NEW YORK-NEW JERSEY HARBOR ESTUARY PROGRAM

NEW JERSEY TOXICS REDUCTION WORK PLAN STUDY I-G PROJECT REPORT

Prepared By:

GLEC
Great Lakes Environmental Center

Principal Contact: Mick DeGraeve
739 Hastings Street
Traverse City, MI 49686
Phone: (231) 941-2230
Fax: (231) 941-2240

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EXECUTIVE SUMMARY

NJ Toxics Reduction Workplan for NY-NJ Harbor Study I-G Project Report

POTW and CSO/SWO Discharges

The New York-New Jersey (NY-NJ) Harbor estuary system is of enormous and interdependent ecological and economic importance. The presence of toxic chemicals in water and sediments throughout the harbor estuary has resulted in reduced water quality, fisheries restrictions/advisories, reproductive impairments in some species, and general adverse impacts to the estuarine and coastal ecosystems. In addition, problems associated with the management of contaminated dredged material have resulted in uncertainty regarding planned construction and future maintenance of the maritime infrastructure that supports shipping in the Harbor.

The New Jersey Toxics Reduction Workplan for NY-NJ Harbor (NJTRWP) includes a series of studies designed to provide the NJ Department of Environmental Protection (and other entities with environmental management and regulatory responsibilities) with the information needed to identify sources of the toxic chemicals of concern, and to prioritize these sources for appropriate action. Study I-G of the NJTRWP consists of the sampling of discharges from all twelve (12) New Jersey municipal wastewater treatment facilities (POTWs), and selected combined sewer outfalls (CSOs) and storm water outfalls (SWOs), which discharge to NY-NJ Harbor. The primary objective of Study I-G is to estimate the loadings of the chemicals of concern discharged from these POTWs and CSOs/SWOs into the NY-NJ Harbor estuary. Other uses of the data collected in Study I-G will be to

(1) provide the necessary background information to initiate the trackdown efforts that will identify the ultimate sources of the chemicals of concern;
(2) provide the loadings data needed for developing and calibrating a water quality, sediment and contaminant fate and transport model; and
(3) facilitate the development of Total Maximum Daily Load (TMDL) calculations.

Sampling of the POTWs was initiated in October 2000 and completed in August 2001. The six (6) largest POTWs, each with significant industrial/commercial service areas, were each sampled four (4) times apiece; the six (6) smallest POTWs, serving mostly residential areas, were sampled twice. Sampling of the CSOs and SWOs began in September 2001 and was completed in April 2004. Five (5) SWOs were sampled three (3) times each, while nine (9) CSOs were sampled from one to three times each. Whole water 24-hour composite (POTW) and grab (CSO and SWO) samples were analyzed for dioxins/furans, polychlorinated biphenyls (PCBs), pesticides, polyaromatic hydrocarbons (PAHs), and metals (Cd, Pb, Hg, and methyl-Hg).

In general – but with some notable exceptions – the average concentrations of the target analytes were observed to be similar in the effluents from the twelve POTWs. Compared to the POTW effluents, the average concentrations of the target analytes in the CSO and SWO discharges were elevated.

Average Total Organic Carbon (TOC) concentrations in the large POTWs ranged from 18 to 78 mgC/L, while average TOC concentrations in the small POTWs ranged from 10 to 35 mgC/L. Except for one sample, TOC concentrations in the SWO discharges did not exceed 40 mgC/L. Likewise, except for one sample, TOC concentrations in the CSO discharges did not exceed 50 mgC/L.

Average suspended sediment (SS) concentrations in the large POTWs ranged between 21 and 38 mg/L (mean = 29 mg/L), while SS concentrations in the small POTWs ranged between 5 and 23 mg/L (mean = 16 mg/L). Suspended sediment concentrations were greater and more variable in the SWO and CSO discharges; concentrations ranged between 13 and 423 mg/L (mean = 169 mg/L) in the SWOs, and between 31 and 503 mg/L (mean = 101 mg/L) in the CSOs.

The samples were analyzed for approximately 146 PCB congeners (including coelutions) following United States Environmental Protection Agency (USEPA) Method 1668 Revision A. The overall average total PCB concentration in the POTW effluents was approximately 29 ng/L. The Passaic Valley Sewerage Commissioners (PVSC; mean = 87 ng/L) and Linden-Roselle effluents (on occasion) were found to have higher total PCB concentrations compared to the other POTWs. Average total PCB concentrations were less in the POTW discharges compared to discharges from CSOs (59 ng/L) and SWOs (52 ng/L). The POTW and SWO effluents were generally dominated by the tetra-, penta-, and hexa-PCB homologs, while the hepta-PCBs were most significant in CSO discharges.

One particular PCB congener - PCB 11 – comprised an average of 70% of the total PCB concentration in the PVSC effluent samples. This congener is a by-product of the production of the pigment diarylide yellow (and other pigments), which is used to color plastics and inks. When the PCB 11 concentration was removed from the calculation of the PVSC total PCB concentration, the average PVSC total PCB concentration (15 ng/L) was comparable to the other POTW effluents.

The samples were analyzed for 26 PAH target analytes following Modified USEPA Methods 8270C and 625. Blank correction using the NJTRWP procedures affected the POTW sample data to varying degrees; in contrast, the CSO and SWO data were minimally impacted by the NJTRWP blank correction procedures. Average total PAH concentrations in the POTW effluents typically ranged between 500 and 3,000 ng/L, but tended to be higher at the PVSC (4,100 ng/L) and West New York (6,800 ng/L) POTWs. Total PAH concentrations were considerably greater in the discharges from the CSOs (mean = 28,000 ng/L) and SWOs (mean = 60,000 ng/L).

The samples were also analyzed for 28 pesticide target analytes. Blank correction and/or non-detections combined to affect the POTW, SWO, and CSO chlorinated pesticide data during all sampling events. However, the sample data for the NY-NJ Harbor Estuary Program Contaminant Assessment and Reduction Project (CARP) pesticides of concern (DDTs, chlordane, and dieldrin) were minimally impacted. The mean POTW total pesticide concentration was 19.5 ng/L, with an elevated mean observed in the effluent from the Rahway Valley POTW (29.7 ng/L). Higher average total pesticide concentrations were observed in the CSO (79 ng/L) and SWO (70 ng/L) discharges. Five compounds (gamma-BHC, gamma- and alpha-chlordane, trans-nonaclor, and dieldrin) plus total DDTs accounted for at least 75% of the total pesticides in each of the POTWs. In contrast, gamma-BHC (due to blank correction) was a minor component of the SWO and CSO discharges, while total DDTs were a more significant percentage of the total pesticides compared to the POTW effluents.

The samples were analyzed for 17 dioxin/furan congeners using modified USEPA Methods 8290 and 1613 Revision B. Concentrations of dioxins/furans were found to be extremely low in the POTW effluents; generally, concentrations were less than 31 pg/L in the large POTWs and less than 100 pg/L in the small POTWs. Total dioxin/furan concentrations were higher in the SWOs (mean = 2,400 pg/L) and CSOs (mean = 2,600 pg/L). The least toxic congeners (OCDD and OCDF) dominated in the samples from the POTWs and the CSOs/SWOs, comprising approximately 80-90% of the total dioxin/furan concentration. 2,3,7,8-TCDD was rarely found in the POTW effluents and CSO/SWO discharges.

The samples were analyzed for cadmium (Cd) and lead (Pb) using USEPA Draft Method 1638 modified. The overall mean total Cd concentration in the POTW effluents was 131 ng/L. The mean Cd concentrations at PVSC (330 ng/L) and North Bergen-Woodcliff (210 ng/L) were elevated compared to the other POTWs. In comparison, Cd concentrations were greater in the effluents collected from the SWOs (mean = 790 ng/L) and CSOs (mean = 500 ng/L). Total Pb concentrations were similar in all of the POTWs, averaging approximately 2,000 ng/L. In contrast, Pb concentrations were significantly higher in the SWO (mean = 100,000 ng/L) and CSO (mean = 51,000 ng/L) discharges.

The samples were analyzed for mercury (Hg) using USEPA Method 1631. The overall mean total Hg concentration in the POTW effluents was 30 ng/L. The mean total Hg concentration observed at PVSC (55 ng/L) was elevated compared to the other POTWs. Mean total Hg concentrations in the SWO discharges were variable, but greater than those observed in the POTW effluents, ranging between 93 and 691 ng/L. The Peripheral Ditch SWO was one exception, with a mean total Hg concentration of only 5.6 ng/L. The overall mean total Hg in the SWO discharges (277 ng/L) was similar to that observed in the CSO discharges (242 ng/L).

All of the samples were analyzed for dissolved methyl-mercury (methyl-Hg) using USEPA Method 1630, but only a small number of samples were analyzed for total methyl-Hg. In the POTW effluents, total methyl-Hg concentrations ranged from 0.28 to 2.01 ng/L. Similar concentrations were found in the SWO discharges, with mean concentrations at the individual SWOs ranging between 0.16 and 3.13 ng/L. Likewise, the concentrations in the CSO discharges ranged between 0.32 and 2.70 ng/L.

Because of the volume of their discharge, the largest loads of the measured contaminants were typically found in the effluents from the PVSC (1,087 million liters per day [mld]; 46% of the total POTW wastewater discharged to the harbor from the 12 NJ POTWs sampled) and the Middlesex County Utilities Authority (MCUA; 442 mld, 19% of the total wastewater discharged to the harbor from the 12 NJ POTWs sampled) POTWs. The estimated annual load of total PCBs from all of the POTWs was 44 kg; PVSC accounts for approximately 78% of this load. However, if the contribution from PCB 11 is removed from this calculation, the combined annual load of total PCBs decreases to only 15 kg, with PVSC and MCUA now accounting for only about 39% and 24% of the load, respectively. The POTWs combine to discharge an estimated total PAH load of 2,300 kg/year, with PVSC contributing 70% of the load. The combined POTW load of total pesticides was estimated to be approximately 14 kg/year, with PVSC (36%) and MCUA (21%) again accounting for most of the load. A total dioxin/furan annual load of approximately 23 g was estimated to originate from the POTWs, with 43% of this load attributed to PVSC.

The combined load of total Cd from the sampled POTWs is estimated to be 170 kg/year, with PVSC accounting for 77% of the load. The POTWs combine to discharge an estimated total Pb load of 1,480 kg/year, with PVSC contributing 50% of the load. The annual total Hg load from all of the POTWs was estimated to be 29 kg; PVSC accounts for 69% of the load.

Except for total PCBs (including PCB11, at 78%), total PAHs (70%), total Cd (77%), and total Hg (69%), the percent contribution of the PVSC loads to the combined load of all the POTWs is generally proportional to PVSC's percent of the total POTW wastewater flow (46%) to the harbor.

CSO and SWO load estimates for the contaminants of concern were beyond the scope of the present study.

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Errata

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Figure 4b: the mean SS concentration at Joint Meeting Essex-Union Counties should be 22.8 mg/L (not 17.1 mg/L).

Figure 7: the Event #1 Linden-Roselle % mono+di-PCB value is incorrect; the correct value should be 16.2%.

Figure 13: the average % pesticide values are incorrect for BCUA and Rahway Valley (gamma-BHC) and MCUA (methoxychlor). The correct values are: BCUA gamma-BHC – 13.7%, Rahway valley gamma-BHC – 34.7%, and MCUA methoxychlor – 28.5%.

Figure 16: average % gamma-BHC value for NB-Woodcliff is 3.8%.

Figure 20b: the Event #4 Secaucus TEQ should be zero (0).

Figure 22c: the Event #3 Rahway Valley and Linden-Roselle total Hg concentrations are incorrect; the correct values are Rahway Valley (18.5 ng/L) and Linden-Roselle (26.7 ng/L).

Figure 23a: the Secaucus Event #4 and mean dissolved Cd concentrations are incorrect; the correct values are Event #4 (*73.1 ng/L) and mean (*77 ng/L).

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Figure 40a: the Peripheral Ditch total dioxin/furan values are incorrect; the correct concentrations are Event #2 - 21 pg/L, Event #3 – 0.6 pg/L, and Event #4 – 136 pg/L.

Figure 40b: the Event #2 Henley Road total dioxin/furan TEQ concentration is incorrect; the correct concentration is 143 pg/L TEQ.

Figure 44b: the Event #3 total Pb concentrations are incorrect for Henley Road, CCI, and Smith Marina; the correct concentrations are Henley Road – 24,300 ng/L, CCI – 106,000 ng/L, and Smith Marina – 134,000 ng/L.

Figure 44c: the Event #3 total Hg concentrations at Blanchard Street and Henley Road are incorrect; the total Hg concentration for this sample was impacted by blank contamination and censored.

INTRODUCTION

The importance of the ecological health of the New York-New Jersey (NY-NJ) Harbor estuary system cannot be underestimated. Furthermore, the economic vitality of the Harbor region is inextricably linked to the Harbor's ecological health. However, the presence of toxic chemicals in the water and sediments results in reduced water quality, fisheries restrictions/advisories, reproductive impairments in some species, and general adverse impacts to the estuarine and coastal ecosystems. The Port of New York and New Jersey is the largest port on the East Coast of the United States, and central to the economy of the region. However, problems associated with the management of contaminated dredged material have resulted in uncertainty regarding planned construction and future maintenance of the maritime infrastructure that supports shipping in the Harbor. Consequently, there is broad agreement among federal and state agencies, environmental organizations, the Port Authority, scientists and the general public that a comprehensive plan is needed to reduce sediment contamination within the NY-NJ Harbor.

Although some information is currently available regarding potential sources of the chemicals of concern and the levels of contamination in sediments and biota in the NY-NJ harbor, there are significant gaps in the existing data. As a result, funding has been provided to the New York State Department of Environmental Conservation (NYSDEC) and the New Jersey Department of Environmental Protection (NJDEP) to develop and implement the NY-NJ Harbor Estuary Program (HEP) Contaminant Assessment and Reduction Program (CARP); the New Jersey Toxics Reduction Work Plan (NJTRWP) is a component of the CARP Program.

OBJECTIVES/SCOPE

The NJTRWP includes a series of Phase One Studies (I-C, I-D, I-E and I-G; NJDEP, 2001a) designed to provide the NJDEP with the data and information it needs to meet the following primary objectives:

- identify sources of the toxic chemicals of concern, and to prioritize these sources for appropriate action (management, regulatory, trackdown, clean-up);

- identify selected contaminated sediments for future remediation and restoration activities.

NJTRWP Phase One Studies I-C, I-D and I-E are monitoring studies of selected ambient water quality and suspended sediment parameters in various tributaries to the Newark Bay Complex and the NY-NJ Harbor estuary system. This study (I-G) includes monitoring of discharges from selected municipal wastewater treatment facilities (POTWs), combined sewer outfalls (CSOs), and storm water outfalls (SWOs). The specific objectives of Study I-G are provided below.

The primary objective of Study I-G is to determine the loadings of the chemicals of concern discharged from all of the New Jersey Publicly Owned Treatment Works (POTWs) into the NY-NJ Harbor estuary, as well as to estimate the loadings from a selected sample of CSOs and SWOs. A second use of the data collected in Study I-G is to provide the necessary background information to initiate the trackdown efforts that will identify the ultimate sources of the chemicals of concern. Specifically, Study I-G:

- provides calculations and measurements of the contaminant loads (and related water quality parameters) discharged from the New Jersey municipal wastewater treatment facilities discharging to NY-NJ Harbor. Loading data is being used to develop, calibrate and verify the CARP model;

- provides measurements of the levels of contaminants (and related water quality parameters) associated with discharges from selected combined sewer and stormwater outfalls discharging to NY-NJ Harbor;

- provides the data for POTW, CSO and SWO discharges necessary to initiate trackdown efforts to identify the ultimate sources of the chemicals of concern;

- provides baseline information that will be used to evaluate the effectiveness of actions taken to eliminate sources of the chemicals of concern within the service areas of the New Jersey point source discharges;

- provides the basis for a long-term monitoring program of the chemicals of concern in the NY-NJ Harbor system;

This Project Report presents the contaminant monitoring methods, results, analyses, and conclusions of Study I-G of the NJTRWP. Section I includes the results from the POTWs, and Section II includes the results from the CSOs and SWOs.

METHODS

SITE SELECTION AND SAMPLING STRATEGY

This section presents the sampling strategy and the rationale for selecting the sampling locations. Sample locations for the POTW outfalls were fixed and remained unchanged during the course of the project. The sample locations for the combined sewer overflows and storm water outfalls were adjusted from event-to-event, as data were gathered and as climatic and/or logistic considerations warranted. To the greatest extent possible (and where appropriate), sample collection activities for this phase of the study were coordinated with the other components of the NJTRWP (and CARP).

Site Selection

The toxics monitoring/loadings investigations for POTWs, CSOs and SWOs were conducted under the collective jurisdiction of the New Jersey sewerage authorities that are responsible for the POTWs discharging to the Harbor complex. Samples of the discharges from twelve POTWs (six designated as large and six small) were collected during the study. The small POTWs were generally associated with residential discharges, and the large POTWs had larger industrial/commercial contributions. Earth coordinates (latitude and longitude), National Pollutant Discharge Elimination System (NPDES) permit numbers, facility contacts, sampling locations and other background information for the POTWs are provided in Table 1.

The selection of CSO/SWO monitoring sites was made in part by considering the types of industries and land uses in each of the CSO and SWO service areas, thereby eliminating from further consideration those CSO and SWO sampling locations which were least likely to be responsible for contributing meaningful loads of contaminants of concern. Consideration was also given to selecting CSO/SWO sampling sites representative of major drainage areas. The CSOs and SWOs which were sampled in 1997/1998 for the New Jersey Harbor Dischargers Group's (NJHDG) nickel/copper monitoring/modeling program were also considered for inclusion. Those CSOs and SWOs proved to be accessible and reliable sampling locations. The Peripheral Ditch, which collects storm water from the Newark International Airport, was also selected, as were four major interceptor points leading to three POTWs with combined sewer systems. The CSO and SWO sampling sites sampled for this phase of the study, along with the pertinent information regarding exact sampling locations, are presented in Tables 2 and 3, respectively. Figure 1 shows the relative location of the POTW, CSO and SWO sampling sites within the New Jersey portion of the watershed.

Sampling Strategy and Schedule

The study consisted of quarterly sampling of the six largest POTWs, and seasonal (summer, winter) sampling events for the six smaller New Jersey POTWs discharging to the Harbor complex (see Table 1). The CSO/SWO sampling consisted of high flow precipitation sampling events for the selected CSO/SWOs (see Tables 2 and 3). Great Lakes Environmental Center (GLEC) was responsible for identifying candidate high flow/wet weather sampling events.

TABLE 1. POTWs Sampled by the New Jersey Harbor Dischargers Group for the Harbor Estuary Program Contaminant Assessment and Reduction Program.

POTW	Abbreviation	POTW Type[a]	No. of Samples	Contact	Discharge Location	Sampling Location	Approximate Discharge Rate[b]	NJPDES Permit No.
Passaic Valley Sewerage Com.	PVSC	Lg	4	Bridget McKenna	Long. 74° 07'.083 Lat. 40° 39’.083	Long. 74° 08'.006 Lat. 40° 42'. 690	283 mgd	NJ0021016
Middlesex County Utility Authority	Msex	Lg	4	Victor Santamarina	Long. 74° 28’.750 Lat. 40° 29’.750	Long. 74° 18'.678 Lat. 40° 29'.389	115 mgd	NJ0020141
Bergen County Utility Authority	BCUA	Lg	4	Jerome Sheehan	Long. 74° 01’.950 Lat. 40° 49’.900	Long. 74° 01'.957 Lat. 40° 49'.934	69 mgd	NJ0020028
Outfall A						Long. 74° 01'.957 Lat. 40° 49'.934		NJ0020028
Outfall B						Long. 74° 01'.995 Lat. 40° 49'.945		NJ0020028
Outfall C						Long. 74° 02'.051 Lat. 40° 49'.971		NJ0020028
Outfall D						Long. 74° 02'.093 Lat. 40° 49'.984		NJ0020028
Joint Meeting of Essex/Union	Joint	Lg	4	Joe Bonocorso	Long. 74° 11’.850 Lat. 40° 38’.283	Long. 74° 12'.086 Lat. 40° 38'.504	59 mgd	NJ0024741
Rahway Valley Sewerage Authority	Rah	Lg	4	Rich Tokarski	Long. 74° 12’.583 Lat. 40° 35’.217	Long. 74° 15'.395 Lat. 40° 36'.071	26 mgd	NJ0024643
Linden Roselle Sewerage Authority	LinR	Lg	4	Judy Spadone	Long. 74° 13’.150 Lat. 40° 36’.500	Long. 74° 13'.076 Lat. 40° 36'.551	13 mgd	NJ0024953
North Hudson S.A. (Hoboken/North Hudson/Tri City)	NH-Hob	Sm	2	Fredric Pocci	Long. 74° 02’.000 Lat. 40° 45’.500	Long. 74° 01'.874 Lat. 40° 45'.477	21 mgd	NJ0026085
North Bergen MUA (Central)	NB-Cen	Sm	2	Bob Fischer	Long. 74° 02’.450 Lat. 40° 46’.883	Long. 74° 02'.266 Lat. 40° 47'.071	6.8 mgd	NJ0034339
North Bergen MUA (Woodcliff)	NB-Wood	Sm	2	Bob Fischer	Long. 73° 59’.667 Lat. 40° 47’.417	Long. 73° 59'.924 Lat. 40° 47'.528	2.9 mgd	NJ0029084
North Hudson S.A. (West New York)	NH-WNY	Sm	2	Frederic Pocci	Long. 74° 00'.133 Lat. 40° 47’.350	Long. 74° 00'.139 Lat. 40° 47'.243	11 mgd	NJ0025321
Secaucus Municipal Utility Authority	Secauc	Sm	2	Brian Bigler	Long. 74° 02’.883 Lat. 40° 47’.900	Long. 74° 02'.884 Lat. 40° 47'.907	3 mgd	NJ0025038
Edgewater Municipal Utilities Authority	Edge	Sm	2	Kevin Billin	Long. 74° 58’.700 Lat. 40° 49’.433	Long. 74° 58’.896 Lat. 40° 49’.248	3 mgd	NJ0020591

[a] Four quarterly samples were collected at the systems designated as large (Lg): Event #1 2-3 Oct. 2000, Event #2 12-14 Dec. 2000, Event #3 22-24 May 2001, Event #4 7-9 Aug. 2001; and two seasonal samples were collected at small (Sm) systems: Event #2 12-14 Dec. 2000, Event #4 7-9 Aug. 2001.

[b] Actual rates were measured and recorded at the time of sampling (see Table 10).

TABLE 2. CSO Sampling Location Descriptions for the Harbor Estuary Program Contaminant Assessment and Reduction Program.

CSOs	Abbre-viation	Location	County	Township	Receiving Water	# Samples Collected	Sampling Dates	Description
Ivy Street (Passaic River, PVSC)	Ivy St.	N40E 45.590 W074E 08.454	Essex	Kearny	Passaic River	3	16-17 Oct 02; 11 Apr 03; 13 Apr 04	CSO off John Hay Ave. Concrete channel near unpaved off street parking lot on right
Christie Street (Hackensack River, BCUA)[a]	Chris St.	N40E 51.225 W074E 01.623	Bergen	Ridgefield Park	Hackensack River	2	16-17 Oct 02; 11 Apr 03	New construction (1999) Pipe railing at end of street over looking rail road tracks
Court Street (Hackensack River, BCUA)[a]	Court St.	N40E 52.665 W074E 02.406	Bergen	Hackensack / Bogota	Hackensack River	2	16-17 Oct 02; 11 Apr 03	Flap gate along river walkway, behind Cost Co. and Pep Boys parking lot, chain link fence
Elm Street [a]	Elm St.	N40E 50.718 W074E 01.514	Bergen	Ridgefield Park	Hackensack River	1	11 Apr 03	CSO near the intersection of Elm Street and Bergen Pike new construction (1999) BCUA Regulator #1, left manhole
Anderson Street [a]	Ander St.	N40E 53.503 W074E 02.231	Bergen	Hackensack	Hackensack River	1	11 Apr 03	CSO, pipe into river behind car wash
Livingston and Front Streets (Arthur Kill, Joint Meetings)[a]	Liv/Fr St.	N40E 38.856 W074E 11.164	Union	Elizabeth	Arthur Kill	1	16-17 Oct 02	CSO, manhole closest to intersection of Livingston and Front Streets
West Side Road [a]	W side Rd.	N40E 47.757 W074E 01.842	Hudson	N. Bergen	Hackensack River	1	16-17 Oct 02	CSO, adjacent to Cardisco Co. on the right
Rahway Outfall 003 (CSO)	Rahway Outf	N40E 36.660 W074E 15.267	Middlesex	Cateret	Rahway River	2	11 Apr 03; 13 Apr 04	Located at the Rahway POTW
Front Street and Bay Way	FS/BW	N40 38.201 W74 12.020	Union	Elizabeth	Arthur Kill	1	11 Apr 04	CSO, 2nd manhole in middle of street

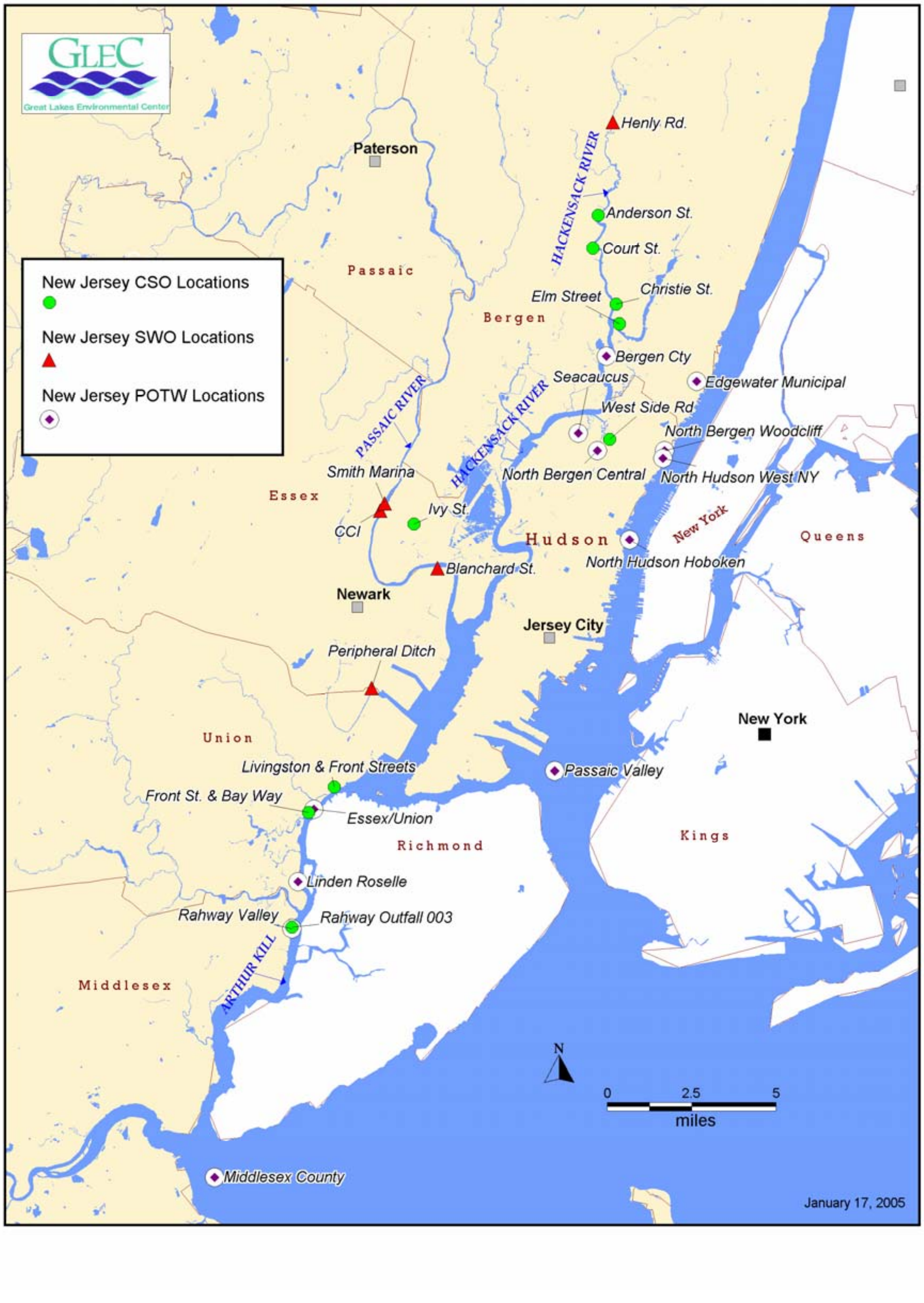
[a] Sample sites that were used in the NJHDG 1997/98 Nickel/Copper Study.

TABLE 3. SWO Sampling Location Descriptions for the Harbor Estuary Program Contaminant Assessment and Reduction Program

SWOs	Abbreviation	Location	County	Township	Receiving Water	# Samples Collected	Sampling Dates	Description
Blanchard Street (Passaic River)	Blanc. St.	N40E 44'.449 W074E 07'.658	Bergen	Newark	Passaic River	3	25-26 Sep 01; 16-17 Oct 02; 11 Apr 03	Manhole in middle of street near Rose Glor Company
Henley Road (Hackensack River, BCUA)[a]	Hen. Rd.	N40E 55'.883 W074E 01'.742	Bergen	New Milford	Hackensack River	3	25-26 Sep 01; 16-17 Oct 02; 11 Apr 03	24" pipe into river at an abandoned turn around with galvanized guardrail
CCI	CCI	N40E 45'.936 W074E 09'.600	Essex	Kearny	Passaic River	3	16-17 Oct 02; 11 Apr 03; 13 Apr 04	Manhole near CCI parking area
Smith Marina	Smith M.	N40E 46'.118 W074E 09'.458	Essex	Kearny	Passaic River	3	16-17 Oct 02; 11 Apr 03; 13 Apr 04	Manhole in the street immediately outside the marina gate
Peripheral Ditch (Newark Airport)	P. Ditch	N40 41.291 W75 9.584	Essex	Newark	Newark Bay	3	16-17 Oct 02; 11 Apr. 03; 13 Apr 04	Outfall 14, north end of Newark Airport

[a] Sample sites that were used in the NJHDG 1997/98 Nickel/Copper Study.

Figure 1. POTW, CSO and SWO Locations for the Harbor Estuary Program Contaminant Assessment and Reduction Program.



SAMPLE COLLECTION TECHNIQUES

The Standard Operating Procedures (SOPs) for the field work associated with the Study I-G Quality Assurance Project Plan (QAPP) can be found in the *Final Quality Assurance Project Plan (Version 1.1, February 12, 2001; Great Lakes Environmental Center, 2001).*

Both procedural and technical issues were raised regarding the most appropriate sampling approach to be used to collect POTW, CSO and SWO effluents for the NJTRWP and CARP. The options considered for collecting point source samples included whole effluent grab/composite sampling, and sampling using the Trace Organics Platform Sampler (TOPS). Work involving the collection of both ambient and POTW effluent samples demonstrated that suspended solids can pass through the filtration device in the TOPS sampler and collect on the XAD resin, and that collecting POTW effluent samples with the TOPS sampler is logistically difficult and cumbersome. These issues were investigated by GLEC and Passaic Valley Sewerage Commissioners (PVSC). GLEC and PVSC collaborated to conduct a sample collection/sample analysis investigation to provide the necessary data to allow NJHDG to finalize the sample collection approach for the New Jersey point sources [*PVSC Performance Report, August 2000; New Jersey Toxics Reduction Program: Toxics Monitoring/Loading Investigations for the Sanitary Sewage Outfalls (POTWs), Combined Sewer Overflows (CSOs) and Storm Water Outfalls (SWOs)*].

Based upon the results of the GLEC/PVSC investigation, a plan was developed to collect 20 liter (L) 24-hour composite samples of effluent for the POTWs and 20 L grab samples of CSO and SWO effluents. Each effluent sample was split at the PVSC laboratory into four 2.5 L samples for organic contaminant analyses (amber glass), one 1000 ml subsample for suspended solids (SS) analyses (polypropylene bottle), one 500 ml subsample for organic carbon (total organic carbon [TOC], particulate organic carbon [POC], and dissolved organic carbon [DOC]) analyses (polypropylene bottle), and three 500 ml subsamples in 500 ml Teflon® bottles for metals analyses. Forty liter composite samples were collected when field duplicate or matrix spike and matrix spike duplicate samples were specified for organic analyses. All the sample containers were pre-cleaned and provided by the analytical laboratories. At the PVSC laboratory, the 20 (or 40) L sample was carefully homogenized and subsampled while it was being continually mixed.

The POTW samples were collected as 24-hour composite samples using an automatic ISCO or equivalent sampler, whereas the CSO and SWO samples (obtained via peristaltic pump) were collected as instantaneous grab samples, or as grab composite samples at intervals throughout the duration of the precipitation event[1].

The 20-liter carboys used to collect the composite samples in the field were held in coolers with wet ice to maintain low sample temperatures during the collection period. Samples were transported to the PVSC laboratory in coolers with wet ice, and held in the coolers for subsampling in the laboratory. The three 500 ml metals sub-samples were distributed first to minimize possible sample contamination from the process. To dechlorinate the samples, sodium thiosulfate was added to the POTW and CSO/SWO sample containers to achieve a final sodium thiosulfate concentration of 80 mg/L prior to shipping the subsample containers for organic contaminant analysis.

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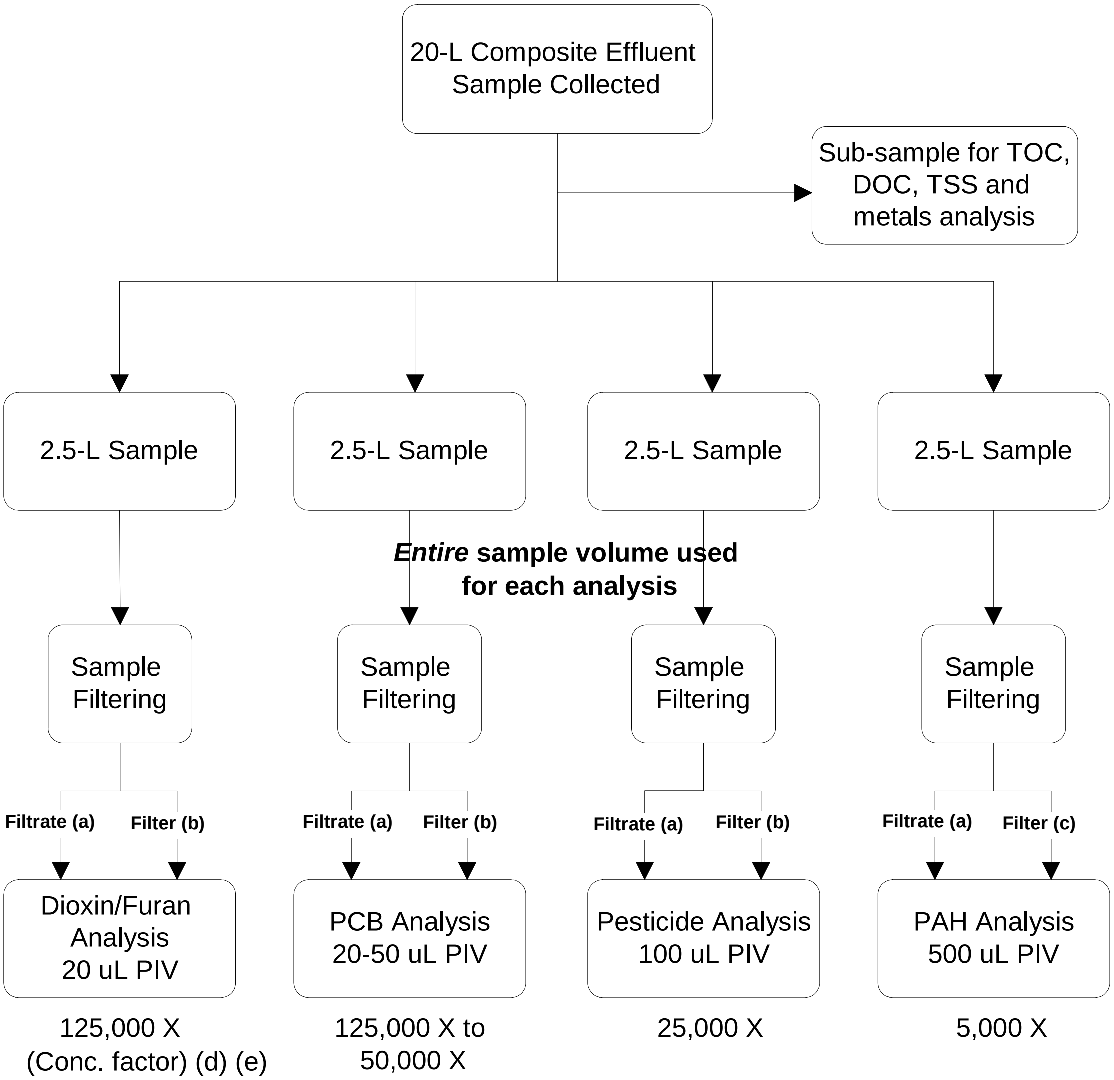
[1]Precipitation event: Storms that are forecast to produce at least 0.2 inches of rain, and which have average intensities of at least 0.05 inches per hour, with no more than 4 continuous dry hours.

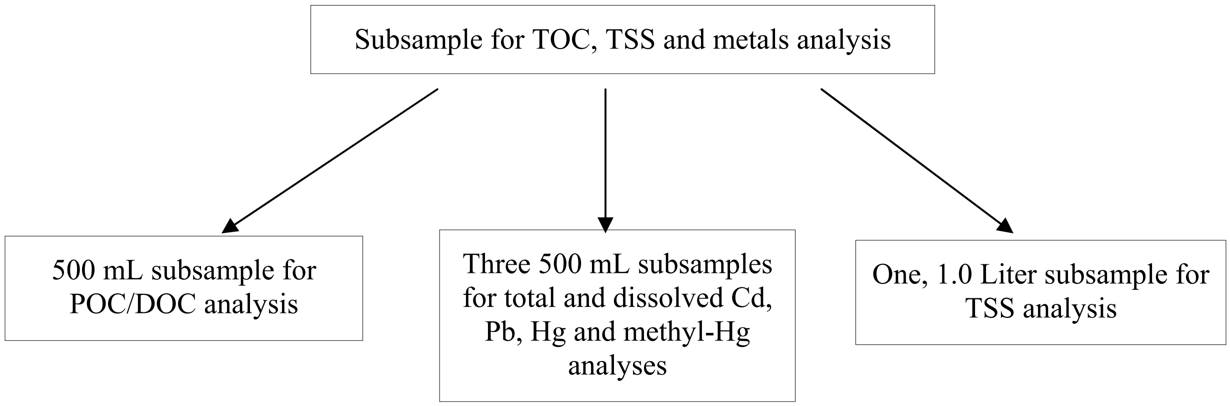
The 2.5 L sub-samples were shipped directly to Battelle Memorial Institute for organic contaminant analysis (Columbus, Ohio for dioxin/furans, polychlorinated biphenyls [PCBs], and pesticides, and Duxbury, Massachusetts for polycyclic aromatic hydrocarbons [PAHs]), where they were filtered separately. The filters were extracted using either sonication and mechanical agitation (PAHs), or Soxhlet extraction (dioxin/furans, pesticides, and PCBs). The filtrates (2.5 L each) were extracted separately using liquid/liquid extraction, and the extracts were concentrated to the pre-injection volumes specified below in the Analytical Chemistry section. Schematic diagrams which outline the sample splitting and analysis plan are shown in Figures 2 and 3.

Figure 2. Whole Water (Effluent) Sample Collection and Analysis Plan



(a) Filtrate samples for all parameters were extracted using a separatory funnel technique.
(b) Filter samples for Dioxin/Furan, PCB, and Pesticide analyses were extracted using a soxhlet technique.
(c) Filter samples for PAH analysis were extracted using a combined shaker and sonication technique.
(d) The concentration factor for combined filter/filtrate analyses was approximately 25% because the samples were split 75:25.
(e) Concentration factors vary with different sample volumes and final extract volumes.

Figure 3. GLEC's Sub-sampling Plan for TOC, TSS and Metals



Samples for the analysis of metals (Hg, Pb and Cd) were shipped directly to Frontier GeoSciences Laboratory (Seattle, WA). The sample collection for metals was conducted using "Clean Hands - Dirty Hands Techniques", according to GLEC SOP *GLEC-CARP-009-01*. Samples for the analysis of POC and DOC were shipped directly to the USGS laboratory in Denver, CO, and those for suspended solids (SS) were shipped directly to the USGS laboratory in Louisville, KY. The 2.5 L samples for PCBs, PAHs, Pesticides, and dioxins and furans were collected in 2.5 L brown amber glass bottles with Teflon® lined caps; 500 ml metals samples were collected in 500 ml Teflon® bottles. POC and DOC samples were obtained from the same 500 ml bottle.

After the sub-sampling was complete, the 20-liter glass carboy field sample bottle was cleaned and stored. The 20-liter carboy containers were stored clean at the PVSC chemistry laboratory; chain of custody for those containers followed the *New Jersey Department of Environmental Protection (NJDEP)-NJTRWP SOP # 1*.

ANALYTICAL CHEMISTRY TASKS

Specific SOPs for the organic contaminant analytical work (sample handling, processing and analysis) associated with this project can be found in the *Final Quality Assurance Project Plan (Version 1.1, February 12, 2001)*. SOPs for metals, POC, DOC, and TSS can be found in *Volume II of the New Jersey Toxics Reduction Work Plan for NY-NJ Harbor (NJDEP, 2001b)*.

PCBs

Battelle Columbus Laboratories performed the analysis of PCB congeners using high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS) following EPA Method 1668 Rev. A.

Sample Preparation

All POTW, CSO, and SWO samples for PCB analysis (except for the field blanks) were filtered. A 142-mm stainless steel filtration apparatus equipped with Whatman GF/F filters (0.7 µm) was used to filter the effluent samples under *gentle* nitrogen pressure. The resulting filter samples were spiked with internal standards and matrix spike standards as appropriate and extracted using the Soxhlet technique. A soil standard reference material was also processed with the filter samples. The filtrates plus the field blank were spiked with internal standards and matrix spike standards as appropriate and then serially liquid-liquid extracted with methylene chloride (DCM), followed by 80% DCM: 20% acetone. The extraction procedures are detailed in Section 10.1 of the *Final Quality Assurance Project Plan (Version 1.1, February 12, 2001)* for this project, and are fully documented in the laboratory record.

In the first POTW sampling event (October 2-4, 2000) the extracts were purified through extract cleanup procedures, and analyzed as separate filter and filtrate samples. In subsequent events each filter and filtrate extract, except for the reference material and the field blank, was brought up to 100 ml in a 100-ml volumetric flask and then split. Twenty five percent of the extract was stored in a labeled vial and archived. The remaining 75% of each filter extract was combined with the remaining 75% of its corresponding filtrate extract. The combined filter/filtrate extracts were put through cleanup. For the reference material and the field blank, 100% of the sample extract was put through cleanup. Cleanup consisted of acid-base washing followed by acid-base silica, alumina, and carbon cleanup columns, followed by a final concentration step prior to analysis (*Battelle SOP ASAT. II-009-00*). Field and laboratory method blanks, as well as laboratory control samples, were carried through the preparative and analysis procedures.

PCB Analysis

Each extract was analyzed by gas chromatography/high resolution mass spectrometry (GC/HRMS) in the selected ion-monitoring mode at a resolution of 10,000 or greater. A 30M (0.25 mm x 0.25µm) SPB-Octyl column was used for analysis of the PCBs. All field samples were diluted from a final volume of 20 to 50 µL using the option of a final volume of 50 µL stated in the quality assurance project plan for this study.

The GC/HRMS instrumentation (Hewlett-Packard) was calibrated with a six-point curve containing a subset of the 209 PCB congeners. Additionally, a single-point calibration containing all 209 PCB congeners was analyzed with the samples from each event. Sample concentrations were calculated using the single-point 209 congener calibration. The mid-level calibration standard from the six-point curve was analyzed on a continuing basis every 12 hours of analysis. Effluent samples for PCB analyses were stored refrigerated until filtering and extraction. Samples were extracted and analyzed using Method 1668 Rev. A designated holding times. Minimum levels of reporting (MLs) for PCBs were based on the estimated minimum level (EML) listed in Method 1668 Rev. A (refer to Table 2 in that method), adjusted for the 75:25 sample split where appropriate. The target MLs were achieved for all samples.

PAH

Battelle Duxbury Operations performed the analysis of PAHs using isotope dilution high-resolution gas chromatography/quadrupole mass spectrometry with the detector operated in the selected ion-monitoring mode (HRGC/MS-SIM), following *Battelle SOP 5-157 (Modified EPA Methods 8270C and 625)*.

Sample Preparation

All PAH POTW, CSO, and SWO samples except the field blanks were filtered. A 142 mm stainless steel filtration apparatus equipped with 0.7 µm Whatman GF/F filters was used to filter the effluent samples under *gentle* nitrogen pressure. Filtrate and filter samples were extracted separately. The filtrate samples were transferred to separatory funnels for extraction serially with methylene chloride after spiking with internal and matrix spike standards (*Battelle SOP 5-200*). Cleanup of the extracts consisted of alumina column cleanup, followed by activated copper for sulfur removal, and final HPLC/GPC cleanup steps (*Battelle SOP 5-191*). Purified extracts were then concentrated prior to analysis. The filter samples were cut into small pieces with clean scissors and transferred to an extraction vessel. Prior to solvent extraction, appropriate internal and matrix standard spikes were added. Filter samples were the extracted by serial extraction using physical shaking/agitation followed by sonication (*Battelle SOP 5-192*). The filter extracts were cleaned up as described above for the filtrate extracts, and concentrated prior to analysis.

In the first POTW sampling event (October 2-4, 2000), the filter and filtrate extracts were analyzed separately. In subsequent events, after extraction the filter and filtrate extracts were concentrated, split 75:25, and then the 75% splits from the filter and filtrate combined for subsequent cleanup and analysis.

PAH Analysis

Samples for PAH were analyzed using isotope dilution high-resolution gas chromatography/quadrupole mass spectrometry with the detector operated in the selected ion-monitoring mode (HRGC/MS-SIM) (*Battelle SOP 5-157*).

Effluent samples for PAH analyses were stored refrigerated until extraction. Samples were extracted within 5-days of the verified time of sample receipt (VTSR), and analyzed within 40 days of extraction.

MLs for PAH were determined based on the low calibration standard, and were adjusted for individual sample processing volumes and factors (e.g., pre-injection volume), as follows:

ML NG/SAMPLE = (Conc. in Low Std. x PIV x DF)

Where:

Concentration in low standard = 0.005 ng/µL.
PIV = pre-injection volume.
DF = dilution and split factors.

Achieved MLs were slightly higher than the target ML. However, the achieved MLs (3-4 ng/sample) were still well below the MLs required by the base method (*NYSDEC Method HRMS-3, 11/99*), which are 25 ng/L, or 62.5 ng/sample based on a 2.5 L sample size.

Pesticides

Battelle Columbus laboratories performed the analysis of chlorinated pesticides by gas chromatography/high resolution mass spectrometry (GC/HRMS) following *Battelle SOP ASAT. II-009-00 (draft).*

Sample Preparation

All POTW, CSO, and SWO pesticide samples except for the field blanks were filtered. A 142-mm stainless steel filtration apparatus equipped with Whatman GF/F filters (0.7 µm) was used to filter the effluent samples under *gentle* nitrogen pressure. The resulting filter samples were spiked with internal standards and matrix spike standards as appropriate, and extracted using the Soxhlet technique. The filtrates plus the field blanks were spiked with internal standards and matrix spike standards as appropriate, and then serially liquid-liquid extracted. The extraction procedures are detailed in Section 10.3 of the *Final Quality Assurance Project Plan (Version 1.1, February 12, 2001)* for this project, and are fully documented in the laboratory record.

In the first POTW sampling event (October 2-4, 2000), the extracts were purified through extract cleanup procedures, and analyzed as separate filter and filtrate samples. For subsequent events, each filter and filtrate extract was reconstituted to 100 ml in a 100- ml volumetric flask, and then split. Twenty five percent of each extract was stored in a labeled vial and archived. The remaining 75% of each filter extract was combined with the remaining 75% of its corresponding filtrate extract. The combined filter/filtrate extracts were put through cleanup. For the reference material and the field blanks, 100% of the sample extract was put through cleanup. The cleanup procedures consisted of copper treatment for removal of sulfur compounds, and a water wash, followed by a final concentration step prior to analysis (*Battelle SOP ASAT. II-008-00*). Field and laboratory method blanks, as well as laboratory control samples, were carried through the preparative and analysis procedures.

Pesticides Analysis

Each combined filter and filtrate extract was analyzed by gas chromatography/high resolution mass spectrometry (GC/HRMS) in the selected ion-monitoring mode at a resolution of 10,000 or greater. A 60M (0.32 mm x 0.25 µm) DB5 column was used for analysis of the pesticides. The GC/HRMS instrumentation (Hewlett-Packard) was calibrated at the levels specified in the QAPP. The calibration range for the samples was 66 pg/sample to 666,666 pg/sample, accounting for the 75% split and assuming a final volume of 200 µL. In several instances the continuing calibration factors exceeded acceptable criteria. Average response factors from the continuing calibrations bracketing the samples were used to calculate analyte concentrations in these instances.

Effluent samples for pesticide analyses were stored refrigerated until filtering and extraction. Samples were extracted and analyzed within designated holding times. Minimum levels of reporting (MLs) for pesticides were determined based on the low calibration standard, and were adjusted for individual sample processing volumes and other factors (e.g., pre-injection volume).

Dioxin/Furan

Battelle Columbus Laboratories performed the analysis of polychlorinated dibenzo-p-dioxin/polychlorinated dibenzofuran (PCDD/PCDF) using high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS) using modified *EPA Methods 8290* and *1613 Rev. B.*

Sample Preparation

All dioxin/furan POTW, CSO, and SWO samples except for the field blank were filtered. A 142-mm stainless steel filtration apparatus equipped with Whatman GF/F filters (0.7 µm) was used to filter the effluent samples under *gentle* nitrogen pressure. The resulting filter samples were spiked with internal standards and matrix spike standards as appropriate, and extracted using the Soxhlet technique. A soil standard reference material was also processed with the filter samples. The filtrates plus the field blanks were spiked with internal standards and matrix spike standards as appropriate, and then serially liquid-liquid extracted with methylene chloride (DCM), followed by 80% DCM: 20% acetone. The extraction procedures are detailed in Section 10.1 of the *Final Quality Assurance Project Plan (Version 1.1, February 12, 2001)* for this project, and are fully documented in the laboratory record.

In the first POTW sampling event (October 2-4, 2000) the extracts were purified through extract cleanup procedures, and analyzed as separate filter and filtrate samples. In subsequent events, each filter and filtrate extract, except for the reference material and the field blanks, was reconstituted to 100 ml in a 100-ml volumetric flask, and then split. Twenty five percent of the extract was stored in a labeled vial and archived. The remaining 75% of each filter extract was combined with the remaining 75% of its corresponding filtrate extract. The combined filter/filtrate extracts were put through cleanup. For the reference material and the field blanks, 100% of the sample extract was put through cleanup. Cleanup consisted of acid-base washing, acid-base silica, alumina, and carbon cleanup columns, followed by a final concentration step prior to analysis (*Battelle SOP ASAT. II-009-00*). Field and laboratory method blanks, as well as laboratory control samples, were also carried through the preparative and analysis procedures.

PCDD/PCDF Analysis

Each filter/filtrate extract was analyzed by gas chromatography/high resolution mass spectrometry (GC/HRMS) in the selected ion-monitoring mode at a resolution of 10,000 or greater. A DB5 column was used for initial analysis of the seventeen dioxins/furans. The GC/HRMS instrumentation (Hewlett-Packard) was calibrated at the levels specified in Method 1613, with one additional calibration standard at concentrations equivalent to ½ the level of the lowest calibration point for the method. The calibration range for the samples corresponds to the following levels, assuming a final volume of 20 µL: 5 to 4,000 pg/sample for tetra compounds; 25 to 20,000 pg/sample for penta through hepta compounds; and 50 to 40,000 pg/sample for octa compounds. The daily continuing calibrations met all criteria, except for 1,2,3,7,8,9-HxCDF in all but the second standard analyzed, and $^{13}C_{12}$-2,3,7,8-PeCDF and $^{13}C_{12}$-2,3,4,7,8-PeCDF in the third standard analyzed with the samples. An average response factor was used for these analytes, and applied to sample concentration calculations. Samples were extracted within several months of verified time of sample receipt, and analyzed within several months of extraction, well within Method 8290 designated holding times. The target minimum levels of reporting (MLs) were achieved for all samples.

Metals

Analysis for cadmium, lead, mercury, and methyl mercury were performed by Frontier Geosciences, Inc. All samples were processed using ultra-clean sample handling techniques in class-100 clean areas known to be low in atmospheric mercury (and presumably other trace elements as well). Reagents, gases, and reagent water were all reagent or ultra-pure grade, and previously analyzed for trace metals to ensure very low blanks. Aliquots of the samples for measuring the dissolved elements were field filtered through a pre-cleaned filter unit (0.45 µm) supplied by Frontier.

Cadmium and Lead Analyses

The water samples were prepared according to Frontier Geosciences, Inc. *SOP FGS-052 (Total Recoverable Metals Digestion by Oven Heating).* All samples were acidified using a 2% HNO_3/HF (9:1) mix, and heated in an oven at 85°C overnight. Cadmium and lead were determined using ICP-MS (*EPA Draft Method 1638 modified*) with a Perkin-Elmer Elan 6000. Daily analytical runs were begun with a 6-point standard curve, spanning the entire analytical range of interest, with additional standards (CCVs) run every 10 samples. The daily standard curves were calculated with the initial standards (calibration blank corrected) of the day, using linear regression, forced through zero (Elan-6000 software). All samples were analyzed undiluted. All sample results are reported as instrument and preparation blank corrected.

Mercury Analysis

Mercury analyses were preformed using cold vapor - atomic fluorescence spectometry (*CV-AFS; EPA Method 1631*), with dual-pen chart recorders or integrators as output devices. Total mercury (THg) standards were prepared by direct dilution of NIST-certified NBS-3133 10.00 mg/ml Hg standard solution, and results were independently verified by the analysis of NRCC NIST 1641d (water SRM). Monomethyl mercury (MeHg) standards were made up from the pure powder, and then accurately calibrated for MeHg (equal to THg minus ionic Hg) against NBS-3133. MeHg results were also cross-verified by the analysis of NRCC DORM-2 (dogfish tissue SRM). All daily analytical runs for mercury were begun with a 5-point standard curve, spanning two orders of magnitude, with additional standards run every 10 samples. The standard curve was calculated with the initial standards (blank corrected) of the day, using linear regression, forced through zero. Calculations were performed manually, by Excel spreadsheet.

Total Hg analysis

For the digestion/oxidation of water samples, BrCl was added to an aliquot of the sample at a level of 1-2 ml per 100 ml of sample. The samples were oxidized on the day of sample receipt. The samples were then digested overnight at room temperature. Digests were analyzed for total Hg in accordance with *EPA Method 1631*. Aliquots of each digest (50-100 ml; 1-2x dilution factors) were reduced in pre-purged reagent water to HgE with $SnCl_2$, and then the HgE purged onto gold traps as a pre-concentration step. The Hg contained on the gold traps was then analyzed by thermal desorption into a CV-AFS detector using the dual amalgamation technique.

Methyl Mercury Analysis

Prior to analysis, the water samples were distilled to liberate the MeHg (*EPA Draft Method 1630*). Using an all Teflon® distillation system, each sample was distilled according to published Frontier protocols. For water samples, 45 ml of 0.4% (v/v) HCl-acidified sample was distilled using 50 ml Teflon® distillation tubes. To each sample, 0.2 ml of 1% APDC solution was added prior to distillation, to enhance reproducibility and recovery. The distillate was placed into a tube containing 5.0 ml of reagent water, and distilled into an engraved line at 40.0 ml. Thus, 35 ml out of 45 ml of sample was distilled for the analysis. The historic mean MeHg distillation recovery has been found to be 90.6 ± 9.4%. All net MeHg results by distillation were corrected for this empirically derived distillation efficiency factor.

Distilled samples were analyzed using aqueous phase ethylation, purging into a Carbotrap, isothermal GC separation, and CV-AFS detection (*Draft EPA Method 1630 modified*). Prior to ethylation, the distillate was diluted to 55 ml with reagent water, and the pH brought to 4.9 with the addition of acetate buffer. Samples were ethylated by the addition of sodium tetraethyl borate, and the volatile ethyl analogs purged with N_2 onto the Carbontrap. After a trap-drying step, the mercury ethyl analogs were thermally desorbed into a 1 m isothermal GC column held at 100EC for separation. The column resolves the following peaks: elemental Hg, dimethyl Hg, methyl ethyl Hg, and diethyl Hg. Because of the wet chemistry used, only methyl ethyl Hg, the MeHg analog, was quantified during this analysis. The organo-Hg compounds were pyrolytically broken down to HgE prior to entering the CV-AFS detector for quantification.

Particulate and Dissolved Organic Carbon

United States Geological Survey's National Water Quality Laboratory performed the analysis of particulate and dissolved organic carbon using infrared spectroscopy methods outlined in *EPA Method 440.0* and *USGS Open File Report 97-380*.

Suspended Solids

United States Geological Survey performed the analysis of suspended solids by filtration and gravimetric analysis using methods outlined in USGS's *Quality-Assurance Plan for the Analysis of Fluvial Sediment by the Northeastern Region, Kentucky District Sediment Laboratory, Open File Report 98-384*.

Parameters Measured and Reporting Limits

Tables 4 through 7 list the organic analytes that were measured in the collected POTW/CSO/SWO samples and their respective target reporting limits. The list of analytes measured was coordinated with NYSDEC and the CARP.

Table 4. Target PCBs and target reporting limits (assignments of internal standards for quantification of PCBs and surrogates defined in method[a]).

Parameter	Target Reporting Limit[b] (pg/L)	Parameter	Target Reporting Limit[b] (pg/L)	Parameter	Target Reporting Limit[b] (pg/L)
PCBs		*PCBs*		*PCBs*	
PCB3	200	PCB66	500	PCB154 [C]	500
PCB4	500	PCB70 [C]	500	PCB156 [C]	500
PCB5	50	PCB74 [C]	500	PCB157 [C]	500
PCB8	500	PCB75 [C]	200	PCB158	200
PCB10	50	PCB77	500	PCB166 [C]	500
PCB11	200	PCB81	500	PCB167	500
PCB15	500	PCB82	500	PCB168 [C]	500
PCB16 [C]	100	PCB84	500	PCB169	500
PCB17	200	PCB85 [C]	200	PCB170	500
PCB18 [C]	500	PCB86 [C]	500	PCB171 [C]	1000
PCB19	100	PCB87 [C]	500	PCB172	1000
PCB22	200	PCB91 [C]	500	PCB174 [C]	500
PCB25	200	PCB92	500	PCB177	500
PCB26 [C]	200	PCB95	500	PCB178	500
PCB27 [C]	200	PCB97 [C]	500	PCB179	500
PCB28 [C]	500	PCB99 [C]	500	PCB180 [C]	500
PCB31	500	PCB101 [C]	1000	PCB183 [C]	1000
PCB32	200	PCB104	500	PCB185 [C]	1000
PCB33 [C]	200	PCB105	200	PCB187	500
PCB37	500	PCB110 [C]	1000	PCB188	500
PCB40 [C]	500	PCB114	500	PCB189	500
PCB42	200	PCB118	500	PCB190	500
PCB43 [C]	200	PCB119 [C]	500	PCB191	1000
PCB44 [C]	500	PCB120	500	PCB194	500
PCB45 [C]	200	PCB123 [C]	500	PCB195	1000
PCB46	200	PCB126	500	PCB196	1000
PCB47 [C]	500	PCB128 [C]	500	PCB198 [C]	500
PCB48	200	PCB132	500	PCB199 [C]	500
PCB49 [C]	500	PCB134 [C]	500	PCB200 [C]	1000
PCB50 [C]	200	PCB135 [C]	500	PCB201	1000
PCB52 [C]	500	PCB136	200	PCB203	1000
PCB53 [C]	200	PCB137 [C]	1000	PCB205	1000
PCB56	200	PCB138 [C]	500	PCB206	1000
PCB59 [C]	200	PCB141	200	PCB207	1000
PCB60	500	PCB146 [C]	500	PCB208	1000
PCB62 [C]	200	PCB149 [C]	500	PCB209	500
PCB63	500	PCB151 [C]	500		
PCB64	200	PCB153 [C]	500		

[a] Surrogate internal standard used to quantify target PCBs and recovery internal standard used to quantify surrogate internal standards are listed in Battelle SOP ASAT.II-009-00 (draft). Table 2 (see Appendix A).

[b] Target reporting limits based on the estimated minimum levels (EML) listed in Method 1668, Rev. A. Table 2. The values were adjusted based on the outcome of a method demonstration and the formula for target reporting limits was provided with the final data. Note that the target reporting limits will double for the POTW and CSO/SWO samples in which half the filter and filtrate extracts was archived.

[c] Co-elution expected.

Table 5. Target PAHs, target reporting limits, and assignments of internal standards for quantification of PAHs and surrogates.

Parameter	Target Reporting Limit [a] (ng/L)	Surrogate Internal Standard[b]	Recovery Internal Standard [c,d]
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	3.33	Acenaphthylene d-8	Acenaphthene d-10
Acenaphthylene	3.33	Acenaphthylene d-8	Acenaphthene d-10
Anthracene	3.33	Phenanthrenene d-10	Pyrene d-10
Benz(a)anthracene	3.33	Benzo(a)anthracene d-12	Pyrene d-10
Benzo(b)fluoranthene	3.33	Benzo(b)fluoranthene d-12	Benzo(e)pyrene d-12
Benzo(k)fluoranthene	3.33	Benzo(k)fluoranthene d-12	Benzo(e)pyrene d-12
Benzo(g,h,i)perylene	3.33	Benzo(g,h,i)perylene d-12	Benzo(e)pyrene d-12
Benzo(a)pyrene	3.33	Benzo(a)pyrene d-12	Benzo(e)pyrene d-12
Benzo(e)pyrene	3.33	Benzo(a)pyrene d-12	Benzo(e)pyrene d-12
Biphenyl	3.33	2-Methylnaphthalene d-10	Acenaphthene d-10
Chrysene	3.33	Chrysene d-12	Pyrene d-10
Dibenz[a,h]anthracene	3.33	Dibenz(a,h)anthracene d-14	Benzo(e)pyrene d-12
Fluoranthene	3.33	Fluoranthene d-10	Pyrene d-10
Fluorene	3.33	Phenanthrenene d-10	Pyrene d-10
Indeno(1,2,3-c,d)pyrene	3.33	Indeno(1,2,3-c,d)pyrene d-12	Benzo(e)pyrene d-12
Naphthalene	3.33	Naphthalene d-8	Acenaphthene d-10
Phenanthrene	3.33	Phenanthrenene d-10	Pyrene d-10
Perylene	3.33	Perylene d-12	Benzo(e)pyrene d-12
Pyrene	3.33	Fluoranthene d-10	Pyrene d-10
1-Methylnaphthalene	3.33	2-Methylnaphthalene d-10[d]	Acenaphthene d-10
2-Methylnaphthalene	3.33	2-Methylnaphthalene d-10	Acenaphthene d-10
2,6-Dimethylnaphthalene	3.33	2,6-Dimethylnaphthalene d-12	Acenaphthene d-10
2,3,5-Trimethylnaphthalene	3.33	2,6-Dimethylnaphthalene d-12	Acenaphthene d-10
1-Methylphenanthrene	3.33	Phenanthrenene d-10	Pyrene d-10
C1-Naphthalenes	3.33	2-Methylnaphthalene d-10	Acenaphthene d-10
C2-Naphthalenes	3.33	2,6-Dimethylnaphthalene d-12	Acenaphthene d-10
C3-Naphthalenes	3.33	2,6-Dimethylnaphthalene d-12	Acenaphthene d-10
C1-Phenanthrenes/Anthracenes	3.33	Phenanthrenene d-10	Pyrene d-10
C2-Phenanthrenes/Anthracenes	3.33	Phenanthrenene d-10	Pyrene d-10

[a] Target reporting limits are calculated as ((lowest calibration point concentration {ng/µL}) x (final extract volume {500µL}) x (dilution/split factor))/sample volume {2.5L}. Note that the target reporting limits were adjusted for sample specific split factors (estimated HPLC factor= 1.667; POTW and CSO/SWO samples split 50:50).

[b] Surrogate internal standard used to quantify target PAHs.

[c] Recovery internal standard used to quantify surrogate internal standards.

[d] Alternate labeled compounds including 1-methylnaphthalene d-10 and Fluorene d-10 were available as backup SIS/RIS.

Table 6. Target pesticides, target reporting limits and assignments of internal standards for quantification of pesticides and surrogates.

Parameter	Target Reporting Limit[a] (pg/L)	Surrogate Internal Standard[b]	Recovery Internal Standard[c]
Chlorinated Pesticides			
Aldrin	200	$^{13}C_{12}$-Aldrin	$^{13}C_{12}$-PCB-101
BHC-alpha	200	$^{13}C_{6}$-BHC-alpha	$^{13}C_{6}$-BHC-delta
BHC-beta	200	$^{13}C_{6}$-BHC-beta	$^{13}C_{6}$-BHC-delta
BHC-delta	200	$^{13}C_{6}$-BHC-gamma	$^{13}C_{6}$-BHC-delta
BHC-gamma (Lindane)	200	$^{13}C_{6}$-BHC-gamma	$^{13}C_{6}$-BHC-delta
Chlordane-alpha (cis)	200	$^{13}C_{10}$-Chlordane-oxy	$^{13}C_{12}$-PCB-101
Chlordane-gamma (trans)	200	$^{13}C_{10}$-Chlordane-oxy	$^{13}C_{12}$-PCB-101
Chlordane-oxy	200	$^{13}C_{10}$-Chlordane-oxy	$^{13}C_{12}$-PCB-101
Dieldrin	200	$^{13}C_{12}$-Dieldrin	$^{13}C_{12}$-PCB-101
2,4'-DDD	200	D_8-4,4'-DDD	$^{13}C_{12}$-PCB-101
4,4'-DDD	200	D_8-4,4'-DDD	$^{13}C_{12}$-PCB-101
2,4'-DDE	200	$^{13}C_{12}$-2,4'-DDE	$^{13}C_{12}$-PCB-101
4,4'-DDE	200	$^{13}C_{12}$-4,4'-DDE	$^{13}C_{12}$-PCB-101
2,4'-DDT	200	$^{13}C_{12}$-2,4'-DDT	$^{13}C_{12}$-PCB-101
4,4'-DDT	200	$^{13}C_{12}$-4,4'-DDT	$^{13}C_{12}$-PCB-101
Endosulfan-I	200	D_4-Endosulfan-I	$^{13}C_{12}$-PCB-101
Endosulfan-II	200	D_4-Endosulfan-II	$^{13}C_{12}$-PCB-101
Endosulfan sulfate	200	$^{13}C_{12}$-Methyoxychlor	$^{13}C_{12}$-PCB-101
Endrin	200	D_4-Endosulfan-I	$^{13}C_{12}$-PCB-101
Endrin aldehyde	200	D_4-Endosulfan-I	$^{13}C_{12}$-PCB-101
Endrin ketone	200	D_4-Endosulfan-I	$^{13}C_{12}$-PCB-101
Heptachlor	200	$^{13}C_{10}$-Heptachlor	$^{13}C_{12}$-PCB-101
Heptachlor epoxide	200	$^{13}C_{10}$-Heptachlor epoxide	$^{13}C_{12}$-PCB-101
Hexachlorobenzene	200	$^{13}C_{6}$-Hexachlorobenzene	$^{13}C_{6}$-BHC-delta
Methoxychlor	200	$^{13}C_{12}$-Methyoxychlor	$^{13}C_{12}$-PCB-101
Mirex	200	$^{13}C_{12}$-4,4'-DDT	$^{13}C_{12}$-PCB-101
Nonachlor-cis	200	$^{13}C_{10}$-Nonachlor-tans	$^{13}C_{12}$-PCB-101
Nonachlor-tans	200	$^{13}C_{10}$-Nonachlor-tans	$^{13}C_{12}$-PCB-101

[a] Target reporting limits are calculated as ((lowest calibration point concentration {2.5 pg/µL}) x (final extract volume {100µL}) x (Split factor {2}) x (dilution factor)/sample volume {2.5L}). Note that the target reporting limits in this table reflect samples collected as two fractions during extract cleanup and that half of each fraction was archived separately in the event that interferences prohibit analysis of the combined fraction. These limits are double for the POTW and CSO/SWO samples in which half the filter and filtrate extracts were archived.

[b] Surrogate internal standard used to quantify target pesticides.

[c] Recovery internal standard used to quantify surrogate internal standards.

Table 7. Target dioxins/furans, target reporting limits, and assignments of internal standards for quantification of dioxin/furans and surrogates.

Parameter	Target Reporting Limit[a] (pg/L)	Surrogate Internal Standard[b]	Recovery Internal Standard[c]
Dioxins/Furans			
2,3,7,8-TCDD	2	$^{13}C_{12}$-2,3,7,8-TCDD	$^{13}C_{12}$-1,2,3,4-TCDD
1,2,3,7,8-PeCDD	10	$^{13}C_{12}$-1,2,3,7,8-PeCDD	$^{13}C_{12}$-1,2,3,4-TCDD
1,2,3,4,7,8-HxCDD	10	$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
1,2,3,6,7,8-HxCDD	10	$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
1,2,3,7,8,9-HxCDD[d]	10	See footnote d	
1,2,3,4,6,7,8-HpCDD	10	$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
OCDD	20	$^{13}C_{12}$-OCDD	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
2,3,7,8-TCDF	2	$^{13}C_{12}$-2,3,7,8-TCDF	$^{13}C_{12}$-1,2,3,4-TCDD
1,2,3,7,8-PeCDF	10	$^{13}C_{12}$-1,2,3,7,8-PeCDF	$^{13}C_{12}$-1,2,3,4-TCDD
2,3,4,7,8-PeCDF	10	$^{13}C_{12}$-2,3,4,7,8-PeCDF	$^{13}C_{12}$-1,2,3,4-TCDD
1,2,3,4,7,8-HxCDF	10	$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
1,2,3,6,7,8-HxCDF	10	$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
1,2,3,7,8,9-HxCDF	10	$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
2,3,4,6,7,8-HxCDF	10	$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
1,2,3,4,6,7,8-HpCDF	10	$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
1,2,3,4,7,8,9-HpCDF	10	$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD
OCDF	20	$^{13}C_{12}$-OCDF	$^{13}C_{12}$-1,2,3,7,8,9-HxCDD

[a] Target reporting limits were calculated as ((lowest calibration point concentration (pg/µL) x (final extract volume {20µL}) x (dilution factor))/ sample volume {2.5L}. Note that the target reporting limits are double for the POTW and CSO/SWO samples in which half the filter and filtrate extracts were archived.

[b] Surrogate internal standard used to quantify target dioxin/furan.

[c] Recovery internal standard used to quantify surrogate internal standards.

[d] 1,2,3,7,8,9-HxCDD is quantified using the average responses for the $^{13}C_{12}$-1,2,3,4,7,8-HxCDD and the $^{13}C_{12}$-1,2,3,6,7,8-HxCDD.

Data Quality Requirements and Assessments

All field and technical activities (including Quality Assurance and Quality Control protocols) undertaken as part of this study have been described in the Quality Assurance Project Plans entitled: *Study I-G Monitoring of Loadings from Selected Point Source Discharges*, prepared by Great Lakes Environmental Center (2001); *Analytical Support for the New Jersey Toxics Reduction Program*, prepared by Battelle; *Ultra-Clean Aqueous Sample Collection and Preservation (FGS-0008 and EPA method 1669, revised, January 3, 1995)*, prepared by Frontier Geosciences (1995); and *New Jersey U.S. Geological Survey Project Plan, Quality Assurance Plan, and Standard Operating Procedures for New Jersey Toxic Reduction Workplan for the NY-NJ Harbor Head of Tide Sampling Study I-C*, prepared by USGS (2001). The overall goal of the CARP Quality Assurance System was to ensure that the data collected are complete, representative, comparable, and of a known and documented quality.

Analytical Services

The analytical laboratories were required to operate their own quality assurance program. The Laboratory Manager for each analytical laboratory had the following responsibilities:

- to ensure that the analytical procedures and QA activities conform with the requirements of the applicable SOPs and/or the NYSDEC Analytical Services Protocols/Methods;

- to manage laboratory resources (staff, facilities, and equipment) to achieve the successful completion of the analytical laboratory services component of the study;

- to review the work performed by the laboratory personnel who work on the samples, including technicians and analysts;

- to ensure that laboratory personnel are adequately trained to perform their assigned tasks;

- to review the quality of the data products produced in the laboratory;

- to ensure that data deliverables conform in content and format to the requirements of the Work Plan SOPs and the CARP Data Management System.

The data quality objectives associated with the chemistry tasks are summarized in Table 8. Measurement quality objectives were specified for each method to assess accuracy, precision, sensitivity, representativeness, and comparability. Procedures were specified for identifying and documenting any limitations on the use of the data.

Table 8. Measurement Quality Objectives.

QC Sample/ Frequency[a,b]	Measure or Acceptance Criteria	Corrective Action
Accuracy	Blank: <RL, or associated samples > 10x blank concentrations	Review with Project Manager, reanalyze or justify in project records
LCS	*Dioxin/Furans*: 50 to 120% recovery *PCB*: 50 to 150% recovery *Pesticide*: 40 to 160% recovery *PAH*: 50 to 150% recovery POC/DOC and TSS: required for 5 to 10% of samples, review as needed	Review with Project Manager, reanalyze or justify in project records
MS/MSD	*Dioxin/Furans*: 50 to 120% recovery *PCB*: 50 to 150% recovery *Pesticide*: 40 to 160% recovery *PAH*: 50 to 150% recovery Analyte concentration in MS must be >5x background concentration to be used for data quality assessment	Review with Project Manager, reanalyze or justify in project records
SRM	Within 30% PD PD measured from the upper or lower 95% confidence interval from certifying agency, as applicable. Certified concentration of analyte in SRM must be >5x RL to be used for data quality assessment. PD determined only for certified analytes.	Review with Project Manager, reanalyze or justify in project records
ICS	70 to 130% recovery	Review with Project Manager, reanalyze or justify in project records
SIS	*Dioxin/Furan, PCB, Pesticide*: 25 to 150% recovery *PAH*: 30 to 120% recovery (except naphthalene-d8 should be 15 to 120% and 2-methylnaphthalene-d10 should be 20 to 120%)	Review with Project Manager, reanalyze or justify in project records
Precision	*MS/MSD*: 30% RPD between % recoveries *Field Sample Duplicate*: no applicable criteria Analyte concentration in MS must be >5x background concentration to be used for data quality assessment. Concentrations of analytes must be >5x RL	Review with Project Manager, reanalyze or justify in project records
Comparability	Intercomparison exercises (e.g. NIST) follow defined SOPs	

RL: reporting limit: LCS: laboratory control sample; MS/MSD: matrix spike/matrix spike duplicate: SRM: standard reference material; SIS: surrogate internal standard; PD: percent difference; RPD: relative percent difference.

[a] Quality control samples are based on an analytical batch size of 20 samples.

[b] QC samples prepared with Filter samples include a MB, ICS, LCS, LCD, and SRM only; MS and MSD not prepared with filter set of samples.

Field Sampling

The field sampling program operated according to its own quality assurance program. Any physical and spatial information collected during the field sampling was recorded daily in a field log book. To maximize data comparability, this study utilized analytical protocols and QA/QC procedures consistent with those being used in the other components of the New Jersey and New York CARP investigations.

Field Blanks: consisted of a bottle of laboratory-grade water supplied by Battelle (for the organic analyses) or Frontier GeoSciences (for the metals analyses) and shipped to the Study I-G investigator. One Field Blank was “collected” at one of the locations sampled during each day of the sample collection activities for each POTW and CSO/SWO sampling event, by handling the laboratory-grade water in the same manner as the investigative samples. The Field Blank bottle was labeled according to the CARP and NJTRWP SOPs, stored with the sample bottles, and shipped to the analytical laboratory with the investigative samples.

Equipment Blanks (CSO/SWO only): no Equipment Blanks were collected in association with the POTW samples. After cleaning, one of the samplers/pumps to be used to collect the CSO/SWO samples during each survey was randomly selected and used to collect the Equipment Blanks. The Study I-G Equipment Blanks were collected using SOP Number GLEC CARP-012-01. Laboratory-grade water (organics – Battelle; metals – Frontier GeoSciences) was pumped from the original bottle into an Equipment Blank bottle using procedures similar to those used to collect the field “sub-samples”. The Equipment Blanks were labeled and stored according to the CARP and NJTRWP SOPs, and shipped to the analytical labs with the sample bottles.

Accuracy

Accuracy, or the degree of agreement between a measurement and the amount actually present, was assessed during sample collection by adhering to all glassware preparation techniques and all sample handling and preservation techniques, and by collecting and analyzing field blank, method blank and equipment blank samples. Field blanks were collected in the field by handling laboratory-grade water in the same manner as the investigative samples. Equipment blanks (CSO/SWO only) were collected in the laboratory where samples were processed by handling laboratory-grade water in the same manner as the investigative samples. Method blanks were collected in the analytical laboratory by handling laboratory-grade water in the same manner as the investigative samples. All blanks were processed and analyzed in the laboratory according to the methods used to analyze for the contaminants in the effluent samples. Sample site locations were verified by GPS coordinates. All of the field sampling adhered to written SOPs.

Precision

Precision, a measure of mutual agreement among multiple measurements of the same sample, was assessed separately. Field duplicates and field blanks were used to determine if samples were compromised during collection, shipment, and storage. The field duplicates were used to assess precision for sample collection, and to determine if the samples were compromised during storage. The field blanks were used to assess precision for sample transport, and to determine if the samples were compromised during transport from the field and during shipment. The laboratory received and processed the field duplicate and field blank samples in the same manner as all investigative samples; method blank duplicates were prepared in the laboratory.

Completeness

Completeness is a measure of the number of samples from which valid data are obtained compared to the number that are needed to meet the data quality objectives. A sampling completeness goal of 100% for the POTW sampling was required to meet the objective of this study. A sampling completeness goal of 100% was also required for the CSO and SWO sampling, unless sampling was interrupted due to weather or safety concerns. In those cases, every attempt was made to sample the CSO/SWO sites, or to sample a viable alternate site.

To achieve the objectives of the New Jersey Toxics Reduction Work Plan, the following data and measurements were collected for the study:

Data needed to calculate loadings of the chemicals of concern:

- Daily and weekly maximum and minimum average wastewater flows (for POTW discharges);
- Stormwater flow (for SWO discharges) based on the calibrated model for that drainage area;
- Rainfall (inches) and duration (to be measured by and obtained from the Newark Airport);
- Estimated CSO discharge, based on either calibrated models or measurements by the applicable POTW

A summary of the quality control samples for the study is provided in Table 9.

Table 9. Summary of Quality Control Samples for the Study.

Sample Type	Field Samples: Effluent	Blank	DU	Events/ Batches	Lab QC samples: MB	LCS	MS/ MSD	SRM	ICS	#Total Samples
POTW Effluent[a]										
Combined Filter/Filtrate	29	5	3	3	3	3	6	3	3	55
Filter/Particulate	6	0	1	1	1	2[c]	0[c]	1	1	12
Filtrate/Dissolved	6	0	1	1	1	1	2	0	1	12
CSO/SWO Effluent[b]										
Combined Filter/Filtrate	29	8[d]	4	4	4	4	6	4	4	63

DU= field sample duplicate. MB= method/procedural blank; LCS= laboratory control sample; MS=matrix spike; MSD= matrix spike duplicate; SRM= standard reference material; ICS=independent control standard.

[a] The POTW field samples were delivered in 4 sets of samples, with ***approximately*** 12, 6, 12, and 6 effluent samples, respectively.

[b] Collection of CSO/SWO samples was weather dependent.

[c] A set of LCS/LCD samples was prepared with the filter sample batch, rather than MS/MSD samples.

[d] 4 Field and 4 Equipment Blanks were collected

Sample Custody and Shipping

The procedures followed for sample custody, shipping and receiving are outlined in the *NJDEP-NJTRWP SOP #1 (New Jersey Toxics Reduction Work Plan)*.

Calibration Procedures and Preventative Maintenance

The calibration procedures for the analytical work were described above. Instrument calibration was performed prior to initiating (and in some cases during) analysis, according to the SOPs.

Routine preventative maintenance was conducted to minimize instrument failure and other system malfunctions. All maintenance performed was documented in instrument operating record books.

Documentation, Data Reduction and Reporting

For the sampling and analytical activities associated with the study, all data generated in the field and laboratory were recorded in logbooks or standardized data forms, including: sampling location, sample identification information, raw analytical data, daily sample processing procedures, and any corrective actions which were implemented, as specified in the *Final Quality Assurance Project Plan (Version 1.1, February 12, 2001)*. Instrument quality control information was maintained on file. Log books for analytical instruments contain information pertinent to the analysis of samples (sample identification numbers, date, methods, injection volume, unusual circumstances), as well as a description of troubleshooting procedures, if any, which were implemented. All sampling and analytical information was entered in the CARP Sample Tracking System (STS) (*CARP SOP No.4*). The notebooks were regularly reviewed by the appropriate QA Officer throughout the course of the project.

Data reduction was performed according to each analytical laboratory's Quality Assurance Project Plan (QAPP) for this study. The final reduction of the analytical chemistry data accounts for the size of the processed sample and dilution factors. For example, ng/sample data from the laboratory was ultimately converted into ng/L concentration units and into a discharge/loading mass; these conversions took under consideration the sample size, final extract volume and extract splitting/archiving.

Interim reports were provided to the NJDEP Project Manager after each field sampling event. All laboratory activities associated with the project were reported, including descriptions of the analyses and presentations of the results.

Data Review

A QA Officer independent of both the sampling and analytical activities reviewed the sampling and analytical results. As part of this evaluation, quality control data were compared to the method acceptance criteria. All the results of the initial and continuing calibrations were reviewed and evaluated. *Battelle SOP 6-027* describes data validation procedures in the analytical laboratory. Data validation for the field collected data was the responsibility of the Field Coordinator. Field data validation included the following activities:

- Field collected data and related project records were reviewed by the field personnel at the end of each working day to ensure that the field activities were completely and adequately documented;

- The Field Coordinator was responsible for reviewing field sampling results and supporting documentation;

- All hand-entered or transcribed data were 100% validated;

- All calculations performed manually were checked for accuracy. Calculations performed by software were checked at a frequency sufficient to verify their accuracy.

In the analytical laboratory, all quality control data that did not meet the data quality objectives were flagged and brought to the attention of the Task Leader and the Principal Investigator, who determined what (if any) corrective action was appropriate.

Performance and System Audits

A performance audit is an independent check to evaluate the quality of the data being generated. A system audit is an on-site review and evaluation of the facilities, instrumentation, quality control practices, data validation, and documentation practices. No internal or external laboratory systems audits were performed over the course of the study. A field audit was conducted by NJDEP on May 23, 2001.

Corrective Action

Corrective action is the process of identifying, recommending, approving and implementing measures to manage circumstances requiring a deviation from the QAPP. Corrective action can be required during field and laboratory activities and during analyses, data validation, and data assessment. Analytical chemists at Battelle Duxbury and Columbus and at Frontier GeoSciences were responsible for identifying and requesting corrective action pertaining to any aspect of the preparation and/or analyses of the test solutions. No corrective action was taken for field or laboratory activities in this study.

Blank Correction

Most of the analytical data were blank corrected using the standard “NJTRWP 5x Maximum Blank Approach”. For each sampling event, Method, Field, and Equipment (CSO/SWO samples only) Blanks were prepared and analyzed in the same manner as their associated samples. That blank having the largest value (the “maximum blank”) was used to assess the effect of background contamination on the sample data for that sampling event. In order for a sample result to be useable, it must have been at least five times (5x) greater than the “maximum blank”. No other blank correction was performed on the sample data. Exceptions to this approach were made in the following sampling events:

1) For the POTW PCBs, see Appendices A.1 and A.2. In POTW events #2, #3, and #4, the method blank was subtracted from the sample result. In event #1, because the samples (but not the blanks) were filtered and analyzed as separate dissolved and suspended sediment fractions, the sample results were blank-corrected as described in Appendix A.2.

2) For all of the CSO/SWO PCB analytical data, 3x the maximum of the method, field, or equipment blank was used for censorship.

3) For POTW event #1 PAHs, see Appendix C.2. PAH analytical data for POTW event #1 were censored by adding the suspended and dissolved fraction method blanks to calculate a “total” method blank concentration for each analyte; any total (dissolved + suspended sediment fraction) sample data for each analyte that were less than 5X the “total” method blank result for the analyte were censored.

4) For POTW event #1 dioxins/furans, the “NJTRWP 5X Maximum Blank Approach” was applied to the sample data. However, for the suspended sediment fraction, only the associated method blank was used; for the dissolved fraction, only trip blank 1GLC00023TB was used.

5) For POTW event #2 dioxins/furans, only the field blank was used with the standard “NJTRWP 5X Maximum Blank Approach” (the method blank was inadvertently contaminated during analysis).

6) For POTW event #4 PAHs, see Appendix C.1. The mean of the PAH field blank data for POTW events #1, #2 and #3 was calculated and then compared to the PAH method blank for POTW event #4. Any PAH data less than 5x the maximum of the events #1 - #3 mean or the POTW event #4 method blank were censored.

7) For CSO/SWO event # 2, the dioxin/furan data were censored by directly subtracting the maximum of the method blank and equipment blank from the analytical data. The field blank was determined not to be representative of potential background (blank) contamination.

8) For CSO/SWO event # 3, the dioxin/furan method blank data were not used to determine the maximum blank used for the NJTRWP 5x maximum blank approach.

9) For CSO/SWO event #4, the maximum of the field and equipment blank data were directly subtracted from the dissolved Cd and Hg analytical data. The remaining analytical data were censored using the standard NJTRWP 5x maximum blank approach.

In the various data appendices (Appendices B, D, E, F, and H): (1) those cells in the tables that are shaded gray and do not have a value, or have "BC", have been blank-corrected, (2) those cells that are shaded various other colors and have a number should be used with caution due to potential QA problems, and (3) those cells that do not have a number and are not shaded were non-detects.

RESULTS - SECTION 1 POTWs

CHEMICAL CONCENTRATIONS

TOC/DOC and SS

Large POTWs

Figure 4a shows the concentration of total organic carbon that is dissolved and in particulate form in the effluents of the six large POTWs for the four normal flow sampling events. The estimated (as DOC plus POC) total organic carbon (TOC) concentration in all of the POTWs averaged less than 80 mg/L, and averaged 72, 78, 51, 62, 20, and 18 mg/L for the PVSC, Middlesex County, BCUA, Joint Meeting Essex Union, Rahway Valley, and Linden Roselle plants, respectively.

Extraordinarily high spikes in TOC were observed during the August 6-9, 2001 sampling event for the PVSC, BCUA and Joint Meeting plants. The measured TOC values exceeded 125 mg/L on all of these occasions. The trend does not appear to be seasonal, as an extreme value of 269 mg/L TOC for the Middlesex plant was measured during the December 2000 sampling event (event #2), nor does it necessarily indicate that TOC is a highly variable measurement parameter, since each of those incidences appear to be isolated to only one of the four normal flow sampling events in each plant.

The dissolved:total organic carbon ratio in the effluents of the large POTWs ranges from an average of 0.58 for the Linden Roselle plant to 0.84 for PVSC. The dissolved:total organic carbon ratio in the Joint Meeting Essex Union effluent varied the most between sampling events, from 0.03 to 0.97. The overall average ± standard deviation dissolved:total organic carbon ratio for large POTW effluents was 0.70 ± 0.21.

