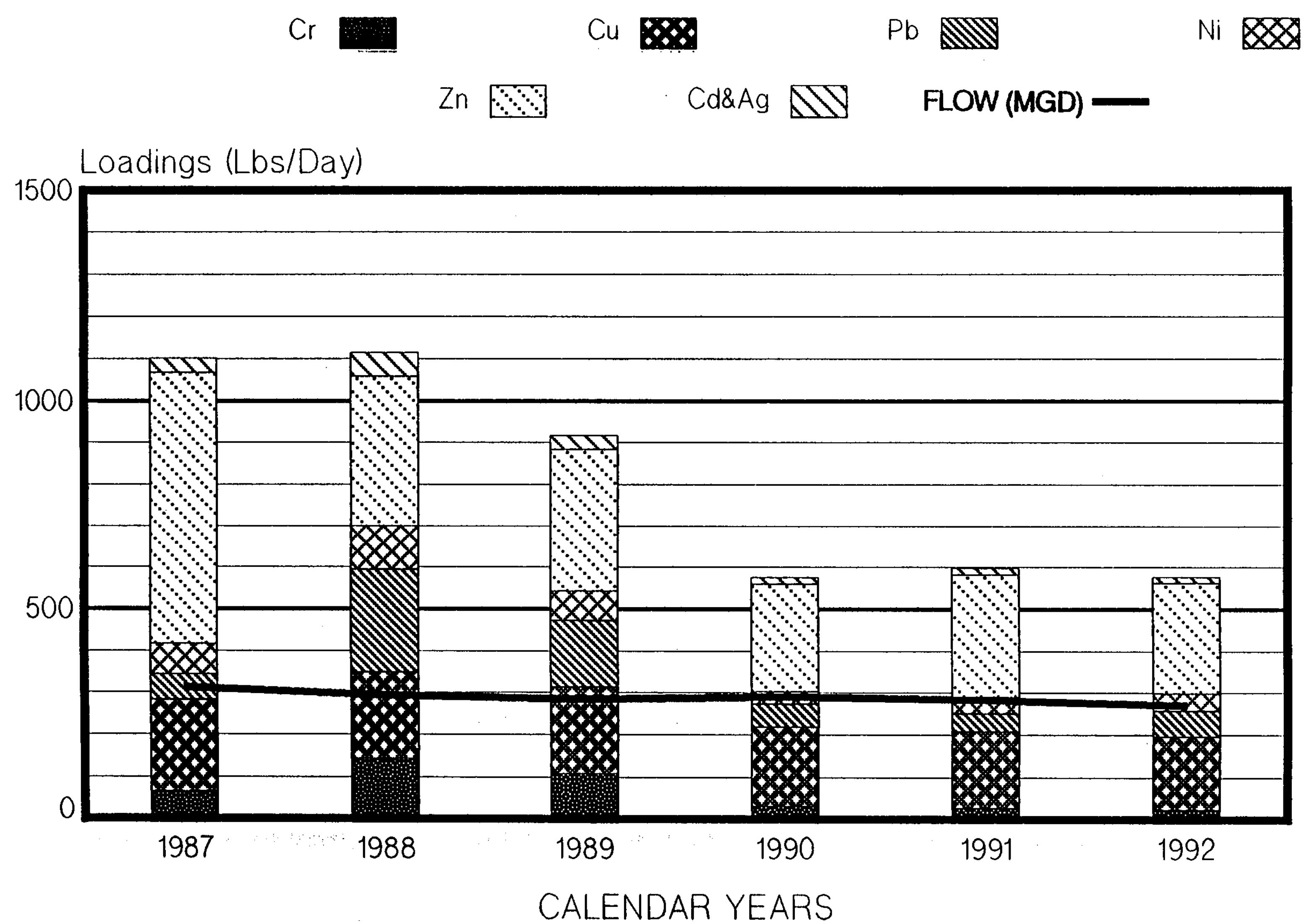
Parameters	Deer Island Laboratory Data	Local Limits Data	Harbor Studies Data
Semivolatile Organics (ug/l)			
1,2-Dichlorobenzene		0.503	
1,3-Dichlorobenzene		0.341	
1,4-Dichlorobenzene		0.336	
2-methylnaphthalene		6.403	5.295
4-methyl phenol		24.25	
Acenaphthene		<.256	0.012
Acenaphthylene		<.256	0.028
Anthracene		<.256	0.058
Benzo(a)anthracene		<.256	0.085
Benzo(a)pyrene		<.256	0.06
Benzo(b)fluoranthene		<.256	0.095
Benzo(g,h,i)perylene		<.256	0.051
Benzo(k)fluoranthene		<.256	0.066
bis(2-ethylhexyl)phthalate		12.451	
Butylbenzyl phthalate		0.446	
Chrysene		<.256	0.066
Di-n-butylphthalate		0.863	
Dibenzo(a,h)anthracene		<.256	0.006
Diethyl phthalate		0.336	
Fluoranthene		<.256	0.204
Fluorene		<.256	0.397
Indeno(1,2,3-c,d)pyrene		<.256	0.055
Naphthalene		1.922	2.523
Perylene		<.256	0.011
Phenanthrene		0.389	0.655
Phenol		2.127	
Pyrene		<.256	0.27

Table II.A.2 (Con't)

Parameters	Deer Island Laboratory Data	Local Limits Data	Harbor Studies Data
Volatile Organics (ug/l)			
1,1,1-Trichloroethane		0.511	
2-Butanone		1.056	
Acetone		19.274	
Benzene		0.594	
Carbon disulfide		1.237	
Chloroform		0.553	
Ethylbenzene		0.562	
Methylene chloride		2.381	
Tetrachloroethene		3.083	
Toluene		3.685	
Total xylenes		3.448	
trans-1,2-dichloroethene		0.622	
Trichloroethene		1.397	

(1) Analytical results, Deer Island Laboratory
(2) Analytical results, Local Limits Study, Appendix A, Table A-2
(3) Analytical results, Harbor Studies Characterization, Appendix A, Table A-3

Figure II.A.5 Deer Island Influent, Mean Metals Loadings 1987 - 1992, Deer Island Laboratory



Trend analyses of conventional parameters for the twelve monitoring months in FY 92 are presented in Figure II.A.6. As indicated on Figure II.A.6, Chart 1, there was only one BOD monthly average violation. However, the BOD % removal (12-month running average) was exceeded consistently starting in January 1992 (Chart 3).

In FY92, there was a total of seven violations, all of which were BOD-related. All other limits were met.

The continued downward trend of BOD removal rates continues and is currently being studied by a BOD task force. The results of their findings will be presented in a separate report.

Table II.A.3 Deer Island Effluent Quality Compared to Interim Limits

Parameter	Interim Limits		Effluent		%
	Mon Ave (2)	Daily Max (3)	Mon Ave (4)	Daily Max (5)	Removal(1)
BOD (mg/L)	140.0	200.0	147.0	190	
BOD Removal (%)	27.0				12
TSS (mg/L)	110.0	180.0	77.0	133	
TSS Removal (%)	38.0				46
SS (ml/L)	2.8		0.4		
Fecal Coliform (#/100 ml)	200.0		60.0		
Total Coliform (#/100 ml)	1000.0		997.0		
pH (units)	6.5 - 8.5		6.6 - 7.3		

(1) 12-month running average
(2) maximum monthly average
(3) daily maximum concentration
(4) highest reported monthly average concentration
(5) maximum daily concentration

A.2.2 Nutrients

Nutrient loadings to the harbor are monitored including: kjeldahl nitrogen (TKN), ammonia, nitrates, nitrites, orthophosphorus, and total phosphorus. Nutrient data for this monitoring period are included in the Deer Island Operations Summary, Appendix A, Table A-1 and summarized in Table II.A.4. There is no seasonal pattern to the nutrient data, similarly, there is no historical trends over the last four years (Figure II.A.7).

Figure II.A.6 Deer Island Trend Analyses of Conventional Parameters

Chart 1

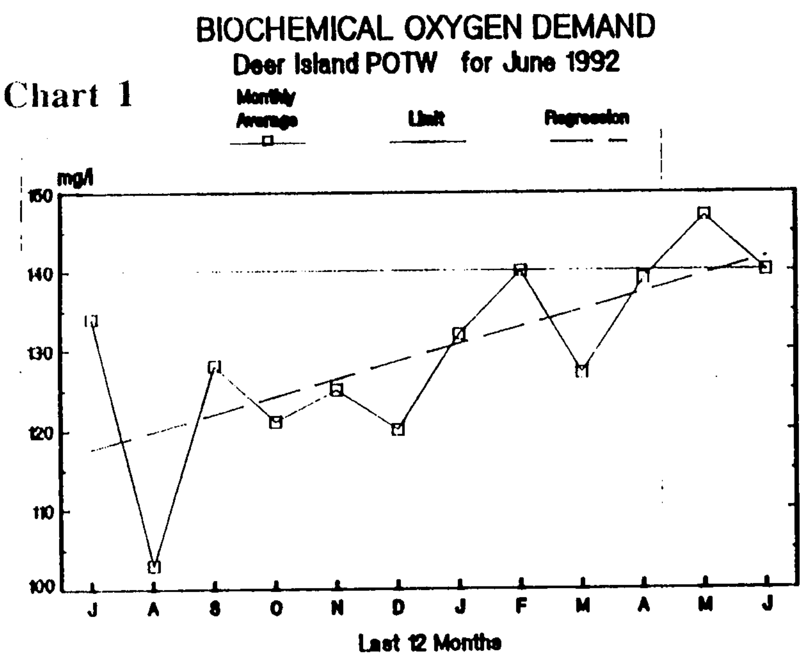


Chart 2

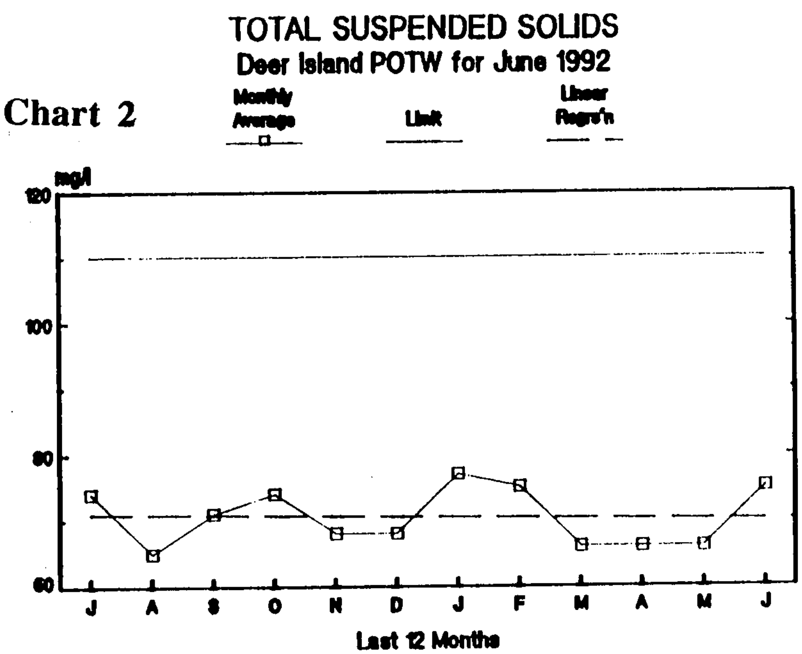


Chart 3

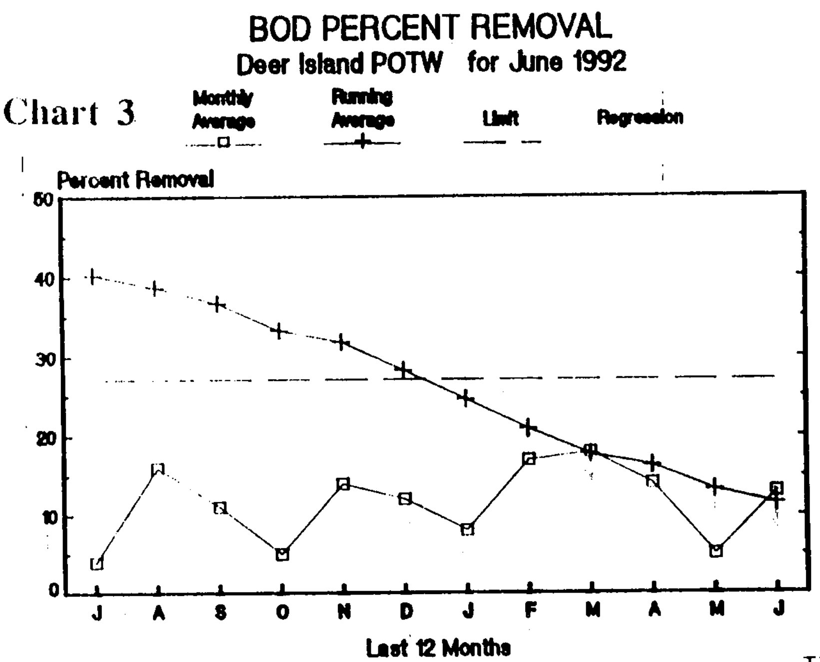


Chart 4

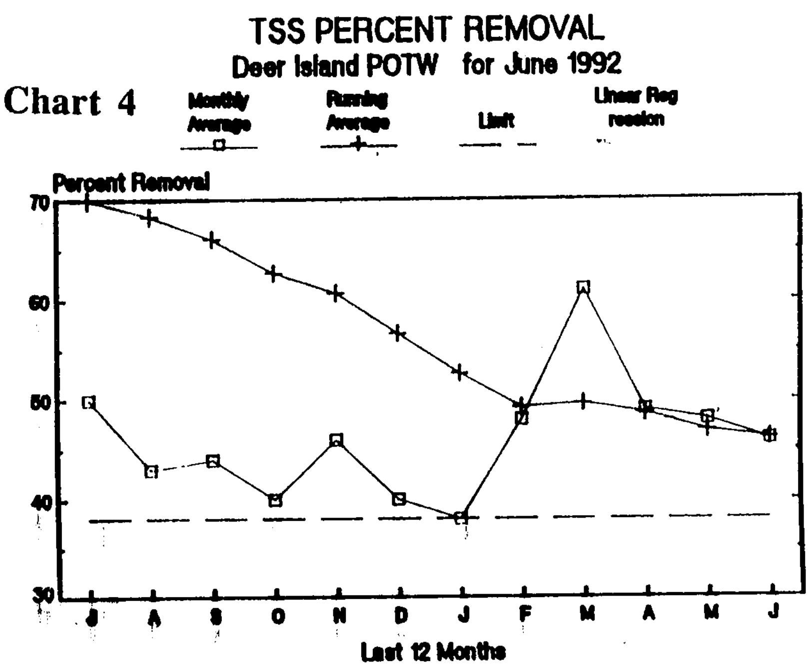


Chart 5

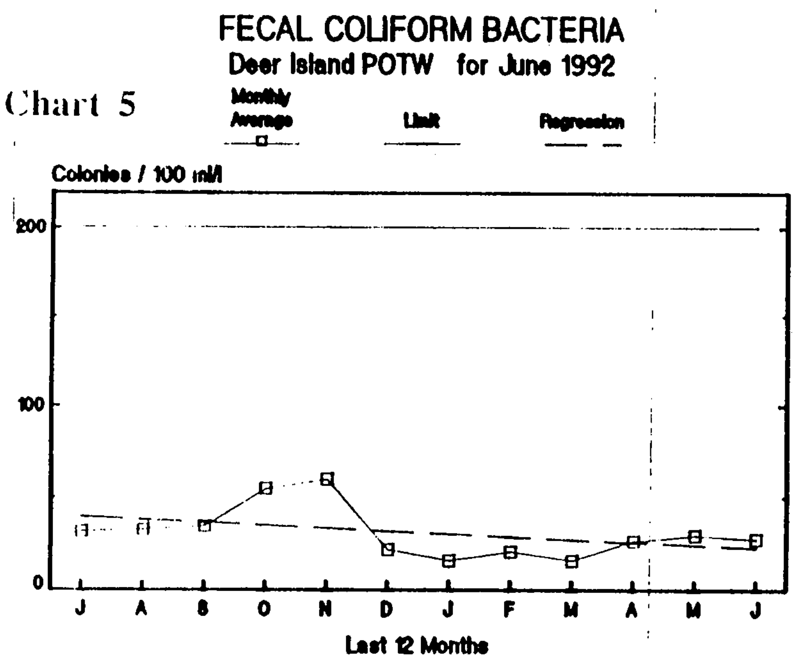


Chart 6

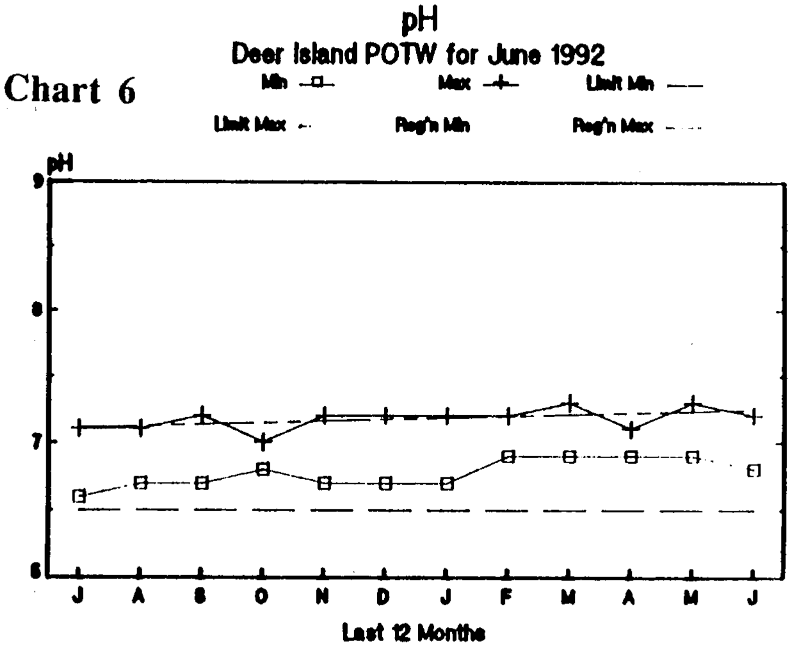


Chart 7

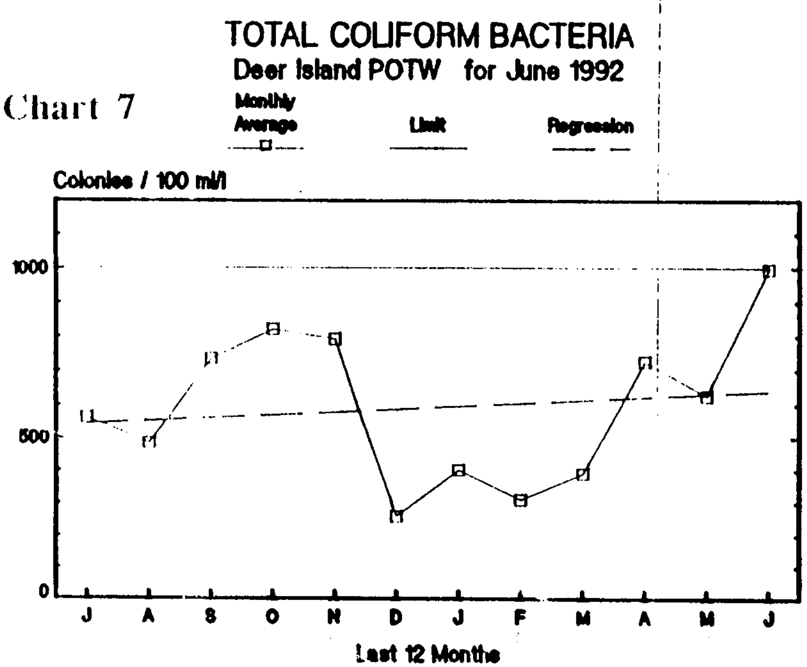


Chart 8

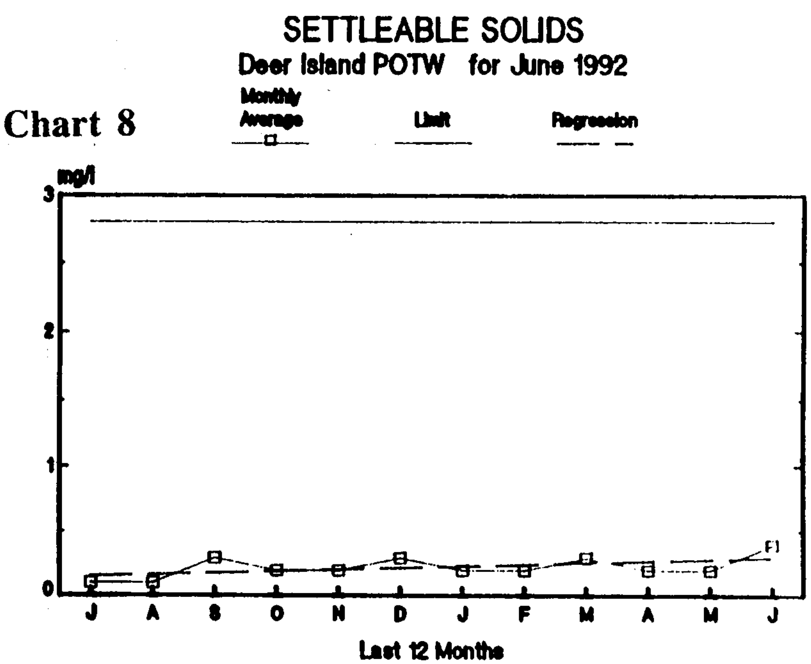


Figure II.A.7 Deer Island Effluent, Mean Nutrient Concentrations FY 1989 - 1992, Deer Island Laboratory

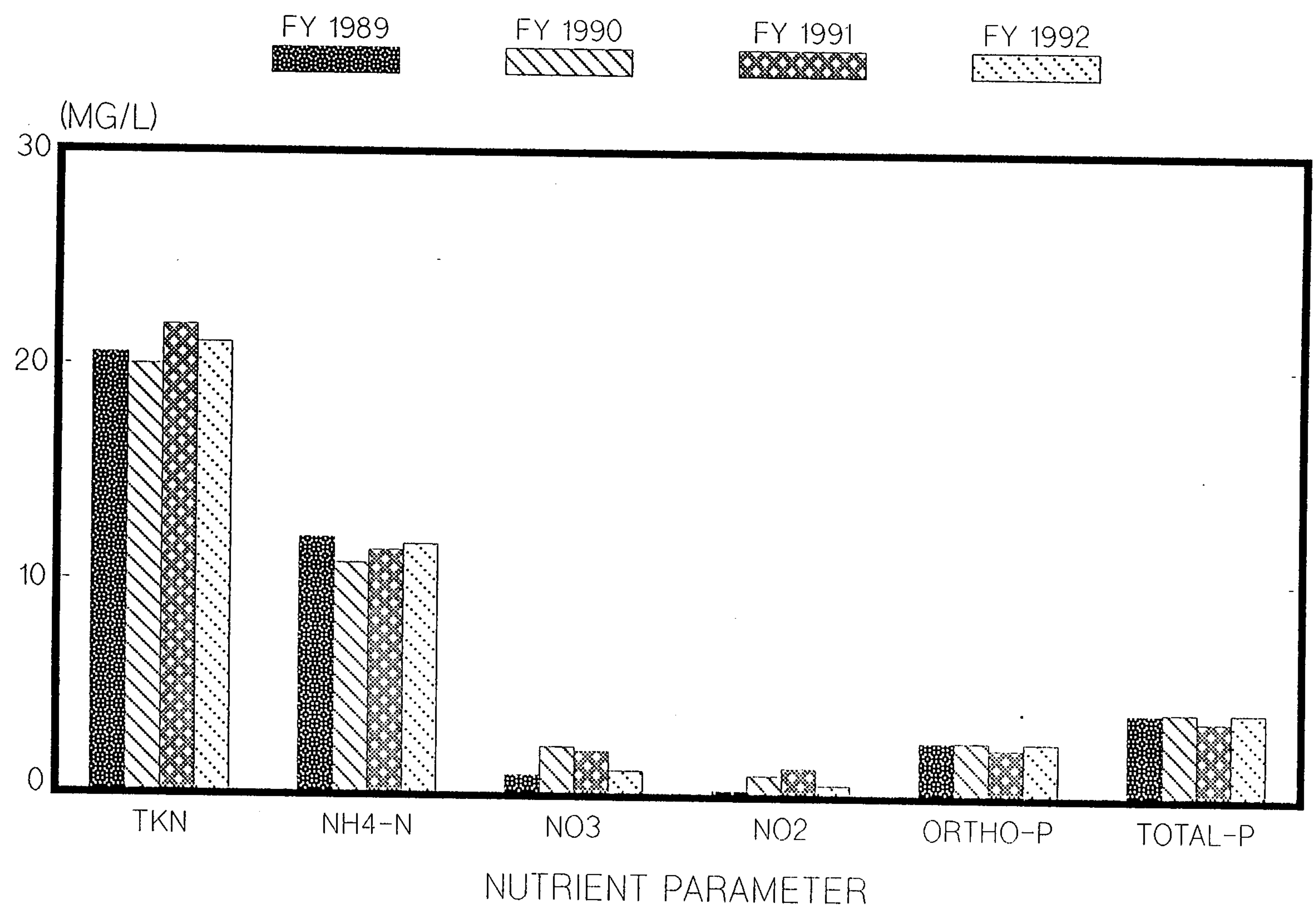


Table II.A.4 Deer Island Effluent Nutrients Concentrations			
	Concentration (mg/L)		
Nutrient (mg/L)	**Minimum**	**Average**	**Maximum**
TKN	10.0	21.0	27.7
Ammonia	6.3	11.7	15.3
Nitrates	0.2	1.2	3.7
Nitrites	0.2	0.6	1.8
Orthophosphorus	1.8	2.5	3.3
Total Phosphorus	3.2	4.0	5.2

A.2.3 Priority Pollutants

Results from the Deer Island, NPDES, Local Limits and Harbor Studies analyses are introduced in Appendix A, Tables A-1, A-4, A-5, and A-6 respectively and are compared in Table II.A.5, Deer Island Effluent Characteristics Compared. In general, the three data sets show reasonable comparability despite the differences in monitoring protocols.

Metals

As expected from a primary treatment facility, most of the metals detected in the influent were also detected in the effluent. Copper, lead and zinc were detected in measurable amounts while the other metals, if detected, were slightly above detection levels.

Figure II.A.8 compares the calculated metal loadings for each of the data sets. Except for copper and zinc, the three data sets show comparable loadings. Copper loadings were slightly higher and zinc is noticeably higher with the Local Limits study. Figure II.A.9 depicts decreasing total metal loads discharged to the harbor.

Pesticides

The Local Limits study did not detect any pesticides/PCBs in the influent; however, the Harbor Studies characterization with its more sensitive methods, reported measurable amounts for lindane, DDE, DDD, DDT, chlordane and dieldrin. Lindane (g-BHC), b-BHC, DDT, chlordane and Endosulfan I showed up in the NPDES results.

Polynuclear Aromatic Hydrocarbon (PAH)

Of the PAH group, naphthalene, 2-methyl naphthalene, phenanthrene, fluoranthene, pyrene, and fluorene were detected.

Other Semivolatile Organics

Semivolatile organics present include chloroform,4-methyl phenol, phthalates.

Volatile Organic Compounds

Of all the volatile compounds, chloroform, tetrachloroethylene, and toluene were detected at all times. Acetone was also measured at a relatively high concentration but it is suspected that it came from laboratory contamination. Acetone is naturally produced during organic biodegradation and is not a concern because it is not considered a priority pollutant by EPA.

TABLE II.A.5 DEER ISLAND EFFLUENT CHARACTERIZATION COMPARED

	Geometric Mean Concentration			
	Deer Island Data (1)	NPDES Data (2)	Local Limits Data (3)	Harbor Studies Data (4)
Metals (mg/l)				
Arsenic	0.0019	0.0015	0.002	
Cadmium	0.0011	0.0007	0.002	
Chromium	0.0038	0.0039	0.004	
Copper	0.0593	0.0593	0.070	
Lead	0.0130	0.0114	0.0070	
Mercury	0.0002	0.0002	0.0001	
Nickel	0.0060	0.0083	0.008	
Selenium		0.0011	0.001	
Silver	0.0049	0.0031	0.0046	
Thallium		0.0011	0.001	
Zinc	0.0769	0.0742	0.113	
Cyanide, Phenols and Total Petroleum Hydrocarbons (mg/l)				
Cyanide		0.0100	0.013	
PHCs		2.7200	0.198	
Phenols		0.0200		
Pesticides/PCBs (ug/l)				
4'4-DDD		0.0100	0.010	0.0096
4'4-DDE		0.0100	0.010	0.0060
4'4-DDT		0.0400	0.010	0.0119
Aldrin		0.0100	0.012	0.0010
b-BHC		0.0600	0.010	
g-BHC		0.0200	0.010	
Chlordane		0.1300	0.040	0.0077
Dieldrin		0.0100	0.010	0.0535

TABLE II.A.5 (Con't)

	Deer Island Data (1)	NPDES Data Data (2)	Local Limits Data (3)	Harbor Studies Data (4)
Endosulfan I		0.0200	0.010	
Endrin		0.0100	0.010	0.0010
Heptachlor		0.0100	0.010	0.0018
Heptachlor epoxide		0.0100	0.010	0.0010
Hexachlorobenzene		0.0100	0.010	0.0054
Lindane		0.0200	0.010	0.0272
Semivolatile Organics (ug/l)				
2-methylnaphthalene		2.2000	2.240	3.0588
4-methylphenol		10.5200	28.125	
Acenaphthene		1.0000	0.256	0.0122
Acenaphthylene		1.0000	0.256	0.0108
Anthracene		1.0000	0.256	0.0331
Benzo(a)anthracene		1.0000	0.256	0.0414
Benzo(a)pyrene		1.0000	0.256	0.0229
Benzo(b)fluoranthene		1.0000	0.256	0.0387
Benzo(e)pyrene		1.0000	0.256	0.0299
Benzo(g,h,i)perylene		1.0000	0.256	0.0202
Benzo(k)fluoranthene		1.0000	0.256	0.0235
bis(2-ethylhexyl)phthalate		8.1400	5.164	
Butylbenzyl phthalate		1.7500	0.305	
Chrysene		1.0000	0.256	0.0536
Di-n-butylphthalate		1.9300	0.256	
Di-n-octylphthalate		1.1600	0.256	
Dibenzo(a,h)anthracene		1.0000	0.256	0.0015
Diethylphthalate		2.1600	0.256	
Fluoranthene		1.0000	0.256	0.1086
Fluorene		1.0000	0.256	0.2036
Indeno(1,2,3-cd)pyrene		1.0000	0.256	0.0227

TABLE II.A.5 (Con't)

	Deer Island Data (1)	NPDES Data Data (2)	Local Limits Data (3)	Harbor Studies Data (4)
Naphthalene		1.0000	0.735	1.7049
Phenanthrene		1.0000	0.259	0.3296
Phenol		1.4100	2.759	
Pyrene		1.0000	0.259	0.1495
Volatile Organics (ug/l)				
1,1,1-trichloroethane		1.7300	0.825	
2-Butanone		2.4500	1.171	
Acetone		101.1600	18.646	
Benzene		1.5700	0.583	
Bromodichloromethane		0.9500	0.500	
Bromoform		0.5300	0.500	
Bromomethane		1.1300	0.500	
Carbon disullfide		1.9400	0.837	
Chlorodibromomethane		0.5900	0.500	
Chloroform		7.7700	5.329	
Chloromethane		1.7700	0.895	
Ethylbenzene		0.6500	0.500	
Methylene Chloride		4.8900	3.012	
Styrene		0.5600	0.617	
Tetrachloroethene		6.8200	3.687	
Toluene		6.2400	4.626	
Trichloroethene		2.6800	0.851	
Vinyl Acetate		1.3500	0.500	
Xylene		4.1500	4.185	

(1) Analytical results, Deer Island Laboratory
(2) Analytical results, Local Limits Study, Appendix A, Table A-5
(3) Analytical results, NPDES ProgramAppendix A, Table A-4
(4) Analytical results, Harbor Studies Characterization, Appendix A, Table A-6

Figure II.A.8 Deer Island Mean Metals Effluent Loadings, Fiscal Year 1992, Comparison of Studies

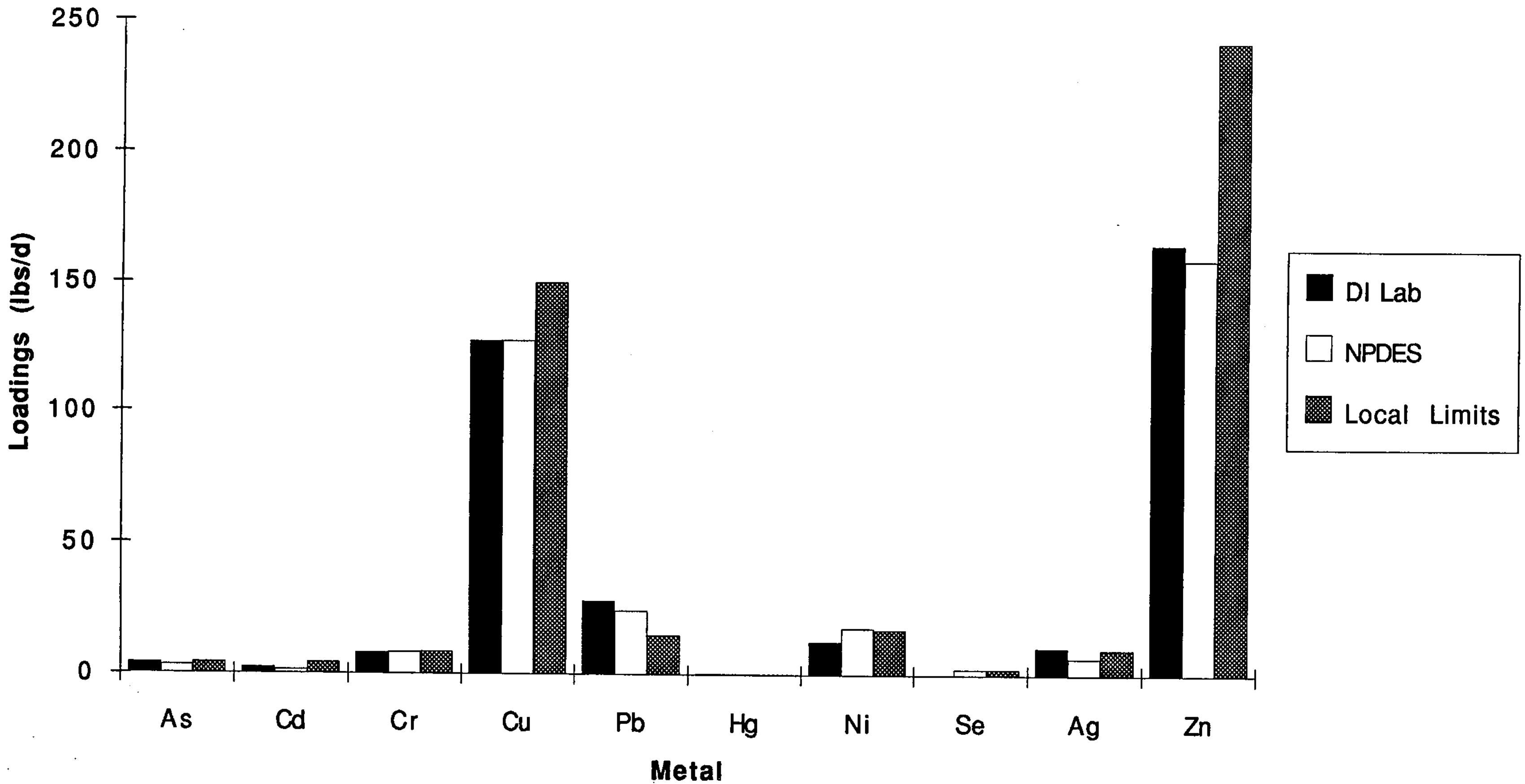
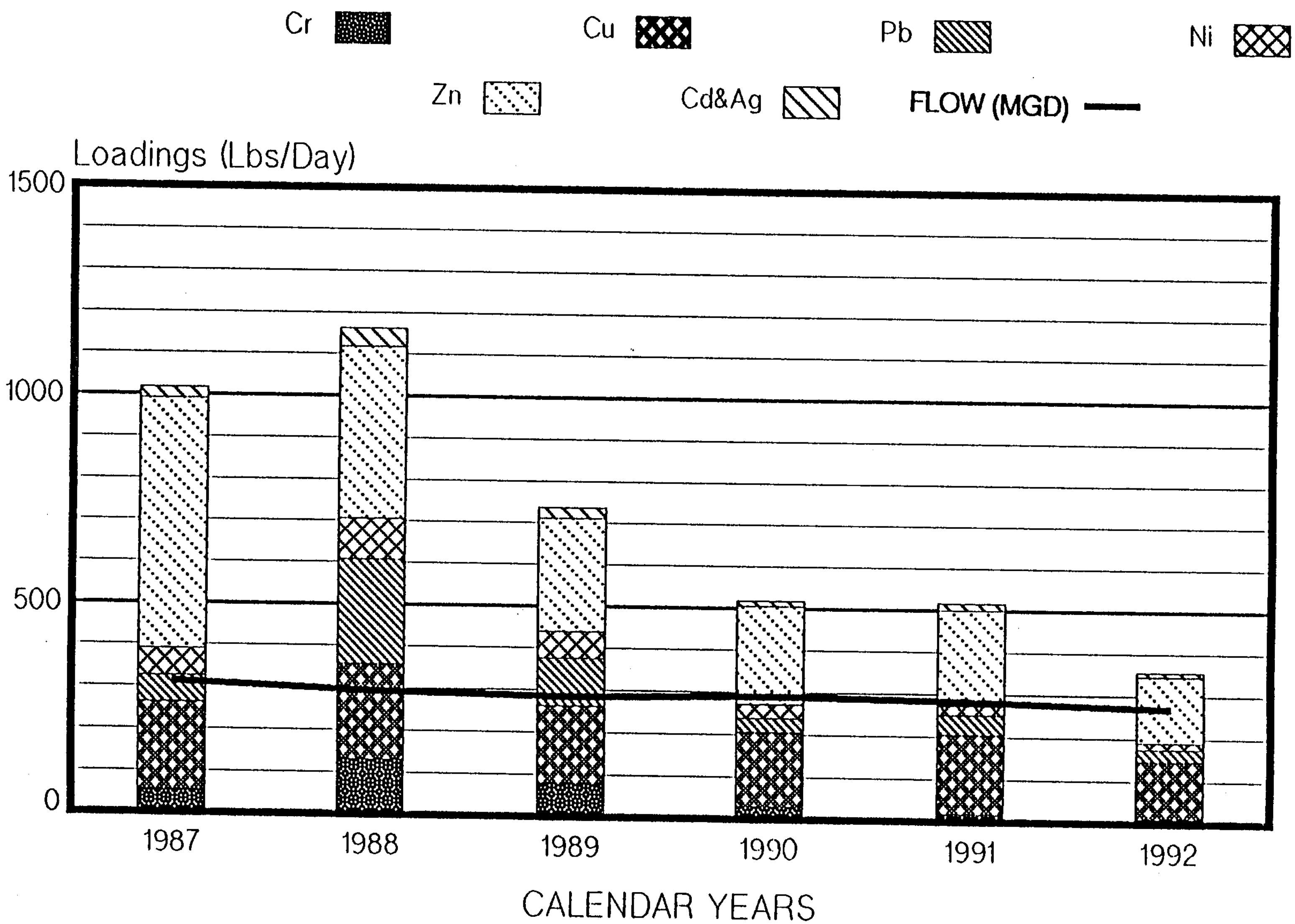


Figure II.A.9 Deer Island Effluent, Mean Metals Loadings 1987 - 1992, Deer Island Laboratory



B. Nut Island

The Nut Island treatment plant, in operation since 1952, serves 21 communities and portions of Boston, Brookline, Newton and Milton. The area served by this treatment plant is approximately 236.83 sq. miles.

Five MWRA pumping stations are located throughout the contributing area. Construction activities to retrofit this facility into a headwork for the new Deer Island secondary treatment plant is continuing.

Figure II.B.1 depicts the process flow diagram of the Nut Island Treatment Plant. Current treatment processes include:

- pre-chlorination
- screening, grit removal
- pre-aeration
- primary settling
- disinfection.

Sludge removed from the sedimentation tanks is thickened prior to anaerobic digestion. Since December 1991, the digested sludge has been barged and converted to fertilizer at the Fore River Pelletizing Plant. Prior to that time, the digested sludge was discharged to the harbor with each outgoing tide.

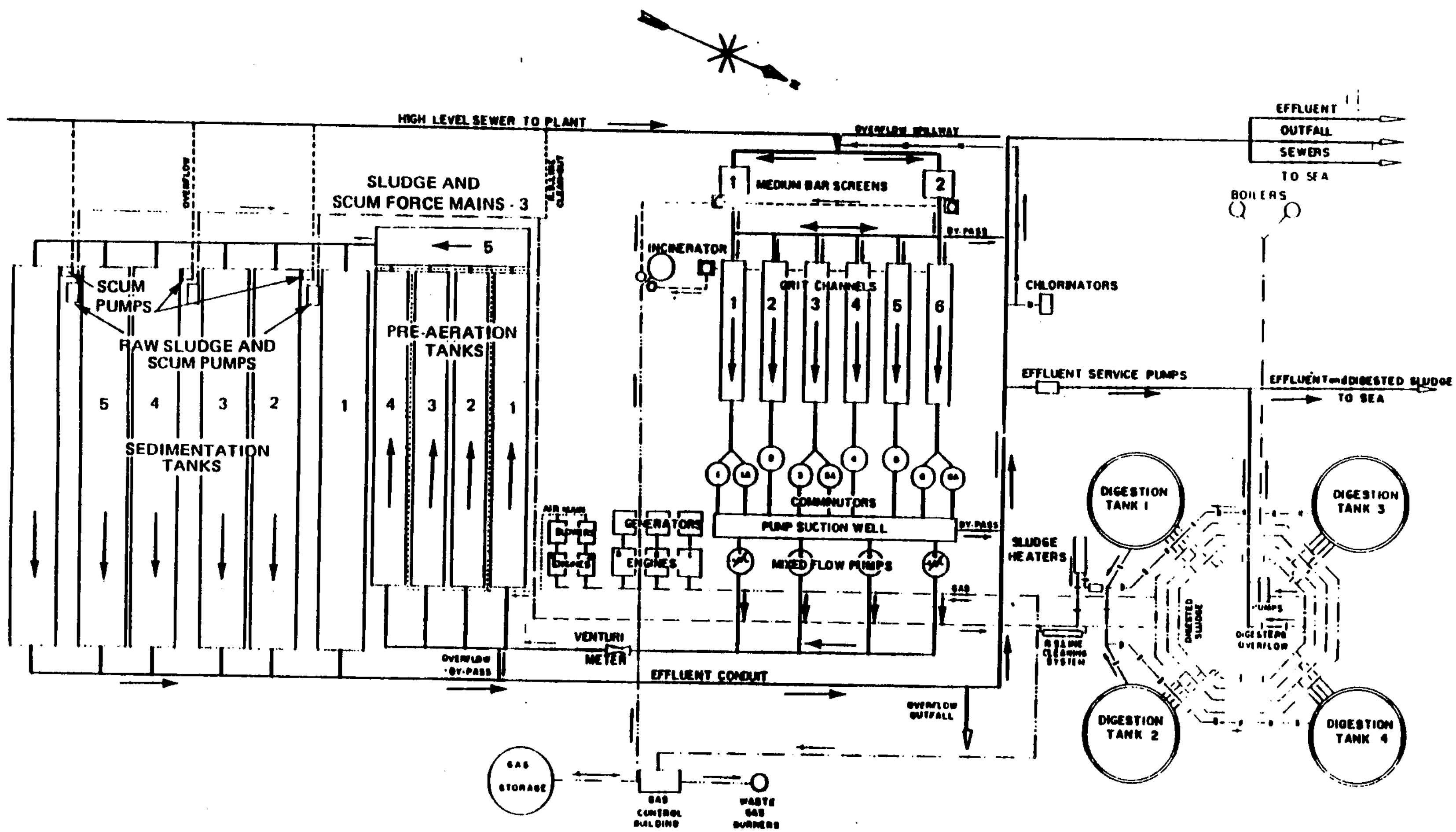
Treated wastewater is discharged through three submerged pipes into the harbor. Figure II.B.2 shows the Nut Island Treatment Plant System Flow Diagram.

B.1 Influent Characteristics

B.1.1 Flow

In FY 92, the average influent flow into Nut Island was 127 million gallons per day (MGD) with a minimum recorded flow of 73 MGD. The maximum flow of 254 MGD occurred after a two day total rainfall of 2.51 inches on October 31 and November 1. Figure II.B.3 graphically depicts the minimum, average, and maximum flows in 1992. Data clearly suggest seasonal variability with high flows exhibited in the fall. Flows drop in the Winter, rise again in late Winter/early Spring, and dip to the low levels in July.

Figure II.B.4 compares the average daily flows by month for the period 1989 to 1992. As shown, there is very little variability observed between the years except for the month of February where, as with the Deer Island records, a great spread is observed. This larger spread is attributed to varying amounts of snowfall and consequently, snowmelt that is introduced into the sewer system through infiltration/inflow. Seasonal flow variability is more pronounced for Nut Island than for Deer Island.



