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Trends of EOM, B(a)P, sulfates, and nitrates in air-borne particulate matter in eleven proximate locations in New Jersey during 1988

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ABSTRACT

Title: *Trends of EOM, B(a)P, Sulfates, and Nitrates in air-borne particulate matter in eleven proximate locations in New Jersey during 1988.*

by

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Air-borne particulate matter was collected at eleven proximate locations in New Jersey during the year 1988. Particulate matter was extracted in cyclohexane and acetone to separate non-polar and polar components. Particulate matter was also analyzed for B(a)P, Sulfates and Nitrates.

This report presents the inter-site and intra-site variation of concentrations of pollutants between summer and winter seasons. Levels of B(a)P varied from 0.12 to 0.03 ng/M^3 between urban and rural sites. During winter, B(a)P concentrations were 5 times more than summer. Concentrations of Cyc which represent mostly primary pollutants, were found 3 times lower in rural sites. Ace fractions were higher during peak summer months due to the occasional photochemical smogs. Sulfates are relatively stable at all the locations. Nitrate concentrations went down in warmer months due to photochemical breakdown.

Interrelationships between inhalable particulate matter (IP10) and total suspended particulate matter(TSP) were also studied. From these studies it was found that, in general, organics were settling down heavily on larger air-borne particles.

Mutagenicity of particulate matter was estimated to be higher during summer.

Trends of EOM, B(a)P, Sulfates, and Nitrates in air-borne particulate matter in eleven proximate locations in New Jersey during 1988.

by

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Thesis submitted to the faculty of the Graduate Division of the New Jersey Institute of Technology in partial fulfillment of the requirements for the degree of Master of Science in Environmental Science.

APPROVAL SHEET

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TABLE OF CONTENTS ..... PAGE NO.

LIST OF FIGURES.....PAGE NO

FIGURE NO.

SECTION I

(INTRODUCTION)

1.1 INTRODUCTION

The atmosphere has always been polluted to some extent. In fact records say that the first measure ever taken to protect the environment goes back as far as 1272, when King Edward I of England tried to clear the smokey sky over London by banning the use of "sea coal". Although limited air pollution was experienced as early as 1272, it has become a major problem only in the recent years.

Unfortunately technological advancement, industrial expansion, and urbanization have all contributed to the increase in the current air pollution. In the United States air pollution reaches toxic thresholds in almost all urban areas. New Jersey, reputed as one of the highly industrialized states in the north eastern region is a perfect example for anthropogenic pollution.

Although the sources of airborne matter are very difficult to classify, most of the air pollutants can be placed in two general categories:

1. Primary pollutants: those emitted directly from sources.
2. secondary pollutants: those formed in the atmosphere by chemical reactions among primary pollutants and normal atmospheric constituents.

Those substances usually considered air pollutants can be classified into the following major groups:

- Sulfur-containing compounds
- Nitrogen-containing compounds
- Carbon-containing compounds (except CO & CO2)
- CO & CO2
- Halogen compounds
- Particulate matter
- Radio active compounds

In the above classification the term "particulate matter" refers to any substance, except pure water, that exists as a solid or liquid in the atmosphere under normal conditions and is of microscopic or submicroscopic size but larger than molecular dimensions normally includes dusts, smoke, mists, and aerosols.

Particulate matter may exert a toxic effect in one or more of the following three ways:

1. The particulate matter may be intrinsically toxic because of it's inherent physical or chemical characteristics.
2. The particle may interfere with one or more of the mechanisms which normally clear the respiratory tract.
3. The particle may act as a carrier of absorbed toxic substances.

Sulfur compounds are among one of the very first pollutants that were identified. The SO_2 and particulate matter result from combustion of coal and high sulfur-containing fuel oil. Cities with this characteristic type of air pollution are often in cold climates where electric power generation and domestic heating are major sources of emissions.

Hydrocarbons are another cause of man-made pollution which are emitted into the rather small air space where most of mankind is crowded together. Hydrocarbons which are products of incomplete combustion of fossil fuels have been shown to be carcinogenic in laboratory studies and have been linked to respiratory cancer in certain occupational settings.

1.2 SCOPE OF THIS PROJECT

This report presents a study done by NJIT in collaboration with NJDEP, at NJIT Air Pollution Research Laboratory on air-borne particulate matter sampling and analysis for selected pollutants. The objectives of this project were :

1. To study the seasonal variance of concentration of pollutants under consideration
2. to compare the distribution pattern of pollutants between rural and urban areas
3. to study the mutagenic activity in EOM, and

4. to compare the distribution pattern of pollutants between IP10 and TSP sites.

1.3 POLLUTANT SELECTION CRITERIA

The compounds that were considered as toxic air pollutants for this study met the following criteria:

- Production, use and number of sources
- Toxicity/Carcinogenity
- Regulation
- Future air quality trends
- Monitoring and analytical technology

Based upon these criteria, the following compounds were chosen:

1. *Inhalable Particulate Matter of less than or equal to 10um. particle cut size (IP10)*
2. *Extractable Organic Matter in Acetone (EOM Ace)*
3. *Extractable Organic Matter in Cyclohexane (EOM Cyc)*
4. *Benzo(a)pyrene (BaP)*
5. *Sulfates*
6. *Nitrates*

1.4 SITE SELECTION CRITERIA

The selection of sampling sites met one or more of the following requirements:

- Proximity to commercial and industrial areas
- High population density
- Major highways
- Automobile traffic
- Rural areas

1.5 SITE DESCRIPTION

By applying one or more of the above requirements the following nine sites were chosen from all over New Jersey. The geographic locations of all sites are shown in Figure 1.

'IP' and 'TSP' identify the type of particulate matter collected at that site. Numericals used in the abreviations are site identification numbers.

1 & 2. Atlantic City (AC7, IP) & Atlantic City (AC6, TSP) : The sampling stations for this site was located in a bus depot. Every day number of buses were reported to stop at this point to drop off and pick up the casino visitors. It is also believed that most of the time, the engines of the buses were running while they were at the site.

3. Camden (CAM): The area has no industrial operations immediately adjacent to the population and very few commercial activities. Major roadways in the vicinity are Routes 676 and 31. Refineries can be found approximately 5 km southwest of the site as well as commercial shipping warehouses and small commercial enterprises. Across the Delaware river there is a power plant belonging to Philadelphia Electric Co. This plant operates only during peak hours. And also there is a municipal incinerator. Traffic was light to moderate around the site. But due to a shopping center with a large paved parking and a train station, commuter traffic
is heavy during the rush hours. (Fig. 1.2 & 1.3)

4 & 5. Elizabeth(ELZ, IP) & Elizabeth (ELZ, TSP): There are no major local industrial sources in Elizabeth; this would be indicative of the nature of source distributions associated with many commercialized urban areas. The commercial center of the city is located south of the site. The port of Elizabeth is found south and southeast of this area. Two kilometers away actually in Newark, there are few industrial facilities; a color and dye manufacturer, a leather processor, a chemical company, and a small waste oil recovery facility. (Fig. 1.4 & 1.5)

6. Fort Lee Bridge (FLB): This sampling site is stationed on a bridge through which a major roadway passes by. Basically this site is used to see the impact of motor vehicle emissions on the concentrations of particulate matter. Fort Lee is located adjacent to the Hudson river, 25 miles northeast of Newark. It is a densely populated area.

7. Fort Lee Library (FLL): This sampling station is located on the roof of a library building in Fort Lee. It is used as a background site for the Fort Lee Bridge.

8 & 9. Newark3 (NWK3) & Newark4 (NWK4): These sites are located within a very complex industrial-commercial population interface. They are surrounded by a number of small and large industrial emission sources. Paint, lacquer and pigment manufacturers, metal fabricators, and stampers are located on all sides of the sites. The auto body shops in the vicinity perform both automobile and truck repairs. Many operate with open doors during the summer. (Fig 1.5 & 1.6)

10. Pennsauken (PENN): This site is located about 25 miles northeast of Camden. It is a densely populated area.

11. Ringwood (RING): It is a rural setting. There are no major anthropogenic sources of airborne materials in the immediate vicinity. The selection of this site serves the

purpose of a non-urban background site. The forest in this area is approximately 90 - 95% hard wood(Oak, Beech, Maple) and 10 - 5 % evergreen.

1.6 PARTICULATE MATTER SAMPLING AND COLLECTION

The sampling period for this project was from 4th January, 1988 to 29th December, 1988 which covered peak winter and the whole summer for that particular year. The hypothesis is that the summer time samples represent essentially the secondary pollutants from photochemical smog and in winter time, samples carry primary chemical species from fossil fuel combustion and automobile exhaust.

The duration of sampling period was 24 hours starting at midnight every six days. Pre-weighed and Pre-ignited (450^{0}C) GERMANE filters of 8" X 10" size were used to collect the particulate matter so that the background concentrations of pollutants were eliminated from the filter itself. Size selective General Metal Works high-Volume samplers were used to regulate the particulate size cut. A 10um opening samplers were used to focus primarily on materials likely to be of some human health consequence. The sampling rate of air through the filters was 40 cfm. To regulate the flow rate a calibrated flow controller was used and calibrated before and after each sample was collected.

B(a)P Samples and Std.

CALIBRATION DATA

SPUTTED STANDARD VOLUME(UL): 30

STD NG/ML	1ST SCAN AREA	2ND AREA	AVERAGE AREA	AVERAGE % DIFF
0	33185	31927	32556	1.9
10	65096	71489	68293	4.7
20	107212	108266	107739	.5
40	218435	206482	212459	2.8
70	429934	379705	404820	6.2

CALIBRATION CURVE COEFFICIENTS
A2 = 3119.02968
A1 = 51623.0397
A0 = 17361.7164

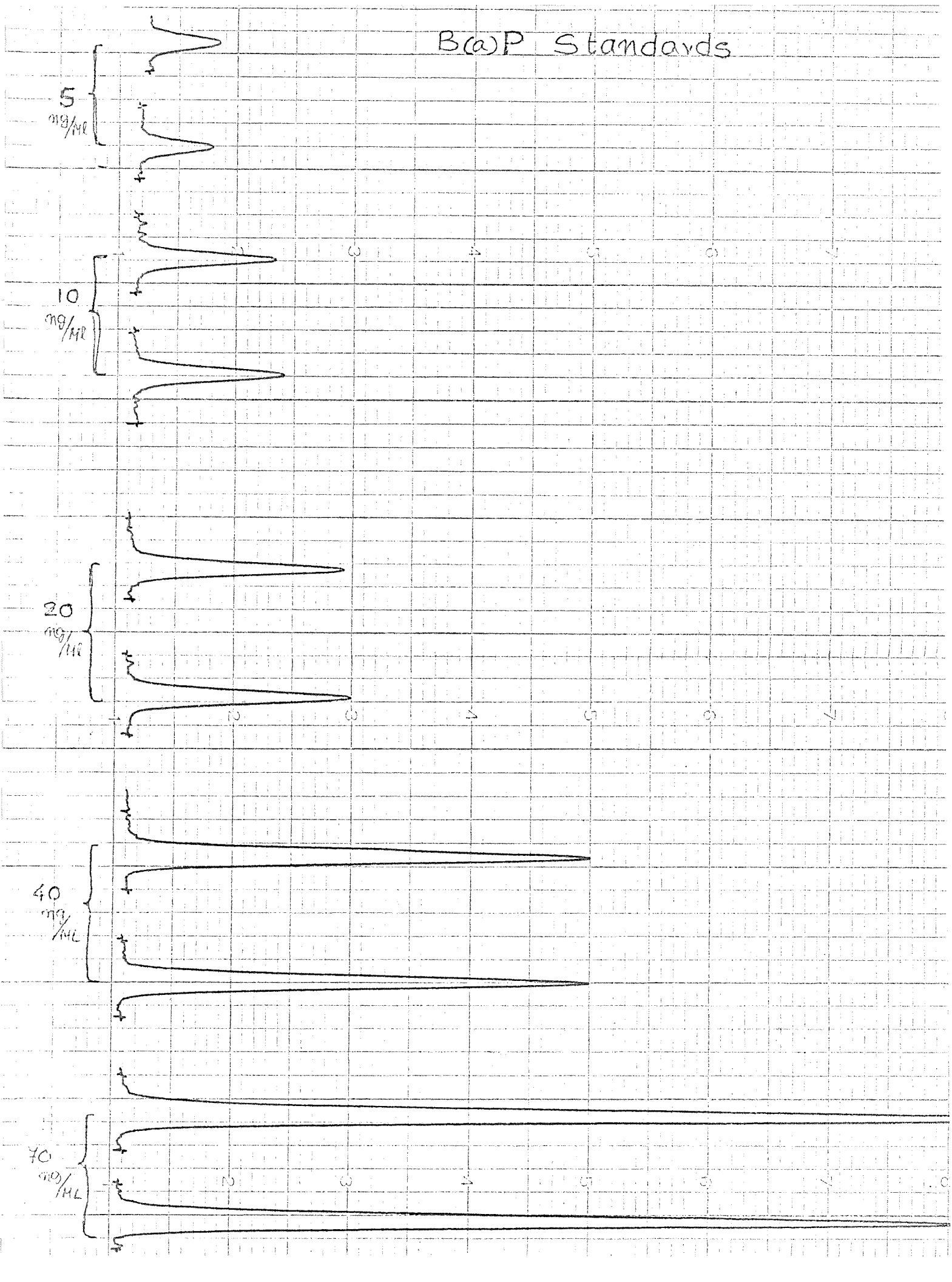
SAMPLE EXTRACTION INFORMATION
SPOTTED VOLUME(UL) :100
EXTRACT VOLUME(UL) :10
FILTER AREA(SQ CM) :7
SAMPLE BURDEN :900

SAMPLE RESULTS

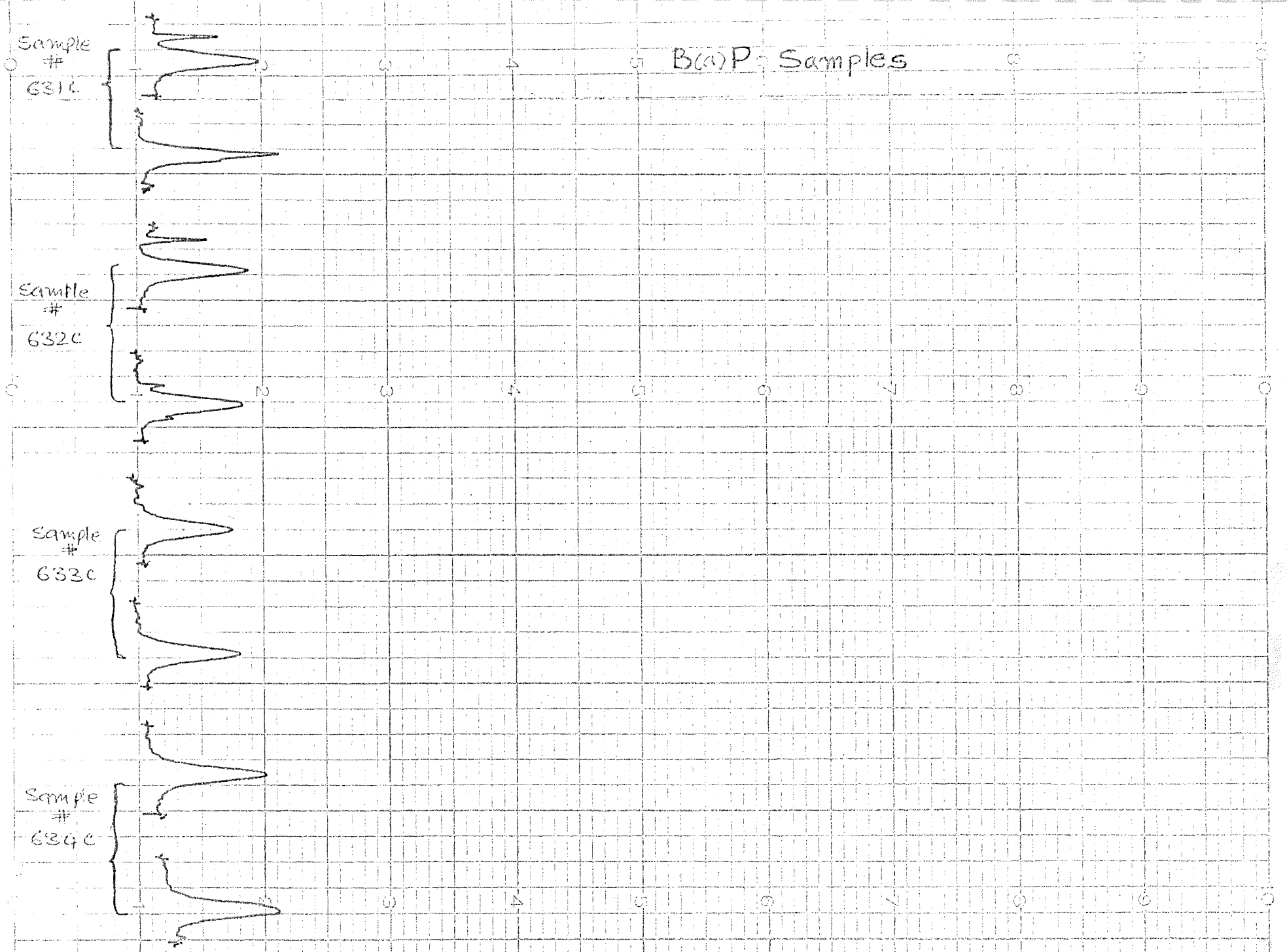
SAMPLE NAME	NG/FIL	AREA	NG/CM²	AVERAGE NG/CM²	% DIFF FROM DATA
6310	515.13	43014	.519	.573	10.1
		50865	.615		-7.3
6320	520.43	45619	.551	.573	3.9
		50113	.606		-5.8
6330	407.58	41792	.504	.477	5.7
		40161	.485		1.7
6340	706.39	59783	.716	.732	-2.1
		61182	.737		.7

NOTE: IN SOME CASES, THE SAMPLE CONCENTRATION IS BY DILUTION
BY A DIRECT RATIO WITH THE HIGHEST STANDARD
THESE CASES ARE:
* SAMPLE WAS USED FOR DILUTION BASED ON STANDARD
! DISCREPANCY BY MORE THAN 10% BETWEEN FLOW MEAN

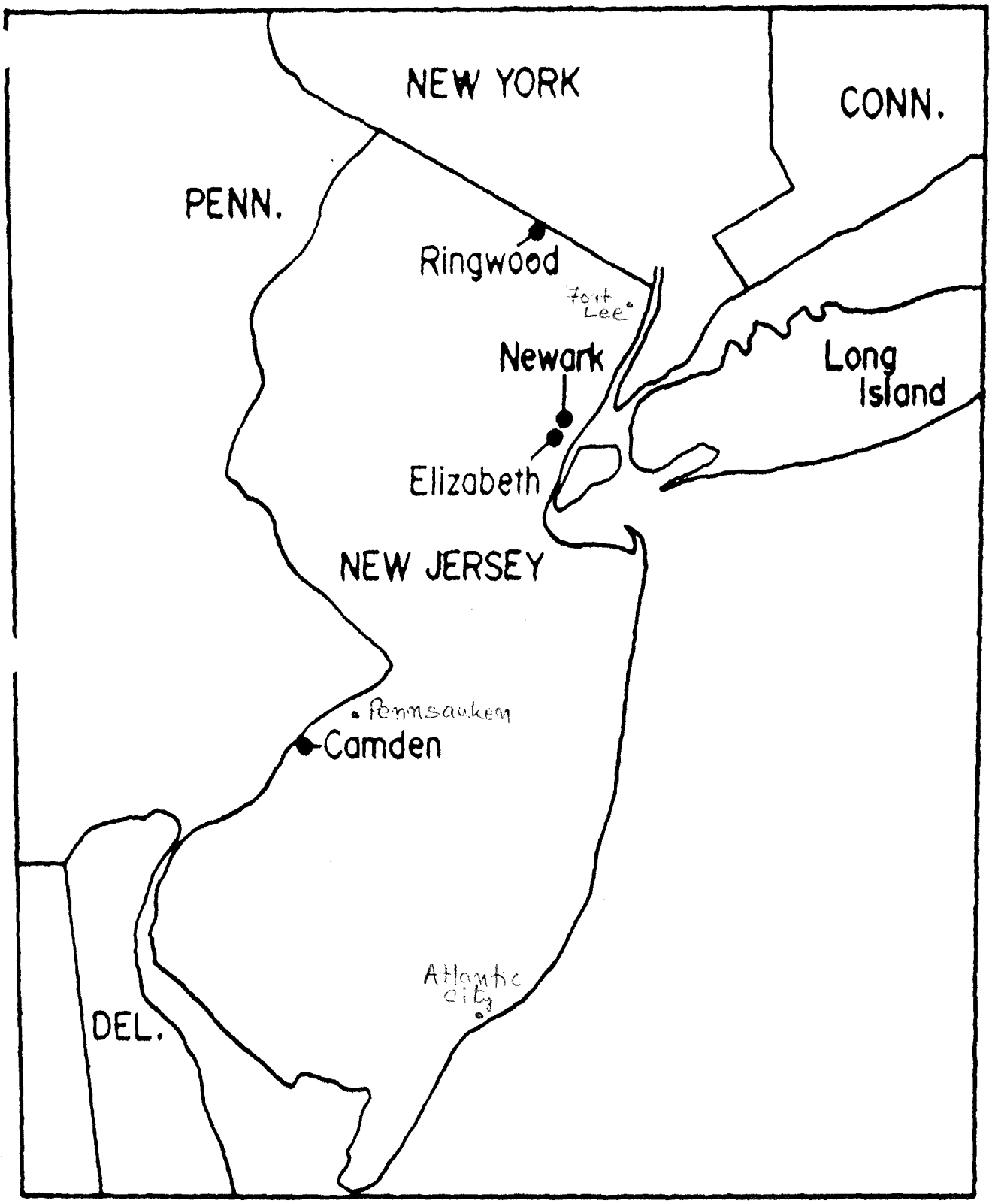
B(a)P Standards



B(a)P Samples

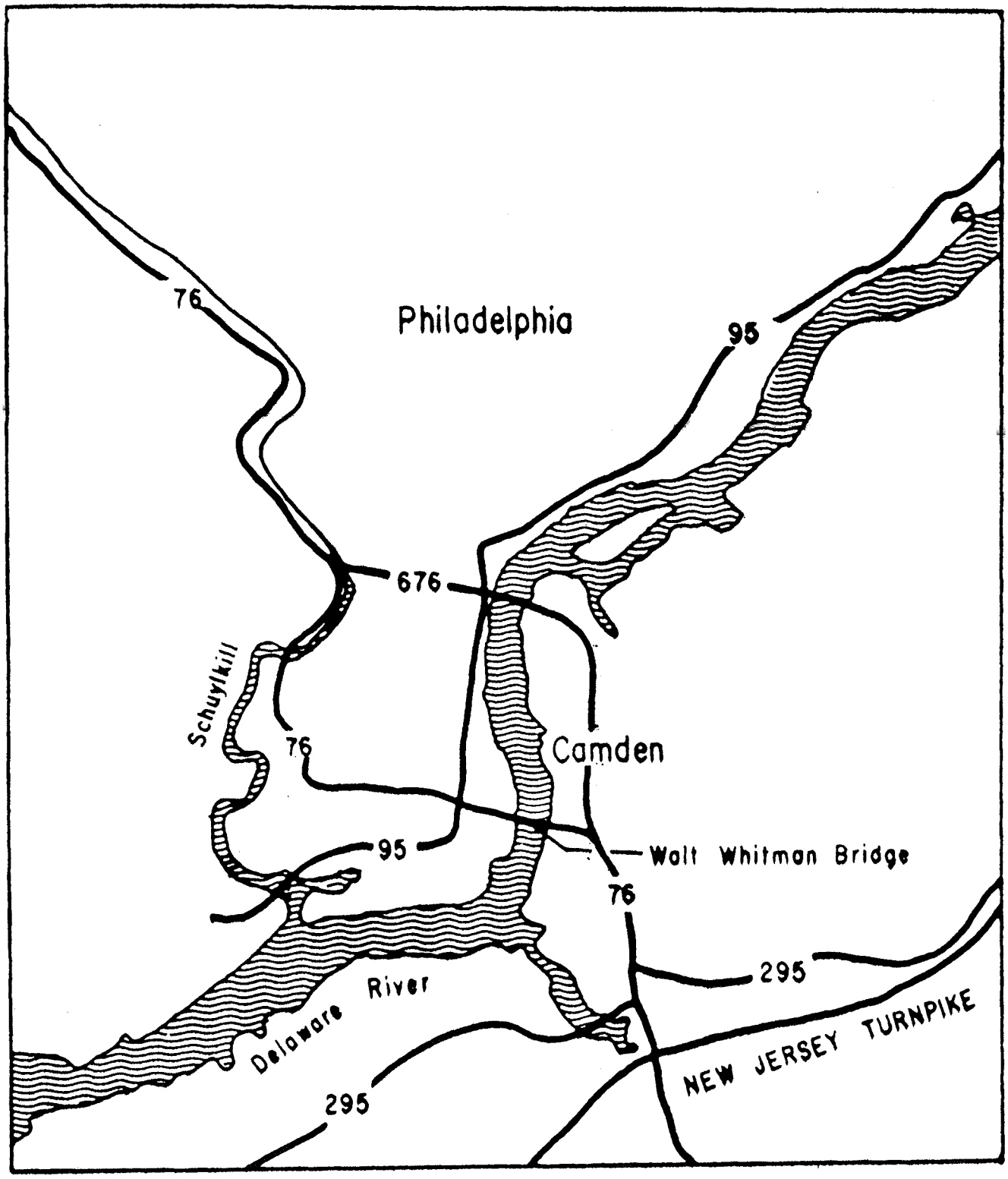


Sampling Sites



ure The geographic locations of the rural site (Ringwood) and urban sites used in the project.

Camden



igure 1. The general area surrounding Camden.

Camden

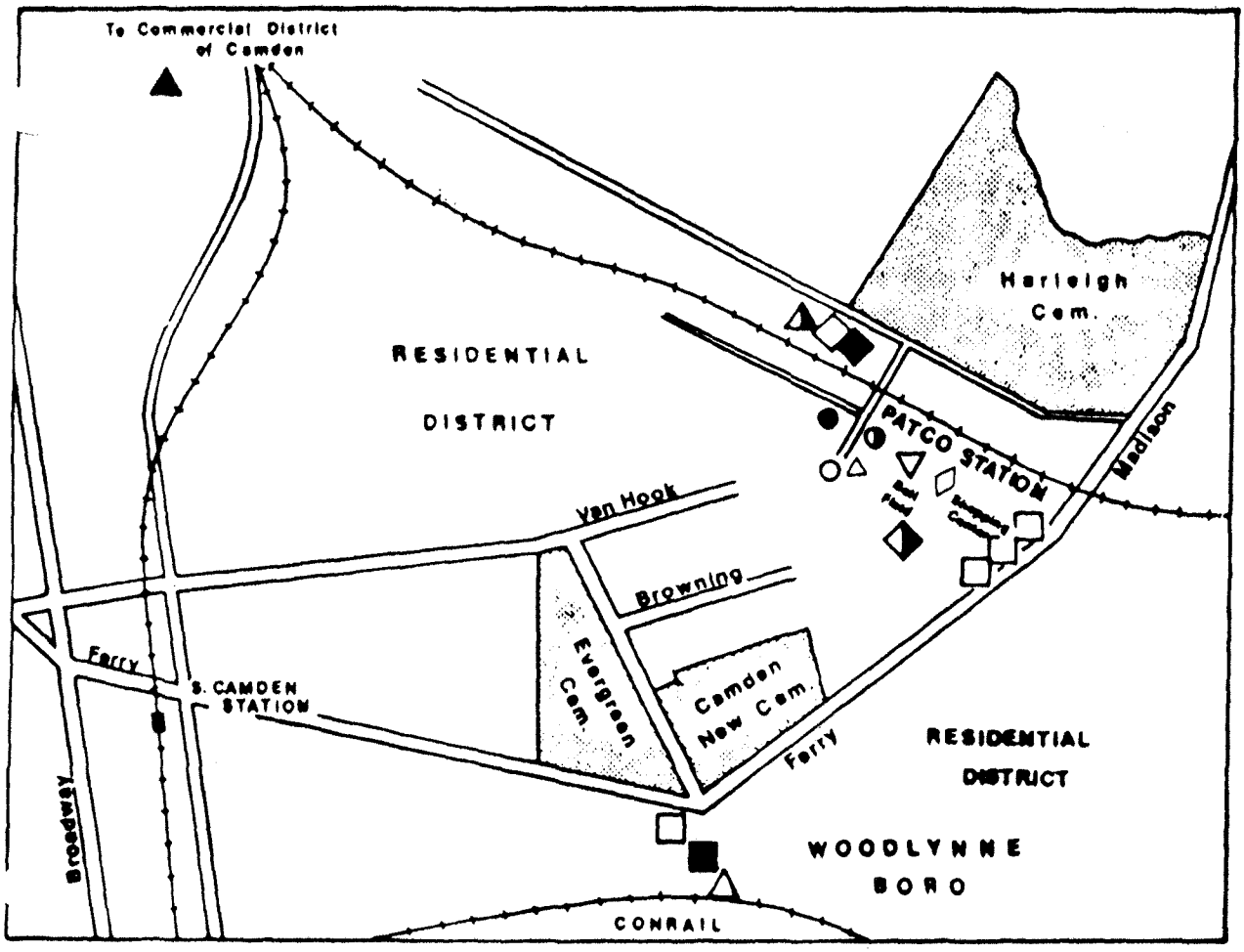
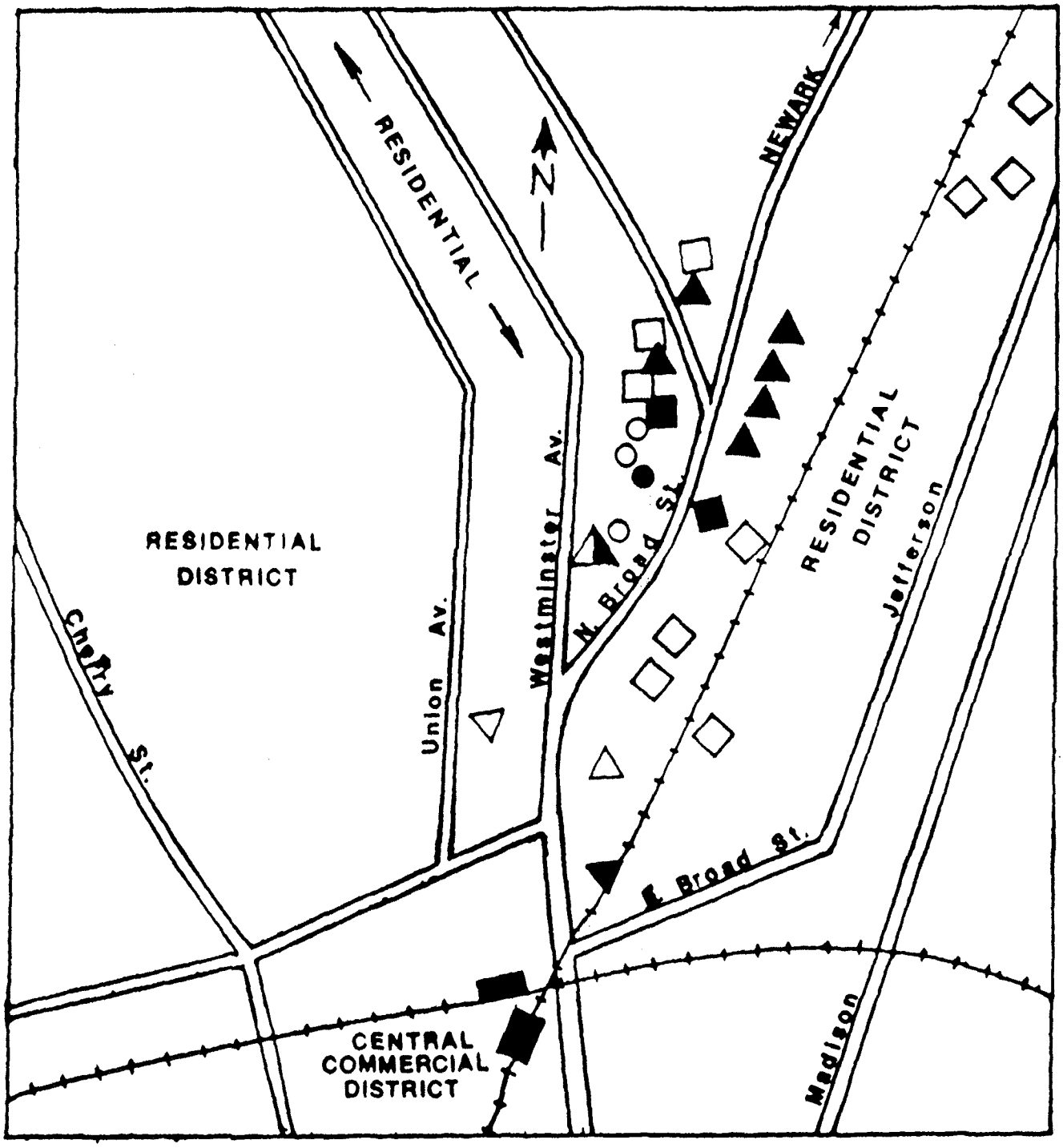
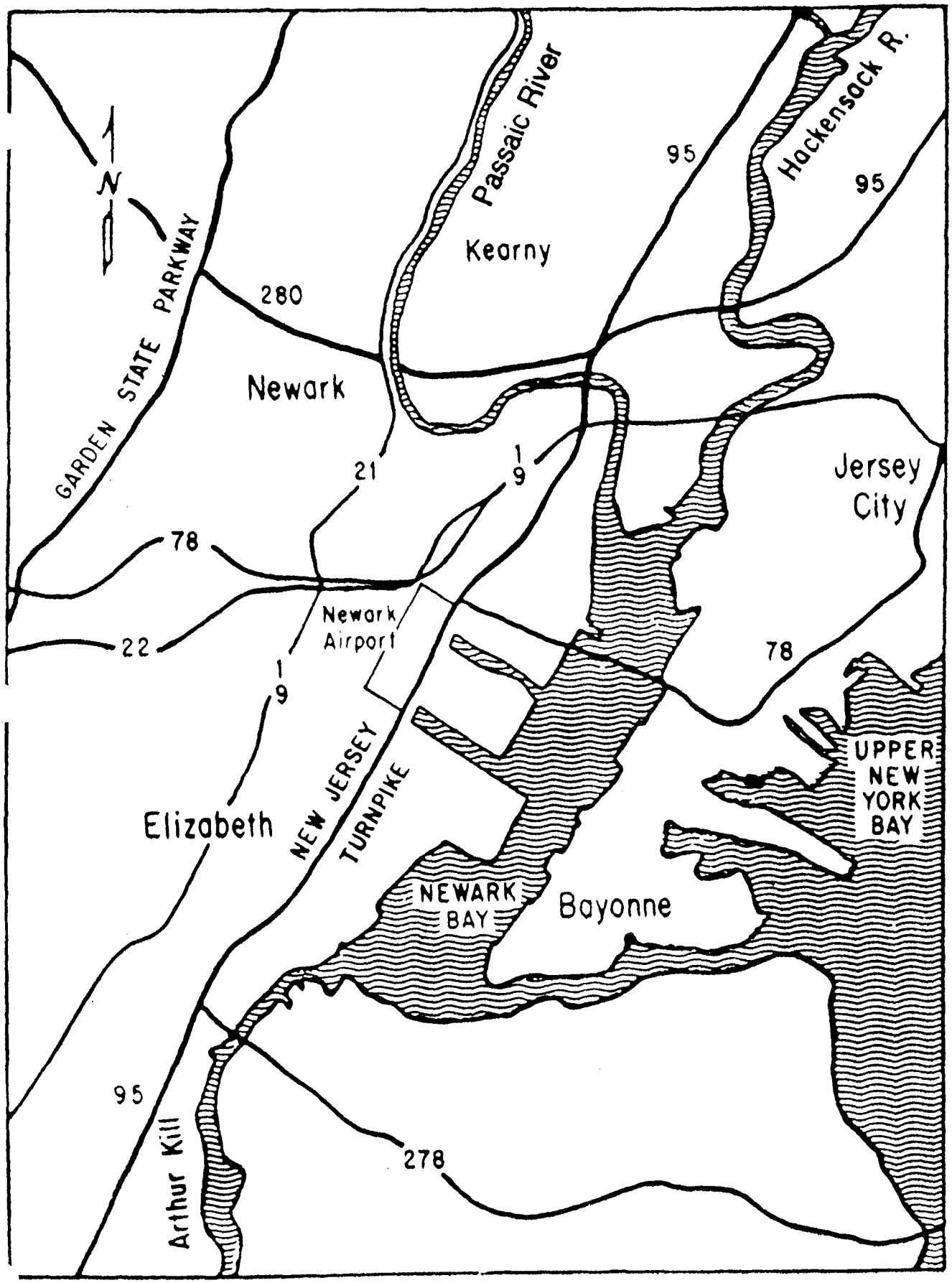


Figure 1 The microinventory for the area surrounding the ATEOS site in Camden. ▲ Institute for Medical Research (sampling site); ◑ R. F. Products, Inc.; ○ Thomas Nelson Book and Bible (publisher); ▽ Pioneer State Co. (shipping); □ Truck container terminal; ■ Engine rebuilder (diesel); △ American Strip Steel; ▲ Scrap metal facility; ● Channel shipping; ◊ PHC Industries; ♦ β Plastics; ♦ Community Sports field; □ Auto and truck repair shops.