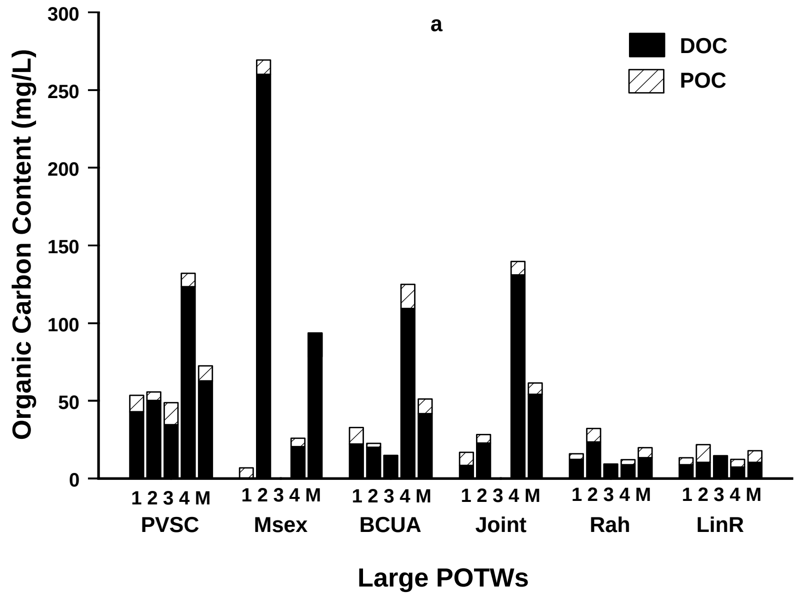
The SS concentrations in the effluents of the large POTWs were somewhat variable, just as were the organic carbon concentrations. The average SS ranged from approximately 21-23 mg/L for Linden-Roselle, Joint Meeting Essex Union, and Rahway Valley plant effluents, to about 37 and 38 mg/L for Middlesex County and PVSC plant effluents, respectively (Figure 4b). Concentrations of SS between sampling events varied by a factor of only 2 to 3 for the PVSC, Joint Meeting Essex Union, and Middlesex County plants, and by factors of 4.5 to 6.3 for the BCUA, Linden Roselle, and Rahway Valley plants (Figure 4b). The overall average ± standard deviation SS concentration in the large POTW effluents was 29 ± 16.6 mg/L.

Small POTWs

Figure 5a shows the concentration of TOC that was dissolved and in particulate form in the effluents of the six designated small POTWs. Excluding a single spike which was measured during the fourth sampling event for the North Bergen-Central plant, the TOC concentrations in the smaller POTWs was less than 35 mg/L, and averaged 17, 35, 29, 27, 16, and 10 mg/L for the North Hudson-Hoboken, North Bergen-Central, N. Bergen-Woodcliff, N. Hudson-West New York, Secaucus, and Edgewater plants, respectively. Excluding the spike in TOC in the effluent for the N. Bergen-Central plant, the average TOC concentration in the North Bergen and North Hudson (West New York) effluents were slightly higher than in the other effluents. The single high spike in TOC was observed during the last sampling event (August 6-9, 2001) for the North Bergen-Central plant (Figure 5a). The measured TOC value exceeded 199 mg/L.

The dissolved:total organic carbon ratio in the small POTW effluents ranged from an average of 0.68 for North Hudson-West New York and Edgewater plants, to 0.89 for the North Bergen-Central plant. Excluding the spike in TOC for North Bergen-Central, the dissolved:total organic carbon ratio within a given small POTW plant effluent was much less variable between sampling events compared to the large POTWs. Nevertheless, the overall dissolved:total organic carbon ratio in the effluents of the small POTWs was close to the arithmetic mean in the effluents of the large POTWs, with means ± standard deviations of 0.74 ± 0.24 versus 0.70 ± 0.21, respectively.

The SS concentrations in the effluents of the small POTWs generally varied by a factor of less than 2, with the exception of the Edgewater plant, which differed by a factor of 2.7. The average SS for small POTWs ranged from as low as 5 mg/L for the Secaucus plant, to 23 mg/L for the North Hudson-Hoboken plant (Figure 5b). The overall average ± standard deviation of the SS concentrations in the small POTWs was half that of the larger POTWs, at approximately 15 ± 6.8 mg/L.



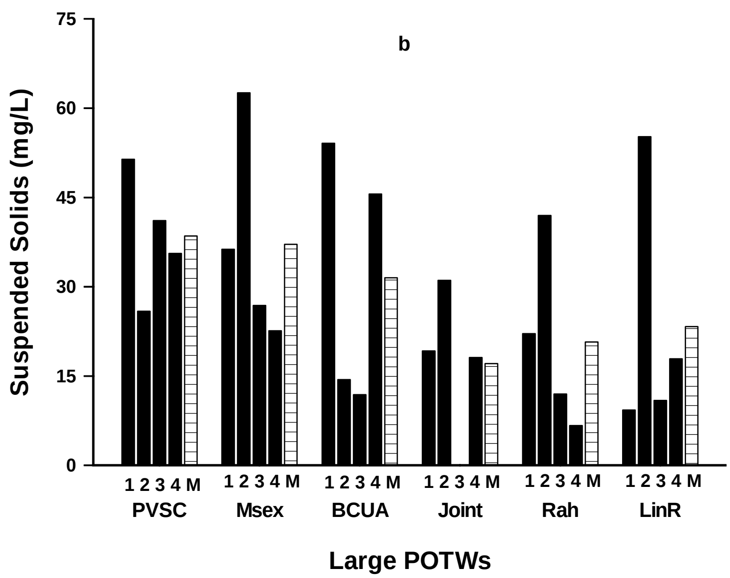
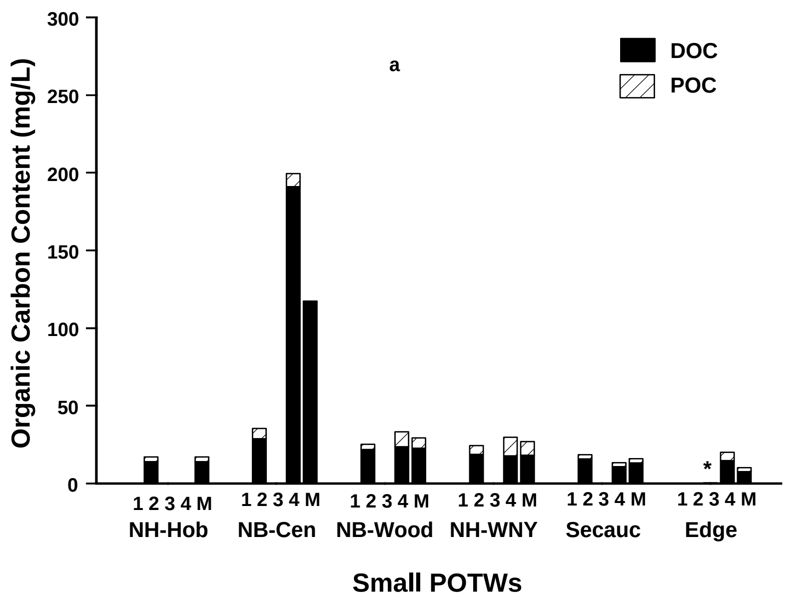


Figure 4. Normal flow effluent dissolved, particulate and estimated total organic carbon concentration (mg/L) at large POTWs (panel a), and corresponding total suspended solids concentrations (panel b) for each of four normal flow sampling events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000; Event #3: 22-24 May 2001; Event #4: 7-9 August 2001. M = POTW data mean.



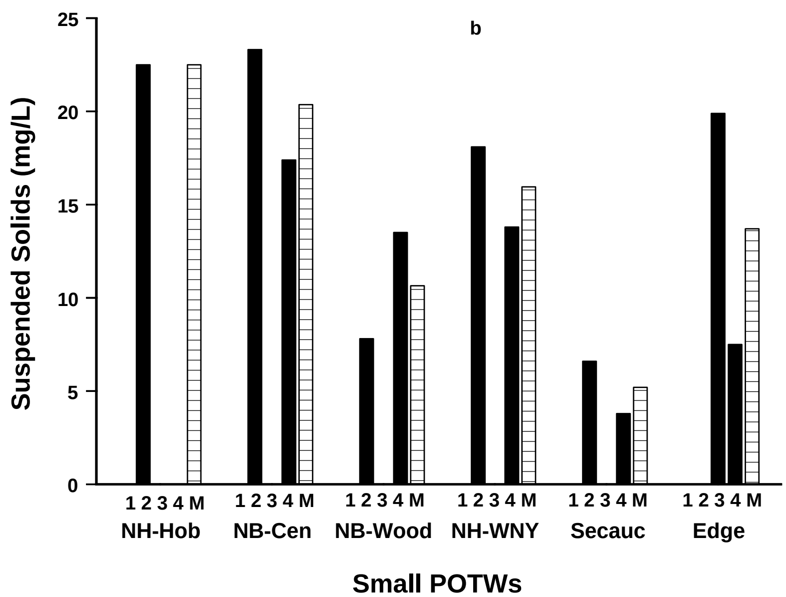


Figure 5. **Normal flow effluent dissolved, particulate and estimated total organic carbon concentration (mg/L) at small POTWs (panel a), and corresponding total suspended solids concentrations (panel b) for each of two sampling events: Event #2: 12-14 December 2000 (excluding the Edgewater plant); Event #3: 22-24 May 2001 (including Edgewater only); Event #4: 7-9 August 2001. M =POTW data mean. * = Scale too large to see the data.**

PCBS

Large POTWs

Detectable concentrations of PCBs were measured in the field and method blanks collected in conjunction with investigative samples during all four sampling events. To address this issue, PCB data from event #1 were adjusted as described in Appendix A.2. PCB data from events #2-#4 were censored by subtracting the value of the method blank for each event on an amount (picogram) and congener-by-congener basis. Censorship of these data significantly impacted all large POTW data during all four sampling events. The logic and method for PCB data censorship are described and discussed in Appendices A.1 and A.2.

Figure 6 shows the total PCB concentrations in the six large POTW plant effluents for the four normal flow sampling events. The individual PCB congener concentrations are presented in Appendix B.

The mean total PCB concentrations (with PCB 11) in the effluents of the large POTWs were less than 24,000 pg/L, with the exception of the PVSC and Linden-Roselle plants (Figure 6a and Table 10). The total PCB concentration in PVSC's effluent was substantially higher than the other large POTWs due primarily to the large concentration of PCB congener 11. PCB 11 represented anywhere from 66 to 92 % of the total PCB concentration in PVSC's effluent at any given time. Subtracting PCB 11, PVSC always has total PCB concentrations less than 21,000 pg/L. PCB 11 was also found at somewhat higher than expected concentrations at MCUA during events #3 and #4. Figure 6b shows the total PCB concentrations in the six large POTW plant effluents without PCB 11.

PCB 11 is a by-product of the production of the pigment diarlyide yellow and other pigments which are produced by several industries, and is used to color plastics and inks, among other things. PCB 11 is a known human carcinogen and developmental toxicant, and has the potential to bioaccumulate. Therefore, PCB 11 is a chemical of concern.

The fraction of total PCB (subtracting PCB 11) that is dissolved is nearly twice as high in the effluent samples from PVSC and BCUA during sampling event #1 compared to the other large POTWs. The dissolved to total PCB ratios in these effluents were 0.50 and 0.40, respectively. All other effluent samples from the remaining four large POTWs contained less than 30% dissolved PCB, and ranged from 21% for Joint Meeting Essex Union to 28% for the Linden Roselle plant. Interestingly, the dissolved to total PCB ratio for PVSC's effluent was only 33% when PCB 11 was included, as opposed to the 50% noted above. The overall mean dissolved to total PCB ratio for large POTW effluents was 0.32 with PCB11, and 0.33 without PCB11.

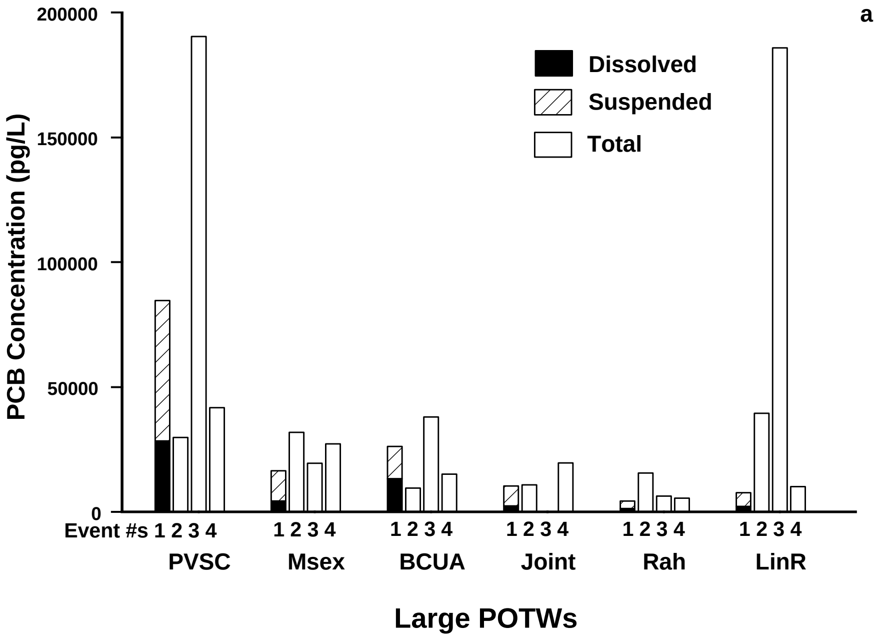
Variability in total PCB concentrations between sampling events within each large POTW effluent differed by 2-4 times, with the exception of the PVSC (6.4X) and Linden Roselle (18.4X) plants. The majority of PCB congeners were one to two orders of magnitude higher in concentration in the effluent samples from the Linden-Roselle plant during event #3 (May 21-23, 2001), thus accounting for the extreme total PCB concentration (185,818 pg/L) in the Linden Roselle plant effluent measured during that event (Figure 6a). Excluding the extreme total PCB concentration for event #3 at the Linden Roselle plant, variability in total PCB concentrations for the other three sampling events conducted at Linden Roselle was only 5.2X (Figure 6a).

The average total PCB concentrations in the effluents of the large POTWs, with and without PCB 11, and excluding the extreme value from event #3 for the Linden Roselle plant, are presented in Table 10 below.

Table 10. Mean Total PCB concentration (with and without PCB11) of four sampling events at six large POTWs. Linden Roselle data in ( ) exclude event #3 data.

POTW	Mean Total PCB (pg/L)	Mean Total PCB - PCB11 (pg/L)
PVSC	86,595	14,612
BCUA	22,187	21,771
Linden Roselle	60,693 (18,985)	60,562 (18,925)
Joint Meeting	13,590	13,481
Rahway Valley	7,940	7,850
Middlesex	23,667	21,833

The effluent of the large POTWs were generally dominated by biphenyls containing three, four, five, and six chlorine atoms, and show similar patterns across all four sampling events at each POTW (Figure 7). The PCB profiles of these effluents were generally unimodally distributed, such that the mono/di- and octa-/nona-/deca-chlorobiphenyls account for only a very small fraction of the total PCBs present. The effluent from the Middlesex POTW and BCUA event #3 samples contained a large portion of di- and trichlorobiphenyls, and the event # 4 effluent from Joint Meeting consisted of a large percentage of octochlorobiphenyls (Figure 7).



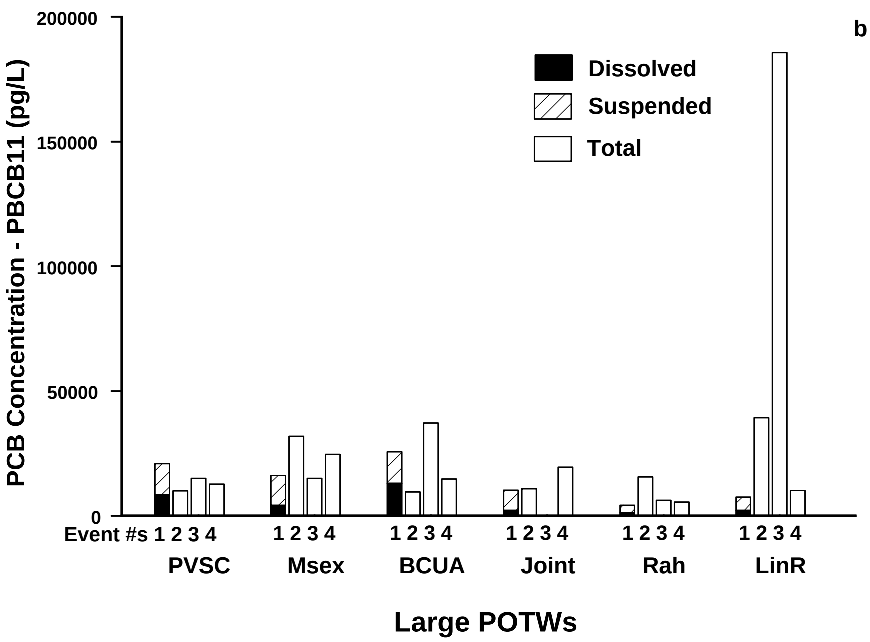


Figure 6. Normal flow effluent total PCB concentration (pg/L) at large POTWs with (panel a) and without (panel b) PCB 11 for each of four normal flow sampling events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000; Event #3: 22-24 May 2001; Event #4: 7-9 August 2001.

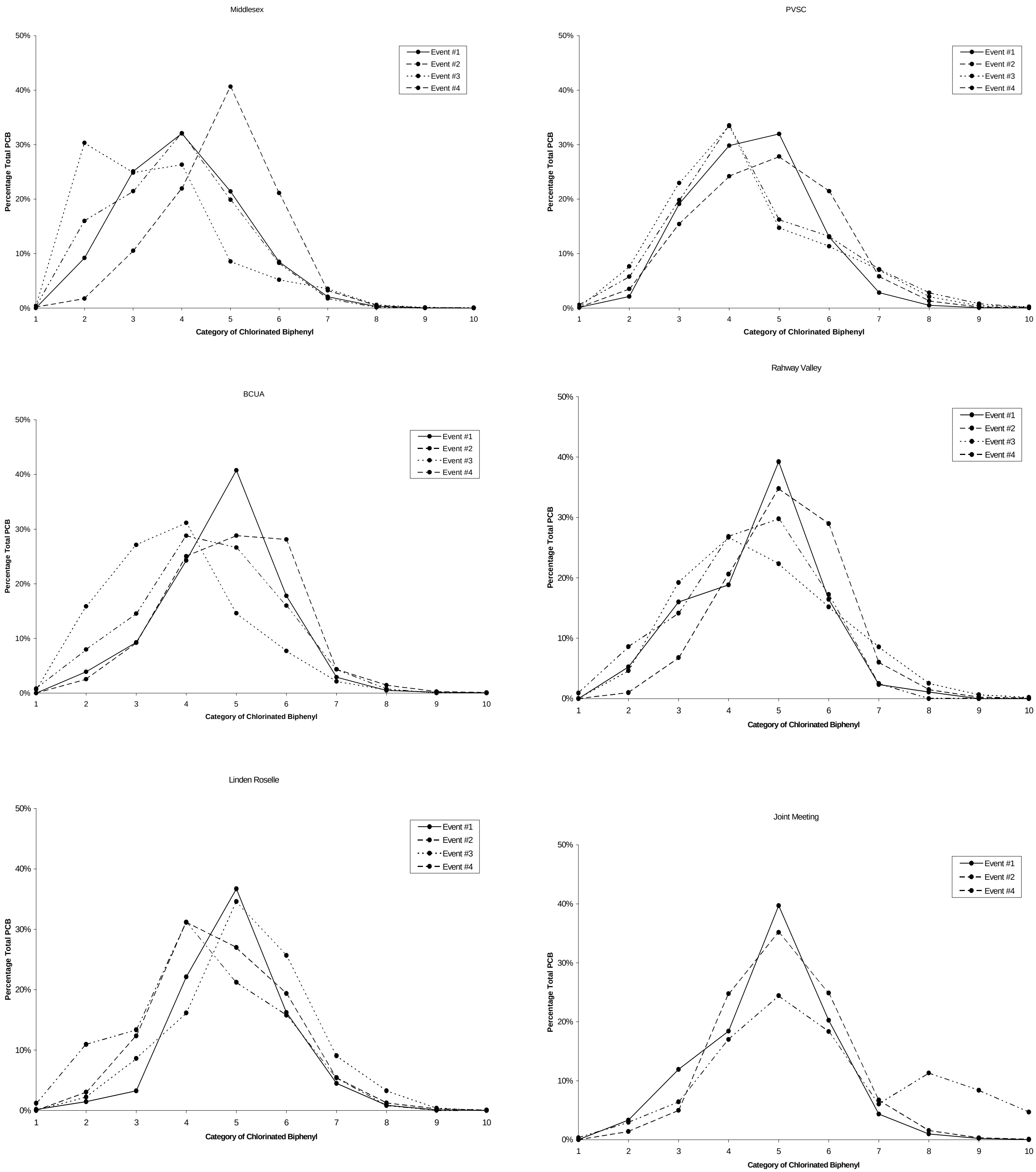


Figure 7. PCB congener distribution in normal flow effluents from the large POTWs. PCB11 was excluded in the PVSC figure.

Small POTWs

Detectable concentrations of PCBs were measured in the field and method blanks collected in conjunction with the investigative samples during both sampling events. PCB data from events #2 and #4 were censored by subtracting the value of the method blank for each event on an amount (picogram) and congener-by-congener basis. Censorship of these data significantly impacted all small POTWs during all sampling events. The logic and method for PCB data censorship are described and discussed in Appendices A.1 and A.2.

Figure 8 shows the total PCB concentrations measured in the six small POTW effluents. The individual PCB congener concentrations are presented in Appendix B.

The total PCB concentrations in the effluents of the small POTWs were found to be less than 12,000 pg/L, with the exception of the North Bergen Central plant and the North Hudson Hoboken plant (Table 11). Overall total PCB concentrations were found to be similar to those measured in the large POTWs (without PCB 11; Figure 6b and Table 10). PCB 11 was detected in many of the small POTW samples; PCB11 concentrations and percent composition were higher in the N. Bergen Central samples (810 pg/L; 3.6%) compared to the other small POTWs (0-260 pg/L; 0-2.4%). The average total PCB concentrations in the effluents of the small POTWs with and without PCB11 are presented in Table 11. The overall mean total PCB concentration for the small POTW effluents with PCB 11 (12,371 pg/L) and without PCB 11 (12,158 pg/L) differed little.

Table 11. Mean Total PCB concentration (with and without PCB11) of three sampling events at six small POTWs.

POTW	Mean Total PCB (pg/L)	Mean Total PCB - PCB11 (pg/L)
N. Hudson Hoboken	16,167	16,167
N. Bergen Central	23,907	23,097
N. Bergen Woodcliff	11,436	11,307
N. Hudson West New York	10,556	10,464
Secaucus	6,798	6,790
Edgewater	7,198	7,126

Variability in total PCB concentration between sampling events for each small POTW differed by a factor of less than 2, except at Edgewater (3X). The ratio of the total PCB standard deviation:mean was between 0.04 and 0.71.

Effluents from the small POTWs tended to be dominated by biphenyls containing four, five and six chlorine atoms (Figure 9). The PCB profiles of these effluents were generally unimodally distributed, except for the Edgewater plant, where the PCB profile was dominated by the much higher proportion of hexa- and heptachlorobiphenyls in event #4. The tetrachlorobiphenyls clearly dominated the effluent from the N. Bergen-Hoboken plant (Figure 9). Except at Edgewater, the PCB homolog distribution patterns were similar at each small POTW during the two sampling events.

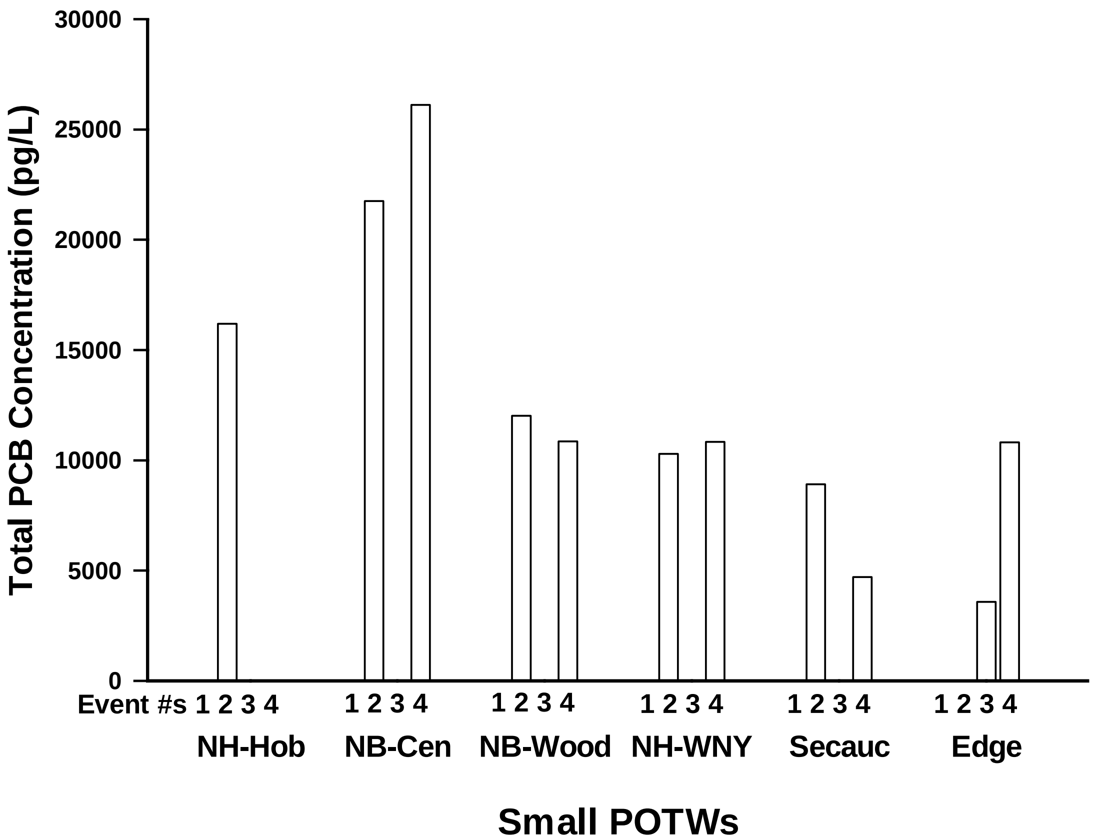


Figure 8. **Normal flow effluent total PCB concentration (pg/L) at small POTWs for each of three sampling events: Event #2: 12-14 December 2000 (excluding the Edgewater plant); Event #3: 22-24 May 2001 (including only Edgewater); and Event #4: 7-9 August 2001.**

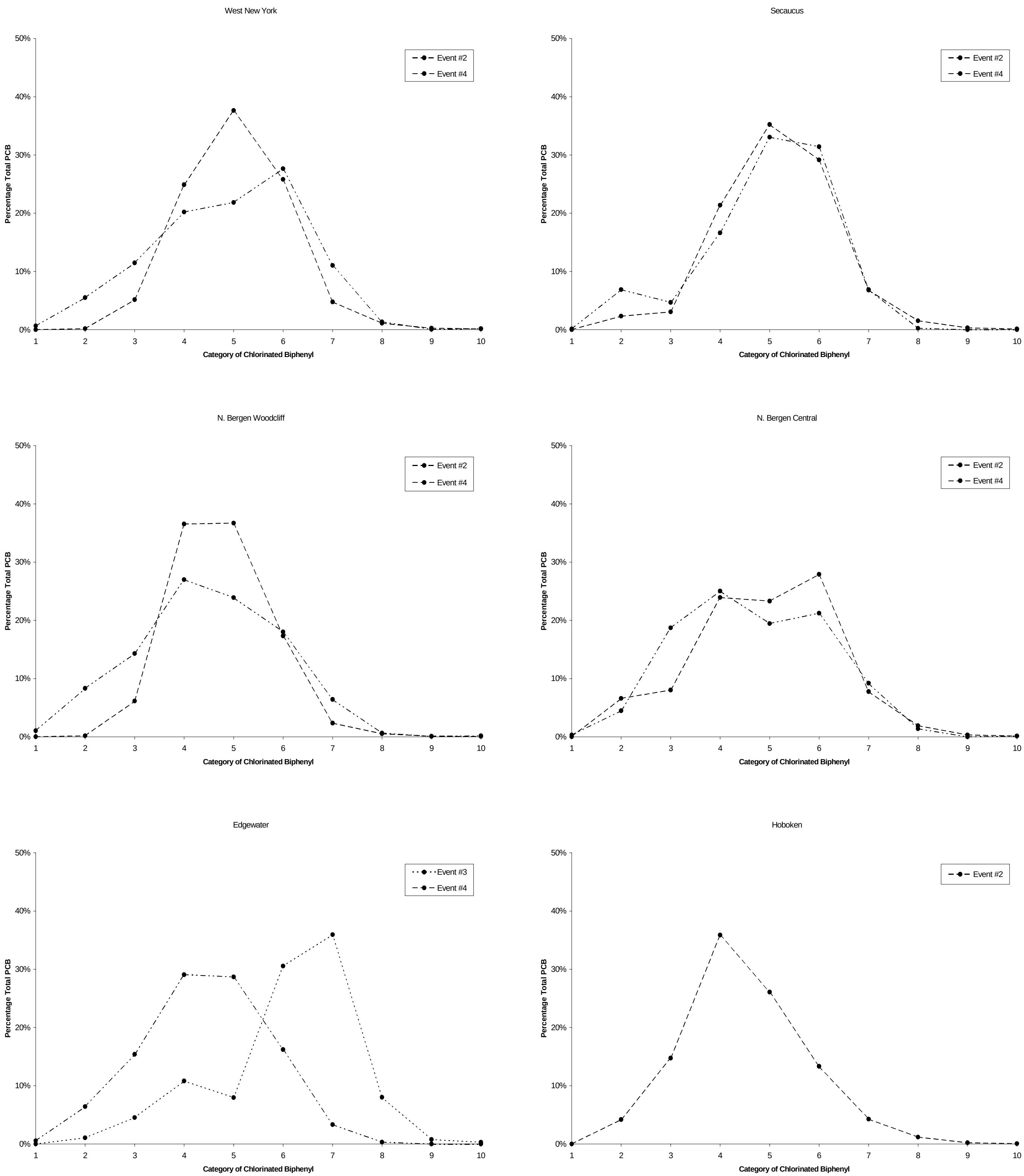


Figure 9. PCB congener distribution in normal flow effluent in small POTWs.

PAHs

Large POTWs

Blank correction affected the sample data from all of the large POTWs to varying degrees. Considering all sampling events, the PVSC and BCUA data were little affected compared to the other POTWs. Data from sampling event #4 were most impacted by the blank correction procedures (particularly at Linden-Roselle, Joint Meeting, Rahway Valley, and MCUA). PVSC events #1 and #3, BCUA events #1 and #4, Rahway Valley event #2 and Middlesex event #3 sample data were not censored by the blank correction procedures. Except for Linden-Roselle event #1, the remaining sample data for the large POTWs was only minimally impacted by blank correction. See Appendices C.1 and C.2 for more information regarding blank correction procedures and the justification for procedures used for blank correction.

Figure 10 shows the total PAH concentrations in the effluents of the six large POTWs for the four normal flow sampling events. The individual PAH concentrations are provided in Appendix D. [Note: the event #1 suspended sediment and dissolved fraction PAH concentrations listed in Appendix D.1 have not been blank corrected.]

The total PAH concentration in the effluents of large POTWs was generally less than 4,400 ng/L (with 17 of the 22 samples less than 1,750 ng/L). An exception to this was the PVSC plant effluent during event #1, which was found to contain 9,963 ng/L (Figure 10), more than two times greater than the next largest total PAH concentration. Excluding this value, the total PAH concentrations in PVSC's effluent averaged approximately 2,120 ng/L, similar to the mean for BCUA (2,500 ng/L). The overall mean total PAH concentrations at the other four large POTWs were lower, and ranged between 600 and 1,300 ng/L.

The fraction of total PAH that was dissolved was similar among the large POTW effluents for sampling event #1. The dissolved to total PAH ratios ranged from 0.72 for Middlesex County to 0.85 for PVSC. The overall mean dissolved to total PAH ratio was 0.79.

Variability in total PAH concentrations between sampling events for each large POTW differed by 2.9 to 7.8 times, except in the effluents from the Linden Roselle plant which varied by a factor of 20.

As noted above, some of the large POTW effluent PAH data were censored by blank correction; in addition, some analytes (including naphthalene, phenanthrene, and benzo(b)fluoranthene) were impacted to a greater degree than others. Thus, the percent composition of the PAH data was likely influenced by the blank correction procedure. The PAH-specific profiles appear to differ substantially in terms of the quantity of the individual PAHs present during different sampling events, although the same PAHs generally dominated in a given effluent. The PAH composition in the samples minimally impacted by the blank correction procedure (PVSC, BCUA, Rahway Valley, and MCUA for most samples) was dominated (>10%) by naphthalene and the C1/C2/C3-naphthalenes. Biphenyl was also a major component in some of the PVSC samples. Effluent PAH composition in POTWs impacted by blank correction (Linden-Roselle, Joint Meeting, and some MCUA samples) was dominated (>10%) by the C1/C2/C3-naphthalenes and the C2-phenanthrenes/anthracenes. The percentage composition of most of the remaining PAH compounds was low for all samples.

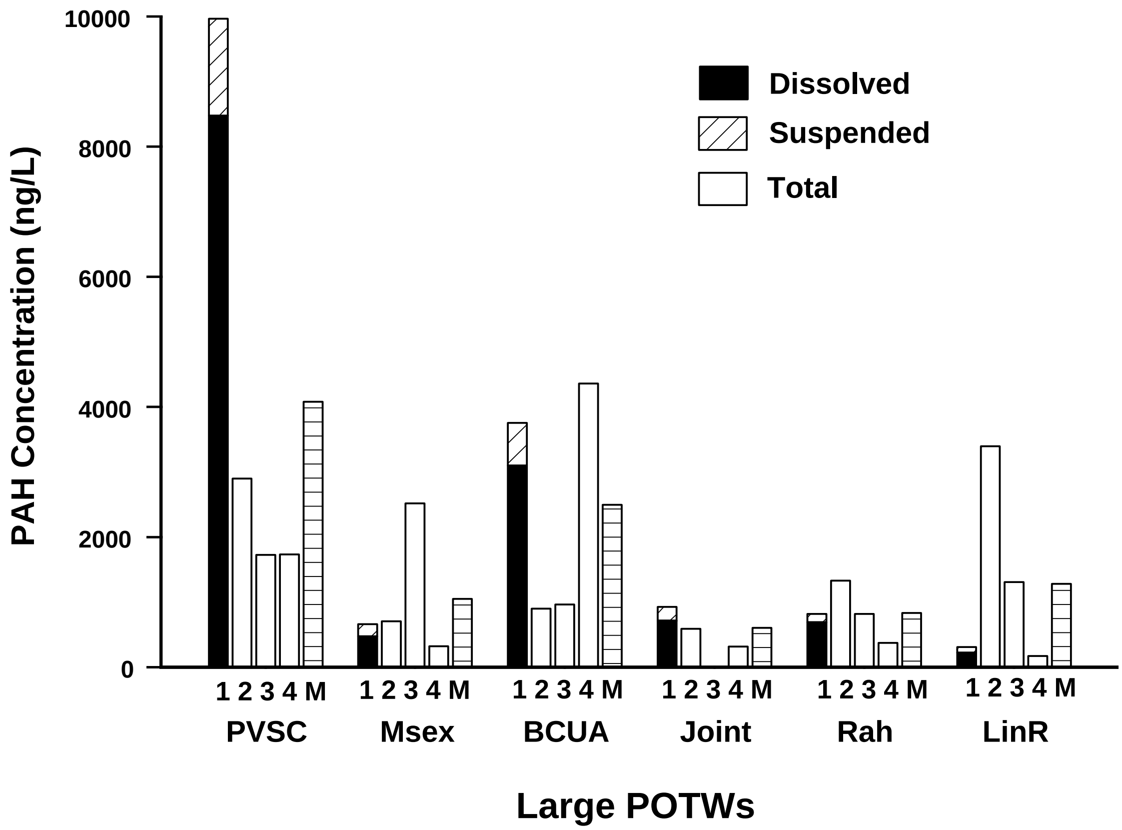


Figure 10. **Normal flow effluent total PAH concentration (ng/L) at large POTWs for four normal flow sampling events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000; Event #3: 22-24 May 2001; Event #4: 7-9 August 2001. M = POTW data mean.**

Small POTWs

For the small POTW samples, the blank correction process affected sample data to varying degrees, especially during both sampling events at Secaucus and North Hudson-Hoboken. In contrast, samples from N. Bergen-Central, N. Bergen Woodcliff, and West New York were minimally impacted. See Appendices C.1 and C.2 for more information regarding blank correction procedures and the justification for procedures used for blank correction.

Figure 11a shows the total PAH concentrations in the effluents of the six small POTWs for two sampling events. The individual PAH concentrations are provided in Appendix D.

The total PAH concentration in the N. Bergen Woodcliff effluent for event #2 (242,760 ng/L) effluent was nearly two orders of magnitude higher than the PAH concentration measured in the other small and large POTWs. A re-sample of the total PAH concentration in the effluent of this POTW the next quarter (Event #3) revealed a much lower, more characteristic total PAH value for the effluent, which was consistent with the concentration measured for sampling event #4. Figure 11b shows the total PAH concentrations in the six small POTWs, but without the aberrant value from N. Bergen-Woodcliff.

Excluding N. Bergen Woodcliff sample for event #2, the mean total PAH concentration in the effluents of the small POTWs ranged between 527 and 6,760 ng/L. The overall mean total PAH without N. Bergen Woodcliff event #2 was 2,367 ng/L, and all but one of the samples had a concentration less than 4,000 ng/L.

The mean total PAH concentration in N. Hudson-West New York plant effluent (6,760 ng/L) was substantially higher than the other small POTWs due to the relatively high total PAH concentration measured for that effluent during sampling event #4 (7-9 August 2001). Variability in total PAH concentrations among sampling events for the individual small POTWs differed by factors of 1.0 to 2.6, excluding the aberrant value from N. Bergen Woodcliff. The ratio of the standard deviation:mean (excluding the N. Bergen-Woodcliff event #2 data) ranged between 0.03 and 0.62.

Other than naphthalene, which was impacted by blank correction in 7 of 11 samples, no other analyte was impacted in more than 2 samples. Naphthalene concentrations tended to be low or were censored by blank correction, so the percent composition of the PAH data is likely influenced by the blank correction procedure. Similar to the large POTWs, the effluents of the small POTWs were dominated (>10%) by the C1/C2/C3-naphthalenes and C1/C2-phenanthrenes/anthracenes. The actual percentage composition of these key PAH groups can vary substantially between plants.

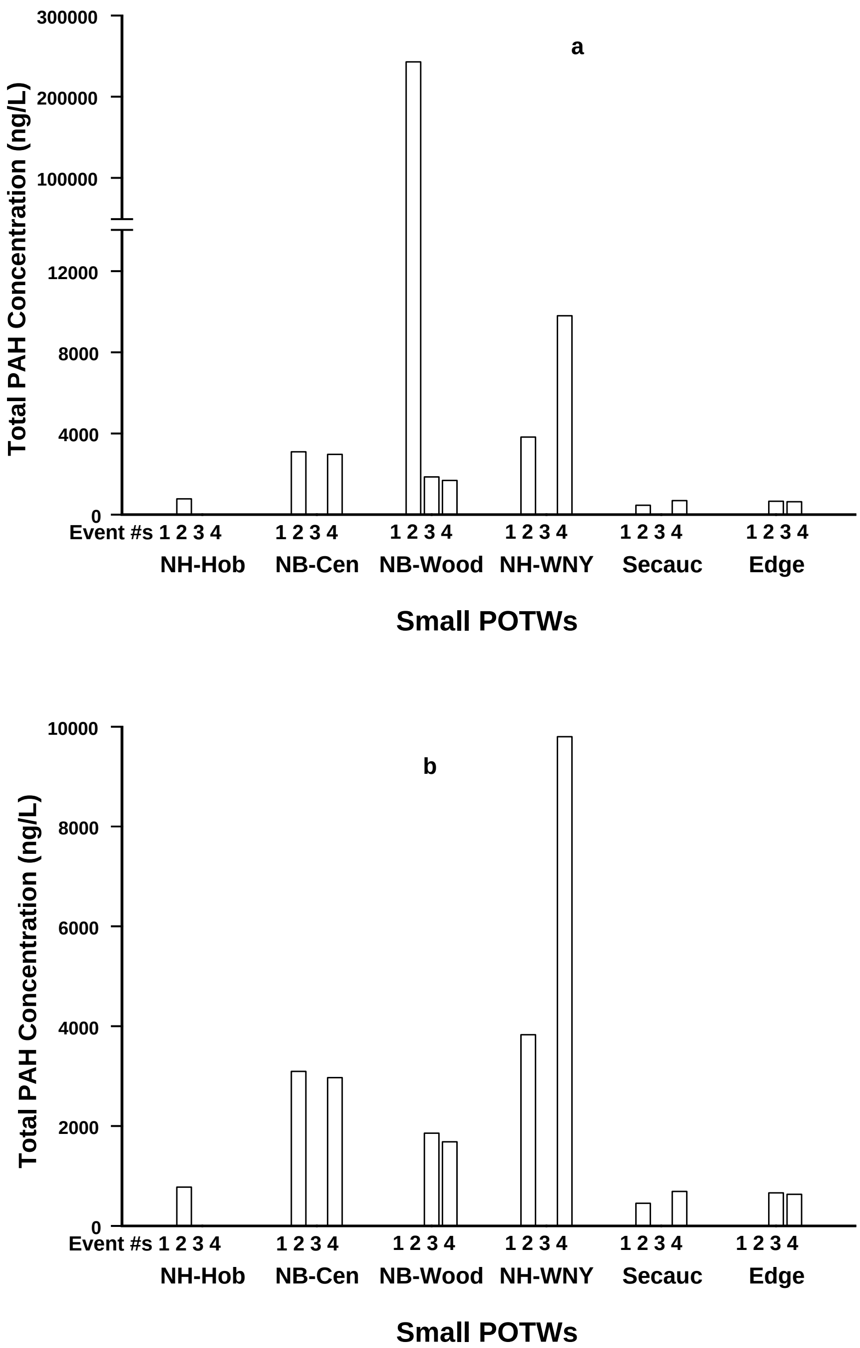


Figure 11. **Normal flow effluent total PAH concentrations (ng/L) at small POTWs with (panel a) and without (panel b) the aberrant value from the N. Bergen Woodcliff plant for event #2. Event #2: 12-14 December 2000 (no Edgewater sample collected); Event #3: 22-24 May 2001 (only an Edgewater sample collected); Event #4: 7-9 August 2001.**

Chlorinated Pesticides

Large POTWs

Blank correction and non-detections combined to affect the large POTW chlorinated pesticide data during all sampling events. Considering all of the sample data for both the Large and Small POTWs, approximately 30% of the data was blank-corrected and an additional 20% was not detected. However, the use of the sample data for the CARP pesticides of concern (DDTs, chlordane, and dieldrin) did not appear to be affected by blank correction impacts or non-detects. The Large POTWs most affected by blank correction and non-detects were Joint Meeting and Rahway Valley. Most event #1 data were impacted, while the least amount of data were impacted in event #3. Target analytes most frequently blank corrected included BHC (alpha- and delta-), aldrin, endrin, mirex, hexachlorbenzene and methoxychlor. Target analytes that were frequently not detected included 2,4'-DDE, endosulfan (alpha- and beta-) and endrin aldehyde.

Figure 12 shows the total chlorinated pesticide concentrations in the effluents of the six large POTWs for four normal flow sampling events. The individual pesticide concentrations are summarized in Appendix E.

The total chlorinated pesticide concentrations in the effluents of the large POTWs were less than 50,000 pg/L (Figure 12), and averaged 12,750, 17,830, 20,167, 18,725, 29,688, and 25,003 pg/L for the PVSC, Middlesex County, BCUA, Joint Meeting Essex Union, Rahway Valley, and Linden Roselle plants, respectively. The mean total chlorinated pesticide concentration for the effluents of the large POTWs was 20,800 $\pm$ 11,100 pg/L. The fraction of total pesticide that was dissolved was somewhat variable among the large POTW effluents for sampling event #1, and ranged from 0.30 for BCUA to 0.51 for Middlesex County.

Total pesticide concentrations for PVSC and Joint Meeting differed by a factor of 2. The other 4 POTWs had 3 samples with about the same total pesticide concentrations, with the fourth sample having variable pesticide concentrations. There was little variability (factor of 2.3) in the average total chlorinated pesticide concentrations among the six large POTWs.

Gamma-BHC (Lindane) dominated at PVSC (mean = 45.2%), MCUA (mean = 27.4%) and Rahway Valley event #4 (mean = 62.3%), while cis + trans Chlordane dominated at BCUA, Linden Roselle, Joint Meeting and Rahway Valley (means ranged from 34.4%-38.8%; Figure 13). BCUA, Linden Roselle, Joint Meeting and Rahway Valley also had significant percentages of trans Nonachlor in their effluents (12.2%-15.6%). Dieldrin was significant in BCUA effluent (mean = 16.9%); other POTW effluent mean dieldrin compositions ranged from 6.9%-10.4% (Figure 13). The total DDD+DDE+DDT concentrations were significant at Linden Roselle (mean = 21.5%) and Joint Meeting (mean = 14.2%); other large POTWs had means ranging from 6.5%-10.5%. Methoxychlor was significant at Middlesex event #3 (48.4%).

Comparison of the pesticide-specific profiles for selected analytes in the effluents sampled during the four events for the Rahway Valley plant (as an example) indicated that the specific chlorinated pesticide profiles for individual POTWs varied substantially between sampling events (Figure 14). This relationship was generally true for all large POTWs. Note, however, that only five analytes (gamma-BHC, gamma- and alpha-chlordane, trans-nonachlor, and dieldrin) plus total DDTs accounted for at least 75% of the total pesticides at each large POTW.

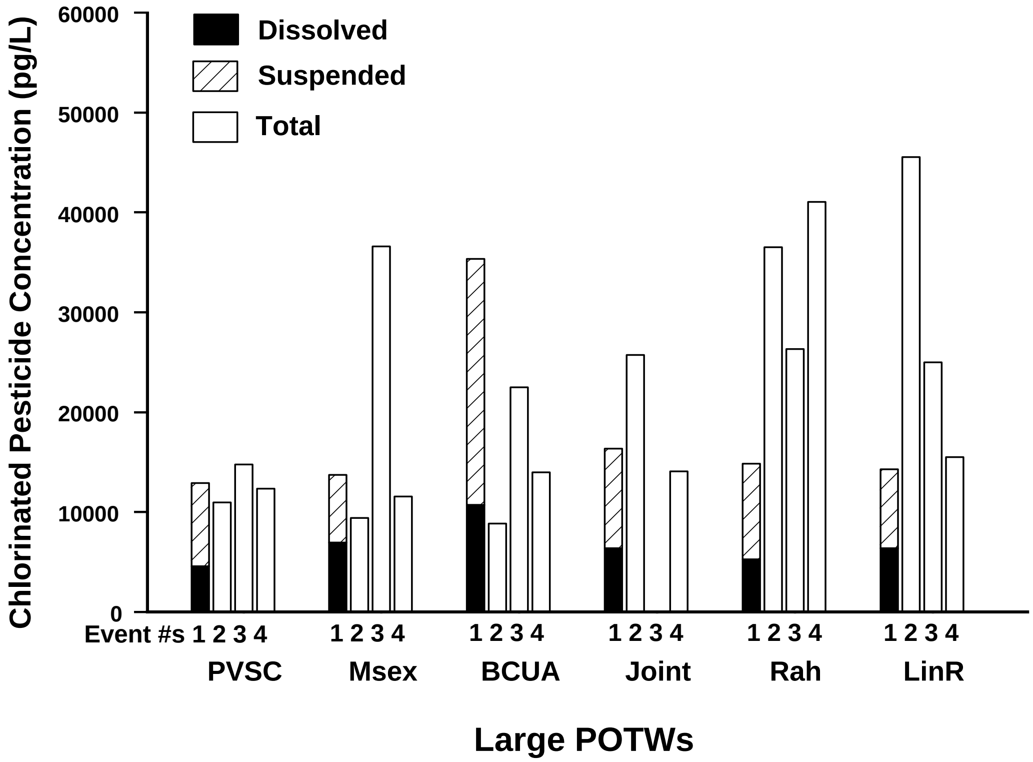


Figure 12. Normal flow effluent total chlorinated pesticide concentrations (pg/L) at the large POTWs for four normal flow sampling events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000; Event #3: 22-24 May 2001; Event #4: 7-9 August 2001.

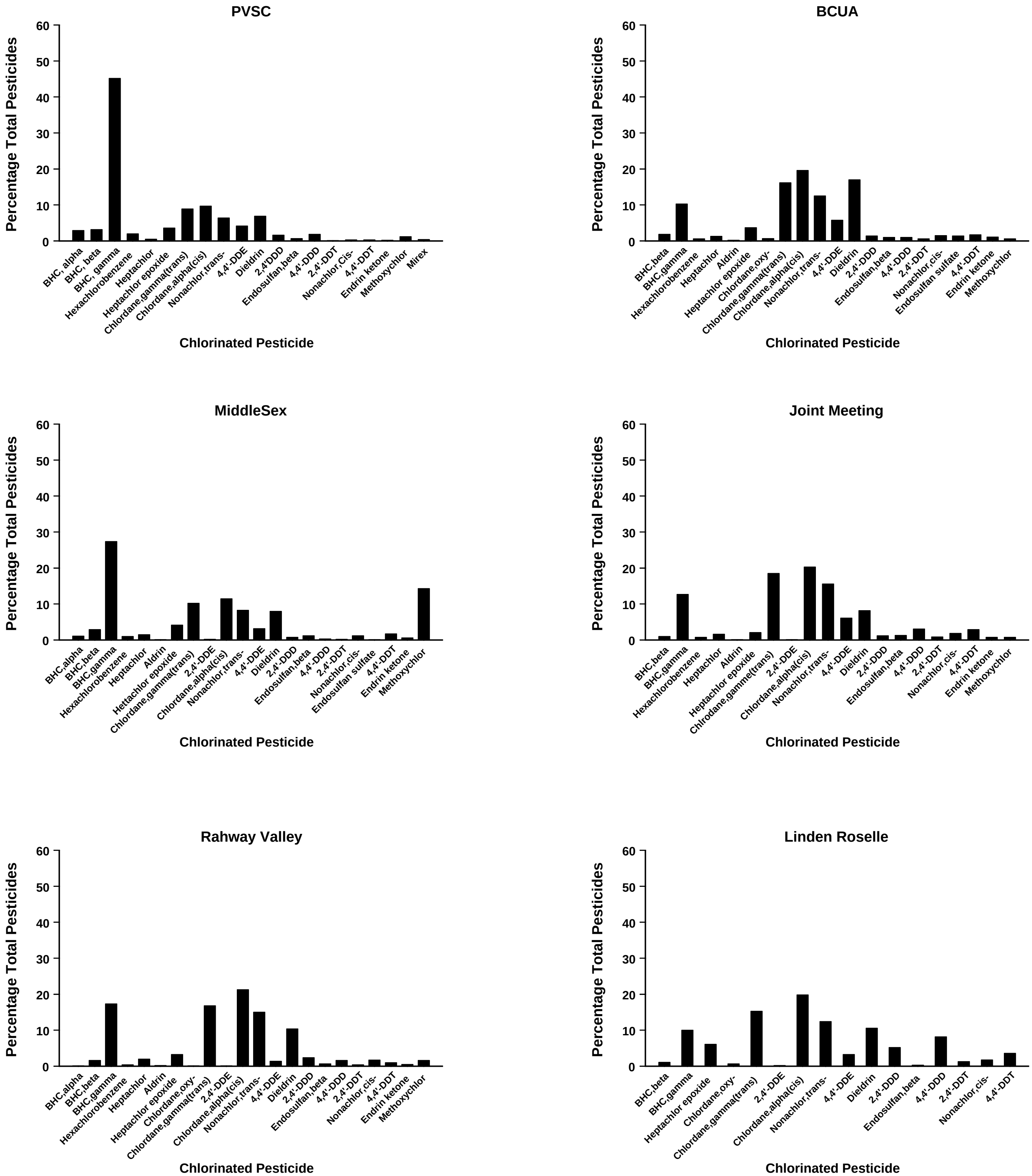


Figure 13. Average percent chlorinated pesticide composition (expressed as a percentage of the total pesticide) for large POTWs during four normal flow sampling events.

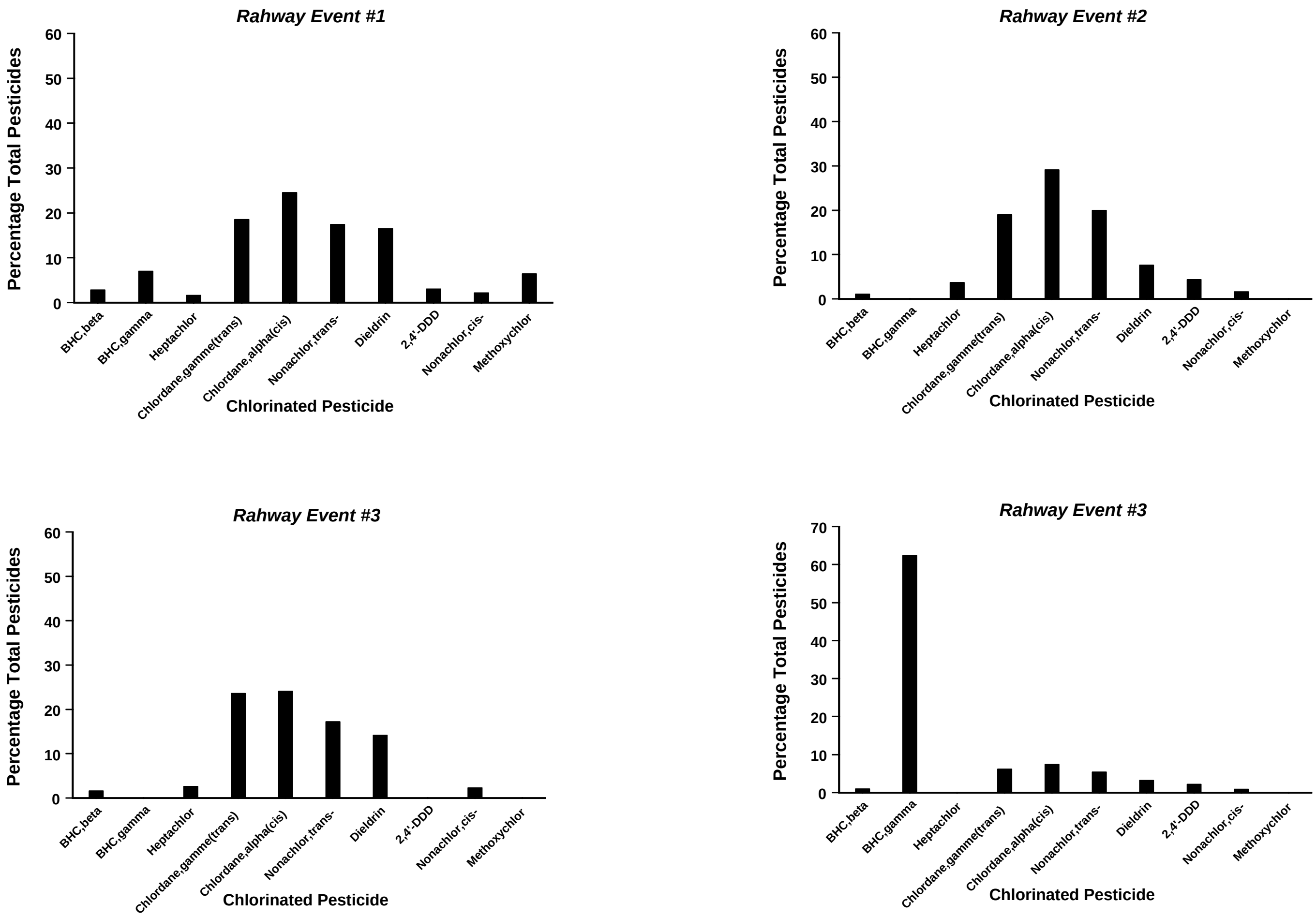


Figure 14. Pesticide-specific profiles for the Rahway Valley effluent for selected analytes during four normal flow sampling events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000; Event #3: 22-24 May 2001; Event #4: 7-9 August 2001.

Small POTWs

Blank correction and non-detections combined to affect the small POTW chlorinated pesticide data during all sampling events. Considering all of the sample data for both the Large and Small POTWs, approximately 30% of the data was blank-corrected and an additional 20% was not detected. However, the use of the sample data for the CARP pesticides of concern (DDTs, chlordane, and dieldrin) did not appear to be affected by blank correction impacts or non-detects. The POTWs most affected by blank correction were N. Bergen-Woodcliff and N. Hudson-West New York. Most data were censored during event #4. The target analytes most frequently blank corrected included BHC (alpha- and delta-), aldrin, mirex, hexachlorbenzene, and methoxychlor. Endosulfan (alpha- and beta-) and endrin aldehyde were frequently not detected.

Figure 15 shows the total chlorinated pesticide concentrations in the effluents of the six small POTWs for the normal flow sampling events. The individual pesticide concentrations and the percentage composition of the total pesticides present are summarized in Appendix E.

The total chlorinated pesticide concentrations in the effluents of the small POTWs was slightly lower than was the case for the effluents of the large POTWs (Figure 15), and averaged 9,761, 23,181, 15,036, 14,878, 23,692, and 10,279 pg/L for North Hudson-Hoboken, North Bergen-Central, N. Bergen-Woodcliff, N. Hudson-West New York, Secaucus, and Edgewater plants, respectively. The mean total chlorinated pesticide concentration for the effluents of all the small POTWs was 16,700 $\pm$ 6,530 pg/L.

The total pesticide concentrations for each small POTW differed by a factor of less than 1.8, and there was little variability (factor of 2.4) in average total pesticides among all of these POTWs (although the number of samples is limited).

Gamma-BHC (Lindane) dominated at N. Hudson-Hoboken (mean = 17.5%), and was significant at N. Bergen-Central (mean = 15.1%) and Secaucus (mean = 13.7%). Lindane was not found at Edgewater, and had a low percent composition at the other POTWs (Figure 16). Cis + trans Chlordane dominated at Edgewater (mean = 45.1%) and N. Bergen-Central (mean = 34.8%), and was significant at Secaucus (mean = 20.8%), N. Bergen-Woodcliff (mean = 27.6%), N. Hudson-Hoboken (mean = 17.5%) and at N. Hudson-West New York (mean = 23.7%). Dieldrin was significant at Secaucus (mean = 14.6%); the other small POTW mean dieldrin values ranged from 6.2% - 9.7%. Methoxychlor was not found at any small POTW. Trans-Nonachlor was significant at N. Bergen-Central, Secaucus, N. Hudson-West New York and Edgewater (means range from 10% - 17.6%; Figure 16). Total DDD+DDE+DDT was significant at N. Hudson-West New York (mean = 43.2%), N. Bergen-Woodcliff (mean = 37.5%), N. Hudson-Hoboken (mean = 33.9%), Secaucus (mean = 25.8%) and N. Bergen-Central (mean = 14.9%).

Comparison of the pesticide-specific profiles for selected analytes in the effluents sampled during the two events for the Secaucus plant (as an example) indicated that the specific chlorinated pesticide profiles for individual POTWs varied substantially between sampling events (Figure 17). This relationship was generally true for all small POTWs. Note, however, that only five analytes (gamma-BHC, gamma- and alpha-chlordane, trans-nonachlor, and dieldrin) plus total DDTs accounted for at least 77% of the total pesticides at each small POTW.

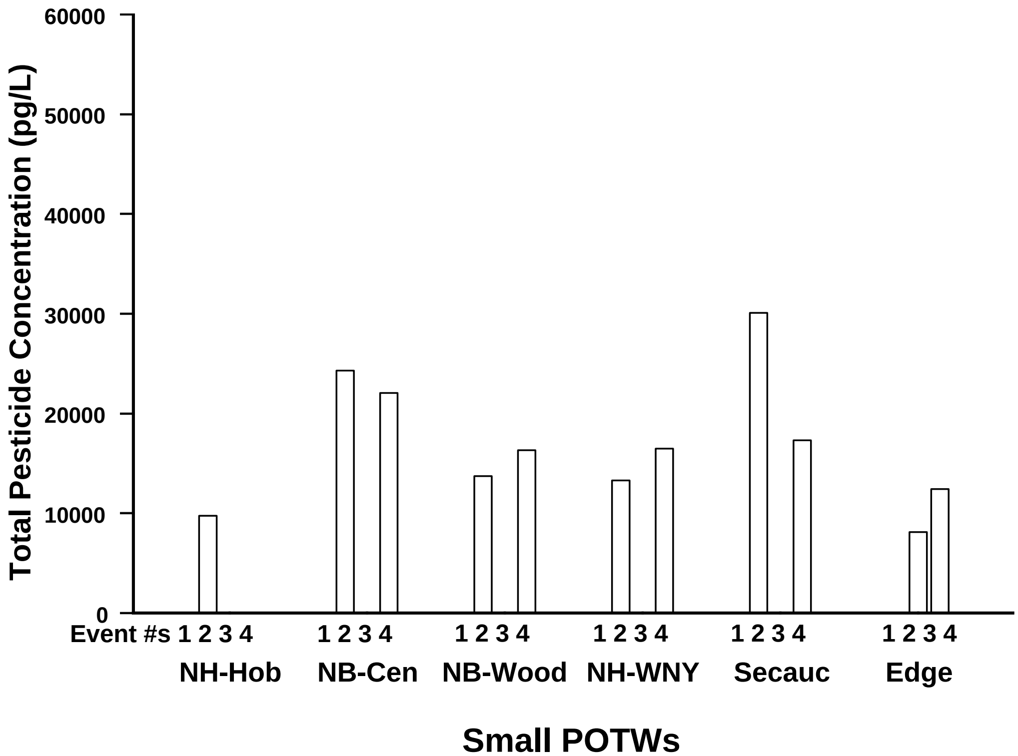


Figure 15. Total chlorinated pesticide concentrations (pg/L) at small POTWs for the normal flow sampling events: Event #2: 12-14 December 2000 (excluding the Edgewater plant); Event #3: 22-24 May 2001 (including only Edgewater); and Event #4: 7-9 August 2001.

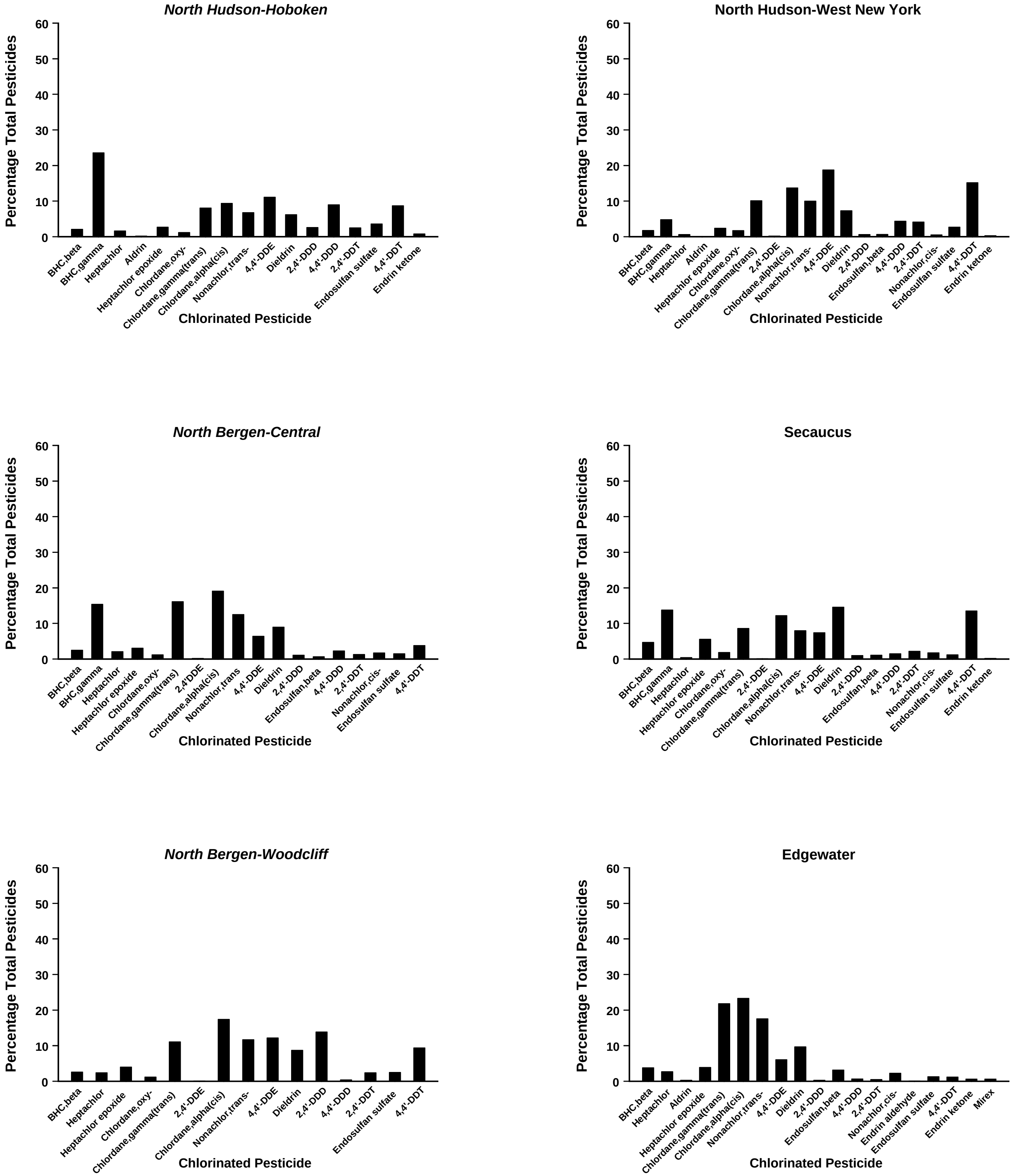
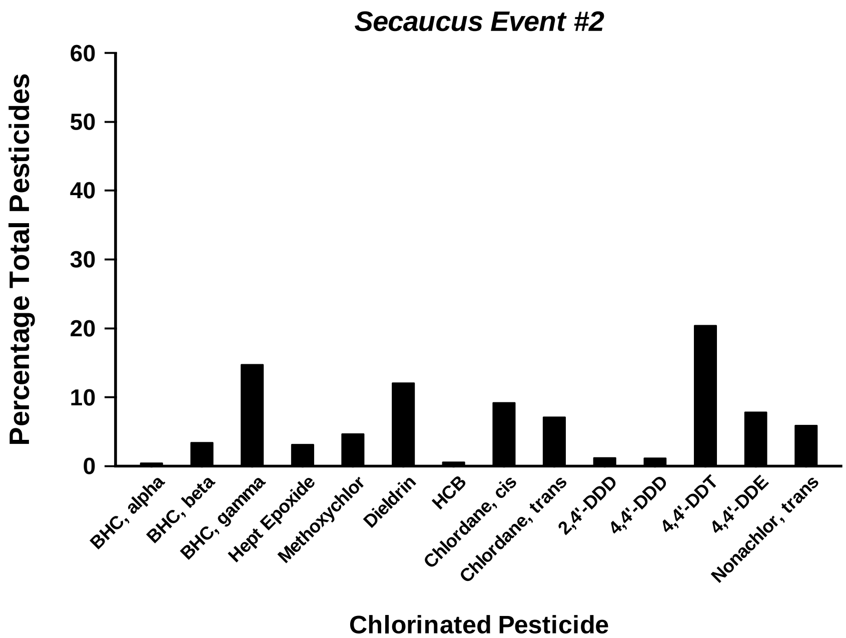


Figure 16. **Average percent chlorinated pesticide composition (expressed as a percentage of the total pesticide) for selected analytes for small POTWs for the normal flow sampling events.**



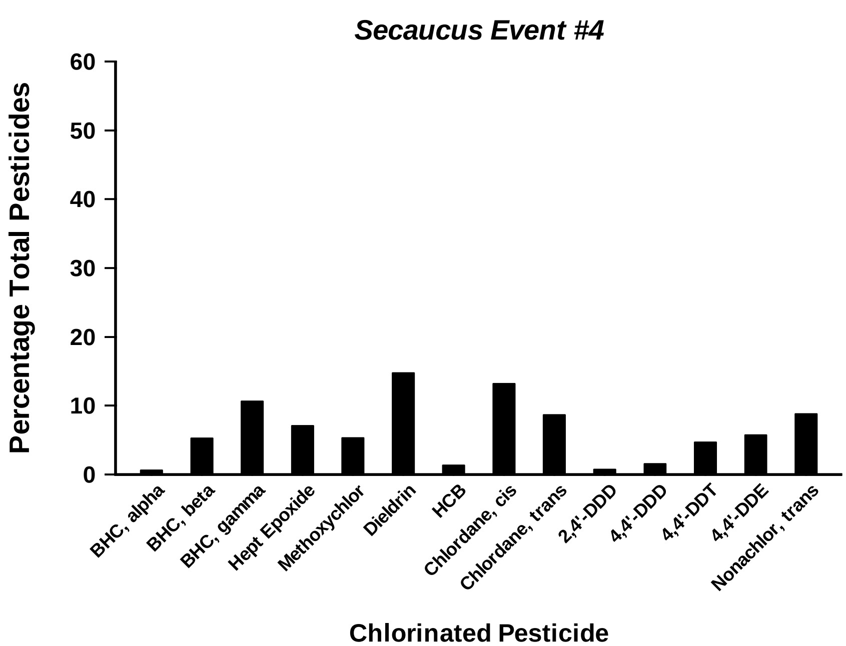


Figure 17. Pesticide-specific profiles for selected analytes for the Secaucus effluent during two normal flow sampling events: Event #2: 12-14 December 2000; Event #4: 7-9 August 2001.

DIOXINS/FURANS

Large POTWs

Dioxins/furans at the large POTWs were analyzed for only the first two events (event # 1 - October 3-4, 2000 and event #2 - December 12-14, 2000) because the concentrations of dioxins/furans were found to be extremely low in the investigative samples. Additionally, sample blanks collected during event #1 were heavily impacted; the data for many congeners from this event were either not detected or were censored at all six large POTWs. Conversely, there was little blank contamination during event #2, so no dioxin/furan data from this event were censored.

Figure 18a shows the total concentrations of dioxins and furans in the effluents of the six large POTWs for two normal flow sampling events. The individual dioxin/furan data are provided in Appendix F.

The total concentration of dioxins and furans measured in the effluents of the large POTWs was generally less than 31 pg/L, with the exception of PVSC and BCUA during event #1 and the Rahway Valley plant during event #2 (Figure 18a). The concentration of toxic equivalents (TEQ; van den Berg et al., 1997) per liter was elevated in the Rahway Valley effluent compared to the other large POTWs (Figure 18b). There was very little dissolved PCDD/Fs in the event #1 effluent samples.

The effluents of the large POTWs were largely comprised of the OCDD dioxin congener (Figure 19), which is 10,000 times less potent than 2,3,7,8-TCDD. The exceptions were the Rahway Valley and Middlesex event # 1 effluents, which were largely comprised of the OCDF congener (Figure 19). The OCDF congener has the same relative toxicity as OCDD. The Rahway Valley effluent also contained measurable concentrations of the 1,2,3,4,6,7,8-HpCDF congener, which appeared, at least to some extent, in most of the other large POTW effluents. The Linden Roselle event # 1 effluent was dominated by 1,2,3,4,7,8-HxCDF (Figure 19). The 17 dioxin/furan congeners included in the dioxin/furan profiles presented for these effluents account for 100 percent of the total dioxin/furan concentration measured. These profiles do not appear to differ substantially among the different sampling events for a given large POTW plant effluent, except for the Linden Roselle and Middlesex samples (Figure 19).

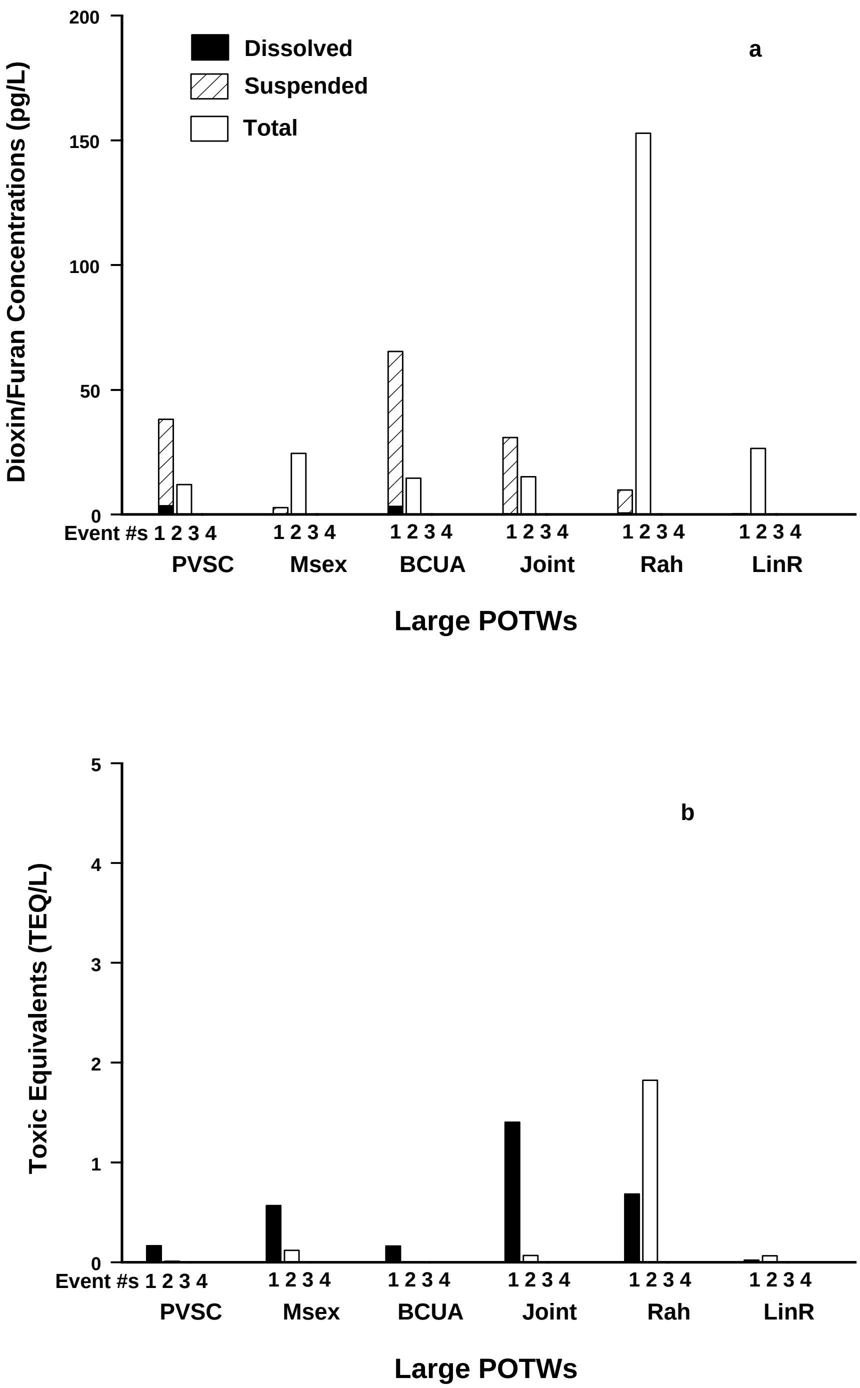


Figure 18. Normal flow effluent total dioxin and furan concentration (panel a) and toxic equivalents (panel b) at large POTWs for each of two sampling events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000.

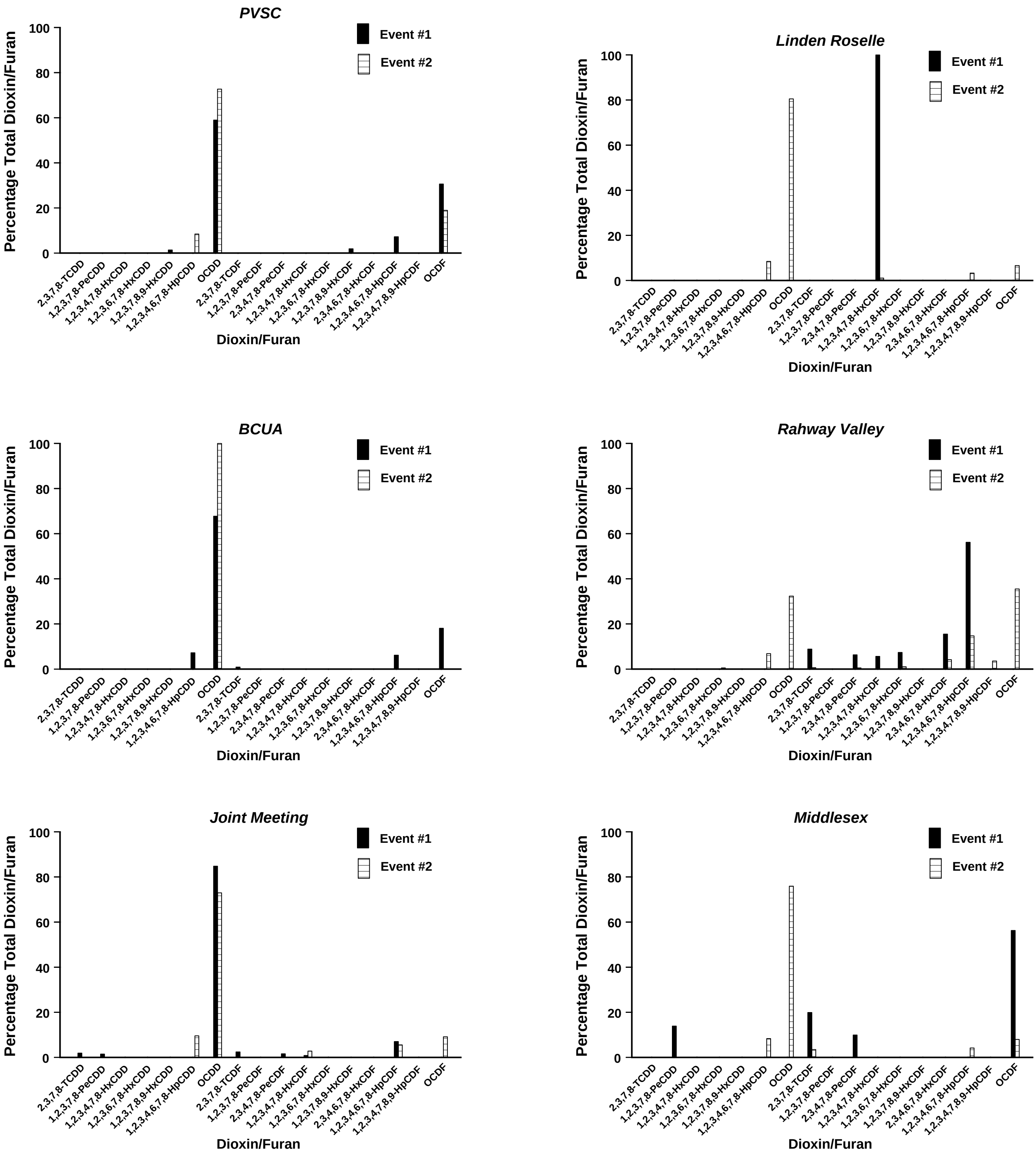


Figure 19. **Dioxin/furan specific profiles (collectively by percentage total Dioxin/Furan) at large POTWs for each of two sampling events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000.**

Small POTWs

Analysis of dioxins/furans at small POTWs was performed during two events (event #2 - December 12-14, 2000 and event #4 - August 6-9, 2001) because of the relatively small concentration of the contaminants found in the investigative samples. There was little blank contamination during event #2, so no dioxin/furan data from this event were censored. However, non-detections and blank contamination during event #4 necessitated censorship of many dioxin/furan congeners at all POTWs.

Figure 20a shows the total concentrations of dioxins and furans in the effluents of the six small POTWs for two normal flow sampling events. The individual dioxin/furan concentrations are provided in Appendix F.

The total concentration of dioxins and furans in the effluents of the small POTWs was generally less than 100 pg/L (Figure 20a). The greatest concentration of dioxins/furans was at N. Bergen Central and N. Bergen Woodcliff for event #4. The concentration of TEQs per liter in the small POTW effluents were quite low, and ranged from 0.0038 for the Edgewater plant effluent to 0.4780 in the N. Bergen Central effluent (Figure 20b).

The effluents of the small POTWs were mostly comprised of the OCDD dioxin congener, with the exception of Edgewater event #4, which was comprised entirely of the OCDF congener (Figure 21). Excluding Edgewater, the effluents of the small POTWs also contained measurable concentrations of 1,2,3,4,6,7,8-HpCDD, 1,2,3,4,6,7,8-HpCDF and OCDF congeners. The dioxin/furan profiles of the small POTW plant effluents do not appear to differ substantially between the two sampling events (Figure 21).

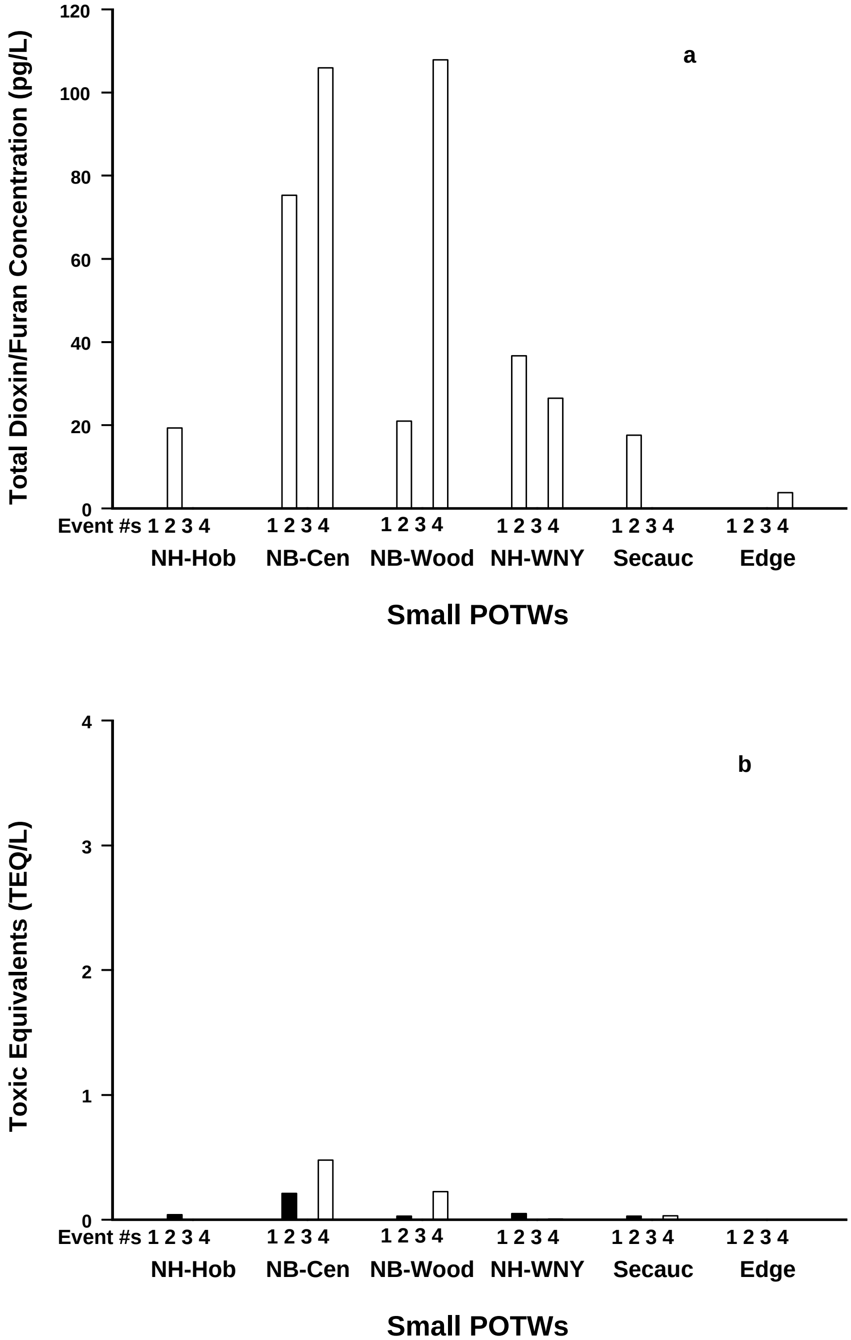


Figure 20. Normal flow effluent total dioxin and furan concentration (panel a) and toxic equivalents (panel b) at small POTWs for each of two sampling events: Event #2: 12-14 December 2000; Event #4: 7-9 August 2001.

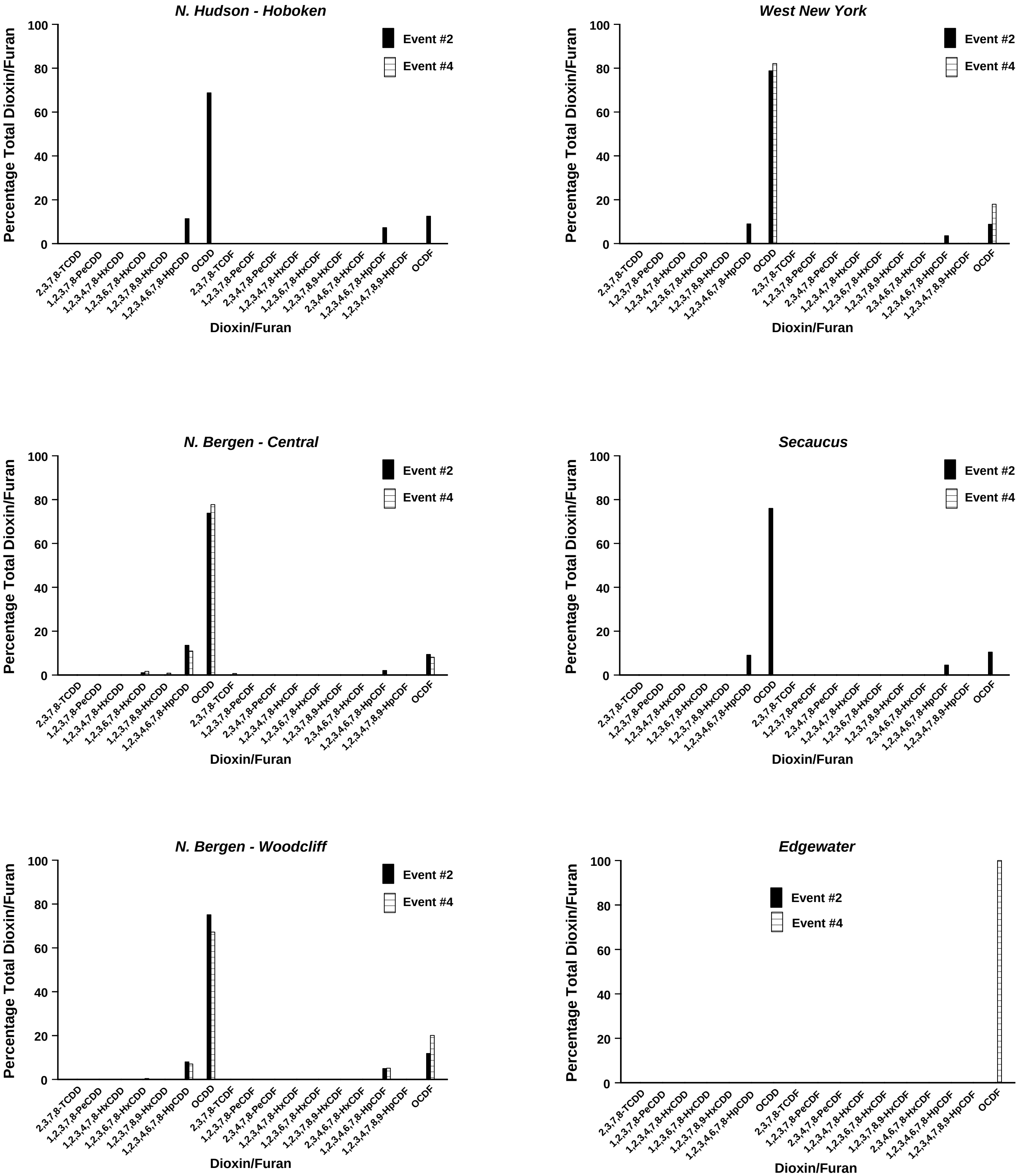


Figure 21. **Dioxin/furan specific profiles (collectively by percentage total Dioxin/Furan) at small POTWs for each of two sampling events: Event #2: 12-14 December 2000; Event #4: 6-9 August 2001.**

METALS

There were several issues regarding blank data and method detection limits. In a few samples, the dissolved fraction result was greater than the total result. None of the Cd, Pb, and methyl-Hg sample data were impacted by blank contamination. A few Hg samples in event #2 and event #4 were blank-censored. See Appendix G for more details.