NOTE:

←— PATH OF FLOW THROUGH WWTP

COURTESY OF THE METROPOLITAN DISTRICT COMMISSION

Figure II.B.1 Nut Island Process Flow Diagram

Figure II.B.2 Nut Island Outfall System Schematic

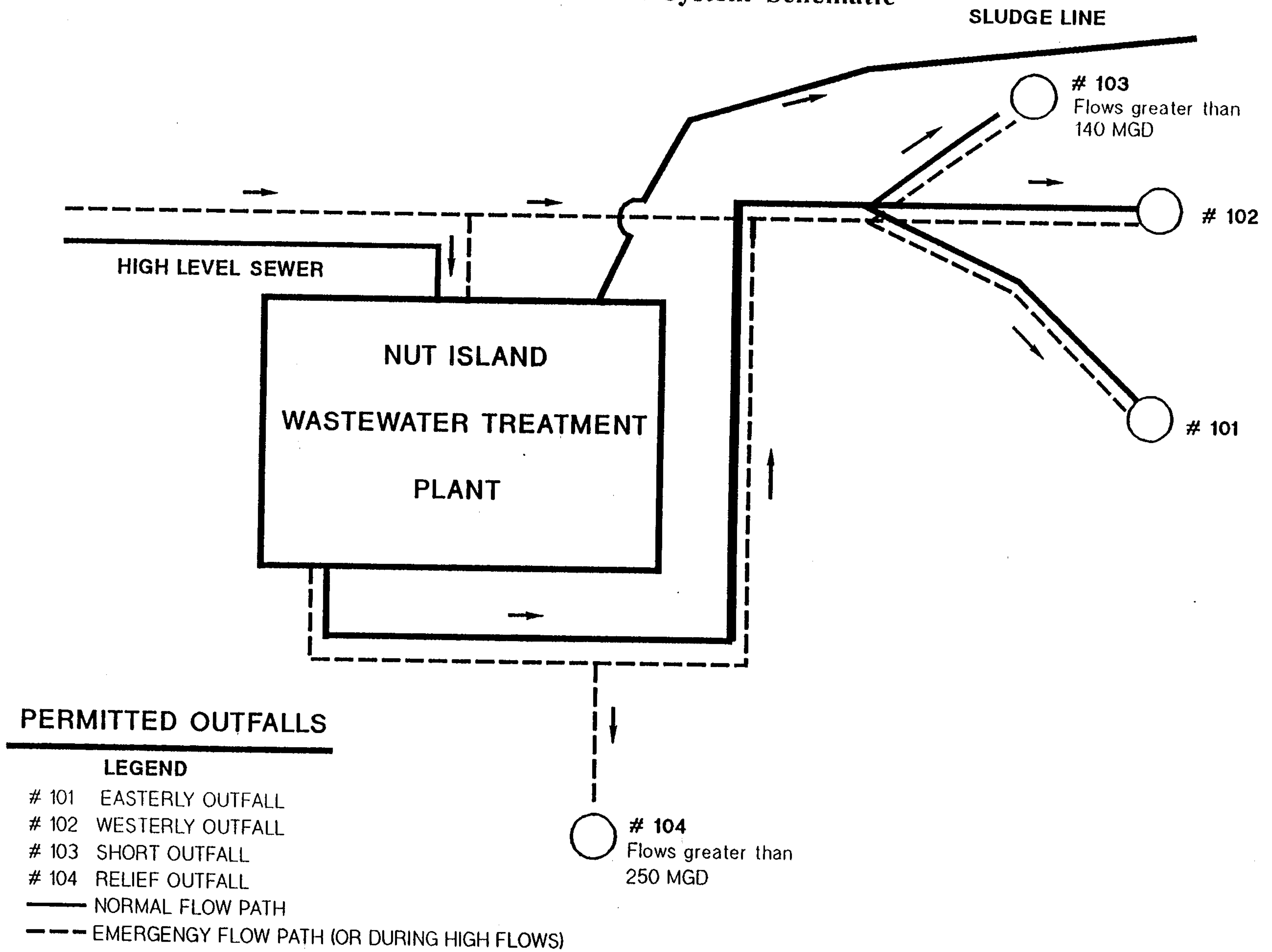


Figure II.B.3 Average Daily Flows, Nut Island Treatment Plant, Fiscal Year 1992

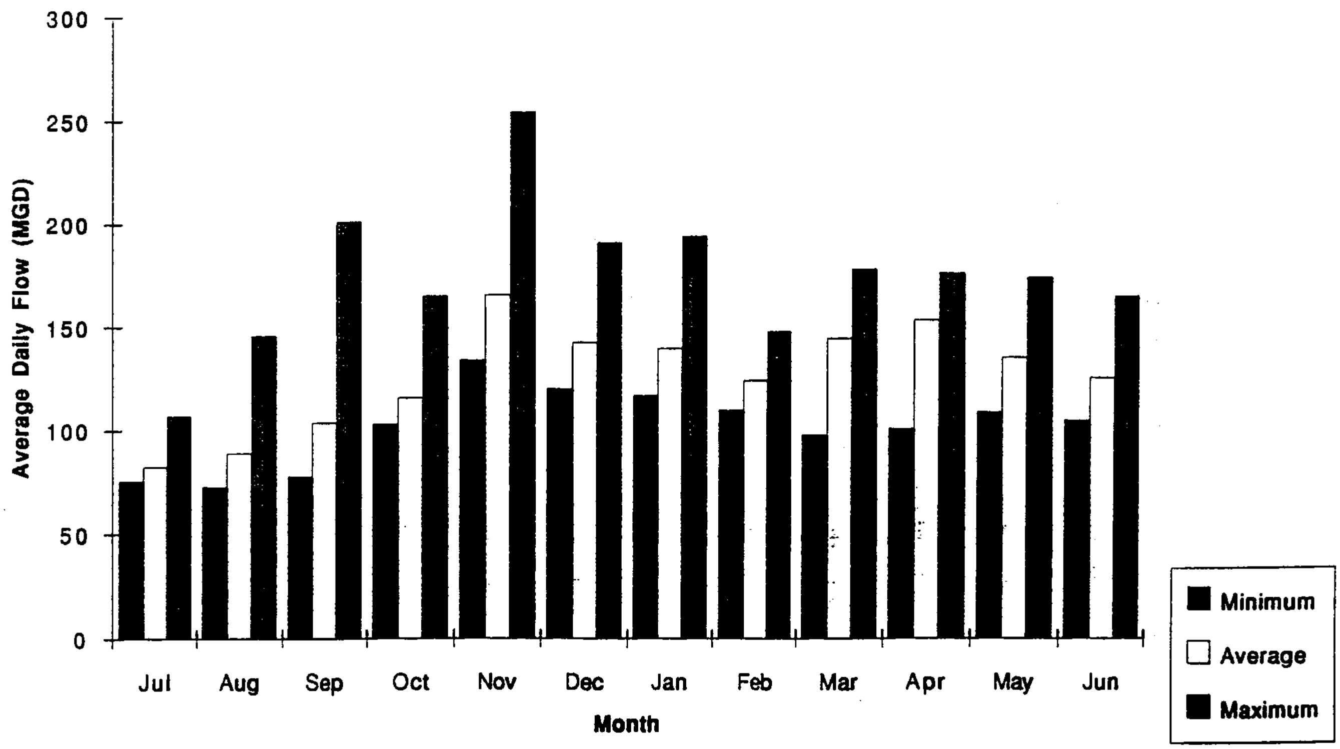
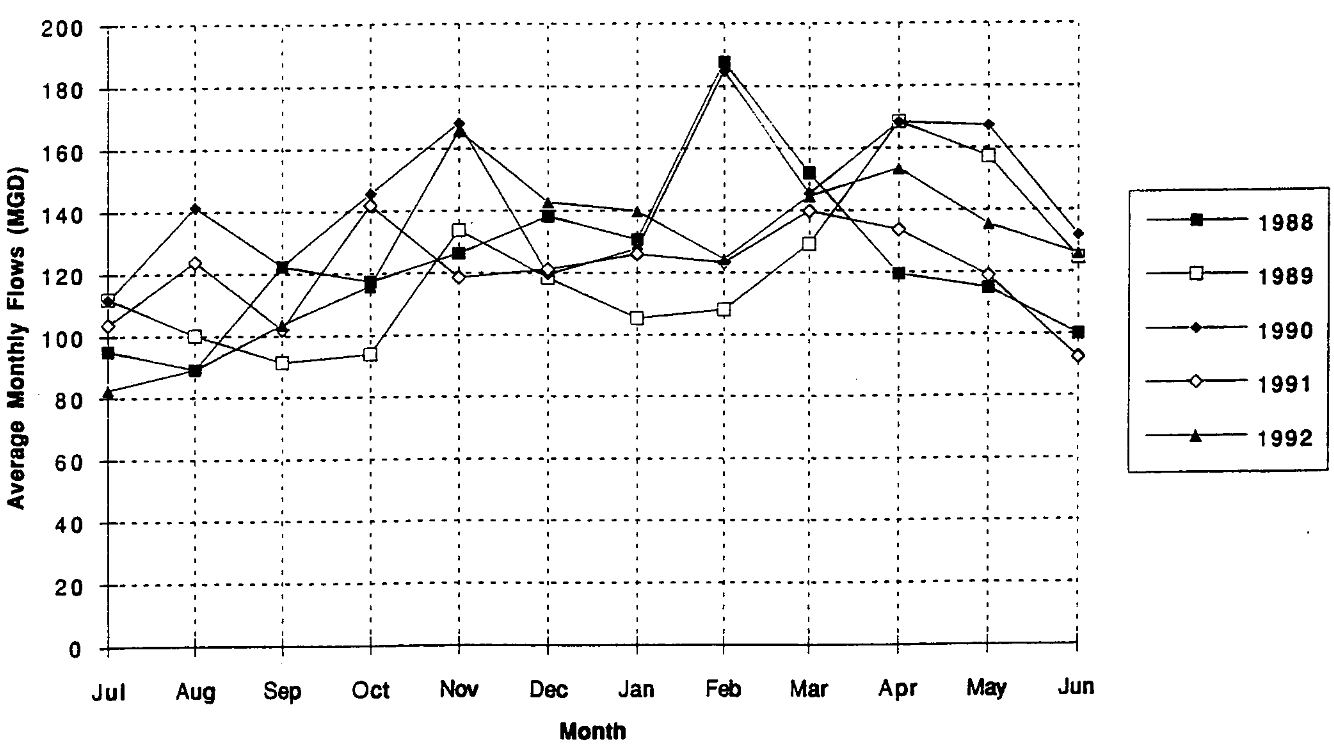


Figure II.B.4 Average Daily Flows Compared, Nut Island Treatment Plant, Fiscal Years 1988 to 1992



B.1.2 Conventional Parameters

Results of monitoring for influent conventional pollutants are presented in Appendix B-1, Nut Island Treatment Plant Operations Summary. Monitoring data suggest that the influent to the Nut Island Treatment Plant could be characterized as about medium in strength, and is slightly stronger than the Deer Island influent.

Table II.B.1 Nut Island Influent Characterization, Fiscal Year 1992

Constituent	Concentration (1)			
	Nut Island Influent	Classification (2)		
		Strong	Medium	Weak
Total Suspended Solids	221	300	200	100
Biochemical Oxygen Demand	194	300	200	100
Settleable Solids	10	20	10	5
Oil & Grease	42	150	100	50

(1) All values expressed in mg/l except for settleable solids, ml/l.
(2) McGraw HIll, Metcalf & Eddy Inc., Wastewater Engineering, 1972.

B.1.3 Priority Pollutants

Similar to the Deer Island program, there are three sets of data for priority pollutants. The Nut Island Laboratory measured the concentration of selected metals, the Local Limits Study conducted a priority pollutant scan and the Harbor Studies characterization analyzed for pesticides, PCBs and PAHs. The results of these analyses are presented in Appendix B, Tables B-1, B-2 and B-3 respectively and are compared in Table II.B.2, Nut Island Influent characterization, Fiscal Year 1992.

Metals

Measurable amounts of copper, lead and zinc and very low concentrations of other metals were observed in both the Nut Island Lab data and the Local Limits data. The values reported by Nut Island for chromium, lead, silver and zinc were considerably higher than those measured in the Local Limits study.

TABLE II.B.2 NUT ISLAND INFLUENT CHARACTERIZATION COMPARED

	Geometric Mean Concentration		
	Nut Island Laboratory Data (1)	Local Limits Study Data (2)	Harbor Studies Data (3)
Metals, Cyanide, Surfactants and TPH (mg/l)			
Arsenic		0.002	
Chromium	0.0126	0.005	
Copper	0.0924	0.085	
Cadmium	0.0007	0.002	
Lead	0.0418	0.009	
Mercury		0.0002	
Nickel	0.0209	0.01	
Silver	0.0059	0.001	
Zinc	0.1769	0.123	
Cyanide		0.021	
Surfactants		8.045	
TPH		0.026	
Pesticides/PCBs (ug/l)			
Aldrin		<.01	<0.001
Chlordane		0.1	0.0028
DDD		<.01	0.0047
DDE		<.01	0.0032
DDT		<.01	0.006
Dieldrin		<.01	0.0776
Endrin		<.01	<0.001
Heptachlor		<.01	0.001
Heptachlor epoxide		<.01	0.0009
Hexachlorobenzene		<.01	0.0072
Lindane		<.01	0.0202
Transnonaroclor			0.0062

TABLE II.B.2 (con't)

	Nut Island Laboratory Data (1)	Local Limits Study Data (2)	Harbor Studies Data (3)
Polynuclear Aromatic Hydrocarbons (ug/l)			
2-methylnaphthalene		0.612	1.046
Acenaphthene		<0.22	0.0088
Acenaphthylene		<0.22	0.0022
Anthracene		<0.22	0.0216
Benzo(a)anthracene		<0.22	0.0325
Benzo(a)pyrene		<0.22	0.0138
Benzo(b)fluoranthene		<0.22	0.036
Benzo(g,h,i)perylene		<0.22	0.0204
Benzo(k)fluoranthene		<0.22	0.0251
Chrysene		<0.22	0.0382
Dibenzo(a,h)anthracene		<0.22	0.0042
Fluoranthene		<0.22	0.0708
Fluorene		<0.22	0.1571
Indeno(1,2,3-c,d)pyrene		<0.22	0.0184
Naphthalene		0.317	0.821
Perylene			0.0051
Phenanthrene		0.292	0.2815
Pyrene		<0.22	0.0963
Other Semivolatile Organics (ug/l)			
4-methyl phenol		22.53	
bis(2-ethylhexyl)phthalate		8.623	
Butylbenzyl phthalate		0.656	
Di-n-butylphthalate		0.335	
Diethyl phthalate		0.36	
Phenol		6.904	

TABLE II.B.2 (con't)

Volatile Organics (ug/l)	Nut Island Laboratory Data (1)	Local Limits Study Data (2)	Harbor Studies Data (3)
1,1,1-Trichloroethane		0.609	
2-Butanone		89.757	
Acetone		16.324	
Benzene		0.594	
Carbon disulfide		0.754	
Chloroethane		1.566	
Methylene chloride		0.702	
Tetrachloroethene		3.478	
Toluene		3.995	
Total xylenes		1.697	
trans-1,2-dichloroethene		0.615	
Trichloroethene		0.909	

(1) Analytical results, Nut Island Laboratory
(2) Analytical results, Local Limits study, Appendix B, Table B-2
(3) Analytical results, Harbor Studies Chaaracterization, Appendix B, Table B-3

Pesticides/PCBs

The Local Limits study did not detect any pesticides/PCBs in the influent; however, the Harbor Studies characterization with its more sensitive methods, reported measurable amounts for lindane, DDE, DDD, DDT, chlordane and dieldrin.

Polynuclear Aromatic Hydrocarbons (PAH)

The Local Limits study detected 2-methyl naphthalene, naphthalene, and phenanthrene in the influent. The Harbor Studies characterization detected of most of the PAHs including 2-methyl naphthalene, naphthalene, phenanthrene, fluoranthene, pyrene, and fluorene.

Other Organic Compounds

Other semi-volatile and volatile organic compounds consistently measured in the influent include phenols, phthalates, acetone, chlorinated hydrocarbons, methylene chlorides, toluene, and xylenes.

Historical Metal Loadings

Metal loadings calculated from Nut Island laboratory historical data are presented in Figure II.B.5 and shows a decrease in metals loadings in the influent.

B.2 Effluent Characteristics

B.2.1 Conventional Parameters

The concentrations of conventional parameters in the effluent are also contained in Appendix B, Table B-1. Table II.B.3 compares the Nut Island effluent quality with our court-ordered interim limits.

Trend analyses of many of the parameters listed above for the twelve monitoring months in FY 92 are presented in Figure II.B.6. As the charts depict, all interim limits were met.

Figure II.B.5 Nut Island Influent, Mean Metals Loadings 1987 - 1992, Nut Island Laboratory

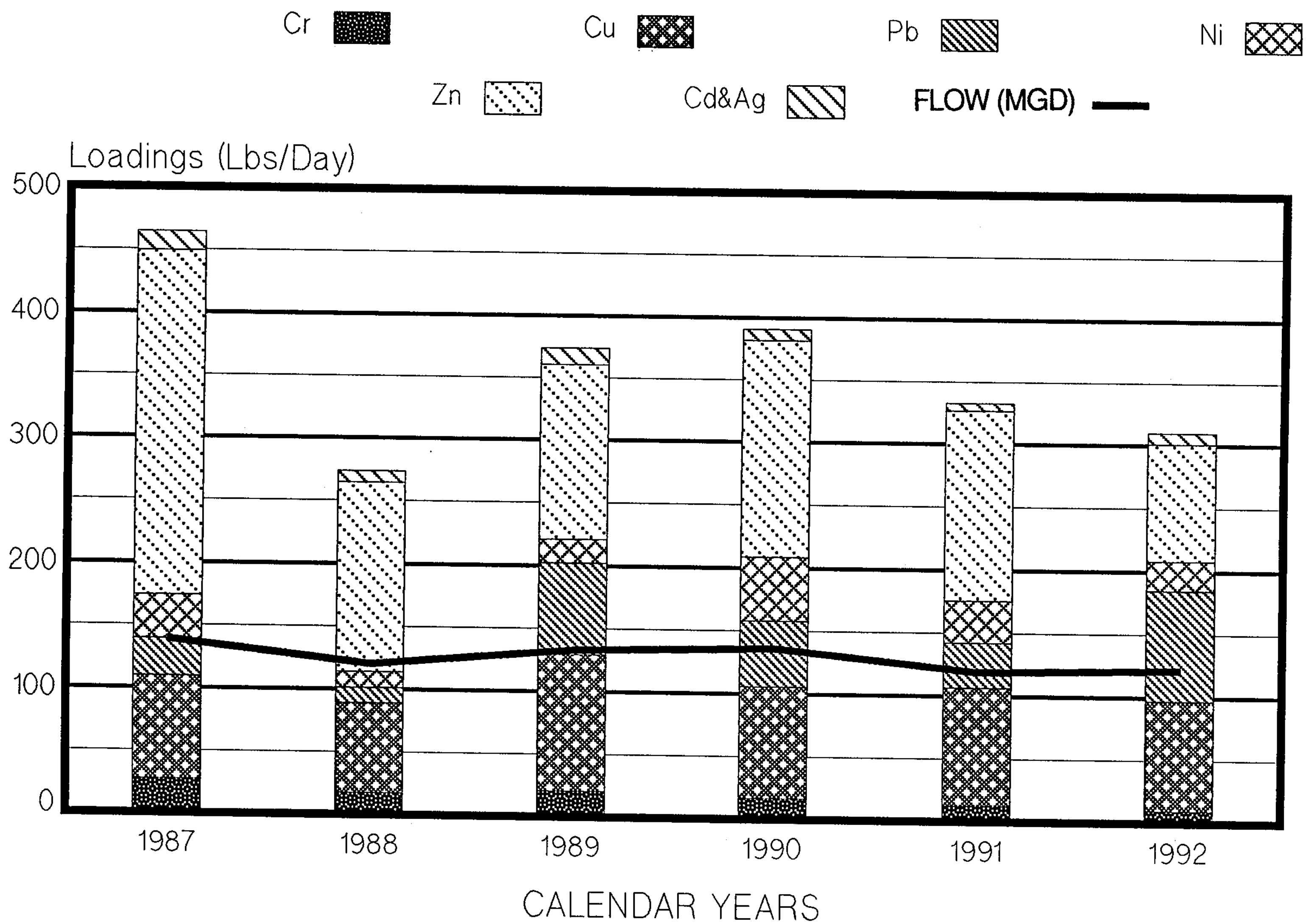


Table II.B.3 Nut Island Effluent Quality Compared to Interim Limits

Parameter	Interim Limits		Effluent		%
	Mon Ave (2)	Daily Max (3)	Mon Ave (4)	Daily Max (5)	Removal(1)
BOD (mg/L)	130.0	185.0	122.0	182	
BOD Removal (%)	15.0				48
TSS (mg/L)	110.0	195.0	79.0	112	
TSS Removal (%)	43.0				68
SS (ml/L)	1.8		1.7		
Fecal Coliform (#/100 ml)	200.0		29.0		
Total Coliform (#/100 ml)	1000.0		636.0		
pH (units)	6.5 - 8.5		6.8 - 7.2		

(1) 12-month running average
(2) maximum monthly average
(3) daily maximum concentration
(4) highest reported monthly average concentration
(5) maximum daily concentration

B.2.2 Nutrients

Because of its potential effect on algal growth in the receiving body of water, nutrients, especially the nitrogen compounds are closely monitored. This nutrient group include: total kjeldahl nitrogen (TKN), ammonia, nitrates, nitrites, orthophosphorus and total phosphorus.

Nutrient data are included in the Nut Island Operations Summary Report in Appendix B, Table B-1. Table II.B.4 summarizes the FY92 data. The table shows no temporal variability and when compared to historical data, it appears that the nutrient loading out of Nut Island remained consistent. Figure II.B.7 compares nutrient loadings from 1989 to 1992.

Figure II.B.6 Nut Island Trend Analyses Of Conventional Parameters

Chart 1

BIOCHEMICAL OXYGEN DEMAND
Nut Island POTW for June 1992

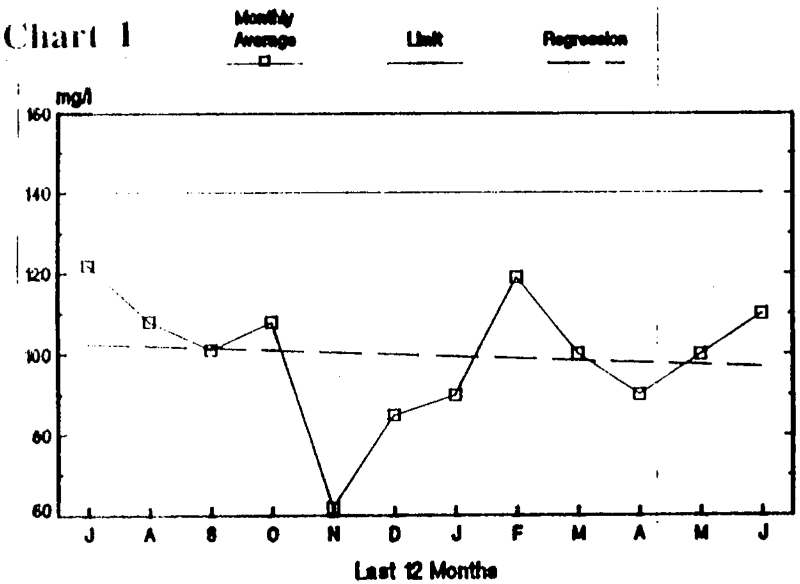


Chart 2

TOTAL SUSPENDED SOLIDS
Nut Island POTW for June 1992

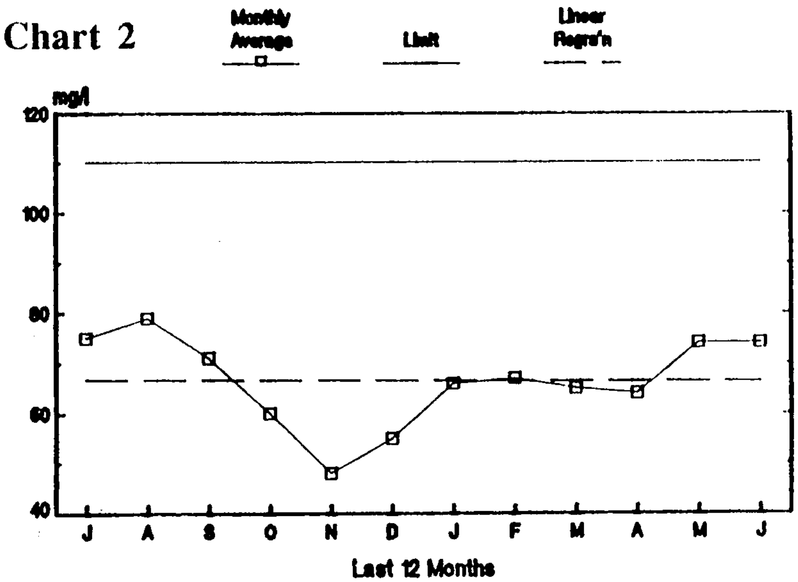


Chart 3

BOD PERCENT REMOVAL
Nut Island POTW for June 1992

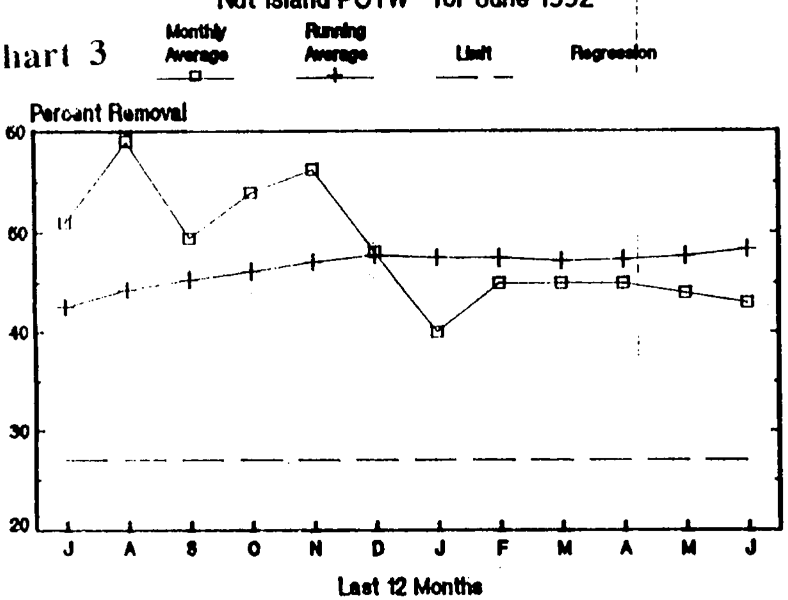


Chart 4

TSS PERCENT REMOVAL
Nut Island POTW for June 1992

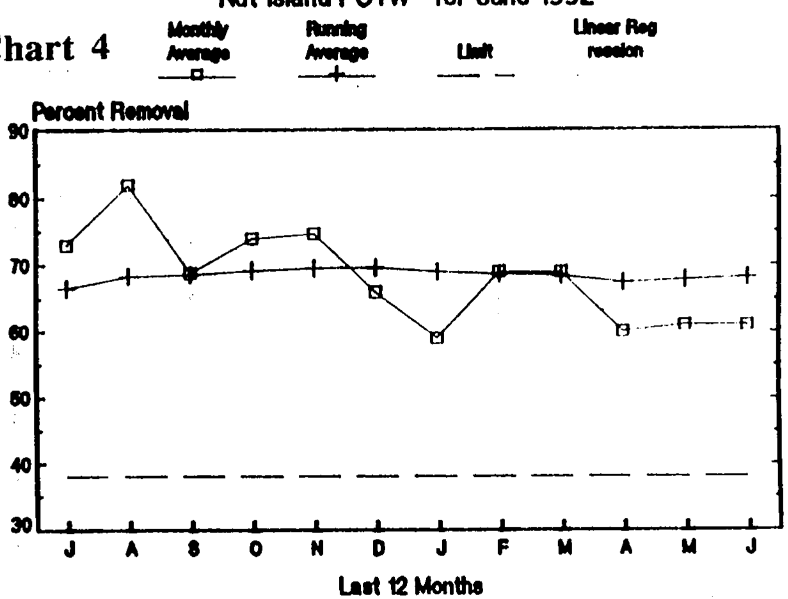


Chart 5

FECAL COLIFORM BACTERIA
Nut Island POTW for June 1992

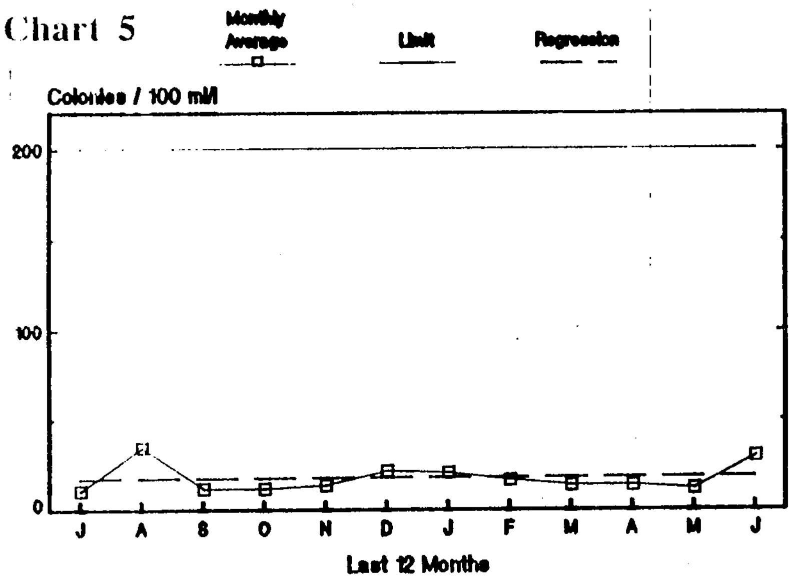


Chart 6

pH
Nut Island POTW for June 1992

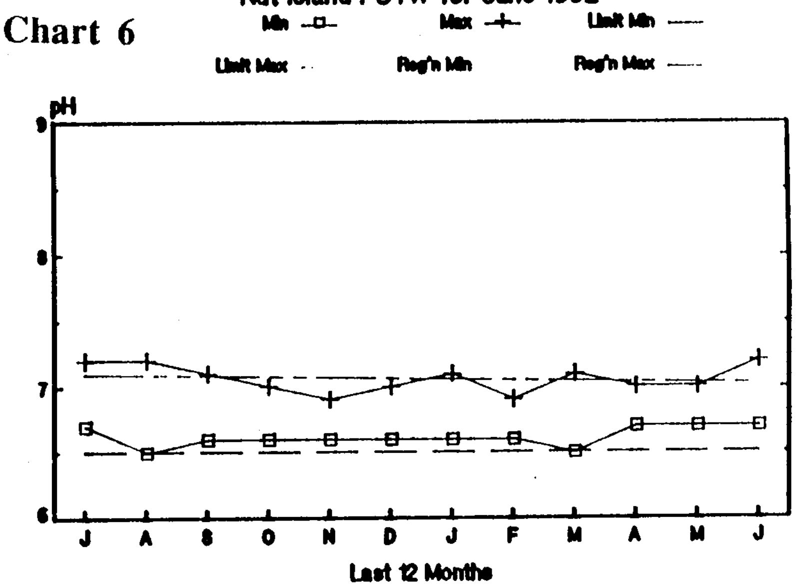


Chart 7

TOTAL COLIFORM BACTERIA
Deer Island POTW for May 1992

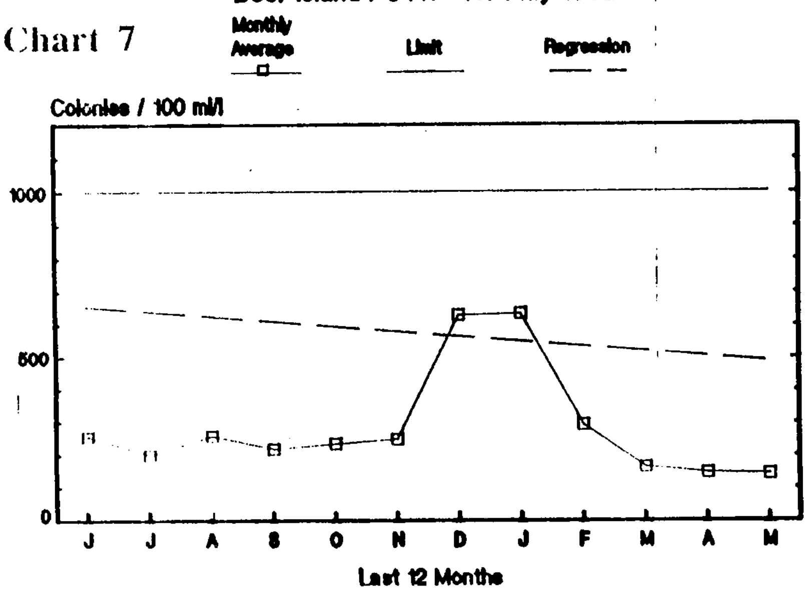


Chart 8

SETTLEABLE SOLIDS
Nut Island POTW for June 1992

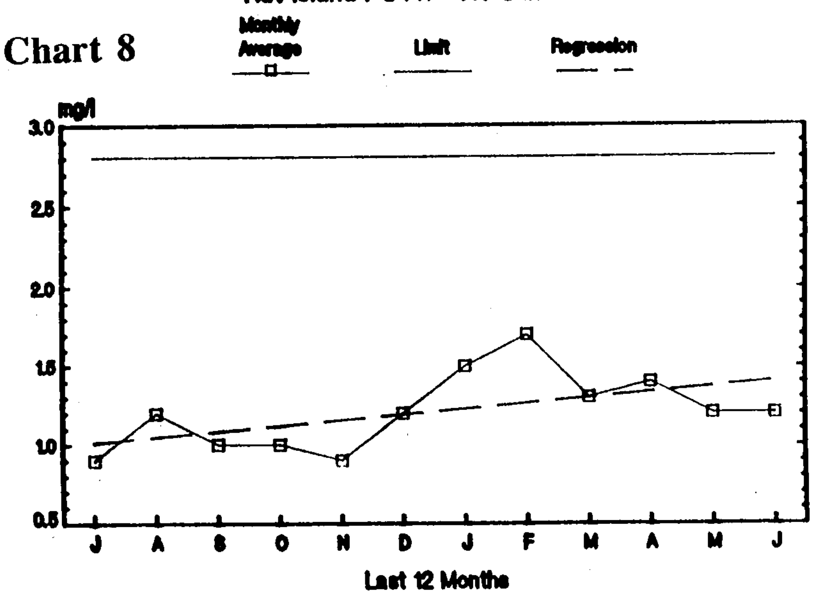


Table II.B.4 Nut Island Effluent Nutrients Concentrations

Nutrient (mg/L)	Concentration (mg/L) Minimum	Average	Maximum
TKN	10.20	15.70	21.60
Ammonia	2.90	8.10	11.10
Nitrates	0.01	0.33	1.06
Nitrites	0.02	0.15	0.37
Orthophosphorus	0.90	1.64	2.90
Total Phosphorus	1.60	2.70	3.70

B.2.3 Priority Pollutants

The results of the Nut Island Laboratory, NPDES, Local Limits and Harbor Studies monitoring programs are presented in Appendix B, Tables B-1, B-5, B-6 and B-7 respectively and are compared on Table II.B.5, Nut Island Effluent Concentration Compared.

Metals

Local Limits and NPDES analytical results show very good agreement except for lead and nickel. The Nut Island study reports higher concentrations for lead, nickel, chromium and zinc than do the NPDES and Local Limits studies. Figure II.B.8 compares the calculated metal loadings for each of the data set. Figure II.B.9 shows a decrease in metal loads from 1987 to 1992.

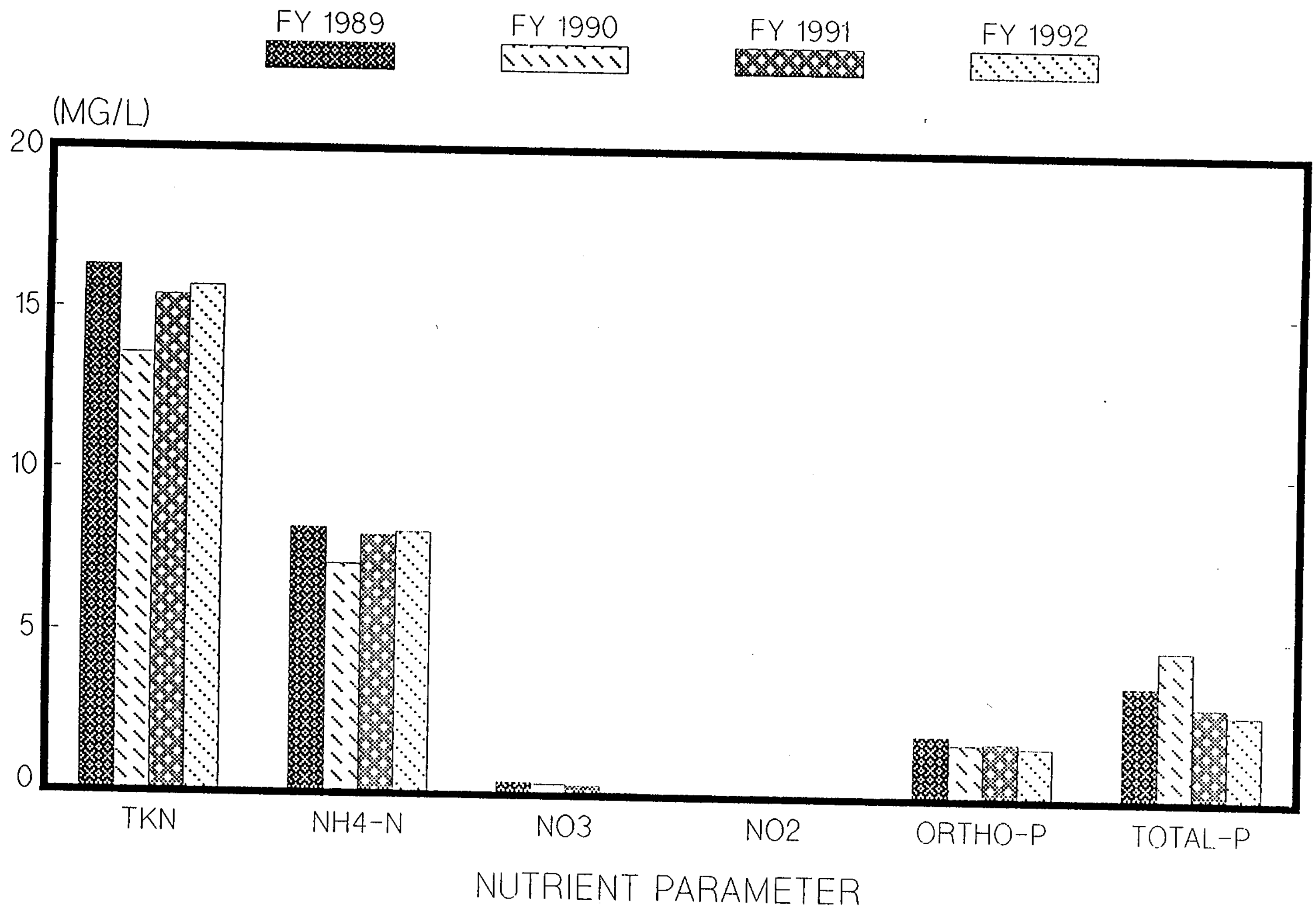
Pesticides/PCBs

The Local Limits study did not detect any pesticides/PCBs in either the influent or effluent. Endosulfan I, b-BHC, DDD, DDT and chlordane were detected in the NPDES samples. The Harbor Studies characterization reported concentrations much lower than those detected by NPDES for these constituents.

Polynuclear Aromatic Hydrocarbons (PAHs)

There were no PAHs detected in either the NPDES or Local Limits studies. The Harbor studies data shows PAHs at extremely low concentrations.

Figure II.B.7 Nut Island Effluent, Mean Nutrient Concentrations FY 1989 - 1992, Nut Island Laboratory



Other Organics.

Other organic compounds measured in the Nut Island effluent include: phthalates, phenolic compounds, chlorinated hydrocarbons, 2-butanone, benzene, styrene, toluene and xylenes. Acetone was also measured, and in high concentration, presumably due to laboratory contamination. However, acetone is naturally produced during biodegradation and is not considered a priority pollutant by EPA.

TABLE II.B.5 NUT ISLAND EFFLUENT CHARACTERIZATION COMPARED

	Geometric Mean Concentration			
	Nut Island Data (1)	NPDES Data (2)	Local Limits Data (3)	Harbor Studies Data (4)
Metals (mg/l)				
Arsenic		0.0015	0.002	
Cadmium	0.0004	0.0007	0.001	
Chromium	0.0061	0.0045	0.004	
Copper	0.0514	0.0555	0.063	
Lead	0.0297	0.0072	0.0060	
Mercury		0.0002	0.0003	
Molybdenum		0.0059	0.022	
Nickel	0.0163	0.0092	0.009	
Selenium		0.0011	0.001	
Silver	0.0044	0.0031	0.0030	
Thallium		0.0013	0.002	
Zinc	0.1095	0.0632	0.085	
Cyanide, Phenols and Total Petroleum Hyudrocarbons (mg/l)				
Cyanide		0.0070	0.012	
PHCs		1.9250	0.120	
Phenols		0.0250		
Pesticides/PCBs (ug/l)				
4'4-DDD		0.0490		0.0018
4'4-DDE		0.0100		0.0034
4'4-DDT		0.0420		0.0059
Aldrin		0.0100		0.0010
b-BHC		0.3030	0.011	
Chlordane		0.2170	0.040	0.0086
Dieldrin		0.0100		0.0663
Endosulfan I		0.0330		
Endrin		0.0100		0.0010
Heptachlor		0.0100		0.0013

TABLE II.B.5 (Con't)

	Nut Island Data (1)	NPDES Data (2)	Local Limits Data (3)	Harbor Studies Data (4)
Heptachlor epoxide		0.0100		0.0011
Hexachlorobenzene		0.0100		0.0033
Lindane		0.0100		0.0259
Semivolatile Organics (ug/l)				
2-methylnaphthalene		1.0000	0.250	0.8406
4-methylphenol		9.3120	24.725	
Acenaphthene		1.0000	0.226	0.0073
Acenaphthylene		1.0000	0.226	0.0027
Anthracene		1.0000	0.226	0.0133
Benzo(a)anthracene		1.0000	0.226	0.0207
Benzo(a)pyrene		1.0000	0.226	0.0105
Benzo(b)fluoranthene		1.0000	0.226	0.0219
Benzo(e)pyrene		1.0000	0.226	0.0169
Benzo(g,h,i)perylene		1.0000	0.226	0.0134
Benzo(k)fluoranthene		1.0000	0.226	0.0143
bis(2-ethylhexyl)phthalate		11.0040	9.977	
Butylbenzyl phthalate		2.4550	0.646	
Chrysene		1.0000	0.226	0.0264
Di-n-butylphthalate		1.8960	0.398	
Dibenzo(a,h)anthracene		1.0000	0.226	0.0011
Diethylphthalate		2.4440	0.351	
Fluoranthene		1.0000	0.226	0.0609
Fluorene		1.0000	0.226	0.1259
Indeno(1,2,3-cd)pyrene		1.0000	0.226	0.0105
Naphthalene		1.0000	0.226	0.7430
Phenanthrene		1.0000	0.226	0.2135
Phenol		1.1610	7.755	
Pyrene		1.0000	0.226	0.0681

TABLE II.B.5 (Con't)

Volatile Organics (ug/l)	Nut Island Data (1)	NPDES Data (2)	Local Limits Data (3)	Harbor Studies Data (4)
1,1,1-trichloroethane		1.8880	0.548	
2-Butanone		104.0150	133.189	
Acetone		113.0570	20.326	
Benzene		0.5460	0.548	
Bromodichloromethane		2.0840	0.548	
Carbon disullfide		0.6640	0.548	
Chlorodibromomethane		0.8970	0.548	
Chloroform		7.9760	7.817	
Chloromethane		1.1190	0.548	
Ethylbenzene		0.5930	0.548	
Methylene Chloride		3.7920	0.721	
Tetrachloroethene		5.4840	3.537	
Toluene		5.6040	2.931	
Trichloroethene		0.9920	0.587	
Xylene		1.3250	1.795	

(1) Analytical results, Nut Island laboratory
(2) Analytical results, Local Limits study, Appendix B, Table B-5
(3) Analytical results, NPDES program, Appendix B, Table B-4
(4) Analytical results, Harbor Studies Characterization, Appendix B, Table B-6

Figure II.B.8 Nut Island Effluent, Mean Metals Loadings FY 1992, Comparison of Studies

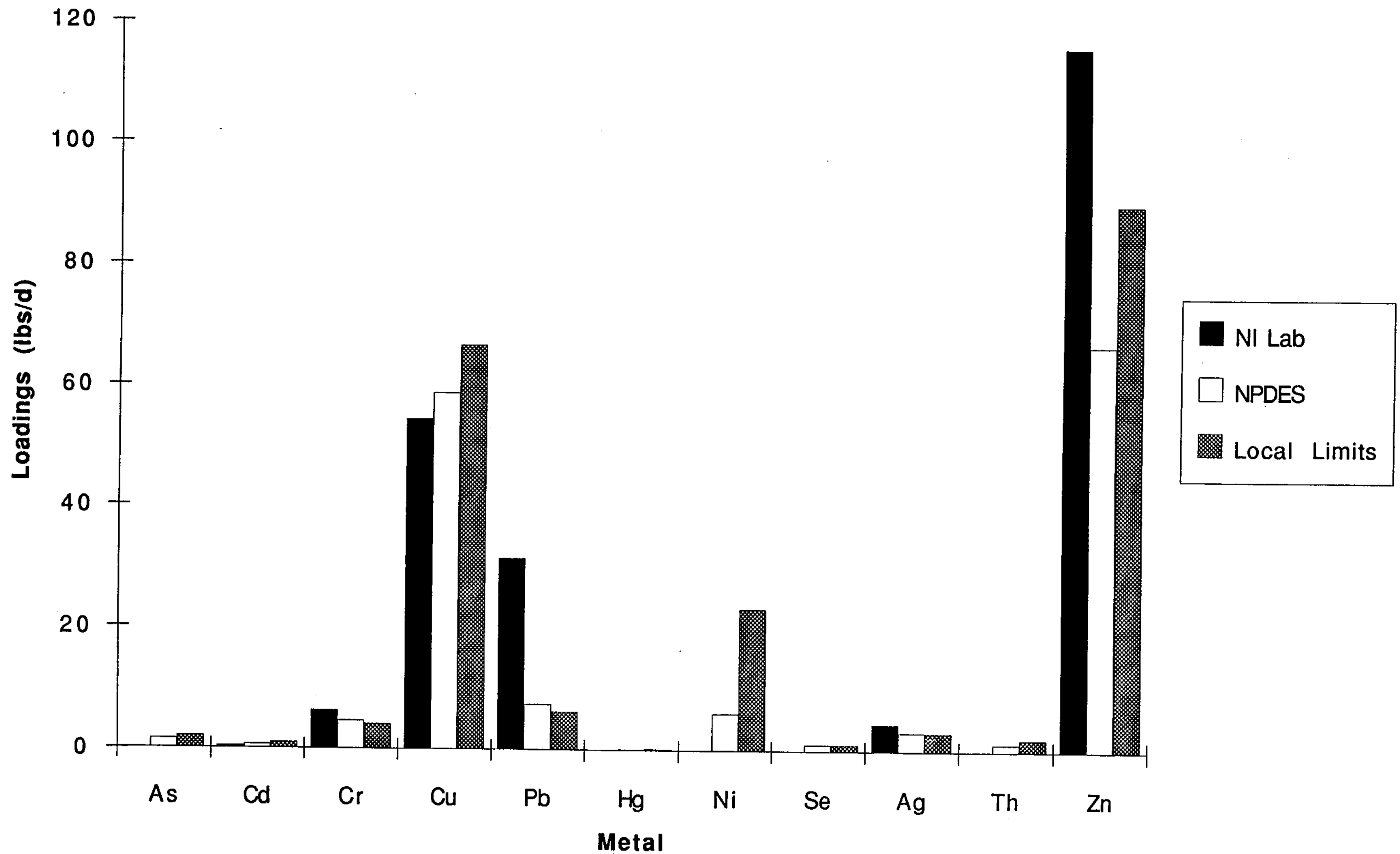
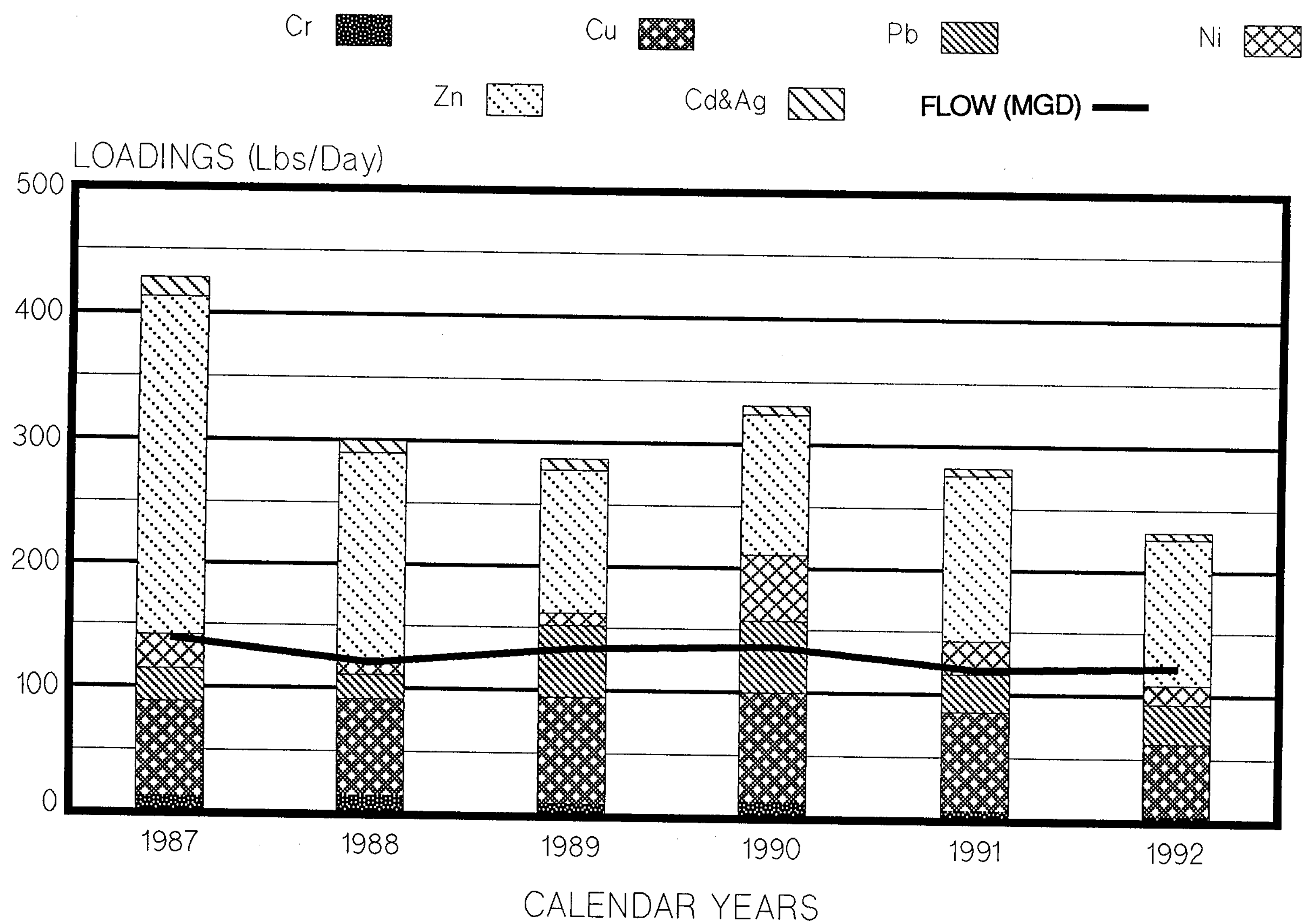


Figure II.B.9 Nut Island Effluent, Mean Metals Loadings 1987 - 1992, Nut Island Laboratory



C. Cottage Farm Combined Sewer Facility

During dry weather conditions, this facility pumps wastewater to the Ward Street Headworks which eventually discharges to the Deer Island Treatment plant. The sewer line has a hydraulic capacity of 1.3 million gallons (MG). Under storm conditions, flows received by the station in excess of the 1.3 MG threshold, is screened, settled, chlorinated and discharged to the Charles river through outfall number MWR 201. This facility has a design capacity of 233 MGD. Figure II.C.1 is a typical combined sewer chlorination facility schematic.

C.1 Activations

The volume of storm-induced flow is very much dependent on rainfall intensity, drainage area, and the sewer line capacity at the time of storm occurrence. When there is a multiple storm event, prediction of rainfall runoff becomes even more complicated. Appendix C, Table C-1 contains the Cottage Farm FY92 operations summary.

