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DIESEL UNREGULATED EMISSIONS CHARACTERIZATION

July 2010

COORDINATING RESEARCH COUNCIL, INC.
3650 MANSELL ROAD·SUITE 140·ALPHARETTA, GA 30022

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DIESEL UNREGULATED EMISSIONS CHARACTERIZATION

FINAL REPORT

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CONTENTS

Page

TABLES AND FIGURES

Page

ACRONYMS AND ABBREVIATIONS

ACES	Advanced Collaborative Emissions Study
CARB	California Air Resources Board
Cl^-	chloride
CO	carbon monoxide
CO_2	carbon dioxide
CRC	Coordinating Research Council
DOE	U.S. Department of Energy
FTP	Federal Test Procedure
HD	heavy-duty
HHD	heavy heavy-duty
LD	light-duty
LDV	light-duty vehicle
MD	medium-duty
NH_4^+	ammonium
NO	nitrogen oxide
NO_2	nitrogen dioxide
NO_2^-	nitrite
NO_3	nitrate
NO_x	oxides of nitrogen
NREL	National Renewable Energy Laboratory
PAHs	polycyclic aromatic hydrocarbons
Pechan	E.H. Pechan & Associates, Inc.
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
ppm	parts per million
SO_4^{-2}	sulfate
THC	total hydrocarbon

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EXECUTIVE SUMMARY

The increasing use of diesel engines due to their fuel economy, durability and power advantages has contributed to the sum total of exhaust emissions from this power source, and thus to interest in clearly understanding these emissions. Emission results can be classified into two broad categories; these are regulated emissions, such as nitrogen oxides, hydrocarbons, carbon monoxide and particulates, and unregulated emissions. Comparisons of regulated emissions among different investigators are generally uncomplicated because regulating agencies have clearly established rules of measurement and reporting. Unfortunately, unregulated emissions are more challenging to compare among investigators for several reasons. First, and likely most important are the vast number of unique compounds that exist in combustion exhaust products. Measuring this vast number of compounds requires expensive analysis techniques, thus most investigations focus on a few of greatest interest to them. Second, and also common to regulated emissions are the multitude of engine types, fuels and test cycle types that are usually run. All together the test variables of engine, test cycle, fuel and individual unregulated emission compounds result in disparate data sets. Through this project, E.H. Pechan & Associates, Inc. (Pechan) reviewed the spectrum of emissions literature that covered diesel vehicle and engine model years from pre-1987 through 2004, and grouped these disparate data sets in the most reasonable manner.

Under Phase 1 of this project, Pechan conducted an in-depth literature review to identify the state of knowledge of regulated and unregulated exhaust emissions from current technology diesel vehicles. The result of Phase 1 was the development of a *Diesel Speciation Database*, compiled from speciated emissions data obtained from the literature review. Developing this database was challenging because there had been scant coordination among studies regarding driving cycles, fuels, measurement methods and diesel vehicle classes.

This current project, Phase 2, was sponsored by CRC, and was also performed by Pechan. The purpose of the Phase 2 work was to develop average emission rates of air toxics and other compounds of interest using the database developed under Phase 1. This work included the development of subcategories for grouping the data by vehicle class, age, test cycle, and fuel. Additional work was needed to revise the original database to include information on these subcategories for as many of the emission records as possible. Data were also converted to a common set of units, where possible.

For each of the unique groups of data—as categorized by a unique set of vehicle category, model year group, test cycle, emission rate units, and pollutant—a set of statistics were calculated. This included: average emission rate, minimum emission rate, maximum emission rate, median emission rate, and the standard deviation of the data in the grouping.

Table ES-1 summarizes the resultant vehicle categories used in the analysis and the corresponding number of emission records associated with that vehicle category. As noted in this table, the predominant vehicle category for which emission data exists in the database is heavy-heavy duty diesel vehicles. For this reason, and due to the greater general interest in this category, the results presented in Chapter IV are focused on this vehicle category. Results for other vehicle categories are presented in the appendix.

Table ES-1. Data Summary by Vehicle Type Group Code

Number of Non-zero Emission Records	Vehicle Type Group Code	Vehicle Type Group Description
24,687	HHD	Heavy Heavy Duty Diesel Vehicle
5,435	L/MHD	Light/Medium Heavy Duty Diesel Vehicle
7,943	LIGHT	Light Duty Diesel Vehicle
487	SCHOOL BUS	Diesel School Bus
3,739	TRANSIT BUS	Diesel Transit Bus

Table ES-2 shows the model year groups that were used in this analysis and the corresponding number of emission records associated with each model year group. Similarly, Table ES-3 summarizes the data analyzed by the emission test cycle. Note that only data that could be assigned to one of the listed groups are shown in these tables. Thus, the sum of the number of non-zero emission records differs in Table ES-1, ES-2, and ES-3. Of the vehicle type, model year group, and test cycle group, the greatest number of records had the necessary information to assign a vehicle type code, while data needed to assign a model year group code was less prevalent. In some cases, this is not due to missing information, but instead is due to the fact that some studies presented average emission rates from several vehicles of different model years that crossed over the groupings shown in Table ES-2.

Table ES-2. Data Summary by Model Year Group Code

Number of Non-zero Emission Records	Model Year Group Code	Model Year Group Description
7,998	pre-87	1986 and earlier model years
3,173	1987-1990	Model years 1987 through 1990
1,920	1991-1993	Model years 1991 through 1993
12,030	1994-1995	Model years 1994 and 1995
1,387	1996-1997	Model years 1996 and 1997
9,673	1998-2003	Model years 1998 through 2003
256	2004+	Model years 2004 and later

Table ES-3. Data Summary by Test Cycle Group Code

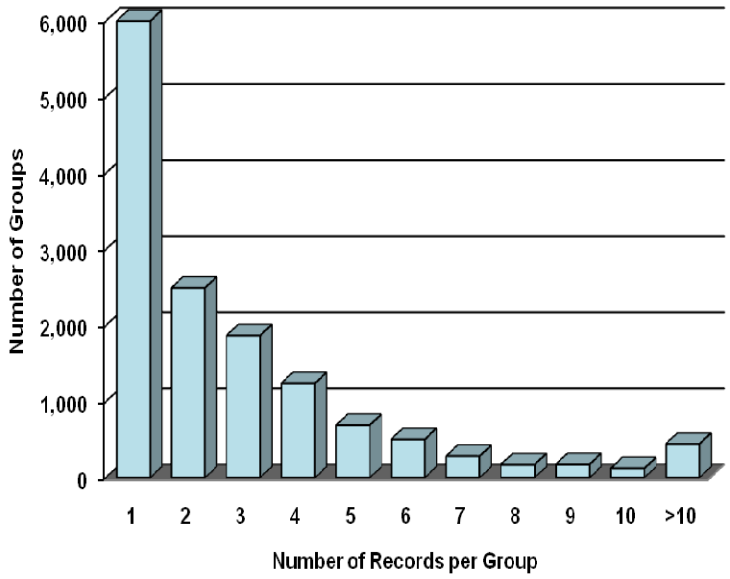
Number of Non-zero Emission Records	Test Cycle Group Code	Test Cycle Group Description
3,539	BUS	Bus test cycles
7,211	CRUISE	Cycles with a majority of time in the cruise mode
4,625	FTP	Federal Test Procedure driving cycle
7,856	IDLE	Test cycles predominantly in the idle mode
2,047	STEADY STATE	Steady state test cycles
14,961	TRANSIENT	Cycles with a majority of time in the transient mode

Resulting average emission rates for a number of key groups of compounds are presented in Chapter IV. When reviewing the data contained in this report, Appendix B, and the

accompanying databases, it is important to keep in mind that the data come from a large number of different studies and that each study may have been focused on different aspects of collecting regulated and speciated emissions from diesel vehicles. Thus, when comparing these data to comparable data from other studies, it may be important to trace the data back to the study or studies in which the emissions data were originally reported in order to better understand possible anomalies in the data. This study has shown that data extracted from studies performed for different purposes can be challenging to compile and compare. Specifically, the pollutant groups analyzed, test methods used, the test cycles used, and the data reporting methods typically differ from one study to another, making it difficult to directly compare results from one study to another.

While the original *Diesel Speciation Database* does contain a large number of emission records, it is important to note that by parsing the data into a large number of different groups for each pollutant, the amount of data available within each group is significantly reduced. Although parsing reduces the amount of data per group, parsing is required in order to develop equitable statistics and comparisons. In total, over 13,000 different groupings of emission records by pollutant and data characteristics were developed. There are few instances, however, where a grouping contains more than ten records of the same pollutant, vehicle type, model year group, and test category. Thus, it is important to note that a balance is needed between the number of groupings used in a study such as this, and the amount of data available per group. This is further illustrated in Figure ES-1. In this figure, the y-axis shows how many groupings were created that contain the number of records listed on the x-axis. For example, about 6,000 of the resulting data groupings (i.e., unique combinations of pollutant, vehicle type, model year group, test cycle type, and units) have only one emission record in them, while about 450 groupings include more than ten emission records that included the same pollutant, vehicle type group, model year group, test cycle group, and emission units.

Figure ES-1. Distribution of Group Size by Number of Records per Group



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CHAPTER I. INTRODUCTION/BACKGROUND

A. INTRODUCTION

Diesel engines are used extensively in transportation, especially in heavy-duty applications, due to their power, durability, and efficiency. Emissions from diesel-powered motor vehicles have substantially changed over the last decade as engine manufacturers have significantly lowered the emissions of particles in diesel exhaust through improved engine design and emission-control technologies--in combination with new fuels. The objective of this project is to develop average emission rates of air toxics and other compounds of interest for diesel vehicles using a previously developed database of diesel emissions data for diesel vehicles from 2004 and earlier. These resulting diesel emission rates can then be compared with results of emissions tests on newer diesel vehicles to determine how these engine and fuel changes have affected emissions of air toxics and other compounds.

Under Phase 1 of this project, jointly sponsored by The Coordinating Research Council (CRC) and the U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL), the E.H. Pechan & Associates, Inc. (Pechan) literature review gathered into one database location the results of regulated and unregulated exhaust emissions from current technology diesel vehicles. The Phase 1 product was a *Diesel Speciation Database*, compiled from regulated and speciated emissions data obtained from the literature review. Due to scant coordination among studies regarding driving cycles, fuels, measurement methods and diesel vehicle classes, this database proved difficult for reviewers to apply and compare with their results, thus Phase 2 required judicial parsing of data into categories that would enable the most reasonable representation of regulated and unregulated diesel emissions from pre-1987 through 2004 model years.

This current project, Phase 2, was sponsored by CRC, and also performed by Pechan. The purpose of Phase 2 was to develop average emission rates of air toxics and other compounds of interest using the database developed under Phase 1. This work included the development of subcategories for grouping the data by vehicle class, age, test cycle, and fuel. Additional work was needed to revise the original database to include information on these subcategories for as many of the emission records as possible. Data were also converted to a common set of units, where possible. Once the groupings were determined, the average emission rates were calculated for each group.

This report describes the effort performed by Pechan to refine the Phase 1 database, develop the groupings, and perform the emission rate analyses. The resulting database of emission factors by group and pollutant and the revised *Diesel Speciation Database* are available, upon request, from CRC.

B. REPORT ORGANIZATION

This report is organized in six chapters. This first chapter is the report introduction. The second chapter details the development of the data groups used for analysis of the emission rates in the *Diesel Speciation Database*. Chapter III provides information on how these groupings were

applied to the database. Chapter IV discusses the results of the emission rate analyses after the groupings were applied. Chapter V provides information on issues of concern to this analysis, and Chapter VI provides references mentioned in the report.

CHAPTER II. DEVELOPMENT OF DATA GROUPS

This chapter summarizes the development of data groups for characterizing the data in the *Diesel Speciation Database* and provides counts of emissions data for several key vehicle and fuel parameters that were proposed to be used for grouping emission data for the purpose of calculating emission rates. These groupings are provided for the following categories: vehicle class, vehicle model year groups or certification standard, test cycle, fuel composition, and after-treatment devices. This chapter also summarizes the emission data by pollutant. *Note that this chapter reports the initial proposed groupings. Several refinements and corrections were made to the database after this process, so the final counts of data may differ from those reported in this chapter. The data counts presented in Chapter III are based on the final data set and reflect the final counts.*

A. DATA FILTERING AND ADJUSTMENTS

In the CRC E-75/NREL ES05-03 *Diesel Speciation Database*, there are a total of 60,231 emission records. However, for the purposes of performing an emission rate analysis, the database was filtered to include 58,591 emission records. Emission records that were filtered out for exclusion from further analysis are those with vehicle categories indicative of nonroad engines and those with fuel types other than conventional diesel. A total of 347 emission records were excluded based on the vehicle category, including those with vehicle categories identified as airport ground support, marine, heavy-duty off-road, and auxiliary power unit because these vehicle categories signify test cycles that are likely to influence emissions and prevent equitable comparison with the majority of vehicle types. Table II-1 summarizes the fuel types that were identified as fuels other than conventional diesel, based on the Fuel Batch ID field in the emission tables, and the number of records with each fuel type. Fuel type can also influence emissions. A total of 1,293 emission records were identified and excluded from further analysis due to the use of a fuel type other than conventional diesel fuel.

Table II-1. Summary of Fuel Data Excluded from Analysis

Fuel Type (based on Fuel Batch ID)	Number of Records
10% ethanol	14
15% ethanol	14
80%CARB/20%OxyG Biodiesel	137
80%CARB/20%SoyGold Biodiesel	138
80%CARB/20%WorldEnergy Biodiesel	138
B100	126
B20	125
BD100	5
BD20	5
BD50	5
F-T	398
FT	64
FT-100	37
commercial biodiesel	87
Total	**1,293**

Some emission values reported in the emissions table have non-numeric values. In order to determine the number of records with emission values greater than zero, the emission values were converted into a numeric data format. Non-numeric emissions values were identified by the codes included by the original investigators such as nd, bdl, ND, bd, <mql, No data, NQ, present, and values reported with a negative sign (-). Emissions values for records with these data qualifiers were reported as 0.00. Emissions for values reported with a less than sign (<) (e.g., <0.0003) were converted to the actual number reported. For example, a record with <0.0003 emission value provided is reported as 0.0003.

A total of 40,573 records were identified that have emissions values greater than zero. The total number of records with emission values less than or equal to zero was 18,018.

B. VEHICLE CATEGORY

Data on vehicle class or engine application is not included in the emission tables. However, the data in the emission tables of the *Diesel Speciation Database* can be mapped to the vehicle-specific data contained in the Engine_Data table of the database by matching the project ID, study ID, and test ID fields of the emission tables with the corresponding data in the engine data table. Four vehicle categories were proposed for grouping the emissions data: light-duty diesel vehicles and trucks (LIGHT), light and medium heavy-duty diesel vehicles (L/MHD), heavy heavy-duty diesel vehicles (HHD), and buses (BUS). Table II-2 below summarizes the number of emission records according to these vehicle categories. Note that there are a large number of emission records with no reported vehicle category. This represents the emission records that could not be matched into the engine data table based on the project ID, study ID, and test ID fields. This table does not include the 347 records, discussed above, that were excluded from the analysis because they represent data from nonroad engines.

Table II-2. Summary of Data by Vehicle Category

Vehicle Category	Number of Records	Proposed Category
Light-Duty (LD) Vehicles (e.g., passenger car & pick-up truck)	7,132	LIGHT
Light Heavy-Duty (LHD) Truck (e.g., box truck, tractor truck, flat bed, & van)	2,482	L/MHD
Medium-Duty (MD) Truck (e.g., truck)	252	L/MHD
Medium Heavy-Duty (MHD) Truck (e.g., tractor truck, box truck, & flat bed)	5,828	L/MHD
Heavy-Duty (HD) Truck (e.g., freightliner, tanker truck, truck, freightliner tractor, & refuse hauler)	558	HHD
Heavy Heavy-Duty (HHD) Truck (e.g., tractor truck)	16,787	HHD
Heavy Heavy-Duty (HHD) Bus (e.g., transit bus)	1,238	BUS
Heavy-Duty (HD) Bus (e.g., bus, old/new bus, school bus, & Cummins L10)	3,182	BUS
HD (only identifier is the engine application – Heavy Duty Onroad)	4,216	?
No Reported Category	16,916	
Total	**58,591**	

Based on feedback from CRC, the BUS vehicle category was subdivided into a school bus category and a transit bus category.

C. VEHICLE MODEL YEAR

As with the vehicle category, the emissions data of the *Diesel Speciation Database* needed to be mapped into the engine data table to determine the number of emission records from vehicles in specific model years. In addition, in Table II-3, there are a number of instances where investigators grouped several vehicles together in estimating a composite emission rate in some studies, such that a single model year cannot always be assigned to an emission record. Table II-3 summarizes the number of emission records and the number of non-zero emission records counted in each model year or set of model years.

Table II-3. Summary of Data by Model Year

Model Year	Record Count	
	Total Number of Records	Number of Records with Non-Zero Emissions
NO DATA REPORTED	23,919	18,311
NOT AVAILABLE	71	64
1977	161	125
1979	274	231
1980	689	496
1981	643	443
1982	1,329	757
1983	49	47
1984	593	417
1985	4,405	2,388
1987	129	106
1988	615	342
1989	2,602	2,149
1989, 1990	620	320
1989, 1990, 1988	311	154
1991	163	117
1992	928	508
1992, 1992, 1993	618	325
1993	228	148
1994	3,008	1,952
1995	2,777	1,492
1995, ?	252	233
1996	27	27
1997	1,610	942
1998	1,052	929
1999	3,297	2,405
1999, 1998, 2000	144	141
1999, 2000, 2001, 1998	618	234
2000	350	207
2001	124	98
2003	3,421	2,556
2004	260	256
1985, 1992, 1993, 1994, 1997, 1999, 2000, 2001, 1998, 1996	311	162
1989, 1979, 1982, ,1984, 1982, 1983, 1979, 1982, 1980, 1981, 1979, 1981	102	93
1994, 1993, 1989, 1992, 1982, 1994, 1982, 1980, 1991, 1995	104	012
1994, 1997, 1996	308	167
1995, 1996, 1999	620	269

Model Year	Record Count	
	Total Number of Records	Number of Records with Non-Zero Emissions
1995, 1999, 1999	310	151
1994, 1994, 1997, 1997, 1996	308	166
1997, 2000	930	403
1997, 2000, 1995, 1996, 1999	311	140
TOTAL	**58,591**	**40,573**

Based on the model year groups corresponding to vehicle and truck emission standards (both the U.S. Environmental Protection Agency [EPA] and the California Air Resources Board [CARB]), the model year groups shown in Table II-4 were proposed for use in this project. The emission records that are part of multi-year model groups that cross over these model year groups, as listed in the bottom half of the table below, will need to be assigned to a single model year group or excluded from further analysis.

Table II-4. Summary of Data by Proposed Model Year Groups

Proposed Model Year Groups	Total Number of Records	Number of Records Above Zero
pre-87	8,143	4,904
1987-1990	4,277	3,071
1991-1993	1,937	1,098
1994-1995	6,037	3,677
1996-1997	1,637	969
1998-2003	9,006	6,570
2004+	260	256
Vehicles in Multi-Model Year Groups		
1985-2001	311	162
1979-1989	102	93
1980-1995	104	102
1994-1997	308	167
1995-1999	930	420
1994-1997	308	166
1997-2000	930	403
1995-2000	311	140
Unknown	23,990	18,375
Total	**58,591**	**40,573**

D. TEST CYCLES

There were 208 unique test cycles reported in the emissions tables in the *Diesel Speciation Database* in the TestProc data field. However, there appeared to be multiple names given to many of the test cycles. Emission counts on the test cycles were performed for emission records with matching data in the engine database table, with records again matched based on project ID, study ID, and test ID. Table II-5 summarizes the test cycles from the emission records that could be matched to engine data table (i.e., those that could also be assigned a vehicle type and model year group). The table shows both the total number of emission records for each test cycle, as

well as the number of emission records with emission values greater than zero. In order to minimize the number of groupings used in estimating emission rates, the following test cycle groupings were proposed: Transient, Cruise, Idle, or Bus. For cycles that include more than one of these (e.g., include both transient and cruise), the proposed cycle classification was based on the cycle in which a majority of the time is spent.

Table II-5. Summary of Data by Test Cycle

Test Cycles	Total Number of Records	Number of Records Above Zero	Proposed Classification	Comment
CBD	1,886	1,667	Bus	
CCS	1,267	933	Transient	Cold City-Suburban Route
CID	281	220	Idle	Cold Idle
CRUISE3 HHDDT_S	1,495	951	Cruise	HHDDT Cruise
CSHVC	124	98	Bus	
CSHVR	921	496	Bus	City Suburban Heavy Vehicle Route
FTP	3,993	2,604	Transient	Federal Test Procedure
HCS	2,955	2,120	Transient	Hot City-Suburban Route
HDT	1,036	205	Transient	Heavy duty transient test cycle
HW	1,682	1,193	Cruise	Highway Cycle
ID	853	626	Idle	
IDLE33	1,793	1,380	Idle	
IM240	557	493	Cruise	
LA-4	531	25	Transient	
LA-4 Phase 1	16	16	Transient	
LA-4 Phase 2	16	16	Cruise	
MC	284	163	Bus	Manhattan Cycle (Transit buses)
MHDLO MHDHI	297	125	Transient	MHDT low speed transient/MHDT high speed transient
MHDTCR	297	165	Cruise	MHDT cruise
NYB	88	69	Bus	New York Bus
NYBUS	58	49	Bus	New York Bus
Not a typical schedule	1	1		
TRANS	358	217	Transient	
TRANS3	1,134	879	Transient	HHDDT Transient
UDC	24	23	Transient	California Unified Driving Cycle (also known as LA92)
UDDS	1,419	135	Transient	Urban Dynamometer Driving Schedule
cold-start/idle	26	22	Idle	
creep	132	22	Idle	
cruise	450	22	Cruise	
hot-start FTP	185	166	Transient	
transient	522	89	Transient	
various	145	145		
Unmatched records	10,725	8,115		
No test cycle reported	23,040	17,123		
Total	**58,591**	**40,573**		

A summary of the number of emission records by the proposed test cycle classification is shown in the Table II-6 below.

Table II-6. Summary of Data by Proposed Test Cycle Classification

Proposed Test Cycle Classification	Total Number of Records	Number of Records Above Zero
Bus	3,361	2,542
Cruise	4,497	2,840
Idle	3,085	2,270
Transient	13,737	7,537
Not Classified	33,911	25,384
Total	**58,591**	**40,573**

Based on feedback from CRC of these proposed test cycle groups, Federal Test Procedure (FTP) was added as an additional test cycle group.

E. FUEL COMPOSITION

Data on key fuel properties, such as sulfur content and cetane number, of the fuels used in the emission testing of the vehicles in the *Diesel Speciation Database* are contained in the fuel data table (*Fuel_Data*), which consists of 295 records. As with the engine data, the fuel property data must be matched to the emission records based on project ID, study ID, and fuel_batch ID. There were 18,018 emission records that could not be matched into the fuel data table. Of these unmatched emission records, 13,072 contained non-zero emission values.

Sulfur content values were reported in a variety of different units. For sulfur content values where units are provided, the units were reported either in ppm, %, wt%, mg/kg, ppm, or ppmw. The sulfur content values were converted to units of ppm in cases where other units were used. Sulfur values reported with a less than (<) sign were reported based on the number reported in the fuel table. For example, a sulfur value reported as < 10.0 was changed to 10.0. Table II-7 summarizes data counts for records based on sulfur levels. As indicated in this table, a number of records had a sulfur content value listed as "not determined" or as a blank with no value reported.

Table II-7. Summary of Data by Sulfur Content

Sulfur Content Ranges (ppm)	Record Count	
	Total	Above Zero
0	51	51
1 - 15	2,397	1,971
16 – 30	311	247
31 - 100	978	743
101 - 500	3,001	2,743
501 - 1000	289	276
1001 - 5000	330	317
Not Determined or Not Reported	33,216	21,153
Unmatched	18,018	13,072
TOTAL	58,591	40,573

A large majority of the emission records could not be matched to a non-zero cetane number. In many cases, no cetane number value was reported, while in others a value of 0 or "No Data" was listed. For emission records with a cetane number provided, a majority had a cetane number in the range of 51 to 55. Data counts for cetane number are reported in Table II-8.

Table II-8. Summary of Data by Cetane Number

Cetane Number Ranges	Record Count	
	Total	Emission Values Above Zero
0	902	818
1 - 30	0	0
31 - 35	2	2
36 - 40	116	115
41 - 45	1,070	994
46 - 50	1,472	1,356
51 - 55	2,488	2,238
56 - 60	475	459
61 - 65	790	562
66 - 70	8	8
71 - 75	64	62
76 - 80	0	0
81 - 85	2	2
Cetane Number Reported as No Data	1,664	1,602
Not Reported	31,520	19,283
Unmatched	18,018	13,072
TOTAL	**58,591**	**40,573**

F. AFTERTREATMENT

Table II-9 summarizes the record counts for the aftertreatment data parameter. Data counts were based on aftertreatment data extracted from the emissions tables of the *Diesel Speciation Database*. Table II-9 indicates that most of these data are *without aftertreatment*. Pechan recommended omitting aftertreatment data from the future analysis of vehicle emission rates because these aftertreatment systems are unlikely to represent what makes up the bulk of diesels on the road either today or in the near future, and thus are not truly representative of most ambient exposures.

Table II-9. Summary of Data by Aftertreatment Device

Category / Aftertreatment	Total Number of Records	Number of Records Above Zero
No Aftertreatment Reported / Unknown	39,972	26,080
None / No / No Available	14,920	11,208
OxyCat / Two-way Oxidation Catalyst	1,107	1,082
All Other Aftertreatment	2,592	2,203
TOTAL	**58,591**	**40,573**

G. POLLUTANTS

Based on the pollutant code reported in the emission table, there were 928 unique pollutants or compounds identified from the emissions tables in the *Diesel Speciation Database*. Several instances of incorrect pollutant codes or names were identified and corrected. This includes an incorrect pollutant code of 25167673 reported for pollutant 1-butene. This pollutant code was corrected as 106989. A pollutant code of 10102440 had been recorded with a pollutant reported as nitrous oxide (N_2O). This pollutant name was corrected and renamed nitrogen dioxide (NO_2). It was also determined that NO_x emission data from the CRC E55/59 Phase I study had been mislabeled in the original *Diesel Speciation Database.* Data reported from two different NOx analyzers were mislabeled in the database as NO and NO_2. Additionally, in some cases, the NOx emissions from the two analyzers had been added together before being entered in the *Diesel Speciation Database*. These errors were corrected by deleting the NO_x, NO, and NO_2 data from this study and replacing it with the correct data as published in the CRC E55/59 Phase I report (Gautam, et al., 2003).

The pollutants were broken into two groups for review – those on the Advanced Collaborative Emissions Study (ACES) list as Priority 1 pollutants, and all other pollutants. Appendix A lists the pollutants included on the ACES Priority 1 list that were included in the *Diesel Speciation Database,* in descending order of occurrence as non-zero emission records. The ACES is a cooperative, multi-party effort to characterize the emissions and assess the possible health impacts of the new, advanced engine systems and fuels that are being introduced into the market during the 2007-2010 time period.

H. MISSING SPECIFICATIONS

Several studies were identified for which no vehicle type was specified in the original *Diesel Speciation Database*. Upon further review of the original reports or data from these studies, Pechan was able to determine the necessary vehicle or engine type information needed for further classification.

Similarly, the original *Diesel Speciation Database* contained no data from several studies in the fuel table. These are shown in the Table II-10. A larger number of studies include emission data with fuel IDs that do not match any of the fuel IDs listed in the fuel table. These records are included in the nonmatching counts for the fuel parameters.

Table II-10. Studies with No Fuel Type Specified

Project ID	Study ID	Total Number of Records	Number of Records Above Zero
1001	29	770	596
1002	166	145	145
1014	195	216	212
1020	236	563	563
1023	233	252	233
AVFL-10A	105	8	8
AVFL-10A	82	1	1
TOTAL		**1,955**	**1,758**

Pechan reviewed the studies with significant amounts of unmatched fuel data to determine whether the necessary data exists for matching the emission records to the fuel data. As a result of this effort, the number of unmatched data records later decreased from those reported above. The numbers in all of the above tables were based on the data as it existed in the final CRC E-75/NREL ES05-03 *Diesel Speciation Database*.

It is important to note that as the number of groupings to be used increases, the number of data records within the groups will decrease, as will the statistical validity of the estimated emission rates for each grouping. As shown in Tables A-1 and A-2, most pollutants have fewer than 200 emission records each. Thus, as each pollutant is further subdivided by vehicle class, model year group, test cycle, aftertreatment, and fuel properties, the number of data records within any one grouping for estimating emission rates will be fairly small. Thus, it is important to select grouping parameters that would be expected to significantly affect emission rates. The final data groupings are discussed in Chapter III.

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CHAPTER III. APPLICATION OF DATA GROUPINGS

Based on the data presented in Chapter II and feedback on this information from the CRC members, as well as further analysis of the data, the data groupings for the analysis of the emission rate data were further refined and then applied to the *Diesel Speciation Database*. A revised database was created that combined all emission records into a single table, including most of the identifying information from the original database for each emission record, and then added data fields with the identifying vehicle type, model year, test cycle, and fuel groups. This was then used as the starting point for analysis of the emission rates. In the analysis of the groupings for emission rates, certain records were excluded, such as those with emission rates of 0, or those where data were not available to identify the group. However, although these records were not included in the emission rate analysis, the data are available for use by interested researchers. In addition, in reviewing the original materials for further information needed to determine the applicable category grouping, there were several cases where data were not included in the original *Diesel Speciation Database*. In such cases, the data were added, but new source studies were not sought for this project.

This chapter explains the process that was used to further identify the final data groupings and then to develop the emission rates presented in Chapter IV, Appendix B tables, and the accompanying spreadsheets.

A. FINALIZATION OF DATA

Based on further review of the data sources and reports included in the *Diesel Speciation Database*, with the removal of the records with zero (0) emissions and the addition of data from the original set of studies that were not previously included in the *Diesel Speciation Database*, the vehicle identifications from Table II-2 resulted in the final assignments of vehicle type data shown in Table III-1. Similarly, the final model year group assignments are summarized in Table III-2. It should be noted that data reported in the results section of this report and in Appendix B exclude data with a model year group code of MULTI or UNKNOWN. However, these data records are still available in the database.

Table III-3 summarizes the final test cycles used in the emission rate analysis. Data for records with a test cycle group name ending with "??" could not definitively be assigned to the corresponding test cycle. Thus, these emission records, as well as those for which no test cycle was listed, were excluded from the emission rate analysis.

Tables II-7 and II-8 summarized the original data by sulfur level and cetane number. These tables showed that a majority of the data in the database did not include identifying fuel information. As this was a concern to many CRC members, a CRC member provided Pechan with default information on the fuel properties that would be expected based on the year the study was undertaken and whether a study would likely be using California or national diesel, as shown in Table III-4. The provided information was applied to data records with no fuel information, resulting in the data summary shown in Table III-5. An initial analysis of average emission rates using these fuel groupings, in combination with the vehicle type, model year, and test cycle groupings, showed little impact of the fuel group on the average emission rates,

possibly due to a narrow range of fuel properties for most of these data. Thus, since use of the fuel data groupings resulted in a very large number of groupings when combined with the vehicle type, model year, test cycle, and pollutant information, and since the application of the fuel groupings was less certain than the other groupings, the fuel grouping was eliminated from the final emission rate analysis.

The final concern prior to performing the emission rate analysis was that the emissions in the *Diesel Speciation Database* were reported in a large number of different units. Since the emission rate units must be the same when calculating an average emission rate over a number of different records, it was desirable to minimize the number of different sets of units being used. To accomplish this, the mass portion of the emission rate for all data were converted to grams, kilometers were converted to miles, and kilowatt-hours were converted to horsepower-hours. Following this initial conversion step, emission records for heavy-heavy duty vehicles or light/medium-heavy duty vehicles that resulted in an emission rate unit of grams per mile were converted to units of grams per horsepower-hour using EPA conversion factors that varied by model year and vehicle category. The conversion factors used are shown in Appendix C. A summary of the count of emission records by emission rate unit is shown in Table III-6. Emission records with different units were not combined in the emission rate analysis. However, after the emission rate analysis was complete, the resulting emission rates were converted to an appropriate set of units for comparison with other data (e.g., from grams per horsepower-hour to micrograms per horsepower-hour for certain pollutants).

Table III-7 summarizes all of the resulting data according to the final groupings of vehicle category, model year group, test cycle, and emission rate units. Keeping in mind that the data were further categorized by pollutant, Table III-8 summarizes the total number of emission records for each pollutant with at least 100 emission records.

B. EMISSION RATE ANALYSIS

For each of the unique groups of data – as categorized by a unique set of vehicle category – model year group, test cycle, emission rate units, and pollutant, a set of statistics were calculated. This included: average emission rate, minimum emission rate, maximum emission rate, median emission rate, and the standard deviation of the data in the grouping.

Table III-1. Data Summary by Vehicle Type Group Code

Number of Non-zero Emission Records	Vehicle Type Group Code	Vehicle Type Group Description
24,687	HHD	Heavy Heavy Duty Diesel Vehicle
5,435	L/MHD	Light/Medium Heavy Duty Diesel Vehicle
7,943	LIGHT	Light Duty Diesel Vehicle
487	SCHOOL BUS	Diesel School Bus
3,739	TRANSIT BUS	Diesel Transit Bus

Table III-2. Data Summary by Model Year Group Code

Number of Non-zero Emission Records	Model Year Group Code	Model Year Group Description
7,998	pre-87	1986 and earlier model years
3,173	1987-1990	Model years 1987 through 1990
1,920	1991-1993	Model years 1991 through 1993
12,030	1994-1995	Model years 1994 and 1995
1,387	1996-1997	Model years 1996 and 1997
9,673	1998-2003	Model years 1998 through 2003
256	2004+	Model years 2004 and later
2,875	MULTI	Includes multiple model years falling across more than one of the above groups
2,979	UNKNOWN	Model year is unknown

Table III-3. Data Summary by Test Cycle Group Code

Number of Non-zero Emission Records	Test Cycle Group Code	Test Cycle Group Description
1,904		Test cycle unknown
3,539	BUS	Bus test cycles
7,211	CRUISE	Cycles with a majority of time in the cruise mode
104	CRUISE ???	Test cycle undetermined—most likely a cruise cycle
4,625	FTP	Federal Test Procedure driving cycle
7,856	IDLE	Test cycles predominantly in the idle mode
2,047	STEADY STATE	Steady state test cycles
36	STEADY STATE ??	Test cycle undetermined—most likely steady state test
14,961	TRANSIENT	Cycles with a majority of time in the transient mode
8	TRANSIENT ???	Test cycle undetermined—most likely a transient cycle

Table III-4. Default Information on Diesel Fuel Properties

Industry Averages	Time Period	Sulfur (ppm)	Aromatics (%)	Cetane
California	<1993	>500		
	1994 - 2006	120	22	51
	2006 - 2007	4	17	52
National	1990 - 1993	2600		45
	1994 - 2005	340	33	46
	2006 *	75 - 340	28	47
	2006 - 2007	6	28	46

*NOTE: Nationally 80% of on-road diesel must be ULSD. It will become 100% ULSD in 2010.

Table III-5. Data Summary by Fuel Group Code

Number of Non-zero Emission Records	Fuel Group Code	Fuel Group Description
1,656	s0_15	Sulfur content less than 15 ppm
368	s15_30	Sulfur content greater than or equal to 15 ppm and less than 30 ppm
3,397	s30_100	Sulfur content greater than or equal to 30 ppm and less than 100 ppm
23,698	s100_150	Sulfur content greater than or equal to 100 ppm and less than 150 ppm
11,5278	s150_500	Sulfur content greater than or equal to 150 ppm and less than 500 ppm; aromatics content greater than or equal to 20%
427	s150_500LA	Sulfur content greater than or equal to 150 ppm and less than 500 ppm; aromatics content less than 20%
999	s500_2500	Sulfur content greater than or equal to 500 ppm and less than 2500 ppm
219	sGT_2500	Sulfur content greater than or equal to 2500 ppm

Table III-6. Data Summary by Emission Units Code

Number of Non-zero Emission Records	Emission Units Code	Units Code Description
250	--	Units unknown
4	%vol	Percent by volume
31	g	Grams
28,890	g/hph	Grams per horsepower-hour
173	g/hr	Grams per hour
24	g/kg	Grams per kilogram
26	g/kgfuel	Grams per kilogram fuel
17	g/l	Grams per liter
205	g/m3	Grams per cubic meter
7,041	g/mi	Grams per mile
1,262	g/min	Grams per minute
4,288	g/mode	Grams per mode
39	ppm	Parts per million
7	ppmC	Parts per million carbon
26	other	Other units

Table III-7. Summary of Final Groupings for Non-zero Emission Records, Excluding Fuel Groupings

Number of Non-zero Emission Records	Vehicle Type Group	Model Year Group	Test Cycle Group[1]	Units Group
269	HHD	pre-87		g/hph
4	HHD	pre-87	BUS	g/hph
670	HHD	pre-87	CRUISE	g/hph
495	HHD	pre-87	IDLE	g/hph
170	HHD	pre-87	IDLE	g/min
441	HHD	pre-87	IDLE	g/mode
30	HHD	pre-87	STEADY STATE	g/hph
1,499	HHD	pre-87	TRANSIENT	g/hph
3	HHD	1987-1990		
106	HHD	1987-1990		g/hph
161	HHD	1987-1990		g/m3
8	HHD	1987-1990		ppm
370	HHD	1987-1990	CRUISE	g/hph
85	HHD	1987-1990	IDLE	g/hph
236	HHD	1987-1990	IDLE	g/mode
404	HHD	1987-1990	TRANSIENT	g/hph
39	HHD	1991-1993		g/m3
3	HHD	1991-1993		ppm
3	HHD	1991-1993		ppmC
81	HHD	1991-1993	IDLE	g/hph
15	HHD	1991-1993	TRANSIENT	g
758	HHD	1991-1993	TRANSIENT	g/hph
4	HHD	1994-1995		%vol
876	HHD	1994-1995		g/hph
15	HHD	1994-1995		g/sm2
4	HHD	1994-1995		g/sm3
28	HHD	1994-1995		ppm
4	HHD	1994-1995		ppmC
2,099	HHD	1994-1995	CRUISE	g/hph
37	HHD	1994-1995	CRUISE	g/mode
1,599	HHD	1994-1995	IDLE	g/hph
447	HHD	1994-1995	IDLE	g/min
1,665	HHD	1994-1995	IDLE	g/mode
261	HHD	1994-1995	STEADY STATE	g/hph
4,026	HHD	1994-1995	TRANSIENT	g/hph
15	HHD	1996-1997	BUS	g/hph
5	HHD	1996-1997	CRUISE	g/hph
5	HHD	1996-1997	IDLE	g/hph
5	HHD	1996-1997	IDLE	g/min
12	HHD	1996-1997	STEADY STATE	g/hph
15	HHD	1996-1997	STEADY STATE	g/kgfuel
59	HHD	1996-1997	TRANSIENT	
55	HHD	1996-1997	TRANSIENT	g/hph

Number of Non-zero Emission Records	Vehicle Type Group	Model Year Group	Test Cycle Group[1]	Units Group
385	HHD	1998-2003	BUS	g/hph
1,484	HHD	1998-2003	CRUISE	g/hph
5	HHD	1998-2003	FTP	g/hph
20	HHD	1998-2003	IDLE	g/hph
12	HHD	1998-2003	IDLE	g/hr
6	HHD	1998-2003	IDLE	g/min
1,444	HHD	1998-2003	IDLE	g/mode
40	HHD	1998-2003	STEADY STATE	g/hph
1,784	HHD	1998-2003	TRANSIENT	g/hph
10	HHD	MULTI	BUS	g/hph
439	HHD	MULTI	CRUISE	g/hph
3	HHD	MULTI	IDLE	g/hph
4	HHD	MULTI	IDLE	g/hr
165	HHD	MULTI	IDLE	g/min
459	HHD	MULTI	TRANSIENT	g/hph
99	HHD	UNKNOWN	BUS	g/hph
38	HHD	UNKNOWN	IDLE	g/hph
1,160	HHD	UNKNOWN	STEADY STATE	g/hph
36	HHD	UNKNOWN	STEADY STATE ??	g/hph
8	HHD	UNKNOWN	TRANSIENT ???	g/hph
203	L/MHD	pre-87	CRUISE	g/hph
175	L/MHD	pre-87	IDLE	g/min
715	L/MHD	pre-87	TRANSIENT	g/hph
170	L/MHD	1987-1990	CRUISE	g/hph
172	L/MHD	1987-1990	TRANSIENT	g/hph
11	L/MHD	1991-1993		g/kgfuel
36	L/MHD	1991-1993	STEADY STATE	g/hph
154	L/MHD	1994-1995	CRUISE	g/hph
25	L/MHD	1994-1995	TRANSIENT	
746	L/MHD	1994-1995	TRANSIENT	g/hph
341	L/MHD	1996-1997	CRUISE	g/hph
1	L/MHD	1996-1997	IDLE	g/hph
465	L/MHD	1996-1997	IDLE	g/mode
366	L/MHD	1996-1997	TRANSIENT	g/hph
20	L/MHD	1998-2003	STEADY STATE	g/hph
364	L/MHD	1998-2003	TRANSIENT	g/hph
412	L/MHD	MULTI	CRUISE	g/hph
294	L/MHD	MULTI	IDLE	g/min
731	L/MHD	MULTI	TRANSIENT	g/hph
14	L/MHD	UNKNOWN	STEADY STATE	
4	L/MHD	UNKNOWN	STEADY STATE	g/hph
16	L/MHD	UNKNOWN	TRANSIENT	g/hph
498	LIGHT	pre-87	CRUISE	g/mi
2,308	LIGHT	pre-87	FTP	g/mi
301	LIGHT	pre-87	TRANSIENT	g/mi
23	LIGHT	1987-1990	CRUISE	g/mi
312	LIGHT	1987-1990	FTP	g/mi

Number of Non-zero Emission Records	Vehicle Type Group	Model Year Group	Test Cycle Group[1]	Units Group
380	LIGHT	1991-1993	FTP	g/mi
140	LIGHT	1991-1993	STEADY STATE	g/hph
5	LIGHT	1991-1993	STEADY STATE	g/m3
15	LIGHT	1991-1993	STEADY STATE	pmm
71	LIGHT	1991-1993	TRANSIENT	g/mi
40	LIGHT	1994-1995	FTP	g/mi
4	LIGHT	1996-1997		g/mi
25	LIGHT	1996-1997	FTP	g/mi
10	LIGHT	1996-1997	STEADY STATE	g/hph
4	LIGHT	1996-1997	STEADY STATE	g/hr
145	LIGHT	1998-2003		g/hph
4	LIGHT	1998-2003	CRUISE	g
192	LIGHT	1998-2003	CRUISE	g/mi
1,257	LIGHT	1998-2003	FTP	g/mi
12	LIGHT	1998-2003	STEADY STATE	g
146	LIGHT	1998-2003	STEADY STATE	g/hr
67	LIGHT	1998-2003	TRANSIENT	g/hph
667	LIGHT	1998-2003	TRANSIENT	g/mi
256	LIGHT	2004+	FTP	g/mi
22	LIGHT	MULTI	FTP	g/mi
336	LIGHT	MULTI	TRANSIENT	g/mi
149	LIGHT	UNKNOWN		
72	LIGHT	UNKNOWN		g/mi
90	LIGHT	UNKNOWN	CRUISE	g/hph
20	LIGHT	UNKNOWN	CRUISE	g/mi
104	LIGHT	UNKNOWN	CRUISE ???	g/mi
20	LIGHT	UNKNOWN	FTP	g/mi
84	LIGHT	UNKNOWN	STEADY STATE	g/hph
7	LIGHT	UNKNOWN	STEADY STATE	g/hr
24	LIGHT	UNKNOWN	STEADY STATE	g/kg
8	LIGHT	UNKNOWN	STEADY STATE	g/mi
125	LIGHT	UNKNOWN	TRANSIENT	g/mi
472	SCHOOL BUS	1998-2003	BUS	g/hph
15	SCHOOL BUS	UNKNOWN	BUS	g/hph
66	TRANSIT BUS	pre-87	BUS	g/hph
154	TRANSIT BUS	pre-87	TRANSIENT	g/hph
1,123	TRANSIT BUS	1987-1990	BUS	g/hph
178	TRANSIT BUS	1991-1993	BUS	g/hph
185	TRANSIT BUS	1991-1993	TRANSIENT	g/hph
1,147	TRANSIT BUS	1998-2003	BUS	g/hph
25	TRANSIT BUS	UNKNOWN	BUS	g/hph
844	TRANSIT BUS	UNKNOWN	TRANSIENT	g/hph
17	TRANSIT BUS	UNKNOWN	TRANSIENT	g/l

[1] In cases where the Test Cycle Group is blank, no test cycle data were available.

Table III-8. Pollutants with at Least 100 Non-zero Emission Records

Number of Non-zero Emission Records	Pollutant Code	Pollutant Name	Pollutant Category
865	NOx	NO_x	RegulatedPollutants
750	TPM	total particulate matter	RegulatedPollutants
742	308067530	THC	RegulatedPollutants
729	CO	CO	RegulatedPollutants
294	129000	pyrene	PAH
282	85018	phenanthrene	PAH
276	CO2	CO_2	RegulatedPollutants
263	208968	acenaphthylene	PAH
261	206440	fluoranthene	PAH
259	86737	fluorene	PAH
257	50000	formaldehyde	Carbonyl
242	75070	acetaldehyde	Carbonyl
233	C158	organic carbon	PM_Speciation
230	C157	elemental carbon	PM_Speciation
223	56553	benz[a]anthracene	PAH
223	91203	naphthalene	PAH
221	218019	chrysene	PAH
212	120127	anthracene	PAH
208	50328	benzo[a]pyrene	PAH
205	7440702	Ca	PM_Speciation
203	7440666	Zn	PM_Speciation
196	7439896	Fe	PM_Speciation
194	7704349	S	PM_Speciation
192	71432	benzene	TOG_VOC_NMOG
191	91576	2-methylnaphthalene	PAH
188	83329	acenaphthene	PAH
188	90120	1-methylnaphthalene	PAH
186	7723140	P	PM_Speciation
185	132649	dibenzofuran	SVOC
185	7440213	Si	PM_Speciation
184	92524	biphenyl	PAH
179	C64	2,6+2,7-dimethylnaphthalene	PAH
178	106990	1,3-butadiene	TOG_VOC_NMOG
177	14808798	SO_4^{-2}	PM_Speciation
175	C55	1,4+1,5+2,3-dimethylnaphthalene	PAH
174	14798039	NH_4^+	PM_Speciation
174	C156	total carbon	PM_Speciation
170	573988	1,2-dimethylnaphthalene	PAH
169	629594	tetradecane	TOG_VOC_NMOG
169	629629	pentadecane	TOG_VOC_NMOG
169	629925	nonadecane	TOG_VOC_NMOG
168	C52	1,3+1,6+1,7-dimethylnaphthalene	PAH
166	593453	octadecane	TOG_VOC_NMOG

Number of Non-zero Emission Records	Pollutant Code	Pollutant Name	Pollutant Category
161	112958	eicosane	TOG_VOC_NMOG
161	7439954	Mg	PM_Speciation
160	C58	1+2-ethylnaphthalene	PAH
154	7440508	Cu	PM_Speciation
152	191242	benzo[ghi]perylene	PAH
143	107028	acrolein	Carbonyl
142	67641	acetone	Carbonyl
139	74851	ethene	TOG_VOC_NMOG
138	C81	A-methylfluorene	PAH
138	C83	A-trimethylnaphthalene	PAH
138	C90	C-dimethylphenanthrene	PAH
136	112403	dodecane	TOG_VOC_NMOG
136	123386	propionaldehyde	Carbonyl
136	1730376	1-methylfluorene	PAH
136	C103	F-trimethylnaphthalene	PAH
136	C89	B-trimethylnaphthalene	PAH
135	192972	benzo[e]pyrene	PAH
135	C102	E-trimethylnaphthalene	PAH
135	C93	C-trimethylnaphthalene	PAH
134	C159	elemental carbon fraction 1	PM_Speciation
134	C160	elemental carbon fraction 2	PM_Speciation
134	C163	organic carbon fraction 2	PM_Speciation
133	C164	organic carbon fraction 3	PM_Speciation
133	C165	organic carbon fraction 4	PM_Speciation
132	22537151	Cl	PM_Speciation
131	111842	nonane	TOG_VOC_NMOG
131	C162	organic carbon fraction 1	PM_Speciation
129	124185	decane	TOG_VOC_NMOG
128	1576676	3,6-dimethylphenanthrene	PAH
127	7429905	Al	PM_Speciation
127	C57	1,7-dimethylphenanthrene	PAH
127	C82	A-methylphenanthrene	PAH
126	C92	C-methylphenanthrene	PAH
125	25155151	isopropyltoluene	TOG_VOC_NMOG
124	103651	propylbenzene	TOG_VOC_NMOG
123	1120214	undecane	TOG_VOC_NMOG
123	16887006	Cl^-	PM_Speciation
123	7440020	Ni	PM_Speciation
122	14797558	NO_3^-	PM_Speciation
121	4170303	crotonaldehyde	Carbonyl
121	7440097	K	PM_Speciation
120	100527	benzaldehyde	SVOC
120	2531842	2-methylphenanthrene	PAH
120	7726956	Br	PM_Speciation
120	PM2.5	$PM_{2.5}$	RegulatedPollutants

Number of Non-zero Emission Records	Pollutant Code	Pollutant Name	Pollutant Category
119	C94	D-dimethylphenanthrene	PAH
118	C204	C27-tetracyclic terpane	SVOC
118	C85	benzo[bkj]fluoranthene	PAH
117	832699	1-methylphenanthrene	PAH
116	193395	indeno[123-cd]pyrene	PAH
116	644086	4-methylbiphenyl	PAH
115	142290	cyclopentene	TOG_VOC_NMOG
115	486259	fluorenone	PAH
115	C87	B-methylfluorene	PAH
114	13849962	17a(H),21·H)-hopane	SVOC
114	C69	3-methylbiphenyl	PAH
114	C74	4-methylpyrene	PAH
113	115071	propene	TOG_VOC_NMOG
113	7440393	Ba	PM_Speciation
112	104518	butylbenzene	TOG_VOC_NMOG
111	C1	m/p-xylenes	TOG_VOC_NMOG
111	C166	pyrolyzed organic carbon	PM_Speciation
111	C80	A-dimethylphenanthrene	PAH
110	C84	B-dimethylphenanthrene	PAH
109	C36	2-methylindan	TOG_VOC_NMOG
108	548390	perinaphthenone	PAH
107	100414	ethylbenzene	TOG_VOC_NMOG
107	C105	J-trimethylnaphthalene	PAH
106	E17150582	C27-20S5a(H),14·H),17·H)-cholestane	SVOC
105	108883	toluene	TOG_VOC_NMOG
105	53584604	17a(H),21·H)-30-norhopane	SVOC
105	74828	methane	TOG_VOC_NMOG
105	C60	1-ethyl-2-methylnaphthalene	PAH
104	7440235	Na	PM_Speciation
103	2381217	1-methylpyrene	PAH
103	638368	phytane	TOG_VOC_NMOG
103	C121	2,3,5+I-trimethylnaphthalene	PAH
102	6006333	tridecylcyclohexane	TOG_VOC_NMOG
102	C101	E-dimethylphenanthrene	PAH
101	C65	2-ethyl-1-methylnaphthalene	PAH
100	620144	m-ethyltoluene	TOG_VOC_NMOG
100	74862	acetylene	TOG_VOC_NMOG
100	C108	methylpyrenes/fluoranthenes	PAH

CHAPTER IV. RESULTS

This chapter presents key emission results from this E-75-2 analysis. The average emission rate results included in this chapter are focused on the HHD diesel vehicle rates. There are several reasons for this. First, the data for HHD diesels are much more complete than the data for other diesel vehicle types. Although the E-75 *Diesel Speciation Database* includes data for other diesel categories, the primary emphasis has been on the HHD diesel vehicles. Finally, the engines tested in the Phase 1 ACES study (CRC, 2009) were all HHD diesel engines. The emission results from this study can be compared with the emission rates presented in the ACES study to review the improvements that have been made in diesel engine emissions.

Appendix B contains detailed emission results by pollutant category for all diesel vehicle types included in the *Diesel Speciation Database*. This appendix also contains statistics on the number of records, average emission rate, minimum emission rate, maximum emission rate, median emission rate, and standard deviation for each pollutant of interest and grouping (e.g., each combination of vehicle type, test cycle, and model year group).

The emission results from the pollutants and groupings included in this chapter were selected for easy comparison to the results presented in the ACES report. The first section of this report presents results for the following regulated and related pollutants: oxides of nitrogen (NO_x), nitrogen oxide (NO), NO_2, carbon monoxide (CO), total hydrocarbon (THC), carbon dioxide (CO_2), particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), and elemental and organic carbon. The second section summarizes results for groups of speciated or unregulated compounds.

It should be noted that some model year groups are not included in some of the tables. This indicates that there are no data for those pollutant and model year group combinations. Additionally, for some pollutants, data were available for some, but not all test cycles for a given model year group. This is true when the number of records listed is 0.

A. REGULATED AND RELATED POLLUTANTS

Results for NO_x, NO, CO, THC, CO_2, $PM_{2.5}$, and elemental and organic carbon emissions from HHD diesel vehicles are presented in Tables IV-1 through IV-7, respectively. Each of these tables shows results for the corresponding pollutant, test cycle, and model year grouping for HHD diesel vehicles. The tables list the number of emission records that occurred in each grouping, along with the average, minimum, maximum, and median emission rates for each grouping. In addition, the standard deviation of each group is also included to assist in understanding the consistency of the data set. Note that emission results from idle test cycles are reported in a variety of units including mass per hp-hr, mass per mode, and mass per unit time. Results reported in each of these unit groupings are shown separately, where applicable.

Note that although there are few emission rates reported for NO in Table IV-2, the corresponding NOx emission rates in Table IV-1 for the same test cycle and model year groups show only a maximum NOx value that is greater than the corresponding NO value. Similarly in Appendix B, Tables B-12a through B-12d, NO values in some cases exceed the corresponding NOx emission

rates. All of the NO values included in this database originated from the Gasoline/Diesel PM Split Study (NREL, 2005). The criteria pollutant data file available from this study show a number of cases where the measured NO value was greater than the measured NOx value.