Duplicate Data

Excluding the sampling event #2 duplicate sample collected at MCUA, concentrations of metals in duplicate samples were generally similar to the investigative samples (<7% average RPD) for dissolved Cd, total and dissolved Pb, and total and dissolved methyl-Hg. Total Cd and total Hg duplicate and investigate samples had an average RPD of 41.9% and 49.7%, respectively. Overall, the greatest variability between investigative and duplicates samples was for dissolved mercury (average RPD of 91.4%).

Large POTWs

Cadmium **-** Figure 22a shows the total and dissolved cadmium concentrations in the effluents of the six large POTWs for four normal flow sampling events. The individual metal concentrations are provided in Appendix H.

The mean total cadmium concentration in the effluents of five of the six large POTWs ranged from a low of 62 ng/L for Middlesex County to a high of 130 ng/L in the Rahway Valley effluent (Figure 22a). These averages were substantially lower than the mean total cadmium concentration in PVSC's effluent of 347 ng/L. Dissolved cadmium fractions in these effluents averaged 75 percent of the total, and exceeded 70% at each POTW except Linden Roselle, where the dissolved to total cadmium ratio in Linden Roselle plant effluent averaged only 0.25. Total and dissolved cadmium concentrations varied moderately within individual POTWs during the different sampling events. Neither the total or dissolved cadmium concentration appears to correlate with the seasons.

Lead **-** Figure 22b shows the total and dissolved lead concentrations in the effluents of the six large POTWs for the four normal flow sampling events. The individual metal concentrations are provided in Appendix H.

The mean total lead concentration in five of the six large POTWs ranged from a low of 1,454 ng/L for Joint Meeting to a high of 2,535 ng/L in the BCUA effluent, less than a 1.8 fold difference (Figure 22b). Meanwhile, the average total lead concentration in Middlesex County effluent was only 743 ng/L. The dissolved lead fraction in these effluents was substantially lower than that for cadmium, averaging from a low of 18% of total lead for Linden Roselle to a high of 40% for BCUA and Rahway Valley (Figure 22b). The mean dissolved to total cadmium ratio in the effluents of the large POTWs averaged only 0.33. Total and dissolved lead concentrations varied moderately within individual POTWs during the different sampling events. They did not appear to correlate with a specific season.

Mercury **-** Figure 22c shows the total and dissolved mercury concentrations in the effluents of the six large POTWs for the four normal flow sampling events. The individual metal concentrations are provided in Appendix H.

The mean total mercury concentrations in five of the six large POTWs ranged from a low of 8.3 ng/L for Middlesex County to 29.5 ng/L in BCUA effluent (Figure 22c). These averages are 2 to 6 times lower than the mean total mercury concentration in PVSC's effluent (55 ng/L). Dissolved mercury fractions in the effluents of the large POTWs generally averaged only about 28% of total, but exceeded 60% in the Middlesex County effluent. Like the other metals, total and dissolved mercury concentrations varied moderately within the individual POTWs among the different sampling events. The measured values do not appear to correlate with a specific season or precipitation event.

<u>Methylmercury</u> - Figure 22d shows the total and dissolved methylmercury concentrations in the effluents of the six large POTWs for four normal flow sampling events. The individual metal concentrations are provided in Appendix H.

Total methylmercury was measured in the effluents of the large POTWs only during sampling event #3. Values ranged from a low of 0.28 ng/L for the Rahway Valley effluent, to a high of 2.07 ng/L in Linden Roselle effluent, a factor of nearly 10 difference (Figure 22d). Dissolved methylmercury fractions were equally variable in these effluents, averaging 0.07 ng/L in Joint Meeting's effluent and 0.36 ng/L in PVSC's effluent. For event #3, percent dissolved methylmercury averaged 21% for all large POTWs, and ranged from a low of 8% for the Rahway Valley plant effluent to 42% for the Middlesex County effluent. Dissolved methylmercury concentrations varied moderately within individual POTWs among the different sampling events.

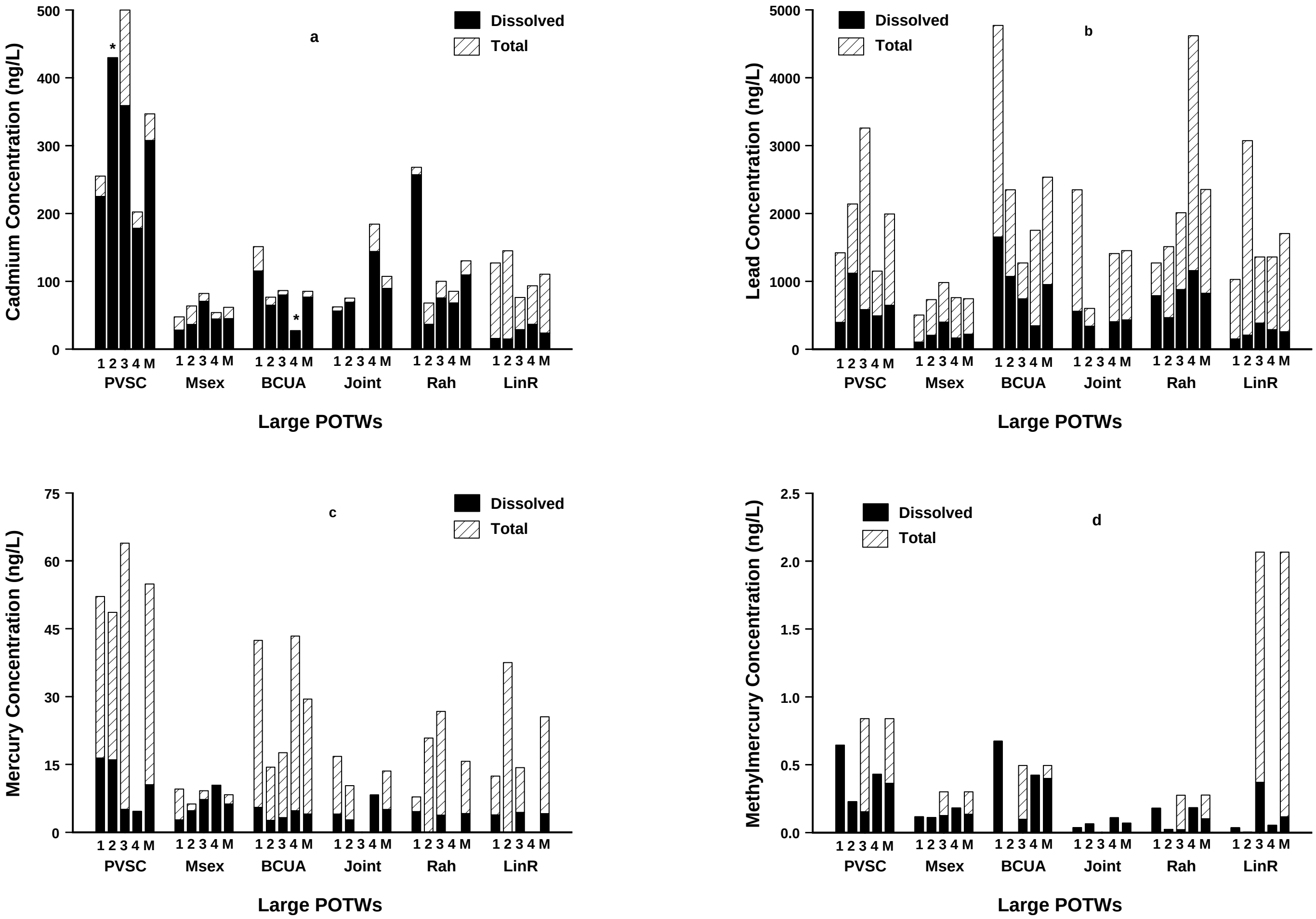


Figure 22. Normal flow metals concentrations (ng/L) in the effluent of the large POTWs during the four events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000; Event #3: 22-24 May 2001; Event #4: 7-9 August 2001. Cadmium (panel a), lead (panel b), mercury (panel c), and methylmercury (panel d). M = POTW data mean. * = dissolved result greater than total.

Small POTWs

Only one or two samples were collected from each of the small POTWs, so conclusions drawn from the data must be viewed with caution.

<u>Cadmium</u> -Figure 23a shows the total and dissolved cadmium concentrations in the effluents of the six small POTWs for the two sampling events. The individual metal concentrations are provided in Appendix H.

The mean total cadmium concentration in the effluents of three of the six small POTWs: N. Hudson-Hoboken, Secaucus, and Edgewater plants, ranged from a low of 44.0 ng/L to 71 ng/L, whereas the mean total cadmium concentration in the other three small POTWs (N. Bergen Woodcliff, N. Bergen Central, N. Hudson West New York) ranged from 125 ng/L to 207 ng/L (Figure 23a). With the exception of PVSC, these mean total cadmium concentrations do not differ substantially from those of the larger POTW effluents. Total and dissolved cadmium concentrations varied moderately within individual small POTW effluent samples during the two events. The mean dissolved cadmium fraction in the effluents of the small POTWs were slightly higher than was the case for the larger POTWs (88 percent of the total), but was less than 70% in four of the eleven small POTW samples.

<u>Lead</u> - Figure 23b shows the total and dissolved lead concentrations in the effluents of the six small POTWs for two sampling events. The individual metal concentrations are provided in Appendix H.

The mean total lead concentration in the effluents of the six small POTWs ranged from a low of 1,380 ng/L for the Edgewater plant to a high of 3,450 ng/L in the N. Bergen Central plant, about a 2.5 fold difference (Figure 23b). As with cadmium, the average total lead concentration in Secaucus and Edgewater effluents were lower than was the case for the other small POTWs. The dissolved lead fraction in the small POTW effluents was also substantially lower than was true for cadmium, and close to the overall average for the effluents of the large POTWs at 37%. The N. Hudson Hoboken effluent had the lowest dissolved to total lead ratio at 0.16, while the Edgewater effluent exhibited the highest at 0.65. Total and dissolved lead concentrations varied moderately within the individual small POTW effluents during the different events.

<u>Mercury</u> - Figure 23c shows the total and dissolved mercury concentrations in the effluents of the six small POTWs for the two sampling events. The individual metal concentrations are provided in Appendix H.

As was the case for the other metals (above), the mean total mercury concentration in the effluents from N. Bergen Woodcliff, N. Bergen Central, and N. Hudson West New York were 1.5 to 7.5 times higher than the averages for N. Hudson-Hoboken, Secaucus, and Edgewater, which ranged from only 9.9 ng/L in the Secaucus plant effluent to 26 ng/L in the N. Hudson Hoboken plant effluent. Effluent from the N. Bergen Central plant had the highest average total mercury concentration at 75 ng/L (Figure 23c), which exceeded that of PVSC’s effluent (Figure 23c). Like the large POTWs, the dissolved mercury fractions in small POTW effluents average only 25% of total, with a maximum in the N. Bergen Woodcliff effluent of 39%. Samples collected from the N. Bergen Central POTW showed the largest degree of variability.

Methylmercury - Figure 23d shows the total and dissolved methylmercury concentrations in the effluents of the six small POTWs for the normal flow sampling events. The individual metal concentrations are provided in Appendix H.

Total methylmercury was measured in the Edgewater effluent (0.436 ng/L) only during sampling event #3 (Figure 23d). Dissolved methylmercury values close to and considerably higher than this were measured in the effluents of the other small POTWs during sampling events #2 and #4. The N. Bergen Central and Woodcliff effluents contained the highest levels of dissolved methylmercury, averaging 0.93 and 0.63 ng/L, respectively (Figure 23d). In general, the dissolved methyl mercury concentrations in the effluents from the smaller POTWs were twice those found in the effluents of the large POTWs. Dissolved methylmercury concentrations varied moderately within the individual small POTWs among the different sampling events

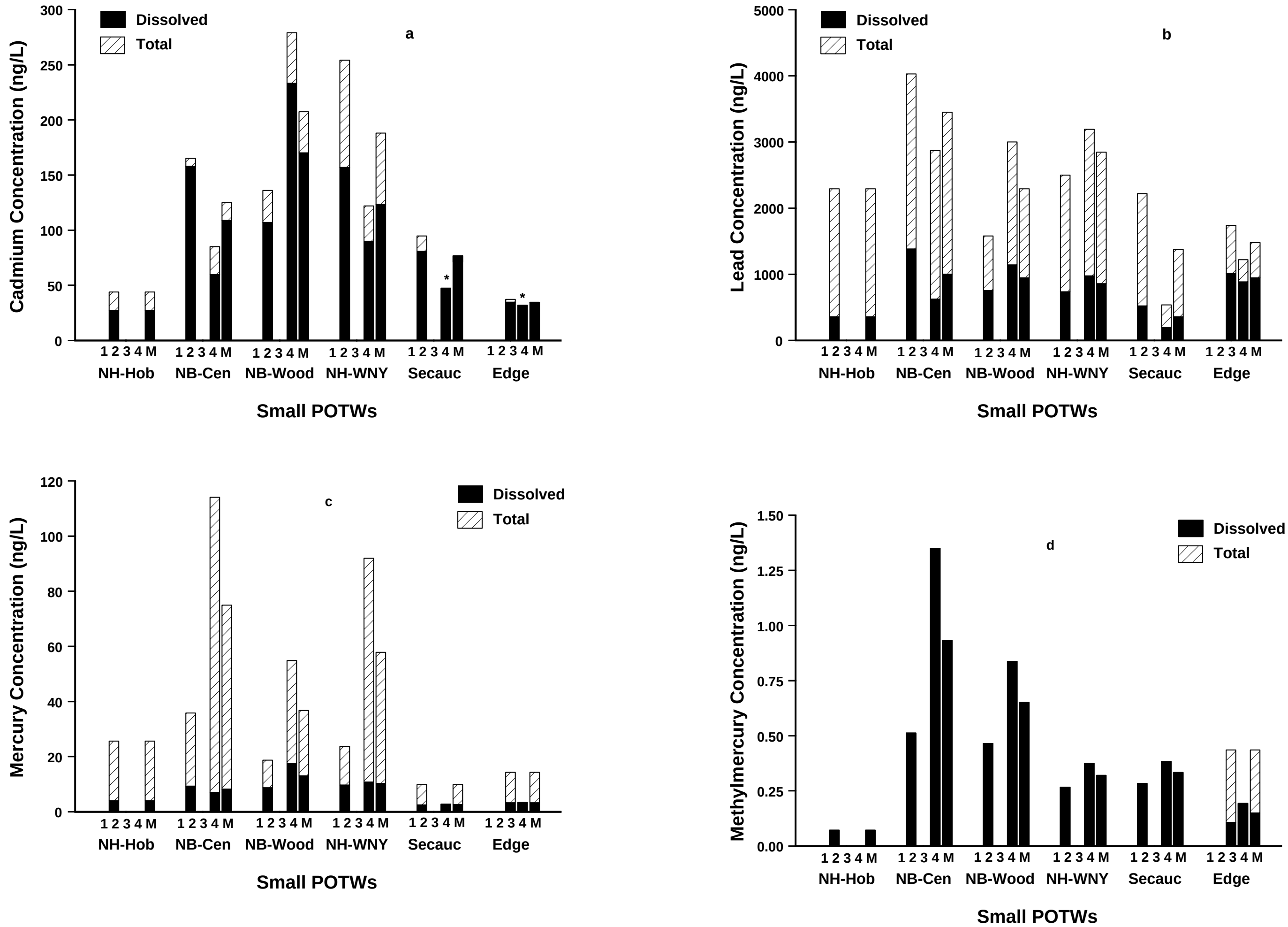


Figure 23. Normal flow metals concentrations (ng/L) in the effluent of the small POTWs during the normal flow sampling events: Event #1: 2-3 October 2000; Event #2: 12-14 December 2000; Event #3: 22-24 May 2001; Event #4: 7-9 August, 2001. Cadmium (panel a), lead (panel b), mercury (panel c), and methylmercury (panel d). M = POTW data mean. * = dissolved result greater than total.

CHEMICAL CONCENTRATIONS

TOC/DOC and SS

SWOs

Figure 24a shows the dissolved, particulate and total organic carbon concentrations in the discharges from the five SWOs for four precipitation events. Except for the large spike in TOC during sampling event #3 (characterized by only 0.22 inches of rain) at the Peripheral Ditch, TOC concentrations in the SWOs did not exceed 40 mg/L, and averaged 22, 22, 29, and 20 mg/L at the Blanchard St., Henley St., CCI, and Smith Marina SWOs, respectively. The TOC concentration in the Peripheral Ditch effluent averaged 157 mg/L, and was greatly elevated during event #3 due to a very high DOC concentration of 437.4 mg/L.

The measured TOC values do not appear to vary consistently with rainfall amount such that higher rainfall amounts always produce the most TOC, or vice versa. However, excluding the Peripheral Ditch, TOC can vary by as much as 3-fold between the different precipitation events, as indicated in Figure 24a.

The mean dissolved:total organic carbon ratios in the discharges from the SWOs ranged from an average of 0.16 for Smith Marina to 0.90 for the Peripheral Ditch. The dissolved:total organic carbon ratio in the SWO discharges as a group did not vary consistently with amount of precipitation. The overall dissolved:total organic carbon ratio for the SWO discharges (0.40) is about half that of the large and small POTW effluents (0.70 and 0.74, respectively).

The SS concentrations in the discharges from the SWOs were as variable as the organic carbon concentrations, as depicted in Figure 24b. The average SS values ranged from approximately 13 mg/L at the Peripheral Ditch to about 423 mg/L for the Smith Marina SWO. Concentrations of SS between sampling events varied by a factor of 3 (Peripheral Ditch) and 4 (CCI), up to a factor of 6 at Henley Road and Smith Marina, and a maximum value of 12 at the Blanchard St. SWO. The overall average $\pm$ standard deviation of the SS concentrations in the discharges from the SWOs was 169 $\pm$ 220 mg/L, which is 6 to 11 times higher than that of the large and small POTWs concentrations, respectively.

CSOs

Figure 25a shows the TOC concentration that was dissolved and in particulate form in the discharges from the nine CSOs for each of three sampling events. The TOC concentrations in the CSO discharges were less than 50 mg/L, with the exception of Rahway Outfall 003 during event # 4 (132 mg/L). Average TOC concentrations were 14, 12, 33, 17, 21, 36, 10, 88 and 24 mg/L for the Ivy St., Christie St., Court St., Elm St., Anderson St., West Side Rd., Livingston and Front Streets, Rahway Outfall 003 and Front St./Bay Way CSO discharges, respectively. Too little data exists at each site to determine the influence the magnitude of precipitation had, if any, on the TOC in the discharges from the CSOs.

The dissolved: total organic carbon ratios in the CSO discharges ranged from an average of 0.09 for the West Side Rd. CSO, to 0.60 for the Livingston/Front St. CSO. The overall dissolved:total organic carbon ratio for the CSO discharges (0.32) was similar to that for the SWOs (0.40), and about half that of the large and small POTW effluents (0.70 and 0.74, respectively).

The average SS concentrations in the discharges from the CSOs ranged from a low of 31 mg/L for the Livingston/Front St. CSO to 503 mg/L for the West Side Rd. CSO (Figure 25b). The overall average SS concentration in CSO discharges was 101 ± 125 mg/L, which was less than that for the SWO discharges (169 mg/L), but greater than that in both the large (29 mg/L) and small (15 mg/L) POTW effluents.

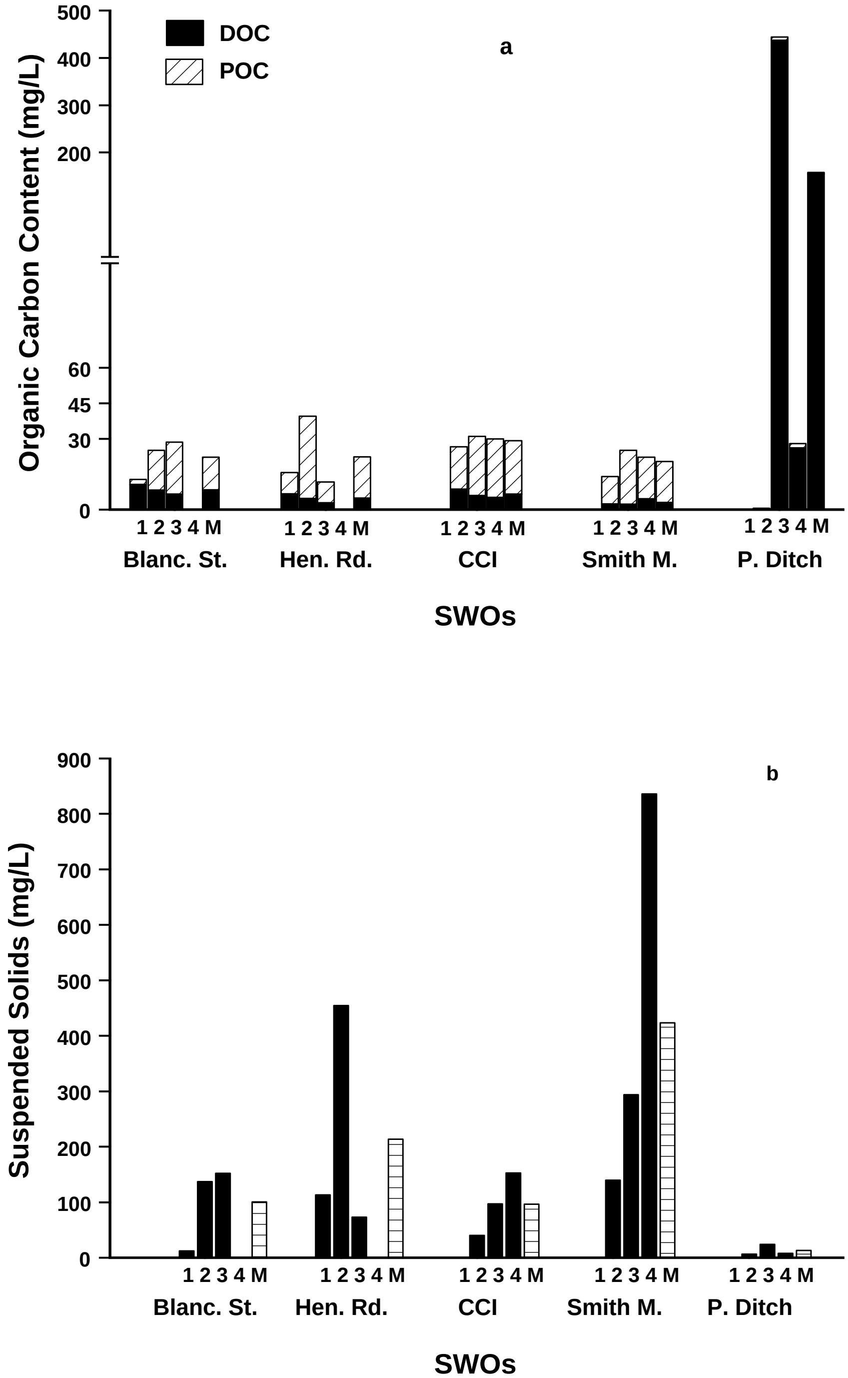


Figure 24. **Dissolved, particulate and estimated total organic carbon concentration (mg/L) in SWOs (panel a) and corresponding suspended solids concentrations (panel b) during each of four precipitation events: Event #1: 25-26 September 2001 (0.47 inches of rain); Event #2: 16-17 October 2002 (1.17 in. of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain). M = SWO data mean.**

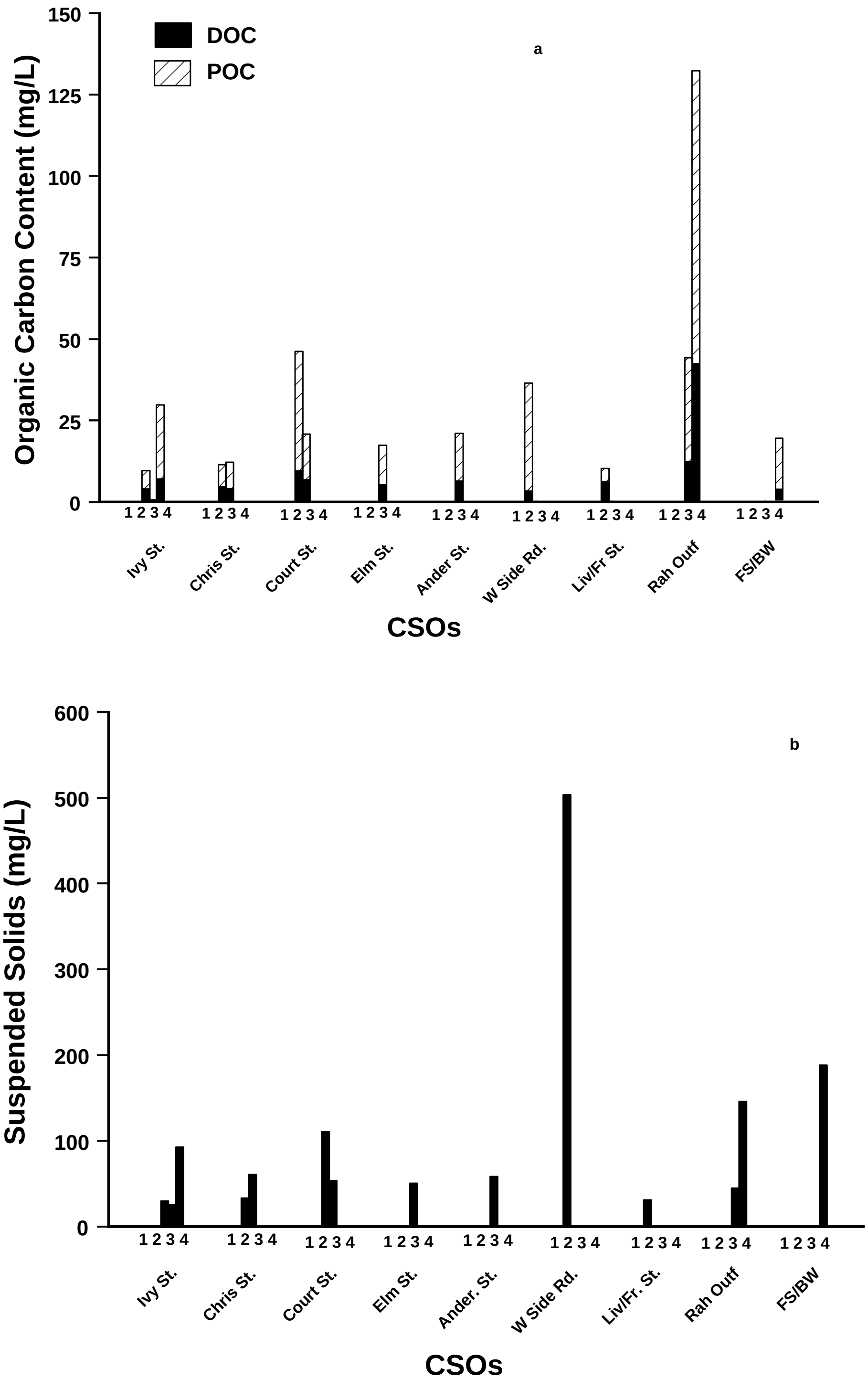


Figure 25. Dissolved, particulate and estimated total organic carbon concentration (mg/L) in CSOs (panel a) and corresponding suspended solids concentrations (panel b) during each of three precipitation events: Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).

PCBs

SWOs

Because of blank contamination during sample collection/processing, the SWO PCB data were rarely blank corrected (please see "blank correction" on page 40 for details on the procedure used to correct these data). Only one to four PCB congeners were censored from each SWO sample (a total of only 17 data points). PCB 3 was the congener most censored in 10 of the 15 SWO samples.

Figure 26 shows the total PCB concentrations in the five SWOs for four precipitation events. The individual PCB congener concentrations are presented in Appendix B.

Total PCB concentrations in the SWOs were less than 85,000 pg/L, with the exception of the Blanchard Street and Henley Road SWOs during event #2 (Figure 26). The largest mean total PCB concentrations were found at the Blanchard St. SWO (80,471 pg/L), and the smallest mean total PCB concentration was measured at the Peripheral Ditch SWO (Table 12). The total PCB concentrations for the Blanchard St., Smith Marina and Henley Rd. SWOs were positively correlated with increasing rainfall (r = 0.92 - 0.99). The remaining SWOs did not show this relationship.

Table 12. Mean Total PCB concentration of four sampling events at five SWOs.

SWO	Mean Total PCB (pg/L)
Blanchard Street	80,471
Henley Road	50,964
CCI	60,401
Smith Marina	39,533
Peripheral Ditch	29,431

Total PCB concentrations varied among precipitation events for a particular SWO by factors of 3 to 10, although this greater variability was only observed at the Blanchard St. (10) and Henley Rd. (8) SWOs. The total PCB concentrations for the other three SWOs varied by less than a factor of 6 (Figure 26).

Discharges from the SWOs, like the large and small POTWs, were dominated by PCBs containing four, five and six chlorine atoms (Figure 27). Overall, these three PCB homolog groups accounted for 74% of the mean total PCBs. Slight variations were observed in the PCB homolog distributions within a SWO, as well as among the SWOs. For example, the Blanchard St. SWO discharge was dominated by tetrachlorobiphehyls during event #3, pentachlorobiphenyls during event #1 and hexachlorobiphenyls during event #2. There was little intra-site variability in the samples from the CCI and Smith Marina SWOs. The pentachlorobiphenyls were usually found in the highest proportions, except at the Henley Road and Blanchard Street SWOs, where either tetra-, penta-, or hexachlorobiphenyls dominated (Figure 27).

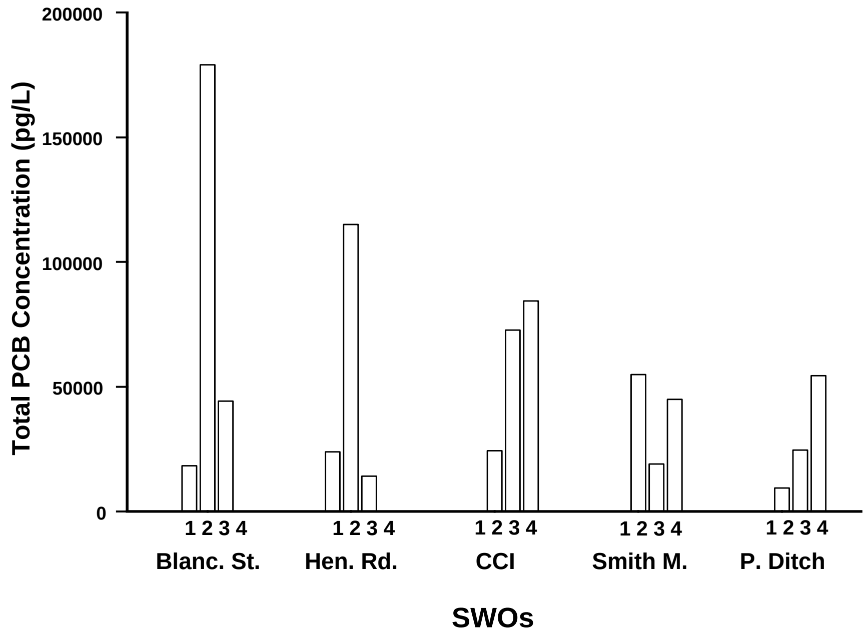


Figure 26. **Total PCB concentrations (pg/L) in discharges from SWOs during each of four precipitation events: Event #1: 25-26 September 2001 (0.47 inches of rain); Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).**

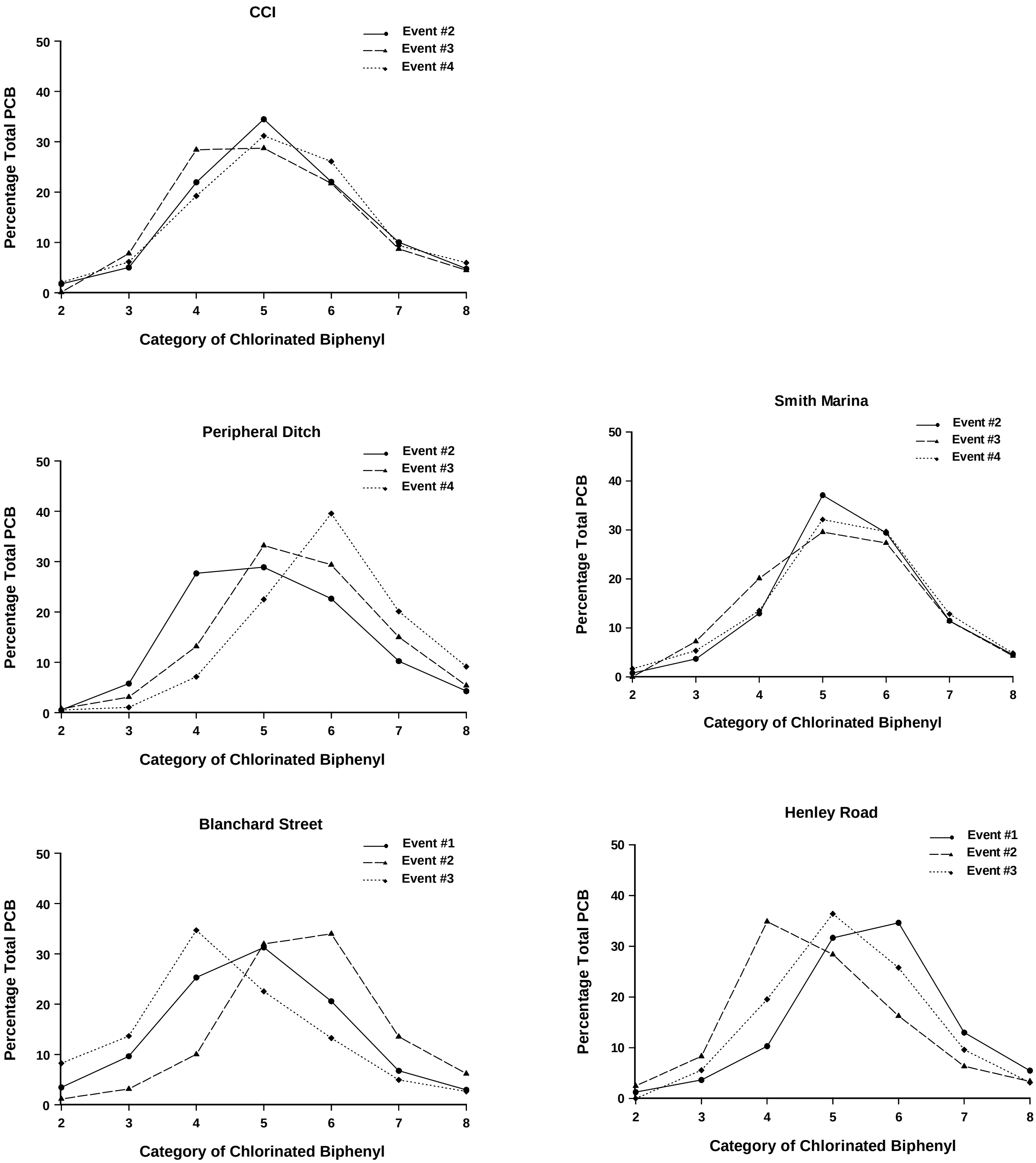


Figure 27. PCB congener distributions in SWOs during four precipitation events: Event #1: 25-26 September 2001 (0.47 inches of rain); Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).

Note: on the x-axis "2" is mono+di homolog and "8" is octa+nona+deca homologs.

CSOs

Because of blank contamination during sample collection/processing, the CSO PCB data were rarely blank corrected (please see "blank correction" on page 40 for details on the procedure used to correct these data). Only zero to three PCB congeners were censored from each CSO sample (a total of only 16 data points). PCB 3 was the congener most censored, in 10 of the 14 CSO samples.

Figure 28 shows the total PCB concentrations in the discharges from the nine CSOs for each of three precipitation events. The individual PCB congener concentrations are provided in Appendix B.

The total PCB concentrations in the discharges from the CSOs were less than 93,000 pg/L, with the exception of the Front Street/Bay Way CSO and the Ivy Street event #4 CSO (Figure 28). Excluding these two samples, total PCB concentrations ranged from 15,300 pg/L (Ivy Street event #2) to 92,888 pg/L (Court Street CSO event # 3). Too little data exist at each site to determine the influence of the magnitude of precipitation has, if any, on total PCBs in the discharges from the CSOs.

Total PCB concentration amongst precipitation events within a particular CSO for which there are sufficient data varied by a factor of one to nine. This variability was somewhat greater than that observed at the large and small POTWs, and comparable to the variability observed at the SWOs.

The discharges from the CSOs were dominated by PCBs containing four, five, six and seven chlorine atoms. Overall, these four PCB homolog groups accounted for 83.6% of the mean total PCBs. An exception to this trend is the Anderson St. CSO for precipitation event #3, in which the biphenyls containing eight (13.7%), nine (22.2%) and 10 (11.0%) chlorine atoms comprised a large percentage of the total PCB mass (Figure 29). The PCB profiles of the West Side Rd. CSO effluent also tended to be dominated by biphenyls with higher molecular weights, and consisted primarily of the penta- and hexa-chlorinated biphenyls. There was some variability in the percentage of penta-chlorinated PCBs between sampling events at the Ivy Street and Rahway Valley 003 CSOs. There was very little variability in the PCB profiles between sampling events at the Christie Street and Court Street CSOs.

Percentages of PCB 11 were typically very low (< 1%) in all of the CSO and SWO samples, except for the Blanchard Street SWO event #3 (4.3%) and event #1 (1.7%) samples. PCB 11 concentrations were more variable, but were less than 1,000 pg/L or not detected in all samples except for the Blanchard Street event #3 SWO (1,900 pg/L). Excluding PVSC and two of the MCUA samples, concentrations of PCB 11 in the large and small POTWs were similar to those observed in the CSOs and SWOs.

In summary, the NJTRWP blank correction procedures had minimal impacts on both CSO and SWO data. Except for a few instances, total PCB concentrations in both the SWO and CSO samples were less than 93,000 pg/L. The New Jersey human health water quality criteria for total PCBs is 64 pg/L and the saline aquatic chronic criteria is 30,000 pg/L. Comparing the overall mean SWO and CSO data, there was no difference in the mean total PCBs (SWO = 52,161 pg/L and CSO = 58,532 pg/L), nor in the mean PCB homolog profiles. Discharges from the SWOs and the CSOs, like the large and small POTWs, were dominated by PCBs containing four, five and six chlorine atoms.

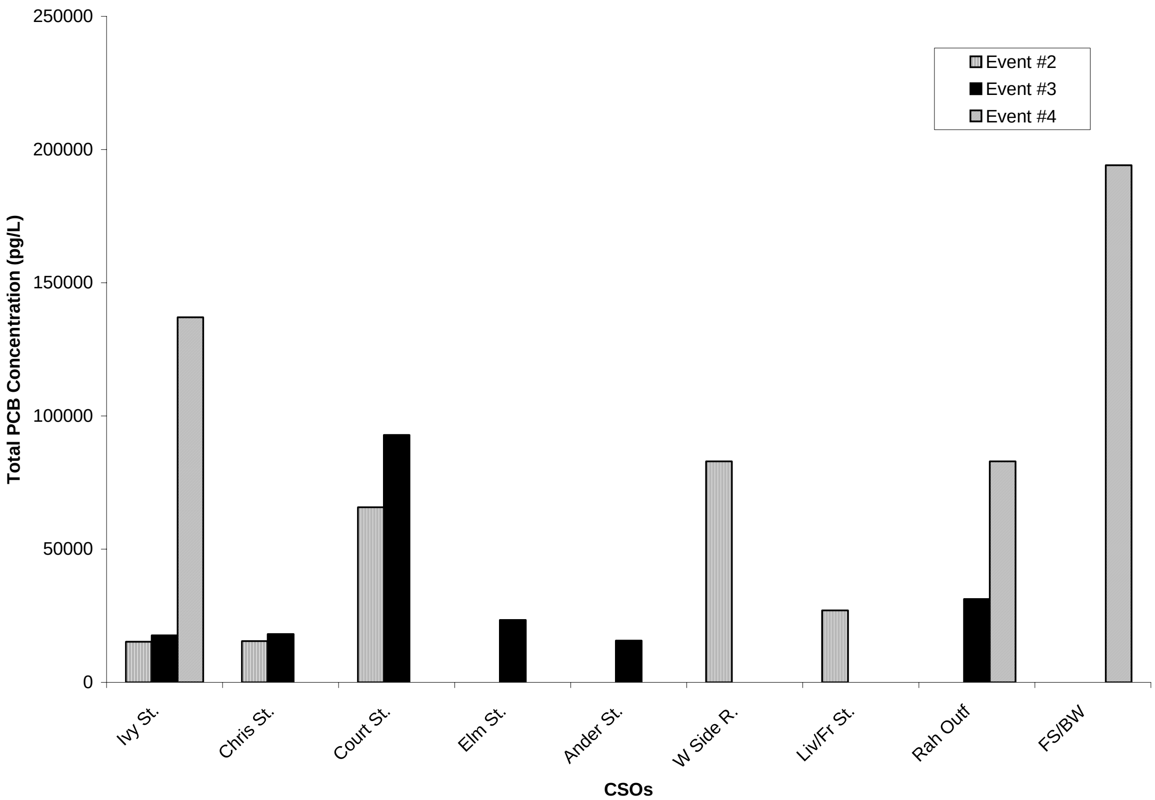


Figure 28. Total PCB concentrations (pg/L) in discharges from CSOs during each of three sampling events: Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).

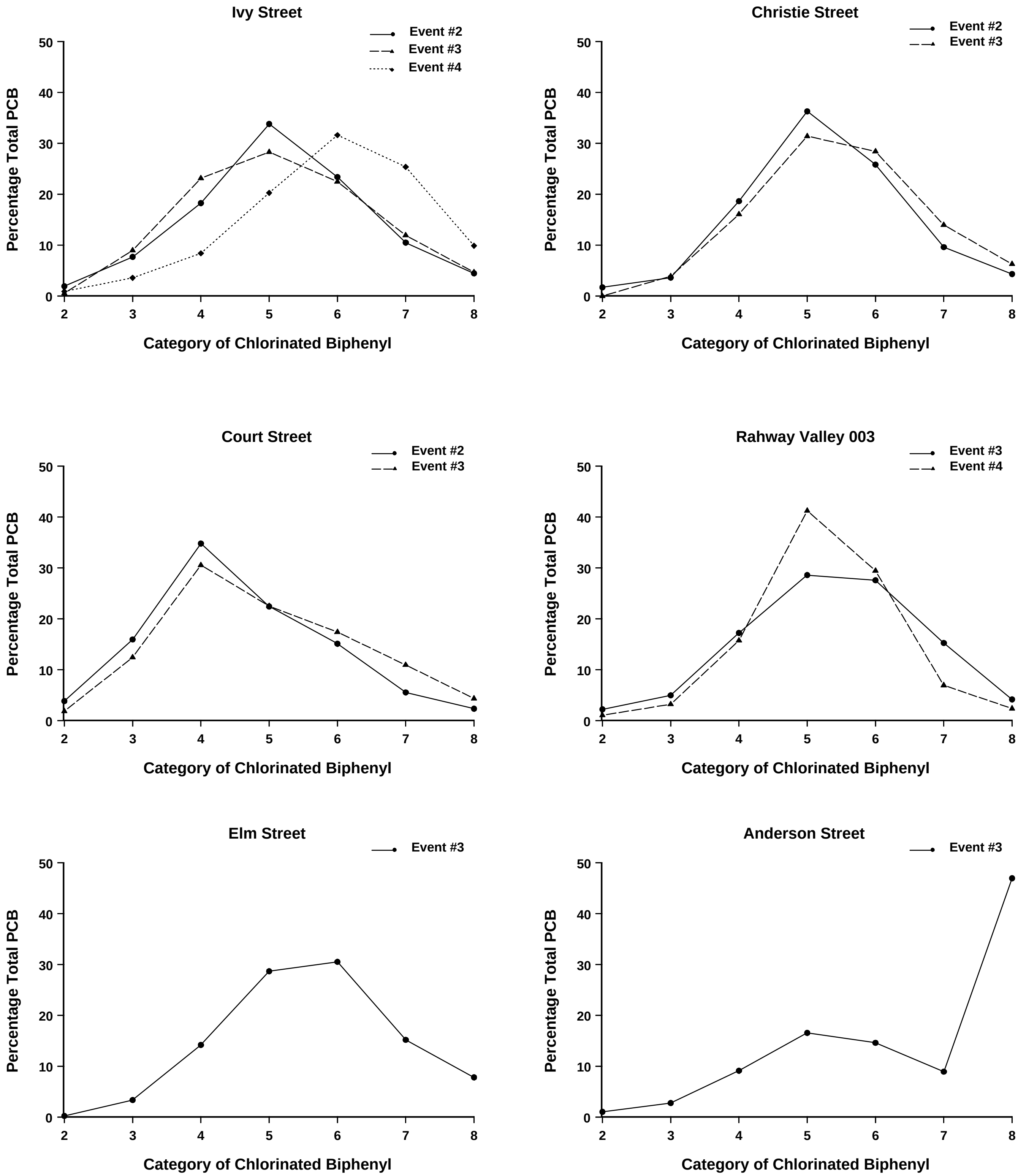


Figure 29. PCB congener distributions in CSOs during three precipitation events: Event #1: 25-26 September 2001 (0.47 inches of rain); Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).

Note: on the x-axis “2” is mono+di homolog and “8” is octa+nona+deca homologs.

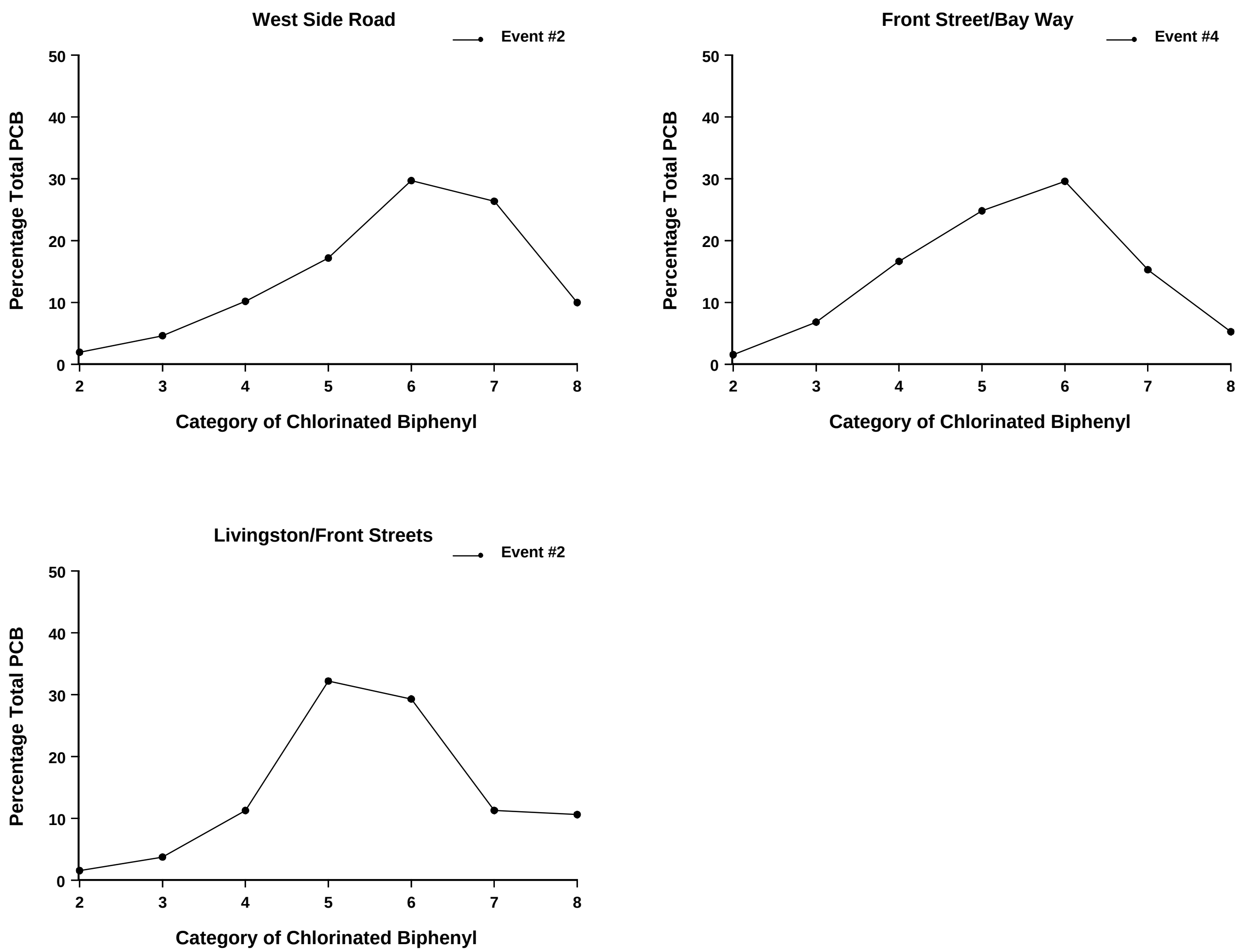


Figure 29 (continued). PCB congener distributions in CSOs during three precipitation events: Event #1: 25-26 September 2001 (0.47 inches of rain); Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).

Note: on the x-axis "2" is mono+di homolog and "8" is octa+nona+deca homologs.

PAHs

SWOs

Few SWO PAH data were blank corrected - zero to four target analytes per sample and a total of 24 data points (please see "blank correction" on page 40 for details on the procedure used to correct these data). Data from the Peripheral Ditch event #2 sample were most impacted by blank correction (11 target analytes). Data from Blanchard St. and Smith Marina were never impacted by the blank correction procedures, and only one target analyte was impacted in the three CCI samples. C-2 phenanthrenes/anthracenes (four samples; two Peripheral Ditch) and naphthalene (three samples; two Henley Rd.) were the PAH parameters most frequently censored.

Figure 30 shows the total PAH concentrations in the discharges from the five SWOs for four precipitation events. The individual PAH concentrations are provided in Appendix D.

The total PAH concentrations in the discharges from the SWOs were less than 30,000 ng/L, with the exception of 598,495 ng/L in the Blanchard St. SWO during event #2, and 103,328 ng/L in the Smith Marina SWO during event # 4 (Figure 30). Including this value at the Blanchard Street SWO, the total PAH concentration in the Blanchard St. SWO effluent averaged approximately 211,000 ng/L. This average total PAH concentration is nearly 23 times greater than that for the Peripheral Ditch (9,204 ng/L), 15 times greater than the average at the CCI (14,411 ng/L) and Henley Rd. (15,265 ng/L) SWOs, and four times the average at Smith Marina (50,295 ng/L). The total PAH concentration in most (31 of 35) of the POTW samples was less than 4,000 ng/L; in contrast, the total PAH concentration in most (10 of 15) of the SWO samples ranged between 7,500 and 28,000 ng/L.

Variability in total PAH concentration amongst sampling events at a SWO, reflected in the maximum:minimum value ratio, was large for the Blanchard St. (58) and Peripheral Ditch (37) SWOs. Variability was lower (maximum:minimum rations of 2.8 to 5.4) in the other SWOs. Similar variabilities (both large and small) were seen in the POTWs.

Discharges from the SWOs tend to be dominated by PAH compounds specific to that SWO (examples are shown in Figure 31 for event #2). However, the Blanchard St., CCI (event #2 sample only), and Smith Marina SWO effluents also contained relatively large proportions of the C2- and C3-naphthalenes, as well as the C1- and C2-Phenanthrene/Anthracenes (Figure 31), which indicates a PAH profile more petrogenic in its origin. The Henley Rd. and Peripheral Ditch SWOs, on the other hand, tended to be dominated by PAHs potentially more pyrogenic in origin (Figure 31). Noteworthy among the latter is the very high percentage of pyrene in the effluent from the Peripheral Ditch SWO during precipitation event #2 (Figure 31). Note that the PAH-specific profile of the Peripheral Ditch during precipitation event #3, however, is substantially different from event #2, and indicates the potential for extreme variability in these profiles from event-to-event (Figure 32). In general, while the PAH composition varied little between sampling events at the Henley Road and Smith Marina SWOs, variability in PAH composition was noticeable between sampling events at the other three SWOs.

The 19 PAHs included in the PAH profiles presented for these effluents account for 78 (Henley Rd. SWO) to 94 (Blanchard St. SWO) percent of the total PAH concentration measured in the effluents during the precipitation events.

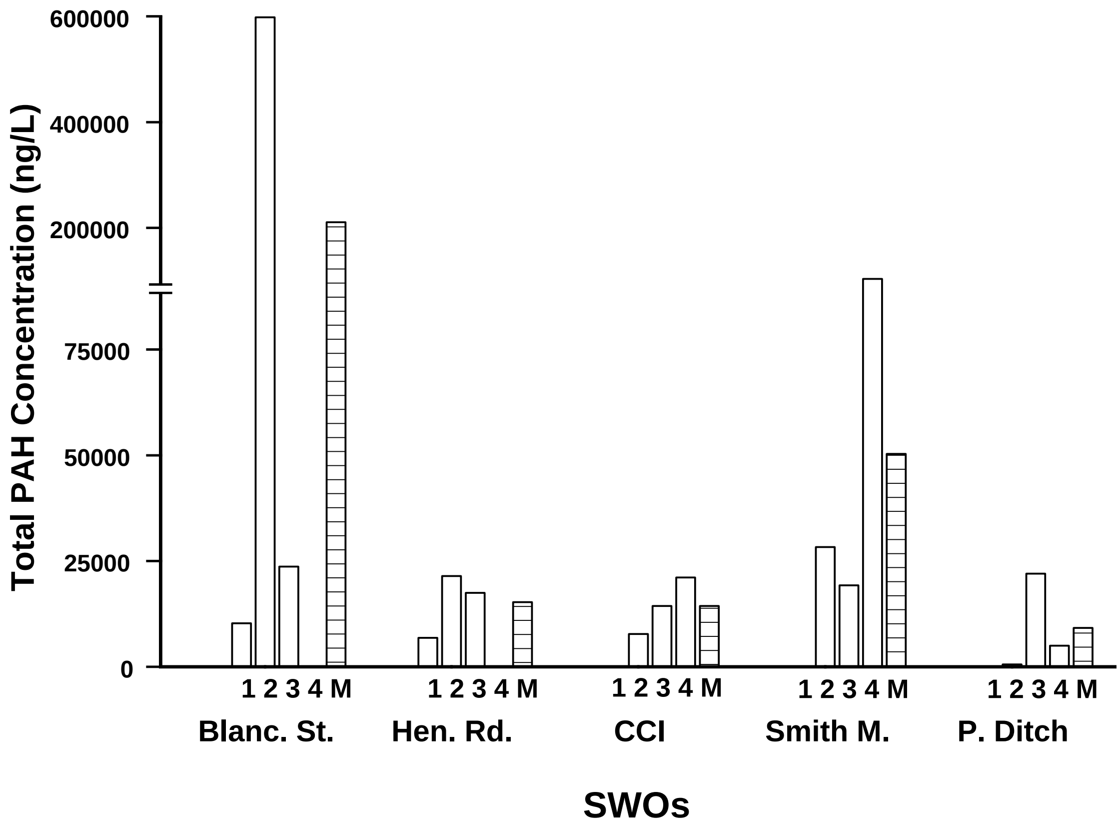
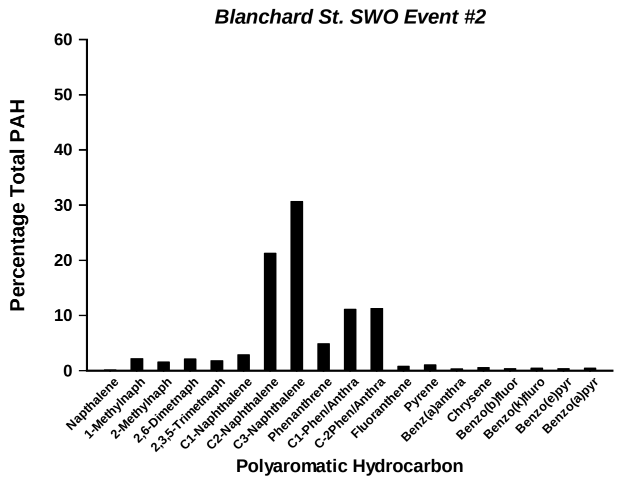


Figure 30. Total PAH concentrations (ng/L) in discharges from SWOs during each of four precipitation events: Event #1: 25 September 2001 (0.47 inches of rain); Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain). M = SWO data mean.



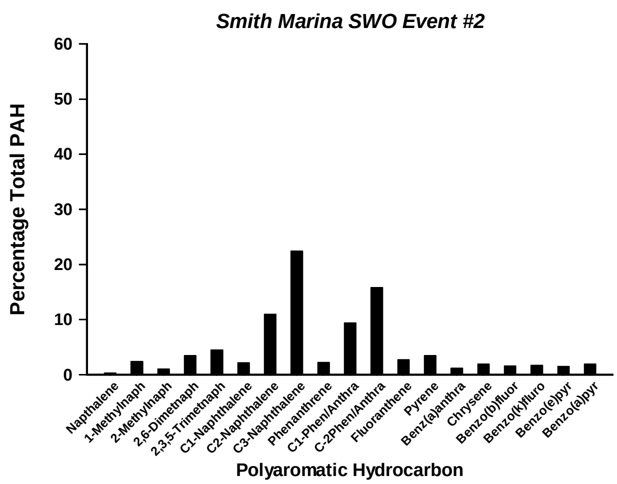
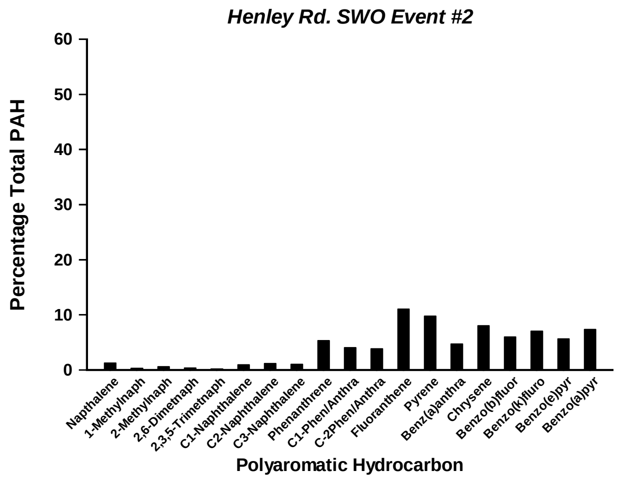
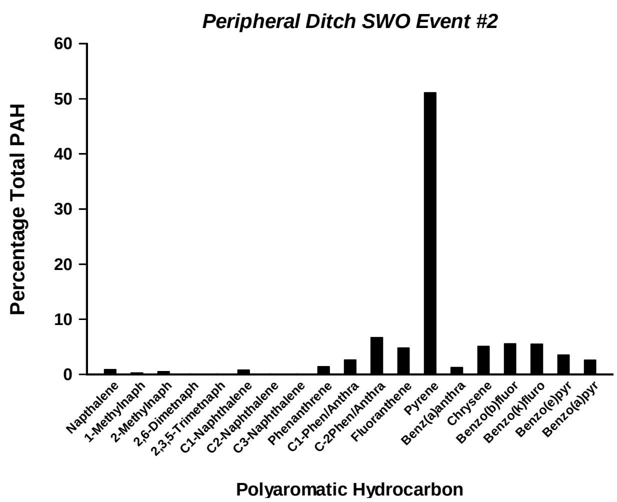


Figure 31. PAH-specific profiles (collectively by percentage total PAH) for SOWs during a high precipitation event.





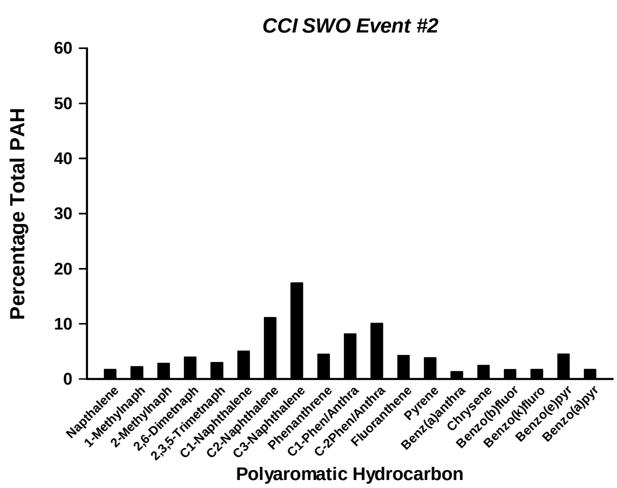
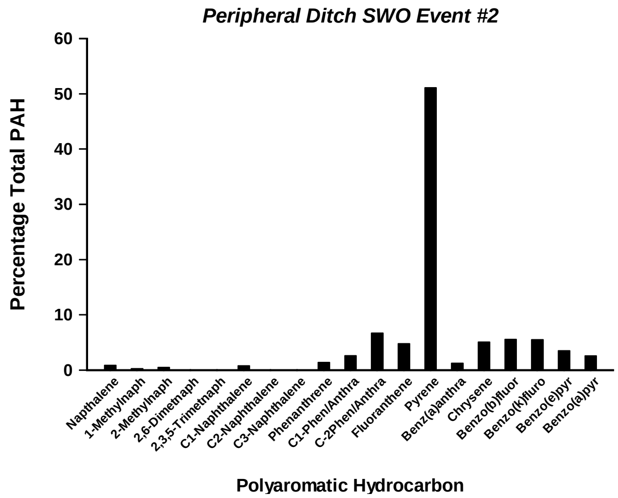


Figure 31 (continued). PAH-specific profiles (collectively by percentage total PAH) for SOWs during a high precipitation event.



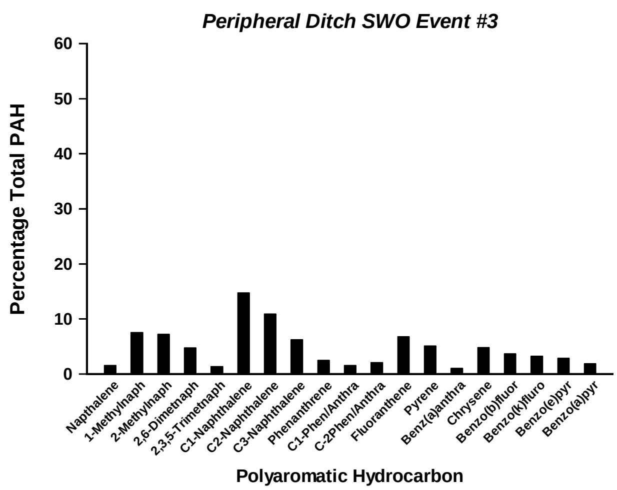


Figure 32. PAH profiles of the discharges from the Peripheral Ditch SWO during sampling events #2 (16-17 October 2002; 1.17 inches of rain) and #3 (11 April 2003; 0.22 inches of rain). Note: the event #4 (13 April 2004; 1.05 inches of rain) profile is similar to that for event #3.

CSOs

CSO data were minimally impacted by blank correction - zero to six analytes per sample, and a total of only 15 data points (please see "blank correction" on page 40 for details on the procedure used to correct these data). Data from the Christie Street event #3 samples were most impacted by blank contamination (six analytes), with the Elm Street CSO event #3 sample impacted for four analytes. No other samples were impacted for more than one analyte. No samples were impacted during event #4, and only 1 PAH parameter was censored during event #2 (Christie St.). Just as in the SWO data, the PAH parameter most impacted by blank correction was C2-phenanthrenes/anthracenes (in six of the 14 CSO samples).

Figure 33 shows the total PAH concentrations in the discharges from the nine CSOs for three sampling events. The individual PAH concentrations are provided in Appendix D.

Most of the CSO total PAH concentrations were less than 40,000 ng/L, with 11 of 14 samples ranging between 7,800 and 38,000 ng/L (Figure 33). This range is comparable to the concentrations found in most of the SWO samples (7,500 – 28,000 ng/L), but greater than the concentrations observed in most of the POTW samples (31 of 35 samples were less than 4,000 ng/L). A total PAH concentration of 138,000 ng/L was measured for the West Side Rd. CSO during precipitation event #2, and a total PAH concentration of 79,121 ng/L was measured at the Rahway Outfall 003 CSO during event #4. These values were substantially higher than all of the other measurements. Overall variability in the total PAH concentration amongst precipitation events within a particular CSO, reflected in the maximum:minimum value ratio, however, differed by factors of only 1.8 to 3.0, except at the Rahway Outfall 003 CSO (8.4).

Like the SWOs, discharges from the CSOs tend to be dominated by specific PAH compounds (examples are shown in Figure 34). The discharges from the Ivy St., Court St., Livingston and Front St., and Rahway Outfall 003 CSOs all exhibited PAH profiles with relatively large proportions (> 10%) of C1-, C2- and C3-naphthalenes; the Rahway Outfall 003 CSO also had the highest percentages (> 10%) of naphthalene and 1- and 2- methylnaphthalene. C1- and C2-phenanthrene/anthracenes were also elevated (> 5%) at these CSOs (except Rahway Outfall 003 - see Figure 34). This again indicates a PAH profile of petrogenic origin. The PAH profiles of the West Side Rd., Elm Street and Christie Street CSOs, however, are dominated by high MW PAHs (> 202 g/mole), particularly fluoranthene and pyrene. These three CSOs also had >5% of the lower MW compound phenanthrene. The Anderson Street and Front and Bayway CSO profiles (data not shown) were also dominated by the higher MW PAHs (including fluoranthene and pyrene), but had high percentages (>5%) of C1-, C2- and C3-naphthanenes and phenanthrene. The PAH-specific profile of the CSO discharges indicate less extreme variation in profile from one precipitation event to another compared to that observed for certain SWOs (for example, see Figure 35). Overall mean concentrations and standard deviations of the overall mean are similar for most compounds, but are greater in SWOs for C2- and C3- naphthalenes, phenanthrene and C1- and C2- phenanthrenes/anthracenes.

The 19 PAHs included in the PAH profiles presented for these CSO discharges account for 78 (West Side Rd. CSO) to 95 (Livingston and Front St. CSO) percent of the total PAH concentrations measured in the discharge during the precipitation events.

In summary, the SWO and CSO data were minimally impacted by the NJTRWP blank correction procedures. Except for a few instances, total PAH concentrations in both the SWO and CSO samples were less than 40,000 ng/L. Excluding the "high" concentration samples, the overall mean total PAH concentration at the SWOs (15,235 pg/L) was comparable to that for the CSO samples (14,512 ng/L). Discharges from the SWOs and CSOs tend to be dominated by PAH compounds specific to that location.

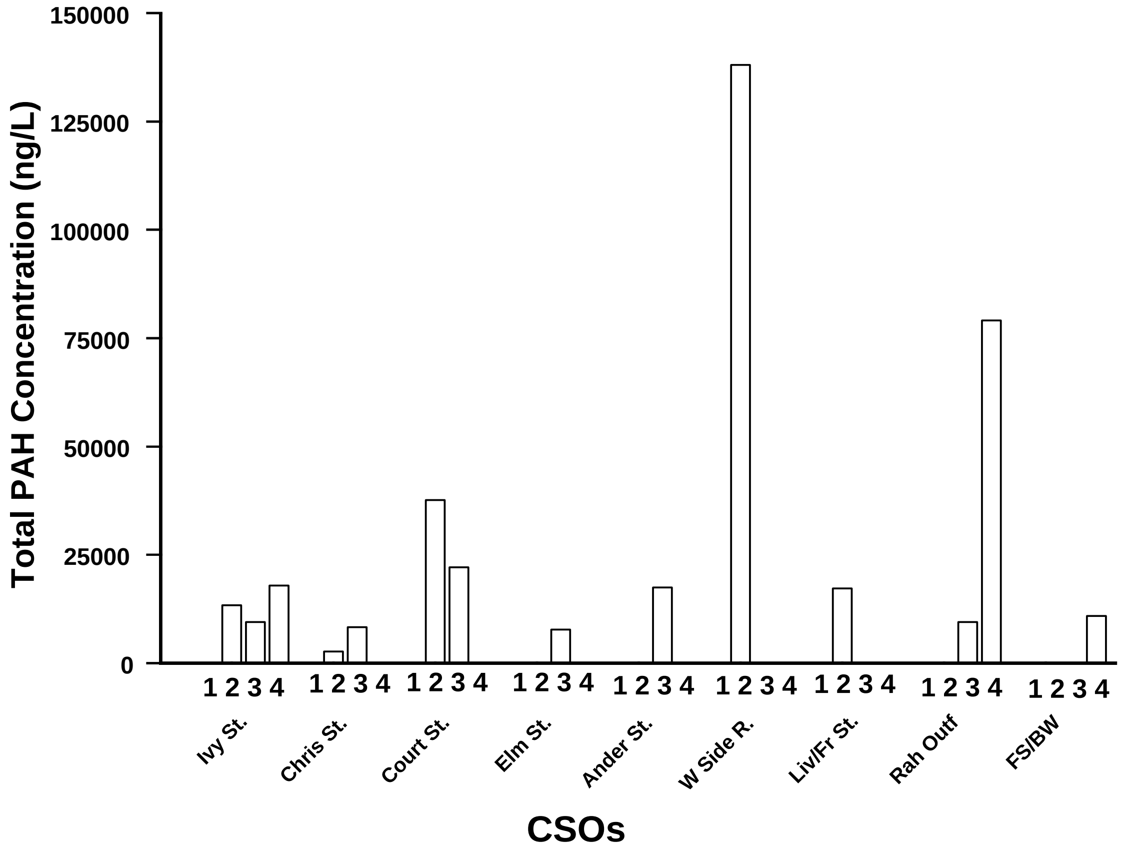


Figure 33. **Total PAH concentrations (ng/L) in the discharges from the CSOs during each of three precipitation events: Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).**

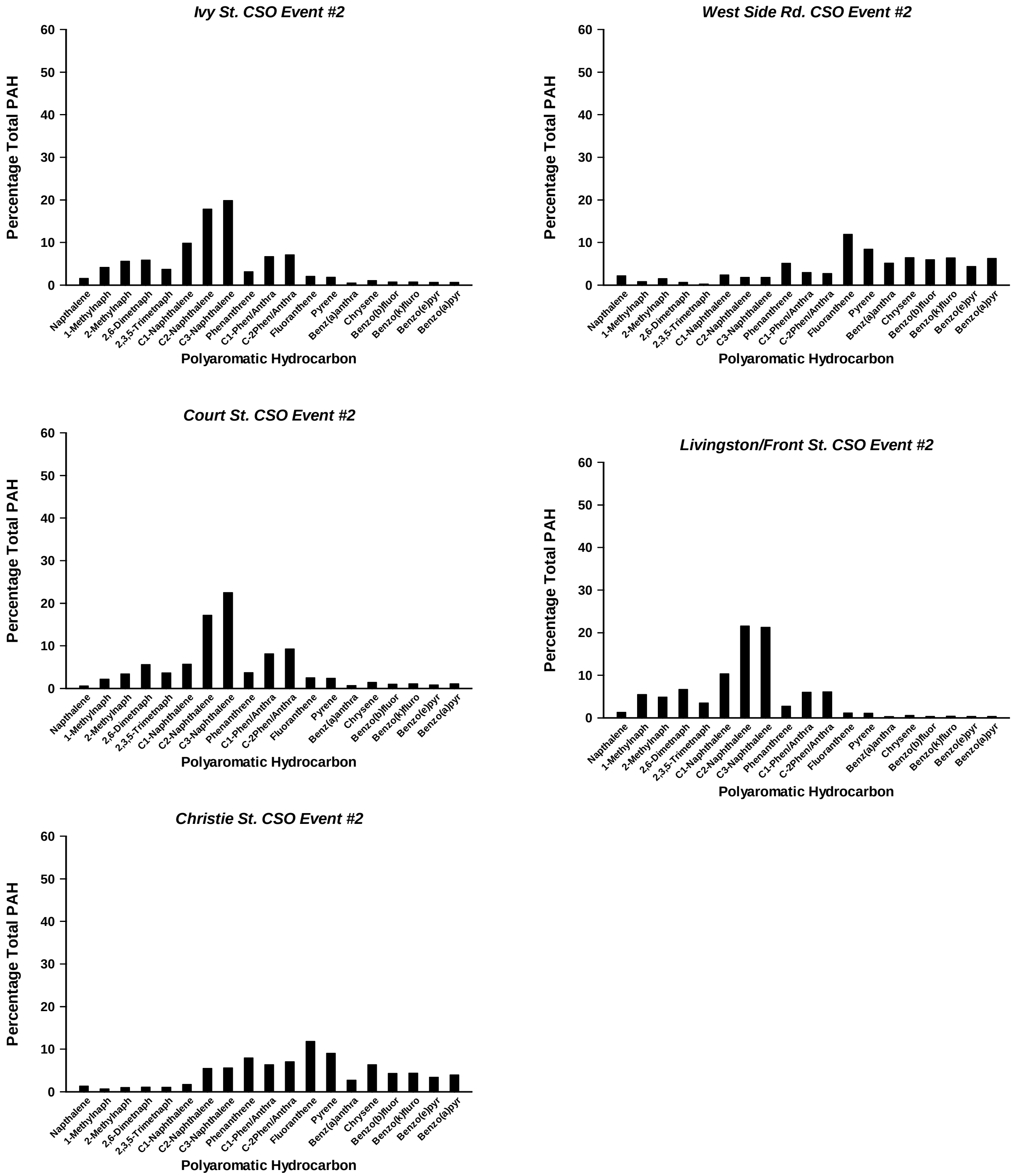


Figure 34. PAH-specific profiles (expressed as a percentage of the total PAH) for CSOs during precipitation Event #2.

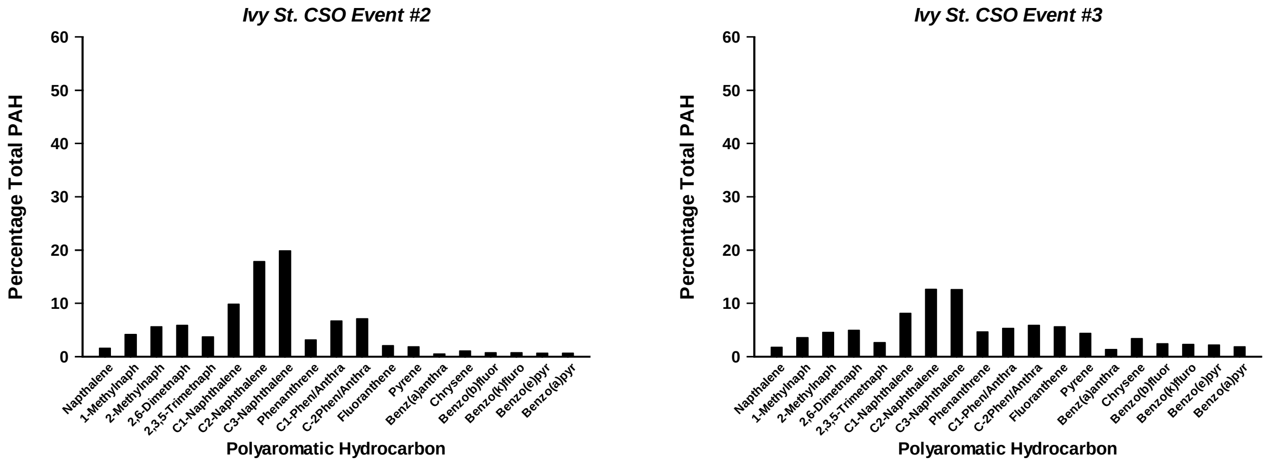


Figure 35. PAH profiles in Ivy St. CSO discharges during sampling events #2 (16-17 October 2002;1.17 inches of rain) and #3 (11 April 2003; 0.22 inches of rain).

CHLORINATED PESTICIDES

SWOs

Blank correction frequently impacted the SWO chlorinated pesticide data during all sampling events (please see "blank correction" on page 40 for details on the procedure used to correct these data). The SWOs most affected by blank correction were the Peripheral Ditch (10 - 11 analytes per sample) and Henley Road (6 - 7 analytes per sample). The target analytes most frequently censored by blank correction, and number of samples impacted (n = 15) include: Mirex (14), gamma-BHC (12), and delta-BHC (11). Heptachlor (6), Aldrin (6), Endosulfan sulfate (8) and Methoxychlor (7) were also frequently censored. However, note that the pesticide target analytes identified as "contaminants of concern" by the NY-NJ HEP were rarely impacted by blank contamination.

A second problem affecting the SWO pesticides data was associated with the frequent non-detection of some target analytes. These included alpha-endosulfan (10 of 15 samples), endrin (14), endrin aldehyde (14) and endrin ketone (10). Except for oxy-Chlordane in 5 samples, the pesticide target analytes identified as "contaminants of concern" by the NY-NJ HEP were consistently detected.

The combination of blank correction and non-detects resulted in little, if any, useable data for the following pesticides: gamma- and delta- BHC, alpha-endosulfan, endrin, endrin aldehyde, endrin ketone, methoxychlor and mirex. The data for the pesticide target analytes identified as "contaminants of concern" by the NY-NJ HEP were useable in almost every sample.

Figure 36 shows the total chlorinated pesticide concentrations in the discharges from the five SWOs for three events. The individual pesticide concentrations are summarized in Appendix E.

The total chlorinated pesticide concentrations in the discharges from the SWOs average 55,853, 168,306, 48,100, 75,193, and 3,598 pg/L for Blanchard St., Henley Rd., CCI, Smith Marina and the Peripheral Ditch, respectively (Figure 36). The overall mean total chlorinated pesticide concentration in the SWO discharges (70,167 pg/L) is 3 to 4 times higher than was observed for the large and small POTWs. However, note that the average total pesticide concentration for the Henley Rd. SWO (168,306 pg/L) was nearly 2.5 times greater than the overall SWO mean (and approximately 8 to 10 times higher than measured for the POTWs), while the average total pesticide concentration for the Peripheral Ditch SWO (3,598 pg/L) was 19.5 times lower than the overall SWO mean (and approximately 4.5-6 times lower than for the POTWs).

Variability in total pesticide concentration between sampling events within a particular SWO, as reflected in the maximum:minimum ratio, was greatest at the Blanchard St. SWO (5.4), with lower ratios at Henley Road (4.4) and CCI (4.2). Variability was lowest for the Smith Marina (1.6) and Peripheral Ditch (1.2) SWOs.

Unlike the POTW effluents where lindane (gamma-BHC) contributed significantly to the total pesticide concentrations in nearly all of the large POTWs, the contribution of this pesticide in the SWO discharges was relatively minor (Figure 37). As noted above, this was due to blank correction in 12 of the 15 SWO samples.

The chlordanes cis- and trans-chlordane, and cis-and trans-nonachlor, were prevalent in most (12-14) of the SWO samples, while oxy-chlordane was not detected in 5 samples (2 samples each at Blanchard Street and the Peripheral Ditch and once at the CCI SWO). Mean total chlordane concentrations and mean percent composition varied considerably among the five SWOs, ranging from a low of 147 pg/L - 3.6% at the Peripheral Ditch to a high of 171,000 pg/L - 59% at Henley Road.

Useable dieldrin data was obtained in all but one sample (Blanchard Street event #1). Mean concentrations ranged from a low of about 1,560 pg/L at CCI and Smith Marina, to a high of 12,310 pg/L at Henley Road. Dieldrin (1,830 pg/L) dominated the pesticides at the Peripheral Ditch CSO - 51.2% of the total, and comprised 7.0% of the pesticides at Henley Road, but was only 1.9 - 3.6% of the pesticides at the other SWOs.

The most obvious difference in the SWO pesticide profiles compared to those of the POTWs was the more significant percentages of DDT, DDE and DDD (i.e., total DDT) present in the discharges from the SWOs (Figure 37). Mean total DDT concentration and mean percent composition was lowest at the Peripheral Ditch (663 pg/L, 17.5%). While mean total DDT concentrations were similar at the other stations (23,600 - 46,750 pg/L), these pesticides dominated at Blanchard St. (64.7%) and CCI (50.1%), and were a significant component at Smith Marina (34.3%).

The 16 chlorinated pesticides included in the pesticide profiles presented for the SWO effluents account for greater than 90 percent of the total pesticide concentration measured for each precipitation event. To summarize, the following pesticides dominated the percentage composition at the SWOs as follows:

- Henley Road - total chlordane (61.5%) and total DDT (26.3%)
- Blanchard Street - total DDT (64.7%) and total chlordane (11.3%)
- CCI - total DDT (50.1%) and total chlordane (34.5%)
- Smith Marina - total chlordane (52.5%) and total DDT (34.2%)
- Peripheral Ditch - dieldrin (51.2%) and total DDT (17.5%)

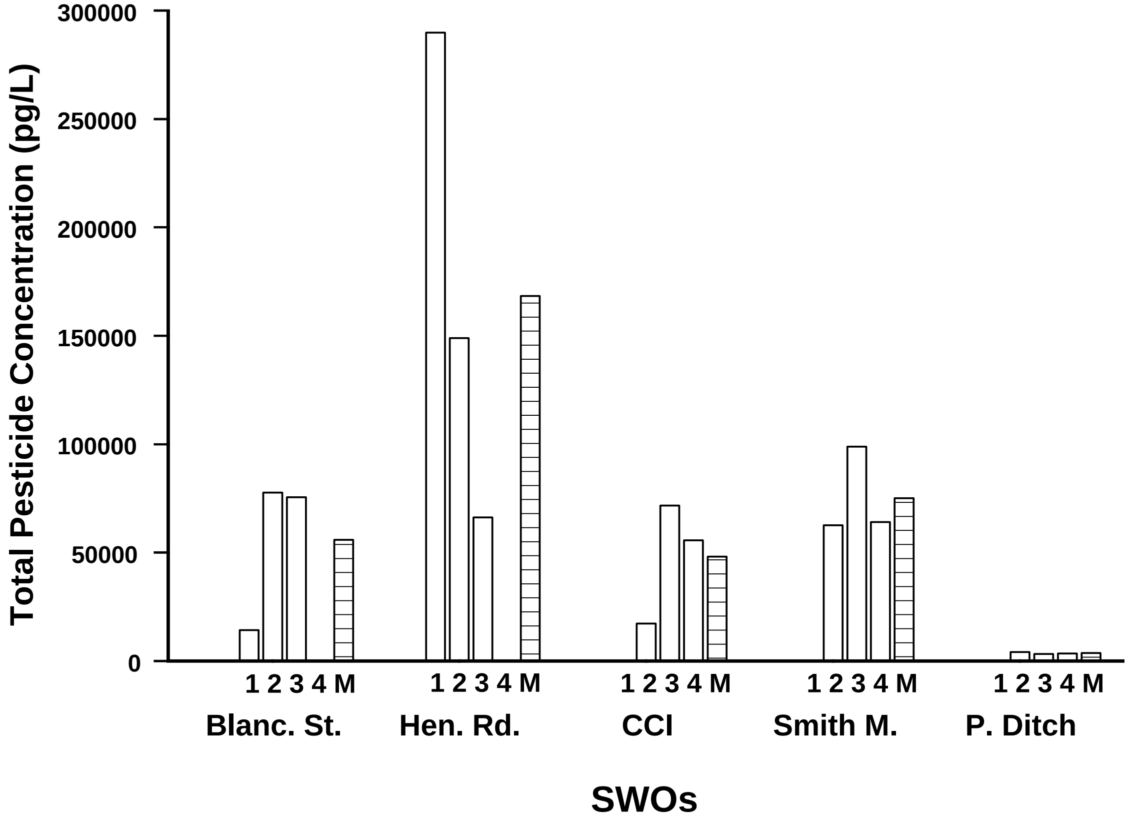


Figure 36. Total chlorinated pesticide concentrations (pg/L) in discharges from SWOs during each of four events. Event #1: 25-26 September 2001 (0.47 inches of rain); Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain). M = SWO data mean.

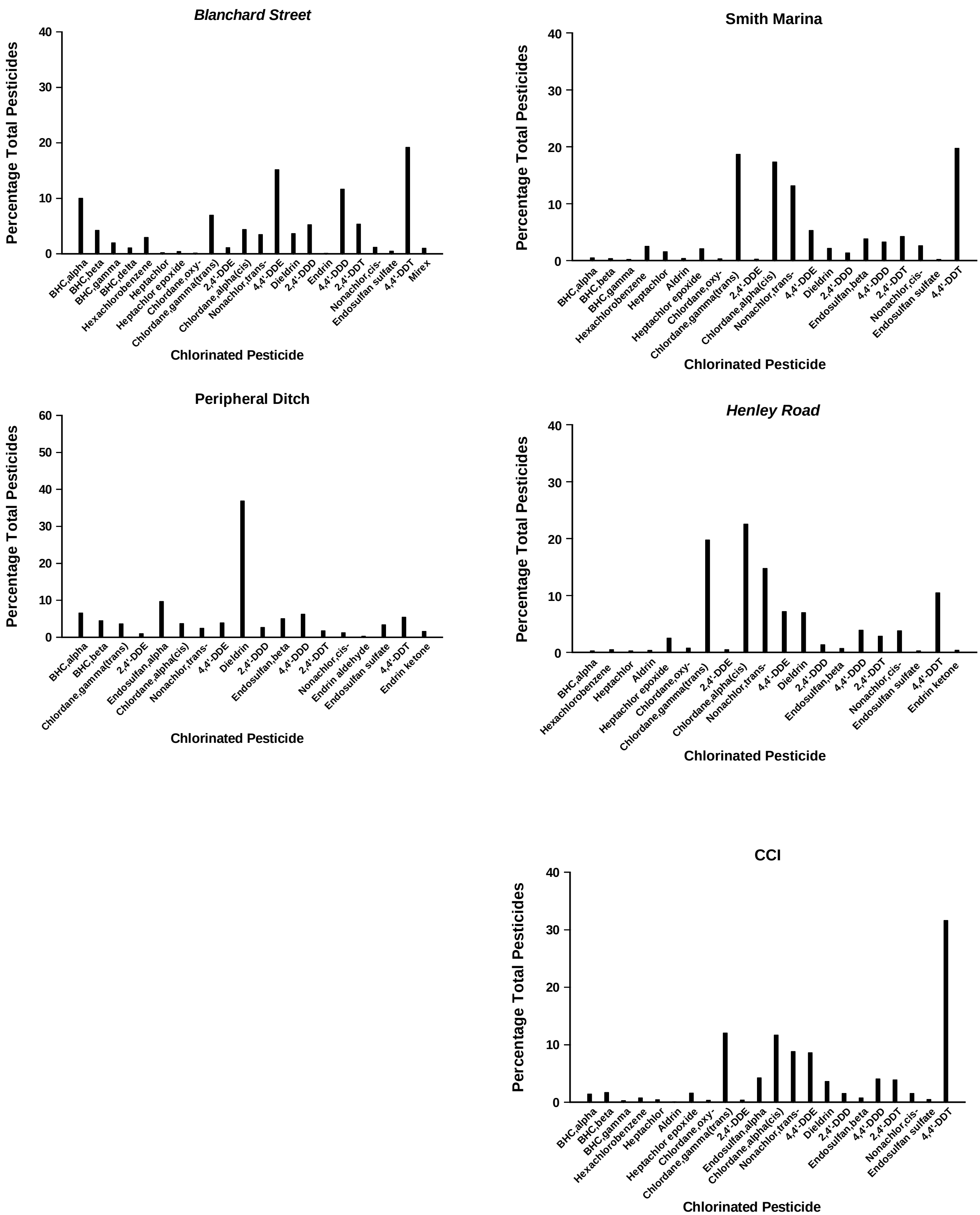


Figure 37. Average percent chlorinated pesticide composition (expressed as a percentage of the total pesticide concentration) for SWOs during four precipitation events.

CSOs

Blank correction of the CSO chlorinated pesticide data frequently affected particular target analytes at all CSOs during all sampling events (please see "blank correction" on page 40 for details on the procedure used to correct these data). Target analytes most frequently censored by blank correction include delta-BHC, alpha-endosulfan, endrin aldehyde and methoxychlor. In addition, gamma-BHC (10 samples), endosulfan sulfate (11), hexachlorobenzene (8), and mirex (12) were frequently impacted. Blank correction affected 3-8 pesticide target analytes in each sample.