Table II.C.1 summarizes the activations during this monitoring period.

Table II.C.1 Cottage Farm CSO FY92 Activations Summary

Number of Activations	23
Total Volume Treated (MG)	361.00
Maximum Flow (MGD)	64.00
Minimum Flow (MGD)	0.01
Average Flow (MGD)	15.69

Average monthly Flow is calculated by dividing the total volume by the number of times the facility activated.

Except for the month of June, there was an activation each month at this facility. More activations occurred in the month of September than in any other month. Two continuous rainfall events occurred on the 25 and 26th of September, with rainfall intensities of 2.42 inches (in.) and 1.19 in. respectively. Each of these rainfall events resulted in activations lasting for about twelve hours and flows of 49 MG and 19 MG respectively.

Because the pumping capacity at Deer Island has increased, the number of activations at Cottage Farm and Prison Point is expected to be greatly reduced. Figure II.C.2 presents the individual activations during this monitoring period.

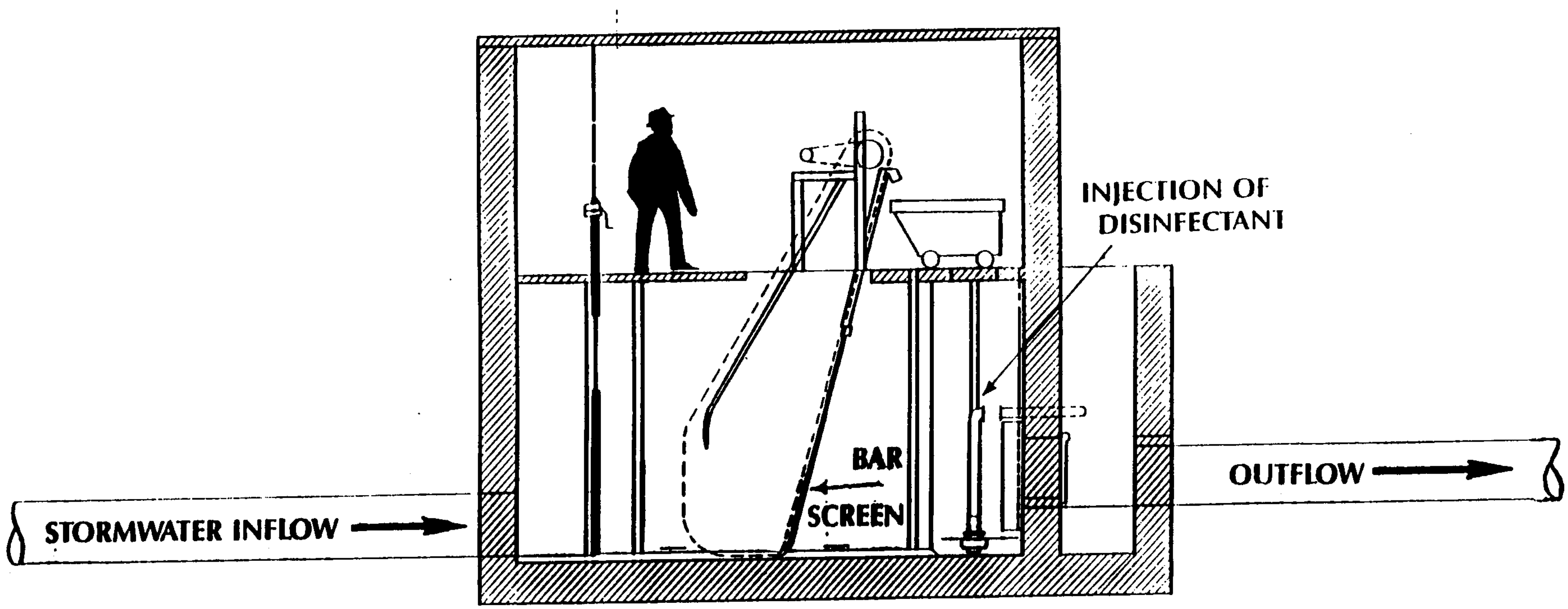


Figure II.C.1 Combined Sewer Overflow Facility Treatment Schematic

Figure II.C.2 Cottage Farm CSO Fiscal Year 1992 Activations

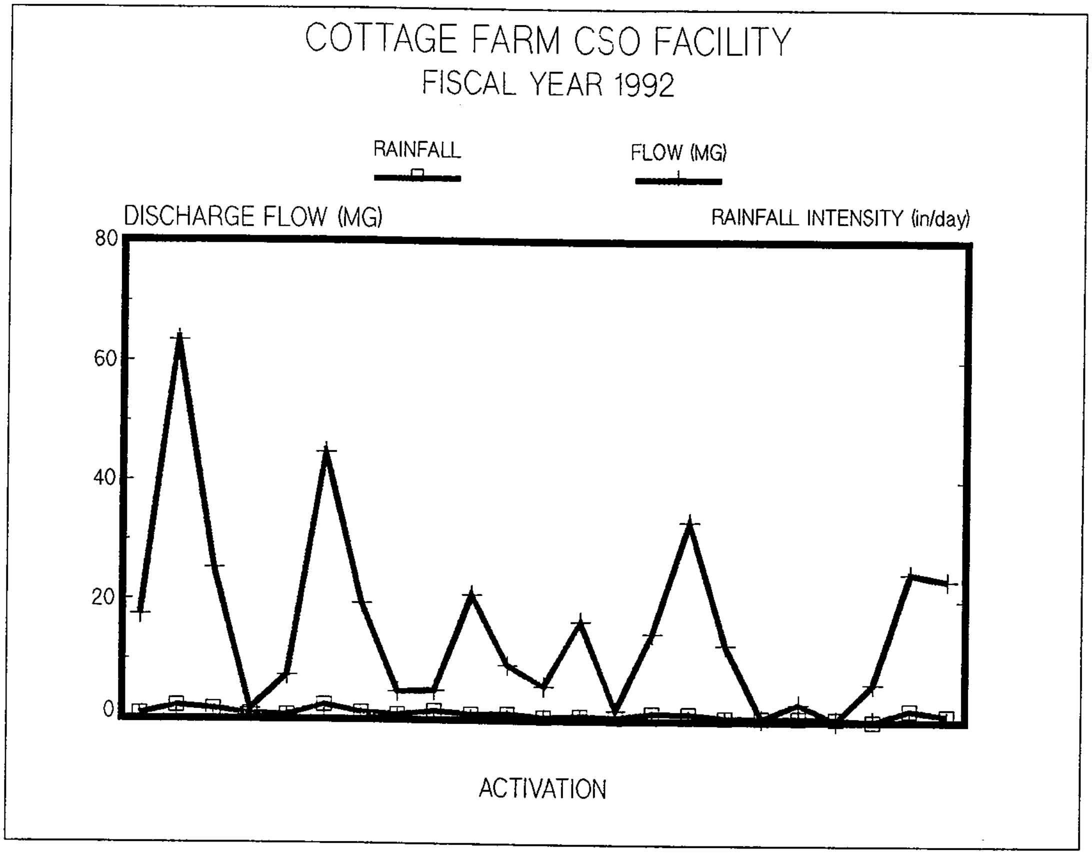


Figure II.C.3 Cottage Farm CSO Activations Decreasing

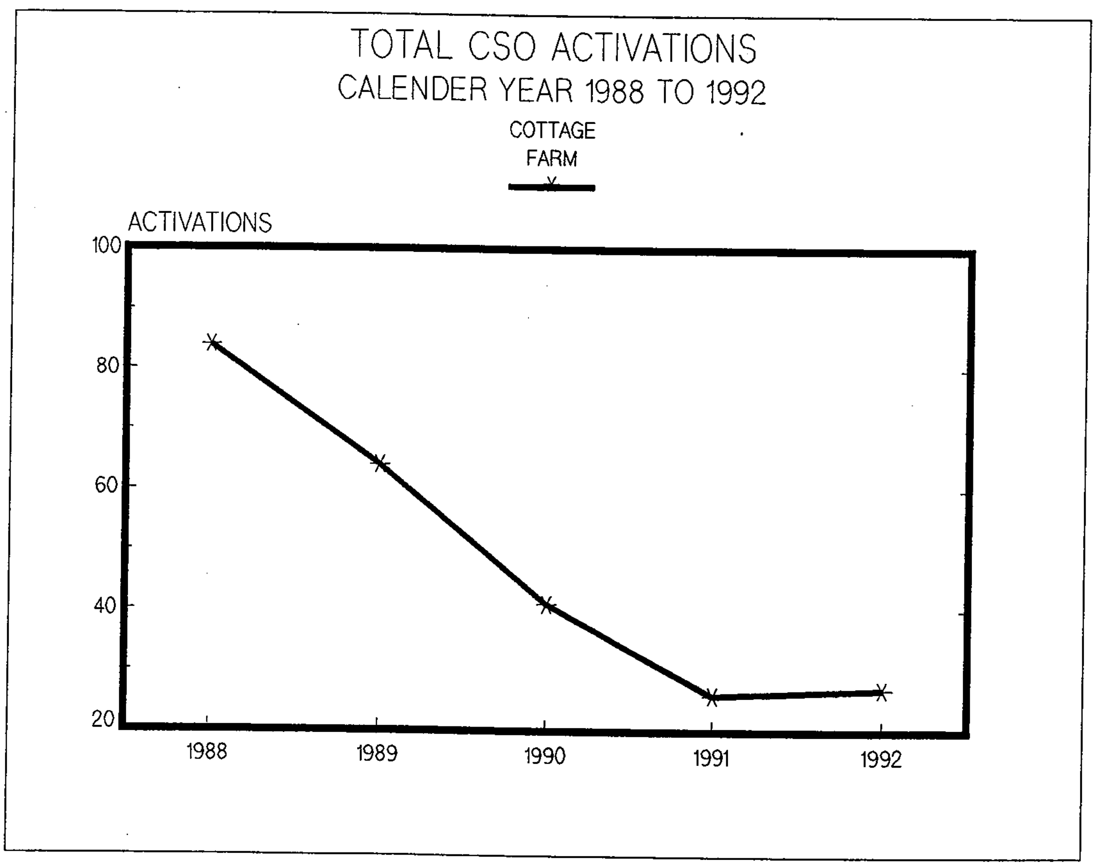


Figure II.C.3 compares the total number of activations at Cottage Farm from 1988 to 1992. As shown, the number of times Cottage Farm activated decreased substantially over the last five years.

C.2 Conventional Parameters

The amount of runoff available for dilution, sampling occurrence with respect to first flush, representativeness of sample, and sample handling greatly affect the concentrations in samples collected from a wet weather activation. As expected, there is a very wide spread in the measured amount of pollutants in all of our CSO samples.

Because the CSO facilities are not designed to remove BOD and TSS, no removal of these contaminants are expected, and at times, the effluent concentration may even be higher than the influent. Analytical results of conventional parameter testing of both influent and effluent are included in Appendix C, Table C-1, Cottage Farm Operations Summary and is summarized in Table II.C.2.

Table II.C.2 Cottage Farm CSO Influent and Effluent Characteristics

	Concentration (1)					
Parameter	Influent			Effluent		
	Min	Ave	Max	Min	Ave	Max
TSS	33	210	866	21	84	484
BOD	25	95	192	23	71	282
Fecal Coliform (#/100				10	34	330000
pH (units)				6.44		7.78

(1) Concentration expressed in mg/l except for pH and Fecal Coliform

Fecal Coliform

In September, there was one high fecal count of 330,000 colonies/100 ml. This one sample represents 25% of the total number of samples in that month. In September, we violated our NPDES permit limit (not more than 10% of the samples exceeding 2500 colonies/100 ml).

pH

There was one low pH reading of 6.44, violating the pH limit of 6.5 pH units.

C.3 Priority Pollutants

During the first significant storm event, samples are collected for selected priority pollutants. Results of effluent monitoring conducted in 1992 are introduced in Appendix C, Table C-2. Figure II.C.4 depicts the priority pollutant concentrations of measured in the effluent.

Of the metals detected, cadmium, copper, lead, mercury and zinc were consistently present in nine samples analyzed. Cyanide was detected four times and total phenols was detected three times out of five samples.

Of the pesticides, b-BHC and methoxychlor were detected fifty percent of the time and, g-chlordane appeared twice in nine samples.

Of the PAH group, a number of compounds were detected at least once during the year, with phenanthrene and 2-methylnaphthalene detected three times and naphthalene and fluoranthene detected twice.

No chlorinated hydrocarbons were detected. Of the volatile organic compounds, acetone, chloroform, tetrachloroethene, methylene chloride were detected all the time, toluene and dichloroethene were detected twice, and 2-butanone, trichloroethene, xylene were detected at least once in three samples.

Appendix C, Table C-4 and Figure II.C.5 compares the concentration of toxic pollutants from 1989 to 1992.

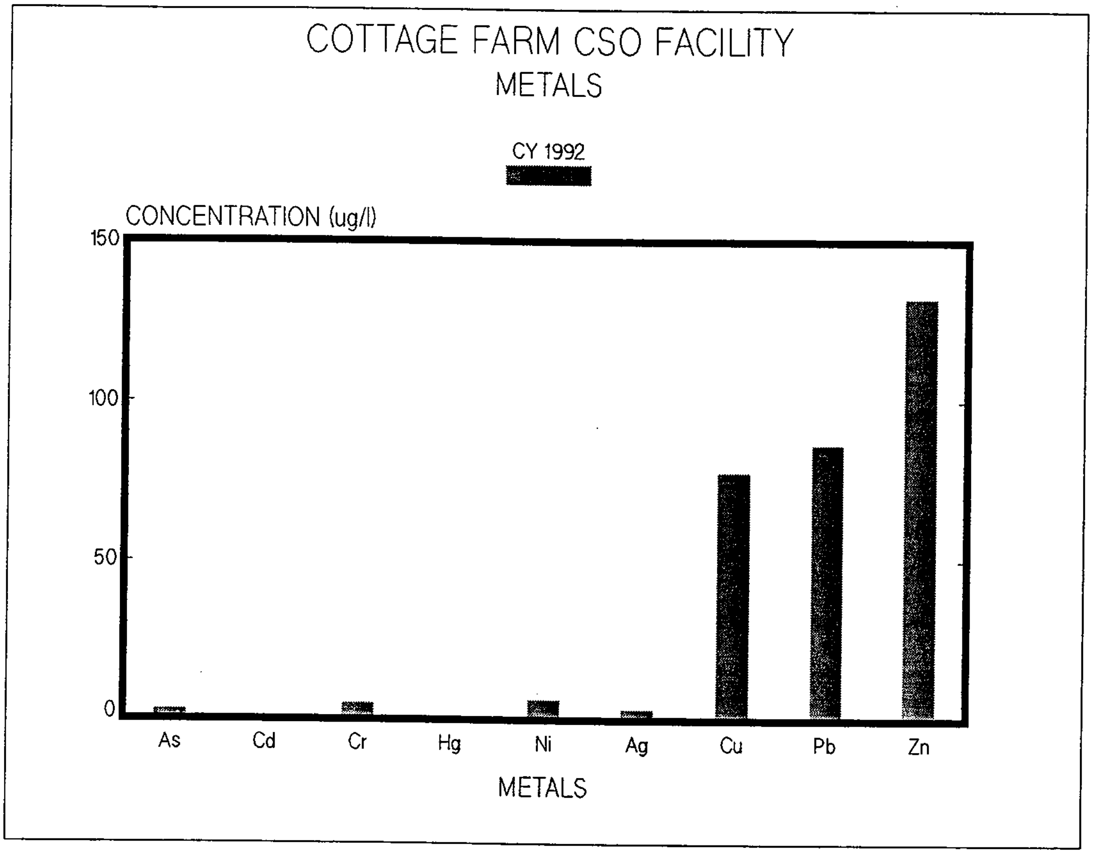
C.4 Loadings

Appendix C, Table C-3 is an attempt to calculate the amounts of contaminants discharged to the Charles River through the Cottage Farm facility during each monthly sampling event. The flows used to calculate the loadings were those measured during the time of sampling. The calculated loadings should not be used to project monthly or yearly loadings.

D. Prison Point Combined Sewer Facility

This facility, like Cottage Farm, is a dry weather flow as well as a stormwater flow pumping station with a design capacity of 385 MGD. The dry weather phase is a 5 MGD capacity sewer pumping station, which discharges to a sewer in Charlestown and eventually flows to the Deer Island Plant. The stormwater phase, any amount in excess of sewer capacity, is screened, settled, chlorinated and discharged downstream below the new Charles River Dam at outfall MWR 203.

Figure II.C.4 Cottage Farm CSO, Priority Pollutant Concentrations, FY 1992



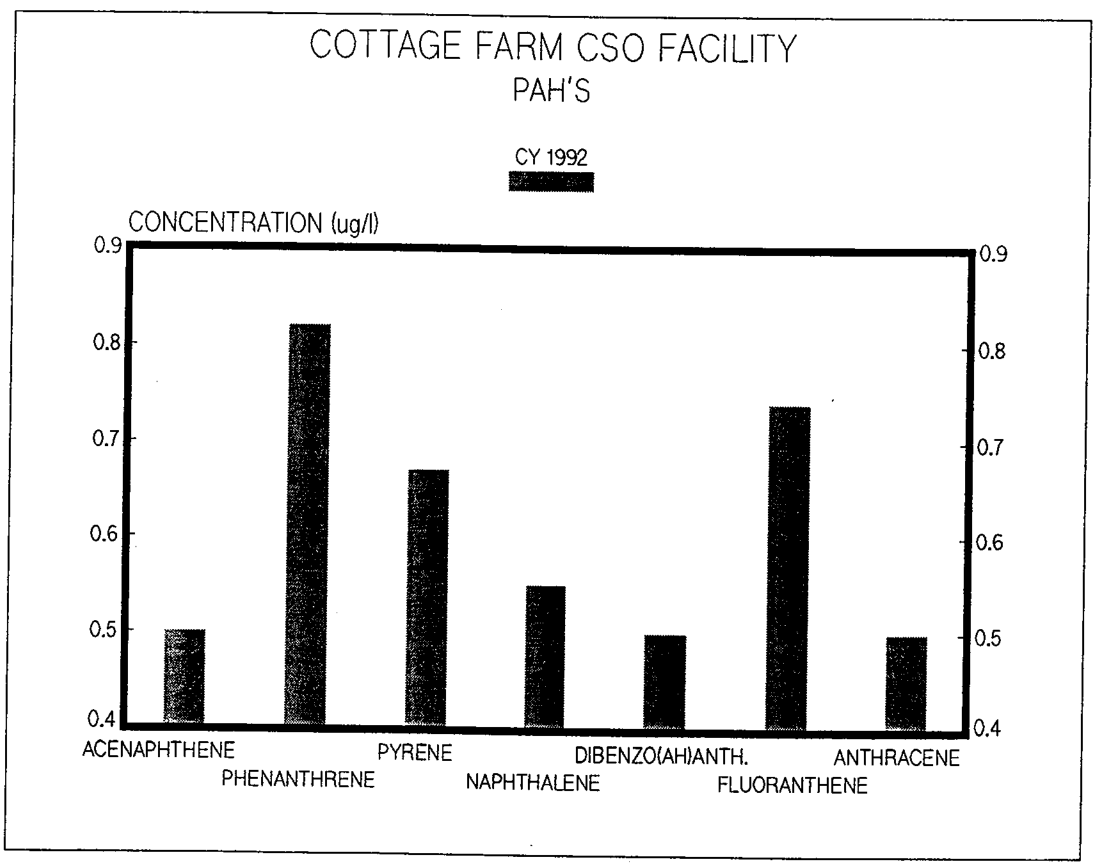


Figure II.C.5 Cottage Farm CSO, Priority Pollutant Concentrations Compared

Chart 1

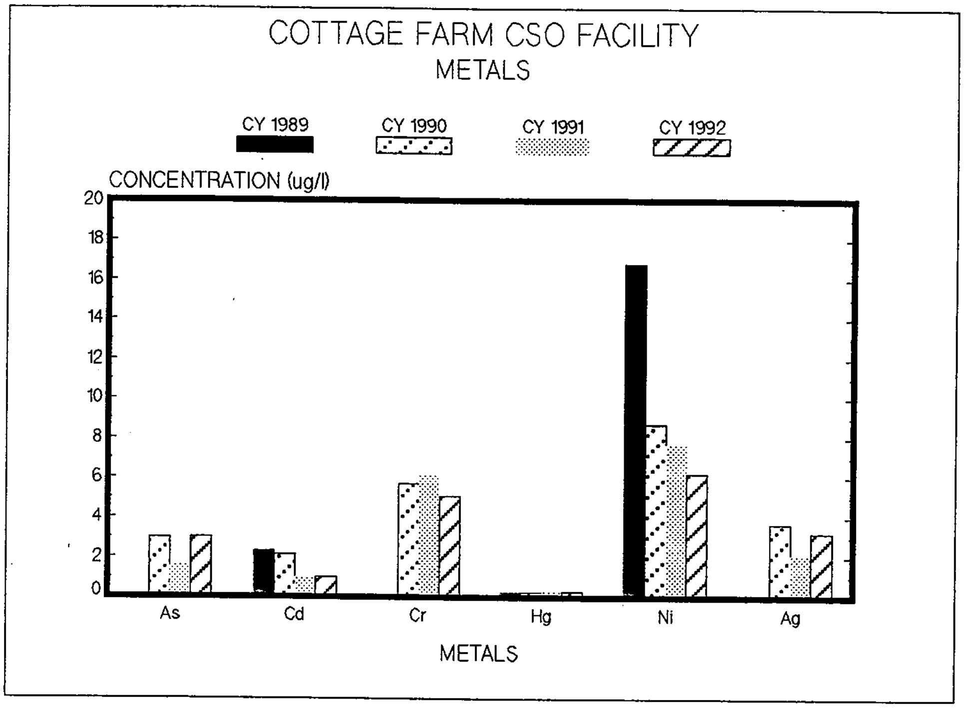


Chart 2

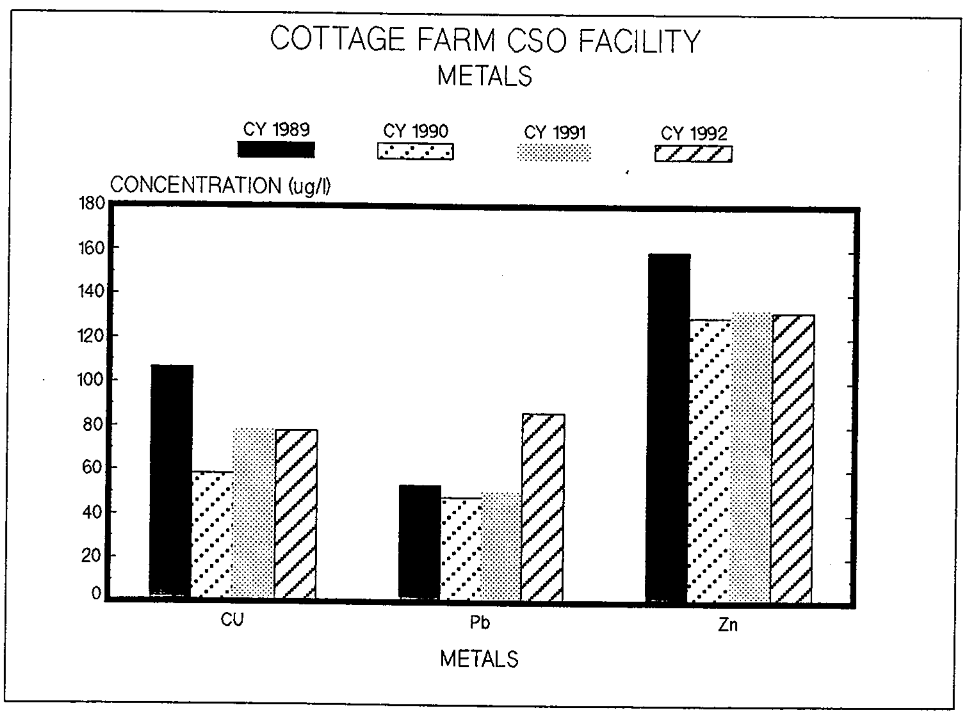


Figure II.C.5 Cottage Farm (Con't)

Chart 3

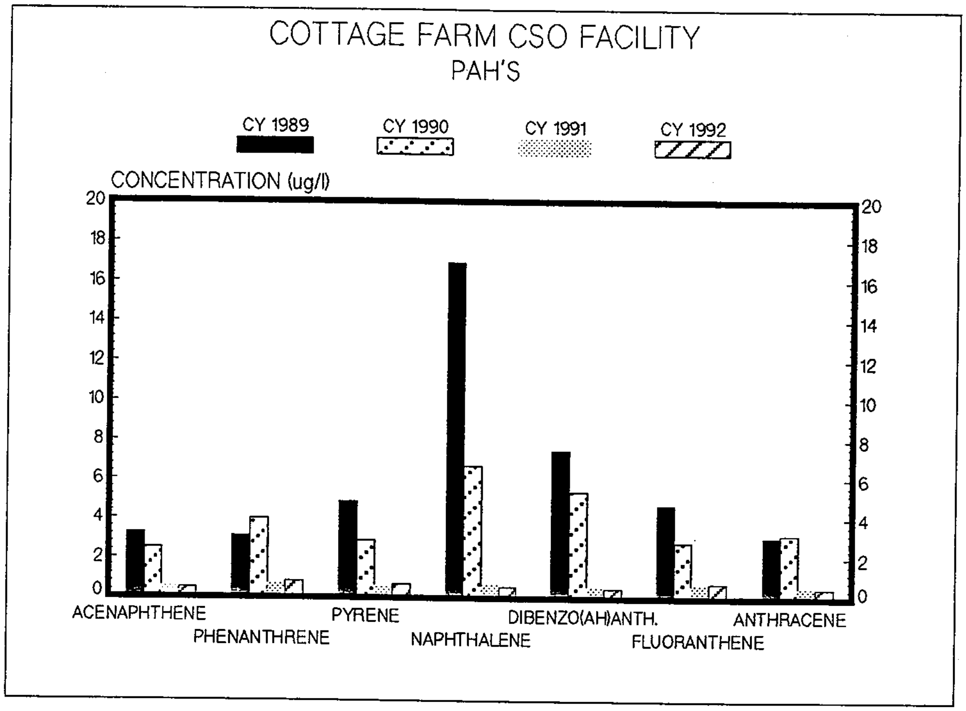
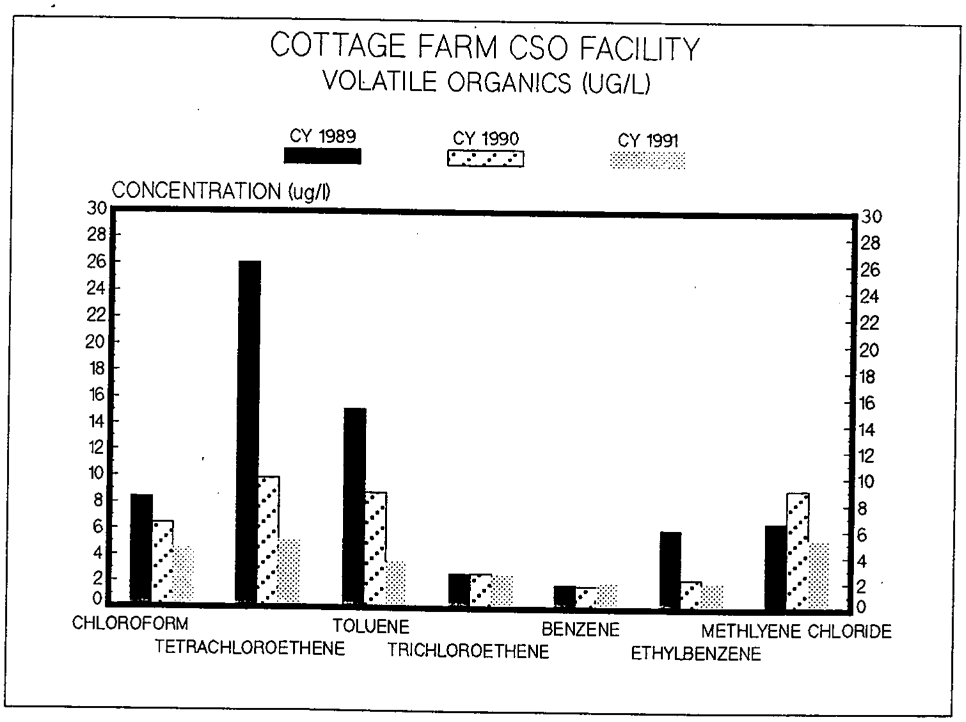


Chart 4



D.1 Activations

Appendix D, Table D-1 contains the Prison Point FY92 operations summary. Table II.D.1 summarizes the activations during this monitoring period.

Table II.D.1 Prison Point CSO FY92 Activations Summary

Number of Activations	29
Total Volume Treated (MG)	429.00
Maximum Flow (MGD)	63.00
Minimum Flow (MGD)	1.00
Average Flow (MGD)	14.79

Average monthly flow is calculated by dividing the total volume treated by the number of times the facility activated.

Figure II.D.1 depicts the activations in FY 92. Except for the month of May, there was at least one activation each month. More activations occurred in the month of September than any other month. The storm on the 25th and 26th of September resulted in flows of 55 and 18 MG respectively.

Figure II.D.2 compares the total number of activations from 1988 to 1992. The graph shows a sharp increase in the number of activations from 1988 to 1989. Since then, it has also decreased dramatically over the years.

D.2 Conventional Parameters

The results of analyses for conventional pollutants in the influent and effluent are contained in Appendix D, Table D-1, Prison Point CSO Operations Summary. Table II.D.2 presents the influent and effluent characteristics of the wastewater.

Fecal Coliform

There were two high readings of fecal coliform in the year, 32,000 colonies/100 ml, measured in February , and 33,000 colonies/100 ml in April. For both these monitoring months, there were only two fecal coliform readings. During these months, we violated our NPDES permit limit of not more than 10% of the samples exceeding 2500 colonies/100 ml.

Figure II.D.1 Prison Point CSO Fiscal Year 1992 Activations

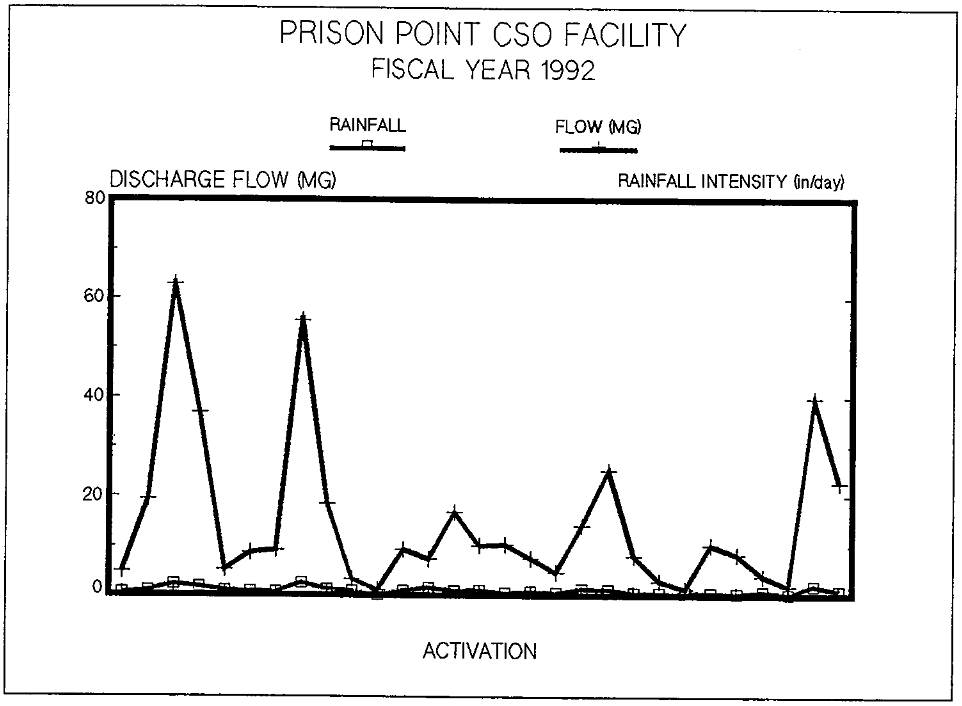
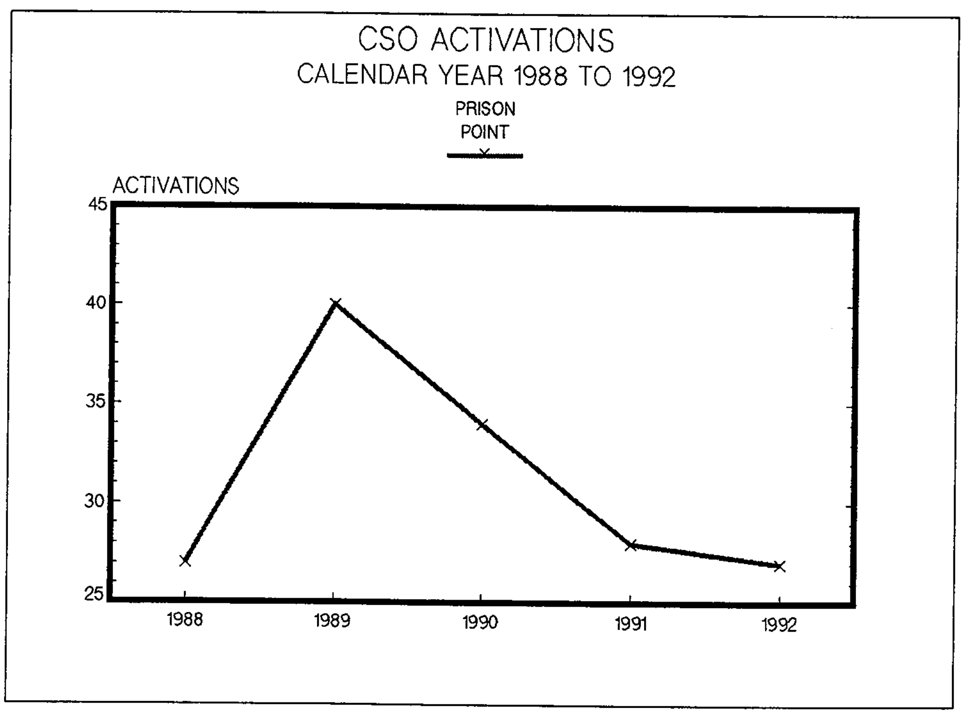


Figure II.D.2 Prison Point CSO Activations Decreasing



pH

There were no pH violations from the Prison Point facility. The pH range observed at this facility, 6.61 - 7.87 was within our permit limit of 6.5 - 9.0 pH units.

Table II.D.2 Prison Point CSO Influent and Effluent Characteristics

	Concentration (1)					
Parameter	Influent			Effluent		
	Min	Ave	Max	Min	Ave	Max
TSS	28	124	256	18	87	166
BOD	26	54	154	15	71	290
Fecal Coliform (#/100				10	39	33000
pH (units)				6.61		7.87

(1) Concentration expressed in mg/l except for pH and Fecal Coliform

D.3 Priority Pollutants

Results of analyses performed in 1992 are presented in Appendix D, Table D-2. Figure II.D.3 depicts the concentration of pollutants measured in the effluent.

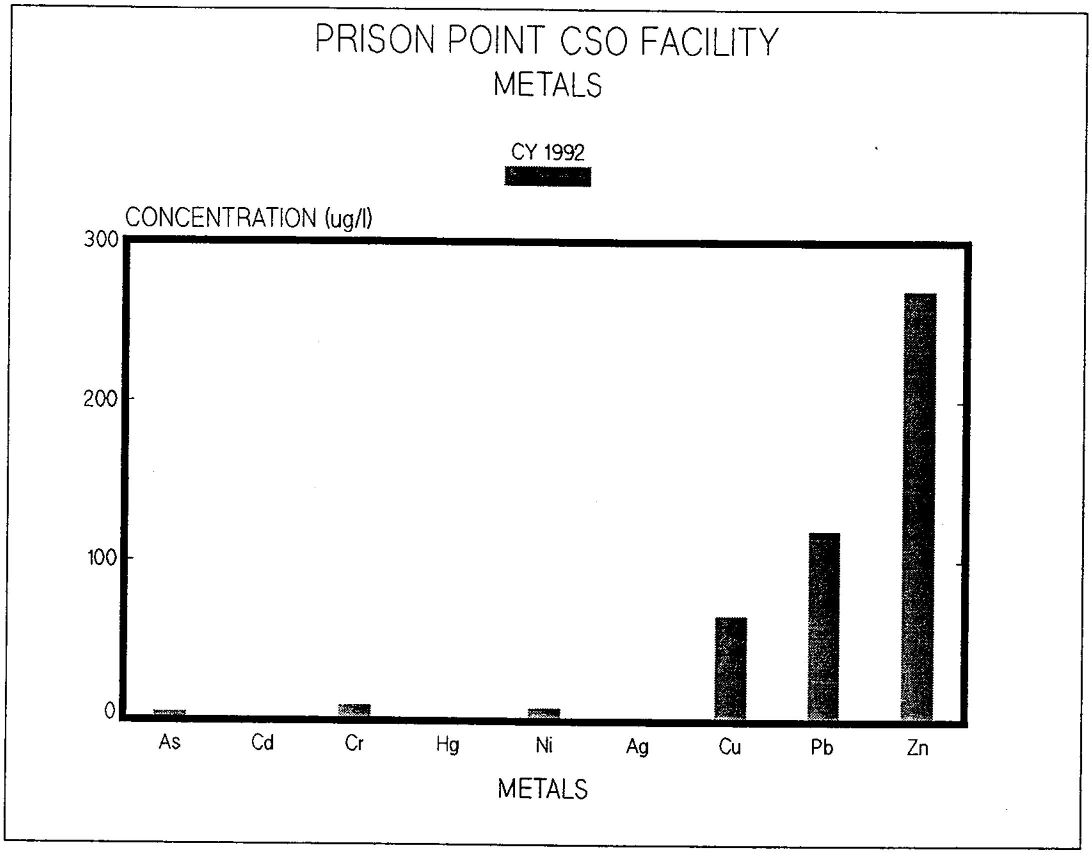
Effluent characteristics of the Prison Point facility are very comparable to those of the Cottage Farm effluent. Of the metals detected, arsenic, cadmium, copper, lead, mercury and zinc were consistently present. Cyanide was only detected twice while total phenols was detected five times out of seven samples. Of the pesticides, B-BHC and methoxychlor were detected twice while 4-4'-DDD was detected once in seven samples.

Of the PAH group, a number of compounds were detected. Phenanthrene, pyrene, chrysene, fluoranthene, naphthalene and 2-methylnaphthalene were detected at least fifty percent of the time.

There were no chlorinated hydrocarbons detected. Of the volatile organic compounds, acetone, chloroform, toluene, methylene chloride, and chlorobenzene were detected most of the time.

Appendix D, Table D-4 and Figure II.D.4 compares the concentration of pollutants discharged form the Prison Point facility from 1988 to 1992.

Figure II.D.3 Prison Point CSO, Priority Pollutant Concentrations, FY 1992



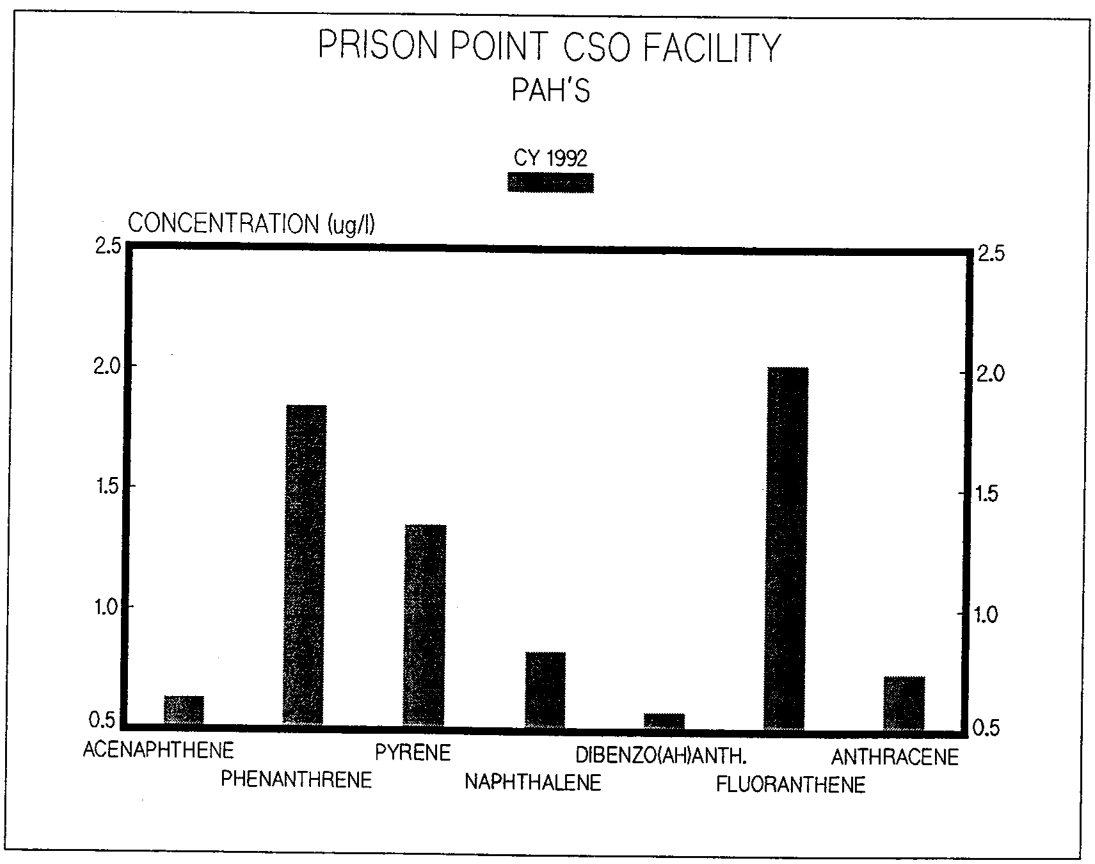


Figure II.D.4 Prison Point CSO, Priority Pollutant Concentrations, Compared

Chart 1

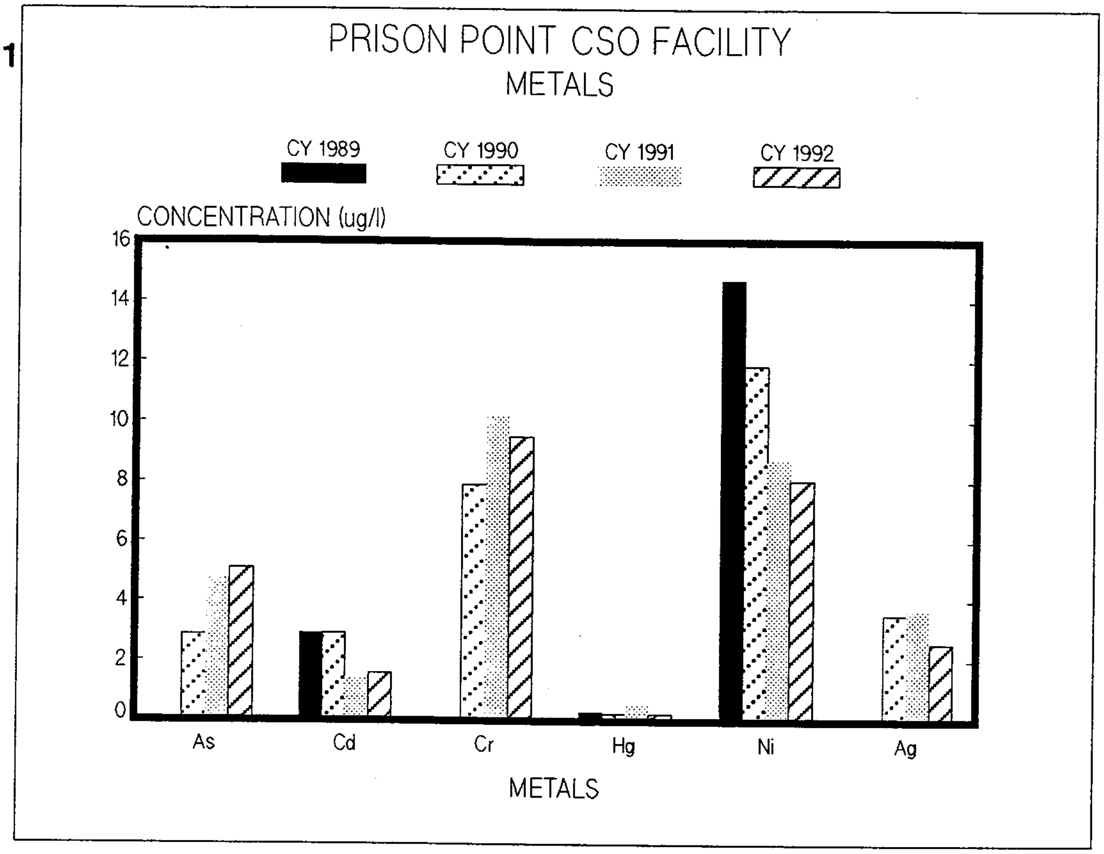


Chart 2

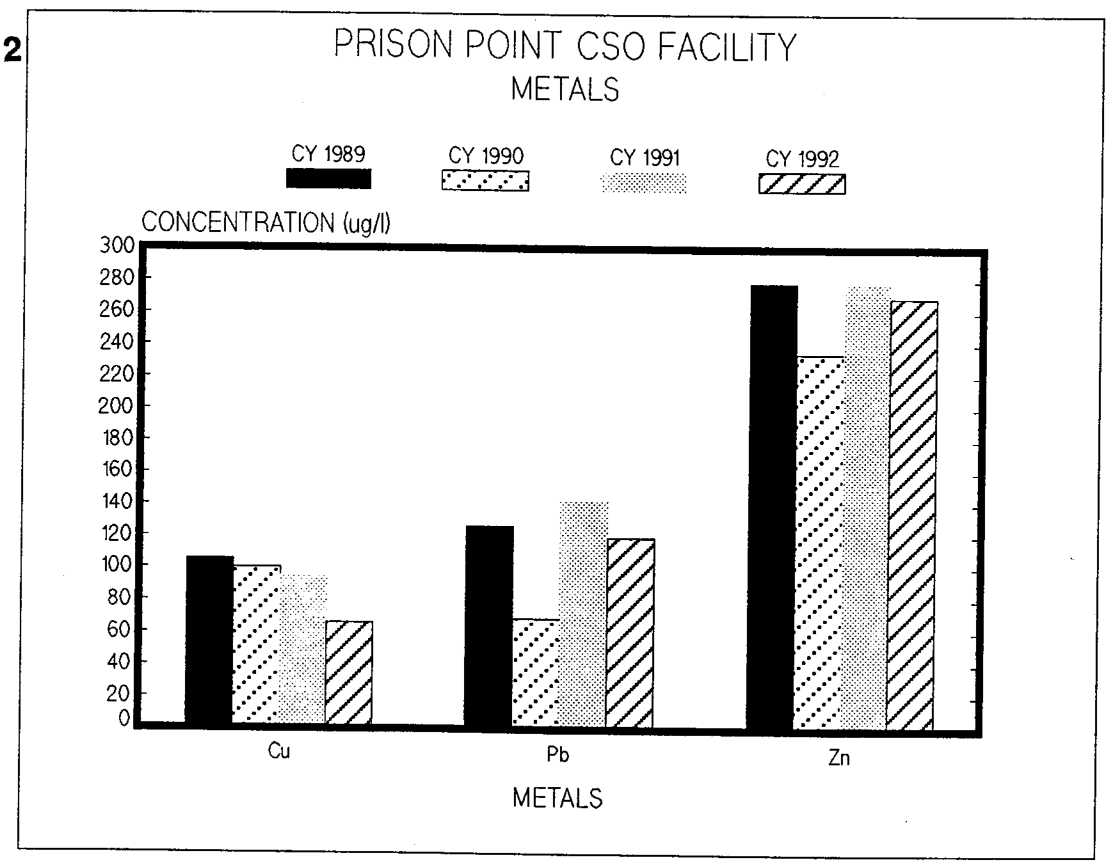


Figure II.D.4 Prison Point (Con't)

Chart 3

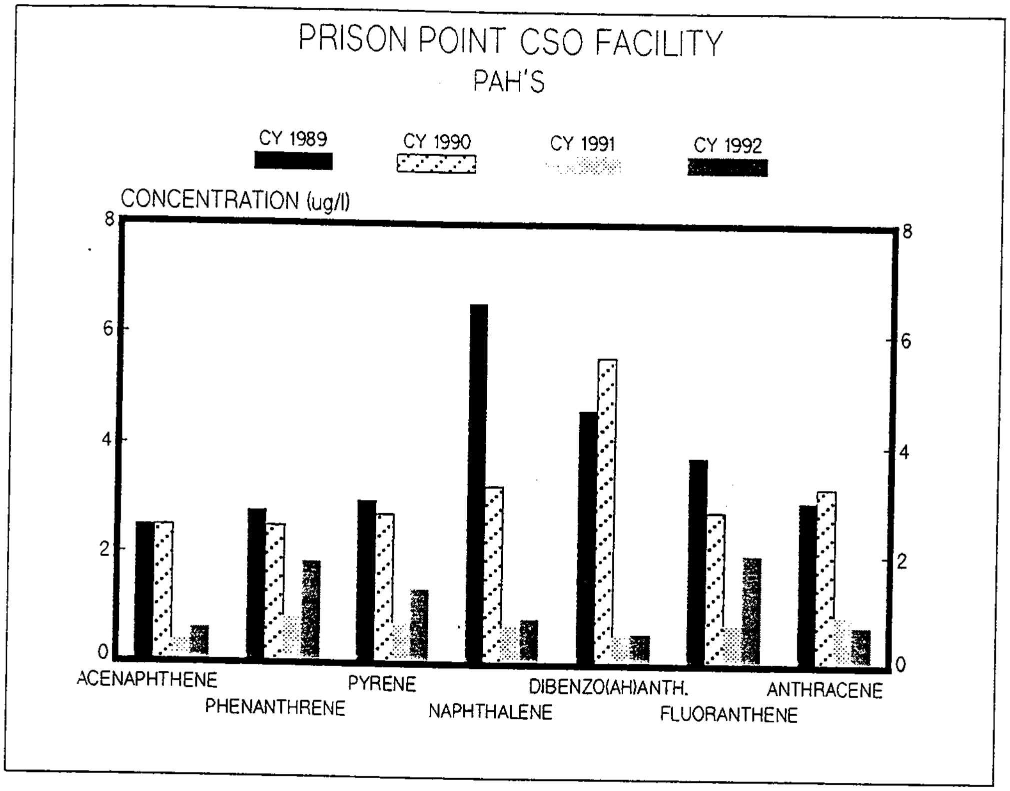
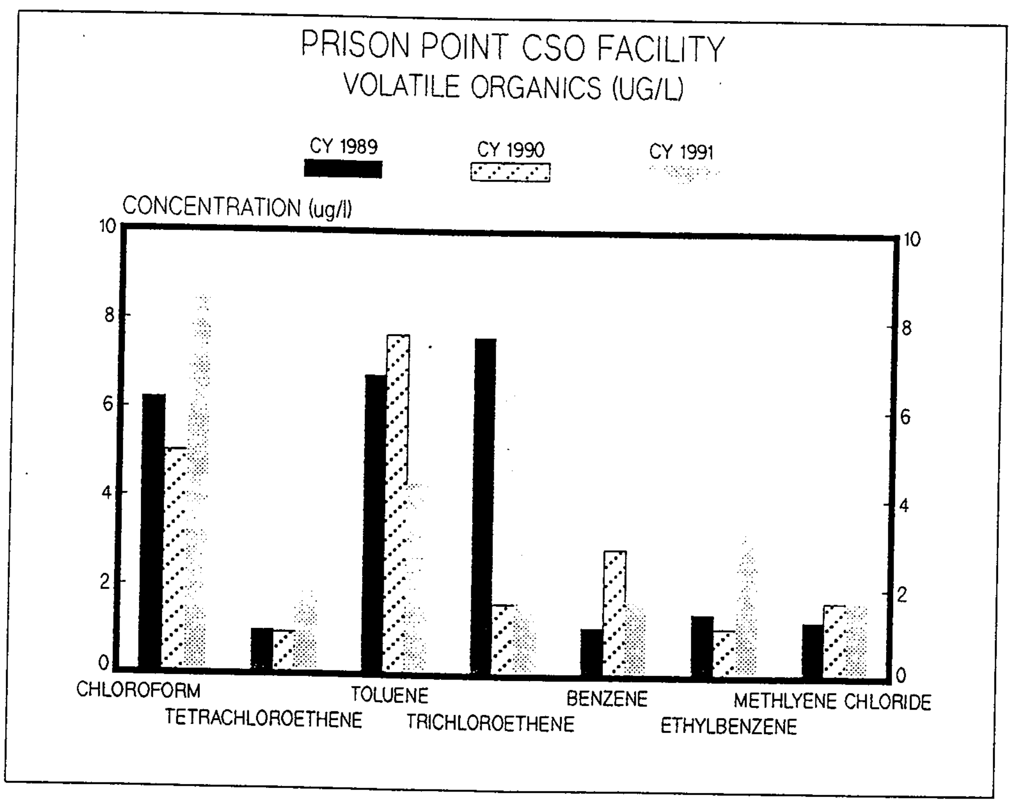


Chart 4



D.4 Loadings

Appendix D, Table D-3 calculates the discharge loadings from Prison Point during our monthly sampling event. The flows used to calculate the loadings were those measured during the time of sampling.