Elizabeth



gure The characteristics of the area surrounding the Elizabeth site. ◭ Sampling site; ▼ Antique dealer; ◊ Auto body paint and repair shops; ▲ Car sales and rental dealer; □ Dry cleaning stores; ▽ Post office; △ Printing; ■ Restaurants; ○ Retail gasoline and auto service stations.



ure 1. The major traffic arteries in the area surrounding the Elizabeth and Newark sites.

Newark

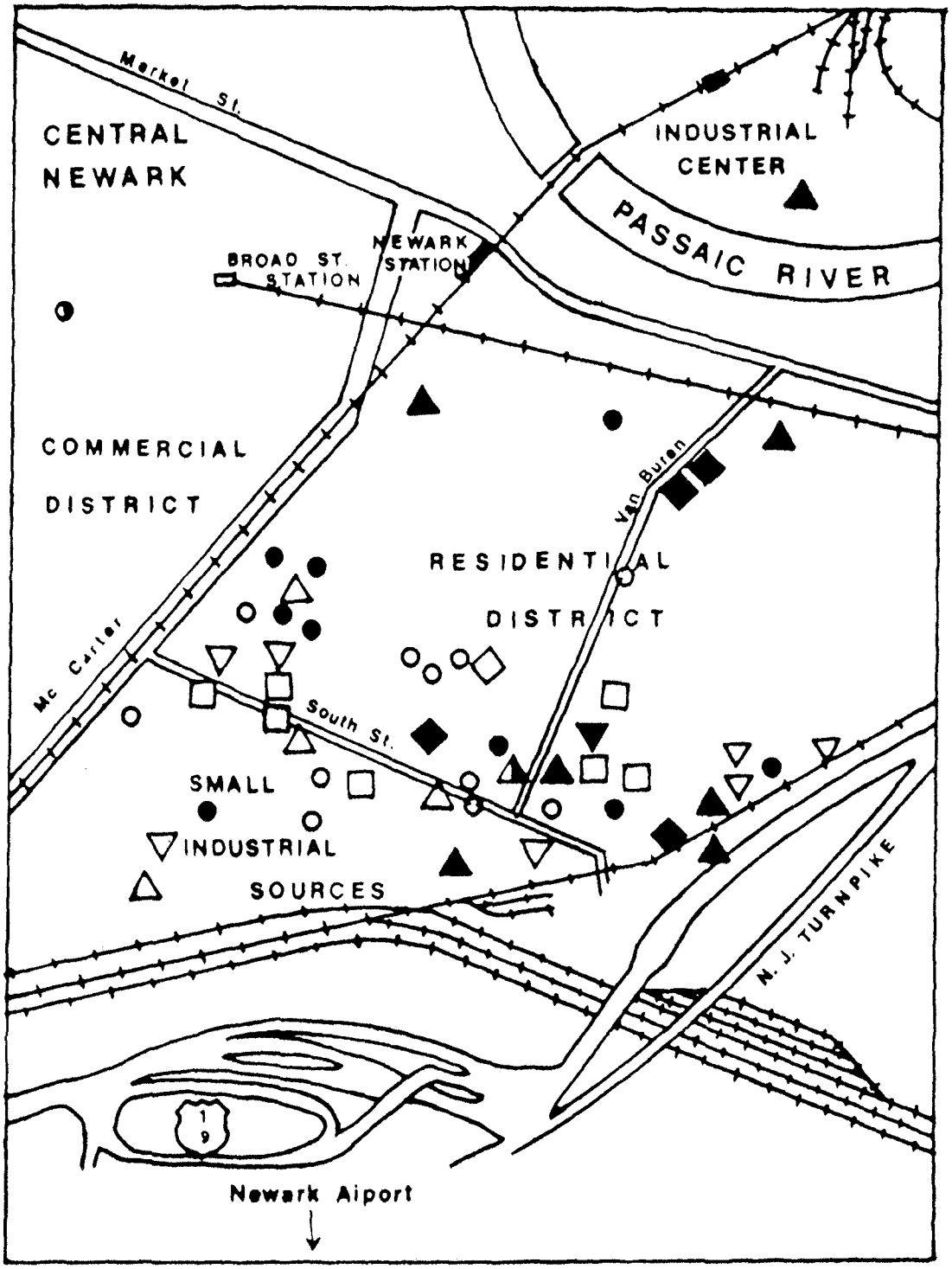


Figure 1. A qualitative microinventory of the area surrounding the Newark site. ▲ IPM, EOM and FPM sampling site; ◑ CO, SO_2 and O_3 monitoring site; □ Auto and truck body paint and repair shops; ○ Chemical manufacturers; ♦ Foundries; ● Metal fabricators (tool and die, etc.); ▲ Metal processing (smelting and refining); ▽ Metal reconditioning and finishing (alloying, plating, etc.); △ Paint spraying/paint pigment manufactures; ◇ Waste paper facility; ▼ Welding.

SECTION II

(EXPERIMENTAL PROCEDURE)

2.1 APPROACH/EQUIPMENT

As mentioned in the previous section particulate matter was analyzed for EOM Cyc, EOM Ace, B(a)P, IP10, Sulfates, and Nitrates.

IP10 was determined by weighing the filter paper after sampling and subtracting the empty filter's weight from it. A calibrated laboratory balance was used for this purpose.

For the separation of EOM fractions, ultrasonic extraction was employed. A strip of filter was extracted ultrasonically in cyclohexane to separate all non-polar components in the particulate matter. Extraction in acetone followed next. The remaining moderately polar and polar components were extracted with acetone. Details of the extraction procedure are discussed later in the section. A Sonic systems, Inc. Ultrasonic bath was used for the extraction.

Part of the extract from cyclohexane was used for B(a)P analysis. A combination of Thin Layer Chromatography (TLC) and Fluorescence Spectrophotometry was employed for the separation and detection of B(a)P respectively.

Standards and samples were spotted onto a 20 cm X 20 cm plate coated with a 250 um. layer of 20% acetylated cellulose (Analtech, Inc.). Plates are scored into 18

channels, each 1cm wide. Standards and samples were simultaneously applied to the plate from 100-ul Teflon coated blunt-tip syringes with an 18-position Analytical Instrument Specialities TLC multi spotter. A Perkin-Elmer model MPF-44B fluorescence spectrophotometer with a thin layer plate scanning attachment, digital integrator, and recorder were used for all measurements from the TLC plates. The slit opening on the scanning attachment was modified to cover the full width of the 1cm channel on the TLC plate.

EOM Cyc & EOM Ace fractions were determined on a hot plate melting point apparatus followed by paired mass measurements on a micro balance.

Sulfate and Nitrate analyses were done by Dr. Kebbekus's research group at the NJIT Air Pollution Research Laboratory and hence the analytical procedure has not been included in this report. However the data is presented in Appendix-I.

2.2 ANALYTICAL PROCEDURE

At the end of each sampling period the filters containing the particulate matter from all the 9 sites were collected by NJDEP personnel and sealed in plastic bags separately before they were hand delivered to NJIT Air Pollution

Research Laboratory for the analysis. Care was taken not to disturb the particles on the filters while handling them.

All the filters were kept in a dessicator for a period of 24 hours before they were weighed for the mass of 'IP10' collected up to the fourth decimal point using a laboratory balance. Half of the filter paper(8" X 5") was used for sulfate and nitrate analysis. From the rest a piece of 8" X 2" was used for other analysis.

Particulate matter was extracted in cyclohexane and acetone in that order to separate organic compounds into nonpolar and polar fractions.

The 8" X 2" strip of filter was folded and placed in the bottom of a 24 ml vial. 10 ml. of cyclohexane was dispensed into the vial and the cap was screwed on finger tight. The vial was placed in Ultrasonic bath with a water level in the bath maintained just above the cyclohexane in the vial. Particulate matter was extracted approximately for 15 minutes with the temperature at 75^{0}C. To facilitate interfacial mass transport, samples were allowed to sit undisturbed at room temperature for about an hour before analysis. The extract was separated into a dark colored glass vial using syringe mounted micro filters. Dark colored vials were used to prevent the potential photo decomposition of organics. The filter strip was left in the vial for

drying over 48 hours and then extracted ultrasonically with acetone at 49^{0}C. The extract of acetone was also transferred into another vial in similar fashion. Both cyclohexane and acetone fractions are stored in freezer for EOM weighing.

2.3 TLC/FLUORESCENCE ANALYSIS

The extract from cyclohexane extraction was analyzed for Benzo(a)Pyrene using Thin Layer Chromatography and Spectrofluorimetry combination.

A set of calibrated standards (5, 10, 20, 40, 70 ng B(a)P/ml was removed from the refrigerator and allowed to reach room temperature. A scored plate was placed in an oven at about 50^{0}C for at least 10 minutes immediately prior to spotting.

Syringes were loaded with standards and samples in duplicates to 80-ul and 100-ul mark respectively and then placed in the appropriate order in the multi spotter. Plungers were driven to the 0-ul mark. The spot size was minimized by driving the plungers in short, quick bursts and allowing the solvent to evaporate between bursts. All the plates that were spotted were scanned on the same day. When the spotting was completed the plate was cooled down for few minutes and developed in TLC tanks in a hood to the 19-cm line using a solvent mixture of 100 ml ethyl alcohol and 50 ml of dichloromethane. The plates were air dried and placed

in fluorescence-spectrophotometric scanner. Each channel was scanned for B(a)P using an excitation wavelength of 386 nm and absorbing the emission at 429 nm.

An IBM personal computer with non-linear correction program was connected directly to the integrator. The computer calibrated the sample's concentration with that of standard and calculated the amount of B(a)P in each sample. A sample spectrum and its results are given at the end of this section. The B(a)P data for all sites is given in Appendix-I

2.4 EXTRACTED ORGANIC MATTER FROM CYCLOHEXANE AND ACETONE

The extract fractions of cyclohexane and acetone were weighed for soluble nonpolar and polar organics using CAHN electro-balance.

Each extract's weight was determined by evaporating 50 and 100 ul. aliquotes on a slide warmer at 40^0C. and weighing the residue. Each weighing was repeated until a reproducibility of 95% was achieved. The average of two nearest weights was considered as the EOM. The EOM data for nine IP10 sites are given in Appendix-I.

The EOM data for TSP sites can be found in Appendix-II

2.5 QUALITY ASSURANCE/QUALITY CONTROL

QA/QC was maintained at every stage of the project.

1. Filters were pre-ignited, numbered and weighed before sampling. The same balance was used throughout the project for consistency. It was calibrated by the manufacturer once a year and also has been calibrated before every use by the operator.

2. Filters after sampling were handled with great care to prevent any change in physical condition or chemical composition of compounds in the particulate matter.

3. Volatility losses during the sampling were considered negligible for 5 ring compounds.

4. All the solvents that were used for extraction and chromatography were of HPLC grade.

5. Photodecomposition of B(a)P was prevented during the storage of extracts by placing them in dark colored vials. No fluorescent light was used during the extraction and chromatography.

6. Glass ware and syringes were double rinsed with hot water and methanol after each use.

7. Standards and samples were spotted in duplicates and any spectrum with less than 80% reproducibility was rejected and repeated.

8. Precision and accuracy of analytical procedure: Precision and accuracy of TLC/Fluorescence spectroscopy procedure was periodically assessed by extracting U.S. National Bureau of Standards SRM 1649 urban dust. It has a certified B(a)P value of 2.9 $\pm$0.5 ug/gm. Urban dust was extracted and analyzed with samples once every month. The results obtained were totally in agreement with the certified range. Results were also matched with that of the USEPA laboratory, which had developed this procedure. The NBS SRM 1649 data is presented in Table 2.1.

9. Most of the analysis included a laboratory blank. The concentration of B(a)P in laboratory blanks were below the detection limits except in two cases. The EOMs, sulfates and Nitrates did show some background concentrations. Data are presented in Table-2.2.

10. Pure solvents, cyclohexane and acetone were also tested for background levels of cyclohexane soluble and acetone soluble components. However the data that is presented in this report was not corrected. The background corrections for cyclohexane and acetone are as follows:

Cyclohexane blank ..... 0.0005 ug/ul

Acetone blank ..... 0.0025 ug/ul

BaP Analysis for SRM 1649

Table 2.1

Analysis Date	BaP ug/gm
01/04/88	2.60
02/01/88	2.18
03/28/88	2.4
04/22/88	2.2
05/16/88	2.8
06/20/88	3.0
08/08/88	2.2
08/22/88	1.9
09/12/88	2.8
10/11/88	2.7
11/22/88	2.5

NBS SRM 1649 Urban Dust Reference Material

BaP values are in ug/gm of dust extracted

Certified value: 2.9 +/- 0.5 ug/gm

SECTION III

RESULTS & DISCUSSION

3.1 RESULTS & DISCUSSION

Among eleven sites, two sites were TSP sites, ie. the particulate matter collected in these sites was 'Total Suspended Particulate matter'. The rest of them were IP10 sites. Results from TSP sites are discussed separately at the end of this section.

With the exception of Atlantic City (AC7) site, all the other eight IP10 sites can be classified into two groups. AC7 is a special site. There was no industrial activity going on and it was not a densely populated location either. The only but very significant source of pollution to this site was the automobile exhaust emissions. Therefore it does not represent a typical urban setting even though it recorded some very high concentrations of pollutants.

The two main groups are as follows:

Urban Industrial Group: Camden, Elizabeth, Fort Lee Bridge, Fort Lee Library, Newark3, Newark4, and Pennsuaken.

Rural Interior: RingWood.

The monthly geometric mean of concentrations for EOMs, B(a)P, IP10, sulfates and nitrates at each site for all nine sites were given in Tables from 3.1 to 3.9. Geometric means

(GM) are employed to decrease the statistical impact of occasional very high concentration values. In Table 3.10 geometric means of each pollutant at various sites from January to December are presented. Table 3.11 gives the monthly GM of each pollutant at all sites. The data from Table 3.10 is plotted for each pollutant against the sampling sites and shown in Figure 3.1. Similarly the data from Table 3.11 is plotted in Figure from 3.2. Plots from Figure 3.3 to 3.8 were drawn against each sampling day and have been superimposed by daily temperature. The data for the same can be found in Table 3.12. The results obtained in the above tables and figures are discussed on a pollutant-by- pollutant basis. Beginning with B(a)P the results of Cyc, Ace, IP10, Sulfates and Nitrates are studied and correlated to other components wherever there is a relationship.

3.2 BENZO(a)PYRENE

The highest mean concentration for B(a)P was recorded at FLB. In this particular site, the sampling station was located on the bridge on which a major roadway passes by. The GM of B(a)P was 0.18 ng/M^3. Another site, FLL, from the same locality but away from the bridge and stationed on the roof of a library building had only 0.11 ng/M^3. A drastic increase of B(a)P concentration in the FLB was believed to be from the bridge automobile emissions. In the study done

by Greenberg et al, 1985 it was found that during the non-heating season motor vehicles account for 98% of the B(a)P emissions in the state (Table 3.13). The mean concentrations of B(a)P during non-heating months for FLB and FLL are 0.13 and 0.05 ng/M^3 (Figure 3.9).

As one can see from Fig. 3.2, AC7 has the highest Cyc fractions among the other sites but surprisingly is indicating a relatively lower levels of B(a)P. Even though there is no obvious relationship between Cyc and B(a)P, one would expect a little higher levels of B(a)P with such a higher fraction of Cyc (seasonal relationships of Cyc and B(a)P are discussed later in this section). As discussed earlier, the sampling station in AC7 was located in a bus depot. Primarily the particulate matter in this site was impacted by the emissions from buses. It was also believed that during short breaks at the site, the engines of the buses were left running. The fugitive vapors and diesel emitted from the 'idling' of the engines caught on particulate matter and resulted in very high levels of EOMs.

As expected, B(a)P had its highest concentration during the heating season (0.29 ng/M^3) and had only 0.06 ng/M^3 during non-heating season which is almost five times lower. The urban and rural variance in B(a)P levels are 0.12 ng/M^3 and 0.03 ng/M^3 respectively. The low concentration of B(a)P during summer was mainly because of the absence of wood

combustion for space heating. Volatility and atmospheric reactivity were also considered as the reducing forces of B(a)P concentration. Yamanski et al, 1982; Galahad et al 1984, suggested in their studies that the atmospheric volatilization is negligible for pentacyclic and larger PAHs. Studies of Grosjean et al, 1983, showed negligible losses of B(a)P when adsorbed to airbound particulate matter. Another study by the National Academy of Sciences, 1983, studied that chemical reactivity in the atmosphere relates to many different aspects. A 1um particle is calculated to have an atmospheric residence time of 4 days and might travel hundreds of miles. Thus the question remains that the physical disappearance of particle bound PAH determines the atmospheric lifetime of these species. PAHs are known to react with Ozone in the dark and perhaps more rapidly in light. Studies of Nitrogen Oxide reactions with PAH yield data that vary strongly as a function of adsorption media.

3.3 EXTRACTED ORGANIC MATTER (CYC & ACE)

Cyc fraction contains polycyclic aromatic hydrocarbons, aliphatic hydrocarbons, nitro-PAH, and other unidentified polar compounds. Both anthropogenic and natural sources can contribute to the Cyc fraction. Analysis of ambient samples and of emissions from combustion and industrial sources indicate that many of these compounds are directly emitted

from sources. Natural sources from non-polar compounds include waxes from plants (aliphatic hydrocarbons) and forest fires.

Ace fraction, which is extracted later, contains both organic and inorganic compounds. Infrared spectra indicate the presence of carbonyl-containing compounds, chemical class analysis have indicated the presence of carboxylic acids, aza-arenes and alkylating/acylating agents in this fraction. The term alkylating agents includes a number of chemical classes such as epoxides and aziridines. Many alkylating agents are directly acting (require no metabolic activation) mutagens and/or carcinogens.

The following Table present the % distribution of annual Cyc and Ace for all IP10 sites.

	ELZ	FLL	FLB	NWK3	NWK4	CAM	PENN	AC7	RING
% CYC	17.7	13.7	19.7	15.8	18.1	17.5	13.9	22.0	12.5
% ACE	82.3	86.3	80.3	84.2	81.9	82.5	86.1	78.0	87.5

The higher percentage of Ace in the above table is related to fewer local sources and 'Aging' of aerosol, ie. the aerosol contains greater proportions of secondary organics produced by oxidation of gaseous organics and gas-to-particle conversion (Wolf et al 1982). The Pennsuaken site was influenced by emissions from both local sources and Philadelphia which is frequently up wind of this site. Pollutants emitted in Philadelphia would be expected to undergo some reactions during transport. On the other hand all the remaining urban sites have shown relatively higher percentages of Cyc, which suggest the presence of local sources and direct emissions from combustion of fossil fuels. Ringwood is recorded the highest percentage of secondary particulate organics as there are few local sources and influenced by the eastern U.S. regional background aerosol.

The non-polar Cyc fraction as a percentage of EOM, increased during winter. Non polar organics increased from 14.4 to 19.9%. The winter time increase in concentration of EOM and carbonaceous species are probably due to increased emissions from space heating.

Percentages of total EOM in IP10 averaged 14.2% during summer. In winter it went upto 23.9%. The summer time decrease in Cyc occurs because of the volatilization of few smaller PAHs. Compounds like Pyrene and Naphthalene exist in vapor phase during the warmer periods of the year. From Fig. 3.1 one can see that Cyc drops down gradually from February to June as smaller PAHs volatilize one by one with increasing temperatures. On the other hand, B(a)P drops down suddenly in February and continued to go down as the temperatures get higher. The rapid decrease in the concentration of B(a)P was not because of volatilization but due to the cut down in wood combustion for space heating.

3.4 INHALABLE PARTICULATE MATTER (IP10)

The percentage of Cyc in IP10 for urban sites were 3.0%. For Pennsuaken it is 3.0% and in Ringwood it is 2.0%. With 5.0% Atlantic City is on the top of the table. The higher percentage of Cyc indicates more number of direct sources in the area. Due to the proximity of sites, both FLB and FLL have similar kind of direct sources other than B(a)P. But

B(a)P makes a very insignificant mass contribution to EOM. And therefore both of these sites have almost same percentage of Cyc fractions (2.6 & 2.5) in their respective IP10s.

IPM and Ace fractions have higher levels during the periods of summer which could be the result of the occasional photochemical smog during that periods. Lioy et al 1980, have shown that during summer the east coast is often impacted by synoplic-scale photochemical oxidant episodes which are characterized by high temperature, atmospheric stagnation and high levels of ozone and sulfate aerosols. And these episodes frequently associate with slow moving high pressure systems and long range transport from the Midwest. During winter time, with lower temperature and sunlight intensity and a large greater preponderance of winds from the less populated Northwest, there is much less photochemistry and aerosol transport from other regions of the United States. But in peak winter time, local (<10km) emissions from space heating, traffic and meteorology became more significant.

3.5 SULFATES

The average sulfate concentration is relatively stable (between 4.5 to 5.5 ug/m^3) for all the sites (Figure. 3.2). Oxides of sulfur are transported into the northeast region

and then transform into sulfates. It is a kind of regional phenomena and therefore did not vary much between sites. But it did show some seasonal differences (Figure 3.2). During summer particularly in the months of July and August concentrations went upto 8.5 ug/M^3 and percentage of sulfates in IP10 was as high as 20%. But after the summer levels were generally around 2-3 ug/M^3. Therefore as Lioy et al 1980 suggested, these summertime peaks are strongly associated with synoplic-scale meteorology.

3.6 NITRATES

Nitrates are also secondary pollutants formed in atmospheric reactions from the nitrogen oxides. Nitrogen oxides are byproducts of combustion of fossil fuels. They very much depend on local sources and somewhat depend on 'Aging'. Summer time decrease in concentrations can be accounted with the photochemical breakdown of nitrate compounds (Fig. 3.1).

3.7 MUTAGENICITY IN EXTRACTED ORGANIC MATTER

Levels of mutagenicity were estimated by multiplying mutagenic activity, revertants/ug[1] with EOM Cyc fraction ug/M^3 to obtain in revertants/M^3. Mutagenic levels were calculated for both with and without metabolizing enzyme activity (- S9 & + S9). Fig. 3.22 shows the mutagenic levels of urban and rural sites in peak summer (July & August) and peak winter months (January & February). The results obtained are given in the following table:

	Urban(revertants/M^3)		Rural(revertants/M^3)	
	-S9	**+S9**	**-S9**	**+S9**
Summer	0.41	1.37	0.14	0.62
Winter	2.24	2.03	0.23	0.15

[1] *Values of mutagenic activity for summer and winter are taken from study done by Paul & Daisey et al, in ATEOS project.*

3.8 VARIATION OF POLLUTANTS BETWEEN IP10 AND TSP SITES

Atlantic City:

Peak winter (Jan & Feb) Cyc fraction was lower by 4 times in IP10 site. In summer it came down to 2 times. For Ace they are 1.5 and 2 in winter and summer respectively. (Table 3.13), (Figs. 3.10 & 3.11)

The difference in EOM levels can be accounted in two ways. First fresh fugitive vapors might be settling down heavily on larger particulate matter. Second, as the smaller particles (IP10) were being collected onto the filters some of the EOM must be blowing off the particulate matter.

Other than one or two episodes daily concentration patterns of B(a)P and particulate matter are quite similar. On the whole TSP site indicated little higher levels (Figs. 3.12 & 3.13).

Overall patterns for sulfates and nitrates are very much similar for both sites but nitrate levels are higher in TSP site beginning with March until June (Figs. 3.14 & 3.15).

Elizabeth:

In Elizabeth TSP site no samples were collected after July. Therefore only the winter time results are compared. Peak winter differences for Cyc and Ace are approximately, 1.5 and 2.5 respectively with TSP site being on the higher side (Table 3.14), (Figs. 3.16 & 3.17)

Rest of the pollutants repeated almost the same pattern in both sites (Figs. 3.18 to 3.22).

Table 3.1

Monthly GMs of each pollutant at each site

Atlantic City IP07, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	41.12	0.87	9.5	0.16	5.61	1.97
FEB	28.89	1.58	6.27	0.07	3.96	1.4
MAR	41.64	2.32	5.79	0.19	4.7	0.92
APR	29.56	1.78	4.82	0.06	4.6	0.82
MAY	33.53	1.96	6.54	0.03	5.72	0.74
JUN	55.19	1.28	5.25	0.02	7.92	0.87
JUL	44.43	1	4.49	0.01	6.51	0.28
AUG	52.09	1.26	5.99	0.03	10.67	0.48
SEP	32.34	2.23	7.01	0.05	4.18	0.62
OCT	36.63	1.84	8.92	0.12	3.3	0.5
NOV	27.63	4.07	7.76	0.26	3.5	0.34
DEC	59.36	9.6	16.63	0.08	4.38	0.69

Table 3.2

Monthly GMs of each pollutant at each site

Camden IP02, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	43.46	3.5	11.1	0.74	8.61	2.45
FEB	21.35	1.99	3.69	0.19	4.53	0.83
MAR	24.5	1.04	4.67	0.16	3.84	1.07
APR	21.2	1.16	3.26	0.05	5.36	0.34
MAY	26.54	0.43	1.24	0.02	6.54	0.4
JUN	36.31	0.35	3.08	0.04	6.79	0.46
JUL	39.24	1.02	5.62	0.03	6.47	0.33
AUG	36.66	0.59	4.55	0.03	8.83	0.28
SEP	25.78	0.5	2.93	0.04	5.07	0.64
OCT	20.48	0.48	3.84	0.15	3.47	0.32
NOV	22.32	0.85	4.16	0.15	3.77	0.58
DEC	25.53	0.63	4.11	0.39	4.38	0.52

Table 3.3

Monthly GMs of each pollutant at each site

Elizabeth IP01, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	40.8	1.86	10.06	0.86	6.32	2.04
FEB	30.02	1.51	6.18	0.28	4.54	1.27
MAR	22.08	2.15	4.83	0.11	3.37	0.46
APR	24.55	0.92	4	0.04	4.66	0.62
MAY	30.96	0.61	1.25	0.03	6.21	0.98
JUN	31.01	0.46	1.79	0.03	4.99	0.27
JUL	38.38	0.43	4.29	0.01	9.26	0.26
AUG	37.33	0.83	3.62	0.03	8.36	0.39
SEP	21.55	0.37	4.59	0.04	3.55	0.53
OCT	16.04	0.69	4.55	0.09	2.16	0.31
NOV	26.73	1.3	5.37	0.31	3.55	0.48
DEC	20.55	1.44	6.28	0.36	2.18	0.37

Table 3.4

Monthly GMs of each pollutant at each site

Fort Lee Bridge IP14, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	58.71	1.49	2.44	0.58	6.91	3.64
FEB	36.8	2.1	6.19	0.27	4.87	2.27
MAR	32.87	1.45	5.62	0.23	4.32	1.06
APR	38.71	1.63	3.63	0.17	6.58	1.55
MAY	47.07	0.35	2.37	0.08	7.11	1.17
JUN	46.57	0.47	2.78	0.05	6.12	0.42
JUL	58.84	1.6	7.72	0.09	9.52	0.33
AUG	61.17	1.4	6.82	0.12	10.59	0.65
SEP	35.98	0.57	4	0.07	4.15	0.59
OCT	31.96	1.41	5.13	0.33	3.39	0.37
NOV	33.32	1.03	3.96	0.32	3.87	0.42
DEC	28.95	1.08	5.8	0.71	3.27	0.59

Table 3.5

Monthly GMs of each pollutant at each site

Fort Lee Library IP15, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	40.4	2.13	8.8	0.59	6.8	1.79
FEB	31.4	1.74	5.93	0.25	5.58	1.85
MAR	18.84	1.07	4.03	0.11	3.87	0.4
APR	28.43	0.26	2.18	0.05	6.36	1.07
MAY	29.26	0.56	2.44	0.05	5.3	0.57
JUN	34.23	0.43	4.89	0.02	5.62	0.38
JUL	44.77	0.52	5.16	0.04	5.84	0.33
AUG	41.46	0.47	5.06	0.03	8.59	0.33
SEP	28.45	0.54	4.34	0.06	4.31	0.45
OCT	22.21	0.4	4.24	0.11	3.49	0.32
NOV	22.11	1.36	5.22	0.59	3.59	0.35
DEC	20.56	0.88	4.51	0.68	2.98	0.41

Table 3.6

Monthly GMs of each pollutant at each site

Newark IP03, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	42.15	4.65	13.91	1.26	6.15	2.05
FEB	28.87	1.13	5.25	0.35	5.75	1.2
MAR	21.36	1.21	4.39	0.3	3.87	0.84
APR	25.4	0.88	2.8	0.08	5.4	0.39
MAY	34.45	0.15	1.54	0.03	6.39	1.2
JUN	33.98	0.22	3.01	0.02	6.22	0.43
JUL	47.01	1.28	4.23	0.06	9.1	0.39
AUG	38.96	0.42	2.95	0.03	6.69	0.39
SEP	24.94	0.84	4.32	0.07	3.54	0.67
OCT	22.08	1.36	7.08	0.31	2.63	0.29
NOV	29.35	2.25	7.56	0.35	3.72	0.47
DEC	23.85	0.67	6.85	0.45	3.22	0.5

Table 3.7

Monthly GMs of each pollutant at each site

Newark IP04, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	44.44	2.96	10.07	2.11	7.4	1.83
FEB	32.46	1.6	6.57	0.59	5.92	1.95
MAR	22.25	1.25	3.58	0.22	4	0.97
APR	26.65	1.19	4.07	0.1	6.55	0.19
MAY	36.46	0.94	4.88	0.08	6.86	0.93
JUN	31.09	0.86	2.65	0.04	5.21	0.39
JUL	43.26	1.14	6.4	0.03	8.81	0.31
AUG	45.36	1.54	9.41	0.05	10.23	0.34
SEP	27.48	0.86	6.02	0.1	4	0.47
OCT	21.9	1.67	5.33	0.32	2.69	0.29
NOV	28.87	1.46	8.23	0.38	3.68	0.57
DEC	25.03	0.79	5.98	0.47	3.48	0.49

Table 3.8

Monthly GMs of each pollutant at each site

Pennsauken IP11, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	46.44	1.45	6.06	0.4	10.33	2.56
FEB	23.85	0.78	4.43	0.09	4.3	1.42
MAR	25.39	1.27	4.05	0.11	4.18	0.92
APR	25.67	0.45	1.04	0.08	6.14	0.58
MAY	35.29	0.44	5.43	0.06	6.45	0.44
JUN	41.64	0.88	6.64	0.05	7.41	0.62
JUL	45.99	0.25	4.54	0.03	10.81	0.32
AUG	41.53	0.73	3.43	0.02	8.86	0.6
SEP	25.84	0.28	2.88	0.04	5.06	0.55
OCT	21.5	0.55	3.16	0.21	3.45	0.31
NOV	21.77	0.66	2.74	0.15	3.9	0.46
DEC	25.17	0.59	5.48	0.42	2.78	1.14

Table 3.9

Monthly GMs of each pollutant at each site

Ringwood Ip05, 1988

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	21.84	0.56	3.21	0.16	5.03	0.46
FEB	14.27	0.59	2.21	0.05	3.01	0.44
MAR	11.81	0.85	2.3	0.06	2.8	0.31
APR	16.97	0.64	3.79	0.04	4.97	0.11
MAY	19.82	0.38	6.21	0.02	5.11	0.3
JUN	24.09	0.21	2.82	0.03	6.17	0.2
JUL	32.89	0.66	4.31	0.02	9.83	0.37
AUG	28.66	0.3	2.85	0.02	7.1	0.26
SEP	18.37	0.19	2.37	0.01	4.06	0.26
OCT	11.25	0.15	1.51	0.02	2.67	0.21
NOV	11.64	0.23	0.86	0.03	2.99	0.2
DEC	10.97	0.42	2.79	0.08	2.22	0.3

Table 3.10

Yearly GM of each pollutant at each site

Site Id	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
AC7	38.94	1.94	6.94	0.06	5.11	0.7
CAM	27.66	0.82	3.88	0.09	5.38	0.55
ELZ	27.33	0.9	4.19	0.08	4.47	0.54
FLB	41.22	1.08	4.39	0.18	5.49	0.81
FLL	29.06	0.71	4.46	0.11	4.97	0.54
NWK3	30.07	0.86	4.57	0.14	4.91	0.61
NWK4	31.13	1.26	5.7	0.17	5.32	0.56
PENN	30.37	0.61	3.79	0.09	5.62	0.68
RING	17.34	0.38	2.64	0.03	4.24	0.27

Table 3.11

GM of each pollutant at various sites for each month

Month	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
JAN	41.02	1.8	7.34	0.57	6.87	1.87
FEB	26.67	1.35	4.95	0.19	4.63	1.28
MAR	23.25	1.33	4.23	0.15	3.85	0.71
APR	25.76	0.85	3.04	0.07	5.57	0.48
MAY	31.81	0.51	2.91	0.04	6.15	0.67
JUN	36.13	0.48	3.39	0.03	6.21	0.41
JUL	43.37	0.76	5.09	0.03	8.29	0.32
AUG	41.69	0.73	4.6	0.03	8.78	0.4
SEP	26.28	0.55	4.04	0.05	4.18	0.51
OCT	21.54	0.74	4.39	0.15	2.99	0.32
NOV	23.97	1.14	4.32	0.22	3.61	0.41
DEC	24.39	1.01	5.77	0.32	3.12	0.52

Table - 3.12

GM of nine IP sites on each sampling day (for each pollutant)

Sampling Day	IP10 (ug/m3)	CYC (ug/m3)	ACE (ug/m3)	BaP (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)
1/4	34.54	3.25	7.64	0.59	5.84	0.94
1/10	39.31	1.49	3.82	0.53	7.19	1.6
1/16	64.91	2.22	12.91	0.93	9.56	5.82
1/22	27.64	0.99	5.56	0.37	4.8	1.07
1/28	46.77	2.22	11.24	0.52	7.85	2.28
2/3	24.13	1.31	5.23	0.22	5.01	0.95
2/9	34.86	1.7	9.42	0.58	4.66	2.17
2/15	26.54	1.11	3.17	0.09	4.63	1.16
2/21	15.96	1.46	2.85	0.1	2.49	0.53
2/27	34.06	1.13	5.47	0.17	7.16	2.19
3/4	36.45	1.53	6.07	0.17	7.93	1.86
3/10	17.3	1.27	2.77	0.08	3	0.48
3/16	22.8	1.16	4.21	0.21	4.81	0.56
3/22	23.97	1.59	4.07	0.22	2.07	1.08
3/28	18.95	1.14	4.61	0.11	3.55	0.3
4/3	36.95	1.22	4.41	0.08	10.67	0.42
4/9	11.17	0.95	2.95	0.08	1.91	0.24
4/15	31.28	0.97	3.31	0.05	6.46	1.55
4/21	26.47	0.52	2.03	0.06	5.91	0.59
4/27	34.56	0.89	2.97	0.07	7.05	0.41
5/3	26.6	0.67	3.17	0.05	7	0.54
5/9	26.35	0.4	2.23	0.03	3.4	0.95
5/15	29.63	0.55	3.48	0.05	5.58	0.32
5/21	43.45	0.62	3.39	0.03	9.79	1.48
5/27	37.72	0.39	2.59	0.04	7.26	0.62
6/2	22.42	0.35	2.36	0.03	1.78	0.84
6/8	22.62	0.67	3.15	0.05	2.24	0.81
6/14	67.65	0.56	5.02	0.03	19.9	0.41
6/20	66.71	0.41	4.08	0.03	21.04	0.15
6/26	29.34	0.47	3.28	0.03	6.4	0.28

7/2	15.46	0.56	3.11	0.02	1.29	0.48
7/8	67.5	1.68	8.74	0.05	15	0.39
7/14	69.15	0.61	6.9	0.03	20.48	0.15
7/20	40.4	0.81	3.94	0.04	8.57	0.39
7/26	55.28	0.58	4.78	0.03	12.22	0.29
8/1	74.87	0.8	4.12	0.03	27.65	0.31
8/7	32.19	0.65	4.38	0.02	9.12	0.3
8/13	63.25	0.81	7.51	0.03	25.38	0.34
8/19	26.65	0.74	3.37	0.03	2.03	0.75
8/25	48.28	0.87	6.5	0.06	10.7	0.39
8/31	24.16	0.5	3.25	0.03	3.03	0.38
9/6	17.29	0.2	2.33	0.04	2.7	0.61
9/12	28.88	0.77	4.72	0.1	2.63	0.88
9/18	37.71	0.69	5.27	0.03	11.27	0.38
9/24	18.17	0.85	5.51	0.04	1.74	0.63
9/30	36.01	0.64	3.02	0.07	7.91	0.34
10/6	17.35	0.82	3.5	0.12	2.67	0.31
10/12	17.4	1.14	3.79	0.16	1.66	0.31
10/18	35.68	0.83	5.76	0.12	5.81	0.24
10/24	27.69	0.71	5.11	0.18	3.92	0.38
10/30	16.7	0.62	4.17	0.18	2.36	0.34
11/5	23.36	1.01	4.04	0.07	3.7	0.44
11/11	18.33	0.98	3.25	0.14	3.11	0.28
11/17	21.57	1.08	2.93	0.16	3.33	0.35
11/23	39.63	1.33	6.51	0.76	5.36	0.65
11/29	20.54	1.31	4.41	0.33	2.99	0.38
12/5	24.26	0.87	5.64	0.38	2.72	0.59
12/11	18.16	0.81	4.35	0.21	3.15	0.46
12/17	28.98	1.11	7.11	0.58	3.52	0.7
12/23	27.98	1.19	6.29	0.73	4.51	0.35
12/29	20.63	0.63	4.5	0.15	2.28	0.55