Non-detection of the pesticide target analytes occurred rarely in the CSO samples, with the exception of endrin (9 of 14 samples). The pesticide target analytes identified as "contaminants of concern" by the NY-NJ HEP were consistently detected in all of the CSO samples.

The combination of blank correction and non-detects resulted in little, if any, useable data for the following pesticides: gamma- and delta- BHC, alpha-endosulfan, endrin, endrin aldehyde, endosulfan sulfate, methoxychlor and mirex. These were essentially the same target analytes affected in the SWO samples. The data for the pesticide target analytes identified as "contaminants of concern" by the NY-NJ HEP were useable in every sample.

Figure 38 shows the total chlorinated pesticide concentrations in the discharges from the nine CSOs for three precipitation events. The individual pesticide concentrations and relative percentages of the total pesticides are summarized in Appendix E.

The total chlorinated pesticide concentration in the discharges from the CSOs (overall average of 78,628 pg/L) is not substantially different from the concentration measured in the SWOs (overall average of 70,167 pg/L), and is 3 to 4 times higher than that of the large and small POTWs, respectively. CSO discharges for a single sampling event ranged from a low of 25,661 pg/L for the Livingston and Front St. CSOs during event #2, to a high of 226,151 pg/L for the Rahway Outfall 003 CSO during event #4 (Figure 38). The elevated average total pesticide concentration at Rahway Outfall 003 (215,933 pg/L) is three to five times higher than all the other CSOs except the West Side Road CSO (120,442 pg/L, 1.8X) and Livingston and Front Streets (25,661 pg/L, 8.5X).

Variability in total pesticide concentration between sampling events for particular CSOs, as reflected in the maximum:minimum ratio, was low for the Ivy St., Court St., Christie St. and Rahway Outfall CSOs, which all differed by a factor of less than 1.7.

Unlike the POTW effluents where lindane (gamma-BHC) contributed significantly to the total pesticide concentrations in nearly all of the large POTWs, its contribution in the CSO discharges (as in the SWOs) was relatively minor (Figure 39). As noted above, this was due to blank correction in 10 of the 14 CSO samples.

Similar to the POTW and SWO effluents, the chlordanes cis- and trans-chlordane, and cis- and trans-nonachlor, were prevalent in all of the CSO samples, while oxy-chlordane was found at only low levels.   Mean total chlordane concentrations varied considerably among the CSOs, ranging from a low of 9,704 pg/L at Livingston and Front Streets to a high of 177,881 pg/L at Rahway Outfall 003. Total chlordanes accounted for 36.2 - 78.7% of the total pesticides in the

CSO samples. Mean percentage composition due to chlordanes was lowest at a number of the CSOs (36.2-37.8%), and was highest at the Rahway Outfall 003 CSO (74.1%).

Useable dieldrin data was obtained in all but one sample (Court Street event #3). Mean concentrations ranged from a low of 1,165 pg/L at the Front Street and Bay Way CSO, to a high of 24,854 pg/L at Rahway Outfall 003. Dieldrin was a major component of the total pesticides at the Christie Street CSO - 25.1% of the total (18,775 pg/L), and comprised > 11.5% of the pesticides at the Rahway Outfall 003, Elm Street, and Anderson Street CSOs. However, dieldrin was only 2.4-9.6% of the pesticides at the other CSOs. The highest concentration of dieldrin in the SWO samples was about 78% of that observed in the highest CSO sample.

The most obvious difference in the CSO pesticide profiles compared to those of the POTWs was the more significant percentages of DDT, DDE and DDD (i.e., total DDT) present in the discharges from most of the CSOs (Figure 39). Mean total DDT concentration and mean percent composition were lowest at the Rahway Outfall 003 CSO (7,512 pg/L; 3.5%); mean percent total DDT ranged between 17.2 and 52.4% at the other stations (9,028 - 38,353 pg/L). Total DDT dominated at Front Street and Bay Way (52.4%), Livingston and Front Street (41.2%) and Ivy Street (39.5%), and was a significant component at West Side Road (31.8%), Court Street (24.4%), Elm Street (28.5%), and Anderson Street (24.7%). Total DDT concentrations were overall more elevated in SWO samples compared to CSO samples.

The 16 chlorinated pesticides included in the pesticide profiles presented for these effluents account for greater than 90 percent of the total pesticide concentration measured in CSOs during each precipitation event. To summarize, the following pesticides dominated the percentage composition at the CSOs as follows:

- West Side Road - total chlordanes (56.7%) and total DDTs (31.8%)
- Ivy Street - total DDTs (39.5%) and total chlordanes (37.5%)
- Livingston and Front Streets - total DDTs (41.2%) and total chlordanes (37.8%)
- Court Street - total chlordanes (57.6%) and total DDTs (24.4%)
- Christie Street - total chlordanes (48.5%) and dieldrin (25.1%)
- Rahway Outfall 003 - total chlordanes (74.1%)
- Elm Street - total chlordanes (47.4%) and total DDTs (28.5%)
- Anderson Street - total chlordanes (54.9%) and total DDTs (24.7%)
- Front Street and Bay Way - total DDTs (52.4%) and total chlordanes (36.2%)

In summary, the pesticide target analytes identified as "contaminants of concern" by the NY-NJ HEP were consistently detected and rarely impacted by blank contamination in both the SWO and CSO samples. Except for a few instances, total pesticide concentrations in both the SWO and CSO samples were less than 80,000 pg/L. Excluding these "high" concentration samples, and the very low concentrations found in the Peripheral Ditch SWO samples, the overall mean total pesticide concentration at the SWOs (56,019 pg/L) was comparable to that for the CSO samples (49,863). Discharges from the SWOs and CSOs tend to be dominated by various chlordane and/or DDT compounds; dieldrin was a significant component only at the Peripheral Ditch SWO and Christie Street CSO.

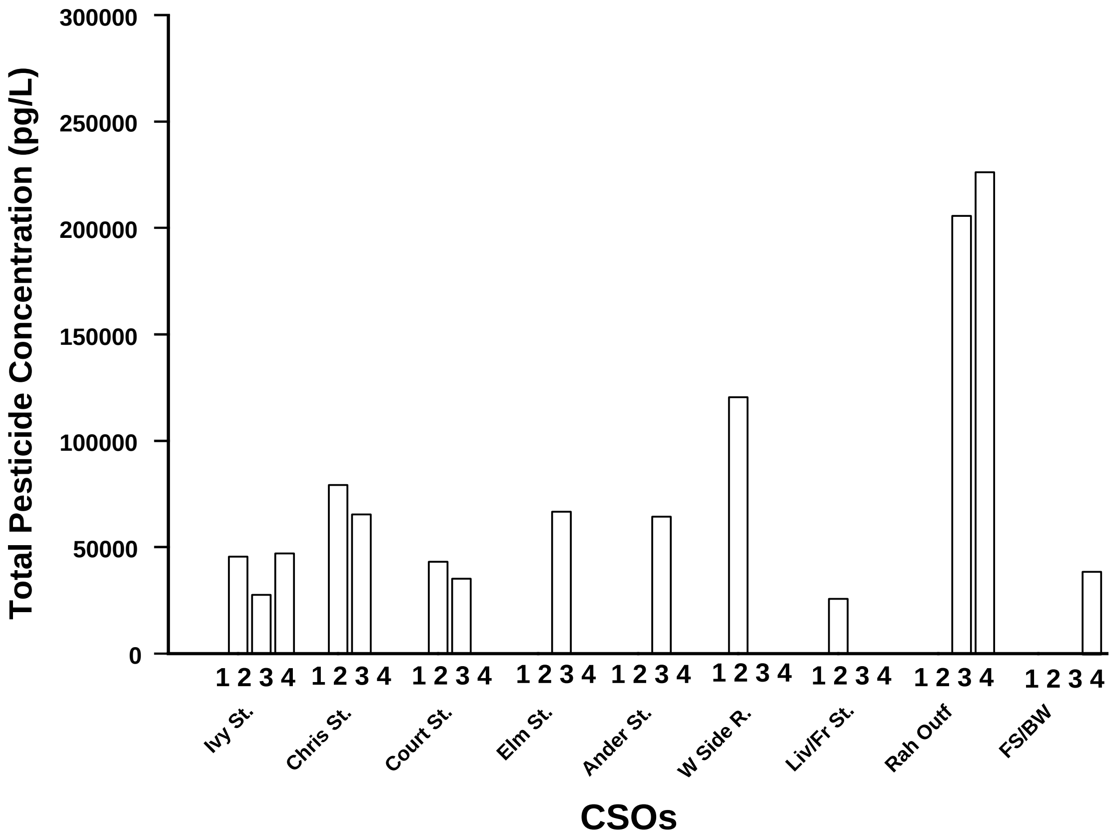


Figure 38. **Total chlorinated pesticide concentrations (pg/L) in effluents from CSOs during each of three precipitation events: Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).**

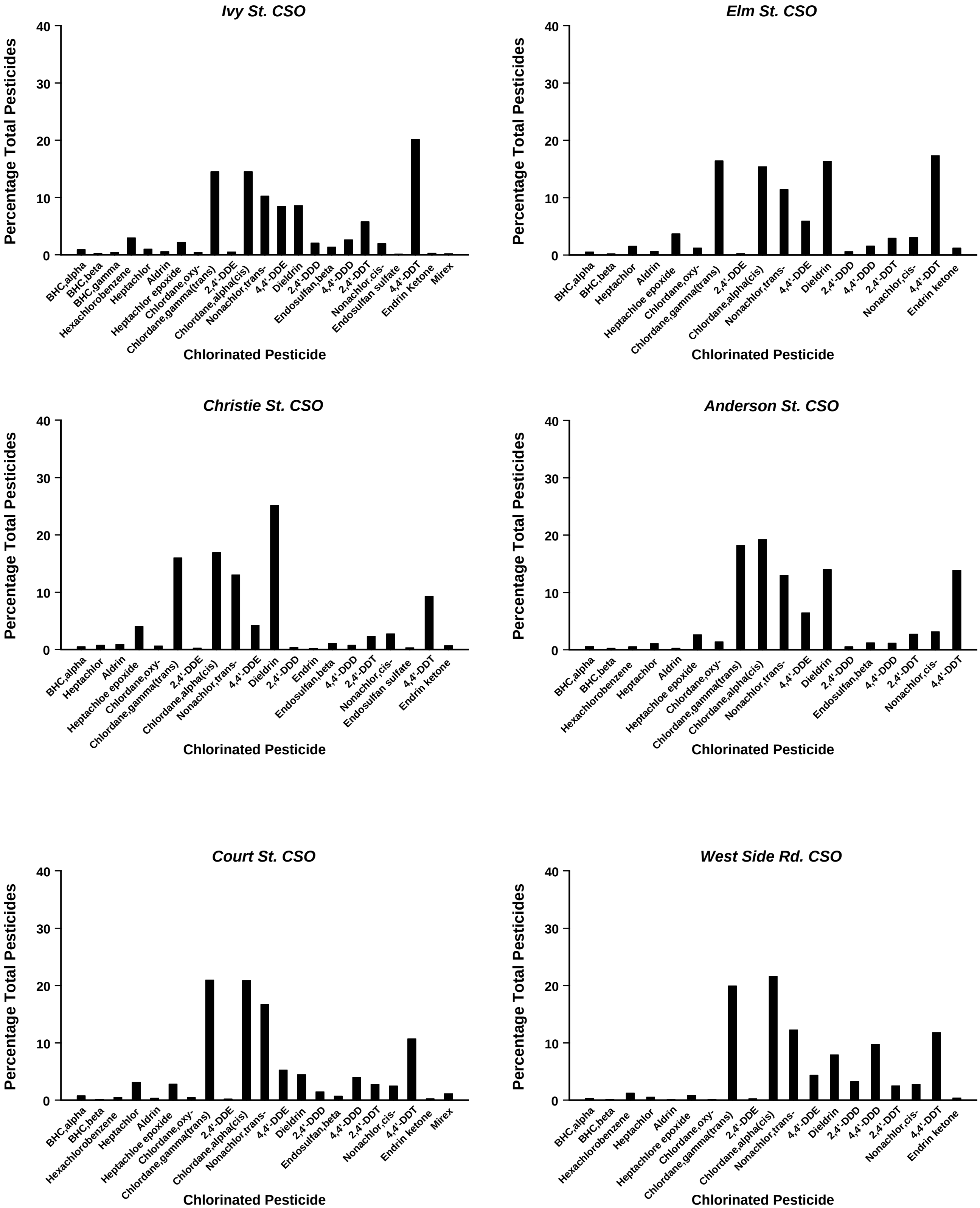
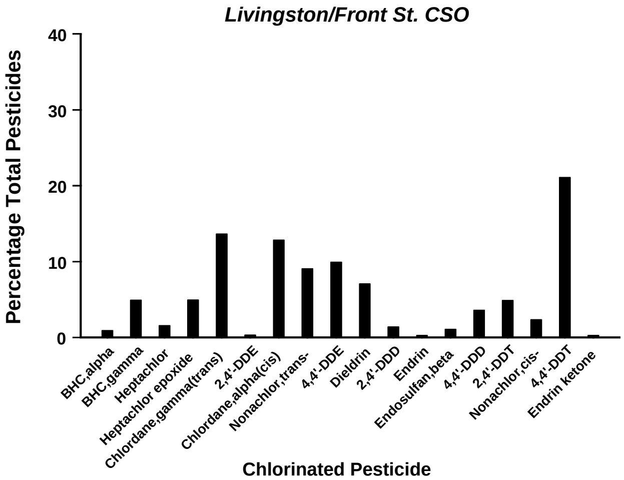
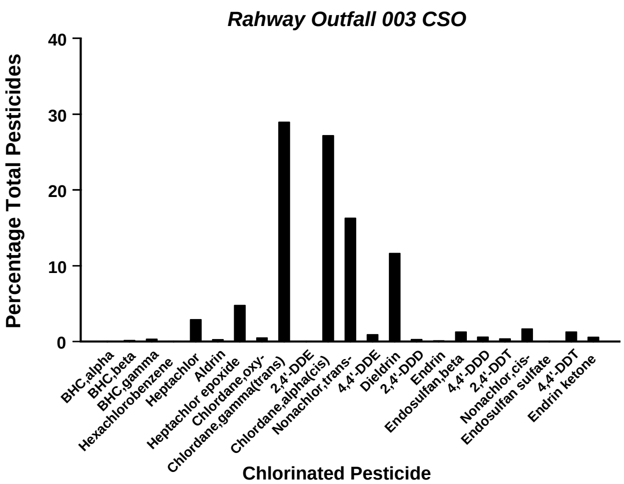


Figure 39. Percent chlorinated pesticide composition (based upon the percentage of total pesticides) for CSOs during three precipitation events. Data forCSOs sampled during more than one event are averaged.





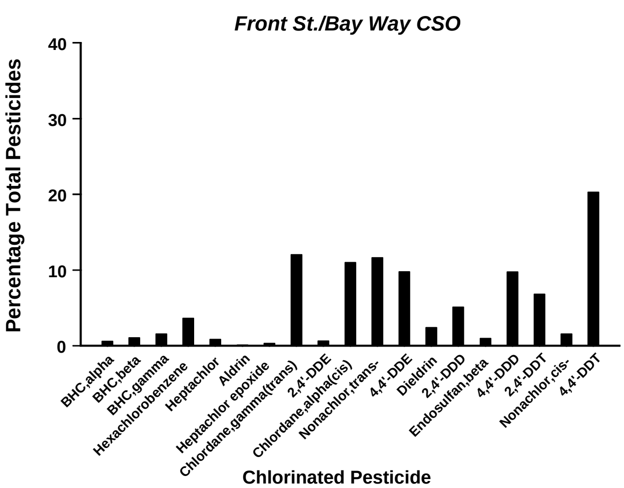


Figure 39 (continued). **Percent chlorinated pesticide composition (based upon the percentage of total pesticides) for CSOs during three precipitation events. Data for CSOs sampled during more than one event are averaged.**

Dioxins/Furans

SWOs

The dioxin/furan data from the SWOs were rarely impacted by the NJTRWP blank correction procedure (a total of nine data points were censored - eight from the Peripheral Ditch event #3 sample). Please see "blank correction" on page 40 for details on the procedure used to correct these data.

Non-detection of individual dioxin/furan congeners was more frequent. In particular, the following congeners were frequently not detected (n = 13 samples): 1,2,3,7,8,9-HxCDf (six samples), 1,2,3,7,8-PeCDD (five samples), 2,3,7,8-TCDD (four samples), 1,2,3,7,8-PeCDF (four samples) and 2,3,4,7,8-PeCDF (four samples). Most of the non-detections occurred in the three Peripheral Ditch SWO samples.

Figure 40a shows the total concentrations of dioxins and furans in the discharges from the five SWOs for three precipitation events. The individual dioxin/furan concentrations are provided in Appendix F.

The concentration of total dioxins and furans in the discharges from the SWOs was generally less than 4,000 pg/L, with the exception of the Henley Rd. SWO during event #2 (9,108 pg/L), and the Smith Marina SWO during event #3 (5,034 pg/L; see Figure 40a). Total dioxin/furan concentrations were very low in the Peripheral Ditch samples. The mean total dioxin/furan concentration in the SWO discharges ranged from 53 pg/L for the Peripheral Ditch SWO to 5,623 pg/L for the Henley Road SWO. The overall average dioxin/furan concentration in the SWO discharges (2,409 pg/L) was approximately 66 times higher than that in the POTWs (36.65 pg/L). In the case of the Henley Rd SWO, a relatively high total dioxin/furan concentration of 9,108 pg/L was measured during precipitation event #2, accounting for the elevated mean value at this location. Mean total dioxin/furan concentrations at the Blanchard Street, CCI, and Smith Marina SWOs ranged between 2,106 and 2,818 pg/L, which is comparable to the Henley Road event #3 concentration (2,138 pg/L).

2,3,7,8-TCDD concentrations were low (ND or <0.75 pg/L) at all of the SWOs except in the two Blanchard Street samples (mean = 8.79 pg/L) and in the Henley Road event #2 samples (15.4 pg/L).

The total dioxin/furan TEQ (pg/L) is less than 16 pg/L at all of the SWOs with the exception of the Henley Road SWO during event #2 (143 pg/L) and the Blanchard Street SWO during event #2 (24 pg/L; see Figure 40b). Total TEQ is very low in the Peripheral Ditch samples (0.06 - 1.4 pg/L TEQ); dioxins and furans in the Peripheral Ditch samples are found at very low concentrations (when detected), and 2,3,7,8-TCDD is not detected in any of the samples. The average toxic equivalents per liter for the Henley Road SWO (76.5 pg/L TEQ) is elevated compared to the average values of 19.8, 11.1 and 6.6 pg/L TEQ for the Blanchard Street, CCI, and Smith Marina SWOs, respectively (Figure 40b). This is due to the high total dioxin/furan concentration in the Henley Road event #2 sample, which also includes a high concentration of 2,3,7,8-TCDD (15.4 pg/L); the Henley Road event #3 sample TEQ is much lower (9.7 pg/L TEQ). The overall average TEQ per liter for the SWOs (19.1 pg/L) is about 68 times that for the POTWs (0.28 pg/L).

The very low toxicity OCDD congener comprises a mean of 60.5 (Peripheral Ditch SWO) to 83.4 (Smith Marina SWO) percent of the total dioxin and furan concentrations in SWO discharges; the low toxicity OCDF congener comprised an additional mean of 6.6 percent (Smith Marina SWO) to 9.4 (Blanchard St. SWO) percent (Figure 41). These results are consistent with the dioxin/furan distribution pattern observed in most of the POTW effluent samples. Only two other congeners were detected in significant amounts: 1,2,3,4,6,7,8-HpCDD (overall mean = 7.6%) and 1,2,3,4,6,7,8-HpCDF (overall mean = 4.9%). However, all of the congeners are present, at least to some extent, in most of the SWO discharges (and POTW effluents). There was little variation in the percent composition for each dioxin/furan congener at any one SWO during the three sampling events (Figure 41).

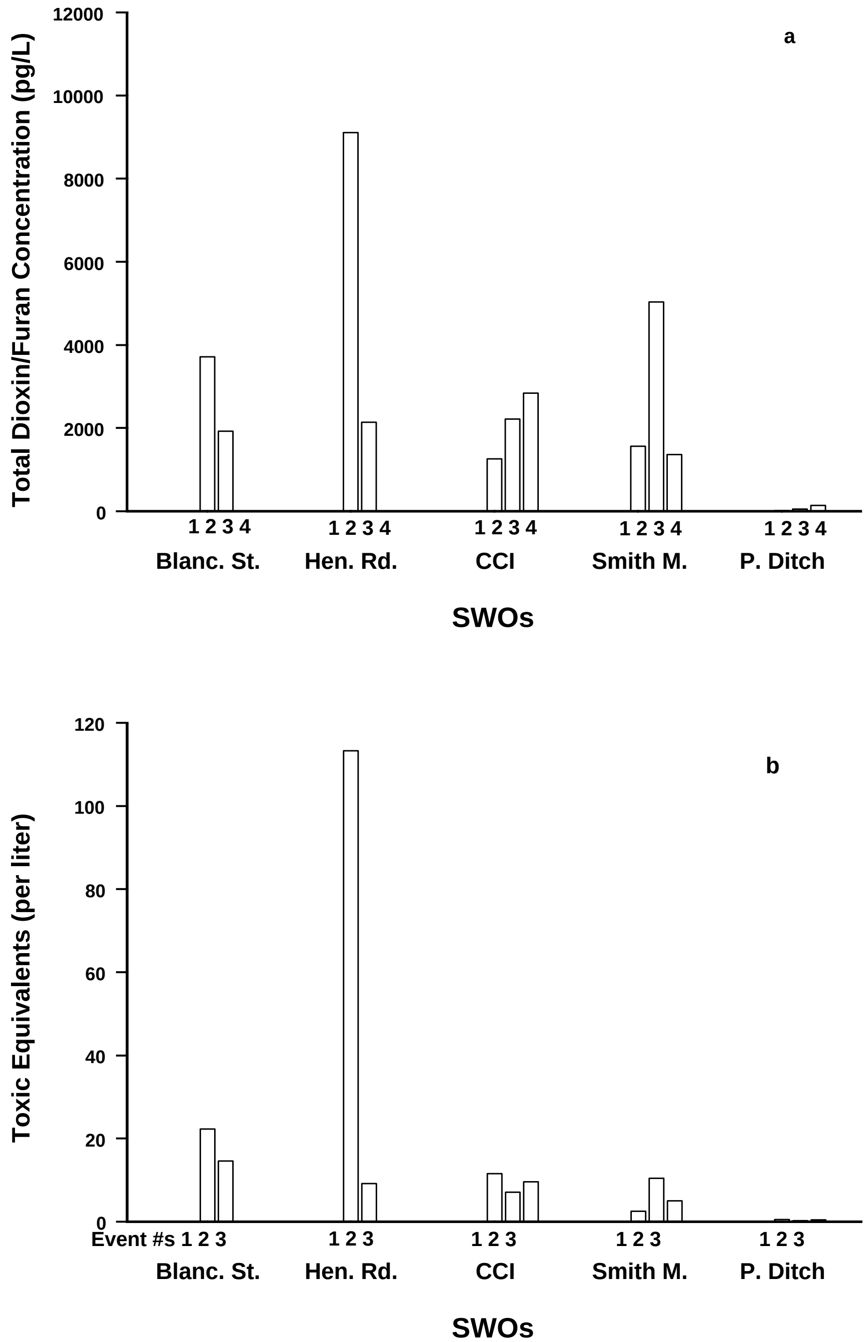


Figure 40. **Effluent total dioxin and furan concentration (panel a) and toxic equivalents (panel b) in effluents of SWOs during each of three precipitation events: Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April, 2004 (1.05 inches of rain).**

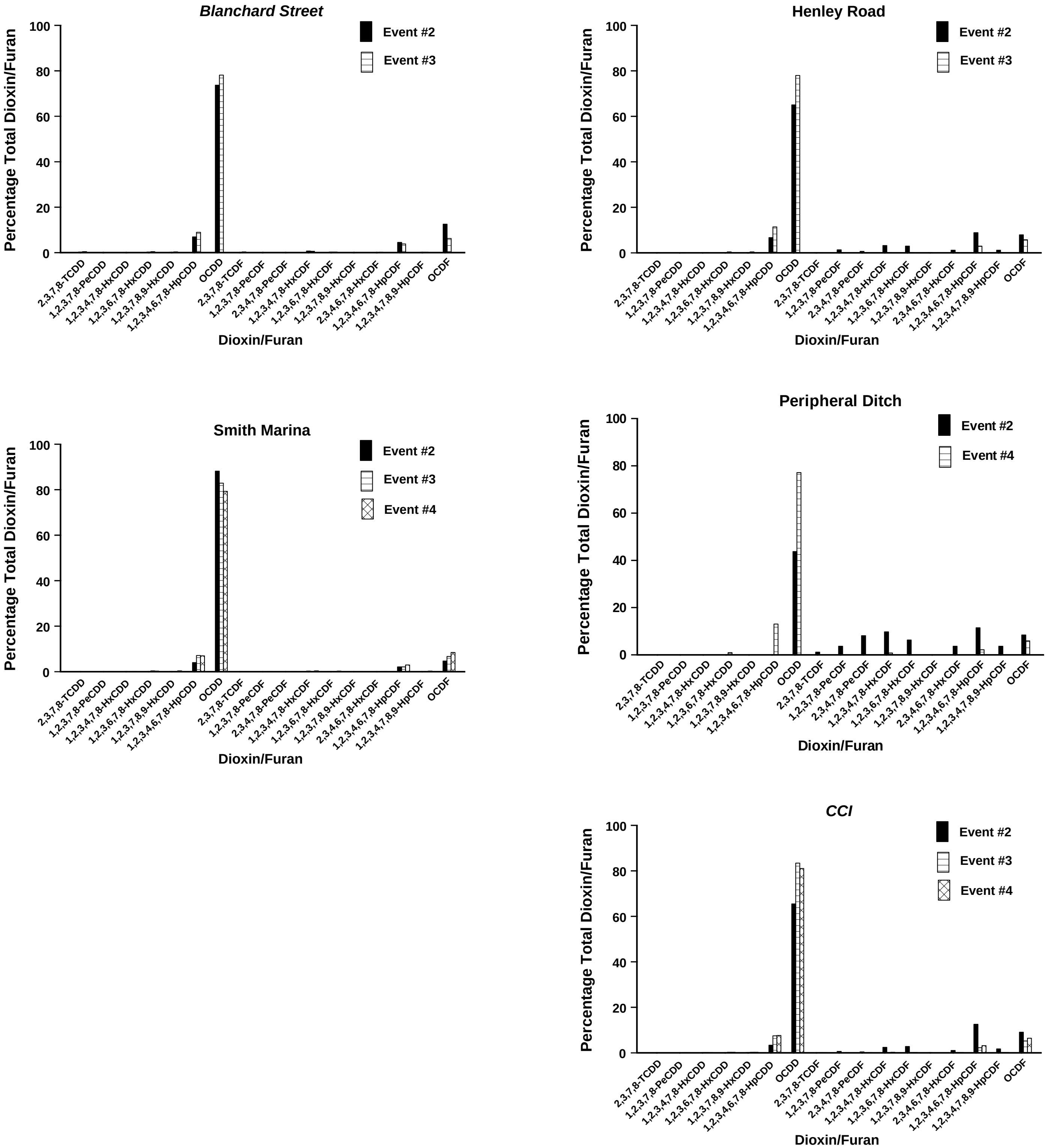


Figure 41. **Dioxin/furan specific profiles (based upon the percentage of total Dioxin/Furan) for SWOs during three precipitation events.**

CSOs

The dioxin/furan data from the CSOs were rarely impacted by the NJTRWP blank correction procedure (a total of only four data points were censored). The dioxin/furan congener most censored was 1,2,3,7,8,9-HxCDF (3 samples during event #3). Please see "blank correction" on page 40 for details on the procedure used to correct these data.

Non-detection of individual dioxin/furan congeners was more frequent, but still relatively rare. In particular, the following congeners were frequently not detected (n = 14 samples): 2,3,7,8-TCDD (in six samples), 1,2,3,7,8-PeCDF (in five samples) and 1,2,3,7,8,9-HxCDF (in five samples). All of the other dioxin and furan congeners were detected in at least 11 of the samples.

Figure 42a shows the total concentrations of dioxins and furans in the discharges from the nine CSOs for three precipitation events. The individual dioxin/furan concentrations are provided in Appendix F.

The total concentration of dioxins and furans measured in the CSOs was similar to that found for the SWOs (Figure 42a), with the concentrations in all but two of the CSO samples also less than 4,000 pg/L. The mean total dioxin/furan concentration in the CSO discharges ranged from 597 pg/L for the Rahway Outfall 003 CSO to 15,462 pg/L for the West Side Rd. CSO. The overall average total dioxin/furan concentration in the CSO discharges (2,633 pg/L) was similar to that for the SWOs (2,409 pg/L), and was approximately 72 times that of the POTW data (36.65 pg/L). The total dioxin/furan concentration was elevated at the West Side Road (15,462 pg/L) and Front Street and Bay Way (4,370 pg/L) CSOs, but only one sample was collected at these locations. Concentrations were similar at the other CSOs sampled.

2,3,7,8-TCDD concentrations were low (ND or < 1.5 pg/L) at all of the CSOs sampled.

The total dioxin/furan TEQ (pg/L) is less than 17 pg/L at all of the SWOs with the exception of the West Side Road SWO during event # 2 (35 pg/L; see Figure 40b). The high total dioxin and furan concentration for the West Side Rd. CSO resulted in a high toxic equivalent for this sample of 35 pg/L TEQ, which was 5.4 times higher than the average of the toxic equivalencies measured in the other CSO discharges (Figure 42b). The overall average toxic equivalency in CSOs (8.6 pg/L TEQ) was about 50% of that reported in the SWOs (19.1 pg/L TEQ), but was approximately 30 times greater than in the effluents of the POTWs (0.28 pg/L).

The very low toxicity OCDD congener comprised a mean of 77.2 (Christie St.) to 88.8 (Livingston/Front Street CSO) percent of the total dioxin and furan concentration in the CSO discharges; the low toxicity OCDF congener comprised an additional mean of 3.1 (Livingston/Front Street CSO) to 7.4 (Ivy Street) percent (Figure 43). These results are generally consistent with the results observed in the SWO and POTW samples. As with the SWO samples, only two other congeners were found in the CSO discharges in significant concentrations: 1,2,3,4,6,7,8-HpCDD (overall mean = 7.7%) and 1,2,3,4,6,7,8-HpCDF (overall mean = 2.9%). However, all of the congeners are present, at least to some extent, in most of the CSO (and SWO) discharges (and POTW effluents). There was little variation in the percent composition for each dioxin/furan congener at any one CSO during the three sampling events (Figure 41).

In summary, dioxins/furans were rarely impacted by blank contamination in both the SWO and CSO samples. Total dioxin/furan and 2,3,7,8-TCDD concentrations were generally low in the

CSO and SWO discharges, particularly those from the Peripheral Ditch SWO. Total dioxin/furans were dominated by OCDD, and secondarily by OCDF, 1,2,3,6,7,8-HpCDD and 1,2,3,4,6,7,8-HpCDF. Likewise, total dioxin/furan TEQs were consistently low in the SWO and CSO discharges. However, on occasion, total dioxin/furan, 2,3,7,8-TCDD and/or TEQ concentrations can be significantly higher (see the Henley Road SWO event #2 sample, the Blanchard Street SWO samples for 2,3,7,8-TCDD, and the West Side Road CSO sample). Excluding these "high" samples and the very low Peripheral Ditch SWO samples, the overall mean total dioxin/furan concentration and TEQ in the SWOs (2,345 pg/L; 9.0 pg/L TEQ) were about 50% greater than that in the CSOs (1,646 pg/L; 6.5 pg/L TEQ). However, the corresponding mean concentration of 2,3,7,8-TCDD in the SWO samples was the same as that in the CSO samples (0.43 pg/L).

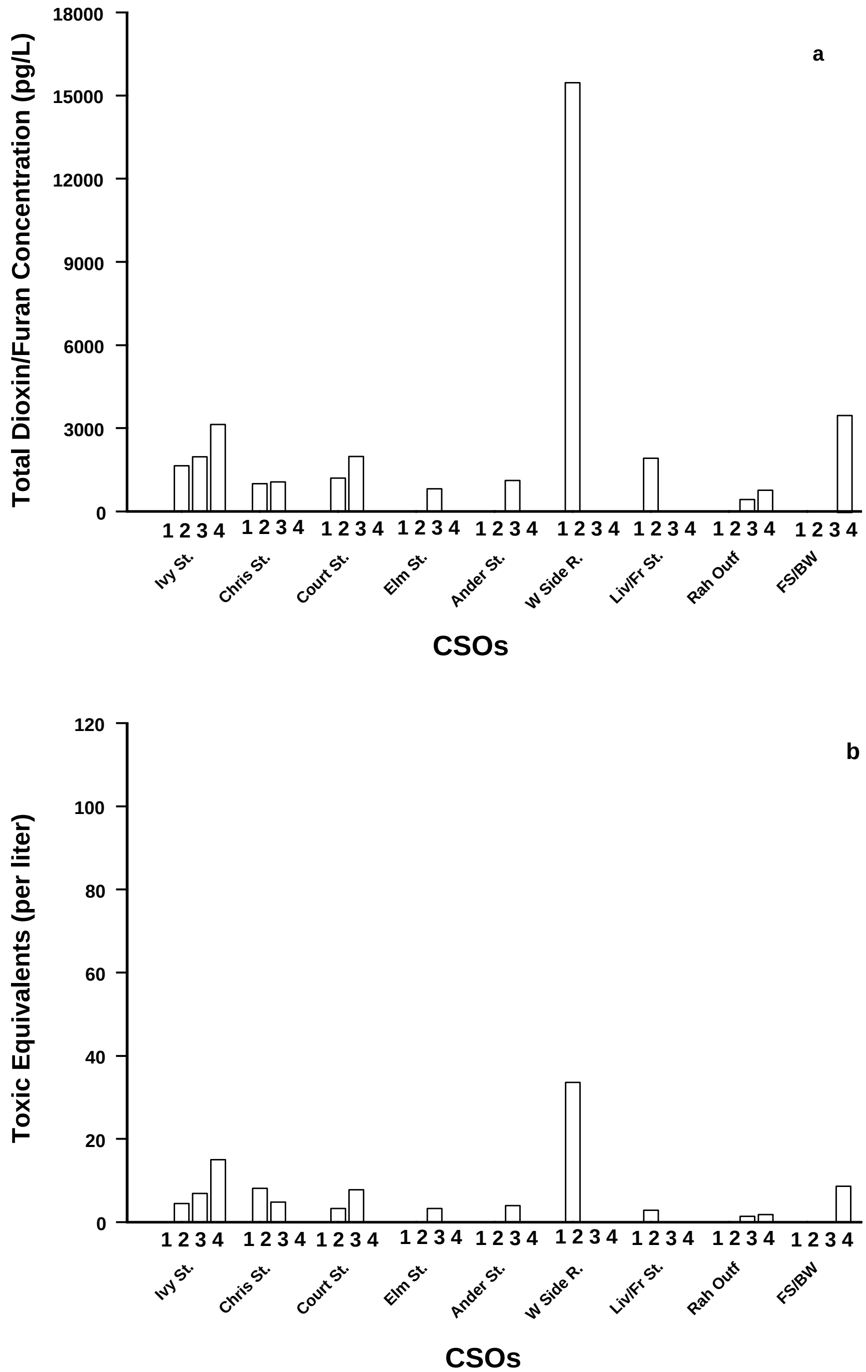


Figure 42. **Effluent total dioxin and furan concentration (panel a) and toxic equivalents (panel b) in discharges from CSOs during each of three precipitation events: Event #2: 16-17 October 2002 (1.17 inches of rain); Event #3: 11 April 2003 (0.22 inches of rain); Event #4: 13 April 2004 (1.05 inches of rain).**

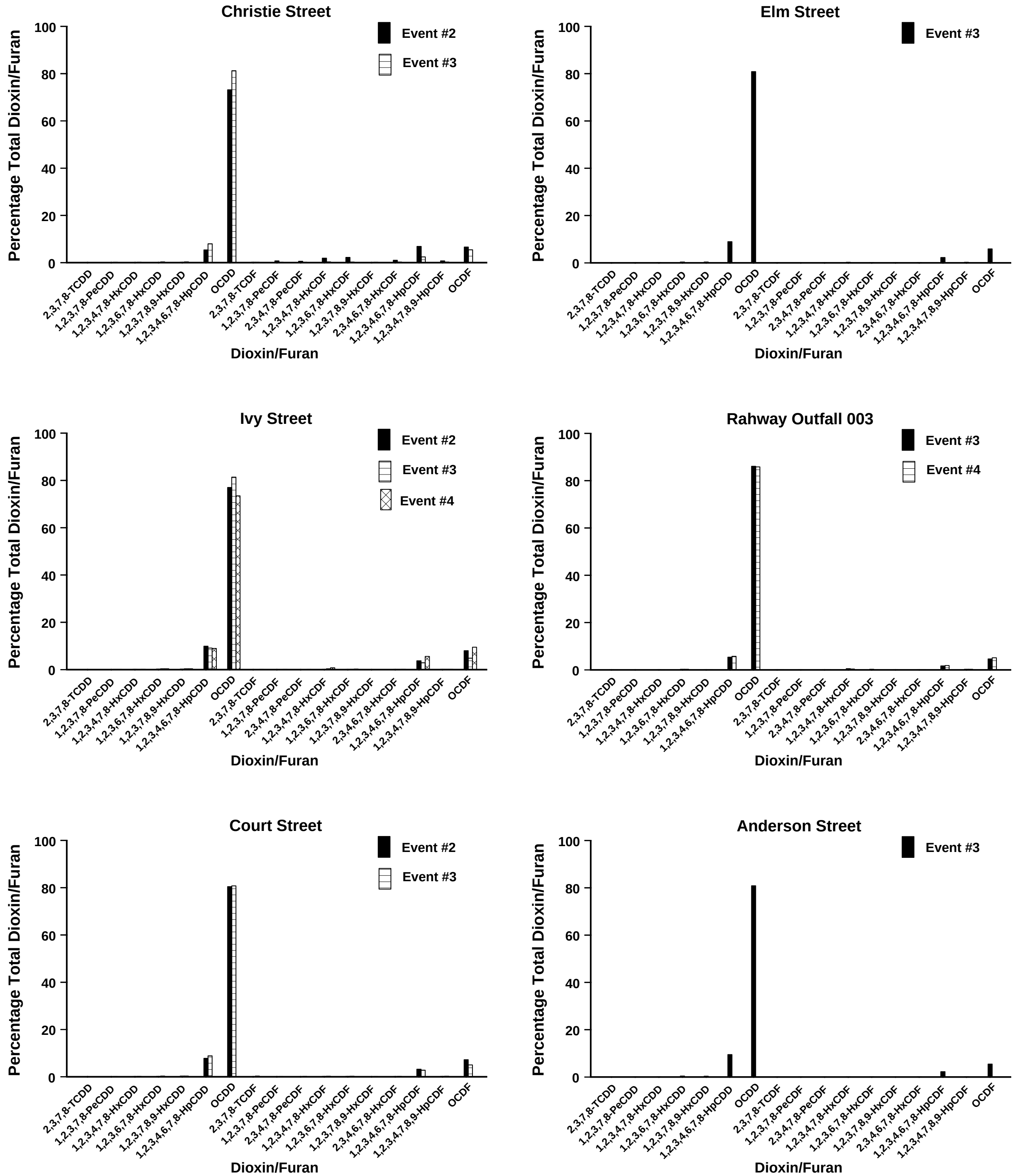
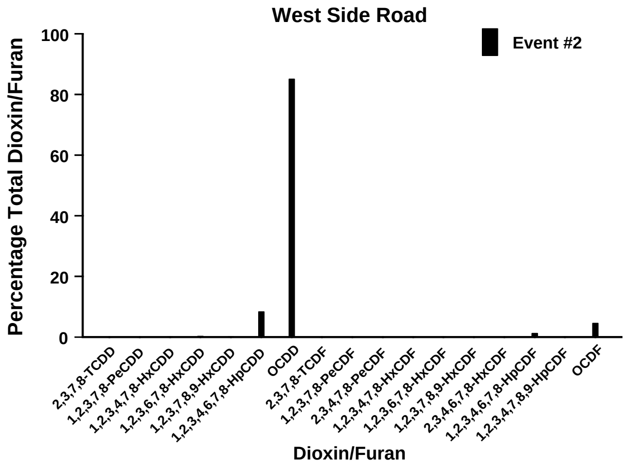
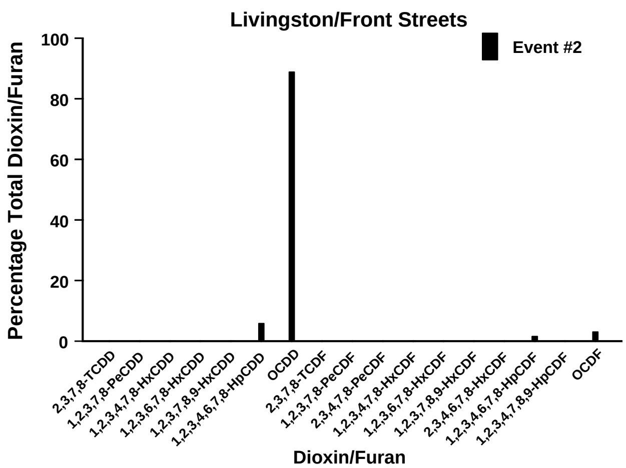


Figure 43. Dioxin/furan specific profiles (based upon the percentage of total Dioxin/Furan) for CSOs during three precipitation events.





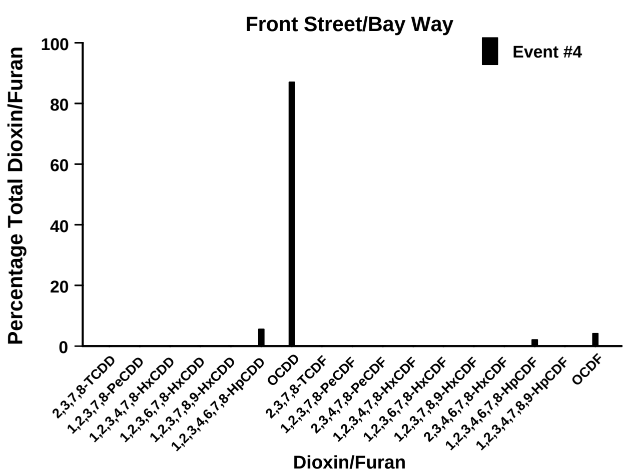


Figure 43 (continued). **Dioxin/furan specific profiles (based upon the percentage of total Dioxin/Furan) for CSOs during three precipitation events.**

Metals

Duplicate Data

One field duplicate sample was collected during each of sampling events #2, #3 and #4. Concentrations of the metals measured in these duplicate samples were generally similar to the concentrations found in the investigative samples. All of the investigative samples varied by less than 22% when compared to the corresponding duplicate samples for total and dissolved cadmium, total lead, and dissolved mercury. There was a 153% difference in total mercury concentrations between the duplicate and investigative sample at event #2; this was the largest difference observed. However, the differences in events #3 (0.2%) and #4 (8.1%) were small. Overall, the greatest variability between investigative and duplicate samples were for dissolved lead (events #2 and #3 - each approximately 40% difference) and total methylmercury (events #2 and #4 – each approximately 31% difference). Dissolved methyl-mercury varied by 50% in event #3, but very little in event #2 (2.5%) and event #3 (4.1%).

SWOs

Cadmium - Total and dissolved cadmium were detected in all of the SWO samples, and no data points were censored for total or dissolved cadmium using the NJTRWP blank correction procedures. Figure 44a shows the total and dissolved cadmium concentrations in the discharges from five SWOs for four precipitation events. The individual sample metal concentrations are provided in Appendix H.

The mean total cadmium concentrations for the Blanchard St., Henley Rd., and Smith Marina SWOs were 784, 926, and 1,313 ng/L, respectively, and were elevated relative to the CCI (493 ng/L) and Peripheral Ditch SWOs (446 ng/L). The SWO overall average total cadmium concentration (792 ng/L) was 6 times higher than that in the effluents of the POTWs (131 ng/L). However, mean dissolved cadmium concentrations in the SWO discharges (37 - 195 ng/L) and POTW effluents were found to be similar, due to much lower dissolved to total cadmium ratios in the SWO samples (i.e., overall mean SWO = 0.22 versus POTW = 0.72).

Total cadmium concentrations within individual SWOs during the different precipitation events, as reflected in the maximum:minimum ratio, vary little at the Peripheral Ditch SWO (ratio = 1.50), and moderately at the other SWOs (ratio = 3.5 - 8.9). Variability in dissolved cadmium concentrations is low at CCI (ratio = 1.75) but more variable at the other SWOs (ratio = 3.3 - 11.4).

Elevated total ($r = 0.729$) and dissolved ($r = 0.695$) cadmium concentrations appear to coincide with high rainfall events at Blanchard Street; there was also a very strong positive correlation ($r = 0.999$) between total and dissolved cadmium at this SWO. At Henley Road, total cadmium concentrations increase with rainfall ($r = 1.000$), but dissolved cadmium decreases ($r = -0.833$); this is also reflected in the negative total:dissolved cadmium correlation at this location ($r = -0.840$). At the CCI SWO, despite the limited variability in concentrations, dissolved cadmium increased with rainfall ($r = 0.972$); total cadmium was unaffected ($r = 0.056$). In contrast, dissolved cadmium decreased with rainfall at Smith Marina ($r = -0.967$), and total cadmium was relatively unaffected ($r = 0.246$). Total cadmium decreased with rainfall at the Peripheral Ditch SWO ($r = -0.604$), but dissolved cadmium was relatively unaffected ($r = 0.339$).

Lead - Total and dissolved lead were detected in all of the SWO samples, and no data points were censored for total or dissolved lead using the NJTRWP blank correction procedures. Figure 44b shows the total and dissolved lead concentrations in the discharges from five SWOs for four precipitation events. The individual sample metal concentrations are provided in Appendix H.

The mean total lead concentration in the SWO discharges (except for the Peripheral Ditch SWO) ranged from 48,700 to 288,000 ng/L (Figure 44b). The Peripheral Ditch SWO had a very low mean concentration of 1,593 ng/L total lead, which was 30 to 180 times lower than the other SWOs, and is consistent with the concentrations typically found in the POTW effluents. Total lead concentrations within individual SWOs during the different precipitation events, as reflected in the maximum:minimum ratio, vary significantly at the Blanchard Street SWO (ratio = 11.8), and moderately (ratio = 3.3 - 6.7) at the other SWOs.

The mean dissolved lead concentration in the SWO discharges (except for the Peripheral Ditch SWO) range from 1,457 to 3,277 ng/L; the Peripheral Ditch mean concentration was only 134 ng/L. Dissolved lead concentrations within individual SWOs during the different precipitation events, as reflected in the maximum:minimum ratio, vary moderately at the Henley Road SWO (ratio = 5.5) and little at the other SWOs (ratios = 1.1 - 2.9). The overall mean dissolved lead concentrations in the SWO discharges (1,813 ng/L) was 3 times higher than that found in the POTW effluent (614 ng/L); this was due to a much lower dissolved to total lead ratio in the SWO discharges (i.e. overall mean SWO = 0.06 versus POTW = 0.34).

Elevated total lead concentrations appear to coincide with high rainfall events at Blanchard Street ($r = 0.71$) and Henley Road ($r = 0.80$), and possibly at Smith Marina ($r = 0.42$), while the opposite is true at the Peripheral Ditch ($r = -0.95$). There was no apparent relationship at Smith Marina ($r = -0.15$). Dissolved lead concentrations did not appear to vary with rainfall at any of the SWOs ($r = -0.35$ to 0.42).

Mercury - Total and dissolved mercury were detected in all of the SWO samples, except for dissolved mercury in the Peripheral Ditch event #4 sample. The NJTRWP blank correction procedures resulted in the censoring of both total and dissolved mercury in two of the three Peripheral Ditch samples, and event #4 samples at the Blanchard Street and Henley Road SWOs (please see "blank correction" on page 40 for details on the procedure used to correct these data). Figure 44c shows the total and dissolved mercury concentrations in the discharges from five SWOs for four precipitation events. The individual sample metal concentrations are provided in Appendix H.

The mean total mercury concentration in the discharges from three of the five SWOs - Henley Road (691 ng/L), CCI (165 ng/L) and Smith Marina (326 ng/L) - are elevated compared to the Blanchard Street and Peripheral Ditch SWOs, which average only 92 and 5.6 ng/L, respectively (Figure 44c). The Peripheral Ditch SWO has the lowest average total mercury concentration (but two of the three samples were blank corrected). The overall average SWO total Hg concentration (277 ng/L) was 9 times higher than that found in the POTW effluents (30 ng/L). Total mercury concentrations within individual SWOs during the different precipitation events, as reflected in the maximum:minimum ratio, vary moderately at the Blanchard Street SWO (ratio = 8.45), and little at the other SWOs (ratio = 1.0 - 3.6).

The mean dissolved mercury concentration in the SWO discharges (except for the Peripheral Ditch SWO) range from 5.5 to 29.7 ng/L; the Peripheral Ditch mean concentration was essentially 0 ng/L (but two of the three samples were blank corrected). Dissolved mercury concentrations within individual SWOs during the different precipitation events, as reflected in the maximum:minimum ratio, vary significantly at the CCI SWO (ratio = 18.4; in contrast to total mercury) and little at the other SWOs (ratios = 1.3 - 5.2). The dissolved to total mercury ratio in the SWO effluents averaged 0.10, compared to the 0.24 to 0.28 ratios calculated for small and large POTWs, respectively.

Total mercury concentrations appear to increase with increasing precipitation at all of the SWOs (except the Peripheral Ditch, with only one data point), with r = 0.46 to 1.0. Likewise, a positive relationship between dissolved mercury and rainfall was also observed at the Henley Road (r = 0.96) and CCI (r = 0.50) SWOs. In contrast, dissolved mercury concentration appears to decrease with increasing precipitation at the Smith Marina SWO (r = -0.77), while no relationship was found at Blanchard Street (r = -0.11).

Methylmercury - Total and dissolved methylmercury were detected in all of the SWO samples, except for dissolved methylmercury in the Peripheral Ditch, CCI, and Smith Marina event #4 samples. None of the samples were censored for total or dissolved methylmercury using the NJTRWP blank correction procedures. Figure 44d shows the total and dissolved methylmercury concentrations in the discharges from the five SWOs for four precipitation events. The individual sample metal concentrations are provided in Appendix H.

Total methylmercury in all of the SWO discharge samples was less than 0.90 ng/L, except for the Henley Road event #2 sample (8.56 ng/L). These concentrations are similar to the POTW effluents, with mean values for individual SWOs ranging from a low of 0.15 ng/L for the Peripheral Ditch SWO to a high of 3.13 ng/L for the Henley Road SWO, a factor of nearly 21 (Figure 44d). The substantially higher average total methylmercury concentration in the Henley Road SWO is attributed to the very high value of 8.56 ng/L measured at this site during the heavy rain which occurred during event #2; omitting this result gives a mean of only 0.42 ng/L. Total methylmercury concentrations within individual SWOs during the different precipitation events, as reflected in the maximum:minimum ratio, vary significantly at the Henley Road SWO (ratio = 32.6), and little at the other SWOs (ratio = 1.8 - 4.6).

Dissolved methylmercury in all of the SWO discharge samples was less than 0.12 ng/L. The dissolved methylmercury concentration averaged 0.067 ng/L in all of the SWO discharges, and comprised approximately 22% of the total methylmercury. This is comparable to that portion of methylmercury that was found to be dissolved in the effluents of the large POTWs (0.21). Dissolved methylmercury concentrations within individual SWOs during the different precipitation events, as reflected in the maximum: minimum ratio, vary little at the SWOs (ratios = 1.1 - 3.0).

Variability in total methylmercury concentrations appear to be positively related to precipitation intensity at Henley Road (r = 0.975), with the opposite the case at the Peripheral Ditch (r = -0.937) and CCI (r = -0.999), and less so at Smith Marina (r = -0.468). Dissolved methylmercury appears to be positively related to precipitation at CCI (r = 1.0), but negatively related at the Peripheral Ditch (r = -1.0), Smith Marina (r = -1.0), and Henley Road (r = -0.85). No relationship between precipitation and total (r = 0.260) or dissolved (r = -0.29) methylmercury was apparent at the Blanchard Street SWO.

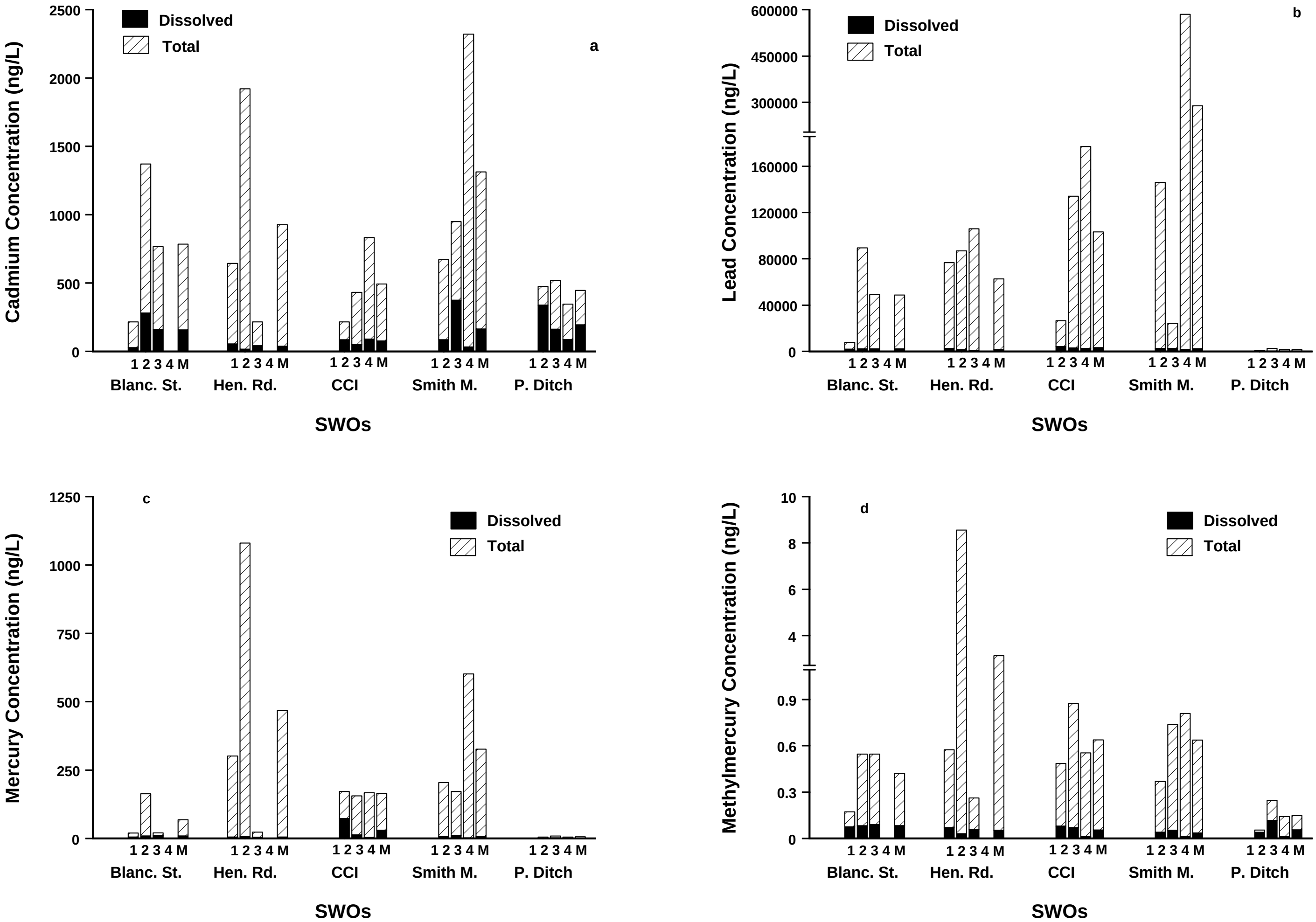


Figure 44. **Normal flow metals concentrations (ng/L) in SWO effluents during precipitation events: Events #1 (25-26 September 2001; 0.47 inches of rain), #2 (16-17 October 2002; 1.17 inches of rain), #3 (11 April 2003; 0.22 inches of rain), Event #4 (13 April 2004; 1.05 inches of rain). Cadmium (panel a), lead (panel b), mercury (panel c), and methylmercury (panel d). M = SWO data mean.**

CSOs

Cadmium - Total and dissolved cadmium were detected in all of the CSO samples, and no data points were censored for total or dissolved cadmium using the NJTRWP blank correction procedures. Figure 45a shows the total and dissolved cadmium concentrations in the discharges from the nine CSOs for four precipitation events. The individual sample metal concentrations are provided in Appendix H.

The total cadmium concentrations in the discharges from the CSOs were less than 650 ng/L, with the exception of the West Side Rd. and the Front Street/Bay Way CSOs, which contained total cadmium concentrations of 1,720 and 1,530 ng/L, respectively. The overall average total cadmium concentration in the CSO discharges (497 ng/L) is about 35% lower than the mean total cadmium concentration measured in the SWO discharges (792 ng/L), and 4 times higher than the average total cadmium concentration found in the POTW effluents (131 ng/L). In addition, the overall mean CSO dissolved cadmium concentration (63 ng/L) is only 50% of that for the SWOs (125 ng/L). The overall mean dissolved cadmium to total cadmium ratio is the same in CSOs (0.24) and SWOs (0.22).

Total and dissolved cadmium concentrations during the different precipitation events, as reflected in the maximum:minimum ratio, did not vary within the individual CSO discharges (range = 1.1 - 3.0) as much as they did for the SWO discharges (range = 1.5 - 11.4) and POTW effluents.

Where multiple samples are available at a given CSO, total cadmium concentrations are positively correlated with rainfall at Ivy Street (r = 0.51) and Rahway Outfall 003, and negatively correlated with rainfall at the Court Street and Christie Street CSOs. However, dissolved cadmium concentrations are negatively correlated with rainfall at all of these CSOs.

Lead **-** Total and dissolved lead were detected in all of the CSO samples, and no data points were censored for total or dissolved lead using the NJTRWP blank correction procedures. Figure 45b shows the total and dissolved lead concentrations in the discharges from the nine CSOs for four precipitation events. The individual sample metal concentrations are provided in Appendix H.

The total lead concentrations in the discharges from the CSOs did not exceed 45,000 ng/L, with the exception of Ivy Street event #4 (80,500 ng/L), West Side Road (176,000 ng/L), and Front Street and Bay Way (153,000 ng/L). The overall mean total lead concentration of the CSO discharges (51,210 ng/L) is about 50% of the overall total mean lead concentration in the SWO discharges (100,900 ng/L), but is about 27 times higher than that found in the POTW effluents (1,866 ng/L). The dissolved lead concentrations in the CSO discharges (530 - 3,880 ng/L) are similar to the concentrations in the SWO discharges (460 - 4,210 ng/L, excluding the Peripheral Ditch). The overall mean dissolved lead concentration in the CSOs (1,866 ng/L) is similar to that found at the SWOs (1,837 ng/L), and three times higher than that found in the POTW effluents (614 ng/L). The dissolved to total lead ratio in both the CSO and SWO discharges averages 0.06.

Total and dissolved lead concentrations during the precipitation events, as reflected in the maximum:minimum ratio, did not vary within the individual CSO discharges (range = 1.0 - 4.5) as much as they did for the SWO discharges (range = 1.1 - 11.8) and POTW effluents.

Where multiple samples are available at a given CSO, total lead concentrations are positively correlated with rainfall at Ivy Street (r = 0.49) and Rahway Outfall 003, but negatively correlated with rainfall at Christie Street and Court Street. In contrast, the reverse holds for dissolved lead concentrations.

Mercury - Total and dissolved mercury were detected in all of the CSO samples, and only one dissolved mercury data point (West Side Road CSO) was censored using the NJTRWP blank correction procedures (please see "blank correction" on page 40 for details on the procedure used to correct these data). Figure 45c shows the total and dissolved mercury concentrations in the discharges from the nine CSOs for four precipitation events. The individual sample metal concentrations are provided in Appendix H.

The total mercury concentration in the discharges from the CSOs did not exceed 360 ng/L, with the exception of the Court Street (727 ng/L) and West Side Road (692 ng/L) CSOs during event #2. The overall mean total mercury concentration in the discharges from the CSOs (242 ng/L) is approximately the same as that in the SWO discharges (277 ng/L). The dissolved mercury concentrations in the CSO discharges (0.2 - 71.3 ng/L) are similar to the concentrations in the SWO discharges (ND - 72.6 ng/L). The overall mean dissolved mercury concentration in the CSO discharges (14.0 ng/L) was slightly higher than that in the SWO discharges (10.9 ng/L), with each about two times higher than that found in POTW effluents (6.2 ng/L). The dissolved to total mercury ratio in the CSO discharges averages 0.085, slightly lower than that in the SWOs (0.10).

Total and dissolved mercury concentrations during the different precipitation events, as reflected in the maximum:minimum ratio, did not vary within the individual CSO discharges (range = 1.5 - 6.7) as much as they did for the SWO discharges (range = 1.0 - 18.4) and POTW effluents.

Where multiple samples are available at a given CSO, total mercury concentrations are negatively correlated with rainfall at Christie Street, but positively correlated with rainfall at the other CSOs. In contrast, dissolved mercury is negatively correlated with rainfall at all of the CSOs.

Methylmercury - Total and dissolved methylmercury were detected in all of the CSO samples, except for dissolved methylmercury at the West Side Road, and Front Street and Bay Way CSOs. None of the data were censored using the NJTRWP blank correction procedures. Figure 45d shows the total and dissolved methylmercury concentrations in the discharges from the nine CSOs for four precipitation events. The individual sample metal concentrations are provided in Appendix H.

The total methylmercury concentrations in the discharges from the CSOs range from a low of 0.324 ng/L at the Front Street and Bay Way CSO to a high of 2.70 ng/L at the Livingston and Front Street CSO (Figure 45d). Concentrations were typically less than 1 ng/L, but the Court Street event #2, Rahway Outfall 003 event #3, and West Side Road CSOs had concentrations exceeding 1.4 ng/L. Total methylmercury in the CSO discharges is similar to that in the SWO discharges and POTW effluents, with an overall average of 1.0 ng/L. The dissolved methylmercury concentrations averaged 0.074 ng/L among discharges from CSOs, which is comparable to that is SWOs (0.067 ng/L), but about 3.5 times lower than that found in the POTW effluents (0.273 ng/L). However, in the CSO discharges, dissolved methylmercury comprised only 10% of total methylmercury. This is 50% of the dissolved to total methylmercury ratio of 0.23 for SWOs and 0.21 for POTWs.

Total and dissolved methylmercury concentrations during the different precipitation events, as reflected in the maximum:minimum ratio, did not vary within the individual CSO discharges (range = 1.1 - 3.2) as much as they did for the SWO discharges (range = 1.0 - 32.6) and POTW effluents.

Where multiple samples are available at a given CSO, total methylmercury concentrations are positively correlated with rainfall at Ivy Street (r = 0.66) and Court Street, but negatively correlated with rainfall at the other CSOs. Dissolved methylmercury is positively correlated with rainfall at Court Street and Rahway Outfall 003, but negatively correlated with rainfall at the other CSOs.

In summary, total and dissolved cadmium, lead, mercury, and methylmercury were consistently detected in the CSO and SWO samples, and only a few samples were impacted by the NJTRWP blank correction procedures. Mean total and dissolved cadmium in the SWO discharges (792 and 125 ng/L, respectively) were greater than those in the CSOs (497 and 63 ng/L, respectively). Mean total lead values were also higher in the SWOs (100,900 ng/L) compared to the CSOs (51,200 ng/L), but mean dissolved lead concentrations were similar (SWO = 1,837 ng/L, CSO = 1,866 ng/L). Mean total and dissolved mercury values were similar in the SWOs (277 and 10.9 ng/L, respectively) compared to the CSOs (242 and 14.0 ng/L, respectively). Likewise, mean total and dissolved methyl-mercury concentrations were similar in both SWOs (0.996 and 0.067 ng/L, respectively) and CSOs (1.019 and 0.074 ng/L, respectively). Among the SWOs, elevated metals concentrations were typically observed at the Henley Road and Smith Marina locations, with low concentrations at the Peripheral Ditch. The West Side Road CSO typically had elevated metal concentrations. However, only a limited number of samples were observed to have elevated (or low) concentrations.

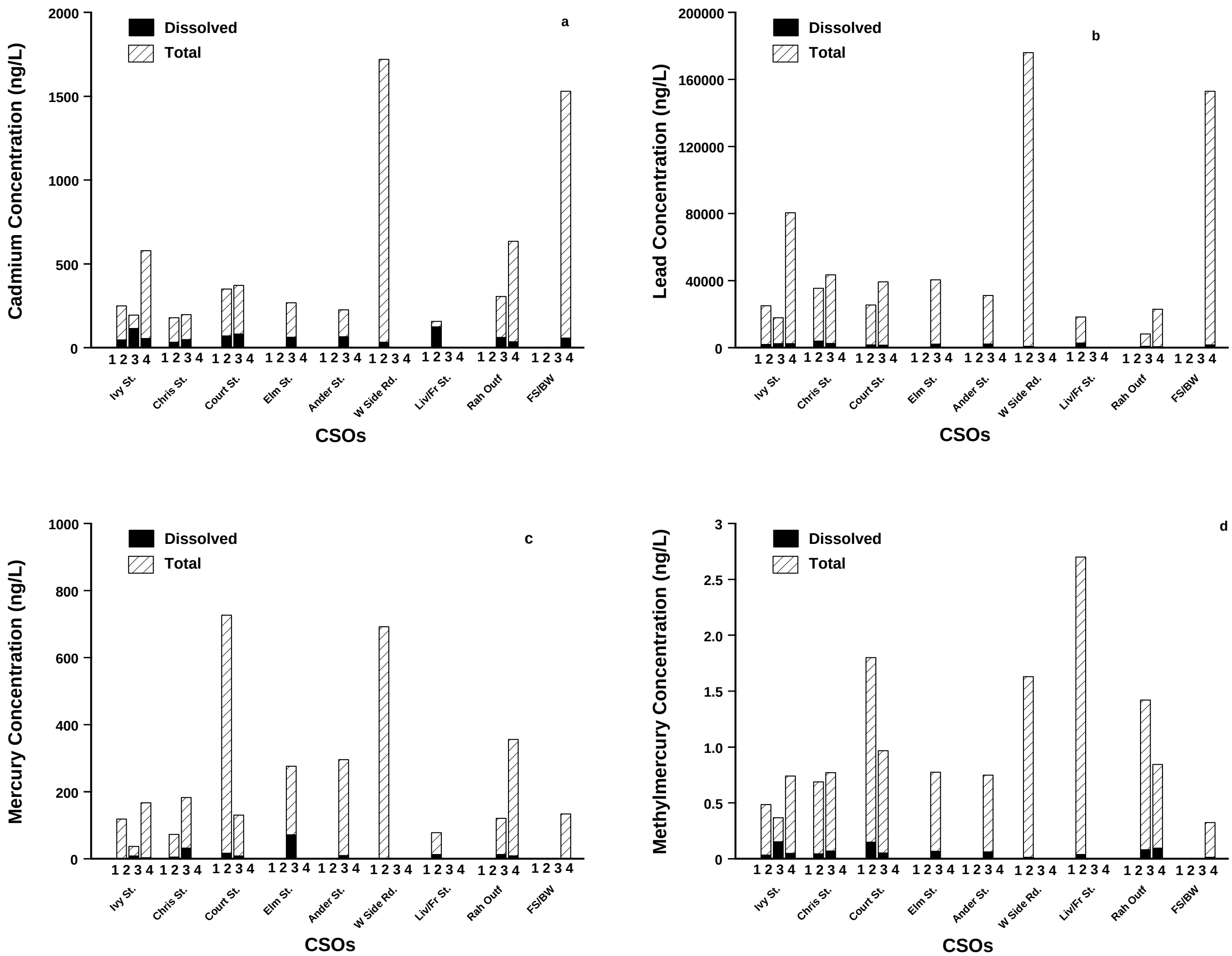


Figure 45. **Normal flow metals concentrations (ng/L) in discharges from the CSOs during precipitation events: Events #1 (25-26 September 2001; 0.47 inches of rain), #2 (16-17 October 2002; 1.17 inches of rain), #3 (11 April 2003; 0.22 inches of rain), #4 (13 April 2004; 1.05 inches of rain). Cadmium (panel a), lead (panel b), mercury (panel c), and methylmercury (panel d).**

DISCUSSION

The primary purpose of this report is to present the methods used to collect the POTW and CSO/SWO data and to convey the results to NJDEP; therefore this discussion of the results is limited in scope. A more expansive and technically rigorous discussion of the results and implications of those results will be the subject of future articles in scientific journals.

RELATIONSHIPS OF CONTAMINANT LEVELS AMONG THE NEW JERSEY POTW EFFLUENTS EVALUATED IN THE CARP PROGRAM

In spite of a number of obvious exceptions, the average concentrations of the measured contaminants and contaminant classes were found to be quite similar among the New Jersey POTWs that participated in this program. This similarity in contaminant profile is one of the outcomes of this study that was somewhat unexpected, considering that the NJHDG POTWs ranged from small (treating primarily sanitary waste) to very large with substantial industrial contributions.

There are some exceptions that are noteworthy:

- The PVSC and (on occasion) Linden-Roselle effluents were found to have, on average, higher concentrations of total PCBs than was the case for the other NJHDG effluents. The elevated concentrations at PVSC were largely the result of high levels of PCB 11 in its effluent.

- The PVSC, BCUA, West New York and North Bergen-Central POTWs averaged somewhat higher PAH concentrations.

- PVSC was found to have higher than average cadmium, mercury and TOC concentrations.

- The PVSC, BCUA, and MCUA POTWs averaged slightly higher TSS (about 32-35 mg/L) concentrations when compared with the other NJHDG member effluents, which averaged about 15 mg/L.

Because of the volume of their discharge, the largest loads of the measured contaminants were typically found in the effluents from the PVSC (1,087 million liters per day [mld]; 46% of the total POTW wastewater discharged to the harbor from the 12 NJ POTWs sampled) and the Middlesex County Utilities Authority (MCUA; 442 mld, 19% of the total wastewater discharged to the harbor from the 12 NJ POTWs sampled) POTWs. The estimated annual load of total PCBs from all of the POTWs was 44 kg; PVSC accounts for approximately 78% of this load. However, if the contribution from PCB 11 is removed from this calculation, the combined annual load of total PCBs decreases to only 15 kg, with PVSC and MCUA now accounting for only about 39% and 24% of the load, respectively. The POTWs combine to discharge an estimated total PAH load of 2,300 kg/year, with PVSC contributing 70% of the load. The combined POTW load of total pesticides was estimated to be approximately 14 kg/year, with PVSC (36%) and MCUA (21%) again accounting for most of the load. A total dioxin/furan annual load of approximately 23 g was estimated to originate from the POTWs, with 43% of this load attributed to PVSC.

The combined load of total Cd from the sampled POTWs is estimated to be 170 kg/year, with PVSC accounting for 77% of the load. The POTWs combine to discharge an estimated total Pb load of 1,480 kg/year, with PVSC contributing 50% of the load. The annual total Hg load from all of the POTWs was estimated to be 29 kg; PVSC accounts for 69% of the load.

Except for total PCBs (including PCB11, at 78%), total PAHs (70%), total Cd (77%), and total Hg (69%), the percent contribution of the PVSC loads to the combined load of all the POTWs is generally proportional to PVSC's percent of the total POTW wastewater flow (46%) to the harbor.

CSO and SWO load estimates for the contaminants of concern were beyond the scope of the present study.

RELATIONSHIPS BETWEEN THE POTW AND THE CSO/SWO DATA

It is first important to note that comparisons between the POTW and CSO/SWO data are constrained because the CSO/SWO samples were obtained as grab samples, while the POTW samples were all collected as 24-hour composite samples. Nevertheless, it is obvious from the data collected that the concentrations of all of the contaminant classes were much higher in the CSO/SWO samples than was the case for the POTW effluents. Correspondingly, the TSS and POC concentrations were also considerably elevated in the CSO/SWO samples, which may account in part for the higher contaminant concentrations (due to the affinity of most of the measured contaminants to solids). In the SWO samples, the TSS averaged about 169 mg/L, while the CSO samples averaged about 102 mg/L, indicating the influence of the sanitary/industrial contribution to the CSO TSS discharge concentrations.

It is also interesting to note that the TOC concentrations (sum of POC and DOC) in the POTW effluents (which averaged about 46 mg/L) were not substantially different from the average TOC concentrations measured in the CSO (about 31 mg/L) and SWO (about 51 mg/L) discharges.

OBSERVATIONS ON THE CONCENTRATIONS OF THE FIVE CONTAMINANT CLASSES IN THE POTW, CSO AND SWO DISCHARGES

Metals

Total cadmium, lead and mercury were measured as a component of the suite of contaminants analyzed on all of the POTW, CSO and SWO samples. Cadmium concentrations were found to be similar for all of the NJHDG POTW effluents (mean about 100 ng/L, range of POTW concentrations 35-210 ng/L), with the exception of PVSC, which averaged about 300 ng/L. Overall, the CSO/SWOs had higher cadmium concentrations than the POTWs. The SWO total cadmium concentrations averaged about 790 ng/L, while the CSOs averaged about 500 ng/L of cadmium.

Total lead concentrations were found to be similar for all of the POTWs, averaging about 2,000 ng/L. In contrast, the CSO/SWO lead discharge concentrations were dramatically higher than was the case for the POTWs; the SWO lead concentrations averaged about 100,000 ng/L, while the CSO lead concentrations averaged about 51,000 ng/L.

Total mercury concentrations for all of the NJHDG POTWs averaged about 27 ng/L, with the exception of PVSC, which averaged about 50 ng/L. Again, the CSO/SWO discharges averaged considerably higher concentrations of total mercury, with the average SWO concentration about 280 ng/L, and the CSOs averaging about 240 ng/L.

Overall we found for the metals that the dissolved fraction Hg and Pb concentrations were higher in the CSO/SWO discharges than was the case for the POTW samples. This appears to be largely related to the higher TSS concentrations in the CSO/SWO samples. In contrast, dissolved Cd levels in the CSO/SWO and POTW discharges were similar, while dissolved methyl-Hg levels were higher in the POTW discharges.

Pesticides

The total pesticide concentrations were found to be similar for all of the POTWs, averaging about 20 ng/L. As expected, the CSO/SWO discharges contained higher concentrations of pesticides overall, averaging about 75 ng/L. Also as expected, the levels of individual pesticides varied considerably from site-to-site, and from event-to-event. This finding is not surprising because pesticide use is likely to be highly variable from location-to-location, and from time-to-time.

PCBs

The overall mean total PCB concentration in all of the POTW discharges was approximately 30 ng/L; for the large POTWs only the mean total PCB concentration was approximately 38 ng/L (21 ng/L if the PVSC data is removed from the calculation), while it was only 12 ng/L for the small POTWs. It is interesting to note that in a previous study of these same POTW effluents, the authors found the total PCB concentrations to average about 25 ng/L (Durrell and Lizotte, 1998), comparable to the concentrations measured in the large POTWs in the present study.

There are two important exceptions to the average PCB concentrations discussed above. In the first case, PVSC's outfall was found to contain considerable concentrations of PCB 11, which is a PCB congener associated with the production and use of yellow pigments. The PVSC service area contains a number of industries that produce and use yellow pigments in their industrial processes. Interestingly, when PCB 11 data are removed from the analytical results, PVSC's total PCB concentration values were found to be consistent with the remaining NJHDG POTWs sampled in this study. This is particularly interesting considering that PVSC is the largest and most industrial of the NJHDG POTWs sampled.

In the second case, one of the four composite samples obtained from the Linden-Roselle POTW was found to contain an unusually high concentration of total PCBs (186 ng/L). This finding was not unexpected, considering that the Linden-Roselle facility is currently performing a PCB track down investigation to identify the sources of PCBs to the sewer system.

The CSO/SWO PCB concentrations were elevated relative to the POTW effluents, with the CSOs averaging approximately 59 ng/L, and the SWOs averaging about 52 ng/L. It is interesting to note that the average CSO PCB concentrations found in the New Jersey CSOs were much lower than the average PCB concentrations reported by Litten et al. (2003) for New York City CSOs (an average of about 500 ng/L). In addition, while the PCB homolog distribution pattern observed in the NJ CSO data was dominated by the penta- and hexa-PCBs, the New York City CSOs were dominated by the hexa- and hepta-PCBs.

In general, the congener profiles (homolog patterns) of most of the collected CSO and SWO samples, considered as levels of chlorination, demonstrate that the concentrations of Aroclor 1254 are particularly high. However, there are meaningful differences from site-to-site, and in some cases within a site from sampling event-to-sampling event. For example, for the second storm event, the Court Street CSO sample consisted primarily of Aroclor 1248, while the Ivy Street CSO was primarily Aroclor 1254, and the West Side CSO was composed largely of Aroclor 1260. The SWO samples collected from the Peripheral Ditch varied considerably from sample event-to-sample event; Aroclor 1248 dominated in the event #2 sample, Aroclor 1254 was dominant in the event #3 sample, and Aroclor 1260 dominated in the fourth CSO/SWO sampling event. In contrast, in the New York City CSO/SWO study the congener patterns were mostly dominated by Aroclor 1260.

PAHs

Overall, the average total PAH concentrations in the POTWs were similar, averaging about 1,000-2,000 ng/L (with several considerably higher spikes). In contrast, the PAH concentrations in the CSO/SWOs were substantially higher than the POTWs, averaging about 28,000 ng/L in the CSOs and 60,000 ng/L in the SWOs. The PAH patterns for most of the sample locations and samples illustrates that the dominant contribution to the observed PAH concentrations is petrogenic in origin, rather than pyrogenic. There are some exceptions; some samples collected from Henley Road, the Peripheral Ditch and West Side Road are clearly dominated by pyrogenic sources. The variability in PAH patterns between sites and within a site for different events illustrates that there are numerous and variable sources of PAHs contributing to the CSO/SWOs.

PCDDs/PCDFs

As was the case for most of the other contaminant types, the PCDD/PCDF concentrations in the NJHDG POTW effluents were similar, averaging about 37 pg/L. In contrast, the CSO and SWO PCDD/PCDF concentrations averaged much higher; about 2,600 and 2,400 pg/L, respectively. From the environmental significance perspective, the least toxic congeners (OCDD and OCDF) dominated the samples collected from both the POTWs and CSO/SWOs (~ 80-90 percent of the total PCDD/PCDF). The congener profiles for all of the collected samples were similar, with both 1,2,3,4,6,7,8 heptachloro-dibenzo dioxin and furan dominating the remaining congeners that were measured.

The dioxin/furan CSO results were very similar to the results obtained in the New York City CSO work performed by Litten et al. (2003). It is interesting to note that the New York City and NJHDG PCDD/PCDF measured values were similar, while the PCB concentrations and profiles were substantially different.

Considered collectively, the comparisons of the POTW data with the CSO/SWO data illustrate that the concentrations of all contaminant classes are substantially lower in the POTW effluents than in either the CSO or SWO effluents. This outcome is not particularly surprising, considering that all of the POTW effluents were subjected to full secondary treatment. Nevertheless, these results illustrate effectiveness of the NJHDG POTWs in treating sanitary and storm sewer wastewater.

REFERENCES

Durrell, G.S. and R.D. Lizotte, 1998. PCB Levels at 26 New York City and New Jersey WPCPs that Discharge to the New York/New Jersey Harbor Estuary. Environmental Science & Technology. Vol. 32. No. 8, 1022-1031.

Ferrario, J., C. Byrne, and A.E. Dupuy, Jr. 1996. Coplanar Polychlorinated Biphenyl (PCB) Background Contamination in Trace Level Analytical Procedures. Organohalogen Compounds. Vol. 28, 123-127.

Frontier Geosciences, 1995. Ultra-Clean Aqueous Sample Collection and Preservation (FGS-0008 and EPA Method 1669), revised January 3, 1995.

Great Lakes Environmental Center, 2001. Quality Assurance Project Plan Study I-G: Monitoring of Loadings from Selected Point Source Discharges, Version 1.1, February 12, 2001, 41 pp + attachments.

Litten, S., D.J. McChesney, M.C. Hamilton, and B. Fowler 2003. Destruction of the World Trade Center and PCBs, PBDEs, PCDD/Fs, PBDD/Fs, and chlorinated biphenylenes in water, sediment, and sewage sludge. Environmental Science & Technology. Vol. 37, No. 24: 5502-5510.

New Jersey Department of Environmental Protection, 2001a. New Jersey Toxics Reduction Workplan, Volume I, Revised/Version 2 – February 2, 2001, 111 pp + attachments.

New Jersey Department of Environmental Protection, 2001b. New Jersey Toxics Reduction Workplan, Volume II, Revised/Version 2.2 – February 2003, 99 pp + attachments.

United States Geological Survey, 2001. New Jersey U.S. Geological Survey Project Plan, Quality Assurance Project Plan, and Standard Operating Procedures for New Jersey Toxics Reduction Workplan for the NY-NJ Harbor Head-of-Tide Sampling Study I-C, Version 4:7 May 2001, 152 pp + attachments.

van den Berg, M., L. Birnbaum, ATC Bosveld, et al., 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environ. Health. Perspect. 106(12): 775-792.

APPENDIX A.1
PCB BLANK CONTAMINATION CONCERNS.

PCB BLANK DATA INFORMATION

Mick:

Attached is that Excel spreadsheet Joel Pecchioli sent a week or so ago with some PCB blank calculations he had performed, to support his blank correction discussions. I have added a second sheet to this file with a few things that may be useful to have for our conference call tomorrow.

These new data demonstrate a very high degree of reproducibility in the PCB composition between the 3 method blanks - the numbers even surprised me. The most useful way to review the reproducibility is to look at the composition (relative concentration) - see the data that shows the % the various congeners represent of the total PCB in the blanks.

There are 24 congeners present at an average concentration that is >1% of the total PCB; 33 congeners above 0.75% and 42 congeners above 0.5% (including both those >0.75 and 1%) of the total PCB. The sum of the 24 congeners that individually represent >1% of the total PCB, collectively represent about 80% of the total PCB (the sum of the 42 congeners that individually are >0.5% of the total, collectively represent >90% of the total PCB). These selected congeners are obviously the ones that matter - variability in other ultra-trace level congeners are of no real significance to the analysis or any background correction considerations.

The 24 congeners that individually represent >1% of the total PCB, have a precision in the calculated composition that results in a %RSD of 20% (19.87%, to be precise). The other two congener sets yielded %RSDs of 22%. The proportion of these congeners in blank after blank was EXTREMELY reproducible (as shown in these tables and the accompanying plot) - a %RSD of 20% with only 3 replicates is very good. If this calculation is performed on an amount basis (rather than % composition basis) the precision is almost as good.

Greg

APPENDIX A.2
PROPOSED APPROACH FOR ADDRESSING PCB BLANK LEVELS IN THE NJ POTW EFFLUENT SAMPLE ANALYSES (BATTELLE-COLUMBUS DATA).

SUMMARY AND RECOMMENDATIONS

Detectable, and notable, concentrations of PCBs were measured in the field and blank samples that were processed and analyzed with the NJ POTW effluent samples. The PCB concentrations in the method blanks were lower than in the POTW effluent samples. However, the method blank concentrations were within a factor of two of the concentrations measured in those effluent samples having the lowest PCB concentrations. The field blank concentrations were approximately half the concentrations of the method blanks. The difference in method and field blank concentrations can be attributed to the difference in the sample preparation techniques. The field blank was prepared from HPLC grade water that was extracted in a separatory funnel as a filtrate/aqueous sample. This sample was not filtered, so as to minimize contributions from laboratory procedures and generate a sample that as much as possible represented contributions associated with field sample handling. The same HPLC grade distilled water was used for the method blank, but this sample was filtered like the POTW field samples, with the filter and filtrate being extracted and concentrated separately, and the extracts combined for purification and subsequent analysis. The difference in the handling of the field blank and method blanks most likely accounts for the differences in the measured PCB levels, suggesting that approximately half the PCB in the method blanks originates with the filtrate extraction and handling steps, and about half is a consequence of the filter extraction and handling steps.

The PCB method blank levels were highly consistent from event-to-event, even though the samples were collected and prepared many months apart. The average total PCB concentration in the method blanks prepared with the POTW event 2, 3, and 4 samples was 10.7 ng/L, and ranged from 8.4 to 12.6 ng/L (Figure 1). The POTW event 1 method blank was prepared slightly differently, as discussed below, and had similar PCB concentrations. This consistency in PCB blank levels is uncommon in most organic contaminant analysis, but is often observed in trace metals analysis.

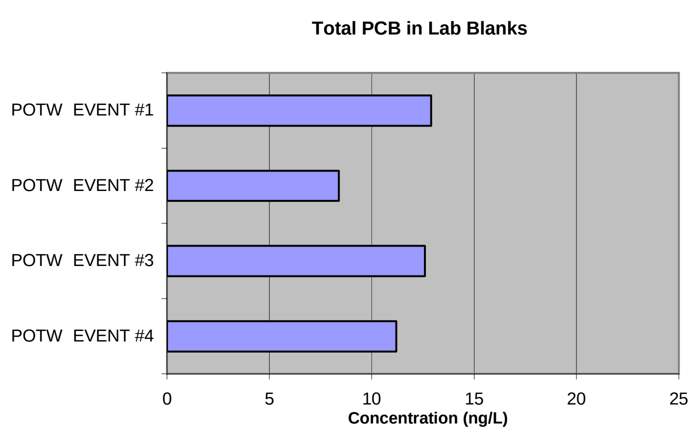


Figure 1: Total PCB Concentrations in the Method Blanks from the 4 POTW Events

Blank correction is not widely used in organic contaminant analysis. However, the primary reason blank correction is not often used is because there is typically uncertainty in the consistency, and therefore the representativeness, of the background levels. A high degree of reproducibility and background representativeness was demonstrated both in terms of the PCB composition and concentrations in this work (Figures 1 and 2); background correction may therefore be performed with confidence. Background correction of high-resolution mass spectroscopy PCB data using method blanks has also been recommended by US EPA (Ferrario *et al*., 1996) for the same reason. In addition, because of the generally consistent blank levels in metals analysis, background correction is performed for the metals data collected in the CARP Program to provide data that better represent the field sample concentrations.

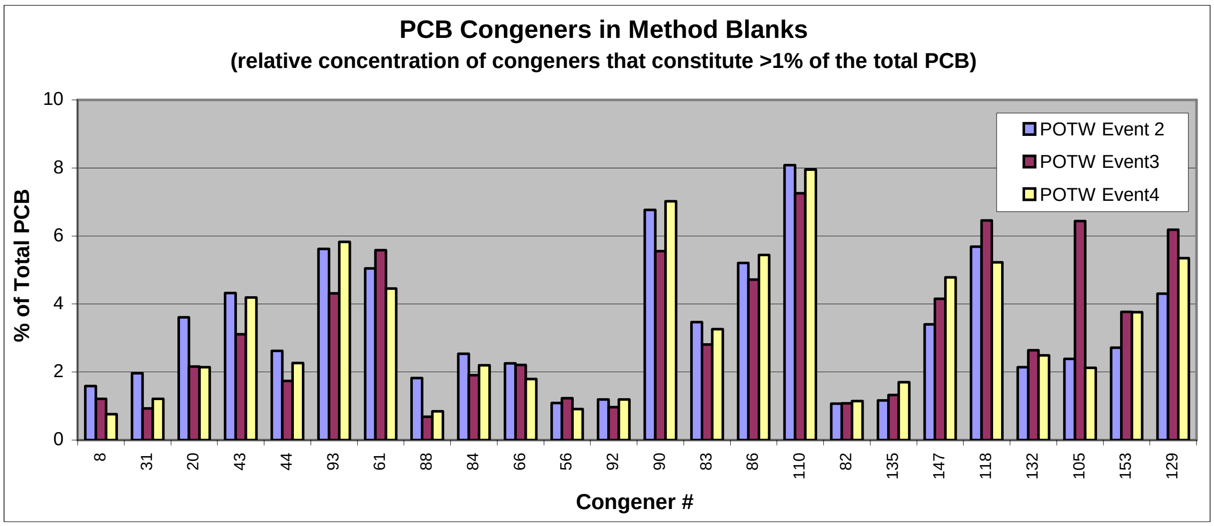


Figure 2: Contribution of Major PCB Congeners to Method Blank PCB Concentrations

The highly reproducible PCB blanks provide options for addressing the PCB background levels that would otherwise not be appropriate. The data have been careful reviewed, and alternative methods have been considered (see Review of Other Background Correction Methods below), and our recommendation is to subtract the PCB measured in the method blank from the PCB in the field samples that were prepared along with the method blank, in order to best generate representative field sample concentrations. This background correction should be performed on an amount (picogram), and not a concentration (picogram/L) basis, should be performed on a congener-by-congener basis, and should be analytical batch specific. Any blank corrected data point that becomes negative (a higher concentration was measured in the method blank than the field sample) would be replaced with a null value (empty field in the data set).