E. Somerville Marginal Combined Sewer Facility

Somerville Marginal CSO is an unmanned gravity facility with a design capacity of 245 MGD. Unlike Cottage Farm or Prison Point, this facility does not provide any detention capacity. Treatment includes screening and chlorination. Effluent is discharged to the lower Mystic River basin at outfall number MWR 205.

E.1 Activations

The majority of activations occurred in the months of September and October. Figure II.E.1 graphs the activations in 1992 and is summarized on Table II.E.1.

Table II.E.1 Somerville Marginal CSO FY92 Activations Summary

Number of Activations	48
Total Volume Treated (MG)	89.000
Maximum Flow (MGD)	8.500
Minimum Flow (MGD)	0.003
Average Flow (MGD)	1.850

Average monthly flow is calculated by dividing the total volume treated by the number of times the facility activated.

Figure II.E.2 graphs the activations from 1988 to 1992. The number of activations at Somerville Marginal increased from 1988 to 1990, but has since been decreasing.

E.2 Conventional Parameters

The results of analyses for conventional pollutants in the influent and effluent are contained in Appendix E, Table E-1, Somerville Marginal CSO Operations Summary and summarized in Table II.E.2.

Figure II.E.1 Somerville Marginal CSO Fiscal Year 1992 Activations

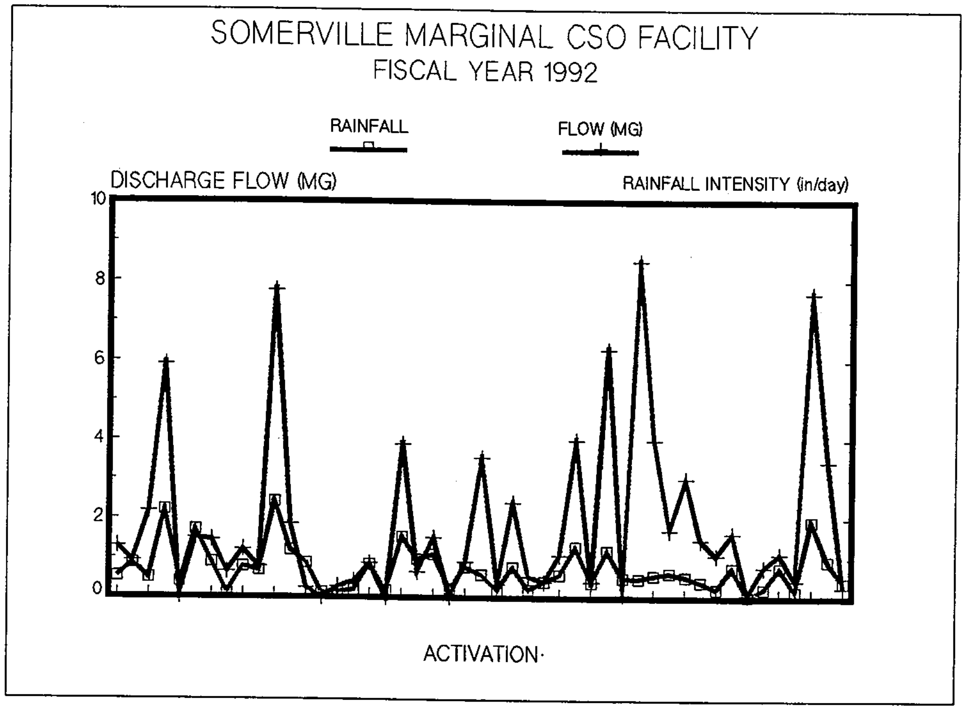


Figure II.E.2 Somerville Marginal CSO Activations Decreasing

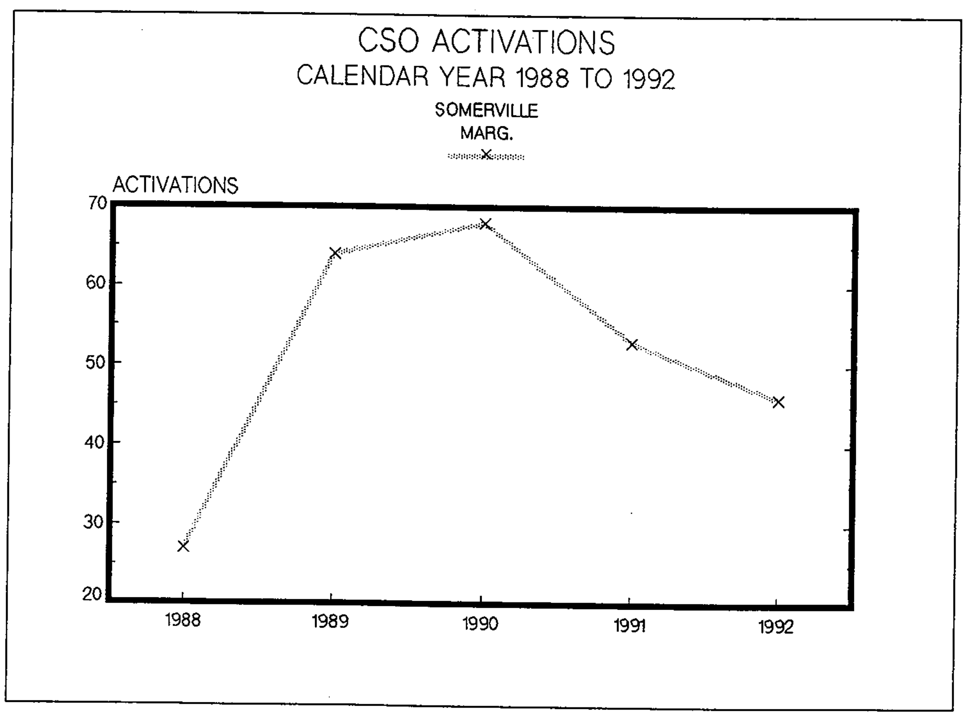


Table II.E.2 Somerville Marginal CSO Influent & Effluent Characteristics

Parameter	Influent Min	Influent Ave	Influent Max	Effluent Min	Effluent Ave	Effluent Max
	Concentration (1)					
TSS	12	151	744	8	79	398
BOD	30	108	344	20	84	289
Fecal Coliform (#/100 ml)				5	26	1000
pH (units)				6.46		9.60

(1) Concentration expressed in mg/l except for pH and Fecal Coliform

Fecal Coliform

There were no fecal coliform violations in FY 92. The highest fecal coliform reading was 1,000 colonies/100 ml, measured once in November and once in December. Both these high readings were below our permit limit .

pH

There were two pH violations in FY 92. The pH range observed at this facility is 6.46 - 9.6, violating our permit limit range of 6.5 - 8.5 pH units.

E.3 Priority Pollutants

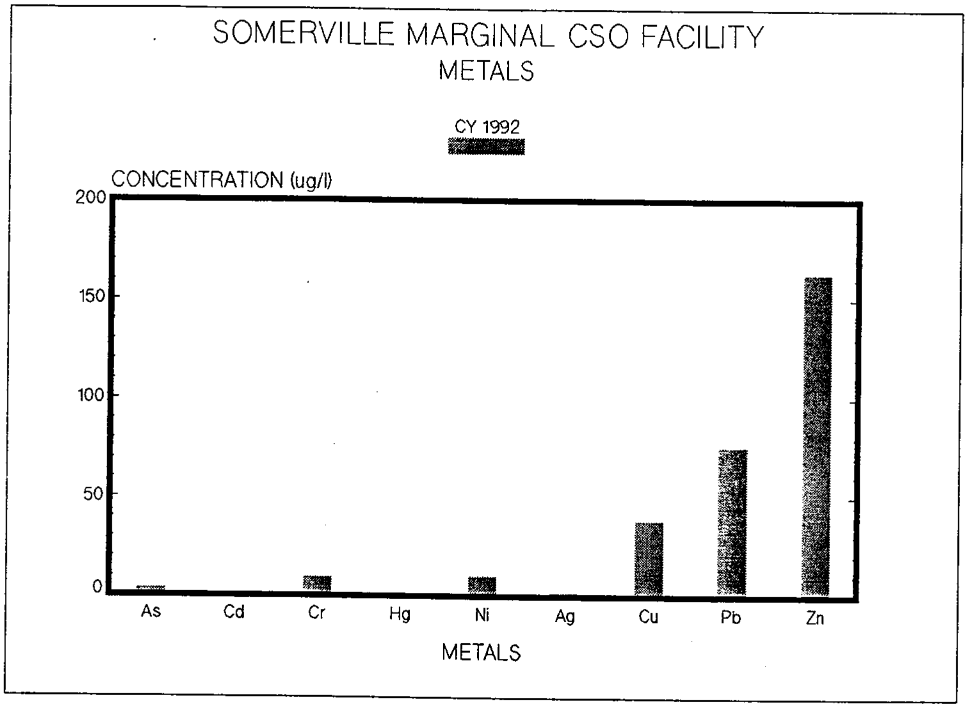
Results of analyses performed in 1992 are contained in Appendix E, Table E-2. Figure II.E.3 depicts the concentration of pollutants measured in the effluent. Effluent characteristics are very comparable to those of the Prison Point effluent.

Of the metals detected, arsenic, cadmium, chromium, copper, lead, mercury, and zinc were consistently present. Cyanide and phenols were detected fifty percent of the time.

Of pesticides/PCBs, only b-BHC was detected almost 50 % of the time and a-BHC and Endosulfan I were detected at least once in twelve samples.

Of the PAH group, a number of compounds were detected, with phenanthrene, pyrene,Chrysene, fluoranthene, detected at least fifty percent of the time.

Figure II.E.3 Somerville Marginal CSO, Priority Pollutant Concentrations, FY1992



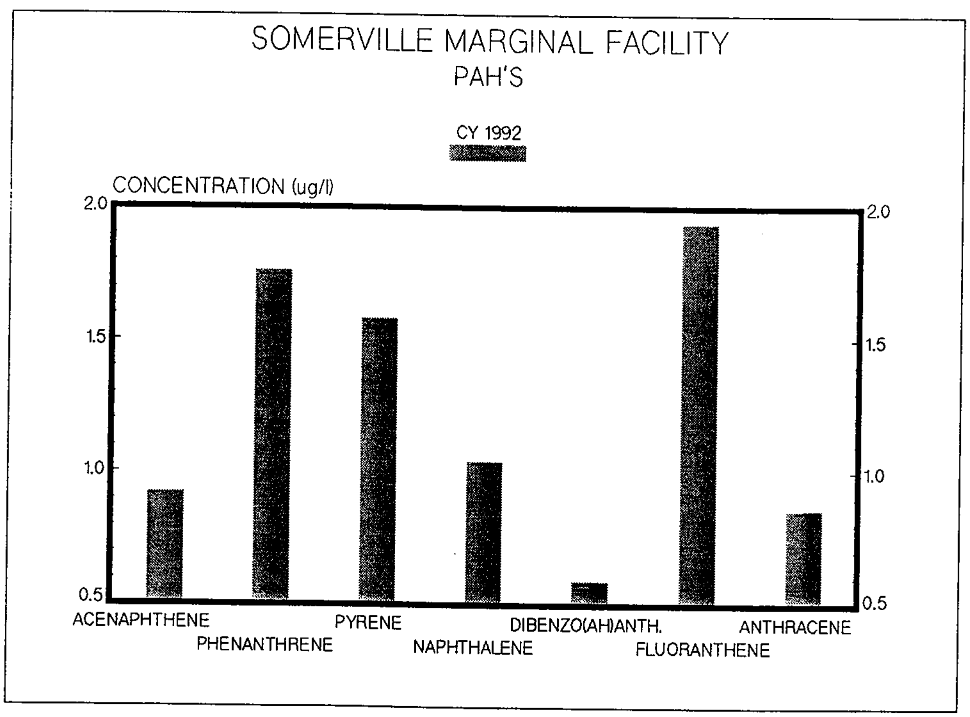


Figure II.E.4 Somerville Marginal CSO, Priority Pollutant Comcentrations Compared

Chart 1

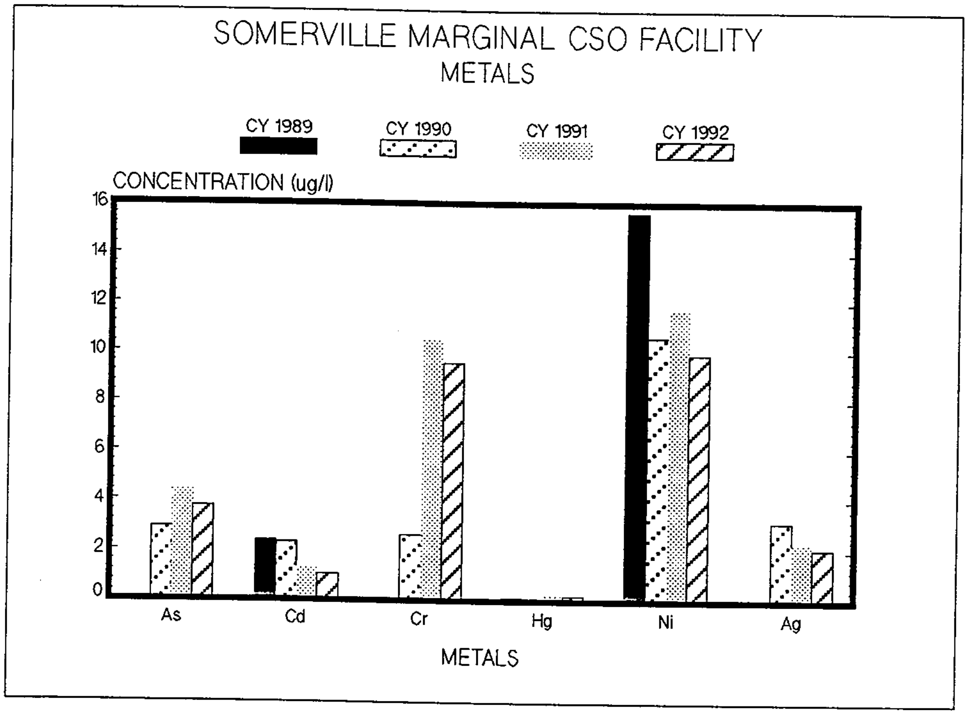


Chart 2

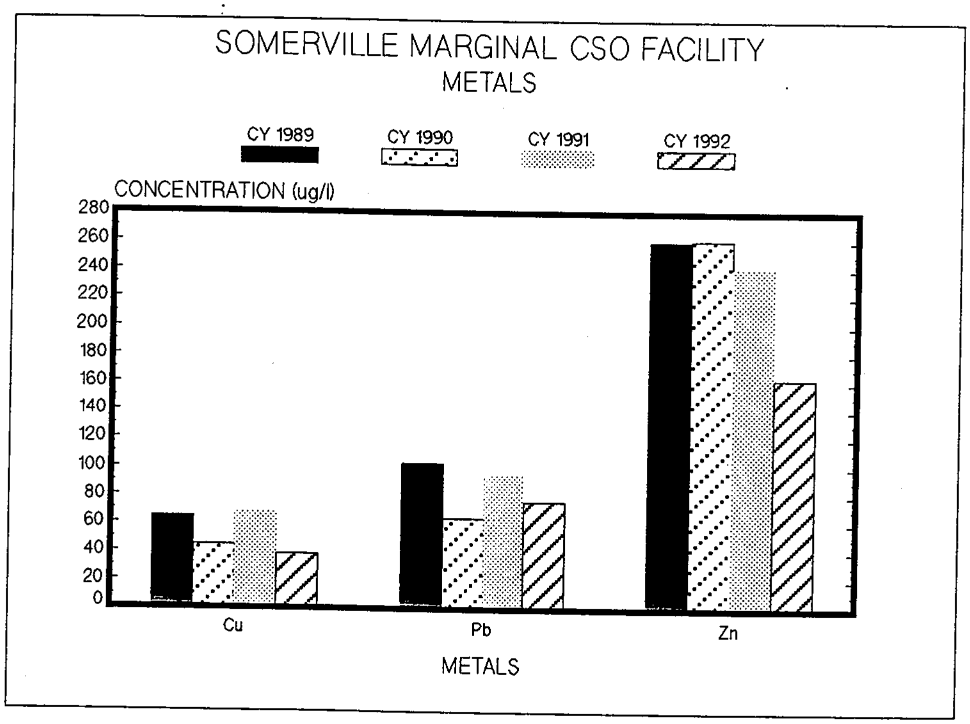


Figure II.E.4 Somerville Marginal (Con't)

Chart 3

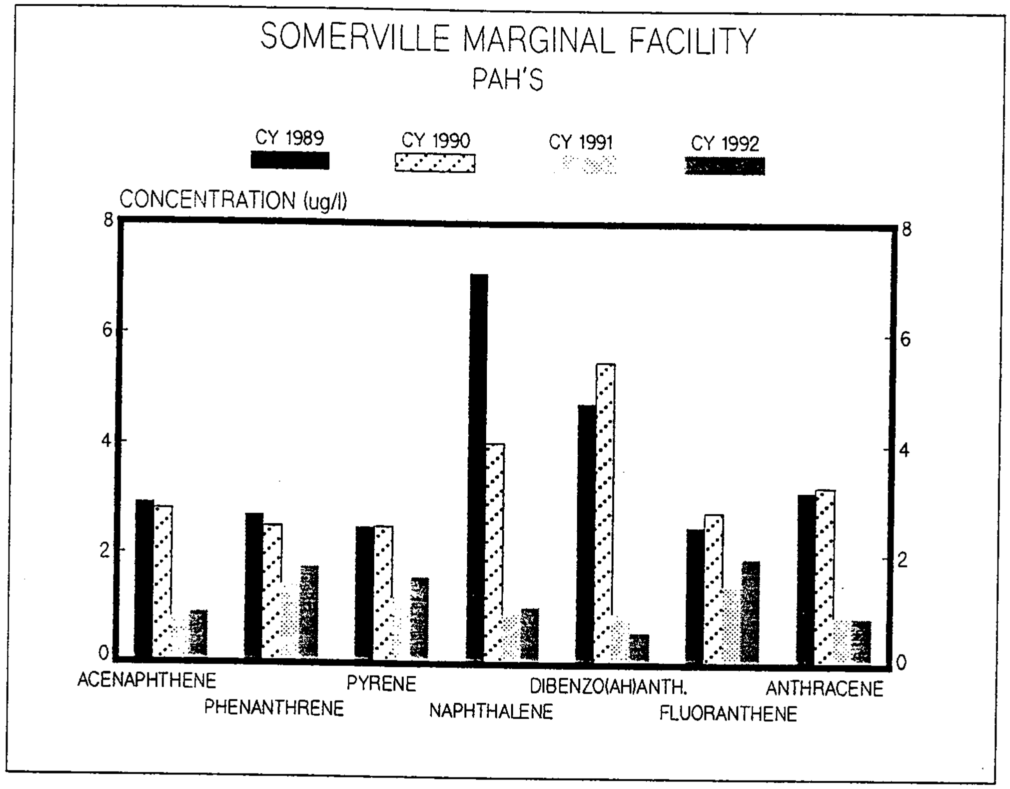
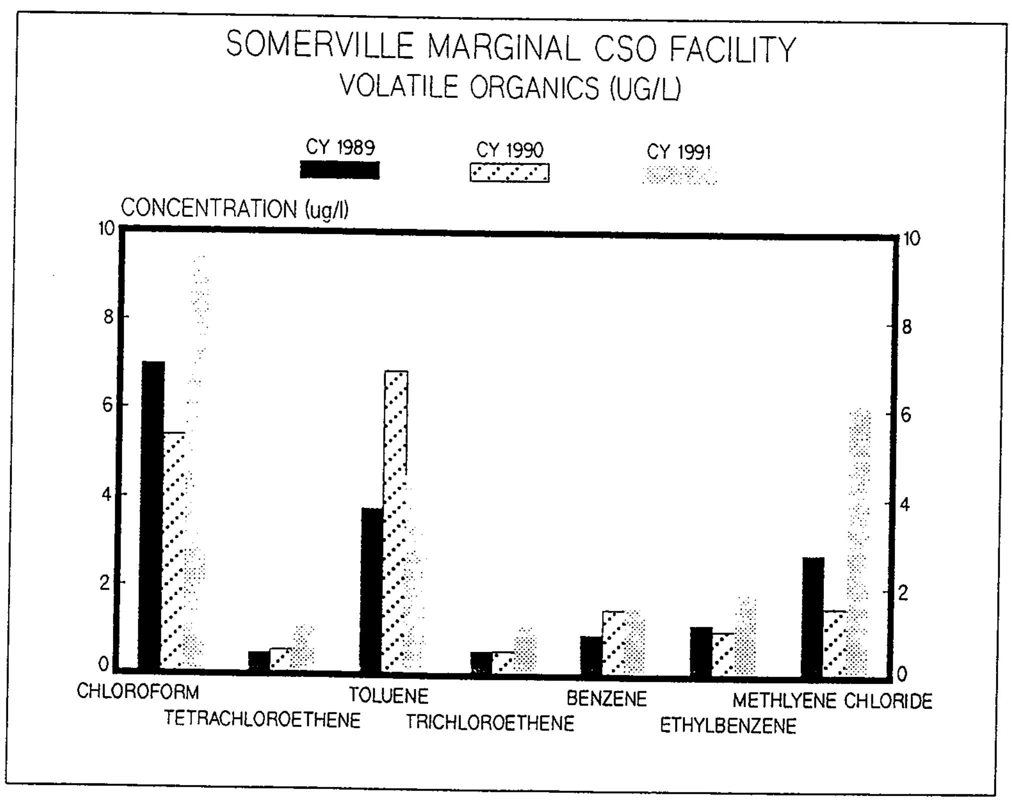


Chart 4



There were no chlorinated hydrocarbons detected. Of the volatile organic compounds, acetone, chloroform, toluene, and methylene chloride were detected most of the time. Appendix E, Table E-4 and Figure II.E.4 compares the concentration of toxic pollutants from 1989 to 1992.

E.4 Loadings

Appendix E, Table E-3 calculates the toxics loadings for each sampling event. The flows used to calculate the loadings were those measured during the time of sampling.

F. Constitution Beach Combined Sewer Facility

Constitution Beach is also an unmanned gravity facility with a design capacity of 20 MGD. Treatment includes screening and disinfection. The effluent is discharged to a BWSC line which ultimately leads to Boston harbor through BOS002. Currently, the NPDES permit for this outfall is included in the BWSC permit. We expect that this facility will be included in our new NPDES permit.

F.1 Activations

Although this facility is not currently permitted to the MWRA, operational data are collected to determine facility performance. In FY 92, there were 12 activations, registering a total of 11 million gallons that were treated and discharged to the harbor.

This facility came on line in 1987 but no flow information is available because of malfunctioning flow meters. The flows presented are estimates and are based on 25% of the flows going through the Somerville Marginal facility.

Appendix F, Table F-1 contains the facility's operations summary. Figure II.F.1 charts the activations in FY92 and Figure II.F.2 depicts the activations experienced since 1987.

F.2 Conventional Parameters

The results of analyses for conventional pollutants are also included in Appendix F, Table F-1, Constitution Beach Operations Summary.

Figure II.F.1 Constitution Beach CSO Activations in 1992

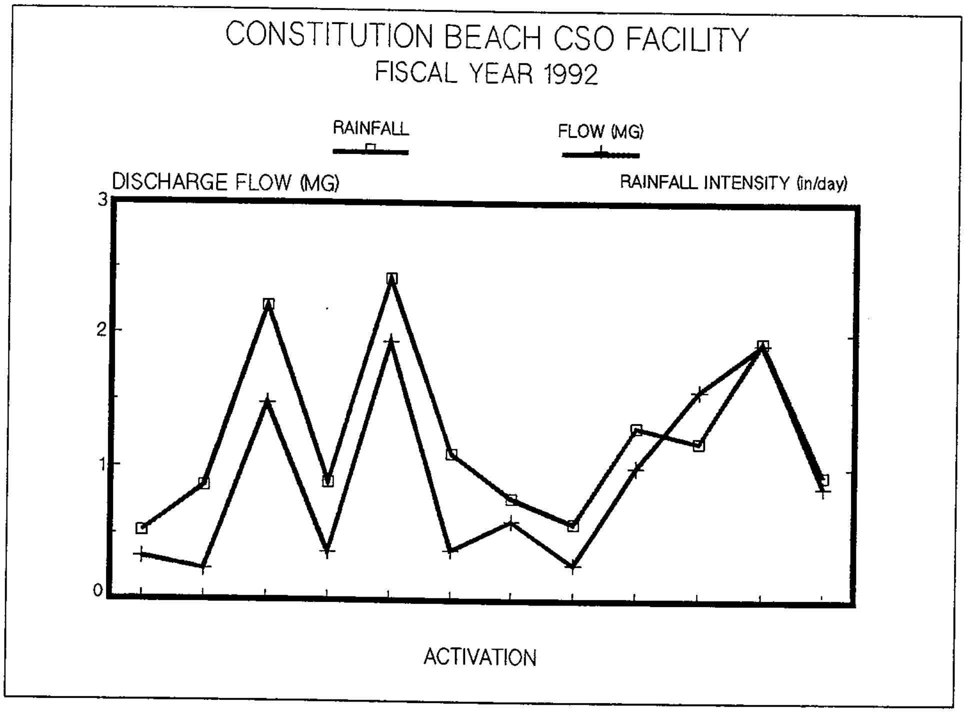


Figure II.F.2 Constitution Beach CSO Activations Compared

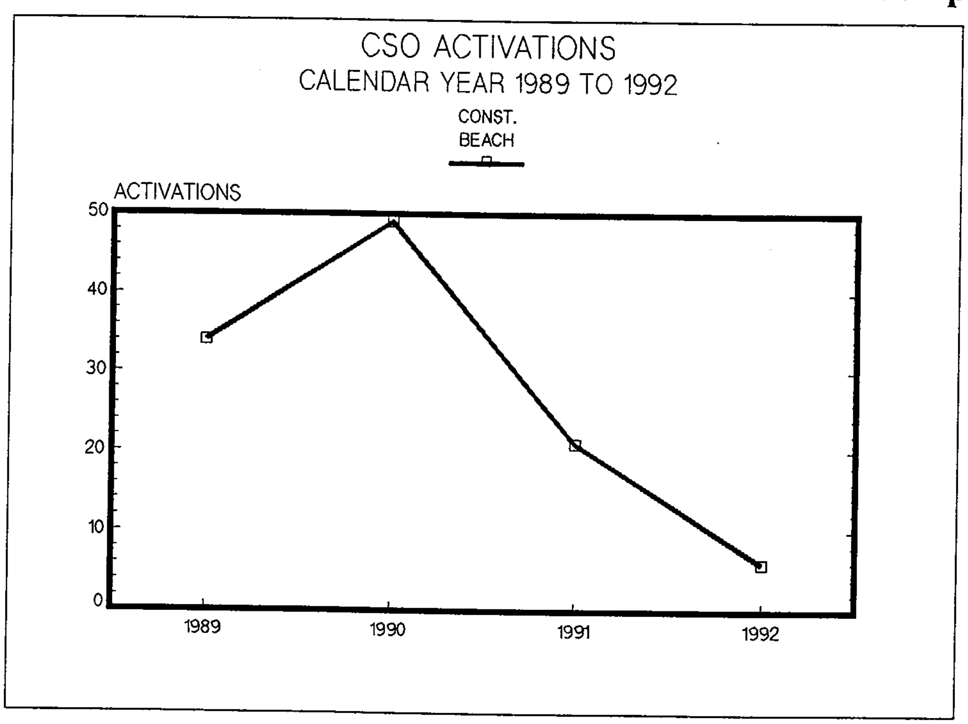


Table II.F.1 Constitution Beach CSO FY92 Activations Summary

Number of Activations	12
Total Volume Treated (MG)	11.00
Maximum Flow (MGD)	5.70
Minimum Flow (MGD)	0.23
Average Flow (MGD)	0.91

Average monthly flow is calculated by dividing the total volume treated by the number of times the facility activated.

Table II.F.2 summarizes the influent and effluent characteristics of the wet weather flow going through the Constitution Beach facility.

The fecal coliform counts were all less than 10 colonies/100 ml. However, the pH measurements were very variable. The pH range for last year's data set was 6.26 to 9.46.

Table II.F.2 Constitution Beach CSO Influent and Effluent Characteristics

Parameter	Concentration (1)					
	Influent			Effluent		
	Min	Ave	Max	Min	Ave	Max
TSS	14	103	506	0.2	108	460
BOD	7	36	91	19	80	296
Fecal Coliform (#/100 ml)				3	9	10
pH (units)				6.26		9.46

(1) Concentration expressed in mg/l except for pH and Fecal Coliform

G. Fox Point Combined Sewer Overflows Facility

This facility came on line in 1989 and has a design capacity of 119 MGD. Operation of this facility is very similar to that of Constitution Beach CSO, treatment including screening and disinfection. The effluent is discharged to a BWSC sewer line and ultimately to the Dorchester Bay through BOS089.

G.1 Activations

Table II.G.1 summarizes Fox Point activations during this monitoring period. During the month of August, the flow meters were malfunctioning, hence there were no flow records during that period.

Table II.G.1 Fox Point CSO FY92 Activations Summary

Number of Activations	22
Total Volume Treated (MG)	38.0
Maximum Flow (MGD)	5.0
Minimum Flow (MGD)	0.4
Average Flow (MGD)	1.7

Average monthly flow is calculated by dividing the total volume treated by the number of times the facility activated.

Figure II.G.1 charts the activations in FY92 and Figure II.G.2 depicts the activations experienced since 1989.

G.2 Conventional Parameters

The results of analyses for conventional pollutants in the influent and effluent are included in Appendix G-1, Fox Point Operations Summary and is summarized in Table II.G.2.

Figure II.G.1 Fox Point CSO Activations in 1992

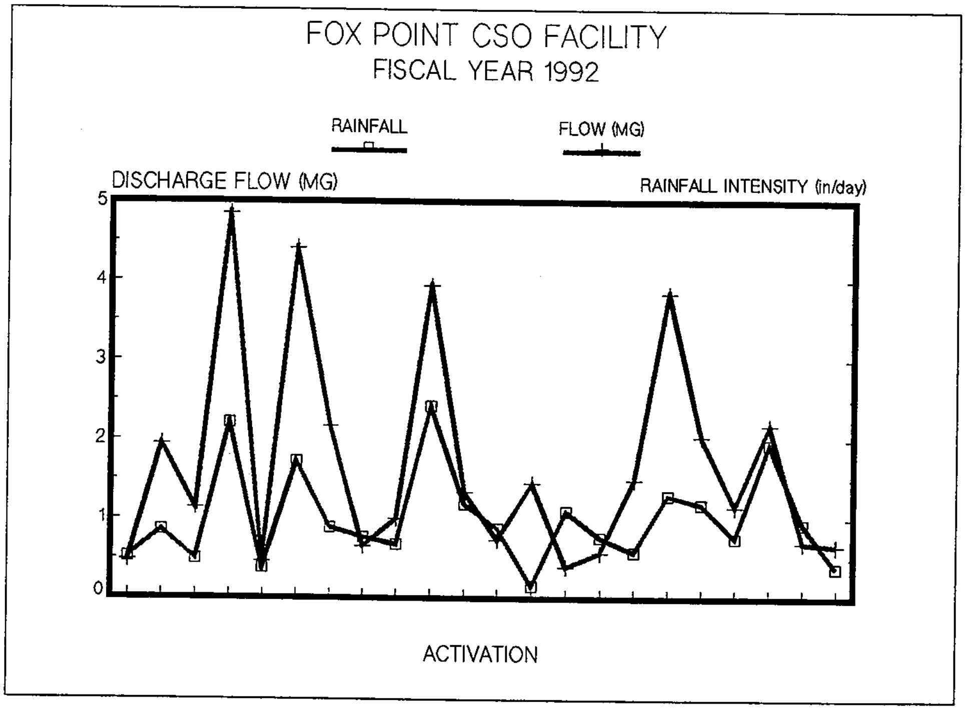


Figure II.G.2 Fox Point CSO Activations Compared

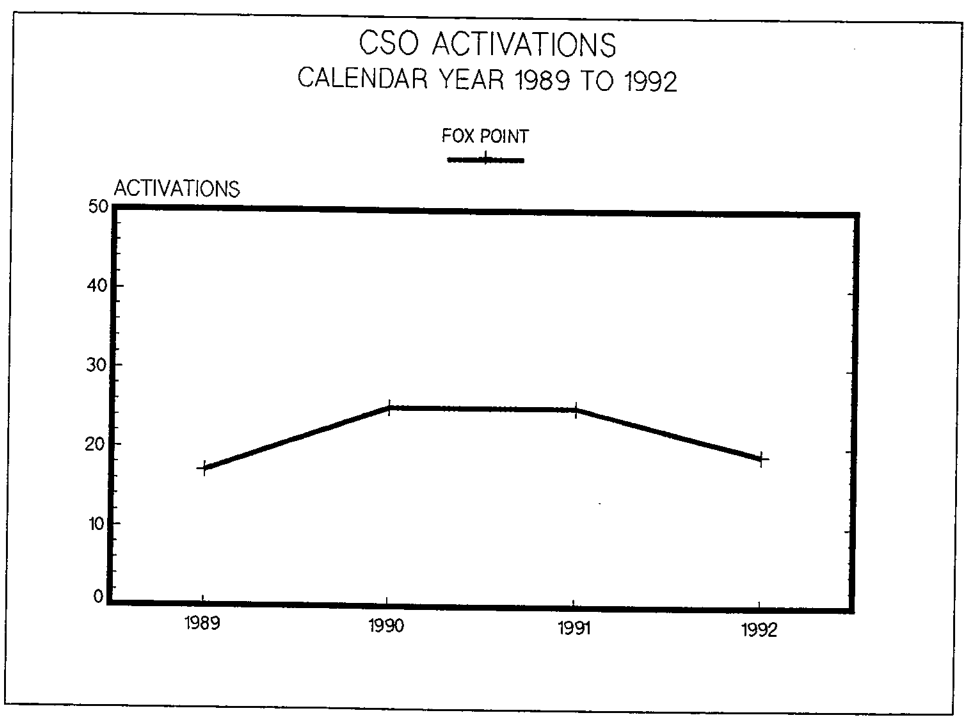


Table II.G.2 Fox Point CSO Influent and Effluent Characteristics						
	Concentration (1)					
Parameter	**Influent**			**Effluent**		
	Min	**Ave**	**Max**	**Min**	**Ave**	**Max**
TSS	22	78	214	16.0	85	268
BOD	19	43	101	24	62	272
Fecal Coliform (#/100 ml)				10	16	800
pH (units)				3.71		8.77

(1) Concentration expressed in mg/l except for pH and Fecal Coliform

H. Commercial Point Combined Sewer Facility

Commercial Point is also an unmanned gravity CSO with a design capacity of 194 MGD. Treatment includes screening and chlorination. The effluent discharges to a BWSC line and ultimately to the Dorchester Bay through BOS090. Few historical data are available because the facility only came on line in 1991.

H.1 Activations

Very low flows are going through this facility with the majority of activations occurring in the month September and October.

Table II.H.1 summarizes Commercial Point activations during this monitoring period.

H.2 Conventional Parameters

The results of analyses for conventional pollutants in the influent and effluent are included in Appendix H, Table H-1, Commercial Point Operations Summary and is summarized in Table II.H.2.

Figure II.H.1 Commercial Point Activations in 1992

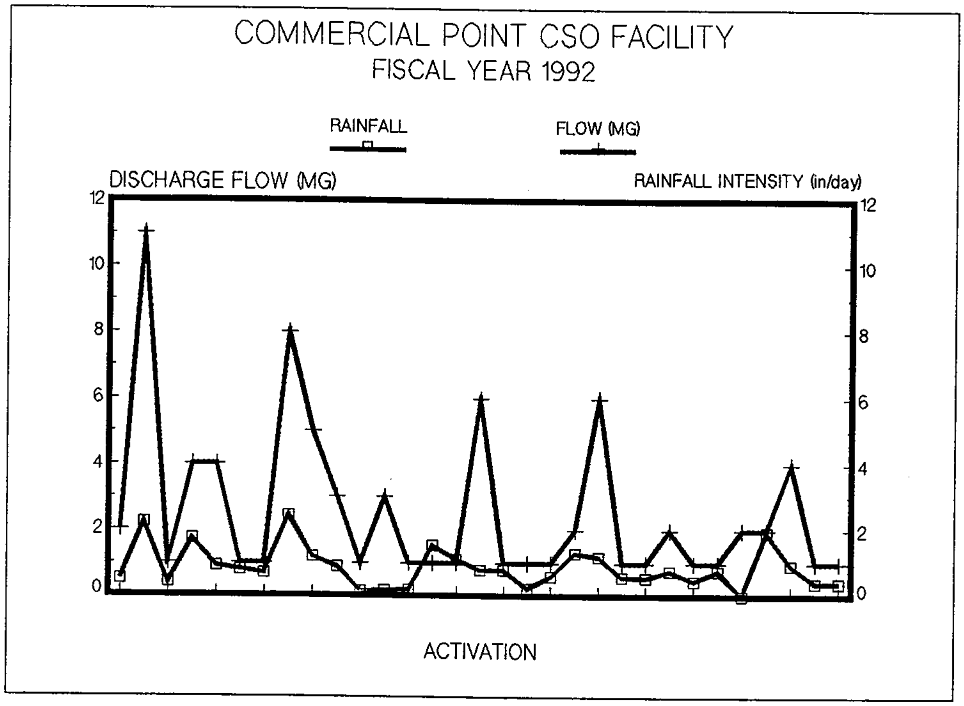


Figure II.H.2 Commercial Point CSO Activations Compared

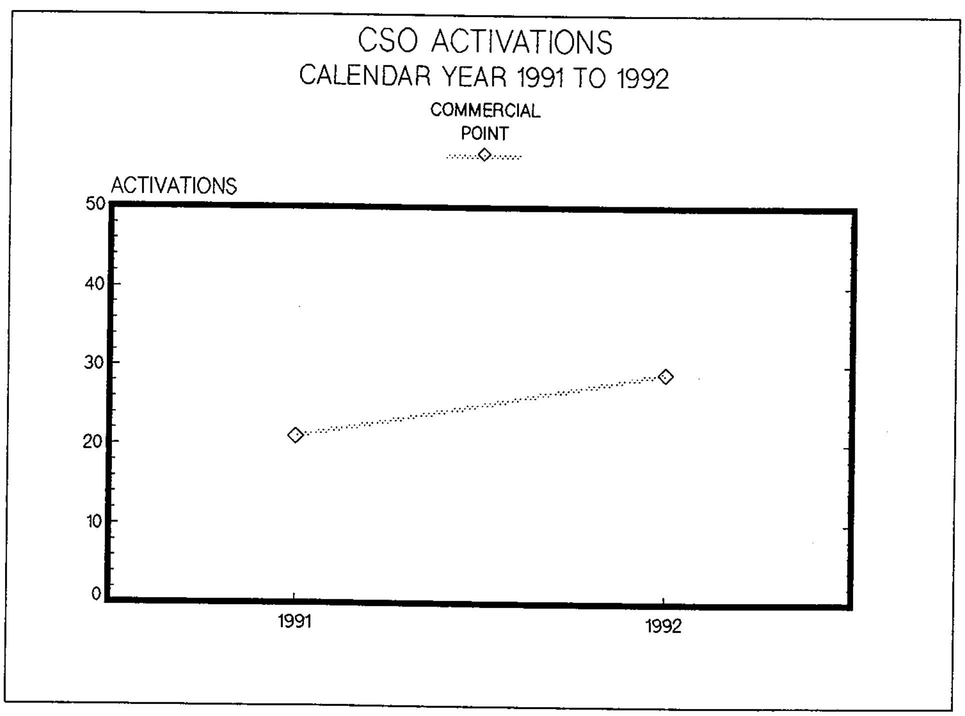


Table II.H.1 Commercial Point CSO FY92 Activations Summary

Number of Activations	33
Total Volume Treated (MG)	80.0
Maximum Flow (MGD)	11.0
Minimum Flow (MGD)	1.0
Average Flow (MGD)	2.4

Average monthly flow is calculated by dividing the total volume treated by the number of times the facility activated.

The highest fecal coliform measurement observed was 190 colonies/100 ml. In July, there were four high pH measurements of 9.87 and 9.55, 8.78 and 8.54.

Table II.H.2 Commercial Point CSO Influent and Effluent Characteristics

Parameter	Concentration (1)					
	Influent			Effluent		
	Min	Ave	Max	Min	Ave	Max
TSS	8	86	481	8.0	108	734
BOD	10	63	302	8	83	288
Fecal Coliform (#/100 ml)				10	13	190
pH (units)				6.61		9.87

(1) Concentration expressed in mg/l except for pH and Fecal Coliform

III. Effluent Toxics Issue

A. Effluent Characteristics Compared With Water Quality Standards

Almost all of the priority pollutant concentrations were reported as being below method detection limits. Some priority pollutants were detected in the effluent at very low concentrations. Analytical results below the methods' quantitation limits are only estimates and are not reliable. Other parameters which have only been detected below their reporting limits are also questionable.

In order to compare our effluent concentrations with water quality standards, we calculated the geometric means for those constituents that were detected at least once during the fiscal year. Half the method detection limit was assigned for those parameters that were below detection.

A.1 Deer Island

Table III.A.1 compares for each pollutant, the effluent maximum concentration observed, and the calculated geometric mean concentration with the concentration of pollutant in Boston Harbor around the Deer Island outfall location. The receiving water data were collected in the summer of 1987 when dilution of discharge was presumably at the seasonal lowest. Also shown is the calculated critical dilution ratio required to meet water quality standards.

The critical dilution required to meet acute criteria is the ratio of the maximum concentration observed to the water quality standard. To meet chronic criteria, the ratio of the geometric mean to the water quality standard is calculated. Problematic parameters are as follows:

	Critical Dilution Required	
Parameter	**Acute Criteria**	**Chronic Criteria**
copper	29	
cyanide	16	
4,4'-DDT	14 (0.13)	40 (11.9)
Chlordane	2	33 (2)

However, if the Harbor Studies data are substituted for the NPDES data, the calculated critical dilution requirement drops dramatically as indicated by the numbers enclosed in parentheses. Critical dilution calculations are questionable in that they do not truly reflect constituent concentrations within the mixing zone, as evidenced by the data collected around the Deer Island outfall.

Table III.A.1 Deer Island Effluent Compared to Water Quality Standards

PARAMETERS METALS: (ug/l)	Boston Harbor (1)	Geometric Mean (2)	Maximum Concentration	Acute Criteria	Max Conc/ Acute Crit.(3)	Chronic Criteria	Geo Mean/ Chronic Crit.(3)
Arsenic		1.500	3.00	69	0.04	36	0.0
Cadmium	0.0348	0.700	2.00	43	0.05	9.3	0.1
Chromium	0.175	3.900	10.00	1100	0.01	50	0.1
Copper	0.943	59.300	83.00	2.9	28.62		
Lead	0.0849	11.400	23.00	220	0.10	8.5	1.3
Mercury	<.0071	0.203	0.50	2.1	0.24	0.025	8.1
Nickel	0.53	8.300	18.00	75	0.24	8.3	1.0
Selenium		1.100	3.00	300	0.01	71.0	0.0
Silver		3.100	9.00	2.3	3.91		
Zinc	1.238	74.200	89.00	95	0.94	86	0.9
Cyanide (ug/l)		10.000	16.00	1	16.00		
PESTICIDES AND PCBs (ug/l)							
Aldrin	0.00005	0.010	0.01	1.300	0.01		
Lindane	0.00136	0.020	0.17	0.160	1.06		
4,4'DDT	0.00057	0.040	1.80	0.130	13.85	0.0010	40.0
Heptachlor epoxide		0.010	0.01	0.053	0.19	0.0036	2.8
Heptachlor	0.000084	0.010	0.01	0.053	0.19	0.0036	2.8
Endrin		0.010	0.01	0.037	0.27	0.0023	4.3
Dieldrin	0.00062	0.010	0.01	0.710	0.01	0.0019	5.3
Chlordane		0.130	0.17	0.090	1.89	0.0040	32.5
Toxaphene				0.210		0.0002	0.0

(1) Data taken from Secondary Treatment Facilities Plan, Volume V, Appendix X.
(2) Geometric mean concentration, Fiscal Year 1992 NPDES data.
(3) Critical dilution required

A.2 Nut Island

Table III.A.2 compares each pollutant's effluent geometric mean concentration with the concentrations of pollutants in Boston Harbor around the Nut Island outfall location. Also shown is the calculated dilution ratio required to meet the water quality standard.

As in the case of Deer Island, copper, DDT and chlordane are problematic.

Parameter	Critical Dilution Required: Acute Criteria	Critical Dilution Required: Chronic Criteria
copper	26	
cyanide	16	
4,4'-DDT	3	42 (10.5)
Chlordane	4	54 (9.8)

A.3 Combined Deer and Nut Island

Table III.A.3 compares the calculated concentrations in flow-weighted Deer and Nut Island combined effluents with water quality standards.

The monthly concentrations are derived by: calculating the monthly loadings from each plant each month, adding the loadings, and dividing the total loadings by the total flow from each plant. The maximum and the geometric mean concentrations are then taken from the calculated combined concentration. Similarly, the same methodology was applied to the Harbor Studies data set.