Table 3.13

Monthly GMs of Cyc & Ace at Atlantic City sites

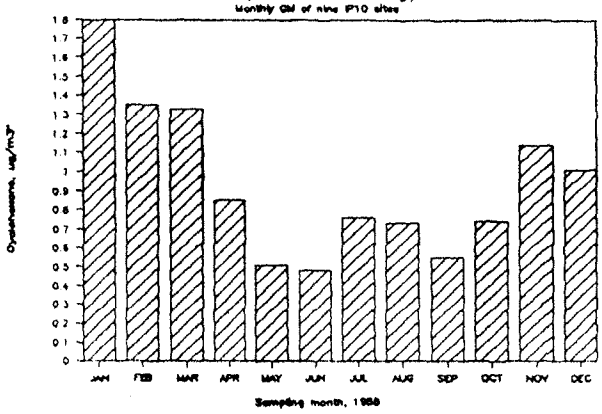
	TSP Site		IP10 Site	
Month	Cyc	Ace	Cyc	Ace
Jan	7.97	16.55	0.87	9.5
Feb	2.07	9.45	1.58	6.27
Mar	3.64	6.89	2.32	5.79
Apr	2.99	5.09	1.78	4.82
May	1.39	6.73	1.96	6.54
Jun	1.45	7.64	1.28	5.25
Jul	1.21	7.96	1	4.49
Aug	3.85	10.2	1.26	5.99
Sep	3.39	8.89	2.23	7.01
Oct	8.03	11.95	1.84	8.92
Nov	3.65	10.2	4.07	7.76
Dec	5.21	22.46	9.6	16.63

Table 3.14

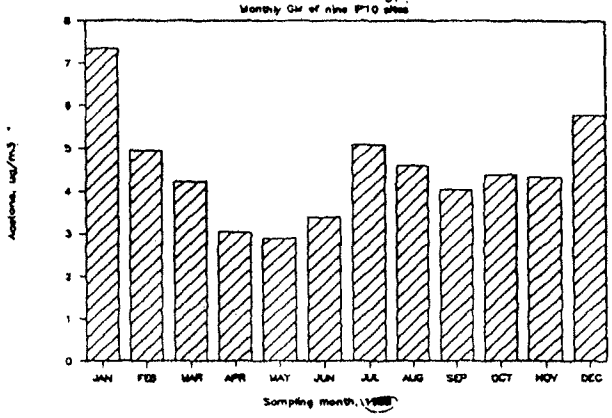
Monthly GMs of Cyc & Ace at Elizabeth sites

	TSP Site		IP10 Site	
Month	Cyc	Ace	Cyc	Ace
Jan	3.14	11.07	1.86	10.06
Feb	2.08	7.91	1.51	6.18
Mar	1.68	6.31	2.15	4.83
Apr	1.47	6.37	0.92	4
May	0.92	6.19	0.61	1.25
Jun	1.13	3.43	0.46	1.79
Jul	0.8	13.54	0.43	4.29

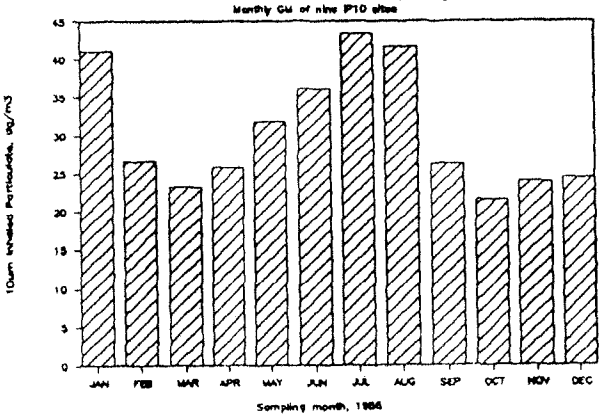
EOM Cyclohexane, ug/m3



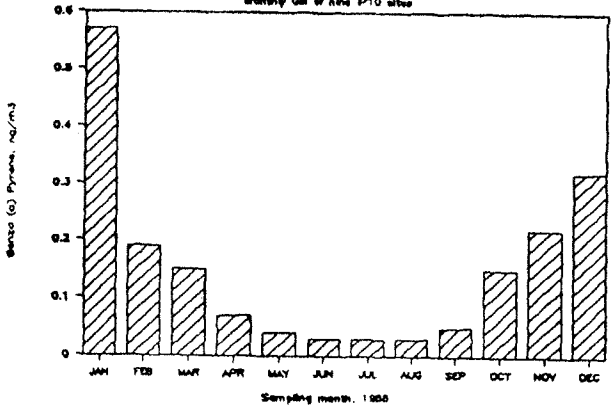
EOM Acetone, ug/m3



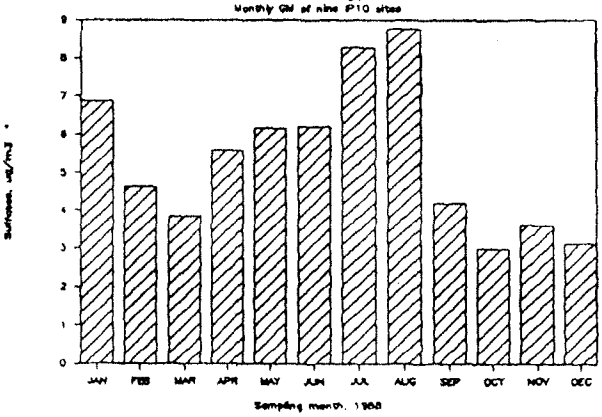
10um Inhaled Particulate, ug/m3



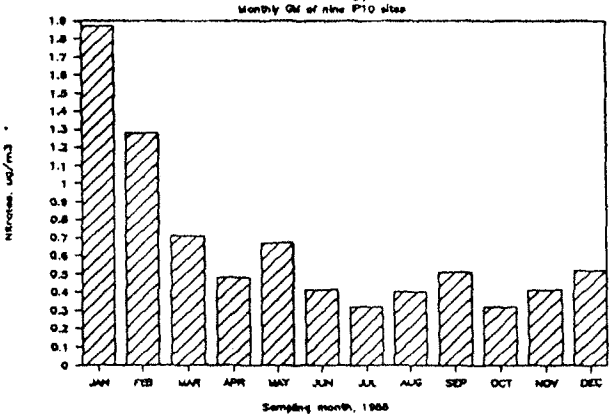
Benzo (a) Pyrene, ng/m3



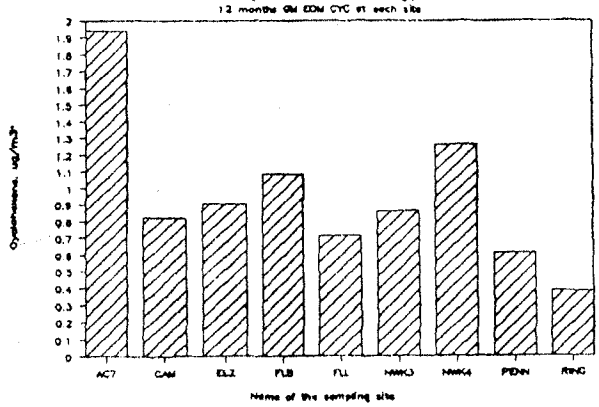
Sulfates, ug/m3



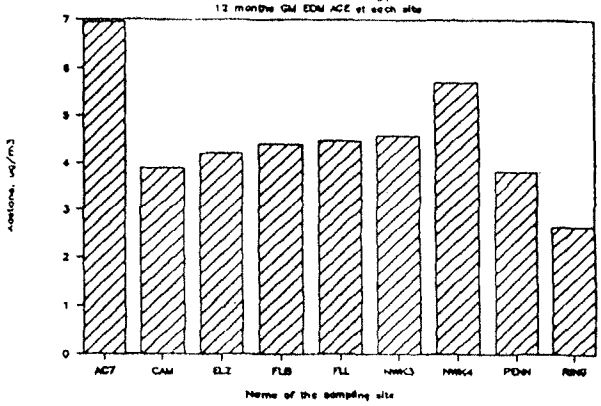
Nitrates, ug/m3



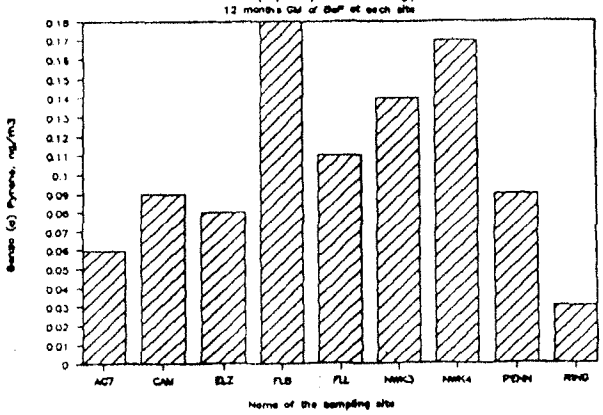
EOM Cyclohexane, ug/m3



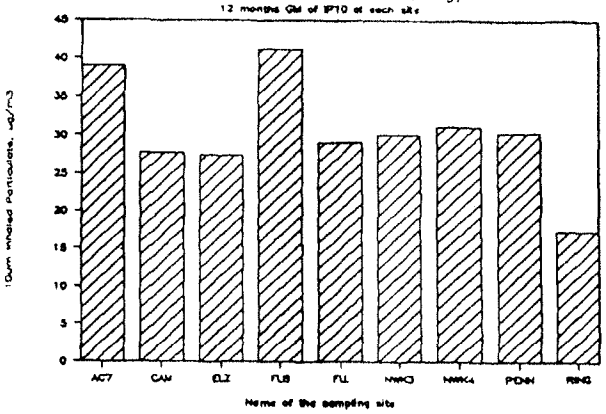
EOM Acetone, ug/m3



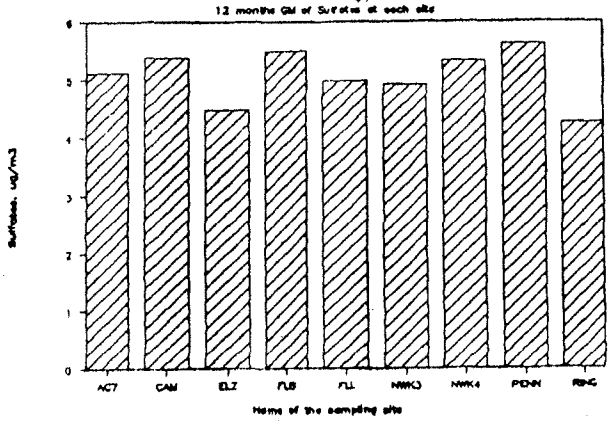
Benzo (a) Pyrene, ng/m3



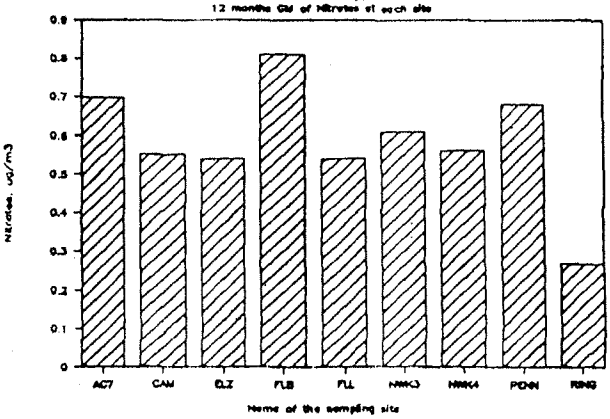
10um Inhaled Particulate, ug/m3

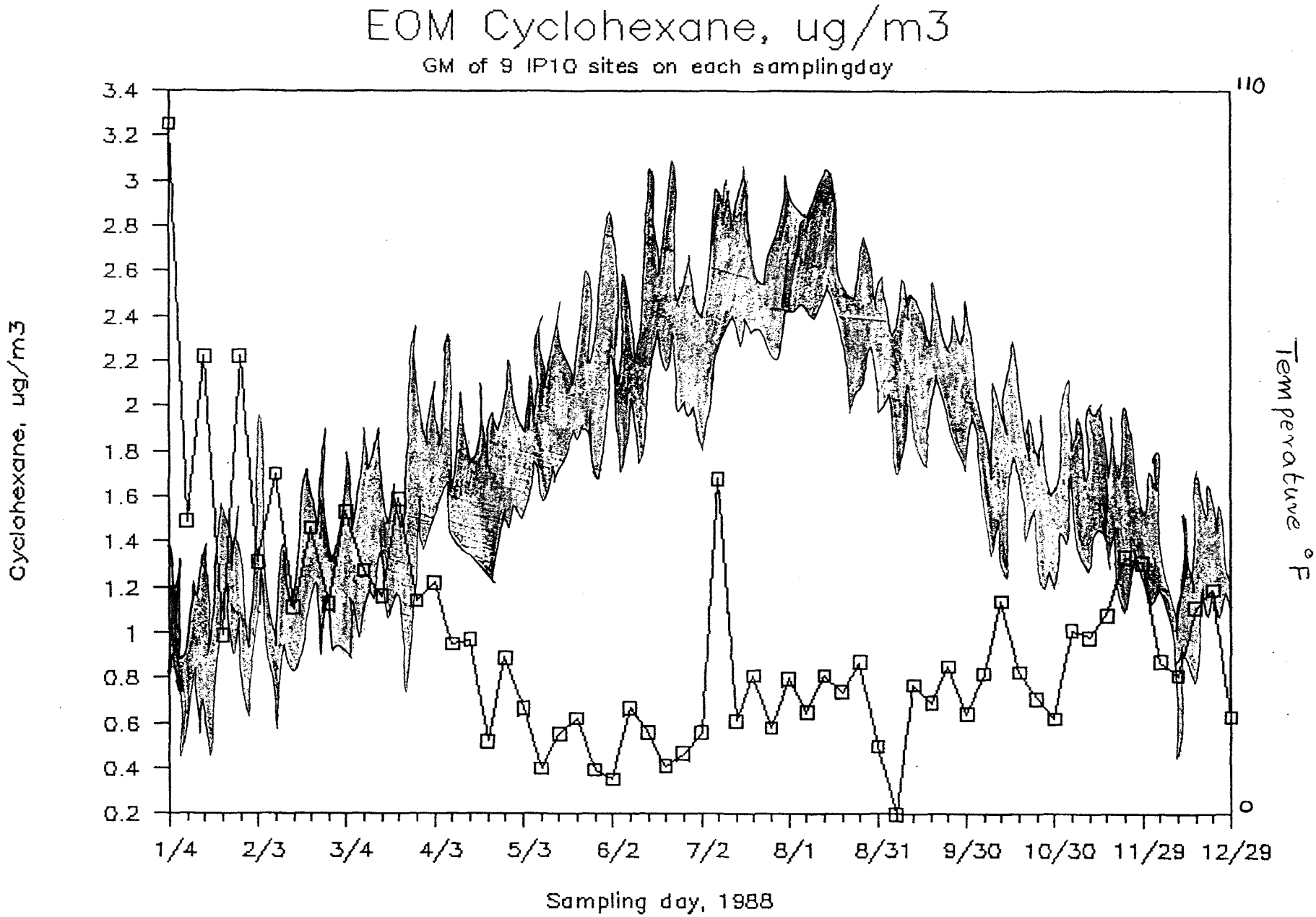


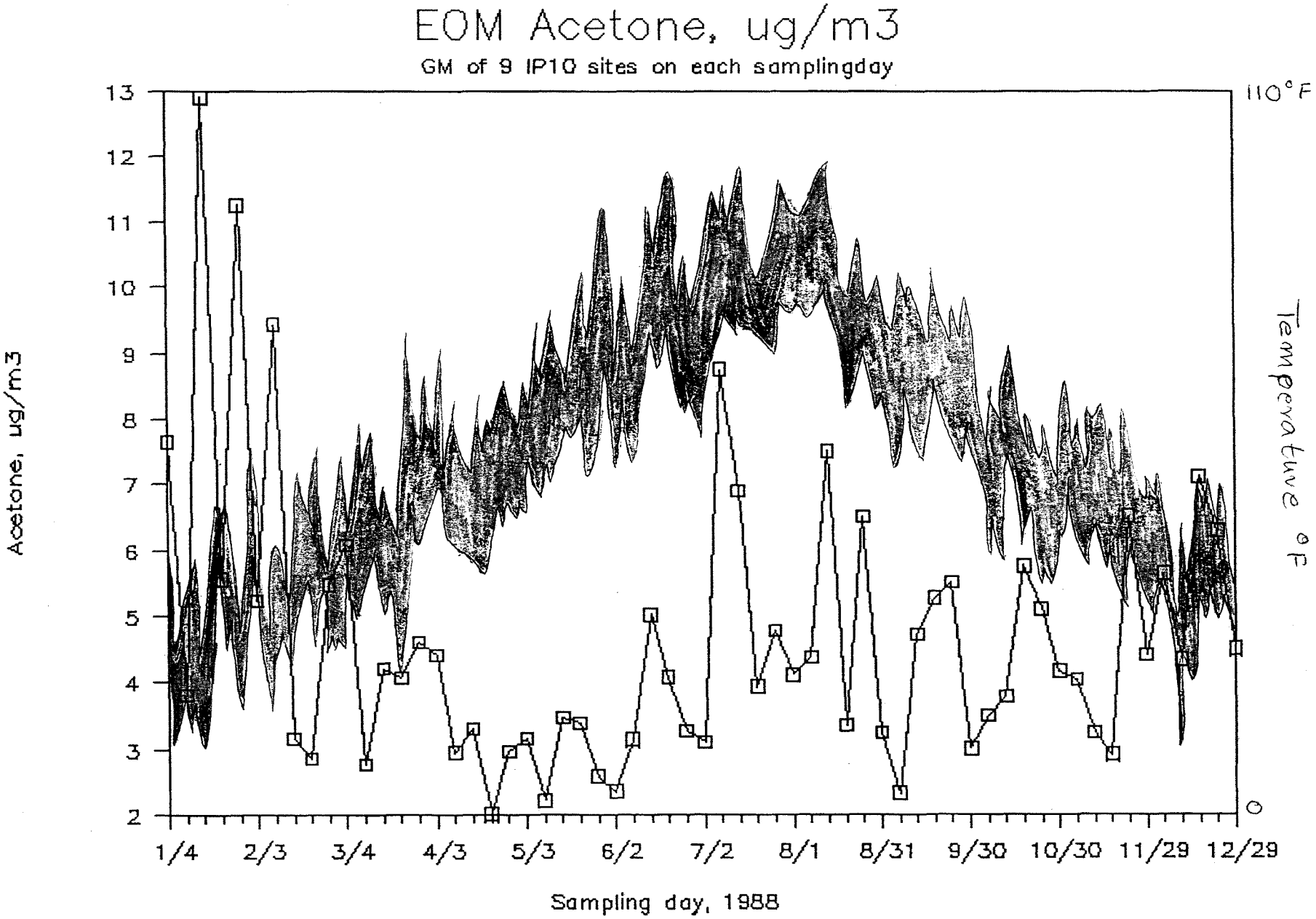
Sulfates, ug/m3

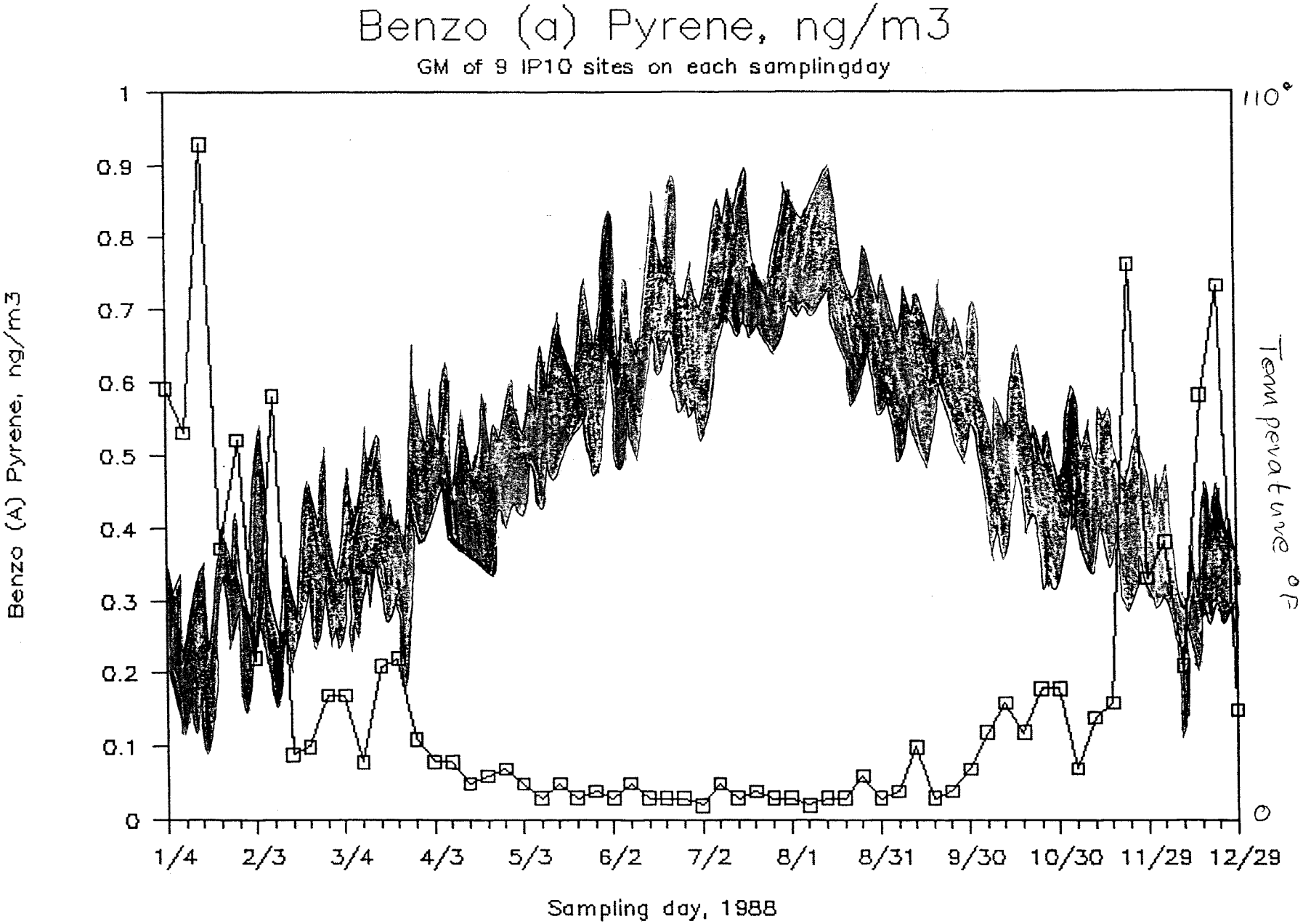


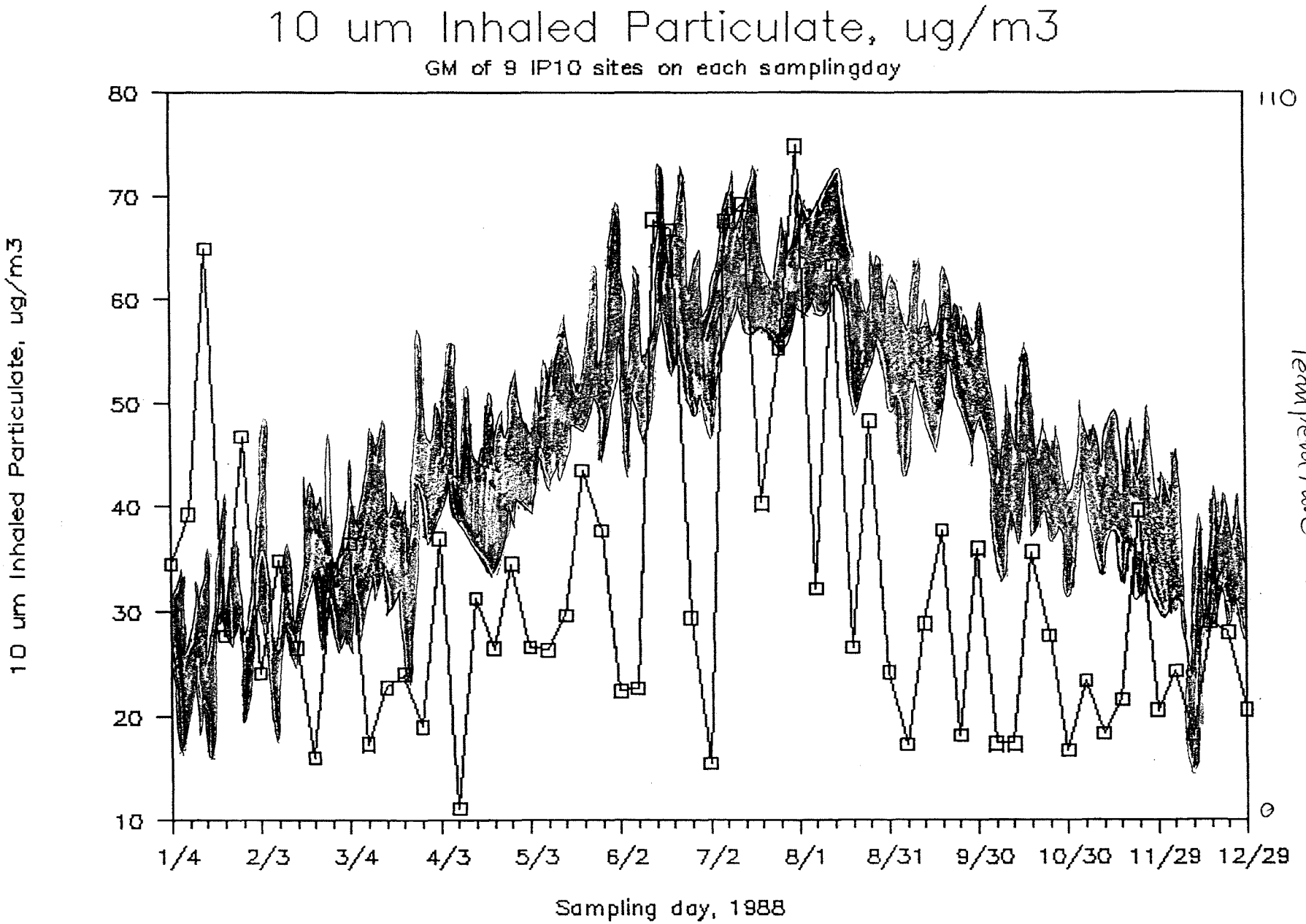
Nitrates, ug/m3

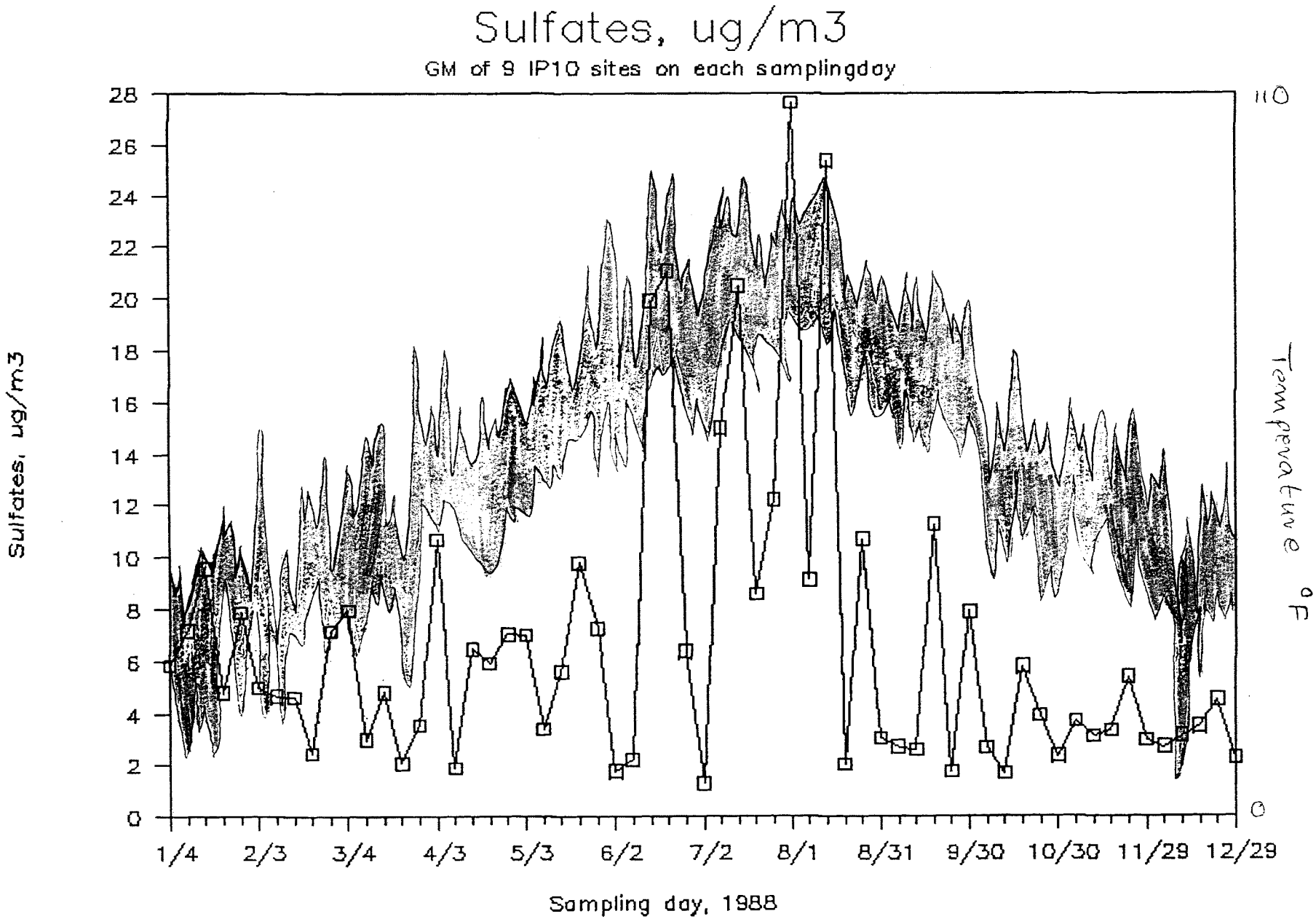


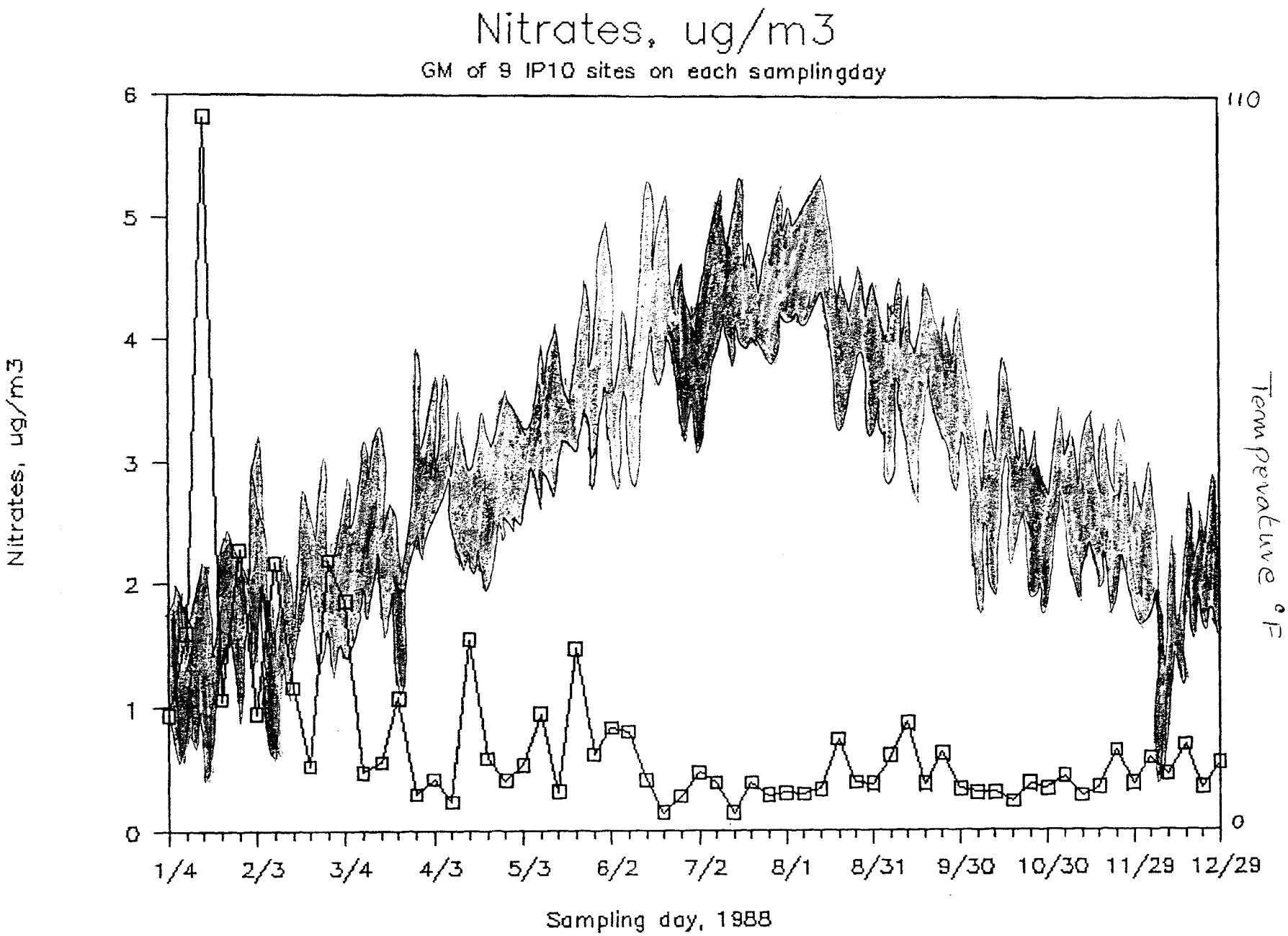

EOM Cyclohexane, ug/m3
GM of 9 IP10 sites on each samplingday
Cyclohexane, ug/m3
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
110
0
Temperature °F
1/4
2/3
3/4
4/3
5/3
6/2
7/2
8/1
8/31
9/30
10/30
11/29
12/29
Sampling day, 1988


EOM Acetone, ug/m3
GM of 9 IP10 sites on each samplingday
Acetone, ug/m3
13
12
11
10
9
8
7
6
5
4
3
2
110°F
Temperature °F
0
1/4
2/3
3/4
4/3
5/3
6/2
7/2
8/1
8/31
9/30
10/30
11/29
12/29
Sampling day, 1988


Benzo (a) Pyrene, ng/m3
GM of 9 IP10 sites on each samplingday
Benzo (A) Pyrene, ng/m3
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
110°
Temperature °F
0
1/4
2/3
3/4
4/3
5/3
6/2
7/2
8/1
8/31
9/30
10/30
11/29
12/29
Sampling day, 1988