Table IV-1. HHD Diesel Vehicle Emission Rates for NO_x

		NO_x HHD Emission Rates by Model Year Group					
Test Cycle		**Pre-87**	**1987-1990**	**1991-1993**	**1994-1995**	**1996-1997**	**1998-2003**
Transient	Number Records	20	2	17	49	4	28
	Average (g/hp-hr)	4.71	6.18	4.46	6.62	4.48	4.41
	Minimum (g/hp-hr)	2.73	6.14	3.90	3.80	4.37	3.58
	Maximum (g/hp-hr)	6.54	6.22	4.90	14.25	4.57	5.91
	Median (g/hp-hr)	4.60	6.18	4.50	5.77	4.49	4.07
	Standard Deviation (g/hp-hr)	1.14	0.04	0.30	2.92	0.07	0.76
Cruise	Number Records	24	2	0	24	0	12
	Average (g/hp-hr)	3.13	4.71		7.09		7.51
	Minimum (g/hp-hr)	2.01	4.67		4.12		2.77
	Maximum (g/hp-hr)	4.61	4.75		10.04		13.63
	Median (g/hp-hr)	3.04	4.71		6.61		7.21
	Standard Deviation (g/hp-hr)	0.79	0.04		1.94		3.85
Steady State	Number Records	15	0	0	45	3	11
	Average (g/hp-hr)	5.51			2.80	3.44	4.85
	Minimum (g/hp-hr)	1.81			1.70	3.34	3.06
	Maximum (g/hp-hr)	8.12			4.52	3.49	6.20
	Median (g/hp-hr)	5.86			2.77	3.49	5.60
	Standard Deviation (g/hp-hr)	2.19			0.96	0.07	1.15
Bus	Number Records	1	0	0	0	3	16
	Average (g/hp-hr)	12.80				5.19	11.19
	Minimum (g/hp-hr)	12.80				4.67	7.72
	Maximum (g/hp-hr)	12.80				5.61	14.46
	Median (g/hp-hr)	12.80				5.30	11.66
	Standard Deviation (g/hp-hr)	0.00				0.39	2.11
FTP	Number Records	0	0	0	0	0	1
	Average (g/hp-hr)						3.67
	Minimum (g/hp-hr)						3.67
	Maximum (g/hp-hr)						3.67
	Median (g/hp-hr)						3.67
	Standard Deviation (g/hp-hr)						0
Idle (g/hp-hr)	Number Records	24	0	0	20	0	0
	Average (g/hp-hr)	10.12			28.42		
	Minimum (g/hp-hr)	6.45			19.96		
	Maximum (g/hp-hr)	14.55			36.46		
	Median (g/hp-hr)	9.22			29.99		
	Standard Deviation (g/hp-hr)	2.55			6.57		
Idle (g/mode)	Number Records	16	2	0	16	0	6
	Average (g/mode)	12.69	4.62		29.71		1.22
	Minimum (g/mode)	1.79	4.59		1.08		1.13
	Maximum (g/mode)	31.84	4.65		64.11		1.36
	Median (g/mode)	9.19	4.62		26.65		1.19
	Standard Deviation (g/mode)	8.69	0.03		17.04		0.07

Table IV-2. HHD Diesel Vehicle Emission Rates for NO

		NO HHD Emission Rates by Model Year Group					
Test Cycle		**Pre-87**	**1987-1990**	**1991-1993**	**1994-1995**	**1996-1997**	**1998-2003**
Transient	Number Records	0	0	1	0	0	1
	Average (g/hp-hr)			4.56			5.90
	Minimum (g/hp-hr)			4.56			5.90
	Maximum (g/hp-hr)			4.56			5.90
	Median (g/hp-hr)			4.56			5.90
	Standard Deviation (g/hp-hr)			0.00			0.00

Table IV-3. HHD Diesel Vehicle Emission Rates for CO

		CO HHD Emission Rates by Model Year Group					
Test Cycle		**Pre-87**	**1987-1990**	**1991-1993**	**1994-1995**	**1996-1997**	**1998-2003**
Transient	Number Records	10	1	17	42	4	25
	Average (g/hp-hr)	3.47	2.55	1.65	1.74	1.13	1.18
	Minimum (g/hp-hr)	2.63	2.55	0.84	0.54	0.75	0.41
	Maximum (g/hp-hr)	4.47	2.55	2.69	5.29	1.49	4.71
	Median (g/hp-hr)	3.39	2.55	1.70	1.42	1.15	1.08
	Standard Deviation (g/hp-hr)	0.68	0.00	0.66	0.93	0.29	0.76
Cruise	Number Records	12	1	0	14	0	9
	Average (g/hp-hr)	1.07	1.29		0.86		0.48
	Minimum (g/hp-hr)	0.71	1.29		0.31		0.04
	Maximum (g/hp-hr)	1.61	1.29		2.70		0.96
	Median (g/hp-hr)	1.02	1.29		0.60		0.56
	Standard Deviation (g/hp-hr)	0.29	0.00		0.70		0.36
Steady State	Number Records	0	0	0	45	3	7
	Average (g/hp-hr)				0.58	0.42	0.46
	Minimum (g/hp-hr)				0.36	0.41	0.21
	Maximum (g/hp-hr)				0.91	0.42	0.87
	Median (g/hp-hr)				0.58	0.42	0.52
	Standard Deviation (g/hp-hr)				0.17	0.00	0.24
Bus	Number Records	1	0	0	0	3	16
	Average (g/hp-hr)	2.50				1.10	1.52
	Minimum (g/hp-hr)	2.50				0.09	0.04
	Maximum (g/hp-hr)	2.50				2.04	4.12
	Median (g/hp-hr)	2.50				1.17	1.36
	Standard Deviation (g/hp-hr)	0.00				0.80	1.17
FTP	Number Records	0	0	0	0	0	1
	Average (g/hp-hr)						1.09
	Minimum (g/hp-hr)						1.09
	Maximum (g/hp-hr)						1.09
	Median (g/hp-hr)						1.09
	Standard Deviation (g/hp-hr)						0
Idle (g/hp-hr)	Number Records	12	0	0	10	0	0
	Average (g/hp-hr)	10.99			6.66		
	Minimum (g/hp-hr)	5.72			4.82		
	Maximum (g/hp-hr)	23.97			10.68		
	Median (g/hp-hr)	8.52			6.05		
	Standard Deviation (g/hp-hr)	5.35			1.74		

Test Cycle		CO HHD Emission Rates by Model Year Group					
		Pre-87	1987-1990	1991-1993	1994-1995	1996-1997	1998-2003
Idle (g/mode)	Number Records	8	1	0	8	0	3
	Average (g/mode)	25.10	1.91		5.26		0.17
	Minimum (g/mode)	5.87	1.91		0.60		0.13
	Maximum (g/mode)	75.48	1.91		12.57		0.19
	Median (g/mode)	13.66	1.91		4.74		0.18
	Standard Deviation (g/mode)	22.78	0.00		3.63		0.03

Table IV-4. HHD Diesel Vehicle Emission Rates for THC

Test Cycle		THC HHD Emission Rates by Model Year Group					
		Pre-87	1987-1990	1991-1993	1994-1995	1996-1997	1998-2003
Transient	Number Records	14	1	17	42	4	25
	Average (g/hp-hr)	0.878	0.453	0.279	0.238	0.133	0.159
	Minimum (g/hp-hr)	0.153	0.453	0.104	0.046	0.060	0.075
	Maximum (g/hp-hr)	1.786	0.453	0.614	0.601	0.230	0.412
	Median (g/hp-hr)	0.813	0.453	0.220	0.201	0.120	0.125
	Standard Deviation (g/hp-hr)	0.529	0.000	0.138	0.164	0.063	0.089
Cruise	Number Records	13	1	0	14	0	7
	Average (g/hp-hr)	0.446	0.166		0.103		0.076
	Minimum (g/hp-hr)	0.122	0.166		0.041		0.052
	Maximum (g/hp-hr)	0.602	0.166		0.223		0.152
	Median (g/hp-hr)	0.426	0.166		0.096		0.057
	Standard Deviation (g/hp-hr)	0.139	0.000		0.053		0.035
Steady State	Number Records	0	0	0	45	3	11
	Average (g/hp-hr)				0.163	0.330	0.151
	Minimum (g/hp-hr)				0.080	0.317	0.103
	Maximum (g/hp-hr)				0.452	0.340	0.196
	Median (g/hp-hr)				0.101	0.334	0.153
	Standard Deviation (g/hp-hr)				0.120	0.009	0.036
Bus	Number Records	1	0	0	0	3	12
	Average (g/hp-hr)	0.090				0.299	0.174
	Minimum (g/hp-hr)	0.090				0.017	0.002
	Maximum (g/hp-hr)	0.090				0.492	0.532
	Median (g/hp-hr)	0.090				0.388	0.094
	Standard Deviation (g/hp-hr)	0.000				0.204	0.180
Idle (g/hp-hr)	Number Records	12	0	0	10	0	0
	Average (g/hp-hr)	5.19			2.11		
	Minimum (g/hp-hr)	2.88			1.62		
	Maximum (g/hp-hr)	7.50			2.61		
	Median (g/hp-hr)	5.22			2.11		
	Standard Deviation (g/hp-hr)	1.67			0.32		
Idle (g/mode)	Number Records	8	1	0	8	0	3
	Average (g/mode)	7.92	0.34		2.26		0.09
	Minimum (g/mode)	2.43	0.34		0.09		0.08
	Maximum (g/mode)	13.10	0.34		4.61		0.12
	Median (g/mode)	7.55	0.34		2.30		0.08
	Standard Deviation (g/mode)	3.88	0.00		1.49		0.02

Table IV-5. HHD Diesel Vehicle Emission Rates for CO_2

		CO_2 HHD Emission Rates by Model Year Group					
Test Cycle		**Pre-87**	**1987-1990**	**1991-1993**	**1994-1995**	**1996-1997**	**1998-2003**
Transient	Number Records	10	1	0	12	2	8
	Average (g/hp-hr)	758	756		820	560	740
	Minimum (g/hp-hr)	535	756		633	558	539
	Maximum (g/hp-hr)	1,060	756		1,009	562	1,025
	Median (g/hp-hr)	771	756		839	560	673
	Standard Deviation (g/hp-hr)	139	0		111	2	198
Cruise	Number Records	12	1	0	12	0	9
	Average (g/hp-hr)	477	538		532		532
	Minimum (g/hp-hr)	320	538		330		475
	Maximum (g/hp-hr)	634	538		664		665
	Median (g/hp-hr)	489	538		501		498
	Standard Deviation (g/hp-hr)	90	0		94		63
Steady State	Number Records	0	0	0	0	0	3
	Average (g/hp-hr)						477
	Minimum (g/hp-hr)						476
	Maximum (g/hp-hr)						477
	Median (g/hp-hr)						477
	Standard Deviation (g/hp-hr)						0
Bus	Number Records	0	0	0	0	3	16
	Average (g/hp-hr)					651	805
	Minimum (g/hp-hr)					629	637
	Maximum (g/hp-hr)					679	1,152
	Median (g/hp-hr)					645	687
	Standard Deviation (g/hp-hr)					21	208
FTP	Number Records	0	0	0	0	0	1
	Average (g/hp-hr)						604
	Minimum (g/hp-hr)						604
	Maximum (g/hp-hr)						604
	Median (g/hp-hr)						604
	Standard Deviation (g/hp-hr)						0
Idle (g/hp-hr)	Number Records	12	0	0	10	0	0
	Average (g/hp-hr)	1,611			1,591		
	Minimum (g/hp-hr)	1,244			1,368		
	Maximum (g/hp-hr)	1,887			2,059		
	Median (g/hp-hr)	1,597			1,580		
	Standard Deviation (g/hp-hr)	166			194		
Idle (g/mode)	Number Records	8	1	0	8	0	3
	Average (g/mode)	2,153	565		1,606		84
	Minimum (g/mode)	1,088	565		75		66
	Maximum (g/mode)	3,301	565		3,270		99
	Median (g/mode)	2,099	565		1,358		87
	Standard Deviation (g/mode)	891	0		966		13

Table IV-6. HHD Diesel Vehicle Emission Rates for $PM_{2.5}$

		$PM_{2.5}$ HHD Emission Rates by Model Year Group					
Test Cycle		**Pre-87**	**1987-1990**	**1991-1993**	**1994-1995**	**1996-1997**	**1998-2003**
Transient	Number Records	4	1	1	7	0	4
	Average (g/hp-hr)	0.605	1.147	0.216	0.189		0.180
	Minimum (g/hp-hr)	0.521	1.147	0.216	0.117		0.048
	Maximum (g/hp-hr)	0.640	1.147	0.216	0.260		0.353
	Median (g/hp-hr)	0.630	1.147	0.216	0.195		0.159
	Standard Deviation (g/hp-hr)	0.049	0.000	0.000	0.052		0.119
Cruise	Number Records	1	1	0	3	0	3
	Average (g/hp-hr)	0.276	0.488		0.064		0.066
	Minimum (g/hp-hr)	0.276	0.488		0.053		0.047
	Maximum (g/hp-hr)	0.276	0.488		0.071		0.084
	Median (g/hp-hr)	0.276	0.488		0.067		0.068
	Standard Deviation (g/hp-hr)	0.000	0.000		0.008		0.015
Bus	Number Records	0	0	0	0	0	5
	Average (g/hp-hr)						0.013
	Minimum (g/hp-hr)						0.001
	Maximum (g/hp-hr)						0.053
	Median (g/hp-hr)						0.002
	Standard Deviation (g/hp-hr)						0.020
Idle (g/mode)	Number Records	0	1	0	1	0	3
	Average (g/mode)		1.142		0.784		0.447
	Minimum (g/mode)		1.142		0.784		0.201
	Maximum (g/mode)		1.142		0.784		0.896
	Median (g/mode)		1.142		0.784		0.244
	Standard Deviation (g/mode)		0.000		0.000		0.318

Table IV-7. HHD Diesel Vehicle Emission Rates for Elemental Carbon and Organic Carbon

		Elemental Carbon/Organic Carbon HHD Emission Rates by Model Year Group									
		Pre-87		**1987-1990**		**1991-1993**		**1994-1995**		**1998-2003**	
Test Cycle		**EC**	**OC**	**EC**	**OC**	**EC**	**OC**	**EC**	**OC**	**EC**	**OC**
Transient	Number Records	8	8	2	2	1	1	16	16	8	8
	Average (mg/hp-hr)	548	194	1,037	107	173	149	118	63	149	72
	Minimum (mg/hp-hr)	414	64	940	102	173	149	79	32	35	22
	Maximum (mg/hp-hr)	630	347	1,134	112	173	149	178	152	320	191
	Median (mg/hp-hr)	570	182	1,037	107	173	149	116	53	115	49
	Standard Deviation (mg/hp-hr)	70	82	97	5	0	0	27	31	95	56
Cruise	Number Records	2	2	2	2	0	0	8	8	7	7
	Average (mg/hp-hr)	201	83	290	198			25	24	43	17
	Minimum (mg/hp-hr)	129	81	226	22			17	14	28	10
	Maximum (mg/hp-hr)	274	86	354	374			37	41	69	44
	Median (mg/hp-hr)	201	83	290	198			25	21	42	13
	Standard Deviation (mg/hp-hr)	72	2	64	176			6	8	13	11
Bus	Number Records	0	0	0	0	0	0	0	0	5	5
	Average (mg/hp-hr)									22	13
	Minimum (mg/hp-hr)									0	2
	Maximum (mg/hp-hr)									67	27
	Median (mg/hp-hr)									0	3

		Elemental Carbon/Organic Carbon HHD Emission Rates by Model Year Group									
		Pre-87		1987-1990		1991-1993		1994-1995		1998-2003	
Test Cycle		**EC**	**OC**	**EC**	**OC**	**EC**	**OC**	**EC**	**OC**	**EC**	**OC**
	Standard Deviation (mg/hp-hr)									28	12
Idle (mg/ hp-hr)	Number Records	2	2	0	0	0	0	5	5	1	1
	Average (mg/hp-hr)	1,352	792.93					161	355	180	145
	Minimum (mg/hp-hr)	1,316	703.4					49	160	180	145
	Maximum (mg/hp-hr)	1,387	882.46					318	531	180	145
	Median (mg/hp-hr)	1,352	792.93					117	409	180	145
	Standard Deviation (mg/hp-hr)	36	89.53					110	130	0	0
Idle (mg/ mode)	Number Records	1	1	2	2	0	0	7	7	6	6
	Average (mg/mode)	2,578	968	917	410			333	431	212	282
	Minimum (mg/mode)	2,578	968	889	272			12	112	34	97
	Maximum (mg/mode)	2,578	968	944	547			1,060	885	446	582
	Median (mg/mode)	2,578	968	917	410			182	486	162	242
	Standard Deviation (mg/mode)	0	0	28	137			397	272	152	170
Idle (mg/ hr)	Number Records	0	0	0	0	0	0	0	0	1	1
	Average (mg/hr)									113	2,458
	Minimum (mg/hr)									113	2,458
	Maximum (mg/hr)									113	2,458
	Median (mg/hr)									113	2,458
	Standard Deviation (mg/hr)									0	0

B. UNREGULATED OR SPECIATED COMPOUNDS AND POLLUTANTS

This section presents emission results for groupings of compounds or pollutants of interest.

Table IV-8 summarizes emission rates from all elements included in the *Diesel Speciation Database*. Since there was more than one data record for many elements included in the database, this table shows both the total number of records from all elements as well as the number of unique elements included. The average emission rates in this table represent the sum of the average rate for each element included.

Table IV-9 summarizes the average emission rates for ten specific elements as well as the sum of the average emission rates from these ten elements. These elements were selected to correspond to the elements whose results are presented in the ACES study. Results from the transient test cycle for these ten elements are plotted in Figure IV-1.

Table IV-10 summarizes the average emission rates from inorganic ions by model year group and test cycle. The ions included in the data base for HHD diesel vehicles include nitrate (NO_3^-), nitrite (NO_2^-), ammonium (NH_4^+), sulfate ($SO4^{-2}$), and chloride (Cl^-). The sum of the average emission rates from each of ions is also included.

Table IV-11 shows the average emission rates for selected carbonyl compounds, as well as 1,3-butadiene. Again, these compounds were selected to match those reported in the ACES report. The total carbonyl emission rate, calculated as the sum of the average rates for the selected compounds is also shown here. Results for the transient test cycles are shown in Figure IV-2.

Emission results from the BTEX compounds are shown in Table IV-12. This group includes benzene, toluene, ethylbenzene, and xylenes. Results are presented graphically in Figure IV-3 for the transient test cycle.

Tables IV-13 through IV-17 show emission results for polycyclic aromatic hydrocarbons (PAHs). Table IV-13 presents emissions for oxygenated PAH (Oxy-PAH) compounds, following the list of Oxy-PAH compounds included in the ACES report. Table IV-14 presents nitrogenated PAH (nitro-PAH) compound emission rates. Only a small number of the nitro-PAH compounds listed in the ACES report were found in the *Diesel Speciation Database* for HHD diesel vehicles. Due to the sparse data for this category of compounds, totals are not reported here. Note that in Table IV-14, the units listed for emission rate data in the cruise test cycle are ug/mode while the units listed for the cruise cycle in the other tables are generally a unit of mass per horsepower-hour (hp-hr). All of the nitro-PAH emission data reported for the cruise test cycle originated from Phase 1 of the CRC E55/59 study. The tests used to estimate the emissions of nitro-PAH compounds in that study combined data from the cruise, transient, idle, and creep modes. Emissions were reported in the E55/59 study from the entire cycle rather than the individual test cycle components. For the purposes of this E75-2 study, the data were assigned to the cruise mode. Tables IV-15 and IV-16 provide emission rates for two sets of PAH compounds noted to be of interest to EPA. These tables show individual emission rates as well as totals for the group of compounds. The Data from Table IV-16 are shown graphically in Figure IV-4 for the transient test cycle. Finally, the emission rates for the remaining PAH compounds are reported in Table IV-17. This table shows the sum of the average emission rates of the PAH compounds included. Because of the large number of compounds, they are not shown individually here. However, the PAH compounds from Tables IV-13 through IV-16 are not included in this total PAH table.

Table IV-8. HHD Diesel Vehicle Emission Rates for All Elements

Test Cycle		Total Elements Emission Rates by Model Year Group				
		Pre-87	1987-1990	1991-1993	1994-1995	1998-2003
Transient	Number Records	136	39	113	331	160
	Number Elements	36	26	26	39	37
	Average (ug/hp-hr)	12,116	11,851	41,937	6,948	6,441
Cruise	Number Records	50	0	0	193	138
	Number Elements	32			39	37
	Average (ug/hp-hr)	4,308			2,273	1,248
Bus	Number Records	0	0	0	0	37
	Number Elements					9
	Average (ug/hp-hr)					353
Idle	Number Records	49	0	47	116	0
	Number Elements	31		16	37	
	Average (ug/hp-hr)	10,420		44,952	16,771	
Idle	Number Records	26	39	0	164	134
	Number Elements	26	22		39	37
	Average (ug/mode)	24,550	30,963		28,147	39,599

NOTE: The average is the sum of the average from each individual element.

Table IV-9. HHD Diesel Vehicle Emission Rates for Selected Elements

Test Cycle	Model Year Group		Average Emission Rate (ug/hp-hr) or Number of Records										
			Al	Ca	Cu	Fe	Mg	Na	P	S	Si	Zn	Total
Trans-ient	pre-87	Num. Recs	6	7	4	7	7	5	7	7	7	7	
		Avg. Rate	341	763	34	982	388	2,044	263	1,685	3,381	615	10,497
	1987-1990	Num. Recs	2	2	2	2	1	1	2	2	2	2	
		Avg. Rate	672	3,179	17	797	750	1,328	1,760	1,177	486	378	10,543
	1991-1993	Num. Recs	1	7	6	7	7	1	1	7	7	7	
		Avg. Rate	301	376	698	1,421	895	134	301	2,219	526	905	7,776
	1994-1995	Num. Recs	9	16	15	16	11	12	16	16	16	16	
		Avg. Rate	71	1,051	12	307	190	1,167	473	1,882	644	414	6,211
	1998-2003	Num. Recs	5	7	6	7	4	3	7	7	7	7	
		Avg. Rate	66	593	28	690	404	1,333	147	1,237	785	289	5,572
Cruise	pre-87	Num. Recs	2	2	1	2	1	2	2	2	2	2	
		Avg. Rate	55	337	25	444	194	391	125	736	1,247	300	3,854
	1994-1995	Num. Recs	8	8	8	8	6	7	8	8	8	8	
		Avg. Rate	43	435	5	108	72	164	157	761	184	201	2,132
	1998-2003	Num. Recs	4	6	6	6	5	5	6	6	6	6	

Test Cycle	Model Year Group		Average Emission Rate (ug/hp-hr) or Number of Records										
			Al	Ca	Cu	Fe	Mg	Na	P	S	Si	Zn	Total
		Avg. Rate	10	199	2	79	19	119	97	522	67	75	1,190
Bus	1998-2003	Num. Recs	0	5	2	5	4	0	5	5	0	4	
		Avg. Rate		53	1	10	27		32	189		38	351
Idle (ug/hp-hr)	pre-87	Num. Recs	2	2	1	2	2	2	2	2	2	2	
		Avg. Rate	239	1,556	26	178	473	1,781	609	2,127	1,513	828	9,330
	1991-1993	Num. Recs	0	3	3	3	3	0	0	3	3	3	
		Avg. Rate	0	277	943	1,963	437	0	0	4,297	110	1,623	9,650
	1994-1995	Num. Recs	3	5	2	5	4	4	5	5	5	5	
		Avg. Rate	765	1,155	7	140	818	6,365	714	2,480	807	752	14,003
Idle (ug/mode)	pre-87	Num. Recs	1	1	1	1	1	1	1	1	1	1	
		Avg. Rate	418	2,584	81	686	960	9,609	927	3,874	3,311	1,259	23,710
	1987-1990	Num. Recs	0	2	2	2	2	2	2	2	2	2	
		Avg. Rate		2,547	232	2,345	2,782	15,131	266	5,063	829	933	30,127
	1994-1995	Num. Recs	5	7	7	7	5	5	7	7	7	7	
		Avg. Rate	287	2,976	137	2,485	1,823	7,729	899	6,342	976	1,276	24,930
	1998-2003	Num. Recs	3	6	6	6	3	6	6	6	6	6	
		Avg. Rate	738	2,592	103	2,484	4,383	13,103	668	5,967	4,185	805	35,029

Figure IV-1. Average HHD Diesel Vehicle Emission Rates for Selected Elements by Model Year Group—Transient Test Cycles

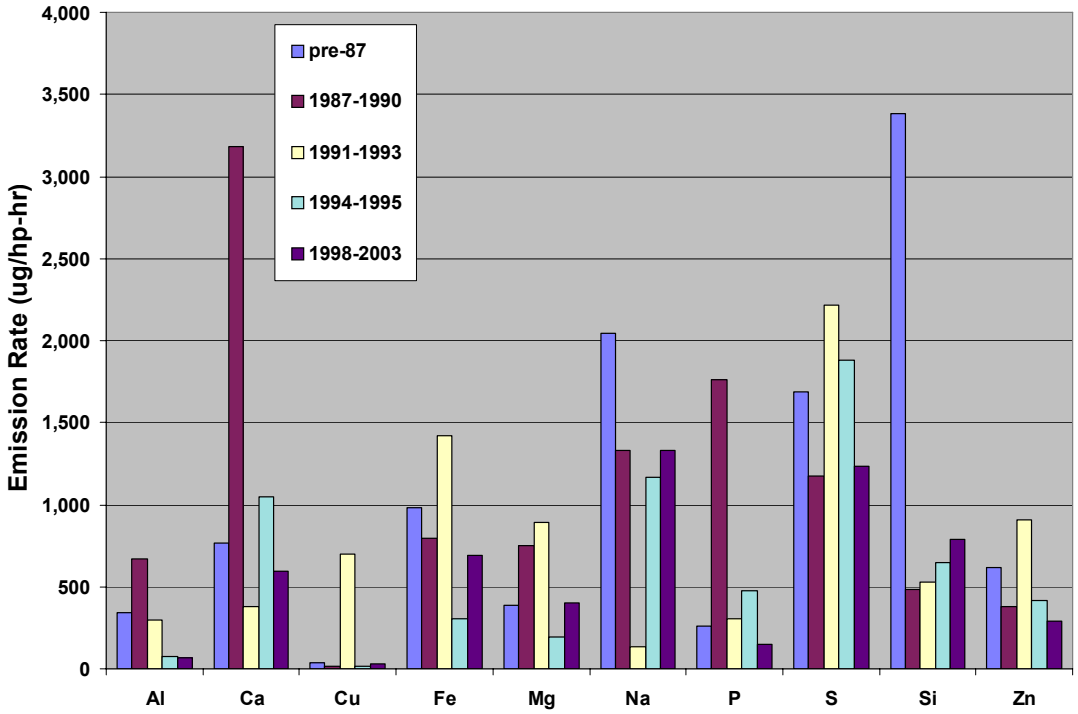


Table IV-10. HHD Diesel Vehicle Emission Rates for Inorganic Ions

		Average HHD Emision Rate (mg/hp-hr)					
Test Cycle	**Model Year Group**	**Cl^-**	**NH_4^+**	**NO_2^-**	**NO_3^-**	**SO_4^{-2}**	**Total**
Transient	pre-1987	7	8	0	3	5	
		0.80	0.68		0.75	2.22	4.44
	1987-1990	1	1	0	1	1	
		0.09	0.51		0.82	0.74	2.16
	1991-1993	1	5	0		1	
		0.76	13.04			7.74	21.54
	1994-1995	12	15	0	6	15	
		0.48	0.81		0.45	2.23	3.97
	1998-2003	3	4	1	3	3	
		0.05	0.79	0.06	0.32	1.91	3.13
Cruise	pre-1987	2	2	0	1	2	
		0.18	0.37		0.21	1.20	1.97
	1987-1990	1	1	1	1	1	
		0.02	0.10	0.02	0.07	0.17	0.38
	1994-1995	7	7	1	6	7	
		0.10	0.59	0.00	0.18	1.81	2.68
	1998-2003	2	3	1	3	3	
		0.01	0.52	0.01	0.13	1.55	2.22
Bus	1998-2003	5	5	0	5	4	
		0.04	0.34		0.55	0.38	1.31
Idle (mg/hp-hr)	pre-1987	2	2	0	2	1	
		1.79	1.15		1.71	1.59	6.24

Test Cycle	Model Year Group	Average HHD Emision Rate (mg/hp-hr)					
		Cl^-	NH_4^+	NO_2^-	NO_3^-	SO_4^{-2}	Total
	1991-1993	0	2	0	0	0	
			20.00				20.00
	1994-1995	5	5	0	2	4	
		5.69	2.35		1.49	4.95	14.48
Idle (mg/mode)	pre-1987	1	1	0	1	1	
		2.33	2.87		3.22	4.06	12.49
	1987-1990	1	1	0	1	1	
		1.05	8.43		13.64	19.35	42.46
	1994-1995	5	6	0	3	6	
		2.89	4.20		4.64	13.24	24.96
	1998-2003	3	3	0	3	3	
		1.46	11.76		10.66	26.19	50.06

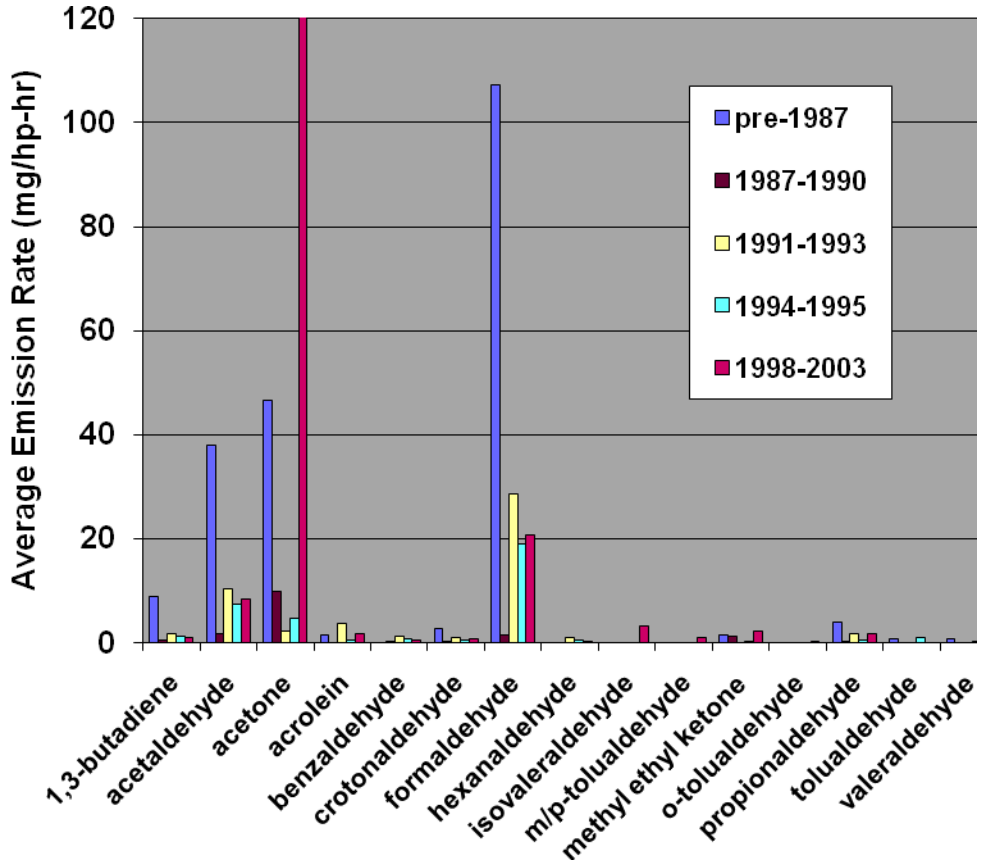
Table IV-11. HHD Diesel Vehicle Emission Rates for Selected Carbonyl Compounds

Test Cycle	Model Year Group		Average Emission Rate (mg/hp-hr)															
			1,3-butadiene	acetaldehyde	acetone	acrolein	benzaldehyde	crotonaldehyde	formaldehyde	hexanaldehyde	isovaleraldehyde	m/p-tolualdehyde	methyl ethyl ketone	o-tolualdehyde	propionaldehyde	tolualdehyde	valeraldehyde	Total
Trans-ient	pre-87	Num. Recs	3	3	3	3	0	3	3	0	0	0	3	0	3	2	3	
		Avg. Rate	9.0	38	47	1.4		2.8	107				1.5		3.9	0.81	0.84	212
	1987-1990	Num. Recs	1	1	1	0	1	1	1	0	0	0	1	0	1	0	0	
		Avg. Rate	0.52	1.64	9.8		0.12	0.09	1.5				1.2		0.16			15
	1991-1993	Num. Recs	7	21	15	9	9	13	21	5	0	0	0	0	9	0	0	
		Avg. Rate	1.81	10.4	2.2	3.67	1.22	0.99	29	0.90					1.78			51
	1994-1995	Num. Recs	12	14	12	10	6	11	14	5	0	0	7	0	10	5	8	
		Avg. Rate	1.16	7.4	4.6	0.62	0.79	0.59	19	0.43			0.37		0.65	0.94	0.15	37
	1998-2003	Num. Recs	4	7	6	2	6	6	7	2	2	2	3	1	6	0	4	
		Avg. Rate	1.09	8.3	492	1.75	0.62	0.89	21	0.07	3.2	1.0	2.2	0.22	1.68		0.52	534
Cruise	pre-87	Num. Recs	2	2	0	2	0	2	2	0	0	0	0	0	2	1	0	
		Avg. Rate	2.51	0.49		0.57		0.25	15						0.18	0.24		20
	1987-1990	Num. Recs	1	1	1	0	1	1	1	0	0	0	1	0	1	0	1	
		Avg. Rate	0.18	0.17	0.9		0.02	0.01	0.17				0.1		0.02		0.02	2
	1994-1995	Num. Recs	5	5	1	0	1	1	5	1	0	0	1	0	1	0	2	
		Avg. Rate	0.08	0.04	0.73		0.01	0.01	0.75	0.01			0.1		0.02		0.01	2
	1998-2003	Num. Recs	4	5	4	2	4	2	5	0	0	0	4	0	4	0	3	
		Avg.	0.30	1.94	20.7	0.09	0.08	0.11	5.9				0.1		0.18		0.08	29

Test Cycle	Model Year Group		Average Emission Rate (mg/hp-hr) 1,3-butadiene	acetaldehyde	acetone	acrolein	benzaldehyde	crotonaldehyde	formaldehyde	hexanaldehyde	isovaleraldehyde	m/p-tolualdehyde	methyl ethyl ketone	o-tolualdehyde	propionaldehyde	tolualdehyde	valeraldehyde	Total
		Rate																
Bus	1998-2003	Num. Recs	4	6	0	0	0	0	7	0	0	0	0	0	0	0	0	
		Avg. Rate	0.002	3.97					10									14
Idle (mg/hp-hr)	pre-87	Num. Recs	2	2	2	2	0	2	2	0	0	0	2	0	2	1	2	
		Avg. Rate	40	124	65	3.3		10.9	450				6.8		30	2.7	8.1	742
	1991-1993	Num. Recs	0	3	3	3	3	3	3	3	0	0	0	0	3	0	0	
		Avg. Rate		12.1	2.7	5.40	2.90	1.90	33	1.13					2.8			62
	1994-1995	Num. Recs	7	10	10	7	5	7	10	5	0	0	5	0	10	1	4	
		Avg. Rate	9.0	43	26	1.53	0.96	1.44	110	0.37			3.1		4.7	3.28	3.50	206
	1998-2003	Num. Recs	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	
		Avg. Rate	10	74					203									287
Idle (mg/mode)	pre-87	Num. Recs	2	2	2	2	0	2	2	0	0	0	2	0	2	0	2	
		Avg. Rate	77	432	214	20		29	1,076				14		81		19	1,963
	1987-1990	Num. Recs	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	
		Avg. Rate	8	29	167		2	2	34				24					266
	1994-1995	Num. Recs	5	6	6	2	1	2	6	3	0	0	6	0	6	2	5	
		Avg. Rate	20	95	92	5	2	11	239	2			9		10	7	3	495
	1998-2003	Num. Recs	3	4	4	0	3	3	4	0	0	0	4	0	3	0	2	
		Avg. Rate	45	271	2,115		28	16	723				57		65		19	3,339
Idle (mg/hr)	1998-2003	Num. Recs	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	
		Avg. Rate	38	438					1,487									1,963

Note: The high emission rate in this table for acetone in the 1998-2003 model year group for the transient test cycle can be traced to a single data entry from the CRC E-55/59 study.

Figure IV-2. Average HHD Diesel Vehicle Emission Rates for Selected Carbonyl Compounds by Model Year Group—Transient Test Cycles



Note: The high emission rate in this figure for acetone can be traced to a single data entry from the CRC E-55/59 study. The average emission rate for acetone from the198 to 2003 model years is 492 mg/hp-hr and exceeds the scale of the above chart.

Table IV-12. HHD Diesel Vehicle Emission Rates for BTEX Compounds

Test Cycle	Model Year Group		Average Emission Rate (mg/hp-hr) ethylbenzene	toluene	benzene	o-xylene	m/p-xylenes	Total
Transient	pre-87	Num. Recs	3	3	3	3	3	
		Avg. Rate	0.46	2.60	6.54	0.42	0.99	11.01
	1987-1990	Num. Recs	1	1	1	1	1	
		Avg. Rate	0.08	0.49	2.45	0.06	0.09	3.17
	1991-1993	Num. Recs	5	6	7	2	6	
		Avg. Rate	0.48	0.63	1.41	0.90	1.32	4.74
	1994-1995	Num. Recs	9	10	11	9	11	
		Avg. Rate	0.13	1.04	1.91	0.11	0.64	3.84
	1998-2003	Num. Recs	4	4	4	4	4	
		Avg. Rate	0.29	0.86	2.12	0.23	0.60	4.09
Cruise	pre-87	Num. Recs	2	2	2	2	2	
		Avg. Rate	0.24	1.24	3.09	0.22	0.54	5.33
	1987-1990	Num. Recs	1	1	1	1	1	
		Avg. Rate	0.11	0.85	6.09	0.07	0.12	7.24

Test Cycle	Model Year Group		Average Emission Rate (mg/hp-hr) ethylbenzene	toluene	benzene	o-xylene	m/p-xylenes	Total
	1994-1995	Num. Recs	5	5	5	5	5	
		Avg. Rate	0.04	0.25	0.83	0.04	0.08	1.24
	1998-2003	Num. Recs	4	4	4	4	4	
		Avg. Rate	0.20	0.51	0.87	0.21	0.56	2.35
Idle (mg/hp-hr)	pre-87	Num. Recs	2	2	2	2	2	
		Avg. Rate	2.7	12.3	26.2	2.4	5.6	49.1
	1994-1995	Num. Recs	5	5	6	5	10	
		Avg. Rate	1.2	7.7	16.2	1.1	3.6	29.8
	1998-2003	Num. Recs	1	1	1	1	1	
		Avg. Rate	1.7	5.3	9.4	1.7	4.5	22.6
Idle (mg/mode)	pre-87	Num. Recs	2	2	2	2	2	
		Avg. Rate	7.3	30.0	59.1	6.5	15.8	118.7
	1987-1990	Num. Recs	1	1	1	1	1	
		Avg. Rate	9.2	49.6	151.8	7.3	10.6	228.4
	1994-1995	Num. Recs	5	5	5	5	5	
		Avg. Rate	3.0	21.6	42.9	2.5	4.4	74.4
	1998-2003	Num. Recs	3	3	3	3	3	
		Avg. Rate	27.5	74.1	87.4	18.0	53.9	261.0
Idle (mg/hr)	1998-2003	Num. Recs	1	1	1	1	1	
		Avg. Rate	6.8	36.5	50.3	14.0	17.9	125.5

Figure IV-3. Average HHD Diesel Vehicle Emission Rates for BTEX Compounds by Model Year Group—Transient Test Cycles

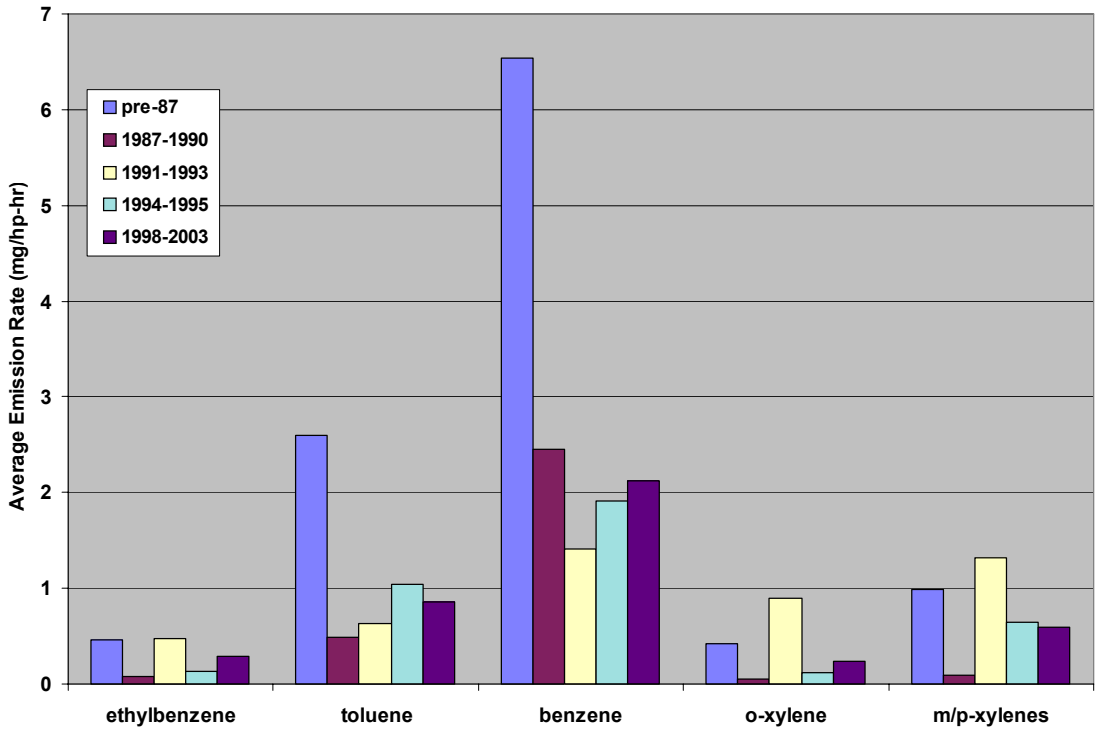


Table IV-13. HHD Diesel Vehicle Emission Rates for Oxy-PAH Compounds

Test Cycle	Model Year Group	Pollutant	Number of Records	Average Emission Rate
Transient (ug/hp-hr)	pre-87	9-anthraldehyde	5	155.6
	pre-87	anthraquinone	7	77.7
	pre-87	anthrone	3	123.5
	pre-87	benz[a]anthracene-7,12-dione	5	10.6
	pre-87	benzanthone	4	35.7
	pre-87	xanthone	5	18.6
	1987-1990	anthraquinone	1	18.0
	1987-1990	anthrone	1	7.1
	1987-1990	benzanthone	1	8.3
	1987-1990	xanthone	1	12.1
	1991-1993	9-anthraldehyde	1	2.4
	1991-1993	anthraquinone	1	21.9
	1991-1993	benzanthone	1	4.9
	1991-1993	xanthone	1	48.8
	1994-1995	9-anthraldehyde	9	14.8
	1994-1995	anthraquinone	9	7.5
	1994-1995	anthrone	7	41.4
	1994-1995	benz[a]anthracene-7,12-dione	6	2.1
	1994-1995	benzanthone	7	5.9
	1994-1995	xanthone	12	14.4
	1998-2003	9-anthraldehyde	1	1,449.9
	1998-2003	anthraquinone	4	8.1
	1998-2003	anthrone	3	10.0
	1998-2003	benzanthone	4	4.9
	1998-2003	xanthone	4	14.1
Cruise (ug/hp-hr)	pre-87	9-anthraldehyde	2	396.5
	pre-87	anthraquinone	2	58.3
	pre-87	anthrone	1	20.3
	pre-87	benz[a]anthracene-7,12-dione	1	0.6
	pre-87	xanthone	2	9.8
	1987-1990	anthraquinone	1	7.1
	1987-1990	anthrone	1	0.2
	1987-1990	benz[a]anthracene-7,12-dione	1	0.2
	1987-1990	benzanthone	1	1.6
	1987-1990	xanthone	1	5.1
	1994-1995	9-anthraldehyde	5	0.1
	1994-1995	anthraquinone	7	2.7
	1994-1995	anthrone	3	8.3
	1994-1995	benz[a]anthracene-7,12-dione	3	0.5
	1994-1995	benzanthone	3	2.0
	1994-1995	xanthone	6	3.1
	1998-2003	9-anthraldehyde	3	0.1
	1998-2003	anthraquinone	3	6.4
	1998-2003	anthrone	3	3.0
	1998-2003	benz[a]anthracene-7,12-dione	2	0.0
	1998-2003	benzanthone	3	1.0

Test Cycle	Model Year Group	Pollutant	Number of Records	Average Emission Rate
	1998-2003	xanthone	3	5.2
Idle (ug/hp-hr)	pre-87	benz[a]anthracene-7,12-dione	1	16.2
	1994-1995	9-anthraldehyde	2	191.9
	1994-1995	xanthone	5	80.5
Idle (ug/mode)	pre-87	benz[a]anthracene-7,12-dione	1	20.7
	1987-1990	anthraquinone	1	86.0
	1987-1990	anthrone	1	44.2
	1987-1990	benzanthone	1	167.2
	1987-1990	xanthone	1	464.1
	1994-1995	9-anthraldehyde	1	296.7
	1994-1995	anthraquinone	3	34.0
	1994-1995	anthrone	1	30.8
	1994-1995	benz[a]anthracene-7,12-dione	1	1.6
	1994-1995	benzanthone	1	161.4
	1994-1995	xanthone	5	109.3
	1998-2003	anthraquinone	3	52.3
	1998-2003	anthrone	3	202.7
	1998-2003	benzanthone	3	97.7
	1998-2003	xanthone	3	354.1

Table IV-14. HHD Diesel Vehicle Emission Rates for Nitro-PAH Compounds

Test Cycle	Model Year Group	Pollutant	Number of Records	Average Emission Rate
Transient (ug/hp-hr)	1991-1993	1-nitropyrene	8	0.766
	1991-1993	2-nitrofluorene	4	0.029
	1991-1993	7-nitrobenz(a)anthracene	4	0.026
	1991-1993	9-nitroanthracene	8	0.229
	1996-1997	1-nitropyrene	4	0.156
	1996-1997	6-nitrochrysene	2	0.001
	1996-1997	7-nitrobenz(a)anthracene	2	0.002
	1996-1997	9-nitroanthracene	2	0.165
Cruise (ug/mode)	1994-1995	1-nitronaphthalene	4	145.238
	1994-1995	1-nitropyrene	4	36.641
	1994-1995	2-nitrobiphenyl	3	174.281
	1994-1995	2-nitronaphthalene	2	34.089
	1994-1995	3-nitrobiphenyl	2	26.619
	1994-1995	3-nitrofluoranthene	2	12.834
	1994-1995	3-nitrophenanthrene	3	16.235
	1994-1995	4-nitrobiphenyl	2	6.960
	1994-1995	4-nitrophenanthrene	3	50.157
	1994-1995	6-nitrochrysene	1	2.211
	1994-1995	9-nitroanthracene	4	15.063
	1994-1995	9-nitrophenanthrene	4	38.154
Bus (ug/hp-hr)	1998-2003	1,3-dinitronaphthalene	3	0.091
	1998-2003	1,5-dinitronaphthalene	5	0.089
	1998-2003	1,8-dinitronaphthalene	5	0.074
	1998-2003	1-nitronaphthalene	5	0.702
	1998-2003	1-nitropyrene	4	0.291
	1998-2003	2-nitrobiphenyl	4	0.727
	1998-2003	2-nitrofluorene	4	0.020

Test Cycle	Model Year Group	Pollutant	Number of Records	Average Emission Rate
	1998-2003	2-nitronaphthalene	4	1.160
	1998-2003	3-nitrobiphenyl	2	0.038
	1998-2003	3-nitrophenanthrene	3	0.091
	1998-2003	4-nitrobiphenyl	4	0.098
	1998-2003	4-nitrophenanthrene	5	0.126
	1998-2003	6-nitrochrysene	3	0.044
	1998-2003	7-nitrobenz(a)anthracene	3	0.069
	1998-2003	9-nitroanthracene	5	0.110
	1998-2003	9-nitrophenanthrene	4	0.130

Table IV-15. HHD Diesel Vehicle Emission Rates for 7-PAH Compounds of Interest to EPA

		Average Emission Rate (ug/hp-hr)							
Test Cycle	Model Year Group	benz[a]anthracene	benzo[a]pyrene	benzo[b]fluoranthene	benzo[k]fluoranthene	chrysene	dibenz[ah]anthracene	indeno[123-cd]pyrene	Total
Transient	pre-1987	6	5	0	0	7	0	2	
		65	14			60		0.28	139
	1987-1990	1	0	0	0	1	0	1	
		4.8				2.6		0.84	8.3
	1991-1993	7	2	0	0	9	0	4	
		2.9	0.16			6.1		0.75	10
	1994-1995	10	12	0	0	12	0	9	
		4.7	12			4.0		0.94	22
	1996-1997	2	4	0	2	2	2	2	
		2.2	0.81		1.2	2.9	0.20	0.58	7.9
	1998-2003	1	0	0	0	4	0	1	
		11				11		0.41	23
Cruise	pre-1987	1	1	0	0	2	0	1	
		2.8	1.5			20		0.18	24
	1987-1990	1	0	0	0	1	0	1	
		0.21				0.76		0.10	1.1
	1994-1995	6	6	0	0	7	0	2	
		1.1	4.5			0.84		0.08	6.5
	1998-2003	2	0	0	0	3	0	3	
		0.31				0.58		0.05	0.93
Steady State	1994-1995	0	26	0	22	0	0	0	
			0.08		0.04				0.12
Bus	1998-2003	3	2	0	0	4	0	2	
		0.86	0.14			0.44		0.24	1.67
Idle (ug/hp-hr)	pre-1987	1	1	0	0	1	0	0	
		5.8	7.4			20			33
	1994-1995	4	5	0	0	2	0	2	
		116	395			3.7		20	535

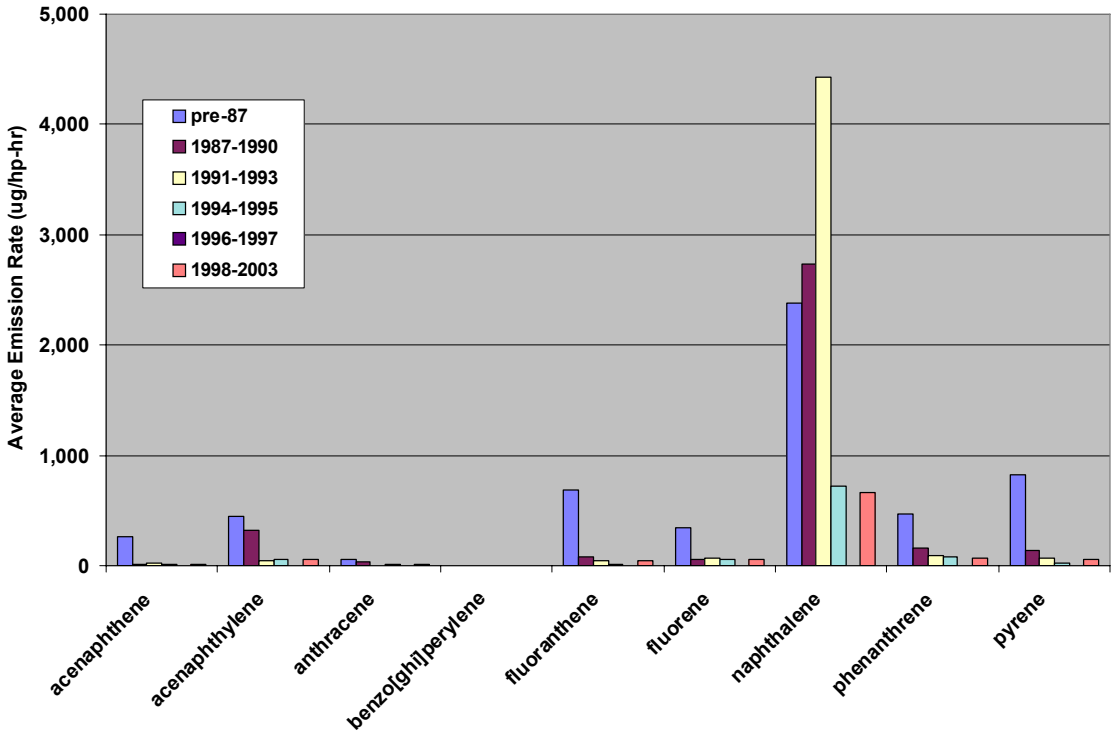
		Average Emission Rate (ug/hp-hr)							
Test Cycle	**Model Year Group**	**benz[a]anthracene**	**benzo[a]pyrene**	**benzo[b]fluoranthene**	**benzo[k]fluoranthene**	**chrysene**	**dibenz[ah]anthracene**	**indeno[123-cd]pyrene**	**Total**
Idle (ug/mode)	pre-1987	1	1	0	0	1	0	1	
		73	165			74		30	342
	1987-1990	1	1	0	0	1	0	1	
		55	204			48		211	517
	1994-1995	1	5	0	0	2	0	3	
		178	253			3.2		106	540
	1998-2003	0	0	0	0	0	0	3	
								3.2	3

Table IV-16. HHD Diesel Vehicle Emission Rates for 9-PAH Compounds of Interest to EPA

			Average Emission Rate (ug/hp-hr)									
Test Cycle	**Model Year Group**		**acenaphthene**	**acenaphthylene**	**anthracene**	**benzo[ghi]perylene**	**fluoranthene**	**fluorene**	**naphthalene**	**phenanthrene**	**pyrene**	**Total**
Transient	pre-1987	Num. Recs	6	7	6	1	7	7	5	7	7	
		Avg. Rate	260	445	58	1.0	692	347	2,375	474	827	5,478
	1987-1990	Num. Recs	2	2	1	1	1	2	2	2	1	
		Avg. Rate	13	321	32	0.4	81	61	2,733	157	137	3,536
	1991-1993	Num. Recs	9	9	6	3	9	9	1	9	9	
		Avg. Rate	28	51	4	0.2	47	72	4,430	89	63	4,784
	1994-1995	Num. Recs	9	17	15	4	12	17	16	17	15	
		Avg. Rate	9	61	8	1.6	11	57	720	76	26	969
	1996-1997	Num. Recs	0	0	0	2	0	0	0	0	0	
		Avg. Rate				0.9						0.9
	1998-2003	Num. Recs	10	10	4	2	4	10	9	10	4	
		Avg. Rate	12	60	8	0.7	45	56	662	63	54	962
Cruise	pre-1987	Num. Recs	2	2	2	1	2	2	1	2	2	
		Avg. Rate	197	121	16	0.3	569	187	453	218	688	2,450
	1987-1990	Num. Recs	1	2	1	1	1	2	2	2	1	
		Avg. Rate	7	96	7	0.2	20	14	750	88	27	1,009
	1994-1995	Num. Recs	7	9	7	3	6	9	9	9	7	
		Avg. Rate	1	12	2	0.2	3	10	162	26	7	223
	1998-2003	Num. Recs	7	8	3	3	3	8	8	8	3	
		Avg. Rate	3	17	3	0.1	3	12	203	26	8	275
Steady State	1994-1995	Num. Recs	0	0	0	26	0	0	0	0	26	
		Avg. Rate				0.3					7	7
Bus	1998-2003	Num. Recs	4	4	3	4	5	5	5	5	5	
		Avg. Rate	15	98	7	0.8	8	34	458	40	14	676
Idle (ug/hp-hr)	pre-1987	Num. Recs	1	1	1	1	1	1	1	1	1	
		Avg. Rate	41	403	1	3.7	24	267	7,708	175	139	8,763

Test Cycle	Model Year Group		Average Emission Rate (ug/hp-hr) acenaphthene	acenaphthylene	anthracene	benzo[ghi]perylene	fluoranthene	fluorene	naphthalene	phenanthrene	pyrene	Total
	1994-1995	Num. Recs	3	5	3	1	2	5	4	5	4	
		Avg. Rate	257	396	38	45	28	333	31,970	428	57	33,553
Idle (ug/mode)	pre-1987	Num. Recs	1	1	1	1	1	1	1	1	1	
		Avg. Rate	72	869	32	42	39	331	4,144	347	188	6,066
	1987-1990	Num. Recs	1	1	1	1	1	1	1	1	1	
		Avg. Rate	846	10,456	509	386	106	3,510	84,355	3,523	121	103,812
	1994-1995	Num. Recs	4	7	4	3	4	7	7	7	5	
		Avg. Rate	145	1,245	119	142	62	826	15,960	1,014	66	19,578
	1998-2003	Num. Recs	8	9	3	3	3	9	9	9	1	
		Avg. Rate	249	1,740	177	8.0	32	914	19,087	916	81	23,204

Figure IV-4. Average HHD Diesel Vehicle Emission Rates for EPA 9-PAH Compounds by Model Year Group—Transient Test Cycles



Note: The high naphthalene data point was from a Cold City-Suburban (CCS) test, and that may explain the high value. For readers who opt to examine results in more detail, i.e., the E75 Speciation Database, we suggest consulting Table II-5 of this report for definitions of test ID.

Table IV-17. HHD Diesel Vehicle Emission Rates for Total PAH Compounds, excluding Oxy-PAH, Nitro-PAH, and EPA PAH Compounds

		Total of PAH Average Emission Rates by Model Year Group				
Test Cycle		**pre-87**	**1987-1990**	**1991-1993**	**1994-1995**	**1998-2003**
Transient (mg/hp-hr)	Num. Records	274	53	57	649	217
	Num. Pollutants	51	44	42	51	48
	Sum of Avg. Rates	9.9	4.653	24.8	4.2	4.6
Cruise (mg/hp-hr)	Num. Records	75	55	0	322	175
	Num. Pollutants	48	46	0	51	47
	Sum of Avg. Rates	3.1	1.4		0.8	1.6
Bus (mg/hp-hr)	Num. Records	0	0	0	0	35
	Num. Pollutants	0	0	0	0	11
	Sum of Avg. Rates					0.2
Idle (mg/hp-hr)	Num. Records	33	0	0	167	0
	Num. Pollutants	33	0	0	44	0
	Sum of Avg. Rates	32.3			28	
Idle (mg/mode)	Num. Records	38	44	0	228	174
	Num. Pollutants	38	43	0	48	47
	Sum of Avg. Rates	33.5	208.1		43.9	128.2

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CHAPTER V. CAVEATS/CONCLUSIONS

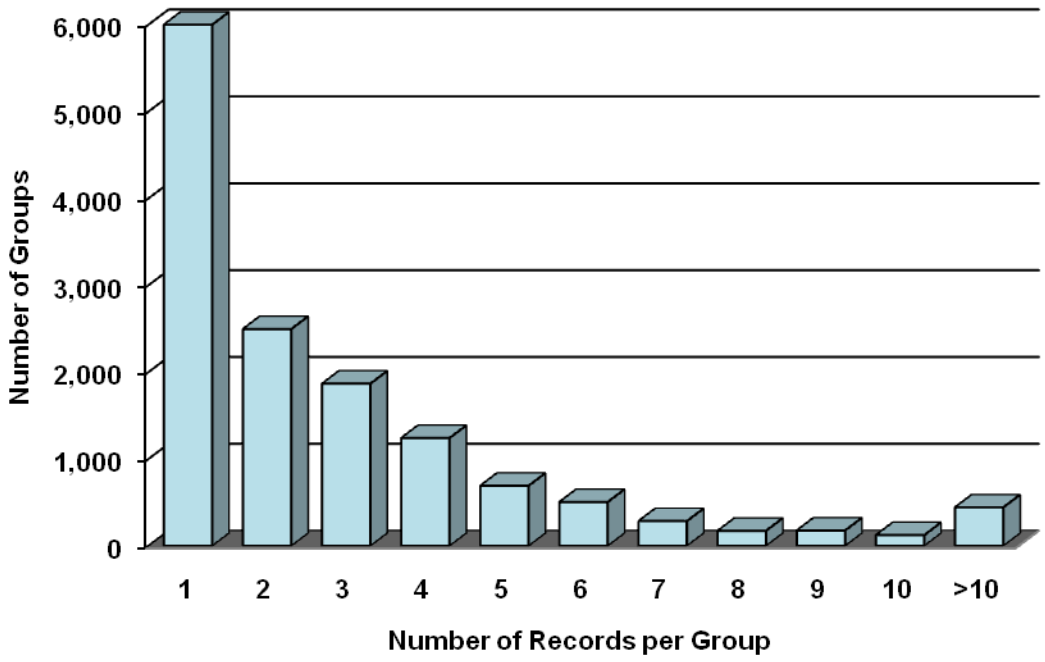
When reviewing the data contained in this report, Appendix B, and the accompanying databases, it is important to keep in mind that the data come from a large number of different studies and that each study may have been focused on different aspects of collecting regulated and speciated emissions from diesel vehicles. Thus, when comparing these data to comparable data from other studies, it may be important to trace the data back to the study or studies in which the emissions data were originally reported in order to better understand possible anomalies in the data. This study has shown that data extracted from studies performed for different purposes can be challenging to compile and compare. Specifically, the pollutant groups analyzed, test methods used, the test cycles used, and the data reporting methods typically differ from one study to another, making it difficult to directly compare results from one study to another.