The critical dilutions are found to be:

Parameter	Critical Dilution Required: Acute Criteria	Critical Dilution Required: Chronic Criteria
copper	27	
cyanide	10	
4,4'-DDT	11 (0.8)	40 (15)
Chlordane	4	43 (7)

Table II.A.2 Nut Island Effluent Compared to Water Quality Standards

PARAMETERS METALS: (ug/L)	Boston Harbor (1)	Geo Mean Conc (2)	Maximum Concentration	Acute Criteria	Max Conc/ Acute Crit. (3)	Chronic Criteria	Geo Mean/ Chronic Crit. (3)
Arsenic		1.528	3.000	69	0.04	36	0.0424
Cadmium	0.0249	0.707	4.000	43	0.09	9.3	0.0760
Chromium	0.325	4.481	14.000	1100.0	0.01	50.0	0.0896
Copper	0.818	55.480	76.000	2.9	26.21		
Lead	0.1078	7.197	10.000	220	0.05	8.5	0.8467
Mercury	<0.0064	0.207	0.600	2.1	0.29	0.025	8.2800
Nickel	0.454	9.236	19.000	75	0.25	8.3	1.1128
Selenium		1.096	3.000	300	0.01	71	0.0154
Silver		3.123	8.000	2.3	3.48		
Zinc	1.238	63.204	74.000	95	0.78	86	0.7349
Cyanide ug/l		7.000	16.000	1	16.00		
PESTICIDES AND PCBs (ug/l)							
Aldrin	0.00002	0.010	0.010	1.300	0.01		
Lindane	0.00109	0.010	0.010	0.160	0.06		
4,4'DDT	0.00012	0.042	0.430	0.130	3.31	0.0010	42.00
Heptachlor epoxide		0.010	0.010	0.053	0.19	0.0036	2.78
Heptachlor	0.00016	0.010	0.010	0.053	0.19	0.0036	2.78
Endosulfan sulfate		0.010	0.010	0.034	0.29	0.0087	1.15
Endosulfan I		0.033	0.920	0.034	27.06	0.0087	3.79
Endrin		0.010	0.010	0.037	0.27	0.0023	4.35
Dieldrin	0.0005	0.010	0.010	0.710	0.01	0.0019	5.26
Chlordane		0.217	0.400	0.090	4.44	0.0040	54.25

(1) Data taken from the Secondary Treatment Facilities Plan, Volume V, Appendix X.
(2) Geometric mean concentration, Fiscal Year 1992 NPDES data.
(3) Critical dilution rerquired.

Table III.A.3 Combined Deer and Nut Island Effluent Compared to Water Quality Standards

PARAMETERS	Geo Mean Conc	Maximum Concentration	Acute Criteria	Max Conc./ Acute Crit.	Chronic Criteria	Geo Mean Conc / Chronic Crit.
METALS: (ug/L)						
Arsenic	1.58	3.00	69	0.04	36	0.0439
Cadmium	0.70	2.01	43	0.05	9.3	0.0753
Chromium	4.26	11.09	1100	0.01	50	0.0852
Copper	58.10	79.18	2.9	27.30		
Lead	10.13	18.90	220	0.09	8.5	1.1918
Mercury	0.23	0.42	2.1	0.20	0.025	9.2000
Nickel	8.87	14.33	75	0.19	8.3	1.0687
Selenium	1.12	2.27	300	0.01	71	0.0158
Silver	3.20	8.64	2.3	3.76		
Zinc	70.76	82.36	95	0.87	86	0.8228
Cyanide (ug/L)	10.00	10.00	1	10.00		
PESTICIDES AND PCBs (ug/L)						
Aldrin	0.01	0.01	1.300	0.01		
Lindane	0.03	0.18	0.160	1.13		
4,4'DDT	0.04	1.43	0.130	11.00	0.0010	40.0000
Heptachlor epoxide	0.01	0.01	0.053	0.19	0.0036	2.7778
Heptachlor	0.01	0.01	0.053	0.19	0.0036	2.7778
Endosulfan sulfate	0.01	0.01	0.034	0.29	0.0087	1.1494
Endosulfan I	0.03	0.29	0.034	8.53	0.0087	3.4483
Endrin	0.01	0.01	0.037	0.27	0.0023	4.3478
Dieldrin	0.01	0.01	0.710	0.01	0.0019	5.2632
Chlordane	0.17	0.33	0.090	3.67	0.0040	42.5000

B. Toxics

B.1 Priority Pollutants

Not surprisingly, the results from Deer and Nut Island effluent are very similar. Most of the priority pollutants were never detected.

The majority of priority pollutants and hazardous substances tested for had concentrations below detection levels or would have concentrations in the mixing zone well below any EPA water quality criteria. There were only a few parameters which appeared often enough or showed at least one result high enough to be concerned about.

B.2 Parameters of Concern

Lead While the concentration of lead in our effluent is low enough compared to the acute and chronic water quality criteria, it is a pollutant to keep an eye on. Lead is assumed to come from surface runoff into the combined sewer system and lead pipes leading out of old houses into the collection system.

Copper The copper concentration in both Deer and Nut Island's effluent is high enough to require a critical dilution of 29 and 27 respectively.

It is believed that most of the copper entering the sewer system comes from households. Copper is leached from copper pipes by the action of acidic water. By September 1995 the MWRA plans to adjust the alkalinity and to add a corrosion inhibitor to the water supply. This action should greatly reduce the corrosivity of the water, resulting in less copper being contributed by households.

Occasionally, copper sulfate is added to the water at the Wachusett intake to control algal growth. This is done on an as-needed basis (mostly in the summer) and should not contribute more than 1 mg/L per application.

Mercury The detection limit for mercury is 0.2 ug/l. Estimating half this value as the actual concentration gives 0.1 ug/l, or four times the chronic criterion for mercury. This, combined with the fact that all mercury detects were below reporting limits, they were "J" values (estimated value, below quantitation limit), is more an indication of the limitations of the EPA-approved methodology than of actual hazard to marine life.

Studies are underway at the moment using methodologies not yet approved by EPA, designed to obtain detection limits of 0.005 ug/l for mercury.

Cyanide Cyanide is detected a little more than half the time at both treatment plants. It is most often associated with metal plating and processing industries.

There are questions regarding the cyanide results. Analytical results are considered suspect because of concerns raised about improper sample collection, sample handling and preservation. In addition, it is also suspected that samples were not properly pretreated for sulfide interference.

DDT and **Chlordane** For each of these there were one or two detects at each plant during the entire year. As with mercury, estimating half the concentration of below EPA method detection limit values gives concentrations of about 30 to 50 times the receiving water chronic concentrations of those pesticides. The Harbor Studies data show concentrations closer to 0.01 ug/l for these pesticides. While these concentrations would still exceed the criteria in the effluent, they would just meet the criteria in the mixing zone with a 10:1 dilution.

B.3 Earlier Projections Compared with More Current Data

In 1987, the concentrations of certain pollutants in primary and secondary effluent were projected. These numbers were derived by applying published chemical-specific removal rates to influent data at that time. Current data reveals that the projections made earlier were indeed very high estimates.

Table III.B.1 compares FY 92 combined Deer and Nut Island effluent concentration with the 1987 primary effluent projections. This comparison is also graphically presented on Figure III.B.1. As the data suggest, earlier projections appear to overestimate the pollutant loadings out of Deer Island and Nut Island.

Table III.B.2 and Figure III.B.2 compares the earlier projections with new estimates. The new estimates are based on FY 92 influent data and apply the same removal rates used in earlier estimates.

C. Toxicity

C.1 Whole Effluent Toxicity

The MWRA tests effluent toxicity every month at the Deer and Nut Island treatment plants. Three tests are used: an acute static toxicity test using mysid shrimp, Mysidopsis bahia, a chronic survival and growth test using the sheepshead minnow, Cyprinodon variegatus , and a chronic reproduction test using the red algae, Champia parvula. Current NPDES permit limits for the toxicity tests are : a No Observed Effect Concentration (NOEC) of 20 % for the acute test and 10% for the chronic tests.

Table III.B.1 Earlier Projections Compared to Current Effluent Concentrations

PARAMETERS	Geometric Mean Concentration (1) (FY 92)	Projected Primary Concentration (2)
METALS: (ug/L)		
Arsenic	1.590	1.810
Cadmium	0.700	2.277
Chromium	4.300	16.890
Copper	58.000	82.265
Lead	10.130	11.940
Mercury	0.230	1.240
Nickel	8.870	21.380
Selenium	1.120	15.260
Silver	3.200	4.010
Zinc	70.760	165.300
PESTICIDES AND PCBs (ug/L)		
Aldrin	0.020	0.212
4,4'DDT	0.150	0.051
Heptachlor	0.020	0.242
Dieldrin	0.020	0.022
PCBs	0.010	1.011

(1) Flow-weighted combined Deer Island and Nut Island geometric mean concentration using FY 1992 NPDES data.
(2) Projections contained in the SEIS document.

Figure III.B.1 Earlier Projections Compared to FY92 Effluent Metals Concentrations

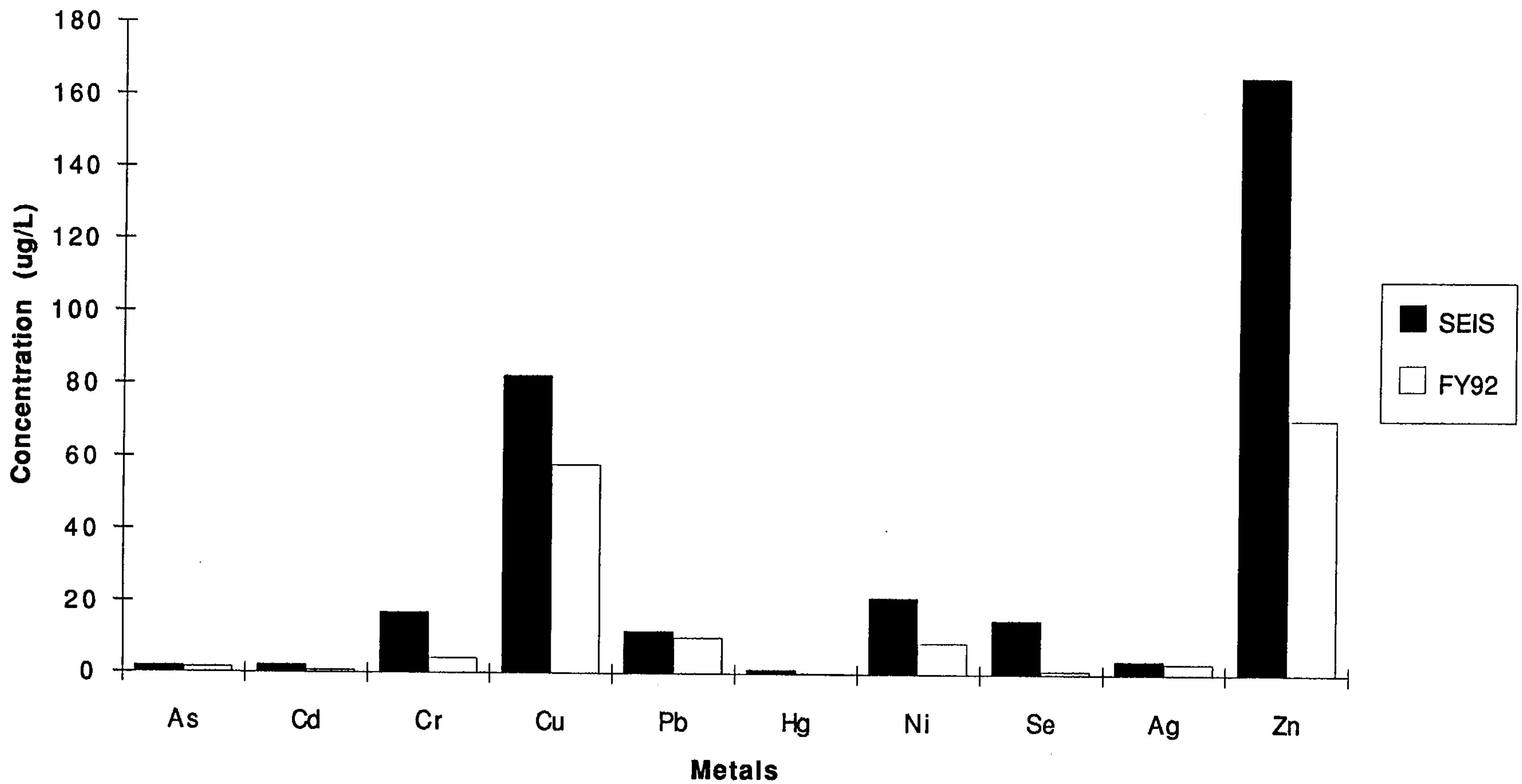


Table III.B.2 New Projections Based on FY92 Influent Data

Parameter (ug/L)	SEIS PROJECTIONS Primary Effluent (1)	Secondary Effluent (2)	NEW ESTIMATES (3) Primary Effluent	Secondary Effluent
Arsenic	1.810	1.17	1.560	1.040
Cadmium	2.277	1.29	1.624	0.955
Chromium	16.890	6.53	4.794	1.918
Copper	82.265	22.13	57.629	15.959
Lead	11.940	9.19	5.886	4.687
Mercury	1.240	0.38	0.187	0.060
Nickel	21.380	16.54	9.631	7.704
Selenium	15.260	8.19	1.548	0.860
Silver	4.010	0.55	4.424	0.632
Zinc	165.300	63.91	81.870	32.748

(1) Taken from Table 6.4.4.a, page 6.10, Supplement Envionmental Impact Statement (SEIS), EPA, 1988
(1) Taken from Table 6.4.4.c, page 6.12, Supplement Envionmental Impact Statement (SEIS), EPA, 1988
(2) Based on Influent Data collected during FY 92, and applying removal efficiencies used in the SEIS document.

Table III.C.1 summarizes the results of toxicity tests conducted during this period. The results for the sheepshead minnow test were always in compliance with current NPDES permit limits during FY92 at both plants. The mysid acute test was in compliance 33% of the time for Deer Island effluent and 25 % of the time for Nut Island effluent. The Champia red algae test was never in compliance at either plant.

C.2 Toxicity Identification and Evaluation

The EPA found that the probable cause of most **acute** toxicity in Deer Island's wastestream was due to surfactants (EPA, 1989). No **acute** toxicity could be attributed to metals or pesticides. Currently, concentrations of surfactants in the effluent from the two plants are consistent with the concentrations which could cause the observed mortality. The study further concluded that surfactants will be readily biodegraded with secondary treatment.

The EPA has concluded that using Champia for toxicity compliance is compromised by its ultrasensitive and inconsistent results. It is currently withdrawn as a test species in permit renewals.

D. 1991 BIOACCUMULATION STUDY, BOSTON HARBOR

Under an arrangement with EPA, the MWRA conducted a study during the summer of 1991, which was designed to improve the detection limits beyond EPA's standard methods and be comparable to a study done by the Authority as part of its Secondary Treatment Facilities Plan (STFP) in 1987. The mussels used in the 1987 study were collected in Barnstable and were deployed for 60 days at the Deer and Nut Island effluent discharges and at the proposed offshore discharge (clean control). The mussels used during 1991 were collected from Gloucester and deployed at the Deer Island discharge, at Gloucester (clean control) and at the New England Aquarium in Boston's Inner Harbor (dirty control) to determine how other sources were impacting the harbor.

Pre-deployment mussels in 1991 have elevated concentrations of metals (copper, zinc, and lead) as compared with the 1987 mussels, but much lower concentrations of pesticides and PCBs. When differences in detection limits are factored in, PAH concentrations of the pre-deployment mussel are similar in both years.

Table III.D.1 compares the 1991 study with the 1987 study. The 1991 study indicated that mussels deployed at Deer Island did not significantly bioaccumulate the three metals over pre-deployment mussels. Mussels deployed at the New England Aquarium showed statistically significant elevations in copper and zinc concentrations over pre-deployment and Deer Island mussels.

TABLE III.C.1
RESULTS OF TOXICITY TESTING ON DEER AND NUT ISLAND EFFLUENT
July 1991 to June 1992

	Mysid acute		Cyprinodon chronic		Champia chronic
	LC50	NOEC	Survival NOEC	Growth NOEC	NOEC
Limits (%)	None	20	10	10	10
DEER ISLAND					
July	30	20	*	*	2.0
August	34	< 5	*	*	2.0
September	37	20	60	60	2.0
October	30	20	60	60	2.0
November	30	< 5	10	*	0.7
December	44	20	20	20	2.0
January	26	5	50	60	2.0
February	20	10	40	10	2.0
March	25	10	40	40	2.0
April	16	10	20	10	2.0
May	25	10	40	20	2.0
June	23	10	40	20	0.2
Average	29	12	37	28	1.7
NUT ISLAND					
July	24	10	*	*	2
August	22	10	*	*	2
September	17	< 5	20	20	2
October	33	20	20	20	0.7
November	28	5	*	*	2
December	49	20	20	20	2
January	27	20	60	40	2
February	22	5	40	20	2
March	30	10	40	40	2
April	23	10	20	10	0.2
May	29	10	20	20	7
June	25	10	40	20	0.7
Average	27	11	31	23	2.1

* No Data

Several organic contaminants (total PAHs, PCBs, DDTs, alpha-chlordane and trans-nonachlor) showed significant bioaccumulation in 1991 Deer Island mussels. However, the tissue contamination was substantially reduced from 1987 levels. This is particularly encouraging since 1987 mussels, which were analyzed for organics, were deployed for only 30-days (vs. 60 days in 1991) and as a result, possibly underestimate any bioaccumulation. For many of these organic contaminants mussels deployed at the New England Aquarium had body burdens which were twice those of Deer Island mussels, indicating exposure to poorer water quality.

E. Metals Bioavailability

One of the principal criticisms of the Water Quality Criteria is that they require water quality to be met and discharges to be regulated using metals that are measured as "total recoverable". This measurement includes metals that are attached to particles and not readily available to animals and plants, as well as, metals in the dissolved state, which are available as the source of most toxicity. The EPA and the state DEP are currently developing protocols which address this issue and provide for more realistic regulations.

The analytical data for priority pollutant metals in MWRA effluent are total metal measurements. In 1987, sampling was conducted at the Deer Island and Nut Island plants specifically to measure the soluble fraction present in our effluent. Figure III.E.1 illustrates the percentage of soluble fraction over total metals. As shown, the percentage of soluble metals in our effluent is quite high, indicating that only half of the discharged metals are in the toxic form.

Table III.D.1 Contaminants Concentrations Bioaccumulating in Mussels

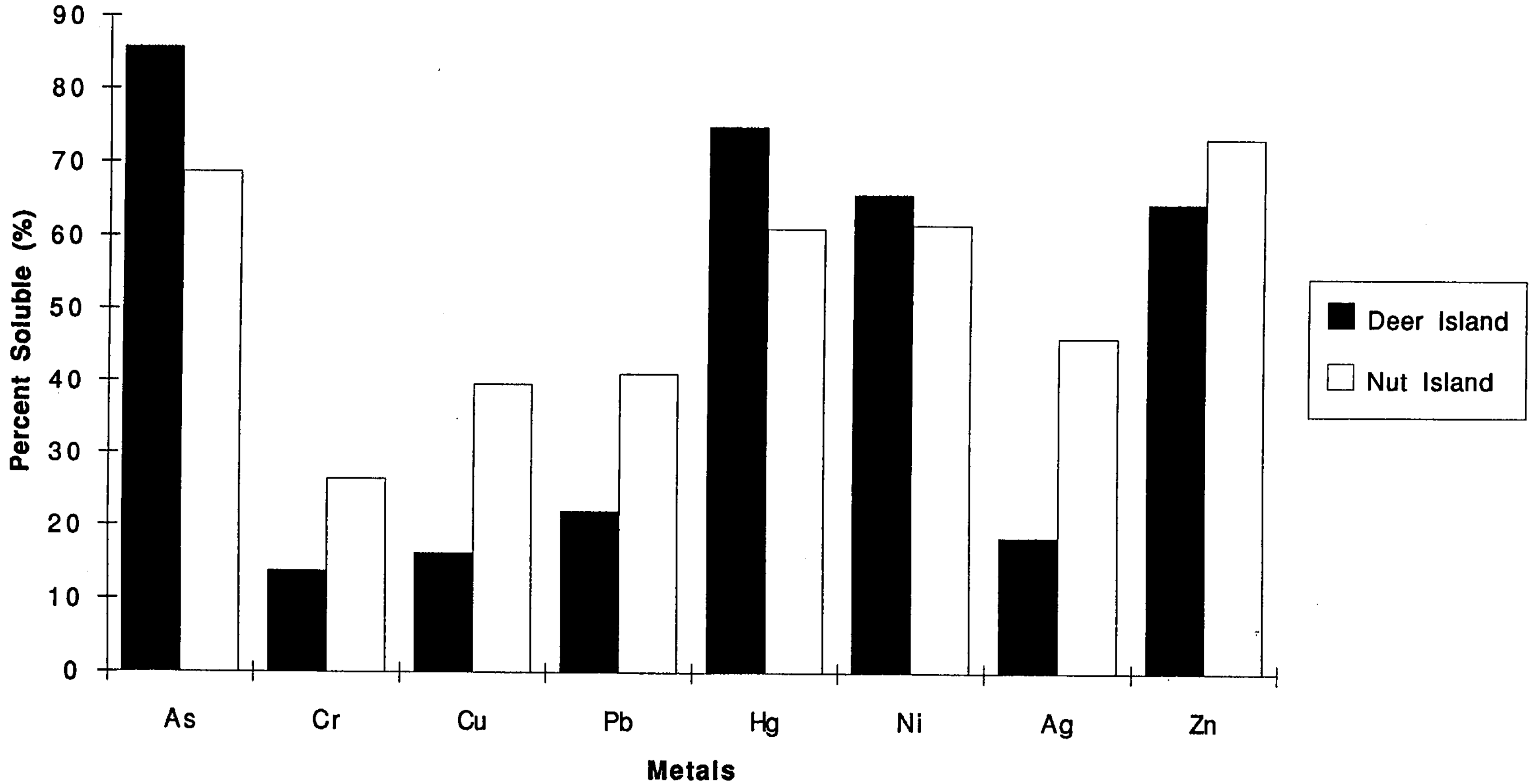
	PRE-DEPLOYMENT	CLEAN CONTROL	DIRTY CONTROL	DEER ISLAND	NUT ISLAND
Copper (ug/g)					
1987	6.6	7.1		9.5**	8.8**
1991	8.8	7.4	12.7**	9.3	
Lead (ug/g)					
1987	2.8	3.1		6.7**	8.3**
1991	6.5	5	6.4	5.9	
Zinc (ug/g)					
1987	83	92		152**	143**
1991	148	173	220**	143	
Total PAH's (ng/g)					
1987	581	465		2363**	683
1991	217	228	2570**	1207**	
Total PCB's (ng/g)					
1987	317	227		630**	604**
1991	77	77	477**	199**	
Total DDT's (ng/g)					
1987	52	30		63	51
1991	28	28	94**	48**	
Alpha-Chlordane (ng/g)					
1987	8.7	6.7		21.5**	19.5**
1991	2.4	2.5	19**	10.3**	
Dieldrin (ng/g)					
1987	6.6	3.6		11.4	7.6
1991	< 1.4	2.3	9**	2.9	
Lindane (ng/g)					
1987	1.8	0.8		5.5	0.8
1991	< 1.5	< 2.2	< 3.2	< 2.5	
Trans-nonachlor (ng/g)					
1987	7.7	6.2		18**	15.8**
1991	< 1.4	< 1.5	< 2.5	8.9**	

Hexachlorobenzene, heptachlor, aldrin, heptachlor epoxide, mirex were not detected any station in either year.

* Mussels collected from Barnstable in 1987 and Gloucester in 1991. Clean control at proposed offshore discharge in 1987 and in Gloucester in 1991. Dirty control at New England Aquarium.

* * Statistically different (p=<0.05) from pre-deployment.

Figure III.E.1 Ratio of Soluble to Total Metals in Combined Deer and Nut Island Effluents



Appendix A

Appendix A Table A.1 Deer Island Treatment Plant Operations Summary, Fiscal Year 1992

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	MIN	AVE	MAX	STD DEV
FLOW (MGD)																
AVERAGE	221	240	266	260	291	274	270	244	268	267	237	248		257		19
MINIMUM	193	187	166	219	244	224	225	208	228	238	196	201	166			23
MAXIMUM	307	466	582	503	450	412	389	369	419	390	346	475			582	75
TEMP (DEG F)	73	74	73	66	60	57	53	53	52	55	59	64		62		8
EFFLUENT pH																
MINIMUM	6.6	6.7	6.7	6.8	6.7	6.7	6.7	6.9	6.9	6.9	6.9	6.8	6.6			0.1
MAXIMUM	7.1	7.1	7.2	7.0	7.2	7.2	7.2	7.2	7.3	7.3	7.3	7.2			7.3	0.1
CONVENTIONAL PARAMETERS (mg/l)																
SETTLEABLE SOLIDS																
INFLUENT	3.2	3.3	3.9	3.9	3.5	3.4	3.2	3.5	3.7	3.4	3.1	3.6	3.1	3	3.9	0.3
EFFLUENT	0.1	0.1	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.4	0.1	0.23	0.4	0.1
BIOCHEMICAL OXYGEN DEMAND																
INFLUENT	140	123	143	127	145	136	144	169	154	161	154	161	123.0	146	169.0	14
EFFLUENT	134	103	128	121	125	120	132	140	127	139	147	140	103.0	130	147.0	12
TOTAL SUSPENDED SOLIDS																
INFLUENT	147	113	128	124	126	113	125	145	170	129	126	138	113.0	132	170.0	16
EFFLUENT	74	65	71	74	68	68	77	75	66	66	66	75	65.0	70	77.0	4
OIL AND GREASE																
INFLUENT	101.0	40.9	60.8	127.1	55.3	70.3	65.9	83.8	51.1	48.6	34.7	28.0	28.0	64.0	127.1	29
EFFLUENT	59.1	38.2	37.6	45.2	41.0	52.4	58.6	67.0	37.7	37.4	34.0	22.0	22.0	44.2	67.0	13
TOTAL COLIFORMS																
INFLUENT (E+06)	52.5	48.8	54.3	41.4	29.1	16.3	12.4	11.41	9.27	8.69	15.39	35.98	8.7	28	54.3	18
EFFLUENT	563	484	736	823	793	260	402	310	391	727	627	997	260.0	593	997.0	229
FECAL COLIFORM																
INFLUENT (E+06)	5.79	5.55	5.32	4.04	2.45	1.68	1.18	1.07	1.02	1.14	1.84	3.22	1.0	3	5.8	2
EFFLUENT	32	33	35	55	60	22	16	21	16	27	30	28	16.0	31	60.0	14

Appendix A, Table A-1, Deer Island Treatment Plant

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	MIN	AVE	MAX	STD DEV
RESIDUAL CHLORINE	1.8	1.6	1.8	1.8	1.8	2	1.9	2	1.8	1.6	1.7	1.7	1.6	2	2.0	0
CHLORIDES	1200	1000	900	900	1000	800	900	1000	900	800	913	1000	800.0	943	1200.0	108
METALS (mg/l)																
CHROMIUM																
INFLUENT	0.010	0.004	0.003	0.006	0.008	0.003	0.004	0.005	0.008	0.003	0.006	0.006	0.0030	0.0055	0.0100	0.002
EFFLUENT	0.003	0.003	0.002	0.003	0.013	0.003	0.004	0.004	0.003	0.003	0.006	0.005	0.0020	0.0043	0.0130	0.003
COPPER																
INFLUENT	0.070	0.050	0.060	0.076	0.060	0.060	0.058	0.068	0.060	0.050	0.064	0.067	0.0500	0.0619	0.0760	0.008
EFFLUENT	0.050	0.070	0.053	0.077	0.050	0.050	0.052	0.076	0.067	0.050	0.062	0.064	0.0500	0.0601	0.0770	0.011
CADMIUM																
INFLUENT	0.002	0.001	<.001	0.001	0.001	<.001	<.001	0.001	<.001	<.001	<.001	<.001	<.001	0.001	0.002	0.000
EFFLUENT	0.001	0.002	<.001	0.003	0.001	<.001	<.001	0.001	<.001	0.001	<.001	<.001	<.001	0.002	0.003	0.001
LEAD																
INFLUENT	0.019	0.017	0.016	0.016	0.010	0.009	0.015	0.014	0.012	0.018	0.012	0.012	0.009	0.014	0.019	0.003
EFFLUENT	0.011	0.009	0.012	0.044	0.008	0.007	0.010	0.010	0.011	0.012	0.012	0.012	0.007	0.013	0.044	0.010
NICKEL																
INFLUENT	0.028	0.022	0.013	0.008	0.006	0.009	0.011	0.016	0.020	0.007	0.007	0.007	0.006	0.013	0.028	0.007
EFFLUENT	0.004	0.009	0.008	0.001	0.008	0.006	0.008	0.010	0.010	0.006	0.008	0.005	0.001	0.007	0.010	0.003
SILVER																
INFLUENT	0.009	0.008	0.006	0.004	0.003	0.006	0.005	0.005	0.003	0.004	0.005	0.005	0.003	0.005	0.009	0.002
EFFLUENT	0.014	0.008	0.004	0.005	0.002	0.008	0.004	0.005	0.003	0.005	0.004	0.005	0.002	0.006	0.014	0.003
ZINC																
INFLUENT	0.140	0.100	0.075	0.147	0.080	0.082	0.096	0.094	0.082	0.130	0.098	0.110	0.075	0.103	0.147	0.024
EFFLUENT	0.077	0.080	0.050	0.111	0.060	0.070	0.082	0.091	0.081	0.070	0.082	0.086	0.050	0.078	0.111	0.015
MERCURY																
INFLUENT	0.0002	0.0003	0.0003	0.0003	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	<.0002	0.0002	<.0002	0.0002	0.0004	0.000
EFFLUENT	0.0002	0.0003	0.0002	0.0003	0.0004	0.0002	0.0002	0.0002	<.0002	<.0002	<.0002	<.0002	<.0002	0.0003	0.0004	0.000

Appendix A, Table A-1, Deer Island Treatment Plant

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	MIN	AVE	MAX	STD DEV
ARSENIC																
INFLUENT	<.005	<.005	ND	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	< 0.005	< 0.005	< 0.005	
EFFLUENT	<.005	<.005	ND	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	< 0.005	< 0.005	< 0.005	
EFFLUENT NUTRIENTS (mg/l)																
TKN	21.030	18.700	19.880	26.260	18.310	18.310	20.500	10.020	24.100	27.700	25.760	21.800	10.0	21.031	27.7	4.741
AMMONIA	11.280	10.900	11.820	11.870	9.740	11.800	11.540	6.300	12.800	12.656	15.300	14.600	6.3	11.717	15.3	2.284
NITRATES	0.400	3.660	3.600	1.400	1.350	0.237	0.443	0.255	0.312	1.173	0.390	0.781	0.2	1.167	3.7	1.225
NITRITE	1.760	1.480	1.080	0.400	0.530	0.098	0.316	0.095	0.276	0.470	0.150	0.039	0.0	0.558	1.8	0.572
ORTHOPHOSPHORUS	2.110	3.300	3.230	3.200	2.760	1.840	2.133	2.400	2.420	1.870	3.000	2.140	1.8	2.534	3.3	0.542
TOTAL PHOSPHORUS	3.150	3.820	5.206	4.300	4.350	4.900	3.330	3.252	4.200	3.740	4.020	3.320	3.2	3.966	5.2	0.660
PRIMARY SLUDGE																
FLOW (MGD)	0.35	0.323	0.344	0.385	0.352	0.353	0.298	0.298	0.274	0.357	0.329	0.396	0.2740	0.3383	0.3960	0.036
SCUM (MGD)	ND	ND	ND	ND	ND	ND	0.0027	0.0032	0.0052	0.00562	0.0068	0.0151	0.0027	0.0064	0.0151	0.005
pH																
MINIMUM	5.4	5.1	5.4	5.2	5.3	5.1	5	5.3	5.1	5.3	4.8	5.2	4.8	5	5.4	0.175
MAXIMUM	5.9	5.8	5.9	5.7	5.7	5.8	5.9	5.8	6	5.8	6.1	6	5.7	6	6.1	0.123
SOLIDS (%)	8.5	8.2	8	7.9	8.6	7.97	8.33	8.69	8	7.58	7.19	8.21	7.2	8	8.7	0.427
VOLATILE SOLIDS (%)	79	79	80	82	81	85	83	86	84	85	83	81	79.0	82	86.0	2.387
GREASE (%)	13.56	10.99	12.94	18.1	10.72	11.1	16.1	14.6	17.5	16.2	11.8	15.4	10.7	14	18.1	2.610
DIGESTED SLUDGE																
FLOW(MGD)	0.292	0.274	0.297	0.286	0.229	0.403	0.252	0.241	0.166	0.193	0.188	0.221	0.2	0	0.4	
pH																
MINIMUM	6.3	6.5	6.9	7.0	7.0	7.1	7.1	7.0	7.2	7.2	7.3	7.1	6.3	7.0	7.3	0.3
MAXIMUM	7.2	7.1	7.3	7.3	7.3	7.6	7.9	7.5	7.6	7.6	7.5	7.5	7.1	7.5	7.9	0.2
TOTAL SOLIDS (%)	2.90	3.10	3.00	2.70	2.50	3.12	3.80	2.92	3.58	3.21	3.84	3.55	2.5	3.2	3.8	0.4

Appendix A, Table A-1, Deer Island Treatment Plant

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	MIN	AVE	MAX	STD DEV
Digested Sludge (con't)																
VOLATILE SOLIDS (%)	64	60	60	61	60	58	50.0	54	58	57	55	56	50.0	57.8	64.0	3.7
VOLATILE ACIDS (ml/l	1054	746	361	298	298								298.0	551.4	1054.0	337.3
GREASE (%)	5.86	7.30	3.98	7.03	6.27	2.30	3.20	3.90	3.50	3.50	3.80	3.90	2.30	4.55	7.30	1.63
METALS (mg/l)																
CHROMIUM	1.600	1.990	2.070	0.400	1.580	1.800	2.490	1.200	1.880	2.060	0.210	2.310	0.210	1.633	2.490	0.708
COPPER	15.900	16.750	19.600	4.200	16.500	15.100	21.350	11.940	17.200	19.500	0.203	24.200	0.203	15.204	24.200	6.887
CADMIUM	0.160	0.200	0.200	0.036	0.130	0.140	0.170	0.120	0.167	0.210	2.400	0.180	0.036	0.343	2.400	0.650
LEAD	6.700	9.910	8.700	1.630	5.800	4.840	8.940	4.280	7.050	8.240	17.500	10.600	1.630	7.849	17.500	3.973
NICKEL	0.880	1.220	1.210	0.320	0.880	0.910	1.360	0.980	1.290	1.220	10.400	2.170	0.320	1.903	10.400	2.710
SILVER	0.100	0.020	0.042	0.040	0.120	0.230	0.120	0.033	0.409	0.110	0.100	0.940	0.020	0.189	0.940	0.260
ZINC	26.200	30.200	25.000	7.950	19.600	20.600	29.100	15.900	25.800	29.600	1.330	37.400	1.330	22.390	37.400	10.097
MERCURY	0.062	0.079	0.077	0.081	0.100	0.030	0.074	0.078	0.063	0.060	0.410	0.130	0.030	0.104	0.410	0.099
ARSENIC	0.050	0.022	ND	0.045	0.100	0.074	3.000	0.230	0.078	0.120	35.700	0.128	0.022	3.595	35.700	10.684
GAS PRODUCED (cu. ft.)																
WASTED	0.329	0.287	0.414	0.577	0.644	1.067	0.926	0.896	0.906	0.873	0.997	0.956	0.287	0.739	1.067	0.276
USED	0.823	0.692	0.604	0.908	1.053	0.000	0.089	0.146	0.157	0.140	0.114	0.101	0.000	0.402	1.053	0.382

ND No Data.

(*) Data reduced from Deer Island Treatment Plant Monthly Operation Logs. All chemical analyses were conducted by Deer Island Laboratory.

Appendix A Table A-2 Deer Island Influent Characterization, Priority Pollutants, Local Limits Study
(March 1991 - December 1991)

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	STD DEV
METALS(mg/l)												
Antimony	0.008	0.006	0.006	0.006	0.015	0.051	0.015	0.015	0.017	0.054	0.014	2.250
Arsenic	0.003	0.002	0.002	0.003	0.002	0.002	0.002	0.007	0.002	0.001	0.002	1.706
Beryllium	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	1.788
Cadmium	0.004	0.003	0.002	0.003	0.002	0.002	0.002	0.001	0.002	0.002	0.002	1.485
Chromium	0.037	0.003	0.012	0.010	0.007	0.004	0.004	0.007	0.005	0.007	0.007	2.069
Copper	0.163	0.058	0.077	0.107	0.094	0.081	0.077	0.109	0.067	0.070	0.086	1.351
Lead	0.037	0.012	0.002	0.012	0.012	0.013	0.006	0.015	0.004	0.003	0.008	2.489
Mercury	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0002	1.860
Molybdenum	0.018	0.018	0.015	0.032	0.025	0.050	0.050	0.050	0.047	0.040	0.031	1.618
Nickel	0.020	0.008	0.008	0.008	0.016	0.009	0.005	0.010	0.006	0.011	0.009	1.523
Selenium	0.002	0.003	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.002	1.343
Silver	0.009	0.004	0.004	0.006	0.008	0.012	0.009	0.006	0.007	0.007	0.006	1.480
Thallium	0.002	0.005	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	1.621
Zinc	0.300	0.082	0.110	0.190	0.089	0.130	0.101	0.188	0.091	0.115	0.128	1.519
Cyanide, Petroleum Hydrocarbons and Surfactants (mg/l)												
Cyanide	0.005	0.007	0.005	0.005	0.005	0.005	0.008	0.005	0.005	0.005	0.005	1.168
Surfactants	2.383	3.455	6.895	5.450	4.833	3.340	3.915	3.810	3.415	13.000	4.487	1.609
PHC	0.875	0.050	0.375	1.605	0.800	0.050	1.050	0.050	0.050	0.153	0.230	4.299
Pesticides/PCBs (ug/l)												
4,4'-DDD	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
4,4'-DDE	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
4,4'-DDT	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Aldrin	0.010	0.010	0.010	0.010	0.013	0.010	0.010	0.010	0.010	0.010	0.010	1.094
Alpha-BHC	0.010	0.010	0.010	0.010	0.013	0.010	0.010	0.010	0.010	0.010	0.010	1.094
Aroclor 1016	0.010	0.010	0.010	0.010	0.133	0.100	0.100	0.100	0.100	0.100	0.041	3.377
Aroclor 1221	0.010	0.010	0.010	0.010	0.133	0.100	0.100	0.100	0.100	0.100	0.041	3.377

Appendix A, Table A-2, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	GEOMETRIC STD DEV
Pesticides (con't)												
Aroclor 1232	0.010	0.010	0.010	0.010	0.133	0.100	0.100	0.100	0.100	0.100	0.041	3.377
Aroclor 1242	0.010	0.010	0.010	0.010	0.133	0.100	0.100	0.100	0.100	0.100	0.041	3.377
Aroclor 1248	0.010	0.010	0.010	0.010	0.133	0.100	0.100	0.100	0.100	0.100	0.041	3.377
Aroclor 1254	0.010	0.010	0.010	0.010	0.133	0.100	0.100	0.100	0.100	0.100	0.041	3.377
Aroclor 1260	0.010	0.010	0.010	0.010	0.133	0.100	0.100	0.100	0.100	0.100	0.041	3.377
Beta-BHC	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Chlordane	0.010	0.010	0.010	0.010	0.150	0.100	0.100	0.100	0.100	0.100	0.041	3.422
Delta-BHC	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Dieldrin	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Endosulfan I	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Endosulfan II	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Endosulfan Sulfate	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Endrin	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Endrin Aldehyde	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Gamma-BHC(Lindane)	0.010	0.010	0.010	0.010	0.013	0.010	0.010	0.010	0.010	0.010	0.010	1.094
Heptachlor	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Heptachlor Epoxide	0.010	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	1.137
Toxaphene	0.010	0.010	0.010	0.010	0.133	0.100	0.100	0.100	0.100	0.100	0.041	3.377
Semivolatile Organics (ug/l)												
1,2,4-Trichlorobenzene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
1,2-Dichlorobenzene	0.467	0.200	0.200	0.200	0.388	0.400	0.388	0.667	4.729	1.480	0.503	2.720
1,3-Dichlorobenzene	0.467	0.200	0.200	0.200	0.388	0.400	0.388	0.667	0.371	0.380	0.341	1.500
1,4-Dichlorobenzene	0.467	0.200	0.200	0.200	0.388	0.400	0.388	0.667	0.350	0.350	0.336	1.496
2,4,5-Trichlorophenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2,4,6-Trichlorophenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2,4-Dichlorophenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2,4-Dimethylphenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2,4-Dinitrophenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730

Appendix A, Table A-2, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	STD DEV
2,4-Dinitrotoluene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2,6-Dinitrotoluene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2-Chloronaphthalene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2-Chlorophenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2-Methylnaphthalene	19.667	3.000	3.500	3.500	5.667	5.000	5.667	45.000	6.333	3.500	6.403	2.388
2-Methylphenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2-Nitroaniline	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
2-Nitrophenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
3,3'-Dichlorobenzidine	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
3-Nitroaniline	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
4,6-Dinitro-2-methylphenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
4-Bromophenyl-phenylether	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
4-Chloraniline	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
4-Chloro-3-methylphenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
4-Chlorophenyl-phenylether	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
4-Methylphenol	28.333	15.500	38.000	29.500	27.667	22.500	30.000	20.000	25.333	15.100	24.250	1.346
4-Nitroaniline	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
4-Nitrophenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Acenaphthene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Acenaphthylene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Anthracene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Benzo(a)anthracene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Benzo(a)pyrene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Benzo(b)fluoranthene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Benzo(g,h,i)perylene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Benzo(k)fluoranthene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Benzoic Acid	103.000	61.000	189.500	137.500	94.333	200.000	176.667	25.500	99.733	80.000	101.051	1.862
Benzyl Alcohol	0.467	10.000	15.000	11.500	14.000	15.000	18.000	10.500	10.067	15.000	9.297	2.917
bis(2-Chloroisopropyl)Ether	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730

Appendix A, Table A-2, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	GEOMETRIC STD DEV
bis(2-Chloroethoxy)Methane	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
bis(2-Chloroethyl)ether	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
bis(2-Ethylhexyl)phthalate	21.333	10.500	7.500	4.000	4.667	50.000	5.333	45.000	5.667	42.000	12.451	2.753
Butylbenzylphthalate	2.067	0.200	2.100	0.200	0.200	0.200	0.200	1.000	1.133	0.200	0.446	2.889
Chrysene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Di-n-butylphthalate	0.467	0.200	1.600	1.600	0.200	75.100	0.200	1.000	0.200	1.600	0.863	6.215
Di-n-octylphthalate	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Dibenzo(a,h)anthracene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Dibenzofuran	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Diethylphthalate	0.467	0.200	3.100	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.336	2.585
Dimethylphthalate	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Fluoranthene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Fluorene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Hexachlorobenzene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Hexachlorobutadiene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Hexachlorocyclopentadiene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Hexachloroethane	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Indeno(1,2,3-cd)pyrene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Isophorone	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
N-Nitroso-di-n-propylamine	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
N-Nitrosodiphenylamine	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Naphthalene	3.000	2.000	0.200	1.600	2.667	2.500	2.667	5.500	3.333	1.100	1.922	2.470
Nitrobenzene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Pentachlorophenol	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730
Phenanthrene	1.400	0.200	0.200	0.200	0.200	0.200	0.200	5.500	0.800	0.200	0.389	3.215
Phenol	2.067	2.600	7.500	6.000	5.067	4.000	9.667	1.000	0.200	0.200	2.127	4.097
Pyrene	0.467	0.200	0.200	0.200	0.200	0.200	0.200	1.000	0.200	0.200	0.256	1.730

Appendix A, Table A-2, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	STD DEV
Volatile Organic Compounds(ug/l)												
1,1,1-Trichloroethane	0.500	0.500	0.500	0.625	0.500	0.500	0.500	0.500	0.500	0.500	0.511	1.073
1,1,2,2-Tetrachloroethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
1,1,2-Trichloroethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
1,1-Dichloroethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
1,1-Dichloroethene	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
1,2-Dichloroethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
1,2-Dichloropropane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
2-Butanone	3.375	0.500	0.500	8.875	0.500	0.500	7.400	0.500	0.500	0.500	1.056	3.416
2-Chloroethylvinylether	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
2-Hexanone	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
4-Methyl-2-pentanone	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Acetone	0.500	0.500	0.500	0.500	186.000	205.000	203.000	172.625	410.000	206.667	19.274	23.376
Benzene	0.500	0.500	0.500	0.875	1.600	0.500	0.500	0.500	0.500	0.500	0.594	1.477
Bromodichloromethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Bromoform	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Bromomethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Carbon Disulfide	0.500	0.500	0.500	1.875	12.800	2.125	2.000	2.625	0.500	0.500	1.237	2.994
Carbon tetrachloride	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Chlorobenzene	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Chloroethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Chloroform	0.500	0.500	0.500	1.375	0.500	0.500	0.500	0.500	0.500	0.500	0.553	1.377
Choloromethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
cis-1,3-Dichloropropene	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Dibromochloromethane	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Ethylbenzene	0.500	0.500	0.500	0.500	1.600	0.500	0.500	0.500	0.500	0.500	0.562	1.445
Methylene Chloride	5.000	3.625	1.875	12.875	8.600	4.750	0.500	2.625	0.500	0.500	2.381	3.338
Styrene	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000

Appendix A, Table A-2, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	GEOMETRIC STD DEV
Tetrachloroethene	21.000	3.250	3.000	5.625	2.400	1.625	0.500	4.500	2.875	2.667	3.083	2.567
Toluene	4.500	6.125	4.500	8.000	11.100	3.250	1.400	0.500	1.625	11.333	3.685	2.723
Total Xylenes	8.875	7.250	0.500	3.750	11.200	2.500	2.500	2.500	2.500	4.500	3.448	2.424
trans-1,2-Dichloroethene	0.500	1.625	0.500	1.375	0.500	0.500	0.500	0.500	0.500	0.500	0.622	1.590
trans-1,3-Dichloropropene	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Trichloroethene	3.500	5.500	3.250	1.875	0.500	0.500	0.500	2.375	1.625	0.500	1.397	2.574
Vinyl Acetate	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000
Vinyl chloride	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	1.000

Note: Average concentrations calculated by substituting 1/2 the MDL for those compounds that were below detection measurements

Appendix A A-3 Deer Island Influent, Harbor Studies Characterization

(November 1991 - June 1992)

PAHs (ng/l)	Nov 13	Nov 14	Nov 15	June 10	June 12	June 14	Geometric Mean	Geometric Std Dev
1,6,7-trimethylnaphthalene	1112	2143	2381	905	646	496	1086.5	1.9
1-methyl naphthalene	3145	6555	4734	3359	2896	2796	3721.0	1.4
1-methylphenanthrene	208	271	586	310	125	181	247.8	1.7
2,6-dimethylnaphthalene	3533	7592	6747	1362	1079	828	2457.4	2.6
2-methylnaphthalene	4651	9767	7110	5392	4524	2796	5294.6	1.5
Acenaphthene	1	1	1	240	183	78	12.3	16.0
Acenaphthylene	23	36	37	27	21	29	28.2	1.3
Anthracene	43	87	58	79	33	65	57.7	1.4
Benz(a)anthracene	58	126	77	128	55	96	85.1	1.4
Benzo(a)pyrene	37	84	44	101	48	69	59.8	1.5
Benzo(b)fluoranthene	47	99	58	179	160	92	94.5	1.7
Benzo(g,h,i)perylene	21	49	22	116	98	72	51.4	2.1
Benzo(k)fluoranthene	33	75	42	94	112	78	66.4	1.6
Biphenyl	618	1126	1112	592	537	376	672.5	1.5
Chrysene	63	142	91	214	84	123	110.3	1.5
Dibenzo(a,h)anthracene	3	9	4	31	1	17	6.2	3.5
Fluoranthene	171	344	228	233	129	179	204.0	1.4
Fluorene	382	680	862	349	229	219	397.1	1.7
Indeno(1,2,3-c,d)pyrene	29	51	33	84	99	66	54.7	1.6
Naphthalene	2544	4283	2687	2382	2291	1616	2523.4	1.4
Perylene	10	22	12	31	1	17	10.6	3.4
Phenanthrene	541	839	1248	727	396	485	655.2	1.5
Pyrene	182	350	302	409	182	270	269.9	1.4
Total PAHs	**17490**	**34802**	**21770**	**17503**	**14058**	**10276**	**17955.0**	**1.5**