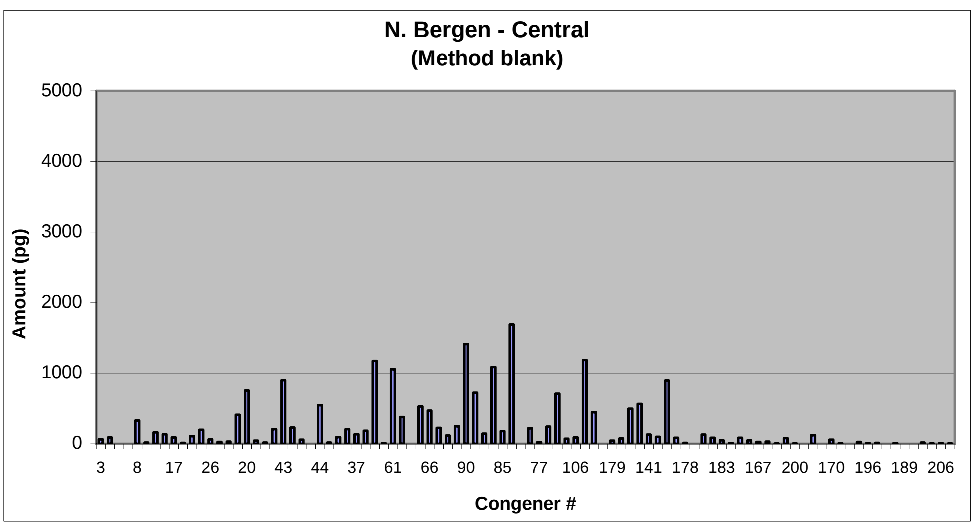
If the blank corrected PCB data are loaded into the CARP database, they should be qualified with the "V" qualifier, and the definition of this qualifier should be changed from "Blank corrected metals data" to "Blank corrected data". Alternatively, a new qualifier can be used that is defined as "Blank corrected organic contaminant data". However, we recommend that non-corrected data be loaded into the database.
This background correction approach will generate a few negative data points for each sample, the majority of which will be only slightly less than zero. Most of the minor negative values that are observed are for congeners that are not detected in most field samples, indicating that they are of negligible importance to the POTW dataset. The conservative approach of replacing these negative values with null will minimize the potential of under-estimating PCB concentrations, without increasing the potential of over-estimating concentrations.

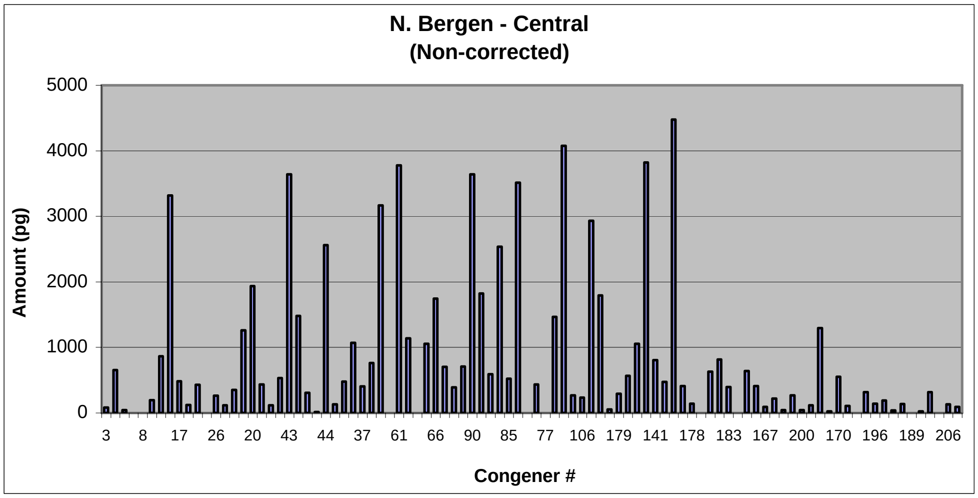
The total PCB concentrations for the POTW effluent samples, with concentrations corrected for background levels using the recommended approach, are summarized in Table 1. The background corrected effluent total PCB concentrations for POTW events 1 through 4 ranged from 3.6 ng/L to approximately 190 ng/L. The non-corrected POTW effluent concentrations are summarized in Table 2, along with the blank/background concentrations. The background corrected concentrations (Table 1) cannot be generated directly using the background and non-corrected POTW effluent concentrations presented in Table 2 because of differences in sample volumes and other minor differences between the effluent and background data; the final background corrected data should be generated on an amount and congener-specific basis, as described above. An example of the PCB congener composition of a POTW effluent sample, before and after background adjustment, is shown in Figure 3, along with the method blank. Key congeners in the method blanks included PCB110/115, PCB118, PCB93/95/98/100/102, PCB90/101, PCB86/87/97/119/125, PCB61/70/74/76, and PCB129/138/160/163, and lower concentrations of a number of other congeners were measured (Figures 2 and 3).

Table 1: Blank Corrected Total PCB Concentrations (ng/L)

POTW Name	Blank Corrected Total PCB Concentration (ng/L) (whole water; combined filter and filtrate)			
	Event #1	Event #2	Event #3	Event #4
Passaic Valley[a]	84.6 (20.9)	29.8 (9.9)	190 (15.0)	41.8 (12.6)
Bergen County	26.2	9.5	37.9	15.1
Linden Roselle	7.6	39.3	186	10.1
Joint Meeting	10.4	10.8		19.6
Rahway Valley	4.4	15.5	6.4	5.5
Middlesex County	16.4	31.8	19.4	27.2
North Bergen-Central		21.7		26.1
North Bergen-Woodcliff		12.0		10.8
Hoboken		16.2		
Secaucus		8.9		4.7
West New York		10.3		10.8
Edgewater			3.6	10.8

[a] The PCB concentrations listed for Passaic Valley are with and without (in parenthesis) the inclusion of PCB11. Although this congener was detected in samples from other POTWs, it did not dominate the PCB composition in other samples the way it did in the Passaic Valley effluent.





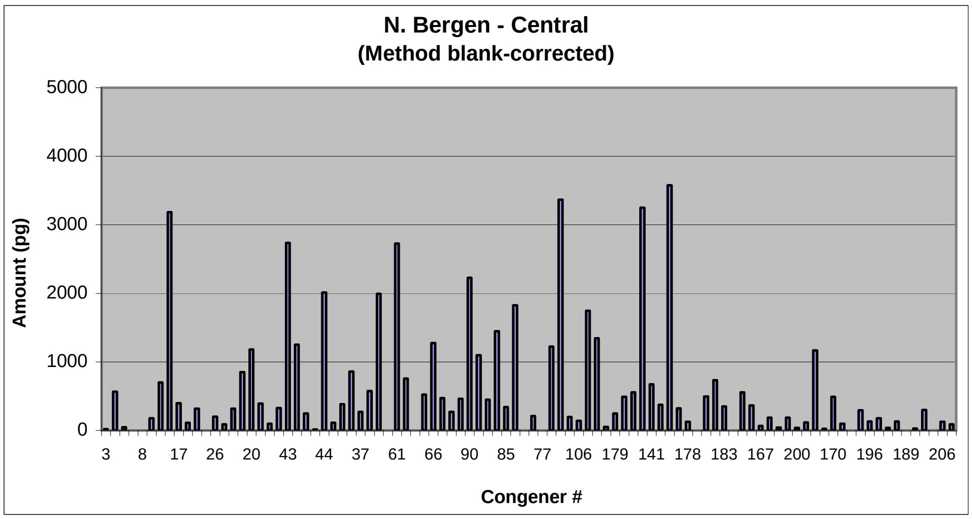


Figure 3: PCB Congener Composition in the Method Blank and the North Bergen-Central Event #2 POTW Effluent Sample (before and after background correction)

Table 2: Total PCB Concentrations (ng/L); *not* Corrected for Background Levels

Sample/POTW	Total PCB Concentration (ng/L) (whole water; combined filter and filtrate)			
	Event #1	**Event #2**	**Event #3**	**Event #4**
Blank/Background	12.9 (12.3)[a]	8.4	12.6	11.2
POTW Name				
Passaic Valley[b]	104 (39.9)	37.5 (17.6)	202 (26.7)	52.6 (23.4)
Bergen County	45.7	17.2	49.8	25.9
Linden Roselle	19.3	47.2	198	20.8
Joint Meeting	22.3	18.4		30.3
Rahway Valley	20.9	23.1	18.5	16.0
Middlesex County	34.9	39.6	31.2	37.9
North Bergen-Central		29.4		36.8
North Bergen-Woodcliff		19.6		21.5
Hoboken		23.7		
Secaucus		16.7		15.8
West New York		17.9		21.5
Edgewater			14.6	21.3

[a] The two blank/background values reported for Event #1 are described in the "Specific Considerations" section of the text; the methods generate very similar data, and we recommend using the 12.9 ng/L value (see text).

[b] The PCB concentrations listed for Passaic Valley are with and without (in parenthesis) the inclusion of PCB11.

SPECIFIC CONSIDERATIONS
(BACKGROUND CORRECTION FOR EVENT #1)

Concentrations of PCBs for POTW event 1 were determined using a different approach than was used for POTW events 2, 3, and 4. The 2.5 L effluent samples were filtered and the filter and filtrate extracted separately for all 4 events. For POTW events 2, 3, and 4, the filter and filtrate extracts were combined for cleanup and instrumental analysis as a single, whole sample. However, for event 1, the filter and filtrate extracts were not combined, and were instead put through cleanup procedures and analyzed as separate fractions. The results were reported as separate quantities for the filtrate (dissolved phase) and the filter (suspended phase), and the results combined for Tables 1 and 2. Additionally, the labeled standard recoveries were initially low for several filtrate samples in POTW event 1. As a result, the filtrates from the low recovery samples were reextracted, put through the cleanup procedures, combined with the original filtrate sample and reanalyzed. This reextraction was performed on the filtrate from Passaic Valley, Bergen County, Middlesex County, and on the filtrate method blank. The differences in PCB concentrations in the method blanks between POTW event 1 and the remaining POTW events are a result of these differences in preparation and handling.

Due to the differences in handling between POTW event 1 and the other POTW events, we recommend a different approach for treating the background results. Because POTW events 2, 3 and 4 were all handled in the same fashion, and because the method blanks for these events demonstrate consistent PCB levels (8.4-12.6 ng/L total PCBs), we recommend (as discussed above) that the value for the method blank for each of events 2, 3, and 4 be subtracted from the value generated for the field samples that were prepared with the same analytical batch (i.e., the method blank prepared in one laboratory analytical batch should be used to correct the data for the field samples prepared in that same analytical batch). This correction should be performed on an amount (picogram) and congener-by-congener basis for each POTW sample.

For POTW event 1 however, the most appropriate method for subtraction of background levels is more complicated; some of the samples (including the method blank) were subjected to a double extraction of the filtrate portion, which the data suggest introduced additional contamination, while for other samples the filtrate portion was only extracted once. It is therefore not appropriate to use the method blank to background subtract all POTW event 1 samples. Samples 1GLC00013 (Passaic Valley), 1GLC00022 (Passaic Valley duplicate), 1GLC00014 (Bergen County), 1GLC00018 (Middlesex County), 1GLC00020 (Bergen County matrix spike), 1GLC00021 (Bergen County matrix spike duplicate), and the method blank received a double filtrate extraction, while the filtrate from samples 1GLC00015 (Linden Roselle), 1GLC00016 (Joint Meeting), 1GLC00017 (Rahway Valley), 1GLC00019 (field blank), and 1GLC00023 (field blank) were only extracted once.

We considered two approaches for determining the appropriate background for the POTW event 1 samples with filtrates which were only extracted once. These approaches are (1) using the field blank background levels and the filter method blank, and (2) using half the filtrate method blank level and the filter method blank.

Using half the filtrate method blank levels (approach 2) assumes that each extraction of the filtrate method blank contributed an equal amount of background PCB contamination. In this case, the total PCB concentration for the method blank (half filtrate + filter) applicable to the single filtrate extraction for POTW event 1 samples would be roughly 12.3 ng/L.

The field blanks were processed as a single liquid-liquid extraction and, therefore, should approximate the method blank contribution from a single extraction of the filtrate. Two field blanks were collected and analyzed for POTW event 1 (1GLC00019 and 1GLC00023). Field blank 1GLC00023 was not considered for this exercise due to unusually high PCB levels; this sample is clearly an outlier and an anomaly since it had concentrations that were much higher than all other field *and* method blank levels measured throughout the project. Field blank 1GLC00019, on the other hand, had PCB levels that were comparable to those measured for the field blanks in subsequent events. These concentrations were about half the concentrations measured in the method blanks, also as observed in subsequent events. We therefore concluded that field blank 1GLC00019 is representative.

When the 1GLC00019 field blank results are combined with the filter method blank (approach 1), a total PCB background concentrations of 12.9 ng/L is obtained. Thus, both methods of determining PCB background levels from a single extraction of filtrate plus the filter method blank generate very similar outcomes (12.3 vs. 12.9 ng/L), and are consistent with background levels determined in POTW events 2, 3 and 4 (8.4-12.6 ng/L). Because the field blank results are based on actual measured sample values, rather than on an assumption that each extraction of the filtrate introduces equal amounts of contamination, we recommend using the concentrations from field blank 1GLC00019 for any filtrate background adjustment that is made to the single-extracted field samples. In addition, the POTW event 1 filtrate method blank was stored for an extended period of time in the laboratory before it was extracted the second time (along with the field samples that received a double extraction), potentially being exposed to additional contamination during the storage time that the single-extracted field samples would not be exposed to. Field blank 1GLC00019, on the other hand, was extracted and analyzed concurrently with the single-extracted field samples.

We recommend using the original POTW event 1 filtrate method blank results to adjust the concentrations measured in the samples that received a double filtrate extraction, just as would be the case for the method blank. The background subtraction should be performed on an amount (picogram) basis, congener-by-congener, with the filter and filtrate samples being subjected to the background subtraction before the results are combined to determine the total/combined sample concentrations.

REVIEW OF OTHER BACKGROUND CORRECTION METHODS

A number of different background/blank correction methods have been considered and used by scientists and other users of analytical data. Some are based on a detailed analysis of the data to generate a technically defensible method specific to an analytical method and dataset, while other methods include censoring approaches that are based on data rejection techniques using comparisons of the data to detection limits or some statistically elevated blank screening level. Data censoring based methods may significantly under-estimate the actual concentrations by “screening out” and rejecting data that may be valid and potentially important.

One additional background correction method was investigated with this dataset. The method involves calculating the average method blank concentration from multiple analytical batches and calculating the standard deviation in the measured concentration. The standard deviation is multiplied by two and added to the average concentration, and this final value is then subtracted from each field sample concentration. Negative values are replaced with null. This method relies on one value for each congener to correct all the data in a dataset (e.g., for all POTW effluent events) — batch-specific background values are not used for data correction. The method is based on a background correction approach described in Ferrario *et al*. (1996). The method blanks from POTW events 2, 3, and 4 were used for the purposes of this exercise, because those were handled and analyzed the same way.

Figure 4 presents the total PCB concentrations for POTW events 2, 3, and 4. The data are presented (1) without any background correction, (2) using the recommended background correction method, and (3) using the background correction method that is based on the average plus two times the standard deviation.

The average total PCB concentrations in the effluent for POTW events 2, 3, and 4 is approximately 20 ng/L using the recommended background correction method; this is after accounting for approximately 10 ng/L of background PCB, as discussed earlier. The average total PCB concentrations in the effluent for POTW events 2, 3, and 4 is approximately 15 ng/L using the average blank plus two times the standard deviation background correction method; the mainly municipal POTWs had total PCB concentrations mostly in the 2 to 10 ng/L range.

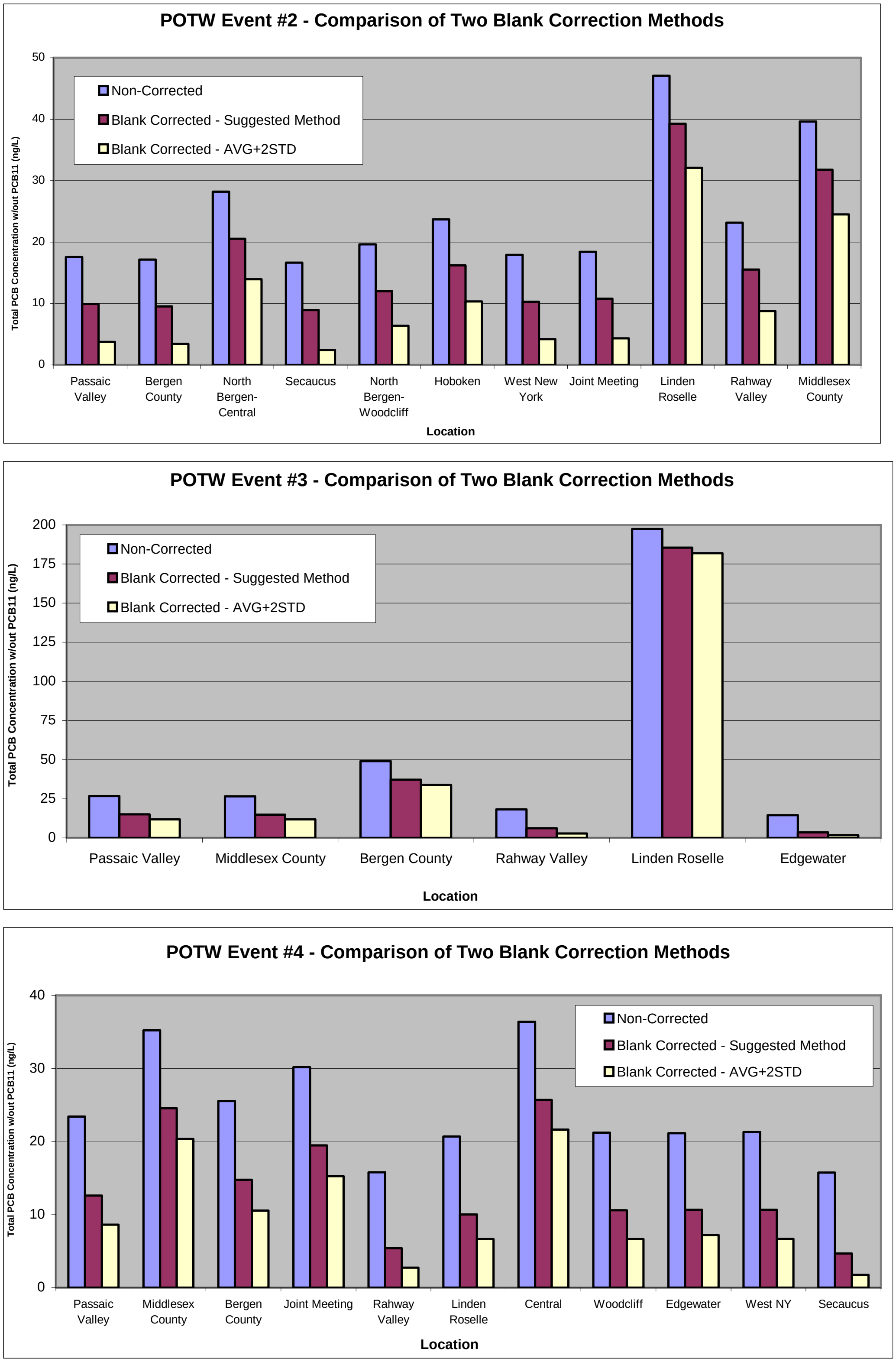


Figure 4: Total PCB Concentrations for Effluent from POTW Events 2, 3, and 4; Without and Using the Two Described Background Correction Methods

We feel that the background correction method that is based on the average blank level plus two times the standard deviation is inappropriate and that it likely under-estimates the effluent PCB concentrations. This method is based on statistical manipulations of multiple method blank concentrations, and such an analysis is not appropriate with only 3-4 replicates; there are not enough replicates to provide a reliable quantitative assessment of the precision, resulting in an artificially high standard deviation and in an over-correction of the background levels. In addition, this background correction method generated many more negative values following the background subtraction step than the recommended method, resulting in less confidence in the final data. Finally, many of the total PCB concentrations that were generated using this method were lower than one would expect, based on historical information and PCB trends and distribution in our environment, while the concentrations calculated using the recommended method were generally consistent with what can be expected (see discussion below).

Although this second tested background correction method probably does not under-estimate the PCB concentrations as much as some other data censoring methods, it is our opinion that it generates POTW effluent total PCB concentrations that are 4-6 ng/L lower than the actual concentrations. This can potentially significantly impact the final interpretation and use of the data because most of the effluent samples have total PCB concentrations in the 5-20 ng/L range (see below). The primary objective of the background correction is to generate final PCB concentrations that, as close as possible, represent the concentrations in the original POTW field samples. We feel that the originally recommended approach meets this objective.

GENERAL POTW EFFLUENT SAMPLE DATA SUMMARY

Figure 4 presents an overview of the average total PCB concentrations measured in NY and NJ POTW effluent samples collected during normal flow conditions in 1994-1995, and in the NJ POTW effluent samples collected in 2000-2001. None of these data include PCB11. The 1994-1995 data are based on the sum of a set of approximately 70 PCB congener "peaks"; not the more inclusive list of congeners used in the CARP Program. The 70 congeners generally include 90-95% of the total PCB, while the CARP congeners generally include >95% of the total PCB. The 1994-1995 data are the average of two normal flow POTW effluent sampling events (Durrell and Lizotte 1998), while the 2000-2001 NJ data are the average background corrected data from 2, 3, or 4 normal flow effluent sampling events (Table 1). Note that the plant designations for the 1994-1995 and 2000-2001 NJ POTWs are not the same (i.e., NJ-1 in 1994-1995 and NJ-1 in 2000-2001 may not be the same POTW).

The data in Figure 4 provide additional confidence in the newly generated NJ POTW effluent data, and support the background correction method described in this document. PCB concentrations have slowly declined in most US environments since PCBs were banned a little over 20 years ago. It is likely that the PCB concentrations in POTW streams also are gradually declining, as indicated by the data in Figure 4. The average total PCB concentration for the 12 NJ POTW effluents was approximately 30-35% lower for the samples collected in 2000-2001 than for those collected in 1994-1995 (18 ng/L vs. 28 ng/L). The mainly municipal POTWs had PCB concentrations mostly in the 15-20 ng/L range in 1994-1995 and mostly in the 8-15 ng/L range in 2000-2001, which also represents a decline of about 30-35%.

The average total PCB concentration was slightly lower for the NY than the NJ POTW samples in 1994-1995 (23 ng/L vs. 28 ng/L), which may be a reflection of the NY POTWs having a greater proportion of municipal rather than industrial dominated POTWs; the total PCB concentrations for the municipal dominated NY POTWs were mostly in the 15-20 ng/L range in 1994-1995, just as was the case for the NJ POTWs. If PCB concentrations have declined at the NY POTWs in a manner similar to the NJ POTWs in the past 6-7 years, one would expect an average total PCB concentration of about 15 ng/L in normal flow effluent from NY in 2000-2001; the total PCB concentrations at the municipal dominated NY POTWs would be expected to be in the 8-15 ng/L range.

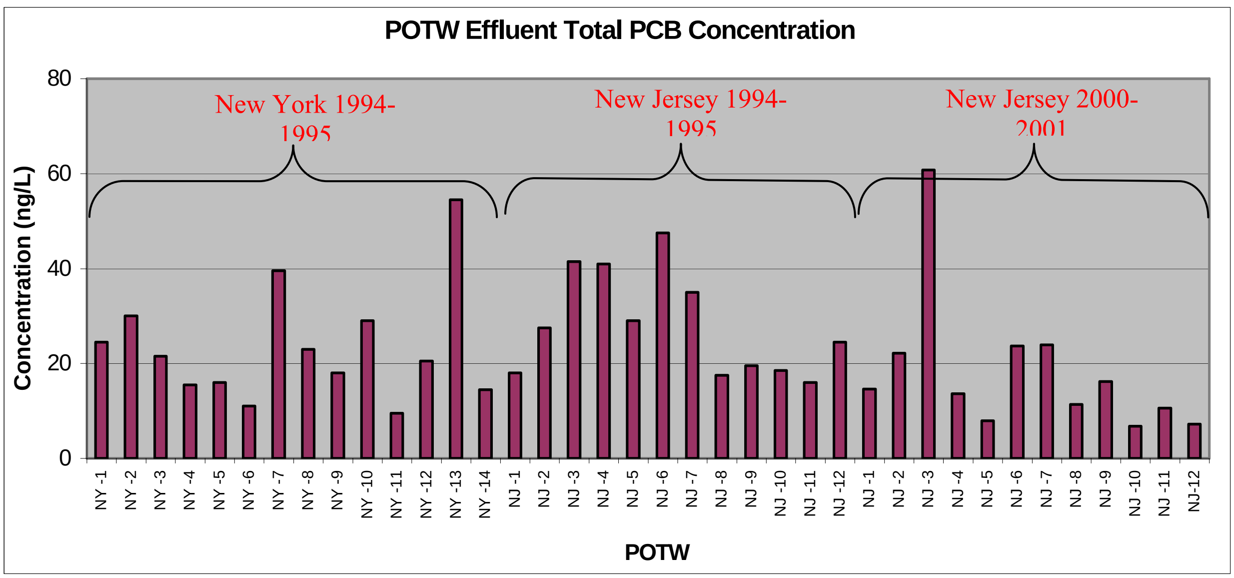


Figure 4: Approximate Average Total PCB Concentrations Measured in Selected NY and NJ POTW Effluent Samples During Normal Flow Condition

APPENDIX B.1
POTW EVENT #1 PCB DATA.

		Passaic Valley	Passaic Valley	Passaic Valley
SAMPLE ID		1GLC00013	1GLC00013	1GLC00013
SAMPLE VOLUME (L)		2.640	2.640	2.640
FRACTION		SUSPENDED	DISSOLVED	TOTAL
UNIT		PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**COEL_QUAL**	**RESULT**	**RESULT**	**RESULT**
3		1.49	71.27	72.76
4			646.39	646.39
10				
5				
8		529.32		529.32
19		210.51	148.73	359.24
18	C	1328.70	815.98	2144.68
30	C18			
11		115617.78	52495.15	168112.93
17		633.61	316.86	950.47
27		102.95	56.99	159.94
16		562.08	339.99	902.07
15		214.23		214.23
26	C	281.70	268.84	550.54
29	C26			
25		158.65	71.80	230.45
50	C	424.24	170.40	594.64
53	C50			
31		1192.77	509.45	1702.22
20	C	1127.18	594.84	1722.02
28	C20			
45	C	478.26	252.64	730.90
51	C45			
21	C	385.72	421.26	806.98
33	C21			
46		166.01	92.85	258.86
22		429.66	328.47	758.13
52		2591.81	1115.95	3707.76
43	C	57.50		57.50
73	C43			
49	C	1130.08	293.16	1423.24
69	C49			
48		302.80	72.60	375.40
104		5.47		5.47
44	C	1831.86	753.42	2585.28
47	C44			
65	C44			

		Passaic Valley	Passaic Valley	Passaic Valley
SAMPLE ID		1GLC00013	1GLC00013	1GLC00013
SAMPLE VOLUME (L)		2.640	2.640	2.640
FRACTION		SUSPENDED	DISSOLVED	TOTAL
UNIT		PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
62	C59			
75	C59			
59	C	117.57	28.17	145.74
42		481.11	110.95	592.06
40	C	913.34	202.24	1115.58
71	C40			
37		202.66	54.23	256.89
64		643.07	431.13	1074.20
95		1195.64	1367.90	2563.54
63		38.62	4.28	42.90
61	C	1401.16	289.40	1690.56
70	C61			
88	C	217.20	216.10	433.30
91	C88			
74	C61			
76	C61			
84		435.30	591.01	1026.31
66		665.35	212.95	878.30
56		350.15	135.36	485.51
60		200.05	62.31	262.36
92		230.60	222.32	452.92
90	C	1257.75	1229.40	2487.15
101	C90			
113	C90			
83	C	655.98	717.70	1373.68
99	C83			
136		126.62	146.10	272.72
108	C86			
125	C86			
119	C86			
97	C86			
86	C	1113.66	1315.98	2429.64
87	C86			
85	C	172.26	205.41	377.67
116	C85			
117	C85			
110	C	1350.20	1967.84	3318.04
115	C110			
81				
82		182.25	293.31	475.56
77		317.99	113.21	431.20
151	C135			
135	C	280.04	735.04	1015.08
154				
147	C	791.32		791.32

		Passaic Valley	Passaic Valley	Passaic Valley
SAMPLE ID		1GLC00013	1GLC00013	1GLC00013
SAMPLE VOLUME (L)		2.640	2.640	2.640
FRACTION		SUSPENDED	DISSOLVED	TOTAL
UNIT		PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
149	C147			
134	C	61.18	181.62	242.80
143	C134			
106	C	41.70	82.83	124.53
109	C106			
123	C106			
118		750.29	1016.04	1766.33
132		382.03	162.09	544.12
114		15.18	25.18	40.36
179		83.66	83.87	167.53
146		97.18	108.02	205.20
105		321.77	432.81	754.58
153	C	729.06	608.72	1337.78
168	C153			
141		195.16	85.86	281.02
137		68.81	131.02	199.83
129	C	699.12	832.64	1531.76
138	C129			
160	C129			
163	C129			
158		96.14	85.08	181.22
178		34.16	10.79	44.95
126				
166	C128			
128	C	154.86	191.88	346.74
187		193.72		193.72
183		99.94	45.84	145.78
185			26.84	26.84
174		243.90	24.42	268.32
177		96.25	18.52	114.77
167		25.24	32.70	57.94
171	C	54.94	27.08	82.02
173	C171			

		Passaic Valley	Passaic Valley	Passaic Valley
SAMPLE ID		1GLC00013	1GLC00013	1GLC00013
SAMPLE VOLUME (L)		2.640	2.640	2.640
FRACTION		SUSPENDED	DISSOLVED	TOTAL
UNIT		PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
201		10.26		10.26
156	C	80.20	96.04	176.24
157	C156			
200				
172		22.27	3.91	26.18
180	C	322.96		322.96
193	C180			
191				
170		147.84		147.84
190		22.24		22.24
169				
198	C	66.78	15.94	82.72
199	C198			
196		37.19	15.74	52.93
203		35.55	8.86	44.41
208		5.29		5.29
195		30.37		30.37
189			0.87	0.87
207		4.47		4.47
194		69.09		69.09
205				
206		8.09	20.28	28.37
209			5.95	5.95

	Bergen County	Bergen County	Bergen County
SAMPLE ID	1GLC00014	1GLC00014	1GLC00014
SAMPLE VOLUME (L)	2.600	2.600	2.600
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3			
4	210.76	644.04	854.80
10		53.18	53.18
5			
8	187.47	12.80	200.27
19	124.73	149.82	274.55
18	819.46	458.30	1277.76
30			
11	794.34	766.18	1560.52
17	423.20	159.61	582.81
27	82.89	36.07	118.96
16	331.66	181.63	513.29
15	153.54	102.98	256.52
26	155.04	84.60	239.64
29			
25	92.54	68.95	161.49
50	259.42	84.66	344.08
53			
31	699.00	293.70	992.70
20	841.14	297.80	1138.94
28			
45	328.86	185.12	513.98
51			
21	166.18	188.22	354.40
33			
46	92.52	72.03	164.55
22	251.10	229.17	480.27
52	2495.36	1854.53	4349.89
43	53.52	33.44	86.96
73			
49	964.88	510.92	1475.80
69			
48	263.56	138.58	402.14
104			
44	1645.59	1520.88	3166.47
47			
65			

	Bergen County	Bergen County	Bergen County
SAMPLE ID	1GLC00014	1GLC00014	1GLC00014
SAMPLE VOLUME (L)	2.600	2.600	2.600
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
62			
75			
59	101.04	54.93	155.97
42	355.32	193.68	549.00
40	649.92	377.84	1027.76
71			
37	127.05	74.29	201.34
64	544.96	597.78	1142.74
95	1575.62	2335.45	3911.07
63		11.72	11.72
61	1251.56	819.60	2071.16
70			
88	227.40	403.24	630.64
91			
74			
76			
84	542.60	1032.35	1574.95
66		346.19	346.19
56	226.99	208.77	435.76
60	115.02	104.69	219.71
92	324.40	497.92	822.32
90	1867.17	2549.43	4416.60
101			
113			
83	956.12	1342.90	2299.02
99			
136	133.49	185.40	318.89
108			
125			
119			
97			
86	1559.04	2126.46	3685.50
87			
85	269.01	459.15	728.16
116			
117			
110	2343.18	3260.60	5603.78
115			
81			

	Bergen County	Bergen County	Bergen County
SAMPLE ID	1GLC00014	1GLC00014	1GLC00014
SAMPLE VOLUME (L)	2.600	2.600	2.600
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
82	255.51	451.12	706.63
77	27.66	64.70	92.36
151			
135	285.46	816.16	1101.62
154			
147	1026.58	823.50	1850.08
149			
134	101.70	258.30	360.00
143			
106	70.89	112.62	183.51
109			
123			
118	946.40	1364.65	2311.05
132	527.80	557.42	1085.22
114	20.89	28.49	49.38
179	78.13	52.89	131.02
146	136.23	204.10	340.33
105	371.49	530.22	901.71
153	1053.78	1187.82	2241.60
168			
141	274.67	226.25	500.92
137	87.45	212.82	300.27
129	1515.00	1459.68	2974.68
138			
160			
163			
158	140.32	145.67	285.99
178	38.38	14.84	53.22
126			
166			
128	208.20	260.70	468.90
187	225.14	270.88	496.02
183	108.99	10.97	119.96
185			
174	236.45		236.45
177	107.14	63.95	171.09
167	35.99	41.47	77.46
171	59.80	33.30	93.10
173			

	Bergen County	Bergen County	Bergen County
SAMPLE ID	1GLC00014	1GLC00014	1GLC00014
SAMPLE VOLUME (L)	2.600	2.600	2.600
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
201	12.21		12.21
156	121.44	121.18	242.62
157			
200	13.46		13.46
172	31.52	7.58	39.10
180	428.54	11.64	440.18
193			
191	9.84	1.72	11.56
170	165.21	2.61	167.82
190	27.81		27.81
169			
198	70.48		70.48
199			
196	50.44	1.46	51.90
203	48.80		48.80
208	18.76	11.81	30.57
195	39.09		39.09
189		0.72	0.72
207	10.68	5.60	16.28
194	91.48		91.48
205			
206	53.63	25.44	79.07
209	6.71	8.61	15.32

	Linden Roselle	Linden Roselle	Linden Roselle
SAMPLE ID	1GLC00015	1GLC00015	1GLC00015
SAMPLE VOLUME (L)	2.630	2.630	2.630
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3		32.18	32.18
4		72.29	72.29
10			
5			
8		30.05	30.05
19	24.53	46.59	71.12
18	67.72	36.14	103.86
30			
11	60.19	126.34	186.53
17	20.50	8.21	28.71
27	13.98	11.50	25.48
16	16.57	24.70	41.27
15	1670.93	1242.29	2913.22
26	18.98	3.68	22.66
29			
25	7.66	5.10	12.76
50	78.72	18.76	97.48
53			
31	14.83	50.77	65.60
20	23.12	24.12	47.24
28			
45	173.00	76.38	249.38
51			
21		22.90	22.90
33			
46	31.94	11.80	43.74
22		32.79	32.79
52	1026.64	25.41	1052.05
43			
73			
49	342.14	26.52	368.66
69			
48	55.35		55.35
104			
44	1125.12	279.90	1405.02
47			
65			

	Linden Roselle	Linden Roselle	Linden Roselle
SAMPLE ID	1GLC00015	1GLC00015	1GLC00015
SAMPLE VOLUME (L)	2.630	2.630	2.630
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
62			
75			
59	44.97	3.93	48.90
42	111.05	10.24	121.29
40	203.76	9.06	212.82
71			
37	115.88	56.17	172.05
64	187.74		187.74
95	648.35	698.04	1346.39
63		13.54	13.54
61	284.12		284.12
70			
88	82.54	75.04	157.58
91			
74			
76			
84		204.50	204.50
66	44.67		44.67
56	35.96		35.96
60			
92		113.71	113.71
90	906.66	516.75	1423.41
101			
113			
83		212.10	212.10
99			
136	41.08	29.34	70.42
108			
125			
119			
97			
86	836.82	327.96	1164.78
87			
85	56.04	88.68	144.72
116			
117			
110	1192.30	471.26	1663.56
115			
81			

	Linden Roselle	Linden Roselle	Linden Roselle
SAMPLE ID	1GLC00015	1GLC00015	1GLC00015
SAMPLE VOLUME (L)	2.630	2.630	2.630
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
82	128.55	50.39	178.94
77	159.74	23.80	183.54
151			
135	297.56	35.34	332.90
154			
147		148.26	148.26
149			
134		2.88	2.88
143			
106	43.71		43.71
109			
123			
118	466.85	15.22	482.07
132	524.25	80.92	605.17
114	6.72		6.72
179	44.30	7.72	52.02
146	85.13	12.45	97.58
105	114.32	22.34	136.66
153	548.68	63.18	611.86
168			
141	141.00	12.40	153.40
137	31.87	10.99	42.86
129	804.77	73.36	878.13
138			
160			
163			
158	74.34	5.28	79.62
178	19.00	7.89	26.89
126	27.01		27.01
166			
128	101.96	19.00	120.96
187	111.47	39.70	151.17
183	51.11	22.56	73.67
185		0.44	0.44
174	106.20	37.85	144.05
177	58.83	12.07	70.90
167	21.87	5.13	27.00
171	30.74	3.76	34.50
173			

	Linden Roselle	Linden Roselle	Linden Roselle
SAMPLE ID	1GLC00015	1GLC00015	1GLC00015
SAMPLE VOLUME (L)	2.630	2.630	2.630
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
201	5.09	2.89	7.98
156	45.10	12.36	57.46
157			
200		1.57	1.57
172	17.84	3.20	21.04
180	192.16	18.64	210.80
193			
191			
170	84.67	6.59	91.26
190	15.90	1.58	17.48
169			
198	38.64	7.86	46.50
199			
196	12.24		12.24
203	18.28		18.28
208	4.22	3.93	8.15
195	21.85	3.33	25.18
189			
207			
194	53.16	8.54	61.70
205			
206	3.53	5.77	9.30
209		2.44	2.44

	Joint Meeting	**Joint Meeting**	**Joint Meeting**
SAMPLE ID	1GLC00016	1GLC00016	1GLC00016
SAMPLE VOLUME (L)	2.640	2.640	2.640
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3		6.13	6.13
4	43.75	350.48	394.23
10			
5			
8		30.72	30.72
19	51.78	74.43	126.21
18	354.70	269.12	623.82
30			
11	181.99	308.43	490.42
17	183.82	107.14	290.96
27	33.31	25.60	58.91
16	161.36	153.47	314.83
15	70.99	129.45	200.44
26	79.40	29.42	108.82
29			
25	45.07	23.10	68.17
50	110.50	30.04	140.54
53			
31	319.61	264.58	584.19
20	317.10	253.60	570.70
28			
45	135.10	42.38	177.48
51			
21		112.74	112.74
33			
46	43.43	19.45	62.88
22	133.91	137.88	271.79
52	1439.66		1439.66
43			
73			
49	515.14		515.14
69			
48	123.41		123.41
104			
44	878.04		878.04
47			
65			

	Joint Meeting	Joint Meeting	Joint Meeting
SAMPLE ID	1GLC00016	1GLC00016	1GLC00016
SAMPLE VOLUME (L)	2.640	2.640	2.640
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
62			
75			
59	55.44	4.68	60.12
42	184.48		184.48
40	252.64		252.64
71			
37	84.97	52.28	137.25
64	299.73		299.73
95	1141.02	468.12	1609.14
63	15.94	12.22	28.16
61	457.36		457.36
70			
88	160.74	63.00	223.74
91			
74			
76			
84	372.93	173.50	546.43
66	216.11		216.11
56	78.43	2.82	81.25
60	64.12		64.12
92	260.02	97.79	357.81
90	1448.76	425.28	1874.04
101			
113			
83	745.72	215.04	960.76
99			
136	87.91	46.29	134.20
108			
125			
119			
97			
86	1226.22	356.76	1582.98
87			
85	210.96	83.28	294.24
116			
117			
110	1558.12	519.62	2077.74
115			
81		27.51	27.51

	Joint Meeting	Joint Meeting	Joint Meeting
SAMPLE ID	1GLC00016	1GLC00016	1GLC00016
SAMPLE VOLUME (L)	2.640	2.640	2.640
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
82	158.90	58.82	217.72
77	31.15	2.70	33.85
151			
135	237.00	74.66	311.66
154			
147	809.90	258.60	1068.50
149			
134	72.66	7.02	79.68
143			
106			
109			
123			
118	804.07		804.07
132	428.16	96.25	524.41
114	15.07		15.07
179	70.97	8.72	79.69
146	118.99	24.08	143.07
105	280.61	26.60	307.21
153	888.56	134.36	1022.92
168			
141	210.24	27.42	237.66
137	60.39	13.75	74.14
129	1245.40	196.44	1441.84
138			
160			
163			
158	117.46	19.33	136.79
178	28.59	7.45	36.04
126			
166			
128	182.80	26.22	209.02
187	199.00	29.17	228.17
183		13.59	13.59
185	17.45	2.27	19.72
174		28.46	28.46
177	98.06	11.56	109.62
167	31.09	4.32	35.41
171	57.22	3.86	61.08
173			

	Joint Meeting	Joint Meeting	Joint Meeting
SAMPLE ID	1GLC00016	1GLC00016	1GLC00016
SAMPLE VOLUME (L)	2.640	2.640	2.640
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
201	8.54	4.18	12.72
156	107.74	20.62	128.36
157			
200		3.90	3.90
172	28.79	1.73	30.52
180	354.34	33.30	387.64
193			
191		3.50	3.50
170	148.15	16.40	164.55
190	25.96	2.31	28.27
169			
198	61.14	12.36	73.50
199			
196			
203	39.05		39.05
208	12.40	4.76	17.16
195	32.63	7.91	40.54
189		2.82	2.82
207	7.66		7.66
194	88.79	13.10	101.89
205			
206	27.73	9.84	37.57
209	0.61	3.42	4.03

	Rahway Valley	Rahway Valley	Rahway Valley
SAMPLE ID	1GLC00017	1GLC00017	1GLC00017
SAMPLE VOLUME (L)	1.780	1.780	1.780
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3			
4		186.37	186.37
10			
5			
8			
19	7.76	34.70	42.46
18	103.46	172.16	275.62
30			
11	44.84	175.95	220.79
17	44.87	66.04	110.91
27	6.54	13.41	19.95
16	40.24	89.88	130.12
15	14.28	52.11	66.39
26	16.50	12.58	29.08
29			
25	7.51	7.84	15.35
50	42.76	34.56	77.32
53			
31	60.40	159.64	220.04
20	61.40	165.94	227.34
28			
45	47.74	43.98	91.72
51			
21		31.36	31.36
33			
46	14.40	17.04	31.44
22	15.68	76.01	91.69
52	535.37		535.37
43	12.48		12.48
73			
49	176.54		176.54
69			
48	27.41		27.41
104			
44	301.53		301.53
47			
65			

	Rahway Valley	Rahway Valley	Rahway Valley
SAMPLE ID	1GLC00017	1GLC00017	1GLC00017
SAMPLE VOLUME (L)	1.780	1.780	1.780
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
62			
75			
59	13.23		13.23
42	55.29		55.29
40	83.36		83.36
71			
37	22.49	25.62	48.11
64			
95	373.04	156.06	529.10
63	8.82		8.82
61	30.00		30.00
70			
88	49.98		49.98
91			
74			
76			
84	126.68	79.00	205.68
66	14.79		14.79
56			
60	0.77		0.77
92	84.52	25.11	109.63
90	496.71	140.97	637.68
101			
113			
83	252.22	43.36	295.58
99			
136	19.72	15.96	35.68
108			
125			
119			
97			
86	20.46		20.46
87			
85	62.43	38.91	101.34
116			
117			
110	528.38	188.16	716.54
115			
81			

	Rahway Valley	Rahway Valley	Rahway Valley
SAMPLE ID	1GLC00017	1GLC00017	1GLC00017
SAMPLE VOLUME (L)	1.780	1.780	1.780
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
82	60.21	39.63	99.84
77	2.60		2.60
151			
135	50.62	17.26	67.88
154			
147	188.12	65.98	254.10
149			
134	21.76	11.40	33.16
143			
106	7.50		7.50
109			
123			
118	200.21		200.21
132	110.88	26.17	137.05
114	2.50		2.50
179	11.46		11.46
146	25.60	1.48	27.08
105	69.79		69.79
153	204.78		204.78
168			
141	47.86	6.26	54.12
137	14.73	3.66	18.39
129	326.84		326.84
138			
160			
163			
158	31.63		31.63
178	3.24	0.15	3.39
126			
166			
128	51.18		51.18
187	26.16	0.53	26.69
183	8.47		8.47
185	0.38		0.38
174			
177	18.23		18.23
167	4.89		4.89
171	14.50		14.50
173			

	Rahway Valley	Rahway Valley	Rahway Valley
SAMPLE ID	1GLC00017	1GLC00017	1GLC00017
SAMPLE VOLUME (L)	1.780	1.780	1.780
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
201	1.06	3.30	4.36
156	20.62	9.08	29.70
157			
200	1.13		1.13
172	5.69		5.69
180	51.80		51.80
193			
191	3.00		3.00
170	28.16	5.48	33.64
190	6.35		6.35
169			
198	7.94	11.70	19.64
199			
196	4.34	1.19	5.53
203	4.31		4.31
208			0.00
195	8.52	8.41	16.93
189			
207			
194	20.65	12.02	32.67
205			
206			
209			

	Middlesex County	Middlesex County	Middlesex County
SAMPLE ID	1GLC00018	1GLC00018	1GLC00018
SAMPLE VOLUME (L)	2.620	2.620	2.620
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3		17.89	17.89
4	305.29	1345.63	1650.92
10		85.59	85.59
5			
8	672.06	678.10	1350.16
19	174.16	193.23	367.39
18	1605.42	887.12	2492.54
30			
11	331.69	541.93	873.62
17	724.70	232.43	957.13
27	99.99	43.62	143.61
16	805.64	306.38	1112.02
15	291.90	249.86	541.76
26	265.16	102.88	368.04
29			
25	111.31	42.81	154.12
50	260.20	69.38	329.58
53			
31	1384.06		1384.06
20	1455.66	371.40	1827.06
28			
45	521.02	212.98	734.00
51			
21	558.62	281.20	839.82
33			
46	112.18	48.53	160.71
22	534.08	294.95	829.03
52	2157.69	508.93	2666.62
43	68.52	27.52	96.04
73			
49	989.28	135.26	1124.54
69			
48	407.28	64.82	472.10
104			
44	2294.55	734.91	3029.46
47			
65			

	Middlesex County	Middlesex County	Middlesex County
SAMPLE ID	1GLC00018	1GLC00018	1GLC00018
SAMPLE VOLUME (L)	2.620	2.620	2.620
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
62			
75			
59	149.01	20.16	169.17
42	465.60	55.08	520.68
40	720.88	60.58	781.46
71			
37	260.85	47.24	308.09
64	723.04	357.60	1080.64
95	993.59	351.12	1344.71
63	36.38		36.38
61	1289.88		1289.88
70			
88	187.38	41.94	229.32
91			
74			
76			
84	376.58	173.68	550.26
66	691.92		691.92
56	306.85		306.85
60	192.28		192.28
92	217.62		217.62
90	1214.19		1214.19
101			
113			
83	649.74	29.52	679.26
99			
136	72.82		72.82
108			
125			
119			
97			
86	1071.06	295.14	1366.20
87			
85	206.43	1.83	208.26
116			
117			
110	1278.68	671.52	1950.20
115			
81			

	Middlesex County	Middlesex County	Middlesex County
SAMPLE ID	1GLC00018	1GLC00018	1GLC00018
SAMPLE VOLUME (L)	2.620	2.620	2.620
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
82	184.29	123.30	307.59
77	48.24	42.22	90.46
151			
135	150.40	384.34	534.74
154			
147	523.76		523.76
149			
134	54.66	114.28	168.94
143			
106		19.86	19.86
109			
123			
118	566.64	158.93	725.57
132	266.57		266.57
114		7.76	7.76
179	35.52	32.50	68.02
146	66.91		66.91
105	218.68	163.63	382.31
153	495.20		495.20
168			
141	137.57		137.57
137	29.01	33.98	62.99
129	726.56	133.32	859.88
138			
160			
163			
158	71.64	20.11	91.75
178	15.99		15.99
126			
166			
128	98.80	151.94	250.74
187	92.60	199.53	292.13
183	50.17		50.17
185	6.62	15.23	21.85
174	122.26		122.26
177	49.01		49.01
167	13.49	12.02	25.51
171	26.50	9.26	35.76
173			

	Middlesex County	Middlesex County	Middlesex County
SAMPLE ID	1GLC00018	1GLC00018	1GLC00018
SAMPLE VOLUME (L)	2.620	2.620	2.620
FRACTION	SUSPENDED	DISSOLVED	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
201	5.44	10.44	15.88
156	43.58	46.36	89.94
157			
200			
172	13.42		13.42
180	148.52		148.52
193			
191	4.19		4.19
170	64.13		64.13
190	12.84		12.84
169			
198	29.00		29.00
199			
196	10.66		10.66
203	18.99		18.99
208	1.97	5.02	6.99
195	13.78		13.78
189			
207		1.44	1.44
194	35.98		35.98
205			
206		7.64	7.64
209		1.93	1.93

APPENDIX B.2 POTW EVENT #2 PCB DATA.

	Passaic Valley	Bergen County	North Bergen-Central
SAMPLE ID	1GLC00030	1GLC00031	1GLC00032
SAMPLE VOLUME (L)	2.65	2.64	2.64
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3	37.29		20.83
4	924.17	610.84	562.61
10		29.94	46.27
5			
8			
19	135.46	76.91	177.24
18	671.92	426.68	702.56
30			
11	52686.92		3182.90
17	311.40	203.71	395.45
27			
24	41.14	40.20	111.62
16	271.91	161.04	317.95
15			
26	178.16	75.46	201.40
29			
25	90.26	53.68	89.02
50	124.38	123.70	318.78
53			
31	812.85	485.62	851.26
20	1112.28	529.00	1180.32
28			
45	161.02	157.54	392.66
51			
21			
33			
46	55.69		97.97
22	271.44	165.19	324.91
52			
43	1099.17	1175.34	2737.35
73			
49	453.42	385.48	1249.18
69	0.00		
48	108.30	107.73	247.30
104			12.22
44	747.84	860.07	2013.15
47			

	Passaic Valley	Bergen County	North Bergen-Central
SAMPLE ID	1GLC00030	1GLC00031	1GLC00032
SAMPLE VOLUME (L)	2.65	2.64	2.64
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
65			
62			
75			
59	42.75	39.45	114.03
42	145.56	164.79	385.09
40	387.93	362.49	857.85
41			
71			
37	163.86	96.34	269.77
64	224.54	248.56	575.96
95			
100			
93	805.10	968.50	1994.50
102			
98			
63	23.58		
61	1450.64	1546.52	2724.72
70			
88	399.82	396.58	755.46
91			
74			
76			
84	289.47	324.62	524.21
66	617.05	642.33	1273.24
56	320.80	290.70	473.66
60	162.03	153.43	271.79
92	166.35	203.48	460.60
90	1025.40	1040.28	2225.37
101			
113			
83	546.48	481.64	1096.68
99			
136	145.77	138.50	447.35
108			
125			
119			
97			
86	796.68	745.98	1445.70
87			

	Passaic Valley	Bergen County	North Bergen-Central
SAMPLE ID	1GLC00030	1GLC00031	1GLC00032
SAMPLE VOLUME (L)	2.65	2.64	2.64
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
85	168.54	128.04	340.05
116			
117			
110	1098.16	1017.24	1824.66
115			
81			
82	140.07	108.49	208.88
77	252.92	27.63	
151			
135	392.64	317.73	1221.48
154			
147	1162.74	1024.10	3367.84
149			
134	101.28	101.98	198.16
143			
106	94.77	96.77	142.23
109			
123			
118	1308.91	1308.71	1745.44
132	510.92	458.83	1344.07
114	49.44		51.51
179	88.68	55.70	248.46
146	150.34	132.64	491.54
161			
105	438.66	413.15	557.21
153	1007.16	1633.98	3251.62
168			
141	276.46	230.51	672.58
137	152.32	143.02	374.44
164			
129	1263.48	2270.00	3576.80
138			
160			
163			
158	135.74	229.91	323.66
178	45.50	25.77	125.54
126			
166			
128	197.08	195.20	495.54

	Passaic Valley	Bergen County	North Bergen-Central
SAMPLE ID	1GLC00030	1GLC00031	1GLC00032
SAMPLE VOLUME (L)	2.65	2.64	2.64
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
187	241.34	171.90	732.82
183	112.60	83.55	348.90
185	20.00	9.02	
174	204.07	126.90	555.33
177	101.06	76.25	362.99
167	33.88	42.37	64.88
171	63.32	43.50	186.84
173			
201	17.87		39.78
156	118.30	137.28	184.88
157			
200	14.96	11.15	39.37
172	42.65	36.22	116.20
180	402.38	297.50	1169.06
193			
191			22.31
170	165.93	136.94	492.04
190	32.85	26.75	99.03
169			
198	109.76	101.42	292.02
199			
196	46.60	44.37	129.91
203	64.99	66.59	178.44
208		20.20	37.85
195		44.74	128.92
189	11.50	9.15	
207	8.76		25.96
194	91.26	93.18	299.37
205		3.87	
206	44.56	50.97	123.86
209	28.63	28.27	88.56

	Secaucus	North Bergen-Woodcliff	Hoboken
SAMPLE ID	1GLC00033	1GLC00034	1GLC00035
SAMPLE VOLUME (L)	2.64	2.65	2.65
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3	5.35	10.82	
4	417.63	56.44	803.20
10			60.25
5			
8			
19	91.83	10.27	173.50
18	93.48	263.42	1076.46
30			
11			
17	66.71	127.66	522.97
27			
24	34.90	30.36	101.06
16	24.07	140.60	386.47
15	128.46		937.99
26	29.94	55.06	381.48
29			
25	20.74	24.03	
50	99.60	101.72	349.42
53			
31	107.37	438.86	1515.28
20	160.28	620.32	1311.08
28			
45	118.06	113.78	454.38
51			
21			
33			
46	29.44	49.52	118.22
22	35.68	134.91	360.38
52			
43	970.71	3388.41	2865.09
73			
49	426.00	777.08	1490.48
69			
48	53.46	158.10	274.91
104	1.21	0.26	6.01
44	688.74	1729.29	2162.19
47			

	Secaucus	North Bergen-Woodcliff	Hoboken
SAMPLE ID	1GLC00033	1GLC00034	1GLC00035
SAMPLE VOLUME (L)	2.64	2.65	2.65
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
65			
62			
75			
59	33.63	69.57	160.38
42	119.66	259.26	493.69
40	249.36	522.78	1024.83
41			
71			
37	55.59	111.66	486.36
64	205.79	526.35	874.62
95			
100			
93	819.20	1837.55	1519.80
102			
98			
63	17.05	29.63	61.89
61	1145.32	2660.92	2761.84
70			
88	395.10	736.48	662.74
91			
74			
76			
84	258.07	661.29	480.02
66	528.33	740.63	1211.12
56	182.02	332.29	524.68
60	126.20	186.64	328.07
92	229.29	370.00	393.29
90	1231.17	1952.85	1876.65
101			
113			
83	669.54	968.10	976.68
99			
136	95.90	165.09	143.84
108			
125			
119			
97			
86	839.04	1354.32	1168.62
87			

	Secaucus	North Bergen-Woodcliff	Hoboken
SAMPLE ID	1GLC00033	1GLC00034	1GLC00035
SAMPLE VOLUME (L)	2.64	2.65	2.65
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
85	217.68	273.54	259.98
116			
117			
110	1460.78	1955.64	1842.16
115			
81			
82	139.41	188.35	220.98
77	29.88		214.88
151			
135	320.04	576.24	699.84
154			
147	1112.18	1101.96	1220.10
149			
134	87.34	105.64	87.20
143			
106	103.50	86.13	104.78
109			
123			
118	1359.88	975.76	1219.40
132	614.66	533.86	498.80
114	50.28		47.59
179	69.59	50.93	97.11
146	183.76	139.42	176.64
161			
105	504.62	296.31	400.00
153	1276.90	945.26	1970.72
168			
141	302.49	221.89	275.20
137	213.84	142.60	163.56
164			
129	1859.04	1205.48	
138			
160			
163			
158	176.99	123.45	129.45
178	39.93	25.63	47.36
126		34.22	
166			
128	311.98	174.68	203.78

	Secaucus	North Bergen-Woodcliff	Hoboken
SAMPLE ID	1GLC00033	1GLC00034	1GLC00035
SAMPLE VOLUME (L)	2.64	2.65	2.65
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
187	223.15	126.15	292.58
183	105.25	68.78	132.96
185	21.60	9.37	21.16
174	186.21	71.54	228.14
177	122.42	68.78	144.16
167	66.95	21.61	42.78
171	71.04	38.52	69.94
173			
201	13.24	7.38	19.34
156	228.30	67.90	101.92
157			
200	16.04		
172	46.99		48.24
180	434.36	195.64	475.02
193			
191	9.28		
170	216.97	88.50	220.30
190	40.40		44.52
169			
198	102.50	51.26	165.80
199			
196	37.71	20.05	57.84
203	66.22	31.93	96.95
208	16.71		29.70
195	33.93	17.54	45.52
189	10.61	7.35	9.63
207	7.71		
194	88.98	41.92	121.58
205	3.89	1.90	
206	49.32	30.84	67.20
209	30.98	24.91	28.39

	West New York	Joint Meeting	Linden Roselle
SAMPLE ID	1GLC00036	1GLC00038	1GLC00039
SAMPLE VOLUME (L)	2.65	2.65	2.64
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3	2.40		
4	50.71	377.49	427.85
10		26.41	24.04
5			
8			
19	13.40	61.93	224.07
18	243.86	352.76	2431.44
30			
11			217.96
17	109.68	184.90	1020.20
27			
24	28.50	46.64	286.22
16	113.81	168.48	1088.73
15			2488.57
26	41.12	64.04	341.46
29			
25	20.63	33.47	174.93
50	65.68	110.64	695.22
53			
31	216.93	229.95	2647.74
20	445.20	148.12	3056.44
28			
45	90.84	125.54	1150.48
51			
21			
33			
46		43.23	
22	93.23	58.73	766.39
52			
43	1641.81	1679.64	6317.82
73			
49	525.80	530.48	3068.98
69			
48	103.27	137.95	680.82
104			
44	977.82	1015.68	5284.59
47			

	West New York	Joint Meeting	Linden Roselle
SAMPLE ID	1GLC00036	1GLC00038	1GLC00039
SAMPLE VOLUME (L)	2.65	2.65	2.64
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
65			
62			
75			
59	56.10	52.62	328.35
42	174.15	198.65	1235.72
40	352.56	401.37	2174.58
41			
71			
37	79.19	75.07	771.93
64	360.98	322.69	1533.07
95			
100			
93	1284.25	1349.40	3409.75
102			
98			
63			
61	1355.00	1521.04	4913.04
70			
88	554.06	548.10	1208.82
91			
74			
76			
84	471.89	380.86	1173.20
66	614.38	554.25	2380.69
56	282.01	211.70	1434.25
60	147.83	118.99	527.17
92	343.65	301.91	734.57
90	1689.48	1606.47	4016.76
101			
113			
83	919.86	781.06	2392.42
99			
136	156.06	182.31	500.09
108			
125			
119			
97			
86	1276.32	1129.02	3095.64
87			

	West New York	Joint Meeting	Linden Roselle
SAMPLE ID	1GLC00036	1GLC00038	1GLC00039
SAMPLE VOLUME (L)	2.65	2.65	2.64
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
85	231.51	294.42	800.16
116			
117			
110	1874.12	1715.28	4779.34
115			
81			
82	197.07	185.32	597.39
77	30.43	45.52	608.45
151			
135	356.16	434.13	1795.77
154			
147	1222.74	1215.36	4462.62
149			
134	108.10	107.78	324.54
143			
106	64.28	92.94	314.98
109			
123			
118	986.05	1149.18	3918.36
132	616.93	644.56	2448.41
114	44.28	50.84	99.35
179	81.67	100.89	296.55
146	174.74	191.24	449.68
161			
105	306.68	455.59	1440.99
153	2036.02	1325.10	2998.16
168			
141	265.15	307.47	691.21
137	176.62	206.96	498.24
164			
129	1437.56	1826.64	4191.96
138			
160			
163			
158	137.60	171.37	413.58
178	39.95	47.85	148.21
126			
166			
128	213.62	287.54	651.96

	West New York	Joint Meeting	Linden Roselle
SAMPLE ID	1GLC00036	1GLC00038	1GLC00039
SAMPLE VOLUME (L)	2.65	2.65	2.64
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
187	221.28	303.48	890.99
183	101.78	161.13	464.35
185		16.83	
174	152.47	222.70	667.72
177	99.94	125.99	404.85
167	30.40	48.20	156.66
171	47.78	81.00	227.50
173			
201	12.62	16.40	54.56
156	91.68	155.02	505.42
157			
200	10.91	15.13	53.49
172	38.67	49.30	139.30
180	341.68	525.82	1536.44
193			
191			33.02
170	144.54	237.29	694.14
190	30.62	46.45	122.07
169			
198	89.36	137.84	405.14
199			
196	29.37	50.84	157.28
203	51.86	81.49	234.84
208	22.66	23.52	65.13
195	31.15	36.65	113.45
189		10.69	24.19
207		9.97	33.17
194	75.23	105.58	285.07
205		5.23	
206	49.59	61.30	188.99
209	39.72	26.48	70.96

	Rahway Valley	Middlesex County
SAMPLE ID	1GLC00040	1GLC00041
SAMPLE VOLUME (L)	2.65	2.58
FRACTION	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**
3	2.18	150.60
4	385.63	1323.82
10	18.82	102.29
5		
8		
19	49.86	196.29
18	583.74	1857.74
30		
11		
17	303.21	858.64
27		
24	59.64	20.28
16	316.62	864.74
15		
26	100.58	269.80
29		
25	53.18	101.77
50	189.04	251.52
53		
31	642.50	1448.86
20	378.12	1944.40
28		
45	210.02	489.28
51		
21		
33		
46	65.28	122.51
22	177.30	626.03
52		
43	1906.77	2734.44
73		
49	764.70	1185.58
69		
48	178.91	418.97
104		
44	1211.10	2387.46
47		

	Rahway Valley	Middlesex County
SAMPLE ID	1GLC00040	1GLC00041
SAMPLE VOLUME (L)	2.65	2.58
FRACTION	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE
65		
62		
75		
59	77.19	164.07
42	263.84	514.86
40	587.46	1123.74
41		
71		
37	127.61	448.41
64	420.25	823.28
95		
100		
93	1858.60	3361.75
102		
98		
63		70.04
61	1452.52	4102.36
70		
88	683.48	1352.26
91		
74		
76		
84	652.03	1356.37
66	653.93	1936.13
56	297.53	934.63
60	131.78	549.15
92	417.49	933.45
90	2261.43	5298.66
101		
113		
83	1200.16	2849.38
99		
136	445.03	641.54
108		
125		
119		
97		
86	1679.40	4019.16
87		

	Rahway Valley	Middlesex County
SAMPLE ID	1GLC00040	1GLC00041
SAMPLE VOLUME (L)	2.65	2.58
FRACTION	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE
85	279.72	865.59
116		
117		
110	2371.08	6377.16
115		
81		
82	208.60	738.28
77	63.03	163.15
151		
135	979.86	1459.92
154		
147	2787.00	3127.08
149		
134	220.84	267.08
143		
106	126.31	298.41
109		
123		
118	1834.95	4337.60
132	1565.93	1682.02
114	55.45	109.88
179	118.04	235.42
146	225.86	455.10
161		
105	671.67	1407.43
153	1718.38	3236.92
168		
141	385.33	755.21
137	283.18	480.46
164		
129	2386.76	3914.92
138		
160		
163		
158	242.59	416.06
178		106.32
126		
166		
128	392.74	531.72

	Rahway Valley	Middlesex County
SAMPLE ID	1GLC00040	1GLC00041
SAMPLE VOLUME (L)	2.65	2.58
FRACTION	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE
187	346.24	526.03
183	203.87	272.02
185		43.30
174	305.43	385.63
177	194.03	173.57
167	62.62	91.01
171	111.48	104.46
173		
201		21.62
156	214.50	262.14
157		
200	26.28	23.26
172	66.48	55.63
180	718.36	500.54
193		
191	15.00	
170	346.16	209.17
190	54.58	36.27
169		
198	168.88	118.10
199		
196	79.93	56.19
203	107.02	74.93
208		16.31
195	66.18	27.35
189		16.90
207		
194	161.52	63.17
205		
206	93.38	38.23
209	37.93	23.33

APPENDIX B.3 POTW EVENT #3 PCB DATA.

	Passaic Valley	Middlesex County	Bergen County
SAMPLE ID	1GLC00073	1GLC00074	1GLC00075
SAMPLE VOLUME (L)	2.61	2.60	2.60
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3	40.76	193.47	640.36
4	2111.71	1239.33	11720.10
10			152.23
5			
8	614.15	1962.58	1322.81
19	522.49	451.78	3216.94
18	1694.46	1541.84	3200.32
30			
11	457489.75	11618.15	1913.20
17	1251.58	1268.00	5742.76
27			
24			1305.30
16	801.42	1135.92	931.61
15	270.81	470.56	557.04
26	326.98	414.42	880.76
29			
25	284.68	180.36	1745.67
50	359.28	231.46	920.20
53			
31	1357.52	2102.74	2873.65
20	2050.96	3879.72	5874.08
28			
45	396.14	489.20	2255.12
51			
21			
33			
46	123.68	134.73	283.94
22	513.37	1111.40	732.57
52			
43	2188.29	1907.46	5525.31
73			
49	1136.78	1076.76	3778.86
69			
48	330.02	474.80	423.73
104			
44	1809.69	1630.02	6558.72
47			

	Passaic Valley	Middlesex County	Bergen County
SAMPLE ID	1GLC00073	1GLC00074	1GLC00075
SAMPLE VOLUME (L)	2.61	2.60	2.60
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
65			
62			
75			
59		149.49	305.31
42	432.24	516.68	978.02
40	975.95	1129.62	2405.52
41			
71			
37	198.12	455.64	234.03
64	520.75	666.36	750.85
95			
100			
93	893.90	699.30	2082.20
102			
98			
63	77.03	68.46	269.90
61	1945.32	2459.72	2756.12
70			
88	181.70	146.40	263.38
91			
74			
76			
84	255.39	243.20	734.23
66	993.43	1151.42	2263.62
56	523.14	691.21	673.54
60	290.34	470.88	411.19
92	198.06	145.01	553.22
90	920.70	701.34	2382.45
101			
113			
83	522.06	451.82	1342.86
99			
136	176.87	111.21	227.39
109			
125			
119			
97			
86	656.46	507.42	1738.32
87			

	Passaic Valley	Middlesex County	Bergen County
SAMPLE ID	1GLC00073	1GLC00074	1GLC00075
SAMPLE VOLUME (L)	2.61	2.60	2.60
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
85	113.40	124.92	337.41
116			
117			
110	1084.42	640.30	2473.62
115			
81			
82	124.44	109.57	285.57
77	999.34	29.45	153.05
151			
135	535.29	214.53	554.70
154			
147	967.18	426.10	1394.46
149			
134	37.08	23.02	115.18
143			
106	21.61	31.51	208.15
107			
123			
118	756.10	458.49	1916.76
132	399.53	287.75	796.64
114	49.12	53.05	85.97
179	167.29	86.76	115.19
146	132.90	73.96	194.92
161			
105			
153	937.68	484.46	1373.12
168			
141	176.52	96.88	289.06
137		85.20	217.68
164			
129	950.04	641.92	1871.72
138			
160			
163			
158		64.07	170.93
178	76.69	50.26	57.13
126			
166			
128	109.26	84.38	333.20

	Passaic Valley	Middlesex County	Bergen County
SAMPLE ID	1GLC00073	1GLC00074	1GLC00075
SAMPLE VOLUME (L)	2.61	2.60	2.60
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
187	423.28	283.72	325.09
183	222.07	131.26	160.50
185			
174	376.81	231.56	257.05
177	183.12	120.86	159.34
167	24.85	27.42	46.45
171	103.96	75.46	85.66
173			
201	33.45	15.53	25.55
156			
157			
200		27.70	
172	64.44	34.69	46.00
180	755.04	509.36	600.62
193			
191		10.62	
170	316.70	212.52	267.37
190	61.47	38.70	42.29
169			31.50
198	275.38	111.94	188.40
199			
196	112.13	51.68	70.85
203	137.67		103.32
208	46.33	24.31	31.51
195	81.80	30.80	59.02
189			
207		5.96	
194	177.50	62.83	108.31
205	7.31		
206	117.15	31.96	74.17
209	99.56	42.58	32.42

	Rahway Valley	Linden Roselle	Edgewater
SAMPLE ID	1GLC00077	1GLC00078	1GLC00079
SAMPLE VOLUME (L)	2.59	2.59	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3		257.11	
4	205.22	1608.21	100.09
10			
5			
8	14.34	4993.49	
19	59.89	721.34	24.17
18	431.92	5648.38	155.44
30			
11	405.89	705.27	
17	191.61	2576.22	73.86
27			
24	37.92	548.20	17.44
16	216.08	2774.22	84.02
15	139.25	3382.77	
26	125.12	1692.72	11.88
29			
25	65.67	609.92	6.32
50	97.82	1068.82	
53			
31	644.71	8225.84	53.14
20	985.72	13038.00	
28			
45	116.76	1275.96	
51			
21			
33			
46	32.43	436.07	15.82
22	288.65	2907.46	
52			
43	820.02	20008.11	239.22
73			
49	367.74	5100.52	115.56
69			
48	115.39	1390.21	34.65
104			
44	657.63	10020.48	210.09
47			

	Rahway Valley	Linden Roselle	Edgewater
SAMPLE ID	1GLC00077	1GLC00078	1GLC00079
SAMPLE VOLUME (L)	2.59	2.59	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
65			
62			
75			
59	46.50	488.82	17.13
42	156.30	1683.68	59.16
40	311.49	3592.38	127.71
41			
71			
37	135.81	2735.43	
64	199.77	2932.50	77.23
95			
100			
93	533.85	17312.70	236.55
102			
98			
63	21.63		
61	835.32	21224.64	
70			
88	78.58	2300.14	16.50
91			
74			
76			
84	105.10	5830.68	
66	314.10		
56	165.60	3201.70	
60	103.87	1697.66	
92	130.73	4369.24	38.89
90	557.61	23499.48	238.38
101			
113			
83	297.76	10871.28	24.44
99			
136	81.20	3333.65	138.86
109			
125			
119			
97			
86	412.14	17118.96	17.82
87			

	Rahway Valley	Linden Roselle	Edgewater
SAMPLE ID	1GLC00077	1GLC00078	1GLC00079
SAMPLE VOLUME (L)	2.59	2.59	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
85	76.08	2830.89	
116			
117			
110	418.22	26325.56	57.58
115			
81			
82	77.79	2916.23	
77	61.48	3592.09	118.89
151			
135	239.91	7445.94	424.41
154			
147	375.30	19299.74	596.50
149			
134	42.88	1715.58	8.88
143			
106	16.82	1894.58	
107			
123			
118	382.57	25931.83	
132	168.49	10941.53	112.61
114		456.90	
179	84.42	2411.50	175.49
146	53.12	2850.66	80.10
161			
105	611.87	23474.05	
153	458.70	20847.34	750.66
168			
141	121.02	5070.44	146.57
137	63.28	3581.48	56.66
164			
129	513.60	28531.68	492.68
138			
160			
163			
158	44.83	2914.05	25.38
178	43.49	1159.16	80.30
126		1326.84	119.15
166			
128	58.46	5093.84	25.98

	Rahway Valley	**Linden Roselle**	**Edgewater**
SAMPLE ID	1GLC00077	1GLC00078	1GLC00079
SAMPLE VOLUME (L)	2.59	2.59	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
187	226.15	6156.71	455.39
183	113.09	3347.52	248.16
185		461.09	34.09
174	173.20	5866.48	415.67
177	82.56	3011.41	241.85
167	35.72	1270.53	7.12
171	44.56	1602.28	125.52
173			
201		588.14	25.88
156	255.66	10377.02	
157			
200	28.12	607.21	39.83
172	40.43	884.34	82.67
180	399.96	12235.22	995.88
193			
191		205.51	13.25
170	178.45	5155.09	398.20
190	32.34	972.29	84.87
169		243.78	
198	129.48	4810.06	218.98
199			
196	55.94	1952.91	124.28
203	71.90	2485.88	
208	30.37	257.09	
195	47.89	1529.82	107.12
189		180.51	21.79
207	8.26	201.55	9.01
194	84.35	3561.35	237.26
205		152.85	
206	65.69	1280.27	63.83
209	33.07	77.12	28.93

APPENDIX B.4 POTW EVENT #4 PCB DATA.

	Passaic Valley	Middlesex County	Bergen County
SAMPLE ID	1GLC00085	1GLC00086	1GLC00087
SAMPLE VOLUME (L)	2.59	2.62	2.59
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3	189.48	237.02	324.97
4	841.14	2016.05	937.10
10	45.68	118.56	34.50
5			
8	506.72	1542.26	752.55
19	170.37	372.38	204.17
18	664.84	2247.48	518.94
30			
11	75438.72	6843.98	841.06
17	527.57	1182.02	503.64
27			
24	84.58	185.70	108.66
16	417.67	1121.02	309.95
15	489.23	851.29	548.06
26	253.94	532.26	202.76
29			
25	126.79	220.53	180.20
50	221.18	401.62	216.78
53			
31	1322.70	2829.37	1083.36
20	2099.08	4417.48	1878.92
28			
45	1562.02	1057.94	1574.24
51			
21			
33			
46	98.59	225.66	103.21
22	471.24	1234.36	411.92
52			
43	1397.37	2957.04	1768.02
73			
49	631.20	1432.42	211.06
69			
48	206.85	659.53	188.82
104	3.71		4.36
44	2384.73	3407.67	2715.87
47			

	Passaic Valley	Middlesex County	Bergen County
SAMPLE ID	1GLC00085	1GLC00086	1GLC00087
SAMPLE VOLUME (L)	2.59	2.62	2.59
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
65			
62			
75			
59	83.67	265.80	93.69
42	251.35	667.68	261.44
40	585.24	1596.15	619.98
41			
71			
37	313.93	900.66	284.53
64	385.92	1158.42	421.48
95			
100			
93	703.55	1658.55	1454.15
102			
98			
63	46.45	113.17	48.95
61	1384.80	4219.84	1592.04
70			
88	111.26	294.54	209.46
91			
74			
76			
84	200.87	676.91	500.97
66	769.10	2590.57	812.37
56	357.59	1114.60	330.30
60	228.44	713.90	205.79
92	152.68	391.05	300.71
90	796.11	2188.77	1639.86
101			
113			
83	421.64	1153.02	829.60
99			
136	107.19	203.36	175.90
109			
125			
119			
97			
86	505.86	1658.22	1119.96
87			

	Passaic Valley	Middlesex County	Bergen County
SAMPLE ID	1GLC00085	1GLC00086	1GLC00087
SAMPLE VOLUME (L)	2.59	2.62	2.59
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
85	86.85	320.13	169.20
116			
117			
110	918.84	2446.40	1855.20
115			
81			
82	123.08	383.94	236.19
77	328.20	215.89	82.25
151			
135	329.91	410.31	422.34
154			
147	665.88	1062.98	990.24
149			
134	39.92	96.60	86.98
143			
106	63.03	167.30	112.09
107			
123			
118	795.07	1901.35	1380.30
132	339.11	559.55	595.99
114	23.93	41.13	
179	118.21	81.27	91.43
146	135.32	142.92	162.42
161			
105	382.79	854.29	583.66
153	834.26	1040.48	1114.12
168			
141	197.72	262.94	261.01
137	112.44	163.94	191.86
164			
129	1090.84	1391.84	1556.48
138			
160			
163			
158	100.45	141.65	164.76
178	56.57	36.66	39.86
126			
166			
128	163.10	211.10	278.76

	Passaic Valley	Middlesex County	Bergen County
SAMPLE ID	1GLC00085	1GLC00086	1GLC00087
SAMPLE VOLUME (L)	2.59	2.62	2.59
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
187	404.79	211.66	272.88
183	183.75	100.49	137.04
185	31.26	19.12	29.68
174	304.66	176.36	215.30
177	132.77	87.33	122.53
167	35.71	47.53	53.75
171	69.86	51.72	65.16
173			
201	33.46	11.35	16.18
156	133.30	156.98	192.94
157			
200	32.93	7.89	16.31
172	41.44	21.41	35.04
180	629.10	295.72	424.12
193			
191	12.32		
170	266.73	141.39	203.60
190	53.68	27.25	42.28
169			
198	281.78	43.42	96.04
199			
196	109.33	8.39	28.89
203	165.05	21.77	65.81
208	38.02	6.62	10.58
195	63.39	6.78	28.46
189	14.33	9.58	12.39
207	21.55		3.35
194	219.24		39.96
205	14.25		
206	201.57		
209	38.39		29.48

	Joint Meeting	Rahway Valley	Linden Roselle
SAMPLE ID	1GLC00088	1GLC00089	1GLC00090
SAMPLE VOLUME (L)	2.62	2.63	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3	183.95	133.31	318.98
4	388.82	244.67	250.14
10			
5			40.21
8	337.57	307.85	773.34
19	93.81	63.42	100.45
18	549.42	398.90	484.04
30			
11	368.20	300.60	262.02
17	283.38	200.99	254.54
27			
24	56.94	37.06	75.28
16	230.46	151.91	193.50
15	421.84	388.38	1574.81
26	141.46	81.42	104.62
29			
25	77.85	36.46	61.98
50	180.76	122.50	192.46
53			
31	633.27	357.45	563.29
20	833.84	471.60	1127.84
28			
45	1120.28	717.18	974.84
51			
21			
33			
46	96.64	0.00	87.67
22	257.78	133.87	241.55
52			
43	1171.41	586.71	1064.73
73			
49	592.18	338.60	543.78
69			
48	176.66	104.65	111.13
104			
44	2373.54	786.96	3029.19
47			

	Joint Meeting	Rahway Valley	Linden Roselle
SAMPLE ID	1GLC00088	1GLC00089	1GLC00090
SAMPLE VOLUME (L)	2.62	2.63	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
65			
62			
75			
59	51.90		69.66
42	233.95	140.50	208.18
40	434.52	217.41	335.25
41			
71			
37	149.26	108.52	333.25
64	331.98	138.44	278.25
95			
100			
93	2045.85	882.25	1098.30
102			
98			
63	37.58		
61	1047.88	334.20	651.76
70			
88	301.64	166.32	180.00
91			
74			
76			
84	658.85	355.84	381.02
66	448.46	179.75	206.21
56	225.35	96.74	145.25
60	129.28	69.58	70.65
92	405.71	197.04	249.47
90	1893.09	719.97	934.65
101			
113			
83	1078.14	461.90	532.38
99			
136	424.41	211.98	236.48
109			
125			
119			
97			
86	1341.48	408.30	606.78
87			

	Joint Meeting	Rahway Valley	Linden Roselle
SAMPLE ID	1GLC00088	1GLC00089	1GLC00090
SAMPLE VOLUME (L)	2.62	2.63	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
85	374.91	145.02	148.74
116			
117			
110	1997.02	599.90	745.02
115			
81			
82	288.01	47.80	121.58
77	96.25	42.77	284.83
151			
135	790.47	350.37	433.80
154			
147	1618.04	511.42	796.28
149			
134	119.70	69.90	61.74
143			
106	151.65		56.98
107			
123			
118	1416.98	187.70	453.54
132	738.62	306.07	402.89
114	58.67		4.64
179	87.53	31.15	100.20
146	224.62	68.04	136.62
161			
105	551.79	129.32	72.65
153	1495.26	327.62	827.06
168			
141	423.78	109.27	189.46
137	255.04	61.44	145.40
164			
129	1837.36	318.96	716.48
138			
160			
163			
158	151.59	57.76	56.29
178	48.96	ND	45.14
126			37.95
166			
128	237.26	44.42	52.36

	Joint Meeting	Rahway Valley	Linden Roselle
SAMPLE ID	1GLC00088	1GLC00089	1GLC00090
SAMPLE VOLUME (L)	2.62	2.63	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
187	266.48	91.20	269.62
183	139.15	36.85	126.26
185	32.78		17.32
174	205.76	56.79	177.54
177	97.27		98.84
167	139.59		38.52
171	74.76	40.20	44.48
173			
201	27.22		23.48
156	407.02	52.30	89.50
157			
200	61.32		13.57
172	74.60		25.50
180	490.94	127.30	338.18
193			
191	94.21		10.90
170	319.80	14.27	159.48
190	191.59		18.96
169	572.74		
198	612.88		92.76
199			
196	386.50		27.84
203	398.18		52.42
208	1439.54		7.86
195	732.61		9.48
189	992.68		
207	696.23		
194	1749.67		
205	1853.91		
206	2179.22		
209	2413.76		14.36

	Central	Woodcliff	Edgewater
SAMPLE ID	1GLC00092	1GLC00093	1GLC00094
SAMPLE VOLUME (L)	2.60	2.63	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**	**RESULT**
3	215.99	303.53	157.33
4	266.74	143.30	354.91
10		20.58	
5			
8	801.21	701.79	567.17
19	131.70	33.98	90.18
18	1378.20	351.64	837.00
30			
11	1078.11	677.62	376.58
17	747.04	212.25	404.79
27			
24	198.18	38.66	82.74
16	596.89	177.74	365.35
15	896.30	830.82	521.58
26	547.96	117.08	133.20
29			
25	283.96	68.42	60.52
50	658.08	101.30	164.68
53			
31	2965.83	846.28	788.71
20	4362.88	1606.32	1093.24
28			
45	1330.42	557.92	1358.10
51			
21			
33			
46	216.77	63.67	99.49
22	1047.50	360.72	322.74
52			
43	3313.89	1703.91	1277.67
73			
49	2164.70	549.44	635.08
69			
48	557.19	160.53	217.99
104			
44	1562.79	1713.60	2424.99
47			

	Central	Woodcliff	Edgewater
SAMPLE ID	1GLC00092	1GLC00093	1GLC00094
SAMPLE VOLUME (L)	2.60	2.63	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
65			
62			
75			
59	245.04	47.37	76.23
42	662.07	213.69	227.16
40	1098.96	325.47	450.33
41			
71			
37	430.06	270.31	184.80
64	969.06	326.09	373.14
95			
100			
93	2631.30	1419.95	1626.45
102			
98			
63	65.82	32.22	29.89
61	2229.12	1015.24	503.08
70			
88	437.22	173.82	215.62
91			
74			
76			
84	526.71	307.93	563.56
66	1079.48	442.67	220.19
56	520.54	217.64	98.09
60	290.65	138.61	38.67
92	639.00	223.81	321.94
90	2422.32	1041.69	1272.18
101			
113			
83	1402.54	615.86	625.18
99			
136	694.71	213.08	336.05
109			
125			
119			
97			
86	1176.54	641.10	845.46
87			

	Central	Woodcliff	Edgewater
SAMPLE ID	1GLC00092	1GLC00093	1GLC00094
SAMPLE VOLUME (L)	2.60	2.63	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
85	330.60	210.45	228.69
116			
117			
110	1955.78	524.52	1215.28
115			
81		39.56	
82	218.44	131.57	184.50
77		53.39	41.39
151			
135	1790.25	371.07	572.46
154			
147	3306.28	786.46	931.18
149			
134	168.02	45.32	90.38
143			
106		83.93	62.73
107			
123			
118	1091.47	1085.84	722.83
132	1067.39	433.84	472.52
114			
179	490.58	102.79	92.59
146	478.94	139.00	89.62
161			
105	351.57	363.52	244.34
153	2759.54	1028.20	717.54
168			
141	582.44	244.43	209.31
137	358.84	164.68	152.56
164			
129	2427.56	1259.00	816.92
138			
160			
163			
158	205.49	108.86	52.16
178	191.00	66.69	30.13
126			
166			
128	256.54	173.28	94.84

	Central	Woodcliff	Edgewater
SAMPLE ID	1GLC00092	1GLC00093	1GLC00094
SAMPLE VOLUME (L)	2.60	2.63	2.62
FRACTION	TOTAL	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE	PG/SAMPLE
187	1146.55	386.22	134.09
183	466.90	161.36	111.32
185	93.51	35.61	21.53
174	888.41	254.23	152.73
177	511.34	96.32	47.92
167	61.55	37.84	59.65
171	208.54	60.52	37.98
173			
201	73.80	14.90	
156	235.54	140.98	
157			
200	45.44	18.49	
172	151.47	28.73	
180	1382.10	422.56	214.96
193			
191			
170	614.33	178.79	92.41
190	105.66	29.32	7.14
169			
198	336.52	84.32	63.86
199			
196	118.29	18.29	12.13
203	153.24	40.08	15.48
208		22.63	
195	103.27	4.63	
189		14.20	
207			
194	111.31		
205		6.98	
206			
209	98.01	53.42	

	West NY	Secaucus
SAMPLE ID	1GLC00095	1GLC00096
SAMPLE VOLUME (L)	2.62	2.50
FRACTION	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE
PARAM_NAME	**RESULT**	**RESULT**
3	185.85	15.73
4	57.15	585.01
10		46.18
5		
8	440.82	12.59
19	21.06	155.59
18	246.48	102.48
30		
11	482.85	40.83
17	137.75	81.54
27		
24	22.34	60.54
16	117.10	9.75
15	586.22	124.61
26	111.58	38.64
29		
25	59.15	30.93
50	55.42	78.58
53		
31	763.52	38.59
20	1252.76	33.52
28		
45	633.02	414.86
51		
21		
33		
46		36.17
22	306.35	
52		
43	702.18	107.67
73		
49	409.42	183.66
69		
48	106.22	20.50
104		
44	1555.95	950.19
47		

	West NY	Secaucus
SAMPLE ID	1GLC00095	1GLC00096
SAMPLE VOLUME (L)	2.62	2.50
FRACTION	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE
65		
62		
75		
59		
42	153.71	49.64
40	176.55	34.80
41		
71		
37	221.84	
64	253.01	28.14
95		
100		
93	888.75	350.10
102		
98		
63	32.30	
61	841.56	
70		
88	107.92	50.88
91		
74		
76		
84	192.31	107.18
66	393.47	
56	217.06	
60	127.94	
92	223.45	123.91
90	1045.68	370.50
101		
113		
83	516.94	332.06
99		
136	283.37	135.82
109		
125		
119		
97		
86	658.92	430.68
87		

	West NY	Secaucus
SAMPLE ID	1GLC00095	1GLC00096
SAMPLE VOLUME (L)	2.62	2.50
FRACTION	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE
85	227.58	145.02
116		
117		
110	847.80	726.46
115		
81	26.29	29.03
82	137.91	111.18
77	54.94	21.62
151		
135	687.78	278.67
154		
147	1385.28	527.74
149		
134	70.84	38.74
143		
106	75.63	28.33
107		
123		
118	938.74	761.75
132	598.03	342.77
114	10.65	16.60
179	188.84	31.67
146	193.50	92.78
161		
105	334.17	328.64
153	1611.20	639.06
168		
141	383.13	169.35
137	241.10	126.58
164		
129	1811.24	980.36
138		
160		
163		
158	116.41	62.41
178	88.55	25.89
126		
166		
128	235.68	149.34

	West NY	Secaucus
SAMPLE ID	1GLC00095	1GLC00096
SAMPLE VOLUME (L)	2.62	2.50
FRACTION	TOTAL	TOTAL
UNIT	PG/SAMPLE	PG/SAMPLE
187	611.76	170.96
183	235.22	76.19
185	66.69	22.30
174	464.14	140.64
177	184.80	38.67
167	58.68	33.44
171	93.24	24.34
173		
201	21.06	5.13
156	176.12	113.64
157		
200	23.12	5.84
172	56.43	12.97
180	722.30	160.16
193		
191		6.94
170	371.75	81.10
190	53.30	11.24
169		
198	144.36	15.40
199		
196	35.25	
203	94.26	3.52
208	19.38	
195	37.46	
189		6.86
207		
194	31.13	
205		
206		
209	54.37	3.94

APPENDIX B.5 CSO/SWO EVENT #1 PCB DATA.