This study might have been improved if the data categories for grouping had been defined prior to the data collection efforts of the *Diesel Speciation Database*. This would have ensured that all necessary identifying data (such as vehicle characteristics and test cycle information) from a given study would be appropriately included and defined. However, it would have been difficult to determine all of these groupings prior to seeing the data first.

While the original *Diesel Speciation Database* does contain a large number of emission records, it is important to note that by parsing the data into a large number of different groups for each pollutant, the amount of data available within each group is significantly reduced. Tables III-7 and III-8 show the total number of emission records for each group and for each pollutant, respectively. However, the total number of records by pollutant and data grouping combined is not shown in this report due to the large number of combinations (over 13,000). Many of the tables in this report do show the number of data records that were used in determining the emission averages and as can be seen in these tables, there are few instances with more than ten records of the same pollutant, vehicle type, model year group, and test category. Thus, it is important to note that a balance is needed between the number of groupings used in a study such as this and the amount of data available per group. This is further illustrated in Figure V-1. In this figure, the y-axis shows how many groupings were created that contain the number of records listed on the x-axis. For example, about 6,000 of the resulting data groupings have only one emission record in them while about 450 groupings include more than ten emission records that included the same pollutant, vehicle type group, model year group, test cycle group, and emission units.

To assist the reader of this report, Appendix D contains Chapter II of the E75-1 report, "Compilation of Diesel Emissions Speciation Data," published in 2007. This chapter is copied here to clearly explain to the readers of the E75-2 report the origins of the data contained in this report, describe the studies that generated the original E75-1 database, and to help readers to avoid misinterpretation or misuse of the results of E75-2 when comparing with similar studies.

Figure V-1. Distribution of Group Size by Number of Records per Group



CHAPTER VI. REFERENCES

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APPENDIX A. ACES PRIORITY 1 POLLUTANTS INCLUDED IN *DIESEL SPECIATION DATABASE*

Pollutant Name	Pollutant Group	Number of Non-Zero Emission Records
CO	Other	732
PYRENE	PAH	291
PHENANTHRENE	PAH	281
ACENAPHTHYLENE	PAH	260
FORMALDEHYDE	Carbonyl	256
FLUORENE	PAH	255
FLUORANTHENE	PAH	252
ACETALDEHYDE	Carbonyl	241
ORGANIC CARBON	EC/OC	233
ELEMENTAL CARBON	EC/OC	230
NAPHTHALENE	PAH	223
BENZ[A]ANTHRACENE	PAH	214
BENZO[A]PYRENE	PAH	206
CHRYSENE	PAH	204
ANTHRACENE	PAH	203
ZN	Metals	203
S	Non-metallic elements	194
BENZENE	BTEX	192
P	Non-metallic elements	185
BIPHENYL	PAH	184
1,3-BUTADIENE	Alkenes	177
ACENAPHTHENE	PAH	177
SO4-2	Other	177
NH4+	Other	174
ACROLEIN	Carbonyl	143
ACETONE	Carbonyl	142
BENZO[GHI]PERYLENE	PAH	139
PROPIONALDEHYDE	Carbonyl	136
ELEMENTAL CARBON FRACTION 1	EC/OC	134
ELEMENTAL CARBON FRACTION 2	EC/OC	134
ORGANIC CARBON FRACTION 2	EC/OC	134
ORGANIC CARBON FRACTION 3	EC/OC	133
ORGANIC CARBON FRACTION 4	EC/OC	133
CL	Non-metallic elements	132
ORGANIC CARBON FRACTION 1	EC/OC	131
AL	Metals	127
BENZO[E]PYRENE	PAH	123
NO3-	Other	122
CROTONALDEHYDE	Carbonyl	121
1-METHYLPHENANTHRENE	PAH	115
PROPENE	Alkenes	113
BA	Metals	112
17A(H),21Á(H)-HOPANE	Hopanes, Steranes, Carpanes	110
ETHYLBENZENE	BTEX	107
METHANE	Other	105
TOLUENE	BTEX	105
NI	Metals	104
17A(H),21Á(H)-30-NORHOPANE	Hopanes, Steranes, Carpanes	103
INDENO[123-CD]PYRENE	PAH	100
O-XYLENE	BTEX	99
C27-20S5A(H),14Á(H),17Á(H)-CHOLESTANE	Hopanes, Steranes, Carpanes	90
PB	Metals	89
METHYL ETHYL KETONE	Carbonyl	82

Pollutant Name	Pollutant Group	Number of Non-Zero Emission Records
AG	Metals	81
ELEMENTAL CARBON FRACTION 3	EC/OC	80
MN	Metals	79
2,2,4-TRIMETHYLPENTANE	Branched Alkanes	77
22R-17A(H),21Á(H)-30-HOMOHOPANE	Hopanes, Steranes, Carpanes	77
SR	Metals	77
CUMENE	Aromatics	73
PD	Metals	73
C28-20R5A(H),14A(H),17A(H)-ERGOSTANE	Hopanes, Steranes, Carpanes	72
STYRENE	Aromatics	72
C27-20S-13Á(H),17A(H)-DIASTERANE	Hopanes, Steranes, Carpanes	71
22S-17A(H),21Á(H)-30-HOMOHOPANE	Hopanes, Steranes, Carpanes	69
C28-20R5A(H),14Á(H),17Á(H)-ERGOSTANE	Hopanes, Steranes, Carpanes	68
17A(H),18A(H),21Á(H)-25,28,30-TRISNORHOPANE	Hopanes, Steranes, Carpanes	67
PHENOL	Phenol type compounds	67
CD	Metals	66
22R-17A(H),21Á(H)-30,31-BISHOMOHOPANE	Hopanes, Steranes, Carpanes	65
C27-20R5A(H),14Á(H)-CHOLESTANE	Hopanes, Steranes, Carpanes	65
C27-20R-13Á(H),17A(H)-DIASTERANE	Hopanes, Steranes, Carpanes	64
C28-20S-13Á(H),17A(H)-DIASTERANE	Hopanes, Steranes, Carpanes	64
HG	Metals	64
C27-20S5A(H),14A(H)-CHOLESTANE	Hopanes, Steranes, Carpanes	62
1-NITROPYRENE	PAH	61
C29-20R5A(H),14Á(H),17Á(H)-STIGMASTANE	Hopanes, Steranes, Carpanes	61
C27-20R-13A(H),17Á(H)-DIASTERANE	Hopanes, Steranes, Carpanes	60
CR	Metals	60
SB	Metals	60
SE	Non-metallic elements	59
22S-17A(H),21Á(H)-30,31-BISHOMOHOPANE	Hopanes, Steranes, Carpanes	57
MO	Metals	57
C27-20R5A(H),14A(H),17A(H)-CHOLESTANE&C29-20S13Á(H),17A(H)-DIASTERANE	Hopanes, Steranes, Carpanes	55
C29-20R-13A(H),17Á(H)-DIASTERANE	Hopanes, Steranes, Carpanes	55
COBALT	Metals	55
NO2	Other	55
17Á(H),21Á(H)-HOPANE	Hopanes, Steranes, Carpanes	54
C27-20S-13A(H),17Á(H)-DIASTERANE	Hopanes, Steranes, Carpanes	54
17Á(H),21A(H)-HOPANE	Hopanes, Steranes, Carpanes	53
MTBE	Other	53
C29-20S5A(H),14A(H),17A(H)-STIGMASTANE	Hopanes, Steranes, Carpanes	49
9-NITROANTHRACENE	PAH	47
17A(H),21Á(H)-22,29,30-TRISNORHOPANE	Hopanes, Steranes, Carpanes	45
18A(H),21Á(H)-22,29,30-TRISNORHOPANE	Hopanes, Steranes, Carpanes	40
AS	Non-metallic elements	40
22S-17A(H),21Á(H)-30,31,32-TRISOMOHOPANE	Hopanes, Steranes, Carpanes	39
C28-20S5A(H),14A(H),17A(H)-ERGOSTANE	Hopanes, Steranes, Carpanes	39
C29-20R5A(H),14A(H),17A(H)-STIGMASTANE	Hopanes, Steranes, Carpanes	39
2-NITROFLUORENE	PAH	36
22R-17A(H),21Á(H)-30,31,32-TRISHOMOHOPANE	Hopanes, Steranes, Carpanes	34
C28-20S5A(H),14Á(H),17Á(H)-ERGOSTANE	Hopanes, Steranes, Carpanes	34
C29-20S5A(H),14Á(H),17Á(H)-STIGMASTANE	Hopanes, Steranes, Carpanes	33
6-NITROCHRYSENE	PAH	31
1-NITRONAPHTHALENE	PAH	28

Pollutant Name	Pollutant Group	Number of Non-Zero Emission Records
9-NITROPHENANTHRENE	PAH	26
17A(H),18A(H),21Á(H)-28,30-BISNORHOPANE	Hopanes, Steranes, Carpanes	25
6-NITROBENZO[A]PYRENE	PAH	24
2-NITROBIPHENYL	PAH	23
18A(H),21Á(H)-30-NORNEOHOPANE	Hopanes, Steranes, Carpanes	22
4-NITROBIPHENYL	PAH	18
3-NITROPHENANTHRENE	PAH	14
N2O	Other	12
3-NITROFLUORANTHENE	PAH	11
ACETOPHENONE	Carbonyl	11
4-NITROPYRENE	PAH	9
1,6-DINITROPYRENE	PAH	3
1,8-DINITROPYRENE	PAH	3
2-NITROANTHRACENE	PAH	2
BIS[2-ETHYLHEXYL]PHTHALATE	Other	2
CRESOL	Phenol type compounds	2
CYANIDE COMPOUNDS	Other	2
METHANOL	Other	2
NH3	Other	2
POM	Other	2
TRIPHENYLENE	PAH	2
DIBUTYL PHTHALATE	Other	1
NITROSODIETHYLAMINE	Nitrosamines	1

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APPENDIX B. DETAILED EMISSION RESULT TABLES

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Table B-1a. Single Ring Aromatics, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	benzene	2	3.0864	2.8765	3.2964	3.0864	0.2100	mg/hph
pre-87	CRUISE	ethylbenzene	2	0.2376	0.1957	0.2794	0.2376	0.0418	mg/hph
pre-87	CRUISE	m/p-xylenes	2	0.5402	0.4442	0.6363	0.5402	0.0961	mg/hph
pre-87	CRUISE	o-xylene	2	0.2180	0.1843	0.2517	0.2180	0.0337	mg/hph
pre-87	CRUISE	toluene	2	1.2430	1.0266	1.4593	1.2430	0.2164	mg/hph
pre-87	IDLE	benzene	2	26.1508	25.6649	26.6367	26.1508	0.4859	mg/hph
pre-87	IDLE	ethylbenzene	2	2.6687	2.5544	2.7829	2.6687	0.1143	mg/hph
pre-87	IDLE	m/p-xylenes	2	5.6436	5.4038	5.8835	5.6436	0.2399	mg/hph
pre-87	IDLE	o-xylene	2	2.4148	2.3820	2.4477	2.4148	0.0329	mg/hph
pre-87	IDLE	toluene	2	12.2543	11.4281	13.0806	12.2543	0.8263	mg/hph
pre-87	IDLE	benzene	2	59.1459	59.0944	59.1974	59.1459	0.0515	mg/mode
pre-87	IDLE	ethylbenzene	2	7.3317	6.6170	8.0464	7.3317	0.7147	mg/mode
pre-87	IDLE	m/p-xylenes	2	15.7673	15.2136	16.3209	15.7673	0.5536	mg/mode
pre-87	IDLE	o-xylene	2	6.4998	6.3773	6.6224	6.4998	0.1226	mg/mode
pre-87	IDLE	toluene	2	29.9692	27.4921	32.4462	29.9692	2.4770	mg/mode
pre-87	TRANS	benzene	3	6.5408	5.3587	7.3140	6.9497	0.8490	mg/hph
pre-87	TRANS	ethylbenzene	3	0.4559	0.3780	0.5828	0.4068	0.0905	mg/hph
pre-87	TRANS	m/p-xylenes	3	0.9947	0.8106	1.2213	0.9522	0.1703	mg/hph
pre-87	TRANS	o-xylene	3	0.4184	0.3540	0.5032	0.3979	0.0626	mg/hph
pre-87	TRANS	toluene	3	2.5976	2.2167	3.2832	2.2928	0.4858	mg/hph
87-90	CRUISE	benzene	1	6.0906	6.0906	6.0906	6.0906	0.0000	mg/hph
87-90	CRUISE	ethylbenzene	1	0.1064	0.1064	0.1064	0.1064	0.0000	mg/hph
87-90	CRUISE	m/p-xylenes	1	0.1249	0.1249	0.1249	0.1249	0.0000	mg/hph
87-90	CRUISE	o-xylene	1	0.0702	0.0702	0.0702	0.0702	0.0000	mg/hph
87-90	CRUISE	toluene	1	0.8464	0.8464	0.8464	0.8464	0.0000	mg/hph
87-90	IDLE	benzene	1	151.8386	151.8386	151.8386	151.8386	0.0000	mg/mode
87-90	IDLE	ethylbenzene	1	9.1756	9.1756	9.1756	9.1756	0.0000	mg/mode
87-90	IDLE	m/p-xylenes	1	10.5760	10.5760	10.5760	10.5760	0.0000	mg/mode
87-90	IDLE	o-xylene	1	7.2698	7.2698	7.2698	7.2698	0.0000	mg/mode
87-90	IDLE	toluene	1	49.5859	49.5859	49.5859	49.5859	0.0000	mg/mode
87-90	TRANS	benzene	1	2.4471	2.4471	2.4471	2.4471	0.0000	mg/hph
87-90	TRANS	ethylbenzene	1	0.0796	0.0796	0.0796	0.0796	0.0000	mg/hph
87-90	TRANS	m/p-xylenes	1	0.0949	0.0949	0.0949	0.0949	0.0000	mg/hph
87-90	TRANS	o-xylene	1	0.0567	0.0567	0.0567	0.0567	0.0000	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	TRANS	toluene	1	0.4896	0.4896	0.4896	0.4896	0.0000	mg/hph
91-93	TRANS	benzene	7	1.4133	0.6000	2.5000	1.1931	0.7701	mg/hph
91-93	TRANS	ethylbenzene	5	0.4800	0.3000	0.7000	0.5000	0.1327	mg/hph
91-93	TRANS	m/p-xylenes	6	1.3167	0.5000	1.8000	1.4500	0.4810	mg/hph
91-93	TRANS	o-xylene	2	0.9000	0.4000	1.4000	0.9000	0.5000	mg/hph
91-93	TRANS	toluene	6	0.6333	0.2000	1.0000	0.6500	0.3399	mg/hph
94-95	CRUISE	benzene	5	0.8284	0.3987	1.4508	0.5567	0.4305	mg/hph
94-95	CRUISE	ethylbenzene	5	0.0405	0.0238	0.0574	0.0414	0.0112	mg/hph
94-95	CRUISE	m/p-xylenes	5	0.0825	0.0031	0.1297	0.0904	0.0429	mg/hph
94-95	CRUISE	o-xylene	5	0.0368	0.0191	0.0571	0.0305	0.0135	mg/hph
94-95	CRUISE	toluene	5	0.2535	0.1631	0.3364	0.2585	0.0573	mg/hph
94-95	IDLE	benzene	6	16.1974	6.6000	22.6852	17.6408	5.6011	mg/hph
94-95	IDLE	ethylbenzene	5	1.2369	0.8399	1.5577	1.2564	0.2449	mg/hph
94-95	IDLE	m/p-xylenes	10	3.5880	1.9866	5.7000	3.3247	1.1906	mg/hph
94-95	IDLE	o-xylene	5	1.0656	0.6880	1.3808	1.1007	0.2476	mg/hph
94-95	IDLE	toluene	5	7.7448	5.9268	11.7636	7.0599	2.0774	mg/hph
94-95	IDLE	benzene	5	42.9396	11.1145	70.7436	50.0791	22.1643	mg/mode
94-95	IDLE	ethylbenzene	5	3.0281	0.8186	4.7091	3.5102	1.3374	mg/mode
94-95	IDLE	m/p-xylenes	5	4.3981	0.2641	8.0481	4.8661	3.0133	mg/mode
94-95	IDLE	o-xylene	5	2.4811	0.6165	3.4905	3.0706	1.1102	mg/mode
94-95	IDLE	toluene	5	21.5523	6.6119	34.4799	20.5534	9.7066	mg/mode
94-95	TRANS	benzene	11	1.9129	0.7746	3.7697	1.8000	0.9664	mg/hph
94-95	TRANS	ethylbenzene	9	0.1269	0.0624	0.1910	0.1429	0.0519	mg/hph
94-95	TRANS	m/p-xylenes	11	0.6403	0.0031	2.4000	0.3333	0.8155	mg/hph
94-95	TRANS	o-xylene	9	0.1126	0.0508	0.1876	0.1080	0.0534	mg/hph
94-95	TRANS	toluene	10	1.0446	0.3603	2.9470	0.9898	0.7081	mg/hph
98-03	CRUISE	benzene	4	0.8693	0.3892	1.2708	0.9086	0.3142	mg/hph
98-03	CRUISE	ethylbenzene	4	0.2018	0.0411	0.4844	0.1408	0.1685	mg/hph
98-03	CRUISE	m/p-xylenes	4	0.5556	0.1170	1.4186	0.3433	0.5171	mg/hph
98-03	CRUISE	o-xylene	4	0.2112	0.0461	0.5190	0.1399	0.1867	mg/hph
98-03	CRUISE	toluene	4	0.5129	0.1762	0.8650	0.5052	0.2476	mg/hph
98-03	IDLE	benzene	1	9.4458	9.4458	9.4458	9.4458	0.0000	mg/hph
98-03	IDLE	ethylbenzene	1	1.6608	1.6608	1.6608	1.6608	0.0000	mg/hph
98-03	IDLE	m/p-xylenes	1	4.5326	4.5326	4.5326	4.5326	0.0000	mg/hph
98-03	IDLE	o-xylene	1	1.6608	1.6608	1.6608	1.6608	0.0000	mg/hph
98-03	IDLE	toluene	1	5.3284	5.3284	5.3284	5.3284	0.0000	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	IDLE	benzene	3	87.4300	24.9590	157.5556	79.7755	54.4023	mg/mode
98-03	IDLE	ethylbenzene	3	27.5493	3.8663	54.7289	24.0526	20.9113	mg/mode
98-03	IDLE	m/p-xylenes	3	53.8797	9.7271	111.0084	40.9034	42.3538	mg/mode
98-03	IDLE	o-xylene	3	18.0409	3.5963	36.5207	14.0057	13.7409	mg/mode
98-03	IDLE	toluene	3	74.0713	17.7603	152.7324	51.7213	57.3237	mg/mode
98-03	IDLE	benzene	1	50.3000	50.3000	50.3000	50.3000	0.0000	mg/hr
98-03	IDLE	ethylbenzene	1	6.8000	6.8000	6.8000	6.8000	0.0000	mg/hr
98-03	IDLE	m/p-xylenes	1	17.9000	17.9000	17.9000	17.9000	0.0000	mg/hr
98-03	IDLE	o-xylene	1	14.0000	14.0000	14.0000	14.0000	0.0000	mg/hr
98-03	IDLE	toluene	1	36.5000	36.5000	36.5000	36.5000	0.0000	mg/hr
98-03	TRANS	benzene	4	2.1181	1.5244	2.8078	2.0700	0.4594	mg/hph
98-03	TRANS	ethylbenzene	4	0.2858	0.1499	0.3806	0.3063	0.0841	mg/hph
98-03	TRANS	m/p-xylenes	4	0.5978	0.3996	0.8362	0.5776	0.1754	mg/hph
98-03	TRANS	o-xylene	4	0.2309	0.1536	0.3714	0.1994	0.0885	mg/hph
98-03	TRANS	toluene	4	0.8595	0.6357	1.1796	0.8114	0.1987	mg/hph
98-03	BUS	benzene	5	0.6062	0.0969	1.1037	0.7335	0.4231	mg/hph

Total records	86
Total with 1 record	25
Total with 2 records	16
Max number of records	11
Total with max number of records	2

Table B-1b. Single Ring Aromatics, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	FTP	benzene	1	2.2000	2.2000	2.2000	2.2000	0.0000	mg/mi
98-03	FTP	benzene	8	2.8089	1.2872	6.5000	1.7091	1.9254	mg/mi
98-03	FTP	ethylbenzene	11	0.1525	0.0100	0.5000	0.1360	0.1290	mg/mi
98-03	FTP	m/p-xylenes	11	0.5756	0.1200	2.5000	0.3640	0.6438	mg/mi
98-03	FTP	o-xylene	11	0.2345	0.0400	1.1000	0.1370	0.2850	mg/mi
98-03	FTP	toluene	4	1.7405	0.4920	2.9000	1.7850	0.8538	mg/mi
98-03	CRUISE	benzene	5	0.8949	0.6436	1.9000	0.6436	0.5026	mg/mi
98-03	CRUISE	ethylbenzene	1	0.1000	0.1000	0.1000	0.1000	0.0000	mg/mi
98-03	CRUISE	m/p-xylenes	1	0.5000	0.5000	0.5000	0.5000	0.0000	mg/mi
98-03	CRUISE	o-xylene	1	0.2000	0.2000	0.2000	0.2000	0.0000	mg/mi
98-03	CRUISE	toluene	1	0.6000	0.6000	0.6000	0.6000	0.0000	mg/mi
98-03	TRANS	benzene	3	1.2180	1.1931	1.2677	1.1931	0.0352	mg/hph
98-03	TRANS	benzene	8	0.9649	0.3218	2.6100	0.5568	0.7907	mg/mi
98-03	TRANS	ethylbenzene	3	0.9800	0.3200	1.3800	1.2400	0.4702	mg/mi
98-03	TRANS	o-xylene	4	0.8300	0.2400	1.2400	0.9200	0.3820	mg/mi
98-03	STEADYST	benzene	3	82.2333	47.5000	133.1000	66.1000	36.7610	mg/hr
98-03	STEADYST	ethylbenzene	3	6.6667	6.0000	7.7000	6.3000	0.7409	mg/hr
98-03	STEADYST	m/p-xylenes	3	25.2667	13.1000	36.7000	26.0000	9.6486	mg/hr
98-03	STEADYST	o-xylene	3	9.4667	0.2000	15.6000	12.6000	6.6660	mg/hr
98-03	STEADYST	toluene	3	23.3333	7.9000	45.1000	17.0000	15.8334	mg/hr
04	FTP	benzene	2	2.3500	1.8000	2.9000	2.3500	0.5500	mg/mi
04	FTP	ethylbenzene	2	0.9000	0.9000	0.9000	0.9000	0.0000	mg/mi
04	FTP	m/p-xylenes	3	1.5333	1.4000	1.8000	1.4000	0.1886	mg/mi
04	FTP	o-xylene	3	0.6000	0.2000	0.9000	0.7000	0.2944	mg/mi
04	FTP	toluene	3	2.0667	0.7000	3.5000	2.0000	1.1441	mg/mi

Total records	25
Total with 1 record	5
Total with 2 records	2
Max number of records	11
Total with max number of records	3

Table B-1c. Single Ring Aromatics, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	TRANS	benzene	7	1.7585	1.4000	2.9097	1.5000	0.4985	mg/hph
94-95	TRANS	ethylbenzene	6	0.5165	0.4000	0.6000	0.5000	0.0688	mg/hph
94-95	TRANS	m/p-xylenes	7	1.2392	0.7000	2.4743	0.9000	0.6016	mg/hph
94-95	TRANS	o-xylene	7	0.9973	0.6000	1.5000	1.0000	0.3126	mg/hph
94-95	TRANS	toluene	6	1.1878	0.2000	4.2265	0.7000	1.3777	mg/hph
96-97	CRUISE	benzene	1	1.4348	1.4348	1.4348	1.4348	0.0000	mg/hph
96-97	CRUISE	ethylbenzene	1	0.1197	0.1197	0.1197	0.1197	0.0000	mg/hph
96-97	CRUISE	m/p-xylenes	1	0.2477	0.2477	0.2477	0.2477	0.0000	mg/hph
96-97	CRUISE	o-xylene	1	0.0781	0.0781	0.0781	0.0781	0.0000	mg/hph
96-97	CRUISE	toluene	1	0.6484	0.6484	0.6484	0.6484	0.0000	mg/hph
96-97	IDLE	benzene	1	11.7669	11.7669	11.7669	11.7669	0.0000	mg/mode
96-97	IDLE	ethylbenzene	1	3.4089	3.4089	3.4089	3.4089	0.0000	mg/mode
96-97	IDLE	m/p-xylenes	1	8.6441	8.6441	8.6441	8.6441	0.0000	mg/mode
96-97	IDLE	o-xylene	1	2.9341	2.9341	2.9341	2.9341	0.0000	mg/mode
96-97	IDLE	toluene	1	24.7269	24.7269	24.7269	24.7269	0.0000	mg/mode
96-97	TRANS	benzene	1	0.1108	0.1108	0.1108	0.1108	0.0000	mg/hph
96-97	TRANS	ethylbenzene	1	0.0640	0.0640	0.0640	0.0640	0.0000	mg/hph
96-97	TRANS	m/p-xylenes	1	0.1404	0.1404	0.1404	0.1404	0.0000	mg/hph
96-97	TRANS	o-xylene	1	0.0384	0.0384	0.0384	0.0384	0.0000	mg/hph
96-97	TRANS	toluene	1	0.2431	0.2431	0.2431	0.2431	0.0000	mg/hph
98-03	TRANS	benzene	1	1.1931	1.1931	1.1931	1.1931	0.0000	mg/hph

Total records	21
Total with 1 record	16
Total with 2 records	0
Max number of records	7
Total with max number of records	3

Table B-1d. Single Ring Aromatics, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	BUS	benzene	4	5.5802	4.7523	5.9740	5.7972	0.4953	mg/hph
87-90	BUS	ethylbenzene	4	2.8042	1.9682	3.6044	2.8221	0.5891	mg/hph
98-03	BUS	benzene	16	0.3072	0.0428	1.0272	0.2461	0.2623	mg/hph
98-03	BUS	ethylbenzene	5	0.4918	0.0749	1.7548	0.2226	0.6346	mg/hph
98-03	BUS	m/p-xylenes	3	0.3638	0.0642	0.7490	0.2782	0.2860	mg/hph
98-03	BUS	o-xylene	3	0.1569	0.0428	0.3424	0.0856	0.1323	mg/hph
98-03	BUS	toluene	5	0.1669	0.0428	0.2782	0.1926	0.0970	mg/hph

Total records	7
Total with 1 record	0
Total with 2 records	0
Max number of records	16
Total with max number of records	1

Table B-1e. Single Ring Aromatics, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	benzene	6	0.6990	0.0637	1.5745	0.7471	0.5274	mg/hph
98-03	BUS	toluene	2	1.0553	0.6700	1.4405	1.0553	0.3853	mg/hph

Total records	2
Total with 1 record	0
Total with 2 records	1
Max number of records	6
Total with max number of records	0

Table B-2a. Carbonyls, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	1,3-butadiene	2	2.513	2.254	2.773	2.513	0.259	mg/hph
pre-87	CRUISE	acetaldehyde	2	0.495	0.347	0.642	0.495	0.147	mg/hph
pre-87	CRUISE	acrolein	2	0.570	0.300	0.840	0.570	0.270	mg/hph
pre-87	CRUISE	crotonaldehyde	2	0.254	0.243	0.264	0.254	0.011	mg/hph
pre-87	CRUISE	formaldehyde	2	15.287	15.229	15.346	15.287	0.058	mg/hph
pre-87	CRUISE	propionaldehyde	2	0.181	0.132	0.231	0.181	0.050	mg/hph
pre-87	CRUISE	tolualdehyde	1	0.238	0.238	0.238	0.238	0.000	mg/hph
pre-87	IDLE	1,3-butadiene	2	40.369	38.708	42.030	40.369	1.661	mg/hph
pre-87	IDLE	acetaldehyde	2	124.081	54.626	193.537	124.081	69.455	mg/hph
pre-87	IDLE	acetone	2	65.477	62.496	68.458	65.477	2.981	mg/hph
pre-87	IDLE	acrolein	2	3.302	2.619	3.985	3.302	0.683	mg/hph
pre-87	IDLE	crotonaldehyde	2	10.935	9.666	12.204	10.935	1.269	mg/hph
pre-87	IDLE	formaldehyde	2	450.495	381.335	519.654	450.495	69.160	mg/hph
pre-87	IDLE	methyl ethyl ketone	2	6.803	6.693	6.912	6.803	0.110	mg/hph
pre-87	IDLE	propionaldehyde	2	29.830	26.164	33.496	29.830	3.666	mg/hph
pre-87	IDLE	tolualdehyde	1	2.655	2.655	2.655	2.655	0.000	mg/hph
pre-87	IDLE	valeraldehyde	2	8.140	3.466	12.814	8.140	4.674	mg/hph
pre-87	IDLE	1,3-butadiene	2	77.435	74.307	80.564	77.435	3.129	mg/mode
pre-87	IDLE	acetaldehyde	2	432.432	423.401	441.463	432.432	9.031	mg/mode
pre-87	IDLE	acetone	2	213.505	166.416	260.594	213.505	47.089	mg/mode
pre-87	IDLE	acrolein	2	19.597	18.417	20.777	19.597	1.180	mg/mode
pre-87	IDLE	crotonaldehyde	2	29.448	27.935	30.961	29.448	1.513	mg/mode
pre-87	IDLE	formaldehyde	2	1076.058	1065.036	1087.081	1076.058	11.023	mg/mode
pre-87	IDLE	methyl ethyl ketone	2	14.187	9.610	18.765	14.187	4.577	mg/mode
pre-87	IDLE	propionaldehyde	2	80.695	80.639	80.752	80.695	0.057	mg/mode
pre-87	IDLE	valeraldehyde	2	19.330	10.546	28.115	19.330	8.784	mg/mode
pre-87	TRANS	1,3-butadiene	3	8.983	7.308	9.922	9.720	1.187	mg/hph
pre-87	TRANS	acetaldehyde	3	38.031	27.246	44.910	41.937	7.722	mg/hph
pre-87	TRANS	acetone	3	46.593	5.613	74.519	59.648	29.607	mg/hph
pre-87	TRANS	acrolein	3	1.430	1.186	1.801	1.303	0.266	mg/hph
pre-87	TRANS	crotonaldehyde	3	2.819	2.182	3.314	2.960	0.473	mg/hph
pre-87	TRANS	formaldehyde	3	107.225	79.200	122.674	119.801	19.851	mg/hph
pre-87	TRANS	methyl ethyl ketone	3	1.549	0.546	2.345	1.755	0.749	mg/hph
pre-87	TRANS	propionaldehyde	3	3.917	1.367	6.429	3.954	2.067	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	tolualdehyde	2	0.814	0.475	1.153	0.814	0.339	mg/hph
pre-87	TRANS	valeraldehyde	3	0.843	0.265	1.307	0.956	0.433	mg/hph
87-90	CRUISE	1,3-butadiene	1	0.176	0.176	0.176	0.176	0.000	mg/hph
87-90	CRUISE	acetaldehyde	1	0.166	0.166	0.166	0.166	0.000	mg/hph
87-90	CRUISE	acetone	1	0.903	0.903	0.903	0.903	0.000	mg/hph
87-90	CRUISE	benzaldehyde	1	0.019	0.019	0.019	0.019	0.000	mg/hph
87-90	CRUISE	crotonaldehyde	1	0.014	0.014	0.014	0.014	0.000	mg/hph
87-90	CRUISE	formaldehyde	1	0.172	0.172	0.172	0.172	0.000	mg/hph
87-90	CRUISE	methyl ethyl ketone	1	0.117	0.117	0.117	0.117	0.000	mg/hph
87-90	CRUISE	propionaldehyde	1	0.024	0.024	0.024	0.024	0.000	mg/hph
87-90	CRUISE	valeraldehyde	1	0.016	0.016	0.016	0.016	0.000	mg/hph
87-90	IDLE	1,3-butadiene	1	8.055	8.055	8.055	8.055	0.000	mg/mode
87-90	IDLE	acetaldehyde	1	29.092	29.092	29.092	29.092	0.000	mg/mode
87-90	IDLE	acetone	1	167.279	167.279	167.279	167.279	0.000	mg/mode
87-90	IDLE	benzaldehyde	1	2.038	2.038	2.038	2.038	0.000	mg/mode
87-90	IDLE	crotonaldehyde	1	1.534	1.534	1.534	1.534	0.000	mg/mode
87-90	IDLE	formaldehyde	1	33.665	33.665	33.665	33.665	0.000	mg/mode
87-90	IDLE	methyl ethyl ketone	1	24.221	24.221	24.221	24.221	0.000	mg/mode
87-90	TRANS	1,3-butadiene	1	0.522	0.522	0.522	0.522	0.000	mg/hph
87-90	TRANS	acetaldehyde	1	1.637	1.637	1.637	1.637	0.000	mg/hph
87-90	TRANS	acetone	1	9.847	9.847	9.847	9.847	0.000	mg/hph
87-90	TRANS	benzaldehyde	1	0.119	0.119	0.119	0.119	0.000	mg/hph
87-90	TRANS	crotonaldehyde	1	0.090	0.090	0.090	0.090	0.000	mg/hph
87-90	TRANS	formaldehyde	1	1.513	1.513	1.513	1.513	0.000	mg/hph
87-90	TRANS	methyl ethyl ketone	1	1.232	1.232	1.232	1.232	0.000	mg/hph
87-90	TRANS	propionaldehyde	1	0.156	0.156	0.156	0.156	0.000	mg/hph
91-93	IDLE	acetaldehyde	3	12.133	11.100	14.000	11.300	1.322	mg/hph
91-93	IDLE	acetone	3	2.733	0.600	4.200	3.400	1.543	mg/hph
91-93	IDLE	acrolein	3	5.400	4.200	7.200	4.800	1.296	mg/hph
91-93	IDLE	benzaldehyde	3	2.900	0.800	4.200	3.700	1.499	mg/hph
91-93	IDLE	crotonaldehyde	3	1.900	1.400	2.600	1.700	0.510	mg/hph
91-93	IDLE	formaldehyde	3	32.667	30.200	35.200	32.600	2.042	mg/hph
91-93	IDLE	hexanaldehyde	3	1.133	0.200	2.100	1.100	0.776	mg/hph
91-93	IDLE	propionaldehyde	3	2.767	2.400	3.300	2.600	0.386	mg/hph
91-93	TRANS	1,3-butadiene	7	1.810	0.900	3.400	1.500	0.916	mg/hph
91-93	TRANS	acetaldehyde	21	10.416	5.600	25.600	7.800	5.757	mg/hph
91-93	TRANS	acetone	15	2.193	0.100	5.300	2.100	1.215	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	TRANS	acrolein	9	3.667	2.800	5.000	3.300	0.787	mg/hph
91-93	TRANS	benzaldehyde	9	1.222	0.300	2.700	0.700	0.974	mg/hph
91-93	TRANS	crotonaldehyde	13	0.992	0.600	1.600	0.900	0.295	mg/hph
91-93	TRANS	formaldehyde	21	28.509	15.600	69.000	22.400	14.920	mg/hph
91-93	TRANS	hexanaldehyde	5	0.900	0.100	1.700	1.200	0.636	mg/hph
91-93	TRANS	propionaldehyde	9	1.778	1.400	2.200	1.700	0.235	mg/hph
94-95	CRUISE	1,3-butadiene	5	0.076	0.012	0.190	0.036	0.067	mg/hph
94-95	CRUISE	acetaldehyde	5	0.043	0.001	0.145	0.024	0.052	mg/hph
94-95	CRUISE	acetone	1	0.725	0.725	0.725	0.725	0.000	mg/hph
94-95	CRUISE	benzaldehyde	1	0.010	0.010	0.010	0.010	0.000	mg/hph
94-95	CRUISE	crotonaldehyde	1	0.015	0.015	0.015	0.015	0.000	mg/hph
94-95	CRUISE	formaldehyde	5	0.750	0.145	1.377	0.722	0.475	mg/hph
94-95	CRUISE	hexanaldehyde	1	0.005	0.005	0.005	0.005	0.000	mg/hph
94-95	CRUISE	methyl ethyl ketone	1	0.132	0.132	0.132	0.132	0.000	mg/hph
94-95	CRUISE	propionaldehyde	1	0.019	0.019	0.019	0.019	0.000	mg/hph
94-95	CRUISE	valeraldehyde	2	0.011	0.009	0.014	0.011	0.003	mg/hph
94-95	IDLE	1,3-butadiene	7	9.026	0.300	14.505	11.286	5.609	mg/hph
94-95	IDLE	acetaldehyde	10	42.897	3.400	145.057	10.461	48.676	mg/hph
94-95	IDLE	acetone	10	25.743	1.600	78.426	11.713	27.852	mg/hph
94-95	IDLE	acrolein	7	1.534	0.600	2.742	1.100	0.841	mg/hph
94-95	IDLE	benzaldehyde	5	0.960	0.400	1.700	0.700	0.500	mg/hph
94-95	IDLE	crotonaldehyde	7	1.441	0.200	4.642	0.400	1.760	mg/hph
94-95	IDLE	formaldehyde	10	109.743	8.300	363.164	23.442	124.209	mg/hph
94-95	IDLE	hexanaldehyde	5	0.371	0.255	0.500	0.400	0.086	mg/hph
94-95	IDLE	methyl ethyl ketone	5	3.083	1.214	5.345	3.391	1.434	mg/hph
94-95	IDLE	propionaldehyde	10	4.652	0.400	12.139	1.452	4.827	mg/hph
94-95	IDLE	tolualdehyde	1	3.284	3.284	3.284	3.284	0.000	mg/hph
94-95	IDLE	valeraldehyde	4	3.499	1.146	6.030	3.410	2.239	mg/hph
94-95	IDLE	1,3-butadiene	5	20.272	8.564	29.462	20.338	7.353	mg/mode
94-95	IDLE	acetaldehyde	6	94.612	17.998	181.202	102.569	57.383	mg/mode
94-95	IDLE	acetone	6	91.615	53.912	179.478	79.218	40.968	mg/mode
94-95	IDLE	acrolein	2	5.084	4.326	5.841	5.084	0.758	mg/mode
94-95	IDLE	benzaldehyde	1	2.061	2.061	2.061	2.061	0.000	mg/mode
94-95	IDLE	crotonaldehyde	2	10.893	10.321	11.466	10.893	0.573	mg/mode
94-95	IDLE	formaldehyde	6	239.219	26.781	469.198	259.791	163.313	mg/mode
94-95	IDLE	hexanaldehyde	3	1.717	0.402	3.970	0.779	1.600	mg/mode
94-95	IDLE	methyl ethyl ketone	6	9.348	3.151	24.501	5.977	7.529	mg/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	IDLE	propionaldehyde	6	10.147	2.425	26.716	7.713	8.504	mg/mode
94-95	IDLE	tolualdehyde	2	6.997	5.769	8.224	6.997	1.227	mg/mode
94-95	IDLE	valeraldehyde	5	2.629	0.723	4.631	2.499	1.351	mg/mode
94-95	TRANS	1,3-butadiene	12	1.165	0.066	2.850	0.801	1.014	mg/hph
94-95	TRANS	acetaldehyde	14	7.406	0.636	23.130	4.850	6.285	mg/hph
94-95	TRANS	acetone	12	4.646	1.200	10.498	3.576	3.346	mg/hph
94-95	TRANS	acrolein	10	0.615	0.174	1.800	0.481	0.461	mg/hph
94-95	TRANS	benzaldehyde	6	0.787	0.119	1.700	0.700	0.533	mg/hph
94-95	TRANS	crotonaldehyde	11	0.588	0.089	1.380	0.600	0.334	mg/hph
94-95	TRANS	formaldehyde	14	19.052	0.657	59.880	10.500	15.209	mg/hph
94-95	TRANS	hexanaldehyde	5	0.428	0.038	0.600	0.500	0.209	mg/hph
94-95	TRANS	methyl ethyl ketone	7	0.369	0.079	0.960	0.304	0.280	mg/hph
94-95	TRANS	propionaldehyde	10	0.649	0.094	1.500	0.648	0.381	mg/hph
94-95	TRANS	tolualdehyde	5	0.941	0.831	1.091	0.945	0.093	mg/hph
94-95	TRANS	valeraldehyde	8	0.151	0.041	0.335	0.126	0.091	mg/hph
98-03	CRUISE	1,3-butadiene	4	0.301	0.020	1.003	0.090	0.408	mg/hph
98-03	CRUISE	acetaldehyde	5	1.944	0.052	3.806	1.647	1.238	mg/hph
98-03	CRUISE	acetone	4	20.654	0.642	38.029	21.972	16.494	mg/hph
98-03	CRUISE	acrolein	2	0.085	0.064	0.107	0.085	0.022	mg/hph
98-03	CRUISE	benzaldehyde	4	0.084	0.010	0.189	0.068	0.066	mg/hph
98-03	CRUISE	crotonaldehyde	2	0.112	0.111	0.112	0.112	0.001	mg/hph
98-03	CRUISE	formaldehyde	5	5.888	0.029	13.494	5.329	4.321	mg/hph
98-03	CRUISE	methyl ethyl ketone	4	0.126	0.004	0.366	0.067	0.141	mg/hph
98-03	CRUISE	propionaldehyde	4	0.181	0.032	0.361	0.165	0.139	mg/hph
98-03	CRUISE	valeraldehyde	3	0.085	0.043	0.108	0.103	0.029	mg/hph
98-03	IDLE	1,3-butadiene	1	10.034	10.034	10.034	10.034	0.000	mg/hph
98-03	IDLE	acetaldehyde	1	74.009	74.009	74.009	74.009	0.000	mg/hph
98-03	IDLE	formaldehyde	1	203.448	203.448	203.448	203.448	0.000	mg/hph
98-03	IDLE	1,3-butadiene	3	45.127	8.334	90.177	36.871	33.919	mg/mode
98-03	IDLE	acetaldehyde	4	270.902	11.979	373.772	348.928	149.921	mg/mode
98-03	IDLE	acetone	4	2115.268	81.429	5498.774	1440.434	2157.258	mg/mode
98-03	IDLE	benzaldehyde	3	28.497	26.610	30.337	28.544	1.522	mg/mode
98-03	IDLE	crotonaldehyde	3	15.842	13.699	18.486	15.342	1.986	mg/mode
98-03	IDLE	formaldehyde	4	722.747	6.933	1014.276	934.889	415.370	mg/mode
98-03	IDLE	methyl ethyl ketone	4	56.611	11.766	83.934	65.371	26.987	mg/mode
98-03	IDLE	propionaldehyde	3	65.391	57.689	77.504	60.979	8.670	mg/mode
98-03	IDLE	valeraldehyde	2	18.534	15.995	21.073	18.534	2.539	mg/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	IDLE	1,3-butadiene	1	37.900	37.900	37.900	37.900	0.000	mg/hr
98-03	IDLE	acetaldehyde	1	438.200	438.200	438.200	438.200	0.000	mg/hr
98-03	IDLE	formaldehyde	1	1487.000	1487.000	1487.000	1487.000	0.000	mg/hr
98-03	TRANS	1,3-butadiene	4	1.087	0.079	2.180	1.044	0.753	mg/hph
98-03	TRANS	acetaldehyde	7	8.295	0.633	16.109	8.429	4.865	mg/hph
98-03	TRANS	acetone	6	491.543	1.268	2509.544	96.804	907.670	mg/hph
98-03	TRANS	acrolein	2	1.752	0.969	2.535	1.752	0.783	mg/hph
98-03	TRANS	benzaldehyde	6	0.623	0.132	1.319	0.476	0.465	mg/hph
98-03	TRANS	crotonaldehyde	6	0.889	0.099	1.864	0.717	0.629	mg/hph
98-03	TRANS	formaldehyde	7	20.769	0.168	39.790	23.824	12.521	mg/hph
98-03	TRANS	hexanaldehyde	2	0.075	0.075	0.075	0.075	0.000	mg/hph
98-03	TRANS	isovaleraldehyde	2	3.169	0.373	5.966	3.169	2.796	mg/hph
98-03	TRANS	m/p-tolualdehyde	2	1.007	0.895	1.119	1.007	0.112	mg/hph
98-03	TRANS	methyl ethyl ketone	3	2.150	0.961	2.882	2.608	0.849	mg/hph
98-03	TRANS	o-tolualdehyde	1	0.224	0.224	0.224	0.224	0.000	mg/hph
98-03	TRANS	propionaldehyde	6	1.676	0.173	3.199	1.553	0.944	mg/hph
98-03	TRANS	valeraldehyde	4	0.523	0.373	0.916	0.401	0.228	mg/hph
98-03	BUS	1,3-butadiene	4	0.002	0.000	0.005	0.002	0.002	mg/hph
98-03	BUS	acetaldehyde	6	3.969	0.033	6.747	5.121	2.857	mg/hph
98-03	BUS	formaldehyde	7	10.242	0.000	19.099	16.643	8.858	mg/hph

Total records	165
Total with 1 record	41
Total with 2 records	36
Max number of records	21
Total with max number of records	2

Table B-2b. Carbonyls, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	acetaldehyde	7	5.636	2.630	7.980	6.650	1.956	mg/mi
pre-87	CRUISE	acetone	7	0.983	0.390	1.510	1.020	0.408	mg/mi
pre-87	CRUISE	acrolein	7	1.156	0.540	2.080	0.840	0.562	mg/mi
pre-87	CRUISE	benzaldehyde	7	0.273	0.110	0.450	0.250	0.122	mg/mi
pre-87	CRUISE	formaldehyde	7	27.414	9.170	52.240	26.590	14.800	mg/mi
pre-87	CRUISE	methyl ethyl ketone	7	0.167	0.080	0.270	0.170	0.065	mg/mi
pre-87	CRUISE	tolualdehyde	6	0.170	0.070	0.330	0.150	0.095	mg/mi
87-90	FTP	1,3-butadiene	1	3.800	3.800	3.800	3.800	0.000	mg/mi
87-90	FTP	acetaldehyde	1	1.900	1.900	1.900	1.900	0.000	mg/mi
87-90	FTP	formaldehyde	1	7.500	7.500	7.500	7.500	0.000	mg/mi
87-90	CRUISE	acetaldehyde	1	3.150	3.150	3.150	3.150	0.000	mg/mi
87-90	CRUISE	acetone	1	0.600	0.600	0.600	0.600	0.000	mg/mi
87-90	CRUISE	acrolein	1	0.550	0.550	0.550	0.550	0.000	mg/mi
87-90	CRUISE	benzaldehyde	1	0.090	0.090	0.090	0.090	0.000	mg/mi
87-90	CRUISE	formaldehyde	1	11.690	11.690	11.690	11.690	0.000	mg/mi
87-90	CRUISE	methyl ethyl ketone	1	0.130	0.130	0.130	0.130	0.000	mg/mi
87-90	CRUISE	tolualdehyde	1	0.040	0.040	0.040	0.040	0.000	mg/mi
98-03	FTP	1,3-butadiene	8	1.822	0.369	4.900	1.448	1.354	mg/mi
98-03	FTP	acetaldehyde	10	12.165	7.723	30.000	9.654	6.360	mg/mi
98-03	FTP	acetone	5	1.382	0.161	5.300	0.644	1.971	mg/mi
98-03	FTP	acrolein	10	2.548	0.322	16.400	1.126	4.663	mg/mi
98-03	FTP	benzaldehyde	16	1.120	0.030	2.090	1.287	0.660	mg/mi
98-03	FTP	crotonaldehyde	7	3.554	2.253	10.400	2.414	2.797	mg/mi
98-03	FTP	dimethylbenzaldehyde	1	0.161	0.161	0.161	0.161	0.000	mg/mi
98-03	FTP	formaldehyde	10	26.816	16.090	70.400	18.343	15.855	mg/mi
98-03	FTP	hexanaldehyde	4	0.322	0.322	0.322	0.322	0.000	mg/mi
98-03	FTP	isovaleraldehyde	6	0.161	0.161	0.161	0.161	0.000	mg/mi
98-03	FTP	m/p-tolualdehyde	6	3.057	1.770	4.023	3.379	0.947	mg/mi
98-03	FTP	methyl ethyl ketone	3	0.429	0.322	0.483	0.483	0.076	mg/mi
98-03	FTP	o-tolualdehyde	4	0.161	0.161	0.161	0.161	0.000	mg/mi
98-03	FTP	propionaldehyde	10	3.791	1.480	8.200	3.379	1.657	mg/mi
98-03	FTP	valeraldehyde	6	0.483	0.322	0.644	0.483	0.131	mg/mi
98-03	CRUISE	1,3-butadiene	5	0.518	0.322	0.644	0.500	0.120	mg/mi
98-03	CRUISE	acetaldehyde	7	4.053	3.540	5.200	3.540	0.630	mg/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	CRUISE	acetone	3	0.407	0.161	0.900	0.161	0.348	mg/mi
98-03	CRUISE	acrolein	7	0.481	0.161	2.400	0.161	0.784	mg/mi
98-03	CRUISE	benzaldehyde	6	1.073	0.644	1.448	1.126	0.331	mg/mi
98-03	CRUISE	crotonaldehyde	7	0.918	0.644	1.600	0.805	0.304	mg/mi
98-03	CRUISE	dimethylbenzaldehyde	3	0.215	0.161	0.322	0.161	0.076	mg/mi
98-03	CRUISE	formaldehyde	7	8.284	7.080	13.900	7.241	2.307	mg/mi
98-03	CRUISE	hexanaldehyde	3	0.349	0.080	0.483	0.483	0.190	mg/mi
98-03	CRUISE	isovaleraldehyde	4	0.161	0.161	0.161	0.161	0.000	mg/mi
98-03	CRUISE	m/p-tolualdehyde	6	1.019	0.483	1.609	0.965	0.461	mg/mi
98-03	CRUISE	methyl ethyl ketone	3	0.375	0.322	0.483	0.322	0.076	mg/mi
98-03	CRUISE	o-tolualdehyde	2	0.161	0.161	0.161	0.161	0.000	mg/mi
98-03	CRUISE	propionaldehyde	7	1.643	1.200	2.092	1.609	0.311	mg/mi
98-03	CRUISE	valeraldehyde	5	0.145	0.080	0.161	0.161	0.032	mg/mi
98-03	TRANS	1,3-butadiene	3	1.193	0.969	1.491	1.119	0.220	mg/hph
98-03	TRANS	acetaldehyde	3	5.294	4.474	5.891	5.518	0.600	mg/hph
98-03	TRANS	acetone	3	1.218	0.969	1.417	1.268	0.186	mg/hph
98-03	TRANS	acrolein	3	2.138	0.969	2.908	2.535	0.840	mg/hph
98-03	TRANS	benzaldehyde	3	0.447	0.224	0.895	0.224	0.316	mg/hph
98-03	TRANS	crotonaldehyde	3	1.740	1.566	1.864	1.790	0.127	mg/hph
98-03	TRANS	dimethylbenzaldehyde	1	0.224	0.224	0.224	0.224	0.000	mg/hph
98-03	TRANS	formaldehyde	3	13.323	11.186	15.212	13.572	1.653	mg/hph
98-03	TRANS	hexanaldehyde	3	0.224	0.075	0.522	0.075	0.211	mg/hph
98-03	TRANS	isovaleraldehyde	3	0.497	0.373	0.597	0.522	0.093	mg/hph
98-03	TRANS	m/p-tolualdehyde	3	1.094	0.895	1.268	1.119	0.153	mg/hph
98-03	TRANS	methyl ethyl ketone	3	0.323	0.298	0.373	0.298	0.035	mg/hph
98-03	TRANS	o-tolualdehyde	2	0.149	0.075	0.224	0.149	0.075	mg/hph
98-03	TRANS	propionaldehyde	3	1.690	1.119	2.386	1.566	0.525	mg/hph
98-03	TRANS	valeraldehyde	3	0.447	0.373	0.597	0.373	0.105	mg/hph
98-03	TRANS	1,3-butadiene	5	0.298	0.040	0.644	0.322	0.203	mg/mi
98-03	TRANS	acetaldehyde	10	3.916	2.414	8.500	2.735	1.993	mg/mi
98-03	TRANS	acetone	8	3.077	0.161	8.240	1.690	3.225	mg/mi
98-03	TRANS	acrolein	8	0.343	0.161	1.040	0.161	0.324	mg/mi
98-03	TRANS	benzaldehyde	10	0.400	0.020	0.960	0.322	0.306	mg/mi
98-03	TRANS	crotonaldehyde	10	0.758	0.350	1.360	0.805	0.269	mg/mi
98-03	TRANS	dimethylbenzaldehyde	1	0.322	0.322	0.322	0.322	0.000	mg/mi
98-03	TRANS	formaldehyde	10	10.387	5.632	23.520	6.275	6.244	mg/mi
98-03	TRANS	hexanaldehyde	4	0.161	0.161	0.161	0.161	0.000	mg/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	isovaleraldehyde	5	0.161	0.161	0.161	0.161	0.000	mg/mi
98-03	TRANS	m/p-tolualdehyde	6	0.858	0.644	1.126	0.805	0.201	mg/mi
98-03	TRANS	methyl ethyl ketone	7	1.219	0.161	3.450	1.090	1.166	mg/mi
98-03	TRANS	propionaldehyde	10	1.042	0.300	1.448	1.135	0.412	mg/mi
98-03	TRANS	valeraldehyde	9	0.262	0.060	0.600	0.161	0.197	mg/mi
98-03	STEADYST	1,3-butadiene	2	36.700	28.700	44.700	36.700	8.000	mg/hr
98-03	STEADYST	acetaldehyde	3	268.667	45.200	450.900	309.900	168.173	mg/hr
98-03	STEADYST	acetone	3	56.033	43.000	76.300	48.800	14.525	mg/hr
98-03	STEADYST	acrolein	3	91.900	45.400	124.500	105.800	33.755	mg/hr
98-03	STEADYST	crotonaldehyde	3	104.433	77.300	147.900	88.100	31.050	mg/hr
98-03	STEADYST	formaldehyde	3	799.267	608.700	958.800	830.300	144.602	mg/hr
98-03	STEADYST	propionaldehyde	3	95.400	80.400	123.900	81.900	20.162	mg/hr
04	FTP	1,3-butadiene	3	1.500	1.100	1.900	1.500	0.327	mg/mi
04	FTP	acetaldehyde	4	14.575	7.400	23.100	13.900	6.006	mg/mi
04	FTP	acetone	4	2.400	0.700	4.800	2.050	1.771	mg/mi
04	FTP	acrolein	4	3.700	0.600	8.600	2.800	2.972	mg/mi
04	FTP	benzaldehyde	4	1.400	0.100	3.500	1.000	1.285	mg/mi
04	FTP	crotonaldehyde	4	4.700	1.200	8.500	4.550	3.152	mg/mi
04	FTP	dimethylbenzaldehyde	2	0.650	0.100	1.200	0.650	0.550	mg/mi
04	FTP	formaldehyde	4	42.325	30.000	56.900	41.200	12.249	mg/mi
04	FTP	hexanaldehyde	2	0.500	0.400	0.600	0.500	0.100	mg/mi
04	FTP	isobutyraldehyde	3	0.900	0.500	1.600	0.600	0.497	mg/mi
04	FTP	isovaleraldehyde	3	1.433	0.100	2.600	1.600	1.027	mg/mi
04	FTP	m/p-tolualdehyde	3	1.367	0.700	1.800	1.600	0.478	mg/mi
04	FTP	methyl ethyl ketone	3	0.900	0.500	1.600	0.600	0.497	mg/mi
04	FTP	o-tolualdehyde	3	1.267	0.300	2.400	1.100	0.865	mg/mi
04	FTP	propionaldehyde	4	6.150	1.100	12.800	5.350	5.134	mg/mi
04	FTP	valeraldehyde	2	1.300	0.500	2.100	1.300	0.800	mg/mi