Appendix A, Table A-3, Deer Island Treatment Plant

Pesticides/PCBs	Nov 13	Nov 14	Nov 15	June 10	June 12	June 14	Mean	Std Dev
Aldrin	1	1	1	1	1	1	1.0	1.0
Chlordane	5.2	4.1	4	17.5	6	7.3	6.3	1.7
DDD	1	4.2	1.8	91.6	64.2	80	12.4	7.9
DDE	7.1	8.3	8	12.5	1	9.5	6.2	2.5
DDT	11.5	22	19.8	8.6	1	16.7	9.5	3.2
Dieldrin	44.7	60.1	71.7	78.8	84.2	150.9	76.0	1.5
Endrin	1	1	1	1	1	1	1.0	1.0
Heptachlor	0.1	0.6	0.1	1	1	1	.4	3.1
Heptachlor epoxide	1	1	1.1	9.5	1	1	1.5	2.5
Hexachlorobenzene	5.6	1	7.3	1	1	55	3.6	5.0
Lindane	14.2	19.1	21.8	28.9	31	68.5	26.7	1.7
Transnonaroclor	1	1	1	18.4	5.1	17.8	3.4	4.2
Total PCBs	**0.9**	**8.7**	**5.2**	**61.5**	**46.6**	**39.8**	**12.9**	**5.1**

Reporting Limit is 10 ng/L

Appendix A Table A.4 Deer Island Effluent Characterization, Priority Pollutants, NPDES Data, FY 1992

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	AVE MDL	TIMES DETECTED	GEOMETRIC MEAN	GEOMETRIC STD DEV
METALS (ug/l)																
Arsenic	1	**2**	**3**	1	**2**	1	1	1	**2**	**3**	**2**	1	2	6 of 12	1.51	1.58
Boron	**435**	**375**	**431**	**284**	**338**	**266**	**242**	**298**	**290**	**333**	**294**	**338**	11	12 of 12	322.00	1.20
Cadmium	0.5	0.5	**1**	0.5	0.5	0.5	**1**	**1**	0.5	0.5	**2**	0.5	1	4 of 12	0.67	1.59
Chromium (Total)	**10**	3.5	3.5	3.5	3	**9**	3	3	3	3	**6**	2.5	5	3 of 12	3.94	1.59
Chromium (Hex)	3.5	3.5	3.5	3.5	3.5	3.5	**6.3**	3	3	3	2	2.5	5	1 of 12	3.28	1.31
Copper	**83**	**67**	**63**	**57**	**42**	**61**	**55**	**62**	**56**	**51**	**58**	**66**	5	12 of 12	59.34	1.18
Lead	**23**	**9.2**	**9.4**	**18**	**6.5**	**21**	**16**	**11**	**11**	**9**	**6**	**9**	1.5	12 of 12	11.36	1.55
Mercury	**0.5**	**0.3**	**0.3**	0.1	0.1	**0.3**	0.1	0.1	**0.3**	**0.4**	**0.4**	**0.3**	0.2	8 of 12	0.23	1.87
Molybdenum	4	**11**	4	4	7.5	7.5	6	6	6	6	**13**	4	8	2 of 12	6.10	1.48
Nickel	8.5	8.5	8.5	8.5	8.5	8.5	7.5	7.5	**18**	7.5	6	6	12	1 of 12	8.28	1.32
Selenium	1	1	1	1	1	1	1	1	1	**3**	1	1	2	1 of 12	1.10	1.37
Silver	2	**5**	**7**	2	**9**	**6**	2	**5**	2	2	1.5	1.5	3	5 of 12	3.06	1.92
Thallium	1	1	1	1	1	1	1	1	1	1	1	**2**	2	1 of 12	1.06	1.22
Zinc	**83**	**69**	**60**	**75**	**63**	**83**	**69**	**75**	**89**	**70**	**77**	**83**	5	12 of 12	74.18	1.13
Cyanide (mg/l)	0.005	0.005	**0.005**	**0.007**	**0.006**	**0.014**	**0.012**	**0.014**	**0.016**	**0.009**	**0.005**	0.005	0.005	9 of 12	0.01	1.61
Phenols (mg/l)	**0.019**	**0.031**	**0.021**	**0.016**	**0.013**	**0.023**	**0.03**	**0.03**	**0.024**	**0.013**	**0.032**	0.02	0.02	12 of 12	0.02	1.38
PHC (mg/l)	**3.44**	**5.125**	1	**4.84**	**2.175**	**2.825**	**2.875**	**2.56**	**1.725**	**1.925**	**3.96**	**3.25**	2	11 of 12	2.72	1.59
PESTICIDES AND PCBs (ug/l)																
b-BHC	**0.96**	**0.14**	0.025	0.01	0.01	**0.16**	**0.12**	**0.23**	0.005	**0.23**	**0.07**	0.01	0.05	7 of 12	0.06	5.22
g-BHC	0.025	0.01	0.025	0.01	0.01	0.025	0.01	0.025	0.005	0.01	0.01	**0.17**	0.05	1 of 12	0.02	2.48
4,4'DDT	0.05	**1.8**	0.05	0.02	0.02	0.05	0.02	0.05	0.01	0.02	0.02	0.02	0.1	1 of 12	0.04	3.78
Endosulfan I	0.025	0.01	0.025	0.01	0.01	**0.33**	0.01	0.025	0.005	0.01	**0.28**	0.01	0.05	2 of 12	0.02	3.82
Chlordane	0.25	0.1	0.25	0.1	0.1	0.25	0.1	0.25	0.05	0.1	0.1	**0.17**	0.1	1 of 12	0.13	1.70

Appendix A, Table A-4, Deer Island Treatment Plant

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	AVE	TIMES	GEOMETRIC	
SEMIVOLATILE ORGANICS (ug/l)																
2-Methylnaphthalene	2	**4**	**2**	**3**	1	1	**2**	**3**	**3**	**3**	**5**	1	10	9 of 12	2.20	1.73
4-Methyl phenol	**13**	**36**	**18**	1	**15**	1	3	**30**	**17**	**18**	**21**	**25**	10	10 of 12	10.52	3.53
Benzyl alcohol	**10**	**12**	**11**	**17**	1	**8**	1	**12**	**13**	**11**	1	1	10	8 of 12	5.10	3.37
bis(2-ethylhexyl)pthalate	**9**	**8**	**14**	**10**	**11**	**8**	**9**	**8**	**11**	1	**10**	**12**	10	11 of 12	8.14	1.98
Butylbenzyl phthalate	2	**5**	1	**3**	1	1	**3**	**3**	1	1	**3**	1	10	5 of 12	1.75	1.85
Di-n-butylpthalate	2	**4**	**2**	**3**	1	1	**3**	**2**	1	1	**3**	3	10	7 of 12	1.93	1.69
Di-n-octylphthalate	2	1	**3**	1	1	1	1	1	1	1	1	1	10	1 of 12	1.16	1.43
Diethyl pthalate	2	**7**	**3**	**4**	1	1	1	**5**	1	1	**4**	3	10	6 of 12	2.16	2.10
Phenol	2	**5**	1	1	1	1	1	1	**6**	1	1	1	10	2 of 12	1.41	1.95
VOLATILE ORGANICS (ug/l)																
1,1,1-Trichloroethane	**5.0**	**7.3**	**6.0**	**1.5**	**1.5**	**3.3**	**1.3**	0.5	**1.5**	**0.7**	**1.3**	0.5	5.0	10 of 12	1.73	2.52
1,2-Dichloroethene	**4.0**	**3.3**	**2.3**	**1.0**	**3.7**	**3.0**	**3.0**	0.5	**3.0**	**4.0**	**4.3**	**3.0**	5	11 of 12	2.55	1.90
2-Butanone	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**75.5**	1.0	**9.7**	**7.7**	**8.3**	10	4 of 12	2.45	4.23
Acetone	**51.0**	**236.7**	**76.5**	**92.7**	**70.0**	**62.7**	**133.3**	**93.5**	**206.7**	**45.7**	**166.7**	**156.0**	10	12 of 12	101.16	1.73
Benzene	**2.7**	**1.2**	**1.0**	**1.7**	**2.0**	**2.0**	**2.0**	0.5	**2.3**	**1.2**	**2.0**	**2.0**	5	11 of 12	1.57	1.60
Bromodichloromethane	**4.3**	**2.3**	**1.3**	**0.7**	**0.7**	**0.7**	0.5	**3.5**	**0.7**	0.5	0.5	0.5	5.0	8 of 12	0.95	2.23
Bromoform	**1.0**	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5.0	1 of 12	0.53	1.22
Bromomethane	**1.7**	**1.3**	**2.0**	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	10	3 of 12	1.13	1.27
Carbon disulfide	**4.8**	**6.3**	**8.5**	**1.3**	**1.3**	**1.0**	**2.7**	0.5	0.5	0.5	**7.7**	**2.3**	5	9 of 12	1.94	2.93
Chloroform	**14.0**	**11.7**	**13.0**	**6.0**	**6.3**	**6.0**	**6.0**	**8.0**	**7.0**	**4.3**	**9.0**	**7.7**	5	12 of 12	7.77	1.43
Chloromethane	**7.0**	**3.7**	**7.5**	**1.0**	**3.0**	**1.0**	1.0	1.0	1.0	1.0	1.0	**1.7**	10	6 of 12	1.77	2.23
Dibromochloromethane	**1.8**	**0.7**	0.5	0.5	0.5	0.5	0.5	**0.8**	0.5	0.5	0.5	0.5	5.0	3 of 12	0.59	1.47
Ethyl benzene	**3.0**	0.5	**0.8**	0.5	**0.7**	0.5	0.5	0.5	0.5	1.0	0.5	0.5	5.0	4 of 12	0.65	1.70
Methylene chloride	**32.7**	**17.0**	**8.5**	**1.3**	**7.3**	**6.7**	**1.3**	0.5	**3.3**	**5.7**	**11.0**	**4.3**	5	11 of 12	4.89	3.23
Styrene	0.5	0.5	0.5	0.5	0.5	**2.0**	0.5	0.5	0.5	0.5	0.5	0.5	5.0	1 of 12	0.56	1.49
Tetrachloroethene	**9.3**	**6.3**	**4.0**	**4.0**	**7.0**	**6.0**	**14.3**	**5.0**	**7.7**	**13.7**	**9.3**	**3.7**	5	12 of 12	6.82	1.58
Toluene	**15.0**	**7.0**	**6.0**	**5.0**	**4.7**	**5.3**	**5.0**	**8.0**	**6.3**	**5.3**	**7.0**	**4.7**	5	12 of 12	6.24	1.39
Trichloroethene	**3.0**	**2.7**	**3.0**	**2.7**	**4.0**	**3.7**	0.5	**1.5**	**4.0**	**4.0**	**3.0**	**4.0**	5	11 of 12	2.68	1.82
Vinyl Acetate	1.0	**1.7**	1.0	1.0	1.0	1.0	1.0	1.0	**2.7**	1.0	**8.3**	1.0	10	3 of 12	1.35	1.91
Xylene	**15.7**	**4.5**	**4.0**	**2.5**	**4.2**	**4.8**	**3.3**	**4.0**	**7.5**	**5.5**	**6.7**	0.5	5.0	11 of 12	4.15	2.25

Notes: (*) Average concentrations were calculated using 1/2 the MDL for those compounds that were below detection. Bold entries indicate detected or J values.

Appendix A Table A.5 Deer Island Effluent Characterization, Priority Pollutants, Local Limits Study (March 1991 - December 1991)

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	STD DEV
Metals (mg/l)												
Antimony	0.0083	0.006	0.006	0.006	0.015	0.0515	0.015	0.015	0.0167	0.02	0.013	1.979
Arsenic	0.0025	0.0015	0.0015	0.0036	0.0015	0.0015	0.0015	0.0035	0.001	0.001	0.002	1.578
Beryllium	0.0022	0.0015	0.0015	0.0015	0.0005	0.0005	0.0005	0.0005	0.0007	0.001	0.001	1.788
Cadmium	0.0029	0.0015	0.0015	0.0015	0.0021	0.0015	0.001	0.0012	0.0073	0.001	0.002	1.814
Chromium	0.0203	0.003	0.0104	0.0047	0.0049	0.0025	0.0025	0.0037	0.0036	0.0025	0.004	1.991
Copper	0.1233	0.054	0.074	0.0885	0.084	0.0865	0.067	0.0623	0.055	0.04	0.070	1.375
Lead	0.019	0.0115	0.0027	0.0194	0.023	0.004	0.0023	0.008	0.0042	0.002	0.007	2.563
Mercury	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003	0.0005	0.0001	0.0001	0.000	1.802
Molybdenum	0.022	0.0185	0.015	0.031	0.025	0.05	0.05	0.05	0.0467	0.04	0.032	1.577
Nickel	0.0187	0.008	0.008	0.008	0.0133	0.0154	0.0039	0.0088	0.0062	0.003	0.008	1.774
Selenium	0.0012	0.0005	0.0008	0.0015	0.0013	0.0016	0.0022	0.001	0.0016	0.001	0.001	1.521
Silver	0.008	0.0035	0.0053	0.0035	0.0035	0.0093	0.0076	0.0025	0.0054	0.0025	0.005	1.615
Thallium	0.0017	0.0015	0.0015	0.0015	0.002	0.001	0.001	0.0015	0.001	0.001	0.001	1.297
Zinc	0.2	0.068	0.103	0.135	0.0977	0.0985	0.411	0.1067	0.0703	0.063	0.113	1.764
Cyanide	0.005	0.022	0.021	0.0192	0.0235	0.0123	0.0206	0.0063	0.0065	0.0167	0.013	1.815
Petroleum Hydrocarbons(ug/l)	1.3	0.05	0.5	0.25	0.95	0.05	1.35	0.05	0.05	0.07	0.198	4.318
Surfactants	3.2567	4.28	6.62	4.985	4.8333	4.245	3.615	1.87	3.08	3.21	3.802	1.411
Pesticides/PCBs(ug/l)												
4,4'-DDD	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
4,4'-DDE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
4,4'-DDT	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Aldrin	0.07	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.012	1.850
alpha-BHC	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Aroclor-1016	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284
Aroclor-1221	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284
Aroclor-1232	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284

Appendix A, Table A-5, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Pesticides/PCBs(ug/l)												
Aroclor-1242	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284
Aroclor-1248	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284
Aroclor-1254	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284
Aroclor-1260	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284
beta-BHC	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Chlordane	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284
delta-BHC	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Dieldrin	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Endosulfan I	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Endosulfan II	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Endosulfan Sulfate	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Endrin	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Endrin Aldehyde	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
gamma-BHC (Lindane)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Heptachlor	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Heptachlor Epoxide	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010	1.000
Toxaphene	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.040	3.284
Semvolatiles (ug/l)												
1,2,4-Trichlorobenzene	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
1,2-Dichlorobenzene	0.2	0.2	0.3	0.2	0.4	0.4333	0.4143	0.4	0.6286	0.425	0.336	1.491
1,3-Dichlorobenzene	0.2	0.2	0.3	0.2	0.4	0.4333	0.4143	0.4	0.6286	0.425	0.336	1.491
1,4-Dichlorobenzene	0.2	0.2	0.3	0.2	0.4	0.4333	0.4143	0.4	0.6286	0.425	0.336	1.491
2,4,5-Trichlorophenol	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
2,4,6-Trichlorophenol	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
2,4-Dichlorophenol	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
2,4-Dimethylphenol	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
2,4-Dinitrophenol	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
2,4-Dinitrotoluene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548

Appendix A, Table A-5, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Semvolatiles (ug/l)												
2,6-Dinitrotoluene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
2-Chloroethylvinyl Ether	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
2-Chloronaphthalene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
2-Chlorophenol	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
2-Methylnaphthalene	7	3	1.2	0.2	2.8	4	3.5	2.6	2.0667	3	2.240	2.614
2-Methylphenol	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
2-Nitroaniline	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
2-Nitrophenol	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
3,3'-Dichlorobenzidine	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
3-Nitroaniline	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
4,6-Dinitro-2-methylphenol	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
4-Bromophenyl-phenylether	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
4-Chloraniline	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
4-Chlorophenyl-phenylether	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
4-Chloro-3-methylphenol	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
4-Methylphenol	20	25	36	31.5	29.6667	28.5	35.5	26.5	34.3333	20	28.125	1.241
4-Nitroaniline	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
4-Nitrophenol	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
Acenaphthene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Acenaphthylene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Anthracene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Benzoic Acid	94.6667	101.5	185	130	180	215	210	65.1	183.3333	120	138.986	1.490
Benzo(a)Anthracene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Benzo(a)Pyrene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Benzo(b)Fluoranthene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Benzo(g,h,i)Perylene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Benzo(k)Fluoranthene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Benzyl Alcohol	12.4	15	15	20	17	10	15	29	6.3333	10	13.859	1.520
bis(2-Chloroethoxy)Methane	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548

Appendix A, Table A-5, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Semvolatiles (ug/l)												
bis(2-Chloroethyl) Ether	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
bis(2-Chloroisopropyl)Ether	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
bis(2-Ethylhexyl)phthalate	13.3333	8	13.5	5.1	5.3333	17	3.5	3.1	9.3333	0.2	5.164	3.600
Butylbenzylphthalate	0.2	0.2	1.7	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.305	2.102
Chrysene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Dibenzofuran	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Dibenzo(a,h)Anthracene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Diethylphthalate	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Dimethylphthalate	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Di-n-butylphthalate	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Di-n-octylphthalate	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Fluoranthene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Fluorene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Hexachlorobenzene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Hexachlorobutadiene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Hexachlorocyclopentadiene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Hexachloroethane	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Indeno(1,2,3-cd)Pyrene	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Isophorone	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Naphthalene	1.7333	2	0.3	0.2	1.2	0.3	2	1.1	1.4	0.2	0.735	2.651
Nitrobenzene	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
N-Nitrosodiphenylamine	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
N-Nitroso-di-n-propylamine	0.2	0.2	0.3	0.2	0.2667	0.3	0.2	0.2	0.8	0.2	0.256	1.548
Pentachlorophenol	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
Phenanthrene	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552
Phenol	1.4667	2.1	0.3	2.6	4.2	5	15	6.5	1.7333	3	2.759	2.832
Pyrene	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.8	0.2	0.259	1.552

Appendix A, Table A-5, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Volatile Organic Compounds(ug/l)												
1,1,1-Trichloroethane	0.5	2.3333	1.875	0.5	4.25	0.5	0.5	0.5	0.5	0.5	0.825	2.293
1,1,2,2-Tetrachlorethane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
1,1,2-Trichloroethane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
1,1-Dichloroethane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
1,1-Dichloroethylene	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
1,2-Dichloroethane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
1,2-Dichloropropane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
2-Butanone (MEK)	0.5	0.5	10.125	12	0.5	0.5	0.5	0.5	5.125	0.5	1.171	4.003
2-Hexanone (MPK)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
4-Methyl-2-pentanone (MIBK)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Acetone	0.5	0.5	0.5	0.5	225	294.25	184.2	242.5	142	193.5	18.646	22.650
Benzene	0.5	2.3333	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.583	1.628
Bromodichloromethane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Bromoform	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Bromomethane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Carbon Disulfide	0.5	0.5	0.5	0.5	2.125	4.25	2.4	0.5	0.5	0.5	0.837	2.336
Carbon tetrachloride	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Chlorobenzene	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Chlorodibromomethane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Chloroethane	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Chloroform	5.375	6.6667	9	8.25	7.875	7.5	10.6	9.5	0.5	2.3333	5.329	2.548
Chloromethane	0.5	0.5	0.5	1.875	3.75	1.875	1.6	0.5	0.5	0.5	0.895	2.188
cis-1,3-Dichloropropene	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Ethylbenzene	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Methylene Chloride	4	0.5	4	8.75	6.125	4.25	4.3	5.875	0.5	2.6667	3.012	2.712
Styrene	0.5	0.5	0.5	0.5	0.5	4.125	0.5	0.5	0.5	0.5	0.617	1.949
Tetrachloroethene	16.125	5.6667	1.625	6.625	6	2.625	0.5	6.25	2.875	3.3333	3.687	2.578
Toluene	7.25	10.3333	5.875	10	15	6.75	1.4	3.75	0.5	3.8333	4.626	2.791
trans-1,2-Dichloroethene	0.5	2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.574	1.550

Appendix A, Table A-5, Deer Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Volatile Organic Compounds(ug/l)												
trans-1,3-Dichloropropene	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Trichloroethene	0.5	4.1667	3.25	0.5	0.5	0.5	0.5	1.875	0.5	0.5	0.851	2.404
Vinyl Acetate	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Vinyl Chloride	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.500	1.000
Xylenes	8.625	8.5	4	5	11.5	2.5	2.5	2.5	2.5	2.5	4.185	1.850

NOTES: Average concentrations were calculated using 1/2 the MDL for those compounds that were below detection.

Appendix A Table A-6 Deer Island Effluent, Harbor Studies Characterization

(November 1991 - June 1992)

PAHs	Nov 13	Nov 14	Nov 15	June 10	June 12	June 14	Geometric Mean	Geometric Std Dev
1,6,7-trimethylnaphthalene	532	768	410	507	435	349	484.2	1.3
1-methyl naphthalene	1804	3339	1512	2424	2295	1367	2026.5	1.4
1-methylphenanthrene	110	101	95	147	100	131	112.5	1.2
2,6-dimethylnaphthalene	1778	3154	1462	915	760	571	1217.4	1.9
2-methylnaphthalene	2661	4979	2224	3785	3553	2067	3058.8	1.4
Acenaphthene	1	1	1	157	151	139	12.2	15.5
Acenaphthylene	16	14	15	23	1	20	10.8	3.2
Anthracene	27	28	27	42	35	44	33.1	1.3
Benz(a)anthracene	39	33	34	55	43	49	41.4	1.2
Benzo(a)pyrene	23	18	18	34	22	26	22.9	1.3
Benzo(b)fluoranthene	33	25	25	75	46	47	38.7	1.5
Benzo(e)pyrene	23	18	21	62	34	39	29.9	1.6
Benzo(ghi)perylene	16	12	11	28	32	36	20.2	1.7
Benzo(k)fluoranthene	25	17	18	37	24	25	23.5	1.3
Biphenyl	317	540	253	418	367	294	353.6	1.3
Chrysene	45	39	40	81	57	73	53.6	1.4
Dibenzo(a,h)anthracene	3	2	2	1	1	1	1.5	1.6
Fluoranthene	123	102	102	130	92	107	108.6	1.1
Fluorene	203	275	175	223	189	173	203.6	1.2
Indeno(1,2,3-cd)pyrene	20	18	21	33	23	24	22.7	1.2
Naphthalene	1472	2692	1325	1823	1829	1403	1704.9	1.3
Perylene	6	5	5	11	8	10	7.1	1.4
Phenanthrene	327	317	283	415	307	343	329.6	1.1
Pyrene	121	105	104	184	142	165	133.6	1.3
Total PAHs	**9721**	**16602**	**8184**	**11630**	**10544**	**7503**	**10330.2**	**1.3**

Appendix A, Table A-6, Deer Island Treatment Plant

PESTICIDES/PCBs	Nov 13	Nov 14	Nov 15	June 10	June 12	June 14	Geometric Mean	Geometric Std Dev
Aldrin	1	1	1	1	1	1	1.0	1.0
Chlordane	4.6	3.4	3	22.3	12.8	15	7.7	2.4
DDD	2.3	1.7	1.7	62.6	40.5	46.5	9.6	6.0
DDE	6.6	5.5	7.4	12.5	13.6	1	6.0	2.6
DDT	13.8	14.6	17.2	5.5	10.9	14	11.9	1.5
Dieldrin	40.1	39.7	54.2	55.1	63	77.9	53.5	1.3
Endrin	1	1	1	1	1	1	1.0	1.0
Heptachlor	1	1	1	5.5	6.4	1	1.8	2.5
Heptachlor epoxide	1	1	1	1	1	1	1.0	1.0
Hexachlorobenzene	1	4.6	5.7	1	17.2	56.5	5.4	4.9
Lindane	19	17	21.1	32.2	34.8	53.4	27.2	1.5
Transnonaroclor	1	1	1	18.1	16	13.1	3.9	4.5
Total PCB Congeners	**10.5**	**10.8**	**51.5**	**47.8**	**129.3**	**40.1**	33.6	**2.7**

Notes: Reporting limit is 10 ng/L. Geometric mean concentrations calculated by substituting 1/2 the MDL for parameters below detection.

Appendix A Table A-7 Deer Island Priority Pollutants Loadings, NPDES Data, FY 1992

	LOADINGS (lbs/d)												
	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	Average Loading
METALS													
Arsenic	1.84	4.00	6.66	2.17	4.85	2.29	2.25	2.03	4.47	6.68	3.95	2.07	3.61
Boron	802	751	956	616	820	608	545	606	648	742	581	699	698
Cadmium	0.92	1.00	2.22	1.08	1.21	1.14	2.25	2.03	1.12	1.11	3.95	1.03	1.59
Chromium (Total)	18.43	7.01	7.76	7.59	7.28	20.57	6.76	6.10	6.71	6.68	11.86	5.17	9.33
Chromium (Hex)	6.45	7.01	7.76	7.59	8.49	8.00	14.26	6.10	6.71	6.68	3.95	5.17	7.35
Copper	153	134	140	124	102	139	124	126	125	114	115	137	128
Lead	42.39	18.41	20.85	39.03	15.78	47.99	36.03	22.38	24.59	20.04	11.86	18.61	26.50
Mercury	0.92	0.60	0.67	0.22	0.24	0.69	0.23	0.20	0.67	0.89	0.79	0.62	0.56
Molybdenum	7.37	22.02	8.87	8.67	18.20	17.14	13.51	12.21	13.41	13.36	25.70	8.27	14.06
Nickel	15.67	17.01	18.86	18.43	20.63	19.42	16.89	15.26	40.23	16.70	11.86	12.41	18.61
Selenium	1.84	2.00	2.22	2.17	2.43	2.29	2.25	2.03	2.24	6.68	1.98	2.07	2.52
Silver	3.69	10.01	15.53	4.34	21.84	13.71	4.50	10.17	4.47	4.45	2.96	3.10	8.23
Thallium	1.84	2.00	2.22	2.17	2.43	2.29	2.25	2.03	2.24	2.23	1.98	4.14	2.32
Zinc	153	138	133	163	153	190	155	153	199	156	152	172	160
Cyanide	9.22	10.01	11.09	15.18	14.56	31.99	27.02	28.49	35.76	20.04	9.88	10.34	18.63
Phenols	35.02	62.05	46.59	34.69	31.55	52.56	67.55	61.05	53.64	28.95	63.25	41.37	48.19
PHC	6340	10258	2218	10495	5279	6456	6474	5209	3856	4287	7827	6722	6285
PESTICIDES AND PCBs													
b-BHC	1.77	0.28	0.06	0.02	0.02	0.37	0.27	0.47	0.01	0.51	0.14	0.02	0.33
g-BHC	0.05	0.02	0.06	0.02	0.02	0.06	0.02	0.05	0.01	0.02	0.02	0.35	0.06
4,4'DDT	0.09	3.60	0.11	0.04	0.05	0.11	0.05	0.10	0.02	0.04	0.04	0.04	0.36
Endosulfan I	0.05	0.02	0.06	0.02	0.02	0.75	0.02	0.05	0.01	0.02	0.55	0.02	0.13
Chlordane	0.46	0.20	0.55	0.22	0.24	0.57	0.23	0.51	0.11	0.22	0.20	0.35	0.32

Appendix A, Table A-7, Deer Island Treatment Plant

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	LOADINGS
SEMI-VOLATILE ORGANICS													
2-Methylnaphthalene	3.69	8.01	4.44	6.51	2.43	2.29	4.50	6.10	6.71	6.68	9.88	2.07	5.27
4-Methyl phenol	23.96	72.06	39.93	2.17	36.40	2.29	6.76	61.05	38.00	40.08	41.51	51.71	34.66
Benzyl alcohol	18.43	24.02	24.40	36.86	2.43	18.28	2.25	24.42	29.06	24.49	1.98	2.07	17.39
bis(2-ethylhexyl)pthalate	16.59	16.01	31.06	21.68	26.70	18.28	20.27	16.28	24.59	2.23	19.77	24.82	19.86
Butylbenzyl phthalate	3.69	10.01	2.22	6.51	2.43	2.29	6.76	6.10	2.24	2.23	5.93	2.07	4.37
Di-n-butylpthalate	3.69	8.01	4.44	6.51	2.43	2.29	6.76	4.07	2.24	2.23	5.93	6.20	4.56
Di-n-octylphthalate	3.69	2.00	6.66	2.17	2.43	2.29	2.25	2.03	2.24	2.23	1.98	2.07	2.67
Diethyl pthalate	3.69	14.01	6.66	8.67	2.43	2.29	2.25	10.17	2.24	2.23	7.91	6.20	5.73
Phenol	3.69	10.01	2.22	2.17	2.43	2.29	2.25	2.03	13.41	2.23	1.98	2.07	3.90
VOLATILE ORGANICS													
1,1,1-Trichloroethane	9.22	14.68	13.31	3.25	3.64	7.62	3.00	1.02	3.35	1.48	2.64	1.03	5.35
1,2-Dichloroethene	7.37	6.67	4.99	2.17	8.90	6.86	6.76	1.02	6.71	8.91	8.57	6.20	6.26
2-Butanone	1.84	2.00	2.22	2.17	2.43	2.29	2.25	153.64	2.24	21.53	15.15	17.24	18.75
Acetone	94.00	473.71	169.71	200.94	169.89	143.20	300.24	190.27	461.92	101.69	329.43	322.66	246.47
Benzene	4.92	2.34	2.22	3.61	4.85	4.57	4.50	1.02	5.22	2.60	3.95	4.14	3.66
Bromodichloromethane	7.99	4.67	2.77	1.45	1.62	1.52	1.13	7.12	1.49	1.11	0.99	1.03	2.74
Bromoform	1.84	1.00	1.11	1.08	1.21	1.14	1.13	1.02	1.12	1.11	0.99	1.03	1.15
Bromomethane	3.07	2.67	4.44	2.17	2.43	2.29	2.25	2.03	2.24	2.23	1.98	2.07	2.49
Carbon disulfide	8.91	12.68	18.86	2.89	3.24	2.29	6.00	1.02	1.12	1.11	15.15	4.83	6.51
Chloroform	25.80	23.35	28.84	13.01	15.37	13.71	13.51	16.28	15.65	9.65	17.79	15.86	17.40
Chloromethane	12.90	7.34	16.64	2.17	7.28	2.29	2.25	2.03	2.24	2.23	1.98	3.45	5.23
Dibromochloromethane	3.38	1.33	1.11	1.08	1.21	1.14	1.13	1.53	1.12	1.11	0.99	1.03	1.35
Ethyl benzene	5.53	1.00	1.66	1.08	1.62	1.14	1.13	1.02	1.12	2.23	0.99	1.03	1.63
Methylene chloride	60.21	34.03	18.86	2.89	17.80	15.23	3.00	1.02	7.45	12.62	21.74	8.96	16.98
Styrene	0.92	1.00	1.11	1.08	1.21	4.57	1.13	1.02	1.12	1.11	0.99	1.03	1.36
Tetrachloroethene	17.20	12.68	8.87	8.67	16.99	13.71	32.28	10.17	17.14	30.43	18.45	7.58	16.18
Toluene	27.65	14.01	13.31	10.84	11.33	12.19	11.26	16.28	14.16	11.88	13.84	9.65	13.87
Trichloroethene	5.53	5.34	6.66	5.78	9.71	8.38	1.13	3.05	8.94	8.91	5.93	8.27	6.47
Vinyl Acetate	1.84	3.34	2.22	2.17	2.43	2.29	2.25	2.03	5.96	2.23	16.47	2.07	3.77
Xylene	28.88	9.01	8.87	5.42	10.11	11.04	7.51	8.14	16.76	12.25	13.18	1.03	11.02

NOTES: Loadings calculated from the NPDES data set using the average daily flow for the month.

Appendix A Table A-8 Deer Island Treatment Plant, Priority Pollutants, NPDES Data

	FY 89	FY 90	FY 91	FY 92
METALS (ug/L)				
Arsenic	1.14	1.66	1.39	1.51
Boron				322.00
Cadmium	2.60	2.12	1.50	0.67
Chromium (Total)	10.96	4.50	5.76	3.94
Chromium (Hex)	6.93	5.00	4.22	3.28
Copper	131.69	82.71	53.68	59.34
Lead	18.43	16.75	11.90	11.36
Mercury	0.12	0.16	0.30	0.23
Molybdenum				6.10
Nickel	10.10	9.04	7.22	8.28
Selenium	1.21	1.50	1.31	1.10
Silver	7.73	7.65	3.24	3.06
Thallium	0.89	0.50	0.70	1.06
Zinc	95.12	71.63	74.29	74.18
Cyanide (mg/l)	0.060	0.020	0.020	0.010
Phenols (mg/l)	0.020	0.010	0.020	0.020
PHC (mg/l)	2.890	1.960	2.420	2.720
PESTICIDES AND PCBs (ug/l\L)				
4,4'DDT	0.060	0.020		0.040
a-BHC	0.030	0.010	0.010	
Aldrin		0.020		
b-BHC	0.040	0.020		0.060
Chlordane	0.280	0.050		0.130

	FY 89	FY 90	FY 91	FY 92
Pesticides (con't)				
d-BHC		0.010		
Dieldrin		0.010		
Endosulfan I		0.010		0.020
g-BHC	0.050	0.020	0.010	0.020
Heptachlor	0.030	0.020		
Heptachlor Epoxide	0.050	0.040		
SEMIVOLATILE ORGANICS (ug/l)				
2-Methylnaphthalene	1.46	1.05	1.83	2.20
4-Methyl phenol	6.60	2.99	3.67	10.52
Benzoic Acid	19.19	5.00		
Benzyl alcohol	3.88	1.60	3.34	5.10
bis(2-chloroethyl)ether	1.46	1.05	1.67	
bis(2-ethylhexyl)pthalate	4.58	4.57	2.54	8.14
Butylbenzyl phthalate	1.46	1.05	1.53	1.75
Di-n-butylpthalate	1.84	1.55	1.53	1.93
Di-n-octylphthalate	1.46	1.05	1.53	1.16
Diethyl pthalate	1.80	1.61	1.53	2.16
Naphthalene	1.46	1.05	1.62	
Phenol	1.46	1.05	1.88	1.41
VOLATILE ORGANICS (ug/l)				
1,1,1-Trichloroethane	1.75	2.19	2.58	1.73
1,2-Dichloroethene	1.51	0.55	0.49	2.55
2-Butanone	8.66	11.13	2.58	2.45
Acetone	107.00	151.38	164.35	101.00
Benzene	1.99	1.86	1.49	1.57
Bromodichloromethane	0.73	0.54	0.84	0.95

Appendix A, Table A-8, Deer Island Treatment Plant

	FY 89	FY 90	FY 91	FY 92
Volatile Organics (Con't)				
Bromoform	0.60	0.99	0.49	0.53
Bromomethane	1.48	1.07	1.07	1.13
Carbon disulfide	3.05	0.65	1.00	1.94
Carbon Tetrachloride	0.50	0.56	0.49	
Chlorobenzene	0.51	0.55	0.49	
Chloroform	6.37	5.39	5.95	7.77
Chloromethane	5.91	2.10	1.33	1.77
Dibromochloromethane	0.72	0.84	0.56	0.59
Ethyl benzene	1.41	2.96	0.66	0.65
Methylene chloride	11.40	3.17	6.44	4.89
Styrene	0.73	0.61	0.49	0.56
Tetrachloroethene	7.76	5.49	5.17	6.82
Toluene	10.78	7.58	6.85	6.24
Trichloroethene	4.27	3.88	3.41	2.68
Vinyl Acetate	1.00	1.00	0.98	1.35
Xylene	5.59	3.13	4.43	4.15
Average Flow (MGD)	259.00	272.80	262.42	257.17

Notes: Data from NPDES Monitoring Program, concentrations are geometric means

Appendix B

Appendix B Table B-1 Nut Island Treatment Plant, Operations Summary, Fiscal Year 1992

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	MIN VALUE	AVE VALUE	MAX VALUE	STD DEV
FLOW (MGD)																
AVERAGE	82.61	89.37	103.7	115.82	165.7	142.8	139.9	124.3	144.5	153.5	135.4	125.7		127		25.33
MINIMUM	75.81	72.55	81.78	102.97	134.16	120.3	117.5	109.7	97.64	101.5	108.7	104.9	73			18.35
MAXIMUM	107.34	145.84	201.16	138.1	253.7	191.22	193.5	148	177.74	176.3	173.7	165			254	36.98
TEMP (DEG F)	69.6	70.9	69	66.4	60.3	57.6	56	55.3	56.7	58.3	60	64		62		5.71
EFFLUENT pH																
MINIMUM	6.7	6.5	6.6	6.6	6.6	6.7	6.6	6.6	6.5	6.7	6.7	6.7	6.8			0.07
MAXIMUM	7.2	7.2	7.1	7.0	6.9	7.0	6.8	6.9	7.1	7.0	7.0	7.0			7.2	0.12
CONVENTIONAL PARAMETERS (mg/l)																
SETTLEABLE SOLIDS																
INFLUENT	13.7	39.3	6.5	8.6	6	6.3	5.2	8.6	7.3	6.6	8.1	7.5	5.2	10.3	39.3	9.38
EFFLUENT	0.9	1.2	1	1	0.9	1.2	1.5	1.7	1.3	1.4	1.2	1.2	0.9	1.2	1.7	0.24
BIOCHEMICAL OXYGEN DEMAND																
INFLUENT	250	259	200	234	141	162	150	215	182	164	178	192	141	194	259	38.74
EFFLUENT	122	108	101	108	62	84.5	90	119	96	90	100	110	62	99	122	16.42
TOTAL SUSPENDED SOLIDS																
INFLUENT	278	437	227	231	189	162	162	215	207	163	190	187	162.0	220.7	437.0	76.12
EFFLUENT	75	79	71	59.6	48	55	66	71	65	65	76	74	48.0	67.1	79.0	9.24
OIL AND GREASE																
INFLUENT	63.3	119.0	51.1	36.7	35.1	27.5	27.2	27.8	23.8	22.6	36.0	39.2	22.6	42.4	119.0	26.83
EFFLUENT	34.6	41.0	17.5	23.5	16.2	19.9	10.8	13.9	11.2	13.7	25.4	28.2	10.8	21.3	41.0	9.54
TOTAL COLIFORMS																
INFLUENT (E+06)	125.8	96.897	80.87	83.525	49.912	39.44	21.959	16.28	8.85	6.199	4.292	18.207	4.3	46.0	125.8	41.10
EFFLUENT	199	259	218	235	249	631	636	293	163	145	142	264	142.0	286.2	636.0	169.14
FECAL COLIFORM																
INFLUENT (E+06)	4.856	5	3.695	2.712	1.646	1.354	0.852	0.903	0.685	0.695	0.713	2.8	0.7	2.2	5.0	1.62
EFFLUENT	11	12	12	12	14	22	21	17	14	14	12	29	11.0	15.8	29.0	5.49

Appendix B, Table B-1, Nut Island Treatment Plant

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	MIN VALUE	AVE VALUE	MAX VALUE	STD DEV
RESIDUAL CHLORINE	3.1	2.8	2.8	2.9	2.5	2.3	2.3	2.8	2.4	2.5	2.5	2.4	2.3	2.6	3.1	0.26
CHLORIDES	602	481	5.3	501	395	406	362	457	385	380	419	484	5.3	406.4	602.0	143.23
METALS																
CHROMIUM																
INFLUENT	0.0070	0.0186	0.0190	0.0105	0.0144	0.0108	0.0170	0.0127	0.0198	0.0095	0.0081	0.0116	0.0070	0.0133	0.0198	0.004
EFFLUENT	0.0070	0.0106	0.0084	0.0037	0.0049	0.0066	0.0089	0.0037	0.0052	0.0069	0.0048	0.0059	0.0037	0.0064	0.0106	0.002
COPPER																
INFLUENT	0.1360	0.1640	0.1324	0.1040	0.0764	0.0840	0.0713	0.0794	0.0748	0.0681	0.0734	0.0929	0.0681	0.0964	0.1640	0.031
EFFLUENT	0.0660	0.0641	0.0557	0.0486	0.0436	0.0460	0.0446	0.0436	0.0500	0.0483	0.0564	0.0563	0.0436	0.0519	0.0660	0.008
CADMIUM																
INFLUENT	0.0032	0.0005	0.0011	0.0004	0.0008	0.0006	<.0005	0.0006	<.0005	0.0006	<.01	0.0008	0.0004	0.0010	0.0032	0.001
EFFLUENT	0.0032	0.0005	0.0004	0.0004	0.0007	<.0006	<.0005	<.0006	<.0005	<.0006	0.0003	0.0004	0.0003	0.0008	0.0032	0.001
LEAD																
INFLUENT	0.0190	0.0351	0.0603	0.0300	0.0543	0.0498	0.0530	0.0231	0.0577	0.0400	0.0425	0.0723	0.0190	0.0448	0.0723	0.016
EFFLUENT	0.0200	0.0154	0.0355	0.0122	0.0347	0.0347	0.0516	0.0192	0.0420	0.0400	0.0305	0.0573	0.0122	0.0328	0.0573	0.014
NICKEL																
INFLUENT	<.06	0.0020	0.0332	0.0255	0.0232	0.0249	0.0311	0.0236	0.0208	0.0190	0.0240	0.0348	<.06	0.0238	0.0348	0.009
EFFLUENT	<.06	0.0038	0.0250	0.0168	0.0128	0.0198	0.0300	0.0110	0.0100	0.0137	0.0204	0.0316	<.06	0.0177	0.0316	0.009
SILVER																
INFLUENT	0.0056	0.0071	0.0084	0.0032	0.0056	0.0056	0.0073	0.0062	0.0042	0.0056	0.0056	0.0083	0.0032	0.0061	0.0084	0.002
EFFLUENT	0.0056	0.0048	0.0053	0.0031	0.0039	0.0034	0.0060	0.0040	0.0037	0.0034	0.0042	0.0072	0.0031	0.0046	0.0072	0.001
ZINC																
INFLUENT	0.1315	1.0160	0.2270	0.0640	0.1350	0.1520	0.1235	0.1285	0.3310	0.1657	0.1266	0.1629	0.0640	0.2303	1.0160	0.256
EFFLUENT	0.1315	0.3960	0.1125	0.0658	0.1170	0.0660	0.0790	0.0665	0.1305	0.1236	0.0893	0.1323	0.0658	0.1258	0.3960	0.089
EFFLUENT NUTRIENTS (mg/l)																
TKN	20.400	20.600	16.940	14.400	10.220	10.360	13.300	17.200	12.040	14.300	21.560	16.660	10.2200	15.6650	21.5600	3.89
AMMONIA	11.100	11.100	7.980	9.520	5.600	2.870	7.000	10.600	5.600	8.120	9.520	8.330	2.8700	8.1117	11.1000	2.51
NITRATES								0.350	1.060	0.080	0.014	0.150	0.0140	0.3308	1.0600	0.43

Appendix B, Table B-1, Nut Island Treatment Plant

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	MIN VALUE	AVE VALUE	MAX VALUE	STD DEV
NITRITE								0.300	0.370	0.030	0.016	0.050	0.0160	0.1532	0.3700	0.17
ORTHOPHOSPHORUS	2.900	1.600	2.900	2.300	1.200	1.300	1.200	1.600	0.900	1.200	1.300	1.300	0.9000	1.6417	2.9000	0.68
TOTAL PHOSPHORUS	3.700	3.000	3.600	3.100	1.600	2.000	1.900	3.400	2.100	2.400	2.700	3.000	1.6000	2.7083	3.7000	0.70
SLUDGE																
PRIMARY SLUDGE																
FLOW (MGD)	0.2010	0.1850	0.2070	0.2160	0.2390	0.2504	0.2490	0.2850	0.2820	0.2860	0.3050	0.2580	0.1850	0.2470	0.3050	0.04
SCUM (MGD)	0.0206	0.016	0.017	0.022	0.02	0.02							0.0160	0.0193	0.0220	0.00
pH	5.43	5.22	5.45	5.41	5.6	5.6	5.6	5.63	5.67	5.69	5.7	5.3	5.2	5.5	5.7	0.16
SOLIDS (%)	7.12	8.6	6.46	6.33	5.39	5.73	5.9	6.33	5.87	5.3	6.9	6.8	5.3	6.4	8.6	0.90
VOLATILE SOLIDS (%)	92	80.9	83.3	83.11	80.2	82.6	84.4	86.12	81.65	84	79.7	79.4	79.4	83.1	92.0	3.46
GREASE (%)	12.1	12.52	13.8	13.4	13.44	12.24	6.9	6.75	8.86	9.54	11.3	12.2	6.8	11.1	13.8	2.48
DIGESTED SLUDGE																
FLOW (MGD)	0.201	0.185	0.207	0.216	0.239	0.250	0.249	0.285	0.282	0.286	0.305	0.258	0.185	0.247	0.305	0.04
pH	7.29	7	7	7	7	7	7	7	7	7	7	7	6.980	7.154	7.290	0.14
TOTAL SOLIDS (%)	5.64	3.15	4.06	4.43	3.16	3.19	3.11	2.72	2.78	2.37	2.67	3.10	2.370	3.365	5.640	0.92
VOLATILE SOLIDS (%)	67	62	64	61	65	70	68.1	66	66	66	61	60	60.400	64.727	69.690	2.95
GREASE (%)	7.10	7.10	7.10	7.10	7.10	4.48	4.68	7.96	3.65	20.00	9.69	11.70	3.650	8.138	20.000	4.33
CHROMIUM (mg/l)	1.600	1.390	1.517	1.035	0.958	0.950	1.760	0.873	0.658	0.660	0.670	0.753	0.658	1.069	1.760	0.40
COPPER (mg/l)	15.900	18.236	21.816	17.485	15.865	20.290	13.150	10.744	10.810	10.500	12.030	14.470	10.500	15.108	21.816	3.83
CADMIUM (mg/l)	0.160	0.096	0.115	0.080	0.197	0.089	0.067	<.06	0.056	0.075	<.01	0.082	<.01	0.1016	0.1965	0.04
LEAD (mg/l)	6.700	4.072	4.830	3.237	4.487	5.500	2.797	2.765	5.856	3.270	2.820	3.000	2.7654	4.1112	6.7000	1.36
NICKEL (mg/l)	0.880	0.992	1.569	1.052	0.855	0.930	0.740	0.544	<.26	0.610	0.600	0.680	<.26	0.8592	1.5690	0.29
SILVER (mg/l)	0.100	0.135	0.735	0.630	0.478	0.285	0.393	0.081	0.293	0.470	0.267	0.387	0.0805	0.3544	0.7350	0.20
ZINC (mg/l)	26.200	17.420	18.110	21.076	28.000	14.270	23.910	15.025	14.067	13.390	16.190	20.436	13.3900	19.0078	28.0000	4.94
GAS PRODUCED (cu. ft.)	0.821	0.888	0.834	0.797	0.805	0.851	0.840	0.893	0.857	0.866	0.978	0.955	0.7970	0.8654	0.9780	0.06

(*) Data reduced from Nut Island Monthly Operation Logs. All anayses were performed by Nut Island Laboratory.