		Henley Road (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00065	1GLC00071
LAB_SAMP_ID		48903-29-02	48903-29-03
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
3	PG/LITER		
4	PG/LITER		
10	PG/LITER		
5	PG/LITER		
8	PG/LITER	80.71	166.84
19	PG/LITER	12.09	131.62
18	PG/LITER	97.55	224.44
30	PG/LITER		
11	PG/LITER	155.75	315.69
17	PG/LITER	46.90	126.26
27	PG/LITER		
24	PG/LITER		
16	PG/LITER	46.92	136.17
15	PG/LITER	63.25	150.33
26	PG/LITER	26.90	87.75
29	PG/LITER		
25	PG/LITER	17.70	46.71
50	PG/LITER	29.26	106.78
53	PG/LITER		
31	PG/LITER	166.40	298.76
20	PG/LITER	294.12	558.65
28	PG/LITER		
45	PG/LITER	41.88	131.18
51	PG/LITER		
21	PG/LITER		
33	PG/LITER		
46	PG/LITER	15.39	42.99
22	PG/LITER	70.45	
52	PG/LITER		
43	PG/LITER	491.22	671.91
73	PG/LITER		
49	PG/LITER	175.45	324.76
69	PG/LITER		
48	PG/LITER	40.04	67.54
104	PG/LITER		
44	PG/LITER	333.89	610.83
47	PG/LITER		
65	PG/LITER		
62	PG/LITER		

		Henley Road (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00065	1GLC00071
LAB_SAMP_ID		48903-29-02	48903-29-03
FRACTION		TOTAL	TOTAL
PARAM_NAME	UNIT	RESULT	RESULT
75	PG/LITER		
59	PG/LITER	23.76	46.77
42	PG/LITER	75.58	142.09
40	PG/LITER	161.65	324.19
41	PG/LITER		
71	PG/LITER		
37	PG/LITER	92.07	154.34
64	PG/LITER	129.22	195.97
95	PG/LITER	698.57	611.81
100	PG/LITER		
93	PG/LITER	22.52	40.93
102	PG/LITER		
98	PG/LITER		
63	PG/LITER		17.28
61	PG/LITER	500.77	957.94
70	PG/LITER		
88	PG/LITER	89.24	116.21
91	PG/LITER		
74	PG/LITER		
76	PG/LITER		
84	PG/LITER	259.81	
66	PG/LITER	220.57	546.39
56	PG/LITER	123.78	260.00
60	PG/LITER	39.53	115.78
92	PG/LITER	141.08	147.94
90	PG/LITER	818.94	827.68
101	PG/LITER		
113	PG/LITER		
83	PG/LITER	462.47	399.51
99	PG/LITER		
112	PG/LITER		
136	PG/LITER	124.65	85.79
109	PG/LITER		
125	PG/LITER		
119	PG/LITER		
97	PG/LITER		
86	PG/LITER	818.22	681.60
87	PG/LITER		
85	PG/LITER	202.05	149.78

		Henley Road (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00065	1GLC00071
LAB_SAMP_ID		48903-29-02	48903-29-03
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
116	PG/LITER		
117	PG/LITER		
110	PG/LITER	1810.02	1110.67
115	PG/LITER		
81	PG/LITER		
82	PG/LITER	168.43	137.82
77	PG/LITER	69.35	65.33
151	PG/LITER		
135	PG/LITER	440.03	194.94
154	PG/LITER		
147	PG/LITER	1418.22	610.42
149	PG/LITER		
134	PG/LITER	106.58	43.47
143	PG/LITER		
106	PG/LITER	113.01	81.83
107	PG/LITER		
123	PG/LITER		
118	PG/LITER	1330.15	964.99
132	PG/LITER	700.86	340.58
114	PG/LITER	21.27	20.40
179	PG/LITER	133.80	60.73
146	PG/LITER	224.86	88.27
161	PG/LITER		
105	PG/LITER	580.78	432.09
153	PG/LITER	1583.67	677.52
168	PG/LITER		
141	PG/LITER	284.94	153.67
137	PG/LITER	242.58	120.69
164	PG/LITER		
129	PG/LITER	2206.98	995.16
138	PG/LITER		
160	PG/LITER		
163	PG/LITER		
158	PG/LITER	212.83	102.92
178	PG/LITER	75.07	27.59
126	PG/LITER	30.48	
166	PG/LITER		
128	PG/LITER	398.32	182.86
187	PG/LITER	442.59	174.66

		Henley Road (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00065	1GLC00071
LAB_SAMP_ID		48903-29-02	48903-29-03
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
183	PG/LITER		
185	PG/LITER		
174	PG/LITER	555.09	246.54
177	PG/LITER	251.78	74.11
167	PG/LITER	83.76	40.31
171	PG/LITER	114.95	49.85
173	PG/LITER		
201	PG/LITER	30.39	11.22
156	PG/LITER	245.07	129.22
157	PG/LITER		
200	PG/LITER		
197	PG/LITER	34.87	17.03
172	PG/LITER	79.16	27.81
180	PG/LITER	905.96	363.62
193	PG/LITER		
191	PG/LITER	16.93	6.01
170	PG/LITER	424.84	168.78
190	PG/LITER	85.76	32.13
169	PG/LITER		
198	PG/LITER	274.58	111.18
199	PG/LITER		
196	PG/LITER	107.16	48.04
203	PG/LITER	150.45	73.94
208	PG/LITER	59.90	21.98
195	PG/LITER	77.63	35.51
189	PG/LITER	17.69	5.41
207	PG/LITER	21.91	11.25
194	PG/LITER	225.72	102.13
205	PG/LITER	13.00	3.82
206	PG/LITER	178.70	67.68
209	PG/LITER	138.15	39.40

APPENDIX B.6 CSO/SWO EVENT #2 PCB DATA.

		Henley Road (Hackensack River)	West Side Road	CCI
SAMP_ID		1GLC00120	1GLC00114	1GLC00117
LAB_SAMP_ID		48903-29-04	48903-29-21	48903-29-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
3	PG/LITER	101.21	50.74	
4	PG/LITER	426.16	167.71	
10	PG/LITER			
5	PG/LITER			
8	PG/LITER	672.24	450.46	132.71
19	PG/LITER	182.28	90.81	19.36
18	PG/LITER	1399.43	430.18	117.75
30	PG/LITER			
11	PG/LITER	759.51	582.98	202.92
17	PG/LITER	743.93	226.79	65.17
27	PG/LITER			
24	PG/LITER			
16	PG/LITER	527.95	199.57	62.60
15	PG/LITER	878.51	366.63	86.56
26	PG/LITER	417.77	118.31	34.27
29	PG/LITER			
25	PG/LITER	330.98	68.52	14.54
50	PG/LITER	473.67	200.55	42.75
53	PG/LITER			
31	PG/LITER	1729.91	670.84	212.83
20	PG/LITER	2818.99	1311.98	378.15
28	PG/LITER			
45	PG/LITER	660.73	280.24	
51	PG/LITER			
21	PG/LITER			
33	PG/LITER			
46	PG/LITER	213.41	116.36	27.88
22	PG/LITER	561.14	334.55	129.08
52	PG/LITER			
43	PG/LITER	5969.24	1369.49	891.22
73	PG/LITER			
49	PG/LITER	3410.90	603.41	
69	PG/LITER			
48	PG/LITER	851.95	149.34	106.47
104	PG/LITER			
44	PG/LITER	5812.13	1097.07	757.17
47	PG/LITER			
65	PG/LITER			
62	PG/LITER			

		Henley Road (Hackensack River)	West Side Road	CCI
SAMP_ID		1GLC00120	1GLC00114	1GLC00117
LAB_SAMP_ID		48903-29-04	48903-29-21	48903-29-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
75	PG/LITER			
59	PG/LITER	438.93	113.52	50.14
42	PG/LITER	1660.61	206.52	175.24
40	PG/LITER	2975.91	589.84	384.25
41	PG/LITER			
71	PG/LITER			
37	PG/LITER	850.93	376.81	187.65
64	PG/LITER	2330.15	463.23	292.98
95	PG/LITER	4098.24	2591.32	1037.03
100	PG/LITER			
93	PG/LITER	316.41	101.65	48.80
102	PG/LITER			
98	PG/LITER			
63	PG/LITER	153.96		25.47
61	PG/LITER	7955.07	1606.89	1421.37
70	PG/LITER			
88	PG/LITER	835.73	336.78	178.09
91	PG/LITER			
74	PG/LITER			
76	PG/LITER			
84	PG/LITER	1578.67	792.35	371.30
66	PG/LITER	4259.06	888.47	636.12
56	PG/LITER	1877.21	459.67	314.47
60	PG/LITER	604.24	176.60	149.98
92	PG/LITER	986.43	360.11	253.11
90	PG/LITER	5132.57	1938.35	1435.07
101	PG/LITER			
113	PG/LITER			
83	PG/LITER	2907.25	765.45	616.33
99	PG/LITER			
112	PG/LITER			
136	PG/LITER	406.19	734.93	139.56
109	PG/LITER			
125	PG/LITER			
119	PG/LITER			
97	PG/LITER			
86	PG/LITER	3578.60	1176.39	959.30
87	PG/LITER			
85	PG/LITER	828.05	287.67	182.09

		Henley Road (Hackensack River)	West Side Road	CCI
SAMP_ID		1GLC00120	1GLC00114	1GLC00117
LAB_SAMP_ID		48903-29-04	48903-29-21	48903-29-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
116	PG/LITER			
117	PG/LITER			
110	PG/LITER	6133.02	3289.22	1505.96
115	PG/LITER			
81	PG/LITER			
82	PG/LITER	682.94	241.56	159.54
77	PG/LITER	414.26	125.48	62.29
151	PG/LITER			
135	PG/LITER	1023.17	2059.85	334.84
154	PG/LITER			
147	PG/LITER	3519.23	5725.91	980.59
149	PG/LITER			
134	PG/LITER	225.26	240.18	67.86
143	PG/LITER			
106	PG/LITER	333.37	144.69	89.39
107	PG/LITER			
123	PG/LITER			
118	PG/LITER	3663.70	1540.01	1099.93
132	PG/LITER	1576.53	2084.88	447.77
114	PG/LITER	59.45		21.98
179	PG/LITER	350.93	1090.32	132.92
146	PG/LITER	607.68	730.44	142.84
161	PG/LITER			
105	PG/LITER	1466.83	682.44	429.76
153	PG/LITER	3844.08	4370.98	1064.76
168	PG/LITER			
141	PG/LITER	702.04	916.61	214.44
137	PG/LITER	484.41	629.44	146.84
164	PG/LITER			
129	PG/LITER	4595.91	5374.76	1310.11
138	PG/LITER			
160	PG/LITER			
163	PG/LITER			
158	PG/LITER	429.93	494.45	123.98
178	PG/LITER	178.75	501.70	63.38
126	PG/LITER	20.98		
166	PG/LITER			
128	PG/LITER	760.90	717.27	206.23
187	PG/LITER	1125.92	3034.61	378.51

		Henley Road (Hackensack River)	West Side Road	CCI
SAMP_ID		1GLC00120	1GLC00114	1GLC00117
LAB_SAMP_ID		48903-29-04	48903-29-21	48903-29-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
183	PG/LITER			
185	PG/LITER			
174	PG/LITER	1374.11	4273.19	475.61
177	PG/LITER	570.40	1742.31	181.59
167	PG/LITER	131.90	167.90	45.69
171	PG/LITER	264.63	800.02	86.20
173	PG/LITER			
201	PG/LITER	83.44	209.45	31.97
156	PG/LITER	361.82	381.02	138.78
157	PG/LITER			
200	PG/LITER			
197	PG/LITER	90.08	251.85	33.44
172	PG/LITER	142.69	482.30	47.32
180	PG/LITER	2115.85	6414.73	709.80
193	PG/LITER			
191	PG/LITER	23.95	98.02	10.56
170	PG/LITER	912.78	2821.66	293.18
190	PG/LITER	194.95	523.84	53.57
169	PG/LITER			
198	PG/LITER	696.08	1722.29	237.67
199	PG/LITER			
196	PG/LITER	237.82	623.82	99.63
203	PG/LITER	338.98	1114.86	138.78
208	PG/LITER	254.06	287.74	54.51
195	PG/LITER	203.98	672.86	65.35
189	PG/LITER	28.40	82.24	10.09
207	PG/LITER	85.43	104.84	20.85
194	PG/LITER	632.74	1793.24	181.60
205	PG/LITER	21.20	70.25	9.68
206	PG/LITER	743.55	1020.85	163.36
209	PG/LITER	481.41	414.32	120.57

		Ivy Street (Passaic River)	Smith Marina	Livingston and Front Streets
SAMP_ID		1GLC00106	1GLC00118	1GLC00109
LAB_SAMP_ID		48903-29-22	48903-29-10	48903-29-11
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
3	PG/LITER			
4	PG/LITER			81.87
10	PG/LITER			
5	PG/LITER			
8	PG/LITER	116.68	109.13	110.14
19	PG/LITER	24.41	30.67	29.12
18	PG/LITER	167.42	206.45	144.20
30	PG/LITER			
11	PG/LITER	105.53	165.57	158.19
17	PG/LITER	79.04	100.52	66.58
27	PG/LITER			
24	PG/LITER			
16	PG/LITER	77.99	116.75	77.24
15	PG/LITER	71.65	164.49	70.77
26	PG/LITER	28.55	67.22	28.30
29	PG/LITER			
25	PG/LITER	15.03	31.03	14.05
50	PG/LITER	41.13	120.55	39.79
53	PG/LITER			
31	PG/LITER	206.71	347.83	168.08
20	PG/LITER	377.62	702.89	300.15
28	PG/LITER			
45	PG/LITER		157.83	
51	PG/LITER			
21	PG/LITER			
33	PG/LITER			
46	PG/LITER	20.63	54.73	18.93
22	PG/LITER	100.59	178.06	82.63
52	PG/LITER			
43	PG/LITER	555.53	1472.98	556.49
73	PG/LITER			
49	PG/LITER			186.93
69	PG/LITER			
48	PG/LITER	73.28	110.03	56.26
104	PG/LITER			
44	PG/LITER	422.26	979.35	402.32
47	PG/LITER			
65	PG/LITER			
62	PG/LITER			

		Ivy Street (Passaic River)	Smith Marina	Livingston and Front Streets
SAMP_ID		1GLC00106	1GLC00118	1GLC00109
LAB_SAMP_ID		48903-29-22	48903-29-10	48903-29-11
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
75	PG/LITER			
59	PG/LITER	34.06	33.16	28.20
42	PG/LITER	100.84	175.60	94.36
40	PG/LITER	228.30	410.40	197.45
41	PG/LITER			
71	PG/LITER			
37	PG/LITER	98.48	236.18	98.23
64	PG/LITER		372.75	163.80
95	PG/LITER	610.83	2489.66	788.45
100	PG/LITER			
93	PG/LITER	26.07	107.09	28.84
102	PG/LITER			
98	PG/LITER			
63	PG/LITER	11.27		13.58
61	PG/LITER	716.23	1704.61	711.83
70	PG/LITER			
88	PG/LITER	97.84	331.96	125.18
91	PG/LITER			
74	PG/LITER			
76	PG/LITER			
84	PG/LITER	234.34	972.44	297.40
66	PG/LITER	303.92	788.57	304.50
56	PG/LITER	155.18	395.60	145.75
60	PG/LITER	90.18	192.03	74.93
92	PG/LITER	123.57	541.55	200.54
90	PG/LITER	781.91	2932.16	1237.22
101	PG/LITER			
113	PG/LITER			
83	PG/LITER	344.69	1281.25	533.57
99	PG/LITER			
112	PG/LITER			
136	PG/LITER	85.12	393.98	139.30
109	PG/LITER			
125	PG/LITER			
119	PG/LITER			
97	PG/LITER			
86	PG/LITER	604.80	2258.05	1001.63
87	PG/LITER			
85	PG/LITER	117.13	361.68	208.47

		Ivy Street (Passaic River)	Smith Marina	Livingston and Front Streets
SAMP_ID		1GLC00106	1GLC00118	1GLC00109
LAB_SAMP_ID		48903-29-22	48903-29-10	48903-29-11
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
116	PG/LITER			
117	PG/LITER			
110	PG/LITER	1019.87	4525.60	1808.41
115	PG/LITER			
81	PG/LITER			
82	PG/LITER	107.78	423.46	183.23
77	PG/LITER	37.32	137.20	46.35
151	PG/LITER			
135	PG/LITER	207.85	977.98	393.85
154	PG/LITER			
147	PG/LITER	617.83	2818.33	1230.91
149	PG/LITER			
134	PG/LITER	45.69	290.77	84.76
143	PG/LITER			
106	PG/LITER	54.55	227.72	111.84
107	PG/LITER			
123	PG/LITER			
118	PG/LITER	716.64	2666.09	1490.26
132	PG/LITER	304.87	1410.11	678.60
114	PG/LITER	12.44		28.13
179	PG/LITER	81.33	302.52	155.77
146	PG/LITER	89.85	422.00	208.53
161	PG/LITER			
105	PG/LITER	314.53	1184.25	642.77
153	PG/LITER	666.54	3206.08	1504.15
168	PG/LITER			
141	PG/LITER	150.41	440.80	356.20
137	PG/LITER	104.36	284.89	256.51
164	PG/LITER			
129	PG/LITER	922.99	4148.85	2173.87
138	PG/LITER			
160	PG/LITER			
163	PG/LITER			
158	PG/LITER	86.93	318.70	219.81
178	PG/LITER	38.16	152.87	77.15
126	PG/LITER		24.95	5.63
166	PG/LITER			
128	PG/LITER	148.25	709.88	351.17
187	PG/LITER	234.73	883.92	532.65

		Ivy Street (Passaic River)	Smith Marina	Livingston and Front Streets
SAMP_ID		1GLC00106	1GLC00118	1GLC00109
LAB_SAMP_ID		48903-29-22	48903-29-10	48903-29-11
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
183	PG/LITER			
185	PG/LITER			
174	PG/LITER	319.63	1158.36	583.62
177	PG/LITER	113.79	511.49	221.95
167	PG/LITER	32.82	179.02	74.61
171	PG/LITER	62.80	248.11	111.48
173	PG/LITER			
201	PG/LITER	17.66	65.75	66.10
156	PG/LITER	109.39	514.39	234.76
157	PG/LITER			
200	PG/LITER			
197	PG/LITER	21.21	72.89	53.34
172	PG/LITER	33.22	140.84	61.90
180	PG/LITER	466.51	1798.13	853.70
193	PG/LITER			
191	PG/LITER	7.51		11.44
170	PG/LITER	201.41	888.32	360.48
190	PG/LITER	38.61	194.97	64.00
169	PG/LITER			
198	PG/LITER	134.16	440.33	616.72
199	PG/LITER			
196	PG/LITER	66.97		134.97
203	PG/LITER	81.15	116.08	377.62
208	PG/LITER	25.95	172.85	323.22
195	PG/LITER	48.57	164.27	73.02
189	PG/LITER	6.95		12.48
207	PG/LITER	8.84		67.09
194	PG/LITER	124.21	487.08	249.06
205	PG/LITER	5.36	33.75	10.31
206	PG/LITER	92.89	508.02	644.24
209	PG/LITER	52.60	439.70	251.21

		Court Street (Hackensack River)	Christie Street (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00108	1GLC00107	1GLC00116
LAB_SAMP_ID		48903-29-12	48903-29-13	48903-29-08
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
3	PG/LITER	42.28		36.90
4	PG/LITER	446.41		509.29
10	PG/LITER	21.10		
5	PG/LITER			
8	PG/LITER	1132.57	94.52	510.72
19	PG/LITER	254.40	10.18	128.37
18	PG/LITER	1478.94	71.49	521.81
30	PG/LITER			
11	PG/LITER	213.96	124.13	571.10
17	PG/LITER	724.91	34.30	295.00
27	PG/LITER			
24	PG/LITER			
16	PG/LITER	606.88		262.74
15	PG/LITER	667.95	44.91	455.35
26	PG/LITER	285.11		212.42
29	PG/LITER			
25	PG/LITER	128.33	6.62	87.90
50	PG/LITER	331.71	19.54	261.43
53	PG/LITER			
31	PG/LITER	1759.16	115.00	1046.72
20	PG/LITER	3388.39	200.34	1989.48
28	PG/LITER			
45	PG/LITER	597.26		347.19
51	PG/LITER			
21	PG/LITER			
33	PG/LITER			
46	PG/LITER	206.51	12.15	131.80
22	PG/LITER	881.19	60.18	502.97
52	PG/LITER			
43	PG/LITER	3686.66	633.26	3927.46
73	PG/LITER			
49	PG/LITER	1767.93	173.23	991.54
69	PG/LITER			
48	PG/LITER		48.25	213.82
104	PG/LITER			
44	PG/LITER	3540.42	368.24	2443.11
47	PG/LITER			
65	PG/LITER			
62	PG/LITER			

		Court Street (Hackensack River)	Christie Street (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00108	1GLC00107	1GLC00116
LAB_SAMP_ID		48903-29-12	48903-29-13	48903-29-08
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
75	PG/LITER			
59	PG/LITER	194.33	17.92	63.29
42	PG/LITER	868.72	63.84	343.15
40	PG/LITER	1826.34	148.91	811.92
41	PG/LITER			
71	PG/LITER			
37	PG/LITER	974.05	64.62	590.83
64	PG/LITER	1190.29	136.03	825.27
95	PG/LITER	1652.51	661.16	6395.07
100	PG/LITER			
93	PG/LITER	104.09	23.10	202.78
102	PG/LITER			
98	PG/LITER			
63	PG/LITER	75.66	9.79	44.14
61	PG/LITER	4041.50	772.80	4074.19
70	PG/LITER			
88	PG/LITER	293.31	95.23	974.97
91	PG/LITER			
74	PG/LITER			
76	PG/LITER			
84	PG/LITER	647.09	237.11	2295.24
66	PG/LITER	2492.31	266.97	1880.53
56	PG/LITER	1341.07	132.20	922.24
60	PG/LITER	422.07	60.72	383.89
92	PG/LITER	332.81	136.66	1547.91
90	PG/LITER	2119.73	864.15	8708.57
101	PG/LITER			
113	PG/LITER			
83	PG/LITER	1049.34	375.60	3591.19
99	PG/LITER			
112	PG/LITER			
136	PG/LITER	207.30	90.67	968.76
109	PG/LITER			
125	PG/LITER			
119	PG/LITER			
97	PG/LITER			
86	PG/LITER	1676.26	624.71	6362.27
87	PG/LITER			
85	PG/LITER	418.94	119.39	1721.48

		Court Street (Hackensack River)	Christie Street (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00108	1GLC00107	1GLC00116
LAB_SAMP_ID		48903-29-12	48903-29-13	48903-29-08
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
116	PG/LITER			
117	PG/LITER			
110	PG/LITER	2687.62	1086.04	12919.34
115	PG/LITER			
81	PG/LITER			
82	PG/LITER	341.24	106.40	1184.68
77	PG/LITER	284.83	29.09	304.20
151	PG/LITER			
135	PG/LITER	518.33	214.47	2995.20
154	PG/LITER			
147	PG/LITER	1595.71	661.79	10357.63
149	PG/LITER			
134	PG/LITER	97.89	53.51	665.70
143	PG/LITER			
106	PG/LITER	170.41	62.26	655.70
107	PG/LITER			
123	PG/LITER			
118	PG/LITER	2197.40	853.59	7321.02
132	PG/LITER	851.53	353.11	5294.85
114	PG/LITER	47.85	17.02	113.19
179	PG/LITER	182.88	69.25	1103.92
146	PG/LITER	253.88	100.15	1643.21
161	PG/LITER			
105	PG/LITER	999.18	372.55	3237.89
153	PG/LITER	1927.70	742.80	11266.63
168	PG/LITER			
141	PG/LITER	364.79	167.25	2691.48
137	PG/LITER	299.76	119.51	1899.89
164	PG/LITER			
129	PG/LITER	2686.88	1052.11	16490.55
138	PG/LITER			
160	PG/LITER			
163	PG/LITER			
158	PG/LITER	261.91	104.46	1630.57
178	PG/LITER	94.02	38.93	561.92
126	PG/LITER			
166	PG/LITER			
128	PG/LITER	452.41	168.21	2798.06
187	PG/LITER	541.33	205.14	3530.73

		Court Street (Hackensack River)	Christie Street (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00108	1GLC00107	1GLC00116
LAB_SAMP_ID		48903-29-12	48903-29-13	48903-29-08
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
183	PG/LITER			
185	PG/LITER			
174	PG/LITER	611.19	280.92	4735.63
177	PG/LITER	289.08	113.42	1817.50
167	PG/LITER	100.78	40.41	503.36
171	PG/LITER	142.40	58.80	910.93
173	PG/LITER			
201	PG/LITER	37.64	13.76	224.22
156	PG/LITER	315.53	140.96	1509.81
157	PG/LITER			
200	PG/LITER			
197	PG/LITER	52.94	17.26	279.46
172	PG/LITER	77.67	35.57	519.37
180	PG/LITER	1050.57	432.97	7018.68
193	PG/LITER			
191	PG/LITER	18.27	8.08	112.50
170	PG/LITER	519.27	207.34	3128.09
190	PG/LITER	97.98	33.78	656.84
169	PG/LITER			81.03
198	PG/LITER	305.88	115.22	1986.16
199	PG/LITER			
196	PG/LITER	142.80	56.18	832.52
203	PG/LITER	188.14	76.90	959.76
208	PG/LITER	62.84	36.65	380.04
195	PG/LITER	114.98	38.77	697.31
189	PG/LITER	17.94	8.70	106.69
207	PG/LITER	23.57	11.33	231.03
194	PG/LITER	285.28	103.05	1926.39
205	PG/LITER	13.75	4.94	82.99
206	PG/LITER	213.90	111.71	1283.42
209	PG/LITER	96.07	85.66	2201.99

		Peripheral Ditch (Newark Air)
SAMP_ID		1GLC00115
LAB_SAMP_ID		48903-29-09
FRACTION		TOTAL
PARAM_NAME	**UNIT**	**RESULT**
3	PG/LITER	
4	PG/LITER	
10	PG/LITER	
5	PG/LITER	
8	PG/LITER	
19	PG/LITER	33.57
18	PG/LITER	143.41
30	PG/LITER	
11	PG/LITER	
17	PG/LITER	71.82
27	PG/LITER	
24	PG/LITER	
16	PG/LITER	63.89
15	PG/LITER	48.49
26	PG/LITER	23.54
29	PG/LITER	
25	PG/LITER	7.48
50	PG/LITER	33.30
53	PG/LITER	
31	PG/LITER	135.25
20	PG/LITER	
28	PG/LITER	
45	PG/LITER	179.70
51	PG/LITER	
21	PG/LITER	
33	PG/LITER	
46	PG/LITER	16.28
22	PG/LITER	
52	PG/LITER	
43	PG/LITER	347.36
73	PG/LITER	
49	PG/LITER	138.86
69	PG/LITER	
48	PG/LITER	41.57
104	PG/LITER	
44	PG/LITER	641.73
47	PG/LITER	
65	PG/LITER	
62	PG/LITER	

		Peripheral Ditch (Newark Air)
SAMP_ID		1GLC00115
LAB_SAMP_ID		48903-29-09
FRACTION		TOTAL
PARAM_NAME	**UNIT**	**RESULT**
75	PG/LITER	
59	PG/LITER	21.65
42	PG/LITER	66.27
40	PG/LITER	149.61
41	PG/LITER	
71	PG/LITER	
37	PG/LITER	57.97
64	PG/LITER	110.84
95	PG/LITER	297.43
100	PG/LITER	
93	PG/LITER	14.97
102	PG/LITER	
98	PG/LITER	
63	PG/LITER	9.21
61	PG/LITER	439.70
70	PG/LITER	
88	PG/LITER	48.43
91	PG/LITER	
74	PG/LITER	
76	PG/LITER	
84	PG/LITER	109.98
66	PG/LITER	206.04
56	PG/LITER	93.75
60	PG/LITER	49.20
92	PG/LITER	61.39
90	PG/LITER	385.08
101	PG/LITER	
113	PG/LITER	
83	PG/LITER	183.17
99	PG/LITER	
112	PG/LITER	
136	PG/LITER	49.38
109	PG/LITER	
125	PG/LITER	
119	PG/LITER	
97	PG/LITER	
86	PG/LITER	308.76
87	PG/LITER	
85	PG/LITER	68.66

		Peripheral Ditch (Newark Air)
SAMP_ID		1GLC00115
LAB_SAMP_ID		48903-29-09
FRACTION		TOTAL
PARAM_NAME	**UNIT**	**RESULT**
116	PG/LITER	
117	PG/LITER	
110	PG/LITER	512.08
115	PG/LITER	
81	PG/LITER	
82	PG/LITER	53.66
77	PG/LITER	26.78
151	PG/LITER	
135	PG/LITER	125.89
154	PG/LITER	
147	PG/LITER	389.83
149	PG/LITER	
134	PG/LITER	25.33
143	PG/LITER	
106	PG/LITER	33.11
107	PG/LITER	
123	PG/LITER	
118	PG/LITER	428.65
132	PG/LITER	183.76
114	PG/LITER	9.27
179	PG/LITER	49.37
146	PG/LITER	55.38
161	PG/LITER	
105	PG/LITER	170.86
153	PG/LITER	413.78
168	PG/LITER	
141	PG/LITER	94.58
137	PG/LITER	59.44
164	PG/LITER	
129	PG/LITER	503.94
138	PG/LITER	
160	PG/LITER	
163	PG/LITER	
158	PG/LITER	51.68
178	PG/LITER	24.46
126	PG/LITER	
166	PG/LITER	
128	PG/LITER	80.02
187	PG/LITER	146.18

		Peripheral Ditch (Newark Air)
SAMP_ID		1GLC00115
LAB_SAMP_ID		48903-29-09
FRACTION		TOTAL
PARAM_NAME	**UNIT**	**RESULT**
183	PG/LITER	
185	PG/LITER	
174	PG/LITER	186.95
177	PG/LITER	70.91
167	PG/LITER	19.88
171	PG/LITER	34.28
173	PG/LITER	
201	PG/LITER	13.12
156	PG/LITER	52.09
157	PG/LITER	
200	PG/LITER	
197	PG/LITER	14.71
172	PG/LITER	21.73
180	PG/LITER	281.48
193	PG/LITER	
191	PG/LITER	3.74
170	PG/LITER	107.05
190	PG/LITER	21.83
169	PG/LITER	
198	PG/LITER	79.17
199	PG/LITER	
196	PG/LITER	34.81
203	PG/LITER	46.59
208	PG/LITER	13.13
195	PG/LITER	27.68
189	PG/LITER	3.87
207	PG/LITER	16.03
194	PG/LITER	78.95
205	PG/LITER	3.33
206	PG/LITER	39.16
209	PG/LITER	29.96

APPENDIX B.7 CSO/SWO EVENT #3 PCB DATA.

		Rahway Outfall 003	Ivy Street (Passaic River)	Christie Street (Hackensack River)
SAMP_ID		1GLC00131	1GLC00132	1GLC00133
LAB_SAMP_ID		48903-40-04	48903-40-05	48903-40-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
3	PG/LITER			
4	PG/LITER	215.17	97.75	
10	PG/LITER			
5	PG/LITER			
8	PG/LITER	210.11		
19	PG/LITER	66.18	29.98	13.97
18	PG/LITER	229.70	288.12	123.55
30	PG/LITER			
11	PG/LITER	267.49		
17	PG/LITER	158.83	142.47	60.05
27	PG/LITER			
24	PG/LITER			
16	PG/LITER	112.91	136.40	64.47
15	PG/LITER			
26	PG/LITER	36.80	39.39	17.10
29	PG/LITER			
25	PG/LITER	22.71	16.58	8.71
50	PG/LITER	49.30	53.73	43.16
53	PG/LITER			
31	PG/LITER	263.02	242.69	107.08
20	PG/LITER	501.21	390.18	168.86
28	PG/LITER			
45	PG/LITER	94.36	112.43	59.98
51	PG/LITER			
21	PG/LITER			
33	PG/LITER			
46	PG/LITER	31.07	37.25	20.97
22	PG/LITER		113.43	41.69
52	PG/LITER			
43	PG/LITER	1003.48	716.22	591.44
73	PG/LITER			
49	PG/LITER	411.16	313.39	232.46
69	PG/LITER			
48	PG/LITER	87.69	125.41	59.85
104	PG/LITER			
44	PG/LITER	809.44	653.16	448.27
47	PG/LITER			
65	PG/LITER			
62	PG/LITER			

		Rahway Outfall 003	Ivy Street (Passaic River)	Christie Street (Hackensack River)
SAMP_ID		1GLC00131	1GLC00132	1GLC00133
LAB_SAMP_ID		48903-40-04	48903-40-05	48903-40-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
75	PG/LITER			
59	PG/LITER	37.43	53.33	31.33
42	PG/LITER	160.82	170.97	107.15
40	PG/LITER	329.17	363.68	224.69
41	PG/LITER			
71	PG/LITER			
37	PG/LITER	161.28	178.12	95.89
64	PG/LITER	245.12	265.31	178.15
95	PG/LITER	1064.08	608.29	682.60
100	PG/LITER			
93	PG/LITER			
102	PG/LITER			
98	PG/LITER			
63	PG/LITER			
61	PG/LITER	1236.21	610.78	472.42
70	PG/LITER			
88	PG/LITER	150.24	97.62	97.04
91	PG/LITER			
74	PG/LITER			
76	PG/LITER			
84	PG/LITER	349.24	212.88	228.56
66	PG/LITER	533.53	307.92	220.78
56	PG/LITER	220.02	158.59	101.61
60	PG/LITER	90.31	77.47	54.58
92	PG/LITER	243.15	127.27	138.59
90	PG/LITER	1441.57	729.70	809.92
101	PG/LITER			
113	PG/LITER			
83	PG/LITER	578.17	321.33	358.81
99	PG/LITER			
112	PG/LITER			
136	PG/LITER	158.74	89.97	
109	PG/LITER			
125	PG/LITER			
119	PG/LITER			
97	PG/LITER			
86	PG/LITER	944.85	569.40	637.22
87	PG/LITER			
85	PG/LITER	200.97	96.67	125.33

			Ivy Street	Christie Street
		Rahway Outfall 003	(Passaic River)	(Hackensack River)
SAMP_ID		1GLC00131	1GLC00132	1GLC00133
LAB_SAMP_ID		48903-40-04	48903-40-05	48903-40-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
116	PG/LITER			
117	PG/LITER			
110	PG/LITER	1709.99	987.62	1184.43
115	PG/LITER			
81	PG/LITER			
82	PG/LITER	164.16	110.09	111.12
77	PG/LITER	40.51	53.55	58.63
151	PG/LITER			
135	PG/LITER	433.34	225.44	
154	PG/LITER			
147	PG/LITER	1511.49	774.11	965.35
149	PG/LITER			
134	PG/LITER	86.60	51.62	55.45
143	PG/LITER			
106	PG/LITER	105.05	55.36	72.65
107	PG/LITER			
123	PG/LITER			
118	PG/LITER	1398.05	701.41	797.13
132	PG/LITER	764.94	427.31	533.30
114	PG/LITER	23.28	11.78	12.51
179	PG/LITER	242.44	91.63	117.18
146	PG/LITER	226.12	116.32	147.68
161	PG/LITER			
105	PG/LITER	554.89	354.78	431.78
153	PG/LITER	1913.49	853.53	1083.15
168	PG/LITER			
141	PG/LITER	350.80	164.81	188.48
137	PG/LITER	225.42	102.85	154.72
164	PG/LITER			
129	PG/LITER	2199.03	769.95	1442.85
138	PG/LITER			
160	PG/LITER			
163	PG/LITER			
158	PG/LITER	203.33	72.48	137.18
178	PG/LITER	115.90	35.90	59.94
126	PG/LITER			
166	PG/LITER			
128	PG/LITER	266.02	148.28	218.73
187	PG/LITER	659.18	247.42	315.75

			Ivy Street	Christie Street
		Rahway Outfall 003	**(Passaic River)**	**(Hackensack River)**
SAMP_ID		1GLC00131	1GLC00132	1GLC00133
LAB_SAMP_ID		48903-40-04	48903-40-05	48903-40-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
183	PG/LITER			
185	PG/LITER			
174	PG/LITER	914.62	321.09	384.22
177	PG/LITER	373.05	184.96	223.78
167	PG/LITER	58.77	43.03	56.92
171	PG/LITER	197.69	93.65	113.99
173	PG/LITER			
201	PG/LITER	65.63	24.76	29.43
156	PG/LITER	209.55	117.04	158.74
157	PG/LITER			
200	PG/LITER			
197	PG/LITER	73.96	32.78	32.25
172	PG/LITER	111.93	55.47	68.28
180	PG/LITER	1446.44	692.69	807.78
193	PG/LITER			
191	PG/LITER	21.83	11.22	
170	PG/LITER	581.11	300.80	361.97
190	PG/LITER	96.45	56.17	63.10
169	PG/LITER			
198	PG/LITER	264.67	181.61	224.57
199	PG/LITER			
196	PG/LITER	81.65	78.02	81.35
203	PG/LITER	153.22	113.94	143.11
208	PG/LITER	67.39		
195	PG/LITER	92.71	71.72	68.07
189	PG/LITER		9.28	13.37
207	PG/LITER	28.82		
194	PG/LITER	193.00	139.53	166.70
205	PG/LITER	17.85		10.59
206	PG/LITER	189.95	110.73	211.62
209	PG/LITER	73.11	67.05	169.77

		Court Street (Hackensack River)	Elm Street	Anderson Street
SAMP_ID		1GLC00134	1GLC00138	1GLC00139
LAB_SAMP_ID		48903-40-07	48903-40-08	48903-40-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
3	PG/LITER			
4	PG/LITER	496.91	56.94	34.42
10	PG/LITER			
5	PG/LITER			
8	PG/LITER	624.33		23.85
19	PG/LITER	263.92	14.06	7.01
18	PG/LITER	1641.63	181.72	61.23
30	PG/LITER			
11	PG/LITER			104.74
17	PG/LITER	820.49	84.78	31.11
27	PG/LITER			
24	PG/LITER			
16	PG/LITER	807.41	89.67	33.41
15	PG/LITER	601.90		
26	PG/LITER	322.61	13.76	14.45
29	PG/LITER			
25	PG/LITER	139.77	8.09	5.67
50	PG/LITER	559.76	60.45	19.43
53	PG/LITER			
31	PG/LITER	1761.87	85.07	65.50
20	PG/LITER	3572.57	170.83	129.50
28	PG/LITER			
45	PG/LITER	847.74	79.68	23.85
51	PG/LITER			
21	PG/LITER			
33	PG/LITER			
46	PG/LITER			
22	PG/LITER	1042.88	43.55	38.92
52	PG/LITER			
43	PG/LITER	4296.88	776.73	270.24
73	PG/LITER			
49	PG/LITER	2370.59	292.68	95.56
69	PG/LITER			
48	PG/LITER	818.12	76.05	26.09
104	PG/LITER			
44	PG/LITER	3995.62	601.53	185.75
47	PG/LITER			
65	PG/LITER			
62	PG/LITER			

		Court Street (Hackensack River)	Elm Street	Anderson Street
SAMP_ID		1GLC00134	1GLC00138	1GLC00139
LAB_SAMP_ID		48903-40-07	48903-40-08	48903-40-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
75	PG/LITER			
59	PG/LITER	266.97	22.79	13.52
42	PG/LITER	1030.92	98.20	38.83
40	PG/LITER	2255.62	233.99	92.99
41	PG/LITER			
71	PG/LITER			
37	PG/LITER	1177.72	96.38	45.86
64	PG/LITER	1576.70	187.89	71.60
95	PG/LITER	2313.70	855.50	315.85
100	PG/LITER			
93	PG/LITER	101.72		
102	PG/LITER			
98	PG/LITER			
63	PG/LITER	84.70		5.42
61	PG/LITER	4806.15	506.63	305.05
70	PG/LITER			
88	PG/LITER	378.82	169.51	52.04
91	PG/LITER			
74	PG/LITER			
76	PG/LITER			
84	PG/LITER	922.05	187.24	106.07
66	PG/LITER	2987.68	192.16	146.26
56	PG/LITER	1432.20	110.71	72.84
60	PG/LITER	652.86	37.31	38.77
92	PG/LITER	520.11	176.44	68.00
90	PG/LITER	2994.54	1069.81	396.19
101	PG/LITER			
113	PG/LITER			
83	PG/LITER	1355.70	435.68	161.02
99	PG/LITER			
112	PG/LITER			
136	PG/LITER	329.51	145.19	50.99
109	PG/LITER			
125	PG/LITER			
119	PG/LITER			
97	PG/LITER			
86	PG/LITER	2368.36	751.15	282.55
87	PG/LITER			
85	PG/LITER	489.79	124.70	59.82

		Court Street (Hackensack River)	Elm Street	Anderson Street
SAMP_ID		1GLC00134	1GLC00138	1GLC00139
LAB_SAMP_ID		48903-40-07	48903-40-08	48903-40-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
116	PG/LITER			
117	PG/LITER			
110	PG/LITER	4206.00	1432.88	518.32
115	PG/LITER			
81	PG/LITER			
82	PG/LITER	480.58	129.72	54.06
77	PG/LITER	393.71	46.52	22.00
151	PG/LITER			
135	PG/LITER	827.33	381.81	136.64
154	PG/LITER			
147	PG/LITER	2952.51	1454.97	410.58
149	PG/LITER			
134	PG/LITER	260.34	147.21	25.65
143	PG/LITER			
106	PG/LITER	239.79	70.48	34.79
107	PG/LITER			
123	PG/LITER			
118	PG/LITER	3043.06	846.59	372.81
132	PG/LITER	1551.17	705.50	217.85
114	PG/LITER	50.73		6.60
179	PG/LITER	475.06	199.13	60.79
146	PG/LITER	430.40	191.33	60.26
161	PG/LITER			
105	PG/LITER	1431.04	464.10	162.59
153	PG/LITER	3325.19	1584.50	412.05
168	PG/LITER			
141	PG/LITER	760.38	285.48	89.19
137	PG/LITER	448.44	104.33	48.82
164	PG/LITER			
129	PG/LITER	3609.67	1644.45	600.23
138	PG/LITER			
160	PG/LITER			
163	PG/LITER			
158	PG/LITER	349.32	93.22	55.22
178	PG/LITER	193.90	79.63	55.37
126	PG/LITER			
166	PG/LITER			
128	PG/LITER	697.37	228.28	95.32
187	PG/LITER	1312.15	449.13	197.63

		Court Street (Hackensack River)	Elm Street	Anderson Street
SAMP_ID		1GLC00134	1GLC00138	1GLC00139
LAB_SAMP_ID		48903-40-07	48903-40-08	48903-40-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
183	PG/LITER			
185	PG/LITER			
174	PG/LITER	1933.34	625.14	256.12
177	PG/LITER	851.76	297.17	93.40
167	PG/LITER	151.43	40.35	19.81
171	PG/LITER	393.45	128.93	120.94
173	PG/LITER			
201	PG/LITER	139.14	44.65	481.51
156	PG/LITER	462.61	139.96	62.04
157	PG/LITER			
200	PG/LITER			
197	PG/LITER	165.74	60.30	591.11
172	PG/LITER	236.96	91.50	37.22
180	PG/LITER	3151.86	1128.45	397.37
193	PG/LITER			
191	PG/LITER			8.30
170	PG/LITER	1329.76	449.44	146.89
190	PG/LITER	226.16	97.10	7.17
169	PG/LITER			
198	PG/LITER	899.89	336.05	303.59
199	PG/LITER			
196	PG/LITER	402.11	70.78	215.10
203	PG/LITER	484.46	115.24	147.97
208	PG/LITER	237.58		837.91
195	PG/LITER	294.91	122.40	222.74
189	PG/LITER	48.04	12.99	17.04
207	PG/LITER	66.98		2053.45
194	PG/LITER	660.89	270.30	86.59
205	PG/LITER	48.07		100.00
206	PG/LITER	471.92	286.19	580.13
209	PG/LITER	162.04	526.44	1724.61

		Peripheral Ditch (Newark Air)	CCI	Henley Road (Hackensack River)
SAMP_ID		1GLC00141	1GLC00143	1GLC00146
LAB_SAMP_ID		48903-40-10	48903-40-12	48903-40-14
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
3	PG/LITER			
4	PG/LITER	187.92	88.53	
10	PG/LITER			
5	PG/LITER			
8	PG/LITER			
19	PG/LITER	28.13	122.21	17.40
18	PG/LITER	199.55	434.59	121.81
30	PG/LITER			
11	PG/LITER			
17	PG/LITER	99.48	276.45	59.06
27	PG/LITER			
24	PG/LITER			
16	PG/LITER	80.08	416.20	59.40
15	PG/LITER			
26	PG/LITER	13.06	187.81	22.39
29	PG/LITER			
25	PG/LITER	10.57	71.41	9.98
50	PG/LITER	94.81	365.07	35.47
53	PG/LITER			
31	PG/LITER	88.12	1007.21	128.90
20	PG/LITER	131.78	1740.94	217.73
28	PG/LITER			
45	PG/LITER	104.43	654.91	50.98
51	PG/LITER			
21	PG/LITER			
33	PG/LITER			
46	PG/LITER	28.93	223.65	16.74
22	PG/LITER	39.15	490.83	59.89
52	PG/LITER			
43	PG/LITER	755.28	3375.92	556.16
73	PG/LITER			
49	PG/LITER	260.30	1657.74	206.46
69	PG/LITER			
48	PG/LITER	44.71	419.43	49.37
104	PG/LITER			
44	PG/LITER	508.96	3223.91	400.11
47	PG/LITER			
65	PG/LITER			
62	PG/LITER			

		Peripheral Ditch (Newark Air)	CCI	Henley Road (Hackensack River)
SAMP_ID		1GLC00141	1GLC00143	1GLC00146
LAB_SAMP_ID		48903-40-10	48903-40-12	48903-40-14
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
75	PG/LITER			
59	PG/LITER	19.11	177.50	20.21
42	PG/LITER	90.43	818.71	79.74
40	PG/LITER	208.92	1733.48	170.53
41	PG/LITER			
71	PG/LITER			
37	PG/LITER	72.71	919.14	87.72
64	PG/LITER	149.70	1192.40	143.42
95	PG/LITER	834.38	2387.47	659.64
100	PG/LITER			
93	PG/LITER			
102	PG/LITER			
98	PG/LITER			
63	PG/LITER			
61	PG/LITER	544.28	3203.52	585.57
70	PG/LITER			
88	PG/LITER	133.71	306.74	122.62
91	PG/LITER			
74	PG/LITER			
76	PG/LITER			
84	PG/LITER	281.01	1048.21	132.98
66	PG/LITER	196.84	1856.32	229.19
56	PG/LITER	119.77	1061.88	127.69
60	PG/LITER	30.22	427.27	43.96
92	PG/LITER	197.29	521.95	141.76
90	PG/LITER	1211.52	3082.00	775.23
101	PG/LITER			
113	PG/LITER			
83	PG/LITER	530.57	1370.07	347.18
99	PG/LITER			
112	PG/LITER			
136	PG/LITER	141.80	406.54	94.29
109	PG/LITER			
125	PG/LITER			
119	PG/LITER			
97	PG/LITER			
86	PG/LITER	1062.19	2419.04	606.62
87	PG/LITER			
85	PG/LITER	196.85	539.35	119.53

		Peripheral Ditch (Newark Air)	CCI	Henley Road (Hackensack River)
SAMP_ID		1GLC00141	1GLC00143	1GLC00146
LAB_SAMP_ID		48903-40-10	48903-40-12	48903-40-14
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
116	PG/LITER			
117	PG/LITER			
110	PG/LITER	1741.56	4073.54	1016.40
115	PG/LITER			
81	PG/LITER			
82	PG/LITER	173.19	456.47	108.42
77	PG/LITER	82.32	255.98	37.53
151	PG/LITER			
135	PG/LITER	363.35	915.54	216.44
154	PG/LITER			
147	PG/LITER	1364.03	256.39	56.81
149	PG/LITER			
134	PG/LITER	93.16	293.52	65.17
143	PG/LITER			
106	PG/LITER	90.57	239.76	59.19
107	PG/LITER			
123	PG/LITER			
118	PG/LITER	1183.64	2947.86	713.02
132	PG/LITER	632.54	1829.20	468.33
114	PG/LITER		58.83	
179	PG/LITER	160.22	392.51	73.11
146	PG/LITER	231.15	494.97	118.41
161	PG/LITER			
105	PG/LITER	528.98	1407.80	325.95
153	PG/LITER	1590.54	3582.67	846.33
168	PG/LITER			
141	PG/LITER	336.21	838.40	212.98
137	PG/LITER	197.33	466.21	90.66
164	PG/LITER			
129	PG/LITER	1680.68	4866.58	1080.60
138	PG/LITER			
160	PG/LITER			
163	PG/LITER			
158	PG/LITER	165.00	391.94	77.98
178	PG/LITER	97.58	175.69	35.91
126	PG/LITER			
166	PG/LITER			
128	PG/LITER	234.65	717.91	150.29
187	PG/LITER	480.08	912.85	152.25

		Peripheral Ditch (Newark Air)	CCI	Henley Road (Hackensack River)
SAMP_ID		1GLC00141	1GLC00143	1GLC00146
LAB_SAMP_ID		48903-40-10	48903-40-12	48903-40-14
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
183	PG/LITER			
185	PG/LITER			
174	PG/LITER	700.39	1048.77	181.57
177	PG/LITER	325.09	531.90	117.85
167	PG/LITER	55.50	129.95	34.35
171	PG/LITER	110.69	246.78	50.60
173	PG/LITER			
201	PG/LITER	48.96	98.15	
156	PG/LITER	134.64	485.83	119.46
157	PG/LITER			
200	PG/LITER			
197	PG/LITER	53.29	115.98	
172	PG/LITER	96.37		38.57
180	PG/LITER	1189.49	1965.04	453.69
193	PG/LITER			
191	PG/LITER		31.40	
170	PG/LITER	417.14	848.63	208.70
190	PG/LITER	94.24	171.06	38.84
169	PG/LITER		98.37	
198	PG/LITER	325.58	683.71	120.09
199	PG/LITER			
196	PG/LITER	109.84	256.45	18.45
203	PG/LITER	187.28	323.00	36.94
208	PG/LITER		189.51	
195	PG/LITER	117.22	200.20	
189	PG/LITER	17.44		
207	PG/LITER			
194	PG/LITER	283.80	509.12	114.67
205	PG/LITER			
206	PG/LITER	150.98	557.29	93.35
209	PG/LITER	46.99	332.25	59.15

		Blanchard Street (Passaic River)	Smith Marina
SAMP_ID		1GLC00142	1GLC00144
LAB_SAMP_ID		48903-40-11	48903-40-13
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
3	PG/LITER		
4	PG/LITER	370.06	
10	PG/LITER	13.45	
5	PG/LITER		
8	PG/LITER	422.97	
19	PG/LITER	255.58	41.22
18	PG/LITER	333.30	226.34
30	PG/LITER		
11	PG/LITER	1891.50	
17	PG/LITER	203.84	118.53
27	PG/LITER		
24	PG/LITER		
16	PG/LITER	224.87	137.30
15	PG/LITER	942.53	
26	PG/LITER	234.30	45.23
29	PG/LITER		
25	PG/LITER	104.69	25.93
50	PG/LITER	255.09	96.50
53	PG/LITER		
31	PG/LITER	1010.69	197.39
20	PG/LITER	2242.05	350.93
28	PG/LITER		
45	PG/LITER	455.78	131.97
51	PG/LITER		
21	PG/LITER		
33	PG/LITER		
46	PG/LITER	141.28	
22	PG/LITER	519.45	93.39
52	PG/LITER		
43	PG/LITER	1882.78	761.15
73	PG/LITER		
49	PG/LITER	1080.77	331.87
69	PG/LITER		
48	PG/LITER	238.03	86.18
104	PG/LITER		
44	PG/LITER	2024.03	631.52
47	PG/LITER		
65	PG/LITER		
62	PG/LITER		

		Blanchard Street (Passaic River)	Smith Marina
SAMP_ID		1GLC00142	1GLC00144
LAB_SAMP_ID		48903-40-11	48903-40-13
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
75	PG/LITER		
59	PG/LITER	191.08	34.98
42	PG/LITER	603.62	135.35
40	PG/LITER	1157.40	284.88
41	PG/LITER		
71	PG/LITER		
37	PG/LITER	897.34	135.41
64	PG/LITER	783.99	232.27
95	PG/LITER	1068.81	713.23
100	PG/LITER		
93	PG/LITER		
102	PG/LITER		
98	PG/LITER		
63	PG/LITER		
61	PG/LITER	2908.00	590.00
70	PG/LITER		
88	PG/LITER	224.43	108.40
91	PG/LITER		
74	PG/LITER		
76	PG/LITER		
84	PG/LITER	473.10	280.07
66	PG/LITER	2062.26	261.65
56	PG/LITER	908.28	146.54
60	PG/LITER	387.45	49.96
92	PG/LITER	245.88	139.83
90	PG/LITER	1337.59	861.48
101	PG/LITER		
113	PG/LITER		
83	PG/LITER	722.05	433.81
99	PG/LITER		
112	PG/LITER		
136	PG/LITER	128.36	131.35
109	PG/LITER		
125	PG/LITER		
119	PG/LITER		
97	PG/LITER		
86	PG/LITER	1155.98	657.91
87	PG/LITER		
85	PG/LITER	237.31	125.92

		Blanchard Street (Passaic River)	Smith Marina
SAMP_ID		1GLC00142	1GLC00144
LAB_SAMP_ID		48903-40-11	48903-40-13
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
116	PG/LITER		
117	PG/LITER		
110	PG/LITER	1893.40	1128.63
115	PG/LITER		
81	PG/LITER		
82	PG/LITER	265.97	112.12
77	PG/LITER	223.02	36.20
151	PG/LITER		
135	PG/LITER	304.78	337.59
154	PG/LITER		
147	PG/LITER	1070.64	1041.96
149	PG/LITER		
134	PG/LITER	56.71	107.35
143	PG/LITER		
106	PG/LITER	132.85	55.80
107	PG/LITER		
123	PG/LITER		
118	PG/LITER	1435.91	663.69
132	PG/LITER	580.60	527.16
114	PG/LITER	30.54	
179	PG/LITER	106.74	115.78
146	PG/LITER	149.55	142.55
161	PG/LITER		
105	PG/LITER	717.03	287.52
153	PG/LITER	1067.13	1045.70
168	PG/LITER		
141	PG/LITER	244.62	197.95
137	PG/LITER	158.59	94.31
164	PG/LITER		
129	PG/LITER	1490.91	1150.47
138	PG/LITER		
160	PG/LITER		
163	PG/LITER		
158	PG/LITER	144.76	77.79
178	PG/LITER	52.28	52.77
126	PG/LITER		31.28
166	PG/LITER		
128	PG/LITER	223.99	181.79
187	PG/LITER	291.69	288.09

		Blanchard Street (Passaic River)	Smith Marina
SAMP_ID		1GLC00142	1GLC00144
LAB_SAMP_ID		48903-40-11	48903-40-13
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
183	PG/LITER		
185	PG/LITER		
174	PG/LITER	411.37	398.63
177	PG/LITER	169.55	183.13
167	PG/LITER	47.94	25.98
171	PG/LITER	90.33	91.18
173	PG/LITER		
201	PG/LITER	27.70	16.30
156	PG/LITER	177.22	114.52
157	PG/LITER		
200	PG/LITER		
197	PG/LITER	31.67	19.68
172	PG/LITER	50.88	51.90
180	PG/LITER	658.30	639.78
193	PG/LITER		
191	PG/LITER		
170	PG/LITER	289.83	286.67
190	PG/LITER	50.02	54.63
169	PG/LITER		
198	PG/LITER	220.52	151.71
199	PG/LITER		
196	PG/LITER	91.40	63.69
203	PG/LITER	138.83	110.02
208	PG/LITER	59.86	
195	PG/LITER	59.26	69.57
189	PG/LITER	13.69	
207	PG/LITER	23.19	
194	PG/LITER	172.67	145.64
205	PG/LITER	21.16	
206	PG/LITER	189.31	132.99
209	PG/LITER	136.67	102.16

APPENDIX B.8 CSO/SWO EVENT #4 PCB DATA.

		Rahway Outfall 003	Ivy Street (Passaic River)	Front Street and Bay Way
Replacement SAMP ID		**1GLC00160**	**1GLC00157**	**1GLC00162**
LAB_SAMP_ID		49023-44-05	49023-44-07	49023-44-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
3	PG/LITER	58.42		62.53
4	PG/LITER	201.55	124.92	455.34
10	PG/LITER			40.61
5	PG/LITER			
8	PG/LITER	221.11	264.40	691.50
19	PG/LITER	48.88	55.27	215.35
18	PG/LITER	400.47	666.03	1759.27
30	PG/LITER			
11	PG/LITER	257.27	570.87	838.93
17	PG/LITER	201.07	315.72	862.37
27	PG/LITER			
24	PG/LITER			
16	PG/LITER	210.29	346.30	964.06
15	PG/LITER	144.25	278.35	948.70
26	PG/LITER	84.95	155.15	435.42
29	PG/LITER			
25	PG/LITER	43.83	64.63	188.55
50	PG/LITER	186.98	174.21	674.94
53	PG/LITER			
31	PG/LITER	484.75	865.87	2220.97
20	PG/LITER	817.61	1576.62	4221.58
28	PG/LITER			
45	PG/LITER	192.92	244.01	882.33
51	PG/LITER			
21	PG/LITER			
33	PG/LITER			
46	PG/LITER	69.70	81.13	311.34
22	PG/LITER	193.39	398.17	1074.93
52	PG/LITER			
43	PG/LITER	3096.74	1872.65	5007.04
73	PG/LITER			
49	PG/LITER	949.47	840.06	2465.55
69	PG/LITER			
48	PG/LITER	175.27	285.38	769.47
104	PG/LITER			
44	PG/LITER	1788.60	1497.50	4402.82

		Rahway Outfall 003	Ivy Street (Passaic River)	Front Street and Bay Way
Replacement SAMP ID		**1GLC00160**	**1GLC00157**	**1GLC00162**
LAB_SAMP_ID		49023-44-05	49023-44-07	49023-44-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
47	PG/LITER			
65	PG/LITER			
62	PG/LITER			
75	PG/LITER			
59	PG/LITER	72.37	130.13	406.63
42	PG/LITER	308.83	395.69	1229.28
40	PG/LITER	668.70	889.95	2685.06
41	PG/LITER			
71	PG/LITER			
37	PG/LITER	179.96	457.83	1302.44
64	PG/LITER	607.16	670.77	2064.56
95	PG/LITER	3862.08	2775.10	5785.37
100	PG/LITER			
93	PG/LITER	137.11	112.48	258.19
102	PG/LITER			
98	PG/LITER			
63	PG/LITER		39.53	104.83
61	PG/LITER	3181.24	2226.97	5408.75
70	PG/LITER			
88	PG/LITER	624.31	403.12	934.77
91	PG/LITER			
74	PG/LITER			
76	PG/LITER			
84	PG/LITER	1425.07	940.49	2024.74
66	PG/LITER	1043.04	1041.24	3046.15
56	PG/LITER	465.38	553.63	1569.74
60	PG/LITER	186.65	314.78	788.20
92	PG/LITER	903.82	677.42	1188.00
90	PG/LITER	5359.05	4347.17	7260.22
101	PG/LITER			
113	PG/LITER			
83	PG/LITER	2265.63	1752.33	3237.60
99	PG/LITER			
112	PG/LITER			
136	PG/LITER	1063.76	1538.50	2304.65
109	PG/LITER			
125	PG/LITER			

		Rahway Outfall 003	Ivy Street (Passaic River)	Front Street and Bay Way
Replacement SAMP ID		1GLC00160	1GLC00157	1GLC00162
LAB_SAMP_ID		49023-44-05	49023-44-07	49023-44-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	UNIT	RESULT	RESULT	RESULT
119	PG/LITER			
97	PG/LITER			
86	PG/LITER	3873.59	3156.37	5497.73
87	PG/LITER			
85	PG/LITER	581.24	577.43	1244.58
116	PG/LITER			
117	PG/LITER			
110	PG/LITER	6499.59	5686.87	9774.96
115	PG/LITER			
81	PG/LITER			
82	PG/LITER	638.97	600.51	1178.94
77	PG/LITER	57.50	244.39	508.44
151	PG/LITER			
135	PG/LITER	2465.87	5468.40	6887.29
154	PG/LITER			
147	PG/LITER	3346.48	7112.70	9326.25
149	PG/LITER			
134	PG/LITER	286.37	368.22	559.00
143	PG/LITER			
106	PG/LITER	375.00	326.38	509.13
107	PG/LITER			
123	PG/LITER			
118	PG/LITER	5147.20	4347.84	6058.90
132	PG/LITER	1955.09	2621.66	4002.60
114	PG/LITER	109.92	85.68	139.72
179	PG/LITER	342.80	2536.37	1859.66
146	PG/LITER	541.20	1045.78	1439.42
161	PG/LITER			
105	PG/LITER	2333.05	1985.66	3070.85
153	PG/LITER	4067.97	9013.72	10582.54
168	PG/LITER			
141	PG/LITER	996.16	2290.86	2938.66
137	PG/LITER	722.19	934.66	1333.64
164	PG/LITER			
129	PG/LITER	6137.48	9250.31	13117.20
138	PG/LITER			
160	PG/LITER			

		Rahway Outfall 003	Ivy Street (Passaic River)	Front Street and Bay Way
Replacement SAMP ID		1GLC00160	1GLC00157	1GLC00162
LAB_SAMP_ID		49023-44-05	49023-44-07	49023-44-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	UNIT	RESULT	RESULT	RESULT
163	PG/LITER			
158	PG/LITER	635.54	870.57	1208.58
178	PG/LITER	179.35	1247.10	893.61
126	PG/LITER	57.35		
166	PG/LITER			
128	PG/LITER	990.89	1466.47	1884.50
187	PG/LITER	1011.87	7623.70	5509.26
183	PG/LITER			
185	PG/LITER			
174	PG/LITER	1546.95	10206.88	8460.22
177	PG/LITER	331.03	1845.00	1701.85
167	PG/LITER	254.19	331.49	441.98
171	PG/LITER	192.13	733.44	832.02
173	PG/LITER			
201	PG/LITER	70.89	574.65	326.29
156	PG/LITER	941.07	976.17	1341.36
157	PG/LITER			
200	PG/LITER			
197	PG/LITER	83.57	594.97	387.16
172	PG/LITER	102.56	500.32	494.13
180	PG/LITER	1273.52	7226.36	6536.29
193	PG/LITER			
191	PG/LITER	22.98	82.70	
170	PG/LITER	629.74	2308.16	2819.09
190	PG/LITER	76.81	368.02	432.97
169	PG/LITER		56.58	66.52
198	PG/LITER	468.78	4209.55	2651.07
199	PG/LITER			
196	PG/LITER	204.20	1775.10	1179.77
203	PG/LITER	388.49	2070.37	1501.16
208	PG/LITER	73.19	246.68	250.28
195	PG/LITER	105.99	781.85	623.92
189	PG/LITER	46.56	101.70	152.26
207	PG/LITER	19.92	122.07	112.18
194	PG/LITER	216.69	1767.83	1610.12
205	PG/LITER		114.57	99.75
206	PG/LITER	232.47	936.85	959.87
209	PG/LITER	103.76	333.80	532.28

		Peripheral Ditch (Newark Air)	CCI	Smith Marina
Replacement SAMP ID		**1GLC00156**	**1GLC00158**	**1GLC00159**
LAB_SAMP_ID		49023-44-08	49023-44-06	49023-44-04
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
3	PG/LITER		33.03	
4	PG/LITER	159.45	117.25	104.16
10	PG/LITER	10.57		
5	PG/LITER			
8	PG/LITER		267.53	152.80
19	PG/LITER	18.39	54.86	44.83
18	PG/LITER	107.68	617.02	344.27
30	PG/LITER			
11	PG/LITER	70.51	1009.60	312.79
17	PG/LITER	47.86	298.93	167.59
27	PG/LITER			
24	PG/LITER			
16	PG/LITER	51.74	345.72	192.83
15	PG/LITER	39.77	291.82	174.59
26	PG/LITER		168.50	76.70
29	PG/LITER			
25	PG/LITER	8.49	70.42	31.62
50	PG/LITER	62.56	271.57	114.76
53	PG/LITER			
31	PG/LITER	89.07	919.48	388.45
20	PG/LITER	169.07	1693.26	750.90
28	PG/LITER			
45	PG/LITER	71.47	381.47	152.57
51	PG/LITER			
21	PG/LITER			
33	PG/LITER			
46	PG/LITER	22.65	132.70	51.53
22	PG/LITER	37.03	441.81	192.53
52	PG/LITER			
43	PG/LITER	983.66	2877.17	1216.85
73	PG/LITER			
49	PG/LITER	301.85	1291.80	470.15
69	PG/LITER			
48	PG/LITER	63.69	425.07	125.74
104	PG/LITER			
44	PG/LITER	596.92	2340.17	813.68

		Peripheral Ditch (Newark Air)	CCI	Smith Marina
Replacement SAMP ID		**1GLC00156**	**1GLC00158**	**1GLC00159**
LAB_SAMP_ID		49023-44-08	49023-44-06	49023-44-04
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
47	PG/LITER			
65	PG/LITER			
62	PG/LITER			
75	PG/LITER			
59	PG/LITER	32.45	186.12	66.30
42	PG/LITER	108.66	593.43	191.48
40	PG/LITER	255.24	1299.24	429.70
41	PG/LITER			
71	PG/LITER			
37	PG/LITER	49.23	552.82	213.52
64	PG/LITER	224.85	998.59	356.03
95	PG/LITER	1181.11	3439.61	1963.30
100	PG/LITER			
93	PG/LITER	47.74	152.12	77.18
102	PG/LITER			
98	PG/LITER			
63	PG/LITER	8.66	46.23	19.79
61	PG/LITER	601.19	2855.48	1071.97
70	PG/LITER			
88	PG/LITER	177.66	540.84	315.20
91	PG/LITER			
74	PG/LITER			
76	PG/LITER			
84	PG/LITER	383.33	1111.34	659.99
66	PG/LITER	207.42	1308.53	509.55
56	PG/LITER	120.49	628.73	257.22
60	PG/LITER	51.74	339.18	134.98
92	PG/LITER	294.88	687.38	386.92
90	PG/LITER	1737.92	3950.26	2189.02
101	PG/LITER			
113	PG/LITER			
83	PG/LITER	735.37	1674.70	975.47
99	PG/LITER			
112	PG/LITER			
136	PG/LITER	676.73	1074.55	553.82
109	PG/LITER			
125	PG/LITER			

		Peripheral Ditch (Newark Air)	CCI	Smith Marina
Replacement SAMP ID		1GLC00156	1GLC00158	1GLC00159
LAB_SAMP_ID		49023-44-08	49023-44-06	49023-44-04
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	UNIT	RESULT	RESULT	RESULT
119	PG/LITER			
97	PG/LITER			
86	PG/LITER	1427.31	2811.07	1549.91
87	PG/LITER			
85	PG/LITER	240.03	461.67	366.63
116	PG/LITER			
117	PG/LITER			
110	PG/LITER	2570.13	4932.01	3139.82
115	PG/LITER			
81	PG/LITER	4.71		
82	PG/LITER	270.84	518.28	304.19
77	PG/LITER	162.64	222.15	90.44
151	PG/LITER			
135	PG/LITER	2251.23	2758.22	1511.51
154	PG/LITER			
147	PG/LITER	3116.76	3327.82	2169.07
149	PG/LITER			
134	PG/LITER	192.02	344.03	144.08
143	PG/LITER			
106	PG/LITER	167.28	294.35	129.94
107	PG/LITER			
123	PG/LITER			
118	PG/LITER	2002.00	3892.32	1595.81
132	PG/LITER	1494.89	1566.75	1053.52
114	PG/LITER	34.47		33.06
179	PG/LITER	674.83	547.77	356.06
146	PG/LITER	633.00	511.52	334.00
161	PG/LITER			
105	PG/LITER	902.38	1792.03	733.02
153	PG/LITER	4123.73	3729.17	2208.62
168	PG/LITER			
141	PG/LITER	1060.73	814.44	581.07
137	PG/LITER	574.32	548.68	366.07
164	PG/LITER			
129	PG/LITER	5202.38	4993.45	3113.89
138	PG/LITER			
160	PG/LITER			

		Peripheral Ditch (Newark Air)	CCI	Smith Marina
Replacement SAMP ID		**1GLC00156**	**1GLC00158**	**1GLC00159**
LAB_SAMP_ID		49023-44-08	49023-44-06	49023-44-04
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
163	PG/LITER			
158	PG/LITER	510.01	480.24	318.03
178	PG/LITER	402.58	261.88	164.61
126	PG/LITER	66.55		
166	PG/LITER			
128	PG/LITER	974.31	813.28	522.98
187	PG/LITER	2316.61	1524.92	1035.88
183	PG/LITER			
185	PG/LITER			
174	PG/LITER	2881.26	2012.40	1570.23
177	PG/LITER	595.59	470.95	331.94
167	PG/LITER	199.63	247.04	119.38
171	PG/LITER	250.11	232.11	179.16
173	PG/LITER			
201	PG/LITER	160.73	134.13	62.42
156	PG/LITER	483.04	761.64	316.60
157	PG/LITER			
200	PG/LITER			
197	PG/LITER	190.36	151.83	77.44
172	PG/LITER	220.32	151.09	103.55
180	PG/LITER	2511.01	1704.44	1274.70
193	PG/LITER			
191	PG/LITER	31.00	24.58	21.00
170	PG/LITER	863.59	784.02	594.37
190	PG/LITER	136.28	138.97	93.20
169	PG/LITER	25.16		
198	PG/LITER	1419.10	1126.46	505.39
199	PG/LITER			
196	PG/LITER	593.64	420.61	222.99
203	PG/LITER	688.53	633.33	291.79
208	PG/LITER	64.08	224.47	90.90
195	PG/LITER	319.02	236.33	115.76
189	PG/LITER	59.63	59.59	37.61
207	PG/LITER	43.46	79.43	38.46
194	PG/LITER	1026.67	653.23	296.87
205	PG/LITER	57.26	44.46	
206	PG/LITER	338.62	746.02	256.22
209	PG/LITER	70.18	572.88	209.06

APPENDIX C.1 QA issue for POTW event #4 PAH field blank.

Draft – 11 December 2003

Introduction: this QA Issue Report discusses an observed problem with the results from the Field Blank (1GLC00099FB) collected in the Study I-G POTW Sampling Event #4 (Survey 2001-IGB, 7-9 August 2001).

Observed Problem: use of the Field Blank (1GLC00099FB) for the Study I-G POTW Event #4 samples in the NJTRWP Maximum Blank Approach for assessing blank contamination impacts would result in the blank correction of substantial amounts of the POTW #4 sample data. Specifically, the data for almost every PAH target analyte would be censored for 6 of the 11 samples collected, with about half the data censored for an additional 2 of the 11 samples.

Observations on the POTW Event #4 Sample Data

(1) E-mail from Greg Durrell (Battelle) to Jamie Saxton (GLEC) – see Attachment #1. concludes that it is pretty clear to me that this sample [POTW Event #4 Field Blank] is an anomaly for this batch and for the projects as a whole, and does in no way represent the background levels that can reasonably be expected to be present in the field samples even from this batch - if it does not represent the background, then it should not be used for blank correction.

(2) Comparison of the Field Blanks collected during all of the Study I-G sampling Events (see Figure 1) shows that, except for naphthalene in one of the POTW Event #3 Field Blanks, the level of contamination was greatest for all of the analytes in the POTW Event #4 Field Blank. This was particularly true for most of the non-naphthalene compounds (for example – the phenanthrenes, fluoranthenes, pyrenes, and benzo(ghi)perylene).

Conclusions

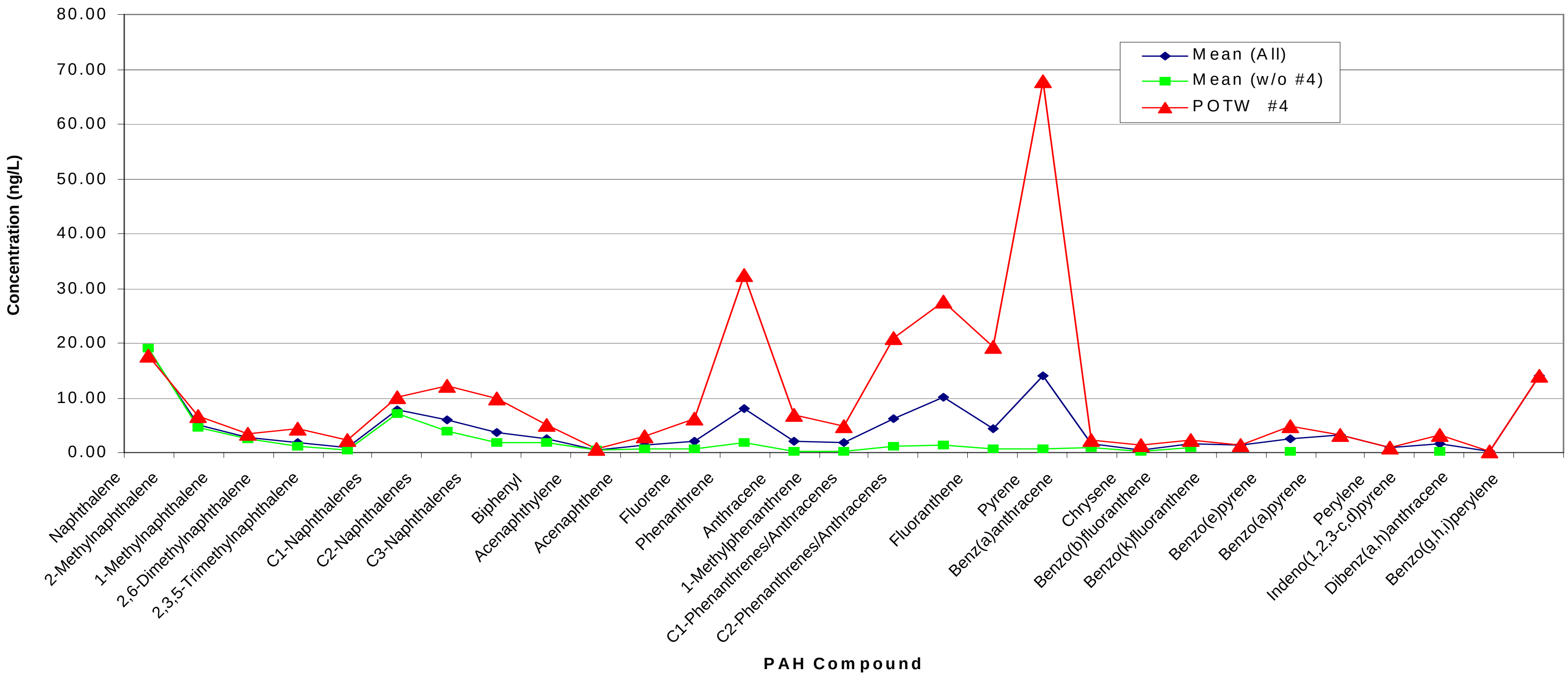
(1) The Field Blank (1GLC00099FB) for POTW Event #4 will not be used for blank correction of the sample results for POTW Event #4. As a surrogate for this field blank, the mean of the field blanks for POTW Events #1, #2, and #3 will be used in the NJTRWP Maximum Blank Approach for assessing blank contamination impacts – see Table 1.

Table 1: Mean of the PAH Field Blanks Collected for Study I-G POTW Events #1, #2, and #3 and the Event #3 Method Blank

Note: the "Maximum Blank" is highlighted in grey.

PAH Analyte	Mean Field Blanks (ng/L)	Mean Field Blanks (ng/sample)	Event #3 Method Blank (ng/sample)
Naphthalene	19.01	47.22	15.64
2-Methylnaphthalene	4.55	11.34	4.64
1-Methylnaphthalene	2.58	6.43	2.17
2,6-Dimethylnaphthalene	1.11	2.76	
2,3,5-Trimethylnaphthalene	0.35	0.86	
C1-Naphthalenes	7.13	17.77	6.81
C2-Naphthalenes	3.98	9.80	
C3-Naphthalenes	1.77	4.37	
Biphenyl	1.85	4.58	7.73
Acenaphthylene	0.47	1.16	1.07
Acenaphthene	0.69	1.70	
Fluorene	0.70	1.73	1.02
Phenanthrene	1.87	4.61	7.96
Anthracene	0.34	0.85	0.63
1-Methylphenanthrene	0.28	0.69	0.95
C1-Phenanthrenes/Anthracenes	1.22	2.99	2.48
C2-Phenanthrenes/Anthracenes	1.48	3.64	
Fluoranthene	0.74	1.82	2.53
Pyrene	0.60	1.47	2.12
Benz(a)anthracene	0.93	2.29	
Chrysene	0.22	0.55	
Benzo(b)fluoranthene	0.99	2.43	3.62
Benzo(k)fluoranthene			
Benzo(e)pyrene	0.16	0.42	1.32
Benzo(a)pyrene			
Perylene			
Indeno(1,2,3-c,d)pyrene	0.15	0.38	1.75
Dibenz(a,h)anthracene			0.67
Benzo(g,h,i)perylene			2.87

Figure 1: POTW PAH Field Blanks



ATTACHMENT #1

Reply from Greg Durrell at Battelle....................

Jamie,

There is definitely something odd with the FB from POTW Event #4, and I really can't explain what is going on. The lab method blank looks fine, so maybe the specific sample bottle used in the field or some glassware used for just that sample was contaminated somehow, or something else - your guess is as good as mine. However, and the important point is, that it is pretty clear to me that this sample is an anomaly for this batch and for the projects as a whole, and does in no way represent the background levels that can reasonably be expected to be present in the field samples even from this batch - if it does not represent the background, then it should not be used for blank correction.

The relative concentrations of the PAH compounds in this sample is really odd too - unusually high relative concentrations of pyrene, the phenanthrene compounds, and benzo[g,h,i]perylene. This does not suggest any particular hydrocarbon contamination that I am aware of (e.g., such as lubricating oil, any fuel, combustion product ...). This is also completely different from the relative amounts of PAH in the field samples - if there were similar background levels in the field samples or some related cross contamination then you should be able to see comparable relative levels of some of these compounds. In fact, the levels of some of the key PAH are higher in this FB than in some of the field samples, and the composition of all field samples are very different from that of the FB. This is completely inconsistent with a theory of there being a constant background represented by the FB. The FB from the other POTW and CSO/SW events were fine, all laboratory MBs were fine, so something weird happened with this single sample that also did not happen to the field samples even in that batch. In addition, the PAH levels and composition in the field samples in POTW Event #4 makes sense considering the other sampling events, and do not seem to have been contributed by any additional source. You need to look at the data set as a whole, and what the PAH data together mean (PAH don't come as individual compounds in our environment - they are related) - not just go through the data one analyte at a time and compare individual concentrations. I certainly see no evidence that the PAH in the field samples are contributed by background levels like those seen in the FB, and would feel confident just ignoring the results for this particular FB.

Greg

-----Original Message-----
From: Jamie Saxton [mailto:jsaxton@glec-tc.com]
Sent: Wednesday, December 03, 2003 12:09 PM
To: Durell, Gregory
Subject: [Fwd: NJTRWP Study I-G POTW Event #4 PAH Data]

Greg,

Do you have any response to Joel's comments?

Thanks.
Jamie

Hi Jamie ...

I started performing the blank correction review of the POTW Event #4 PAH data, and noticed that the Field Blank would have an unusually large impact on the sample data (particularly when compared with the levels of the PAH analytes in the POTW Events #1-3 Field Blanks).

In general, if the FB is used, just about all of the data will be censored for samples 1GLC00086/88/89/90/94/96, and at least 50% of the data will be censored for samples 1GLC00085/87.

Please contact Battelle and have them review the data for this sampling event - are there any reasons why the FB should not be used?

APPENDIX C.2
QA issue: POTW event #1 PAH trip blanks

Draft – 9 February 2004

Introduction: this QA Issue Report discusses potential problems with using the results for some of the analytes/fraction from the Trip Blanks (1GLC00019/23TB) collected in the Study I-G POTW Sampling Event #1 (Survey 2000-IGA, 2-3 October 2000).

Observed Problem: the samples collected as part of Study I-G POTW Sampling Event #1 were analyzed as separate dissolved and suspended sediment fractions. In contrast, the Trip Blanks collected for this sampling event (1GLC00019/23TB) were analyzed as "totals". Thus, when applying the NJTRWP Maximum Blank Approach for assessing blank contamination impacts to the POTW Event #1 samples, there is the potential to "over-correct" for blank contamination for those analytes where the Trip Blank was the "maximum blank". This "over-correction" effect could impact the following analytes for the identified fraction (i.e. the Trip Blank results are greater than the corresponding Method Blank results; see Table 1):

Dissolved Fraction	Suspended Fraction	
Naphthalene	Acenaphthylene	C1 Naphthalenes
Anthracene	2-Methylnaphthalene	C2 Naphthalenes
Indeno (1,2,3-cd) pyrene	1-Methylnaphthalene	Biphenyl
	2,6-Dimethynaphthalene	Acenaphthene
	2,3,5-Trimethylnaphthalene	Fluorene
	Phenanthrene	

Observations/Conclusions on the POTW Event #1 Blank and Sample Data

(3) E-mail from Greg Durrell (Battelle) to Joel Pecchioli (NJDEP) – see Attachment #1, states that

> The TB/EB should actually only experience laboratory-based background comparable to the DISS MB [dissolved Method Blank], and anything else would likely be coming from some other source(s). The TB/EB samples were NOT filtered …

(2) The POTW PAH samples were analyzed for a total of 29 analytes/groups. Only 3 PAH analytes in the dissolved phase samples, and 11 analytes in the suspended sediment fraction samples, have the potential to be impacted by blank contamination in the Trip Blanks. For all other analytes, the associated Method Blank was the "maximum blank". This suggests that the POTW Trip Blanks were not consistently contaminated at unexpectedly high levels for all of the PAH analytes, beyond the contamination found in the associated Method Blanks. It all suggests that the additional contamination occurred in the suspended sediment fraction samples, resulting from a sample collection (for example, the filters used) or analytical source.

(3) Comparison of the Trip/Field Blanks collected during all of the Study I-G Sampling Events (except the Field Blank for POTW Event #4; see Table 1) shows what appears to be a random

distribution of the “maximum blank” for the various analytes among these blanks. This suggests that the POTW Event #1 Trip Blanks were not consistently contaminated at unexpectedly high levels for all of the analytes of interest.

(4) Comparison of additional Method and Field Blanks from the CSO/SWO sampling events (data not shown) shows a similar random distribution of the “maximum blank” among these blanks. In addition, the level of contamination in the CSO/SWO Method and Equipment Blanks were generally comparable to that in the POTW blanks.

(5) However, comparison of the data in Table 1 suggests that the following analytes in the Trip Blanks from POTW Event #1 are elevated beyond that expected to be found in the other Trip/Field Blanks:

- Naphthalene (dissolved) - 1GLC00019TB
- Indeno(1,2,3-cd)pyrene (dissolved) - 1GLC00023TB
- Acenaphthylene (suspended) - 1GLC00019TB
- 2,3,5-Trimethylnaphthalene (suspended) - 1GLC00019TB
- Acenaphthene (suspended) - 1GLC00019TB
- Fluorene (suspended) - 1GLC00019TB

Conclusion: the CARP/HydroQual model is only using Total PAH concentrations (sum of the dissolved and suspended sediment fraction data) in its loading estimates. In general, for most analytes, the sum of the Method Blanks for the separate dissolved and suspended sediment fraction analyses is equal to/greater than the associated Field Blank data. Therefore, blank correction will occur at the level of “Total PAHs” (sum of the dissolved and suspended sediment fraction data) for each analyte. The sum of the Method Blanks for the separate dissolved and suspended sediment fraction analyses will be used, and the 5X factor applied to this “Total Method Blank” value for each analyte (see attached table). Any “Total PAH” sample result for a given analyte that is less than 5X the “Total Method Blank” will be blank-corrected (i.e. censored).

Table 1: Method Blank Data for POTW Event #1, and Trip and Field Blank Data for POTW Events #1, #2, #3 and #4 for those Fractions/ PAH Analytes Listed in the "Observed Problem" Statement

Note: the "Maximum Blank" for each analyte for the Trip/Field Blanks in POTW Events #1, #2, and #3 is highlighted in aqua. The Field Blank Data for POTW Event #4 was previously rejected for use – see "QA Issue: POTW Event #4 PAH Field Blank (Draft, 11 December 2003).

	Event #1	Event #1	Event #1	Event #1	Event #2	Event #3	Event #4
POTW PAH TB/FB 1GLC000	MB-Diss	MB-Susp	19TB	23TB	44FB	81FB	99FB
Dissolved Fraction Analytes:							
Napthalene	9.55		83.5	37.67	32.08	35.62	43.92
Anthracene	0.33		0.69	0.66	ND	1.19	16.85
Indeno(1,2,3-cd)pyrene	ND		ND	0.38	ND	ND	8.08
Suspended Fraction Analytes:							
Acenaphthylene		0.56	1.67	0.56	ND	1.26	1.76
2-Methylnaphthalene		2.83	11.41	7.12	14.31	12.53	16.47
1-Methylnaphthalene		1.66	5.07	3.1	9.63	7.91	8.65
2,6-Dimethylnaphthalene		0.93	3.01	1.75	2.73	3.53	10.92
2,3,5-Trimethylnaphthalene		ND	1.12	0.59	ND	ND	5.43
C1 Napthalenes		4.49	16.48	10.22	23.94	20.44	25.12
C2 Naphthalenes		ND	7.12	5.98	ND	16.31	30.45
Biphenyl		1.62	3.62	3.18	2.12	9.41	12.79
Acenaphthene		ND	2.26	1.14	ND	ND	7.45
Fluorene		0.64	2.17	1.51	ND	1.5	15.31
Phenanthrene		1.92	6.42	2.71	1.7	7.63	80.4

LAB_SAMP_ID		YH69MB-F	YH69MB		
FRACTION		SUSPENDED	DISS		
EXTRACT_DATE		6-Oct-00	6-Oct-00		
SAMP_WGT_VOL		2.50	2.50		
SAMP_WGT_VOL_UNIT		L	L		
QC_CODE		MB	MB	**TOTAL MB**	**TOTAL MBx5**
REP		1	1		
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**		
Naphthalene	NG/SAMPLE	6.73	9.55	16.28	81.41
2-Methylnaphthalene	NG/SAMPLE	2.83	5.82	8.65	43.25
1-Methylnaphthalene	NG/SAMPLE	1.66	3.45	5.11	25.56
2,6-Dimethylnaphthalene	NG/SAMPLE	0.93	1.57	2.50	12.52
2,3,5-Trimethylnaphthalene	NG/SAMPLE		0.70	0.70	3.48
C1-Naphthalenes	NG/SAMPLE	4.49	9.27	13.76	68.81
C2-Naphthalenes	NG/SAMPLE		4.74	4.74	23.71
C3-Naphthalenes	NG/SAMPLE		2.15	2.15	10.73
Biphenyl	NG/SAMPLE	1.62	2.77	4.39	21.95
Acenaphthylene	NG/SAMPLE	0.56	0.56	1.12	5.60
Acenaphthene	NG/SAMPLE		0.77	0.77	3.86
Fluorene	NG/SAMPLE	0.64	1.53	2.17	10.83
Phenanthrene	NG/SAMPLE	1.92	4.77	6.69	33.47
Anthracene	NG/SAMPLE	0.47	0.33	0.79	3.97
1-Methylphenanthrene	NG/SAMPLE	0.34	0.89	1.23	6.13
C1-Phenanthrenes/Anthracenes	NG/SAMPLE	1.96	2.11	4.07	20.36
C2-Phenanthrenes/Anthracenes	NG/SAMPLE			0.00	0.00
Fluoranthene	NG/SAMPLE	1.07	1.17	2.24	11.18
Pyrene	NG/SAMPLE	0.82	1.09	1.91	9.54
Benz(a)anthracene	NG/SAMPLE			0.00	0.00
Chrysene	NG/SAMPLE		0.32	0.32	1.59
Benzo(b)fluoranthene	NG/SAMPLE			0.00	0.00
Benzo(k)fluoranthene	NG/SAMPLE			0.00	0.00
Benzo(e)pyrene	NG/SAMPLE			0.00	0.00
Benzo(a)pyrene	NG/SAMPLE			0.00	0.00
Perylene	NG/SAMPLE			0.00	0.00
Indeno(1,2,3-c,d)pyrene	NG/SAMPLE	0.40		0.40	2.02
Dibenz(a,h)anthracene	NG/SAMPLE			0.00	0.00
Benzo(g,h,i)perylene	NG/SAMPLE			0.00	0.00

ATTACHMENT #1

From: "Durell, Gregory" durell@BATTELLE.ORG
To: Joel Pecchioli
Date: December 29, 2003

Looked at your message, and your logic is not at all flawed. Your reasoning makes sense, but I should point out something. The TP/EB should actually only experience laboratory-based background comparable to the DISS MB, and anything else would likely be coming from some other source(s). The TP/EB samples were NOT filtered - they were handled as little as possible in the lab (i.e., extracted as the water directly) to as close as possible represent the field, without unnecessary lab components introduced. The MB were processed through all lab steps to represent possible lab-based contamination. The DISS-MB and MBs in other batches should represent lab-based background in the MB/FB. So, the two TBs in POTW #1 are both DISS-phase TBs.