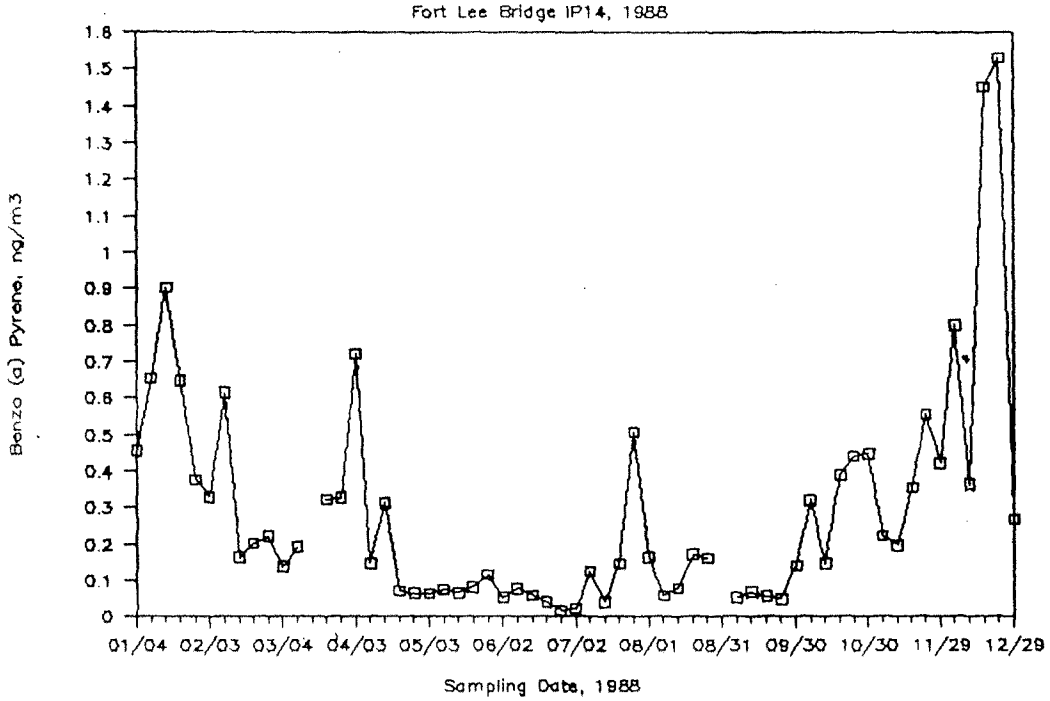

10 um Inhaled Particulate, ug/m3
GM of 9 IP10 sites on each samplingday
10 um Inhaled Particulate, ug/m3
80
70
60
50
40
30
20
10
110
0
Temperature °F
1/4
2/3
3/4
4/3
5/3
6/2
7/2
8/1
8/31
9/30
10/30
11/29
12/29
Sampling day, 1988


Sulfates, ug/m3
GM of 9 IP10 sites on each samplingday
Sulfates, ug/m3
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
110
0
Temperature F°
1/4
2/3
3/4
4/3
5/3
6/2
7/2
8/1
8/31
9/30
10/30
11/29
12/29
Sampling day, 1988


Nitrates, ug/m3
GM of 9 IP10 sites on each samplingday
Nitrates, ug/m3
Temperature °F
Sampling day, 1988
0
1
2
3
4
5
6
0
110
1/4
2/3
3/4
4/3
5/3
6/2
7/2
8/1
8/31
9/30
10/30
11/29
12/29

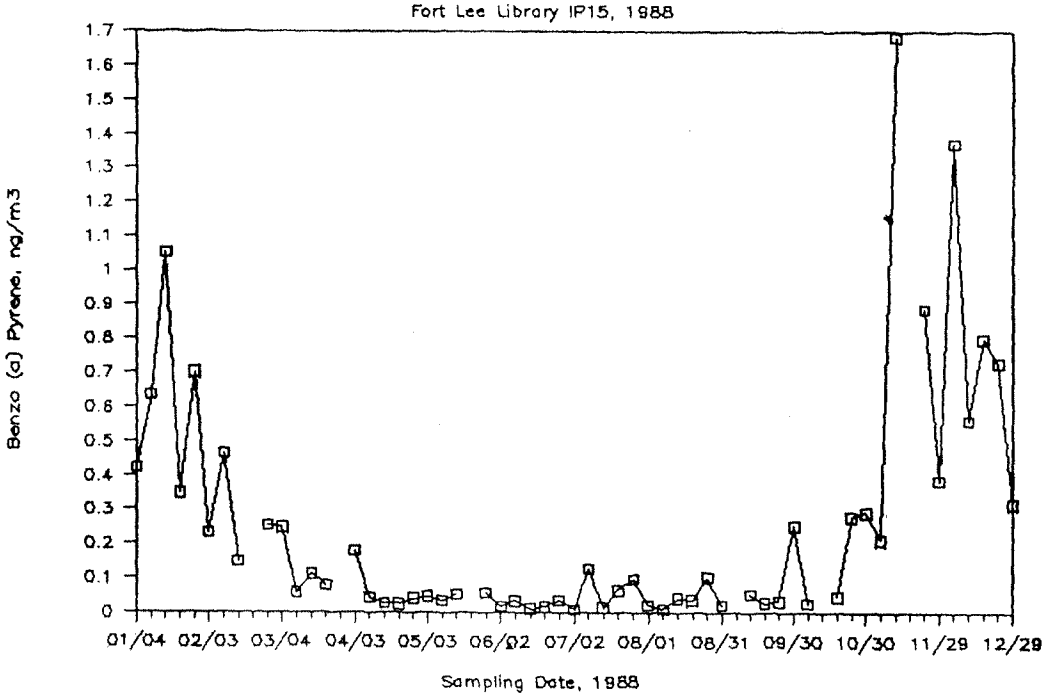
Benzo (a) Pyrene, ng/m3

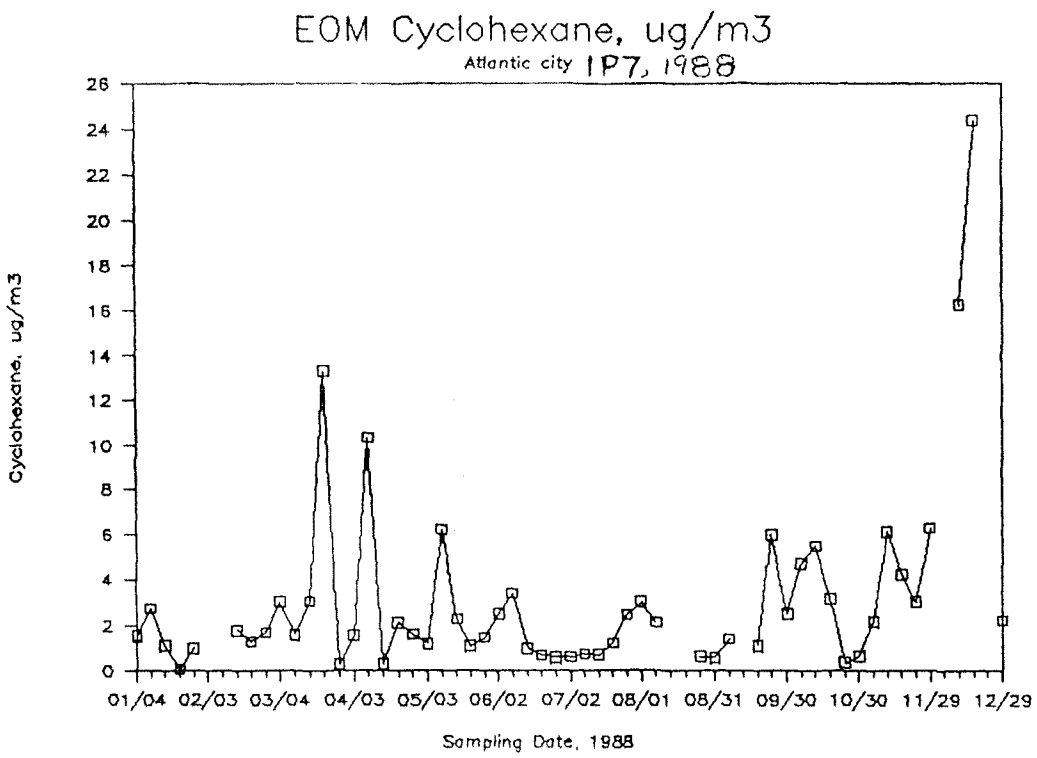
Fort Lee Bridge IP14, 1988

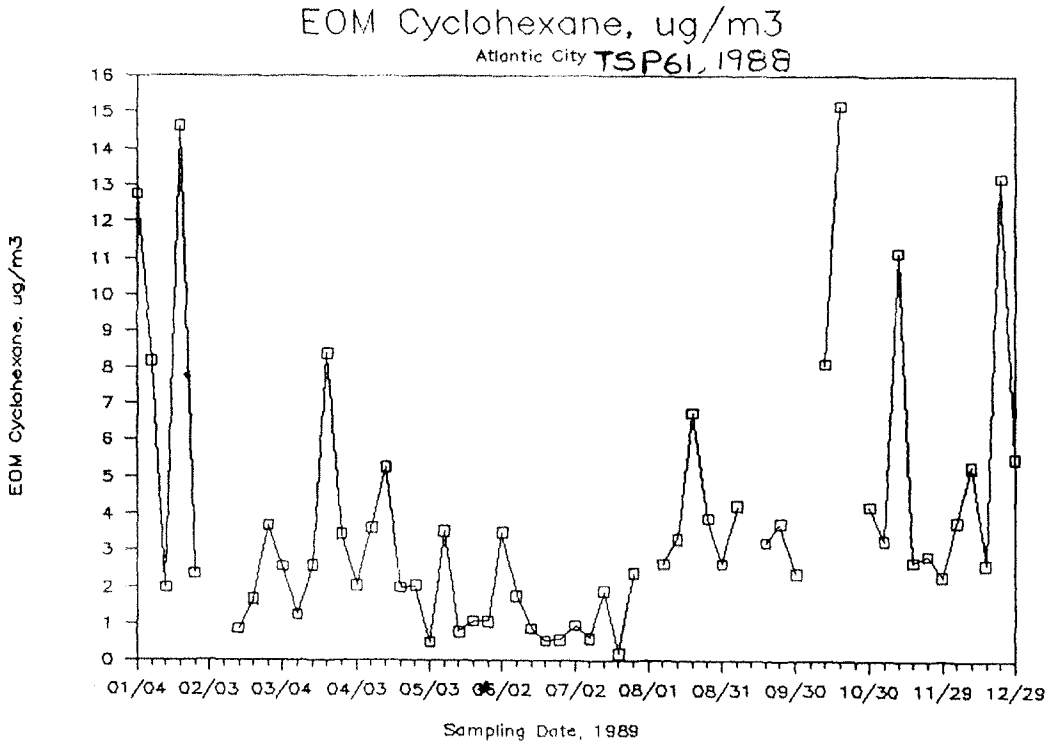


Benzo (a) Pyrene, ng/m3

Fort Lee Library IP15, 1988

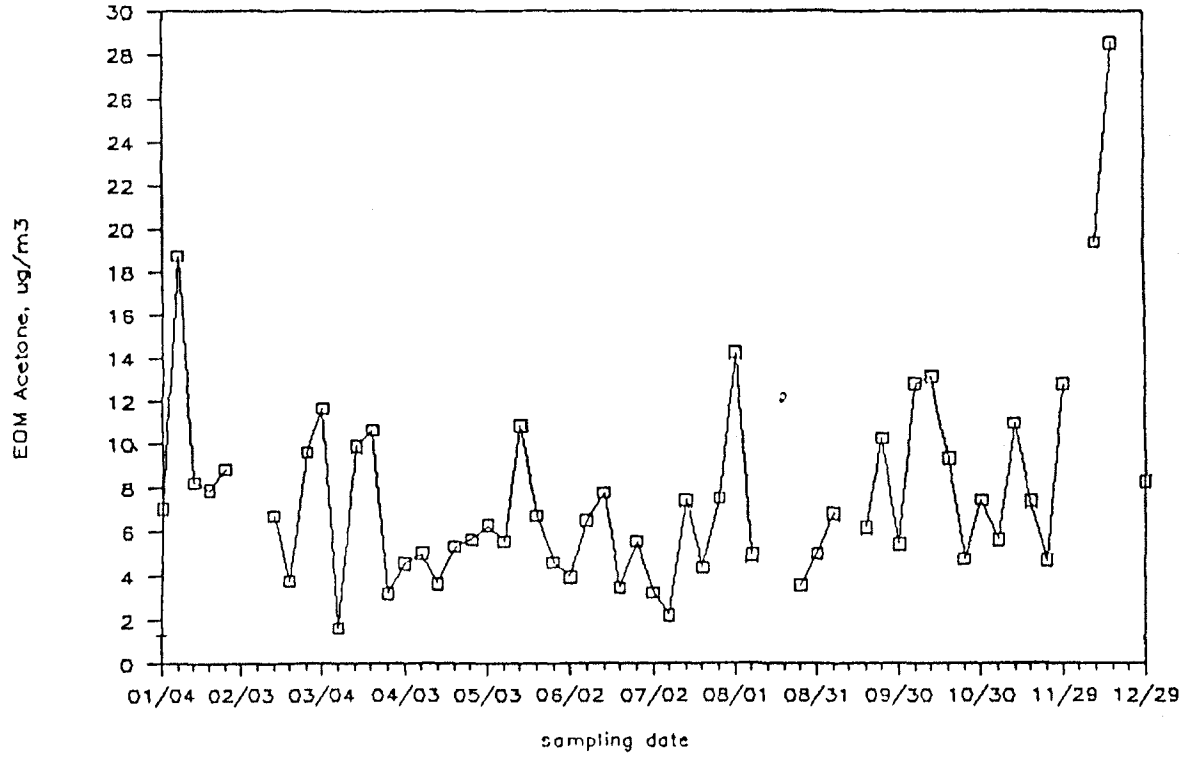



EOM Cyclohexane, ug/m3
Atlantic city IP7, 1988
Cyclohexane, ug/m3
0
2
4
6
8
10
12
14
16
18
20
22
24
26
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988


EOM Cyclohexane, ug/m3
Atlantic City TSP61, 1988
EOM Cyclohexane, ug/m3
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1989

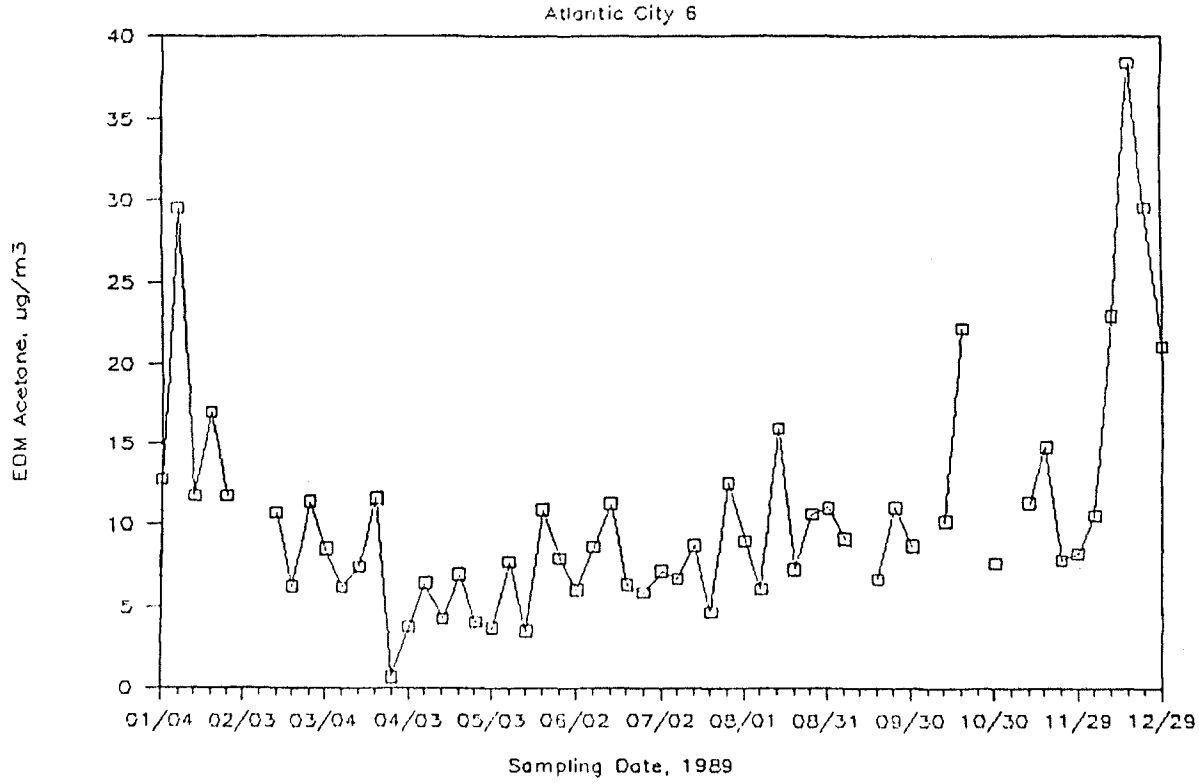
EOM Acetone, ug/m3

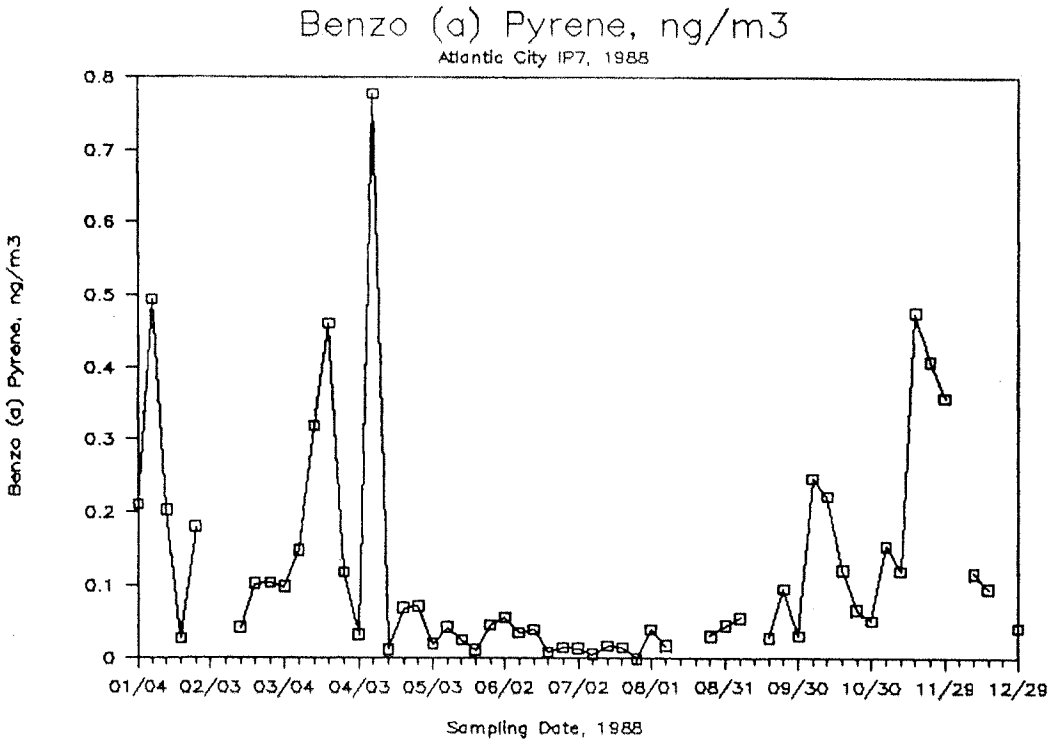
Atlantic city 7

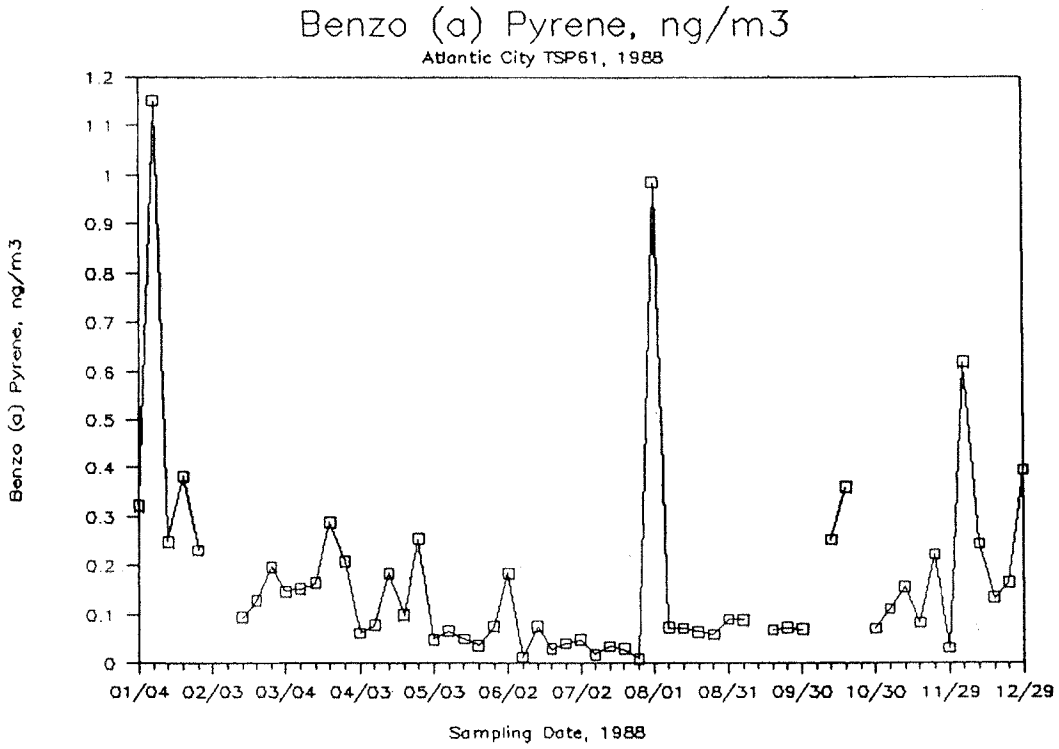


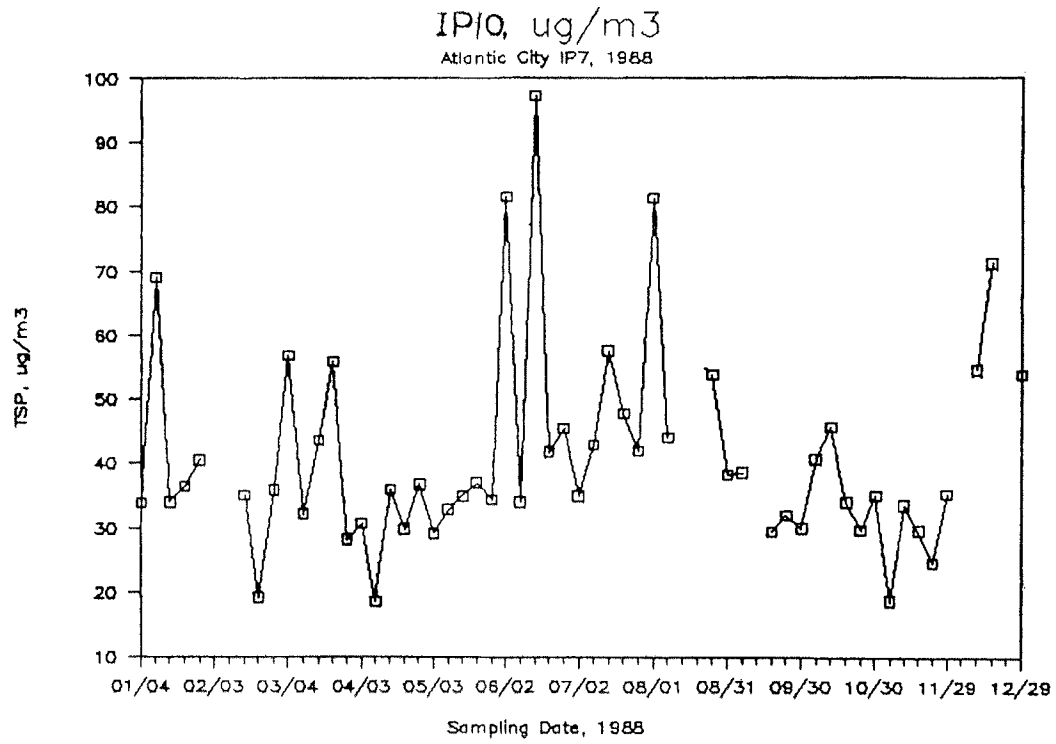
EOM Acetone, ug/m3

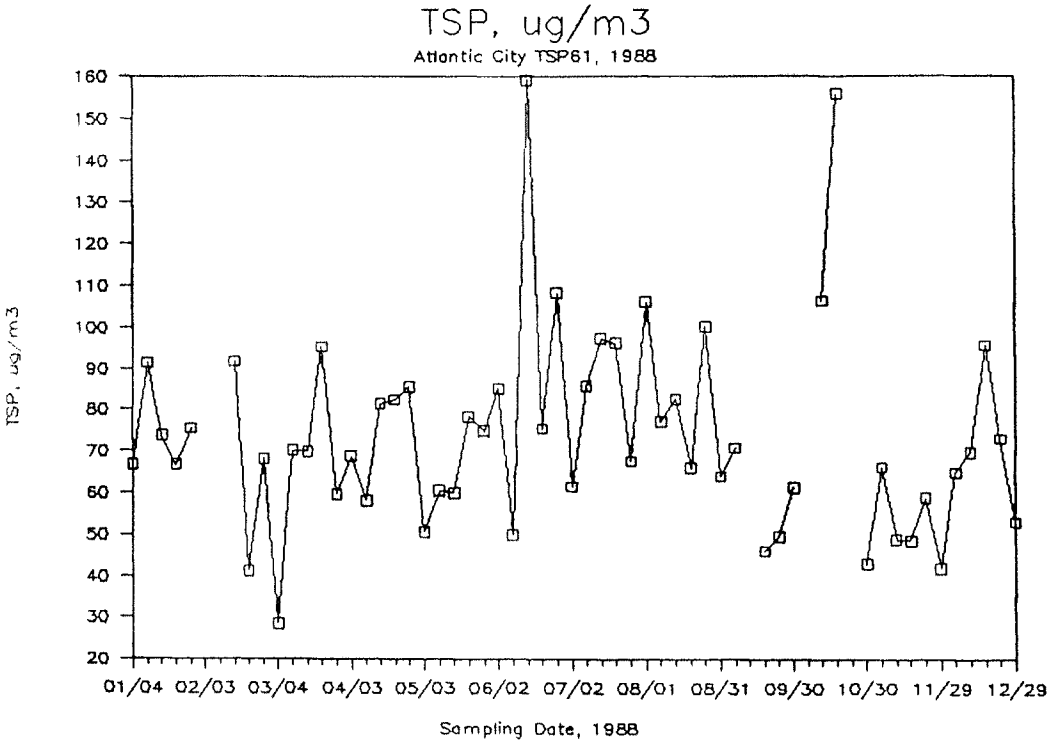
Atlantic City 6

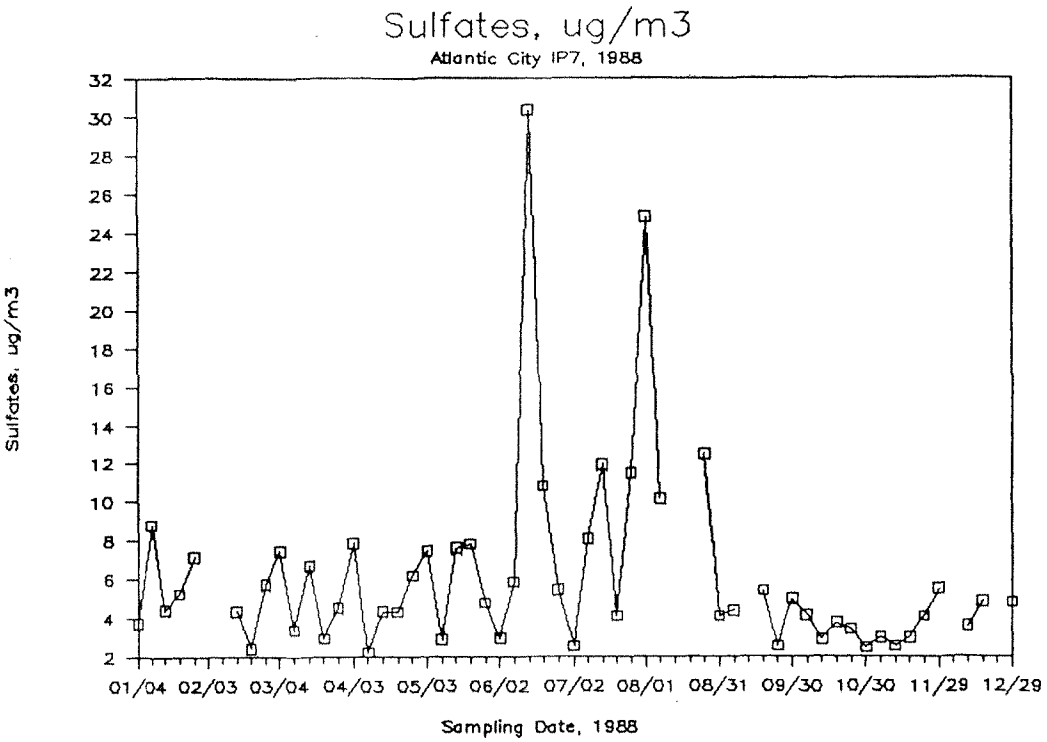


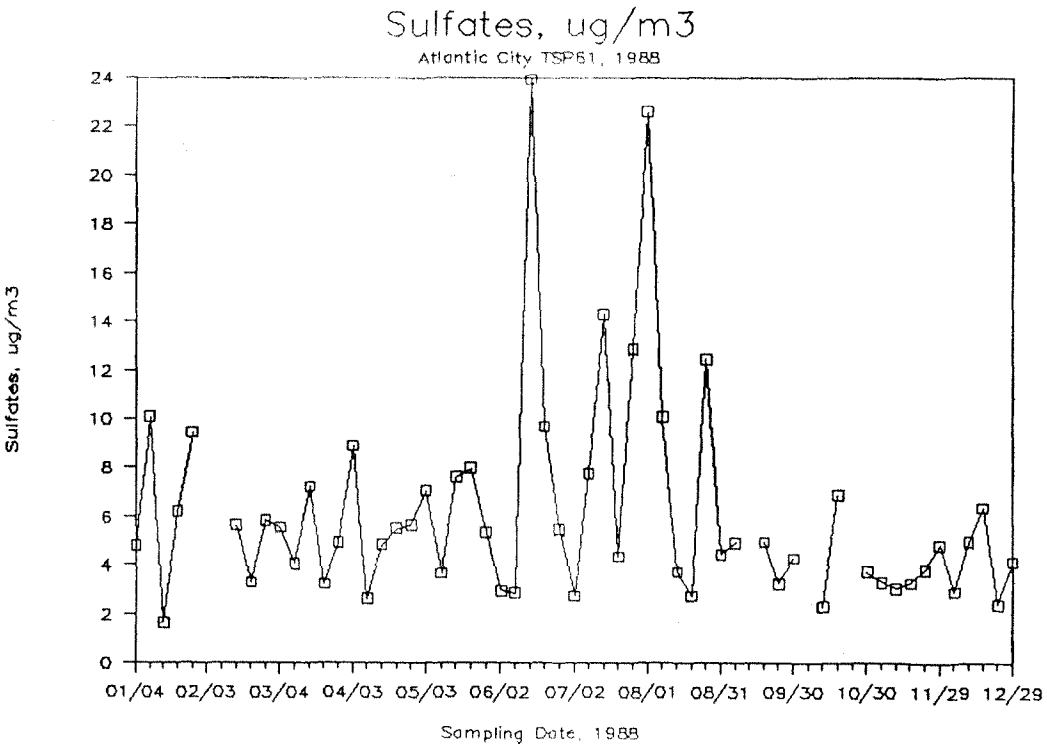

Benzo (a) Pyrene, ng/m3
Atlantic City IP7, 1988
Benzo (a) Pyrene, ng/m3
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988


Benzo (a) Pyrene, ng/m3
Atlantic City TSP61, 1988
Benzo (a) Pyrene, ng/m3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988


IP10, ug/m3
Atlantic City IP7, 1988
TSP, ug/m3
100
90
80
70
60
50
40
30
20
10
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988

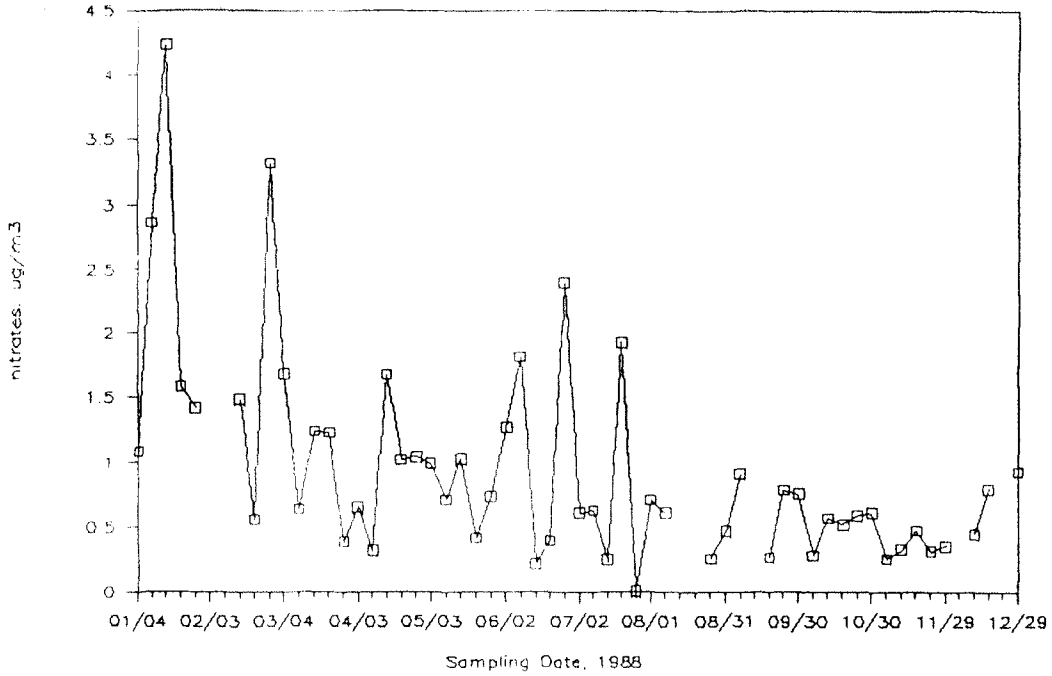

TSP, ug/m3
Atlantic City TSP61, 1988
TSP, ug/m3
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988


Sulfates, ug/m3
Atlantic City IP7, 1988
Sulfates, ug/m3
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988


Sulfates, ug/m3
Atlantic City TSP61, 1988
Sulfates, ug/m3
24
22
20
18
16
14
12
10
8
6
4
2
0
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988