Appendix B Table B-2 Nut Island Treatment Plant, Local Limits Study
(March 1991 - December 1991)

	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	GEOMETRIC MEAN	GEOMETRIC STD DEV
Metals (mg/l)												
Antimony	0.007	0.006	0.006	0.006	0.015	0.015	0.015	0.015	0.017	0.020	0.011	1.651
Arsenic	0.002	0.002	0.002	0.004	0.002	0.002	0.002	0.002	0.001	0.002	0.002	1.416
Beryllium	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	1.665
Cadmium	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.001	0.001	0.001	0.002	1.488
Chromium	0.005	0.007	0.007	0.005	0.006	0.004	0.004	0.004	0.004	0.004	0.005	1.297
Copper	0.074	0.081	0.084	0.087	0.127	0.110	0.104	0.079	0.063	0.064	0.085	1.255
Lead	0.012	0.011	0.013	0.007	0.010	0.006	0.007	0.012	0.006	0.010	0.009	1.342
Mercury	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0002	1.857
Molybdenum	0.020	0.005	0.015	0.014	0.025	0.050	0.050	0.050	0.083	0.040	0.027	2.307
Nickel	0.017	0.008	0.008	0.008	0.080	0.008	0.011	0.007	0.005	0.003	0.010	2.392
Selenium	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.001	1.633
Silver	0.005	0.004	0.004	0.004	0.005	0.009	0.005	0.006	0.004	0.005	0.005	1.360
Thallium	0.001	0.002	0.002	0.002	0.002	0.001	0.001	0.006	0.001	0.003	0.002	1.726
Zinc	0.137	0.091	0.110	0.120	0.156	0.125	0.380	0.096	0.077	0.088	0.123	1.572
Cyanide, Petroleum Hydrocarbons and Surfactants (mg/l)												
Cyanide	0.005	0.007	0.005	0.010	0.005	0.005	0.005	5.350	2.945	0.005	0.021	16.088
Petroleum Hydocarbons	0.050	0.050	0.265	0.220	3.720	0.068	3.100	0.000	0.000	0.050	0.026	119.695
Surfactants	1.647	3.515	4.210	5.520	10.495	4.550	4.250	50.000	180.000	4.620	8.045	4.092
Pesticidess/PCBs (ug/l)												
4,4'-DDD	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
4,4'-DDE	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
4,4'-DDT	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Aldrin	0.040	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.011	1.550
Alpha-BHC	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000

Appendix B, Table B-2, Nut Island Treatment Plant

	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	GEOMETRIC MEAN	GEOMETRIC STD DEV
Aroclor 1016	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1221	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1232	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1242	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1248	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1254	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1260	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Beta-BHC	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Chlordane	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Delta-BHC	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Dieldrin	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endosulfan I	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endosulfan II	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endosulfan Sulfate	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endrin	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endrin Aldehyde	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Gamma-BHC (Lindane)	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Heptachlor	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Heptachlor Epoxide	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Toxaphene	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Semi-volatile Organic Compounds (ug/l)												
1,2,4-Trichlorobenzene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
1,2-Dichlorobenzene	0.467	0.200	0.200	0.200	0.413	0.400	0.375	0.400	0.371	0.400	0.326	1.410
1,3-Dichlorobenzene	0.467	0.200	0.200	0.200	0.413	0.400	0.375	0.400	0.371	0.400	0.326	1.410
1,4-Dichlorobenzene	0.467	0.200	0.200	0.200	0.413	0.400	0.375	0.400	0.371	0.400	0.326	1.410
2,4,5-Trichlorophenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2,4,6-Trichlorophenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2,4-Dichlorophenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333

Appendix B, Table B-2, Nut Island Treatment Plant

	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	GEOMETRIC MEAN	STD DEV
2,4-Dimethylphenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2,4-Dinitrophenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2,4-Dinitrotoluene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2,6-Dinitrotoluene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2-Chloronaphthalene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2-Chlorophenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2-Methylnaphthalene	9.733	0.200	0.200	0.200	3.533	0.200	1.367	0.200	2.467	0.200	0.612	4.577
2-Methylphenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2-Nitroaniline	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
2-Nitrophenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
3,3'-Dichlorobenzidine	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
3-Nitroaniline	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
4,6-Dinitro-2-methylphenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
4-Bromophenyl-phenylether	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
4-Chloroaniline	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
4-Chlorophenyl-phenylether	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
4-Chloro-3-methylphenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
4-Methylphenol	20.000	25.500	20.000	27.000	34.667	31.500	25.000	27.000	11.067	15.000	22.530	1.416
4-Nitroaniline	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
4-Nitrophenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Acenaphthene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Acenaphthylene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Anthracene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Benzoic Acid	73.333	175.000	104.500	45.100	176.667	155.000	388.667	107.000	45.400	54.500	105.476	2.008
Benzo(a)Anthracene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Benzo(a)Pyrene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Benzo(b)Fluoranthene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Benzo(g,h,i)Perylene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Benzo(k)Fluoranthene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333

Appendix B, Table B-2, Nut Island Treatment Plant

	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	GEOMETRIC MEAN	STD DEV
Benzyl Alcohol	0.467	10.000	13.500	25.000	20.667	20.500	15.000	20.000	10.000	10.000	10.719	3.167
bis(2-Chloroethoxy)Methane	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
bis(2-Chloroethyl)Ether	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
bis(2-Chloroisopropyl)Ether	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
bis(2-Ethylhexyl)phthalate	19.000	8.000	8.000	6.000	7.000	26.500	7.000	9.000	5.333	5.000	8.623	1.719
Butylbenzylphthalate	10.067	2.600	1.100	1.100	0.267	0.200	1.100	0.200	0.200	0.200	0.656	3.890
Chrysene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Dibenzofuran	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Dibenzo(a,h)Anthracene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Diethylphthalate	1.067	0.200	2.600	0.200	0.267	0.200	0.767	0.200	0.200	0.200	0.360	2.540
Dimethylphthalate	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Di-n-butylphthalate	1.733	0.200	0.200	3.600	0.267	0.200	0.167	0.200	0.200	0.200	0.335	2.941
Di-n-octylphthalate	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Fluoranthene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Fluorene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Hexachlorobenzene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Hexachlorobutadiene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Hexachlorocyclopentadiene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Hexachloroethane	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Indeno(1,2,3-cd)Pyrene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Isophorone	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Naphthalene	1.400	0.200	0.200	0.200	0.867	0.200	0.167	0.200	0.800	0.200	0.317	2.226
Nitrobenzene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
N-Nitrosodiphenylamine	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
N-Nitroso-di-n-propylamine	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Pentachlorophenol	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333
Phenanthrene	1.400	0.200	0.200	0.200	1.533	0.200	0.167	0.200	0.200	0.200	0.292	2.343
Phenol	6.733	5.100	5.100	5.100	16.667	10.000	8.333	10.000	6.400	3.100	6.904	1.604
Pyrene	0.467	0.200	0.200	0.200	0.267	0.200	0.167	0.200	0.200	0.200	0.220	1.333

Appendix B, Table B-2, Nut Island Treatment Plant

	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	GEOMETRIC MEAN	STD DEV
Volatile Organic Compounds (ug/l)												
1,1,1-Trichloroethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.000	0.500	0.609	1.756
1,1,2,2-Tetrachloroethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
1,1,2-Trichloroethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
1,1-Dichloroethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
1,1-Dichloroethene	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
1,2-Dichloroethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
1,2-Dichloropropane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
2-Butanone	44.400	13.125	87.625	78.200	68.900	185.000	45.200	195.000	196.500	385.000	89.757	2.660
2-Chloroethylvinyl Ether	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
2-Hexanone	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
4-Methyl-2-pentanone	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Acetone	0.600	0.500	0.500	0.500	96.400	242.750	104.500	177.625	105.750	390.000	16.324	19.905
Benzene	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Bromodichloromethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Bromoform	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Bromomethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Carbon Disulfide	0.600	0.500	0.500	0.500	0.500	7.875	1.600	0.500	0.500	0.500	0.754	2.462
Carbon tetrachloride	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Chlorobenzene	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Chlorodibromomethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Chloroethane	0.600	6.625	4.000	7.500	5.600	2.125	0.500	0.500	0.500	0.500	1.566	3.367
Chloroform	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Chloromethane	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
cis-1,3-Dichloropropene	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Ethylbenzene	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Methylene Chloride	0.600	0.500	0.500	2.900	0.500	2.125	0.500	0.500	0.500	0.500	0.702	1.959
Styrene	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Tetrachloroethene	9.800	9.250	7.250	4.600	3.700	4.000	0.500	5.000	0.500	4.625	3.478	2.931

Appendix B, Table B-2, Nut Island Treatment Plant

	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	GEOMETRIC MEAN	GEOMETRIC STD DEV
Toluene	2.400	1.875	4.625	6.600	4.800	5.125	3.700	5.875	2.750	5.125	3.995	1.516
Total Xylenes	0.600	1.625	0.500	0.500	5.200	2.500	2.500	2.500	2.500	4.000	1.697	2.364
trans-1,2-Dichloroethene	0.600	0.500	0.500	0.500	0.500	0.500	3.300	0.500	0.500	0.500	0.615	1.810
trans-1,3-Dichloropropene	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Trichloroethene	0.600	2.125	0.500	0.500	1.400	1.875	3.700	0.500	0.500	0.500	0.909	2.164
Vinyl Acetate	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059
Vinyl Chloride	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.509	1.059

Note: Geometric mean concentrations calculated by substituting 1/2 the MDL for those compounds that were below detection levels.

Appendix B B-3 Nut Island Influent, Harbor Studies Characterization

(November 1991 - June 1992)

PAHs	Nov 13	Nov 14	Nov 15	June 10	June 12	June 14	Geometric Mean	Geometric Std Dev
1,6,7-trimethylnaphthalene	415	244	394	366	149	304	295.2	1.5
1-methyl naphthalene	1013	534	947	777	541	547	700.1	1.3
1-methylphenanthrene	136	74	131	125	47	114	97.9	1.5
2,6-dimethylnaphthalene	1144	628	880	409	197	282	493.0	2.0
2-methylnaphthalene	1628	837	947	1269	893	899	1046.6	1.3
Acenaphthene	1	1	1	93	52	98	8.8	11.0
Acenaphthylene	5	4	5	1	1	1	2.2	2.3
Anthracene	19	10	20	41	18	36	21.6	1.7
Benz(a)anthracene	28	13	38	67	21	62	32.6	1.9
Benzo(a)pyrene	12	7	24	61	1	57	13.8	4.7
Benzo(b)fluoranthene	16	11	37	115	24	121	36.0	2.7
Benzo(g,h,i)perylene	10	5	11	86	18	85	20.4	3.3
Benzo(k)fluoranthene	13	7	24	83	17	82	25.1	2.7
Biphenyl	224	132	171	462	172	193	206.5	1.5
Chrysene	24	15	42	86	33	72	38.2	1.9
Dibenzo(a,h)anthracene	1	1	2	117	1	22	4.2	7.6
Fluoranthene	70	44	109	159	62	38	70.8	1.7
Fluorene	172	107	156	223	104	226	157.1	1.4
Indeno(1,2,3-c,d)pyrene	13	10	26	105	1	111	18.4	5.8
Naphthalene	1003	637	663	1199	881	685	821.1	1.3
Perylene	4	2	7	21	1	15	5.1	3.2
Phenanthrene	305	188	295	419	180	390	281.5	1.4
Pyrene	83	50	108	179	63	158	96.3	1.7
Total PAHs	**6355**	**3569**	**4735**	**6442**	**3473**	**4781**	4750.1	1.3

Appendix B, Table B-3, Nut Island Treatment Plant

Pesticides/PCBs	Nov 13	Nov 14	Nov 15	June 10	June 12	June 14	Mean	Std Dev
Aldrin	4.6	1	1	1	1	1	1.3	1.9
Chlordane	7.5	6.4	11.1	1	1	1	2.8	3.2
DDD	1	1	2.2	35.5	4	35.6	4.7	5.2
DDE	4.5	5.5	5.2	9	1	1	3.2	2.6
DDT	5	11.1	6.2	10	1	12.9	6.0	2.6
Dieldrin	40.9	43	89.1	94.8	65.4	225.1	77.6	1.9
Endrin	1	1	1	1	1	1	1.0	1.0
Heptachlor	1.8	0.5	1	1	1	1	1.0	1.5
Heptachlor epoxide	1	0.6	1	1	1	1	.9	1.2
Hexachlorobenzene	4.8	4.6	5.3	16.9	1	70.8	7.2	4.2
Lindane	7	6.4	10.4	31.6	143.1	31.9	20.2	3.3
Transnonaroclor	3.5	1	2.6	20.1	14.7	20.5	6.2	3.5
Total PCBs	**28.3**	**2.6**	**64.8**	**19.1**	**10.5**	**30.3**	**17.5**	**3.0**

Reporting Limit is 10 ng/L

Appendix B Table B-4 Nut Island Effluent Characterization, NPDES Program, FY 1992

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TIMES DETECTED	GEOMETRIC MEAN	GEOMETRIC STD DEV
METALS (ug/l)															
Antimony	**5**	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	**3**	2.5	2 of 12	2.689	1.224
Arsenic	**3**	**3**	**3**	**2**	0.5	1	1	**2**	**3**	1	1	1	6 of 12	1.528	1.843
Boron	**346**	**259**	**330**	**202**	**158**	**177**	**150**	**189**	**189**	**197**	**209**	**214**	12 of 12	211.224	1.298
Cadmium	0.5	0.5	0.5	0.5	0.5	0.5	**1**	**4**	0.5	0.5	**2**	0.5	3 of 12	0.707	2.000
Chromium (total)	**14**	3.5	3.5	3.5	3.5	3	**11**	3	3	**7**	**6**	2.5	4 of 12	4.481	1.752
Chromium (Hex.)	3.5	3.5	3.5	3.5	3.5	3	**5**	3	3	3	2	2.5	1 of 12	3.160	1.232
Copper	**69**	**66**	**76**	**56**	**42**	**51**	**42**	**58**	**52**	**49**	**55**	**60**	12 of 12	55.480	1.200
Lead	**8**	**6.5**	**8.3**	**10**	**6.5**	**6.5**	**7**	**9**	**8**	**7**	**5**	**6**	12 of 12	7.197	1.210
Mercury	**0.2**	**0.4**	**0.4**	0.1	**0.2**	0.1	0.1	0.1	**0.6**	**0.4**	**0.4**	0.1	7 of 12	0.207	2.030
Molybdenum	4	4	4	4	7.5	7.5	**16**	6	6	6	6	6	1 of 12	5.903	1.484
Nickel	8.5	8.5	8.5	8.5	8.5	8.5	7.5	7.5	7.5	7.5	**19**	**17**	2 of 12	9.236	1.373
Selenium	1	1	1	1	1	1	1	1	1	1	**3**	1	1 of 12	1.096	1.373
Silver	2	2	**7**	**5**	**8**	**6**	2	2	2	2	**4**	2	5 of 12	3.123	1.777
Thallium	**2**	1	1	1	1	**3**	1	1	1	1	1	**4**	3 of 12	1.303	1.651
Zinc	**62**	**68**	**70**	**54**	**57**	**53**	**53**	**74**	**70**	**72**	**70**	**61**	12 of 12	63.204	1.135
Cyanide (mg/l)	0.005	0.005	0.003	0.003	**0.012**	**0.009**	**0.015**	**0.012**	**0.009**	**0.005**	**0.016**	0.005	7 of 12	0.007	1.901
Phenols (mg/l)	**0.025**	**0.030**	**0.012**	**0.024**	**0.019**	**0.026**	**0.028**	**0.046**	**0.023**	**0.018**	**0.039**	**0.027**	12 of 12	0.025	1.420
PHC (mg/l)	**2.7**	**3.6**	**1.8**	**1.9**	**1.3**	**2.1**	1.7	**2.4**	**2.1**	**2.3**	**1.6**	1.0	10 of 12	1.925	1.399
PESTICIDES AND PCBs (ug/l)															
b-BHC	**1.3**	**1.00**	**0.29**	**0.24**	**0.72**	**0.36**	**0.73**	**0.67**	**0.34**	0.005	**0.41**	**0.076**	11 of 12	0.303	4.468
4,4'DDD	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.01	**0.47**	0.01	1 of 12	0.049	2.678
4,4'DDT	0.05	**0.43**	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.01	0.01	0.01	1 of 12	0.042	2.910
Endosulfan I	0.025	0.025	0.025	**0.92**	0.025	0.025	0.025	0.05	0.025	0.005	**0.24**	0.005	2 of 12	0.033	4.226
Chlordane	0.25	**0.40**	0.25	0.25	0.25	0.25	0.25	0.5	0.25	0.05	0.1	**0.18**	2 of 12	0.217	1.828

Appendix B, Table B-4, Nut Island Treatment Plant

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TIMES DETECTED	GEOMETRIC MEAN	STD DEV
SEMIVOLATILE ORGANICS (ug/l)															
4-Methyl phenol	**27**	**33**	**20**	1	**7**	1	**2**	**26**	**13**	**15**	**14**	**24**	10 of 12	9.312	3.617
Benzyl alcohol	**35**	**17**	1	**10**	1	**8**	**16**	**13**	**12**	**9**	**10**	**24**	10 of 12	8.928	3.022
bis(2-ethylhexyl)pthalate	**14**	**13**	**11**	**13**	**8**	**7**	**14**	**11**	**10**	**12**	**9**	**13**	12 of 12	11.004	1.254
Butyl benzylpthalate	**4**	**5**	**2**	**3**	1	1	**2**	**5**	1	**5**	**2**	**4**	9 of 12	2.455	1.907
Di-n-butylpthalate	3	**4**	**2**	1	1	1	1	**5**	1	**3**	**2**	**3**	7 of 12	1.896	1.853
Diethylpthalate	**3**	**8**	**3**	**5**	1	1	1	**6**	1	**7**	**3**	1	7 of 12	2.444	2.340
Phenol	1	1	1	1	1	1	1	1	1	**6**	1	1	1 of 12	1.161	1.677
VOLATILE ORGANICS (ug/l)															
1,1,1-trichloroethane	**1**	0.5	**2**	**3**	**3**	**5**	**3**	**1**	**2**	**1**	**4**	**2**	11 of 12	1.888	1.932
1,2-dichloroethene	**3**	**1**	**4**	**2**	**1**	0.5	**1**	**1**	**1**	**1**	**2**	**1**	11 of 12	1.162	1.842
2-butanone	**71**	**117**	**77**	**147**	**186**	**168**	**157**	**109**	**33**	**55**	**92**	**194**	12 of 12	104.015	1.725
Acetone	**76**	**687**	**68**	**150**	**71**	**75**	**113**	**247**	**107**	**45**	**120**	**95**	12 of 12	113.057	2.044
Benzene	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**1**	0.5	0.5	0.5	0.5	1 of 12	0.546	1.355
Bromodichloromethane	**3**	**5**	0.5	**1**	**2**	**3**	**4**	**3**	**3**	**3**	**3**	0.5	10 of 12	2.084	2.130
Carbon disulfide	**1**	0.5	**4**	0.5	0.5	0.5	0.5	0.5	1	1	1	**1**	3 of 12	0.664	1.827
Chloroform	**10**	**12**	**11**	**8**	**7**	**8**	**6**	**7**	**6**	**7**	**9**	**7**	12 of 12	7.976	1.248
Chloromethane	1	1	**2**	1	1	1	1	1	1	**1**	**1**	1	3 of 12	1.119	1.266
Dibromochloromethane	**1**	0.5	0.5	0.5	1	0.5	1	1	2	2	**1**	**2**	7 of 12	0.897	1.816
Ethyl benzene	0.5	0.5	0.5	0.5	**1**	0.5	0.5	**1**	1	1	**1**	1	3 of 12	0.593	1.334
Methylene chloride	**27**	**6**	**4**	**2**	**2**	**12**	**1**	**4**	**1**	**3**	**3**	**7**	12 of 12	3.792	2.575
Tetrachloroethene	**6**	**10**	**6**	**4**	**4**	**5**	**12**	**5**	**3**	**5**	**7**	**5**	12 of 12	5.484	1.459
Toluene	**7**	**7**	**6**	**4**	**5**	**6**	**5**	**9**	**5**	**4**	**5**	**6**	12 of 12	5.604	1.264
Trichloroethene	**2**	**2**	**3**	0.5	**1**	**1**	0.5	**2**	**1**	0.5	**1**	**1**	9 of 12	0.992	1.870
Xylene	0.5	0.5	**1**	**1**	**3**	0.5	**2**	**4**	1	**1**	**4**	**3**	8 of 12	1.325	2.387

Notes: Average concentrations were calculated using 1/2 the MDL for those compounds that were below detection.
BOLD entries indicate detected or J values.

Appendix B Table B-5 Nut Island Effluent Characterization, Priority Pollutants, Local Limits Study
(March 1991 - December 1991)

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	GEOMETRIC STD DEV
Metals(mg/l)												
Antimony	0.007	0.006	0.006	0.006	0.015	0.015	0.015	0.015	0.018	0.020	0.011	1.667
Arsenic	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.002	0.001	0.001	0.002	1.524
Beryllium	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	1.658
Cadmium	0.003	0.002	0.002	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	1.505
Chromium	0.003	0.005	0.007	0.005	0.003	0.004	0.003	0.003	0.003	0.005	0.004	1.417
Copper	0.052	0.057	0.063	0.076	0.068	0.080	0.069	0.084	0.049	0.047	0.063	1.228
Lead	0.009	0.008	0.018	0.010	0.007	0.004	0.001	0.013	0.006	0.008	0.006	2.646
Mercury	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.005	0.000	0.000	0.0003	9.154
Molybdenum	0.017	0.005	0.015	0.014	0.025	0.050	0.015	0.050	0.043	0.040	0.022	2.106
Nickel	0.017	0.008	0.008	0.013	0.013	0.009	0.003	0.012	0.006	0.007	0.009	1.673
Selenium	0.002	0.001	0.002	0.002	0.001	0.001	0.003	0.001	0.002	0.001	0.001	1.401
Silver	0.005	0.004	0.004	0.004	0.003	0.008	0.001	0.004	0.003	0.004	0.003	1.711
Thallium	0.001	0.002	0.008	0.002	0.002	0.001	0.065	0.001	0.001	0.001	0.002	3.840
Zinc	0.096	0.063	0.090	0.099	0.300	0.105	0.024	0.118	0.064	0.066	0.085	1.881
Cyanide, Petroleum Hydrocarbons and Surfactants (mg/l)												
Cyanide	0.005	0.015	0.019	0.020	0.028	0.019	0.003	0.009	0.010	0.018	0.012	2.058
Petroleum Hydocarbons	0.050	0.050	0.454	0.070	0.684	0.050	1.864	0.050	0.050	0.050	0.120	3.987
Surfactants	1.023	4.400	4.550	6.290	10.300	5.820	3.480	1.870	3.845	3.715	3.851	1.901
Pesticides/PCBs (ug/l)												
4,4'-DDD	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
4,4'-DDE	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
4,4'-DDT	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Aldrin	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
alpha-BHC	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Aroclor 1016	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1221	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	GEOMETRIC MEAN	STD DEV
Pesticides/PCBs (con't)												
Aroclor 1232	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1242	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1248	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1254	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Aroclor 1260	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
beta-BHC	0.040	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.011	1.550
Chlordane	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
delta-BHC	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Dieldrin	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endosulfan I	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endosulfan II	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endosulfan Sulfate	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endrin	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Endrin Aldehyde	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
gamma-BHC (Lindane)	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Heptachlor	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Heptachlor Epoxide	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	1.000
Toxaphene	0.010	0.010	0.010	0.010	0.100	0.100	0.100	0.100	0.100	0.100	0.040	3.284
Semi-volatile Organic Compounds (ug/l)												
1,2,4-Trichlorobenzene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
1,2-Dichlorobenzene	0.200	0.200	0.200	0.200	0.438	0.467	0.783	0.400	0.371	0.400	0.330	1.609
1,3-Dichlorobenzene	0.200	0.200	0.200	0.200	0.438	0.467	0.783	0.400	0.371	0.400	0.330	1.609
1,4-Dichlorobenzene	0.200	0.200	0.200	0.200	0.438	0.467	0.783	0.400	0.371	0.400	0.330	1.609
2,4,5-Trichlorophenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2,4,6-Trichlorophenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2,4-Dichlorophenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2,4-Dimethylphenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2,4-Dinitrophenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294

Appendix B, Table B-5, Nut Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Semi-volatile Organics (con't)												
2,4-Dinitrotoluene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2,6-Dinitrotoluene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2-Chloronaphthalene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2-Chlorophenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2-Methylnaphthalene	0.200	0.200	0.200	0.200	0.933	0.400	0.200	0.200	0.200	0.200	0.250	1.668
2-Methylphenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2-Nitroaniline	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
2-Nitrophenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
3,3'-Dichlorobenzidine	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
3-Nitroaniline	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
4,6-Dinitro-2-methylphenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
4-Bromophenyl-phenylether	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
4-Chloroaniline	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
4-Chlorophenyl-phenylether	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
4-Chloro-3-methylphenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
4-Methylphenol	11.000	20.500	29.000	36.000	38.667	30.000	30.500	25.000	20.000	20.500	24.725	1.445
4-Nitroaniline	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
4-Nitrophenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Acenaphthene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Acenaphthylene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Anthracene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Benzoic Acid	64.333	90.100	160.000	200.000	230.000	240.000	205.000	88.000	124.667	101.000	136.980	1.594
Benzo(a)Anthracene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Benzo(a)Pyrene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Benzo(b)Fluoranthene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Benzo(g,h,i)Perylene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Benzo(k)Fluoranthene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294

Appendix B, Table B-5, Nut Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Semi-volatile Organics (con't)												
Benzyl Alcohol	0.200	10.000	16.500	27.000	20.000	25.000	27.000	15.000	10.000	20.000	11.369	4.330
bis(2-Chloroethoxy)Methane	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
bis(2-Chloroethyl)Ether	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
bis(2-Chloroisopropyl)Ether	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
bis(2-Ethylhexyl)phthalate	16.667	15.000	20.000	7.000	7.000	25.000	9.500	6.000	4.000	7.000	9.977	1.820
Butylbenzylphthalate	2.467	3.100	3.000	2.600	0.333	0.400	0.200	0.200	0.200	0.200	0.646	3.592
Chrysene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Dibenzofuran	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Dibenzo(a,h)Anthracene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Diethylphthalate	0.200	0.200	2.100	0.200	0.333	0.400	1.600	0.200	0.200	0.200	0.351	2.479
Dimethylphthalate	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Di-n-butylphthalate	0.200	0.200	1.100	10.600	0.333	0.400	0.200	0.200	0.200	0.200	0.398	3.586
Di-n-octylphthalate	0.200	0.200	1.100	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.268	1.747
Fluoranthene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Fluorene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Hexachlorobenzene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Hexachlorobutadiene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Hexachlorocyclopentadiene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Hexachloroethane	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Indeno(1,2,3-cd)Pyrene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Isophorone	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Naphthalene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Nitrobenzene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
N-Nitrosodiphenylamine	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
N-Nitroso-di-n-propylamine	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Pentachlorophenol	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Phenanthrene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294
Phenol	3.467	7.500	5.100	5.100	16.667	10.000	10.000	8.500	9.667	8.500	7.755	1.560
Pyrene	0.200	0.200	0.200	0.200	0.333	0.400	0.200	0.200	0.200	0.200	0.226	1.294

Appendix B, Table B-5, Nut Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Volatile Organic Compounds (ug/l)												
1,1,1-Trichloroethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
1,1,2,2-Tetrachloroethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
1,1,2-Trichloroethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
1,1-Dichloroethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
1,1-Dichloroethene	0.500	0.500	0.575	0.600	0.500	0.500	2.000	0.500	0.500	0.500	0.593	1.541
1,2-Dichloroethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
1,2-Dichloropropane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
2-Butanone	198.100	45.375	64.250	114.300	114.200	232.500	170.400	160.000	165.125	222.625	133.189	1.714
2-Chloroethylvinyl ether	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
2-Hexanone	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
4-Methyl-2-pentanone	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Acetone	0.500	0.500	0.575	0.600	175.000	273.750	188.200	452.500	150.000	228.000	20.326	22.964
Benzene	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Bromodichloromethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Bromoform	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Bromomethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Carbon Disulfide	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Carbon tetrachloride	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Chlorobenzene	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Chloroethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Chloroform	5.900	8.750	8.750	11.600	11.000	7.375	8.700	7.375	4.625	6.750	7.817	1.320
Chloromethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
cis-1,3-Dichloropropene	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Dibromochloromethane	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Ethylbenzene	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Methylene Chloride	0.500	0.500	0.575	2.600	1.800	0.500	0.900	0.500	0.500	0.500	0.721	1.847
Styrene	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Tetrachloroethene	8.100	7.000	6.825	6.200	4.200	2.875	4.300	2.625	0.500	1.875	3.537	2.313
Toluene	4.000	0.500	5.125	5.000	4.600	0.500	7.700	4.375	1.625	7.250	2.931	2.781
trans-1,2-Dichloroethene	0.500	0.500	0.575	0.600	0.500	0.500	1.800	0.500	0.500	0.500	0.587	1.491

Appendix B, Table B-5, Nut Island Treatment Plant

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN	STD DEV
Volatile Organic Compounds (con't))												
trans-1,3-Dichloropropene	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Trichloroethene	0.500	0.500	0.575	0.600	0.500	0.500	1.800	0.500	0.500	0.500	0.587	1.491
Vinyl Acetate	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Vinyl Chloride	0.500	0.500	0.575	0.600	0.500	0.500	0.900	0.500	0.500	0.500	0.548	1.206
Xylenes	2.700	0.500	0.575	0.600	2.500	2.500	4.500	2.500	2.500	4.250	1.795	2.312

Notes: Geometric mean concentrations were calculated by substituting 1/2 the MDL for those compounds that were below detection levels.

Appendix B Table B-6 Nut Island Effluent, Harbor Studies Characterization

(November 1991 - June 1992)

	Nov 13	Nov 14	Nov 15	June 10	June 12	June 14	Geometric Mean	Geometric Std Dev
Polynuclear Aromatic Hydrocarbons								
1,6,7-trimethylnaphthalene	278	201	192	194	229	128	198.4	1.3
1-methyl naphthalene	833	465	400	583	622	642	574.8	1.3
1-methylphenanthrene	47	45	64	583	73	54	82.3	2.7
2,6-dimethylnaphthalene	806	520	440	248	271	155	352.6	1.8
2-methylnaphthalene	1311	704	588	959	1056	642	840.6	1.4
Acenaphthene	1	1	1	52	55	55	7.3	8.9
Acenaphthylene	3	3	4	1	11	1	2.7	2.5
Anthracene	8	7	9	23	30	16	13.3	1.8
Benz(a)anthracene	17	12	20	28	36	19	20.7	1.5
Benzo(a)pyrene	5	4	9	20	26	14	10.5	2.1
Benzo(b)fluoranthene	10	10	16	44	47	33	21.9	2.0
Benzo(e)pyrene	10	6	13	28	45	24	16.9	2.1
Benzo(ghi)perylene	5	5	8	24	46	26	13.4	2.6
Benzo(k)fluoranthene	6	7	14	26	37	15	14.3	2.0
Biphenyl	186	120	107	369	192	403	202.1	1.7
Chrysene	16	15	27	40	48	27	26.4	1.6
Dibenzo(a,h)anthracene	1	1	2	1	1	1	1.1	1.3
Fluoranthene	47	45	64	71	102	52	60.9	1.4
Fluorene	140	104	94	154	134	141	125.9	1.2
Indeno(1,2,3-cd)pyrene	9	12	17	1	44	17	10.5	3.6
Naphthalene	903	552	527	1074	935	638	743.0	1.4
Perylene	1	1	3	5	8	1	2.2	2.5
Phenanthrene	227	184	183	239	266	195	213.5	1.2
Pyrene	56	47	64	85	109	64	68.1	1.4
Total PAHs	**4973**	**3090**	**2872**	**4331**	**4422**	**2839**	**3658.9**	**1.3**

Appendix B, Table B-6, Nut Island Treatment Plant

PESTICIDES/PCBs	Nov 13	Nov 14	Nov 15	June 10	June 12	June 14	Geometric Mean	Geometric Std Dev
Aldrin	1	1	1	1	1	1	1.0	1.0
Chlordane	10.9	6.9	10.9	39	12.5	1	8.6	3.3
DDD	1	1	1	33.4	1	1	1.8	4.2
DDE	3.8	4.1	7	16	1	0.9	3.4	3.1
DDT	6.5	3.6	10.6	1	11	15.4	5.9	2.7
Dieldrin	35.6	58.3	61.7	68.1	117.4	82.8	66.3	1.5
Endrin	1	1	1	1	1	1	1.0	1.0
Heptachlor	3.9	1	1	1	1	1	1.3	1.7
Heptachlor epoxide	1	1	1.6	1	1	1	1.1	1.2
Hexachlorobenzene	1	5.5	6	1	1	40.4	3.3	4.5
Lindane	8.7	15.5	11.2	31.3	164.7	39.1	25.9	2.9
Transnonaroclor	1	1	2.4	16.5	18.9	1	3.0	4.1
TOTAL PCBS	**19.6**	**6.6**	**77.2**	**132.6**	**44.1**	**258.2**	**49.7**	**3.8**

Notes: Reporting limit is 10 ng/L. Geometric mean concentrations calculated by substituting 1/2 the MDL for parameters below detection.

Appendix B Table B-7 Nut Island Priority Pollutants Loadings, NPDES Data, FY 1992

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	AVERAGE LOADING
METALS (lb/d)													
Antimony	3.44	1.86	2.16	2.41	3.45	2.98	2.92	2.59	3.01	3.20	3.39	2.62	2.84
Arsenic	2.07	2.24	2.59	1.93	0.69	1.19	1.17	2.07	3.62	1.28	1.13	1.05	1.75
Boron	238.38	193.04	285.40	195.12	218.35	210.80	175.01	195.93	227.77	252.20	236.01	224.34	221.03
Cadmium	0.34	0.37	0.43	0.48	0.69	0.60	1.17	4.15	0.60	0.64	2.26	0.52	1.02
Chromium (total)	9.65	2.61	3.03	3.38	4.84	3.57	12.83	3.11	3.62	8.96	6.78	2.62	5.42
Chromium (Hex.)	2.41	2.61	3.03	3.38	4.84	3.57	5.44	3.11	3.62	3.84	2.26	2.62	3.39
Copper	47.54	49.19	65.73	54.09	58.04	60.74	49.00	60.13	62.67	62.73	62.11	62.90	57.91
Lead	5.51	4.84	7.18	9.66	8.98	7.74	8.17	9.33	9.64	8.96	5.65	6.29	7.66
Mercury	0.14	0.30	0.35	0.10	0.28	0.12	0.12	0.10	0.72	0.51	0.45	0.10	0.27
Molybdenum	2.76	2.98	3.46	3.86	10.36	8.93	18.67	6.22	7.23	7.68	6.78	6.29	7.10
Nickel	5.86	6.34	7.35	8.21	11.75	10.12	8.75	7.77	9.04	9.60	21.46	17.82	10.34
Selenium	0.69	0.75	0.86	0.97	1.38	1.19	1.17	1.04	1.21	1.28	3.39	1.05	1.25
Silver	1.38	1.49	6.05	4.83	11.06	7.15	2.33	2.07	2.41	2.56	4.52	2.10	4.00
Thallium	1.38	0.75	0.86	0.97	1.38	3.57	1.17	1.04	1.21	1.28	1.13	4.19	1.58
Zinc	42.72	50.68	60.54	52.16	78.77	63.12	61.84	76.71	84.36	92.17	79.05	63.95	67.17
Cyanide (lb/d)	3.44	3.73	2.16	2.41	16.58	10.72	17.50	12.44	10.85	6.40	18.07	5.24	9.13
Phenols (lb/d)	17.22	22.36	10.38	23.18	26.26	30.96	32.67	47.69	27.72	23.04	44.04	28.31	27.82
PHC (lb/d)	1873.99	2664.61	1513.50	1796.65	1796.52	2471.23	1944.61	2462.07	2482.57	2976.44	1806.78	1048.34	2069.78
PESTICIDES AND PCBs (lb/d)													
b-BHC	0.90	0.75	0.25	0.23	0.99	0.43	0.85	0.69	0.41	0.01	0.46	0.08	0.50
4,4'DDD	0.03	0.04	0.04	0.05	0.07	0.06	0.06	0.10	0.06	0.01	0.53	0.01	0.09
4,4'DDT	0.03	0.32	0.04	0.05	0.07	0.06	0.06	0.10	0.06	0.01	0.01	0.01	0.07
Endosulfan I	0.02	0.02	0.02	0.89	0.03	0.03	0.03	0.05	0.03	0.01	0.27	0.01	0.12
Chlordane	0.17	0.30	0.22	0.24	0.35	0.30	0.29	0.52	0.30	0.06	0.11	0.19	0.25

Appendix B, Table B-7, Nut Island Treatment Plant

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	AVERAGE LOADING
SEMIVOLATILE ORGANICS (lb/d)													
4-Methyl phenol	18.60	24.60	17.30	0.97	9.67	1.19	2.33	26.95	15.67	19.20	15.81	25.16	14.79
Benzyl alcohol	24.11	12.67	0.86	9.66	1.38	9.53	18.67	13.48	14.46	11.52	11.29	25.16	12.73
bis(2-ethylhexyl)pthalate	9.65	9.69	9.51	12.56	11.06	8.34	16.33	11.40	12.05	15.36	10.16	13.63	11.65
Butyl benzylpthalate	2.76	3.73	1.73	2.90	1.38	1.19	2.33	5.18	1.21	6.40	2.26	4.19	2.94
Di-n-butylpthalate	2.07	2.98	1.73	0.97	1.38	1.19	1.17	5.18	1.21	3.84	2.26	3.15	2.26
Diethylpthalate	2.07	5.96	2.59	4.83	1.38	1.19	1.17	6.22	1.21	8.96	3.39	1.05	3.33
Phenol	0.69	0.75	0.86	0.97	1.38	1.19	1.17	1.04	1.21	7.68	1.13	1.05	1.59
VOLATILE ORGANICS (lb/d)													
1,1,1-trichloroethane	0.69	0.37	1.30	2.90	3.92	5.56	3.50	1.14	2.61	1.71	4.89	1.75	2.53
1,2-dichloroethene	1.72	0.75	3.75	1.45	1.38	0.60	0.78	1.14	0.80	1.07	2.07	1.05	1.38
2-butanone	49.15	87.08	66.59	141.67	257.50	200.48	182.79	113.00	39.37	69.98	103.51	203.73	126.24
Acetone	52.36	511.80	58.52	144.89	97.66	89.72	132.23	255.71	128.55	58.04	135.51	99.94	147.08
Benzene	0.34	0.37	0.43	0.48	0.69	0.60	0.58	1.49	0.60	0.64	0.56	0.52	0.61
Bromodichloromethane	1.72	3.48	0.43	1.13	2.53	3.57	4.67	2.94	4.02	4.05	3.39	0.52	2.70
Carbon disulfide	0.69	0.37	3.17	0.48	0.69	0.60	0.58	0.52	0.60	0.64	0.56	1.07	0.83
Chloroform	6.66	9.19	9.51	7.73	9.67	9.13	7.39	6.91	7.63	9.39	10.16	6.99	8.36
Chloromethane	0.69	0.75	1.87	0.97	1.38	1.19	1.17	1.04	1.21	1.71	1.51	1.05	1.21
Dibromochloromethane	0.92	0.37	0.43	0.48	0.92	0.60	1.56	0.52	2.41	2.35	1.13	2.10	1.15
Ethyl benzene	0.34	0.37	0.43	0.48	0.92	0.60	0.58	1.14	0.60	0.64	0.75	1.05	0.66
Methylene chloride	18.26	4.60	3.46	1.61	2.53	14.69	1.40	3.63	1.41	3.84	3.76	7.69	5.57
Tetrachloroethene	3.90	7.45	4.90	3.54	5.99	5.56	13.61	5.18	4.02	5.97	8.28	4.89	6.11
Toluene	4.59	4.97	5.48	4.19	6.45	7.54	5.83	9.33	5.62	5.12	5.65	6.64	5.95
Trichloroethene	1.38	1.61	2.16	0.48	1.38	0.79	0.58	2.00	0.80	0.64	1.32	0.70	1.16
Xylene	0.34	0.37	0.86	1.29	4.38	0.60	2.33	4.60	0.60	1.28	4.71	3.15	2.04

Notes: Loadings calculated from NPDES data set using average monthly flow.

Appendix B Table B-8 Nut Island Treatment Plant Priority Pollutants, NPDES Data

	FY 89	FY 90	FY 91	FY 92
METALS (ug/l)				
Arsenic	1.18	1.68	1.31	1.53
Boron				211.00
Cadmium	2.47	2.16	1.50	0.71
Chromium (Total)	5.39	4.50	5.09	4.48
Chromium (Hex)	7.49	10.24	7.34	3.16
Copper	71.91	51.57	55.26	55.48
Lead	13.05	8.08	7.00	7.20
Mercury	0.10	0.13	0.27	0.21
Molybdenum				5.90
Nickel	10.03	11.45	9.42	9.24
Selenium	1.18	1.86	1.53	1.10
Silver	5.73	8.25	3.06	3.12
Thallium	0.89	0.50	0.70	1.30
Zinc	81.66	60.95	58.84	63.20
Cyanide (mg/l)	0.02	0.01	0.01	0.01
Phenols (mg/l)	0.03	0.03	0.02	0.03
PHC (mg/l)	2.46	2.30	2.30	1.93
PESTICIDES AND PCBs (ug/l)				
4,4'DDD	0.10			0.05
4,4'DDT		0.02		0.04
a-BHC		0.02		
Aldrin		0.03		
b-BHC	0.06	0.01		0.30
Chlordane			0.02	0.22

Appendix B, Table B-8, Nut Island Treatment Plant

	FY 89	FY 90	FY 91	FY 92
Pesticides (con't)				
Endosulfan I		0.01		0.03
Endosulfan Sulfate	0.08	0.01		
g-BHC	0.05	0.02		
Heptachlor Epoxide	0.05	0.04	0.01	
SEMIVOLATILE ORGANICS (ug/l)				
2-Methylnaphthalene				
4-Methyl phenol	7.24	2.26	3.40	9.31
Benzoic Acid	15.00	6.66	12.42	
Benzyl alcohol	4.26	2.00	3.50	8.93
bis(2-ethylhexyl)pthalate	4.52	4.34	3.73	11.00
Butylbenzyl phthalate	2.89	1.75	2.43	2.46
Di-n-butylpthalate	1.98	2.13	2.10	1.90
Diethyl pthalate	3.24	3.66	2.49	2.44
Phenol	2.02		2.46	1.16
VOLATILE ORGANICS (ug/l)				
1,1,1-Trichloroethane	2.23	2.72	2.03	1.89
1,2-Dichloroethene	0.79	0.53	0.56	1.16
1,2-dichloropropane	0.50	0.54		
2-Butanone	8.14	4.98	138.75	104.00
2-hexanone	1.21			
Acetone	88.55	125.66	143.26	113.06
Benzene	0.72		0.62	0.55
Bromodichloromethane	0.69	0.54		2.08
Carbon disulfide	0.77	0.59	0.61	0.66
Carbon Tetrachloride		0.59		
Chlorobenzene		0.53	0.57	

Volatile (con't)	FY 89	FY 90	FY 91	FY 92
Chloroform	4.26	3.17	4.89	7.98
Chloromethane		1.06		1.12
Dibromochloromethane	0.59		0.54	0.90
Ethyl benzene	1.01	1.22	0.56	0.59
Methylene chloride	18.53	2.50	4.43	3.79
Styrene	0.61	0.56		
Tetrachloroethene	9.18	8.66	7.06	5.48
Toluene	7.25	4.86	6.27	5.60
Trichloroethene	1.47	2.31	1.32	0.99
Xylene	3.14	1.16	1.31	1.33
Average Flow (MGD)	119.83	144.17	120.17	127.00

Notes: Data from NPDES Monitoring Program, concentrations are geometric means

Appendix C

Appendix C Table C-1 Cottage Farm CSO Facility Operations Summary, FY 1992

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effleunt (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100 ml)	CHLORINE RESIDUAL (mg/l)
JULY											
7-26-91	0.86	6	17.46	7.16	67	51	256	40	0.1	10	1.125
AUGUST											
8-19-91	2.21	12.3	63.5	7.14	74	59	60	58	0.1	110	1.05
8-21-91	1.72	5.35	25.3	6.78	27	42	74	84	0.4	10	1.5
SEPTEMBER											
9-5-91	0.89	1.667	1.67	6.69	146	109	156	106	0.4	330000	1.8
9-19-91	0.77	2.75	7.35	6.44	76	35	92	78	0.6	50	1.25
9-25-91	2.42	12.5	44.66	7.32	85	34	244	70	0.2	10	1.18
9-26-91	1.19	12	19.39	7.07	77	78	74	30	0.1	10	1.43
OCTOBER											
10-18-91	0.84	2.5	4.66	6.95	29	282	84	40			1.25
10-31-91	1.54	4	4.95	7.11	84	65	146	58			1.4
NOVEMBER											
11-1-91	0.97	10.2	20.91	7.09	86	51	136	48	0.2	10	1.3
11-11-91	1.1	8	9.176	7.38	93	83	166	68	0.1	10	1
11-23-91	0.58	4.3	5.61	7.3	167	55	461	87	0.1	100	1.1
DECEMBER											
12-3-91	0.77	8.25	16.5	7.3	90	28	282	94	2	10	1.57
12-29-91	0.58	3.33	1.68	7.3	83	107	190	52	0.1	10	1
JANAURY											
1-4-92	1.3	7	14.58	7.19	171	73	426	44	0.1	10	1.1
1-23-92	1.19	7.5	33.15	6.8	126	60	238	80	0.08	10	1.37
FEBRUARY											
2-16-92	0.57	6.75	12.67	6.67	192	63	866	140	0.5	10	1
2-26-92	0.57	2.25	0.47	6.84	135	84	120	36	0.2	10	1

Appendix C, Table C-1, Cottage Farm CSO

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effluent (SU)	BOD Influent (MG/L)	BOD Effluent (MG/L)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100 ml)	CHLORINE RESIDUAL (mg/l)
MARCH											
3-11-92	0.54	2	2.91	7.06	25	79	52	102	1.2	10	1.5
3-27-92	0.41	2.1	0.01	7.22	57	23	106	36	0.2	10	1.5
MAY											
5-3-92	0.01	5.5	6.2	7.78	122	33	388	64	0.2	10	1.5
JUNE											
6-1-92	1.94	8.5	24.6	7.18	85	72	33	21	1.2	10	1.3
6-6-92	0.94	7	23.45	7.24	93	59	190	484	2.6	50	1.5
TOTAL	**23.91**	**141.747**	**360.856**								
AVERAGE	**1.04**	**6.16**	**15.69**		**95.22**	**70.65**	**210.43**	**83.48**	**0.51**	**33.94**	**1.29**
MINIMUM	**0.01**	**1.667**	**0.01**	**6.44**	**25**	**23**	**33**	**21**	**0.08**	**10**	**1**
MAXIMUM	**2.42**	**12.5**	**63.5**	**7.78**	**192**	**282**	**866**	**484**	**2.6**	**330000**	**1.8**
Number of Activations			**23**								

Appendix C Table C-2 Cottage Farm CSO Facility, Priority Pollutants, NPDES Program

PARAMETERS	JULY (A)	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR (B)	APR (B)	MAY	JUNE	TIMES DETECTED	GEOMETRIC MEAN	GEOMETRIC STD DEV
Metals (ug/l)															
Arsenic			2		3		4				3		4 of 4	2.913	1.330
Boron			52		68		100				30		4 of 4	57.070	1.658
Cadmium		1	0.5	4	0.5	1	2	2			2	0.5	6 of 9	1.167	2.133
Chromium (Hex)		3.5	10	3.5	3.5	7	3	3					2 of 8	4.296	1.603
Chromium			14		3.5		18				12		3 of 4	10.143	2.073
Copper		145	79	63	42	92	175	72			112	48	9 of 9	83.096	1.613
Lead		144	34	32	36	42	160	67			143	45	9 of 9	63.311	1.966
Mercury		1.5	0.5	0.1	0.2	0.4	0.7	0.4			0.6	0.3	7 of 9	0.406	2.162
Nickel		21	8.5	17	8.5	8.5	7.5	7.5			6	6	2 of 9	9.137	1.548
Silver			2		2		10				7		2 of 4	4.091	2.314
Zinc		222	130	108	80	125	267	136			176	95	9 of 9	138.640	1.480
Cyanide			24		2.5		7				17	16	4 of 5	10.270	2.485
Phenol			15		6		12				2.5	0.05	3 of 5	2.667	10.281
Ammonia mg/l		0.2	0.05	3.6	4	6.75	4.2	3.7			4.9	3.5	8 of 9	1.854	5.492
Phosphorus mg/l		0.9	1.2	1	1.3	1.6	2.4	1.4			1.1	1.3	9 of 9	1.303	1.334
MBAS		0.4	2.05	0.6	0.8	1.9	2.9	1.3			1.7	0.9	8 of 9	1.176	1.907
Pesticides/PCB (ug/l)															
b-BHC		0.005	0.23	0.34	0.28	0.15	0.025	0.27			0.01	0.01	5 of 9	0.061	5.581
Methoxychlor		0.8	0.1	0.1	0.1	0.25	0.25	0.7			2.1	0.43	4 of 9	0.316	2.932
g-Chlordane		0.05	0.1	0.1	0.058	0.06	0.25	0.1			0.1	0.1	2 of 9	0.091	1.607

PARAMETERS	JULY (A)	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR (B)	APR (B)	MAY	JUNE	TIMES DETECTED	GEOMETRIC MEAN	GEOMETRIC STD DEV
Polynuclear Aromatic Hydrocarbons, Method 610 (ug/l)															
Phenanthrene		0.1	0.1	0.5	0.5	**2**	0.5	0.5			**2**	**1**	3 of 9	0.514	2.973
Pyrene		0.1	0.1	0.5	0.5	0.5	0.5	**1**			**2**	0.5	1 of 9	0.441	2.623
Chrysene		0.1	0.1	0.5	0.5	0.5	0.5	0.5			**1**	0.5	1 of 9	0.378	2.196
Benzo(b)fluoranthene		0.1	0.1	0.5	0.5	0.5	0.5	0.5			**1**	0.5	1 of 9	0.378	2.196
Naphthalene		0.1	0.1	0.5	0.5	**4**	0.5	0.5			0.5	**1**	2 of 9	0.476	3.053
2-Methylnaphthalene		0.1	0.1	0.5	0.5	**12**	0.5	0.5			**1**	**3**	3 of 9	0.656	4.539
Fluoranthene		0.1	0.1	0.5	0.5	0.5	0.5	**2**			**2**	0.5	2 of 9	0.476	2.889
Volatile Organics (ug/l)															
Acetone			**260**		**43**		**90**						3 of 3	100.206	2.471
Chloroform			**7**		**4**		**2**						3 of 3	3.826	1.873
2-Butanone			0.1		**17**		0.5						1 of 3	0.947	13.830
Tetrachloroethene			**11**		**2**		**8**						3 of 3	5.604	2.475
Toluene			**4**		**3**		0.1						2 of 3	1.063	7.782
Trichloroethene			0.5		**1**		0.1						1 of 3	0.368	3.259
Xylene			**2**		0.5		0.1						1 of 3	0.464	4.478
Methlyene chloride			**16**		**6**		**4**						3 of 3	7.268	2.040
1,2-Dichloroetheme			**3**		0.5		**2**						2 of 3	1.442	2.559

NOTES: Bold numbers indicate detects, geometric mean concentrations calculated by substituting 1/2 the MDL for BDL.

(A) Insufficient time to set up sampler, no samples collected.

(B) No Activation.