However, unfortunately it does not always work out this neatly in real life - elevations above the MB levels are not necessarily constant field-based background experienced for all samples! My remaining reservations and suggestions are to consider the following:

1. Are the concentrations and composition of PAH in the TB "reasonable" for what can be expected as "event-wide" field-based background levels, or is it more reasonable to expect that some (most?) of what is measured in the TB is unique to that single sample and not representative of all field samples? This is the key question! We can't put the blinders on and just compare two numbers - let's use the project dataset as a whole that is available to us. Non-representative things happen (e.g., some "dirt" that was captured with a FB, something in the FB bottle, contamination on some glassware used in the lab for just that sample, or whatever), and if we can identify them then lets not have them impact the rest of the dataset. If we can truly answer that the FB values measured in POTW #1 are representative and probably what all field samples experienced, then we can proceed with that assumption. However, I don't think we can honestly say that for all FB/TB/EB data. I believe that such an assumption would impact some of the results with false negatives (and lost data/information) much more than a more moderate adjustment would impact the data with some minor false positives - we would screw/misrepresent the data more.

For instance, I think we had earlier clearly established that much of the data for FB for POTW #4 is totally not-representative - both the concentrations and PAH composition clearly indicate that. See attached spreadsheet for a summary of the MB/FB/TB data for the project, and the analytes you had identified Floyd - I inserted this info into the spreadsheet you had sent us. This may be worth pondering. I have highlighted (in blue) those I believe are likely "non-representative"/outliers (there are probably more - this can of course be analyzed/determined more thoroughly), that we should carefully consider how/if to use.

2. Whatever background adjustment is done should be done in a way that it represents what we reasonably expect the background to be, possibly with a very minor error margin. For instance, we should not apply a 5X screen if we believe the background really is ~1X, or 0.5-2X some measure value. We should absolutely not use 5X (or 3X, or maybe not even 1X?) if we really believe the measured blank level is higher than what is "real" for the samples. The 3X and 5X elevations of a background screen are there to accommodate for high levels of uncertainty and highly varying background levels - if those levels of uncertainty are not present (and I don't think they are here), then I don't think we should screen the data in such a way. It would be a shame to loose perfectly usable data. The attached spreadsheet indicates that there is pretty decent reproducibility between across the

batches, for the same type of blank - so lets use that knowledge and not elevate the number for background adjustment/censoring.

One last thing. I did not know why you had separated the analytes in "Dissolved" and "Suspended" fraction analytes. If the intent was to separate tem by what fraction those compounds are mostly in, then the separation was incorrect. You can take a look at the POTW #1 Field sample data to get a good idea. Naphthalene is certainly mostly associated with the dissolved phase, as are the alkylated naphthalenes, anthracene and phenanthrene are about equally in the dissolved and suspended phase, and all the higher molecular weight 4/5-ring PAH (including indeno(1,2,3-cd)pyrene) are mostly associated with particles in the suspended phase.

APPENDIX D.1
POTW EVENT #1 PAH DATA

		Passaic Valley	Bergen County	Linden Roselle
SAMP_ID		1GLC00013	1GLC00014	1GLC00015
LAB_SAMP_ID		X8953-F	X8956-F	X8992-F
FRACTION		SUSPENDED	SUSPENDED	SUSPENDED
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	72.37	17.45	4.28
2-Methylnaphthalene	NG/LITER	39.79	36.39	1.62
1-Methylnaphthalene	NG/LITER	56.39	26.91	1.02
2,6-Dimethylnaphthalene	NG/LITER	42.14	27.17	1.25
2,3,5-Trimethylnaphthalene	NG/LITER	26.64	10.38	0.26
C1-Naphthalenes	NG/LITER	96.18	63.31	2.64
C2-Naphthalenes	NG/LITER	149.62	67.99	3.37
C3-Naphthalenes	NG/LITER	175.25	76.01	6.91
Biphenyl	NG/LITER	196.35	5.73	1.74
Acenaphthylene	NG/LITER	1.77	1.56	0.83
Acenaphthene	NG/LITER	11.15	7.71	0.64
Fluorene	NG/LITER	15.13	11.63	0.63
Phenanthrene	NG/LITER	37.21	21.15	2.55
Anthracene	NG/LITER	4.54	3.09	1.22
1-Methylphenanthrene	NG/LITER	19.46	7.56	0.66
C1-Phenanthrenes/Anthracenes	NG/LITER	100.72	33.02	4.63
C2-Phenanthrenes/Anthracenes	NG/LITER	273.58	84.88	13.21
Fluoranthene	NG/LITER	32.74	26.66	2.36
Pyrene	NG/LITER	66.05	36.89	11.57
Benz(a)anthracene	NG/LITER	10.25	13.01	0.98
Chrysene	NG/LITER	16.90	17.80	2.79
Benzo(b)fluoranthene	NG/LITER			
Benzo(k)fluoranthene	NG/LITER	7.66	12.47	2.37
Benzo(e)pyrene	NG/LITER	9.06	10.92	3.15
Benzo(a)pyrene	NG/LITER	7.59	10.92	2.42
Perylene	NG/LITER	1.83	2.10	0.75
Indeno(1,2,3-c,d)pyrene	NG/LITER	4.33	7.54	2.29
Dibenz(a,h)anthracene	NG/LITER	1.14	1.68	0.44
Benzo(g,h,i)perylene	NG/LITER	10.66	9.82	3.60

		Joint Meeting	Rahway Valley	Middlesex County
SAMP_ID		1GLC00016	1GLC00017	1GLC00018
LAB_SAMP_ID		X8994-F	X8995-F	X8996-F
FRACTION		SUSPENDED	SUSPENDED	SUSPENDED
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	4.81	3.98	4.49
2-Methylnaphthalene	NG/LITER	3.92	2.43	2.96
1-Methylnaphthalene	NG/LITER	3.24	1.88	2.01
2,6-Dimethylnaphthalene	NG/LITER	5.19	3.22	3.71
2,3,5-Trimethylnaphthalene	NG/LITER	1.85	1.83	2.56
C1-Naphthalenes	NG/LITER	7.17	4.30	4.97
C2-Naphthalenes	NG/LITER	11.21	7.42	8.05
C3-Naphthalenes	NG/LITER	13.36	12.67	21.29
Biphenyl	NG/LITER	1.95	1.30	2.64
Acenaphthylene	NG/LITER	1.26	0.72	0.75
Acenaphthene	NG/LITER	1.12	1.20	1.09
Fluorene	NG/LITER	1.28	1.93	2.28
Phenanthrene	NG/LITER	3.55	5.01	3.86
Anthracene	NG/LITER	0.96	0.94	1.33
1-Methylphenanthrene	NG/LITER	2.66	1.51	3.66
C1-Phenanthrenes/Anthracenes	NG/LITER	11.90	8.50	14.61
C2-Phenanthrenes/Anthracenes	NG/LITER	54.74	34.43	61.66
Fluoranthene	NG/LITER	8.61	5.58	5.69
Pyrene	NG/LITER	36.77	11.42	15.30
Benz(a)anthracene	NG/LITER	3.94	2.82	3.78
Chrysene	NG/LITER	7.18	4.22	5.18
Benzo(b)fluoranthene	NG/LITER		0.41	3.20
Benzo(k)fluoranthene	NG/LITER	4.96	2.27	2.90
Benzo(e)pyrene	NG/LITER	5.11	1.92	2.42
Benzo(a)pyrene	NG/LITER	4.36	5.39	2.38
Perylene	NG/LITER	0.75	0.37	0.47
Indeno(1,2,3-c,d)pyrene	NG/LITER	2.76		1.52
Dibenz(a,h)anthracene	NG/LITER	0.74		0.51
Benzo(g,h,i)perylene	NG/LITER	3.86	1.28	2.15

		Passaic Valley	Bergen County	Linden Roselle
SAMP_ID		1GLC00013	1GLC00014	1GLC00015
LAB_SAMP_ID		X8953	X8956	X8992
FRACTION		DISS	DISS	DISS
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	2534.07	513.11	26.35
2-Methylnaphthalene	NG/LITER	539.50	499.70	26.89
1-Methylnaphthalene	NG/LITER	779.60	379.48	24.05
2,6-Dimethylnaphthalene	NG/LITER	177.29	119.70	9.79
2,3,5-Trimethylnaphthalene	NG/LITER	46.13	21.29	1.05
C1-Naphthalenes	NG/LITER	1319.09	879.18	50.94
C2-Naphthalenes	NG/LITER	671.48	332.70	30.74
C3-Naphthalenes	NG/LITER	439.99	166.47	17.14
Biphenyl	NG/LITER	1566.82	36.40	11.38
Acenaphthylene	NG/LITER	8.79	4.10	1.70
Acenaphthene	NG/LITER	77.84	27.45	2.51
Fluorene	NG/LITER	74.18	24.66	1.58
Phenanthrene	NG/LITER	42.89	24.28	1.98
Anthracene	NG/LITER	4.42	3.92	0.91
1-Methylphenanthrene	NG/LITER	12.36	4.35	0.34
C1-Phenanthrenes/Anthracenes	NG/LITER	56.11	3.06	3.23
C2-Phenanthrenes/Anthracenes	NG/LITER	82.96	28.40	2.81
Fluoranthene	NG/LITER	11.90	8.81	0.77
Pyrene	NG/LITER	22.06	13.00	9.34
Benz(a)anthracene	NG/LITER	1.46	1.40	0.08
Chrysene	NG/LITER	2.75	2.46	0.55
Benzo(b)fluoranthene	NG/LITER		1.60	
Benzo(k)fluoranthene	NG/LITER	0.67	1.16	
Benzo(e)pyrene	NG/LITER	1.09	1.16	0.34
Benzo(a)pyrene	NG/LITER	1.05	1.08	0.25
Perylene	NG/LITER		0.23	
Indeno(1,2,3-c,d)pyrene	NG/LITER	0.66	0.65	0.27
Dibenz(a,h)anthracene	NG/LITER			
Benzo(g,h,i)perylene	NG/LITER	1.72	0.79	0.31

		Joint Meeting	Rahway Valley	Middlesex County
SAMP_ID		1GLC00016	1GLC00017	1GLC00018
LAB_SAMP_ID		X8994	X8995	X8996
FRACTION		DISS	DISS	DISS
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	52.73	194.28	48.82
2-Methylnaphthalene	NG/LITER	87.88	64.48	30.68
1-Methylnaphthalene	NG/LITER	78.98	43.25	31.71
2,6-Dimethylnaphthalene	NG/LITER	40.36	22.57	20.83
2,3,5-Trimethylnaphthalene	NG/LITER	4.37	6.59	12.74
C1-Naphthalenes	NG/LITER	166.86	107.74	62.39
C2-Naphthalenes	NG/LITER	107.52	71.61	75.24
C3-Naphthalenes	NG/LITER	58.78	57.25	59.88
Biphenyl	NG/LITER	19.25	12.00	29.82
Acenaphthylene	NG/LITER	5.23	3.22	2.58
Acenaphthene	NG/LITER	8.51	13.39	5.09
Fluorene	NG/LITER	5.06	11.62	9.98
Phenanthrene	NG/LITER	5.40	13.36	8.71
Anthracene	NG/LITER	0.42	0.73	1.61
1-Methylphenanthrene	NG/LITER	2.17	2.07	3.96
C1-Phenanthrenes/Anthracenes	NG/LITER	10.35	10.95	16.63
C2-Phenanthrenes/Anthracenes	NG/LITER	26.02	30.58	35.36
Fluoranthene	NG/LITER	6.16	6.95	4.14
Pyrene	NG/LITER	24.18	12.97	10.01
Benz(a)anthracene	NG/LITER	0.79	1.16	0.77
Chrysene	NG/LITER	1.70	1.73	1.07
Benzo(b)fluoranthene	NG/LITER			
Benzo(k)fluoranthene	NG/LITER	0.57	0.53	0.39
Benzo(e)pyrene	NG/LITER	0.75	0.59	0.37
Benzo(a)pyrene	NG/LITER	0.65	0.53	0.32
Perylene	NG/LITER	0.12	0.13	
Indeno(1,2,3-c,d)pyrene	NG/LITER	0.50	0.40	0.26
Dibenz(a,h)anthracene	NG/LITER	0.11		
Benzo(g,h,i)perylene	NG/LITER	0.59	0.30	0.31

		Passaic Valley	Bergen County	Linden Roselle
SAMP_ID		1GLC00013	1GLC00014	1GLC00015
FRACTION		TOTAL	TOTAL	TOTAL
EXTRACT_DATE		6-Oct-00	6-Oct-00	6-Oct-00
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	2606.43	530.57	
2-Methylnaphthalene	NG/LITER	579.29	536.09	28.51
1-Methylnaphthalene	NG/LITER	835.98	406.39	25.08
2,6-Dimethylnaphthalene	NG/LITER	219.43	146.86	11.04
2,3,5-Trimethylnaphthalene	NG/LITER	72.77	31.67	
C1-Naphthalenes	NG/LITER	1415.27	942.48	53.59
C2-Naphthalenes	NG/LITER	821.10	400.68	34.11
C3-Naphthalenes	NG/LITER	615.24	242.48	24.06
Biphenyl	NG/LITER	1763.17	42.12	13.12
Acenaphthylene	NG/LITER	10.55	5.66	2.53
Acenaphthene	NG/LITER	88.98	35.17	3.16
Fluorene	NG/LITER	89.31	36.30	
Phenanthrene	NG/LITER	80.10	45.43	
Anthracene	NG/LITER	8.97	7.01	2.13
1-Methylphenanthrene	NG/LITER	31.83	11.92	
C1-Phenanthrenes/Anthracenes	NG/LITER	156.82	36.08	
C2-Phenanthrenes/Anthracenes	NG/LITER	356.54	113.28	16.02
Fluoranthene	NG/LITER	44.64	35.47	
Pyrene	NG/LITER	88.10	49.89	20.91
Benz(a)anthracene	NG/LITER	11.72	14.41	1.07
Chrysene	NG/LITER	19.65	20.26	3.34
Benzo(b)fluoranthene	NG/LITER		1.60	
Benzo(k)fluoranthene	NG/LITER	8.33	13.63	2.37
Benzo(e)pyrene	NG/LITER	10.16	12.08	3.49
Benzo(a)pyrene	NG/LITER	8.63	12.00	2.67
Perylene	NG/LITER	1.83	2.33	0.75
Indeno(1,2,3-c,d)pyrene	NG/LITER	4.99	8.19	2.56
Dibenz(a,h)anthracene	NG/LITER	1.14	1.68	0.44
Benzo(g,h,i)perylene	NG/LITER	12.39	10.60	3.92

		Joint Meeting	Rahway Valley	Middlesex County
SAMP_ID		1GLC00016	1GLC00017	1GLC00018
FRACTION		TOTAL	TOTAL	TOTAL
EXTRACT_DATE		6-Oct-00	6-Oct-00	6-Oct-00
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	57.54	198.27	53.31
2-Methylnaphthalene	NG/LITER	91.80	66.91	33.64
1-Methylnaphthalene	NG/LITER	82.23	45.13	33.72
2,6-Dimethylnaphthalene	NG/LITER	45.55	25.79	24.53
2,3,5-Trimethylnaphthalene	NG/LITER	6.22	8.42	15.30
C1-Naphthalenes	NG/LITER	174.03	112.04	67.36
C2-Naphthalenes	NG/LITER	118.73	79.04	83.30
C3-Naphthalenes	NG/LITER	72.14	69.92	81.18
Biphenyl	NG/LITER	21.19	13.31	32.46
Acenaphthylene	NG/LITER	6.48	3.94	3.33
Acenaphthene	NG/LITER	9.64	14.58	6.19
Fluorene	NG/LITER	6.34	13.55	12.26
Phenanthrene	NG/LITER		18.38	
Anthracene	NG/LITER		1.67	2.94
1-Methylphenanthrene	NG/LITER	4.83	3.58	7.62
C1-Phenanthrenes/Anthracenes	NG/LITER	22.25	19.45	31.24
C2-Phenanthrenes/Anthracenes	NG/LITER	80.76	65.01	97.02
Fluoranthene	NG/LITER	14.76	12.53	9.83
Pyrene	NG/LITER	60.95	24.38	25.31
Benz(a)anthracene	NG/LITER	4.73	3.98	4.54
Chrysene	NG/LITER	8.88	5.95	6.25
Benzo(b)fluoranthene	NG/LITER		0.41	3.20
Benzo(k)fluoranthene	NG/LITER	5.52	2.80	3.29
Benzo(e)pyrene	NG/LITER	5.86	2.51	2.79
Benzo(a)pyrene	NG/LITER	5.01	5.92	2.70
Perylene	NG/LITER	0.87	0.49	0.47
Indeno(1,2,3-c,d)pyrene	NG/LITER	3.26		1.78
Dibenz(a,h)anthracene	NG/LITER	0.85		0.51
Benzo(g,h,i)perylene	NG/LITER	4.45	1.58	2.47

APPENDIX D.2
POTW EVENT #2 PAH DATA

		Passaic Valley	Bergen County	North Bergen-Central
SAMP_ID		1GLC00030	1GLC00031	1GLC00032
LAB_SAMP_ID		W0119-C	W0120-C	W0121-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	440.76	438.13	162.21
2-Methylnaphthalene	NG/LITER	159.85	43.25	178.05
1-Methylnaphthalene	NG/LITER	195.07	31.65	154.42
2,6-Dimethylnaphthalene	NG/LITER	73.74	21.19	171.53
2,3,5-Trimethylnaphthalene	NG/LITER	49.54	5.30	98.51
C1-Naphthalenes	NG/LITER	354.92	74.89	332.47
C2-Naphthalenes	NG/LITER	675.54	58.04	505.45
C3-Naphthalenes	NG/LITER	436.25	77.78	549.46
Biphenyl	NG/LITER	94.29	14.97	42.46
Acenaphthylene	NG/LITER	10.64	1.40	38.80
Acenaphthene	NG/LITER	37.89	9.87	41.47
Fluorene	NG/LITER	44.99	7.92	41.81
Phenanthrene	NG/LITER	34.15	10.17	79.81
Anthracene	NG/LITER	4.20	2.03	10.29
1-Methylphenanthrene	NG/LITER	13.65		31.82
C1-Phenanthrenes/Anthracenes	NG/LITER	61.92	12.64	161.07
C2-Phenanthrenes/Anthracenes	NG/LITER	137.10	30.96	286.89
Fluoranthene	NG/LITER	10.55	8.35	40.23
Pyrene	NG/LITER	34.91	23.97	71.03
Benz(a)anthracene	NG/LITER	3.95	4.88	12.85
Chrysene	NG/LITER	6.74	6.01	19.11
Benzo(b)fluoranthene	NG/LITER			11.32
Benzo(k)fluoranthene	NG/LITER	2.74	3.94	10.47
Benzo(e)pyrene	NG/LITER	3.60	3.44	10.38
Benzo(a)pyrene	NG/LITER	3.10	4.03	8.86
Perylene	NG/LITER	0.76	1.07	1.83
Indeno(1,2,3-c,d)pyrene	NG/LITER	1.99	2.49	7.33
Dibenz(a,h)anthracene	NG/LITER	0.51	0.48	1.32
Benzo(g,h,i)perylene	NG/LITER	4.53	3.16	8.82

		Secaucus	North Bergen-Woodcliff	Hoboken
SAMP_ID		1GLC00033	1GLC00034	1GLC00035
LAB_SAMP_ID		W0122-C	W0161-C	W0162-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER		1824.98	
2-Methylnaphthalene	NG/LITER	32.40	13681.25	
1-Methylnaphthalene	NG/LITER	23.14	12280.72	
2,6-Dimethylnaphthalene	NG/LITER	19.91	15374.34	12.06
2,3,5-Trimethylnaphthalene	NG/LITER	8.29	7940.92	14.97
C1-Naphthalenes	NG/LITER	55.54	25961.97	
C2-Naphthalenes	NG/LITER	53.31	59108.70	34.79
C3-Naphthalenes	NG/LITER	51.44	58855.95	134.81
Biphenyl	NG/LITER	9.32	1447.98	5.54
Acenaphthylene	NG/LITER	3.73	119.06	11.04
Acenaphthene	NG/LITER	5.03	1517.63	7.29
Fluorene	NG/LITER	4.44	3536.09	4.69
Phenanthrene	NG/LITER	8.78	6993.70	10.83
Anthracene	NG/LITER		196.43	3.41
1-Methylphenanthrene	NG/LITER		3178.93	9.27
C1-Phenanthrenes/Anthracenes	NG/LITER	22.00	15897.72	68.03
C2-Phenanthrenes/Anthracenes	NG/LITER	74.59	14113.45	268.32
Fluoranthene	NG/LITER	7.13	122.82	11.14
Pyrene	NG/LITER	19.98	544.11	54.24
Benz(a)anthracene	NG/LITER		11.75	6.75
Chrysene	NG/LITER	5.45	29.99	14.37
Benzo(b)fluoranthene	NG/LITER		4.61	8.08
Benzo(k)fluoranthene	NG/LITER	2.84	3.67	6.66
Benzo(e)pyrene	NG/LITER	3.03	3.41	8.20
Benzo(a)pyrene	NG/LITER	1.87	2.95	8.48
Perylene	NG/LITER	0.47	0.67	1.71
Indeno(1,2,3-c,d)pyrene	NG/LITER	2.08	2.06	5.33
Dibenz(a,h)anthracene	NG/LITER	0.44	0.56	1.47
Benzo(g,h,i)perylene	NG/LITER	2.40	2.20	8.10

		West New York	Joint Meeting	Linden Roselle
SAMP_ID		1GLC00036	1GLC00038	1GLC00039
LAB_SAMP_ID		W0163-C	W0226-C	W0228-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER			
2-Methylnaphthalene	NG/LITER	46.12	31.20	90.96
1-Methylnaphthalene	NG/LITER	41.83	29.72	54.21
2,6-Dimethylnaphthalene	NG/LITER	88.68	33.65	271.08
2,3,5-Trimethylnaphthalene	NG/LITER	105.00	19.49	132.55
C1-Naphthalenes	NG/LITER	87.95	60.92	145.18
C2-Naphthalenes	NG/LITER	292.60	79.35	597.66
C3-Naphthalenes	NG/LITER	665.62	106.43	1062.27
Biphenyl	NG/LITER	11.89	10.36	40.58
Acenaphthylene	NG/LITER	6.63	4.48	5.48
Acenaphthene	NG/LITER	14.87	7.35	13.13
Fluorene	NG/LITER	22.18	8.25	18.89
Phenanthrene	NG/LITER	45.47	11.08	76.53
Anthracene	NG/LITER	12.42	1.66	9.53
1-Methylphenanthrene	NG/LITER	71.01	6.59	44.09
C1-Phenanthrenes/Anthracenes	NG/LITER	343.46	29.03	219.01
C2-Phenanthrenes/Anthracenes	NG/LITER	1616.99	92.23	406.27
Fluoranthene	NG/LITER	16.91	7.32	13.08
Pyrene	NG/LITER	225.07	21.83	84.28
Benz(a)anthracene	NG/LITER	7.44	4.01	6.62
Chrysene	NG/LITER	24.43	5.97	16.38
Benzo(b)fluoranthene	NG/LITER	7.94		12.94
Benzo(k)fluoranthene	NG/LITER	6.26	2.86	9.71
Benzo(e)pyrene	NG/LITER	8.45	3.01	16.16
Benzo(a)pyrene	NG/LITER	6.81	2.91	14.61
Perylene	NG/LITER	1.23	0.57	2.84
Indeno(1,2,3-c,d)pyrene	NG/LITER	4.65	2.08	9.78
Dibenz(a,h)anthracene	NG/LITER	1.04	0.51	1.99
Benzo(g,h,i)perylene	NG/LITER	8.25	3.00	16.46

		Rahway Valley	Middlesex County
SAMP_ID		1GLC00040	1GLC00041
LAB_SAMP_ID		W0225-C	W0223-C
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	174.04	
2-Methylnaphthalene	NG/LITER	73.67	
1-Methylnaphthalene	NG/LITER	58.45	
2,6-Dimethylnaphthalene	NG/LITER	60.12	23.53
2,3,5-Trimethylnaphthalene	NG/LITER	25.55	32.73
C1-Naphthalenes	NG/LITER	132.12	
C2-Naphthalenes	NG/LITER	174.33	54.51
C3-Naphthalenes	NG/LITER	170.11	125.64
Biphenyl	NG/LITER	91.24	19.16
Acenaphthylene	NG/LITER	11.02	168.17
Acenaphthene	NG/LITER	10.61	3.68
Fluorene	NG/LITER	18.56	8.39
Phenanthrene	NG/LITER	24.98	11.16
Anthracene	NG/LITER	2.33	2.86
1-Methylphenanthrene	NG/LITER	8.98	10.47
C1-Phenanthrenes/Anthracenes	NG/LITER	40.82	37.42
C2-Phenanthrenes/Anthracenes	NG/LITER	116.54	146.88
Fluoranthene	NG/LITER	21.31	8.50
Pyrene	NG/LITER	40.23	24.32
Benz(a)anthracene	NG/LITER	9.93	4.11
Chrysene	NG/LITER	14.79	6.96
Benzo(b)fluoranthene	NG/LITER	8.72	
Benzo(k)fluoranthene	NG/LITER	8.36	3.05
Benzo(e)pyrene	NG/LITER	7.53	3.45
Benzo(a)pyrene	NG/LITER	10.50	3.08
Perylene	NG/LITER	1.44	0.61
Indeno(1,2,3-c,d)pyrene	NG/LITER	5.32	2.18
Dibenz(a,h)anthracene	NG/LITER	1.25	0.53
Benzo(g,h,i)perylene	NG/LITER	6.24	3.16

APPENDIX D.3
POTW EVENT #3 PAH DATA

		Passaic Valley	Middlesex County	Bergen County
SAMP_ID		1GLC00073	1GLC00074	1GLC00075
LAB_SAMP_ID		W3214-C	W3238-C	W3212-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/L	195.05	263.30	243.34
2-Methylnaphthalene	NG/L	76.93	98.47	56.12
1-Methylnaphthalene	NG/L	59.13	95.10	39.74
2,6-Dimethylnaphthalene	NG/L	43.75	91.39	32.67
2,3,5-Trimethylnaphthalene	NG/L	20.56	40.01	13.57
C1-Naphthalenes	NG/L	136.06	193.58	95.86
C2-Naphthalenes	NG/L	335.44	299.55	156.38
C3-Naphthalenes	NG/L	239.58	377.20	121.23
Biphenyl	NG/L	53.74	353.55	
Acenaphthylene	NG/L	4.58	3.08	4.41
Acenaphthene	NG/L	26.27	35.73	13.07
Fluorene	NG/L	35.18	47.43	11.61
Phenanthrene	NG/L	25.91	70.62	18.72
Anthracene	NG/L	9.65	14.04	3.22
1-Methylphenanthrene	NG/L	12.79	27.58	4.41
C1-Phenanthrenes/Anthracenes	NG/L	48.96	129.77	19.93
C2-Phenanthrenes/Anthracenes	NG/L	219.44	219.74	44.23
Fluoranthene	NG/L	33.77	22.94	13.74
Pyrene	NG/L	60.52	68.23	26.42
Benz(a)anthracene	NG/L	10.64	11.99	4.73
Chrysene	NG/L	19.62	17.54	8.54
Benzo(b)fluoranthene	NG/L	10.79	6.18	6.68
Benzo(k)fluoranthene	NG/L	8.93	4.81	5.65
Benzo(e)pyrene	NG/L	10.66	5.45	5.47
Benzo(a)pyrene	NG/L	8.49	5.27	5.32
Perylene	NG/L	2.53	2.50	2.05
Indeno(1,2,3-c,d)pyrene	NG/L	5.75	2.79	3.38
Dibenz(a,h)anthracene	NG/L	1.43	1.31	0.93
Benzo(g,h,i)perylene	NG/L	10.36	5.53	5.15

		Rahway Valley	Linden Roselle	Edgewater
SAMP_ID		1GLC00077	1GLC00078	1GLC00079
LAB_SAMP_ID		W3234-C	W3236-C	W3213-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/L		103.54	100.49
2-Methylnaphthalene	NG/L	48.87	25.97	25.58
1-Methylnaphthalene	NG/L	36.11	25.68	18.42
2,6-Dimethylnaphthalene	NG/L	45.33	39.33	13.26
2,3,5-Trimethylnaphthalene	NG/L	17.37	49.50	12.85
C1-Naphthalenes	NG/L	84.98	51.66	44.00
C2-Naphthalenes	NG/L	95.01	113.77	43.68
C3-Naphthalenes	NG/L	117.59	294.53	72.68
Biphenyl	NG/L		60.65	
Acenaphthylene	NG/L			
Acenaphthene	NG/L	8.12	11.47	6.93
Fluorene	NG/L	9.09	21.24	9.74
Phenanthrene	NG/L	19.43	19.27	17.59
Anthracene	NG/L		6.18	4.14
1-Methylphenanthrene	NG/L	11.48	14.98	9.35
C1-Phenanthrenes/Anthracenes	NG/L	49.41	83.16	36.54
C2-Phenanthrenes/Anthracenes	NG/L	124.12	272.39	105.66
Fluoranthene	NG/L	25.26	18.31	26.21
Pyrene	NG/L	42.91	42.75	38.52
Benz(a)anthracene	NG/L	9.96	5.75	8.45
Chrysene	NG/L	16.46	11.79	13.37
Benzo(b)fluoranthene	NG/L	11.24	7.07	7.97
Benzo(k)fluoranthene	NG/L	9.76	5.91	7.21
Benzo(e)pyrene	NG/L	9.94	6.59	6.18
Benzo(a)pyrene	NG/L	10.05	5.61	6.80
Perylene	NG/L	3.05	1.81	1.27
Indeno(1,2,3-c,d)pyrene	NG/L	6.92	5.60	5.09
Dibenz(a,h)anthracene	NG/L	1.74	1.08	1.20
Benzo(g,h,i)perylene	NG/L	9.45	6.08	6.30

		North Bergen - Woodcliff
SAMP_ID		1GLC00082
LAB_SAMP_ID		W3332-C
FRACTION		TOTAL
PARAM_NAME	**UNIT**	**RESULT**
Naphthalene	NG/L	
2-Methylnaphthalene	NG/L	29.05
1-Methylnaphthalene	NG/L	19.72
2,6-Dimethylnaphthalene	NG/L	54.15
2,3,5-Trimethylnaphthalene	NG/L	31.47
C1-Naphthalenes	NG/L	48.77
C2-Naphthalenes	NG/L	128.81
C3-Naphthalenes	NG/L	338.07
Biphenyl	NG/L	23.18
Acenaphthylene	NG/L	2.93
Acenaphthene	NG/L	10.41
Fluorene	NG/L	16.87
Phenanthrene	NG/L	41.09
Anthracene	NG/L	3.93
1-Methylphenanthrene	NG/L	42.23
C1-Phenanthrenes/Anthracenes	NG/L	197.43
C2-Phenanthrenes/Anthracenes	NG/L	568.50
Fluoranthene	NG/L	51.65
Pyrene	NG/L	89.05
Benz(a)anthracene	NG/L	13.99
Chrysene	NG/L	34.76
Benzo(b)fluoranthene	NG/L	17.52
Benzo(k)fluoranthene	NG/L	14.43
Benzo(e)pyrene	NG/L	13.81
Benzo(a)pyrene	NG/L	9.83
Perylene	NG/L	2.12
Indeno(1,2,3-c,d)pyrene	NG/L	8.05
Dibenz(a,h)anthracene	NG/L	1.79
Benzo(g,h,i)perylene	NG/L	11.71

APPENDIX D.4
POTW EVENT #4 PAH DATA

		Passaic Valley	Middlesex County	Bergen County
SAMP_ID		1GLC00085	1GLC00086	1GLC00087
LAB_SAMP_ID		W5891-C	W5894-C	W5902-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	301.36		3352.84
2-Methylnaphthalene	NG/LITER	126.21		89.14
1-Methylnaphthalene	NG/LITER	151.16		75.33
2,6-Dimethylnaphthalene	NG/LITER	38.24	8.54	48.39
2,3,5-Trimethylnaphthalene	NG/LITER	15.43		10.86
C1-Naphthalenes	NG/LITER	277.36		164.47
C2-Naphthalenes	NG/LITER	183.80	47.07	131.23
C3-Naphthalenes	NG/LITER	183.08	27.19	118.69
Biphenyl	NG/LITER	171.36	20.30	29.53
Acenaphthylene	NG/LITER	5.39	4.80	5.84
Acenaphthene	NG/LITER	18.92		23.24
Fluorene	NG/LITER	20.71	4.36	18.64
Phenanthrene	NG/LITER	16.09		40.83
Anthracene	NG/LITER	2.25	2.47	4.24
1-Methylphenanthrene	NG/LITER	6.26	6.30	7.58
C1-Phenanthrenes/Anthracenes	NG/LITER	34.05	22.20	37.80
C2-Phenanthrenes/Anthracenes	NG/LITER	104.00	112.53	64.03
Fluoranthene	NG/LITER	11.20	9.70	30.14
Pyrene	NG/LITER	38.96	35.77	37.22
Benz(a)anthracene	NG/LITER		4.99	8.17
Chrysene	NG/LITER	11.27	7.79	14.24
Benzo(b)fluoranthene	NG/LITER		3.00	9.83
Benzo(k)fluoranthene	NG/LITER	2.44	1.78	7.45
Benzo(e)pyrene	NG/LITER	4.10	3.05	7.53
Benzo(a)pyrene	NG/LITER	2.36	1.69	7.23
Perylene	NG/LITER	0.81	0.98	1.79
Indeno(1,2,3-c,d)pyrene	NG/LITER			6.38
Dibenz(a,h)anthracene	NG/LITER			1.47
Benzo(g,h,i)perylene	NG/LITER	5.55		8.36

		Joint Meeting	Rahway Valley	Linden Roselle
SAMP_ID		1GLC00088	1GLC00089	1GLC00090
LAB_SAMP_ID		W5701-C	W5898-C	W5703-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER			
2-Methylnaphthalene	NG/LITER		34.66	
1-Methylnaphthalene	NG/LITER		26.80	
2,6-Dimethylnaphthalene	NG/LITER	13.52	26.80	33.88
2,3,5-Trimethylnaphthalene	NG/LITER	9.75	5.20	
C1-Naphthalenes	NG/LITER		61.46	
C2-Naphthalenes	NG/LITER	34.22	70.95	20.73
C3-Naphthalenes	NG/LITER	50.12	59.40	9.08
Biphenyl	NG/LITER			15.79
Acenaphthylene	NG/LITER	9.04	4.75	
Acenaphthene	NG/LITER	7.49	5.43	
Fluorene	NG/LITER	8.69	6.23	
Phenanthrene	NG/LITER			
Anthracene	NG/LITER	1.81		1.71
1-Methylphenanthrene	NG/LITER	5.84	2.35	
C1-Phenanthrenes/Anthracenes	NG/LITER	22.92	11.99	7.95
C2-Phenanthrenes/Anthracenes	NG/LITER	84.60	31.83	26.68
Fluoranthene	NG/LITER	12.23		6.01
Pyrene	NG/LITER	22.71	16.98	18.21
Benz(a)anthracene	NG/LITER	5.08		
Chrysene	NG/LITER	9.65	4.54	5.93
Benzo(b)fluoranthene	NG/LITER			
Benzo(k)fluoranthene	NG/LITER	4.20	1.72	3.30
Benzo(e)pyrene	NG/LITER	4.64		5.57
Benzo(a)pyrene	NG/LITER	3.41	1.46	3.66
Perylene	NG/LITER	1.32	0.55	0.85
Indeno(1,2,3-c,d)pyrene	NG/LITER	3.31		3.96
Dibenz(a,h)anthracene	NG/LITER			
Benzo(g,h,i)perylene	NG/LITER			6.02

		North Bergen - Central	North Bergen - Woodcliff	Edgewater
SAMP_ID		1GLC00092	1GLC00093	1GLC00094
LAB_SAMP_ID		W5895-C	W5926-C	W5928-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER		138.70	163.33
2-Methylnaphthalene	NG/LITER	159.94	93.16	28.20
1-Methylnaphthalene	NG/LITER	132.22	65.99	28.60
2,6-Dimethylnaphthalene	NG/LITER	160.19	72.54	16.23
2,3,5-Trimethylnaphthalene	NG/LITER	72.60	44.92	8.20
C1-Naphthalenes	NG/LITER	292.16	159.14	56.79
C2-Naphthalenes	NG/LITER	425.19	230.85	52.62
C3-Naphthalenes	NG/LITER	524.98	281.51	42.06
Biphenyl	NG/LITER	57.23	27.96	16.03
Acenaphthylene	NG/LITER	9.13	6.69	8.55
Acenaphthene	NG/LITER	47.16	17.07	11.27
Fluorene	NG/LITER	38.79	21.03	11.20
Phenanthrene	NG/LITER	107.07	58.14	22.29
Anthracene	NG/LITER	13.55	5.63	3.46
1-Methylphenanthrene	NG/LITER	32.63	20.68	5.16
C1-Phenanthrenes/Anthracenes	NG/LITER	164.17	101.60	19.38
C2-Phenanthrenes/Anthracenes	NG/LITER	239.07	176.52	46.42
Fluoranthene	NG/LITER	78.79	38.46	19.72
Pyrene	NG/LITER	92.51	45.22	29.80
Benz(a)anthracene	NG/LITER	30.65	12.09	5.95
Chrysene	NG/LITER	36.81	14.93	7.96
Benzo(b)fluoranthene	NG/LITER	29.08	8.31	
Benzo(k)fluoranthene	NG/LITER	25.49	9.00	3.88
Benzo(e)pyrene	NG/LITER	21.47	6.90	4.42
Benzo(a)pyrene	NG/LITER	25.95	9.71	4.38
Perylene	NG/LITER	9.04	1.89	1.14
Indeno(1,2,3-c,d)pyrene	NG/LITER	18.63	6.62	3.74
Dibenz(a,h)anthracene	NG/LITER	4.88	1.50	
Benzo(g,h,i)perylene	NG/LITER	20.40	7.08	

		West New York	Secaucus
SAMP_ID		1GLC00095	1GLC00096
LAB_SAMP_ID		W5924-C	W5897-C
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER		
2-Methylnaphthalene	NG/LITER	152.57	37.23
1-Methylnaphthalene	NG/LITER	142.53	32.98
2,6-Dimethylnaphthalene	NG/LITER	240.43	25.26
2,3,5-Trimethylnaphthalene	NG/LITER	237.99	9.60
C1-Naphthalenes	NG/LITER	295.11	70.21
C2-Naphthalenes	NG/LITER	708.80	76.35
C3-Naphthalenes	NG/LITER	2183.46	85.88
Biphenyl	NG/LITER	37.63	40.87
Acenaphthylene	NG/LITER	7.86	3.00
Acenaphthene	NG/LITER	48.34	8.38
Fluorene	NG/LITER	84.16	8.56
Phenanthrene	NG/LITER	143.59	26.44
Anthracene	NG/LITER	36.03	2.19
1-Methylphenanthrene	NG/LITER	206.41	8.22
C1-Phenanthrenes/Anthracenes	NG/LITER	1046.74	36.08
C2-Phenanthrenes/Anthracenes	NG/LITER	3715.31	87.19
Fluoranthene	NG/LITER	51.17	17.20
Pyrene	NG/LITER	294.46	27.60
Benz(a)anthracene	NG/LITER	14.27	5.08
Chrysene	NG/LITER	31.65	9.14
Benzo(b)fluoranthene	NG/LITER	10.96	
Benzo(k)fluoranthene	NG/LITER	6.73	4.89
Benzo(e)pyrene	NG/LITER	9.40	5.27
Benzo(a)pyrene	NG/LITER	7.07	3.95
Perylene	NG/LITER	1.90	0.84
Indeno(1,2,3-c,d)pyrene	NG/LITER	4.98	3.97
Dibenz(a,h)anthracene	NG/LITER	1.41	
Benzo(g,h,i)perylene	NG/LITER	8.37	

APPENDIX D.5
CSO/SWO EVENT #1 PAH DATA

		Henley Road (Hackensack Rd)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00065	1GLC00061
LAB_SAMP_ID		W7175-C	W7179-C
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER		235.42
2-Methylnaphthalene	NG/LITER	27.85	518.07
1-Methylnaphthalene	NG/LITER	19.82	2276.29
2,6-Dimethylnaphthalene	NG/LITER	9.37	380.64
2,3,5-Trimethylnaphthalene	NG/LITER	6.83	31.07
C1-Naphthalenes	NG/LITER	47.66	2794.36
C2-Naphthalenes	NG/LITER	32.90	1113.98
C3-Naphthalenes	NG/LITER	35.08	458.54
Biphenyl	NG/LITER		127.67
Acenaphthylene	NG/LITER	22.54	41.46
Acenaphthene	NG/LITER	41.31	472.23
Fluorene	NG/LITER	38.25	405.96
Phenanthrene	NG/LITER	479.96	148.06
Anthracene	NG/LITER	77.59	74.53
1-Methylphenanthrene	NG/LITER	45.23	40.29
C1-Phenanthrenes/Anthracenes	NG/LITER	203.42	167.67
C2-Phenanthrenes/Anthracenes	NG/LITER	225.32	161.93
Fluoranthene	NG/LITER	1060.20	196.01
Pyrene	NG/LITER	866.28	185.60
Benz(a)anthracene	NG/LITER	328.36	45.22
Chrysene	NG/LITER	582.80	75.39
Benzo(b)fluoranthene	NG/LITER	497.51	54.99
Benzo(k)fluoranthene	NG/LITER	465.70	55.82
Benzo(e)pyrene	NG/LITER	423.85	49.69
Benzo(a)pyrene	NG/LITER	447.11	50.74
Perylene	NG/LITER	109.42	15.67
Indeno(1,2,3-c,d)pyrene	NG/LITER	312.45	33.92
Dibenz(a,h)anthracene	NG/LITER	77.13	13.13
Benzo(g,h,i)perylene	NG/LITER	359.91	42.14

APPENDIX D.6
CSO/SWO EVENT #2 PAH DATA

		Peripheral Ditch (Newark Air)	Ivy Street (Passaic River)	Blanchard Street (Passaic Riv)
SAMP_ID		1GLC00115	1GLC00106	1GLC00116
LAB_SAMP_ID		V8818-COMB	V8799COMB	V8800-COMB-D
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER		215.20	925.71
2-Methylnaphthalene	NG/LITER		753.60	9298.83
1-Methylnaphthalene	NG/LITER		564.78	8048.30
2,6-Dimethylnaphthalene	NG/LITER		787.81	12729.48
2,3,5-Trimethylnaphthalene	NG/LITER		500.67	10594.93
C1-Naphthalenes	NG/LITER		1318.38	17347.13
C2-Naphthalenes	NG/LITER		2389.57	127444.63
C3-Naphthalenes	NG/LITER		2660.82	183514.31
Biphenyl	NG/LITER		117.74	4042.62
Acenaphthylene	NG/LITER	2.28	5.41	234.47
Acenaphthene	NG/LITER		83.31	1925.72
Fluorene	NG/LITER		125.16	11237.17
Phenanthrene	NG/LITER	8.61	423.98	29021.87
Anthracene	NG/LITER	5.47	52.18	2529.51
1-Methylphenanthrene	NG/LITER	4.49	184.15	13143.95
C1-Phenanthrenes/Anthracenes	NG/LITER	16.18	897.84	66645.96
C2-Phenanthrenes/Anthracenes	NG/LITER	41.23	955.72	67451.26
Fluoranthene	NG/LITER	29.57	279.28	4859.06
Pyrene	NG/LITER	314.09	253.37	6270.66
Benz(a)anthracene	NG/LITER	7.96	69.34	2021.71
Chrysene	NG/LITER	31.32	144.05	3497.77
Benzo(b)fluoranthene	NG/LITER	34.37	99.99	2249.87
Benzo(k)fluoranthene	NG/LITER	33.99	103.84	2862.85
Benzo(e)pyrene	NG/LITER	21.86	86.12	2108.37
Benzo(a)pyrene	NG/LITER	16.06	90.51	2709.25
Perylene	NG/LITER	3.55	22.57	806.02
Indeno(1,2,3-c,d)pyrene	NG/LITER	13.22	80.97	2302.83
Dibenz(a,h)anthracene	NG/LITER		16.19	531.32
Benzo(g,h,i)perylene	NG/LITER	12.39	88.25	2139.42

		Court Street (Hackensack Riv)	Christie Street (Hackensack R)	Smith Marina
SAMP_ID		1GLC00108	1GLC00107	1GLC00118
LAB_SAMP_ID		V8802-COMB	V8803-COMB	V8805-COMB
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	232.80	36.99	98.61
2-Methylnaphthalene	NG/LITER	1305.01	28.99	296.96
1-Methylnaphthalene	NG/LITER	841.20	18.88	318.39
2,6-Dimethylnaphthalene	NG/LITER	2124.28	30.87	987.18
2,3,5-Trimethylnaphthalene	NG/LITER	1395.19	30.09	1274.38
C1-Naphthalenes	NG/LITER	2146.21	47.87	615.35
C2-Naphthalenes	NG/LITER	6470.73	151.73	3095.68
C3-Naphthalenes	NG/LITER	8479.33	154.27	6349.33
Biphenyl	NG/LITER	90.01		48.28
Acenaphthylene	NG/LITER	62.70	13.78	51.63
Acenaphthene	NG/LITER	192.98	14.92	182.40
Fluorene	NG/LITER	268.35	31.14	341.25
Phenanthrene	NG/LITER	1410.62	219.15	624.42
Anthracene	NG/LITER	281.47	31.85	205.63
1-Methylphenanthrene	NG/LITER	688.01	41.04	679.26
C1-Phenanthrenes/Anthracenes	NG/LITER	3084.76	174.69	2662.65
C2-Phenanthrenes/Anthracenes	NG/LITER	3504.47	194.43	4479.21
Fluoranthene	NG/LITER	962.64	324.56	771.39
Pyrene	NG/LITER	907.48	248.19	993.91
Benz(a)anthracene	NG/LITER	261.25	74.40	336.96
Chrysene	NG/LITER	557.74	175.06	547.75
Benzo(b)fluoranthene	NG/LITER	384.22	119.23	449.47
Benzo(k)fluoranthene	NG/LITER	419.90	120.47	479.76
Benzo(e)pyrene	NG/LITER	319.68	95.04	432.51
Benzo(a)pyrene	NG/LITER	420.81	109.43	545.53
Perylene	NG/LITER	96.66	25.58	244.72
Indeno(1,2,3-c,d)pyrene	NG/LITER	297.31	86.85	455.64
Dibenz(a,h)anthracene	NG/LITER	67.96	19.63	110.20
Benzo(g,h,i)perylene	NG/LITER	381.22	113.10	593.07

		Livingston & Front Streets	West Side Road	Henley Road (Hackensack Rd)
SAMP_ID		1GLC00109	1GLC00114	1GLC00120
LAB_SAMP_ID		V8807-COMB	V8809-COMB	V8812-COMB
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	226.06	3063.38	276.72
2-Methylnaphthalene	NG/LITER	847.42	2151.44	128.25
1-Methylnaphthalene	NG/LITER	955.96	1183.49	72.07
2,6-Dimethylnaphthalene	NG/LITER	1160.11	948.15	76.51
2,3,5-Trimethylnaphthalene	NG/LITER	612.66	406.32	39.92
C1-Naphthalenes	NG/LITER	1803.38	3334.93	200.31
C2-Naphthalenes	NG/LITER	3739.07	2518.11	257.36
C3-Naphthalenes	NG/LITER	3687.99	2562.23	220.39
Biphenyl	NG/LITER	126.03	903.20	44.81
Acenaphthylene	NG/LITER	22.53	2304.27	271.27
Acenaphthene	NG/LITER	116.90	2582.15	116.96
Fluorene	NG/LITER	187.59	3042.18	109.40
Phenanthrene	NG/LITER	480.70	7101.55	1143.53
Anthracene	NG/LITER	28.75	4698.11	408.49
1-Methylphenanthrene	NG/LITER	224.12	895.17	195.83
C1-Phenanthrenes/Anthracenes	NG/LITER	1049.32	4131.29	869.14
C2-Phenanthrenes/Anthracenes	NG/LITER	1066.39	3761.56	836.54
Fluoranthene	NG/LITER	204.52	16483.65	2382.78
Pyrene	NG/LITER	197.33	11652.86	2105.36
Benz(a)anthracene	NG/LITER	57.76	7207.96	1015.30
Chrysene	NG/LITER	104.42	8918.85	1723.64
Benzo(b)fluoranthene	NG/LITER	69.29	8256.74	1291.40
Benzo(k)fluoranthene	NG/LITER	74.66	8839.18	1517.61
Benzo(e)pyrene	NG/LITER	66.74	6038.41	1222.70
Benzo(a)pyrene	NG/LITER	65.56	8678.61	1589.13
Perylene	NG/LITER	18.12	2681.12	498.35
Indeno(1,2,3-c,d)pyrene	NG/LITER	55.08	6451.37	1297.44
Dibenz(a,h)anthracene	NG/LITER	12.78	1354.55	283.99
Benzo(g,h,i)perylene	NG/LITER	61.02	5902.97	1308.12

		CCI
SAMP_ID		1GLC00117
LAB_SAMP_ID		V8814-COMB
FRACTION		TOTAL
PARAM_NAME	**UNIT**	**RESULT**
Naphthalene	NG/LITER	133.89
2-Methylnaphthalene	NG/LITER	217.91
1-Methylnaphthalene	NG/LITER	171.32
2,6-Dimethylnaphthalene	NG/LITER	306.64
2,3,5-Trimethylnaphthalene	NG/LITER	231.15
C1-Naphthalenes	NG/LITER	389.24
C2-Naphthalenes	NG/LITER	860.00
C3-Naphthalenes	NG/LITER	1345.35
Biphenyl	NG/LITER	34.50
Acenaphthylene	NG/LITER	25.59
Acenaphthene	NG/LITER	32.91
Fluorene	NG/LITER	68.54
Phenanthrene	NG/LITER	345.72
Anthracene	NG/LITER	25.31
1-Methylphenanthrene	NG/LITER	150.69
C1-Phenanthrenes/Anthracenes	NG/LITER	630.92
C2-Phenanthrenes/Anthracenes	NG/LITER	781.98
Fluoranthene	NG/LITER	330.10
Pyrene	NG/LITER	300.58
Benz(a)anthracene	NG/LITER	100.08
Chrysene	NG/LITER	189.57
Benzo(b)fluoranthene	NG/LITER	130.34
Benzo(k)fluoranthene	NG/LITER	135.87
Benzo(e)pyrene	NG/LITER	350.45
Benzo(a)pyrene	NG/LITER	135.39
Perylene	NG/LITER	34.66
Indeno(1,2,3-c,d)pyrene	NG/LITER	109.20
Dibenz(a,h)anthracene	NG/LITER	21.96
Benzo(g,h,i)perylene	NG/LITER	127.21

APPENDIX D.7
CSO/SWO EVENT #3 PAH DATA

ALUMCU		Peripheral Ditch (Newark Air)	Court Street (Hackensack River)	Henley Road (Hackensack River)
SAMP_ID		1GLC00141	1GLC00134	1GLC00146
LAB_SAMP_ID		T1342-WF-D	T1343-WF-D	T1345-WF-D
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	353.91	191.61	
2-Methylnaphthalene	NG/LITER	1652.63	211.03	
1-Methylnaphthalene	NG/LITER	1732.16	160.07	32.01
2,6-Dimethylnaphthalene	NG/LITER	1093.14	147.28	23.13
2,3,5-Trimethylnaphthalene	NG/LITER	311.98	80.32	14.29
C1-Naphthalenes	NG/LITER	3384.79	371.10	
C2-Naphthalenes	NG/LITER	2503.44	365.47	72.99
C3-Naphthalenes	NG/LITER	1426.22	337.12	80.55
Biphenyl	NG/LITER	95.70	30.39	17.35
Acenaphthylene	NG/LITER	31.66	146.89	48.26
Acenaphthene	NG/LITER	406.27	104.29	69.27
Fluorene	NG/LITER	199.07	139.64	112.23
Phenanthrene	NG/LITER	570.45	1175.57	1335.77
Anthracene	NG/LITER	102.87	302.73	210.24
1-Methylphenanthrene	NG/LITER		185.76	117.53
C1-Phenanthrenes/Anthracenes	NG/LITER		773.07	480.48
C2-Phenanthrenes/Anthracenes	NG/LITER			
Fluoranthene	NG/LITER	1554.18	2864.93	2866.47
Pyrene	NG/LITER	1165.66	2459.02	1808.43
Benz(a)anthracene	NG/LITER	234.91	1073.21	851.11
Chrysene	NG/LITER	1100.22	1877.78	1745.99
Benzo(b)fluoranthene	NG/LITER	845.71	1415.39	1339.45
Benzo(k)fluoranthene	NG/LITER	742.60	1435.02	1301.76
Benzo(e)pyrene	NG/LITER	658.17	1239.40	1095.30
Benzo(a)pyrene	NG/LITER	432.28	1359.59	1192.82
Perylene	NG/LITER	88.68	344.86	281.87
Indeno(1,2,3-c,d)pyrene	NG/LITER	600.58	1061.63	1027.78
Dibenz(a,h)anthracene	NG/LITER	94.62	276.50	232.09
Benzo(g,h,i)perylene	NG/LITER	616.48	1206.05	1090.28

ALUMCU		**Smith Marina**	**Rahway Outfall 003**	**Ivy Street (Passaic River)**
SAMP_ID		1GLC00144	1GLC00131	1GLC00132
LAB_SAMP_ID		T1346-WF-D	T1347-WF-D	T1350-WF-D
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	76.14	430.73	177.92
2-Methylnaphthalene	NG/LITER	105.09	785.32	461.48
1-Methylnaphthalene	NG/LITER	107.74	590.01	361.62
2,6-Dimethylnaphthalene	NG/LITER	282.79	783.49	498.39
2,3,5-Trimethylnaphthalene	NG/LITER	409.47	269.31	265.88
C1-Naphthalenes	NG/LITER	212.84	1375.33	823.10
C2-Naphthalenes	NG/LITER	725.38	1438.01	1273.31
C3-Naphthalenes	NG/LITER	1773.44	974.83	1268.27
Biphenyl	NG/LITER	90.42	124.92	70.86
Acenaphthylene	NG/LITER	89.56	26.29	21.48
Acenaphthene	NG/LITER	108.18	78.51	62.50
Fluorene	NG/LITER	159.90	169.27	156.70
Phenanthrene	NG/LITER	514.34	327.24	471.46
Anthracene	NG/LITER	242.99	59.29	54.16
1-Methylphenanthrene	NG/LITER	560.11	114.92	108.80
C1-Phenanthrenes/Anthracenes	NG/LITER	2151.18	560.65	535.78
C2-Phenanthrenes/Anthracenes	NG/LITER	3891.66		
Fluoranthene	NG/LITER	1228.20	222.45	565.38
Pyrene	NG/LITER	1398.95	226.31	443.30
Benz(a)anthracene	NG/LITER	505.19	77.94	139.46
Chrysene	NG/LITER	800.09	125.16	339.68
Benzo(b)fluoranthene	NG/LITER	626.03	163.17	247.77
Benzo(k)fluoranthene	NG/LITER	630.98	102.79	233.99
Benzo(e)pyrene	NG/LITER	575.22	95.67	223.03
Benzo(a)pyrene	NG/LITER	621.92	99.95	192.24
Perylene	NG/LITER	160.68	31.98	43.88
Indeno(1,2,3-c,d)pyrene	NG/LITER	494.43	81.91	177.98
Dibenz(a,h)anthracene	NG/LITER	128.23	18.32	39.31
Benzo(g,h,i)perylene	NG/LITER	615.87	91.71	198.72

		Elm Street	Christie Street (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00138	1GLC00133	1GLC00142
LAB_SAMP_ID		T1351-WF-D	T1352-WF-D	T1353-WF-D
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER			2798.10
2-Methylnaphthalene	NG/LITER	123.23		890.15
1-Methylnaphthalene	NG/LITER	96.30	35.35	1041.22
2,6-Dimethylnaphthalene	NG/LITER	119.83	27.48	550.33
2,3,5-Trimethylnaphthalene	NG/LITER	68.18	18.53	290.92
C1-Naphthalenes	NG/LITER	219.53		1931.37
C2-Naphthalenes	NG/LITER	337.84	102.75	1600.95
C3-Naphthalenes	NG/LITER	310.00	108.89	1603.74
Biphenyl	NG/LITER	25.30	11.81	278.99
Acenaphthylene	NG/LITER	44.85	66.47	228.37
Acenaphthene	NG/LITER	47.21	47.03	336.85
Fluorene	NG/LITER	89.03	58.36	310.99
Phenanthrene	NG/LITER	551.65	710.07	831.47
Anthracene	NG/LITER	87.78	122.77	400.13
1-Methylphenanthrene	NG/LITER			252.35
C1-Phenanthrenes/Anthracenes	NG/LITER			1281.29
C2-Phenanthrenes/Anthracenes	NG/LITER			1669.35
Fluoranthene	NG/LITER	1035.34	1332.66	1022.34
Pyrene	NG/LITER	808.21	1033.29	1228.66
Benz(a)anthracene	NG/LITER	302.20	374.91	536.15
Chrysene	NG/LITER	655.61	788.46	917.00
Benzo(b)fluoranthene	NG/LITER	501.29	596.21	550.02
Benzo(k)fluoranthene	NG/LITER	491.01	596.22	560.90
Benzo(e)pyrene	NG/LITER	458.16	510.98	628.85
Benzo(a)pyrene	NG/LITER	430.27	532.48	615.45
Perylene	NG/LITER	103.72	128.09	173.99
Indeno(1,2,3-c,d)pyrene	NG/LITER	372.09	465.91	449.59
Dibenz(a,h)anthracene	NG/LITER	88.00	105.60	141.28
Benzo(g,h,i)perylene	NG/LITER	415.46	497.09	596.45

		CCI	Anderson Street
SAMP_ID		1GLC00143	1GLC00139
LAB_SAMP_ID		T1354-WF-D	T1355-WF-D
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	195.65	218.41
2-Methylnaphthalene	NG/LITER	216.44	543.70
1-Methylnaphthalene	NG/LITER	152.95	448.24
2,6-Dimethylnaphthalene	NG/LITER	141.71	597.76
2,3,5-Trimethylnaphthalene	NG/LITER	80.01	319.55
C1-Naphthalenes	NG/LITER	369.39	991.95
C2-Naphthalenes	NG/LITER	364.61	1572.03
C3-Naphthalenes	NG/LITER	360.47	1535.93
Biphenyl	NG/LITER	51.61	90.93
Acenaphthylene	NG/LITER	50.98	114.19
Acenaphthene	NG/LITER	85.04	115.49
Fluorene	NG/LITER	183.37	171.72
Phenanthrene	NG/LITER	1155.22	948.54
Anthracene	NG/LITER	202.64	193.72
1-Methylphenanthrene	NG/LITER	119.90	140.63
C1-Phenanthrenes/Anthracenes	NG/LITER	505.71	623.08
C2-Phenanthrenes/Anthracenes	NG/LITER		
Fluoranthene	NG/LITER	1958.48	1618.50
Pyrene	NG/LITER	1548.85	1328.84
Benz(a)anthracene	NG/LITER	609.75	482.13
Chrysene	NG/LITER	1116.03	962.59
Benzo(b)fluoranthene	NG/LITER	828.28	719.09
Benzo(k)fluoranthene	NG/LITER	844.18	751.28
Benzo(e)pyrene	NG/LITER	783.58	781.42
Benzo(a)pyrene	NG/LITER	764.72	704.51
Perylene	NG/LITER	191.77	162.30
Indeno(1,2,3-c,d)pyrene	NG/LITER	652.88	591.29
Dibenz(a,h)anthracene	NG/LITER	146.67	135.35
Benzo(g,h,i)perylene	NG/LITER	702.20	622.21

APPENDIX D.8
CSO/SWO EVENT #4 PAH DATA

		Rahway Outfall 003	Ivy Street (Passaic River)	Front Street and Bay Way
Replacement SAMP ID		**1GLC00160**	**1GLC00157**	**1GLC00162**
LAB_SAMP_ID		S1703-C	S1710-C	S1701-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	11621.55	123.67	109.89
2-Methylnaphthalene	NG/LITER	14762.23	226.50	109.60
1-Methylnaphthalene	NG/LITER	7706.24	207.11	81.84
2,6-Dimethylnaphthalene	NG/LITER	3404.29	380.71	141.83
2,3,5-Trimethylnaphthalene	NG/LITER	545.18	117.22	143.56
C1-Naphthalenes	NG/LITER	22468.46	433.61	191.43
C2-Naphthalenes	NG/LITER	7628.41	766.17	334.60
C3-Naphthalenes	NG/LITER	4002.82	860.16	637.43
Biphenyl	NG/LITER	388.12	61.42	41.75
Acenaphthylene	NG/LITER	63.25	30.11	50.15
Acenaphthene	NG/LITER	268.86	91.16	87.86
Fluorene	NG/LITER	342.28	140.94	133.88
Phenanthrene	NG/LITER	659.43	1313.83	482.25
Anthracene	NG/LITER	143.70	128.81	167.07
1-Methylphenanthrene	NG/LITER	202.33	214.08	217.07
C1-Phenanthrenes/Anthracenes	NG/LITER	955.68	752.60	703.03
C2-Phenanthrenes/Anthracenes	NG/LITER	882.43	733.52	1078.86
Fluoranthene	NG/LITER	482.01	2412.38	1196.79
Pyrene	NG/LITER	431.70	1674.95	1139.53
Benz(a)anthracene	NG/LITER	200.46	500.90	417.05
Chrysene	NG/LITER	348.99	1181.26	793.04
Benzo(b)fluoranthene	NG/LITER	260.81	1052.62	588.33
Benzo(k)fluoranthene	NG/LITER	220.14	916.88	546.74
Benzo(e)pyrene	NG/LITER	231.87	1187.29	609.29
Benzo(a)pyrene	NG/LITER	243.55	756.54	508.01
Perylene	NG/LITER	127.10	168.01	138.97
Indeno(1,2,3-c,d)pyrene	NG/LITER	234.48	632.28	384.77
Dibenz(a,h)anthracene	NG/LITER	66.70	132.37	100.90
Benzo(g,h,i)perylene	NG/LITER	227.55	693.35	440.08

		Peripheral Ditch (Newark Air)	CCI	Smith Marina
Replacement SAMP ID		**1GLC00156**	**1GLC00158**	**1GLC00159**
LAB_SAMP_ID		S1700-C	S1709-C	S1707-C
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
Naphthalene	NG/LITER	242.97	202.18	261.80
2-Methylnaphthalene	NG/LITER	220.29	200.93	456.52
1-Methylnaphthalene	NG/LITER	194.63	156.45	851.27
2,6-Dimethylnaphthalene	NG/LITER	191.59	148.53	3758.91
2,3,5-Trimethylnaphthalene	NG/LITER	57.28	69.38	2130.59
C1-Naphthalenes	NG/LITER	414.92	357.38	1307.79
C2-Naphthalenes	NG/LITER	390.87	299.40	10006.70
C3-Naphthalenes	NG/LITER	334.21	351.56	15740.39
Biphenyl	NG/LITER	38.41	49.37	201.13
Acenaphthylene	NG/LITER	10.01	57.99	244.09
Acenaphthene	NG/LITER	175.86	117.14	650.52
Fluorene	NG/LITER	117.03	200.30	1124.39
Phenanthrene	NG/LITER	470.60	1866.16	3651.24
Anthracene	NG/LITER	44.58	246.12	978.38
1-Methylphenanthrene	NG/LITER	37.99	272.55	3764.05
C1-Phenanthrenes/Anthracenes	NG/LITER	136.61	966.29	12892.05
C2-Phenanthrenes/Anthracenes	NG/LITER		928.36	15236.24
Fluoranthene	NG/LITER	625.11	3022.18	4677.16
Pyrene	NG/LITER	380.70	2308.38	5344.77
Benz(a)anthracene	NG/LITER	41.55	937.96	2151.02
Chrysene	NG/LITER	237.61	1664.38	3126.14
Benzo(b)fluoranthene	NG/LITER	153.95	1199.82	2438.50
Benzo(k)fluoranthene	NG/LITER	123.17	1102.70	2438.63
Benzo(e)pyrene	NG/LITER	125.31	1305.89	2477.47
Benzo(a)pyrene	NG/LITER	67.65	1054.59	2577.57
Perylene	NG/LITER	12.32	255.65	668.62
Indeno(1,2,3-c,d)pyrene	NG/LITER	81.46	749.31	1770.55
Dibenz(a,h)anthracene	NG/LITER	11.95	189.27	406.94
Benzo(g,h,i)perylene	NG/LITER	81.48	855.02	1994.34

APPENDIX E.1
POTW EVENT #1 PESTICIDE DATA

		Passaic Valley	Bergen County	Linden Roselle
SAMP_ID		1GLC00013	1GLC00014	1GLC00015
LAB_SAMP_ID		48616-05-02	48616-05-04	48616-05-05
FRACTION		DISS	DISS	DISS
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	212.24		
BHC, beta	PG/LITER	256.65	314.21	215.02
BHC, gamma	PG/LITER	3158.70	4332.73	1812.69
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER		6.00	
Heptachlor	PG/LITER			
Aldrin	PG/LITER			
Heptachlor epoxide	PG/LITER		681.54	842.38
Chlordane,oxy-	PG/LITER			
Chlordane,gamma (trans)	PG/LITER	228.51	690.78	460.68
2,4'-DDE	PG/LITER			
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	195.59	762.04	562.52
Nonachlor, trans-	PG/LITER		342.86	209.05
4,4'-DDE	PG/LITER			
Dieldrin	PG/LITER	535.25	2475.57	1538.69
2,4'-DDD	PG/LITER			
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER		140.17	
4,4'-DDD	PG/LITER			181.90
2,4'-DDT	PG/LITER			
Nonachlor, cis-	PG/LITER		151.33	
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER		265.60	
4,4'-DDT	PG/LITER			
Endrin ketone	PG/LITER		546.58	324.92
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		Joint Meeting	Rahway Valley	Middlesex County
SAMP_ID		1GLC00016	1GLC00017	1GLC00018
LAB_SAMP_ID		48616-05-06	48616-05-07	48616-05-08
FRACTION		DISS	DISS	DISS
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER			219.26
BHC, beta	PG/LITER	203.84	419.17	350.97
BHC, gamma	PG/LITER	3369.11	1045.59	4776.76
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER	104.87		
Heptachlor	PG/LITER			
Aldrin	PG/LITER			
Heptachlor epoxide	PG/LITER			247.75
Chlordane,oxy-	PG/LITER			
Chlordane,gamma (trans)	PG/LITER	433.89	764.48	297.42
2,4'-DDE	PG/LITER			
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	501.99	858.25	315.44
Nonachlor, trans-	PG/LITER	197.81	424.93	
4,4'-DDE	PG/LITER			
Dieldrin	PG/LITER	1255.55	1626.11	709.86
2,4'-DDD	PG/LITER		147.05	37.42
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER			
4,4'-DDD	PG/LITER			
2,4'-DDT	PG/LITER			
Nonachlor, cis-	PG/LITER			
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER			
4,4'-DDT	PG/LITER			
Endrin ketone	PG/LITER	327.76		
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		Passaic Valley	Bergen County	Linden Roselle
SAMP_ID		1GLC00013	1GLC00014	1GLC00015
LAB_SAMP_ID		48616-03-02	48616-03-04	48616-03-05
FRACTION		SUSPENDED	SUSPENDED	SUSPENDED
PARAM_NAME	UNIT	RESULT	RESULT	RESULT
BHC, alpha	PG/LITER			
BHC, beta	PG/LITER	126.93		
BHC, gamma	PG/LITER	399.12	247.16	
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER	258.19	253.54	
Heptachlor	PG/LITER		539.33	
Aldrin	PG/LITER			
Heptachlor epoxide	PG/LITER	1179.00	285.98	372.21
Chlordane,oxy-	PG/LITER		940.37	
Chlordane,gamma (trans)	PG/LITER	944.33	4034.61	1251.91
2,4'-DDE	PG/LITER			
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	1194.88	6207.17	2133.71
Nonachlor, trans-	PG/LITER	755.45	4145.81	1485.63
4,4'-DDE	PG/LITER	753.21	1264.14	324.66
Dieldrin	PG/LITER	701.83	3251.68	667.18
2,4'-DDD	PG/LITER	419.18	310.06	417.08
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER			
4,4'-DDD	PG/LITER	625.78	363.60	548.98
2,4'-DDT	PG/LITER		348.72	
Nonachlor, cis-	PG/LITER	165.69	600.11	281.29
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER			
4,4'-DDT	PG/LITER		1060.05	239.59
Endrin ketone	PG/LITER			
Methoxychlor	PG/LITER	618.38	802.61	150.19
Mirex	PG/LITER	185.55		

		Joint Meeting	Rahway Valley	Middlesex County
SAMP_ID		1GLC00016	1GLC00017	1GLC00018
LAB_SAMP_ID		48616-03-06	48616-03-07	48616-03-08
FRACTION		SUSPENDED	SUSPENDED	SUSPENDED
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER			
BHC, beta	PG/LITER			
BHC, gamma	PG/LITER			207.36
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER			241.42
Heptachlor	PG/LITER	212.20	233.18	123.46
Aldrin	PG/LITER			
Heptachlor epoxide	PG/LITER	260.23		927.54
Chlordane,oxy-	PG/LITER			
Chlordane,gamma (trans)	PG/LITER	2087.61	1981.99	877.12
2,4'-DDE	PG/LITER			
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	2590.14	2790.83	1230.25
Nonachlor, trans-	PG/LITER	1861.15	2163.66	919.87
4,4'-DDE	PG/LITER	1103.51		318.30
Dieldrin	PG/LITER	822.70	827.34	483.52
2,4'-DDD	PG/LITER		297.85	
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER			113.98
4,4'-DDD	PG/LITER			
2,4'-DDT	PG/LITER			
Nonachlor, cis-	PG/LITER	293.42	330.10	156.21
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER			
4,4'-DDT	PG/LITER	366.05		
Endrin ketone	PG/LITER			
Methoxychlor	PG/LITER	373.34	954.64	1186.54
Mirex	PG/LITER			

		Passaic Valley	Bergen County	Linden Roselle
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	212.24		
BHC, beta	PG/LITER	383.59	314.21	215.02
BHC, gamma	PG/LITER	3557.82	4579.89	1812.69
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER	258.19	259.54	
Heptachlor	PG/LITER		539.33	
Aldrin	PG/LITER			
Heptachlor epoxide	PG/LITER	1179.00	967.52	1214.59
Chlordane,oxy-	PG/LITER		940.37	
Chlordane,gamma (trans)	PG/LITER	1172.84	4725.39	1712.59
2,4'-DDE	PG/LITER			
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	1390.47	6969.21	2696.24
Nonachlor, trans-	PG/LITER	755.45	4488.67	1694.69
4,4'-DDE	PG/LITER	753.21	1264.14	324.66
Dieldrin	PG/LITER	1237.08	5727.25	2205.87
2,4'-DDD	PG/LITER	419.18	310.06	417.08
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER		140.17	
4,4'-DDD	PG/LITER	625.78	363.60	730.89
2,4'-DDT	PG/LITER		348.72	
Nonachlor, cis-	PG/LITER	165.69	751.44	281.29
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER		265.60	
4,4'-DDT	PG/LITER		1060.05	239.59
Endrin ketone	PG/LITER		546.58	324.92
Methoxychlor	PG/LITER	618.38	802.61	150.19
Mirex	PG/LITER	185.55		

		Joint Meeting	Rahway Valley	Middlesex County
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER			219.26
BHC, beta	PG/LITER	203.84	419.17	350.97
BHC, gamma	PG/LITER	3369.11	1045.59	4984.13
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER	104.87		241.42
Heptachlor	PG/LITER	212.20	233.18	123.46
Aldrin	PG/LITER			
Heptachlor epoxide	PG/LITER	260.23		1175.29
Chlordane,oxy-	PG/LITER			
Chlordane,gamma (trans)	PG/LITER	2521.50	2746.46	1174.54
2,4'-DDE	PG/LITER			
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	3092.13	3649.08	1545.69
Nonachlor, trans-	PG/LITER	2058.96	2588.59	919.87
4,4'-DDE	PG/LITER	1103.51		318.30
Dieldrin	PG/LITER	2078.25	2453.45	1193.38
2,4'-DDD	PG/LITER		444.91	37.42
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER			113.98
4,4'-DDD	PG/LITER			
2,4'-DDT	PG/LITER			
Nonachlor, cis-	PG/LITER	293.42	330.10	156.21
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER			
4,4'-DDT	PG/LITER	366.05		
Endrin ketone	PG/LITER	327.76		
Methoxychlor	PG/LITER	373.34	954.64	1186.54
Mirex	PG/LITER			

APPENDIX E.2
POTW EVENT #2 PESTICIDE DATA

		Passaic Valley	Bergen County	North Bergen-Central
SAMP_ID		1GLC00030	1GLC00031	1GLC00032
LAB_SAMP_ID		48616-53-05	48616-53-02	48616-53-03
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	207.05		456.75
BHC, beta	PG/LITER	252.93	278.51	612.74
BHC, gamma	PG/LITER	7677.11		5213.53
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER			
Heptachlor	PG/LITER	98.85	212.12	482.52
Aldrin	PG/LITER		42.38	49.18
Heptachlor epoxide	PG/LITER	125.77	429.10	624.62
Chlordane,oxy-	PG/LITER			156.47
Chlordane,gamma (trans)	PG/LITER	529.00	1700.17	3340.23
2,4'-DDE	PG/LITER			
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	559.72	1792.70	4149.62
Nonachlor, trans-	PG/LITER	343.85	1153.71	2358.86
4,4'-DDE	PG/LITER	515.45	822.40	1724.18
Dieldrin	PG/LITER	559.94	1694.33	2073.78
2,4'-DDD	PG/LITER			187.11
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER		185.92	
4,4'-DDD	PG/LITER			545.07
2,4'-DDT	PG/LITER			342.20
Nonachlor, cis-	PG/LITER		159.52	369.20
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER		224.58	356.44
4,4'-DDT	PG/LITER			1148.83
Endrin ketone	PG/LITER	77.81	135.44	127.84
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		Secaucus	North Bergen-Woodcliff	Hoboken
SAMP_ID		1GLC00033	1GLC00034	1GLC00035
LAB_SAMP_ID		48616-53-04	48616-53-08	48616-53-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER			
BHC, beta	PG/LITER	1092.79	373.97	202.59
BHC, gamma	PG/LITER	4728.42	520.78	2299.24
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER			
Heptachlor	PG/LITER	225.46	245.41	156.13
Aldrin	PG/LITER	18.12	58.34	16.78
Heptachlor epoxide	PG/LITER	1008.11	531.70	267.30
Chlordane,oxy-	PG/LITER	398.81	173.58	113.94
Chlordane,gamma (trans)	PG/LITER	2276.08	2012.24	787.06
2,4'-DDE	PG/LITER	85.84		
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	2953.77	2310.40	918.10
Nonachlor, trans-	PG/LITER	1897.84	1341.27	661.18
4,4'-DDE	PG/LITER	2518.53	1761.46	1082.95
Dieldrin	PG/LITER	3877.79	1253.13	605.62
2,4'-DDD	PG/LITER	383.50	468.92	258.25
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER			
4,4'-DDD	PG/LITER	372.05		876.04
2,4'-DDT	PG/LITER	1023.90	530.20	242.53
Nonachlor, cis-	PG/LITER	317.02		
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER	233.91	434.94	347.10
4,4'-DDT	PG/LITER	6556.87	1589.49	849.65
Endrin ketone	PG/LITER	117.02	129.38	76.59
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		West New York	Joint Meeting	Linden Roselle
SAMP_ID		1GLC00036	1GLC00038	1GLC00039
LAB_SAMP_ID		48616-53-10	48616-53-12	48616-53-13
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER			
BHC, beta	PG/LITER	281.22	158.77	193.26
BHC, gamma	PG/LITER	1282.00	1539.39	1630.52
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER		485.07	
Heptachlor	PG/LITER	157.38	929.12	256.85
Aldrin	PG/LITER	25.86	47.20	
Heptachlor epoxide	PG/LITER	255.90	291.30	1819.59
Chlordane,oxy-	PG/LITER	175.44		465.24
Chlordane,gamma (trans)	PG/LITER	1256.70	6308.69	8921.76
2,4'-DDE	PG/LITER		66.56	218.41
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	1569.19	5945.13	9875.86
Nonachlor, trans-	PG/LITER	1101.11	5269.51	6374.05
4,4'-DDE	PG/LITER	2580.90	1229.78	2897.22
Dieldrin	PG/LITER	965.28	1019.67	3391.75
2,4'-DDD	PG/LITER		186.32	2416.95
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER	192.46	375.47	
4,4'-DDD	PG/LITER	570.28	385.83	4352.46
2,4'-DDT	PG/LITER	481.21	219.25	369.07
Nonachlor, cis-	PG/LITER		559.04	669.67
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER	338.05		283.01
4,4'-DDT	PG/LITER	1952.52	595.06	1305.34
Endrin ketone	PG/LITER	86.15	104.82	93.36
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		Rahway Valley	Middlesex County
SAMP_ID		1GLC00040	1GLC00041
LAB_SAMP_ID		48616-53-15	48616-53-11
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	171.76	202.00
BHC, beta	PG/LITER	407.98	392.25
BHC, gamma	PG/LITER		2811.77
BHC, delta	PG/LITER		
Hexachlorobenzene	PG/LITER	560.36	
Heptachlor	PG/LITER	1365.99	337.89
Aldrin	PG/LITER	65.78	21.02
Heptachlor epoxide	PG/LITER	1252.00	224.09
Chlordane,oxy-	PG/LITER		
Chlordane,gamma (trans)	PG/LITER	6942.25	1155.07
2,4'-DDE	PG/LITER	83.46	34.47
Endosulfan, alpha	PG/LITER		
Chlordane,alpha (cis)	PG/LITER	10633.69	1118.97
Nonachlor, trans-	PG/LITER	7300.18	836.13
4,4'-DDE	PG/LITER	1137.75	541.05
Dieldrin	PG/LITER	2766.52	876.56
2,4'-DDD	PG/LITER	1621.13	110.30
Endrin	PG/LITER		
Endosulfan, beta	PG/LITER		132.41
4,4'-DDD	PG/LITER	514.36	
2,4'-DDT	PG/LITER	285.26	
Nonachlor, cis-	PG/LITER	589.17	
Endrin aldehyde	PG/LITER		
Endosulfan sulfate	PG/LITER		
4,4'-DDT	PG/LITER	820.82	459.65
Endrin ketone	PG/LITER		135.73
Methoxychlor	PG/LITER		
Mirex	PG/LITER		

APPENDIX E.3
POTW EVENT #3 PESTICIDE DATA

		Passaic Valley	Middlesex County	Bergen County
SAMP_ID		1GLC00073	1GLC00074	1GLC00075
LAB_SAMP_ID		48904-01-02	48904-01-06	48904-01-03
FRACTION		TOTAL	TOTAL	TOTAL
REEXTRACT				
EXTRACT_DATE		24-May-01	24-May-01	24-May-01
SAMP_WGT_VOL		2.610	2.590	2.610
SAMP_WGT_VOL_UNIT		L	L	L
QC_CODE		SA	SA	SA
REP		1	1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/L	770.27	229.87	
BHC, beta	PG/L	512.85	405.49	350.26
BHC, gamma	PG/L	6014.11	3015.54	4025.18
BHC, delta	PG/L			
Hexachlorobenzene	PG/L	893.01	885.93	337.29
Heptachlor	PG/L	174.37	513.05	322.61
Aldrin	PG/L		43.35	43.29
Heptachlor epoxide	PG/L	332.90	690.01	836.05
Chlordane,oxy-	PG/L			
Chlordane,gamma (trans)	PG/L	1235.18	3047.98	2942.24
2,4'-DDE	PG/L			
Endosulfan, alpha	PG/L			
Chlordane,alpha (cis)	PG/L	1334.38	3028.40	3895.47
Nonachlor, trans-	PG/L	880.63	2370.54	2765.09
4,4'-DDE	PG/L	475.26	657.39	964.22
Dieldrin	PG/L	1065.02	2493.58	3678.15
2,4'-DDD	PG/L	309.16	192.70	510.06
Endrin	PG/L			
Endosulfan, beta	PG/L	397.62	327.63	317.08
4,4'-DDD	PG/L	211.64		300.83
2,4'-DDT	PG/L			191.89
Nonachlor, cis-	PG/L		406.39	481.00
Endrin aldehyde	PG/L			
Endosulfan sulfate	PG/L		168.60	
4,4'-DDT	PG/L	172.16		545.42
Endrin ketone	PG/L		409.03	
Methoxychlor	PG/L		17719.61	
Mirex	PG/L			

		Rahway Valley	Linden Roselle	Edgewater
SAMP_ID		1GLC00077	1GLC00078	1GLC00079
LAB_SAMP_ID		48904-01-07	48904-01-08	48904-01-09
FRACTION		TOTAL	TOTAL	TOTAL
REEXTRACT				
EXTRACT_DATE		24-May-01	24-May-01	24-May-01
SAMP_WGT_VOL		2.600	2.570	2.615
SAMP_WGT_VOL_UNIT		L	L	L
QC_CODE		SA	SA	SA
REP		1	1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/L		266.87	
BHC, beta	PG/L	431.08	188.26	347.67
BHC, gamma	PG/L		3841.25	
BHC, delta	PG/L			
Hexachlorobenzene	PG/L			
Heptachlor	PG/L	694.57	254.76	209.20
Aldrin	PG/L	181.23		46.49
Heptachlor epoxide	PG/L	2131.83	1177.37	350.39
Chlordane,oxy-	PG/L			
Chlordane,gamma (trans)	PG/L	6223.70	4131.51	1830.22
2,4'-DDE	PG/L			
Endosulfan, alpha	PG/L			
Chlordane,alpha (cis)	PG/L	6341.05	4126.28	1950.52
Nonachlor, trans-	PG/L	4524.06	2567.72	1264.28
4,4'-DDE	PG/L	428.35	275.19	583.94
Dieldrin	PG/L	3745.44	1747.79	986.28
2,4'-DDD	PG/L		1287.03	
Endrin	PG/L			
Endosulfan, beta	PG/L	560.80		279.72
4,4'-DDD	PG/L		2203.02	
2,4'-DDT	PG/L		786.86	
Nonachlor, cis-	PG/L	603.22	418.99	165.48
Endrin aldehyde	PG/L			
Endosulfan sulfate	PG/L			
4,4'-DDT	PG/L		1469.56	
Endrin ketone	PG/L	462.00	239.68	98.14
Methoxychlor	PG/L			
Mirex	PG/L			

APPENDIX E.4
POTW EVENT #4 PESTICIDE DATA

		Passaic Valley	Middlesex County	Bergen County
SAMP_ID		1GLC00085	1GLC00086	1GLC00087
LAB_SAMP_ID		48904-11-04	48904-11-10	48904-11-02
FRACTION		TOTAL	TOTAL	TOTAL
REEXTRACT				
EXTRACT_DATE		13-Aug-01	13-Aug-01	13-Aug-01
SAMP_WGT_VOL		2.590	2.620	2.585
SAMP_WGT_VOL_UNIT		L	L	L
QC_CODE		SA	SA	SA
REP		1	1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/L	330.88		
BHC, beta	PG/L	508.53	414.68	283.57
BHC, gamma	PG/L	5252.63	4082.18	1450.78
BHC, delta	PG/L			
Hexachlorobenzene	PG/L			
Heptachlor	PG/L			
Aldrin	PG/L			
Heptachlor epoxide	PG/L	207.03	471.91	502.01
Chlordane,oxy-	PG/L			
Chlordane,gamma (trans)	PG/L	1646.10	1348.47	2693.13
2,4'-DDE	PG/L		55.50	
Endosulfan, alpha	PG/L			
Chlordane,alpha (cis)	PG/L	1697.01	1689.27	2935.50
Nonachlor, trans-	PG/L	1293.20	1289.69	1664.02
4,4'-DDE	PG/L	352.47	316.16	831.58
Dieldrin	PG/L	703.31	808.32	2247.09
2,4'-DDD	PG/L	128.33	132.98	339.28
Endrin	PG/L			
Endosulfan, beta	PG/L		185.92	
4,4'-DDD	PG/L	172.64	157.78	245.84
2,4'-DDT	PG/L	64.96	110.30	100.09
Nonachlor, cis-	PG/L		281.95	
Endrin aldehyde	PG/L			
Endosulfan sulfate	PG/L			297.45
4,4'-DDT	PG/L		242.61	190.95
Endrin ketone	PG/L			185.59
Methoxychlor	PG/L			
Mirex	PG/L			

		Joint Meeting	Rahway Valley	Linden Roselle
SAMP_ID		1GLC00088	1GLC00089	1GLC00090
LAB_SAMP_ID		48904-11-08	48904-11-09	48904-11-12
FRACTION		TOTAL	TOTAL	TOTAL
REEXTRACT				
EXTRACT_DATE		13-Aug-01	13-Aug-01	13-Aug-01
SAMP_WGT_VOL		2.630	2.620	2.630
SAMP_WGT_VOL_UNIT		L	L	L
QC_CODE		SA	SA	SA
REP		1	1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/L			
BHC, beta	PG/L	172.99	418.11	257.39
BHC, gamma	PG/L	1625.29	25572.04	1121.09
BHC, delta	PG/L			
Hexachlorobenzene	PG/L			
Heptachlor	PG/L			
Aldrin	PG/L			
Heptachlor epoxide	PG/L	517.89	611.66	1014.17
Chlordane,oxy-	PG/L		107.96	268.22
Chlordane,gamma (trans)	PG/L	2191.80	2548.42	1784.01
2,4'-DDE	PG/L		48.08	72.83
Endosulfan, alpha	PG/L			
Chlordane,alpha (cis)	PG/L	2681.36	3036.72	3122.44
Nonachlor, trans-	PG/L	1950.23	2202.08	1906.54
4,4'-DDE	PG/L	958.57	321.92	503.36
Dieldrin	PG/L	1107.05	1318.45	1738.74
2,4'-DDD	PG/L	413.76	919.10	1103.85
Endrin	PG/L			
Endosulfan, beta	PG/L	331.41	259.21	175.22
4,4'-DDD	PG/L	1104.11	2103.22	1303.15
2,4'-DDT	PG/L	240.03	349.76	181.32
Nonachlor, cis-	PG/L	236.19	349.93	321.80
Endrin aldehyde	PG/L		36.98	23.44
Endosulfan sulfate	PG/L			
4,4'-DDT	PG/L	564.17	678.49	579.24
Endrin ketone	PG/L		162.66	
Methoxychlor	PG/L			
Mirex	PG/L			