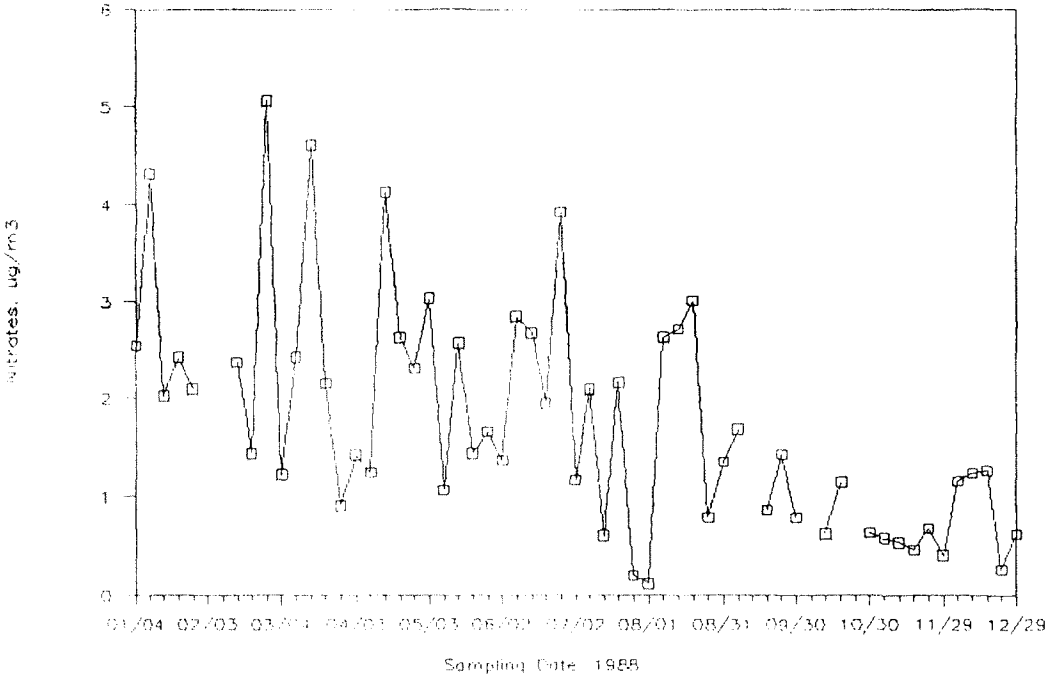
Nitrates, ug/m3

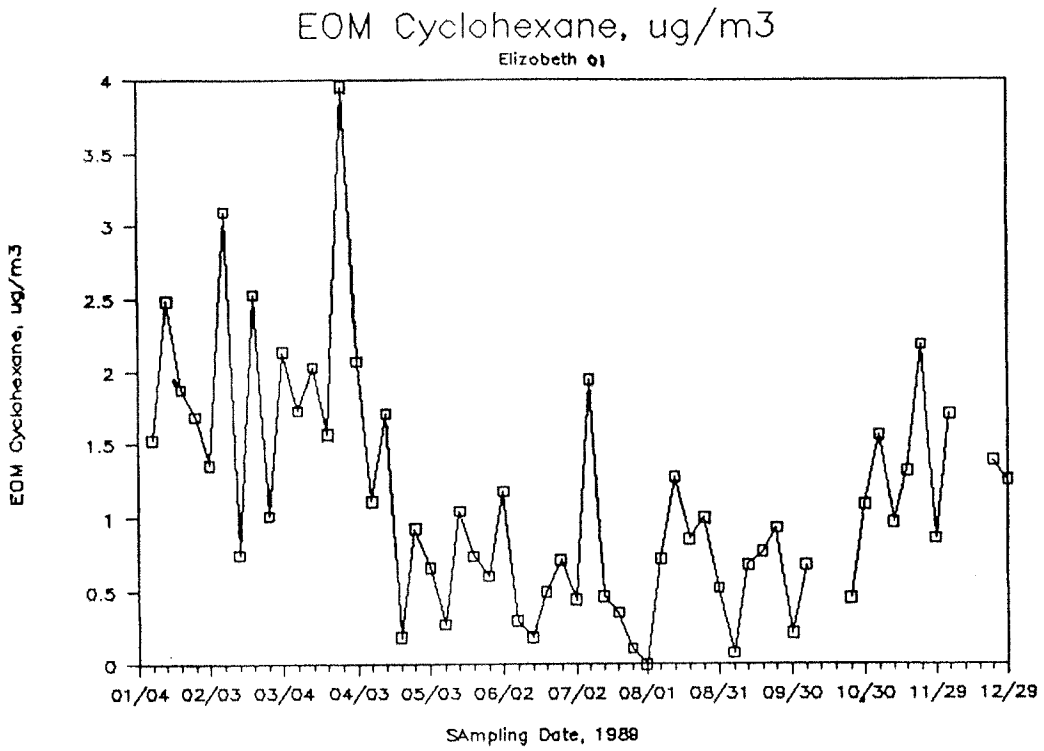
Atlantic City IP7, 1988

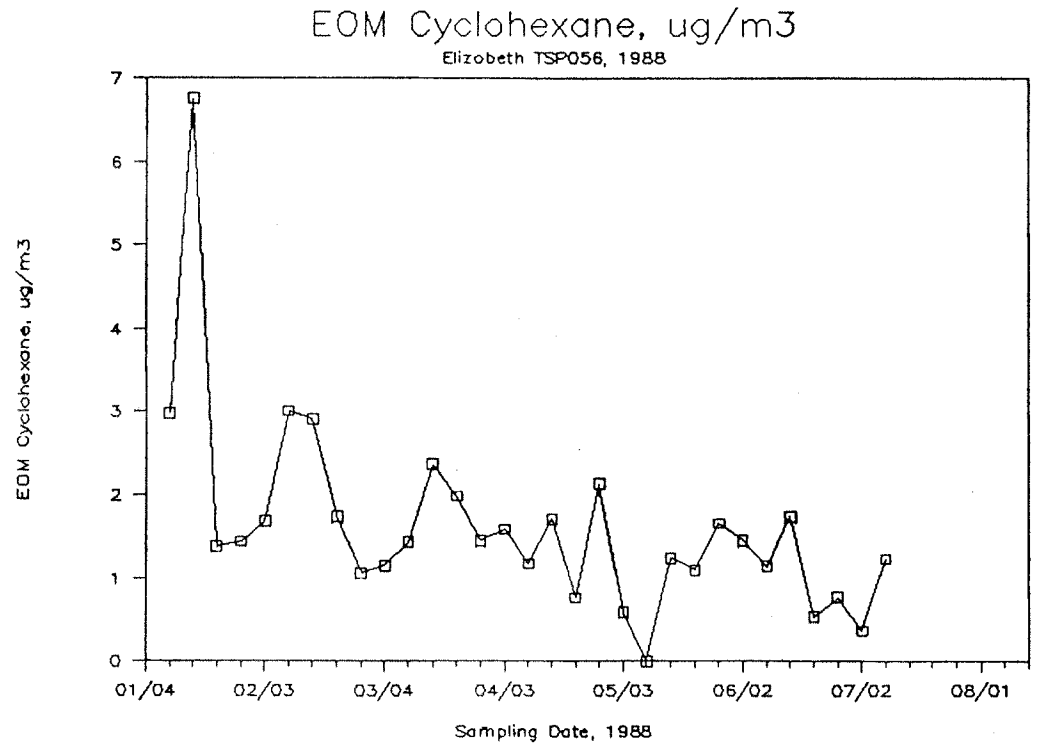


Nitrates, ug/m3

Atlantic City [illegible], 1988

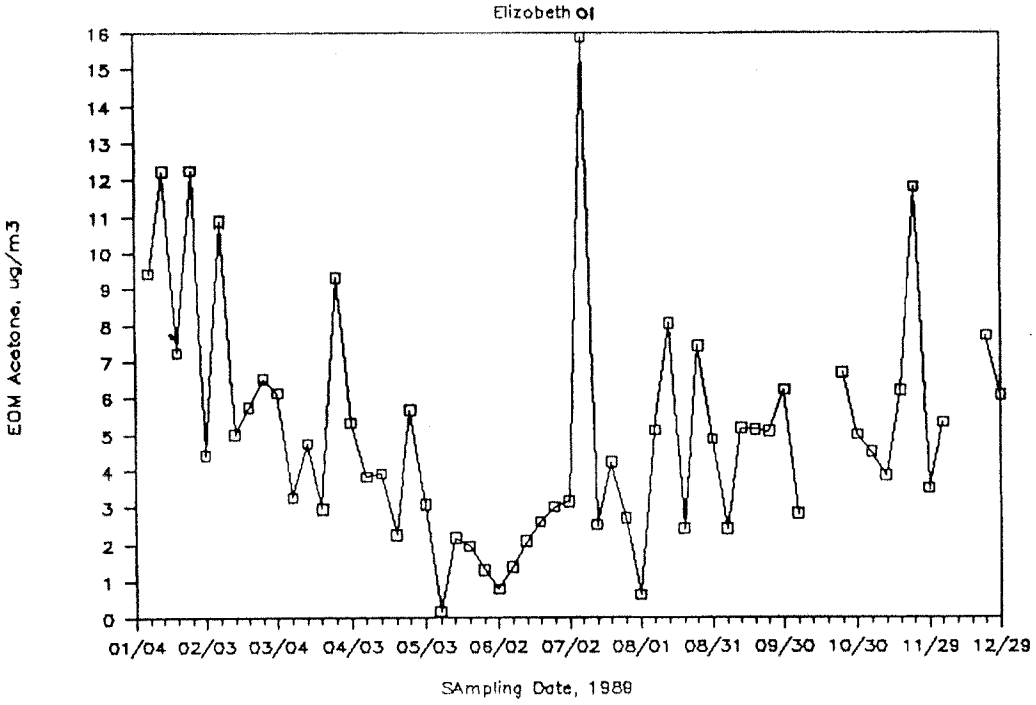



EOM Cyclohexane, ug/m3
Elizobeth 01
EOM Cyclohexane, ug/m3
0
0.5
1
1.5
2
2.5
3
3.5
4
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
SAmpling Date, 1988


EOM Cyclohexane, ug/m3
Elizobeth TSP056, 1988
EOM Cyclohexane, ug/m3
0
1
2
3
4
5
6
7
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01
Sampling Date, 1988

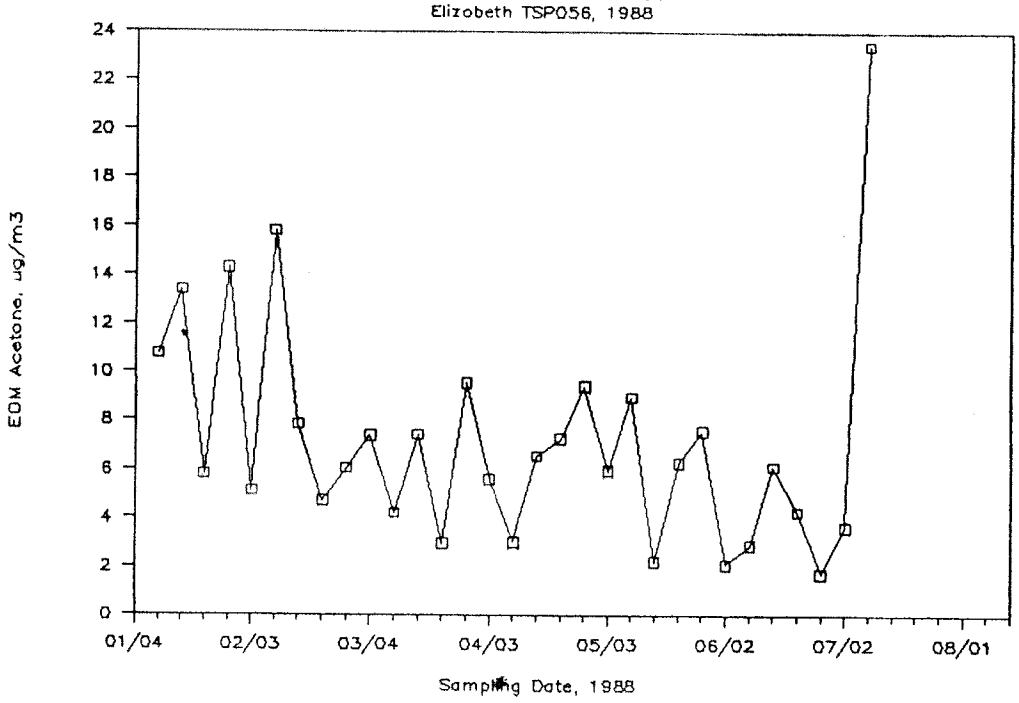
EOM Acetone, ug/m3

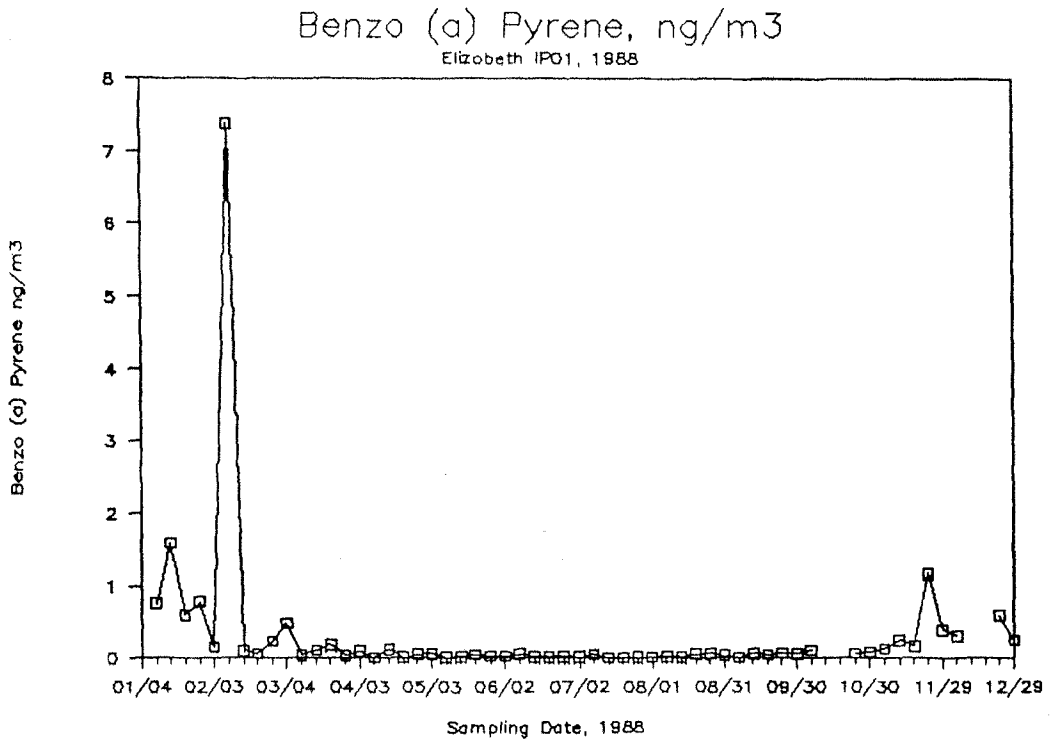
Elizobeth 01

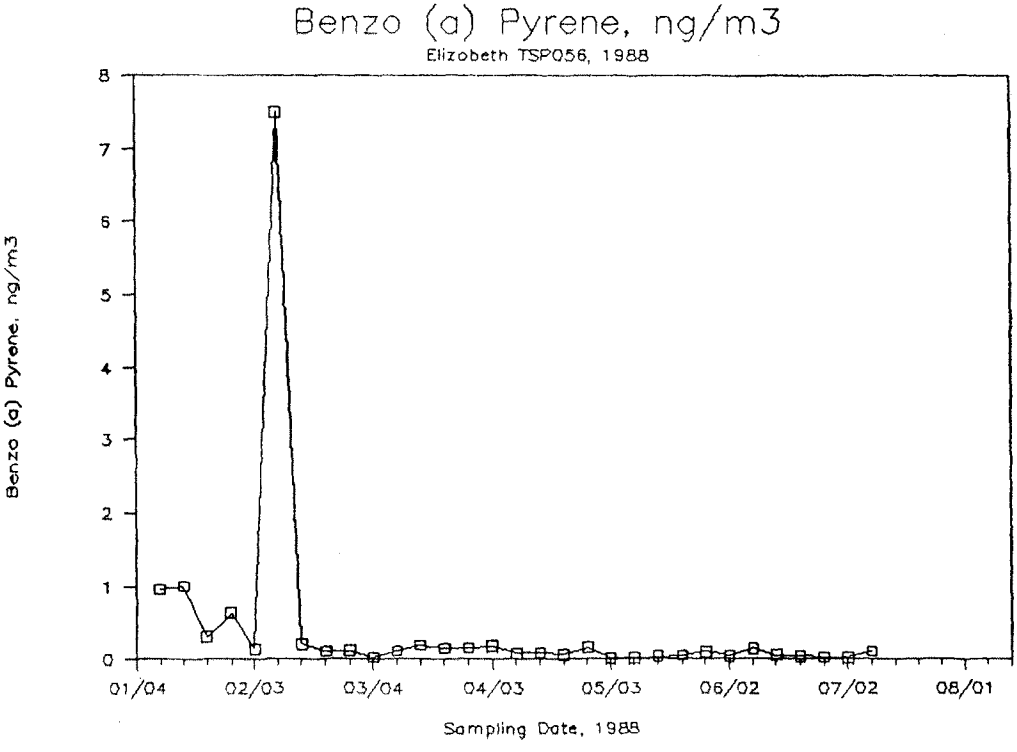


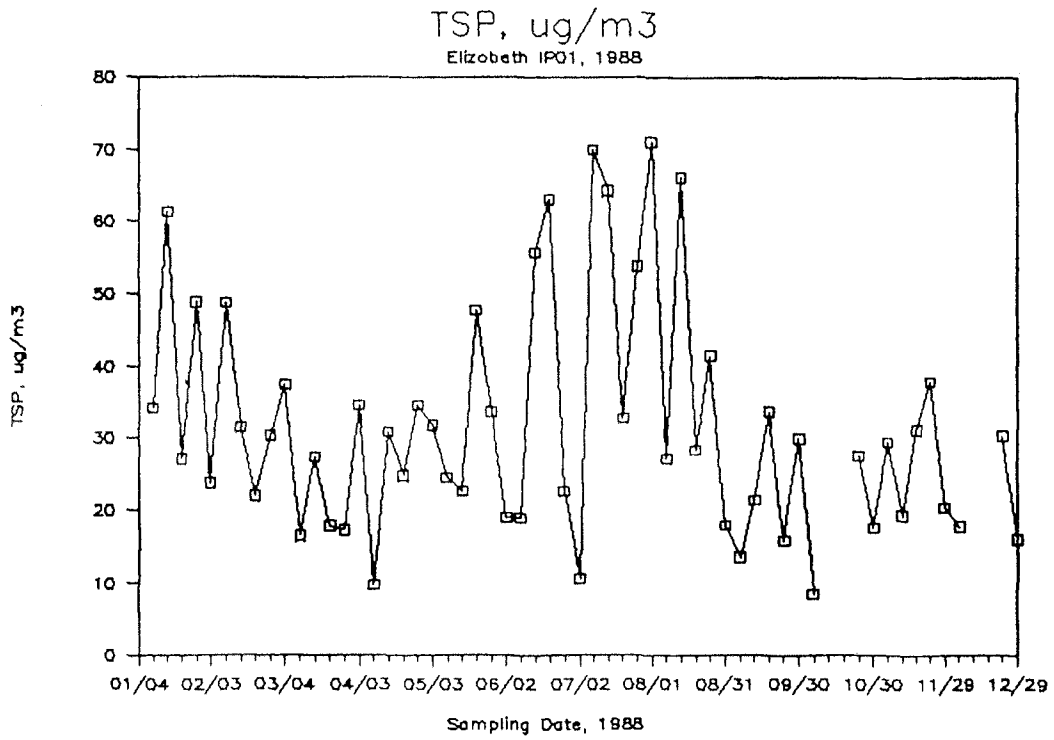
EOM Acetone, ug/m3

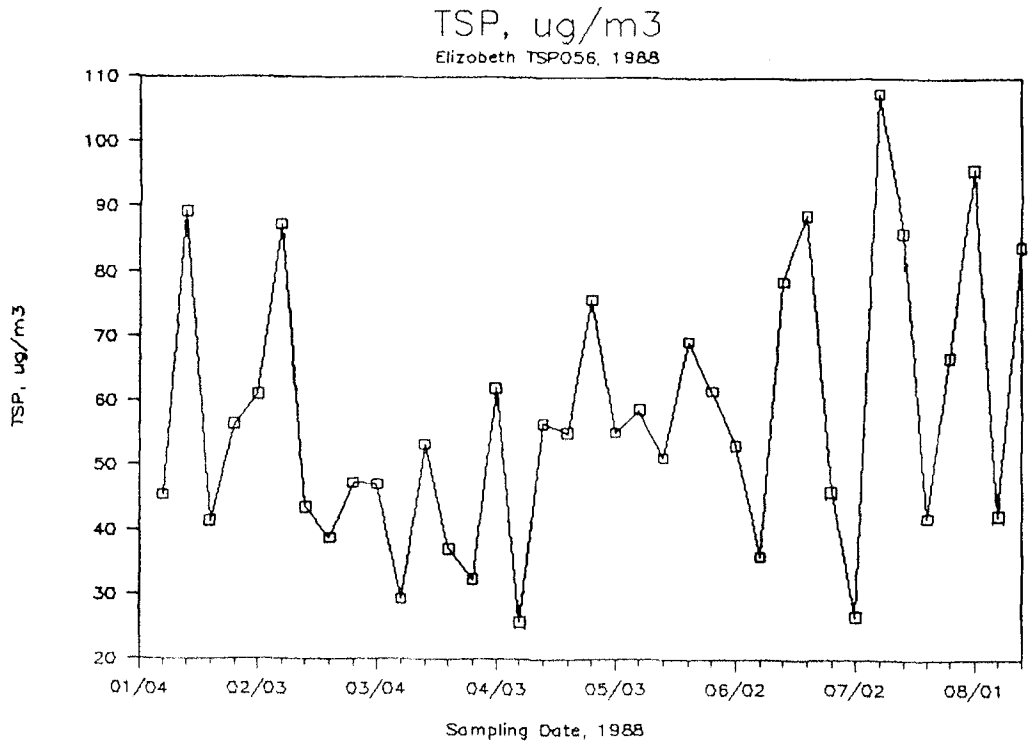
Elizobeth TSP056, 1988

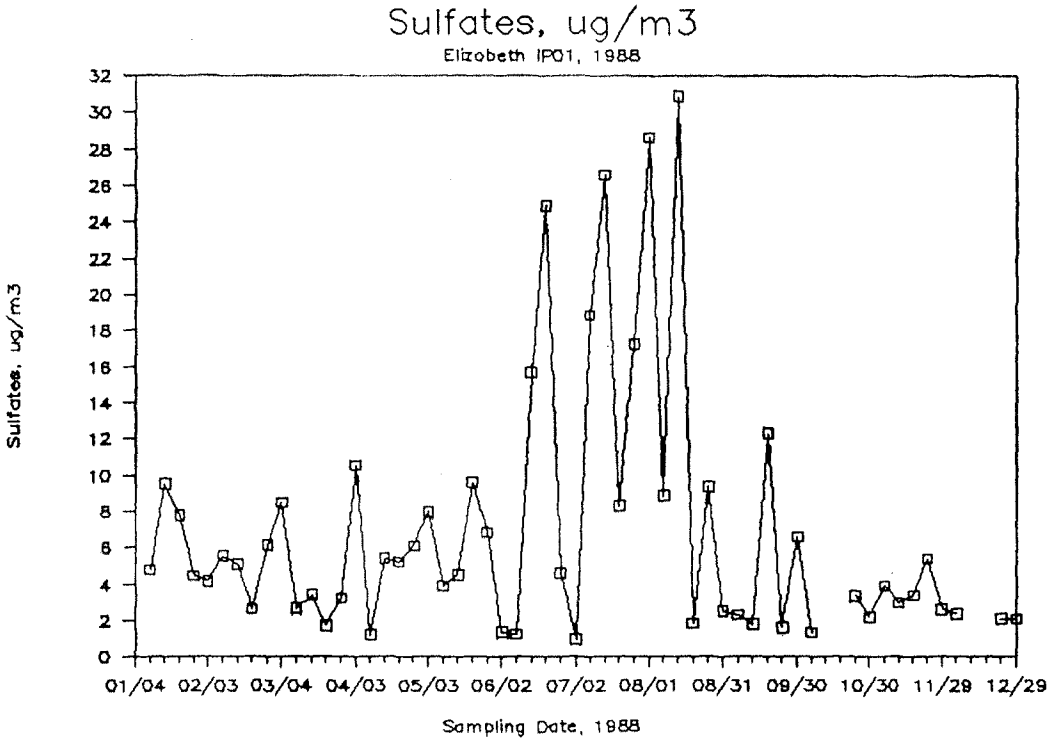


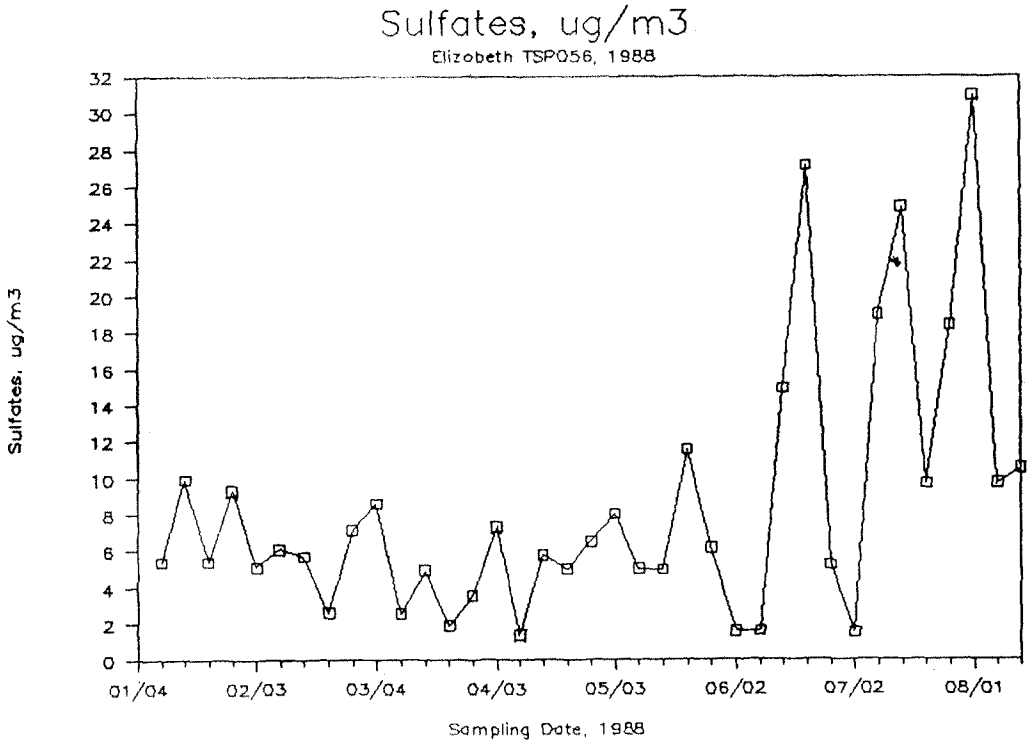

Benzo (a) Pyrene, ng/m3
Elizobeth IP01, 1988
Benzo (a) Pyrene ng/m3
0
1
2
3
4
5
6
7
8
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988

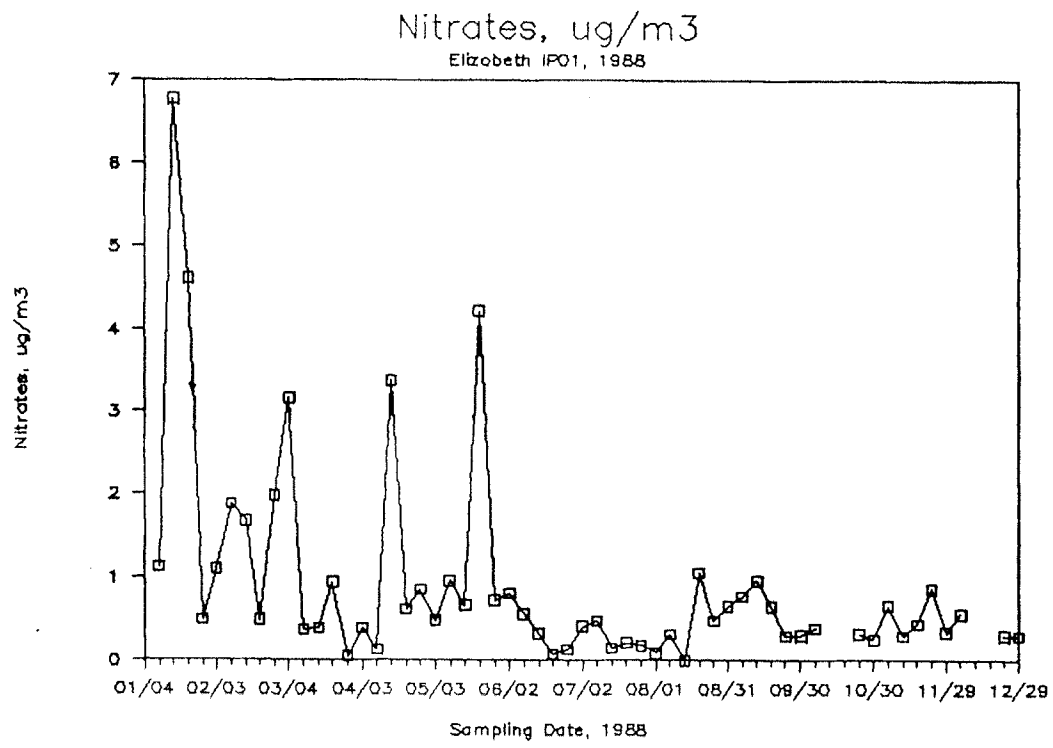

Benzo (a) Pyrene, ng/m3
Elizobeth TSP056, 1988
Benzo (a) Pyrene, ng/m3
0
1
2
3
4
5
6
7
8
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01
Sampling Date, 1988

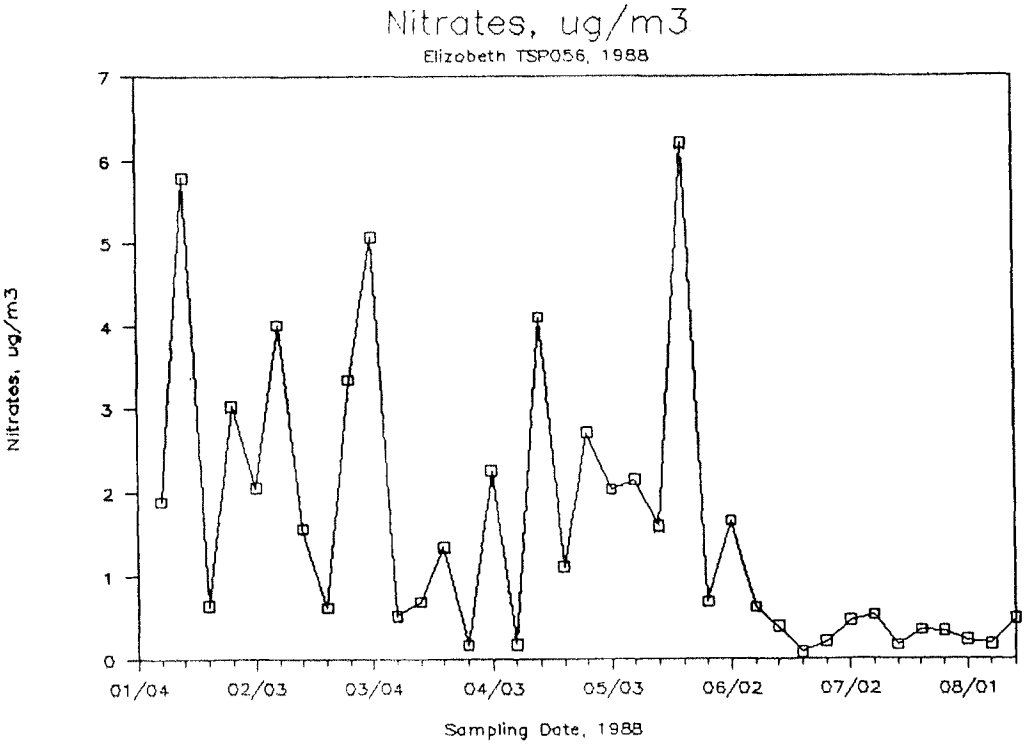

TSP, ug/m3
Elizobeth IP01, 1988
TSP, ug/m3
80
70
60
50
40
30
20
10
0
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988


TSP, ug/m3
Elizobeth TSP056, 1988
TSP, ug/m3
110
100
90
80
70
60
50
40
30
20
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01
Sampling Date, 1988

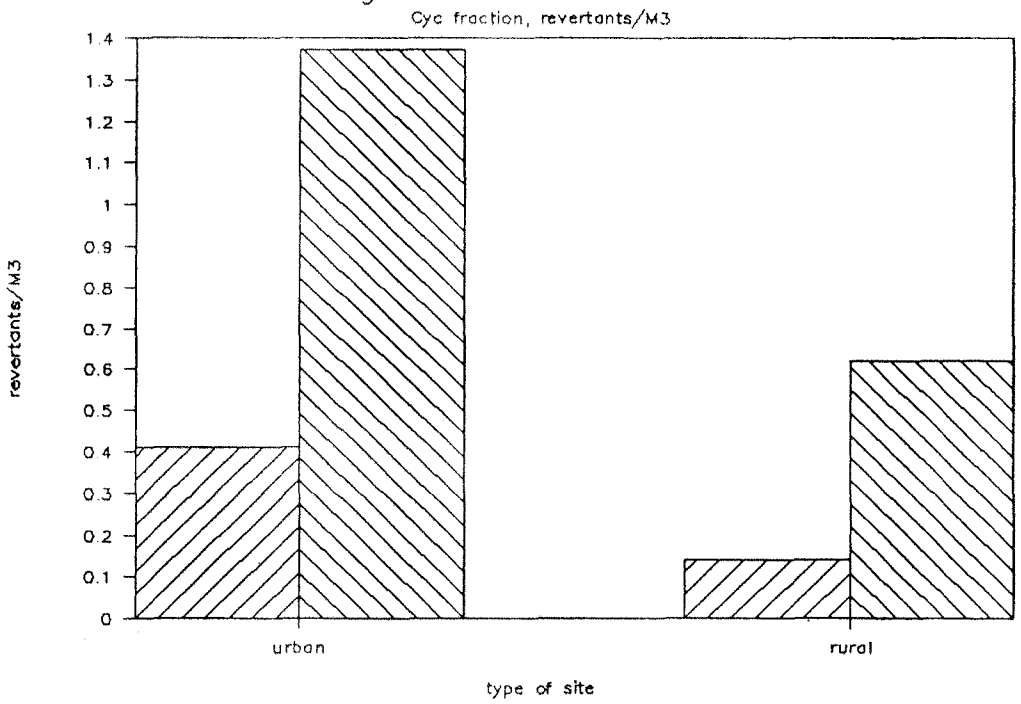

Sulfates, ug/m3
Elizobeth IP01, 1988
Sulfates, ug/m3
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988


Sulfates, ug/m3
Elizobeth TSP056, 1988
Sulfates, ug/m3
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01
Sampling Date, 1988

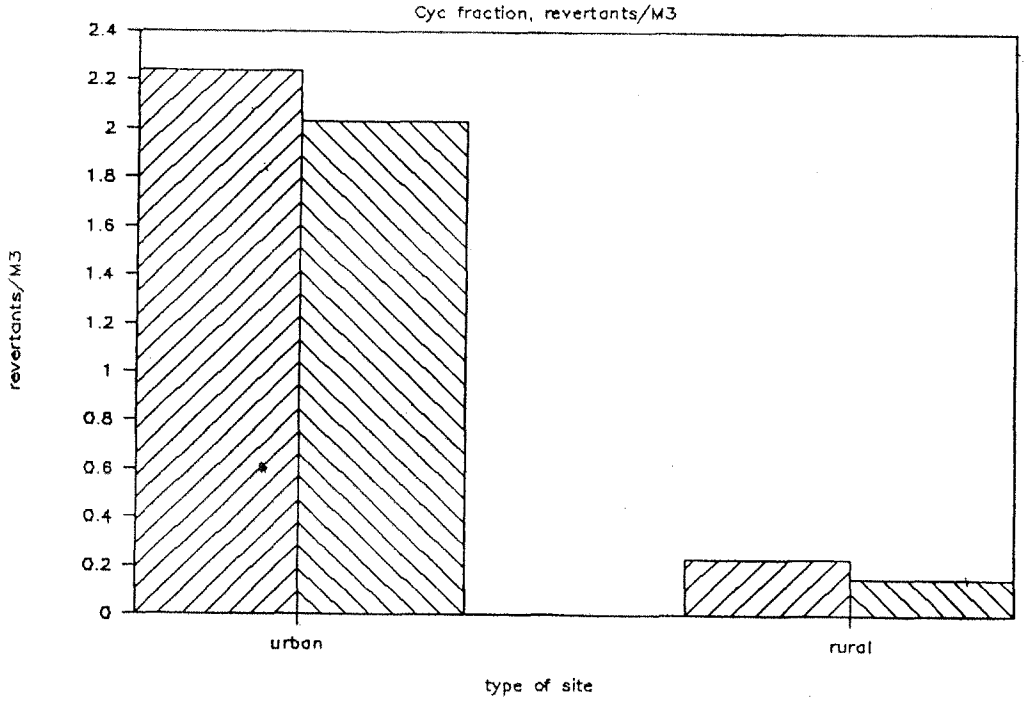

Nitrates, ug/m3
Elizobeth IP01, 1988
Nitrates, ug/m3
0
1
2
3
4
5
6
7
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Sampling Date, 1988


Nitrates, ug/m3
Elizobeth TSP056, 1988
Nitrates, ug/m3
0
1
2
3
4
5
6
7
01/04 02/03 03/04 04/03 05/03 06/02 07/02 08/01
Sampling Date, 1988

Estimated
Mutagenic levels in Summer



Estimated
Mutagenic levels in Winter



SECTION IV

(CONCLUSIONS)

CONCLUSIONS

The results obtained in this project are summerized in the following manner:

1. Benzo (a) Pyrene levels in New Jersey varied from 0.12 ng/M^3 to 0.03 ng/M^3 at urban and rural sites respectively during 1988.

2. Benzo (a) Pyrene levels in New Jersey were more than 5 times greater for heating than non-heating season during 1988.

3. Cyc levels decreased from urban (0.94 ug/M^3) to rural (0.38 ug/M^3) areas. A lower Cyc represents fewer local sources and direct emissions.

4. Due to volatilization of PAHs in summer Cyc as a percentage of total EOM decreased from 19.9 to 14.4%.

5. Percentage of total EOM in IP10 averaged 14.2% during summer. In winter it went upto 23.9%.

6. Due to occasional photochemical smogs during peak summer months, IP10 and Ace fractions indicated higher levels of concentrations.

7. Overall sulfate concentrations are relatively stable (4.5 to 5.5 ug/M^3) for all sites.

8. During peak summer months (July & August) sulfate concentrations went upto 8.5 ug/M^3.

9. Concentrations of nitrate went down in warmer periods of the year because of photochemical decomposition.

10. In Atlantic City, peak winter and summer levels of Cyc lowered by 4 and 2 times respectively between TSP and IP10 sites with IP being on the higher level. For Ace it was 1.5 and 2.

11. Between Elizabeth TSP and IP10 sites, the winter time differences for Cyc and Ace are 1.5 and 2.5 times respectively.

12. Apparently other than EOMs, rest of the pollutants did not show much of varience between the sites.

13. The estimated average mutagenic levels in summer are higher for both urban and rural sites with metabolic enzymes. The trend reversed during winter (Fig 3.22).