Appendix C Table C-3 Cottage Farm CSO Facility, Priority Pollutants Loadings, NPDES Data

Loadings (lbs/d)

	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	AVERAGE LOADING
Metals													
Arsenic			.123		.523		.486				.155		.322
Boron			3.188		11.858		12.160				1.551		7.189
Cadmium		.530	.031	.155	.087	.138	.243	.211			.103	.103	.178
Chromium (Hex)		1.854	.613	.136	.610	.963	.365	.317					.694
Chromium			.858		.610		2.189				.620		1.069
Copper		76.791	4.843	2.448	7.324	12.660	21.280	7.608			5.791	9.848	16.510
Lead		76.261	2.084	1.244	6.278	5.780	19.456	7.080			7.394	9.232	14.979
Mercury		.794	.031	.004	.035	.055	.085	.042			.031	.062	.127
Nickel		11.121	.521	.661	1.482	1.170	.912	.793			.310	1.231	2.022
Silver			.123		.349		1.216				.362	.000	.410
Zinc		117.569	7.969	4.197	13.951	17.201	32.466	14.371			9.101	19.491	26.257
Cyanide			1.471		.436		.851					3.283	1.510
Phenol			.919		1.046		1.459					.010	.859
Ammonia		105.918	3.065	139.912	697.558	928.868	510.708	390.971			253.369	718.074	416.494
Phosphorus		476.631	73.559	38.864	226.706	220.176	291.833	147.935			56.879	266.713	199.922
MBAS		211.836	125.663	23.319	139.512	261.459	352.632	137.368			87.904	184.648	169.371
Pesticides/PCB													
b-BHC		.003	.014	.013	.049	.021	.003	.029			.001	.002	.015
Methoxychlor		.424	.006	.004	.017	.034	.030	.074			.109	.088	.087
g-Chlordane		.026	.006	.004	.010	.008	.030	.011			.005	.021	.014

Appendix C, Table C-3, Cottage Farm CSO

	JULY (A)	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR (B)	APR (B)	MAY	JUNE	AVERAGE LOADING
Polynuclear Aromatic Hydrocarbons, Method 610													
Phenanthrene		.053	.006	.019	.087	.275	.061	.053			.103	.205	.096
Pyrene		.053	.006	.019	.087	.069	.061	.106			.103	.103	.067
Chrysene		.053	.006	.019	.087	.069	.061	.053			.052	.103	.056
Benzo(b)fluoranthene		.053	.006	.019	.087	.069	.061	.053			.052	.103	.056
Naphthalene		.053	.006	.019	.087	.550	.061	.053			.026	.205	.118
2-Methylnaphthalene		.053	.006	.019	.087	1.651	.061	.053			.052	.615	.289
Fluoranthene		.053	.006	.019	.087	.069	.061	.211			.103	.103	.079
Volatile Organics													
Acetone			15.938		7.499		10.944						11.460
Chloroform			.429		.698		.243						.457
2-Butanone			.006		2.965		.061						1.011
Tetrachloroethene			.674		.349		.973						.665
Toluene			.245		.523		.012						.260
Trichloroethene			.031		.174		.012						.072
Xylene			.123		.087		.012						.074
Methlyene chloride			.981		1.046		.486						.838
1,2-Dichloroetheme			.184		.087		.243						.171

Notes: Loadings calculated using measured monthly concentration and the discharge flow at time of sampling.

Appendix C Table C-4 Cottage Farm CSO Facility, Priority Pollutants, Historical NPDES Data

	CONCENTRATION (1)			
	1989	1990	1991	1992
Metals (ug/l)				
Antimony		5	4.35	2.5
Arsenic		2.99	1.55	3
Beryllium		0.5	0.38	0.5
Boron		1	59.46	38.34
Cadmium	2.32	2.13	0.90	1
Chromium (Hex)		1	4.96	3
Chromium		5.73	6.18	5.09
Copper	106.5	58.25	78.52	77.84
Lead	53.41	47.99	50.84	86.4
Mercury	0.28	0.28	0.38	0.29
Molybdenum		1	6.00	9.38
Nickel	16.89	8.7	7.69	6.23
Selenium		1.5	1.08	1
Silver		3.68	2.14	3.24
Thallium		0.5	0.94	1
Zinc	159.46	129.71	133.52	131.97
PAHs (610) ug/l				
Acenaphthene	3.25	2.5	0.54	0.5
Anthracene	3.06	3.19	0.54	0.5
Dibenzo(a,h)anthracene	7.48	5.37	0.57	0.5
Fluoranthene	4.7	2.82	0.64	0.74
Naphthalene	16.94	6.7	0.66	0.55
Phenanthrene	3.09	3.97	0.71	0.82
Pyrene	4.85	2.88	0.62	0.67

Appendix C, Table C-4, Cottage Farm CSO

	CONCENTRATION (1)			
	1989	1990	1991	1992
Volatile Organics (ug/l)				
Benzene	1.89	1.77	1.99	
Chloroform	8.4	6.45	4.60	2
Ethylbenzene	6.09	2.32	1.99	
Methylene chloride	6.63	9.1	5.43	4
Tetrachloroethene	26.1	9.88	5.19	8
Toluene	15.15	8.82	3.51	0.1
Trichloroethene	2.67	2.7	0.00	0.1

(1) Concentrations expressed as the arithmetic mean concentration.

Appendix D

Appendix D Table D-1 Prison Point CSO Operations Summary, FY 1992

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100 ml)	CHLORINE RESIDUAL (mg/l)
JULY											
7-14-91	0.01	1.3	4.789	7.02	43	51	96	98	0.5		1.16
7-26-91	0.86	4	19.346	7.09	32	15	182	88	0.1	50	1.11
AUGUST											
8-19-91	2.21	12.45	62.8	7.09	42	39	128	108	2	180	0.45
8-21-91	1.72	8.3	36.9	6.86	27	37	114	90	0.2	10	1.16
SEPTEMBER											
9-5-91	0.89	2.25	5.232	7.18	84	106	224	102	0.5	150	1.5
9-19-91	0.77	3.5	8.691	6.65	65	76	134	126	0.5	40	2
9-20-91	0.68	5.5	9.175	6.68	29	66	64	48	0.1	10	1.26
9-25-91	2.42	12	55.434	7.23	30	46	48	56	1	10	1
9-26-91	1.19	7	18.465	6.88	29	53	74	18	0.1	10	1
OCTOBER											
10-6-91	0.88	1.75	3.26	7.2	37	65	182	118	0.4	20	1
10-16-91	0.15	2.5	1.08	6.8	63	290	170	124	0.8	10	1.6
10-18-91	0.84	5.25	9.263	6.61	28	37	98	84	1.2	100	1
10-31-91	1.54	4	7.423	7.51	76	77	114	76	0.2	10	1.9
NOVEMBER											
11-1-91	0.97	8	16.755	7.3	28	32	28	36	0.2	10	1
11-11-91	1.1	6	10.089	7.26	57	70	72	58	0.1	10	1.6
11-23-91	0.58	5.5	10.285	7.5	58	48	83	79	1	100	2
DECEMBER											
12-3-91	0.77	3.5	7.536	7.21	51	36	168	96	1.5	10	2.05
12-29-91	0.58	2	4.633	7.07	154	79	100	34	0.1	50	2

Appendix D, Table D-1, Prison Point CSO

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100 ml)	CHLORINE RESIDUAL (mg/l)
JANUARY											
1-4-92	1.3	8	14.153	7.05	41	43	120	166	1	10	1.44
1-23-92	1.19	9	25.217	6.97	109	67	256	84	0.4	10	1.2
FEBRUARY											
2-16-92	0.56	5.5	8.062	7.04	56	73	136	134	2	10	1.08
2-26-92	0.57	3	2.791	7.23	63	71	32	50	0.1	32000	1
MARCH											
3-7-92	0.63	4	1.266	7.31	79	61	194		0.6	10	2
3-11-92	0.54	10	10.241	7.01	32	36	138	82	0.5	10	1.5
3-27-92	0.41	9	8.235	7.43	65	76	142	144	2	10	1.3
APRIL											
4-17-92	0.76	3	3.829	6.61	26	280	146	66	0.4	190	1.2
4-25-92	0.22	1	1.762	6.69	38	40	58	70	0.1	33000	1
JUNE											
6-1-92	1.94	9	39.875	6.88	97	74	182	120	0.2	390	1
6-6-92	0.94	6	22.756	7.87	38	16	102	86	0.4	10	1.6
TOTAL	**27.22**	**162.3**	**429.343**								
AVERAGE	**0.94**	**5.60**	**14.80**		**54.38**	**71.03**	**123.62**	**87.18**	**0.63**	**39.24**	**1.35**
MINIMUM	**0.01**	**1**	**1.08**	**6.61**	**26**	**15**	**28**	**18**	**0.1**	**10**	**0.45**
MAXIMUM	**2.42**	**12.45**	**62.8**	**7.87**	**154**	**290**	**256**	**166**	**2**	**33000**	**2.05**
NUMBER OF ACTIVATIONS			**29**								

Appendix D Table D-2 Prison Point CSO Facility, Priority Pollutants, NPDES Program

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY (A)	JUNE	TIMES DETECTED	GEOMETRIC MEAN	GEOMETRIC STD DEV
Metals (ug/l)															
Antimony	2.5		5		2.5		5		5				3 of 5	3.79	1.46
Arsenic	4		4		5.7		6		4				5 of 5	4.66	1.23
Cadmium ug/l	2	0.5	1	0.5	1	2	2	2	2	1		2	9 of 11	1.29	1.75
Chromium (Hex)	3.5	3.5	3.5	3.5	3.5	3	8	3	3				1 of 9	3.64	1.36
Chromium	16		34		3.5	2	22						4 of 5	9.65	3.41
Copper	141	87	178	87	44	100	146	109	109	106		140	11 of 11	107.21	1.45
Lead	165	123	290	149	24	99	180	149	79	176		160	11 of 11	125.75	1.90
Mercury	0.9	0.6	1.1	0.1	0.4	0.5	0.6	0.3	0.2	0.5		0.5	10 of 11	0.44	1.97
Nickel	8.5	8.5	8.5	8.5	8.5	8.5	7.5	7.5	16	7.5		20	2 of 11	9.40	1.39
Silver	4		12		5		2		5				4 of 5	4.74	1.90
Zinc	354	242	412	189	135	228	336	275	266	276		328	11 of 11	265.23	1.37
Cyanide	5		2.5		2.5		5		2.5	2.5		23	2 of 7	4.18	2.27
Phenol	2.5		5		6		11		9	2.5		5	5 of 7	5.12	1.77
Ammonia (mg/l)	1.9	0.1	0.05	3.2	0.74	2.39	1.4	1.6	5.8	2.1		1.9	10 of 11	1.10	4.29
Phosphorus (mg/l)	1.1	0.6	1	0.8	0.68	0.95	1	1	1.4	1.2		1	11 of 11	0.95	1.27
MBAS (mg/l)		0.2	0.93	1.4	0.4	1	0.8	0.8		0.6		0.8	8 of 9	0.68	1.78
Org. Pesticides PCB (ug/l)															
b-BHC	0.05	0.005	0.24	0.65	0.005	0.01	0.01	0.05	0.025	0.005		0.005	2 of 11	0.02	5.42
4,4'-DDD	0.1	0.01	0.01	0.05	0.01	0.13	0.02	0.1	0.05	0.05		0.05	1 of 11	0.04	2.64
Methoxychlor	0.5	0.05	0.05	0.25	0.17	0.26	0.1	0.5	0.25	0.25		0.25	2 of 11	0.19	2.21

Appendix D, Table D-2, Prison Point CSO

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY (A)	JUNE	TIMES DETECTED	GEOMETRIC MEAN	GEOMETRIC STD DEV
PAHs (610) ug/l															
Acenapthene	0.1	0.1	0.1	0.5	0.5	0.5	0.5	0.5	1	1		0.5	1 of 11	0.37	2.40
Phenanthrene	1	0.1	4	2	0.5	2	5	3	5	2		1	9 of 11	1.55	3.19
Pyrene	0.1	0.1	4	0.5	0.5	2	5	3	3	1		0.5	5 of 11	0.93	4.03
Benzo(a)anthracene	0.1	0.1	2	0.5	0.5	0.5	2	1	0.5	1		0.5	3 of 11	0.54	2.71
Chrysene	0.1	0.1	2	1	0.5	0.5	3	1	2	1		0.5	5 of 11	0.68	3.07
Benzo(b)fluoranthene	0.1	0.1	2	0.5	0.5	0.5	2	1	1	1		0.5	4 of 11	0.58	2.75
Benzo(k)fluoranthene	0.1	0.1	1	0.5	0.5	0.5	2	1	1	1		0.5	4 of 11	0.54	2.57
Benzo(a)pyrene	0.1	0.1	1	0.5	0.5	0.5	2	0.5	0.5	1		0.5	2 of 11	0.48	2.45
Naphthalene	0.1	0.1	0.1	1	0.5	0.5	2	1	1	1		0.5	4 of 11	0.47	2.93
2-methylnaphthalene	0.1	0.1	0.1	0.5	0.5	2	4	2	2	2		0.5	5 of 11	0.64	3.98
Fluoranthene	1	0.1	4	0.5	0.5	2	6	3	4	2		1	7 of 11	1.36	3.33
Fluorene	0.1	0.1	0.1	0.5	0.5	0.5	0.5	0.5	1	1		0.5	1 of 11	0.37	2.40
Anthracene	0.1	0.1	1	0.5	0.5	0.5	0.5	1	0.5	1		0.5	2 of 11	0.45	2.24
Volatile Organics (ug/l)															
Acetone	17		50		1		63		1				3 of 5	8.83	7.76
Chloroform	210		5		25		2		2				5 of 5	10.10	7.28
2-butanone	17		2		1		1		1				1 of 5	2.02	3.41
Tetrachloroethene	0.8		31		0.5		0.5		0.5				1 of 5	1.25	6.08
Toluene	10		9		3		0.5		0.5				3 of 5	2.32	4.39
1,2-dichloroethene	0.8		4		1		0.5		0.5				2 of 5	0.96	2.35
1,1,1 trichloroethane	5		4		0.5		0.5		0.5				2 of 5	1.20	3.33
Trichloroethene	0.8		0.5		1		0.5		0.5				1 of 5	0.63	1.39
Benzene	0.8		3		1		0.5		0.5				2 of 5	0.90	2.09
Methlyene chloride	6		4		2		0.5		1				4 of 5	1.89	2.74
Chlorobenzene	0.8		0.5		1		0.5		0.5				3 of 5	0.63	1.39
Chloromethane	4		1		1		1		1				1 of 5	1.32	1.86
Bromodichloromethane	12		2.5		4		0.5		0.5				1 of 5	1.97	3.96

Notes: (A) No Activation

Appendix D Table D-3 Prison Point CSO Facility, Priority Pollutants Loadings, NPDES Data

PARAMETERS	Loadings (lb/d)												
	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY (A)	JUNE	AVERAGE LOADING
Metals													
Antimony	0.100		0.383		0.210		0.590		0.427				0.342
Arsenic	0.160		0.306		0.480		0.708		0.342				0.399
Cadmium	0.080	0.262	0.077	0.014	0.084	0.126	0.236	0.134	0.171	0.032			0.122
Chromium (Hex)	0.140	1.833	0.268	0.095	0.294	0.189	0.944	0.202	0.256				0.469
Chromium	0.639		2.602		0.294	0.126	2.597						1.252
Copper	5.632	45.566	13.620	2.365	3.702	6.285	17.233	7.329	9.310	3.385		46.558	14.635
Lead	6.590	64.421	22.191	4.051	2.019	6.222	21.246	10.018	6.747	5.620		53.209	18.394
Mercury	0.036	0.314	0.084	0.003	0.034	0.031	0.071	0.020	0.017	0.016		0.166	0.072
Nickel	0.339	4.452	0.650	0.231	0.715	0.534	0.885	0.504	1.367	0.240		6.651	1.506
Silver	0.160		0.918		0.421		0.236		0.427				0.432
Zinc	14.139	126.748	31.526	5.139	11.359	14.330	39.660	18.490	22.719	8.814		109.079	36.546
Cyanide	0.200		0.191		0.210		0.590		0.214	0.080		7.649	1.305
Phenol	0.100		0.383		0.505		1.298		0.769	0.080		1.663	0.685
Ammonia	75.886	52.375	3.826	87.003	62.265	150.212	165.250	107.579	495.378	67.061		631.859	172.609
Phosphorus	43.934	314.251	76.520	21.751	57.217	59.708	118.036	67.237	119.574	38.321		332.558	113.555
MBAS		104.750	71.163	38.064	33.657	62.850	94.429	53.790		19.160		266.046	82.657
Organic Pesticides													
b-BHC	0.002	0.003	0.018	0.018		0.001	0.001	0.003	0.002	0.000		0.002	0.005
4,4'-DDD	0.004	0.005	0.001	0.001	0.001	0.008	0.002	0.007	0.004	0.002		0.017	0.005
Methoxychlor	0.020	0.026	0.004	0.007	0.014	0.016	0.012	0.034	0.021	0.008		0.083	0.022

Appendix D, Table D-3, Prison Point CSO

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY (A)	JUNE	AVERAGE LOADING
Acenapthene	0.004	0.052	0.008	0.014	0.042	0.031	0.059	0.034	0.085	0.032		0.166	0.048
Phenanthrene	0.040	0.052	0.306	0.054	0.042	0.126	0.590	0.202	0.427	0.064		0.333	0.203
Pyrene	0.004	0.052	0.306	0.014	0.042	0.126	0.590	0.202	0.256	0.032		0.166	0.163
Benzo(a)anthracene	0.004	0.052	0.153	0.014	0.042	0.031	0.236	0.067	0.043	0.032		0.166	0.076
Chrysene	0.004	0.052	0.153	0.027	0.042	0.031	0.354	0.067	0.171	0.032		0.166	0.100
Benzo(b)fluoranthene	0.004	0.052	0.153	0.014	0.042	0.031	0.236	0.067	0.085	0.032		0.166	0.080
Benzo(k)fluoranthene	0.004	0.052	0.077	0.014	0.042	0.031	0.236	0.067	0.085	0.032		0.166	0.073
Benzo(a)pyrene	0.004	0.052	0.077	0.014	0.042	0.031	0.236	0.034	0.043	0.032		0.166	0.066
Naphthalene	0.004	0.052	0.008	0.027	0.042	0.031	0.236	0.067	0.085	0.032		0.166	0.068
2-methylnaphthalene	0.004	0.052	0.008	0.014	0.042	0.126	0.472	0.134	0.171	0.064		0.166	0.114
Fluoranthene	0.040	0.052	0.306	0.014	0.042	0.126	0.708	0.202	0.342	0.064		0.333	0.203
Fluorene	0.004	0.052	0.008	0.014	0.042	0.031	0.059	0.034	0.085	0.032		0.166	0.048
Anthracene	0.004	0.052	0.077	0.014	0.042	0.031	0.059	0.067	0.043	0.032		0.166	0.053
Volatile Organics													
1,1,1 trichloroethane	0.679		3.826		0.084		7.436		0.085				2.422
1,2-dichloroethene	8.387		0.383		2.104		0.236		0.171				2.256
2-butanone	0.679		0.153		0.084		0.118		0.085				0.224
Acetone	0.032		2.372		0.042		0.059		0.043				0.510
Benzene	0.399		0.689		0.252		0.059		0.043				0.288
Bromodichloromethane	0.032		0.306		0.084		0.059		0.043				0.105
Chlorobenzene	0.200		0.306		0.042		0.059		0.043				0.130
Chloroform	0.032		0.038		0.084		0.059		0.043				0.051
Chloromethane	0.032		0.230		0.084		0.059		0.043				0.089
Methlyene chloride	0.240		0.306		0.168		0.059		0.085				0.172
Tetrachloroethene	0.032		0.038		0.084		0.059		0.043				0.051
Toluene	0.160		0.077		0.084		0.118		0.085				0.105
Trichloroethene	0.479		0.191		0.337		0.059		0.043				0.222

Appendix D Table D-4 Prison Point CSO Facility, Priority Pollutants, Historical NPDES Data

	CONCENTRATION (1)			
	1989	1990	1991	1992
Metals (ug/l)				4.73
Antimony		25	4.45	5.02
Arsenic		2.88	4.71	0.5
Beryllium		0.5	0.35	41.86
Boron			41.35	1.59
Cadmium ug/l	2.9	2.91	1.43	3
Chromium (Hex)			3.32	9.49
Chromium		7.9	10.19	65.95
Copper	105.68	100.08	95.09	119.38
Lead	126.56	68.72	142.39	0.24
Mercury	0.3	0.24	0.58	9.3
Molybdenum			4.00	8.04
Nickel	14.66	11.87	8.71	1
Selenium		1.5	0.95	2.59
Silver		3.55	3.73	1
Thallium		0.5	0.95	269.67
Zinc	278.82	234.65	278.90	
PAHs (610) ug/l				0.63
Acenaphthene	2.54	2.5	0.40	0.74
Anthracene	2.99	3.24	0.92	0.58
Dibenzo(a,h)anthracene	4.64	5.59	0.52	2.02
Fluoranthene	3.8	2.79	0.76	0.83
Naphthalene	6.56	3.25	0.69	1.84
Phenanthrene	2.77	2.5	0.84	1.35
Pyrene	2.96	2.72	0.74	

Appendix D, Table D-4, Prison Point CSO

	CONCENTRATION (1)			
	1989	1990	1991	1992
Volatile Organics ug/l				0.5
Benzene	1.12	2.88	1.72	2
Chloroform	6.22	5.01	8.49	
Ethylbenzene	1.44	1.1	3.38	0.75
Methylene chloride	1.28	1.71	1.72	0.5
Tetrachloroethene	1	0.95	1.99	0.5
Toluene	6.76	7.66	4.32	0.5
Trichloroethene	7.62	1.62	1.72	

(1) Concentrations expressed as the arithmetic mean concentration.

Appendix E

Appendix E Table E-1 Somerville Marginal CSO Facility Operations Summary, FY 1992

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100ml)	CHLORINE RESIDUAL (mg/l)
JULY											
7-13-91	0.52	12.3	1.3	6.71	127	86	164	166	0.1	10	2
7-26-91	0.86	5.1	0.928	6.41	88	37	170	34	0.1	10	3
AUGUST											
8-10-91	0.49	8.1	2.19	7.04	86	62	42	40	0.2	310	4
8-19-91	2.21	6	5.9	6.74	35	37	60	46	0.1	270	3
8-20-91	0.38	8	0.013	7	71	76	22	20	0.1	10	3
8-21-91	1.72	9	1.5	7.05	62	62	22	36	0.1	10	3
SEPTEMBER											
9-5-91	0.89	10	1.452	**9.6**	64	289	54	34	0.1	10	4
9-15-91	0.12	1	0.647	6.71	145	66	48	38	0.2	210	3
9-19-91	0.77	8.5	1.218	6.77	77	76	106	44	0.1	10	3
9-20-91	0.68	2.75	0.78	6.6	67	64	22	26	0.1	10	3
9-25-91	2.42	19	7.75	7.17	30	54	12	8	0.1	690	3
9-26-91	1.19	17	1.86	6.94	47	50	12	8	0.1	10	3
OCTOBER											
10-6-91	0.88	20	0.239	6.82	125	72	140	42	0.1	10	3
10-12-91	0.13	7	0.004	6.9	42	20	86	24	0.1	20	3
10-16-91	0.15	10.5	0.276	7.63	45	35	22	26	0.1	10	3
10-17-91	0.19	6.75	0.427	6.58	68	60	46	26	0.2	10	3
10-18-91	0.84	11	0.88	6.85	30	32	26	18	0.2	10	3
10-30-91	0.18	16.5	0.003	6.83	180	161	174	78	0.2	10	3
10-31-91	1.54	11	3.874	6.87	288	126	744	78	0.1	10	4

Appendix E, Table E-1, Somerville Marginal CSO

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100ml)	CHLORINE RESIDUAL (mg/l)
NOVEMBER											
11-1-91	0.97	4	0.652	8.34	283	287	156	54	0.2	10	3
11-11-91	1.1	9	1.518	7.22	106	89	50	30	0.1	10	3
11-21-91	0.22	1	0.0107	6.92	56	61	82	96	1	10	3
11-22-91	0.77	5	0.9	6.88	44	49	55	69	0.1	30	3
11-23-91	0.58	14	3.547	6.96	53	26	50	39	0.1	1000	3
11-24-91	0.19	2.15	0.343	7.06	95	82	15	30	0.1	10	3
DECEMBER											
12-3-91	0.77	12	2.407	8.36	96	55	484	60	0.2	160	3
12-4-91	0.21	1.5	0.542	8.01	32	33	62	62	0.1	10	3
12-14-91	0.4	6	0.403	6.9	116	88	82	38	0.4	1000	3
12-29-91	0.58	5.75	1.09	7.47	86	44	242	186	0.5	10	3
JANUARY											
1-4-92	1.3	5.5	3.99	6.93	67	111	150	124	0.4	10	3
1-5-92	0.02			7.29	89	50	96	98	0.4	60	
1-14-92	0.39	11	0.399	6.92	257	131	462	134	0.2	10	3
1-23-92	1.19	11	6.291	7.01	125	85	170	126	1.2	10	3
1-24-92	0.5	7	0.081	6.91	118	94	192	118	0.6	10	3
FEBRUARY											
2-15-92	0.48	3.747	8.5	6.46	249	216	378	242	2.5	250	3
2-26-92	0.57	1.461	4	6.99	81	122	38	100	0.2	10	3
MARCH											
3-7-92	0.63	8	1.721	6.97	108	76	222	102	1	10	3
3-11-92	0.54	15.3	3.02	7.04	53	36	108	60	0.2	10	4
3-27-92	0.41	10	1.473	6.81	103	70	164	120	2	5	4

Appendix E, Table E-1, Somerville Marginal CSO

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100ml)	CHLORINE RESIDUAL (mg/l)
APRIL											
4-12-92	0.23	0.63	1.086	7.54	344	79	112	20	0.1	10	4
4-17-92	0.76	4	1.625	6.49	67	39	114	70	0.1	40	4
4-22-92	0.05	0.25	0.083	7.02		186		114	0.2	10	4
4-24-92	0.22	4.5	0.777	7.56	155	123	110	142	2	690	4
MAY											
5-2-92	0.76	6.25	1.12	6.9	125	105	260	166	4	200	3.5
5-9-92	0.17	0.5	0.442	7.36	126	112	568	398	2	10	4
JUNE											
6-1-92	1.94	12	7.693	7.1	86	20	224	48	0.1	10	4
6-6-92	0.94	12	3.44	7.32	61	36	184	54	0.1	40	4
6-24-92	0.39	6	0.257	7.08	235	68	310	101	0.5	180	4
TOTALS	**33.44**	**369.038**	**88.6517**								
AVERAGE	**0.70**	**7.85**	**1.89**		**108.36**	**84.13**	**151.32**	**79.02**	**0.48**	**25.53**	**3.27**
MINIMUM	**0.02**	**0.25**	**0.003**	**6.41**	**30**	**20**	**12**	**8**	**0.1**	**5**	**2**
MAXIMUM	**2.42**	**20**	**8.5**	**9.6**	**344**	**289**	**744**	**398**	**4**	**1000**	**4**
NUMBER OF ACTIVATIONS			**48**								

Appendix E Table E-2 Somerville Marginal CSO Facility, Priority Pollutants, NPDES Program
(JULY 1991 - JUNE 1992)

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TIMES DETECTED	GEOMETRIC MEAN	GEOMETRIC STD DEV
METALS (ug/l)															
Antimony	21		8		2.5		12		84		44		5 of 6	16.28	3.50
Arsenic	9.3		6.3		3		4		4		6		6 of 6	5.06	1.50
Cadmium	1	1	0.5	0.5	0.5	3	2	3	2	1	2	2	9 of 12	1.27	1.97
Chromium (Hex)	3.5	3.5	3.5	3.5	3	3	12	3					1 of 8	3.85	1.59
Chromium	15		21		13		16		21		19		6 of 6	17.23	1.22
Copper	75	56	80	48	21	61	65	39	63	45	59	50	12 of 12	52.50	1.43
Lead	74	130	143	89	11	73	133	139	89	76	185	121	12 of 12	89.81	2.07
Mercury	2.2	0.3	2	0.1	0.3	0.3	0.1	0.1	0.3	1	0.3	0.2	9 of 12	0.34	2.92
Nickel	8.5	8.5	8.5	23	8.5	21	7.5	7.5	7.5	7.5	23	12	4 of 12	10.68	1.59
Zinc	267	214	229	138	66	251	269	165	273	183	268	192	12 of 12	196.98	1.51
Cyanide	5		2.5		2.5		15		25	26	98	24	5 of 8	12.79	3.65
Phenol	13		2.5		7		12			2.5	6		4 of 6	5.87	2.07
Ammonia (mg/l)	1.5	0.1	0.05	2.3	0.015	2.5	0.9	1	0.8	1.1	1.4	0.3	10 of 12	0.52	5.49
Phosphorus (mg/l)	1.6	0.5	0.6	0.5	0.8	0.7	1.1	0.7	1.1	1	0.9	1.5	12 of 12	0.86	1.47
MBAS (mg/l)		0.4	1.53	1.6	0.6	1.3	1.2		12	0.7	0.6	0.3	9 of 10	1.03	2.81
PESTICIDES/PCBs (ug/l)															
a-BHC	0.025	0.005	0.05	0.025	0.01	0.01	0.025	0.01	0.72	0.01	0.01	0.01	1 of 12	0.02	3.67
b-BHC	0.025	0.005	0.11	0.025	0.4	0.09	0.025	0.01	0.77	0.01	0.63	0.01	5 of 12	0.05	5.75
Endosulfan I	0.025	0.035	0.01	0.025	0.01	0.01	0.025	0.01	0.025	0.01	0.01	0.01	1 of 12	0.02	1.67

Appendix E, Table E-2, Somerville Marginal CSO

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TIMES DETECTED	GEOMETRIC MEAN	STD DEV
PAHs (610) ug/l															
acenapthene	0.1	0.1	0.1	0.5	0.5	0.5	0.5	0.5	1	1	0.5	0.5	1 of 12	0.38	2.31
Dibenzofuran	0.1	0.1	0.1	1	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	1 of 12	0.38	2.31
phenanthrene	1	0.1	0.1	7	0.5	0.5	3	2	5	1	2	1	7 of 12	1.00	3.87
pyrene	0.1	0.1	0.1	5	0.5	0.5	4	2	3	1	2	0.5	5 of 12	0.75	4.25
benzo(a)anthracene	0.1	0.1	0.1	2	0.5	0.5	1	0.5	0.5	1	1	0.5	3 of 12	0.45	2.72
chrysene	0.1	0.1	0.1	3	0.5	0.5	2	1	2	1	1	0.5	5 of 12	0.58	3.34
benzo(b)fluoranthene	0.1	0.1	0.1	2	0.5	0.5	2	0.5	1	1	2	0.5	4 of 12	0.53	3.15
benzo(k)fluoranthene	0.1	0.1	0.1	2	0.5	0.5	0.5	0.5	1	1	0.5	0.5	2 of 12	0.42	2.63
benzo(a)pyrene	0.1	0.1	0.1	1	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	1 of 12	0.38	2.31
napthalene	0.1	0.1	0.1	0.5	0.5	0.5	0.5	0.5	2	1	0.5	1	2 of 12	0.42	2.63
2-methylnaphthalene	0.1	0.1	0.1	0.5	0.5	0.5	0.5	1	2	1	0.5	0.5	2 of 12	0.42	2.63
FLuoranthene	1	0.1	0.1	5	0.5	0.5	4	2	4	1	3	1	7 of 12	1.02	3.81
fluorene	0.1	0.1	0.1	2	0.5	0.5	0.5	0.5	1	1	0.5	0.5	2 of 12	0.42	2.63
anthracene	0.1	0.1	0.1	1	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	1 of 12	0.38	2.31
Indeno(1,2,3-cd)pyrene	0.1	0.1	0.1	0.1	0.5	0.5	1	0.5	0.5	1	0.5	0.5	1 of 12	0.33	2.50
Volatile Organics (ug/l)															
acetone	56		12		9		25		1				4 of 5	10.86	4.53
chloroform	14		27		160		27		44				5 of 5	37.26	2.49
toluene	48		4		2		5		4				5 of 5	5.99	3.37
xylene	42		0.5		0.5		0.5		0.5				1 of	1.21	7.25
benzene	7		0.5		0.5		0.5		0.5				1 of 5	0.85	3.26
ethylbenzene	7		0.5		0.5		0.5		0.5				1 of 5	0.85	3.26
methlyene chloride	39		3		3		0.5		2				4 of 5	3.23	4.83
Bromodichloromethane	0.5		0.5		4		0.5		3				2 of 5	1.08	2.90

Appendix E Table E-3 Somerville Marginal CSO Facility, Priority Pollutants Loadings, NPDES Data
(JULY 1991 - JUNE 1992)

PARAMETERS	Loadings (lb/d) JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	AVERAGE LOADING
METALS													
Antimony	0.228		0.052		0.014		0.399		1.206		0.411		0.385
Arsenic	0.101		0.041		0.016		0.133		0.057		0.056		0.067
Cadmium	0.011	0.000	0.003	0.001	0.003	0.060	0.067	0.213	0.029	0.009	0.019	0.128	0.045
Chromium (Hex)	0.038	0.000	0.023	0.007	0.016	0.060	0.399	0.213					0.095
Chromium	0.163		0.137		0.071		0.532		0.301	0.000	0.177		0.197
Copper	0.813	0.006	0.520	0.096	0.114	1.225	2.163	2.765	0.904	0.408	0.551	3.208	1.064
Lead	0.802	0.014	0.930	0.177	0.060	1.465	4.426	9.854	1.277	0.688	1.728	7.763	2.432
Mercury	0.024	0.000	0.013	0.000	0.002	0.006	0.003	0.007	0.004	0.009	0.003	0.013	0.007
Nickel	0.092	0.001	0.055	0.046	0.046	0.422	0.250	0.532	0.108	0.068	0.215	0.770	0.217
Zinc	2.895	0.023	1.490	0.275	0.359	5.039	8.951	11.697	3.918	1.657	2.503	12.319	4.261
Cyanide	0.054		0.016		0.014		0.499		0.359	0.235	0.915	1.540	0.454
Phenol	0.141		0.016		0.038		0.399			0.023	0.056		0.112
Ammonia	16.263	0.011	0.325	4.584	0.082	50.186	29.949	70.890	11.483	9.963	13.077	19.248	18.838
Phosphorus	17.347	0.054	3.903	0.997	4.350	14.052	36.604	49.623	15.788	9.057	8.407	96.239	21.369
MBAS		0.043	9.953	3.189	3.263	26.097	39.932		172.238	6.340	5.604	19.248	28.591
PESTICIDES/PCBs													
a-BHC	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.010	0.000	0.000	0.001	0.001
b-BHC	0.000	0.000	0.001	0.000	0.002	0.002	0.001	0.001	0.011	0.000	0.006	0.001	0.002
Endosulfan I	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.001	0.000

Appendix E, Table E-3, Somerville Marginal CSO

PARAMETERS	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	AVERAGE LOADING
PAHs (610)													
acenapthene	0.001	0.000	0.001	0.001	0.003	0.010	0.017	0.035	0.014	0.009	0.005	0.032	0.011
Dibenzofuran	0.001	0.000	0.001	0.002	0.003	0.010	0.017	0.035	0.007	0.009	0.005	0.032	0.010
phenanthrene	0.011	0.000	0.001	0.014	0.003	0.010	0.100	0.142	0.072	0.009	0.019	0.064	0.037
pyrene	0.001	0.000	0.001	0.010	0.003	0.010	0.133	0.142	0.043	0.009	0.019	0.032	0.034
benzo(a)anthracene	0.001	0.000	0.001	0.004	0.003	0.010	0.033	0.035	0.007	0.009	0.009	0.032	0.012
chrysene	0.001	0.000	0.001	0.006	0.003	0.010	0.067	0.071	0.029	0.009	0.009	0.032	0.020
benzo(b)fluoranthene	0.001	0.000	0.001	0.004	0.003	0.010	0.067	0.035	0.014	0.009	0.019	0.032	0.016
benzo(k)fluoranthene	0.001	0.000	0.001	0.004	0.003	0.010	0.017	0.035	0.014	0.009	0.005	0.032	0.011
benzo(a)pyrene	0.001	0.000	0.001	0.002	0.003	0.010	0.017	0.035	0.007	0.009	0.005	0.032	0.010
napthalene	0.001	0.000	0.001	0.001	0.003	0.010	0.017	0.035	0.029	0.009	0.005	0.064	0.015
2-methylnaphthalene	0.001	0.000	0.001	0.001	0.003	0.010	0.017	0.071	0.029	0.009	0.005	0.032	0.015
FLuoranthene	0.011	0.000	0.001	0.010	0.003	0.010	0.133	0.142	0.057	0.009	0.028	0.064	0.039
fluorene	0.001	0.000	0.001	0.004	0.003	0.010	0.017	0.035	0.014	0.009	0.005	0.032	0.011
anthracene	0.001	0.000	0.001	0.002	0.003	0.010	0.017	0.035	0.007	0.009	0.005	0.032	0.010
Indeno(1,2,3-cd)pyrene	0.001	0.000	0.001	0.000	0.003	0.010	0.033	0.035	0.007	0.009	0.005	0.032	0.011
Volatile Organics													
acetone	0.607		0.078		0.049		0.832		0.014				0.316
chloroform	0.152		0.176		0.870		0.898		0.632				0.545
toluene	0.520		0.026		0.011		0.166		0.057				0.156
xylene	0.455		0.003		0.003		0.017		0.007				0.097
benzene	0.076		0.003		0.003		0.017		0.007				0.021
ethylbenzene	0.076		0.003		0.003		0.017		0.007				0.021
methlyene chloride	0.423		0.020		0.016		0.017		0.029				0.101
Bromodichloromethane	0.005		0.003		0.022		0.017		0.043				0.018

Appendix E Table E-4 Somerville Marginal CSO Facility, Priority Pollutants, NPDES Data

	CONCENTRATION (1)			
	1989	1990	1991	1992
Metals (ug/l)				
Antimony		29.68	8.26	37.51
Arsenic		2.94	4.39	0
Beryllium		0.5	0.32	0.5
Boron			22.91	14.68
Cadmium ug/l	2.37	2.32	1.29	1.04
Chromium (Hex)			3.32	3
Chromium		2.62	10.46	9.56
Copper	64.41	44.5	67.50	38.2
Lead	102.84	64.23	94.17	75.79
Mercury	0.16	0.12	0.28	0.22
Molybdenum			4.00	4.43
Nickel	15.64	10.6	11.76	9.91
Selenium		1.5	1.41	1
Silver		3.16	2.30	2.1
Thallium		0.5	1.06	1.25
Zinc	259.96	260.99	241.65	163.25
PAHs (610) ug/l				
Acenaphthene	2.91	2.81	0.82	0.92
Anthracene	3.16	3.24	0.87	0.86
Dibenzo(a,h)anthracene	4.74	5.49	0.92	0.59
Fluoranthene	2.51	2.77	1.44	1.94
Naphthalene	7.1	4.03	0.90	1.04
Phenanthrene	2.7	2.5	1.44	1.76
Pyrene	2.48	2.5	1.21	1.58

Appendix E, Table E-4, Somerville Marginal CSO

	CONCENTRATION (1)			
	1989	**1990**	**1991**	**1992**
Volatile Organics ug/l				0.5
Benzene	1.12	2.88	1.72	2
Chloroform	6.22	5.01	8.49	
Ethylbenzene	1.44	1.1	3.38	0.75
Methylene chloride	1.28	1.71	1.72	0.5
Tetrachloroethene	1	0.95	1.99	0.5
Toluene	6.76	7.66	4.32	0.5
Trichloroethene	7.62	1.62	1.72	

(1) Concentrations expressed as the arithmetic mean concentration.

Appendix F

Table F.1 Constitution Beach CSO Facility Operations Summary, FY 1992

Appendix F Table F-1 Constitution Beach CSO Facility Operations Summary, Fiscal Year 1992

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)*	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100ml)	CHLORINE RESIDUAL (mg/l)
JULY											
7-13-91	0.52	2	0.325	6.7	91	74	58	24	0.1	10	2
7-26-91	0.86		0.232	**6.26**	39	32	22	14	0.1	10	3
AUGUST											
8-19-91	2.21	10.25	1.475	8.27	72	296	58	24	0.1	10	3
SEPTEMBER											
9-5-91	0.89	8.5	0.363	6.89	30	55	64	18	0.1	10	3
9-25-91	2.42	7.5	1.938	6.68	49	53	14	22	0.1	10	3
NOVEMBER											
11-11-91	1.1	1.75	0.380	7.37	25	30	124	178	0.5	10	3
DECEMBER											
12-3-91	0.77	1.25	0.602	9.46	22	227	40	334	0.6	10	3
12-29-91	0.58	2	0.273	8.01	7		506	460	0.1	10	3
JANUARY											
1-4-92	1.3	4.5	0.998	7.76	16	23	78	42	0.1	10	3
1-23-92	1.19	3	1.573	7.52	32	48	168	142	0.2	10	3.5
JUNE											
6-1-92	1.94	9	1.923	7.39	23	22	58	40	0.1	10	3
6-6-92	0.94	2	0.860	7.69	21	19	46	0.2	10	3	
TOTAL	**14.72**	**51.75**	**10.9395**								
AVERAGE	**1.23**	**4.70**	**0.91**		**35.58**	**79.91**	**103.00**	**108.18**	**1.01**	**9.00**	**2.95**
MINIMUM	**0.52**	**1.25**	**0.232**	**6.26**	**7**	**19**	**14**	**0.2**	**0.1**	**3**	**2**
MAXIMUM	**2.42**	**10.25**	**1.9375**	**9.46**	**91**	**296**	**506**	**460**	**10**	**10**	**3.5**
NUMBER OF ACTIVATIONS			**12**								

*** Meters broken, flows are estimates and are 25% of Somerville Marginal flows.**

Appendix G

Table G.1 Fox Point CSO Facility Operations Summary, FY 1992

Appendix G Table G-1 Fox Point CSO Facility Operations Summary, Fiscal Year 1992

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100ml)	CHLORINE RESIDUAL (mg/l)
JULY											
7-13-91	0.52	3	0.48	3.71	75	47	22	20	0.1	10	3.5
7-26-91	0.86	0.5	1.94	6.4	101	48	62	64	0.1	10	3
AUGUST											
8-10-91	0.49	2.2	1.14	7.06	32	45	52	152	1	140	3
8-19-91	2.21	9.15	4.85	6.89	40	55	50	59	0.1	10	3
8-20-91	0.38	1	0.46	7.02	38	45	44	42	0.1	10	3
8-21-91	1.72	4.5	4.41	7.11	25	272	36	40	0.1	10	3
SEPTEMBER											
9-5-91	0.89	2	2.16	6.9	50	89	70	34	0.1	10	3
9-19-91	0.77	2	0.66	6.65	68	65	48	52	0.1	10	4
9-20-91	0.68	2	1.00	6.55	63	78	48	48	0.1	10	3
9-25-91	2.42	8	3.93	6.86	32	41	72	44	0.2	10	3
9-26-91	1.19	4	1.34	6.83	44	66	26	48	0.7	10	3
OCTOBER											
10-6-91	0.88	1.5	0.73	7.03	45	100	70	184	2	10	3
10-18-91	0.15	1	1.45	6.74	19	37	78	16	0.1	10	3
NOVEMBER											
11-11-91	1.1	1	0.40	7.28	51	45	48	36	0.1	800	3
DECEMBER											
12-3-91	0.77	1.5	0.58	8.77	36	50	66	52	0.2	10	3
12-29-91	0.58	3	1.50	7.02	41	42	214	136	0.1	10	3
JANUARY											
1-4-92	1.3	6	3.84	7.52	28	36	94	144	0.6	230	3
1-23-92	1.19	2.5	2.03	7.25	34	57	172	268	3	10	

Appendix G, Table G-1, Fox Point CSO

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	TOTAL FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLIFORM (#/100ml)	CHLORINE RESIDUAL (mg/l)
APRIL											
4-17-92	0.76	1	1.15	7.02	35	44	42	60	0.02	10	3
JUNE											
6-1-92	1.94	11	2.18	7.29	48	34	188	150	0.8	10	3.5
6-6-92	0.94	1	0.70	8.5	26	24	132	138	0.2	20	3.5
6-8-92	0.39	1	0.67	7.28	22	52		91	0.1	10	4
TOTAL	**22.13**	**68.85**	**37.59**								
AVERAGE	**1.01**	**3.13**	**1.71**		**43.32**	**62.36**	**77.81**	**85.36**	**0.45**	**16.37**	**3.17**
MINIMUM	**0.15**	**0.5**	**0.40**	**3.71**	**19**	**24**	**22**	**16**	**0.02**	**10**	**3**
MAXIMUM	**2.42**	**11**	**4.85**	**8.77**	**101**	**272**	**214**	**268**	**3**	**800**	**4**
NUMBER OF ACTIVATIONS			**22**								

Appendix H

Table H.1 Commercial Point CSO Facility Operations Summary, FY 1992

Appendix H Table H-1 Commercial Point CSO Facility Operations Summary, Fiscal Year 1992

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLI Effluent (#/100 ml)	RESIDUAL CHLORINE (mg/l)
AUGUST											
8/10/91	0.49	9	2.00	9.87	250	283	481	39	0.1	10	3
8/19/91	2.21	11.1	11.00	6.92	38	68	58	56	1	150	3
8/20/91	0.38	4	1.00	7.01	65	54	28	10	0.1	10	3
8/21/91	1.72	10.45	4.00	6.79	22	37	30	62	0.1	10	3
SEPTEMBER											
9/5/91	0.89	9.5	4.00	7.33	37	71	48	32	0.1	10	3
9/19/91	0.77	4	1.00	6.86	98	62	144	112	0.1	10	3
9/20/91	0.68	3	1.00	6.77	302	77	24	66	0.1	10	3
9/25/91	2.42	8	8.00	6.98	33	33	38	214	6	10	3
9/26/91	1.19	4	5.00	6.89	29	82	8	12	0.1	10	3
OCTOBER											
10/6/91	0.88	2.25	3.00	6.61	56	51	68	101	1.6	10	4
10/12/91	0.13	2	1.00	6.69	26	16	84	28	0.1	10	3
10/18/91	0.15	1.75	3.00	6.96	32	32	186	38	0.1	10	4
10/30/91	0.18	2	1.00	6.85	38	288	24	76	0.4	190	3
10/31/91	1.54	2.25	1.00	6.97	53	288	22	48	0.1	10	3
NOVEMBER											
11/1/91	0.97			8.02	89	59	34	30	0.1	10	3
11/11/91	1.1	4	1.00	7.04	69	105	58	70	0.1	10	3
11/22/91	0.77	3	6.00	6.98	118	46	44	162	1	10	3
DECEMBER											
12/3/91	0.77	5	1.00	6.76	56	84	112	92	0.8	10	3
12/4/91	0.21	2.5	1.00	6.77	23	32	18	16	0.4	10	3
12/29/91	0.58	3.5	1.00	6.9	41	30	116	98	0.1	10	3

Appendix H, Table H-1, Commercial Point CSO

DATE	RAINFALL (inches)	DISCHARGE DURATION (hours)	FLOW (MG)	pH Effluent (SU)	BOD Influent (mg/l)	BOD Effluent (mg/l)	TSS Influent (mg/l)	TSS Effluent (mg/l)	SS Effluent (mg/l)	FECAL COLI Effluent (#/100 ml)	RESIDUAL CHLORINE (mg/l)
JANUARY											
1/4/92	1.3	15.5	2.00	6.93	35	39	40	76	0.2	10	4
1/5/92	0.02			7.15	10	31	12	12	0.1	10	
1/23/92	1.19	6	6.00	**8.78**	61	42	166	86	0.1	10	
FEBRUARY											
2/26/92	0.57	2	1.00	7.42	77	102	54	54	0.2	10	4
MARCH											
3-11-92	0.54	4	1.00	7.07	15	28	38	38	0.6	10	
APRIL											
4/17/92	0.76	1	2.00	**9.55**	38	8	140	8	0.1	10	3
4/24/92	0.44	3.5	1.00	**8.54**	32	57	88	34	0.1	10	3
MAY											
5/2/92	0.76	2.5	1.00	6.84	78	200	172	734	17	10	3
5/3/92	0.01	4	2.00	6.73	70	213	132	724	18	10	3
JUNE											
6/1/92	1.94	12.5	2.00	7.92	31	68	38	108	0.2	10	3.5
6/6/92	0.94	4	4.00	8.29	44	28	114	96	0.6	10	4
6/8/92	0.39	6	1.00	7.46	46	79	61	126	0.1	10	3
6/24/92	0.39	3	1.00	7.22	56	36	162	110	0.2	20	3
TOTAL	**27.28**	**155.3**	**80**								
AVERAGE	**0.83**	**5.01**	**2.58**		**62.67**	**82.70**	**86.12**	**108.12**	**1.52**	**13.47**	**3.18**
MINIMUM	**0.01**	**1**	**1**	**6.61**	**10**	**8**	**8**	**8**	**0.1**	**10**	**3**
MAXIMUM	**2.42**	**15.5**	**11**	**9.87**	**302**	**288**	**481**	**734**	**18**	**190**	**4**
NUMBER OF ACTIVATIONS			**33**								

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