Total records	99
Total with 1 record	13
Total with 2 records	6
Max number of records	16
Total with max number of records	1

Table B-2c. Carbonyls, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	TRANS	1,3-butadiene	7	0.933	0.329	1.200	1.000	0.282	mg/hph
94-95	TRANS	acetaldehyde	7	15.584	8.000	44.389	12.000	12.023	mg/hph
94-95	TRANS	acetone	7	5.238	1.300	23.363	2.300	7.423	mg/hph
94-95	TRANS	acrolein	7	2.916	1.700	3.611	3.300	0.689	mg/hph
94-95	TRANS	benzaldehyde	3	1.412	0.100	4.035	0.100	1.855	mg/hph
94-95	TRANS	crotonaldehyde	3	4.843	0.100	14.230	0.200	6.637	mg/hph
94-95	TRANS	formaldehyde	7	19.383	15.000	23.681	20.000	3.182	mg/hph
94-95	TRANS	hexanaldehyde	1	2.336	2.336	2.336	2.336	0.000	mg/hph
94-95	TRANS	methyl ethyl ketone	1	7.965	7.965	7.965	7.965	0.000	mg/hph
94-95	TRANS	propionaldehyde	7	2.952	0.800	14.867	0.900	4.868	mg/hph
96-97	CRUISE	1,3-butadiene	1	0.138	0.138	0.138	0.138	0.000	mg/hph
96-97	CRUISE	acetaldehyde	1	2.581	2.581	2.581	2.581	0.000	mg/hph
96-97	CRUISE	acetone	1	2.478	2.478	2.478	2.478	0.000	mg/hph
96-97	CRUISE	benzaldehyde	1	0.271	0.271	0.271	0.271	0.000	mg/hph
96-97	CRUISE	crotonaldehyde	1	0.125	0.125	0.125	0.125	0.000	mg/hph
96-97	CRUISE	formaldehyde	1	2.618	2.618	2.618	2.618	0.000	mg/hph
96-97	CRUISE	methyl ethyl ketone	1	0.513	0.513	0.513	0.513	0.000	mg/hph
96-97	CRUISE	propionaldehyde	1	0.237	0.237	0.237	0.237	0.000	mg/hph
96-97	IDLE	1,3-butadiene	1	0.554	0.554	0.554	0.554	0.000	mg/mode
96-97	IDLE	acetaldehyde	1	52.471	52.471	52.471	52.471	0.000	mg/mode
96-97	IDLE	acetone	1	262.512	262.512	262.512	262.512	0.000	mg/mode
96-97	IDLE	benzaldehyde	1	6.090	6.090	6.090	6.090	0.000	mg/mode
96-97	IDLE	crotonaldehyde	1	3.056	3.056	3.056	3.056	0.000	mg/mode
96-97	IDLE	formaldehyde	1	48.141	48.141	48.141	48.141	0.000	mg/mode
96-97	IDLE	methyl ethyl ketone	1	24.122	24.122	24.122	24.122	0.000	mg/mode
96-97	IDLE	propionaldehyde	1	5.323	5.323	5.323	5.323	0.000	mg/mode
96-97	TRANS	1,3-butadiene	1	0.002	0.002	0.002	0.002	0.000	mg/hph
96-97	TRANS	acetaldehyde	1	0.884	0.884	0.884	0.884	0.000	mg/hph
96-97	TRANS	acetone	1	4.995	4.995	4.995	4.995	0.000	mg/hph
96-97	TRANS	benzaldehyde	1	0.076	0.076	0.076	0.076	0.000	mg/hph
96-97	TRANS	crotonaldehyde	1	0.057	0.057	0.057	0.057	0.000	mg/hph
96-97	TRANS	formaldehyde	1	0.548	0.548	0.548	0.548	0.000	mg/hph
96-97	TRANS	methyl ethyl ketone	1	0.598	0.598	0.598	0.598	0.000	mg/hph
96-97	TRANS	propionaldehyde	1	0.075	0.075	0.075	0.075	0.000	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	1,3-butadiene	1	1.491	1.491	1.491	1.491	0.000	mg/hph
98-03	TRANS	acetaldehyde	1	5.891	5.891	5.891	5.891	0.000	mg/hph
98-03	TRANS	acetone	1	0.969	0.969	0.969	0.969	0.000	mg/hph
98-03	TRANS	acrolein	1	2.908	2.908	2.908	2.908	0.000	mg/hph
98-03	TRANS	benzaldehyde	1	0.895	0.895	0.895	0.895	0.000	mg/hph
98-03	TRANS	crotonaldehyde	1	1.790	1.790	1.790	1.790	0.000	mg/hph
98-03	TRANS	formaldehyde	1	15.138	15.138	15.138	15.138	0.000	mg/hph
98-03	TRANS	hexanaldehyde	1	0.522	0.522	0.522	0.522	0.000	mg/hph
98-03	TRANS	isovaleraldehyde	1	0.522	0.522	0.522	0.522	0.000	mg/hph
98-03	TRANS	m/p-tolualdehyde	1	1.268	1.268	1.268	1.268	0.000	mg/hph
98-03	TRANS	o-tolualdehyde	1	0.075	0.075	0.075	0.075	0.000	mg/hph
98-03	TRANS	propionaldehyde	1	1.119	1.119	1.119	1.119	0.000	mg/hph
98-03	TRANS	valeraldehyde	1	0.597	0.597	0.597	0.597	0.000	mg/hph

Total records	47
Total with 1 record	39
Total with 2 records	0
Max number of records	7
Total with max number of records	6

Table B-2d. Carbonyls, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	BUS	1,3-butadiene	4	0.073	0.022	0.115	0.078	0.040	mg/hph
87-90	BUS	acetaldehyde	4	12.415	9.939	15.763	11.979	2.331	mg/hph
87-90	BUS	acrolein	4	2.467	1.521	3.613	2.367	0.750	mg/hph
87-90	BUS	benzaldehyde	4	0.877	0.640	1.387	0.741	0.297	mg/hph
87-90	BUS	crotonaldehyde	4	1.224	0.892	1.621	1.192	0.322	mg/hph
87-90	BUS	formaldehyde	4	32.144	27.034	34.559	33.492	2.987	mg/hph
87-90	BUS	hexanaldehyde	4	0.512	0.343	0.629	0.538	0.108	mg/hph
87-90	BUS	isovaleraldehyde	4	1.293	1.035	1.782	1.178	0.288	mg/hph
87-90	BUS	methyl ethyl ketone	4	0.377	0.208	0.684	0.308	0.191	mg/hph
87-90	BUS	propionaldehyde	4	2.356	2.064	2.962	2.198	0.360	mg/hph
98-03	BUS	1,3-butadiene	5	0.010	0.000	0.043	0.001	0.017	mg/hph
98-03	BUS	acetaldehyde	13	3.743	0.016	19.046	3.210	4.679	mg/hph
98-03	BUS	acetone	5	1.370	0.642	3.638	0.856	1.137	mg/hph
98-03	BUS	acrolein	7	0.224	0.055	0.471	0.069	0.188	mg/hph
98-03	BUS	benzaldehyde	2	0.169	0.169	0.169	0.169	0.000	mg/hph
98-03	BUS	crotonaldehyde	2	0.278	0.195	0.362	0.278	0.083	mg/hph
98-03	BUS	formaldehyde	15	6.633	0.044	38.734	3.980	9.174	mg/hph
98-03	BUS	propionaldehyde	2	0.633	0.475	0.792	0.633	0.158	mg/hph

Total records	18
Total with 1 record	0
Total with 2 records	3
Max number of records	15
Total with max number of records	1

Table B-2e. Carbonyls, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	1,3-butadiene	6	0.073	0.000	0.436	0.001	0.162	mg/hph
98-03	BUS	acetaldehyde	10	3.196	0.035	5.025	4.255	1.955	mg/hph
98-03	BUS	acrolein	8	0.286	0.116	1.106	0.194	0.312	mg/hph
98-03	BUS	benzaldehyde	2	0.549	0.549	0.549	0.549	0.000	mg/hph
98-03	BUS	formaldehyde	10	8.454	0.062	13.668	11.122	5.295	mg/hph
98-03	BUS	methyl ethyl ketone	2	0.086	0.001	0.171	0.086	0.085	mg/hph
98-03	BUS	propionaldehyde	2	0.561	0.117	1.005	0.561	0.444	mg/hph

Total records	7
Total with 1 record	0
Total with 2 records	3
Max number of records	10
Total with max number of records	2

Table B-3a. Elemental/Organic Carbon, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	Elemental carbon	2	201.406	129.279	273.534	201.406	72.128	mg/hph
pre-87	CRUISE	Elemental Carbon Fraction 1	2	30.051	22.102	38.001	30.051	7.949	mg/hph
pre-87	CRUISE	Elemental Carbon Fraction 2	2	172.091	92.728	251.454	172.091	79.363	mg/hph
pre-87	CRUISE	Elemental Carbon Fraction 3	1	0.006	0.006	0.006	0.006	0.000	mg/hph
pre-87	CRUISE	Organic carbon	2	83.330	81.037	85.623	83.330	2.293	mg/hph
pre-87	CRUISE	Organic Carbon Fraction 1	2	42.387	38.810	45.965	42.387	3.577	mg/hph
pre-87	CRUISE	Organic Carbon Fraction 2	2	12.392	9.469	15.316	12.392	2.923	mg/hph
pre-87	CRUISE	Organic Carbon Fraction 3	2	18.221	14.570	21.872	18.221	3.651	mg/hph
pre-87	CRUISE	Organic Carbon Fraction 4	2	9.552	9.527	9.578	9.552	0.025	mg/hph
pre-87	CRUISE	Pyrolyzed Organic Carbon	2	0.756	0.055	1.457	0.756	0.701	mg/hph
pre-87	CRUISE	Total Carbon	2	284.682	210.316	359.048	284.682	74.366	mg/hph
pre-87	IDLE	Elemental carbon	2	1351.569	1315.702	1387.436	1351.569	35.867	mg/hph
pre-87	IDLE	Elemental Carbon Fraction 1	2	223.081	214.567	231.596	223.081	8.514	mg/hph
pre-87	IDLE	Elemental Carbon Fraction 2	2	1128.489	1084.075	1172.902	1128.489	44.414	mg/hph
pre-87	IDLE	Elemental Carbon Fraction 3	2	0.106	0.104	0.109	0.106	0.003	mg/hph
pre-87	IDLE	Organic carbon	2	792.928	703.397	882.458	792.928	89.530	mg/hph
pre-87	IDLE	Organic Carbon Fraction 1	2	479.914	406.479	553.349	479.914	73.435	mg/hph
pre-87	IDLE	Organic Carbon Fraction 2	2	81.517	74.079	88.955	81.517	7.438	mg/hph
pre-87	IDLE	Organic Carbon Fraction 3	2	177.985	170.459	185.511	177.985	7.526	mg/hph
pre-87	IDLE	Organic Carbon Fraction 4	2	53.374	52.204	54.544	53.374	1.170	mg/hph
pre-87	IDLE	Pyrolyzed Organic Carbon	2	0.138	0.131	0.145	0.138	0.007	mg/hph
pre-87	IDLE	Total Carbon	2	2144.497	2019.099	2269.894	2144.497	125.398	mg/hph
pre-87	IDLE	Elemental carbon	1	2578.025	2578.025	2578.025	2578.025	0.000	mg/mode
pre-87	IDLE	Elemental Carbon Fraction 1	1	249.527	249.527	249.527	249.527	0.000	mg/mode
pre-87	IDLE	Elemental Carbon Fraction 2	1	2436.627	2436.627	2436.627	2436.627	0.000	mg/mode
pre-87	IDLE	Elemental Carbon Fraction 3	1	1.520	1.520	1.520	1.520	0.000	mg/mode
pre-87	IDLE	Organic carbon	1	967.812	967.812	967.812	967.812	0.000	mg/mode
pre-87	IDLE	Organic Carbon Fraction 1	1	454.553	454.553	454.553	454.553	0.000	mg/mode
pre-87	IDLE	Organic Carbon Fraction 2	1	133.832	133.832	133.832	133.832	0.000	mg/mode
pre-87	IDLE	Organic Carbon Fraction 3	1	174.467	174.467	174.467	174.467	0.000	mg/mode
pre-87	IDLE	Organic Carbon Fraction 4	1	95.245	95.245	95.245	95.245	0.000	mg/mode
pre-87	IDLE	Pyrolyzed Organic Carbon	1	109.765	109.765	109.765	109.765	0.000	mg/mode
pre-87	IDLE	Total Carbon	1	3545.837	3545.837	3545.837	3545.837	0.000	mg/mode
pre-87	TRANS	Elemental carbon	8	547.813	414.168	629.544	570.074	70.408	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	Elemental Carbon Fraction 1	8	54.245	15.257	107.003	47.418	34.049	mg/hph
pre-87	TRANS	Elemental Carbon Fraction 2	8	497.422	346.943	609.033	512.023	92.719	mg/hph
pre-87	TRANS	Elemental Carbon Fraction 3	4	1.247	0.079	2.499	1.205	1.169	mg/hph
pre-87	TRANS	Organic carbon	8	193.909	63.749	346.654	182.075	82.262	mg/hph
pre-87	TRANS	Organic Carbon Fraction 1	8	80.403	18.467	212.641	67.956	53.782	mg/hph
pre-87	TRANS	Organic Carbon Fraction 2	8	31.826	15.396	50.141	32.215	10.916	mg/hph
pre-87	TRANS	Organic Carbon Fraction 3	8	53.281	19.754	118.939	47.670	29.312	mg/hph
pre-87	TRANS	Organic Carbon Fraction 4	8	23.906	5.725	50.798	21.646	13.043	mg/hph
pre-87	TRANS	Pyrolyzed Organic Carbon	5	7.138	0.014	27.498	0.089	10.637	mg/hph
pre-87	TRANS	Total Carbon	8	741.744	530.887	864.121	775.052	98.622	mg/hph
87-90	CRUISE	Elemental carbon	2	290.139	225.890	354.388	290.139	64.249	mg/hph
87-90	CRUISE	Elemental Carbon Fraction 1	2	24.304	11.128	37.479	24.304	13.175	mg/hph
87-90	CRUISE	Elemental Carbon Fraction 2	2	398.988	277.161	520.814	398.988	121.827	mg/hph
87-90	CRUISE	Elemental Carbon Fraction 3	2	33.290	0.482	66.098	33.290	32.808	mg/hph
87-90	CRUISE	Organic carbon	2	197.852	21.570	374.134	197.852	176.282	mg/hph
87-90	CRUISE	Organic Carbon Fraction 1	2	10.718	8.266	13.169	10.718	2.452	mg/hph
87-90	CRUISE	Organic Carbon Fraction 2	2	9.370	7.705	11.035	9.370	1.665	mg/hph
87-90	CRUISE	Organic Carbon Fraction 3	2	6.873	4.244	9.501	6.873	2.628	mg/hph
87-90	CRUISE	Organic Carbon Fraction 4	2	4.440	1.353	7.526	4.440	3.087	mg/hph
87-90	CRUISE	Pyrolyzed Organic Carbon	2	166.453	0.003	332.903	166.453	166.450	mg/hph
87-90	CRUISE	Total Carbon	2	487.976	375.943	600.009	487.976	112.033	mg/hph
87-90	IDLE	Elemental carbon	2	916.673	888.985	944.361	916.673	27.688	mg/mode
87-90	IDLE	Elemental Carbon Fraction 1	2	68.632	61.716	75.549	68.632	6.917	mg/mode
87-90	IDLE	Elemental Carbon Fraction 2	2	852.291	847.072	857.510	852.291	5.219	mg/mode
87-90	IDLE	Elemental Carbon Fraction 3	1	11.632	11.632	11.632	11.632	0.000	mg/mode
87-90	IDLE	Organic carbon	2	409.619	272.259	546.980	409.619	137.361	mg/mode
87-90	IDLE	Organic Carbon Fraction 1	2	204.247	167.232	241.262	204.247	37.015	mg/mode
87-90	IDLE	Organic Carbon Fraction 2	2	57.098	36.637	77.558	57.098	20.460	mg/mode
87-90	IDLE	Organic Carbon Fraction 3	2	97.199	30.454	163.944	97.199	66.745	mg/mode
87-90	IDLE	Organic Carbon Fraction 4	2	40.906	18.030	63.782	40.906	22.876	mg/mode
87-90	IDLE	Pyrolyzed Organic Carbon	2	10.081	0.330	19.832	10.081	9.751	mg/mode
87-90	IDLE	Total Carbon	2	1324.822	1159.802	1489.842	1324.822	165.020	mg/mode
87-90	TRANS	Elemental carbon	2	1036.847	939.751	1133.944	1036.847	97.096	mg/hph
87-90	TRANS	Elemental Carbon Fraction 1	2	77.649	69.119	86.179	77.649	8.530	mg/hph
87-90	TRANS	Elemental Carbon Fraction 2	2	959.016	870.540	1047.493	959.016	88.477	mg/hph
87-90	TRANS	Elemental Carbon Fraction 3	2	0.300	0.121	0.480	0.300	0.179	mg/hph
87-90	TRANS	Organic carbon	2	107.312	102.275	112.349	107.312	5.037	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	TRANS	Organic Carbon Fraction 1	2	38.695	37.167	40.224	38.695	1.528	mg/hph
87-90	TRANS	Organic Carbon Fraction 2	2	24.954	23.924	25.985	24.954	1.031	mg/hph
87-90	TRANS	Organic Carbon Fraction 3	2	30.197	28.182	32.212	30.197	2.015	mg/hph
87-90	TRANS	Organic Carbon Fraction 4	2	13.327	12.945	13.709	13.327	0.382	mg/hph
87-90	TRANS	Pyrolyzed Organic Carbon	2	0.135	0.053	0.217	0.135	0.082	mg/hph
87-90	TRANS	Total Carbon	2	1143.948	1041.828	1246.067	1143.948	102.119	mg/hph
91-93	TRANS	Elemental carbon	1	172.569	172.569	172.569	172.569	0.000	mg/hph
91-93	TRANS	Elemental Carbon Fraction 1	1	16.792	16.792	16.792	16.792	0.000	mg/hph
91-93	TRANS	Elemental Carbon Fraction 2	1	155.952	155.952	155.952	155.952	0.000	mg/hph
91-93	TRANS	Elemental Carbon Fraction 3	1	1.220	1.220	1.220	1.220	0.000	mg/hph
91-93	TRANS	Organic carbon	1	149.037	149.037	149.037	149.037	0.000	mg/hph
91-93	TRANS	Organic Carbon Fraction 1	1	54.153	54.153	54.153	54.153	0.000	mg/hph
91-93	TRANS	Organic Carbon Fraction 2	1	32.916	32.916	32.916	32.916	0.000	mg/hph
91-93	TRANS	Organic Carbon Fraction 3	1	43.636	43.636	43.636	43.636	0.000	mg/hph
91-93	TRANS	Organic Carbon Fraction 4	1	16.734	16.734	16.734	16.734	0.000	mg/hph
91-93	TRANS	Pyrolyzed Organic Carbon	1	1.511	1.511	1.511	1.511	0.000	mg/hph
91-93	TRANS	Total Carbon	1	321.316	321.316	321.316	321.316	0.000	mg/hph
94-95	CRUISE	Elemental carbon	8	25.311	16.877	36.806	24.828	6.369	mg/hph
94-95	CRUISE	Elemental Carbon Fraction 1	8	13.661	3.225	23.289	13.694	6.152	mg/hph
94-95	CRUISE	Elemental Carbon Fraction 2	8	15.548	8.703	22.793	16.099	4.364	mg/hph
94-95	CRUISE	Elemental Carbon Fraction 3	4	0.021	0.004	0.040	0.021	0.018	mg/hph
94-95	CRUISE	Organic carbon	8	23.618	13.987	41.487	20.759	8.161	mg/hph
94-95	CRUISE	Organic Carbon Fraction 1	8	8.674	4.710	14.564	7.164	3.754	mg/hph
94-95	CRUISE	Organic Carbon Fraction 2	8	3.293	2.388	4.596	3.295	0.668	mg/hph
94-95	CRUISE	Organic Carbon Fraction 3	8	4.888	2.608	6.958	4.834	1.443	mg/hph
94-95	CRUISE	Organic Carbon Fraction 4	8	2.853	1.227	5.391	2.369	1.382	mg/hph
94-95	CRUISE	Pyrolyzed Organic Carbon	7	4.468	0.007	19.290	0.018	7.270	mg/hph
94-95	CRUISE	Total Carbon	8	48.925	33.203	61.775	48.624	9.071	mg/hph
94-95	IDLE	Elemental carbon	5	161.111	48.675	317.902	117.160	109.924	mg/hph
94-95	IDLE	Elemental Carbon Fraction 1	5	39.621	8.160	84.516	17.411	32.006	mg/hph
94-95	IDLE	Elemental Carbon Fraction 2	5	126.189	46.456	233.474	104.625	74.595	mg/hph
94-95	IDLE	Elemental Carbon Fraction 3	3	2.661	1.135	4.915	1.933	1.627	mg/hph
94-95	IDLE	Organic carbon	5	355.147	160.452	531.126	409.426	130.092	mg/hph
94-95	IDLE	Organic Carbon Fraction 1	5	151.197	43.911	255.667	147.599	88.851	mg/hph
94-95	IDLE	Organic Carbon Fraction 2	5	61.337	25.565	105.581	59.712	26.157	mg/hph
94-95	IDLE	Organic Carbon Fraction 3	5	89.443	58.170	163.847	73.274	38.393	mg/hph
94-95	IDLE	Organic Carbon Fraction 4	5	46.824	26.879	105.939	29.679	30.212	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	IDLE	Pyrolyzed Organic Carbon	5	6.350	0.114	17.374	5.958	6.362	mg/hph
94-95	IDLE	Total Carbon	5	516.303	277.717	727.328	579.800	185.346	mg/hph
94-95	IDLE	Elemental carbon	7	332.584	12.075	1059.997	182.122	396.749	mg/mode
94-95	IDLE	Elemental Carbon Fraction 1	7	107.399	8.579	193.733	147.149	83.149	mg/mode
94-95	IDLE	Elemental Carbon Fraction 2	7	265.986	19.674	910.605	84.633	332.118	mg/mode
94-95	IDLE	Elemental Carbon Fraction 3	5	2.855	0.084	5.386	2.110	2.062	mg/mode
94-95	IDLE	Organic carbon	7	430.886	112.446	885.156	486.403	272.137	mg/mode
94-95	IDLE	Organic Carbon Fraction 1	7	94.483	23.096	230.826	53.840	80.710	mg/mode
94-95	IDLE	Organic Carbon Fraction 2	7	69.313	16.956	144.398	71.496	44.310	mg/mode
94-95	IDLE	Organic Carbon Fraction 3	7	155.976	40.445	355.166	95.131	115.400	mg/mode
94-95	IDLE	Organic Carbon Fraction 4	7	68.244	17.991	188.477	45.639	58.498	mg/mode
94-95	IDLE	Pyrolyzed Organic Carbon	7	42.890	0.167	117.352	23.162	43.480	mg/mode
94-95	IDLE	Total Carbon	7	763.018	128.390	1546.401	847.055	553.919	mg/mode
94-95	TRANS	Elemental carbon	16	118.378	78.879	177.697	116.203	27.411	mg/hph
94-95	TRANS	Elemental Carbon Fraction 1	16	34.320	7.566	62.838	31.878	13.907	mg/hph
94-95	TRANS	Elemental Carbon Fraction 2	16	84.751	22.855	139.033	86.055	27.182	mg/hph
94-95	TRANS	Elemental Carbon Fraction 3	4	1.567	0.070	2.719	1.738	1.047	mg/hph
94-95	TRANS	Organic carbon	16	62.710	32.421	151.735	53.074	30.718	mg/hph
94-95	TRANS	Organic Carbon Fraction 1	16	23.294	9.411	63.062	19.029	13.700	mg/hph
94-95	TRANS	Organic Carbon Fraction 2	16	12.500	6.619	38.429	9.794	7.729	mg/hph
94-95	TRANS	Organic Carbon Fraction 3	16	18.071	7.463	35.556	15.162	7.829	mg/hph
94-95	TRANS	Organic Carbon Fraction 4	16	7.749	3.037	16.323	6.389	4.322	mg/hph
94-95	TRANS	Pyrolyzed Organic Carbon	14	1.248	0.016	16.964	0.036	4.359	mg/hph
94-95	TRANS	Total Carbon	16	181.058	111.269	294.853	169.326	52.167	mg/hph
98-03	CRUISE	Elemental carbon	7	43.467	27.888	68.697	41.822	13.138	mg/hph
98-03	CRUISE	Elemental Carbon Fraction 1	6	7.877	2.882	20.589	4.454	6.215	mg/hph
98-03	CRUISE	Elemental Carbon Fraction 2	6	42.118	28.589	56.977	45.008	10.507	mg/hph
98-03	CRUISE	Elemental Carbon Fraction 3	4	0.684	0.006	2.551	0.089	1.080	mg/hph
98-03	CRUISE	Organic carbon	7	17.275	9.853	43.752	12.740	11.024	mg/hph
98-03	CRUISE	Organic Carbon Fraction 1	6	5.384	4.031	6.824	5.495	0.849	mg/hph
98-03	CRUISE	Organic Carbon Fraction 2	6	2.581	1.910	3.240	2.744	0.510	mg/hph
98-03	CRUISE	Organic Carbon Fraction 3	6	3.748	1.821	5.097	4.101	1.058	mg/hph
98-03	CRUISE	Organic Carbon Fraction 4	6	1.683	0.397	3.834	0.798	1.463	mg/hph
98-03	CRUISE	Pyrolyzed Organic Carbon	5	5.266	0.002	26.035	0.010	10.385	mg/hph
98-03	CRUISE	Total Carbon	6	63.834	44.630	85.854	60.590	16.831	mg/hph
98-03	IDLE	Elemental carbon	1	180.024	180.024	180.024	180.024	0.000	mg/hph
98-03	IDLE	Organic carbon	1	145.285	145.285	145.285	145.285	0.000	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	IDLE	Elemental carbon	6	211.772	33.926	446.259	162.421	152.219	mg/mode
98-03	IDLE	Elemental Carbon Fraction 1	6	68.870	10.023	217.418	31.406	74.610	mg/mode
98-03	IDLE	Elemental Carbon Fraction 2	6	155.402	55.160	294.597	149.953	85.050	mg/mode
98-03	IDLE	Elemental Carbon Fraction 3	5	3.534	1.245	5.578	3.782	1.631	mg/mode
98-03	IDLE	Organic carbon	6	281.983	96.685	582.233	242.023	170.500	mg/mode
98-03	IDLE	Organic Carbon Fraction 1	6	101.725	19.815	307.747	67.179	97.015	mg/mode
98-03	IDLE	Organic Carbon Fraction 2	6	58.405	18.551	115.659	44.537	37.767	mg/mode
98-03	IDLE	Organic Carbon Fraction 3	6	75.359	44.788	138.443	63.324	34.377	mg/mode
98-03	IDLE	Organic Carbon Fraction 4	6	31.019	8.745	72.965	26.739	21.190	mg/mode
98-03	IDLE	Pyrolyzed Organic Carbon	5	18.538	0.078	68.822	0.365	26.679	mg/mode
98-03	IDLE	Total Carbon	6	492.458	256.862	966.188	303.579	297.397	mg/mode
98-03	IDLE	Elemental carbon	1	113.000	113.000	113.000	113.000	0.000	mg/hr
98-03	IDLE	Organic carbon	1	2458.000	2458.000	2458.000	2458.000	0.000	mg/hr
98-03	TRANS	Elemental carbon	8	149.178	34.634	320.025	114.912	94.525	mg/hph
98-03	TRANS	Elemental Carbon Fraction 1	7	32.048	3.029	99.160	18.429	32.958	mg/hph
98-03	TRANS	Elemental Carbon Fraction 2	7	129.813	27.706	256.604	105.012	80.804	mg/hph
98-03	TRANS	Elemental Carbon Fraction 3	4	1.892	0.163	3.078	2.163	1.222	mg/hph
98-03	TRANS	Organic carbon	8	72.165	21.578	191.104	48.731	55.849	mg/hph
98-03	TRANS	Organic Carbon Fraction 1	7	24.974	8.609	89.318	12.113	26.850	mg/hph
98-03	TRANS	Organic Carbon Fraction 2	7	13.264	4.304	32.808	9.332	9.606	mg/hph
98-03	TRANS	Organic Carbon Fraction 3	7	19.250	3.937	44.223	13.754	13.353	mg/hph
98-03	TRANS	Organic Carbon Fraction 4	7	9.354	1.210	24.625	4.232	8.428	mg/hph
98-03	TRANS	Pyrolyzed Organic Carbon	6	8.179	0.016	47.176	0.110	17.450	mg/hph
98-03	TRANS	Total Carbon	7	229.632	56.067	415.811	147.501	147.285	mg/hph
98-03	BUS	Elemental carbon	5	22.378	0.069	66.778	0.218	28.099	mg/hph
98-03	BUS	Organic carbon	5	12.726	2.387	27.369	3.460	11.793	mg/hph

Total records	171
Total with 1 record	28
Total with 2 records	53
Max number of records	16
Total with max number of records	9

Table B-3b. Elemental/Organic Carbon, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	Elemental carbon	26	221.896	16.390	664.700	186.300	152.692	mg/mi
pre-87	FTP	Organic carbon	26	254.220	8.210	2345.000	91.530	451.570	mg/mi
pre-87	FTP	Total Carbon	18	527.616	24.590	2773.000	385.500	586.669	mg/mi
pre-87	CRUISE	Elemental carbon	7	292.886	108.200	451.700	319.600	129.977	mg/mi
pre-87	CRUISE	Elemental Carbon Fraction 1	7	30.594	10.250	66.000	20.360	18.355	mg/mi
pre-87	CRUISE	Elemental Carbon Fraction 2	7	248.866	97.280	384.270	255.270	107.895	mg/mi
pre-87	CRUISE	Elemental Carbon Fraction 3	5	19.208	0.440	91.600	0.960	36.203	mg/mi
pre-87	CRUISE	Organic carbon	7	91.543	32.200	182.200	89.400	47.975	mg/mi
pre-87	CRUISE	Organic Carbon Fraction 1	7	50.239	16.470	127.500	41.690	36.258	mg/mi
pre-87	CRUISE	Organic Carbon Fraction 2	7	21.337	7.290	31.350	24.540	9.122	mg/mi
pre-87	CRUISE	Organic Carbon Fraction 3	7	12.633	6.180	20.380	13.190	4.077	mg/mi
pre-87	CRUISE	Organic Carbon Fraction 4	7	7.040	2.310	11.810	6.900	3.063	mg/mi
pre-87	CRUISE	Pyrolyzed Organic Carbon	2	1.040	0.010	2.070	1.040	1.030	mg/mi
pre-87	CRUISE	Total Carbon	7	384.443	140.400	541.100	484.700	149.173	mg/mi
pre-87	TRANS	Elemental carbon	2	120.061	93.761	146.361	120.061	26.300	mg/mi
pre-87	TRANS	Elemental Carbon Fraction 1	2	20.306	18.253	22.359	20.306	2.053	mg/mi
pre-87	TRANS	Elemental Carbon Fraction 2	2	154.303	141.730	166.876	154.303	12.573	mg/mi
pre-87	TRANS	Elemental Carbon Fraction 3	2	0.353	0.010	0.697	0.353	0.344	mg/mi
pre-87	TRANS	Organic carbon	2	182.382	175.450	189.314	182.382	6.932	mg/mi
pre-87	TRANS	Organic Carbon Fraction 1	2	80.521	77.833	83.209	80.521	2.688	mg/mi
pre-87	TRANS	Organic Carbon Fraction 2	2	23.421	11.538	35.303	23.421	11.883	mg/mi
pre-87	TRANS	Organic Carbon Fraction 3	2	18.066	10.666	25.465	18.066	7.399	mg/mi
pre-87	TRANS	Organic Carbon Fraction 4	2	5.470	3.803	7.137	5.470	1.667	mg/mi
pre-87	TRANS	Pyrolyzed Organic Carbon	2	54.908	43.581	66.235	54.908	11.327	mg/mi
pre-87	TRANS	Total Carbon	2	302.443	269.210	335.675	302.443	33.233	mg/mi
87-90	FTP	Elemental carbon	4	42.000	26.000	71.000	35.500	17.790	mg/mi
87-90	FTP	Organic carbon	4	114.250	74.000	176.000	103.500	38.002	mg/mi
87-90	CRUISE	Elemental carbon	1	104.100	104.100	104.100	104.100	0.000	mg/mi
87-90	CRUISE	Elemental Carbon Fraction 1	1	7.520	7.520	7.520	7.520	0.000	mg/mi
87-90	CRUISE	Elemental Carbon Fraction 2	1	96.440	96.440	96.440	96.440	0.000	mg/mi
87-90	CRUISE	Elemental Carbon Fraction 3	1	0.120	0.120	0.120	0.120	0.000	mg/mi
87-90	CRUISE	Organic carbon	1	13.300	13.300	13.300	13.300	0.000	mg/mi
87-90	CRUISE	Organic Carbon Fraction 1	1	5.030	5.030	5.030	5.030	0.000	mg/mi
87-90	CRUISE	Organic Carbon Fraction 2	1	3.490	3.490	3.490	3.490	0.000	mg/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	CRUISE	Organic Carbon Fraction 3	1	3.420	3.420	3.420	3.420	0.000	mg/mi
87-90	CRUISE	Organic Carbon Fraction 4	1	1.390	1.390	1.390	1.390	0.000	mg/mi
87-90	CRUISE	Total Carbon	1	117.400	117.400	117.400	117.400	0.000	mg/mi
91-93	FTP	Elemental carbon	5	78.171	40.000	118.218	72.000	27.880	mg/mi
91-93	FTP	Organic carbon	5	469.391	10.910	1170.000	449.146	417.986	mg/mi
91-93	FTP	Total Carbon	1	71.510	71.510	71.510	71.510	0.000	mg/mi
91-93	TRANS	Elemental carbon	1	111.330	111.330	111.330	111.330	0.000	mg/mi
91-93	TRANS	Organic carbon	1	348.192	348.192	348.192	348.192	0.000	mg/mi
94-95	FTP	Elemental carbon	1	142.395	142.395	142.395	142.395	0.000	mg/mi
94-95	FTP	Organic carbon	1	49.924	49.924	49.924	49.924	0.000	mg/mi
96-97	FTP	Elemental carbon	1	71.778	71.778	71.778	71.778	0.000	mg/mi
96-97	FTP	Organic carbon	1	17.793	17.793	17.793	17.793	0.000	mg/mi
98-03	FTP	Elemental carbon	3	141.300	60.400	194.700	168.800	58.174	mg/mi
98-03	FTP	Organic carbon	3	36.267	5.400	60.400	43.000	22.953	mg/mi
98-03	FTP	Total Carbon	3	164.667	27.100	255.100	211.800	98.867	mg/mi
98-03	TRANS	Elemental carbon	2	17.375	17.320	17.430	17.375	0.055	mg/mi
98-03	TRANS	Organic carbon	2	23.005	22.530	23.480	23.005	0.475	mg/mi
98-03	TRANS	Total Carbon	2	40.390	39.970	40.810	40.390	0.420	mg/mi

Total records	52
Total with 1 record	17
Total with 2 records	15
Max number of records	26
Total with max number of records	2

Table B-3c. Elemental/Organic Carbon, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	Elemental carbon	1	448.168	448.168	448.168	448.168	0.000	mg/hph
pre-87	CRUISE	Elemental Carbon Fraction 1	1	69.023	69.023	69.023	69.023	0.000	mg/hph
pre-87	CRUISE	Elemental Carbon Fraction 2	1	378.949	378.949	378.949	378.949	0.000	mg/hph
pre-87	CRUISE	Elemental Carbon Fraction 3	1	0.232	0.232	0.232	0.232	0.000	mg/hph
pre-87	CRUISE	Organic carbon	1	252.129	252.129	252.129	252.129	0.000	mg/hph
pre-87	CRUISE	Organic Carbon Fraction 1	1	138.075	138.075	138.075	138.075	0.000	mg/hph
pre-87	CRUISE	Organic Carbon Fraction 2	1	34.365	34.365	34.365	34.365	0.000	mg/hph
pre-87	CRUISE	Organic Carbon Fraction 3	1	54.637	54.637	54.637	54.637	0.000	mg/hph
pre-87	CRUISE	Organic Carbon Fraction 4	1	25.014	25.014	25.014	25.014	0.000	mg/hph
pre-87	CRUISE	Pyrolyzed Organic Carbon	1	0.038	0.038	0.038	0.038	0.000	mg/hph
pre-87	CRUISE	Total Carbon	1	700.297	700.297	700.297	700.297	0.000	mg/hph
pre-87	TRANS	Elemental carbon	4	1140.386	971.790	1267.930	1160.911	113.347	mg/hph
pre-87	TRANS	Elemental Carbon Fraction 1	4	139.257	110.816	197.209	124.502	34.045	mg/hph
pre-87	TRANS	Elemental Carbon Fraction 2	4	1022.569	866.954	1105.132	1059.095	93.806	mg/hph
pre-87	TRANS	Elemental Carbon Fraction 3	1	0.183	0.183	0.183	0.183	0.000	mg/hph
pre-87	TRANS	Organic carbon	4	441.220	337.675	566.605	430.300	103.193	mg/hph
pre-87	TRANS	Organic Carbon Fraction 1	4	244.282	156.737	351.105	234.642	84.672	mg/hph
pre-87	TRANS	Organic Carbon Fraction 2	4	55.766	39.131	71.879	56.027	11.830	mg/hph
pre-87	TRANS	Organic Carbon Fraction 3	4	77.661	53.283	100.155	78.604	17.518	mg/hph
pre-87	TRANS	Organic Carbon Fraction 4	4	41.999	32.274	56.857	39.433	9.211	mg/hph
pre-87	TRANS	Pyrolyzed Organic Carbon	4	21.513	0.054	45.549	20.224	19.009	mg/hph
pre-87	TRANS	Total Carbon	4	1581.605	1447.901	1834.535	1521.993	150.701	mg/hph
87-90	CRUISE	Elemental carbon	1	864.758	864.758	864.758	864.758	0.000	mg/hph
87-90	CRUISE	Elemental Carbon Fraction 1	1	138.213	138.213	138.213	138.213	0.000	mg/hph
87-90	CRUISE	Elemental Carbon Fraction 2	1	726.625	726.625	726.625	726.625	0.000	mg/hph
87-90	CRUISE	Organic carbon	1	317.174	317.174	317.174	317.174	0.000	mg/hph
87-90	CRUISE	Organic Carbon Fraction 1	1	116.570	116.570	116.570	116.570	0.000	mg/hph
87-90	CRUISE	Organic Carbon Fraction 2	1	69.524	69.524	69.524	69.524	0.000	mg/hph
87-90	CRUISE	Organic Carbon Fraction 3	1	102.174	102.174	102.174	102.174	0.000	mg/hph
87-90	CRUISE	Organic Carbon Fraction 4	1	28.777	28.777	28.777	28.777	0.000	mg/hph
87-90	CRUISE	Pyrolyzed Organic Carbon	1	0.096	0.096	0.096	0.096	0.000	mg/hph
87-90	CRUISE	Total Carbon	1	1181.932	1181.932	1181.932	1181.932	0.000	mg/hph
87-90	TRANS	Elemental carbon	1	967.112	967.112	967.112	967.112	0.000	mg/hph
87-90	TRANS	Elemental Carbon Fraction 1	1	343.065	343.065	343.065	343.065	0.000	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	TRANS	Elemental Carbon Fraction 2	1	624.233	624.233	624.233	624.233	0.000	mg/hph
87-90	TRANS	Organic carbon	1	391.103	391.103	391.103	391.103	0.000	mg/hph
87-90	TRANS	Organic Carbon Fraction 1	1	176.837	176.837	176.837	176.837	0.000	mg/hph
87-90	TRANS	Organic Carbon Fraction 2	1	68.097	68.097	68.097	68.097	0.000	mg/hph
87-90	TRANS	Organic Carbon Fraction 3	1	95.366	95.366	95.366	95.366	0.000	mg/hph
87-90	TRANS	Organic Carbon Fraction 4	1	50.391	50.391	50.391	50.391	0.000	mg/hph
87-90	TRANS	Pyrolyzed Organic Carbon	1	0.299	0.299	0.299	0.299	0.000	mg/hph
87-90	TRANS	Total Carbon	1	1357.841	1357.841	1357.841	1357.841	0.000	mg/hph
94-95	CRUISE	Elemental carbon	1	101.879	101.879	101.879	101.879	0.000	mg/hph
94-95	CRUISE	Elemental Carbon Fraction 1	1	14.744	14.744	14.744	14.744	0.000	mg/hph
94-95	CRUISE	Elemental Carbon Fraction 2	1	80.529	80.529	80.529	80.529	0.000	mg/hph
94-95	CRUISE	Elemental Carbon Fraction 3	1	6.670	6.670	6.670	6.670	0.000	mg/hph
94-95	CRUISE	Organic carbon	1	147.694	147.694	147.694	147.694	0.000	mg/hph
94-95	CRUISE	Organic Carbon Fraction 1	1	35.373	35.373	35.373	35.373	0.000	mg/hph
94-95	CRUISE	Organic Carbon Fraction 2	1	35.740	35.740	35.740	35.740	0.000	mg/hph
94-95	CRUISE	Organic Carbon Fraction 3	1	54.015	54.015	54.015	54.015	0.000	mg/hph
94-95	CRUISE	Organic Carbon Fraction 4	1	22.414	22.414	22.414	22.414	0.000	mg/hph
94-95	CRUISE	Pyrolyzed Organic Carbon	1	0.101	0.101	0.101	0.101	0.000	mg/hph
94-95	CRUISE	Total Carbon	1	249.447	249.447	249.447	249.447	0.000	mg/hph
94-95	TRANS	Elemental carbon	2	112.061	60.509	163.612	112.061	51.552	mg/hph
94-95	TRANS	Elemental Carbon Fraction 1	1	29.581	29.581	29.581	29.581	0.000	mg/hph
94-95	TRANS	Elemental Carbon Fraction 2	1	133.565	133.565	133.565	133.565	0.000	mg/hph
94-95	TRANS	Elemental Carbon Fraction 3	1	0.653	0.653	0.653	0.653	0.000	mg/hph
94-95	TRANS	Organic carbon	2	139.106	38.702	239.509	139.106	100.403	mg/hph
94-95	TRANS	Organic Carbon Fraction 1	1	48.586	48.586	48.586	48.586	0.000	mg/hph
94-95	TRANS	Organic Carbon Fraction 2	1	52.723	52.723	52.723	52.723	0.000	mg/hph
94-95	TRANS	Organic Carbon Fraction 3	1	91.698	91.698	91.698	91.698	0.000	mg/hph
94-95	TRANS	Organic Carbon Fraction 4	1	46.378	46.378	46.378	46.378	0.000	mg/hph
94-95	TRANS	Pyrolyzed Organic Carbon	1	0.187	0.187	0.187	0.187	0.000	mg/hph
94-95	TRANS	Total Carbon	1	403.121	403.121	403.121	403.121	0.000	mg/hph
96-97	CRUISE	Elemental carbon	2	44.068	39.686	48.449	44.068	4.381	mg/hph
96-97	CRUISE	Elemental Carbon Fraction 1	2	21.486	19.564	23.408	21.486	1.922	mg/hph
96-97	CRUISE	Elemental Carbon Fraction 2	2	25.669	22.435	28.903	25.669	3.234	mg/hph
96-97	CRUISE	Organic carbon	2	22.540	19.707	25.372	22.540	2.833	mg/hph
96-97	CRUISE	Organic Carbon Fraction 1	2	4.445	3.326	5.563	4.445	1.119	mg/hph
96-97	CRUISE	Organic Carbon Fraction 2	2	3.268	2.247	4.288	3.268	1.021	mg/hph
96-97	CRUISE	Organic Carbon Fraction 3	2	6.054	3.260	8.847	6.054	2.793	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	CRUISE	Organic Carbon Fraction 4	2	5.686	4.719	6.653	5.686	0.967	mg/hph
96-97	CRUISE	Pyrolyzed Organic Carbon	2	3.087	0.018	6.156	3.087	3.069	mg/hph
96-97	CRUISE	Total Carbon	2	66.585	59.373	73.797	66.585	7.212	mg/hph
96-97	IDLE	Elemental carbon	2	32.417	24.743	40.092	32.417	7.675	mg/mode
96-97	IDLE	Elemental Carbon Fraction 1	2	15.438	10.458	20.418	15.438	4.980	mg/mode
96-97	IDLE	Elemental Carbon Fraction 2	2	17.087	14.417	19.757	17.087	2.670	mg/mode
96-97	IDLE	Organic carbon	2	24.502	23.766	25.238	24.502	0.736	mg/mode
96-97	IDLE	Organic Carbon Fraction 1	1	6.551	6.551	6.551	6.551	0.000	mg/mode
96-97	IDLE	Organic Carbon Fraction 2	2	6.986	0.413	13.559	6.986	6.573	mg/mode
96-97	IDLE	Organic Carbon Fraction 3	2	14.348	10.271	18.425	14.348	4.077	mg/mode
96-97	IDLE	Organic Carbon Fraction 4	2	6.529	6.510	6.549	6.529	0.019	mg/mode
96-97	IDLE	Total Carbon	2	55.226	48.661	61.791	55.226	6.565	mg/mode
96-97	TRANS	Elemental carbon	2	0.566	0.519	0.613	0.566	0.047	mg/hph
96-97	TRANS	Elemental Carbon Fraction 1	2	0.293	0.273	0.313	0.293	0.020	mg/hph
96-97	TRANS	Elemental Carbon Fraction 2	2	0.358	0.304	0.412	0.358	0.054	mg/hph
96-97	TRANS	Organic carbon	1	0.112	0.112	0.112	0.112	0.000	mg/hph
96-97	TRANS	Organic Carbon Fraction 2	2	0.140	0.103	0.178	0.140	0.038	mg/hph
96-97	TRANS	Organic Carbon Fraction 3	1	0.361	0.361	0.361	0.361	0.000	mg/hph
96-97	TRANS	Organic Carbon Fraction 4	1	0.124	0.124	0.124	0.124	0.000	mg/hph
96-97	TRANS	Pyrolyzed Organic Carbon	1	0.162	0.162	0.162	0.162	0.000	mg/hph
96-97	TRANS	Total Carbon	2	0.454	0.230	0.678	0.454	0.224	mg/hph
98-03	TRANS	Elemental carbon	2	83.864	80.498	87.230	83.864	3.366	mg/hph
98-03	TRANS	Elemental Carbon Fraction 1	2	8.818	8.575	9.062	8.818	0.244	mg/hph
98-03	TRANS	Elemental Carbon Fraction 2	2	68.564	62.940	74.188	68.564	5.624	mg/hph
98-03	TRANS	Elemental Carbon Fraction 3	2	6.480	4.093	8.866	6.480	2.387	mg/hph
98-03	TRANS	Organic carbon	2	182.957	168.871	197.044	182.957	14.087	mg/hph
98-03	TRANS	Organic Carbon Fraction 1	2	59.353	34.270	84.436	59.353	25.083	mg/hph
98-03	TRANS	Organic Carbon Fraction 2	2	44.025	37.884	50.165	44.025	6.141	mg/hph
98-03	TRANS	Organic Carbon Fraction 3	2	55.173	48.019	62.327	55.173	7.154	mg/hph
98-03	TRANS	Organic Carbon Fraction 4	2	24.393	22.137	26.649	24.393	2.256	mg/hph
98-03	TRANS	Total Carbon	2	266.822	249.369	284.275	266.822	17.453	mg/hph

Total records	102
Total with 1 record	57
Total with 2 records	35
Max number of records	4
Total with max number of records	10

Table B-3d. Elemental/Organic Carbon, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	Elemental carbon	1	391.358	391.358	391.358	391.358	0.000	mg/hph
pre-87	TRANS	Elemental Carbon Fraction 1	1	59.312	59.312	59.312	59.312	0.000	mg/hph
pre-87	TRANS	Elemental Carbon Fraction 2	1	332.128	332.128	332.128	332.128	0.000	mg/hph
pre-87	TRANS	Organic carbon	1	152.263	152.263	152.263	152.263	0.000	mg/hph
pre-87	TRANS	Organic Carbon Fraction 1	1	45.238	45.238	45.238	45.238	0.000	mg/hph
pre-87	TRANS	Organic Carbon Fraction 2	1	32.576	32.576	32.576	32.576	0.000	mg/hph
pre-87	TRANS	Organic Carbon Fraction 3	1	54.215	54.215	54.215	54.215	0.000	mg/hph
pre-87	TRANS	Organic Carbon Fraction 4	1	20.217	20.217	20.217	20.217	0.000	mg/hph
pre-87	TRANS	Pyrolyzed Organic Carbon	1	0.049	0.049	0.049	0.049	0.000	mg/hph
pre-87	TRANS	Total Carbon	1	543.703	543.703	543.703	543.703	0.000	mg/hph
pre-87	BUS	Elemental carbon	1	841.867	841.867	841.867	841.867	0.000	mg/hph
pre-87	BUS	Elemental Carbon Fraction 1	1	29.992	29.992	29.992	29.992	0.000	mg/hph
pre-87	BUS	Elemental Carbon Fraction 2	1	803.423	803.423	803.423	803.423	0.000	mg/hph
pre-87	BUS	Elemental Carbon Fraction 3	1	8.452	8.452	8.452	8.452	0.000	mg/hph
pre-87	BUS	Organic carbon	1	415.994	415.994	415.994	415.994	0.000	mg/hph
pre-87	BUS	Organic Carbon Fraction 1	1	154.598	154.598	154.598	154.598	0.000	mg/hph
pre-87	BUS	Organic Carbon Fraction 2	1	92.940	92.940	92.940	92.940	0.000	mg/hph
pre-87	BUS	Organic Carbon Fraction 3	1	126.198	126.198	126.198	126.198	0.000	mg/hph
pre-87	BUS	Organic Carbon Fraction 4	1	42.148	42.148	42.148	42.148	0.000	mg/hph
pre-87	BUS	Pyrolyzed Organic Carbon	1	0.137	0.137	0.137	0.137	0.000	mg/hph
pre-87	BUS	Total Carbon	1	1257.862	1257.862	1257.862	1257.862	0.000	mg/hph
87-90	BUS	Elemental carbon	4	118.102	91.140	171.430	104.920	32.603	mg/hph
87-90	BUS	Organic carbon	4	212.986	54.250	388.430	204.631	144.639	mg/hph
87-90	BUS	Total Carbon	4	331.034	178.374	506.261	319.750	134.205	mg/hph
91-93	TRANS	Elemental carbon	1	128.333	128.333	128.333	128.333	0.000	mg/hph
91-93	TRANS	Elemental Carbon Fraction 1	1	12.955	12.955	12.955	12.955	0.000	mg/hph
91-93	TRANS	Elemental Carbon Fraction 2	1	115.459	115.459	115.459	115.459	0.000	mg/hph
91-93	TRANS	Organic carbon	1	120.727	120.727	120.727	120.727	0.000	mg/hph
91-93	TRANS	Organic Carbon Fraction 1	1	68.916	68.916	68.916	68.916	0.000	mg/hph
91-93	TRANS	Organic Carbon Fraction 2	1	19.986	19.986	19.986	19.986	0.000	mg/hph
91-93	TRANS	Organic Carbon Fraction 3	1	23.781	23.781	23.781	23.781	0.000	mg/hph
91-93	TRANS	Organic Carbon Fraction 4	1	8.027	8.027	8.027	8.027	0.000	mg/hph
91-93	TRANS	Pyrolyzed Organic Carbon	1	0.040	0.040	0.040	0.040	0.000	mg/hph
91-93	TRANS	Total Carbon	1	249.140	249.140	249.140	249.140	0.000	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	BUS	Elemental carbon	1	472.430	472.430	472.430	472.430	0.000	mg/hph
91-93	BUS	Elemental Carbon Fraction 1	1	22.480	22.480	22.480	22.480	0.000	mg/hph
91-93	BUS	Elemental Carbon Fraction 2	1	448.468	448.468	448.468	448.468	0.000	mg/hph
91-93	BUS	Elemental Carbon Fraction 3	1	1.563	1.563	1.563	1.563	0.000	mg/hph
91-93	BUS	Organic carbon	1	243.628	243.628	243.628	243.628	0.000	mg/hph
91-93	BUS	Organic Carbon Fraction 1	1	74.544	74.544	74.544	74.544	0.000	mg/hph
91-93	BUS	Organic Carbon Fraction 2	1	60.880	60.880	60.880	60.880	0.000	mg/hph
91-93	BUS	Organic Carbon Fraction 3	1	85.590	85.590	85.590	85.590	0.000	mg/hph
91-93	BUS	Organic Carbon Fraction 4	1	22.506	22.506	22.506	22.506	0.000	mg/hph
91-93	BUS	Pyrolyzed Organic Carbon	1	0.107	0.107	0.107	0.107	0.000	mg/hph
91-93	BUS	Total Carbon	1	716.058	716.058	716.058	716.058	0.000	mg/hph
98-03	BUS	Elemental carbon	21	35.726	0.128	141.454	23.326	36.853	mg/hph
98-03	BUS	Organic carbon	23	7.715	0.556	24.182	4.815	7.301	mg/hph
98-03	BUS	Total Carbon	13	37.837	0.556	109.568	29.960	33.773	mg/hph

Total records	48
Total with 1 record	42
Total with 2 records	0
Max number of records	23
Total with max number of records	1

Table B-3e. Elemental/Organic Carbon, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	Elemental carbon	5	28.187	0.251	46.900	46.565	22.782	mg/hph
98-03	BUS	Organic carbon	5	16.107	2.613	26.767	23.115	10.650	mg/hph

Total records	2
Total with 1 record	0
Total with 2 records	0
Max number of records	5
Total with max number of records	2