APPENDIX I

DEP Worksheet Descriptions
11-Site Study 1988

Column	Description
Sample Date	Date of Sample Collection.
Volume (m3)	Total sampled air volume, in cubic meters.
TSP Wt. (gram)	Total mass of suspended particulate matter captured on sample filter, in grams.
TSP (ug/m3)	TSP Wt.(gram) / Volume(m3) , in micrograms/cubic meter.
EOM Cyc (mg/fil)	Mass of Extractable Organic Material in the cyclohexane fraction, in milligrams per entire filter.
Corrected EOM Cyc	EOM Cyc(mg/fil) - 0.28, in milligrams per entire filter, where 0.28 is the average mass of cyclohexane-extractable material in a blank filter.
EOM Cyc (ug/m3)	Corrected EOM Cyc / Volume(m3) , in micrograms/cubic meter.
EOM Ace (mg/fil)	Mass of Extractable Organic Material in the acetone fraction, in milligrams per entire filter.
Corrected EOM Ace	EOM Ace(mg/fil) - 1.16, in milligrams per entire filter, where 1.16 is the average mass of acetone-extractable material in a blank filter.
EOM Ace (ug/m3)	Corrected EOM Ace / Volume(m3) , in micrograms/cubic meter.
BaP (ng/fil)	Mass of benzo(a)pyrene on filter, in nanograms per entire filter.
BaP (ng/m3)	BaP(ng/fil) / Volume(m3), in nanograms/cubic meter.
SO4 (ug/m3)	Concentration of sulfate ions, in micrograms/cubic meter.
NO3 (ug/m3)	Concentration of nitrate ions, in micrograms/cubic meter.
% Cyc	100 x EOM Cyc(ug/m3) / TSP(ug/m3).
% Ace	100 x EOM Ace(ug/m3) / TSP(ug/m3).
% SO4	100 x SO4(ug/m3) / TSP(ug/m3).
% NO3	100 x NO3(ug/m3) / TSP(ug/m3).
TOTAL %	% Cyc + % Ace + % SO4 + % NO3

Atlantic City IP07, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1654	0.056	33.86	2.97	2.64	1.60	12.38	11.73
01/10	1695	0.117	69.03	5.04	4.71	2.78	32.45	31.80
01/16	1673	0.057	34.07	2.21	1.88	1.12	14.49	13.84
01/22	1701	0.062	36.45	0.50	0.17	0.10	14.13	13.48
01/28	1654	0.067	40.51	1.98	1.65	1.00	15.35	14.70
02/03	NA	NA	NA	NA	NA	NA	NA	NA
02/09	NA	NA	NA	NA	NA	NA	NA	NA
02/15	1682	0.059	35.08	3.38	3.05	1.81	11.97	11.32
02/21	1724	0.033	19.14	2.57	2.24	1.30	7.20	6.55
02/27	1671	0.060	35.91	3.15	2.82	1.69	16.79	16.14
03/04	1638	0.093	56.78	5.34	5.01	3.06	19.76	19.11
03/10	1838	0.059	32.10	3.29	2.96	1.61	3.65	3.00
03/16	1744	0.076	43.58	5.72	5.39	3.09	18.00	17.35
03/22	1755	0.098	55.84	23.63	23.30	13.28	19.35	18.70
03/28	1737	0.049	28.21	0.90	0.57	0.33	6.26	5.61
04/03	1665	0.051	30.63	2.97	2.64	1.59	8.33	7.68
04/09	1607	0.030	18.67	16.88	16.55	10.30	8.78	8.13
04/15	1640	0.059	35.98	0.86	0.53	0.32	6.71	6.06
04/21	1812	0.054	29.80	4.19	3.86	2.13	10.35	9.70
04/27	1713	0.063	36.78	3.11	2.78	1.62	10.35	9.70
05/03	1749	0.051	29.16	2.43	2.10	1.20	11.66	11.01
05/09	1737	0.057	32.82	11.16	10.83	6.23	10.35	9.70
05/15	1688	0.059	34.95	4.23	3.90	2.31	18.99	18.34
05/21	1706	0.063	36.93	2.25	1.92	1.13	12.11	11.46
05/27	1778	0.061	34.31	2.97	2.64	1.48	8.91	8.26
06/02	1827	0.149	81.55	4.95	4.62	2.53	7.97	7.32
06/08	1617	0.055	34.01	5.85	5.52	3.41	11.25	10.60
06/14	1749	0.170	97.20	2.07	1.74	0.99	14.31	13.66
06/20	1699	0.071	41.79	1.49	1.16	0.68	6.57	5.92
06/26	1694	0.077	45.45	1.35	1.02	0.60	10.08	9.43

Atlantic City IP07, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1716	0.060	34.97	1.40	1.07	0.62	6.26	5.61
07/08	1725	0.074	42.90	1.62	1.29	0.75	4.50	3.85
07/14	1737	0.100	57.57	1.58	1.25	0.72	13.64	12.99
07/20	1761	0.084	47.70	2.48	2.15	1.22	8.46	7.81
07/26	1690	0.071	42.01	4.55	4.22	2.50	13.46	12.81
08/01	1662	0.135	81.23	5.40	5.07	3.05	24.30	23.65
08/07	1748	0.077	44.05	4.10	3.76	2.15	9.41	8.75
08/13	NA	NA	NA	NA	NA	NA	NA	NA
08/19	NA	NA	NA	NA	NA	NA	NA	NA
08/25	1767	0.095	53.76	1.49	1.16	0.66	7.02	6.37
08/31	1724	0.066	38.28	1.35	1.02	0.59	9.32	8.67
09/06	1761	0.068	38.61	2.84	2.51	1.43	12.74	12.09
09/12	NA	NA	NA	NA	NA	NA	NA	NA
09/18	1764	0.052	29.48	2.34	2.01	1.14	11.66	11.01
09/24	1749	0.056	32.02	10.85	10.52	6.01	18.63	17.98
09/30	1733	0.052	30.01	4.68	4.35	2.51	10.13	9.48
10/06	1718	0.070	40.75	8.46	8.13	4.73	22.59	21.94
10/12	1687	0.077	45.64	9.59	9.26	5.49	22.73	22.08
10/18	1767	0.060	33.96	5.99	5.66	3.20	17.24	16.59
10/24	1713	0.051	29.77	0.99	0.66	0.39	8.87	8.22
10/30	1710	0.060	35.09	1.44	1.11	0.65	13.50	12.85
11/05	1765	0.033	18.70	4.23	3.90	2.21	10.71	10.06
11/11	1731	0.058	33.51	10.94	10.61	6.13	19.62	18.97
11/17	1690	0.050	29.59	7.56	7.23	4.28	13.23	12.58
11/23	1703	0.042	24.66	5.54	5.21	3.06	8.73	8.08
11/29	1703	0.060	35.23	11.07	10.74	6.31	22.37	21.72
12/05	NA	NA	NA	NA	ERR	ERR	NA	ERR
12/11	1685	0.092	54.60	27.63	27.30	16.20	33.30	32.65
12/17	1698	0.121	71.26	41.67	41.34	24.35	49.05	48.40
12/23	NA	NA	NA	NA	NA	NA	NA	NA
12/29	1767	0.095	53.76	4.28	3.95	2.24	15.35	14.70

Atlantic City IP07, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	7.09	347.10	0.21	3.77	1.08	5	21	11	3	40
01/10	18.76	836.21	0.49	8.79	2.87	4	27	13	4	48
01/16	8.27	340.34	0.20	4.44	4.24	3	24	13	12	53
01/22	7.92	47.36	0.03	5.27	1.59	0	22	14	4	41
01/28	8.89	298.35	0.18	7.16	1.42	2	22	18	4	46
02/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
02/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
02/15	6.73	71.59	0.04	4.39	1.49	5	19	13	4	41
02/21	3.80	176.05	0.10	2.46	0.56	7	20	13	3	42
02/27	9.66	172.92	0.10	5.76	3.32	5	27	16	9	57
03/04	11.67	160.27	0.10	7.46	1.69	5	21	13	3	42
03/10	1.63	271.48	0.15	3.42	0.64	5	5	11	2	23
03/16	9.95	557.10	0.32	6.71	1.24	7	23	15	3	48
03/22	10.66	809.34	0.46	2.94	1.23	24	19	5	2	50
03/28	3.23	204.30	0.12	4.55	0.39	1	11	16	1	30
04/03	4.61	53.87	0.03	7.87	0.66	5	15	26	2	48
04/09	5.06	1248.75	0.78	2.26	0.32	55	27	12	2	96
04/15	3.70	20.11	0.01	4.36	1.68	1	10	12	5	28
04/21	5.35	125.33	0.07	4.32	1.02	7	18	14	3	43
04/27	5.66	123.43	0.07	6.18	1.04	4	15	17	3	39
05/03	6.30	34.36	0.02	7.46	0.99	4	22	26	3	55
05/09	5.58	73.95	0.04	2.90	0.71	19	17	9	2	47
05/15	10.86	42.20	0.03	7.59	1.03	7	31	22	3	62
05/21	6.72	19.87	0.01	7.80	0.42	3	18	21	1	43
05/27	4.65	82.37	0.05	4.80	0.74	4	14	14	2	34
06/02	4.01	103.36	0.06	2.97	1.27	3	5	4	2	13
06/08	6.56	58.12	0.04	5.89	1.82	10	19	17	5	52
06/14	7.81	69.77	0.04	30.33	0.22	1	8	31	0	40
06/20	3.48	15.61	0.01	10.82	0.40	2	8	26	1	37
06/26	5.57	25.20	0.01	5.43	2.40	1	12	12	5	31

Atlantic City IP07, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	3.27	23.80	0.01	2.56	0.61	2	9	7	2	20
07/08	2.23	9.22	0.01	8.08	0.63	2	5	19	1	27
07/14	7.48	29.98	0.02	11.95	0.25	1	13	21	0	35
07/20	4.43	26.22	0.01	4.11	1.93	3	9	9	4	25
07/26	7.58	0.00	0.00	11.47	0.01	6	18	27	0	51
08/01	14.23	65.62	0.04	24.79	0.71	4	18	31	1	53
08/07	5.01	31.77	0.02	10.17	0.61	5	11	23	1	41
08/13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
08/19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
08/25	3.60	54.33	0.03	12.49	0.26	1	7	23	0	32
08/31	5.03	76.56	0.04	4.12	0.47	2	13	11	1	27
09/06	6.87	97.05	0.06	4.40	0.91	4	18	11	2	35
09/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
09/18	6.24	50.51	0.03	5.41	0.27	4	21	18	1	44
09/24	10.28	165.49	0.09	2.57	0.79	19	32	8	2	61
09/30	5.47	55.13	0.03	4.98	0.76	8	18	17	3	46
10/06	12.77	425.56	0.25	4.15	0.28	12	31	10	1	54
10/12	13.09	376.25	0.22	2.92	0.57	12	29	6	1	48
10/18	9.39	214.21	0.12	3.76	0.52	9	28	11	2	50
10/24	4.80	115.21	0.07	3.40	0.59	1	16	11	2	31
10/30	7.51	88.66	0.05	2.51	0.61	2	21	7	2	32
11/05	5.70	271.96	0.15	3.01	0.26	12	30	16	1	60
11/11	10.96	206.60	0.12	2.55	0.33	18	33	8	1	60
11/17	7.44	804.14	0.48	2.99	0.48	14	25	10	2	51
11/23	4.74	696.60	0.41	4.12	0.32	12	19	17	1	50
11/29	12.75	610.84	0.36	5.52	0.36	18	36	16	1	71
12/05	ERR	NA	NA	NA	NA	ERR	ERR	NA	NA	ERR
12/11	19.38	196.87	0.12	3.60	0.45	30	35	7	1	73
12/17	28.50	162.98	0.10	4.85	0.80	34	40	7	1	82
12/23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/29	8.32	74.19	0.04	4.80	0.93	4	15	9	2	30

Camden IPO2, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1688	0.062	36.73	17.69	17.36	10.28	12.20	11.55
01/10	1675	0.078	46.57	2.88	2.55	1.52	14.81	14.16
01/16	1686	0.097	57.53	3.69	3.36	1.99	18.14	17.49
01/22	1688	0.051	30.21	3.65	3.32	1.97	20.66	20.01
01/28	1688	0.088	52.13	14.72	14.39	8.52	40.73	40.08
02/03	1672	0.031	18.54	1.76	1.43	0.86	5.85	5.20
02/09	1670	0.061	36.53	3.24	2.91	1.74	12.47	11.82
02/15	1649	0.032	19.41	10.08	9.75	5.91	6.57	5.92
02/21	1670	0.024	14.37	2.21	1.88	1.13	3.92	3.27
02/27	1659	0.039	23.51	5.49	5.16	3.11	7.97	7.32
03/04	1670	0.077	46.11	3.47	3.14	1.88	14.40	13.75
03/10	1696	0.027	15.92	1.80	1.47	0.87	7.38	6.73
03/16	1566	0.031	19.80	1.31	0.98	0.63	5.27	4.62
03/22	1659	0.045	27.12	2.30	1.97	1.19	9.90	9.25
03/28	1698	0.038	22.38	1.98	1.65	0.97	7.70	7.05
04/03	1628	0.040	24.57	4.91	4.58	2.81	3.47	2.82
04/09	1665	0.017	10.21	1.58	1.25	0.75	9.90	9.25
04/15	1665	0.043	25.83	2.43	2.10	1.26	7.83	7.18
04/21	1640	0.044	26.83	1.53	1.20	0.73	5.13	4.48
04/27	1665	0.041	24.62	2.16	1.83	1.10	6.08	5.43
05/03	1663	0.055	33.07	2.34	2.01	1.21	8.51	7.86
05/09	1612	0.025	15.51	1.44	1.11	0.69	2.61	1.96
05/15	1662	0.035	21.06	0.86	0.53	0.32	4.91	4.26
05/21	1611	0.054	33.52	0.54	0.21	0.13	1.17	0.52
05/27	1622	0.059	36.37	0.27	0.00	0.00	1.67	1.02
06/02	1698	0.028	16.49	0.54	0.21	0.12	2.79	2.14
06/08	1684	0.039	23.16	0.59	0.26	0.15	4.01	3.36
06/14	1647	0.126	76.50	0.99	0.66	0.40	4.50	3.85
06/20	1611	0.105	65.18	1.26	0.93	0.58	6.80	6.15
06/26	1659	0.055	33.15	2.34	2.01	1.21	21.11	20.46

Camden IPO2, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1593	0.024	15.07	1.94	1.61	1.01	7.97	7.32
07/08	1631	0.095	58.25	4.05	3.72	2.28	11.61	10.96
07/14	1638	0.108	65.93	1.26	0.93	0.57	18.14	17.49
07/20	1633	0.062	37.97	2.34	2.01	1.23	6.30	5.65
07/26	1606	0.068	42.34	1.40	1.07	0.67	8.51	7.86
08/01	1643	0.119	72.43	0.68	0.35	0.21	15.93	15.28
08/07	1618	0.059	36.46	1.89	1.56	0.96	10.85	10.20
08/13	1631	0.060	36.79	0.77	0.44	0.27	5.49	4.84
08/19	1631	0.033	20.23	0.99	0.66	0.40	6.12	5.47
08/25	1643	0.068	41.39	1.62	1.29	0.79	12.51	11.86
08/31	1643	0.049	29.82	4.46	4.13	2.51	4.10	3.45
09/06	1622	0.025	15.41	1.08	0.75	0.46	4.05	3.40
09/12	1608	0.046	28.61	1.49	1.16	0.72	10.71	10.06
09/18	1647	0.066	40.07	0.54	0.21	0.13	4.86	4.21
09/24	1647	0.031	18.82	2.70	2.37	1.44	7.07	6.42
09/30	1634	0.056	34.27	0.45	ERR	ERR	3.33	2.68
10/06	1676	0.033	19.69	1.76	0.12	0.07	7.20	6.55
10/12	1653	0.025	15.12	1.49	1.43	0.87	5.63	4.98
10/18	1663	0.048	28.86	1.62	1.16	0.70	8.73	8.08
10/24	1678	0.039	23.24	1.58	1.29	0.77	6.62	5.97
10/30	1663	0.030	18.04	2.39	1.25	0.75	7.47	6.82
11/05	1667	0.021	12.60	0.63	2.06	1.24	5.13	4.48
11/11	1667	0.032	19.20	1.98	0.30	0.18	6.98	6.33
11/17	1665	0.030	18.02	1.94	1.61	0.97	3.29	2.64
11/23	1654	0.084	50.79	1.71	1.38	0.83	33.75	33.10
11/29	1679	0.042	25.01	4.50	4.17	2.48	7.07	6.42
12/05	1696	0.053	31.25	1.26	0.93	0.55	8.60	7.95
12/11	1709	0.027	15.80	1.44	1.11	0.65	8.24	7.59
12/17	1670	0.059	35.33	1.49	1.16	0.69	10.13	9.48
12/23	1696	0.044	25.94	2.39	2.06	1.21	10.31	9.66
12/29	1670	0.040	23.95	0.90	0.57	0.34	3.56	2.91

Camden IPO2, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	6.84	1638.34	0.97	7.43	1.11	28	19	20	3	70
01/10	8.45	1423.54	0.85	8.90	1.98	3	18	19	4	45
01/16	10.37	2265.82	1.34	11.74	4.28	3	18	20	7	49
01/22	11.85	700.24	0.41	6.05	1.52	7	39	20	5	71
01/28	23.74	837.66	0.50	10.05	6.22	16	46	19	12	93
02/03	3.11	257.81	0.15	4.71	0.54	5	17	25	3	50
02/09	7.08	799.27	0.48	6.40	1.00	5	19	18	3	44
02/15	3.59	301.49	0.18	4.28	0.66	30	19	22	3	74
02/21	1.96	158.69	0.10	2.67	0.64	8	14	19	4	44
02/27	4.41	NA	NA	5.56	1.68	13	19	24	7	63
03/04	8.23	344.96	0.21	8.94	4.64	4	18	19	10	51
03/10	3.97	151.57	0.09	2.28	0.57	5	25	14	4	48
03/16	2.95	230.52	0.15	4.84	0.67	3	15	24	3	46
03/22	5.58	485.52	0.29	2.13	1.46	4	21	8	5	38
03/28	4.15	234.70	0.14	3.96	0.53	4	19	18	2	43
04/03	1.73	29.70	0.02	8.77	0.22	11	7	36	1	55
04/09	5.56	103.81	0.06	2.24	0.21	7	54	22	2	86
04/15	4.31	76.90	0.05	6.44	1.32	5	17	25	5	52
04/21	2.73	124.53	0.08	5.88	0.64	3	10	22	2	37
04/27	3.26	139.91	0.08	5.94	0.12	4	13	24	0	42
05/03	4.73	75.21	0.05	8.76	1.06	4	14	26	3	48
05/09	1.22	10.46	0.01	1.89	1.00	4	8	12	6	31
05/15	2.56	12.78	0.01	6.72	0.11	2	12	32	1	46
05/21	0.32	0.00	0.00	11.50	0.18	0	1	34	1	36
05/27	0.63	49.11	0.03	9.34	0.46	0	2	26	1	29
06/02	1.26	0.00	0.00	1.29	0.63	1	8	8	4	20
06/08	2.00	38.81	0.02	2.72	0.76	1	9	12	3	24
06/14	2.34	40.87	0.02	27.54	0.97	1	3	36	1	41
06/20	3.82	40.52	0.03	24.23	0.11	1	6	37	0	44
06/26	12.33	495.40	0.30	6.15	0.42	4	37	19	1	61

Camden IPO2, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	4.60	55.92	0.04	1.49	0.64	7	30	10	4	51
07/08	6.72	81.49	0.05	18.13	0.48	4	12	31	1	47
07/14	10.68	84.26	0.05	27.30	0.10	1	16	41	0	59
07/20	3.46	76.69	0.05	11.22	0.16	3	9	30	0	42
07/26	4.89	18.15	0.01	1.37	0.84	2	12	3	2	18
08/01	9.30	0.00	0.00	30.90	0.08	0	13	43	0	56
08/07	6.30	45.50	0.03	11.65	0.29	3	17	32	1	53
08/13	2.97	17.68	0.01	12.63	0.12	1	8	34	0	43
08/19	3.35	16.06	0.01	2.77	0.76	2	17	14	4	36
08/25	7.22	76.51	0.05	9.81	0.41	2	17	24	1	44
08/31	2.10	198.67	0.12	3.84	0.59	8	7	13	2	30
09/06	2.10	42.70	0.03	3.30	0.87	3	14	21	6	44
09/12	6.26	104.64	0.07	4.06	0.92	3	22	14	3	42
09/18	2.56	69.47	0.04	12.13	0.41	0	6	30	1	38
09/24	3.90	110.22	0.07	2.31	0.77	8	21	12	4	45
09/30	1.64	38.30	0.02	8.90	0.44	ERR	5	26	1	ERR
10/06	3.91	304.82	0.18	4.30	0.43	0	20	22	2	44
10/12	3.01	211.09	0.13	1.66	0.27	6	20	11	2	38
10/18	4.86	103.32	0.06	5.40	0.23	2	17	19	1	39
10/24	3.56	278.90	0.17	4.15	0.27	3	15	18	1	38
10/30	4.10	565.94	0.34	3.16	0.46	4	23	18	3	47
11/05	2.69	13.66	0.01	2.13	0.37	10	21	17	3	51
11/11	3.80	224.16	0.13	3.97	0.42	1	20	21	2	44
11/17	1.59	217.04	0.13	3.76	0.40	5	9	21	2	37
11/23	20.01	1879.52	1.14	5.75	1.78	2	39	11	4	56
11/29	3.82	667.75	0.40	4.14	0.61	10	15	17	2	44
12/05	4.69	985.73	0.58	3.94	0.60	2	15	13	2	31
12/11	4.44	566.50	0.33	3.49	0.45	4	28	22	3	57
12/17	5.68	1323.24	0.79	3.96	0.91	2	16	11	3	32
12/23	5.70	1174.25	0.69	7.13	0.24	5	22	27	1	55
12/29	1.74	156.35	0.09	4.14	0.62	1	7	17	3	29

Elizabeth IP01, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	NA	NA	NA	NA	NA	NA	NA	NA
01/10	1698	0.058	34.16	2.93	2.60	1.53	16.65	16.00
01/16	1698	0.104	61.25	4.55	4.22	2.49	21.42	20.77
01/22	1698	0.046	27.09	3.51	3.18	1.87	12.96	12.31
01/28	1698	0.083	48.88	3.20	2.87	1.69	21.47	20.82
02/03	1682	0.040	23.78	2.61	2.28	1.36	8.10	7.45
02/09	1682	0.082	48.75	5.54	5.21	3.10	18.95	18.30
02/15	1682	0.053	31.51	1.58	1.25	0.74	9.05	8.40
02/21	1682	0.037	22.00	4.59	4.26	2.53	10.31	9.66
02/27	1682	0.051	30.32	2.03	1.70	1.01	11.61	10.96
03/04	1682	0.063	37.46	3.92	3.59	2.13	10.98	10.33
03/10	1682	0.028	16.65	3.24	2.91	1.73	6.12	5.47
03/16	1682	0.046	27.35	3.74	3.41	2.03	8.64	7.99
03/22	1682	0.030	17.84	2.97	2.64	1.57	5.63	4.98
03/28	1682	0.029	17.24	6.98	6.65	3.95	16.34	15.69
04/03	1649	0.057	34.57	3.74	3.41	2.07	9.41	8.76
04/09	1649	0.016	9.70	2.16	1.83	1.11	6.98	6.33
04/15	1649	0.051	30.93	3.15	2.82	1.71	7.11	6.46
04/21	1649	0.041	24.86	0.63	0.30	0.18	4.37	3.72
04/27	1649	0.057	34.57	1.85	1.52	0.92	9.99	9.34
05/03	1633	0.052	31.84	1.40	1.07	0.66	5.67	5.02
05/09	1633	0.040	24.49	0.77	0.44	0.27	0.95	0.30
05/15	1633	0.037	22.66	2.03	1.70	1.04	4.19	3.54
05/21	1633	0.078	47.76	1.53	1.20	0.73	3.83	3.18
05/27	1633	0.055	33.68	1.31	0.98	0.60	2.79	2.14
06/02	1633	0.031	18.98	2.25	1.92	1.18	1.94	1.29
06/08	1633	0.031	18.98	0.81	0.48	0.29	2.93	2.28
06/14	1633	0.091	55.73	0.63	0.30	0.18	4.05	3.40
06/20	1633	0.103	63.07	1.13	0.80	0.49	4.91	4.26
06/26	1633	0.037	22.66	1.49	1.16	0.71	5.58	4.93

Elizabeth IP01, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1617	0.017	10.51	1.04	0.71	0.44	5.76	5.11
07/08	1617	0.113	69.88	3.47	3.14	1.94	26.33	25.68
07/14	1617	0.104	64.32	1.08	0.75	0.46	4.73	4.08
07/20	1617	0.053	32.78	0.90	0.57	0.35	7.47	6.82
07/26	1617	0.087	53.80	0.50	0.17	0.11	5.04	4.39
08/01	1617	0.115	71.12	0.27	0.00	0.00	1.67	1.02
08/07	1617	0.044	27.21	1.49	1.16	0.72	8.91	8.26
08/13	1617	0.107	66.17	2.39	2.06	1.27	13.68	13.03
08/19	1617	0.046	28.45	1.71	1.38	0.85	4.55	3.90
08/25	1617	0.067	41.43	1.94	1.61	1.00	12.69	12.04
08/31	1617	0.029	17.93	1.17	0.84	0.52	8.51	7.86
09/06	1633	0.022	13.47	0.45	0.12	0.07	4.59	3.94
09/12	1633	0.035	21.43	1.44	1.11	0.68	9.09	8.44
09/18	1633	0.055	33.68	1.58	1.25	0.77	9.05	8.40
09/24	1633	0.026	15.92	1.85	1.52	0.93	8.96	8.31
09/30	1633	0.049	30.01	0.68	0.35	0.21	10.80	10.15
10/06	1649	0.014	8.49	1.44	1.11	0.67	5.31	4.66
10/12	NA	NA	NA	NA	NA	NA	NA	NA
10/18	NA	NA	NA	NA	NA	NA	NA	NA
10/24	1664	0.046	27.64	1.08	0.75	0.45	11.79	11.14
10/30	1649	0.029	17.59	2.12	1.79	1.09	8.87	8.22
11/05	1665	0.049	29.43	2.93	2.60	1.56	8.15	7.50
11/11	1665	0.032	19.22	1.94	1.61	0.97	7.07	6.42
11/17	1665	0.052	31.23	2.52	2.19	1.32	10.98	10.33
11/23	1665	0.063	37.84	3.96	3.63	2.18	20.30	19.65
11/29	1665	0.034	20.42	1.76	1.43	0.86	6.48	5.83
12/05	1682	0.030	17.84	3.20	2.87	1.71	9.59	8.94
12/11	NA	NA	NA	NA	NA	NA	NA	NA
12/17	NA	NA	NA	NA	NA	NA	NA	NA
12/23	1682	0.051	30.32	2.66	2.33	1.39	13.59	12.94
12/29	1682	0.027	16.05	2.43	2.10	1.25	10.85	10.20

Elizabeth IP01, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
01/10	9.42	1280.31	0.75	4.80	1.12	4	28	14	3	49
01/16	12.23	2700.61	1.59	9.51	6.77	4	20	16	11	51
01/22	7.25	1015.21	0.60	7.81	4.62	7	27	29	17	80
01/28	12.26	1312.95	0.77	4.47	0.49	3	25	9	1	39
02/03	4.43	255.73	0.15	4.19	1.09	6	19	18	5	47
02/09	10.88	12403.73	7.37	5.56	1.88	6	22	11	4	44
02/15	4.99	174.13	0.10	5.07	1.67	2	16	16	5	40
02/21	5.74	120.89	0.07	2.66	0.48	12	26	12	2	52
02/27	6.52	394.61	0.23	6.15	1.98	3	21	20	7	52
03/04	6.14	797.57	0.47	8.51	3.16	6	16	23	8	53
03/10	3.25	71.30	0.04	2.67	0.37	10	20	16	2	48
03/16	4.75	186.98	0.11	3.43	0.38	7	17	13	1	39
03/22	2.96	311.05	0.18	1.72	0.93	9	17	10	5	40
03/28	9.33	64.95	0.04	3.24	0.05	23	54	19	0	96
04/03	5.31	165.33	0.10	10.53	0.38	6	15	30	1	53
04/09	3.84	17.22	0.01	1.21	0.13	11	40	12	1	65
04/15	3.92	199.87	0.12	5.42	3.38	6	13	18	11	47
04/21	2.26	21.60	0.01	5.21	0.62	1	9	21	2	33
04/27	5.66	95.88	0.06	6.09	0.85	3	16	18	2	39
05/03	3.07	101.72	0.06	7.96	0.48	2	10	25	2	38
05/09	0.18	18.93	0.01	3.91	0.95	1	1	16	4	22
05/15	2.17	34.18	0.02	4.52	0.66	5	10	20	3	37
05/21	1.95	82.46	0.05	9.60	4.22	2	4	20	9	35
05/27	1.31	41.38	0.03	6.85	0.71	2	4	20	2	28
06/02	0.79	44.31	0.03	1.36	0.80	6	4	7	4	22
06/08	1.40	87.13	0.05	1.27	0.56	2	7	7	3	19
06/14	2.08	39.20	0.02	15.67	0.32	0	4	28	1	33
06/20	2.61	31.85	0.02	24.89	0.08	1	4	39	0	45
06/26	3.02	37.61	0.02	4.60	0.13	3	13	20	1	37

Elizabeth IP01, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	3.16	19.80	0.01	0.95	0.41	4	30	9	4	47
07/08	15.88	71.86	0.04	18.86	0.47	3	23	27	1	53
07/14	2.52	16.38	0.01	26.59	0.15	1	4	41	0	46
07/20	4.22	15.53	0.01	8.27	0.21	1	13	25	1	40
07/26	2.71	21.35	0.01	17.26	0.18	0	5	32	0	38
08/01	0.63	8.42	0.01	28.63	0.09	0	1	40	0	41
08/07	5.11	27.38	0.02	8.84	0.31	3	19	32	1	55
08/13	8.06	25.85	0.02	30.86	0.00	2	12	47	0	61
08/19	2.41	92.76	0.06	1.84	1.05	3	8	6	4	22
08/25	7.45	99.05	0.06	9.36	0.47	2	18	23	1	44
08/31	4.86	61.29	0.04	2.53	0.64	3	27	14	4	48
09/06	2.41	16.47	0.01	2.34	0.76	1	18	17	6	41
09/12	5.17	99.98	0.06	1.78	0.95	3	24	8	4	40
09/18	5.14	73.47	0.04	12.29	0.65	2	15	36	2	56
09/24	5.09	116.56	0.07	1.66	0.29	6	32	10	2	50
09/30	6.22	101.80	0.06	6.62	0.30	1	21	22	1	44
10/06	2.83	187.88	0.11	1.35	0.38	8	33	16	4	62
10/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/24	6.69	109.15	0.07	3.38	0.32	2	24	12	1	39
10/30	4.98	147.21	0.09	2.21	0.25	6	28	13	1	49
11/05	4.50	224.81	0.14	3.88	0.66	5	15	13	2	36
11/11	3.86	411.87	0.25	3.01	0.29	5	20	16	2	42
11/17	6.20	277.01	0.17	3.42	0.44	4	20	11	1	36
11/23	11.80	1950.14	1.17	5.38	0.86	6	31	14	2	53
11/29	3.50	649.02	0.39	2.63	0.34	4	17	13	2	36
12/05	5.32	515.03	0.31	2.37	0.56	10	30	13	3	56
12/11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/23	7.69	988.86	0.59	2.11	0.30	5	25	7	1	38
12/29	6.06	422.97	0.25	2.08	0.29	8	38	13	2	60

Fort Lee Bridge IP 14, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1658	0.077	46.44	1.94	1.61	0.97	0.50	0.00
01/10	1604	0.096	59.85	3.20	2.87	1.79	0.68	0.03
01/16	1653	0.164	99.21	2.93	2.60	1.57	25.61	24.96
01/22	1713	0.066	38.53	3.24	2.91	1.70	14.22	13.57
01/28	1675	0.110	65.67	3.02	2.69	1.61	25.65	25.00
02/03	1733	0.056	32.31	4.32	3.99	2.30	11.61	10.96
02/09	1642	0.089	54.20	3.69	3.36	2.05	27.23	26.58
02/15	1682	0.067	39.83	2.03	1.70	1.01	7.38	6.73
02/21	1669	0.033	19.77	15.12	14.79	8.86	5.67	5.02
02/27	1695	0.083	48.97	1.98	1.65	0.97	13.10	12.45
03/04	1682	0.066	39.24	1.26	0.93	0.55	10.17	9.52
03/10	1720	0.057	33.14	3.47	3.14	1.83	9.00	8.35
03/16	NA	NA	NA	NA	NA	NA	NA	NA
03/22	1620	0.052	32.10	3.78	3.45	2.13	11.93	11.28
03/28	1645	0.046	27.96	3.74	3.41	2.07	9.23	8.58
04/03	1647	0.094	57.07	4.91	4.58	2.78	20.43	19.78
04/09	1662	0.029	17.45	3.11	2.78	1.67	7.52	6.87
04/15	1687	0.090	53.35	14.85	14.52	8.61	2.57	1.92
04/21	1672	0.060	35.89	1.13	0.80	0.48	8.42	7.77
04/27	1930	0.088	45.60	1.49	1.16	0.60	5.31	4.66
05/03	1828	0.068	37.20	0.81	0.48	0.26	5.72	5.07
05/09	1814	0.082	45.20	1.62	1.29	0.71	5.04	4.39
05/15	1780	0.068	38.20	0.54	0.21	0.12	3.96	3.31
05/21	1714	0.113	65.93	0.81	0.48	0.28	3.42	2.77
05/27	1778	0.097	54.56	1.89	1.56	0.88	7.25	6.60
06/02	1569	0.045	28.68	0.90	0.57	0.36	2.52	1.87
06/08	1670	0.056	33.53	3.06	2.73	1.63	6.44	5.79
06/14	1723	0.137	79.51	2.30	1.97	1.14	15.89	15.24
06/20	1723	0.145	84.16	1.17	0.84	0.49	5.36	4.71
06/26	1763	0.060	34.03	0.45	0.12	0.07	3.60	2.95

Fort Lee Bridge IP 14, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1730	0.032	18.50	1.80	1.47	0.85	6.08	5.43
07/08	1713	0.163	95.15	4.10	3.77	2.20	27.32	26.67
07/14	1678	0.147	87.60	2.03	1.70	1.01	16.29	15.64
07/20	1554	0.087	55.98	3.78	3.45	2.22	10.17	9.52
07/26	1554	0.127	81.72	4.23	3.90	2.51	15.93	15.28
08/01	1611	0.149	92.49	4.14	3.81	2.36	7.74	7.09
08/07	1664	0.055	33.05	1.67	1.34	0.81	9.72	9.07
08/13	1592	0.134	84.17	1.98	1.65	1.04	17.51	16.86
08/19	1696	0.068	40.09	3.42	3.09	1.82	9.77	9.12
08/25	1566	0.130	83.01	2.70	2.37	1.51	17.51	16.86
08/31	NA	NA	NA	NA	NA	NA	NA	NA
09/06	1646	0.050	30.38	0.41	0.08	0.05	3.83	3.18
09/12	1633	0.067	41.03	1.26	0.93	0.57	8.55	7.90
09/18	1638	0.079	48.23	3.15	2.82	1.72	10.98	10.33
09/24	1645	0.036	21.88	1.85	1.52	0.92	7.65	7.00
09/30	1657	0.076	45.87	2.57	2.24	1.35	7.38	6.73
10/06	1659	0.048	28.93	4.05	3.72	2.24	11.57	10.92
10/12	1688	0.044	26.07	0.68	0.35	0.21	5.58	4.93
10/18	1667	0.096	57.59	6.57	6.24	3.74	15.21	14.56
10/24	1647	0.064	38.86	4.37	4.04	2.45	9.72	9.07
10/30	1669	0.033	19.77	2.48	2.15	1.29	7.07	6.42
11/05	1738	0.063	36.25	2.52	2.19	1.26	10.08	9.43
11/11	1728	0.043	24.88	1.89	1.56	0.90	7.29	6.64
11/17	1750	0.053	30.29	2.66	2.33	1.33	9.36	8.71
11/23	1695	0.091	53.69	1.58	1.25	0.74	6.62	5.97
11/29	1678	0.047	28.01	NA	ERR	ERR	5.13	4.48
12/05	1745	0.067	38.40	1.40	1.07	0.61	8.15	7.50
12/11	1710	0.036	21.05	2.21	1.88	1.10	9.41	8.76
12/17	1700	0.044	25.88	3.42	3.09	1.82	9.86	9.21
12/23	1766	0.061	34.54	5.40	5.07	2.87	13.68	13.03
12/29	1707	0.048	28.12	1.04	0.71	0.42	13.41	12.76