		Central	Woodcliff	Edgewater
SAMP_ID		1GLC00092	1GLC00093	1GLC00094
LAB_SAMP_ID		48904-11-03	48904-11-11	48904-11-06
FRACTION		TOTAL	TOTAL	TOTAL
REEXTRACT				
EXTRACT_DATE		13-Aug-01	13-Aug-01	13-Aug-01
SAMP_WGT_VOL		2.620	2.600	2.620
SAMP_WGT_VOL_UNIT		L	L	L
QC_CODE		SA	SA	SA
REP		1	1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/L			
BHC, beta	PG/L	537.26	395.00	412.63
BHC, gamma	PG/L	1948.99		
BHC, delta	PG/L			
Hexachlorobenzene	PG/L			
Heptachlor	PG/L	469.28	475.71	347.71
Aldrin	PG/L			
Heptachlor epoxide	PG/L	779.54	651.20	442.48
Chlordane,oxy-	PG/L	381.90	164.14	0.00
Chlordane,gamma (trans)	PG/L	3983.51	1094.45	2617.84
2,4'-DDE	PG/L	85.73	28.14	
Endosulfan, alpha	PG/L			
Chlordane,alpha (cis)	PG/L	4552.67	2792.38	2817.87
Nonachlor, trans-	PG/L	3306.93	2149.64	2437.05
4,4'-DDE	PG/L	1217.55	1782.05	611.26
Dieldrin	PG/L	2050.32	1271.84	895.60
2,4'-DDD	PG/L	329.74	3955.72	71.46
Endrin	PG/L			
Endosulfan, beta	PG/L	328.95		379.59
4,4'-DDD	PG/L	502.80	131.37	165.81
2,4'-DDT	PG/L	250.69	106.26	123.16
Nonachlor, cis-	PG/L	394.21		326.34
Endrin aldehyde	PG/L			17.14
Endosulfan sulfate	PG/L	334.03	260.92	333.28
4,4'-DDT	PG/L	588.16	1078.61	291.85
Endrin ketone	PG/L			
Methoxychlor	PG/L			
Mirex	PG/L			154.33

		West NY	Secaucus
SAMP_ID		1GLC00095	1GLC00096
LAB_SAMP_ID		48904-11-05	48904-11-07
FRACTION		TOTAL	TOTAL
REEXTRACT			
EXTRACT_DATE		13-Aug-01	13-Aug-01
SAMP_WGT_VOL		2.615	2.610
SAMP_WGT_VOL_UNIT		L	L
QC_CODE		SA	SA
REP		1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
BHC, alpha	PG/L		
BHC, beta	PG/L	254.80	1012.86
BHC, gamma	PG/L		2036.66
BHC, delta	PG/L		
Hexachlorobenzene	PG/L		
Heptachlor	PG/L		
Aldrin	PG/L		
Heptachlor epoxide	PG/L	474.80	1363.13
Chlordane,oxy-	PG/L	350.54	425.67
Chlordane,gamma (trans)	PG/L	1755.76	1658.40
2,4'-DDE	PG/L	60.34	
Endosulfan, alpha	PG/L		
Chlordane,alpha (cis)	PG/L	2560.32	2530.59
Nonachlor, trans-	PG/L	1934.31	1687.45
4,4'-DDE	PG/L	2986.03	1102.84
Dieldrin	PG/L	1198.03	2828.78
2,4'-DDD	PG/L	188.60	134.75
Endrin	PG/L		
Endosulfan, beta	PG/L		379.85
4,4'-DDD	PG/L	729.97	300.58
2,4'-DDT	PG/L	764.26	182.70
Nonachlor, cis-	PG/L	168.50	454.81
Endrin aldehyde	PG/L		
Endosulfan sulfate	PG/L	465.41	293.60
4,4'-DDT	PG/L	2592.66	904.34
Endrin ketone	PG/L		
Methoxychlor	PG/L		
Mirex	PG/L		

APPENDIX E.5
CSO/SWO EVENT #1 PESTICIDE DATA

		Henley Road (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00065	1GCL00061
LAB_SAMP_ID		490237-12-08	49037-12-09
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER		451.72
BHC, beta	PG/LITER		1477.10
BHC, gamma	PG/LITER		
BHC, delta	PG/LITER		893.90
Hexachlorobenzene	PG/LITER	554.09	339.90
Heptachlor	PG/LITER	627.12	40.99
Aldrin	PG/LITER		
Heptachlor epoxide	PG/LITER	6949.35	
Chlordane,oxy-	PG/LITER	1810.27	
Chlordane,gamma (trans)	PG/LITER	53640.98	
2,4'-DDE	PG/LITER	1328.68	138.31
Endosulfan, alpha	PG/LITER		
Chlordane,alpha (cis)	PG/LITER	62003.39	294.09
Nonachlor, trans-	PG/LITER	41415.40	185.56
4,4'-DDE	PG/LITER	17914.57	1843.40
Dieldrin	PG/LITER	21802.30	
2,4'-DDD	PG/LITER	2077.59	1691.89
Endrin	PG/LITER		66.60
Endosulfan, beta	PG/LITER	4584.58	
4,4'-DDD	PG/LITER	5672.01	3833.34
2,4'-DDT	PG/LITER	13292.85	547.30
Nonachlor, cis-	PG/LITER	12130.10	
Endrin aldehyde	PG/LITER		
Endosulfan sulfate	PG/LITER	928.92	281.19
4,4'-DDT	PG/LITER	42806.10	2248.78
Endrin ketone	PG/LITER	349.48	
Methoxychlor	PG/LITER		
Mirex	PG/LITER		

APPENDIX E.6
CSO/SWO EVENT #2 PESTICIDE DATA

		Henley Road (Hackensack River)	West Side Road	CCI
SAMP_ID		1GLC00120	1GLC00114	1GLC00117
LAB_SAMP_ID		49513-07-05	49513-07-06	49513-07-13
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	305.13	353.95	454.48
BHC, beta	PG/LITER		188.78	332.61
BHC, gamma	PG/LITER			
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER	1088.95	1510.13	
Heptachlor	PG/LITER		622.69	
Aldrin	PG/LITER	1237.36	144.97	
Heptachlor epoxide	PG/LITER	3676.56	961.89	316.47
Chlordane,oxy-	PG/LITER	585.24	212.45	
Chlordane,gamma (trans)	PG/LITER	27864.28	24018.20	2158.66
2,4'-DDE	PG/LITER	1071.48	287.86	91.72
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	31847.95	26014.74	2092.52
Nonachlor, trans-	PG/LITER	18903.05	14769.23	1414.28
4,4'-DDE	PG/LITER	14339.34	5236.21	1687.20
Dieldrin	PG/LITER	11210.21	9522.90	767.11
2,4'-DDD	PG/LITER	4426.58	3890.52	388.47
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER	824.84		220.55
4,4'-DDD	PG/LITER	12585.93	11736.77	1154.00
2,4'-DDT	PG/LITER	2140.80	3006.08	1109.06
Nonachlor, cis-	PG/LITER	5829.25	3325.98	255.77
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER	695.01		
4,4'-DDT	PG/LITER	8615.43	14195.28	4734.47
Endrin ketone	PG/LITER	1559.13	443.11	
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		Ivy Street (Passaic River)	Smith Marina	Livingston and Front Streets
SAMP_ID		1GLC00106	1GLC00118	1GLC00109
LAB_SAMP_ID		49513-07-09	49513-08-17	49513-07-24
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	310.93	388.64	227.96
BHC, beta	PG/LITER		211.48	
BHC, gamma	PG/LITER			1263.11
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER		2210.00	
Heptachlor	PG/LITER	401.76		401.68
Aldrin	PG/LITER	303.44	579.28	
Heptachlor epoxide	PG/LITER	785.68	872.38	1265.78
Chlordane,oxy-	PG/LITER	126.69	208.50	
Chlordane,gamma (trans)	PG/LITER	5883.28	9547.40	3496.13
2,4'-DDE	PG/LITER	167.34	180.80	82.81
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	6178.80	9831.26	3289.08
Nonachlor, trans-	PG/LITER	4082.08	8213.82	2322.72
4,4'-DDE	PG/LITER	3789.85	3659.47	2546.67
Dieldrin	PG/LITER	4349.32	1438.86	1815.44
2,4'-DDD	PG/LITER	1883.38	974.31	358.39
Endrin	PG/LITER			73.41
Endosulfan, beta	PG/LITER	405.23		277.82
4,4'-DDD	PG/LITER	1673.45	2349.56	915.77
2,4'-DDT	PG/LITER	3762.40	3392.24	1247.63
Nonachlor, cis-	PG/LITER	919.19	2221.17	595.84
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER			
4,4'-DDT	PG/LITER	10150.96	16056.27	5409.89
Endrin ketone	PG/LITER	384.08		71.59
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		Court Street (Hackensack River)	Christie Street (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00108	1GLC00107	1GLC00116
LAB_SAMP_ID		49513-08-14	49513-08-11	49513-07-17
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	230.87	324.24	929.04
BHC, beta	PG/LITER			2853.95
BHC, gamma	PG/LITER			
BHC, delta	PG/LITER			407.58
Hexachlorobenzene	PG/LITER			1102.52
Heptachlor	PG/LITER	2174.89	653.46	161.91
Aldrin	PG/LITER	122.69	1005.48	
Heptachlor epoxide	PG/LITER	624.59	1460.86	
Chlordane,oxy-	PG/LITER	111.31	387.09	
Chlordane,gamma (trans)	PG/LITER	10014.85	12382.01	6249.10
2,4'-DDE	PG/LITER	66.96	154.16	730.39
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	9461.33	12043.94	5793.52
Nonachlor, trans-	PG/LITER	8495.68	10479.73	4770.52
4,4'-DDE	PG/LITER	1331.60	2084.92	9866.74
Dieldrin	PG/LITER	3848.85	27185.15	2239.80
2,4'-DDD	PG/LITER	325.74	234.62	4631.92
Endrin	PG/LITER		328.77	
Endosulfan, beta	PG/LITER	631.99	849.02	
4,4'-DDD	PG/LITER	1055.33	545.32	10318.68
2,4'-DDT	PG/LITER	409.51	1170.83	5521.30
Nonachlor, cis-	PG/LITER	1434.92	2080.52	1100.24
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER			
4,4'-DDT	PG/LITER	1664.83	4785.88	19886.62
Endrin ketone	PG/LITER	196.72	1036.34	
Methoxychlor	PG/LITER			
Mirex	PG/LITER	953.14		602.32

		Peripheral Ditch (Newark Air)
SAMP_ID		1GLC00115
LAB_SAMP_ID		49513-08-04
FRACTION		TOTAL
PARAM_NAME	**UNIT**	**RESULT**
BHC, alpha	PG/LITER	177.77
BHC, beta	PG/LITER	345.13
BHC, gamma	PG/LITER	
BHC, delta	PG/LITER	
Hexachlorobenzene	PG/LITER	
Heptachlor	PG/LITER	
Aldrin	PG/LITER	
Heptachlor epoxide	PG/LITER	
Chlordane,oxy-	PG/LITER	
Chlordane,gamma (trans)	PG/LITER	
2,4'-DDE	PG/LITER	60.21
Endosulfan, alpha	PG/LITER	
Chlordane,alpha (cis)	PG/LITER	
Nonachlor, trans-	PG/LITER	84.36
4,4'-DDE	PG/LITER	191.51
Dieldrin	PG/LITER	1888.82
2,4'-DDD	PG/LITER	187.01
Endrin	PG/LITER	
Endosulfan, beta	PG/LITER	
4,4'-DDD	PG/LITER	473.82
2,4'-DDT	PG/LITER	87.92
Nonachlor, cis-	PG/LITER	62.36
Endrin aldehyde	PG/LITER	
Endosulfan sulfate	PG/LITER	167.96
4,4'-DDT	PG/LITER	244.56
Endrin ketone	PG/LITER	80.01
Methoxychlor	PG/LITER	
Mirex	PG/LITER	

APPENDIX E.7
CSO/SWO EVENT #3 PESTICIDE DATA

		Rahway Outfall 003	Ivy Street (Passaic River)	Christie Street (Hackensack River)
SAMP_ID		1GLC00131	1GLC00132	1GLC00133
LAB_SAMP_ID		48904-39-04	48904-39-05	48904-39-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER		445.02	357.31
BHC, beta	PG/LITER	363.52	133.65	
BHC, gamma	PG/LITER			
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER	304.22		
Heptachlor	PG/LITER	7780.83	342.39	481.97
Aldrin	PG/LITER	1005.53	224.36	378.54
Heptachlor epoxide	PG/LITER	11587.14	1038.35	4023.26
Chlordane,oxy-	PG/LITER	1366.64	100.40	471.54
Chlordane,gamma (trans)	PG/LITER	52923.73	4494.44	10684.65
2,4'-DDE	PG/LITER	77.70	139.70	187.86
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	55845.96	4452.27	12151.06
Nonachlor, trans-	PG/LITER	30982.87	3006.01	8342.42
4,4'-DDE	PG/LITER	1964.33	2244.95	3815.78
Dieldrin	PG/LITER	28210.11	2554.68	10365.56
2,4'-DDD	PG/LITER	600.93	271.26	267.04
Endrin	PG/LITER	436.82		
Endosulfan, beta	PG/LITER	2630.02	580.57	714.84
4,4'-DDD	PG/LITER	1183.99	559.04	573.29
2,4'-DDT	PG/LITER	767.61	1224.19	2039.07
Nonachlor, cis-	PG/LITER	3779.45	577.56	1874.25
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER			406.32
4,4'-DDT	PG/LITER	2225.94	4984.01	8176.49
Endrin ketone	PG/LITER	1678.80		
Methoxychlor	PG/LITER			
Mirex	PG/LITER		159.06	

		Court Street (Hackensack River)	Elm Street	Anderson Street
SAMP_ID		1GLC00134	1GLC00138	1GLC00139
LAB_SAMP_ID		48904-39-07	48904-39-08	48904-39-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	354.70	347.82	353.45
BHC, beta	PG/LITER	127.58	125.78	165.63
BHC, gamma	PG/LITER			
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER	340.10		330.10
Heptachlor	PG/LITER	428.20	1013.87	694.45
Aldrin	PG/LITER	130.28	412.83	171.26
Heptachlor epoxide	PG/LITER	1480.94	2455.15	1675.98
Chlordane,oxy-	PG/LITER	231.25	808.14	904.16
Chlordane,gamma (trans)	PG/LITER	6560.35	10945.98	11718.69
2,4'-DDE	PG/LITER	92.31	155.17	
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	6959.64	10258.73	12370.29
Nonachlor, trans-	PG/LITER	4819.13	7606.30	8352.81
4,4'-DDE	PG/LITER	2603.41	3938.99	4133.51
Dieldrin	PG/LITER		10921.05	9008.18
2,4'-DDD	PG/LITER	766.98	392.08	335.74
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER			779.51
4,4'-DDD	PG/LITER	1940.53	1047.10	736.43
2,4'-DDT	PG/LITER	1609.68	1945.48	1757.90
Nonachlor, cis-	PG/LITER	572.07	2018.97	2019.85
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER			
4,4'-DDT	PG/LITER	6189.48	11552.94	8926.36
Endrin ketone	PG/LITER		805.95	
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		Peripheral Ditch (Newark Air)	CCI	Henley Road (Hackensack River)
SAMP_ID		1GLC00141	1GLC00143	1GLC00146
LAB_SAMP_ID		48904-39-10	48904-39-12	48904-39-14
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	595.62	660.41	413.95
BHC, beta	PG/LITER	220.27	611.75	
BHC, gamma	PG/LITER			
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER		587.67	339.15
Heptachlor	PG/LITER		347.02	413.38
Aldrin	PG/LITER		73.64	121.09
Heptachlor epoxide	PG/LITER		1141.08	1716.69
Chlordane,oxy-	PG/LITER		407.66	827.41
Chlordane,gamma (trans)	PG/LITER		7403.79	14555.03
2,4'-DDE	PG/LITER		208.40	162.19
Endosulfan, alpha	PG/LITER	482.68	9150.37	
Chlordane,alpha (cis)	PG/LITER		7513.47	16417.36
Nonachlor, trans-	PG/LITER		6147.35	11392.10
4,4'-DDE	PG/LITER		5480.75	3767.50
Dieldrin	PG/LITER	2022.05	1720.57	3920.26
2,4'-DDD	PG/LITER		575.69	286.39
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER			
4,4'-DDD	PG/LITER		1489.90	837.19
2,4'-DDT	PG/LITER		3761.18	1712.61
Nonachlor, cis-	PG/LITER		891.75	2138.02
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER		577.08	
4,4'-DDT	PG/LITER		22797.04	7204.73
Endrin ketone	PG/LITER			
Methoxychlor	PG/LITER			
Mirex	PG/LITER			

		Blanchard Street (Passaic River)	Smith Marina
SAMP_ID		1GLC00142	1GLC00144
LAB_SAMP_ID		48904-39-11	48904-39-13
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	16641.11	518.16
BHC, beta	PG/LITER	3281.64	351.02
BHC, gamma	PG/LITER	1192.91	
BHC, delta	PG/LITER		
Hexachlorobenzene	PG/LITER	3898.57	1861.67
Heptachlor	PG/LITER	196.87	2758.41
Aldrin	PG/LITER		149.20
Heptachlor epoxide	PG/LITER	250.11	2364.92
Chlordane,oxy-	PG/LITER	77.93	256.55
Chlordane,gamma (trans)	PG/LITER	2065.57	20814.74
2,4'-DDE	PG/LITER	1133.62	242.91
Endosulfan, alpha	PG/LITER		
Chlordane,alpha (cis)	PG/LITER	1772.24	19288.12
Nonachlor, trans-	PG/LITER	1300.14	15689.70
4,4'-DDE	PG/LITER	15547.71	5335.86
Dieldrin	PG/LITER	2143.00	1687.12
2,4'-DDD	PG/LITER	3109.41	1194.13
Endrin	PG/LITER		
Endosulfan, beta	PG/LITER		856.08
4,4'-DDD	PG/LITER	6784.64	2991.41
2,4'-DDT	PG/LITER	3562.56	3769.58
Nonachlor, cis-	PG/LITER	298.75	2223.38
Endrin aldehyde	PG/LITER		
Endosulfan sulfate	PG/LITER		
4,4'-DDT	PG/LITER	12385.30	16486.94
Endrin ketone	PG/LITER		
Methoxychlor	PG/LITER		
Mirex	PG/LITER		

APPENDIX E.8
CSO/SWO EVENT #4 PESTICIDE DATA

		Rahway Outfall 003	Ivy Street (Passaic River)	Front Street and Bay Way
Replacement SAMP ID		**1GLC00160**	**1GLC00157**	**1GLC00162**
LAB_SAMP_ID		48904-50-05	48904-50-07	48904-50-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	141.67	190.75	287.06
BHC, beta	PG/LITER	257.86	124.25	504.54
BHC, gamma	PG/LITER	1426.74	559.98	753.69
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER		4185.45	1748.71
Heptachlor	PG/LITER	4463.23	422.47	413.38
Aldrin	PG/LITER		112.27	60.21
Heptachlor epoxide	PG/LITER	8824.99	510.32	152.60
Chlordane,oxy-	PG/LITER	777.50	299.29	
Chlordane,gamma (trans)	PG/LITER	72665.74	6696.76	5846.32
2,4'-DDE	PG/LITER	102.69	248.05	295.95
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	61447.15	6458.49	5351.26
Nonachlor, trans-	PG/LITER	39546.46	5148.89	5651.10
4,4'-DDE	PG/LITER	2020.44	4171.90	4755.65
Dieldrin	PG/LITER	21497.75	3283.74	1165.15
2,4'-DDD	PG/LITER	643.82	494.54	2489.26
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER	2705.77	499.04	478.48
4,4'-DDD	PG/LITER	1352.62	998.35	4742.04
2,4'-DDT	PG/LITER	764.59	2202.37	3315.02
Nonachlor, cis-	PG/LITER	3443.87	812.08	754.96
Endrin aldehyde	PG/LITER			
Endosulfan sulfate	PG/LITER	164.31	194.86	
4,4'-DDT	PG/LITER	3319.78	9449.39	9857.64
Endrin ketone	PG/LITER	584.78		
Methoxychlor	PG/LITER			
Mirex	PG/LITER	BC	BC	BC

		Peripheral Ditch (Newark Air)	CCI	Smith Marina
Replacement SAMP ID		**1GLC00156**	**1GLC00158**	**1GLC00159**
LAB_SAMP_ID		48904-50-08	48904-50-06	48904-50-04
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
BHC, alpha	PG/LITER	208.75	378.94	190.35
BHC, beta	PG/LITER	99.68	1289.50	211.24
BHC, gamma	PG/LITER		461.02	373.14
BHC, delta	PG/LITER			
Hexachlorobenzene	PG/LITER		801.36	1385.72
Heptachlor	PG/LITER		491.55	1222.41
Aldrin	PG/LITER		54.51	64.50
Heptachlor epoxide	PG/LITER		733.57	1581.53
Chlordane,oxy-	PG/LITER		246.98	211.95
Chlordane,gamma (trans)	PG/LITER	180.52	7360.32	12629.86
2,4'-DDE	PG/LITER	35.88	185.13	144.33
Endosulfan, alpha	PG/LITER			
Chlordane,alpha (cis)	PG/LITER	183.12	6907.87	10778.45
Nonachlor, trans-	PG/LITER	157.59	5388.01	6727.56
4,4'-DDE	PG/LITER	194.27	4689.91	2986.36
Dieldrin	PG/LITER	1581.19	2218.03	1558.85
2,4'-DDD	PG/LITER	75.22	848.21	836.97
Endrin	PG/LITER			
Endosulfan, beta	PG/LITER	251.73	580.47	6805.92
4,4'-DDD	PG/LITER	147.25	1900.57	1965.21
2,4'-DDT	PG/LITER			2249.56
Nonachlor, cis-	PG/LITER		1009.97	1305.20
Endrin aldehyde	PG/LITER	15.98		
Endosulfan sulfate	PG/LITER		356.85	117.81
4,4'-DDT	PG/LITER	292.19	19675.40	10817.16
Endrin ketone	PG/LITER			
Methoxychlor	PG/LITER			
Mirex	PG/LITER	BC	BC	BC

APPENDIX F.1
POTW EVENT #1 DIOXIN/FURAN DATA

		Passaic Valley	Bergen County	Linden Roselle
SAMP_ID		1GLC00013	1GLC00014	1GLC00015
LAB_SAMP_ID		48616-13-02	48616-13-04	48616-13-05
FRACTION		SUSPENDED	SUSPENDED	SUSPENDED
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE			
1,2,3,7,8-PeCDD	PG/SAMPLE			
1,2,3,4,7,8-HxCDD	PG/SAMPLE			
1,2,3,6,7,8-HxCDD	PG/SAMPLE			
1,2,3,7,8,9-HxCDD	PG/SAMPLE	1.35		
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE		12.15	
OCDD	PG/SAMPLE	58.54	114.45	
2,3,7,8-TCDF	PG/SAMPLE		1.51	
1,2,3,7,8-PeCDF	PG/SAMPLE			
2,3,4,7,8-PeCDF	PG/SAMPLE			
1,2,3,4,7,8-HxCDF	PG/SAMPLE			
1,2,3,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,7,8,9-HxCDF	PG/SAMPLE	1.91		
2,3,4,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE	7.15	10.4	
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE			
OCDF	PG/SAMPLE	21.44	22.45	

		Joint Meeting	Rahway Valley	Middlesex County
SAMP_ID		1GLC00016	1GLC00017	1GLC00018
LAB_SAMP_ID		48616-13-06	48616-13-07	48616-13-08
FRACTION		SUSPENDED	SUSPENDED	SUSPENDED
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE	1.54		
1,2,3,7,8-PeCDD	PG/SAMPLE	1.16		0.94
1,2,3,4,7,8-HxCDD	PG/SAMPLE			
1,2,3,6,7,8-HxCDD	PG/SAMPLE			
1,2,3,7,8,9-HxCDD	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE			
OCDD	PG/SAMPLE	67.95		
2,3,7,8-TCDF	PG/SAMPLE	1.92	1.48	1.34
1,2,3,7,8-PeCDF	PG/SAMPLE			
2,3,4,7,8-PeCDF	PG/SAMPLE	1.25	1.06	0.67
1,2,3,4,7,8-HxCDF	PG/SAMPLE			
1,2,3,6,7,8-HxCDF	PG/SAMPLE		1.23	
1,2,3,7,8,9-HxCDF	PG/SAMPLE			
2,3,4,6,7,8-HxCDF	PG/SAMPLE		2.58	
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE	5.62	9.35	
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE			
OCDF	PG/SAMPLE			3.79

		Passaic Valley	Bergen County	Linden Roselle
SAMP_ID		1GLC00013	1GLC00014	1GLC00015
LAB_SAMP_ID		48616-15-02	48616-15-04	48616-15-05
FRACTION		DISS	DISS	DISS
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE			
1,2,3,7,8-PeCDD	PG/SAMPLE			
1,2,3,4,7,8-HxCDD	PG/SAMPLE			
1,2,3,6,7,8-HxCDD	PG/SAMPLE			
1,2,3,7,8,9-HxCDD	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE			
OCDD	PG/SAMPLE			
2,3,7,8-TCDF	PG/SAMPLE			
1,2,3,7,8-PeCDF	PG/SAMPLE			
2,3,4,7,8-PeCDF	PG/SAMPLE			
1,2,3,4,7,8-HxCDF	PG/SAMPLE			0.61
1,2,3,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,7,8,9-HxCDF	PG/SAMPLE			
2,3,4,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE			
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE			
OCDF	PG/SAMPLE	8.97	8.03	

		Joint Meeting	Rahway Valley	Middlesex County
SAMP_ID		1GLC00016	1GLC00017	1GLC00018
LAB_SAMP_ID		48616-15-06	48616-15-07	48616-15-08
FRACTION		DISS	DISS	DISS
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE			
1,2,3,7,8-PeCDD	PG/SAMPLE			
1,2,3,4,7,8-HxCDD	PG/SAMPLE			
1,2,3,6,7,8-HxCDD	PG/SAMPLE			
1,2,3,7,8,9-HxCDD	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE			
OCDD	PG/SAMPLE			
2,3,7,8-TCDF	PG/SAMPLE			
1,2,3,7,8-PeCDF	PG/SAMPLE			
2,3,4,7,8-PeCDF	PG/SAMPLE			
1,2,3,4,7,8-HxCDF	PG/SAMPLE	0.72	0.94	
1,2,3,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,7,8,9-HxCDF	PG/SAMPLE			
2,3,4,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE			
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE			
OCDF	PG/SAMPLE			

APPENDIX F.2
POTW EVENT #2 DIOXIN/FURAN DATA

		Passaic Valley	Bergen County	North Bergen-Central
SAMP_ID		1GLC00030	1GLC00031	1GLC00032
LAB_SAMP_ID		48616-79-02	48616-79-03	48616-79-04
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE			
1,2,3,7,8-PeCDD	PG/SAMPLE			
1,2,3,4,7,8-HxCDD	PG/SAMPLE			
1,2,3,6,7,8-HxCDD	PG/SAMPLE			2.11
1,2,3,7,8,9-HxCDD	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE	2.62		26.23
OCDD	PG/SAMPLE	22.59	37.70	145.05
2,3,7,8-TCDF	PG/SAMPLE			
1,2,3,7,8-PeCDF	PG/SAMPLE			
2,3,4,7,8-PeCDF	PG/SAMPLE			
1,2,3,4,7,8-HxCDF	PG/SAMPLE			
1,2,3,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,7,8,9-HxCDF	PG/SAMPLE			
2,3,4,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE			4.06
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE			
OCDF	PG/SAMPLE	5.88		18.22

		Secaucus	North Bergen-Woodcliff	Hoboken
SAMP_ID		1GLC00033	1GLC00034	1GLC00035
LAB_SAMP_ID		48616-79-05	48616-79-06	48616-79-07
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE			
1,2,3,7,8-PeCDD	PG/SAMPLE			
1,2,3,4,7,8-HxCDD	PG/SAMPLE			
1,2,3,6,7,8-HxCDD	PG/SAMPLE			
1,2,3,7,8,9-HxCDD	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE	3.99	4.24	5.53
OCDD	PG/SAMPLE	35.84	42.11	35.72
2,3,7,8-TCDF	PG/SAMPLE			
1,2,3,7,8-PeCDF	PG/SAMPLE			
2,3,4,7,8-PeCDF	PG/SAMPLE			
1,2,3,4,7,8-HxCDF	PG/SAMPLE			
1,2,3,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,7,8,9-HxCDF	PG/SAMPLE			
2,3,4,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE	2.00	2.64	3.54
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE			
OCDF	PG/SAMPLE	4.59	6.28	6.07

		West New York	Joint Meeting	Linden Roselle
SAMP_ID		1GLC00036	1GLC00038	1GLC00039
LAB_SAMP_ID		48616-79-08	48616-79-09	48616-79-10
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE			
1,2,3,7,8-PeCDD	PG/SAMPLE			
1,2,3,4,7,8-HxCDD	PG/SAMPLE			
1,2,3,6,7,8-HxCDD	PG/SAMPLE			
1,2,3,7,8,9-HxCDD	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE	8.42	3.75	5.91
OCDD	PG/SAMPLE	76.49	28.66	56.38
2,3,7,8-TCDF	PG/SAMPLE			
1,2,3,7,8-PeCDF	PG/SAMPLE			
2,3,4,7,8-PeCDF	PG/SAMPLE			
1,2,3,4,7,8-HxCDF	PG/SAMPLE		1.08	0.76
1,2,3,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,7,8,9-HxCDF	PG/SAMPLE			
2,3,4,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE	3.33	2.19	2.34
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE			
OCDF	PG/SAMPLE	8.25	3.60	4.63

		Rahway Valley	Middlesex County
SAMP_ID		1GLC00040	1GLC00041
LAB_SAMP_ID		48616-79-11	48616-79-12
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE		
1,2,3,7,8-PeCDD	PG/SAMPLE		
1,2,3,4,7,8-HxCDD	PG/SAMPLE		
1,2,3,6,7,8-HxCDD	PG/SAMPLE	2.26	
1,2,3,7,8,9-HxCDD	PG/SAMPLE		
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE	27.63	5.27
OCDD	PG/SAMPLE	130.32	47.67
2,3,7,8-TCDF	PG/SAMPLE	2.53	2.16
1,2,3,7,8-PeCDF	PG/SAMPLE		
2,3,4,7,8-PeCDF	PG/SAMPLE	2.07	
1,2,3,4,7,8-HxCDF	PG/SAMPLE		
1,2,3,6,7,8-HxCDF	PG/SAMPLE	4.24	
1,2,3,7,8,9-HxCDF	PG/SAMPLE		
2,3,4,6,7,8-HxCDF	PG/SAMPLE	17.01	
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE	59.31	2.64
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE	14.32	
OCDF	PG/SAMPLE	142.96	5.04

APPENDIX F.3
POTW EVENT #4 DIOXIN/FURAN DATA

		North Bergen-Central	North Bergen-Woodcliff	Edgewater
SAMP_ID		1GLC00092	1GLC00093	1GLC00094
LAB_SAMP_ID		49023-01-02	49023-01-03	49023-01-04
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE			
1,2,3,7,8-PeCDD	PG/SAMPLE			
1,2,3,4,7,8-HxCDD	PG/SAMPLE			
1,2,3,6,7,8-HxCDD	PG/SAMPLE	4.56	1.23	
1,2,3,7,8,9-HxCDD	PG/SAMPLE	2.48	0.43	
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE	30.68	20.05	
OCDD	PG/SAMPLE	217.29	190.87	
2,3,7,8-TCDF	PG/SAMPLE	2.07		
1,2,3,7,8-PeCDF	PG/SAMPLE			
2,3,4,7,8-PeCDF	PG/SAMPLE			
1,2,3,4,7,8-HxCDF	PG/SAMPLE			
1,2,3,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,7,8,9-HxCDF	PG/SAMPLE			
2,3,4,6,7,8-HxCDF	PG/SAMPLE			
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE		14.53	
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE			
OCDF	PG/SAMPLE	22.52	57.01	9.90

		West New York	Secaucus
SAMP_ID		1GLC00095	1GLC00096
LAB_SAMP_ID		49023-01-05	49023-01-06
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/SAMPLE		
1,2,3,7,8-PeCDD	PG/SAMPLE		
1,2,3,4,7,8-HxCDD	PG/SAMPLE		
1,2,3,6,7,8-HxCDD	PG/SAMPLE		
1,2,3,7,8,9-HxCDD	PG/SAMPLE		
1,2,3,4,6,7,8-HpCDD	PG/SAMPLE		
OCDD	PG/SAMPLE	57.65	
2,3,7,8-TCDF	PG/SAMPLE		
1,2,3,7,8-PeCDF	PG/SAMPLE		
2,3,4,7,8-PeCDF	PG/SAMPLE		
1,2,3,4,7,8-HxCDF	PG/SAMPLE		
1,2,3,6,7,8-HxCDF	PG/SAMPLE		
1,2,3,7,8,9-HxCDF	PG/SAMPLE		
2,3,4,6,7,8-HxCDF	PG/SAMPLE		
1,2,3,4,6,7,8-HpCDF	PG/SAMPLE		
1,2,3,4,7,8,9-HpCDF	PG/SAMPLE		
OCDF	PG/SAMPLE	12.55	

APPENDIX F.4
CSO/SWO EVENT #2 DIOXIN/FURAN DATA

		Henley Road (Hackensack River)	West Side Road	CCI
SAMP_ID		1GLC00120SA	1GLC00114SA	1GLC00117SA
LAB_SAMP_ID		49023-20-02	49023-20-03	49023-20-04
FRACTION		TOTAL	TOTAL	TOTAL
REEXTRACT				
EXTRACT_DATE		13-Nov-02	13-Nov-02	13-Nov-02
SAMP_WGT_VOL		2.630	2.640	2.640
SAMP_WGT_VOL_UNIT		L	L	L
QC_CODE		SA	SA	SA
REP		1	1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER	15.44	1.45	0.53
1,2,3,7,8-PeCDD	PG/LITER	3.95	4.15	
1,2,3,4,7,8-HxCDD	PG/LITER	7.08	8.81	0.85
1,2,3,6,7,8-HxCDD	PG/LITER	19.49	43.46	0.13
1,2,3,7,8,9-HxCDD	PG/LITER	19.68	29.14	1.74
1,2,3,4,6,7,8-HpCDD	PG/LITER	612.83	1293.33	42.50
OCDD	PG/LITER	5925.68	13155.91	824.78
2,3,7,8-TCDF	PG/LITER	14.80	4.16	
1,2,3,7,8-PeCDF	PG/LITER	119.50	2.18	8.01
2,3,4,7,8-PeCDF	PG/LITER	55.21	3.83	5.72
1,2,3,4,7,8-HxCDF	PG/LITER	294.46	13.84	31.18
1,2,3,6,7,8-HxCDF	PG/LITER	267.57	8.27	35.22
1,2,3,7,8,9-HxCDF	PG/LITER	16.26	0.28	1.36
2,3,4,6,7,8-HxCDF	PG/LITER	105.44	6.23	13.08
1,2,3,4,6,7,8-HpCDF	PG/LITER	809.53	185.48	158.19
1,2,3,4,7,8,9-HpCDF	PG/LITER	100.51	9.30	22.61
OCDF	PG/LITER	720.86	692.31	114.51

		Ivy Street (Passaic River)	Smith Marina	Livingston and Front Streets
SAMP_ID		1GLC00106SA	1GLC00118SA	1GLC00109SA
LAB_SAMP_ID		49023-20-05	49023-20-08	49023-20-09
FRACTION		TOTAL	TOTAL	TOTAL
REEXTRACT				
EXTRACT_DATE		13-Nov-02	13-Nov-02	13-Nov-02
SAMP_WGT_VOL		2.650	2.620	2.640
SAMP_WGT_VOL_UNIT		L	L	L
QC_CODE		SA	SA	SA
REP		1	1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER		0.0305	
1,2,3,7,8-PeCDD	PG/LITER	0.15		
1,2,3,4,7,8-HxCDD	PG/LITER	2.08	0.92	1.44
1,2,3,6,7,8-HxCDD	PG/LITER	4.54	1.51	3.17
1,2,3,7,8,9-HxCDD	PG/LITER	4.68	2.61	3.15
1,2,3,4,6,7,8-HpCDD	PG/LITER	163.39	62.90	110.53
OCDD	PG/LITER	1263.77	1376.99	1696.74
2,3,7,8-TCDF	PG/LITER		0.44	0.17
1,2,3,7,8-PeCDF	PG/LITER			
2,3,4,7,8-PeCDF	PG/LITER			
1,2,3,4,7,8-HxCDF	PG/LITER	3.11	3.95	1.77
1,2,3,6,7,8-HxCDF	PG/LITER	2.02	1.79	1.19
1,2,3,7,8,9-HxCDF	PG/LITER			
2,3,4,6,7,8-HxCDF	PG/LITER	1.19	1.77	0.97
1,2,3,4,6,7,8-HpCDF	PG/LITER	61.43	33.13	30.75
1,2,3,4,7,8,9-HpCDF	PG/LITER	3.61	1.47	1.77
OCDF	PG/LITER	130.70	73.48	58.41

		Court Street (Hackensack River)	Christie Street (Hackensack River)	Blanchard Street (Passaic River)
SAMP_ID		1GLC00108SA	1GLC00107SA	1GLC00116SA
LAB_SAMP_ID		49023-20-10	49023-20-11	49023-20-06
FRACTION		TOTAL	TOTAL	TOTAL
REEXTRACT				
EXTRACT_DATE		13-Nov-02	13-Nov-02	13-Nov-02
SAMP_WGT_VOL		2.610	2.640	2.620
SAMP_WGT_VOL_UNIT		L	L	L
QC_CODE		SA	SA	SA
REP		1	1	1
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER		0.0076	9.39
1,2,3,7,8-PeCDD	PG/LITER	0.52	0.83	1.69
1,2,3,4,7,8-HxCDD	PG/LITER	1.30	1.11	3.27
1,2,3,6,7,8-HxCDD	PG/LITER	2.69	0.36	9.06
1,2,3,7,8,9-HxCDD	PG/LITER	3.77	1.83	8.31
1,2,3,4,6,7,8-HpCDD	PG/LITER	94.56	53.15	258.56
OCDD	PG/LITER	967.16	725.27	2734.61
2,3,7,8-TCDF	PG/LITER		1.77	3.08
1,2,3,7,8-PeCDF	PG/LITER		7.56	2.53
2,3,4,7,8-PeCDF	PG/LITER		5.82	4.39
1,2,3,4,7,8-HxCDF	PG/LITER	1.81	18.55	26.52
1,2,3,6,7,8-HxCDF	PG/LITER	1.64	22.40	8.86
1,2,3,7,8,9-HxCDF	PG/LITER		0.83	0.18
2,3,4,6,7,8-HxCDF	PG/LITER	0.82	10.29	4.59
1,2,3,4,6,7,8-HpCDF	PG/LITER	39.00	68.43	166.48
1,2,3,4,7,8,9-HpCDF	PG/LITER	2.66	8.18	6.66
OCDF	PG/LITER	86.36	65.61	465.31

		Peripheral Ditch (Newark Air)
SAMP_ID		1GLC00115A
LAB_SAMP_ID		49023-20-07
FRACTION		TOTAL
REEXTRACT		
EXTRACT_DATE		13-Nov-02
SAMP_WGT_VOL		2.610
SAMP_WGT_VOL_UNIT		L
QC_CODE		SA
REP		1
PARAM_NAME	**UNIT**	**RESULT**
2,3,7,8-TCDD	PG/LITER	
1,2,3,7,8-PeCDD	PG/LITER	
1,2,3,4,7,8-HxCDD	PG/LITER	
1,2,3,6,7,8-HxCDD	PG/LITER	
1,2,3,7,8,9-HxCDD	PG/LITER	
1,2,3,4,6,7,8-HpCDD	PG/LITER	
OCDD	PG/LITER	9.38
2,3,7,8-TCDF	PG/LITER	0.24
1,2,3,7,8-PeCDF	PG/LITER	0.78
2,3,4,7,8-PeCDF	PG/LITER	1.74
1,2,3,4,7,8-HxCDF	PG/LITER	2.09
1,2,3,6,7,8-HxCDF	PG/LITER	1.34
1,2,3,7,8,9-HxCDF	PG/LITER	
2,3,4,6,7,8-HxCDF	PG/LITER	0.79
1,2,3,4,6,7,8-HpCDF	PG/LITER	2.47
1,2,3,4,7,8,9-HpCDF	PG/LITER	0.79
OCDF	PG/LITER	1.81

APPENDIX F.5
CSO/SWO EVENT #3 DIOXIN/FURAN DATA

		Rahway Outfall 003	Ivy Street (Passaic River)	Christie Street (Hackensack River)
SAMP_ID		1GLC00131SA	1GLC00132SA	1GLC00133SA
LAB_SAMP_ID		49023-32-04	49023-32-05	49023-32-06
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER	0.27	0.35	
1,2,3,7,8-PeCDD	PG/LITER		1.23	1.59
1,2,3,4,7,8-HxCDD	PG/LITER	0.33	2.43	2.34
1,2,3,6,7,8-HxCDD	PG/LITER	1.21	6.38	3.83
1,2,3,7,8,9-HxCDD	PG/LITER	0.93	6.16	3.58
1,2,3,4,6,7,8-HpCDD	PG/LITER	23.16	179.54	84.81
OCDD	PG/LITER	372.54	1604.09	865.74
2,3,7,8-TCDF	PG/LITER	0.53	0.77	1.36
1,2,3,7,8-PeCDF	PG/LITER	0.59	0.75	1.52
2,3,4,7,8-PeCDF	PG/LITER	0.32	0.74	1.82
1,2,3,4,7,8-HxCDF	PG/LITER	2.32	6.55	3.60
1,2,3,6,7,8-HxCDF	PG/LITER	1.26	3.25	3.05
1,2,3,7,8,9-HxCDF	PG/LITER			1.82
2,3,4,6,7,8-HxCDF	PG/LITER	0.71	2.05	2.84
1,2,3,4,6,7,8-HpCDF	PG/LITER	7.32	56.97	26.36
1,2,3,4,7,8,9-HpCDF	PG/LITER		3.02	2.88
OCDF	PG/LITER	20.01	95.28	58.66

		Court Street (Hackensack River)	Elm Street	Anderson Street
SAMP_ID		1GLC00134SA	1GLC00138SA	1GLC00139SA
LAB_SAMP_ID		49023-32-07	49023-32-08	49023-32-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER		0.21	
1,2,3,7,8-PeCDD	PG/LITER	2.03	0.83	0.86
1,2,3,4,7,8-HxCDD	PG/LITER	3.14	1.53	1.81
1,2,3,6,7,8-HxCDD	PG/LITER	6.46	2.92	4.41
1,2,3,7,8,9-HxCDD	PG/LITER	6.81	2.63	3.78
1,2,3,4,6,7,8-HpCDD	PG/LITER	175.84	73.28	105.43
OCDD	PG/LITER	1600.64	662.37	902.48
2,3,7,8-TCDF	PG/LITER	6.53	0.52	0.94
1,2,3,7,8-PeCDF	PG/LITER	2.17		0.68
2,3,4,7,8-PeCDF	PG/LITER	3.43	0.68	0.95
1,2,3,4,7,8-HxCDF	PG/LITER	5.02	1.96	2.39
1,2,3,6,7,8-HxCDF	PG/LITER	4.50	1.49	1.77
1,2,3,7,8,9-HxCDF	PG/LITER	1.06		
2,3,4,6,7,8-HxCDF	PG/LITER	3.94	1.45	1.56
1,2,3,4,6,7,8-HpCDF	PG/LITER	54.75	18.41	25.41
1,2,3,4,7,8,9-HpCDF	PG/LITER	4.82	1.98	2.14
OCDF	PG/LITER	99.37	48.20	61.54

		Peripheral Ditch (Newark Air)	CCI	Henley Road (Hackensack River)
SAMP_ID		1GLC00141SA	1GLC00143SA	1GLC00146SA
LAB_SAMP_ID		49023-32-10	49023-32-12	49023-32-14
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER		0.55	0.45
1,2,3,7,8-PeCDD	PG/LITER		1.38	1.95
1,2,3,4,7,8-HxCDD	PG/LITER		2.81	3.82
1,2,3,6,7,8-HxCDD	PG/LITER		6.42	9.05
1,2,3,7,8,9-HxCDD	PG/LITER		6.21	9.77
1,2,3,4,6,7,8-HpCDD	PG/LITER	4.14	166.70	243.25
OCDD	PG/LITER	40.60	1847.50	1667.86
2,3,7,8-TCDF	PG/LITER		2.28	1.25
1,2,3,7,8-PeCDF	PG/LITER		0.86	1.63
2,3,4,7,8-PeCDF	PG/LITER		1.45	1.15
1,2,3,4,7,8-HxCDF	PG/LITER	0.93	4.23	3.44
1,2,3,6,7,8-HxCDF	PG/LITER	0.63	3.03	3.24
1,2,3,7,8,9-HxCDF	PG/LITER	0.42		0.20
2,3,4,6,7,8-HxCDF	PG/LITER	0.59	2.93	3.01
1,2,3,4,6,7,8-HpCDF	PG/LITER	1.75	49.69	62.92
1,2,3,4,7,8,9-HpCDF	PG/LITER	0.77	4.16	3.43
OCDF	PG/LITER	2.97	115.82	121.78

		Blanchard Street (Passaic River)	Smith Marina
SAMP_ID		1GLC00142SA	1GLC00144SA
LAB_SAMP_ID		49023-32-11	49023-32-13
FRACTION		TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER	8.18	
1,2,3,7,8-PeCDD	PG/LITER	0.00	
1,2,3,4,7,8-HxCDD	PG/LITER	1.91	3.32
1,2,3,6,7,8-HxCDD	PG/LITER	7.69	16.19
1,2,3,7,8,9-HxCDD	PG/LITER	5.94	10.61
1,2,3,4,6,7,8-HpCDD	PG/LITER	172.42	357.19
OCDD	PG/LITER	1501.39	4169.86
2,3,7,8-TCDF	PG/LITER	7.34	4.16
1,2,3,7,8-PeCDF	PG/LITER		1.37
2,3,4,7,8-PeCDF	PG/LITER		2.20
1,2,3,4,7,8-HxCDF	PG/LITER	12.36	7.62
1,2,3,6,7,8-HxCDF	PG/LITER	4.73	6.35
1,2,3,7,8,9-HxCDF	PG/LITER	0.00	
2,3,4,6,7,8-HxCDF	PG/LITER	3.87	4.95
1,2,3,4,6,7,8-HpCDF	PG/LITER	73.10	106.85
1,2,3,4,7,8,9-HpCDF	PG/LITER	3.79	7.08
OCDF	PG/LITER	120.41	336.18

APPENDIX F.6
CSO/SWO EVENT #4 DIOXIN/FURAN DATA

		Rahway Outfall 003	Ivy Street (Passaic River)	Front Street and Bay Way
SAMP_ID		1GLC00146A	1GLC00147A	1GLC00152A
LAB_SAMP_ID		49023-44-05	49023-44-07	49023-44-09
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER	0.33	1.32	0.56
1,2,3,7,8-PeCDD	PG/LITER		2.13	1.68
1,2,3,4,7,8-HxCDD	PG/LITER	0.19	4.67	2.67
1,2,3,6,7,8-HxCDD	PG/LITER	1.80	10.76	7.61
1,2,3,7,8,9-HxCDD	PG/LITER	0.95	10.96	7.13
1,2,3,4,6,7,8-HpCDD	PG/LITER	43.52	281.40	243.08
OCDD	PG/LITER	654.00	2305.27	3803.73
2,3,7,8-TCDF	PG/LITER	0.80	1.76	2.58
1,2,3,7,8-PeCDF	PG/LITER		1.98	1.75
2,3,4,7,8-PeCDF	PG/LITER	0.59	3.35	2.39
1,2,3,4,7,8-HxCDF	PG/LITER	2.42	23.72	9.23
1,2,3,6,7,8-HxCDF	PG/LITER	0.80	7.96	4.68
1,2,3,7,8,9-HxCDF	PG/LITER		0.26	0.26
2,3,4,6,7,8-HxCDF	PG/LITER	1.37	5.42	3.20
1,2,3,4,6,7,8-HpCDF	PG/LITER	13.83	173.23	92.72
1,2,3,4,7,8,9-HpCDF	PG/LITER	2.07	6.73	4.16
OCDF	PG/LITER	39.33	297.18	182.11

		Peripheral Ditch (Newark Air)	CCI	Smith Marina
SAMP_ID		1GLC00156A	1GLC00158A	1GLC00159A
LAB_SAMP_ID		49023-44-08	49023-44-06	49023-44-04
FRACTION		TOTAL	TOTAL	TOTAL
PARAM_NAME	**UNIT**	**RESULT**	**RESULT**	**RESULT**
2,3,7,8-TCDD	PG/LITER		0.73	0.29
1,2,3,7,8-PeCDD	PG/LITER		1.71	0.81
1,2,3,4,7,8-HxCDD	PG/LITER		3.05	2.02
1,2,3,6,7,8-HxCDD	PG/LITER	1.34	8.32	4.10
1,2,3,7,8,9-HxCDD	PG/LITER		8.32	4.88
1,2,3,4,6,7,8-HpCDD	PG/LITER	17.70	216.99	95.77
OCDD	PG/LITER	104.82	2301.66	1083.79
2,3,7,8-TCDF	PG/LITER		1.75	0.90
1,2,3,7,8-PeCDF	PG/LITER		1.36	0.85
2,3,4,7,8-PeCDF	PG/LITER		2.52	1.36
1,2,3,4,7,8-HxCDF	PG/LITER	1.03	7.31	4.89
1,2,3,6,7,8-HxCDF	PG/LITER		4.90	3.31
1,2,3,7,8,9-HxCDF	PG/LITER			1.46
2,3,4,6,7,8-HxCDF	PG/LITER		3.97	2.95
1,2,3,4,6,7,8-HpCDF	PG/LITER	2.97	88.66	41.01
1,2,3,4,7,8,9-HpCDF	PG/LITER		5.29	3.76
OCDF	PG/LITER	8.00	183.76	115.04

APPENDIX G
QA ISSUE: NJTRWP POTW METALS BLANKS AND DETECTION LIMITS DRAFT - MAY 15, 2003

Introduction: this QA Issue report summarizes and discusses the significance of blank contamination and analytical detection limits in relation to the NJTRWP Phase 1 POTW effluent concentrations of the metals Cd, Hg, methyl-Hg, and Pb. This discussion is general in nature and focuses on significant observations made on the Study I-G POTW effluent data. No Equipment Blanks for metals were collected in association with the POTW effluent samples.

Cadmium (Figure 1)

Total-Cd and Dissolved-Cd Method Detection Limits (MDLs) ranged between 0.8 and 3.1 ng/L, with a mean of 1.93 ng/L, and a median of 2.05 ng/L (n=6). Comparison of the Overall POTW mean Total-Cd and Dissolved-Cd concentrations with the mean MDL suggests that reliable sample data were obtained.

Of 4 Field Blanks collected, 3 had Total-Cd levels that exceeded the MDL (mean = 2.60 ng/L). Comparison of the Overall POTW mean Total-Cd concentration (130.9 ng/L) with the mean Field Blank data suggest little impact of blank contamination on the sample data.

Of 4 Field Blanks collected, only 1 had a Dissolved-Cd level (2.4 ng/L) that exceeded the MDL. Comparison of the Overall POTW mean Dissolved-Cd concentration (105.0 ng/L) with the Field Blank data suggest little impact of blank contamination on the sample data.

Lead (Figure 2)

Total-Pb and Dissolved-Pb Method Detection Limits (MDLs) ranged between 3.4 and 16 ng/L, with a mean and median of 8.0 ng/L (n=6). Comparison of the Overall POTW mean Total-Pb and Dissolved-Pb concentrations with the mean MDL suggests that reliable sample data were obtained.

Of 4 Field Blanks collected, 3 had Total-Pb levels that exceeded the MDL (mean = 43.3 ng/L; median = 15.0 ng/L). Comparison of the Overall POTW mean Total-Pb concentration (1824 ng/L) with the mean Field Blank data suggest little impact of blank contamination on the sample data.

Of 4 Field Blanks collected, 2 had Dissolved-Pb levels that exceeded the MDL (mean = 21.5 ng/L). Comparison of the Overall POTW mean Dissolved-Pb concentration (614 ng/L) with the mean Field Blank data suggest little impact of blank contamination on the sample data.

Mercury (Figure 3)

Total-Hg and Dissolved-Hg Method Detection Limits (MDLs) ranged between 0.01 and 0.06 ng/L, with a mean of 0.025 ng/L, and a median of 0.020 ng/L (n=6). Comparison of the Overall POTW mean Total-Hg and Dissolved-Hg concentrations with the mean MDL suggests that reliable sample data were obtained.

All 4 Field Blanks collected had Total-Hg levels that exceeded the MDL (mean = 2.42 ng/L; median = 0.57 ng/L). Comparison of the Overall POTW mean Total-Hg concentration (30.1 ng/L) with the mean Field Blank data suggests little impact of blank contamination on the sample data.

All 4 Field Blanks collected had Dissolved-Hg levels that exceeded the MDL (mean = 0.44 ng/L; median = 0.43 ng/L). Comparison of the Overall POTW mean Dissolved-Hg concentration (5.98 ng/L) with the mean Field Blank data suggests little impact of blank contamination on the sample data.

Methyl-Mercury (Figure 4)

Only 1 POTW effluent survey (May 2001) was analyzed for Total-methyl-Hg (MDL = 0.001 ng/L), with an Overall POTW mean of 0.67 ng/L. Dissolved-methyl-Hg MDLs ranged between 0.001 and 0.023 ng/L, with a mean of 0.008 ng/L and median of 0.006 ng/L (n=6). Comparison of the Overall POTW mean Dissolved-methyl-Hg concentrations with the mean MDL suggests that reliable sample data were obtained.

Only 1 Field Blank was analyzed for Total-methyl-Hg (0.002 ng/L). Comparison of the Overall POTW mean Total-methyl-Hg concentration (0.67 ng/L) with the Field Blank data suggests little impact of blank contamination on the sample data.

Of the 4 Field Blanks analyzed for Dissolved-methyl-Hg, 2 reported a value above the MDL (mean = 0.005 ng/L). Comparison of the Overall POTW mean Dissolved-methyl-Hg concentration (0.27 ng/L) with the mean Field Blank data suggests little impact of blank contamination on the sample data.

Conclusions: based on the analyses conducted in this QA Issue Report, all of the POTW Overall mean metals sample data were significantly greater than the MDL. Note that individual sample results may not be consistent with this general conclusion.

Blank contamination impacts on sample data appear to be minimal for Total and Dissolved Cd, Total and Dissolved Pb, Total and Dissolved Hg, and Total and Dissolved methyl-Hg. Note that individual sample results may not be consistent with these general conclusions.

FIGURE 1

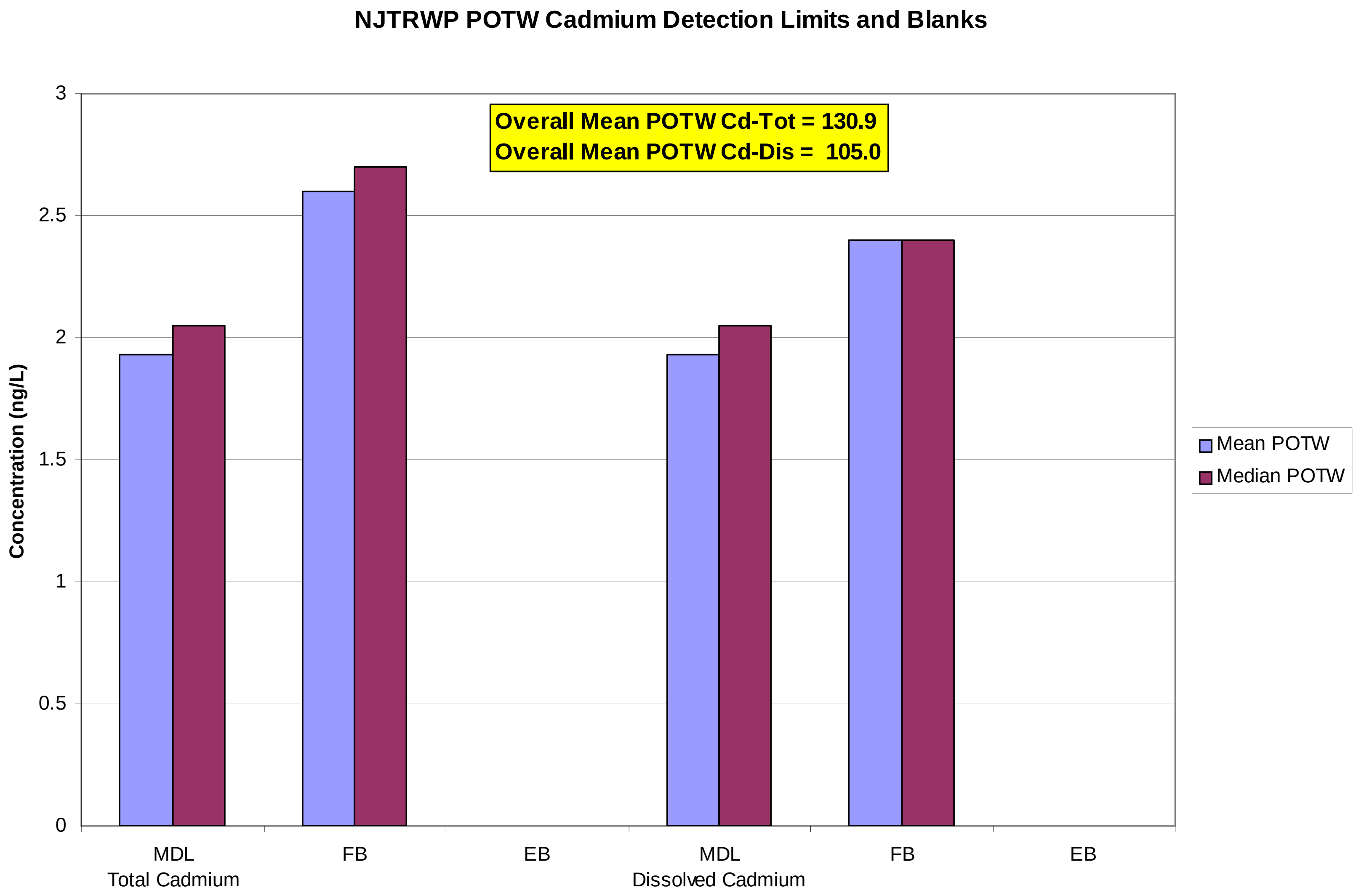

NJTRWP POTW Cadmium Detection Limits and Blanks
Overall Mean POTW Cd-Tot = 130.9
Overall Mean POTW Cd-Dis = 105.0
Concentration (ng/L)
0
0.5
1
1.5
2
2.5
3
MDL
Total Cadmium
FB
EB
MDL
Dissolved Cadmium
FB
EB
Mean POTW
Median POTW

FIGURE 2

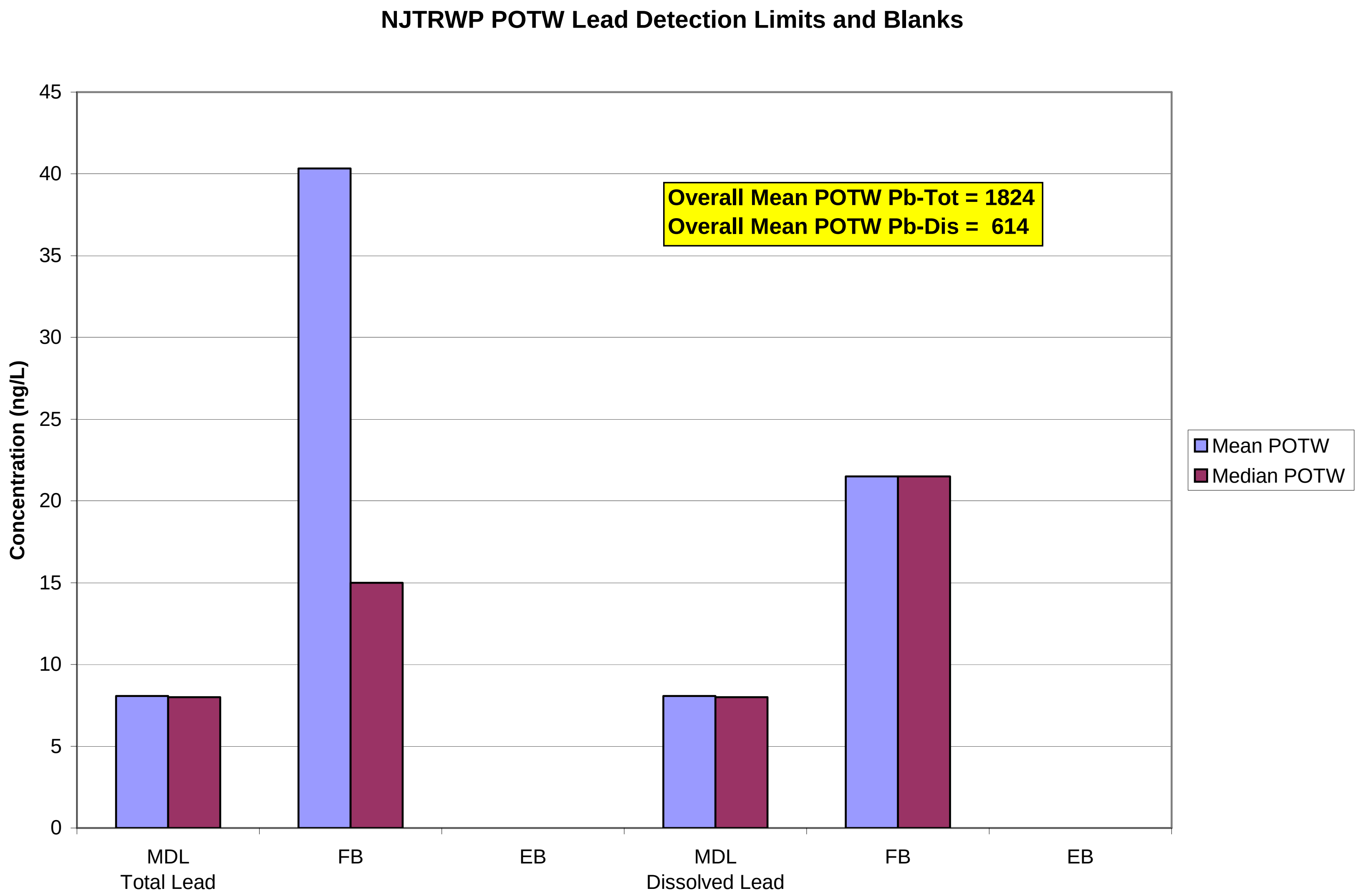

NJTRWP POTW Lead Detection Limits and Blanks
Concentration (ng/L)
45
40
35
30
25
20
15
10
5
0
Overall Mean POTW Pb-Tot = 1824
Overall Mean POTW Pb-Dis = 614
Mean POTW
Median POTW
MDL
Total Lead
FB
EB
MDL
Dissolved Lead
FB
EB

FIGURE 3

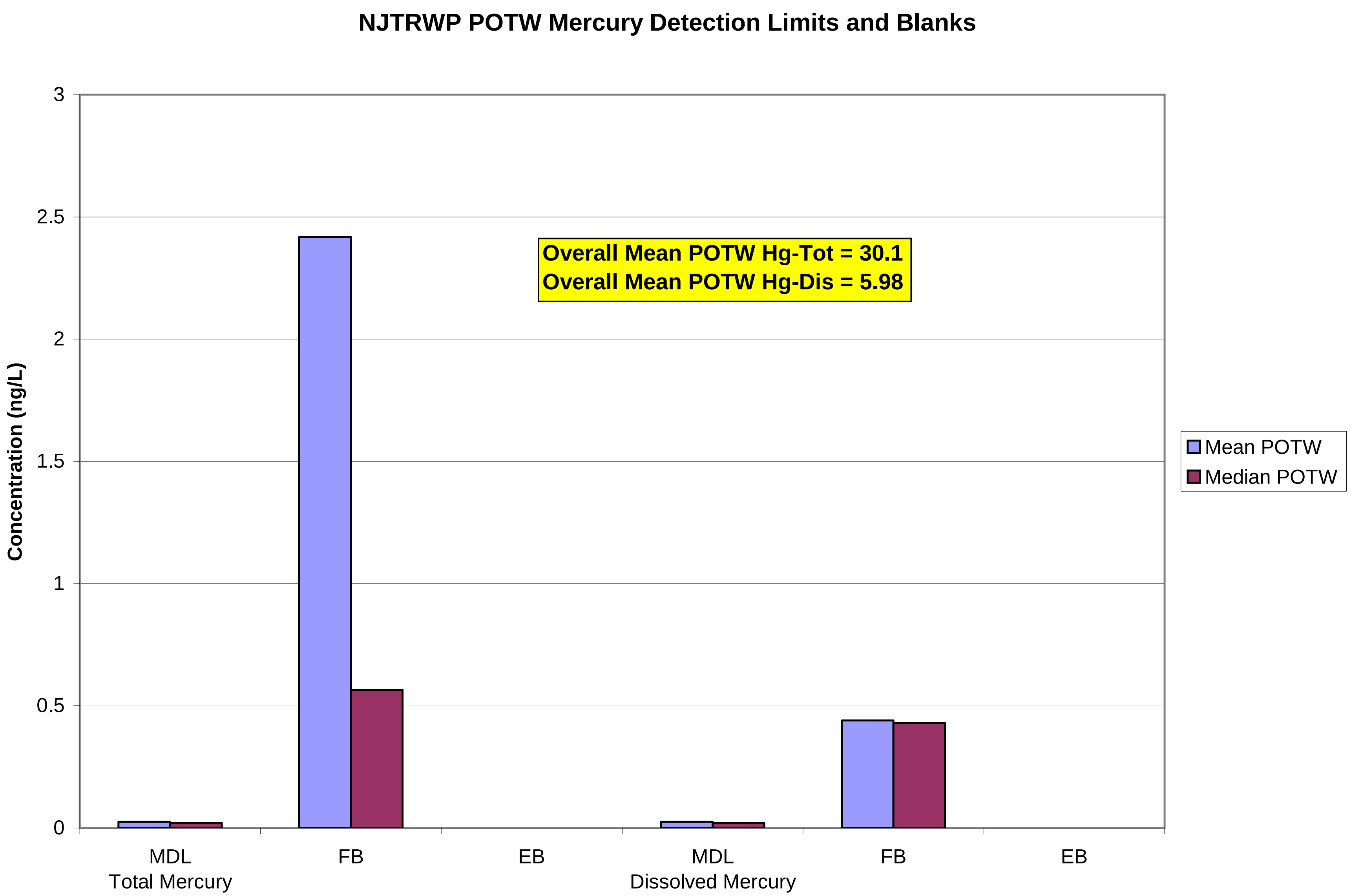
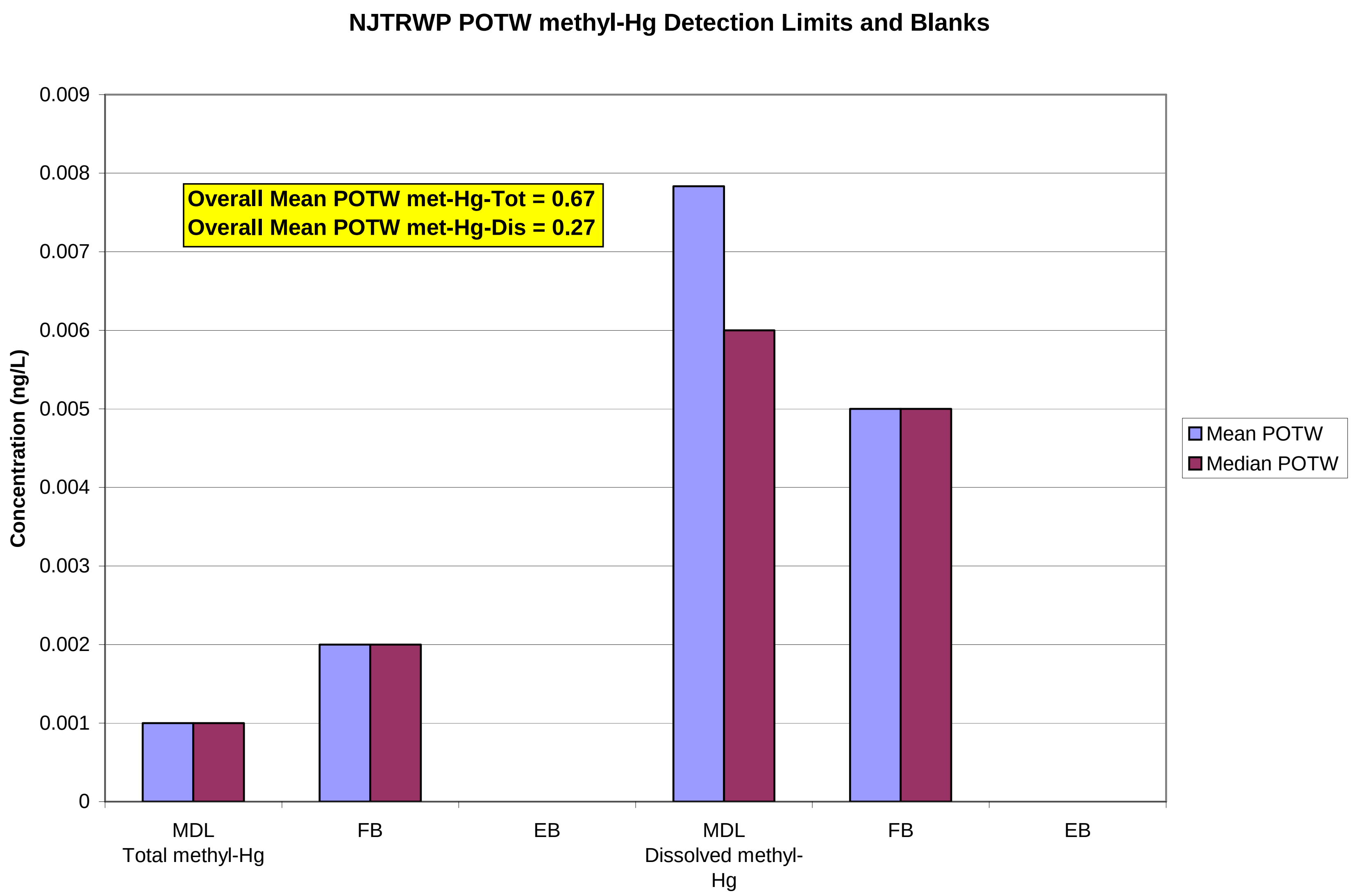

NJTRWP POTW Mercury Detection Limits and Blanks
Concentration (ng/L)
3
2.5
2
1.5
1
0.5
0
Overall Mean POTW Hg-Tot = 30.1
Overall Mean POTW Hg-Dis = 5.98
Mean POTW
Median POTW
MDL
FB
EB
MDL
FB
EB
Total Mercury
Dissolved Mercury

FIGURE 4



NJTRWP POTW methyl-Hg Detection Limits and Blanks
Overall Mean POTW met-Hg-Tot = 0.67
Overall Mean POTW met-Hg-Dis = 0.27
Concentration (ng/L)
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
MDL
Total methyl-Hg
FB
EB
MDL
Dissolved methyl-Hg
FB
EB
Mean POTW
Median POTW

APPENDIX H.1
POTW EVENTS #1-4 METALS DATA

DATE	SITE	CARP SAMPLE ID NUMBER	TOTAL LEAD (ng/L)	DISSOLVED LEAD (ng/L)
October 2/4, 2000	PVSC	1GLC00013SA	1420	397
Survey 2000-IGA	Middlesex County MUA	1GLC00018SA	504	105
	Bergen County MUA	1GLC00014SA	4770	1650
	Joint Meeting Essex-Union	1GLC00016SA	2350	558
	Rahway Valley MUA	1GLC00017SA	1270	789
	Linden-Roselle MUA	1GLC00015SA	1030	151
	Field Blank	1GLC00019FB	15	<4
December 11/15, 2000	PVSC	1GLC00030SA	2140	1120
Survey 2000-IGB	Middlesex County MUA	1GLC00041SA	730	206
	Bergen County MUA	1GLC00031SA	2350	1070
	Joint Meeting Essex-Union	1GLC00038SA	602	338
	Rahway Valley MUA	1GLC00040SA	1510	463
	Linden-Roselle MUA	1GLC00039SA	3070	207
	North Hudson - Hoboken, etc.	1GLC00035SA	2290	357
	North Bergen - Central	1GLC00032SA	4030	1380
	North Bergen - Woodcliff	1GLC00034SA	1580	752
	North Hudson - West New York	1GLC00036SA	2500	734
	Secaucus MUA	1GLC00033SA	2220	521
	Field Blank	1GLC00044SA	99	14
May 21/23, 2001	PVSC	1GLC00073SA	3260	582
Survey 2001-IGA	Middlesex County MUA	1GLC00074SA	982	399
	Bergen County MUA	1GLC00075SA	1270	741
	Rahway Valley MUA	1GLC00077SA	2010	877
	Linden-Roselle MUA	1GLC00078SA	1360	383
	Edgewater MUA	1GLC00079SA	1740	1010
	Field Blank	1GLC00081SA	7	29
August 6/9, 2001	PVSC	1GLC00085SA	1150	490
Survey 2001-Igb	Middlesex County MUA	1GLC00086SA	758	167
	Bergen County MUA	1GLC00087SA	1750	345
	Joint Meeting Essex-Union	1GLC00088SA	1410	403
	Rahway Valley MUA	1GLC00089SA	4620	1160
	Linden-Roselle MUA	1GLC00090SA	1360	286
	North Bergen - Central	1GLC00092SA	2870	621
	North Bergen - Woodcliff	1GLC00093SA	3000	1140
	Edgewater MUA	1GLC00094SA	1220	883
	North Hudson - West New York	1GLC00095SA	3190	976
	Secaucus MUA	1GLC00096SA	534	194
	Field Blank	1GLC00099SA	<3.4	<3.4

DATE	SITE	CARP SAMPLE ID NUMBER	TOTAL CADMIUM (ng/L)	DISSOLVED CADMIUM (ng/L)
October 2/4, 2000	PVSC	1GLC00013SA	255	225
Survey 2000-IGA	Middlesex County MUA	1GLC00018SA	47.3	28.1
	Bergen County MUA	1GLC00014SA	151	115
	Joint Meeting Essex-Union	1GLC00016SA	62.2	56
	Rahway Valley MUA	1GLC00017SA	268	257
	Linden-Roselle MUA	1GLC00015SA	127	15.7
	Field Blank	1GLC00019FB	3.1	2.4
December 11/15, 2000	PVSC	1GLC00030SA	430	468
Survey 2000-IGB	Middlesex County MUA	1GLC00041SA	63.5	36.3
	Bergen County MUA	1GLC00031SA	76.6	64.6
	Joint Meeting Essex-Union	1GLC00038SA	75.2	69.1
	Rahway Valley MUA	1GLC00040SA	68	36.5
	Linden-Roselle MUA	1GLC00039SA	145	14.6
	North Hudson - Hoboken, etc.	1GLC00035SA	44	27
	North Bergen - Central	1GLC00032SA	165	158
	North Bergen - Woodcliff	1GLC00034SA	136	107
	North Hudson - West New York	1GLC00036SA	254	157
	Secaucus MUA	1GLC00033SA	94.7	80.8
	Field Blank	1GLC00044SA	2	0.8
May 21/23, 2001	PVSC	1GLC00073SA	500	359
Survey 2001-IGA	Middlesex County MUA	1GLC00074SA	81.9	70.6
	Bergen County MUA	1GLC00075SA	86.3	79.8
	Rahway Valley MUA	1GLC00077SA	100	75.4
	Linden-Roselle MUA	1GLC00078SA	76.2	28.7
	Edgewater MUA	1GLC00079SA	37.3	34.7
	Field Blank	1GLC00081SA	2.7	<0.9
August 6/9, 2001	PVSC	1GLC00085SA	202	178
Survey 2001-Igb	Middlesex County MUA	1GLC00086SA	53.8	44.1
	Bergen County MUA	1GLC00087SA	27.2	46.8
	Joint Meeting Essex-Union	1GLC00088SA	184	144
	Rahway Valley MUA	1GLC00089SA	85.2	67.9
	Linden-Roselle MUA	1GLC00090SA	93.6	36.5
	North Bergen - Central	1GLC00092SA	85.1	59.5
	North Bergen - Woodcliff	1GLC00093SA	279	233
	Edgewater MUA	1GLC00094SA	32	34.1
	North Hudson - West New York	1GLC00095SA	122	89.9
	Secaucus MUA	1GLC00096SA	47.4	73.1
	Field Blank	1GLC00099SA	<3.1	<3.1

DATE	SITE	CARP SAMPLE ID NUMBER	TOTAL MERCURY (ng/L)	DISSOLVED MERCURY (ng/L)
October 2/4, 2000	PVSC	1GLC00013SA	52.1	16.4
Survey 2000-IGA	Middlesex County MUA	1GLC00018SA	9.53	2.75
	Bergen County MUA	1GLC00014SA	42.4	5.48
	Joint Meeting Essex-Union	1GLC00016SA	16.8	4.02
	Rahway Valley MUA	1GLC00017SA	7.82	4.56
	Linden-Roselle MUA	1GLC00015SA	12.4	3.81
	Field Blank	1GLC00019FB	0.46	0.33
December 11/15, 2000	PVSC	1GLC00030SA	48.6	16
Survey 2000-IGB	Middlesex County MUA	1GLC00041SA	6.23	4.72
	Bergen County MUA	1GLC00031SA	14.4	2.66
	Joint Meeting Essex-Union	1GLC00038SA	10.3	2.76
	Rahway Valley MUA	1GLC00040SA	20.8	
	Linden-Roselle MUA	1GLC00039SA	37.5	
	North Hudson - Hoboken, etc.	1GLC00035SA	25.6	3.95
	North Bergen - Central	1GLC00032SA	35.8	9.33
	North Bergen - Woodcliff	1GLC00034SA	18.7	8.73
	North Hudson - West New York	1GLC00036SA	23.7	9.66
	Secaucus MUA	1GLC00033SA	9.87	2.54
	Field Blank	1GLC00044SA	0.26	0.39
May 21/23, 2001	PVSC	1GLC00073SA	63.9	5.05
Survey 2001-IGA	Middlesex County MUA	1GLC00074SA	9.17	7.21
	Bergen County MUA	1GLC00075SA	17.6	3.25
	Rahway Valley MUA	1GLC00077SA	18.5	3.78
	Linden-Roselle MUA	1GLC00078SA	26.7	4.38
	Edgewater MUA	1GLC00079SA	14.3	3.26
	Field Blank	1GLC00081SA	0.67	0.47
August 6/9, 2001	PVSC	1GLC00085SA		4.62
Survey 2001-Igb	Middlesex County MUA	1GLC00086SA		10.4
	Bergen County MUA	1GLC00087SA	43.4	4.75
	Joint Meeting Essex-Union	1GLC00088SA		8.26
	Rahway Valley MUA	1GLC00089SA		
	Linden-Roselle MUA	1GLC00090SA		
	North Bergen - Central	1GLC00092SA	114	7.04
	North Bergen - Woodcliff	1GLC00093SA	54.8	17.4
	Edgewater MUA	1GLC00094SA		3.38
	North Hudson - West New York	1GLC00095SA	91.9	10.8
	Secaucus MUA	1GLC00096SA		2.81
	Field Blank	1GLC00099SA	8.28	0.57

DATE	SITE	CARP SAMPLE ID NUMBER	TOTAL METHYL MERCURY (ng/L)	DISSOLVED METHYL MERCURY (ng/L)
October 2/4, 2000	PVSC	1GLC00013SA	NC	0.643
Survey 2000-IGA	Middlesex County MUA	1GLC00018SA	NC	0.117
	Bergen County MUA	1GLC00014SA	NC	0.674
	Joint Meeting Essex-Union	1GLC00016SA	NC	0.038
	Rahway Valley MUA	1GLC00017SA	NC	0.180
	Linden-Roselle MUA	1GLC00015SA	NC	0.036
	Field Blank	1GLC00019FB	NC	<0.006
December 11/15, 2000	PVSC	1GLC00030SA	NC	0.228
Survey 2000-IGB	Middlesex County MUA	1GLC00041SA	NC	0.112
	Bergen County MUA	1GLC00031SA	NC	U
	Joint Meeting Essex-Union	1GLC00038SA	NC	0.064
	Rahway Valley MUA	1GLC00040SA	NC	0.023
	Linden-Roselle MUA	1GLC00039SA	NC	0.004
	North Hudson - Hoboken, etc.	1GLC00035SA	NC	0.072
	North Bergen - Central	1GLC00032SA	NC	0.513
	North Bergen - Woodcliff	1GLC00034SA	NC	0.465
	North Hudson - West New York	1GLC00036SA	NC	0.267
	Secaucus MUA	1GLC00033SA	NC	0.284
	Field Blank	1GLC00044SA	NC	<0.002
May 21/23, 2001	PVSC	1GLC00073SA	0.840	0.153
Survey 2001-IGA	Middlesex County MUA	1GLC00074SA	0.301	0.126
	Bergen County MUA	1GLC00075SA	0.494	0.098
	Rahway Valley MUA	1GLC00077SA	0.276	0.022
	Linden-Roselle MUA	1GLC00078SA	2.067	0.370
	Edgewater MUA	1GLC00079SA	0.436	0.107
	Field Blank	1GLC00081SA	0.002	0.002
August 6/9, 2001	PVSC	1GLC00085SA	NC	0.43
Survey 2001-Igb	Middlesex County MUA	1GLC00086SA	NC	0.182
	Bergen County MUA	1GLC00087SA	NC	0.423
	Joint Meeting Essex-Union	1GLC00088SA	NC	0.109
	Rahway Valley MUA	1GLC00089SA	NC	0.184
	Linden-Roselle MUA	1GLC00090SA	NC	0.054
	North Bergen - Central	1GLC00092SA	NC	1.35
	North Bergen - Woodcliff	1GLC00093SA	NC	0.837
	Edgewater MUA	1GLC00094SA	NC	0.193
	North Hudson - West New York	1GLC00095SA	NC	0.374
	Secaucus MUA	1GLC00096SA	NC	0.383
	Field Blank	1GLC00099SA	NC	0.008

APPENDIX H.2
CSO/SWO EVENT #1 METALS DATA

CSO/SWO ID	CARP Sample ID	Location/River	Total Cd	Diss Cd	Total Pb	Diss Pb	Total Hg	Diss Hg	Total met-Hg	Diss met-Hg
Survey 2001-IGC - 25 Sep 2001										
SWO011	1GLC00061SA	Passaic - Blanchard St.	215	27.3	7590	1940	19.4	5.13	0.172	0.075
SWO015	1GLC00065SA	Hackensack-Henley Rd	643	53.3	76600	2530	301	5.53	0.575	0.07
Equipment Blank	1GLC00068EB		< 7.5	< 7.5	30.1	22.5	0.81	0.78	< 0.016	< 0.016
Field Blank	1GLC00070FB		< 7.5	< 7.5	< 0.9	< 0.9	18.7	0.62	< 0.016	< 0.016

APPENDIX H.3
CSO/SWO EVENT #2 METALS DATA

CARP Sample ID	Location/River	Total Cd	Diss Cd	Total Pb	Diss Pb	Total Hg	Diss Hg	Total met-Hg	Diss met-Hg
Survey 2001-IGA - 16 Oct 2002									
1GLC00106SA	Passaic - Ivy Street	249	46	25000	1890	119		0.486	0.033
1GLC00107SA	Hackensack-Christie Street	178	32	35400	3880	72.6	4.72	0.689	0.044
1GLC00108SA	Hackensack-Court Street	349	69	25500	1520	727	16.7	1.8	0.149
1GLC00109SA	Livingston/Front St. (Arthur Kill)	157	123	18300	2680	77.7	13.3	2.7	0.039
1GLC00114SA	West Side Rd.	1720	32	176000	690	692		1.63	<0.025
1GLC00115SA	Newark Bay - Airport Per Ditch	475	338	760	74	5.61		0.054	0.039
1GLC00116SA	Passaic - Blanchard St.	1370	281	89500	2120	164	9.2	0.547	0.082
1GLC00117SA	CCI	215	84	26600	4210	172	72.6	0.486	0.08
1GLC00118SA	Smith Marina	670	85	146000	2550	204	6.94	0.369	0.04
1GLC00120SA	Hackensack-Henley Rd	1920	16	86800	1380	1080	6.15	8.56	0.03
1GLC00122EB		<10	<10	<35	<35	1.1	0.91	<0.025	<0.025
1GLC00123FB		<10	<10	<35	<35	0.43	0.49	<0.025	<0.025

APPENDIX H.4
CSO/SWO EVENT #3 METALS DATA

CARP Sample ID	Location/River	Total Cd	Diss Cd	Total Pb	Diss Pb	Total Hg	Diss Hg	Total met-Hg	Diss met-Hg
Survey 2001-IGA - 16 Oct 2002									
1GLC0001	Rahway Outfall 003	305	60	8140	727	121	12.8	1.42	0.08
1GLC0002	Ivy Street (Passaic River)	194	114	17900	2320	37	8.01	0.368	0.152
1GLC0003	Christie Street (Hackensack R)	197	47	43500	2430	183	31.4	0.771	0.068
1GLC0004	Court Street (Hackensack R)	371	81	39300	1460	130	8.12	0.968	0.051
1GLC0008	Elm Street	268	62	40500	1990	276	71.3	0.776	0.066
1GLC0009	Anderson Street	226	64	31100	2120	296	9.34	0.749	0.061
1GLC0011	Peripheral Ditch (Newark Air)	518	161	2500	118	BC	BC	0.247	0.117
1GLC0012	Blanchard Street (Passaic R)	766	159	49000	2150	BC	11.6	0.547	0.09
1GLC0013	CCI	431	51	106000	2980	156	12.4	0.875	0.07
1GLC0014	Smith Marina	949	375	134000	2500	172	10.9	0.737	0.053
1GLC0016	Henley Road (Hackensack R)	215	41	24300	460	BC	4.86	0.263	0.058
1GLC0021	Equipment Blank	<10	<10	<35	<35	6.22	0.68	<0.025	<0.025
1GLC0022	Field Blank	<10	<10	<35	<35	0.9	4.17	<0.025	<0.025
1GLC0023	Field Duplicate (SWO010)	573	155	2760	177	8.83	2.25	0.255	0.07

APPENDIX H.5
CSO/SWO EVENT #4 METALS DATA

REPLACEMENT CARP ID	Location/River	Total Cd	Diss Cd	Total Pb	Diss Pb	Total Hg	Diss Hg	Total met-Hg	Diss met-Hg
Survey 2004-IGA - 14 Apr 2004									
1GLC00160	Rahway Outfall 003	634	34	22800	530	356	8.84	0.843	0.094
1GLC00157	Ivy Street Passaic River	578	54	80500	2270	167	3.14	0.741	0.048
1GLC00162	Front Street and Bay Way	1530	58	153000	1620	134	0.2	0.324	<0.025
1GLC00156	Peripheralk Ditch Newark Airport	345	86	1520	211	5.13	0	0.142	<0.025
1GLC00158	CCI	833	89	177000	2640	167	3.94	0.555	<0.025
1GLC00159	Smith Marina	2320	33	585000	1690	602	2.08	0.809	<0.025
1GLC00161DU	Ivy Street Passaic River	584	53	64700	2090	154	3.54	0.538	0.05
1GLC00165FB	Passaic Valley	36	37	<35	<35	3.89	2.27	<0.025	<0.025
1GLC00166EB		37	38	<35	51	0.77	2.96	<0.025	<0.025