Table B-4a. Inorganic Ions, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	Cl-	2	0.183	0.107	0.259	0.183	0.076	mg/hph
pre-87	CRUISE	NH4+	2	0.373	0.196	0.550	0.373	0.177	mg/hph
pre-87	CRUISE	NO3-	1	0.214	0.214	0.214	0.214	0.000	mg/hph
pre-87	CRUISE	SO4-2	2	1.197	0.357	2.036	1.197	0.840	mg/hph
pre-87	IDLE	Cl-	2	1.788	1.776	1.800	1.788	0.012	mg/hph
pre-87	IDLE	NH4+	2	1.148	1.112	1.184	1.148	0.036	mg/hph
pre-87	IDLE	NO3-	2	1.711	1.589	1.832	1.711	0.122	mg/hph
pre-87	IDLE	SO4-2	1	1.589	1.589	1.589	1.589	0.000	mg/hph
pre-87	IDLE	Cl-	1	2.329	2.329	2.329	2.329	0.000	mg/mode
pre-87	IDLE	NH4+	1	2.874	2.874	2.874	2.874	0.000	mg/mode
pre-87	IDLE	NO3-	1	3.221	3.221	3.221	3.221	0.000	mg/mode
pre-87	IDLE	SO4-2	1	4.063	4.063	4.063	4.063	0.000	mg/mode
pre-87	TRANS	Cl-	7	0.799	0.169	1.314	0.710	0.330	mg/hph
pre-87	TRANS	NH4+	8	0.676	0.439	0.946	0.643	0.182	mg/hph
pre-87	TRANS	NO3-	3	0.746	0.491	0.951	0.795	0.191	mg/hph
pre-87	TRANS	SO4-2	5	2.219	0.781	3.295	2.956	1.076	mg/hph
87-90	CRUISE	Cl-	1	0.021	0.021	0.021	0.021	0.000	mg/hph
87-90	CRUISE	NH4+	1	0.104	0.104	0.104	0.104	0.000	mg/hph
87-90	CRUISE	NO2-	1	0.022	0.022	0.022	0.022	0.000	mg/hph
87-90	CRUISE	NO3-	1	0.066	0.066	0.066	0.066	0.000	mg/hph
87-90	CRUISE	SO4-2	1	0.167	0.167	0.167	0.167	0.000	mg/hph
87-90	IDLE	Cl-	1	1.049	1.049	1.049	1.049	0.000	mg/mode
87-90	IDLE	NH4+	1	8.425	8.425	8.425	8.425	0.000	mg/mode
87-90	IDLE	NO3-	1	13.641	13.641	13.641	13.641	0.000	mg/mode
87-90	IDLE	SO4-2	1	19.346	19.346	19.346	19.346	0.000	mg/mode
87-90	TRANS	Cl-	1	0.088	0.088	0.088	0.088	0.000	mg/hph
87-90	TRANS	NH4+	1	0.510	0.510	0.510	0.510	0.000	mg/hph
87-90	TRANS	NO3-	1	0.820	0.820	0.820	0.820	0.000	mg/hph
87-90	TRANS	SO4-2	1	0.742	0.742	0.742	0.742	0.000	mg/hph
91-93	IDLE	NH4+	2	20.000	13.000	27.000	20.000	7.000	mg/hph
91-93	TRANS	Cl-	1	0.757	0.757	0.757	0.757	0.000	mg/hph
91-93	TRANS	NH4+	5	13.044	2.019	19.000	14.100	6.079	mg/hph
91-93	TRANS	SO4-2	1	7.740	7.740	7.740	7.740	0.000	mg/hph
94-95	CRUISE	Cl-	7	0.098	0.030	0.180	0.087	0.049	mg/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	CRUISE	NH4+	7	0.593	0.273	1.268	0.381	0.356	mg/hph
94-95	CRUISE	NO2-	1	0.000	0.000	0.000	0.000	0.000	mg/hph
94-95	CRUISE	NO3-	6	0.184	0.111	0.337	0.154	0.078	mg/hph
94-95	CRUISE	SO4-2	7	1.808	0.729	4.256	1.517	1.124	mg/hph
94-95	IDLE	Cl-	5	5.693	1.923	10.308	4.760	3.619	mg/hph
94-95	IDLE	NH4+	5	2.350	1.426	4.510	1.923	1.123	mg/hph
94-95	IDLE	NO3-	2	1.487	1.261	1.712	1.487	0.226	mg/hph
94-95	IDLE	SO4-2	4	4.952	3.940	7.191	4.338	1.304	mg/hph
94-95	IDLE	Cl-	5	2.891	1.713	6.374	2.087	1.763	mg/mode
94-95	IDLE	NH4+	6	4.197	1.821	11.799	3.008	3.441	mg/mode
94-95	IDLE	NO3-	3	4.639	1.390	9.816	2.710	3.700	mg/mode
94-95	IDLE	SO4-2	6	13.238	3.748	50.642	6.291	16.790	mg/mode
94-95	TRANS	Cl-	12	0.482	0.087	1.149	0.451	0.357	mg/hph
94-95	TRANS	NH4+	15	0.805	0.391	1.330	0.721	0.289	mg/hph
94-95	TRANS	NO3-	6	0.448	0.333	0.717	0.391	0.127	mg/hph
94-95	TRANS	SO4-2	15	2.231	1.037	4.226	2.034	0.798	mg/hph
98-03	CRUISE	Cl-	2	0.008	0.004	0.011	0.008	0.004	mg/hph
98-03	CRUISE	NH4+	3	0.525	0.344	0.709	0.521	0.149	mg/hph
98-03	CRUISE	NO2-	1	0.006	0.006	0.006	0.006	0.000	mg/hph
98-03	CRUISE	NO3-	3	0.126	0.075	0.181	0.124	0.043	mg/hph
98-03	CRUISE	SO4-2	3	1.552	0.811	2.222	1.624	0.579	mg/hph
98-03	IDLE	Cl-	3	1.455	0.679	2.691	0.996	0.883	mg/mode
98-03	IDLE	NH4+	3	11.759	8.665	15.590	11.022	2.874	mg/mode
98-03	IDLE	NO3-	3	10.658	2.185	17.124	12.666	6.262	mg/mode
98-03	IDLE	SO4-2	3	26.186	11.282	47.202	20.076	15.288	mg/mode
98-03	TRANS	Cl-	3	0.054	0.037	0.077	0.048	0.017	mg/hph
98-03	TRANS	NH4+	4	0.787	0.376	1.177	0.797	0.302	mg/hph
98-03	TRANS	NO2-	1	0.059	0.059	0.059	0.059	0.000	mg/hph
98-03	TRANS	NO3-	3	0.317	0.147	0.636	0.167	0.226	mg/hph
98-03	TRANS	SO4-2	3	1.910	0.815	3.632	1.283	1.233	mg/hph
98-03	BUS	Cl-	5	0.043	0.014	0.069	0.035	0.022	mg/hph
98-03	BUS	NH4+	5	0.338	0.156	0.692	0.277	0.188	mg/hph
98-03	BUS	NO3-	5	0.553	0.381	0.827	0.554	0.158	mg/hph
98-03	BUS	SO4-2	4	0.380	0.031	0.900	0.294	0.356	mg/hph

Total records	68
Total with 1 record	24
Total with 2 records	9
Max number of records	15
Total with max number of records	2

Table B-4b. Inorganic Ions, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	Cl-	13	0.230	0.020	0.720	0.110	0.231	mg/mi
pre-87	FTP	NH4+	22	0.655	0.030	2.830	0.335	0.790	mg/mi
pre-87	FTP	NO3-	24	0.449	0.030	2.780	0.334	0.527	mg/mi
pre-87	FTP	SO4-2	25	1.264	0.100	5.200	0.900	1.267	mg/mi
pre-87	TRANS	Cl-	2	0.076	0.051	0.102	0.076	0.026	mg/mi
pre-87	TRANS	NH4+	2	0.101	0.088	0.115	0.101	0.013	mg/mi
pre-87	TRANS	NO3-	1	0.138	0.138	0.138	0.138	0.000	mg/mi
pre-87	TRANS	SO4-2	2	0.223	0.154	0.293	0.223	0.070	mg/mi
87-90	FTP	Cl-	2	0.100	0.100	0.100	0.100	0.000	mg/mi
87-90	FTP	NH4+	4	0.225	0.200	0.300	0.200	0.043	mg/mi
87-90	FTP	NO3-	4	0.300	0.200	0.400	0.300	0.071	mg/mi
87-90	FTP	SO4-2	4	0.450	0.300	0.700	0.400	0.150	mg/mi
91-93	FTP	NH4+	3	0.167	0.100	0.200	0.200	0.047	mg/mi
91-93	FTP	NO3-	5	0.477	0.070	0.930	0.400	0.281	mg/mi
91-93	FTP	SO4-2	5	1.013	0.310	2.008	0.500	0.714	mg/mi
91-93	TRANS	Cl-	1	0.010	0.010	0.010	0.010	0.000	mg/mi
91-93	TRANS	NH4+	1	0.910	0.910	0.910	0.910	0.000	mg/mi
91-93	TRANS	NO3-	1	0.300	0.300	0.300	0.300	0.000	mg/mi
91-93	TRANS	SO4-2	1	2.630	2.630	2.630	2.630	0.000	mg/mi
94-95	FTP	NO3-	1	0.268	0.268	0.268	0.268	0.000	mg/mi
94-95	FTP	SO4-2	1	0.710	0.710	0.710	0.710	0.000	mg/mi
96-97	FTP	NO3-	1	0.119	0.119	0.119	0.119	0.000	mg/mi
96-97	FTP	SO4-2	1	0.345	0.345	0.345	0.345	0.000	mg/mi
98-03	FTP	NH4+	3	0.133	0.040	0.260	0.100	0.093	mg/mi
98-03	FTP	NO3-	3	0.160	0.060	0.210	0.210	0.071	mg/mi
98-03	FTP	SO4-2	3	0.310	0.090	0.580	0.260	0.203	mg/mi
98-03	TRANS	Cl-	1	0.040	0.040	0.040	0.040	0.000	mg/mi
98-03	TRANS	NH4+	2	0.650	0.600	0.700	0.650	0.050	mg/mi
98-03	TRANS	NO2-	2	0.100	0.090	0.110	0.100	0.010	mg/mi
98-03	TRANS	NO3-	2	0.240	0.210	0.270	0.240	0.030	mg/mi
98-03	TRANS	SO4-2	2	1.890	1.740	2.040	1.890	0.150	mg/mi

Total records	31
Total with 1 record	10
Total with 2 records	8
Max number of records	25
Total with max number of records	1

Table B-4c. Inorganic Ions, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	NH4+	1	1.876	1.876	1.876	1.876	0.000	mg/hph
pre-87	CRUISE	NO3-	1	0.581	0.581	0.581	0.581	0.000	mg/hph
pre-87	CRUISE	SO4-2	1	2.245	2.245	2.245	2.245	0.000	mg/hph
pre-87	TRANS	NH4+	4	1.728	0.672	3.797	1.222	1.271	mg/hph
pre-87	TRANS	NO3-	1	0.987	0.987	0.987	0.987	0.000	mg/hph
pre-87	TRANS	SO4-2	4	4.810	1.875	11.254	3.055	3.811	mg/hph
87-90	CRUISE	Cl-	1	0.338	0.338	0.338	0.338	0.000	mg/hph
87-90	CRUISE	NH4+	1	1.159	1.159	1.159	1.159	0.000	mg/hph
87-90	CRUISE	SO4-2	1	5.022	5.022	5.022	5.022	0.000	mg/hph
87-90	TRANS	NH4+	1	8.456	8.456	8.456	8.456	0.000	mg/hph
87-90	TRANS	NO3-	1	12.351	12.351	12.351	12.351	0.000	mg/hph
87-90	TRANS	SO4-2	1	20.585	20.585	20.585	20.585	0.000	mg/hph
94-95	CRUISE	NH4+	1	1.089	1.089	1.089	1.089	0.000	mg/hph
94-95	CRUISE	SO4-2	1	3.158	3.158	3.158	3.158	0.000	mg/hph
94-95	TRANS	Cl-	1	5.459	5.459	5.459	5.459	0.000	mg/hph
94-95	TRANS	NH4+	2	2.528	1.434	3.623	2.528	1.094	mg/hph
94-95	TRANS	NO2-	1	0.020	0.020	0.020	0.020	0.000	mg/hph
94-95	TRANS	NO3-	2	2.956	0.452	5.459	2.956	2.504	mg/hph
94-95	TRANS	SO4-2	2	6.206	1.965	10.448	6.206	4.242	mg/hph
96-97	CRUISE	Cl-	1	0.017	0.017	0.017	0.017	0.000	mg/hph
96-97	CRUISE	NH4+	1	2.351	2.351	2.351	2.351	0.000	mg/hph
96-97	CRUISE	NO3-	1	0.044	0.044	0.044	0.044	0.000	mg/hph
96-97	CRUISE	SO4-2	1	13.329	13.329	13.329	13.329	0.000	mg/hph
96-97	IDLE	Cl-	1	11.472	11.472	11.472	11.472	0.000	mg/mode
96-97	IDLE	NH4+	1	50.186	50.186	50.186	50.186	0.000	mg/mode
96-97	IDLE	NO3-	1	196.471	196.471	196.471	196.471	0.000	mg/mode
96-97	IDLE	SO4-2	1	22.459	22.459	22.459	22.459	0.000	mg/mode
96-97	TRANS	Cl-	1	0.084	0.084	0.084	0.084	0.000	mg/hph
96-97	TRANS	NH4+	1	0.582	0.582	0.582	0.582	0.000	mg/hph
96-97	TRANS	NO3-	1	1.915	1.915	1.915	1.915	0.000	mg/hph
96-97	TRANS	SO4-2	1	0.242	0.242	0.242	0.242	0.000	mg/hph
98-03	TRANS	Cl-	1	1.140	1.140	1.140	1.140	0.000	mg/hph
98-03	TRANS	NH4+	2	1.039	0.850	1.227	1.039	0.188	mg/hph

Total records	33
Total with 1 record	27
Total with 2 records	4
Max number of records	4
Total with max number of records	2

Table B-4d. Inorganic Ions, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	NH4+	1	1.314	1.314	1.314	1.314	0.000	mg/hph
pre-87	TRANS	SO4-2	1	3.941	3.941	3.941	3.941	0.000	mg/hph
pre-87	BUS	Cl-	1	1.876	1.876	1.876	1.876	0.000	mg/hph
pre-87	BUS	NH4+	1	1.279	1.279	1.279	1.279	0.000	mg/hph
pre-87	BUS	SO4-2	1	4.605	4.605	4.605	4.605	0.000	mg/hph
87-90	BUS	Cl-	1	0.119	0.119	0.119	0.119	0.000	mg/hph
87-90	BUS	NO2-	4	0.035	0.020	0.043	0.039	0.009	mg/hph
87-90	BUS	NO3-	4	0.146	0.067	0.256	0.130	0.071	mg/hph
87-90	BUS	SO4-2	4	1.256	0.206	1.805	1.507	0.633	mg/hph
91-93	TRANS	Cl-	1	0.124	0.124	0.124	0.124	0.000	mg/hph
91-93	TRANS	NH4+	1	0.420	0.420	0.420	0.420	0.000	mg/hph
91-93	TRANS	SO4-2	1	1.779	1.779	1.779	1.779	0.000	mg/hph
91-93	BUS	Cl-	1	0.366	0.366	0.366	0.366	0.000	mg/hph
91-93	BUS	NH4+	1	0.529	0.529	0.529	0.529	0.000	mg/hph
91-93	BUS	SO4-2	1	1.953	1.953	1.953	1.953	0.000	mg/hph
98-03	BUS	Cl-	6	0.049	0.019	0.079	0.043	0.019	mg/hph
98-03	BUS	NH4+	4	0.183	0.086	0.364	0.141	0.107	mg/hph
98-03	BUS	NO3-	6	0.326	0.024	0.663	0.353	0.237	mg/hph
98-03	BUS	SO4-2	15	3.814	0.043	13.268	1.776	4.348	mg/hph

Total records	19
Total with 1 record	12
Total with 2 records	0
Max number of records	15
Total with max number of records	1

Table B-4e. Inorganic Ions, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	Cl-	4	0.056	0.023	0.067	0.067	0.019	mg/hph
98-03	BUS	NH4+	5	0.181	0.111	0.335	0.157	0.079	mg/hph
98-03	BUS	NO3-	5	0.210	0.080	0.312	0.255	0.102	mg/hph
98-03	BUS	SO4-2	4	0.926	0.000	2.100	0.802	0.881	mg/hph

Total records	4
Total with 1 record	0
Total with 2 records	0
Max number of records	5
Total with max number of records	2

Table B-5a. Elements, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	Ag	2	31.233	4.771	57.696	31.233	26.463	ug/hph
pre-87	CRUISE	Al	2	54.855	9.742	99.968	54.855	45.113	ug/hph
pre-87	CRUISE	As	1	1.014	1.014	1.014	1.014	0.000	ug/hph
pre-87	CRUISE	Au	1	37.408	37.408	37.408	37.408	0.000	ug/hph
pre-87	CRUISE	Ba	2	79.253	11.275	147.232	79.253	67.979	ug/hph
pre-87	CRUISE	Br	2	1.149	0.315	1.984	1.149	0.835	ug/hph
pre-87	CRUISE	Ca	2	337.443	305.638	369.248	337.443	31.805	ug/hph
pre-87	CRUISE	Cd	1	5.227	5.227	5.227	5.227	0.000	ug/hph
pre-87	CRUISE	Cl	2	79.857	15.649	144.064	79.857	64.207	ug/hph
pre-87	CRUISE	Cu	1	24.896	24.896	24.896	24.896	0.000	ug/hph
pre-87	CRUISE	Fe	2	444.249	11.698	876.800	444.249	432.551	ug/hph
pre-87	CRUISE	Ga	1	10.528	10.528	10.528	10.528	0.000	ug/hph
pre-87	CRUISE	Hg	2	9.400	1.680	17.120	9.400	7.720	ug/hph
pre-87	CRUISE	In	1	0.007	0.007	0.007	0.007	0.000	ug/hph
pre-87	CRUISE	K	1	32.256	32.256	32.256	32.256	0.000	ug/hph
pre-87	CRUISE	Mg	1	193.600	193.600	193.600	193.600	0.000	ug/hph
pre-87	CRUISE	Mn	1	0.102	0.102	0.102	0.102	0.000	ug/hph
pre-87	CRUISE	Na	2	390.907	109.398	672.416	390.907	281.509	ug/hph
pre-87	CRUISE	Ni	2	4.086	0.523	7.648	4.086	3.562	ug/hph
pre-87	CRUISE	P	2	124.546	100.292	148.800	124.546	24.254	ug/hph
pre-87	CRUISE	Pd	2	50.171	3.414	96.928	50.171	46.757	ug/hph
pre-87	CRUISE	S	2	735.945	326.035	1145.856	735.945	409.911	ug/hph
pre-87	CRUISE	Sb	1	59.904	59.904	59.904	59.904	0.000	ug/hph
pre-87	CRUISE	Si	2	1247.077	100.267	2393.888	1247.077	1146.811	ug/hph
pre-87	CRUISE	Sr	2	0.686	0.060	1.312	0.686	0.626	ug/hph
pre-87	CRUISE	Ti	1	23.968	23.968	23.968	23.968	0.000	ug/hph
pre-87	CRUISE	Tl	2	8.840	0.303	17.376	8.840	8.536	ug/hph
pre-87	CRUISE	U	2	7.624	2.352	12.896	7.624	5.272	ug/hph
pre-87	CRUISE	V	1	2.240	2.240	2.240	2.240	0.000	ug/hph
pre-87	CRUISE	Y	1	6.592	6.592	6.592	6.592	0.000	ug/hph
pre-87	CRUISE	Zn	2	300.490	149.685	451.296	300.490	150.806	ug/hph
pre-87	CRUISE	Zr	1	2.752	2.752	2.752	2.752	0.000	ug/hph
pre-87	IDLE	Ag	2	38.782	20.022	57.543	38.782	18.761	ug/hph
pre-87	IDLE	Al	2	239.384	239.043	239.725	239.384	0.341	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	IDLE	As	2	6.946	2.960	10.933	6.946	3.987	ug/hph
pre-87	IDLE	Br	1	5.352	5.352	5.352	5.352	0.000	ug/hph
pre-87	IDLE	Ca	2	1556.373	1516.902	1595.844	1556.373	39.471	ug/hph
pre-87	IDLE	Cd	1	57.628	57.628	57.628	57.628	0.000	ug/hph
pre-87	IDLE	Cl	2	202.688	142.132	263.244	202.688	60.556	ug/hph
pre-87	IDLE	Cr	1	2.187	2.187	2.187	2.187	0.000	ug/hph
pre-87	IDLE	Cu	1	25.607	25.607	25.607	25.607	0.000	ug/hph
pre-87	IDLE	Fe	2	177.881	119.261	236.502	177.881	58.621	ug/hph
pre-87	IDLE	Ga	1	20.255	20.255	20.255	20.255	0.000	ug/hph
pre-87	IDLE	Hg	1	20.025	20.025	20.025	20.025	0.000	ug/hph
pre-87	IDLE	K	2	171.103	70.663	271.543	171.103	100.440	ug/hph
pre-87	IDLE	La	1	366.313	366.313	366.313	366.313	0.000	ug/hph
pre-87	IDLE	Mg	2	472.535	376.217	568.853	472.535	96.318	ug/hph
pre-87	IDLE	Mn	2	7.411	4.086	10.736	7.411	3.325	ug/hph
pre-87	IDLE	Mo	1	25.319	25.319	25.319	25.319	0.000	ug/hph
pre-87	IDLE	Na	2	1781.464	1438.175	2124.753	1781.464	343.289	ug/hph
pre-87	IDLE	Ni	2	13.994	9.518	18.471	13.994	4.477	ug/hph
pre-87	IDLE	P	2	608.986	570.483	647.489	608.986	38.503	ug/hph
pre-87	IDLE	Pb	1	7.883	7.883	7.883	7.883	0.000	ug/hph
pre-87	IDLE	Pd	2	47.939	46.898	48.981	47.939	1.042	ug/hph
pre-87	IDLE	S	2	2126.642	1977.815	2275.468	2126.642	148.827	ug/hph
pre-87	IDLE	Sb	1	41.661	41.661	41.661	41.661	0.000	ug/hph
pre-87	IDLE	Si	2	1512.922	1387.998	1637.845	1512.922	124.924	ug/hph
pre-87	IDLE	Sr	2	5.942	3.482	8.401	5.942	2.460	ug/hph
pre-87	IDLE	Ti	1	36.271	36.271	36.271	36.271	0.000	ug/hph
pre-87	IDLE	Tl	2	2.305	0.754	3.855	2.305	1.550	ug/hph
pre-87	IDLE	U	1	3.308	3.308	3.308	3.308	0.000	ug/hph
pre-87	IDLE	Y	1	7.020	7.020	7.020	7.020	0.000	ug/hph
pre-87	IDLE	Zn	2	827.971	796.685	859.256	827.971	31.286	ug/hph
pre-87	IDLE	Al	1	418.065	418.065	418.065	418.065	0.000	ug/mode
pre-87	IDLE	Ba	1	8.200	8.200	8.200	8.200	0.000	ug/mode
pre-87	IDLE	Br	1	4.889	4.889	4.889	4.889	0.000	ug/mode
pre-87	IDLE	Ca	1	2584.404	2584.404	2584.404	2584.404	0.000	ug/mode
pre-87	IDLE	Cl	1	235.132	235.132	235.132	235.132	0.000	ug/mode
pre-87	IDLE	Cu	1	80.901	80.901	80.901	80.901	0.000	ug/mode
pre-87	IDLE	Fe	1	686.157	686.157	686.157	686.157	0.000	ug/mode
pre-87	IDLE	Ga	1	16.086	16.086	16.086	16.086	0.000	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	IDLE	Hg	1	15.612	15.612	15.612	15.612	0.000	ug/mode
pre-87	IDLE	La	1	122.691	122.691	122.691	122.691	0.000	ug/mode
pre-87	IDLE	Mg	1	960.399	960.399	960.399	960.399	0.000	ug/mode
pre-87	IDLE	Mn	1	32.960	32.960	32.960	32.960	0.000	ug/mode
pre-87	IDLE	Na	1	9609.355	9609.355	9609.355	9609.355	0.000	ug/mode
pre-87	IDLE	Ni	1	71.596	71.596	71.596	71.596	0.000	ug/mode
pre-87	IDLE	P	1	926.809	926.809	926.809	926.809	0.000	ug/mode
pre-87	IDLE	Pb	1	61.661	61.661	61.661	61.661	0.000	ug/mode
pre-87	IDLE	Pd	1	89.574	89.574	89.574	89.574	0.000	ug/mode
pre-87	IDLE	S	1	3874.241	3874.241	3874.241	3874.241	0.000	ug/mode
pre-87	IDLE	Sb	1	59.453	59.453	59.453	59.453	0.000	ug/mode
pre-87	IDLE	Si	1	3310.933	3310.933	3310.933	3310.933	0.000	ug/mode
pre-87	IDLE	Sn	1	53.461	53.461	53.461	53.461	0.000	ug/mode
pre-87	IDLE	Sr	1	20.501	20.501	20.501	20.501	0.000	ug/mode
pre-87	IDLE	Tl	1	2.839	2.839	2.839	2.839	0.000	ug/mode
pre-87	IDLE	U	1	43.210	43.210	43.210	43.210	0.000	ug/mode
pre-87	IDLE	V	1	2.523	2.523	2.523	2.523	0.000	ug/mode
pre-87	IDLE	Zn	1	1258.612	1258.612	1258.612	1258.612	0.000	ug/mode
pre-87	TRANS	Ag	2	23.964	5.720	42.208	23.964	18.244	ug/hph
pre-87	TRANS	Al	6	341.475	103.323	789.184	246.093	229.031	ug/hph
pre-87	TRANS	As	3	5.561	2.475	9.664	4.544	3.022	ug/hph
pre-87	TRANS	Au	1	1.248	1.248	1.248	1.248	0.000	ug/hph
pre-87	TRANS	Ba	4	595.468	109.520	951.552	660.400	307.049	ug/hph
pre-87	TRANS	Br	5	4.203	3.018	5.344	4.305	0.774	ug/hph
pre-87	TRANS	Ca	7	763.109	518.726	1014.560	714.828	181.281	ug/hph
pre-87	TRANS	Cd	3	17.901	9.870	22.648	21.184	5.710	ug/hph
pre-87	TRANS	Cl	7	212.368	41.698	491.584	162.304	170.320	ug/hph
pre-87	TRANS	Cu	4	33.760	2.240	69.600	31.600	25.525	ug/hph
pre-87	TRANS	Fe	7	982.050	37.218	2076.864	1251.328	833.675	ug/hph
pre-87	TRANS	Ga	1	10.880	10.880	10.880	10.880	0.000	ug/hph
pre-87	TRANS	Hg	3	4.590	2.342	6.117	5.312	1.623	ug/hph
pre-87	TRANS	In	2	43.820	37.760	49.879	43.820	6.060	ug/hph
pre-87	TRANS	K	6	175.196	35.100	351.392	178.032	122.712	ug/hph
pre-87	TRANS	La	3	118.561	3.229	331.254	21.202	150.575	ug/hph
pre-87	TRANS	Mg	7	388.126	209.568	683.104	309.790	183.329	ug/hph
pre-87	TRANS	Mn	2	2.383	1.024	3.743	2.383	1.359	ug/hph
pre-87	TRANS	Mo	1	11.001	11.001	11.001	11.001	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	Na	5	2043.792	1119.904	4648.157	1432.064	1331.548	ug/hph
pre-87	TRANS	Ni	3	4.952	3.515	6.679	4.663	1.308	ug/hph
pre-87	TRANS	P	7	263.350	138.464	408.448	230.993	103.760	ug/hph
pre-87	TRANS	Pb	3	34.965	1.024	64.256	39.616	26.023	ug/hph
pre-87	TRANS	Pd	3	32.086	16.365	52.320	27.575	15.021	ug/hph
pre-87	TRANS	Rb	1	13.216	13.216	13.216	13.216	0.000	ug/hph
pre-87	TRANS	S	7	1685.264	639.608	2484.320	1937.248	640.126	ug/hph
pre-87	TRANS	Sb	1	175.328	175.328	175.328	175.328	0.000	ug/hph
pre-87	TRANS	Si	7	3380.727	471.579	5908.992	5018.912	2330.959	ug/hph
pre-87	TRANS	Sn	1	17.776	17.776	17.776	17.776	0.000	ug/hph
pre-87	TRANS	Sr	4	4.798	4.032	6.464	4.347	0.975	ug/hph
pre-87	TRANS	Ti	2	45.792	37.760	53.824	45.792	8.032	ug/hph
pre-87	TRANS	Tl	2	22.592	6.080	39.104	22.592	16.512	ug/hph
pre-87	TRANS	U	6	13.622	3.515	36.896	8.776	11.473	ug/hph
pre-87	TRANS	V	1	2.528	2.528	2.528	2.528	0.000	ug/hph
pre-87	TRANS	Zn	7	615.230	257.809	927.424	785.856	252.405	ug/hph
pre-87	TRANS	Zr	2	23.824	22.496	25.152	23.824	1.328	ug/hph
87-90	IDLE	Ag	2	104.996	86.920	123.072	104.996	18.076	ug/mode
87-90	IDLE	Au	1	48.013	48.013	48.013	48.013	0.000	ug/mode
87-90	IDLE	Ca	2	2546.558	1953.421	3139.694	2546.558	593.137	ug/mode
87-90	IDLE	Cd	1	54.897	54.897	54.897	54.897	0.000	ug/mode
87-90	IDLE	Cobalt	2	25.563	20.434	30.692	25.563	5.129	ug/mode
87-90	IDLE	Cr	2	9.284	8.540	10.028	9.284	0.744	ug/mode
87-90	IDLE	Cu	2	231.830	67.096	396.564	231.830	164.734	ug/mode
87-90	IDLE	Fe	2	2345.265	1549.012	3141.518	2345.265	796.253	ug/mode
87-90	IDLE	Hg	2	54.790	50.627	58.953	54.790	4.163	ug/mode
87-90	IDLE	In	1	117.114	117.114	117.114	117.114	0.000	ug/mode
87-90	IDLE	K	1	223.048	223.048	223.048	223.048	0.000	ug/mode
87-90	IDLE	Mg	2	2781.886	2533.149	3030.623	2781.886	248.737	ug/mode
87-90	IDLE	Mn	2	24.504	22.874	26.134	24.504	1.630	ug/mode
87-90	IDLE	Na	2	15130.698	10503.025	19758.370	15130.698	4627.672	ug/mode
87-90	IDLE	Ni	2	74.850	52.762	96.938	74.850	22.088	ug/mode
87-90	IDLE	P	2	265.545	225.993	305.096	265.545	39.552	ug/mode
87-90	IDLE	Pd	1	25.009	25.009	25.009	25.009	0.000	ug/mode
87-90	IDLE	S	2	5063.275	4041.644	6084.905	5063.275	1021.631	ug/mode
87-90	IDLE	Si	2	828.617	636.196	1021.039	828.617	192.421	ug/mode
87-90	IDLE	Ti	2	48.653	17.689	79.617	48.653	30.964	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	IDLE	V	2	25.765	3.647	47.882	25.765	22.118	ug/mode
87-90	IDLE	Zn	2	932.897	746.905	1118.888	932.897	185.992	ug/mode
87-90	TRANS	Ag	1	22.139	22.139	22.139	22.139	0.000	ug/hph
87-90	TRANS	Al	2	671.997	469.781	874.214	671.997	202.217	ug/hph
87-90	TRANS	Ba	1	122.371	122.371	122.371	122.371	0.000	ug/hph
87-90	TRANS	Br	1	3.936	3.936	3.936	3.936	0.000	ug/hph
87-90	TRANS	Ca	2	3178.728	751.620	5605.836	3178.728	2427.108	ug/hph
87-90	TRANS	Cd	1	5.945	5.945	5.945	5.945	0.000	ug/hph
87-90	TRANS	Cl	2	155.898	83.172	228.623	155.898	72.726	ug/hph
87-90	TRANS	Cobalt	2	1.289	1.248	1.330	1.289	0.041	ug/hph
87-90	TRANS	Cr	1	0.750	0.750	0.750	0.750	0.000	ug/hph
87-90	TRANS	Cu	2	16.690	12.287	21.092	16.690	4.402	ug/hph
87-90	TRANS	Fe	2	796.877	795.008	798.746	796.877	1.869	ug/hph
87-90	TRANS	Hg	1	1.745	1.745	1.745	1.745	0.000	ug/hph
87-90	TRANS	In	1	16.982	16.982	16.982	16.982	0.000	ug/hph
87-90	TRANS	K	2	83.020	63.322	102.719	83.020	19.699	ug/hph
87-90	TRANS	La	1	296.710	296.710	296.710	296.710	0.000	ug/hph
87-90	TRANS	Mg	1	749.578	749.578	749.578	749.578	0.000	ug/hph
87-90	TRANS	Na	1	1327.767	1327.767	1327.767	1327.767	0.000	ug/hph
87-90	TRANS	Ni	2	5.239	3.400	7.077	5.239	1.839	ug/hph
87-90	TRANS	P	2	1760.305	176.179	3344.432	1760.305	1584.127	ug/hph
87-90	TRANS	Pd	1	7.627	7.627	7.627	7.627	0.000	ug/hph
87-90	TRANS	S	2	1176.651	1043.030	1310.271	1176.651	133.620	ug/hph
87-90	TRANS	Sb	1	555.686	555.686	555.686	555.686	0.000	ug/hph
87-90	TRANS	Si	2	486.066	275.006	697.127	486.066	211.060	ug/hph
87-90	TRANS	Sn	1	20.673	20.673	20.673	20.673	0.000	ug/hph
87-90	TRANS	Sr	2	8.853	4.695	13.011	8.853	4.158	ug/hph
87-90	TRANS	Zn	2	377.845	353.344	402.346	377.845	24.501	ug/hph
91-93	IDLE	Ba	3	1126.667	460.000	2270.000	650.000	812.171	ug/hph
91-93	IDLE	Br	3	436.667	200.000	650.000	460.000	184.451	ug/hph
91-93	IDLE	Ca	3	276.667	120.000	380.000	330.000	112.645	ug/hph
91-93	IDLE	Ce	2	27665.000	8850.000	46480.000	27665.000	18815.000	ug/hph
91-93	IDLE	Cl	3	193.333	80.000	290.000	210.000	86.538	ug/hph
91-93	IDLE	Cr	3	1276.667	640.000	2270.000	920.000	711.633	ug/hph
91-93	IDLE	Cu	3	943.333	330.000	1770.000	730.000	606.923	ug/hph
91-93	IDLE	Fe	3	1963.333	950.000	3090.000	1850.000	877.319	ug/hph
91-93	IDLE	Mg	3	436.667	330.000	580.000	400.000	105.304	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	IDLE	Mn	3	630.000	330.000	920.000	640.000	240.970	ug/hph
91-93	IDLE	Ni	3	416.667	330.000	540.000	380.000	89.567	ug/hph
91-93	IDLE	Pb	3	1816.667	1070.000	2580.000	1800.000	616.568	ug/hph
91-93	IDLE	S	3	4296.667	2630.000	6180.000	4080.000	1457.357	ug/hph
91-93	IDLE	Si	3	110.000	80.000	150.000	100.000	29.439	ug/hph
91-93	IDLE	V	3	1740.000	1020.000	2740.000	1460.000	729.566	ug/hph
91-93	IDLE	Zn	3	1623.333	540.000	3360.000	970.000	1240.493	ug/hph
91-93	TRANS	Ag	1	456.438	456.438	456.438	456.438	0.000	ug/hph
91-93	TRANS	Al	1	300.529	300.529	300.529	300.529	0.000	ug/hph
91-93	TRANS	Ba	7	1077.853	480.000	2160.000	804.972	557.880	ug/hph
91-93	TRANS	Br	7	489.194	4.355	660.000	590.000	213.088	ug/hph
91-93	TRANS	Ca	7	376.016	30.000	1282.112	250.000	386.707	ug/hph
91-93	TRANS	Cd	1	179.158	179.158	179.158	179.158	0.000	ug/hph
91-93	TRANS	Ce	4	27075.000	8650.000	48950.000	25350.000	18487.349	ug/hph
91-93	TRANS	Cl	7	156.020	62.143	260.000	190.000	72.275	ug/hph
91-93	TRANS	Cr	6	611.667	30.000	930.000	645.000	298.854	ug/hph
91-93	TRANS	Cu	6	698.333	170.000	1280.000	720.000	386.670	ug/hph
91-93	TRANS	Fe	7	1420.774	100.000	3000.000	1810.000	919.869	ug/hph
91-93	TRANS	In	1	233.328	233.328	233.328	233.328	0.000	ug/hph
91-93	TRANS	K	1	124.654	124.654	124.654	124.654	0.000	ug/hph
91-93	TRANS	Mg	7	895.281	30.000	3590.000	680.000	1140.098	ug/hph
91-93	TRANS	Mn	6	588.333	170.000	930.000	645.000	294.132	ug/hph
91-93	TRANS	Na	1	134.101	134.101	134.101	134.101	0.000	ug/hph
91-93	TRANS	Ni	6	401.667	170.000	540.000	465.000	143.691	ug/hph
91-93	TRANS	P	1	301.266	301.266	301.266	301.266	0.000	ug/hph
91-93	TRANS	Pb	6	1831.667	1100.000	2580.000	1805.000	579.264	ug/hph
91-93	TRANS	Pd	1	17.085	17.085	17.085	17.085	0.000	ug/hph
91-93	TRANS	S	7	2219.111	770.000	4900.000	1960.000	1234.290	ug/hph
91-93	TRANS	Si	7	526.274	50.000	2213.915	190.000	741.540	ug/hph
91-93	TRANS	Tl	1	12.362	12.362	12.362	12.362	0.000	ug/hph
91-93	TRANS	V	6	895.000	30.000	1470.000	1025.000	525.983	ug/hph
91-93	TRANS	Y	1	10.888	10.888	10.888	10.888	0.000	ug/hph
91-93	TRANS	Zn	7	904.637	30.000	2180.000	540.000	759.217	ug/hph
94-95	CRUISE	Ag	4	2.233	0.896	4.420	1.809	1.316	ug/hph
94-95	CRUISE	Al	8	42.569	2.756	228.446	18.416	70.582	ug/hph
94-95	CRUISE	As	6	0.353	0.052	0.650	0.341	0.210	ug/hph
94-95	CRUISE	Au	2	0.094	0.081	0.107	0.094	0.013	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	CRUISE	Ba	6	16.763	1.513	40.521	11.225	14.134	ug/hph
94-95	CRUISE	Br	6	0.436	0.185	0.666	0.466	0.163	ug/hph
94-95	CRUISE	Ca	8	435.373	218.966	773.261	271.051	251.718	ug/hph
94-95	CRUISE	Cd	4	6.261	3.050	11.168	5.413	3.083	ug/hph
94-95	CRUISE	Cl	3	3.660	1.841	5.470	3.670	1.482	ug/hph
94-95	CRUISE	Cobalt	5	0.818	0.302	1.122	0.885	0.305	ug/hph
94-95	CRUISE	Cr	3	0.626	0.336	0.965	0.577	0.259	ug/hph
94-95	CRUISE	Cu	8	4.938	0.056	12.974	1.622	5.365	ug/hph
94-95	CRUISE	Fe	8	108.414	4.492	389.674	7.404	141.482	ug/hph
94-95	CRUISE	Ga	3	1.003	0.259	2.027	0.724	0.748	ug/hph
94-95	CRUISE	Hg	3	0.343	0.207	0.548	0.273	0.148	ug/hph
94-95	CRUISE	In	5	2.408	0.168	5.224	2.393	1.638	ug/hph
94-95	CRUISE	K	4	35.681	0.645	132.498	4.791	55.925	ug/hph
94-95	CRUISE	La	3	39.646	28.084	55.014	35.839	11.319	ug/hph
94-95	CRUISE	Mg	6	72.409	28.962	100.470	89.076	31.176	ug/hph
94-95	CRUISE	Mn	5	1.625	0.377	5.576	0.845	1.986	ug/hph
94-95	CRUISE	Mo	6	2.659	0.853	4.073	2.434	1.120	ug/hph
94-95	CRUISE	Na	7	164.175	4.562	409.160	126.189	139.685	ug/hph
94-95	CRUISE	Ni	6	1.155	0.187	2.983	0.679	0.966	ug/hph
94-95	CRUISE	P	8	157.403	92.223	272.524	137.973	64.771	ug/hph
94-95	CRUISE	Pb	4	0.977	0.025	2.380	0.750	0.922	ug/hph
94-95	CRUISE	Pd	5	2.216	0.589	3.158	2.885	1.002	ug/hph
94-95	CRUISE	Rb	2	0.766	0.172	1.360	0.766	0.594	ug/hph
94-95	CRUISE	S	8	761.058	384.543	1229.882	808.687	270.141	ug/hph
94-95	CRUISE	Sb	5	2.253	1.089	3.638	1.903	0.908	ug/hph
94-95	CRUISE	Si	8	184.396	14.829	931.464	51.227	293.273	ug/hph
94-95	CRUISE	Sn	2	3.622	1.002	6.243	3.622	2.620	ug/hph
94-95	CRUISE	Sr	6	0.766	0.082	2.074	0.617	0.638	ug/hph
94-95	CRUISE	Ti	3	11.377	0.103	33.898	0.128	15.925	ug/hph
94-95	CRUISE	Tl	5	1.029	0.171	2.074	0.965	0.667	ug/hph
94-95	CRUISE	U	7	1.034	0.281	1.871	1.089	0.499	ug/hph
94-95	CRUISE	V	1	0.884	0.884	0.884	0.884	0.000	ug/hph
94-95	CRUISE	Y	1	0.127	0.127	0.127	0.127	0.000	ug/hph
94-95	CRUISE	Zn	8	201.015	119.284	358.952	158.175	89.482	ug/hph
94-95	CRUISE	Zr	1	0.015	0.015	0.015	0.015	0.000	ug/hph
94-95	IDLE	Ag	4	50.615	20.406	76.723	52.666	20.044	ug/hph
94-95	IDLE	Al	3	765.026	587.406	1032.588	675.084	192.551	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	IDLE	As	2	4.309	1.594	7.024	4.309	2.715	ug/hph
94-95	IDLE	Au	1	82.298	82.298	82.298	82.298	0.000	ug/hph
94-95	IDLE	Ba	3	302.548	88.880	556.652	262.112	193.096	ug/hph
94-95	IDLE	Br	4	6.402	0.307	12.869	6.217	4.463	ug/hph
94-95	IDLE	Ca	5	1155.059	277.122	2351.889	879.951	707.282	ug/hph
94-95	IDLE	Cd	5	71.152	4.883	270.324	16.410	100.991	ug/hph
94-95	IDLE	Cl	4	156.583	60.249	300.201	132.940	100.302	ug/hph
94-95	IDLE	Cobalt	2	3.536	2.519	4.554	3.536	1.018	ug/hph
94-95	IDLE	Cr	1	12.732	12.732	12.732	12.732	0.000	ug/hph
94-95	IDLE	Cu	2	7.009	4.512	9.507	7.009	2.497	ug/hph
94-95	IDLE	Fe	5	140.107	91.035	266.562	112.044	64.040	ug/hph
94-95	IDLE	Hg	3	10.671	3.338	17.717	10.960	5.874	ug/hph
94-95	IDLE	In	4	149.147	20.769	512.731	31.544	210.042	ug/hph
94-95	IDLE	K	4	139.848	61.612	287.266	105.257	88.689	ug/hph
94-95	IDLE	La	4	1093.050	31.124	3660.789	340.143	1494.856	ug/hph
94-95	IDLE	Mg	4	818.355	342.783	2121.145	404.745	752.625	ug/hph
94-95	IDLE	Mn	4	9.329	4.203	16.736	8.189	5.093	ug/hph
94-95	IDLE	Mo	3	89.525	25.674	216.734	26.168	89.950	ug/hph
94-95	IDLE	Na	4	6364.818	2496.670	15558.359	3702.122	5331.073	ug/hph
94-95	IDLE	Ni	5	22.101	2.334	80.054	9.024	29.129	ug/hph
94-95	IDLE	P	5	713.728	154.545	1172.644	807.210	339.049	ug/hph
94-95	IDLE	Pb	1	244.651	244.651	244.651	244.651	0.000	ug/hph
94-95	IDLE	Pd	4	91.144	32.245	230.330	51.001	81.395	ug/hph
94-95	IDLE	Rb	1	3.956	3.956	3.956	3.956	0.000	ug/hph
94-95	IDLE	S	5	2479.952	2207.710	2799.669	2557.303	222.050	ug/hph
94-95	IDLE	Si	5	807.400	284.048	1766.939	555.306	523.447	ug/hph
94-95	IDLE	Sn	1	69.352	69.352	69.352	69.352	0.000	ug/hph
94-95	IDLE	Sr	1	8.538	8.538	8.538	8.538	0.000	ug/hph
94-95	IDLE	Ti	2	34.363	15.637	53.088	34.363	18.726	ug/hph
94-95	IDLE	Tl	2	16.560	9.395	23.724	16.560	7.165	ug/hph
94-95	IDLE	U	3	47.969	6.020	110.215	27.672	44.893	ug/hph
94-95	IDLE	V	1	3.152	3.152	3.152	3.152	0.000	ug/hph
94-95	IDLE	Y	3	16.092	5.651	23.429	19.195	7.582	ug/hph
94-95	IDLE	Zn	5	751.833	348.876	1425.872	461.260	430.514	ug/hph
94-95	IDLE	Zr	1	28.709	28.709	28.709	28.709	0.000	ug/hph
94-95	IDLE	Ag	5	46.744	15.062	96.210	44.598	30.417	ug/mode
94-95	IDLE	Al	5	287.404	14.599	820.174	201.946	295.800	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	IDLE	As	2	11.085	2.378	19.792	11.085	8.707	ug/mode
94-95	IDLE	Au	3	49.847	0.159	146.312	3.069	68.222	ug/mode
94-95	IDLE	Ba	4	835.129	634.721	1047.369	829.213	147.054	ug/mode
94-95	IDLE	Br	4	4.717	1.841	7.907	4.560	2.471	ug/mode
94-95	IDLE	Ca	7	2975.910	510.850	7613.751	1451.544	2875.335	ug/mode
94-95	IDLE	Cd	3	438.715	82.672	1130.130	103.342	488.977	ug/mode
94-95	IDLE	Cl	4	61.335	18.029	85.115	71.098	26.570	ug/mode
94-95	IDLE	Cobalt	3	57.128	3.637	114.959	52.787	45.551	ug/mode
94-95	IDLE	Cr	2	77.711	72.122	83.299	77.711	5.589	ug/mode
94-95	IDLE	Cu	7	136.706	2.050	628.588	20.130	218.096	ug/mode
94-95	IDLE	Fe	7	2485.008	186.103	10956.178	354.450	3825.692	ug/mode
94-95	IDLE	Ga	2	14.943	0.159	29.728	14.943	14.785	ug/mode
94-95	IDLE	Hg	6	20.803	0.556	40.818	19.424	15.051	ug/mode
94-95	IDLE	In	3	100.180	85.115	113.234	102.190	11.568	ug/mode
94-95	IDLE	K	4	189.739	107.480	336.673	157.401	93.363	ug/mode
94-95	IDLE	La	3	724.154	384.608	1254.846	533.007	380.115	ug/mode
94-95	IDLE	Mg	5	1823.075	225.050	3653.995	1440.260	1275.863	ug/mode
94-95	IDLE	Mn	4	37.934	1.735	93.443	28.278	36.726	ug/mode
94-95	IDLE	Mo	6	24.974	1.272	68.238	17.761	23.777	ug/mode
94-95	IDLE	Na	5	7728.605	45.499	22528.878	6385.161	7857.867	ug/mode
94-95	IDLE	Ni	7	50.350	4.744	190.882	13.790	66.739	ug/mode
94-95	IDLE	P	7	899.300	228.204	1325.413	1121.733	433.905	ug/mode
94-95	IDLE	Pb	2	45.999	17.614	74.385	45.999	28.386	ug/mode
94-95	IDLE	Pd	5	44.595	27.360	86.066	29.728	22.411	ug/mode
94-95	IDLE	Rb	1	7.934	7.934	7.934	7.934	0.000	ug/mode
94-95	IDLE	S	7	6341.516	1767.703	15124.837	4540.162	4627.370	ug/mode
94-95	IDLE	Sb	2	18.393	4.611	32.176	18.393	13.782	ug/mode
94-95	IDLE	Si	7	976.197	598.854	1410.557	831.709	300.271	ug/mode
94-95	IDLE	Sn	1	206.367	206.367	206.367	206.367	0.000	ug/mode
94-95	IDLE	Sr	6	11.658	0.715	28.542	12.038	9.601	ug/mode
94-95	IDLE	Ti	3	55.404	16.289	98.668	51.253	33.759	ug/mode
94-95	IDLE	Tl	4	20.371	2.856	40.170	19.228	15.525	ug/mode
94-95	IDLE	U	5	21.392	10.724	51.873	16.456	15.442	ug/mode
94-95	IDLE	V	1	28.586	28.586	28.586	28.586	0.000	ug/mode
94-95	IDLE	Y	3	2.297	0.922	3.683	2.287	1.127	ug/mode
94-95	IDLE	Zn	7	1276.367	310.437	2777.159	984.603	916.994	ug/mode
94-95	IDLE	Zr	2	8.694	2.941	14.447	8.694	5.753	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	TRANS	Ag	10	17.219	8.608	25.583	17.933	5.770	ug/hph
94-95	TRANS	Al	9	71.135	3.259	243.809	57.188	68.277	ug/hph
94-95	TRANS	As	4	0.959	0.320	1.887	0.814	0.576	ug/hph
94-95	TRANS	Au	2	1.172	0.374	1.970	1.172	0.798	ug/hph
94-95	TRANS	Ba	10	191.016	28.973	887.395	96.437	243.962	ug/hph
94-95	TRANS	Br	8	2.479	1.020	4.899	2.246	1.215	ug/hph
94-95	TRANS	Ca	16	1051.312	125.018	9124.468	506.589	2095.492	ug/hph
94-95	TRANS	Cd	9	15.258	0.578	36.259	11.214	12.458	ug/hph
94-95	TRANS	Cl	12	51.853	1.989	221.447	27.080	61.167	ug/hph
94-95	TRANS	Cobalt	6	3.986	0.755	14.617	1.786	4.864	ug/hph
94-95	TRANS	Cr	2	9.220	4.459	13.982	9.220	4.761	ug/hph
94-95	TRANS	Cu	15	12.068	0.725	80.546	5.008	19.466	ug/hph
94-95	TRANS	Fe	16	306.760	19.819	3444.347	45.526	823.784	ug/hph
94-95	TRANS	Ga	4	4.745	1.788	7.344	4.925	2.009	ug/hph
94-95	TRANS	Hg	5	3.079	1.112	5.595	2.477	1.671	ug/hph
94-95	TRANS	In	4	26.179	13.890	36.411	27.208	8.180	ug/hph
94-95	TRANS	K	11	35.532	1.088	112.608	18.287	36.818	ug/hph
94-95	TRANS	La	10	196.619	47.060	605.988	142.510	157.201	ug/hph
94-95	TRANS	Mg	11	190.055	30.356	412.811	179.974	122.987	ug/hph
94-95	TRANS	Mn	5	5.024	0.480	17.704	1.684	6.515	ug/hph
94-95	TRANS	Mo	8	8.104	0.136	25.501	7.562	7.545	ug/hph
94-95	TRANS	Na	12	1166.686	60.711	3199.751	611.713	1184.825	ug/hph
94-95	TRANS	Ni	12	5.124	0.442	19.336	3.604	5.328	ug/hph
94-95	TRANS	P	16	473.172	77.316	4519.456	194.262	1047.690	ug/hph
94-95	TRANS	Pb	5	4.369	1.235	11.634	2.414	3.753	ug/hph
94-95	TRANS	Pd	10	8.598	1.729	23.562	7.289	6.734	ug/hph
94-95	TRANS	Rb	1	0.446	0.446	0.446	0.446	0.000	ug/hph
94-95	TRANS	S	16	1882.022	812.421	11228.489	1143.585	2442.619	ug/hph
94-95	TRANS	Sb	6	108.008	4.964	553.362	22.462	199.357	ug/hph
94-95	TRANS	Si	16	643.535	133.423	1254.145	463.432	348.880	ug/hph
94-95	TRANS	Sn	5	19.709	12.245	35.232	17.930	8.443	ug/hph
94-95	TRANS	Sr	9	2.449	0.069	6.845	1.368	2.239	ug/hph
94-95	TRANS	Ti	2	3.206	0.652	5.761	3.206	2.554	ug/hph
94-95	TRANS	Tl	12	3.039	0.049	7.922	2.881	2.290	ug/hph
94-95	TRANS	U	10	4.043	0.412	10.941	3.027	2.840	ug/hph
94-95	TRANS	V	2	2.064	1.543	2.584	2.064	0.520	ug/hph
94-95	TRANS	Y	2	0.382	0.254	0.510	0.382	0.128	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	TRANS	Zn	16	414.014	150.858	2055.098	283.947	434.202	ug/hph
94-95	TRANS	Zr	2	3.102	2.538	3.666	3.102	0.564	ug/hph
98-03	CRUISE	Ag	4	0.895	0.460	1.554	0.783	0.442	ug/hph
98-03	CRUISE	Al	4	9.911	2.210	30.832	3.300	12.095	ug/hph
98-03	CRUISE	As	1	0.218	0.218	0.218	0.218	0.000	ug/hph
98-03	CRUISE	Au	1	1.438	1.438	1.438	1.438	0.000	ug/hph
98-03	CRUISE	Ba	4	9.093	2.485	19.208	7.339	6.176	ug/hph
98-03	CRUISE	Br	6	0.369	0.031	0.555	0.435	0.169	ug/hph
98-03	CRUISE	Ca	6	199.371	53.699	852.736	70.141	292.376	ug/hph
98-03	CRUISE	Cd	2	0.430	0.080	0.779	0.430	0.350	ug/hph
98-03	CRUISE	Cl	1	7.453	7.453	7.453	7.453	0.000	ug/hph
98-03	CRUISE	Cobalt	5	1.072	0.364	1.626	1.214	0.524	ug/hph
98-03	CRUISE	Cr	6	0.723	0.178	1.434	0.619	0.468	ug/hph
98-03	CRUISE	Cu	6	2.377	0.805	6.078	1.811	1.701	ug/hph
98-03	CRUISE	Fe	6	79.338	27.890	231.700	49.524	69.832	ug/hph
98-03	CRUISE	Ga	1	0.529	0.529	0.529	0.529	0.000	ug/hph
98-03	CRUISE	Hg	4	0.097	0.019	0.196	0.087	0.064	ug/hph
98-03	CRUISE	In	3	0.689	0.256	1.043	0.769	0.326	ug/hph
98-03	CRUISE	K	5	5.806	2.547	7.984	6.023	2.036	ug/hph
98-03	CRUISE	La	2	6.116	5.787	6.445	6.116	0.329	ug/hph
98-03	CRUISE	Mg	5	19.202	10.739	32.205	15.169	8.167	ug/hph
98-03	CRUISE	Mn	5	0.528	0.337	0.687	0.544	0.143	ug/hph
98-03	CRUISE	Mo	4	0.494	0.031	0.945	0.500	0.323	ug/hph
98-03	CRUISE	Na	5	118.730	32.178	178.594	156.130	57.971	ug/hph
98-03	CRUISE	Ni	6	0.966	0.846	1.108	0.943	0.094	ug/hph
98-03	CRUISE	P	6	97.221	23.951	437.441	27.968	152.261	ug/hph
98-03	CRUISE	Pb	1	0.889	0.889	0.889	0.889	0.000	ug/hph
98-03	CRUISE	Pd	5	0.661	0.037	1.131	0.587	0.389	ug/hph
98-03	CRUISE	Rb	1	0.190	0.190	0.190	0.190	0.000	ug/hph
98-03	CRUISE	S	6	522.005	101.863	815.374	581.748	254.030	ug/hph
98-03	CRUISE	Sb	4	12.754	0.746	42.841	3.713	17.441	ug/hph
98-03	CRUISE	Si	6	66.653	7.780	144.591	37.648	55.074	ug/hph
98-03	CRUISE	Sn	2	2.006	1.746	2.265	2.006	0.259	ug/hph
98-03	CRUISE	Sr	5	0.272	0.056	0.577	0.254	0.200	ug/hph
98-03	CRUISE	Ti	1	2.838	2.838	2.838	2.838	0.000	ug/hph
98-03	CRUISE	U	1	0.814	0.814	0.814	0.814	0.000	ug/hph
98-03	CRUISE	V	1	0.647	0.647	0.647	0.647	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	CRUISE	Zn	6	75.402	38.280	210.846	49.365	60.975	ug/hph
98-03	CRUISE	Zr	1	0.230	0.230	0.230	0.230	0.000	ug/hph
98-03	IDLE	Ag	4	119.024	55.703	169.417	125.487	44.614	ug/mode
98-03	IDLE	Al	3	738.203	85.945	1589.526	539.138	629.767	ug/mode
98-03	IDLE	As	2	44.520	29.357	59.682	44.520	15.162	ug/mode
98-03	IDLE	Au	1	2.755	2.755	2.755	2.755	0.000	ug/mode
98-03	IDLE	Ba	6	1134.506	302.409	2906.220	917.560	864.765	ug/mode
98-03	IDLE	Br	4	8.875	0.917	23.873	5.355	9.315	ug/mode
98-03	IDLE	Ca	6	2592.388	665.841	4137.876	2669.286	1282.295	ug/mode
98-03	IDLE	Cd	1	34.079	34.079	34.079	34.079	0.000	ug/mode
98-03	IDLE	Cl	3	129.850	19.880	239.532	130.138	89.673	ug/mode
98-03	IDLE	Cobalt	5	16.166	4.899	29.969	19.269	9.652	ug/mode
98-03	IDLE	Cr	2	11.662	2.141	21.184	11.662	9.522	ug/mode
98-03	IDLE	Cu	6	103.318	7.345	317.019	36.275	117.512	ug/mode
98-03	IDLE	Fe	6	2484.128	625.162	4356.528	2198.098	1344.479	ug/mode
98-03	IDLE	Hg	5	63.771	11.974	116.230	74.923	42.540	ug/mode
98-03	IDLE	In	2	95.532	21.118	169.945	95.532	74.414	ug/mode
98-03	IDLE	K	6	660.853	268.538	1260.965	554.450	376.591	ug/mode
98-03	IDLE	La	3	1610.670	1046.933	2483.693	1301.384	626.000	ug/mode
98-03	IDLE	Mg	3	4382.646	2509.759	6883.401	3754.778	1839.900	ug/mode
98-03	IDLE	Mn	2	32.048	17.737	46.359	32.048	14.311	ug/mode
98-03	IDLE	Mo	2	71.225	42.368	100.082	71.225	28.857	ug/mode
98-03	IDLE	Na	6	13102.880	1761.921	30037.160	10714.300	10600.742	ug/mode
98-03	IDLE	Ni	6	20.780	5.811	41.338	21.756	11.344	ug/mode
98-03	IDLE	P	6	667.840	523.542	1058.677	603.501	177.596	ug/mode
98-03	IDLE	Pb	1	82.587	82.587	82.587	82.587	0.000	ug/mode
98-03	IDLE	Pd	2	44.669	30.300	59.037	44.669	14.369	ug/mode
98-03	IDLE	Rb	1	10.411	10.411	10.411	10.411	0.000	ug/mode
98-03	IDLE	S	6	5967.051	2798.737	12487.327	3062.382	4259.416	ug/mode
98-03	IDLE	Sb	3	94.858	61.242	154.867	68.464	42.536	ug/mode
98-03	IDLE	Si	6	4184.907	2409.760	7582.935	3195.382	1877.856	ug/mode
98-03	IDLE	Sn	2	37.142	5.206	69.078	37.142	31.936	ug/mode
98-03	IDLE	Sr	5	20.579	7.675	47.462	11.011	15.145	ug/mode
98-03	IDLE	Ti	2	135.871	22.139	249.602	135.871	113.732	ug/mode
98-03	IDLE	Tl	1	2.446	2.446	2.446	2.446	0.000	ug/mode
98-03	IDLE	U	4	18.444	8.302	34.891	15.292	10.065	ug/mode
98-03	IDLE	V	1	47.894	47.894	47.894	47.894	0.000	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	IDLE	Zn	6	805.146	207.368	1673.682	495.835	622.971	ug/mode
98-03	IDLE	Zr	4	18.992	2.447	30.606	21.458	10.577	ug/mode
98-03	TRANS	Ag	4	9.145	5.309	16.025	7.623	4.093	ug/hph
98-03	TRANS	Al	5	66.260	7.517	167.275	59.108	53.995	ug/hph
98-03	TRANS	As	1	2.771	2.771	2.771	2.771	0.000	ug/hph
98-03	TRANS	Au	2	35.048	10.411	59.685	35.048	24.637	ug/hph
98-03	TRANS	Ba	5	209.032	59.200	452.533	105.181	163.070	ug/hph
98-03	TRANS	Br	3	0.584	0.451	0.812	0.489	0.162	ug/hph
98-03	TRANS	Ca	7	592.786	76.929	1399.678	237.225	549.009	ug/hph
98-03	TRANS	Cd	1	0.959	0.959	0.959	0.959	0.000	ug/hph
98-03	TRANS	Cl	1	113.038	113.038	113.038	113.038	0.000	ug/hph
98-03	TRANS	Cobalt	7	9.712	0.843	45.153	2.725	14.715	ug/hph
98-03	TRANS	Cr	4	14.461	0.908	32.524	12.206	13.047	ug/hph
98-03	TRANS	Cu	6	27.921	1.592	64.893	22.057	26.319	ug/hph
98-03	TRANS	Fe	7	690.215	86.395	1861.509	256.356	699.249	ug/hph
98-03	TRANS	Ga	4	19.353	5.791	39.790	15.915	12.559	ug/hph
98-03	TRANS	Hg	6	4.923	2.421	7.092	5.094	1.766	ug/hph
98-03	TRANS	In	2	5.600	1.250	9.951	5.600	4.350	ug/hph
98-03	TRANS	K	7	58.363	11.452	127.259	49.189	41.767	ug/hph
98-03	TRANS	La	3	233.158	4.177	355.273	340.024	162.033	ug/hph
98-03	TRANS	Mg	4	404.162	182.248	962.022	236.190	322.983	ug/hph
98-03	TRANS	Mn	5	7.441	1.946	15.778	2.499	6.403	ug/hph
98-03	TRANS	Mo	4	3.625	0.686	10.752	1.532	4.130	ug/hph
98-03	TRANS	Na	3	1332.938	1174.938	1558.259	1265.616	163.571	ug/hph
98-03	TRANS	Ni	6	6.585	0.799	14.274	3.588	5.471	ug/hph
98-03	TRANS	P	7	146.994	6.968	427.961	146.668	134.145	ug/hph
98-03	TRANS	Pb	4	22.410	3.309	72.003	7.164	28.701	ug/hph
98-03	TRANS	Pd	5	7.079	1.551	20.036	4.976	6.642	ug/hph
98-03	TRANS	Rb	3	1.595	0.019	3.250	1.518	1.320	ug/hph
98-03	TRANS	S	7	1236.661	332.426	2479.814	859.476	837.439	ug/hph
98-03	TRANS	Sb	4	31.263	11.879	78.308	17.433	27.302	ug/hph
98-03	TRANS	Si	7	785.082	140.083	2918.268	504.710	883.568	ug/hph
98-03	TRANS	Sn	2	8.764	3.166	14.363	8.764	5.599	ug/hph
98-03	TRANS	Sr	5	2.573	1.238	4.461	2.214	1.270	ug/hph
98-03	TRANS	Ti	4	33.477	4.329	87.469	21.056	32.620	ug/hph
98-03	TRANS	U	3	12.070	0.646	33.804	1.760	15.375	ug/hph
98-03	TRANS	V	2	10.190	2.076	18.303	10.190	8.114	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	Zn	7	289.318	51.361	638.918	98.654	254.022	ug/hph
98-03	TRANS	Zr	3	4.994	2.132	9.901	2.950	3.485	ug/hph
98-03	BUS	Ca	5	53.146	0.692	159.160	1.038	66.312	ug/hph
98-03	BUS	Cu	2	1.384	0.692	2.076	1.384	0.692	ug/hph
98-03	BUS	Fe	5	9.619	2.768	22.836	4.498	7.778	ug/hph
98-03	BUS	Mg	4	26.815	6.920	69.200	15.570	24.755	ug/hph
98-03	BUS	Mo	2	0.519	0.346	0.692	0.519	0.173	ug/hph
98-03	BUS	P	5	32.455	2.768	83.040	10.380	33.579	ug/hph
98-03	BUS	Pb	5	1.868	0.692	4.498	1.384	1.360	ug/hph
98-03	BUS	S	5	189.331	21.452	460.180	93.074	177.602	ug/hph
98-03	BUS	Zn	4	37.974	0.346	84.424	33.562	38.141	ug/hph