Fort Lee Bridge IP 14, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	0.00	754.90	0.46	6.17	1.79	2	0	13	4	19
01/10	0.02	1051.64	0.66	6.94	5.34	3	0	12	9	24
01/16	15.10	1490.81	0.90	10.78	9.49	2	15	11	10	37
01/22	7.92	1109.75	0.65	4.33	1.24	4	21	11	3	39
01/28	14.93	628.13	0.38	7.90	5.67	2	23	12	9	46
02/03	6.32	569.93	0.33	4.97	1.46	7	20	15	5	47
02/09	16.19	1010.56	0.62	5.61	5.15	4	30	10	10	53
02/15	4.00	274.57	0.16	5.58	2.67	3	10	14	7	33
02/21	3.01	339.80	0.20	2.37	0.57	45	15	12	3	75
02/27	7.35	373.47	0.22	7.41	5.22	2	15	15	11	43
03/04	5.66	232.39	0.14	7.85	2.80	1	14	20	7	43
03/10	4.85	330.02	0.19	4.06	0.95	6	15	12	3	35
03/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
03/22	6.96	522.00	0.32	2.72	1.15	7	22	8	4	40
03/28	5.22	537.66	0.33	4.00	0.41	7	19	14	1	42
04/03	12.01	1187.14	0.72	11.56	5.03	5	21	20	9	55
04/09	4.13	246.36	0.15	2.12	0.58	10	24	12	3	49
04/15	1.14	527.12	0.31	8.24	2.75	16	2	15	5	39
04/21	4.65	119.91	0.07	7.26	1.18	1	13	20	3	38
04/27	2.41	124.48	0.06	8.43	0.95	1	5	18	2	27
05/03	2.77	117.18	0.06	6.80	0.42	1	7	18	1	28
05/09	2.42	137.09	0.08	4.81	1.42	2	5	11	3	21
05/15	1.86	116.88	0.07	6.75	0.35	0	5	18	1	24
05/21	1.62	141.52	0.08	10.14	10.08	0	2	15	15	34
05/27	3.71	208.06	0.12	8.14	1.05	2	7	15	2	25
06/02	1.19	81.23	0.05	2.04	0.81	1	4	7	3	15
06/08	3.47	130.30	0.08	1.80	0.94	5	10	5	3	23
06/14	8.85	100.92	0.06	15.12	0.46	1	11	19	1	32
06/20	2.73	70.44	0.04	28.87	0.14	1	3	34	0	38
06/26	1.67	30.20	0.02	5.36	0.27	0	5	16	1	22

Fort Lee Bridge IP 14, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	3.14	38.20	0.02	1.39	0.37	5	17	8	2	31
07/08	15.57	212.33	0.12	19.32	0.44	2	16	20	0	39
07/14	9.32	69.50	0.04	21.63	0.14	1	11	25	0	37
07/20	6.13	224.98	0.14	8.78	0.45	4	11	16	1	31
07/26	9.83	786.92	0.51	15.36	0.38	3	12	19	0	34
08/01	4.40	265.66	0.16	25.79	0.66	3	5	28	1	36
08/07	5.45	99.14	0.06	7.41	0.21	2	16	22	1	42
08/13	10.59	125.88	0.08	27.80	0.75	1	13	33	1	48
08/19	5.38	290.99	0.17	1.99	0.89	5	13	5	2	25
08/25	10.77	252.71	0.16	12.59	1.26	2	13	15	2	31
08/31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
09/06	1.93	86.99	0.05	2.33	0.49	0	6	8	2	16
09/12	4.84	111.69	0.07	3.09	1.59	1	12	8	4	25
09/18	6.31	92.16	0.06	13.55	0.28	4	13	28	1	45
09/24	4.26	81.04	0.05	1.61	0.88	4	19	7	4	35
09/30	4.06	234.04	0.14	7.85	0.36	3	9	17	1	30
10/06	6.58	532.09	0.32	2.92	0.42	8	23	10	1	42
10/12	2.92	246.68	0.15	1.84	0.29	1	11	7	1	20
10/18	8.73	649.65	0.39	7.54	0.28	7	15	13	0	35
10/24	5.51	725.02	0.44	4.89	0.61	6	14	13	2	35
10/30	3.85	746.47	0.45	2.27	0.35	7	19	11	2	39
11/05	5.43	389.23	0.22	4.95	0.55	3	15	14	2	34
11/11	3.84	340.74	0.20	3.03	0.25	4	15	12	1	32
11/17	4.98	619.07	0.35	3.37	0.46	4	16	11	2	33
11/23	3.52	940.89	0.56	5.89	0.64	1	7	11	1	20
11/29	2.67	710.58	0.42	2.91	0.34	ERR	10	10	1	ERR
12/05	4.30	1398.31	0.80	2.88	0.75	2	11	8	2	22
12/11	5.12	624.19	0.37	2.99	0.61	5	24	14	3	47
12/17	5.42	2467.88	1.45	3.04	0.63	7	21	12	2	42
12/23	7.38	2702.92	1.53	4.27	0.49	8	21	12	1	43
12/29	7.48	458.96	0.27	3.35	0.49	1	27	12	2	42

Fort Lee Library IP 15, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1636	0.054	33.01	3.33	3.00	1.83	17.64	16.99
01/10	1590	0.062	38.99	3.47	3.14	1.97	17.37	16.72
01/16	1632	0.142	87.01	11.34	11.01	6.75	28.80	28.15
01/22	1651	0.037	22.41	2.56	2.23	1.35	4.86	4.21
01/28	1609	0.069	42.88	2.48	2.15	1.34	18.27	17.62
02/03	1583	0.039	24.64	3.74	3.41	2.15	8.55	7.90
02/09	1602	0.062	38.70	4.10	3.77	2.35	12.83	12.18
02/15	1613	0.041	25.42	2.16	1.83	1.13	6.66	6.01
02/21	NA	NA	NA	NA	NA	NA	NA	NA
02/27	1620	0.065	40.12	2.93	2.60	1.60	14.81	14.16
03/04	1616	0.049	30.32	3.74	3.41	2.11	16.02	15.37
03/10	1671	0.023	13.76	1.31	0.98	0.59	6.12	5.47
03/16	1646	0.029	17.62	1.85	1.52	0.92	6.30	5.65
03/22	1634	0.028	17.14	2.21	1.88	1.15	4.68	4.03
03/28	NA	NA	NA	NA	NA	NA	NA	NA
04/03	1611	0.082	50.90	2.88	2.55	1.58	6.26	5.61
04/09	1636	0.019	11.61	1.26	0.93	0.57	5.27	4.62
04/15	1611	0.058	36.00	0.72	0.39	0.24	4.10	3.45
04/21	1716	0.043	25.06	0.14	-0.19	-0.11	2.43	1.78
04/27	1721	0.060	34.86	0.68	0.35	0.20	4.50	3.85
05/03	1660	0.034	20.48	1.08	0.75	0.45	3.11	2.46
05/09	1674	0.045	26.88	1.94	1.61	0.96	7.07	6.42
05/15	1683	0.049	29.11	1.04	0.71	0.42	2.75	2.10
05/21	NA	NA	NA	NA	NA	NA	NA	NA
05/27	1683	0.077	45.75	1.22	0.89	0.53	9.09	8.44
06/02	1665	0.034	20.42	0.45	0.12	0.07	3.24	2.59
06/08	1695	0.034	20.06	1.26	0.93	0.55	7.38	6.73
06/14	1747	0.101	57.81	1.22	0.89	0.51	8.82	8.17
06/20	1740	0.124	71.26	0.77	0.44	0.25	37.80	37.15
06/26	1687	0.047	27.86	5.63	5.30	3.14	8.28	7.63

Fort Lee Library IP 15, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1675	0.022	13.13	0.68	0.35	0.21	2.97	2.32
07/08	1658	0.131	79.01	3.74	3.41	2.06	32.36	31.71
07/14	1696	0.122	71.93	1.62	1.29	0.76	15.26	14.61
07/20	1667	0.059	35.39	2.34	2.01	1.21	9.72	9.07
07/26	1629	0.111	68.14	0.50	0.17	0.10	5.45	4.80
08/01	1675	0.126	75.22	0.90	0.57	0.34	7.74	7.09
08/07	1644	0.046	27.98	0.81	0.48	0.29	6.12	5.47
08/13	1668	0.126	75.54	2.57	2.24	1.34	27.68	27.03
08/19	1658	0.045	27.14	1.35	1.02	0.62	9.41	8.76
08/25	1666	0.084	50.42	3.42	3.09	1.85	13.05	12.40
08/31	1629	0.038	23.33	0.45	0.12	0.07	3.69	3.04
09/06	NA	NA	NA	NA	NA	NA	NA	NA
09/12	1650	0.045	27.27	NA	ERR	ERR	6.66	6.01
09/18	1633	0.066	40.42	1.62	1.29	0.79	11.03	10.38
09/24	1668	0.026	15.59	2.16	1.83	1.10	11.12	10.47
09/30	1652	0.063	38.14	0.63	0.30	0.18	4.68	4.03
10/06	1658	0.026	15.68	0.72	0.39		3.87	3.22
10/12	NA	NA	NA	NA	NA	NA	NA	NA
10/18	1661	0.063	37.93	1.22	0.89	0.54	17.55	16.90
10/24	1663	0.045	27.06	1.13	0.80	0.48	7.97	7.32
10/30	1653	0.025	15.12	NA	ERR	ERR	6.84	6.19
11/05	1702	0.049	28.79	2.48	2.15	1.26	8.82	8.17
11/11	1651	0.023	13.93	1.71	1.38	0.84	6.17	5.52
11/17	NA	NA	NA	NA	NA	NA	NA	NA
11/23	1613	0.066	40.92	5.40	5.07	3.14	16.70	16.05
11/29	1647	0.024	14.57	2.03	1.70	1.03	8.33	7.68
12/05	1659	0.042	25.32	1.40	1.07	0.64	7.74	7.09
12/11	1616	0.023	14.23	2.21	1.88	1.16	6.80	6.15
12/17	1642	0.035	21.32	3.42	3.09	1.88	6.89	6.24
12/23	1671	0.047	28.13	2.12	1.79	1.07	10.53	9.88
12/29	1645	0.028	17.02	0.90	0.57	0.35	9.05	8.40

Fort Lee Library IP 15, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	10.39	686.88	0.42	6.30	0.92	6	31	19	3	59
01/10	10.52	1010.32	0.64	6.83	1.63	5	27	18	4	54
01/16	17.25	1721.36	1.05	11.26	7.53	8	20	13	9	49
01/22	2.55	576.53	0.35	3.99	0.64	6	11	18	3	38
01/28	10.95	1128.82	0.70	7.50	2.56	3	26	17	6	52
02/03	4.99	369.24	0.23	4.53	1.24	9	20	18	5	52
02/09	7.60	744.43	0.46	6.05	3.10	6	20	16	8	49
02/15	3.73	241.45	0.15	4.82	1.03	4	15	19	4	42
02/21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
02/27	8.74	411.16	0.25	7.36	2.93	4	22	18	7	51
03/04	9.51	400.69	0.25	8.34	1.20	7	31	28	4	70
03/10	3.27	100.07	0.06	3.01	0.20	4	24	22	1	51
03/16	3.43	187.49	0.11	5.17	0.23	5	19	29	1	55
03/22	2.47	130.52	0.08	1.73	0.48	7	14	10	3	34
03/28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
04/03	3.48	291.48	0.18	12.37	4.73	3	7	24	9	44
04/09	2.82	75.20	0.05	2.12	0.40	5	24	18	3	51
04/15	2.14	46.56	0.03	7.91	2.71	1	6	22	8	36
04/21	1.04	46.40	0.03	6.63	0.44	-0	4	26	2	32
04/27	2.24	72.19	0.04	7.55	0.62	1	6	22	2	30
05/03	1.48	78.03	0.05	5.60	0.28	2	7	27	1	38
05/09	3.84	60.94	0.04	3.55	1.34	4	14	13	5	36
05/15	1.25	91.18	0.05	5.14	0.32	1	4	18	1	24
05/21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
05/27	5.01	99.78	0.06	7.72	0.86	1	11	17	2	31
06/02	1.56	30.14	0.02	1.67	0.86	0	8	8	4	20
06/08	3.97	58.44	0.03	1.46	0.56	3	20	7	3	33
06/14	4.68	20.47	0.01	15.91	0.39	1	8	28	1	37
06/20	21.35	29.95	0.02	25.27	0.19	0	30	35	0	66
06/26	4.52	61.64	0.04	5.71	0.21	11	16	20	1	49

Fort Lee Library IP 15, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	1.39	17.16	0.01	1.22	0.45	2	11	9	3	25
07/08	19.13	212.03	0.13	6.03	0.26	3	24	8	0	35
07/14	8.61	27.17	0.02	7.12	0.17	1	12	10	0	23
07/20	5.44	107.56	0.06	7.56	0.47	3	15	21	1	41
07/26	2.95	158.62	0.10	17.20	0.40	0	4	25	1	30
08/01	4.23	38.29	0.02	26.96	0.55	0	6	36	1	43
08/07	3.33	17.70	0.01	8.00	0.13	1	12	29	0	42
08/13	16.21	70.76	0.04	31.57	0.59	2	21	42	1	66
08/19	5.28	63.27	0.04	1.85	0.62	2	19	7	2	31
08/25	7.44	174.11	0.10	11.41	0.14	4	15	23	0	41
08/31	1.87	37.02	0.02	2.80	0.37	0	8	12	2	22
09/06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
09/12	3.64	87.73	0.05	2.37	0.61	ERR	13	9	2	ERR
09/18	6.36	48.44	0.03	13.24	0.23	2	16	33	1	51
09/24	6.28	57.95	0.03	1.35	0.77	7	40	9	5	61
09/30	2.44	417.74	0.25	8.18	0.37	0	6	21	1	29
10/06	1.94	45.34	0.03	2.58	0.27	2	12	16	2	32
10/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/18	10.17	79.70	0.05	6.61	0.28	1	27	17	1	46
10/24	4.40	463.04	0.28	4.28	0.47	2	16	16	2	36
10/30	3.74	483.67	0.29	2.03	0.30	ERR	25	13	2	ERR
11/05	4.80	363.55	0.21	4.61	0.52	4	17	16	2	39
11/11	3.34	2777.16	1.68	3.16	0.24	6	24	23	2	54
11/17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/23	9.95	1432.61	0.89	4.81	0.43	8	24	12	1	45
11/29	4.66	633.47	0.38	2.37	0.28	7	32	16	2	57
12/05	4.27	2277.44	1.37	2.61	0.57	3	17	10	2	32
12/11	3.81	904.54	0.56	2.64	0.37	8	27	19	3	56
12/17	3.80	1310.45	0.80	2.97	0.55	9	18	14	3	43
12/23	5.91	1218.09	0.73	3.96	0.34	4	21	14	1	40
12/29	5.11	523.89	0.32	2.90	0.28	2	30	17	2	51

Newark IP04, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1685	0.065	38.58	5.09	4.76	2.82	16.16	15.51
01/10	1576	0.050	31.73	3.42	3.09	1.96	15.57	14.92
01/16	1672	0.136	81.34	7.74	7.41	4.43	23.90	23.25
01/22	1685	0.052	30.86	4.01	3.68	2.18	10.80	10.15
01/28	1631	0.092	56.41	7.29	6.96	4.27	23.85	23.20
02/03	1642	0.048	29.23	3.02	2.69	1.64	16.79	16.14
02/09	1663	0.086	51.71	6.93	6.60	3.97	23.67	23.02
02/15	NA	NA	NA	NA	NA	NA	NA	NA
02/21	1575	0.024	15.24	1.35	1.02	0.65	4.28	3.63
02/27	1286	0.062	48.21	2.34	2.01	1.56	8.33	7.68
03/04	1656	0.061	36.84	1.17	0.84	0.51	9.59	8.94
03/10	1682	0.027	16.05	2.25	1.92	1.14	3.96	3.31
03/16	1637	0.042	25.66	2.25	1.92	1.17	6.84	6.19
03/22	1629	0.037	22.71	3.65	3.32	2.04	7.11	6.46
03/28	1705	0.027	15.84	4.01	3.68	2.16	6.89	6.24
04/03	1662	0.063	37.91	3.42	3.09	1.86	7.65	7.00
04/09	1675	0.017	10.15	0.99	0.66	0.39	3.51	2.86
04/15	NA	NA	NA	NA	NA	NA	NA	NA
04/21	1677	0.048	28.62	2.61	2.28	1.36	9.63	8.98
04/27	1682	0.077	45.78	3.78	3.45	2.05	12.60	11.95
05/03	1646	0.052	31.59	1.40	1.07	0.65	6.08	5.43
05/09	1641	0.053	32.30	1.31	0.98	0.60	9.95	9.30
05/15	1663	0.048	28.86	2.57	2.24	1.35	8.96	8.31
05/21	1633	0.089	54.50	2.79	2.46	1.51	17.33	16.68
05/27	1719	0.069	40.14	1.89	1.56	0.91	5.63	4.98
06/02	1658	0.033	19.90	1.62	1.29	0.78	10.04	9.39
06/08	1670	0.037	22.16	3.29	2.96	1.77	8.37	7.72
06/14	NA	NA	NA	NA	NA	NA	NA	NA
06/20	1543	0.118	76.47	1.35	1.02	0.66	3.56	2.91
06/26	1516	0.042	27.70	1.22	0.89	0.59	2.16	1.51

Newark IP04, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1527	0.021	13.75	2.16	1.83	1.20	11.88	11.23
07/08	NA	NA	NA	NA	NA	NA	NA	NA
07/14	1785	0.138	77.31	2.16	1.83	1.03	13.41	12.76
07/20	1527	0.072	47.15	1.40	1.07	0.70	5.08	4.43
07/26	1617	0.113	69.88	3.51	3.18	1.97	18.41	17.76
08/01	1642	0.133	81.00	7.61	7.28	4.43	14.76	14.11
08/07	1692	0.052	30.73	1.58	1.25	0.74	13.23	12.58
08/13	1823	0.135	74.05	1.80	1.47	0.81	25.06	24.41
08/19	1566	0.053	33.84	2.70	2.37	1.51	16.34	15.69
08/25	1599	0.086	53.78	3.78	3.45	2.16	16.97	16.32
08/31	1617	0.042	25.97	2.79	2.46	1.52	13.46	12.81
09/06	1608	0.025	15.55	0.63	0.30	0.19	10.71	10.06
09/12	1403	0.044	31.36	2.07	1.74	1.24	9.00	8.35
09/18	1548	0.068	43.93	2.07	1.74	1.12	8.91	8.26
09/24	1582	0.027	17.07	2.03	1.70	1.07	11.12	10.47
09/30	1633	0.070	42.87	3.06	2.73	1.67	NA	ERR
10/06	1726	0.030	17.38	3.42	3.09	1.79	5.27	4.62
10/12	1719	0.026	15.13	2.52	2.19	1.27	7.07	6.42
10/18	1795	0.073	40.67	7.70	7.37	4.11	14.67	14.02
10/24	1649	0.057	34.57	3.47	3.14	1.90	15.12	14.47
10/30	1687	0.023	13.63	1.58	1.25	0.74	11.25	10.60
11/05	1613	0.057	35.34	2.43	2.10	1.30	14.58	13.93
11/11	NA	NA	NA	NA	NA	NA	NA	NA
11/17	NA	NA	NA	NA	NA	NA	NA	NA
11/23	NA	NA	NA	NA	NA	NA	NA	NA
11/29	1653	0.039	23.59	3.02	2.69	1.63	13.59	12.94
12/05	1629	0.047	28.85	4.14	3.81	2.34	23.99	23.34
12/11	1589	0.027	16.99	0.54	0.21	0.13	3.87	3.22
12/17	1616	0.049	30.32	1.62	1.29	0.80	15.03	14.38
12/23	1682	0.058	34.48	3.24	2.91	1.73	11.34	10.69
12/29	1720	0.033	19.19	1.62	1.29	0.75	8.64	7.99

Newark IP04, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	9.20	4079.99	2.42	7.12	1.10	7	24	18	3	52
01/10	9.47	1175.65	0.75	7.46	1.46	6	30	24	5	64
01/16	13.91	2911.80	1.74	10.38	8.23	5	17	13	10	45
01/22	6.02	8989.61	5.34	4.67	0.73	7	20	15	2	44
01/28	14.22	4014.37	2.46	8.64	2.14	8	25	15	4	52
02/03	9.83	613.30	0.37	5.83	1.23	6	34	20	4	63
02/09	13.84	2427.13	1.46	6.58	4.59	8	27	13	9	56
02/15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
02/21	2.30	375.97	0.24	2.87	0.57	4	15	19	4	42
02/27	5.97	1230.14	0.96	11.15	4.52	3	12	23	9	48
03/04	5.40	196.07	0.12	9.07	2.87	1	15	25	8	48
03/10	1.97	192.89	0.11	4.05	0.71	7	12	25	4	49
03/16	3.78	1317.48	0.80	4.84	0.69	5	15	19	3	41
03/22	3.97	481.80	0.30	1.89	1.54	9	17	8	7	42
03/28	3.66	290.25	0.17	3.06	0.40	14	23	19	3	59
04/03	4.21	55.47	0.03	13.64	0.02	5	11	36	0	52
04/09	1.71	278.83	0.17	2.21	0.22	4	17	22	2	45
04/15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
04/21	5.35	281.45	0.17	6.66	0.66	5	19	23	2	49
04/27	7.10	193.83	0.12	9.17	0.44	4	16	20	1	41
05/03	3.30	215.82	0.13	7.50	0.38	2	10	24	1	37
05/09	5.67	75.45	0.05	4.43	0.95	2	18	14	3	36
05/15	5.00	129.90	0.08	5.24	0.59	5	17	18	2	42
05/21	10.21	105.79	0.06	11.12	3.24	3	19	20	6	48
05/27	2.90	166.94	0.10	7.87	1.00	2	7	20	2	32
06/02	5.66	55.87	0.03	2.20	1.02	4	28	11	5	49
06/08	4.62	155.10	0.09	2.00	0.94	8	21	9	4	42
06/14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
06/20	1.89	46.31	0.03	31.04	0.09	1	2	41	0	44
06/26	1.00	25.07	0.02	5.41	0.26	2	4	20	1	26

Newark IP04, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	7.35	37.85	0.02	1.14	0.46	9	53	8	3	74
07/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
07/14	7.15	56.38	0.03	25.96	0.15	1	9	34	0	44
07/20	2.90	46.88	0.03	10.60	0.30	1	6	22	1	31
07/26	10.98	41.81	0.03	19.23	0.44	3	16	28	1	47
08/01	8.59	81.77	0.05	31.12	0.17	5	11	38	0	55
08/07	7.43	58.56	0.03	10.03	0.25	2	24	33	1	60
08/13	13.39	59.13	0.03	34.75	0.00	1	18	47	0	66
08/19	10.02	63.34	0.04	2.75	1.40	4	30	8	4	46
08/25	10.21	262.53	0.16	11.80	0.22	4	19	22	0	45
08/31	7.92	98.47	0.06	3.25	0.37	6	30	13	1	50
09/06	6.26	108.31	0.07	2.53	0.44	1	40	16	3	61
09/12	5.95	353.41	0.25	2.23	0.79	4	19	7	3	33
09/18	5.34	73.95	0.05	13.96	0.22	3	12	32	1	47
09/24	6.62	107.07	0.07	1.63	0.91	6	39	10	5	60
09/30	ERR	322.29	0.20	8.00	0.32	4	ERR	19	1	ERR
10/06	2.68	579.49	0.34	1.95	0.30	10	15	11	2	39
10/12	3.73	509.90	0.30	1.37	0.28	8	25	9	2	44
10/18	7.81	682.33	0.38	5.61	0.17	10	19	14	0	44
10/24	8.78	399.54	0.24	4.07	0.43	6	25	12	1	44
10/30	6.28	600.28	0.36	2.31	0.31	5	46	17	2	71
11/05	8.64	282.19	0.17	5.19	0.67	4	24	15	2	45
11/11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/29	7.83	1413.79	0.86	2.61	0.49	7	33	11	2	53
12/05	14.33	1698.03	1.04	3.20	0.66	8	50	11	2	71
12/11	2.03	122.28	0.08	3.25	0.46	1	12	19	3	35
12/17	8.90	1315.77	0.81	3.61	0.53	3	29	12	2	46
12/23	6.36	2318.71	1.38	5.43	0.38	5	18	16	1	40
12/29	4.65	432.68	0.25	2.52	0.48	4	24	13	3	44

Newark IP03, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1658	0.062	37.39	31.05	30.72	18.53	25.66	25.01
01/10	1620	0.048	29.63	3.96	3.63	2.24	13.14	12.49
01/16	1645	0.125	75.99	5.85	5.52	3.36	32.49	31.84
01/22	1679	0.049	29.18	5.58	5.25	3.13	18.90	18.25
01/28	1606	0.087	54.17	8.33	8.00	4.98	34.79	34.14
02/03	1656	0.045	27.17	3.33	3.00	1.81	12.87	12.22
02/09	1669	0.081	48.53	3.29	2.96	1.77	23.18	22.53
02/15	NA	NA	NA	NA	NA	NA	NA	NA
02/21	1647	0.023	13.96	1.71	1.38	0.84	6.17	5.52
02/27	1642	0.062	37.76	1.31	0.98	0.60	4.37	3.72
03/04	1669	0.059	35.35	3.24	2.91	1.74	13.86	13.21
03/10	1707	0.027	15.82	3.78	3.45	2.02	8.37	7.72
03/16	1628	0.039	23.96	2.16	1.83	1.12	6.93	6.28
03/22	1656	0.035	21.14	1.49	1.16	0.70	4.50	3.85
03/28	1720	0.027	15.70	1.98	1.65	0.96	9.45	8.80
04/03	1699	0.063	37.08	2.07	1.74	1.02	8.87	8.22
04/09	1720	0.017	9.88	0.77	0.44	0.26	3.92	3.27
04/15	NA	NA	NA	NA	NA	NA	NA	NA
04/21	1755	0.046	26.21	2.03	1.70	0.97	3.24	2.59
04/27	1731	0.075	43.33	4.28	3.95	2.28	8.46	7.81
05/03	1683	0.050	29.71	2.66	2.33	1.38	7.11	6.46
05/09	1670	0.052	31.14	0.45	0.12	0.07	1.58	0.93
05/15	1707	0.046	26.95	0.63	0.30	0.18	5.90	5.25
05/21	1670	0.086	51.50	0.50	0.17	0.10	3.65	3.00
05/27	1719	0.065	37.81	0.41	0.08	0.05	1.89	1.24
06/02	1658	0.031	18.70	0.36	0.03	0.02	9.32	8.67
06/08	1658	0.034	20.51	0.72	0.39	0.24	3.29	2.64
06/14	1405	0.094	66.90	0.77	0.44	0.31	9.41	8.76
06/20	1621	0.118	72.79	1.40	1.07	0.66	5.67	5.02
06/26	1608	0.039	24.25	1.08	0.75	0.47	3.15	2.50

Newark IP03, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1592	0.019	11.93	1.80	1.47	0.92	4.28	3.63
07/08	1629	0.121	74.28	6.66	6.33	3.89	6.17	5.52
07/14	1629	0.127	77.96	1.17	0.84	0.52	5.72	5.07
07/20	1617	0.076	47.00	4.01	3.68	2.28	10.89	10.24
07/26	1612	0.114	70.72	1.62	1.29	0.80	14.40	14.40
08/01	1610	0.131	81.37	1.17	0.84	0.52		-0.65
08/07	1637	0.046	28.10	1.17	0.84	0.51	7.92	7.27
08/13	NA	NA	NA	NA	NA	NA	NA	NA
08/19	1617	0.050	30.92	1.04	0.71	0.44	2.48	1.83
08/25	1617	0.083	51.33	1.71	1.38	0.85	11.88	11.23
08/31	1617	0.040	24.74	0.54	0.21	0.13	9.45	8.80
09/06	1610	0.024	14.91	1.13	0.80	0.50	5.22	4.57
09/12	1621	0.041	25.29	1.62	1.29	0.80	9.32	8.67
09/18	1608	0.066	41.04	1.85	1.52	0.95	7.11	6.46
09/24	1633	0.025	15.31	1.71	1.38	0.85	8.28	7.63
09/30	1621	0.066	40.72	2.43	2.10	1.30	9.23	8.58
10/06	1585	0.028	17.67	2.75	2.42	1.53	12.92	12.27
10/12	1637	0.025	15.27	4.19	3.86	2.36	8.64	7.99
10/18	1664	0.071	42.67	2.16	1.83	1.10	21.33	20.68
10/24	1677	0.054	32.20	3.02	2.69	1.60	16.88	16.23
10/30	1624	0.023	14.16	1.53	1.20	0.74	7.02	6.37
11/05	1703	0.057	33.47	NA	ERR	ERR	12.20	11.55
11/11	1653	0.038	22.99	2.84	2.51	1.52	10.49	9.84
11/17	1653	0.037	22.38	6.65	6.32	3.82	8.69	8.04
11/23	1636	0.088	53.79	4.19	3.86	2.36	28.13	27.48
11/29	1615	0.038	23.53	3.33	3.00	1.86	12.78	12.13
12/05	1629	0.045	27.62	1.22	0.89	0.55	14.99	14.34
12/11	1602	0.026	16.23	1.49	1.16	0.72	7.11	6.46
12/17	1616	0.044	27.23	1.22	0.89	0.55	10.40	9.75
12/23	1669	0.055	32.95	2.57	2.24	1.34	19.67	19.02
12/29	1669	0.032	19.17	1.08	0.75	0.45	10.94	10.29

Newark IP03, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	15.08	2708.18	1.63	4.72	0.95	50	40	13	3	105
01/10	7.71	852.96	0.53	5.32	1.13	8	26	18	4	55
01/16	19.36	3126.96	1.90	9.78	7.93	4	25	13	10	53
01/22	10.87	2471.47	1.47	3.63	0.69	11	37	12	2	63
01/28	21.26	2098.98	1.31	9.88	6.16	9	39	18	11	78
02/03	7.38	1144.73	0.69	5.58	1.06	7	27	21	4	58
02/09	13.50	1841.80	1.10	5.81	1.84	4	28	12	4	47
02/15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
02/21	3.35	206.23	0.13	3.42	0.61	6	24	24	4	59
02/27	2.27	242.07	0.15	9.84	1.73	2	6	26	5	38
03/04	7.91	538.39	0.32	8.15	1.57	5	22	23	4	55
03/10	4.52	347.66	0.20	3.15	0.66	13	29	20	4	65
03/16	3.86	1570.08	0.96	5.14	0.68	5	16	21	3	45
03/22	2.32	672.06	0.41	2.21	1.57	3	11	10	7	32
03/28	5.12	151.81	0.09	2.97	0.38	6	33	19	2	60
04/03	4.84	133.12	0.08	13.19	0.17	3	13	36	0	52
04/09	1.90	113.95	0.07	1.46	0.21	3	19	15	2	39
04/15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
04/21	1.48	96.88	0.06	5.64	0.66	4	6	22	3	33
04/27	4.51	262.50	0.15	7.83	0.96	5	10	18	2	36
05/03	3.84	169.10	0.10	7.00	2.26	5	13	24	8	49
05/09	0.56	33.05	0.02	4.55	0.98	0	2	15	3	20
05/15	3.08	56.62	0.03	5.26	0.65	1	11	20	2	34
05/21	1.80	31.29	0.02	10.06	2.74	0	3	20	5	29
05/27	0.72	32.14	0.02	6.30	0.63	0	2	17	2	20
06/02	5.23	24.55	0.01	1.92	1.04	0	28	10	6	44
06/08	1.59	34.56	0.02	1.80	0.78	1	8	9	4	21
06/14	6.23	37.58	0.03	18.35	0.81	0	9	27	1	38
06/20	3.10	34.92	0.02	28.89	0.08	1	4	40	0	45
06/26	1.55	30.95	0.02	5.09	0.27	2	6	21	1	30

Newark IP03, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	2.28	32.82	0.02	0.97	0.51	8	19	8	4	39
07/08	3.39	356.71	0.22	18.04	2.08	5	5	24	3	37
07/14	3.11	46.73	0.03	27.07	0.12	1	4	35	0	40
07/20	6.33	152.92	0.09	8.31	0.18	5	13	18	0	36
07/26	8.93	122.44	0.08	15.82	0.40	1	13	22	1	37
08/01	-0.40	63.32	0.04	31.68	0.17	1	-0	39	0	39
08/07	4.44	38.41	0.02	7.20	0.17	2	16	26	1	44
08/13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
08/19	1.13	124.19	0.08	2.22	1.22	1	4	7	4	16
08/25	6.94	47.08	0.03	10.94	0.47	2	14	21	1	37
08/31	5.44	34.36	0.02	2.42	0.54	1	22	10	2	34
09/06	2.84	119.58	0.07	2.05	0.60	3	19	14	4	40
09/12	5.35	206.61	0.13	1.78	0.80	3	21	7	3	34
09/18	4.02	77.15	0.05	12.73	0.64	2	10	31	2	45
09/24	4.67	67.28	0.04	1.55	1.28	6	31	10	8	55
09/30	5.29	140.30	0.09	7.70	0.35	3	13	19	1	36
10/06	7.74	407.71	0.26	2.33	0.37	9	44	13	2	68
10/12	4.88	596.83	0.36	1.20	0.28	15	32	8	2	57
10/18	12.43	447.49	0.27	6.37	0.18	3	29	15	0	47
10/24	9.68	544.59	0.32	3.19	0.35	5	30	10	1	46
10/30	3.92	580.33	0.36	2.20	0.29	5	28	16	2	50
11/05	6.78	117.28	0.07	4.81	0.53	ERR	20	14	2	ERR
11/11	5.95	394.59	0.24	3.45	0.25	7	26	15	1	49
11/17	4.86	509.56	0.31	3.58	0.35	17	22	16	2	56
11/23	16.80	3476.62	2.13	4.93	1.06	4	31	9	2	47
11/29	7.51	784.88	0.49	2.42	0.46	8	32	10	2	52
12/05	8.80	528.57	0.32	2.46	0.57	2	32	9	2	45
12/11	4.03	542.16	0.34	3.40	0.44	4	25	21	3	53
12/17	6.03	1170.20	0.72	3.48	0.61	2	22	13	2	39
12/23	11.40	1279.29	0.77	5.14	0.42	4	35	16	1	56
12/29	6.17	514.27	0.31	2.32	0.49	2	32	12	3	49

Pennsauken IP11, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1723	0.061	35.40	20.88	20.55	11.93	10.35	9.70
01/10	1736	0.089	51.27	2.25	1.92	1.11	10.98	10.33
01/16	1736	0.125	72.00	2.57	2.24	1.29	17.19	16.54
01/22	1683	0.046	27.33	1.04	0.71	0.42	5.67	5.02
01/28	1703	0.103	60.48	1.85	1.52	0.89	15.26	14.61
02/03	1699	0.037	21.78	2.07	1.74	1.02	9.77	9.12
02/09	1680	0.069	41.07	1.98	1.65	0.98	28.49	27.84
02/15	1673	0.036	21.52	0.77	0.44	0.26	5.45	4.80
02/21	1667	0.026	15.60	2.52	2.19	1.31	5.27	4.62
02/27	1673	0.043	25.70	1.76	1.43	0.85	4.68	4.03
03/04	1673	0.078	46.62	1.85	1.52	0.91	5.85	5.20
03/10	1643	0.026	15.82	4.64	4.31	2.62	3.60	2.95
03/16	1707	0.034	19.92	2.07	1.74	1.02	8.55	7.90
03/22	1775	0.062	34.93	3.29	2.96	1.67	9.86	9.21
03/28	1750	0.036	20.57	1.76	1.43	0.82	14.76	14.11
04/03	1679	0.067	39.90	1.13	0.80	0.48	5.63	4.98
04/09	1748	0.019	10.87	1.49	1.16	0.66	5.04	4.39
04/15	1699	0.050	29.43	1.76	1.43	0.84	9.27	8.62
04/21	1719	0.051	29.67	0.59	0.26	0.15	0.81	0.16
04/27	1699	0.050	29.43	NA	NA	NA	1.26	0.61
05/03	1675	0.056	33.43	2.07	1.74	1.04	8.73	8.08
05/09	1682	0.034	20.21	0.36	0.03	0.02	7.34	6.69
05/15	1567	0.096	61.26	1.35	1.02	0.65	5.90	5.25
05/21	1731	0.058	33.51	16.16	15.83	9.15	19.76	19.11
05/27	1520	0.060	39.47	0.54	0.21	0.14	10.80	10.15
06/02	1731	0.035	20.22	2.34	2.01	1.16	9.72	9.07
06/08	1663	0.047	28.26	2.88	2.55	1.53	11.03	10.38
06/14	1542	0.129	83.66	3.33	3.00	1.95	12.83	12.18
06/20	1644	0.121	73.60	1.31	0.98	0.60	11.40	10.75
06/26	1743	0.062	35.57	0.77	0.44	0.25	13.95	13.30

Pennsauken IP11, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1742	0.041	23.54	0.50	0.17	0.10	5.72	5.07
07/08	1678	0.101	60.19	2.12	1.79	1.07	20.34	19.69
07/14	1685	0.123	73.00	0.59	0.26	0.15	17.01	16.36
07/20	1685	0.071	42.14	0.86	0.53	0.31	5.22	4.57
07/26	1695	0.080	47.20	0.63	0.30	0.18	4.28	3.63
08/01	1527	0.126	82.51	0.90	0.57	0.37	7.16	6.51
08/07	1628	0.069	42.38	1.08	0.75	0.46	4.14	3.49
08/13	1678	0.075	44.70	1.85	1.52	0.91	5.13	4.48
08/19	1651	0.040	24.23	1.31	0.98	0.59	7.92	7.27
08/25	1636	0.073	44.62	3.96	3.63	2.22	11.97	11.32
08/31	1680	0.051	30.36	1.62	1.29	0.77	4.32	3.67
09/06	1707	0.026	15.23	0.81	0.48	0.28	2.93	2.28
09/12	1657	0.051	30.78	1.58	1.25	0.75	5.40	4.75
09/18	1657	0.063	38.02	1.13	0.80	0.48	13.37	12.72
09/24	1719	0.031	18.03	0.50	0.17	0.10	6.93	6.28
09/30	1675	0.060	35.82	0.59	0.26	0.16	3.74	3.09
10/06	1699	0.030	17.66	1.35	1.02	0.60	5.45	4.80
10/12	1667	0.025	15.00	1.89	1.56	0.94	4.91	4.26
10/18	1661	0.053	31.91	1.22	0.89	0.54	5.04	4.39
10/24	1675	0.044	26.27	0.86	0.53	0.32	8.78	8.13
10/30	1741	0.036	20.68	1.22	0.89	0.51	6.53	5.88
11/05	1653	0.025	15.12	0.77	0.44	0.27	4.41	3.76
11/11	1684	0.027	16.03	1.53	1.20	0.71	2.61	1.96
11/17	1671	0.028	16.76	0.77	0.44	0.26	2.21	1.56
11/23	1641	0.093	56.67	3.65	3.32	2.02	18.05	17.40
11/29	1646	0.035	21.26	2.43	2.10	1.28	10.40	9.75
12/05	1675	0.044	26.27	2.97	2.64	1.58	11.66	11.01
12/11	1708	0.026	15.22	0.95	0.62	0.36	6.75	6.10
12/17	1725	0.066	38.26	0.75	0.42	0.24	20.97	20.32
12/23	1662	0.055	33.09	1.98	1.65	0.99	9.81	9.16
12/29	1703	0.034	19.96	1.26	0.93	0.55	6.21	5.56

Pennsauken IP11, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	5.63	761.99	0.44	6.73	1.01	34	16	19	3	71
01/10	5.95	831.31	0.48	15.10	3.37	2	12	29	7	50
01/16	9.53	1536.50	0.89	15.04	5.56	2	13	21	8	44
01/22	2.98	223.17	0.13	5.75	1.10	2	11	21	4	38
01/28	8.58	718.50	0.42	13.39	5.29	1	14	22	9	47
02/03	5.37	171.97	0.10	4.82	0.89	5	25	22	4	56
02/09	16.57	440.17	0.26	5.99	3.80	2	40	15	9	67
02/15	2.87	104.27	0.06	4.11	1.74	1	13	19	8	42
02/21	2.77	73.96	0.04	1.98	0.56	8	18	13	4	42
02/27	2.41	130.27	0.08	6.29	1.75	3	9	24	7	44
03/04	3.11	204.11	0.12	8.39	4.27	2	7	18	9	36
03/10	1.80	72.78	0.04	3.17	0.37	17	11	20	2	50
03/16	4.63	158.70	0.09	4.67	0.90	5	23	23	5	56
03/22	5.19	560.00	0.32	2.41	1.58	5	15	7	5	31
03/28	8.06	223.19	0.13	4.26	0.29	4	39	21	1	65
04/03	2.97	237.01	0.14	9.21	1.18	1	7	23	3	35
04/09	2.51	109.70	0.06	2.97	0.31	6	23	27	3	59
04/15	5.07	98.32	0.06	6.83	1.47	3	17	23	5	48
04/21	0.09	168.41	0.10	7.15	0.91	1	0	24	3	28
04/27	0.36	89.04	0.05	6.53	0.13	NA	1	22	0	NA
05/03	4.82	135.51	0.08	7.88	0.19	3	14	24	1	42
05/09	3.98	75.24	0.04	2.48	1.09	0	20	12	5	37
05/15	3.35	954.31	0.61	6.41	0.30	1	5	10	0	17
05/21	11.04	16.80	0.01	9.98	0.41	27	33	30	1	91
05/27	6.68	50.93	0.03	8.91	0.63	0	17	23	2	41
06/02	5.24	44.50	0.03	2.14	0.77	6	26	11	4	46
06/08	6.24	148.62	0.09	2.62	1.62	5	22	9	6	43
06/14	7.90	174.01	0.11	26.78	0.87	2	9	32	1	45
06/20	6.54	70.43	0.04	6.66	0.42	1	9	9	1	19
06/26	7.63	47.86	0.03	22.40	0.20	1	21	63	1	86

Pennsauken IP11, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	2.91	55.92	0.03	1.13	0.64	0	12	5	3	20
07/08	11.73	96.67	0.06	17.58	0.14	2	19	29	0	51
07/14	9.71	73.99	0.04	29.39	0.17	0	13	40	0	54
07/20	2.71	115.40	0.07	12.99	0.47	1	6	31	1	39
07/26	2.14	20.93	0.01	19.43	0.47	0	5	41	1	47
08/01	4.26	36.38	0.02	34.41	0.61	0	5	42	1	48
08/07	2.14	35.91	0.02	11.82	0.79	1	5	28	2	36
08/13	2.67	58.60	0.03	14.85	0.46	2	6	33	1	42
08/19	4.40	15.01	0.01	1.63	1.07	2	18	7	4	32
08/25	6.92	60.63	0.04	11.87	0.61	5	16	27	1	48
08/31	2.18	9.94	0.01	4.14	0.33	3	7	14	1	24
09/06	1.34	35.89	0.02	3.59	0.44	2	9	24	3	37
09/12	2.87	268.56	0.16	4.17	0.75	2	9	14	2	28
09/18	7.68	50.16	0.03	11.36	1.91	1	20	30	5	56
09/24	3.65	41.69	0.02	2.01	0.30	1	20	11	2	34
09/30	1.84	80.74	0.05	9.71	0.27	0	5	27	1	33
10/06	2.83	129.88	0.08	3.62	0.29	3	16	21	2	42
10/12	2.56	218.39	0.13	1.75	0.34	6	17	12	2	37
10/18	2.64	526.69	0.32	6.03	0.26	2	8	19	1	30
10/24	4.85	1247.11	0.74	4.31	0.29	1	18	16	1	37
10/30	3.38	314.82	0.18	2.98	0.41	2	16	14	2	35
11/05	2.27	47.73	0.03	2.47	0.38	2	15	16	3	36
11/11	1.16	94.02	0.06	3.30	0.31	4	7	21	2	34
11/17	0.93	108.89	0.07	3.27	0.28	2	6	20	2	28
11/23	10.60	1994.61	1.22	8.20	0.98	4	19	14	2	38
11/29	5.92	732.46	0.44	4.12	0.67	6	28	19	3	56
12/05	6.57	1099.74	0.66	3.05	0.96	6	25	12	4	46
12/11	3.57	282.90	0.17	3.43	0.62	2	23	23	4	52
12/17	11.78	1961.73	1.14	4.86	1.83	1	31	13	5	49
12/23	5.51	966.90	0.58	8.43	0.60	3	17	25	2	47
12/29	3.26	282.60	0.17	0.39	2.98	3	16	2	15	36

Ringwood IP05, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1633	0.034	20.82	1.44	1.11	0.68	6.93	6.28
01/10	1598	0.029	18.15	0.86	0.53	0.33	2.70	2.05
01/16	1645	0.073	44.38	2.21	1.88	1.14	24.03	23.38
01/22	1614	0.024	14.87	0.95	0.62	0.38	3.69	3.04
01/28	1606	0.032	19.93	0.18	0.00	0.00	4.82	4.17
02/03	1636	0.031	18.95	1.17	0.84	0.51	6.03	5.38
02/09	1591	0.009	5.66	0.95	0.62	0.39	4.01	3.36
02/15	1915	0.038	19.84	2.03	1.70	0.89	1.85	1.20
02/21	1602	0.017	10.61	1.71	1.38	0.86	3.20	2.55
02/27	1642	0.043	26.19	1.08	0.75	0.46	13.05	12.40
03/04	1682	0.027	16.05	7.25	6.92	4.11	5.13	4.48
03/10	1687	0.015	8.89	1.22	0.89	0.53	3.65	3.00
03/16	1675	0.024	14.33	1.49	1.16	0.69	5.76	5.11
03/22	1622	0.017	10.48	1.08	0.75	0.46	4.10	3.45
03/28	1683	0.018	10.70	1.40	1.07	0.64	4.14	3.49
04/03	1650	0.050	30.30	0.59	0.26	0.16	10.31	9.66
04/09	1658	0.011	6.63	2.25	1.92	1.16	3.38	2.73
04/15	1662	0.030	18.05	1.44	1.11	0.67	9.95	9.30
04/21	1683	0.027	16.04	3.60	3.27	1.94	9.45	8.80
04/27	1694	0.041	24.20	1.08	0.75	0.44	5.36	4.71
05/03	1650	0.015	9.09	0.77	0.44	0.27	2.97	2.32
05/09	1659	0.033	19.89	0.95	0.62	0.37	16.20	15.55
05/15	1659	0.033	19.89	1.58	1.25	0.75	17.78	17.13
05/21	1646	0.057	34.63	1.17	0.84	0.51	21.60	20.95
05/27	1668	0.041	24.58	0.68	0.35	0.21	9.50	8.85
06/02	1651	0.021	12.72	1.22	0.89	0.54	3.92	3.27
06/08	1670	0.020	11.98	0.86	0.53	0.32	5.00	4.35
06/14	1676	0.069	41.17	0.99	0.66	0.39	9.41	8.76
06/20	1678	0.104	61.98	0.41	0.08	0.05	NA	ERR
06/26	1678	0.035	20.86	0.54	0.21	0.13	4.59	3.94

Ringwood IP05, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
07/02	1649	0.016	9.70	2.03	1.70	1.03	5.04	4.39
07/08	1661	0.122	73.45	2.03	1.70	1.02	20.79	20.14
07/14	1647	0.088	53.43	1.94	1.61	0.98	17.46	16.81
07/20	1610	0.042	26.09	0.68	0.35	0.22	4.05	3.40
07/26	1625	0.063	38.77	1.22	0.89	0.55	4.14	3.49
08/01	1649	0.077	46.69	0.95	0.62	0.38	6.66	6.01
08/07	1635	0.041	25.08	0.86	0.53	0.32	5.36	4.71
08/13	1632	0.129	79.04	1.35	1.02	0.63	15.62	14.97
08/19	1621	0.026	16.04	1.31	0.98	0.60	3.02	2.37
08/25	1634	0.049	29.99	0.41	0.08	0.05	5.13	4.48
08/31	1606	0.020	12.45	0.27	-0.06	0.00	2.88	2.23
09/06	1614	0.015	9.29	0.41	0.08	0.05	1.53	0.88
09/12	NA	NA	NA	NA	NA	NA	NA	NA
09/18	1622	0.047	28.98	1.04	0.71	0.44	10.08	9.43
09/24	1641	0.023	14.02	0.86	0.53	0.32	13.14	12.49
09/30	1491	0.045	30.18	0.27	-0.06	0.00	2.57	1.92
10/06	1531	0.013	8.49	0.27	-0.06	0.00	1.80	1.15
10/12	1550	0.012	7.74	1.67	1.34	0.86	3.87	3.22
10/18	1581	0.035	22.14	0.36	0.03	0.02	2.48	1.83
10/24	1595	0.026	16.30	0.77	0.44	0.28	3.96	3.31
10/30	1581	0.012	7.59	0.50	0.17	0.11	3.96	3.31
11/05	1249	0.020	16.01	0.90	0.57	0.46	2.16	1.51
11/11	1611	0.013	8.07	0.23	-0.10	0.00	2.07	1.42
11/17	1653	0.019	11.49	0.72	0.39	0.24	2.48	1.83
11/23	1616	0.031	19.18	0.59	0.26	0.16	1.40	0.75
11/29	1600	0.012	7.50	0.59	0.26	0.16	2.03	1.38
12/05	1704	0.018	10.56	1.04	0.71	0.42	5.27	4.62
12/11	1561	0.017	10.89	0.95	0.62	0.40	4.73	4.08
12/17	1589	0.018	11.33	0.95	0.62	0.39	5.58	4.93
12/23	1605	0.021	13.08	0.86	0.53	0.33	5.81	5.16
12/29	1612	0.015	9.31	1.31	0.98	0.61	4.50	3.85

Ringwood IP05, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	3.85	361.18	0.22	5.49	0.29	3	18	26	1	49
01/10	1.28	207.65	0.13	4.81	0.22	2	7	27	1	37
01/16	14.21	714.46	0.43	7.25	2.39	3	32	16	5	56
01/22	1.88	134.83	0.08	3.25	0.36	3	13	22	2	40
01/28	2.60	193.67	0.12	5.18	0.38	0	13	26	2	41
02/03	3.29	196.41	0.12	5.68	0.53	3	17	30	3	53
02/09	2.11	53.82	0.03	0.81	0.51	7	37	14	9	68
02/15	0.63	113.69	0.06	4.36	0.37	4	3	22	2	31
02/21	1.59	84.97	0.05	1.84	0.32	8	15	17	3	43
02/27	7.55	59.04	0.04	6.65	0.50	2	29	25	2	58
03/04	2.66	146.71	0.09	5.39	0.17	26	17	34	1	77
03/10	1.78	72.37	0.04	1.92	0.29	6	20	22	3	51
03/16	3.05	165.38	0.10	4.28	0.30	5	21	30	2	58
03/22	2.13	94.70	0.06	1.39	0.57	4	20	13	5	43
03/28	2.07	75.59	0.04	2.79	0.34	6	19	26	3	55
04/03	5.85	71.93	0.04	10.44	0.08	1	19	34	0	55
04/09	1.65	62.30	0.04	1.26	0.09	17	25	19	1	63
04/15	5.60	31.90	0.02	6.95	0.26	4	31	39	1	75
04/21	5.23	121.53	0.07	5.11	0.10	12	33	32	1	77
04/27	2.78	65.01	0.04	6.49	0.10	2	11	27	0	41
05/03	1.41	15.50	0.01	4.95	0.39	3	15	54	4	77
05/09	9.37	48.55	0.03	3.32	0.49	2	47	17	2	68
05/15	10.33	44.13	0.03	3.72	0.04	4	52	19	0	75
05/21	12.73	25.24	0.02	8.67	1.92	1	37	25	6	69
05/27	5.31	42.71	0.03	6.60	0.16	1	22	27	1	50
06/02	1.98	21.40	0.01	1.13	0.59	4	16	9	5	33
06/08	2.60	94.34	0.06	2.85	0.31	3	22	24	3	51
06/14	5.23	65.66	0.04	15.87	0.09	1	13	39	0	52
06/20	ERR	73.60	0.04	28.38	0.00	0	ERR	46	0	ERR
06/26	2.35	73.60	0.04	6.18	0.09	1	11	30	0	42

Ringwood IP05, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
07/02	2.66	34.08	0.02	1.29	0.33	11	27	13	3	55
07/08	12.13	40.40	0.02	25.12	0.12	1	17	34	0	52
07/14	10.21	35.16	0.02	22.98	0.00	2	19	43	0	64
07/20	2.11	19.89	0.01	8.63	0.64	1	8	33	2	44
07/26	2.15	13.33	0.01	14.31	0.73	1	6	37	2	46
08/01	3.64	31.70	0.02	18.27	0.81	1	8	39	2	49
08/07	2.88	10.54	0.01	8.23	0.41	1	11	33	2	47
08/13	9.17	85.79	0.05	38.40	0.20	1	12	49	0	61
08/19	1.46	17.29	0.01	1.57	0.13	4	9	10	1	23
08/25	2.74	0.00	0.00	7.27	0.37	0	9	24	1	35
08/31	1.39	0.00	0.00	1.95	0.10	-0	11	16	1	27
09/06	0.55	0.00	0.00	1.92	0.53	1	6	21	6	33
09/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
09/18	5.81	10.37	0.01	10.03	0.13	2	20	35	0	57
09/24	7.61	14.92	0.01	1.31	0.37	2	54	9	3	69
09/30	1.29	42.59	0.03	10.73	0.17	-0	4	36	1	40
10/06	0.75	33.17	0.02	2.32	0.18	-0	9	27	2	38
10/12	2.08	54.40	0.04	1.36	0.21	11	27	18	3	58
10/18	1.16	14.40	0.01	5.92	0.15	0	5	27	1	33
10/24	2.08	44.03	0.03	3.87	0.26	2	13	24	2	40
10/30	2.09	61.39	0.04	1.89	0.25	1	28	25	3	57
11/05	1.21	17.72	0.01	3.73	0.27	3	8	23	2	35
11/11	0.88	15.02	0.01	2.62	0.21	-1	11	32	3	45
11/17	1.11	43.94	0.03	2.98	0.17	2	10	26	1	39
11/23	0.46	256.37	0.16	4.70	0.22	1	2	25	1	29
11/29	0.86	48.25	0.03	1.75	0.16	2	12	23	2	39
12/05	2.71	25.23	0.01	1.76	0.28	4	26	17	3	49
12/11	2.61	146.20	0.09	2.61	0.36	4	24	24	3	55
12/17	3.10	339.99	0.21	2.25	0.39	3	27	20	3	54
12/23	3.21	462.11	0.29	2.86	0.21	3	25	22	2	51
12/29	2.39	86.29	0.05	1.84	0.31	7	26	20	3	55

APPENDIX II

Atlantic City TSP061, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	1831	0.122	66.63	23.67	23.34	12.75	24.03	23.38
01/10	1808	0.165	91.26	15.08	14.75	8.16	54.00	53.35
01/16	1803	0.133	73.77	3.92	3.59	1.99	21.83	21.18
01/22	1831	0.122	66.63	27.09	26.76	14.61	31.77	31.12
01/28	1803	0.136	75.43	4.59	4.26	2.36	21.83	21.18
02/03	NA	NA	NA	NA	NA	NA	NA	NA
02/09	NA	NA	NA	NA	NA	NA	NA	NA
02/15	1844	0.169	91.65	1.94	1.61	0.87	20.43	19.78
02/21	1820	0.075	41.21	3.38	3.05	1.68	12.02	11.37
02/27	1820	0.124	68.13	7.02	6.69	3.68	21.33	20.68
03/04	1814	0.052	28.67	5.00	4.67	2.57	16.07	15.42
03/10	1879	0.132	70.25	2.66	2.33	1.24	12.29	11.64
03/16	1844	0.129	69.96	5.09	4.76	2.58	14.31	13.66
03/22	1814	0.173	95.37	15.53	15.20	8.38	21.74	21.09
03/28	1814	0.108	59.54	6.57	6.24	3.44	1.94	1.29
04/03	1789	0.123	68.75	4.01	3.68	2.06	7.38	6.73
04/09	1807	0.105	58.11	6.84	6.51	3.60	12.29	11.64
04/15	1768	0.144	81.45	9.63	9.30	5.26	8.15	7.50
04/21	1785	0.147	82.35	3.87	3.54	1.98	13.05	12.40
04/27	1779	0.152	85.44	3.96	3.63	2.04	7.83	7.18
05/03	1761	0.089	50.54	1.22	0.89	0.51	7.11	6.46
05/09	1768	0.107	60.52	6.57	6.24	3.53	14.36	13.71
05/15	1768	0.106	59.95	1.71	1.38	0.78	6.75	6.10
05/21	1739	0.136	78.21	2.21	1.88	1.08	19.53	18.88
05/27	1763	0.132	74.87	2.21	1.88	1.07	14.63	13.98

Atlantic City TSP061, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
06/02	1705	0.145	85.04	6.26	5.93	3.48	10.94	10.29
06/08	1824	0.091	49.89	3.56	3.23	1.77	16.43	15.78
06/14	1785	0.284	159.10	1.89	1.56	0.87	20.79	20.14
06/20	1761	0.133	75.53	1.31	0.98	0.56	11.79	11.14
06/26	1763	0.191	108.34	1.35	1.02	0.58	11.03	10.38
07/02	1723	0.106	61.52	1.98	1.65	0.96	13.01	12.36
07/08	1739	0.149	85.68	1.40	1.07	0.62	12.33	11.68
07/14	1811	0.176	97.18	3.74	3.41	1.88	16.43	15.78
07/20	1872	0.180	96.15	0.72	0.39	0.21	9.36	8.71
07/26	1818	0.123	67.66	4.64	4.31	2.37	23.45	22.80
08/01	1761	0.187	106.19	NA	NA	NA	16.43	15.78
08/07	1804	0.139	77.05	5.09	4.76	2.64	11.66	11.01
08/13	1781	0.147	82.54	6.26	5.93	3.33	29.07	28.42
08/19	1804	0.119	65.96	12.51	12.18	6.75	13.82	13.17
08/25	1806	0.181	100.22	7.34	7.01	3.88	19.85	19.20
08/31	1829	0.117	63.97	5.18	4.85	2.65	20.75	20.10
09/06	1834	0.130	70.88	8.06	7.73	4.21	17.33	16.68
09/12	NA	NA	NA	NA	NA	NA	NA	NA
09/18	1824	0.084	46.05	6.21	5.88	3.22	12.92	12.27
09/24	1926	0.095	49.33	7.52	7.19	3.73	21.82	21.17
09/30	1824	0.112	61.40	4.68	4.35	2.38	16.52	15.87
10/06	NA	NA	NA	NA	NA	NA	NA	NA
10/12	1842	0.196	106.41	15.26	14.93	8.11	19.31	18.66
10/18	1932	0.301	155.80	29.66	29.33	15.18	43.43	42.78
10/24	NA	NA	NA	NA	NA	NA	NA	NA
10/30	1842	0.079	42.89	8.06	7.73	4.20	14.67	14.02
11/05	1861	0.123	66.09	6.44	6.11	3.28	NA	ERR
11/11	1848	0.090	48.70	20.93	20.60	11.15	21.51	20.86
11/17	1861	0.090	48.36	5.31	4.98	2.68	28.17	27.52
11/23	1873	0.110	58.73	5.67	5.34	2.85	15.39	14.74
11/29	1861	0.078	41.91	4.59	4.26	2.29	15.98	15.33
12/05	1870	0.121	64.71	7.38	7.05	3.77	20.30	19.65
12/11	1838	0.128	69.64	10.08	9.75	5.30	42.71	42.06
12/17	1873	0.179	95.57	5.27	4.94	2.64	72.50	71.85
12/23	1879	0.137	72.91	25.16	24.83	13.21	56.07	55.42
12/29	1853	0.098	52.89	10.53	10.20	5.50	39.56	38.91

Atlantic City TSP061, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	12.77	591.00	0.32	4.78	2.55	19	19	7	4	49
01/10	29.51	2083.52	1.15	10.09	4.31	9	32	11	5	57
01/16	11.75	449.21	0.25	1.66	2.03	3	16	2	3	24
01/22	17.00	699.96	0.38	6.22	2.43	22	26	9	4	60
01/28	11.75	417.64	0.23	9.45	2.11	3	16	13	3	34
02/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
02/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
02/15	10.73	174.70	0.09	5.65	2.38	1	12	6	3	21
02/21	6.25	234.11	0.13	3.28	1.45	4	15	8	4	31
02/27	11.36	357.74	0.20	5.85	5.07	5	17	9	7	38
03/04	8.50	267.22	0.15	5.57	1.23	9	30	19	4	62
03/10	6.19	287.75	0.15	4.07	2.43	2	9	6	3	20
03/16	7.41	304.55	0.17	7.23	4.60	4	11	10	7	31
03/22	11.63	525.54	0.29	3.22	2.16	9	12	2	2	26
03/28	0.71	379.94	0.21	4.91	0.91	6	1	2	2	10
04/03	3.76	111.79	0.06	8.90	1.43	3	5	2	2	13
04/09	6.44	142.46	0.08	2.63	1.25	6	11	2	2	22
04/15	4.24	326.65	0.18	4.86	4.13	6	5	5	5	22
04/21	6.95	179.03	0.10	5.53	2.63	2	8	7	3	21
04/27	4.04	453.10	0.25	5.65	2.32	2	5	7	3	16
05/03	3.67	87.16	0.05	7.07	3.03	1	7	14	6	28
05/09	7.75	118.13	0.07	3.66	1.07	6	13	6	2	26
05/15	3.45	87.64	0.05	7.62	2.57	1	6	13	4	24
05/21	10.86	63.93	0.04	7.99	1.45	1	14	10	2	27
05/27	7.93	134.01	0.08	5.36	1.67	1	11	7	2	21

Atlantic City TSP061, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
06/02	6.04	315.01	0.18	2.97	1.38	4	7	3	2	16
06/08	8.65	23.28	0.01	2.87	2.85	4	17	6	6	32
06/14	11.28	135.72	0.08	23.95	2.68	1	7	15	2	24
06/20	6.33	52.41	0.03	9.69	1.96	1	8	13	3	25
06/26	5.89	72.75	0.04	5.46	3.92	1	5	5	4	15
07/02	7.17	83.42	0.05	2.73	1.18	2	12	4	2	20
07/08	6.72	32.16	0.02	7.77	2.11	1	8	9	2	20
07/14	8.71	62.48	0.03	14.29	0.61	2	9	15	1	26
07/20	4.65	55.20	0.03	4.33	2.17	0	5	5	2	12
07/26	12.54	16.98	0.01	12.88	0.21	4	19	19	0	41
08/01	8.96	1736.21	0.99	22.60	0.12	NA	8	21	0	NA
08/07	6.10	130.74	0.07	10.10	2.63	3	8	13	3	28
08/13	15.96	127.72	0.07	3.71	2.72	4	19	4	3	31
08/19	7.30	116.42	0.06	2.72	3.01	10	11	4	5	30
08/25	10.63	107.76	0.06	12.44	0.79	4	11	12	1	28
08/31	10.99	165.46	0.09	4.43	1.36	4	17	7	2	30
09/06	9.09	162.73	0.09	4.93	1.69	6	13	7	2	28
09/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
09/18	6.73	125.83	0.07	4.95	0.87	7	15	11	2	34
09/24	10.99	141.28	0.07	3.26	1.44	8	22	7	3	39
09/30	8.70	127.71	0.07	4.27	0.79	4	14	7	1	26
10/06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/12	10.13	466.30	0.25	2.33	0.63	8	10	2	1	20
10/18	22.14	694.09	0.36	6.89	1.15	10	14	4	1	29
10/24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/30	7.61	133.47	0.07	3.74	0.64	10	18	9	1	38
11/05	ERR	208.69	0.11	3.33	0.58	5	ERR	5	1	ERR
11/11	11.29	289.85	0.16	3.07	0.54	23	23	6	1	53
11/17	14.79	156.85	0.08	3.29	0.47	6	31	7	1	44
11/23	7.87	417.01	0.22	3.82	0.68	5	13	7	1	26
11/29	8.24	58.86	0.03	4.80	0.41	5	20	11	1	38
12/05	10.51	1156.96	0.62	2.93	1.16	6	16	5	2	28
12/11	22.88	448.59	0.24	4.97	1.24	8	33	7	2	49
12/17	38.36	251.92	0.13	6.38	1.27	3	40	7	1	51
12/23	29.49	311.42	0.17	2.40	0.27	18	40	3	0	62
12/29	21.00	731.84	0.39	4.14	0.62	10	40	8	1	59

Elizabeth TSP 056, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
01/04	NA	NA	NA	NA	NA	NA	NA	NA
01/10	1910	0.087	45.55	6.03	5.70	2.98	21.20	20.55
01/16	1825	0.163	89.32	12.65	12.32	6.75	25.11	24.46
01/22	1906	0.079	41.45	2.97	2.64	1.39	11.75	11.10
01/28	1894	0.107	56.49	3.06	2.73	1.44	27.72	27.07
02/03	1916	0.117	61.06	3.56	3.23	1.69	10.49	9.84
02/09	1820	0.159	87.36	5.81	5.48	3.01	29.39	28.74
02/15	1836	0.080	43.57	5.67	5.34	2.91	15.08	14.43
02/21	1907	0.074	38.80	3.65	3.32	1.74	9.68	9.03
02/27	1856	0.088	47.41	2.30	1.97	1.06	11.88	11.23
03/04	1869	0.088	47.08	2.48	2.15	1.15	14.49	13.84
03/10	1878	0.055	29.29	3.02	2.69	1.43	8.55	7.90
03/16	1874	0.100	53.36	4.77	4.44	2.37	14.58	13.93
03/22	1833	0.068	37.10	3.96	3.63	1.98	6.03	5.38
03/28	1911	0.062	32.44	3.11	2.78	1.45	18.90	18.25
04/03	1805	0.112	62.05	3.20	2.87	1.59	10.76	10.11
04/09	1868	0.048	25.70	2.52	2.19	1.17	6.30	5.65
04/15	1841	0.104	56.49	3.47	3.14	1.71	12.74	12.09
04/21	1760	0.097	55.11	1.67	1.34	0.76	13.41	12.76
04/27	1767	0.134	75.83	4.10	3.77	2.13	17.28	16.63

Elizabeth TSP 056, 1988

Sample Date	Volume (m3)	TSP Wt. (gram)	TSP (ug/m3)	EOM Cyc (mg/fil)	Corrected EOM Cyc	EOM Cyc (ug/m3)	EOM Ace (mg/fil)	Corrected EOM Ace
05/03	1810	0.100	55.25	1.40	1.07	0.59	11.43	10.78
05/09	1804	0.106	58.76	0.27	0.00	0.00	16.83	16.18
05/15	1832	0.094	51.31	2.61	2.28	1.24	4.68	4.03
05/21	1832	0.127	69.32	2.34	2.01	1.10	12.15	11.50
05/27	1752	0.108	61.64	3.24	2.91	1.66	13.91	13.26
06/02	1878	0.100	53.25	3.06	2.73	1.45	4.59	3.94
06/08	1802	0.065	36.07	2.39	2.06	1.14	5.85	5.20
06/14	1770	0.139	78.53	3.42	3.09	1.75	11.52	10.87
06/20	1834	0.163	88.88	1.31	0.98	0.53	8.51	7.86
06/26	1864	0.086	46.14	1.76	1.43	0.77	3.87	3.22
07/02	1797	0.048	26.71	0.99	0.66	0.37	7.20	6.55
07/08	1820	0.196	107.69	2.57	2.24	1.23	43.29	42.64
07/14	1707	0.147	86.12	NA	NA	NA	NA	NA
07/20	1831	0.077	42.05	NA	NA	NA	NA	NA
07/26	1793	0.120	66.93	NA	NA	NA	NA	NA
08/01	1780	0.171	96.07	NA	NA	NA	NA	NA
08/07	1819	0.077	42.33	NA	NA	NA	NA	NA
08/13	1797	0.151	84.03	NA	NA	NA	NA	NA

Elizabeth TSP 056, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
01/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
01/10	10.76	1818.60	0.95	5.37	1.89	7	24	12	4	46
01/16	13.40	1812.76	0.99	9.91	5.79	8	15	11	6	40
01/22	5.82	570.70	0.30	5.36	0.64	3	14	13	2	32
01/28	14.29	1189.54	0.63	9.28	3.04	3	25	16	5	50
02/03	5.14	273.15	0.14	5.10	2.06	3	8	8	3	23
02/09	15.79	13642.51	7.50	6.08	4.02	3	18	7	5	33
02/15	7.86	379.26	0.21	5.71	1.57	7	18	13	4	41
02/21	4.74	201.70	0.11	2.60	0.62	4	12	7	2	25
02/27	6.05	214.98	0.12	7.15	3.35	2	13	15	7	37
03/04	7.41	59.92	0.03	8.57	5.07	2	16	18	11	47
03/10	4.21	209.87	0.11	2.51	0.52	5	14	9	2	30
03/16	7.43	354.10	0.19	4.91	0.69	4	14	9	1	29
03/22	2.94	276.91	0.15	1.87	1.35	5	8	5	4	22
03/28	9.55	290.70	0.15	3.50	0.17	4	29	11	1	45
04/03	5.60	324.36	0.18	7.31	2.26	3	9	12	4	27
04/09	3.02	151.17	0.08	1.38	0.18	5	12	5	1	22
04/15	6.57	164.23	0.09	5.76	4.10	3	12	10	7	32
04/21	7.25	106.89	0.06	4.99	1.11	1	13	9	2	26
04/27	9.41	280.85	0.16	6.49	2.71	3	12	9	4	27

Elizabeth TSP 056, 1988

Sample Date	EOM Ace (ug/m3)	Bap (ng/fil)	Bap (ng/m3)	SO4 (ug/m3)	NO3 (ug/m3)	% Cyc	% Ace	% SO4	% NO3	TOTAL %
05/03	5.96	41.17	0.02	8.02	2.04	1	11	15	4	30
05/09	8.97	33.64	0.02	5.00	2.15	0	15	9	4	27
05/15	2.20	69.97	0.04	4.96	1.60	2	4	10	3	19
05/21	6.28	86.77	0.05	11.52	6.20	2	9	17	9	36
05/27	7.57	179.46	0.10	6.16	0.69	3	12	10	1	26
06/02	2.10	76.70	0.04	1.56	1.66	3	4	3	3	13
06/08	2.89	260.44	0.14	1.58	0.62	3	8	4	2	17
06/14	6.14	94.51	0.05	14.91	0.39	2	8	19	0	30
06/20	4.29	74.06	0.04	27.17	0.09	1	5	31	0	36
06/26	1.73	52.54	0.03	5.19	0.21	2	4	11	0	17
07/02	3.64	33.66	0.02	1.50	0.46	1	14	6	2	22
07/08	23.43	205.46	0.11	18.96	0.53	1	22	18	0	41
07/14	NA	NA	NA	24.88	0.17	NA	NA	29	0	NA
07/20	NA	NA	NA	9.64	0.35	NA	NA	23	1	NA
07/26	NA	NA	NA	18.40	0.34	NA	NA	27	1	NA
08/01	NA	NA	NA	30.95	0.23	NA	NA	32	0	NA
08/07	NA	NA	NA	9.67	0.18	NA	NA	23	0	NA
08/13	NA	NA	NA	10.50	0.48	NA	NA	12	1	NA

REFERENCES

1. Airborne toxic elements and organic substances (ATEOS) by Paul J.Lioy and Joan M.Daisey. *Lewis Publishers, Inc. (1987).*

2. A. Greenberg and R. Harkov, 'Benzo(a)Pyrene in New Jersey -results from a twenty-seven-site study' *JAPCA 35:238-243 (1985).*

3. D. Grosjean, K. Fung, J.Harrison, 'Interactions of polycyclic aromatic hydrocarbons with atmospheric pollutants' *Environmental Science & Technology, 17:673(1983).*

4. Yamasaki H., Kuwata K. and Miyamoto H. (1982) 'Effects of ambient temperature on aspects of polycyclic aromatic hydrocarbons'. *Environmental Science & Technology, 16, 189-194.*

5. D. Swanson, C. Morris, R. Hedgcoke, R. Jungers, R. Thompson, J.E. Bumgarner. 'A rapid analytical procedure for the analyses of Benzo(a)Pyrene in environmental samples'. *Trends Fluor. 1:22(1981).*

6. J.M. Daisey, J.L. Cheney, P.J. Lioy. 'Profiles of organic particulate emissions from air pollution sources: Status and needs for receptor source apportionment modelling'. *JAPCA vol 36, No.1:17-33.*

7. P.J. Lioy, J.M. Daisey, A. Greenberg, R. Harkov. 'A major wintertime (1983) pollution episode in Northern New Jersey: Analyses of accumulation and spacial distribution of inhalable particulate matter, extractable organic matter and other species'. *Atmospheric Environment, vol. 19, No 3:429-436, 1985.*

8. J.M.Daisey, R.J.Hershman, T.J.Kneip. 'Ambient levels of particulate organic matter in New York city in winter and summer'. *Atmospheric Environment, vol 9, No 9: 2161-8, 1982.*

9. A. Greenberg, F. Darack, R. Harkov, P.J. Lioy, J.M. Daisey. 'Polycyclic aromatic hydrocarbons in New Jersey: A comparision of winter and summer concentrations over a two-year period'. *Atmospheric Environment, vol. 19, No 8:1325-1339, 1985.*

10. J.M. Daisey, M. Morandi, P.J. Lioy. 'Regional and local influences on the nature of airborne particulate organic matter at four sites in New Jersey during summer 1981'. *Atmospheric Environment, vol. 18, No 7:1411-1419, 1984.*

11. R. Harkov, P.J. Lioy, J.M. Daisey, A. Greenberg, F. Darack, J.W. Bozzelli, B. Kebbekus. 'Quality control and noncriteria air pollutants: Results from the ATEOS project'. *JAPCA, vol 36, No. 4:388-393.*

12. Wolff, G.T., Siak, J.S., Chan, T.L., Korosog,P.E. (1985). 'Multivariate statistical analyses of air quality data and bacterial mutagenicity data from ambient aerosols. *Research publication. GMR-5060. Env -209.*