Total records	489
Total with 1 record	122
Total with 2 records	110
Max number of records	16
Total with max number of records	6

Table B-5b. Elements, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	Ag	2	30.000	20.000	40.000	30.000	10.000	ug/mi
pre-87	FTP	Al	8	142.500	30.000	450.000	75.000	136.084	ug/mi
pre-87	FTP	Ba	13	149.231	20.000	370.000	80.000	121.178	ug/mi
pre-87	FTP	Br	8	64.125	10.000	214.000	28.500	71.609	ug/mi
pre-87	FTP	Ca	24	1010.167	20.000	6340.000	604.000	1320.832	ug/mi
pre-87	FTP	Cl	17	703.529	30.000	5670.000	340.000	1295.948	ug/mi
pre-87	FTP	Cr	8	55.250	10.000	117.000	50.000	34.824	ug/mi
pre-87	FTP	Cu	14	47.071	10.000	210.000	25.000	57.867	ug/mi
pre-87	FTP	Fe	24	1105.250	78.000	5900.000	292.500	1502.176	ug/mi
pre-87	FTP	In	3	23.333	10.000	50.000	10.000	18.856	ug/mi
pre-87	FTP	K	9	181.111	10.000	1210.000	20.000	368.132	ug/mi
pre-87	FTP	La	3	136.667	10.000	380.000	20.000	172.111	ug/mi
pre-87	FTP	Mg	17	193.529	10.000	1440.000	100.000	320.495	ug/mi
pre-87	FTP	Mn	4	20.000	10.000	30.000	20.000	7.071	ug/mi
pre-87	FTP	Mo	4	30.000	10.000	50.000	30.000	20.000	ug/mi
pre-87	FTP	Ni	9	25.556	10.000	70.000	20.000	21.660	ug/mi
pre-87	FTP	P	22	637.727	10.000	5670.000	325.000	1157.811	ug/mi
pre-87	FTP	Pb	6	108.333	10.000	440.000	45.000	150.490	ug/mi
pre-87	FTP	Pd	1	30.000	30.000	30.000	30.000	0.000	ug/mi
pre-87	FTP	S	26	1605.077	70.000	7230.000	1158.000	1510.820	ug/mi
pre-87	FTP	Sb	4	27.500	10.000	70.000	15.000	24.875	ug/mi
pre-87	FTP	Si	23	1253.870	100.000	3319.000	1130.000	850.887	ug/mi
pre-87	FTP	Sn	4	15.000	10.000	20.000	15.000	5.000	ug/mi
pre-87	FTP	Sr	1	10.000	10.000	10.000	10.000	0.000	ug/mi
pre-87	FTP	V	1	20.000	20.000	20.000	20.000	0.000	ug/mi
pre-87	FTP	Zn	26	1107.846	30.000	10950.000	522.500	2076.091	ug/mi
pre-87	TRANS	Ag	1	4.500	4.500	4.500	4.500	0.000	ug/mi
pre-87	TRANS	Al	2	39.000	29.700	48.300	39.000	9.300	ug/mi
pre-87	TRANS	Ba	2	78.600	12.200	145.000	78.600	66.400	ug/mi
pre-87	TRANS	Br	2	1.150	0.300	2.000	1.150	0.850	ug/mi
pre-87	TRANS	Ca	2	170.200	158.800	181.600	170.200	11.400	ug/mi
pre-87	TRANS	Cl	2	53.550	51.400	55.700	53.550	2.150	ug/mi
pre-87	TRANS	Cobalt	1	3.600	3.600	3.600	3.600	0.000	ug/mi
pre-87	TRANS	Cr	2	2.900	1.200	4.600	2.900	1.700	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	Cu	2	13.100	12.100	14.100	13.100	1.000	ug/mi
pre-87	TRANS	Fe	2	87.550	69.700	105.400	87.550	17.850	ug/mi
pre-87	TRANS	Ga	1	1.500	1.500	1.500	1.500	0.000	ug/mi
pre-87	TRANS	Hg	1	3.000	3.000	3.000	3.000	0.000	ug/mi
pre-87	TRANS	K	2	5.450	5.400	5.500	5.450	0.050	ug/mi
pre-87	TRANS	La	1	57.600	57.600	57.600	57.600	0.000	ug/mi
pre-87	TRANS	Mg	2	75.300	63.800	86.800	75.300	11.500	ug/mi
pre-87	TRANS	Mn	1	1.400	1.400	1.400	1.400	0.000	ug/mi
pre-87	TRANS	Mo	1	5.200	5.200	5.200	5.200	0.000	ug/mi
pre-87	TRANS	Na	1	94.300	94.300	94.300	94.300	0.000	ug/mi
pre-87	TRANS	Ni	2	2.350	1.600	3.100	2.350	0.750	ug/mi
pre-87	TRANS	P	2	105.200	93.200	117.200	105.200	12.000	ug/mi
pre-87	TRANS	Pb	2	8.550	4.200	12.900	8.550	4.350	ug/mi
pre-87	TRANS	Pd	2	1.900	0.300	3.500	1.900	1.600	ug/mi
pre-87	TRANS	S	2	439.550	408.000	471.100	439.550	31.550	ug/mi
pre-87	TRANS	Sb	2	14.950	8.700	21.200	14.950	6.250	ug/mi
pre-87	TRANS	Si	2	667.950	439.500	896.400	667.950	228.450	ug/mi
pre-87	TRANS	Sn	2	13.150	7.700	18.600	13.150	5.450	ug/mi
pre-87	TRANS	Sr	1	0.700	0.700	0.700	0.700	0.000	ug/mi
pre-87	TRANS	Y	1	0.900	0.900	0.900	0.900	0.000	ug/mi
pre-87	TRANS	Zn	2	204.250	197.300	211.200	204.250	6.950	ug/mi
pre-87	TRANS	Zr	1	2.000	2.000	2.000	2.000	0.000	ug/mi
87-90	FTP	Ca	4	300.000	100.000	500.000	300.000	158.114	ug/mi
87-90	FTP	Fe	1	100.000	100.000	100.000	100.000	0.000	ug/mi
87-90	FTP	Mg	2	100.000	100.000	100.000	100.000	0.000	ug/mi
87-90	FTP	P	4	175.000	100.000	300.000	150.000	82.916	ug/mi
87-90	FTP	S	4	350.000	300.000	400.000	350.000	50.000	ug/mi
87-90	FTP	Si	4	400.000	200.000	600.000	400.000	158.114	ug/mi
87-90	FTP	Zn	4	325.000	200.000	500.000	300.000	129.904	ug/mi
91-93	FTP	Al	1	10.000	10.000	10.000	10.000	0.000	ug/mi
91-93	FTP	Ba	1	60.000	60.000	60.000	60.000	0.000	ug/mi
91-93	FTP	Br	2	172.500	30.000	315.000	172.500	142.500	ug/mi
91-93	FTP	Ca	5	293.000	110.000	522.000	300.000	138.729	ug/mi
91-93	FTP	Cl	2	59.000	8.000	110.000	59.000	51.000	ug/mi
91-93	FTP	Cr	3	64.333	10.000	102.000	81.000	39.364	ug/mi
91-93	FTP	Cu	1	10.000	10.000	10.000	10.000	0.000	ug/mi
91-93	FTP	Fe	5	419.800	100.000	809.000	500.000	279.793	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	FTP	Mg	3	76.667	30.000	100.000	100.000	32.998	ug/mi
91-93	FTP	Mn	1	20.000	20.000	20.000	20.000	0.000	ug/mi
91-93	FTP	Ni	2	83.500	47.000	120.000	83.500	36.500	ug/mi
91-93	FTP	P	4	333.750	100.000	1035.000	100.000	404.867	ug/mi
91-93	FTP	S	5	1498.600	400.000	3284.000	600.000	1245.270	ug/mi
91-93	FTP	Si	4	950.000	200.000	2420.000	590.000	887.525	ug/mi
91-93	FTP	Zn	5	386.600	140.000	657.000	300.000	218.379	ug/mi
94-95	FTP	Br	1	20.000	20.000	20.000	20.000	0.000	ug/mi
94-95	FTP	Fe	1	209.000	209.000	209.000	209.000	0.000	ug/mi
94-95	FTP	Mn	1	104.000	104.000	104.000	104.000	0.000	ug/mi
94-95	FTP	S	1	1135.000	1135.000	1135.000	1135.000	0.000	ug/mi
94-95	FTP	Zn	1	846.000	846.000	846.000	846.000	0.000	ug/mi
96-97	FTP	Br	1	17.000	17.000	17.000	17.000	0.000	ug/mi
96-97	FTP	Ca	1	337.000	337.000	337.000	337.000	0.000	ug/mi
96-97	FTP	Cr	1	10.000	10.000	10.000	10.000	0.000	ug/mi
96-97	FTP	Cu	1	38.000	38.000	38.000	38.000	0.000	ug/mi
96-97	FTP	Fe	1	266.000	266.000	266.000	266.000	0.000	ug/mi
96-97	FTP	S	1	575.000	575.000	575.000	575.000	0.000	ug/mi
96-97	FTP	Zn	1	335.000	335.000	335.000	335.000	0.000	ug/mi
98-03	FTP	Al	1	104.000	104.000	104.000	104.000	0.000	ug/mi
98-03	FTP	Ca	4	73.000	10.000	160.000	61.000	56.009	ug/mi
98-03	FTP	Cl	3	56.667	10.000	120.000	40.000	46.428	ug/mi
98-03	FTP	Fe	2	115.500	110.000	121.000	115.500	5.500	ug/mi
98-03	FTP	Mg	3	214.667	140.000	334.000	170.000	85.266	ug/mi
98-03	FTP	P	4	92.000	10.000	210.000	74.000	79.887	ug/mi
98-03	FTP	S	1	134.000	134.000	134.000	134.000	0.000	ug/mi
98-03	FTP	Si	4	94.250	50.000	180.000	73.500	51.324	ug/mi
98-03	FTP	Zn	4	154.750	10.000	360.000	124.500	141.006	ug/mi
98-03	CRUISE	Al	1	198.000	198.000	198.000	198.000	0.000	ug/mi
98-03	CRUISE	Ca	1	113.000	113.000	113.000	113.000	0.000	ug/mi
98-03	CRUISE	Fe	1	487.000	487.000	487.000	487.000	0.000	ug/mi
98-03	CRUISE	Mg	1	226.000	226.000	226.000	226.000	0.000	ug/mi
98-03	CRUISE	P	1	66.000	66.000	66.000	66.000	0.000	ug/mi
98-03	CRUISE	S	1	400.000	400.000	400.000	400.000	0.000	ug/mi
98-03	CRUISE	Si	1	204.000	204.000	204.000	204.000	0.000	ug/mi
98-03	CRUISE	Zn	1	97.000	97.000	97.000	97.000	0.000	ug/mi
98-03	STEADYST	Al	3	6672.333	4240.000	10841.000	4936.000	2961.356	ug/hr

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	STEADYST	Ca	3	981.667	93.000	2315.000	537.000	960.075	ug/hr
98-03	STEADYST	Fe	3	1383.000	200.000	3598.000	351.000	1567.454	ug/hr
98-03	STEADYST	Mg	3	20752.667	7907.000	39592.000	14759.000	13611.952	ug/hr
98-03	STEADYST	P	2	721.500	707.000	736.000	721.500	14.500	ug/hr
98-03	STEADYST	S	3	8291.333	1508.000	21710.000	1656.000	9488.623	ug/hr
98-03	STEADYST	Si	3	4396.333	2370.000	8170.000	2649.000	2670.815	ug/hr
98-03	STEADYST	Zn	3	1012.333	94.000	2531.000	412.000	1081.678	ug/hr

Total records	115
Total with 1 record	41
Total with 2 records	26
Max number of records	26
Total with max number of records	2

Table B-5c. Elements, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	Ag	1	9.382	9.382	9.382	9.382	0.000	ug/hph
pre-87	CRUISE	Al	1	42.637	42.637	42.637	42.637	0.000	ug/hph
pre-87	CRUISE	Br	1	2.782	2.782	2.782	2.782	0.000	ug/hph
pre-87	CRUISE	Ca	1	920.940	920.940	920.940	920.940	0.000	ug/hph
pre-87	CRUISE	Cl	1	29.374	29.374	29.374	29.374	0.000	ug/hph
pre-87	CRUISE	Cu	1	7.246	7.246	7.246	7.246	0.000	ug/hph
pre-87	CRUISE	Fe	1	150.363	150.363	150.363	150.363	0.000	ug/hph
pre-87	CRUISE	K	1	3.817	3.817	3.817	3.817	0.000	ug/hph
pre-87	CRUISE	Mg	1	98.215	98.215	98.215	98.215	0.000	ug/hph
pre-87	CRUISE	Na	1	156.251	156.251	156.251	156.251	0.000	ug/hph
pre-87	CRUISE	Ni	1	11.646	11.646	11.646	11.646	0.000	ug/hph
pre-87	CRUISE	P	1	327.447	327.447	327.447	327.447	0.000	ug/hph
pre-87	CRUISE	Pd	1	7.246	7.246	7.246	7.246	0.000	ug/hph
pre-87	CRUISE	S	1	2385.166	2385.166	2385.166	2385.166	0.000	ug/hph
pre-87	CRUISE	Sb	1	5.176	5.176	5.176	5.176	0.000	ug/hph
pre-87	CRUISE	Si	1	1640.598	1640.598	1640.598	1640.598	0.000	ug/hph
pre-87	CRUISE	Tl	1	1.035	1.035	1.035	1.035	0.000	ug/hph
pre-87	CRUISE	Zn	1	522.711	522.711	522.711	522.711	0.000	ug/hph
pre-87	TRANS	Ag	2	37.526	21.351	53.701	37.526	16.175	ug/hph
pre-87	TRANS	Al	3	204.668	17.534	484.215	112.255	201.417	ug/hph
pre-87	TRANS	Br	2	4.400	3.817	4.982	4.400	0.582	ug/hph
pre-87	TRANS	Ca	3	2046.892	1526.791	2787.405	1826.481	537.726	ug/hph
pre-87	TRANS	Cd	1	9.123	9.123	9.123	9.123	0.000	ug/hph
pre-87	TRANS	Cl	3	328.892	112.578	689.831	184.266	256.895	ug/hph
pre-87	TRANS	Cobalt	1	2.394	2.394	2.394	2.394	0.000	ug/hph
pre-87	TRANS	Cu	2	160.294	57.712	262.876	160.294	102.582	ug/hph
pre-87	TRANS	Fe	3	1006.538	170.743	1732.213	1116.657	642.205	ug/hph
pre-87	TRANS	Hg	1	9.705	9.705	9.705	9.705	0.000	ug/hph
pre-87	TRANS	K	3	175.553	36.556	441.836	48.266	188.352	ug/hph
pre-87	TRANS	La	2	115.360	66.900	163.820	115.360	48.460	ug/hph
pre-87	TRANS	Mg	2	209.790	150.169	269.411	209.790	59.621	ug/hph
pre-87	TRANS	Na	3	502.331	1.682	1198.956	306.355	508.049	ug/hph
pre-87	TRANS	Ni	2	82.525	48.978	116.072	82.525	33.547	ug/hph
pre-87	TRANS	P	3	521.870	386.906	667.769	510.936	114.922	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	Rb	1	7.182	7.182	7.182	7.182	0.000	ug/hph
pre-87	TRANS	S	3	4393.518	2616.209	7162.161	3402.185	1983.847	ug/hph
pre-87	TRANS	Sb	3	132.894	1.359	257.441	139.881	104.662	ug/hph
pre-87	TRANS	Si	3	7038.778	5074.486	10463.284	5578.563	2430.220	ug/hph
pre-87	TRANS	Sn	1	38.691	38.691	38.691	38.691	0.000	ug/hph
pre-87	TRANS	Sr	1	3.688	3.688	3.688	3.688	0.000	ug/hph
pre-87	TRANS	Ti	1	34.679	34.679	34.679	34.679	0.000	ug/hph
pre-87	TRANS	Tl	2	19.895	15.140	24.651	19.895	4.755	ug/hph
pre-87	TRANS	U	1	6.599	6.599	6.599	6.599	0.000	ug/hph
pre-87	TRANS	Zn	3	1131.948	799.821	1608.766	987.257	345.735	ug/hph
pre-87	TRANS	Zr	1	0.841	0.841	0.841	0.841	0.000	ug/hph
87-90	CRUISE	Al	1	421.461	421.461	421.461	421.461	0.000	ug/hph
87-90	CRUISE	Ba	1	330.017	330.017	330.017	330.017	0.000	ug/hph
87-90	CRUISE	Br	1	17.848	17.848	17.848	17.848	0.000	ug/hph
87-90	CRUISE	Ca	1	1997.298	1997.298	1997.298	1997.298	0.000	ug/hph
87-90	CRUISE	Cd	1	235.198	235.198	235.198	235.198	0.000	ug/hph
87-90	CRUISE	Cl	1	411.401	411.401	411.401	411.401	0.000	ug/hph
87-90	CRUISE	Cobalt	1	6.815	6.815	6.815	6.815	0.000	ug/hph
87-90	CRUISE	Cu	1	55.879	55.879	55.879	55.879	0.000	ug/hph
87-90	CRUISE	Fe	1	4603.357	4603.357	4603.357	4603.357	0.000	ug/hph
87-90	CRUISE	In	1	37.253	37.253	37.253	37.253	0.000	ug/hph
87-90	CRUISE	K	1	135.771	135.771	135.771	135.771	0.000	ug/hph
87-90	CRUISE	La	1	2113.858	2113.858	2113.858	2113.858	0.000	ug/hph
87-90	CRUISE	Mg	1	89.367	89.367	89.367	89.367	0.000	ug/hph
87-90	CRUISE	Na	1	687.810	687.810	687.810	687.810	0.000	ug/hph
87-90	CRUISE	P	1	683.267	683.267	683.267	683.267	0.000	ug/hph
87-90	CRUISE	Rb	1	0.195	0.195	0.195	0.195	0.000	ug/hph
87-90	CRUISE	S	1	3104.167	3104.167	3104.167	3104.167	0.000	ug/hph
87-90	CRUISE	Si	1	6277.647	6277.647	6277.647	6277.647	0.000	ug/hph
87-90	CRUISE	Sn	1	96.766	96.766	96.766	96.766	0.000	ug/hph
87-90	CRUISE	Sr	1	7.204	7.204	7.204	7.204	0.000	ug/hph
87-90	CRUISE	Tl	1	34.592	34.592	34.592	34.592	0.000	ug/hph
87-90	CRUISE	U	1	23.559	23.559	23.559	23.559	0.000	ug/hph
87-90	CRUISE	Zn	1	1326.816	1326.816	1326.816	1326.816	0.000	ug/hph
87-90	TRANS	Al	1	2166.362	2166.362	2166.362	2166.362	0.000	ug/hph
87-90	TRANS	Br	1	15.706	15.706	15.706	15.706	0.000	ug/hph
87-90	TRANS	Ca	1	4975.494	4975.494	4975.494	4975.494	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	TRANS	Cl	1	1046.967	1046.967	1046.967	1046.967	0.000	ug/hph
87-90	TRANS	Cu	1	145.701	145.701	145.701	145.701	0.000	ug/hph
87-90	TRANS	Fe	1	6121.044	6121.044	6121.044	6121.044	0.000	ug/hph
87-90	TRANS	In	1	59.968	59.968	59.968	59.968	0.000	ug/hph
87-90	TRANS	K	1	1594.528	1594.528	1594.528	1594.528	0.000	ug/hph
87-90	TRANS	La	1	100.465	100.465	100.465	100.465	0.000	ug/hph
87-90	TRANS	Mg	1	1154.571	1154.571	1154.571	1154.571	0.000	ug/hph
87-90	TRANS	Mn	1	12.850	12.850	12.850	12.850	0.000	ug/hph
87-90	TRANS	Na	1	3442.361	3442.361	3442.361	3442.361	0.000	ug/hph
87-90	TRANS	Ni	1	13.305	13.305	13.305	13.305	0.000	ug/hph
87-90	TRANS	P	1	188.535	188.535	188.535	188.535	0.000	ug/hph
87-90	TRANS	Pd	1	204.760	204.760	204.760	204.760	0.000	ug/hph
87-90	TRANS	Rb	1	2.401	2.401	2.401	2.401	0.000	ug/hph
87-90	TRANS	S	1	9485.784	9485.784	9485.784	9485.784	0.000	ug/hph
87-90	TRANS	Si	1	14256.064	14256.064	14256.064	14256.064	0.000	ug/hph
87-90	TRANS	Sr	1	55.684	55.684	55.684	55.684	0.000	ug/hph
87-90	TRANS	Ti	1	262.326	262.326	262.326	262.326	0.000	ug/hph
87-90	TRANS	Tl	1	8.567	8.567	8.567	8.567	0.000	ug/hph
87-90	TRANS	Zn	1	1475.502	1475.502	1475.502	1475.502	0.000	ug/hph
94-95	CRUISE	Al	1	199.848	199.848	199.848	199.848	0.000	ug/hph
94-95	CRUISE	Br	1	4.092	4.092	4.092	4.092	0.000	ug/hph
94-95	CRUISE	Ca	1	573.738	573.738	573.738	573.738	0.000	ug/hph
94-95	CRUISE	Cl	1	125.796	125.796	125.796	125.796	0.000	ug/hph
94-95	CRUISE	Cobalt	1	1.584	1.584	1.584	1.584	0.000	ug/hph
94-95	CRUISE	Cr	1	17.886	17.886	17.886	17.886	0.000	ug/hph
94-95	CRUISE	Cu	1	6.270	6.270	6.270	6.270	0.000	ug/hph
94-95	CRUISE	Fe	1	380.754	380.754	380.754	380.754	0.000	ug/hph
94-95	CRUISE	K	1	61.842	61.842	61.842	61.842	0.000	ug/hph
94-95	CRUISE	Mg	1	70.356	70.356	70.356	70.356	0.000	ug/hph
94-95	CRUISE	Mn	1	10.626	10.626	10.626	10.626	0.000	ug/hph
94-95	CRUISE	Ni	1	1.254	1.254	1.254	1.254	0.000	ug/hph
94-95	CRUISE	P	1	339.438	339.438	339.438	339.438	0.000	ug/hph
94-95	CRUISE	Pb	1	27.390	27.390	27.390	27.390	0.000	ug/hph
94-95	CRUISE	S	1	1459.920	1459.920	1459.920	1459.920	0.000	ug/hph
94-95	CRUISE	Sb	1	208.032	208.032	208.032	208.032	0.000	ug/hph
94-95	CRUISE	Si	1	1257.432	1257.432	1257.432	1257.432	0.000	ug/hph
94-95	CRUISE	Sn	1	136.554	136.554	136.554	136.554	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	CRUISE	Sr	1	2.046	2.046	2.046	2.046	0.000	ug/hph
94-95	CRUISE	U	1	20.064	20.064	20.064	20.064	0.000	ug/hph
94-95	CRUISE	Y	1	6.138	6.138	6.138	6.138	0.000	ug/hph
94-95	CRUISE	Zn	1	565.752	565.752	565.752	565.752	0.000	ug/hph
94-95	CRUISE	Zr	1	7.194	7.194	7.194	7.194	0.000	ug/hph
94-95	TRANS	Ag	1	19.646	19.646	19.646	19.646	0.000	ug/hph
94-95	TRANS	Al	2	1552.463	157.167	2947.758	1552.463	1395.295	ug/hph
94-95	TRANS	Ba	1	407.682	407.682	407.682	407.682	0.000	ug/hph
94-95	TRANS	Br	1	19.998	19.998	19.998	19.998	0.000	ug/hph
94-95	TRANS	Ca	2	2785.200	58.938	5511.462	2785.200	2726.262	ug/hph
94-95	TRANS	Cd	2	177.045	117.875	236.214	177.045	59.169	ug/hph
94-95	TRANS	Cl	1	364.122	364.122	364.122	364.122	0.000	ug/hph
94-95	TRANS	Cobalt	1	19.646	19.646	19.646	19.646	0.000	ug/hph
94-95	TRANS	Cr	1	19.646	19.646	19.646	19.646	0.000	ug/hph
94-95	TRANS	Cu	1	19.646	19.646	19.646	19.646	0.000	ug/hph
94-95	TRANS	Fe	2	3086.369	98.229	6074.508	3086.369	2988.139	ug/hph
94-95	TRANS	Ga	1	19.646	19.646	19.646	19.646	0.000	ug/hph
94-95	TRANS	In	2	200.178	117.875	282.480	200.178	82.302	ug/hph
94-95	TRANS	K	1	1562.748	1562.748	1562.748	1562.748	0.000	ug/hph
94-95	TRANS	Mg	1	978.516	978.516	978.516	978.516	0.000	ug/hph
94-95	TRANS	Mn	1	19.646	19.646	19.646	19.646	0.000	ug/hph
94-95	TRANS	P	2	325.864	19.646	632.082	325.864	306.218	ug/hph
94-95	TRANS	Pb	2	23.353	19.646	27.060	23.353	3.707	ug/hph
94-95	TRANS	Pd	1	19.646	19.646	19.646	19.646	0.000	ug/hph
94-95	TRANS	Rb	1	6.666	6.666	6.666	6.666	0.000	ug/hph
94-95	TRANS	S	1	4466.616	4466.616	4466.616	4466.616	0.000	ug/hph
94-95	TRANS	Si	2	4844.958	1237.691	8452.224	4844.958	3607.266	ug/hph
94-95	TRANS	Sr	1	32.142	32.142	32.142	32.142	0.000	ug/hph
94-95	TRANS	Ti	1	311.916	311.916	311.916	311.916	0.000	ug/hph
94-95	TRANS	Tl	1	69.828	69.828	69.828	69.828	0.000	ug/hph
94-95	TRANS	U	1	98.472	98.472	98.472	98.472	0.000	ug/hph
94-95	TRANS	Y	1	14.124	14.124	14.124	14.124	0.000	ug/hph
94-95	TRANS	Zn	2	771.661	137.521	1405.800	771.661	634.139	ug/hph
94-95	TRANS	Zr	1	59.664	59.664	59.664	59.664	0.000	ug/hph
96-97	CRUISE	Ag	2	3.023	1.523	4.523	3.023	1.500	ug/hph
96-97	CRUISE	Al	2	40.128	18.486	61.769	40.128	21.642	ug/hph
96-97	CRUISE	As	1	0.509	0.509	0.509	0.509	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	CRUISE	Br	2	0.664	0.339	0.989	0.664	0.325	ug/hph
96-97	CRUISE	Ca	2	384.434	313.036	455.832	384.434	71.398	ug/hph
96-97	CRUISE	Cd	2	1.399	0.119	2.679	1.399	1.280	ug/hph
96-97	CRUISE	Cobalt	2	1.728	1.405	2.051	1.728	0.323	ug/hph
96-97	CRUISE	Cr	1	0.535	0.535	0.535	0.535	0.000	ug/hph
96-97	CRUISE	Cu	2	2.281	2.245	2.318	2.281	0.036	ug/hph
96-97	CRUISE	Fe	2	589.719	418.221	761.216	589.719	171.497	ug/hph
96-97	CRUISE	Hg	1	0.394	0.394	0.394	0.394	0.000	ug/hph
96-97	CRUISE	In	1	0.941	0.941	0.941	0.941	0.000	ug/hph
96-97	CRUISE	K	2	16.768	3.099	30.438	16.768	13.669	ug/hph
96-97	CRUISE	La	1	0.157	0.157	0.157	0.157	0.000	ug/hph
96-97	CRUISE	Mg	2	60.233	24.327	96.138	60.233	35.906	ug/hph
96-97	CRUISE	Mn	2	2.308	1.181	3.435	2.308	1.127	ug/hph
96-97	CRUISE	Na	2	337.581	102.721	572.441	337.581	234.860	ug/hph
96-97	CRUISE	Ni	2	0.491	0.461	0.521	0.491	0.030	ug/hph
96-97	CRUISE	P	2	84.361	67.758	100.963	84.361	16.602	ug/hph
96-97	CRUISE	Rb	1	0.128	0.128	0.128	0.128	0.000	ug/hph
96-97	CRUISE	S	2	4379.223	3572.575	5185.872	4379.223	806.649	ug/hph
96-97	CRUISE	Sb	1	0.634	0.634	0.634	0.634	0.000	ug/hph
96-97	CRUISE	Si	2	71.224	21.718	120.730	71.224	49.506	ug/hph
96-97	CRUISE	Sr	2	0.865	0.691	1.039	0.865	0.174	ug/hph
96-97	CRUISE	Ti	2	2.442	0.579	4.305	2.442	1.863	ug/hph
96-97	CRUISE	Tl	1	0.374	0.374	0.374	0.374	0.000	ug/hph
96-97	CRUISE	U	2	0.739	0.448	1.030	0.739	0.291	ug/hph
96-97	CRUISE	Y	1	0.506	0.506	0.506	0.506	0.000	ug/hph
96-97	CRUISE	Zn	2	174.836	151.073	198.599	174.836	23.763	ug/hph
96-97	CRUISE	Zr	2	0.443	0.157	0.729	0.443	0.286	ug/hph
96-97	IDLE	Ag	1	217.387	217.387	217.387	217.387	0.000	ug/mode
96-97	IDLE	Al	2	3806.204	2337.043	5275.364	3806.204	1469.160	ug/mode
96-97	IDLE	As	2	61.672	27.363	95.980	61.672	34.308	ug/mode
96-97	IDLE	Ba	2	1238.840	762.223	1715.457	1238.840	476.617	ug/mode
96-97	IDLE	Br	2	32.413	30.470	34.356	32.413	1.943	ug/mode
96-97	IDLE	Ca	2	6962.489	6881.328	7043.649	6962.489	81.161	ug/mode
96-97	IDLE	Cd	1	194.703	194.703	194.703	194.703	0.000	ug/mode
96-97	IDLE	Cl	2	693.020	436.903	949.138	693.020	256.118	ug/mode
96-97	IDLE	Cobalt	2	45.827	27.667	63.987	45.827	18.160	ug/mode
96-97	IDLE	Cr	2	26.758	2.742	50.774	26.758	24.016	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	IDLE	Cu	2	59.965	55.943	63.987	59.965	4.022	ug/mode
96-97	IDLE	Fe	2	8911.359	7568.730	10253.987	8911.359	1342.629	ug/mode
96-97	IDLE	Hg	2	38.034	26.814	49.254	38.034	11.220	ug/mode
96-97	IDLE	In	1	36.869	36.869	36.869	36.869	0.000	ug/mode
96-97	IDLE	K	2	2699.682	2360.201	3039.164	2699.682	339.482	ug/mode
96-97	IDLE	Mg	2	1046.788	426.565	1667.010	1046.788	620.222	ug/mode
96-97	IDLE	Mn	2	159.310	134.677	183.943	159.310	24.633	ug/mode
96-97	IDLE	Na	2	18892.076	6201.768	31582.385	18892.076	12690.308	ug/mode
96-97	IDLE	Ni	2	18.854	3.352	34.356	18.854	15.502	ug/mode
96-97	IDLE	P	2	215.804	69.625	361.983	215.804	146.179	ug/mode
96-97	IDLE	Pb	1	23.107	23.107	23.107	23.107	0.000	ug/mode
96-97	IDLE	Pd	1	56.369	56.369	56.369	56.369	0.000	ug/mode
96-97	IDLE	Rb	1	3.344	3.344	3.344	3.344	0.000	ug/mode
96-97	IDLE	S	2	5813.345	5170.137	6456.552	5813.345	643.207	ug/mode
96-97	IDLE	Sb	1	52.104	52.104	52.104	52.104	0.000	ug/mode
96-97	IDLE	Si	2	15254.233	13343.391	17165.076	15254.233	1910.843	ug/mode
96-97	IDLE	Sn	1	50.885	50.885	50.885	50.885	0.000	ug/mode
96-97	IDLE	Sr	2	73.961	73.737	74.185	73.961	0.224	ug/mode
96-97	IDLE	Ti	1	967.753	967.753	967.753	967.753	0.000	ug/mode
96-97	IDLE	Tl	1	26.451	26.451	26.451	26.451	0.000	ug/mode
96-97	IDLE	U	1	7.905	7.905	7.905	7.905	0.000	ug/mode
96-97	IDLE	V	1	71.449	71.449	71.449	71.449	0.000	ug/mode
96-97	IDLE	Zn	2	445.344	354.061	536.627	445.344	91.283	ug/mode
96-97	IDLE	Zr	1	23.157	23.157	23.157	23.157	0.000	ug/mode
96-97	TRANS	Ag	1	7.046	7.046	7.046	7.046	0.000	ug/hph
96-97	TRANS	Al	1	25.732	25.732	25.732	25.732	0.000	ug/hph
96-97	TRANS	Ba	2	40.674	22.815	58.534	40.674	17.859	ug/hph
96-97	TRANS	Ca	2	221.924	178.545	265.302	221.924	43.379	ug/hph
96-97	TRANS	Cd	1	2.184	2.184	2.184	2.184	0.000	ug/hph
96-97	TRANS	Cl	1	9.663	9.663	9.663	9.663	0.000	ug/hph
96-97	TRANS	Cobalt	2	1.868	1.407	2.328	1.868	0.461	ug/hph
96-97	TRANS	Cr	2	8.495	0.232	16.757	8.495	8.263	ug/hph
96-97	TRANS	Cu	2	3.395	2.971	3.818	3.395	0.424	ug/hph
96-97	TRANS	Fe	2	244.953	171.632	318.274	244.953	73.321	ug/hph
96-97	TRANS	Hg	1	2.070	2.070	2.070	2.070	0.000	ug/hph
96-97	TRANS	K	2	66.151	51.744	80.559	66.151	14.408	ug/hph
96-97	TRANS	Mg	2	159.905	144.244	175.566	159.905	15.661	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	TRANS	Mn	2	5.496	3.156	7.836	5.496	2.340	ug/hph
96-97	TRANS	Na	2	929.757	825.748	1033.767	929.757	104.010	ug/hph
96-97	TRANS	Ni	2	2.062	0.594	3.530	2.062	1.468	ug/hph
96-97	TRANS	P	1	3.142	3.142	3.142	3.142	0.000	ug/hph
96-97	TRANS	Pb	2	8.071	4.734	11.407	8.071	3.337	ug/hph
96-97	TRANS	Pd	1	0.389	0.389	0.389	0.389	0.000	ug/hph
96-97	TRANS	S	2	158.221	129.281	187.161	158.221	28.940	ug/hph
96-97	TRANS	Sb	1	2.500	2.500	2.500	2.500	0.000	ug/hph
96-97	TRANS	Si	2	426.759	338.503	515.015	426.759	88.256	ug/hph
96-97	TRANS	Sr	2	1.687	1.018	2.356	1.687	0.669	ug/hph
96-97	TRANS	Ti	1	31.063	31.063	31.063	31.063	0.000	ug/hph
96-97	TRANS	U	1	0.724	0.724	0.724	0.724	0.000	ug/hph
96-97	TRANS	V	1	0.955	0.955	0.955	0.955	0.000	ug/hph
96-97	TRANS	Y	1	0.178	0.178	0.178	0.178	0.000	ug/hph
96-97	TRANS	Zn	2	17.603	12.492	22.713	17.603	5.110	ug/hph
96-97	TRANS	Zr	2	1.471	0.895	2.047	1.471	0.576	ug/hph
98-03	TRANS	Al	2	468.332	159.277	777.387	468.332	309.055	ug/hph
98-03	TRANS	As	2	15.325	11.055	19.595	15.325	4.270	ug/hph
98-03	TRANS	Au	1	20.985	20.985	20.985	20.985	0.000	ug/hph
98-03	TRANS	Ba	1	2945.106	2945.106	2945.106	2945.106	0.000	ug/hph
98-03	TRANS	Br	1	24.428	24.428	24.428	24.428	0.000	ug/hph
98-03	TRANS	Ca	2	676.399	518.081	834.716	676.399	158.317	ug/hph
98-03	TRANS	Cd	2	133.426	53.423	213.429	133.426	80.003	ug/hph
98-03	TRANS	Cl	2	73.979	45.413	102.544	73.979	28.565	ug/hph
98-03	TRANS	Cobalt	2	19.165	3.840	34.490	19.165	15.325	ug/hph
98-03	TRANS	Cu	2	19.297	8.407	30.187	19.297	10.890	ug/hph
98-03	TRANS	Fe	2	627.642	396.141	859.144	627.642	231.501	ug/hph
98-03	TRANS	Ga	2	25.752	21.780	29.724	25.752	3.972	ug/hph
98-03	TRANS	Hg	1	72.026	72.026	72.026	72.026	0.000	ug/hph
98-03	TRANS	In	1	445.791	445.791	445.791	445.791	0.000	ug/hph
98-03	TRANS	K	1	136.372	136.372	136.372	136.372	0.000	ug/hph
98-03	TRANS	Mg	2	247.588	121.543	373.633	247.588	126.045	ug/hph
98-03	TRANS	Na	2	1764.727	1354.783	2174.670	1764.727	409.944	ug/hph
98-03	TRANS	P	2	127.501	82.419	172.583	127.501	45.082	ug/hph
98-03	TRANS	Pb	1	41.905	41.905	41.905	41.905	0.000	ug/hph
98-03	TRANS	Pd	1	376.612	376.612	376.612	376.612	0.000	ug/hph
98-03	TRANS	Rb	2	6.388	2.317	10.460	6.388	4.071	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	S	2	1202.689	1111.961	1293.416	1202.689	90.727	ug/hph
98-03	TRANS	Si	2	1452.560	1155.984	1749.136	1452.560	296.576	ug/hph
98-03	TRANS	Sr	2	17.179	5.561	28.797	17.179	11.618	ug/hph
98-03	TRANS	Tl	2	42.037	36.211	47.863	42.037	5.826	ug/hph
98-03	TRANS	U	2	14.365	13.041	15.689	14.365	1.324	ug/hph
98-03	TRANS	Zn	2	324.810	283.336	366.285	324.810	41.474	ug/hph
98-03	TRANS	Zr	1	18.139	18.139	18.139	18.139	0.000	ug/hph

Total records	263
Total with 1 record	158
Total with 2 records	94
Max number of records	3
Total with max number of records	11

Table B-5d. Elements, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	Al	1	119.922	119.922	119.922	119.922	0.000	ug/hph
pre-87	TRANS	Ba	1	93.893	93.893	93.893	93.893	0.000	ug/hph
pre-87	TRANS	Br	1	3.008	3.008	3.008	3.008	0.000	ug/hph
pre-87	TRANS	Ca	1	500.223	500.223	500.223	500.223	0.000	ug/hph
pre-87	TRANS	Cd	1	15.718	15.718	15.718	15.718	0.000	ug/hph
pre-87	TRANS	Cl	1	177.692	177.692	177.692	177.692	0.000	ug/hph
pre-87	TRANS	Cu	1	57.552	57.552	57.552	57.552	0.000	ug/hph
pre-87	TRANS	Fe	1	362.076	362.076	362.076	362.076	0.000	ug/hph
pre-87	TRANS	In	1	8.001	8.001	8.001	8.001	0.000	ug/hph
pre-87	TRANS	K	1	151.772	151.772	151.772	151.772	0.000	ug/hph
pre-87	TRANS	Mg	1	237.555	237.555	237.555	237.555	0.000	ug/hph
pre-87	TRANS	Na	1	398.133	398.133	398.133	398.133	0.000	ug/hph
pre-87	TRANS	Ni	1	7.412	7.412	7.412	7.412	0.000	ug/hph
pre-87	TRANS	P	1	238.863	238.863	238.863	238.863	0.000	ug/hph
pre-87	TRANS	S	1	2183.728	2183.728	2183.728	2183.728	0.000	ug/hph
pre-87	TRANS	Si	1	3383.295	3383.295	3383.295	3383.295	0.000	ug/hph
pre-87	TRANS	V	1	1.504	1.504	1.504	1.504	0.000	ug/hph
pre-87	TRANS	Y	1	1.897	1.897	1.897	1.897	0.000	ug/hph
pre-87	TRANS	Zn	1	391.506	391.506	391.506	391.506	0.000	ug/hph
pre-87	TRANS	Zr	1	5.297	5.297	5.297	5.297	0.000	ug/hph
pre-87	BUS	Al	1	474.804	474.804	474.804	474.804	0.000	ug/hph
pre-87	BUS	As	1	10.747	10.747	10.747	10.747	0.000	ug/hph
pre-87	BUS	Ba	1	932.648	932.648	932.648	932.648	0.000	ug/hph
pre-87	BUS	Ca	1	949.194	949.194	949.194	949.194	0.000	ug/hph
pre-87	BUS	Cl	1	406.941	406.941	406.941	406.941	0.000	ug/hph
pre-87	BUS	Cu	1	67.209	67.209	67.209	67.209	0.000	ug/hph
pre-87	BUS	Fe	1	997.939	997.939	997.939	997.939	0.000	ug/hph
pre-87	BUS	Hg	1	38.215	38.215	38.215	38.215	0.000	ug/hph
pre-87	BUS	K	1	358.196	358.196	358.196	358.196	0.000	ug/hph
pre-87	BUS	Na	1	2488.056	2488.056	2488.056	2488.056	0.000	ug/hph
pre-87	BUS	P	1	415.312	415.312	415.312	415.312	0.000	ug/hph
pre-87	BUS	S	1	2727.507	2727.507	2727.507	2727.507	0.000	ug/hph
pre-87	BUS	Sb	1	70.872	70.872	70.872	70.872	0.000	ug/hph
pre-87	BUS	Si	1	7813.578	7813.578	7813.578	7813.578	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	BUS	Tl	1	43.382	43.382	43.382	43.382	0.000	ug/hph
pre-87	BUS	U	1	31.130	31.130	31.130	31.130	0.000	ug/hph
pre-87	BUS	Zn	1	549.970	549.970	549.970	549.970	0.000	ug/hph
87-90	BUS	Ag	3	2.821	1.085	4.774	2.604	1.514	ug/hph
87-90	BUS	Al	4	56.637	6.727	177.506	21.158	70.058	ug/hph
87-90	BUS	As	1	0.217	0.217	0.217	0.217	0.000	ug/hph
87-90	BUS	Ba	4	56.257	38.192	86.149	50.344	19.713	ug/hph
87-90	BUS	Br	4	0.380	0.217	0.651	0.326	0.180	ug/hph
87-90	BUS	Ca	4	874.727	802.900	974.764	860.622	62.447	ug/hph
87-90	BUS	Cd	3	0.940	0.651	1.302	0.868	0.271	ug/hph
87-90	BUS	Ce	4	43.292	28.427	59.675	42.532	13.132	ug/hph
87-90	BUS	Cl	4	136.927	61.194	252.371	117.072	74.088	ug/hph
87-90	BUS	Cobalt	2	1.085	0.651	1.519	1.085	0.434	ug/hph
87-90	BUS	Cr	1	9.982	9.982	9.982	9.982	0.000	ug/hph
87-90	BUS	Cs	4	49.693	24.955	83.762	45.028	22.947	ug/hph
87-90	BUS	Cu	3	5.425	3.472	6.727	6.076	1.406	ug/hph
87-90	BUS	Hg	4	0.217	0.217	0.217	0.217	0.000	ug/hph
87-90	BUS	In	4	3.852	1.736	6.510	3.581	1.906	ug/hph
87-90	BUS	K	2	15.299	13.454	17.143	15.299	1.845	ug/hph
87-90	BUS	La	4	57.776	34.286	87.885	54.467	20.945	ug/hph
87-90	BUS	Mg	4	86.963	66.402	136.710	72.370	28.848	ug/hph
87-90	BUS	Mn	4	20.398	12.803	30.597	19.096	6.727	ug/hph
87-90	BUS	Mo	4	0.434	0.217	0.651	0.434	0.153	ug/hph
87-90	BUS	Ni	2	3.038	2.604	3.472	3.038	0.434	ug/hph
87-90	BUS	P	4	378.177	137.144	519.064	428.250	145.735	ug/hph
87-90	BUS	Pb	4	0.488	0.217	0.868	0.434	0.236	ug/hph
87-90	BUS	Pd	2	1.411	0.868	1.953	1.411	0.543	ug/hph
87-90	BUS	Pr	4	28.264	18.228	37.324	28.753	8.500	ug/hph
87-90	BUS	Rb	4	0.217	0.217	0.217	0.217	0.000	ug/hph
87-90	BUS	S	4	1193.175	241.087	1708.875	1411.368	575.054	ug/hph
87-90	BUS	Sb	4	16.004	10.633	24.521	14.431	5.501	ug/hph
87-90	BUS	Sc	3	20.977	9.331	38.843	14.756	12.826	ug/hph
87-90	BUS	Si	4	746.751	287.742	1397.046	651.109	447.833	ug/hph
87-90	BUS	Sn	4	16.058	8.463	21.049	17.360	4.759	ug/hph
87-90	BUS	Sr	4	0.271	0.217	0.434	0.217	0.094	ug/hph
87-90	BUS	Y	4	0.217	0.217	0.217	0.217	0.000	ug/hph
87-90	BUS	Zn	4	384.470	343.077	419.027	387.888	27.093	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	BUS	Zr	4	0.271	0.217	0.434	0.217	0.094	ug/hph
91-93	TRANS	Ag	1	12.355	12.355	12.355	12.355	0.000	ug/hph
91-93	TRANS	Al	1	153.122	153.122	153.122	153.122	0.000	ug/hph
91-93	TRANS	Ba	1	5.638	5.638	5.638	5.638	0.000	ug/hph
91-93	TRANS	Br	1	0.886	0.886	0.886	0.886	0.000	ug/hph
91-93	TRANS	Ca	1	307.022	307.022	307.022	307.022	0.000	ug/hph
91-93	TRANS	Cl	1	120.679	120.679	120.679	120.679	0.000	ug/hph
91-93	TRANS	Cu	1	34.906	34.906	34.906	34.906	0.000	ug/hph
91-93	TRANS	Fe	1	193.277	193.277	193.277	193.277	0.000	ug/hph
91-93	TRANS	Hg	1	1.685	1.685	1.685	1.685	0.000	ug/hph
91-93	TRANS	K	1	105.732	105.732	105.732	105.732	0.000	ug/hph
91-93	TRANS	Mg	1	341.842	341.842	341.842	341.842	0.000	ug/hph
91-93	TRANS	Na	1	266.566	266.566	266.566	266.566	0.000	ug/hph
91-93	TRANS	Ni	1	3.262	3.262	3.262	3.262	0.000	ug/hph
91-93	TRANS	P	1	192.888	192.888	192.888	192.888	0.000	ug/hph
91-93	TRANS	S	1	904.457	904.457	904.457	904.457	0.000	ug/hph
91-93	TRANS	Si	1	1059.048	1059.048	1059.048	1059.048	0.000	ug/hph
91-93	TRANS	Sn	1	12.355	12.355	12.355	12.355	0.000	ug/hph
91-93	TRANS	Tl	1	1.879	1.879	1.879	1.879	0.000	ug/hph
91-93	TRANS	Zn	1	499.608	499.608	499.608	499.608	0.000	ug/hph
91-93	BUS	Al	1	145.282	145.282	145.282	145.282	0.000	ug/hph
91-93	BUS	Ba	1	241.078	241.078	241.078	241.078	0.000	ug/hph
91-93	BUS	Ca	1	510.883	510.883	510.883	510.883	0.000	ug/hph
91-93	BUS	Cd	1	145.476	145.476	145.476	145.476	0.000	ug/hph
91-93	BUS	Cl	1	194.119	194.119	194.119	194.119	0.000	ug/hph
91-93	BUS	Cu	1	37.519	37.519	37.519	37.519	0.000	ug/hph
91-93	BUS	Fe	1	303.761	303.761	303.761	303.761	0.000	ug/hph
91-93	BUS	K	1	112.363	112.363	112.363	112.363	0.000	ug/hph
91-93	BUS	La	1	184.270	184.270	184.270	184.270	0.000	ug/hph
91-93	BUS	Mg	1	432.475	432.475	432.475	432.475	0.000	ug/hph
91-93	BUS	Na	1	913.378	913.378	913.378	913.378	0.000	ug/hph
91-93	BUS	Ni	1	4.622	4.622	4.622	4.622	0.000	ug/hph
91-93	BUS	P	1	198.936	198.936	198.936	198.936	0.000	ug/hph
91-93	BUS	Pd	1	8.381	8.381	8.381	8.381	0.000	ug/hph
91-93	BUS	S	1	1360.109	1360.109	1360.109	1360.109	0.000	ug/hph
91-93	BUS	Si	1	3037.608	3037.608	3037.608	3037.608	0.000	ug/hph
91-93	BUS	Tl	1	51.991	51.991	51.991	51.991	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	BUS	V	1	1.253	1.253	1.253	1.253	0.000	ug/hph
91-93	BUS	Zn	1	709.193	709.193	709.193	709.193	0.000	ug/hph
98-03	BUS	Ag	2	1.926	1.926	1.926	1.926	0.000	ug/hph
98-03	BUS	As	1	0.214	0.214	0.214	0.214	0.000	ug/hph
98-03	BUS	Ba	2	12.840	10.914	14.766	12.840	1.926	ug/hph
98-03	BUS	Br	2	0.535	0.428	0.642	0.535	0.107	ug/hph
98-03	BUS	Ca	6	87.954	2.140	162.854	99.510	65.885	ug/hph
98-03	BUS	Ce	2	10.807	9.844	11.770	10.807	0.963	ug/hph
98-03	BUS	Cr	1	1.926	1.926	1.926	1.926	0.000	ug/hph
98-03	BUS	Cs	2	7.597	5.564	9.630	7.597	2.033	ug/hph
98-03	BUS	Cu	2	0.428	0.214	0.642	0.428	0.214	ug/hph
98-03	BUS	Fe	6	14.766	0.642	30.602	15.515	11.171	ug/hph
98-03	BUS	Ga	1	0.856	0.856	0.856	0.856	0.000	ug/hph
98-03	BUS	Hg	2	4.601	2.354	6.848	4.601	2.247	ug/hph
98-03	BUS	K	1	1.926	1.926	1.926	1.926	0.000	ug/hph
98-03	BUS	La	2	8.988	7.704	10.272	8.988	1.284	ug/hph
98-03	BUS	Mg	4	44.940	8.560	64.200	53.500	22.749	ug/hph
98-03	BUS	Mn	2	3.959	3.638	4.280	3.959	0.321	ug/hph
98-03	BUS	Mo	3	1.355	0.214	1.926	1.926	0.807	ug/hph
98-03	BUS	Ni	1	2.568	2.568	2.568	2.568	0.000	ug/hph
98-03	BUS	P	6	51.217	2.140	166.492	42.586	54.864	ug/hph
98-03	BUS	Pb	6	1.783	0.428	4.494	1.070	1.476	ug/hph
98-03	BUS	Pr	2	10.914	10.700	11.128	10.914	0.214	ug/hph
98-03	BUS	Rb	2	0.749	0.642	0.856	0.749	0.107	ug/hph
98-03	BUS	S	6	844.052	5.992	4336.924	118.877	1569.222	ug/hph
98-03	BUS	Sc	2	37.129	36.380	37.878	37.129	0.749	ug/hph
98-03	BUS	Si	2	157.076	43.656	270.496	157.076	113.420	ug/hph
98-03	BUS	Sn	2	9.951	9.844	10.058	9.951	0.107	ug/hph
98-03	BUS	Sr	2	0.963	0.856	1.070	0.963	0.107	ug/hph
98-03	BUS	Ti	1	9.202	9.202	9.202	9.202	0.000	ug/hph
98-03	BUS	W	2	121.873	115.774	127.972	121.873	6.099	ug/hph
98-03	BUS	Y	2	0.856	0.642	1.070	0.856	0.214	ug/hph
98-03	BUS	Zn	5	62.274	0.214	79.180	77.682	31.048	ug/hph
98-03	BUS	Zr	2	1.498	1.498	1.498	1.498	0.000	ug/hph

Total records	142
Total with 1 record	83
Total with 2 records	22
Max number of records	6
Total with max number of records	5

Table B-5e. Elements, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	Ca	5	53.198	1.340	167.500	36.850	60.861	ug/hph
98-03	BUS	Cu	3	2.457	2.010	2.680	2.680	0.316	ug/hph
98-03	BUS	Fe	5	25.527	1.675	68.005	17.085	24.378	ug/hph
98-03	BUS	Mg	5	57.620	20.100	100.500	67.000	28.299	ug/hph
98-03	BUS	P	6	61.528	6.700	120.600	67.000	42.718	ug/hph
98-03	BUS	Pb	4	0.838	0.335	2.010	0.503	0.691	ug/hph
98-03	BUS	S	5	409.370	43.885	1072.000	157.450	413.553	ug/hph
98-03	BUS	Zn	4	47.570	1.005	106.195	41.540	44.886	ug/hph

Total records	8
Total with 1 record	0
Total with 2 records	0
Max number of records	6
Total with max number of records	1

Table B-6. Nitrosamines, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	TRANS	Nitrosodiethylamine	1	0.0080	0.0080	0.0080	0.0080	0.0000	ug
91-93	TRANS	Nitrosodimethylamine	7	0.0310	0.0160	0.0440	0.0330	0.0107	ug
91-93	TRANS	Nitrosodipropylamine	4	0.0170	0.0120	0.0250	0.0155	0.0048	ug
91-93	TRANS	Nitrosomorpholine	3	0.0193	0.0180	0.0220	0.0180	0.0019	ug

Total records	4
Total with 1 record	1
Total with 2 records	0
Max number of records	7
Total with max number of records	1

Table B-7a. Nitro PAHs, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	TRANS	1-nitropyrene	8	0.766	0.022	3.310	0.374	1.027	ug/hph
91-93	TRANS	2-nitrofluorene	4	0.029	0.020	0.042	0.027	0.009	ug/hph
91-93	TRANS	7-nitrobenz(a)anthracene	4	0.026	0.010	0.063	0.016	0.022	ug/hph
91-93	TRANS	9-nitroanthracene	8	0.229	0.078	0.461	0.226	0.119	ug/hph
94-95	CRUISE	1-nitronaphthalene	4	145.238	85.053	216.379	139.760	47.302	ug/mode
94-95	CRUISE	1-nitropyrene	4	36.641	24.786	50.368	35.705	9.705	ug/mode
94-95	CRUISE	2-nitrobiphenyl	3	174.281	6.937	305.224	210.681	124.466	ug/mode
94-95	CRUISE	2-nitronaphthalene	2	34.089	19.669	48.510	34.089	14.420	ug/mode
94-95	CRUISE	3-nitrobiphenyl	2	26.619	7.251	45.986	26.619	19.368	ug/mode
94-95	CRUISE	3-nitrofluoranthene	2	12.834	12.579	13.088	12.834	0.254	ug/mode
94-95	CRUISE	3-nitrophenanthrene	3	16.235	13.743	19.629	15.333	2.486	ug/mode
94-95	CRUISE	4-nitrobiphenyl	2	6.960	4.821	9.100	6.960	2.140	ug/mode
94-95	CRUISE	4-nitrophenanthrene	3	50.157	25.851	64.103	60.518	17.249	ug/mode
94-95	CRUISE	6-nitrochrysene	1	2.211	2.211	2.211	2.211	0.000	ug/mode
94-95	CRUISE	9-nitroanthracene	4	15.063	6.448	29.758	12.022	9.518	ug/mode
94-95	CRUISE	9-nitrophenanthrene	4	38.154	2.775	71.697	39.071	26.034	ug/mode
96-97	TRANS	1-nitropyrene	4	0.156	0.082	0.340	0.102	0.107	ug/hph
96-97	TRANS	6-nitrochrysene	2	0.001	0.001	0.001	0.001	0.000	ug/hph
96-97	TRANS	7-nitrobenz(a)anthracene	2	0.002	0.001	0.002	0.002	0.000	ug/hph
96-97	TRANS	9-nitroanthracene	2	0.165	0.060	0.270	0.165	0.105	ug/hph
98-03	BUS	1,3-dinitronaphthalene	3	0.091	0.018	0.230	0.025	0.098	ug/hph
98-03	BUS	1,5-dinitronaphthalene	5	0.089	0.024	0.213	0.077	0.068	ug/hph
98-03	BUS	1,8-dinitronaphthalene	5	0.074	0.014	0.197	0.055	0.064	ug/hph
98-03	BUS	1-nitronaphthalene	5	0.702	0.010	2.204	0.139	0.844	ug/hph
98-03	BUS	1-nitropyrene	4	0.291	0.021	0.775	0.183	0.291	ug/hph
98-03	BUS	2-nitrobiphenyl	4	0.727	0.080	2.214	0.307	0.866	ug/hph
98-03	BUS	2-nitrofluorene	4	0.020	0.001	0.039	0.019	0.016	ug/hph
98-03	BUS	2-nitronaphthalene	4	1.160	0.193	3.633	0.407	1.433	ug/hph
98-03	BUS	3-nitrobiphenyl	2	0.038	0.019	0.056	0.038	0.019	ug/hph
98-03	BUS	3-nitrophenanthrene	3	0.091	0.019	0.199	0.055	0.078	ug/hph
98-03	BUS	4-nitrobiphenyl	4	0.098	0.002	0.243	0.072	0.091	ug/hph
98-03	BUS	4-nitrophenanthrene	5	0.126	0.007	0.436	0.024	0.165	ug/hph
98-03	BUS	6-nitrochrysene	3	0.044	0.011	0.093	0.028	0.035	ug/hph
98-03	BUS	7-nitrobenz(a)anthracene	3	0.069	0.025	0.135	0.047	0.048	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	9-nitroanthracene	5	0.110	0.008	0.236	0.142	0.088	ug/hph
98-03	BUS	9-nitrophenanthrene	4	0.130	0.019	0.422	0.039	0.169	ug/hph

Total records	36
Total with 1 record	1
Total with 2 records	8
Max number of records	8
Total with max number of records	2

Table B-7b. Nitro PAHs, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	1-nitronaphthalene	4	265.068	5.176	569.799	242.648	252.742	ug/mi
pre-87	CRUISE	1-nitropyrene	4	21.671	6.977	49.962	14.872	17.213	ug/mi
pre-87	CRUISE	2-nitrobiphenyl	4	15.536	0.668	41.185	10.145	16.462	ug/mi
pre-87	CRUISE	4-nitrobiphenyl	2	30.715	4.951	56.479	30.715	25.764	ug/mi
91-93	TRANS	1-nitronaphthalene	1	2.050	2.050	2.050	2.050	0.000	ug/mi
91-93	TRANS	1-nitropyrene	1	1.100	1.100	1.100	1.100	0.000	ug/mi
91-93	TRANS	3-nitrofluoranthene	1	0.120	0.120	0.120	0.120	0.000	ug/mi
91-93	TRANS	6-nitrochrysene	1	0.740	0.740	0.740	0.740	0.000	ug/mi
91-93	TRANS	7-nitrobenz(a)anthracene	1	0.120	0.120	0.120	0.120	0.000	ug/mi
91-93	TRANS	9-nitroanthracene	1	0.120	0.120	0.120	0.120	0.000	ug/mi
98-03	TRANS	1,3-dinitropyrene	1	0.030	0.030	0.030	0.030	0.000	ug/mi
98-03	TRANS	1,6-dinitropyrene	2	0.075	0.060	0.090	0.075	0.015	ug/mi
98-03	TRANS	1,8-dinitropyrene	2	0.095	0.050	0.140	0.095	0.045	ug/mi
98-03	TRANS	1-nitrobenzo[e]pyrene	1	0.040	0.040	0.040	0.040	0.000	ug/mi
98-03	TRANS	1-nitropyrene	2	0.655	0.590	0.720	0.655	0.065	ug/mi
98-03	TRANS	2-nitroanthracene	1	0.010	0.010	0.010	0.010	0.000	ug/mi
98-03	TRANS	2-nitrofluoranthene	2	0.030	0.020	0.040	0.030	0.010	ug/mi
98-03	TRANS	4-nitropyrene	1	0.030	0.030	0.030	0.030	0.000	ug/mi
98-03	TRANS	6-nitrochrysene	2	0.010	0.010	0.010	0.010	0.000	ug/mi
98-03	TRANS	7-nitrobenz(a)anthracene	2	0.095	0.070	0.120	0.095	0.025	ug/mi
98-03	TRANS	9-nitroanthracene	2	0.585	0.530	0.640	0.585	0.055	ug/mi
98-03	TRANS	9-nitrophenanthrene	1	0.020	0.020	0.020	0.020	0.000	ug/mi

Total records	22
Total with 1 record	11
Total with 2 records	8
Max number of records	4
Total with max number of records	3

Table B-7c. Nitro PAHs, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	TRANS	1-nitropyrene	1	0.210	0.210	0.210	0.210	0.000	ug/hph
94-95	TRANS	6-nitrochrysene	1	0.011	0.011	0.011	0.011	0.000	ug/hph
94-95	TRANS	7-nitrobenz(a)anthracene	1	0.034	0.034	0.034	0.034	0.000	ug/hph

Total records	3
Total with 1 record	3
Total with 2 records	0
Max number of records	1
Total with max number of records	3

Table B-7d. Nitro PAHs, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	BUS	1-nitrobenzo[e]pyrene	1	0.011	0.011	0.011	0.011	0.000	ug/hph
87-90	BUS	1-nitropyrene	3	1.246	0.547	2.339	0.851	0.783	ug/hph
87-90	BUS	2-nitroanthracene	1	0.007	0.007	0.007	0.007	0.000	ug/hph
87-90	BUS	2-nitrofluorene	2	0.053	0.028	0.078	0.053	0.025	ug/hph
87-90	BUS	2-nitrofluoranthene	1	0.033	0.033	0.033	0.033	0.000	ug/hph
87-90	BUS	4-nitropyrene	3	0.062	0.035	0.089	0.063	0.022	ug/hph
87-90	BUS	6-nitrochrysene	2	0.010	0.007	0.013	0.010	0.003	ug/hph
87-90	BUS	7-nitrobenz(a)anthracene	3	0.059	0.037	0.098	0.041	0.028	ug/hph
87-90	BUS	9-nitroanthracene	3	0.710	0.410	1.222	0.499	0.363	ug/hph
87-90	BUS	9-nitrophenanthrene	3	0.049	0.030	0.067	0.050	0.015	ug/hph
98-03	BUS	1,3-dinitronaphthalene	3	0.063	0.021	0.094	0.075	0.031	ug/hph
98-03	BUS	1,3-dinitropyrene	1	0.017	0.017	0.017	0.017	0.000	ug/hph
98-03	BUS	1,5-dinitronaphthalene	2	0.454	0.121	0.788	0.454	0.333	ug/hph
98-03	BUS	1,6-dinitropyrene	1	0.019	0.019	0.019	0.019	0.000	ug/hph
98-03	BUS	1,8-dinitropyrene	1	0.021	0.021	0.021	0.021	0.000	ug/hph
98-03	BUS	1,8-dinitronaphthalene	4	0.726	0.012	2.110	0.392	0.814	ug/hph
98-03	BUS	1-nitronaphthalene	4	4.230	1.106	8.881	3.467	2.910	ug/hph
98-03	BUS	1-nitropyrene	10	42.031	0.009	241.820	20.330	69.800	ug/hph
98-03	BUS	2-nitrobiphenyl	4	0.981	0.186	2.116	0.811	0.704	ug/hph
98-03	BUS	2-nitrofluorene	11	41.730	0.003	398.040	4.280	112.906	ug/hph
98-03	BUS	2-nitrofluoranthene	6	4.281	0.004	14.980	2.140	4.942	ug/hph
98-03	BUS	2-nitronaphthalene	4	0.820	0.213	2.065	0.501	0.732	ug/hph
98-03	BUS	3-nitrobiphenyl	4	0.993	0.004	3.124	0.422	1.277	ug/hph
98-03	BUS	3-nitrofluoranthene	3	9.273	2.140	21.400	4.280	8.619	ug/hph
98-03	BUS	3-nitrophenanthrene	3	0.093	0.004	0.263	0.012	0.120	ug/hph
98-03	BUS	4-nitrobiphenyl	3	0.126	0.043	0.278	0.057	0.108	ug/hph
98-03	BUS	4-nitrophenanthrene	4	0.353	0.028	0.698	0.343	0.319	ug/hph
98-03	BUS	4-nitropyrene	2	2.140	2.140	2.140	2.140	0.000	ug/hph
98-03	BUS	6-nitrochrysene	2	0.014	0.013	0.015	0.014	0.001	ug/hph
98-03	BUS	7-nitrobenz(a)anthracene	8	1.885	0.004	8.560	1.095	2.706	ug/hph
98-03	BUS	9-nitroanthracene	12	23.912	0.008	160.500	7.986	43.416	ug/hph
98-03	BUS	9-nitrophenanthrene	10	195.057	0.022	1463.760	33.170	427.363	ug/hph

Total records	32
Total with 1 record	6
Total with 2 records	5
Max number of records	12
Total with max number of records	1

Table B-7e. Nitro PAHs, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	1,3-dinitronaphthalene	5	0.406	0.010	0.764	0.372	0.282	ug/hph
98-03	BUS	1,5-dinitronaphthalene	5	0.284	0.092	0.523	0.252	0.167	ug/hph
98-03	BUS	1,8-dinitronaphthalene	5	0.552	0.218	0.884	0.509	0.236	ug/hph
98-03	BUS	1-nitronaphthalene	5	2.655	0.891	4.288	2.412	1.355	ug/hph
98-03	BUS	1-nitropyrene	6	0.447	0.003	0.851	0.477	0.362	ug/hph
98-03	BUS	2-nitrobiphenyl	5	0.628	0.071	1.528	0.256	0.602	ug/hph
98-03	BUS	2-nitrofluorene	3	0.034	0.004	0.056	0.041	0.022	ug/hph
98-03	BUS	2-nitronaphthalene	5	1.791	0.576	4.121	1.293	1.219	ug/hph
98-03	BUS	3-nitrobiphenyl	5	0.136	0.038	0.402	0.056	0.137	ug/hph
98-03	BUS	3-nitrophenanthrene	5	0.109	0.009	0.265	0.103	0.095	ug/hph
98-03	BUS	4-nitrobiphenyl	5	0.812	0.008	2.911	0.342	1.086	ug/hph
98-03	BUS	4-nitrophenanthrene	5	0.305	0.118	0.653	0.262	0.189	ug/hph
98-03	BUS	6-nitrochrysene	5	0.035	0.001	0.076	0.022	0.032	ug/hph
98-03	BUS	7-nitrobenz(a)anthracene	4	0.046	0.001	0.103	0.040	0.041	ug/hph
98-03	BUS	9-nitroanthracene	5	0.464	0.217	1.049	0.266	0.313	ug/hph
98-03	BUS	9-nitrophenanthrene	5	0.545	0.056	1.652	0.375	0.587	ug/hph

Total records	16
Total with 1 record	0
Total with 2 records	0
Max number of records	6
Total with max number of records	1

Table B-8a. Oxy PAHs, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	9-anthraldehyde	2	396.467	0.390	792.544	396.467	396.077	ug/hph
pre-87	CRUISE	anthraquinone	2	58.302	5.180	111.424	58.302	53.122	ug/hph
pre-87	CRUISE	anthrone	1	20.256	20.256	20.256	20.256	0.000	ug/hph
pre-87	CRUISE	benz[a]anthracene-7,12-dione	1	0.570	0.570	0.570	0.570	0.000	ug/hph
pre-87	CRUISE	Xanthone	2	9.807	0.317	19.296	9.807	9.489	ug/hph
pre-87	IDLE	benz[a]anthracene-7,12-dione	1	16.247	16.247	16.247	16.247	0.000	ug/hph
pre-87	IDLE	benz[a]anthracene-7,12-dione	1	20.708	20.708	20.708	20.708	0.000	ug/mode
pre-87	TRANS	9-anthraldehyde	5	155.586	4.583	384.544	16.800	179.256	ug/hph
pre-87	TRANS	anthraquinone	7	77.740	12.646	131.968	111.744	50.636	ug/hph
pre-87	TRANS	anthrone	3	123.467	81.664	173.760	114.976	38.074	ug/hph
pre-87	TRANS	benzanthone	4	35.720	8.288	49.792	42.400	16.342	ug/hph
pre-87	TRANS	benz[a]anthracene-7,12-dione	5	10.644	0.928	28.032	8.354	9.701	ug/hph
pre-87	TRANS	Xanthone	5	18.602	1.334	56.096	5.728	21.027	ug/hph
87-90	CRUISE	anthraquinone	1	7.094	7.094	7.094	7.094	0.000	ug/hph
87-90	CRUISE	anthrone	1	0.186	0.186	0.186	0.186	0.000	ug/hph
87-90	CRUISE	benzanthone	1	1.621	1.621	1.621	1.621	0.000	ug/hph
87-90	CRUISE	benz[a]anthracene-7,12-dione	1	0.215	0.215	0.215	0.215	0.000	ug/hph
87-90	CRUISE	Xanthone	1	5.138	5.138	5.138	5.138	0.000	ug/hph
87-90	IDLE	anthraquinone	1	86.026	86.026	86.026	86.026	0.000	ug/mode
87-90	IDLE	anthrone	1	44.228	44.228	44.228	44.228	0.000	ug/mode
87-90	IDLE	benzanthone	1	167.212	167.212	167.212	167.212	0.000	ug/mode
87-90	IDLE	Xanthone	1	464.070	464.070	464.070	464.070	0.000	ug/mode
87-90	TRANS	anthraquinone	1	17.994	17.994	17.994	17.994	0.000	ug/hph
87-90	TRANS	anthrone	1	7.083	7.083	7.083	7.083	0.000	ug/hph
87-90	TRANS	benzanthone	1	8.269	8.269	8.269	8.269	0.000	ug/hph
87-90	TRANS	Xanthone	1	12.060	12.060	12.060	12.060	0.000	ug/hph
91-93	TRANS	9-anthraldehyde	1	2.446	2.446	2.446	2.446	0.000	ug/hph
91-93	TRANS	anthraquinone	1	21.943	21.943	21.943	21.943	0.000	ug/hph
91-93	TRANS	benzanthone	1	4.891	4.891	4.891	4.891	0.000	ug/hph
91-93	TRANS	Xanthone	1	48.776	48.776	48.776	48.776	0.000	ug/hph
94-95	CRUISE	9-anthraldehyde	5	0.144	0.089	0.272	0.132	0.067	ug/hph
94-95	CRUISE	anthraquinone	7	2.698	0.464	5.216	2.683	1.346	ug/hph
94-95	CRUISE	anthrone	3	8.281	0.676	18.694	5.474	7.619	ug/hph
94-95	CRUISE	benzanthone	3	1.983	1.229	3.293	1.428	0.929	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	CRUISE	benz[a]anthracene-7,12-dione	3	0.480	0.108	0.858	0.476	0.306	ug/hph
94-95	CRUISE	Xanthone	6	3.067	0.212	9.433	2.337	3.089	ug/hph
94-95	IDLE	9-anthraldehyde	2	191.918	1.358	382.478	191.918	190.560	ug/hph
94-95	IDLE	Xanthone	5	80.501	19.066	185.805	53.272	59.323	ug/hph
94-95	IDLE	9-anthraldehyde	1	296.726	296.726	296.726	296.726	0.000	ug/mode
94-95	IDLE	anthraquinone	3	34.043	8.193	83.438	10.497	34.940	ug/mode
94-95	IDLE	anthrone	1	30.837	30.837	30.837	30.837	0.000	ug/mode
94-95	IDLE	benzanthone	1	161.433	161.433	161.433	161.433	0.000	ug/mode
94-95	IDLE	benz[a]anthracene-7,12-dione	1	1.574	1.574	1.574	1.574	0.000	ug/mode
94-95	IDLE	Xanthone	5	109.307	3.674	325.818	44.035	118.857	ug/mode
94-95	TRANS	9-anthraldehyde	9	14.844	0.102	93.736	3.570	28.295	ug/hph
94-95	TRANS	anthraquinone	9	7.497	2.139	11.016	7.870	2.667	ug/hph
94-95	TRANS	anthrone	7	41.442	3.236	68.737	49.392	20.123	ug/hph
94-95	TRANS	benzanthone	7	5.874	1.666	10.693	6.208	2.942	ug/hph
94-95	TRANS	benz[a]anthracene-7,12-dione	6	2.106	0.442	7.255	0.772	2.450	ug/hph
94-95	TRANS	Xanthone	12	14.430	1.224	36.358	12.054	10.248	ug/hph
98-03	CRUISE	9-anthraldehyde	3	0.131	0.057	0.181	0.156	0.053	ug/hph
98-03	CRUISE	anthraquinone	3	6.379	2.387	11.191	5.560	3.640	ug/hph
98-03	CRUISE	anthrone	3	2.994	1.444	4.287	3.251	1.175	ug/hph
98-03	CRUISE	benzanthone	3	0.997	0.441	1.800	0.749	0.582	ug/hph
98-03	CRUISE	benz[a]anthracene-7,12-dione	2	0.043	0.019	0.067	0.043	0.024	ug/hph
98-03	CRUISE	Xanthone	3	5.210	2.901	7.473	5.257	1.867	ug/hph
98-03	IDLE	anthraquinone	3	52.332	36.100	78.036	42.860	18.384	ug/mode
98-03	IDLE	anthrone	3	202.665	17.451	506.019	84.524	216.245	ug/mode
98-03	IDLE	benzanthone	3	97.650	3.572	284.574	4.805	132.176	ug/mode
98-03	IDLE	Xanthone	3	354.139	275.549	493.412	293.457	98.752	ug/mode
98-03	TRANS	9-anthraldehyde	1	1449.878	1449.878	1449.878	1449.878	0.000	ug/hph
98-03	TRANS	anthraquinone	4	8.090	3.073	10.885	9.201	3.150	ug/hph
98-03	TRANS	anthrone	3	9.998	5.062	16.839	8.094	4.993	ug/hph
98-03	TRANS	benzanthone	4	4.910	0.637	12.103	3.450	4.509	ug/hph
98-03	TRANS	Xanthone	4	14.093	7.821	21.314	13.618	5.759	ug/hph

Total records	65
Total with 1 record	26
Total with 2 records	5
Max number of records	12
Total with max number of records	1

Table B-8b. Oxy PAHs, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	9-anthraldehyde	4	32.500	10.000	90.000	15.000	33.448	ug/mi
pre-87	FTP	Xanthone	1	10.000	10.000	10.000	10.000	0.000	ug/mi
pre-87	CRUISE	9-anthraldehyde	4	47.422	4.276	74.525	55.444	28.356	ug/mi
pre-87	CRUISE	anthraquinone	3	34.453	5.176	49.795	48.387	20.710	ug/mi
pre-87	CRUISE	benzanthone	4	19.307	1.350	46.136	14.872	18.250	ug/mi
pre-87	CRUISE	benz[a]anthracene-7,12-dione	2	12.607	10.360	14.854	12.607	2.247	ug/mi
pre-87	CRUISE	Xanthone	4	29.246	11.028	48.792	28.582	13.414	ug/mi
pre-87	TRANS	9-anthraldehyde	2	7.500	1.800	13.200	7.500	5.700	ug/mi
pre-87	TRANS	anthraquinone	2	23.800	7.100	40.500	23.800	16.700	ug/mi
pre-87	TRANS	anthrone	2	22.800	2.600	43.000	22.800	20.200	ug/mi
pre-87	TRANS	benzanthone	2	12.600	5.100	20.100	12.600	7.500	ug/mi
pre-87	TRANS	benz[a]anthracene-7,12-dione	2	0.400	0.200	0.600	0.400	0.200	ug/mi
pre-87	TRANS	Xanthone	2	17.700	6.000	29.400	17.700	11.700	ug/mi
87-90	FTP	9-anthraldehyde	4	17.500	10.000	40.000	10.000	12.990	ug/mi
87-90	FTP	Xanthone	2	20.000	10.000	30.000	20.000	10.000	ug/mi
91-93	FTP	9-anthraldehyde	2	145.000	40.000	250.000	145.000	105.000	ug/mi
91-93	FTP	anthraquinone	1	30.000	30.000	30.000	30.000	0.000	ug/mi
91-93	FTP	benz[a]anthracene-7,12-dione	2	15.000	10.000	20.000	15.000	5.000	ug/mi
91-93	FTP	Xanthone	1	100.000	100.000	100.000	100.000	0.000	ug/mi
91-93	TRANS	anthraquinone	1	0.800	0.800	0.800	0.800	0.000	ug/mi
91-93	TRANS	Xanthone	1	46.500	46.500	46.500	46.500	0.000	ug/mi
98-03	FTP	9-anthraldehyde	2	70.000	60.000	80.000	70.000	10.000	ug/mi
98-03	FTP	anthraquinone	1	10.000	10.000	10.000	10.000	0.000	ug/mi
98-03	FTP	anthrone	3	23.333	20.000	30.000	20.000	4.714	ug/mi
98-03	FTP	Xanthone	2	15.000	10.000	20.000	15.000	5.000	ug/mi

Total records	25
Total with 1 record	6
Total with 2 records	12
Max number of records	4
Total with max number of records	5

Table B-8c. Oxy PAHs, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	9-anthraldehyde	1	21.480	21.480	21.480	21.480	0.000	ug/hph
pre-87	CRUISE	anthraquinone	1	22.451	22.451	22.451	22.451	0.000	ug/hph
pre-87	CRUISE	anthrone	1	231.044	231.044	231.044	231.044	0.000	ug/hph
pre-87	CRUISE	benzanthone	1	24.068	24.068	24.068	24.068	0.000	ug/hph
pre-87	CRUISE	benz[a]anthracene-7,12-dione	1	2.717	2.717	2.717	2.717	0.000	ug/hph
pre-87	CRUISE	Xanthone	1	20.381	20.381	20.381	20.381	0.000	ug/hph
pre-87	TRANS	9-anthraldehyde	4	26.171	15.657	45.808	21.610	12.244	ug/hph
pre-87	TRANS	anthraquinone	2	57.583	32.868	82.298	57.583	24.715	ug/hph
pre-87	TRANS	anthrone	4	573.404	375.778	993.080	462.379	246.438	ug/hph
pre-87	TRANS	benzanthone	4	46.940	13.458	102.485	35.909	35.535	ug/hph
pre-87	TRANS	benz[a]anthracene-7,12-dione	3	13.652	2.523	28.015	10.417	10.655	ug/hph
pre-87	TRANS	Xanthone	3	969.551	74.729	2440.613	393.311	1048.298	ug/hph
87-90	CRUISE	9-anthraldehyde	1	133.305	133.305	133.305	133.305	0.000	ug/hph
87-90	CRUISE	anthraquinone	1	51.401	51.401	51.401	51.401	0.000	ug/hph
87-90	CRUISE	benzanthone	1	45.300	45.300	45.300	45.300	0.000	ug/hph
87-90	TRANS	9-anthraldehyde	1	19.340	19.340	19.340	19.340	0.000	ug/hph
87-90	TRANS	anthraquinone	1	129.151	129.151	129.151	129.151	0.000	ug/hph
87-90	TRANS	anthrone	1	137.199	137.199	137.199	137.199	0.000	ug/hph
87-90	TRANS	benzanthone	1	116.236	116.236	116.236	116.236	0.000	ug/hph
87-90	TRANS	benz[a]anthracene-7,12-dione	1	46.793	46.793	46.793	46.793	0.000	ug/hph
87-90	TRANS	Xanthone	1	69.378	69.378	69.378	69.378	0.000	ug/hph
94-95	CRUISE	9-anthraldehyde	1	1092.102	1092.102	1092.102	1092.102	0.000	ug/hph
94-95	CRUISE	benzanthone	1	1.056	1.056	1.056	1.056	0.000	ug/hph
94-95	CRUISE	Xanthone	1	1.584	1.584	1.584	1.584	0.000	ug/hph
94-95	TRANS	anthraquinone	1	15.906	15.906	15.906	15.906	0.000	ug/hph
94-95	TRANS	benzanthone	1	14.586	14.586	14.586	14.586	0.000	ug/hph
94-95	TRANS	Xanthone	2	7.244	1.320	13.168	7.244	5.924	ug/hph
96-97	CRUISE	anthraquinone	1	4.808	4.808	4.808	4.808	0.000	ug/hph
96-97	CRUISE	anthrone	1	0.579	0.579	0.579	0.579	0.000	ug/hph
96-97	CRUISE	benzanthone	1	1.027	1.027	1.027	1.027	0.000	ug/hph
96-97	CRUISE	benz[a]anthracene-7,12-dione	1	0.009	0.009	0.009	0.009	0.000	ug/hph
96-97	CRUISE	Xanthone	1	1.334	1.334	1.334	1.334	0.000	ug/hph
96-97	IDLE	anthraquinone	1	13.757	13.757	13.757	13.757	0.000	ug/mode
96-97	IDLE	anthrone	1	115.788	115.788	115.788	115.788	0.000	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	IDLE	benzanthone	1	4.012	4.012	4.012	4.012	0.000	ug/mode
96-97	IDLE	Xanthone	1	41.845	41.845	41.845	41.845	0.000	ug/mode
96-97	TRANS	anthraquinone	1	0.342	0.342	0.342	0.342	0.000	ug/hph
96-97	TRANS	anthrone	1	0.088	0.088	0.088	0.088	0.000	ug/hph
96-97	TRANS	benzanthone	1	0.055	0.055	0.055	0.055	0.000	ug/hph
96-97	TRANS	Xanthone	1	0.309	0.309	0.309	0.309	0.000	ug/hph
98-03	TRANS	9-anthraldehyde	2	1170.979	148.354	2193.603	1170.979	1022.625	ug/hph
98-03	TRANS	anthraquinone	2	17.907	17.278	18.536	17.907	0.629	ug/hph
98-03	TRANS	benzanthone	2	20.390	13.571	27.208	20.390	6.819	ug/hph
98-03	TRANS	benz[a]anthracene-7,12-dione	1	27.142	27.142	27.142	27.142	0.000	ug/hph
98-03	TRANS	Xanthone	1	8.672	8.672	8.672	8.672	0.000	ug/hph

Total records	45
Total with 1 record	35
Total with 2 records	5
Max number of records	4
Total with max number of records	3

Table B-8d. Oxy PAHs, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	9-anthraldehyde	1	34.575	34.575	34.575	34.575	0.000	ug/hph
pre-87	TRANS	anthraquinone	1	36.886	36.886	36.886	36.886	0.000	ug/hph
pre-87	TRANS	anthrone	1	431.705	431.705	431.705	431.705	0.000	ug/hph
pre-87	TRANS	benzanthone	1	1.308	1.308	1.308	1.308	0.000	ug/hph
pre-87	TRANS	benz[a]anthracene-7,12-dione	1	3.946	3.946	3.946	3.946	0.000	ug/hph
pre-87	TRANS	Xanthone	1	743.881	743.881	743.881	743.881	0.000	ug/hph
pre-87	BUS	9-anthraldehyde	1	9.243	9.243	9.243	9.243	0.000	ug/hph
pre-87	BUS	anthrone	1	39.698	39.698	39.698	39.698	0.000	ug/hph
pre-87	BUS	benzanthone	1	4.883	4.883	4.883	4.883	0.000	ug/hph
91-93	TRANS	9-anthraldehyde	1	249.480	249.480	249.480	249.480	0.000	ug/hph
91-93	TRANS	anthraquinone	1	34.344	34.344	34.344	34.344	0.000	ug/hph
91-93	TRANS	anthrone	1	330.350	330.350	330.350	330.350	0.000	ug/hph
91-93	TRANS	benzanthone	1	14.861	14.861	14.861	14.861	0.000	ug/hph
91-93	TRANS	Xanthone	1	65.772	65.772	65.772	65.772	0.000	ug/hph
91-93	BUS	9-anthraldehyde	1	23.285	23.285	23.285	23.285	0.000	ug/hph
91-93	BUS	anthraquinone	1	61.560	61.560	61.560	61.560	0.000	ug/hph
91-93	BUS	anthrone	1	583.438	583.438	583.438	583.438	0.000	ug/hph
91-93	BUS	benzanthone	1	6.653	6.653	6.653	6.653	0.000	ug/hph

Total records	18
Total with 1 record	18
Total with 2 records	0
Max number of records	1
Total with max number of records	18

Table B-9a. 9-PAH Compounds of Interest to EPA, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	acenaphthene	2	197.22	4.20	390.24	197.22	193.02	ug/hph
pre-87	CRUISE	acenaphthylene	2	121.04	27.42	214.66	121.04	93.62	ug/hph
pre-87	CRUISE	anthracene	2	15.72	3.95	27.49	15.72	11.77	ug/hph
pre-87	CRUISE	benzo[ghi]perylene	1	0.28	0.28	0.28	0.28	0.00	ug/hph
pre-87	CRUISE	fluoranthene	2	569.12	6.07	1132.16	569.12	563.04	ug/hph
pre-87	CRUISE	fluorene	2	187.32	22.50	352.13	187.32	164.81	ug/hph
pre-87	CRUISE	naphthalene	1	453.26	453.26	453.26	453.26	0.00	ug/hph
pre-87	CRUISE	phenanthrene	2	218.18	23.91	412.45	218.18	194.27	ug/hph
pre-87	CRUISE	pyrene	2	688.01	28.24	1347.78	688.01	659.77	ug/hph
pre-87	IDLE	acenaphthene	1	40.62	40.62	40.62	40.62	0.00	ug/hph
pre-87	IDLE	acenaphthylene	1	403.48	403.48	403.48	403.48	0.00	ug/hph
pre-87	IDLE	anthracene	1	1.35	1.35	1.35	1.35	0.00	ug/hph
pre-87	IDLE	benzo[ghi]perylene	1	3.72	3.72	3.72	3.72	0.00	ug/hph
pre-87	IDLE	fluoranthene	1	24.03	24.03	24.03	24.03	0.00	ug/hph
pre-87	IDLE	fluorene	1	266.73	266.73	266.73	266.73	0.00	ug/hph
pre-87	IDLE	naphthalene	1	7708.07	7708.07	7708.07	7708.07	0.00	ug/hph
pre-87	IDLE	phenanthrene	1	175.34	175.34	175.34	175.34	0.00	ug/hph
pre-87	IDLE	pyrene	1	139.46	139.46	139.46	139.46	0.00	ug/hph
pre-87	IDLE	acenaphthene	1	72.21	72.21	72.21	72.21	0.00	ug/mode
pre-87	IDLE	acenaphthylene	1	869.21	869.21	869.21	869.21	0.00	ug/mode
pre-87	IDLE	anthracene	1	32.39	32.39	32.39	32.39	0.00	ug/mode
pre-87	IDLE	benzo[ghi]perylene	1	42.48	42.48	42.48	42.48	0.00	ug/mode
pre-87	IDLE	fluoranthene	1	39.29	39.29	39.29	39.29	0.00	ug/mode
pre-87	IDLE	fluorene	1	331.33	331.33	331.33	331.33	0.00	ug/mode
pre-87	IDLE	naphthalene	1	4144.30	4144.30	4144.30	4144.30	0.00	ug/mode
pre-87	IDLE	phenanthrene	1	346.73	346.73	346.73	346.73	0.00	ug/mode
pre-87	IDLE	pyrene	1	188.50	188.50	188.50	188.50	0.00	ug/mode
pre-87	TRANS	acenaphthene	6	259.67	11.81	715.71	156.86	272.27	ug/hph
pre-87	TRANS	acenaphthylene	7	444.73	67.07	773.15	500.51	257.32	ug/hph
pre-87	TRANS	anthracene	6	58.01	9.34	117.95	56.62	41.10	ug/hph
pre-87	TRANS	benzo[ghi]perylene	1	1.01	1.01	1.01	1.01	0.00	ug/hph
pre-87	TRANS	fluoranthene	7	691.79	12.82	1299.87	883.81	592.64	ug/hph
pre-87	TRANS	fluorene	7	346.70	64.58	788.45	250.11	266.32	ug/hph
pre-87	TRANS	naphthalene	5	2375.31	1127.26	4223.74	2116.54	1054.27	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	phenanthrene	7	473.73	86.20	876.70	572.77	266.48	ug/hph
pre-87	TRANS	pyrene	7	826.91	76.95	1641.18	1026.75	664.96	ug/hph
87-90	CRUISE	acenaphthene	1	6.68	6.68	6.68	6.68	0.00	ug/hph
87-90	CRUISE	acenaphthylene	2	96.45	80.58	112.31	96.45	15.87	ug/hph
87-90	CRUISE	anthracene	1	6.98	6.98	6.98	6.98	0.00	ug/hph
87-90	CRUISE	benzo[ghi]perylene	1	0.16	0.16	0.16	0.16	0.00	ug/hph
87-90	CRUISE	fluoranthene	1	20.20	20.20	20.20	20.20	0.00	ug/hph
87-90	CRUISE	fluorene	2	13.94	3.81	24.06	13.94	10.12	ug/hph
87-90	CRUISE	naphthalene	2	749.81	350.38	1149.24	749.81	399.43	ug/hph
87-90	CRUISE	phenanthrene	2	88.06	87.13	88.98	88.06	0.92	ug/hph
87-90	CRUISE	pyrene	1	27.00	27.00	27.00	27.00	0.00	ug/hph
87-90	IDLE	acenaphthene	1	845.74	845.74	845.74	845.74	0.00	ug/mode
87-90	IDLE	acenaphthylene	1	10456.11	10456.11	10456.11	10456.11	0.00	ug/mode
87-90	IDLE	anthracene	1	508.90	508.90	508.90	508.90	0.00	ug/mode
87-90	IDLE	benzo[ghi]perylene	1	385.92	385.92	385.92	385.92	0.00	ug/mode
87-90	IDLE	fluoranthene	1	106.02	106.02	106.02	106.02	0.00	ug/mode
87-90	IDLE	fluorene	1	3510.21	3510.21	3510.21	3510.21	0.00	ug/mode
87-90	IDLE	naphthalene	1	84354.67	84354.67	84354.67	84354.67	0.00	ug/mode
87-90	IDLE	phenanthrene	1	3522.93	3522.93	3522.93	3522.93	0.00	ug/mode
87-90	IDLE	pyrene	1	121.16	121.16	121.16	121.16	0.00	ug/mode
87-90	TRANS	acenaphthene	2	13.21	10.30	16.12	13.21	2.91	ug/hph
87-90	TRANS	acenaphthylene	2	320.77	218.34	423.19	320.77	102.43	ug/hph
87-90	TRANS	anthracene	1	32.01	32.01	32.01	32.01	0.00	ug/hph
87-90	TRANS	benzo[ghi]perylene	1	0.38	0.38	0.38	0.38	0.00	ug/hph
87-90	TRANS	fluoranthene	1	80.70	80.70	80.70	80.70	0.00	ug/hph
87-90	TRANS	fluorene	2	61.42	27.92	94.91	61.42	33.49	ug/hph
87-90	TRANS	naphthalene	2	2733.23	2500.31	2966.15	2733.23	232.92	ug/hph
87-90	TRANS	phenanthrene	2	157.36	52.10	262.63	157.36	105.27	ug/hph
87-90	TRANS	pyrene	1	137.29	137.29	137.29	137.29	0.00	ug/hph
91-93	TRANS	acenaphthene	9	27.50	1.20	187.80	7.30	56.82	ug/hph
91-93	TRANS	acenaphthylene	9	51.22	8.80	339.02	11.40	102.22	ug/hph
91-93	TRANS	anthracene	6	4.20	1.30	15.85	2.17	5.22	ug/hph
91-93	TRANS	benzo[ghi]perylene	3	0.18	0.02	0.32	0.21	0.12	ug/hph
91-93	TRANS	fluoranthene	9	46.76	2.70	387.80	4.20	120.58	ug/hph
91-93	TRANS	fluorene	9	71.95	4.50	501.23	16.40	152.10	ug/hph
91-93	TRANS	naphthalene	1	4430.48	4430.48	4430.48	4430.48	0.00	ug/hph
91-93	TRANS	phenanthrene	9	88.78	33.30	307.33	64.30	81.85	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	TRANS	pyrene	9	62.98	4.20	453.66	6.40	138.96	ug/hph
94-95	CRUISE	acenaphthene	7	0.85	0.10	2.06	0.73	0.62	ug/hph
94-95	CRUISE	acenaphthylene	9	11.75	1.93	29.23	8.69	8.82	ug/hph
94-95	CRUISE	anthracene	7	2.18	0.14	4.81	1.81	1.75	ug/hph
94-95	CRUISE	benzo[ghi]perylene	3	0.16	0.03	0.27	0.17	0.10	ug/hph
94-95	CRUISE	fluoranthene	6	2.54	0.10	8.97	1.37	2.98	ug/hph
94-95	CRUISE	fluorene	9	10.19	1.39	25.09	5.42	8.57	ug/hph
94-95	CRUISE	naphthalene	9	162.31	10.08	362.65	105.20	118.61	ug/hph
94-95	CRUISE	phenanthrene	9	25.77	5.69	52.21	25.02	15.37	ug/hph
94-95	CRUISE	pyrene	7	7.18	3.02	13.27	5.45	3.86	ug/hph
94-95	IDLE	acenaphthene	3	257.32	5.43	752.96	13.57	350.49	ug/hph
94-95	IDLE	acenaphthylene	5	396.39	59.97	1139.25	247.41	387.39	ug/hph
94-95	IDLE	anthracene	3	37.70	5.09	90.80	17.21	37.87	ug/hph
94-95	IDLE	benzo[ghi]perylene	1	45.33	45.33	45.33	45.33	0.00	ug/hph
94-95	IDLE	fluoranthene	2	28.40	0.33	56.47	28.40	28.07	ug/hph
94-95	IDLE	fluorene	5	333.43	143.60	769.55	290.51	229.66	ug/hph
94-95	IDLE	naphthalene	4	31970.01	5210.76	101702.89	10483.20	40320.92	ug/hph
94-95	IDLE	phenanthrene	5	427.75	107.95	912.24	203.29	322.29	ug/hph
94-95	IDLE	pyrene	4	56.87	6.95	111.46	54.54	47.46	ug/hph
94-95	IDLE	acenaphthene	4	144.83	55.33	233.99	145.01	66.89	ug/mode
94-95	IDLE	acenaphthylene	7	1245.31	91.37	3686.97	375.00	1436.24	ug/mode
94-95	IDLE	anthracene	4	119.30	2.66	224.63	124.95	80.77	ug/mode
94-95	IDLE	benzo[ghi]perylene	3	141.61	25.39	260.32	139.11	95.92	ug/mode
94-95	IDLE	fluoranthene	4	61.91	4.13	131.70	55.89	49.65	ug/mode
94-95	IDLE	fluorene	7	825.79	138.35	1899.90	516.39	686.44	ug/mode
94-95	IDLE	naphthalene	7	15959.69	1612.66	27287.69	17332.35	8268.72	ug/mode
94-95	IDLE	phenanthrene	7	1014.09	92.40	1866.84	1234.01	727.61	ug/mode
94-95	IDLE	pyrene	5	65.73	4.23	151.80	34.08	57.93	ug/mode
94-95	TRANS	acenaphthene	9	9.28	0.48	15.07	12.18	5.01	ug/hph
94-95	TRANS	acenaphthylene	17	60.66	4.23	149.71	55.60	44.19	ug/hph
94-95	TRANS	anthracene	15	7.57	1.07	17.32	7.21	4.81	ug/hph
94-95	TRANS	benzo[ghi]perylene	4	1.59	0.07	4.56	0.86	1.82	ug/hph
94-95	TRANS	fluoranthene	12	10.78	0.14	33.95	7.57	9.34	ug/hph
94-95	TRANS	fluorene	17	57.02	2.47	133.54	49.54	39.56	ug/hph
94-95	TRANS	naphthalene	16	719.54	100.65	1802.24	562.92	439.57	ug/hph
94-95	TRANS	phenanthrene	17	76.48	6.88	165.59	77.22	42.88	ug/hph
94-95	TRANS	pyrene	15	26.28	3.24	55.02	26.96	13.62	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	STEADYST	benzo[ghi]perylene	26	0.25	0.06	0.81	0.18	0.20	ug/hph
94-95	STEADYST	pyrene	26	7.08	1.63	14.39	6.50	3.23	ug/hph
96-97	TRANS	benzo[ghi]perylene	2	0.91	0.56	1.25	0.91	0.35	ug/hph
98-03	CRUISE	acenaphthene	7	3.02	0.68	7.25	1.31	2.36	ug/hph
98-03	CRUISE	acenaphthylene	8	16.64	2.89	31.73	16.85	9.18	ug/hph
98-03	CRUISE	anthracene	3	3.03	1.61	4.88	2.59	1.37	ug/hph
98-03	CRUISE	benzo[ghi]perylene	3	0.06	0.04	0.08	0.06	0.02	ug/hph
98-03	CRUISE	fluoranthene	3	3.33	1.45	5.36	3.19	1.60	ug/hph
98-03	CRUISE	fluorene	8	12.26	0.68	27.10	7.87	9.41	ug/hph
98-03	CRUISE	naphthalene	8	202.62	8.27	350.22	203.61	110.73	ug/hph
98-03	CRUISE	phenanthrene	8	25.75	8.30	56.44	21.76	15.51	ug/hph
98-03	CRUISE	pyrene	3	8.14	4.41	12.07	7.95	3.13	ug/hph
98-03	IDLE	acenaphthene	8	248.67	18.35	653.38	221.70	198.32	ug/mode
98-03	IDLE	acenaphthylene	9	1739.99	499.12	2929.39	1414.30	836.52	ug/mode
98-03	IDLE	anthracene	3	176.62	136.31	230.50	163.04	39.63	ug/mode
98-03	IDLE	benzo[ghi]perylene	3	7.99	7.14	9.62	7.20	1.16	ug/mode
98-03	IDLE	fluoranthene	3	32.18	14.44	64.23	17.86	22.71	ug/mode
98-03	IDLE	fluorene	9	913.66	201.86	2085.29	559.63	739.37	ug/mode
98-03	IDLE	naphthalene	9	19087.21	7480.66	32929.10	14947.01	9136.34	ug/mode
98-03	IDLE	phenanthrene	9	916.31	175.00	2219.76	442.78	735.17	ug/mode
98-03	IDLE	pyrene	1	81.03	81.03	81.03	81.03	0.00	ug/mode
98-03	TRANS	acenaphthene	10	11.95	2.01	46.21	4.57	14.94	ug/hph
98-03	TRANS	acenaphthylene	10	60.46	15.50	135.49	44.10	38.47	ug/hph
98-03	TRANS	anthracene	4	8.30	3.70	12.98	8.26	4.59	ug/hph
98-03	TRANS	benzo[ghi]perylene	2	0.73	0.23	1.24	0.73	0.50	ug/hph
98-03	TRANS	fluoranthene	4	45.42	1.72	166.43	6.76	69.90	ug/hph
98-03	TRANS	fluorene	10	56.37	9.84	298.74	18.94	85.83	ug/hph
98-03	TRANS	naphthalene	9	661.77	212.35	1145.14	598.77	272.70	ug/hph
98-03	TRANS	phenanthrene	10	63.25	14.28	285.93	24.52	81.96	ug/hph
98-03	TRANS	pyrene	4	53.68	0.41	179.23	17.54	72.92	ug/hph
98-03	BUS	acenaphthene	4	15.44	6.57	39.10	8.04	13.69	ug/hph
98-03	BUS	acenaphthylene	4	97.88	0.55	197.57	96.70	97.28	ug/hph
98-03	BUS	anthracene	3	7.19	1.87	10.59	9.10	3.81	ug/hph
98-03	BUS	benzo[ghi]perylene	4	0.80	0.19	2.22	0.39	0.83	ug/hph
98-03	BUS	fluoranthene	5	8.10	1.24	17.96	4.64	6.91	ug/hph
98-03	BUS	fluorene	5	34.43	1.01	87.54	9.20	36.68	ug/hph
98-03	BUS	naphthalene	5	457.76	97.23	1048.38	144.28	419.29	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	phenanthrene	5	39.52	4.98	99.99	8.86	41.20	ug/hph
98-03	BUS	pyrene	5	14.42	1.25	34.95	4.43	13.95	ug/hph

Total records	147
Total with 1 record	42
Total with 2 records	19
Max number of records	26
Total with max number of records	2

Table B-9b. 9-PAH Compounds of Interest to EPA, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	acenaphthene	21	53.90	9.00	179.00	28.00	48.69	ug/mi
pre-87	FTP	acenaphthylene	26	417.00	0.36	2483.00	185.00	579.52	ug/mi
pre-87	FTP	anthracene	25	80.00	4.98	288.00	55.00	80.59	ug/mi
pre-87	FTP	benzo[ghi]perylene	20	29.17	3.00	213.00	8.50	49.38	ug/mi
pre-87	FTP	fluoranthene	26	233.98	10.00	1133.00	122.16	291.28	ug/mi
pre-87	FTP	fluorene	26	178.11	0.62	745.00	118.00	200.08	ug/mi
pre-87	FTP	naphthalene	26	1847.08	0.53	7444.00	1458.00	1766.31	ug/mi
pre-87	FTP	phenanthrene	26	460.71	31.92	1764.00	321.00	477.25	ug/mi
pre-87	FTP	pyrene	26	318.14	28.00	1504.00	187.50	382.22	ug/mi
pre-87	CRUISE	acenaphthene	4	108.48	7.20	284.40	71.17	112.72	ug/mi
pre-87	CRUISE	acenaphthylene	4	1461.05	43.66	3712.55	1044.00	1518.43	ug/mi
pre-87	CRUISE	anthracene	4	51.07	36.43	61.16	53.34	9.12	ug/mi
pre-87	CRUISE	benzo[ghi]perylene	4	59.24	3.38	156.40	38.60	61.10	ug/mi
pre-87	CRUISE	fluoranthene	3	541.79	59.87	873.25	692.27	348.69	ug/mi
pre-87	CRUISE	fluorene	4	445.66	54.01	873.25	427.70	346.84	ug/mi
pre-87	CRUISE	naphthalene	4	4493.02	91.24	11896.60	2992.11	4849.86	ug/mi
pre-87	CRUISE	phenanthrene	4	753.11	558.77	974.84	739.42	148.29	ug/mi
pre-87	CRUISE	pyrene	3	711.73	63.69	1210.45	861.06	479.92	ug/mi
pre-87	TRANS	acenaphthene	2	10.50	1.30	19.70	10.50	9.20	ug/mi
pre-87	TRANS	acenaphthylene	2	93.10	30.80	155.40	93.10	62.30	ug/mi
pre-87	TRANS	anthracene	2	23.20	5.10	41.30	23.20	18.10	ug/mi
pre-87	TRANS	benzo[ghi]perylene	2	7.00	6.80	7.20	7.00	0.20	ug/mi
pre-87	TRANS	fluoranthene	2	89.60	27.10	152.10	89.60	62.50	ug/mi
pre-87	TRANS	fluorene	2	40.35	13.80	66.90	40.35	26.55	ug/mi
pre-87	TRANS	naphthalene	2	851.60	211.60	1491.60	851.60	640.00	ug/mi
pre-87	TRANS	phenanthrene	2	103.65	28.70	178.60	103.65	74.95	ug/mi
pre-87	TRANS	pyrene	2	133.85	40.30	227.40	133.85	93.55	ug/mi
87-90	FTP	acenaphthene	3	70.00	50.00	90.00	70.00	16.33	ug/mi
87-90	FTP	acenaphthylene	4	355.00	30.00	930.00	230.00	367.32	ug/mi
87-90	FTP	anthracene	3	100.00	10.00	250.00	40.00	106.77	ug/mi
87-90	FTP	benzo[ghi]perylene	2	35.00	30.00	40.00	35.00	5.00	ug/mi
87-90	FTP	fluoranthene	3	100.00	10.00	150.00	140.00	63.77	ug/mi
87-90	FTP	fluorene	4	90.00	10.00	170.00	90.00	70.71	ug/mi
87-90	FTP	naphthalene	4	3262.50	1970.00	4910.00	3085.00	1185.15	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	FTP	phenanthrene	4	212.50	30.00	390.00	215.00	154.98	ug/mi
87-90	FTP	pyrene	4	110.00	10.00	210.00	110.00	95.13	ug/mi
91-93	FTP	acenaphthene	4	79.86	0.43	180.00	69.50	77.25	ug/mi
91-93	FTP	acenaphthylene	5	78.85	0.26	220.00	70.00	80.28	ug/mi
91-93	FTP	anthracene	5	32.56	1.07	100.00	20.00	36.22	ug/mi
91-93	FTP	benzo[ghi]perylene	2	1.48	0.95	2.00	1.48	0.52	ug/mi
91-93	FTP	fluoranthene	5	33.56	20.18	41.00	36.63	7.72	ug/mi
91-93	FTP	fluorene	5	121.41	0.25	450.00	35.00	169.96	ug/mi
91-93	FTP	naphthalene	5	2096.51	0.53	6820.00	501.00	2637.13	ug/mi
91-93	FTP	phenanthrene	5	257.18	8.97	930.00	122.00	342.48	ug/mi
91-93	FTP	pyrene	5	149.62	38.67	290.00	140.00	96.95	ug/mi
91-93	TRANS	acenaphthene	1	29.90	29.90	29.90	29.90	0.00	ug/mi
91-93	TRANS	acenaphthylene	1	70.90	70.90	70.90	70.90	0.00	ug/mi
91-93	TRANS	anthracene	1	25.90	25.90	25.90	25.90	0.00	ug/mi
91-93	TRANS	benzo[ghi]perylene	1	2.07	2.07	2.07	2.07	0.00	ug/mi
91-93	TRANS	fluoranthene	1	19.20	19.20	19.20	19.20	0.00	ug/mi
91-93	TRANS	fluorene	1	146.40	146.40	146.40	146.40	0.00	ug/mi
91-93	TRANS	naphthalene	1	384.20	384.20	384.20	384.20	0.00	ug/mi
91-93	TRANS	phenanthrene	1	344.70	344.70	344.70	344.70	0.00	ug/mi
91-93	TRANS	pyrene	1	45.20	45.20	45.20	45.20	0.00	ug/mi
94-95	FTP	anthracene	1	0.84	0.84	0.84	0.84	0.00	ug/mi
94-95	FTP	benzo[ghi]perylene	1	45.90	45.90	45.90	45.90	0.00	ug/mi
94-95	FTP	fluoranthene	1	31.35	31.35	31.35	31.35	0.00	ug/mi
94-95	FTP	phenanthrene	1	20.15	20.15	20.15	20.15	0.00	ug/mi
94-95	FTP	pyrene	1	54.29	54.29	54.29	54.29	0.00	ug/mi
96-97	FTP	anthracene	1	1.79	1.79	1.79	1.79	0.00	ug/mi
96-97	FTP	fluoranthene	1	7.28	7.28	7.28	7.28	0.00	ug/mi
96-97	FTP	phenanthrene	1	13.45	13.45	13.45	13.45	0.00	ug/mi
96-97	FTP	pyrene	1	11.20	11.20	11.20	11.20	0.00	ug/mi
98-03	FTP	acenaphthene	3	33.33	10.00	50.00	40.00	17.00	ug/mi
98-03	FTP	acenaphthylene	12	45.17	10.00	140.00	30.00	43.44	ug/mi
98-03	FTP	fluoranthene	2	10.00	10.00	10.00	10.00	0.00	ug/mi
98-03	FTP	fluorene	3	33.33	10.00	60.00	30.00	20.55	ug/mi
98-03	FTP	naphthalene	13	448.46	120.00	1060.00	450.00	250.98	ug/mi
98-03	FTP	phenanthrene	13	26.38	10.00	50.00	20.00	13.61	ug/mi
98-03	FTP	pyrene	3	16.67	10.00	30.00	10.00	9.43	ug/mi
98-03	TRANS	acenaphthylene	2	98.05	89.10	107.00	98.05	8.95	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	anthracene	2	8.15	8.00	8.30	8.15	0.15	ug/mi
98-03	TRANS	benzo[ghi]perylene	1	0.42	0.42	0.42	0.42	0.00	ug/mi
98-03	TRANS	fluoranthene	2	9.70	9.30	10.10	9.70	0.40	ug/mi
98-03	TRANS	fluorene	2	117.45	95.90	139.00	117.45	21.55	ug/mi
98-03	TRANS	phenanthrene	2	194.50	185.00	204.00	194.50	9.50	ug/mi
98-03	TRANS	pyrene	2	12.35	11.60	13.10	12.35	0.75	ug/mi

Total records	77
Total with 1 record	19
Total with 2 records	18
Max number of records	26
Total with max number of records	6

Table B-9c. 9-PAH Compounds of Interest to EPA, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	acenaphthene	1	9.90	9.90	9.90	9.90	0.00	ug/hph
pre-87	CRUISE	acenaphthylene	1	63.47	63.47	63.47	63.47	0.00	ug/hph
pre-87	CRUISE	anthracene	1	11.97	11.97	11.97	11.97	0.00	ug/hph
pre-87	CRUISE	benzo[ghi]perylene	1	1.88	1.88	1.88	1.88	0.00	ug/hph
pre-87	CRUISE	fluoranthene	1	14.69	14.69	14.69	14.69	0.00	ug/hph
pre-87	CRUISE	fluorene	1	59.01	59.01	59.01	59.01	0.00	ug/hph
pre-87	CRUISE	naphthalene	1	1525.95	1525.95	1525.95	1525.95	0.00	ug/hph
pre-87	CRUISE	phenanthrene	1	78.03	78.03	78.03	78.03	0.00	ug/hph
pre-87	CRUISE	pyrene	1	55.84	55.84	55.84	55.84	0.00	ug/hph
pre-87	TRANS	acenaphthene	4	150.82	35.39	372.15	97.86	137.23	ug/hph
pre-87	TRANS	acenaphthylene	4	477.63	158.45	1295.16	228.46	474.46	ug/hph
pre-87	TRANS	anthracene	4	228.54	28.53	610.38	137.62	236.21	ug/hph
pre-87	TRANS	benzo[ghi]perylene	2	1.71	1.68	1.75	1.71	0.03	ug/hph
pre-87	TRANS	fluoranthene	1	65.28	65.28	65.28	65.28	0.00	ug/hph
pre-87	TRANS	fluorene	4	1126.49	183.49	3473.10	424.69	1365.78	ug/hph
pre-87	TRANS	naphthalene	4	7004.20	2698.96	13756.64	5780.59	4191.06	ug/hph
pre-87	TRANS	phenanthrene	4	2281.89	288.37	6439.14	1200.02	2511.42	ug/hph
pre-87	TRANS	pyrene	4	252.28	220.17	328.42	230.27	44.27	ug/hph
87-90	CRUISE	acenaphthene	1	305.81	305.81	305.81	305.81	0.00	ug/hph
87-90	CRUISE	acenaphthylene	1	162.38	162.38	162.38	162.38	0.00	ug/hph
87-90	CRUISE	anthracene	1	29.79	29.79	29.79	29.79	0.00	ug/hph
87-90	CRUISE	fluoranthene	1	389.72	389.72	389.72	389.72	0.00	ug/hph
87-90	CRUISE	fluorene	1	144.79	144.79	144.79	144.79	0.00	ug/hph
87-90	CRUISE	naphthalene	1	1717.77	1717.77	1717.77	1717.77	0.00	ug/hph
87-90	CRUISE	phenanthrene	1	225.98	225.98	225.98	225.98	0.00	ug/hph
87-90	CRUISE	pyrene	1	474.29	474.29	474.29	474.29	0.00	ug/hph
87-90	TRANS	acenaphthene	1	259.86	259.86	259.86	259.86	0.00	ug/hph
87-90	TRANS	acenaphthylene	1	755.37	755.37	755.37	755.37	0.00	ug/hph
87-90	TRANS	anthracene	1	100.08	100.08	100.08	100.08	0.00	ug/hph
87-90	TRANS	benzo[ghi]perylene	1	1.62	1.62	1.62	1.62	0.00	ug/hph
87-90	TRANS	fluoranthene	1	850.58	850.58	850.58	850.58	0.00	ug/hph
87-90	TRANS	fluorene	1	340.53	340.53	340.53	340.53	0.00	ug/hph
87-90	TRANS	naphthalene	1	2462.96	2462.96	2462.96	2462.96	0.00	ug/hph
87-90	TRANS	phenanthrene	1	627.84	627.84	627.84	627.84	0.00	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	TRANS	pyrene	1	1559.09	1559.09	1559.09	1559.09	0.00	ug/hph
94-95	CRUISE	acenaphthene	1	29.04	29.04	29.04	29.04	0.00	ug/hph
94-95	CRUISE	acenaphthylene	1	16.70	16.70	16.70	16.70	0.00	ug/hph
94-95	CRUISE	anthracene	1	4.29	4.29	4.29	4.29	0.00	ug/hph
94-95	CRUISE	fluoranthene	1	48.44	48.44	48.44	48.44	0.00	ug/hph
94-95	CRUISE	fluorene	1	72.14	72.14	72.14	72.14	0.00	ug/hph
94-95	CRUISE	phenanthrene	1	43.03	43.03	43.03	43.03	0.00	ug/hph
94-95	CRUISE	pyrene	1	53.86	53.86	53.86	53.86	0.00	ug/hph
94-95	TRANS	acenaphthene	1	20.50	20.50	20.50	20.50	0.00	ug/hph
94-95	TRANS	acenaphthylene	2	107.48	74.44	140.51	107.48	33.04	ug/hph
94-95	TRANS	anthracene	2	12.42	11.58	13.27	12.42	0.85	ug/hph
94-95	TRANS	benzo[ghi]perylene	1	1.35	1.35	1.35	1.35	0.00	ug/hph
94-95	TRANS	fluoranthene	3	99.78	56.28	182.95	60.11	58.83	ug/hph
94-95	TRANS	fluorene	3	163.36	69.24	332.71	88.14	119.99	ug/hph
94-95	TRANS	naphthalene	1	655.22	655.22	655.22	655.22	0.00	ug/hph
94-95	TRANS	phenanthrene	3	134.86	49.91	255.82	98.87	87.83	ug/hph
94-95	TRANS	pyrene	3	137.63	76.35	242.55	93.98	74.54	ug/hph
96-97	CRUISE	acenaphthene	1	4.47	4.47	4.47	4.47	0.00	ug/hph
96-97	CRUISE	acenaphthylene	1	8.99	8.99	8.99	8.99	0.00	ug/hph
96-97	CRUISE	anthracene	1	0.86	0.86	0.86	0.86	0.00	ug/hph
96-97	CRUISE	benzo[ghi]perylene	1	0.02	0.02	0.02	0.02	0.00	ug/hph
96-97	CRUISE	fluoranthene	1	1.07	1.07	1.07	1.07	0.00	ug/hph
96-97	CRUISE	fluorene	1	3.53	3.53	3.53	3.53	0.00	ug/hph
96-97	CRUISE	naphthalene	1	193.70	193.70	193.70	193.70	0.00	ug/hph
96-97	CRUISE	phenanthrene	1	9.77	9.77	9.77	9.77	0.00	ug/hph
96-97	CRUISE	pyrene	1	1.57	1.57	1.57	1.57	0.00	ug/hph
96-97	IDLE	acenaphthene	3	38.14	21.33	63.85	29.23	18.47	ug/mode
96-97	IDLE	acenaphthylene	3	59.69	36.56	76.01	66.49	16.81	ug/mode
96-97	IDLE	anthracene	1	13.76	13.76	13.76	13.76	0.00	ug/mode
96-97	IDLE	fluoranthene	1	8.02	8.02	8.02	8.02	0.00	ug/mode
96-97	IDLE	fluorene	3	167.63	115.79	243.23	143.88	54.67	ug/mode
96-97	IDLE	naphthalene	1	1344.15	1344.15	1344.15	1344.15	0.00	ug/mode
96-97	IDLE	phenanthrene	3	345.85	206.92	547.27	283.37	145.80	ug/mode
96-97	TRANS	acenaphthene	2	3.61	0.27	6.95	3.61	3.34	ug/hph
96-97	TRANS	acenaphthylene	2	0.71	0.68	0.73	0.71	0.02	ug/hph
96-97	TRANS	anthracene	1	0.15	0.15	0.15	0.15	0.00	ug/hph
96-97	TRANS	benzo[ghi]perylene	1	0.18	0.18	0.18	0.18	0.00	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	TRANS	fluoranthene	1	0.04	0.04	0.04	0.04	0.00	ug/hph
96-97	TRANS	fluorene	2	2.15	1.76	2.53	2.15	0.38	ug/hph
96-97	TRANS	naphthalene	1	38.65	38.65	38.65	38.65	0.00	ug/hph
96-97	TRANS	phenanthrene	2	3.24	2.04	4.44	3.24	1.20	ug/hph
98-03	TRANS	acenaphthene	2	27.18	17.28	37.07	27.18	9.90	ug/hph
98-03	TRANS	acenaphthylene	2	49.45	8.67	90.23	49.45	40.78	ug/hph
98-03	TRANS	anthracene	2	27.21	14.83	39.59	27.21	12.38	ug/hph
98-03	TRANS	fluoranthene	2	162.45	160.47	164.44	162.45	1.99	ug/hph
98-03	TRANS	fluorene	2	184.14	125.91	242.36	184.14	58.22	ug/hph
98-03	TRANS	naphthalene	1	501.99	501.99	501.99	501.99	0.00	ug/hph
98-03	TRANS	phenanthrene	2	173.61	145.64	201.58	173.61	27.97	ug/hph
98-03	TRANS	pyrene	2	193.97	181.45	206.48	193.97	12.51	ug/hph

Total records	83
Total with 1 record	54
Total with 2 records	14
Max number of records	4
Total with max number of records	7

Table B-9d. 9-PAH Compounds of Interest to EPA, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	acenaphthylene	1	66.18	66.18	66.18	66.18	0.00	ug/hph
pre-87	TRANS	anthracene	1	2100.91	2100.91	2100.91	2100.91	0.00	ug/hph
pre-87	TRANS	fluoranthene	1	36.23	36.23	36.23	36.23	0.00	ug/hph
pre-87	TRANS	fluorene	1	395.82	395.82	395.82	395.82	0.00	ug/hph
pre-87	TRANS	naphthalene	1	129.75	129.75	129.75	129.75	0.00	ug/hph
pre-87	TRANS	phenanthrene	1	2080.18	2080.18	2080.18	2080.18	0.00	ug/hph
pre-87	TRANS	pyrene	1	209.76	209.76	209.76	209.76	0.00	ug/hph
pre-87	BUS	acenaphthene	1	23.37	23.37	23.37	23.37	0.00	ug/hph
pre-87	BUS	fluoranthene	1	16.85	16.85	16.85	16.85	0.00	ug/hph
pre-87	BUS	pyrene	1	76.10	76.10	76.10	76.10	0.00	ug/hph
87-90	BUS	acenaphthene	1	0.43	0.43	0.43	0.43	0.00	ug/hph
87-90	BUS	anthracene	3	4.56	1.52	9.33	2.82	3.42	ug/hph
87-90	BUS	benzo[ghi]perylene	1	3.69	3.69	3.69	3.69	0.00	ug/hph
87-90	BUS	fluoranthene	3	10.63	6.08	19.10	6.73	5.99	ug/hph
87-90	BUS	fluorene	3	2.24	0.65	4.99	1.09	1.95	ug/hph
87-90	BUS	phenanthrene	3	39.20	16.49	67.27	33.85	21.07	ug/hph
87-90	BUS	pyrene	3	13.82	6.73	26.69	8.03	9.12	ug/hph
91-93	TRANS	acenaphthene	1	87.22	87.22	87.22	87.22	0.00	ug/hph
91-93	TRANS	acenaphthylene	1	376.16	376.16	376.16	376.16	0.00	ug/hph
91-93	TRANS	anthracene	1	72.84	72.84	72.84	72.84	0.00	ug/hph
91-93	TRANS	fluoranthene	1	63.59	63.59	63.59	63.59	0.00	ug/hph
91-93	TRANS	fluorene	1	473.86	473.86	473.86	473.86	0.00	ug/hph
91-93	TRANS	naphthalene	1	3745.48	3745.48	3745.48	3745.48	0.00	ug/hph
91-93	TRANS	phenanthrene	1	692.39	692.39	692.39	692.39	0.00	ug/hph
91-93	TRANS	pyrene	1	191.48	191.48	191.48	191.48	0.00	ug/hph
91-93	BUS	acenaphthene	1	205.76	205.76	205.76	205.76	0.00	ug/hph
91-93	BUS	acenaphthylene	1	56.01	56.01	56.01	56.01	0.00	ug/hph
91-93	BUS	anthracene	1	94.28	94.28	94.28	94.28	0.00	ug/hph
91-93	BUS	fluoranthene	1	109.25	109.25	109.25	109.25	0.00	ug/hph
91-93	BUS	fluorene	1	173.04	173.04	173.04	173.04	0.00	ug/hph
91-93	BUS	naphthalene	1	276.74	276.74	276.74	276.74	0.00	ug/hph
91-93	BUS	phenanthrene	1	1023.78	1023.78	1023.78	1023.78	0.00	ug/hph
91-93	BUS	pyrene	1	281.17	281.17	281.17	281.17	0.00	ug/hph
98-03	BUS	acenaphthene	15	385.78	0.03	2846.20	76.18	707.63	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	acenaphthylene	14	1029.84	0.19	7832.40	79.61	2080.92	ug/hph
98-03	BUS	anthracene	10	253.76	0.03	1134.20	88.80	357.07	ug/hph
98-03	BUS	benzo[ghi]perylene	1	1.02	1.02	1.02	1.02	0.00	ug/hph
98-03	BUS	fluoranthene	15	386.45	0.24	3038.80	10.40	783.70	ug/hph
98-03	BUS	fluorene	14	920.02	0.11	6398.60	25.98	1658.60	ug/hph
98-03	BUS	naphthalene	4	389.58	20.95	723.32	407.03	321.84	ug/hph
98-03	BUS	phenanthrene	15	2310.68	0.04	17227.00	49.43	4420.93	ug/hph
98-03	BUS	pyrene	16	362.71	0.21	3038.80	10.82	772.92	ug/hph

Total records	42
Total with 1 record	29
Total with 2 records	0
Max number of records	16
Total with max number of records	1

Table B-9e. 9-PAH Compounds of Interest to EPA, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	acenaphthene	6	24.11	0.33	61.31	22.90	20.96	ug/hph
98-03	BUS	acenaphthylene	7	60.01	0.07	151.09	40.20	59.73	ug/hph
98-03	BUS	anthracene	7	4.29	0.06	12.40	2.84	4.06	ug/hph
98-03	BUS	benzo[ghi]perylene	4	1.56	0.28	2.30	1.82	0.77	ug/hph
98-03	BUS	fluoranthene	7	6.10	0.40	11.39	7.60	4.60	ug/hph
98-03	BUS	fluorene	7	32.17	0.12	63.65	44.22	27.36	ug/hph
98-03	BUS	naphthalene	7	444.98	23.12	1226.10	244.55	427.32	ug/hph
98-03	BUS	phenanthrene	7	45.42	0.17	137.35	31.59	45.69	ug/hph
98-03	BUS	pyrene	7	14.40	0.40	27.30	19.77	11.24	ug/hph

Total records	9
Total with 1 record	0
Total with 2 records	0
Max number of records	7
Total with max number of records	7

Table B-10a. 7-PAH Compounds of Interest to EPA, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	benzo[a]pyrene	1	1.48	1.48	1.48	1.48	0.00	ug/hph
pre-87	CRUISE	benz[a]anthracene	1	2.77	2.77	2.77	2.77	0.00	ug/hph
pre-87	CRUISE	chrysene	2	19.82	3.92	35.71	19.82	15.89	ug/hph
pre-87	CRUISE	indeno[123-cd]pyrene	1	0.18	0.18	0.18	0.18	0.00	ug/hph
pre-87	IDLE	benzo[a]pyrene	1	7.45	7.45	7.45	7.45	0.00	ug/hph
pre-87	IDLE	benz[a]anthracene	1	5.75	5.75	5.75	5.75	0.00	ug/hph
pre-87	IDLE	chrysene	1	19.97	19.97	19.97	19.97	0.00	ug/hph
pre-87	IDLE	benzo[a]pyrene	1	164.60	164.60	164.60	164.60	0.00	ug/mode
pre-87	IDLE	benz[a]anthracene	1	73.28	73.28	73.28	73.28	0.00	ug/mode
pre-87	IDLE	chrysene	1	74.34	74.34	74.34	74.34	0.00	ug/mode
pre-87	IDLE	indeno[123-cd]pyrene	1	30.27	30.27	30.27	30.27	0.00	ug/mode
pre-87	TRANS	benzo[a]pyrene	5	13.68	4.35	29.82	6.53	10.43	ug/hph
pre-87	TRANS	benz[a]anthracene	6	65.41	6.37	173.18	41.54	65.17	ug/hph
pre-87	TRANS	chrysene	7	60.05	3.70	148.61	24.16	58.41	ug/hph
pre-87	TRANS	indeno[123-cd]pyrene	2	0.28	0.23	0.32	0.28	0.04	ug/hph
87-90	CRUISE	benz[a]anthracene	1	0.21	0.21	0.21	0.21	0.00	ug/hph
87-90	CRUISE	chrysene	1	0.76	0.76	0.76	0.76	0.00	ug/hph
87-90	CRUISE	indeno[123-cd]pyrene	1	0.10	0.10	0.10	0.10	0.00	ug/hph
87-90	IDLE	benzo[a]pyrene	1	203.56	203.56	203.56	203.56	0.00	ug/mode
87-90	IDLE	benz[a]anthracene	1	54.52	54.52	54.52	54.52	0.00	ug/mode
87-90	IDLE	chrysene	1	47.86	47.86	47.86	47.86	0.00	ug/mode
87-90	IDLE	indeno[123-cd]pyrene	1	211.43	211.43	211.43	211.43	0.00	ug/mode
87-90	TRANS	benz[a]anthracene	1	4.82	4.82	4.82	4.82	0.00	ug/hph
87-90	TRANS	chrysene	1	2.64	2.64	2.64	2.64	0.00	ug/hph
87-90	TRANS	indeno[123-cd]pyrene	1	0.84	0.84	0.84	0.84	0.00	ug/hph
91-93	TRANS	benzo[a]pyrene	2	0.16	0.11	0.21	0.16	0.05	ug/hph
91-93	TRANS	benz[a]anthracene	7	2.86	0.10	17.09	0.32	5.83	ug/hph
91-93	TRANS	chrysene	9	6.11	0.17	46.33	0.58	14.28	ug/hph
91-93	TRANS	indeno[123-cd]pyrene	4	0.75	0.11	2.45	0.22	0.98	ug/hph
94-95	CRUISE	benzo[a]pyrene	6	4.47	0.98	9.04	4.12	2.59	ug/hph
94-95	CRUISE	benz[a]anthracene	6	1.12	0.19	2.69	0.93	0.89	ug/hph
94-95	CRUISE	chrysene	7	0.84	0.23	1.61	0.68	0.47	ug/hph
94-95	CRUISE	indeno[123-cd]pyrene	2	0.08	0.03	0.12	0.08	0.04	ug/hph
94-95	IDLE	benzo[a]pyrene	5	395.20	74.45	1353.67	206.34	483.97	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	IDLE	benz[a]anthracene	4	116.10	17.21	285.99	80.61	101.45	ug/hph
94-95	IDLE	chrysene	2	3.72	1.14	6.29	3.72	2.57	ug/hph
94-95	IDLE	indeno[123-cd]pyrene	2	20.09	16.02	24.15	20.09	4.07	ug/hph
94-95	IDLE	benzo[a]pyrene	5	253.07	107.37	381.03	264.99	103.20	ug/mode
94-95	IDLE	benz[a]anthracene	1	177.92	177.92	177.92	177.92	0.00	ug/mode
94-95	IDLE	chrysene	2	3.17	2.10	4.23	3.17	1.07	ug/mode
94-95	IDLE	indeno[123-cd]pyrene	3	106.08	15.12	195.76	107.37	73.75	ug/mode
94-95	TRANS	benzo[a]pyrene	12	11.83	0.34	34.09	8.70	9.03	ug/hph
94-95	TRANS	benz[a]anthracene	10	4.74	0.23	7.40	5.70	2.62	ug/hph
94-95	TRANS	chrysene	12	4.03	0.05	13.68	3.36	3.63	ug/hph
94-95	TRANS	indeno[123-cd]pyrene	9	0.94	0.10	3.64	0.32	1.09	ug/hph
94-95	STEADYST	benzo[a]pyrene	26	0.08	0.01	0.28	0.06	0.07	ug/hph
94-95	STEADYST	benzo[k]fluoranthene	22	0.04	0.01	0.13	0.03	0.03	ug/hph
96-97	TRANS	benzo[a]pyrene	4	0.81	0.04	1.61	0.80	0.71	ug/hph
96-97	TRANS	benzo[k]fluoranthene	2	1.17	0.53	1.81	1.17	0.64	ug/hph
96-97	TRANS	benz[a]anthracene	2	2.23	1.15	3.31	2.23	1.08	ug/hph
96-97	TRANS	chrysene	2	2.87	1.76	3.99	2.87	1.12	ug/hph
96-97	TRANS	dibenz[ah]anthracene	2	0.20	0.09	0.32	0.20	0.11	ug/hph
96-97	TRANS	indeno[123-cd]pyrene	2	0.58	0.23	0.92	0.58	0.34	ug/hph
98-03	CRUISE	benz[a]anthracene	2	0.31	0.04	0.57	0.31	0.26	ug/hph
98-03	CRUISE	chrysene	3	0.58	0.10	1.10	0.54	0.41	ug/hph
98-03	CRUISE	indeno[123-cd]pyrene	3	0.05	0.04	0.06	0.04	0.01	ug/hph
98-03	IDLE	indeno[123-cd]pyrene	3	3.21	0.60	7.82	1.20	3.27	ug/mode
98-03	TRANS	benz[a]anthracene	1	10.66	10.66	10.66	10.66	0.00	ug/hph
98-03	TRANS	chrysene	4	11.47	0.26	41.59	2.01	17.42	ug/hph
98-03	TRANS	indeno[123-cd]pyrene	1	0.41	0.41	0.41	0.41	0.00	ug/hph
98-03	BUS	benzo[a]pyrene	2	0.14	0.09	0.19	0.14	0.05	ug/hph
98-03	BUS	benz[a]anthracene	3	0.86	0.76	1.03	0.78	0.12	ug/hph
98-03	BUS	chrysene	4	0.44	0.02	1.22	0.26	0.47	ug/hph
98-03	BUS	indeno[123-cd]pyrene	2	0.24	0.07	0.40	0.24	0.17	ug/hph

Total records	64
Total with 1 record	23
Total with 2 records	15
Max number of records	26
Total with max number of records	1

Table B-10b. 7-PAH Compounds of Interest to EPA, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	benzo[a]pyrene	22	22.50	1.00	161.00	9.00	37.58	ug/mi
pre-87	FTP	benzo[k]fluoranthene	4	10.23	2.97	23.97	6.98	8.13	ug/mi
pre-87	FTP	benz[a]anthracene	22	24.97	1.00	117.00	13.00	29.56	ug/mi
pre-87	FTP	chrysene	24	28.72	2.00	130.00	11.43	35.18	ug/mi
pre-87	FTP	dibenz[ah]anthracene	1	0.30	0.30	0.30	0.30	0.00	ug/mi
pre-87	FTP	indeno[123-cd]pyrene	19	12.80	1.00	84.00	3.00	21.74	ug/mi
pre-87	CRUISE	benzo[a]pyrene	4	54.25	2.93	122.32	45.87	50.68	ug/mi
pre-87	CRUISE	benz[a]anthracene	4	88.24	3.01	212.88	68.53	89.21	ug/mi
pre-87	CRUISE	chrysene	3	131.22	5.85	228.25	159.56	92.98	ug/mi
pre-87	CRUISE	indeno[123-cd]pyrene	4	51.25	4.95	125.99	37.04	49.64	ug/mi
pre-87	TRANS	benzo[a]pyrene	2	42.65	4.30	81.00	42.65	38.35	ug/mi
pre-87	TRANS	benz[a]anthracene	2	9.00	2.90	15.10	9.00	6.10	ug/mi
pre-87	TRANS	chrysene	2	13.15	5.70	20.60	13.15	7.45	ug/mi
pre-87	TRANS	indeno[123-cd]pyrene	2	2.35	1.00	3.70	2.35	1.35	ug/mi
87-90	FTP	benzo[a]pyrene	3	9.07	7.93	10.00	9.28	0.86	ug/mi
87-90	FTP	benzo[k]fluoranthene	2	2.99	2.51	3.48	2.99	0.48	ug/mi
87-90	FTP	benz[a]anthracene	4	10.29	4.28	20.00	8.44	5.96	ug/mi
87-90	FTP	chrysene	4	13.94	5.79	20.00	14.99	6.24	ug/mi
87-90	FTP	indeno[123-cd]pyrene	2	20.00	20.00	20.00	20.00	0.00	ug/mi
91-93	FTP	benzo[a]pyrene	4	0.68	0.03	1.46	0.62	0.57	ug/mi
91-93	FTP	benzo[k]fluoranthene	5	1.34	0.02	4.40	0.05	1.74	ug/mi
91-93	FTP	benz[a]anthracene	8	3.03	0.34	10.00	1.63	3.17	ug/mi
91-93	FTP	chrysene	9	7.87	0.64	40.00	2.57	11.77	ug/mi
91-93	FTP	indeno[123-cd]pyrene	1	0.56	0.56	0.56	0.56	0.00	ug/mi
91-93	TRANS	benzo[a]pyrene	1	1.47	1.47	1.47	1.47	0.00	ug/mi
91-93	TRANS	benz[a]anthracene	1	2.52	2.52	2.52	2.52	0.00	ug/mi
91-93	TRANS	indeno[123-cd]pyrene	1	0.69	0.69	0.69	0.69	0.00	ug/mi
94-95	FTP	benzo[a]pyrene	1	8.40	8.40	8.40	8.40	0.00	ug/mi
94-95	FTP	benzo[k]fluoranthene	1	5.32	5.32	5.32	5.32	0.00	ug/mi
94-95	FTP	benz[a]anthracene	1	7.84	7.84	7.84	7.84	0.00	ug/mi
94-95	FTP	chrysene	1	8.96	8.96	8.96	8.96	0.00	ug/mi
94-95	FTP	indeno[123-cd]pyrene	1	11.19	11.19	11.19	11.19	0.00	ug/mi
96-97	FTP	chrysene	1	0.95	0.95	0.95	0.95	0.00	ug/mi
98-03	TRANS	benzo[k]fluoranthene	1	0.63	0.63	0.63	0.63	0.00	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	benz[a]anthracene	2	0.81	0.77	0.84	0.81	0.04	ug/mi
98-03	TRANS	chrysene	2	0.79	0.79	0.79	0.79	0.00	ug/mi

Total records	36
Total with 1 record	12
Total with 2 records	8
Max number of records	24
Total with max number of records	1

Table B-10c. 7-PAH Compounds of Interest to EPA, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	benzo[a]pyrene	1	6.60	6.60	6.60	6.60	0.00	ug/hph
pre-87	CRUISE	benz[a]anthracene	1	5.69	5.69	5.69	5.69	0.00	ug/hph
pre-87	CRUISE	chrysene	1	14.62	14.62	14.62	14.62	0.00	ug/hph
pre-87	CRUISE	indeno[123-cd]pyrene	1	0.71	0.71	0.71	0.71	0.00	ug/hph
pre-87	TRANS	benzo[a]pyrene	3	7.10	3.62	11.39	6.28	3.22	ug/hph
pre-87	TRANS	benz[a]anthracene	4	17.24	4.53	37.66	13.39	13.01	ug/hph
pre-87	TRANS	chrysene	4	22.52	5.69	50.79	16.79	17.34	ug/hph
pre-87	TRANS	indeno[123-cd]pyrene	2	0.97	0.65	1.29	0.97	0.32	ug/hph
87-90	CRUISE	benzo[a]pyrene	1	10.84	10.84	10.84	10.84	0.00	ug/hph
87-90	CRUISE	benz[a]anthracene	1	145.44	145.44	145.44	145.44	0.00	ug/hph
87-90	CRUISE	chrysene	1	106.89	106.89	106.89	106.89	0.00	ug/hph
87-90	TRANS	benzo[a]pyrene	1	1.62	1.62	1.62	1.62	0.00	ug/hph
87-90	TRANS	benz[a]anthracene	1	324.44	324.44	324.44	324.44	0.00	ug/hph
87-90	TRANS	chrysene	1	204.95	204.95	204.95	204.95	0.00	ug/hph
94-95	CRUISE	benzo[a]pyrene	1	2.18	2.18	2.18	2.18	0.00	ug/hph
94-95	CRUISE	benz[a]anthracene	1	6.47	6.47	6.47	6.47	0.00	ug/hph
94-95	CRUISE	chrysene	1	17.75	17.75	17.75	17.75	0.00	ug/hph
94-95	TRANS	benzo[a]pyrene	1	0.72	0.72	0.72	0.72	0.00	ug/hph
94-95	TRANS	benzo[k]fluoranthene	1	1.07	1.07	1.07	1.07	0.00	ug/hph
94-95	TRANS	benz[a]anthracene	4	10.37	0.91	29.17	5.70	11.18	ug/hph
94-95	TRANS	chrysene	3	20.68	1.71	43.76	16.57	17.41	ug/hph
94-95	TRANS	dibenz[ah]anthracene	1	0.30	0.30	0.30	0.30	0.00	ug/hph
94-95	TRANS	indeno[123-cd]pyrene	1	1.29	1.29	1.29	1.29	0.00	ug/hph
96-97	CRUISE	benz[a]anthracene	1	0.20	0.20	0.20	0.20	0.00	ug/hph
96-97	CRUISE	chrysene	1	0.14	0.14	0.14	0.14	0.00	ug/hph
96-97	CRUISE	indeno[123-cd]pyrene	1	0.00	0.00	0.00	0.00	0.00	ug/hph
96-97	TRANS	benz[a]anthracene	1	0.11	0.11	0.11	0.11	0.00	ug/hph
98-03	TRANS	benzo[a]pyrene	1	1.26	1.26	1.26	1.26	0.00	ug/hph
98-03	TRANS	benz[a]anthracene	2	87.75	12.31	163.18	87.75	75.43	ug/hph
98-03	TRANS	chrysene	2	53.16	46.94	59.38	53.16	6.22	ug/hph

Total records	30
Total with 1 record	22
Total with 2 records	3
Max number of records	4
Total with max number of records	3

Table B-10d. 7-PAH Compounds of Interest to EPA, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	chrysene	1	6.58	6.58	6.58	6.58	0.00	ug/hph
87-90	BUS	benzo[a]pyrene	1	2.39	2.39	2.39	2.39	0.00	ug/hph
87-90	BUS	benzo[k]fluoranthene	1	1.30	1.30	1.30	1.30	0.00	ug/hph
87-90	BUS	benz[a]anthracene	3	2.46	0.87	5.21	1.30	1.95	ug/hph
87-90	BUS	chrysene	3	3.11	1.74	5.86	1.74	1.94	ug/hph
91-93	TRANS	benzo[a]pyrene	1	130.59	130.59	130.59	130.59	0.00	ug/hph
91-93	TRANS	benz[a]anthracene	1	47.76	47.76	47.76	47.76	0.00	ug/hph
91-93	TRANS	chrysene	1	7.30	7.30	7.30	7.30	0.00	ug/hph
91-93	TRANS	indeno[123-cd]pyrene	1	7.56	7.56	7.56	7.56	0.00	ug/hph
91-93	BUS	benzo[a]pyrene	1	11.64	11.64	11.64	11.64	0.00	ug/hph
91-93	BUS	benz[a]anthracene	1	69.88	69.88	69.88	69.88	0.00	ug/hph
91-93	BUS	chrysene	1	8.32	8.32	8.32	8.32	0.00	ug/hph
91-93	BUS	indeno[123-cd]pyrene	1	2.22	2.22	2.22	2.22	0.00	ug/hph
98-03	BUS	benzo[a]pyrene	3	21.33	0.22	41.73	22.04	16.95	ug/hph
98-03	BUS	benz[a]anthracene	5	0.67	0.03	1.78	0.65	0.63	ug/hph
98-03	BUS	chrysene	4	0.59	0.17	1.59	0.29	0.59	ug/hph
98-03	BUS	indeno[123-cd]pyrene	1	1.44	1.44	1.44	1.44	0.00	ug/hph

Total records	17
Total with 1 record	12
Total with 2 records	0
Max number of records	5
Total with max number of records	1

Table B-10e. 7-PAH Compounds of Interest to EPA, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	benzo[a]pyrene	4	0.64	0.18	1.71	0.34	0.62	ug/hph
98-03	BUS	benzo[k]fluoranthene	2	0.13	0.01	0.24	0.13	0.12	ug/hph
98-03	BUS	benz[a]anthracene	6	20.16	0.03	118.59	0.44	44.02	ug/hph
98-03	BUS	chrysene	6	0.81	0.03	1.68	0.71	0.65	ug/hph
98-03	BUS	dibenz[ah]anthracene	1	0.02	0.02	0.02	0.02	0.00	ug/hph
98-03	BUS	indeno[123-cd]pyrene	3	1.59	0.11	2.56	2.10	1.07	ug/hph

Total records	6
Total with 1 record	1
Total with 2 records	1
Max number of records	6
Total with max number of records	2

Table B-11a. Other PAH Compounds, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	1+2-ethylnaphthalene	2	75.829	26.048	125.610	75.829	49.781	ug/hph
pre-87	CRUISE	1,2-dimethylnaphthalene	2	21.809	4.832	38.787	21.809	16.977	ug/hph
pre-87	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	2	309.601	205.504	413.699	309.601	104.097	ug/hph
pre-87	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	2	90.904	71.392	110.416	90.904	19.512	ug/hph
pre-87	CRUISE	1,4,5-trimethylnaphthalene	1	2.662	2.662	2.662	2.662	0.000	ug/hph
pre-87	CRUISE	1,7-dimethylphenanthrene	2	9.023	4.062	13.984	9.023	4.961	ug/hph
pre-87	CRUISE	1-ethyl-2-methylnaphthalene	1	20.129	20.129	20.129	20.129	0.000	ug/hph
pre-87	CRUISE	1-methylfluorene	2	41.692	9.112	74.272	41.692	32.580	ug/hph
pre-87	CRUISE	1-methylnaphthalene	2	257.660	164.960	350.360	257.660	92.700	ug/hph
pre-87	CRUISE	1-methylphenanthrene	1	6.529	6.529	6.529	6.529	0.000	ug/hph
pre-87	CRUISE	1-methylpyrene	2	30.320	14.336	46.304	30.320	15.984	ug/hph
pre-87	CRUISE	2,3,5+I-trimethylnaphthalene	2	43.527	38.830	48.224	43.527	4.697	ug/hph
pre-87	CRUISE	2,4,5-trimethylnaphthalene	1	15.743	15.743	15.743	15.743	0.000	ug/hph
pre-87	CRUISE	2,6+2,7-dimethylnaphthalene	2	131.523	80.064	182.983	131.523	51.459	ug/hph
pre-87	CRUISE	2-ethyl-1-methylnaphthalene	2	47.022	1.436	92.608	47.022	45.586	ug/hph
pre-87	CRUISE	2-methylnaphthalene	2	401.085	281.728	520.442	401.085	119.357	ug/hph
pre-87	CRUISE	2-methylphenanthrene	1	9.726	9.726	9.726	9.726	0.000	ug/hph
pre-87	CRUISE	3,6-dimethylphenanthrene	2	21.109	3.146	39.072	21.109	17.963	ug/hph
pre-87	CRUISE	3-methylbiphenyl	1	133.979	133.979	133.979	133.979	0.000	ug/hph
pre-87	CRUISE	4-methylbiphenyl	2	518.199	60.525	975.872	518.199	457.673	ug/hph
pre-87	CRUISE	4-methylpyrene	2	55.737	28.499	82.976	55.737	27.239	ug/hph
pre-87	CRUISE	5+6-methylchrysene	1	0.216	0.216	0.216	0.216	0.000	ug/hph
pre-87	CRUISE	7-methylbenzo[a]pyrene	1	0.137	0.137	0.137	0.137	0.000	ug/hph
pre-87	CRUISE	9-methylanthracene	1	0.043	0.043	0.043	0.043	0.000	ug/hph
pre-87	CRUISE	A-dimethylphenanthrene	1	4.127	4.127	4.127	4.127	0.000	ug/hph
pre-87	CRUISE	A-methylfluorene	2	47.320	9.264	85.376	47.320	38.056	ug/hph
pre-87	CRUISE	A-trimethylnaphthalene	2	48.985	30.880	67.091	48.985	18.105	ug/hph
pre-87	CRUISE	acenaphthenequinone	1	6.349	6.349	6.349	6.349	0.000	ug/hph
pre-87	CRUISE	B-dimethylphenanthrene	1	1.934	1.934	1.934	1.934	0.000	ug/hph
pre-87	CRUISE	B-methylfluorene	1	1.623	1.623	1.623	1.623	0.000	ug/hph
pre-87	CRUISE	B-trimethylnaphthalene	2	33.606	17.856	49.357	33.606	15.750	ug/hph
pre-87	CRUISE	benzonaphthothiophene	1	0.563	0.563	0.563	0.563	0.000	ug/hph
pre-87	CRUISE	benzo[bkj]fluoranthene	1	0.988	0.988	0.988	0.988	0.000	ug/hph
pre-87	CRUISE	benzo[e]pyrene	1	1.811	1.811	1.811	1.811	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	biphenyl	2	102.408	69.472	135.343	102.408	32.936	ug/hph
pre-87	CRUISE	C-dimethylphenanthrene	2	22.960	10.209	35.712	22.960	12.752	ug/hph
pre-87	CRUISE	C-trimethylnaphthalene	2	50.712	49.328	52.096	50.712	1.384	ug/hph
pre-87	CRUISE	coronene	1	0.289	0.289	0.289	0.289	0.000	ug/hph
pre-87	CRUISE	D-dimethylphenanthrene	1	5.606	5.606	5.606	5.606	0.000	ug/hph
pre-87	CRUISE	D-MePy/MeFl	1	67.040	67.040	67.040	67.040	0.000	ug/hph
pre-87	CRUISE	Dibenzofuran	3	44.197	21.616	55.488	55.488	15.968	ug/hph
pre-87	CRUISE	dibenz[ah+ac]anthracene	1	0.238	0.238	0.238	0.238	0.000	ug/hph
pre-87	CRUISE	E-dimethylphenanthrene	1	3.622	3.622	3.622	3.622	0.000	ug/hph
pre-87	CRUISE	E-trimethylnaphthalene	2	27.436	16.416	38.455	27.436	11.020	ug/hph
pre-87	CRUISE	F-trimethylnaphthalene	2	27.378	26.048	28.708	27.378	1.330	ug/hph
pre-87	CRUISE	J-trimethylnaphthalene	2	16.709	16.522	16.896	16.709	0.187	ug/hph
pre-87	CRUISE	perinaphthenone	2	312.693	90.409	534.976	312.693	222.283	ug/hph
pre-87	CRUISE	retene	1	0.556	0.556	0.556	0.556	0.000	ug/hph
pre-87	IDLE	1+2-ethylnaphthalene	1	1422.669	1422.669	1422.669	1422.669	0.000	ug/hph
pre-87	IDLE	1,2-dimethylnaphthalene	1	383.169	383.169	383.169	383.169	0.000	ug/hph
pre-87	IDLE	1,3+1,6+1,7-dimethylnaphthalene	1	4708.720	4708.720	4708.720	4708.720	0.000	ug/hph
pre-87	IDLE	1,4+1,5+2,3-dimethylnaphthalene	1	1099.412	1099.412	1099.412	1099.412	0.000	ug/hph
pre-87	IDLE	1,4,5-trimethylnaphthalene	1	59.913	59.913	59.913	59.913	0.000	ug/hph
pre-87	IDLE	1-ethyl-2-methylnaphthalene	1	169.921	169.921	169.921	169.921	0.000	ug/hph
pre-87	IDLE	1-methylnaphthalene	1	4673.179	4673.179	4673.179	4673.179	0.000	ug/hph
pre-87	IDLE	1-methylpyrene	1	148.258	148.258	148.258	148.258	0.000	ug/hph
pre-87	IDLE	2,3,5+I-trimethylnaphthalene	1	599.125	599.125	599.125	599.125	0.000	ug/hph
pre-87	IDLE	2,4,5-trimethylnaphthalene	1	255.220	255.220	255.220	255.220	0.000	ug/hph
pre-87	IDLE	2,6+2,7-dimethylnaphthalene	1	2307.818	2307.818	2307.818	2307.818	0.000	ug/hph
pre-87	IDLE	2-methylnaphthalene	1	7433.896	7433.896	7433.896	7433.896	0.000	ug/hph
pre-87	IDLE	3,6-dimethylphenanthrene	1	18.617	18.617	18.617	18.617	0.000	ug/hph
pre-87	IDLE	3-methylbiphenyl	1	1725.278	1725.278	1725.278	1725.278	0.000	ug/hph
pre-87	IDLE	4-methylbiphenyl	1	615.712	615.712	615.712	615.712	0.000	ug/hph
pre-87	IDLE	4-methylpyrene	1	167.891	167.891	167.891	167.891	0.000	ug/hph
pre-87	IDLE	A-dimethylphenanthrene	1	21.325	21.325	21.325	21.325	0.000	ug/hph
pre-87	IDLE	A-methylfluorene	1	74.806	74.806	74.806	74.806	0.000	ug/hph
pre-87	IDLE	A-trimethylnaphthalene	1	987.372	987.372	987.372	987.372	0.000	ug/hph
pre-87	IDLE	acenaphthenequinone	1	53.820	53.820	53.820	53.820	0.000	ug/hph
pre-87	IDLE	B-dimethylphenanthrene	1	8.462	8.462	8.462	8.462	0.000	ug/hph
pre-87	IDLE	B-trimethylnaphthalene	1	797.480	797.480	797.480	797.480	0.000	ug/hph
pre-87	IDLE	benzonaphthothiophene	1	25.725	25.725	25.725	25.725	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	IDLE	benzo[bkj]fluoranthene	1	14.555	14.555	14.555	14.555	0.000	ug/hph
pre-87	IDLE	benzo[e]pyrene	1	1.016	1.016	1.016	1.016	0.000	ug/hph
pre-87	IDLE	biphenyl	1	1828.179	1828.179	1828.179	1828.179	0.000	ug/hph
pre-87	IDLE	C-dimethylphenanthrene	1	3.046	3.046	3.046	3.046	0.000	ug/hph
pre-87	IDLE	C-trimethylnaphthalene	1	706.088	706.088	706.088	706.088	0.000	ug/hph
pre-87	IDLE	Dibenzofuran	1	253.866	253.866	253.866	253.866	0.000	ug/hph
pre-87	IDLE	E-trimethylnaphthalene	1	490.471	490.471	490.471	490.471	0.000	ug/hph
pre-87	IDLE	F-trimethylnaphthalene	1	413.972	413.972	413.972	413.972	0.000	ug/hph
pre-87	IDLE	J-trimethylnaphthalene	1	305.994	305.994	305.994	305.994	0.000	ug/hph
pre-87	IDLE	perinaphthenone	1	509.764	509.764	509.764	509.764	0.000	ug/hph
pre-87	IDLE	1+2-ethylnaphthalene	1	1413.999	1413.999	1413.999	1413.999	0.000	ug/mode
pre-87	IDLE	1,2-dimethylnaphthalene	1	475.759	475.759	475.759	475.759	0.000	ug/mode
pre-87	IDLE	1,3+1,6+1,7-dimethylnaphthalene	1	5149.975	5149.975	5149.975	5149.975	0.000	ug/mode
pre-87	IDLE	1,4+1,5+2,3-dimethylnaphthalene	1	1359.840	1359.840	1359.840	1359.840	0.000	ug/mode
pre-87	IDLE	1,4,5-trimethylnaphthalene	1	148.143	148.143	148.143	148.143	0.000	ug/mode
pre-87	IDLE	1,7-dimethylphenanthrene	1	39.824	39.824	39.824	39.824	0.000	ug/mode
pre-87	IDLE	1-ethyl-2-methylnaphthalene	1	294.163	294.163	294.163	294.163	0.000	ug/mode
pre-87	IDLE	1-methylnaphthalene	1	2946.939	2946.939	2946.939	2946.939	0.000	ug/mode
pre-87	IDLE	1-methylpyrene	1	200.711	200.711	200.711	200.711	0.000	ug/mode
pre-87	IDLE	2,3,5+I-trimethylnaphthalene	1	883.020	883.020	883.020	883.020	0.000	ug/mode
pre-87	IDLE	2,4,5-trimethylnaphthalene	1	384.429	384.429	384.429	384.429	0.000	ug/mode
pre-87	IDLE	2,6+2,7-dimethylnaphthalene	1	2410.649	2410.649	2410.649	2410.649	0.000	ug/mode
pre-87	IDLE	2-ethyl-1-methylnaphthalene	1	19.646	19.646	19.646	19.646	0.000	ug/mode
pre-87	IDLE	2-methylnaphthalene	1	4415.097	4415.097	4415.097	4415.097	0.000	ug/mode
pre-87	IDLE	3,6-dimethylphenanthrene	1	32.390	32.390	32.390	32.390	0.000	ug/mode
pre-87	IDLE	3-methylbiphenyl	1	2381.445	2381.445	2381.445	2381.445	0.000	ug/mode
pre-87	IDLE	4-methylbiphenyl	1	892.047	892.047	892.047	892.047	0.000	ug/mode
pre-87	IDLE	4-methylpyrene	1	220.357	220.357	220.357	220.357	0.000	ug/mode
pre-87	IDLE	A-dimethylphenanthrene	1	40.354	40.354	40.354	40.354	0.000	ug/mode
pre-87	IDLE	A-methylfluorene	1	180.002	180.002	180.002	180.002	0.000	ug/mode
pre-87	IDLE	A-trimethylnaphthalene	1	1528.161	1528.161	1528.161	1528.161	0.000	ug/mode
pre-87	IDLE	acenaphthenequinone	1	58.408	58.408	58.408	58.408	0.000	ug/mode
pre-87	IDLE	B-dimethylphenanthrene	1	16.991	16.991	16.991	16.991	0.000	ug/mode
pre-87	IDLE	B-trimethylnaphthalene	1	1315.238	1315.238	1315.238	1315.238	0.000	ug/mode
pre-87	IDLE	benzonaphthothiophene	1	22.301	22.301	22.301	22.301	0.000	ug/mode
pre-87	IDLE	benzo[bkj]fluoranthene	1	97.701	97.701	97.701	97.701	0.000	ug/mode
pre-87	IDLE	benzo[e]pyrene	1	110.444	110.444	110.444	110.444	0.000	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	IDLE	biphenyl	1	1922.147	1922.147	1922.147	1922.147	0.000	ug/mode
pre-87	IDLE	C-dimethylphenanthrene	1	2.124	2.124	2.124	2.124	0.000	ug/mode
pre-87	IDLE	C-trimethylnaphthalene	1	1194.705	1194.705	1194.705	1194.705	0.000	ug/mode
pre-87	IDLE	coronene	1	3.186	3.186	3.186	3.186	0.000	ug/mode
pre-87	IDLE	D-dimethylphenanthrene	1	4.248	4.248	4.248	4.248	0.000	ug/mode
pre-87	IDLE	Dibenzofuran	1	398.235	398.235	398.235	398.235	0.000	ug/mode
pre-87	IDLE	dibenz[ah+ac]anthracene	1	1.061	1.061	1.061	1.061	0.000	ug/mode
pre-87	IDLE	E-trimethylnaphthalene	1	947.799	947.799	947.799	947.799	0.000	ug/mode
pre-87	IDLE	F-trimethylnaphthalene	1	672.751	672.751	672.751	672.751	0.000	ug/mode
pre-87	IDLE	J-trimethylnaphthalene	1	490.094	490.094	490.094	490.094	0.000	ug/mode
pre-87	IDLE	perinaphthenone	1	843.196	843.196	843.196	843.196	0.000	ug/mode
pre-87	TRANS	1+2-ethylnaphthalene	7	359.429	163.072	638.496	340.992	176.757	ug/hph
pre-87	TRANS	1,2-dimethylnaphthalene	6	92.450	27.168	184.192	75.239	51.900	ug/hph
pre-87	TRANS	1,3+1,6+1,7-dimethylnaphthalene	7	738.713	277.600	1414.272	587.968	440.315	ug/hph
pre-87	TRANS	1,4+1,5+2,3-dimethylnaphthalene	7	200.102	73.472	383.222	161.472	117.934	ug/hph
pre-87	TRANS	1,4,5-trimethylnaphthalene	6	54.412	17.669	91.360	55.696	28.024	ug/hph
pre-87	TRANS	1,7-dimethylphenanthrene	6	24.569	13.056	40.544	22.891	9.351	ug/hph
pre-87	TRANS	1-ethyl-2-methylnaphthalene	5	121.678	46.467	208.000	114.912	57.760	ug/hph
pre-87	TRANS	1-methylfluorene	7	150.809	32.142	358.368	120.032	114.636	ug/hph
pre-87	TRANS	1-methylnaphthalene	7	694.500	347.840	1248.342	580.608	319.120	ug/hph
pre-87	TRANS	1-methylphenanthrene	5	56.382	17.952	147.424	33.977	47.466	ug/hph
pre-87	TRANS	1-methylpyrene	7	49.172	4.160	98.304	44.611	30.993	ug/hph
pre-87	TRANS	2,3,5+I-trimethylnaphthalene	7	113.386	57.056	207.776	94.000	57.058	ug/hph
pre-87	TRANS	2,4,5-trimethylnaphthalene	4	37.783	3.264	84.696	31.585	30.015	ug/hph
pre-87	TRANS	2,6+2,7-dimethylnaphthalene	7	317.341	70.208	676.178	194.816	222.642	ug/hph
pre-87	TRANS	2-ethyl-1-methylnaphthalene	7	410.067	11.957	1824.896	162.080	604.031	ug/hph
pre-87	TRANS	2-methylbiphenyl	1	1979.808	1979.808	1979.808	1979.808	0.000	ug/hph
pre-87	TRANS	2-methylnaphthalene	7	1089.792	409.824	2040.253	1025.152	531.001	ug/hph
pre-87	TRANS	2-methylphenanthrene	4	82.051	41.768	129.408	78.514	33.057	ug/hph
pre-87	TRANS	3,6-dimethylphenanthrene	6	24.238	11.072	35.104	25.641	10.369	ug/hph
pre-87	TRANS	3-methylbiphenyl	4	441.052	224.192	663.706	438.155	203.500	ug/hph
pre-87	TRANS	4-methylbiphenyl	7	897.741	59.616	2422.944	300.208	911.383	ug/hph
pre-87	TRANS	4-methylpyrene	7	80.997	8.480	141.248	84.580	40.507	ug/hph
pre-87	TRANS	5+6-methylchrysene	4	1.880	0.118	6.592	0.404	2.726	ug/hph
pre-87	TRANS	7-methylbenz[a]anthracene	2	5.808	0.064	11.552	5.808	5.744	ug/hph
pre-87	TRANS	7-methylbenzo[a]pyrene	2	30.920	0.592	61.248	30.920	30.328	ug/hph
pre-87	TRANS	9-methylanthracene	2	0.895	0.192	1.598	0.895	0.703	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	A-dimethylphenanthrene	4	23.931	14.677	39.040	21.003	9.102	ug/hph
pre-87	TRANS	A-methylfluorene	7	156.362	32.468	346.272	160.832	111.204	ug/hph
pre-87	TRANS	A-trimethylnaphthalene	6	147.340	8.992	298.467	113.074	112.785	ug/hph
pre-87	TRANS	acenaphthenequinone	3	14.824	11.010	18.784	14.677	3.175	ug/hph
pre-87	TRANS	B-dimethylphenanthrene	3	12.099	8.702	15.904	11.691	2.954	ug/hph
pre-87	TRANS	B-methylfluorene	5	16.391	2.610	51.456	8.256	18.044	ug/hph
pre-87	TRANS	B-trimethylnaphthalene	7	115.618	12.384	255.680	80.736	93.327	ug/hph
pre-87	TRANS	benzonaphthothiophene	5	8.695	1.312	18.432	6.671	6.273	ug/hph
pre-87	TRANS	benzo[bkj]fluoranthene	3	1.168	0.622	1.664	1.218	0.427	ug/hph
pre-87	TRANS	benzo[e]pyrene	4	17.827	3.670	33.056	17.290	13.667	ug/hph
pre-87	TRANS	biphenyl	7	254.718	76.512	572.686	248.675	155.456	ug/hph
pre-87	TRANS	C-dimethylphenanthrene	7	55.221	3.008	77.568	61.248	23.827	ug/hph
pre-87	TRANS	C-trimethylnaphthalene	7	179.973	127.504	253.973	145.984	47.953	ug/hph
pre-87	TRANS	coronene	3	6.106	0.128	17.952	0.237	8.377	ug/hph
pre-87	TRANS	D-dimethylphenanthrene	6	14.854	4.032	28.591	13.920	7.919	ug/hph
pre-87	TRANS	D-MePy/MeFl	5	54.912	8.864	74.592	61.408	23.753	ug/hph
pre-87	TRANS	Dibenzofuran	13	82.977	46.231	131.648	70.112	31.440	ug/hph
pre-87	TRANS	dibenz[ah+ac]anthracene	2	0.691	0.406	0.977	0.691	0.285	ug/hph
pre-87	TRANS	E-dimethylphenanthrene	4	18.567	13.343	21.952	19.487	3.407	ug/hph
pre-87	TRANS	E-trimethylnaphthalene	7	84.072	16.096	187.144	66.688	57.895	ug/hph
pre-87	TRANS	F-trimethylnaphthalene	7	75.093	35.232	146.188	47.360	42.289	ug/hph
pre-87	TRANS	J-trimethylnaphthalene	5	52.013	15.520	101.113	49.190	28.817	ug/hph
pre-87	TRANS	perinaphthenone	7	458.109	189.599	794.208	525.344	242.033	ug/hph
pre-87	TRANS	perylene	1	0.416	0.416	0.416	0.416	0.000	ug/hph
pre-87	TRANS	retene	5	15.121	1.566	42.112	3.285	16.404	ug/hph
87-90	CRUISE	1+2-ethylnaphthalene	2	59.236	55.000	63.473	59.236	4.236	ug/hph
87-90	CRUISE	1,2-dimethylnaphthalene	2	23.446	17.121	29.772	23.446	6.326	ug/hph
87-90	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	2	157.712	153.515	161.910	157.712	4.197	ug/hph
87-90	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	2	50.691	48.173	53.210	50.691	2.518	ug/hph
87-90	CRUISE	1,4,5-trimethylnaphthalene	1	2.416	2.416	2.416	2.416	0.000	ug/hph
87-90	CRUISE	1,7-dimethylphenanthrene	1	2.241	2.241	2.241	2.241	0.000	ug/hph
87-90	CRUISE	1-methylfluorene	1	7.921	7.921	7.921	7.921	0.000	ug/hph
87-90	CRUISE	1-methylnaphthalene	2	192.145	147.041	237.250	192.145	45.104	ug/hph
87-90	CRUISE	1-methylphenanthrene	1	6.012	6.012	6.012	6.012	0.000	ug/hph
87-90	CRUISE	1-methylpyrene	1	1.975	1.975	1.975	1.975	0.000	ug/hph
87-90	CRUISE	2,3,5+I-trimethylnaphthalene	1	14.618	14.618	14.618	14.618	0.000	ug/hph
87-90	CRUISE	2,4,5-trimethylnaphthalene	1	5.976	5.976	5.976	5.976	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	CRUISE	2,6+2,7-dimethylnaphthalene	2	80.032	78.965	81.099	80.032	1.067	ug/hph
87-90	CRUISE	2-methylbiphenyl	1	34.801	34.801	34.801	34.801	0.000	ug/hph
87-90	CRUISE	2-methylnaphthalene	2	282.757	220.980	344.534	282.757	61.777	ug/hph
87-90	CRUISE	2-methylphenanthrene	1	8.012	8.012	8.012	8.012	0.000	ug/hph
87-90	CRUISE	3,6-dimethylphenanthrene	1	1.734	1.734	1.734	1.734	0.000	ug/hph
87-90	CRUISE	3-methylbiphenyl	1	79.038	79.038	79.038	79.038	0.000	ug/hph
87-90	CRUISE	4-methylbiphenyl	1	26.825	26.825	26.825	26.825	0.000	ug/hph
87-90	CRUISE	4-methylpyrene	1	3.942	3.942	3.942	3.942	0.000	ug/hph
87-90	CRUISE	5+6-methylchrysene	1	0.033	0.033	0.033	0.033	0.000	ug/hph
87-90	CRUISE	7-methylbenzo[a]pyrene	1	0.765	0.765	0.765	0.765	0.000	ug/hph
87-90	CRUISE	9-methylanthracene	1	0.073	0.073	0.073	0.073	0.000	ug/hph
87-90	CRUISE	A-dimethylphenanthrene	1	1.089	1.089	1.089	1.089	0.000	ug/hph
87-90	CRUISE	A-methylfluorene	1	7.757	7.757	7.757	7.757	0.000	ug/hph
87-90	CRUISE	A-trimethylnaphthalene	1	35.908	35.908	35.908	35.908	0.000	ug/hph
87-90	CRUISE	acenaphthenequinone	1	1.556	1.556	1.556	1.556	0.000	ug/hph
87-90	CRUISE	B-dimethylphenanthrene	1	0.838	0.838	0.838	0.838	0.000	ug/hph
87-90	CRUISE	B-methylfluorene	1	1.122	1.122	1.122	1.122	0.000	ug/hph
87-90	CRUISE	B-trimethylnaphthalene	1	29.302	29.302	29.302	29.302	0.000	ug/hph
87-90	CRUISE	benzonaphthothiophene	1	0.138	0.138	0.138	0.138	0.000	ug/hph
87-90	CRUISE	benzo[bkj]fluoranthene	1	0.871	0.871	0.871	0.871	0.000	ug/hph
87-90	CRUISE	benzo[e]pyrene	1	1.079	1.079	1.079	1.079	0.000	ug/hph
87-90	CRUISE	biphenyl	2	129.107	75.440	182.773	129.107	53.666	ug/hph
87-90	CRUISE	C-dimethylphenanthrene	1	4.697	4.697	4.697	4.697	0.000	ug/hph
87-90	CRUISE	C-trimethylnaphthalene	1	29.204	29.204	29.204	29.204	0.000	ug/hph
87-90	CRUISE	coronene	1	0.029	0.029	0.029	0.029	0.000	ug/hph
87-90	CRUISE	D-dimethylphenanthrene	1	1.465	1.465	1.465	1.465	0.000	ug/hph
87-90	CRUISE	D-MePy/MeFl	1	3.910	3.910	3.910	3.910	0.000	ug/hph
87-90	CRUISE	Dibenzofuran	2	25.495	25.495	25.495	25.495	0.000	ug/hph
87-90	CRUISE	dibenz[ah+ac]anthracene	1	0.007	0.007	0.007	0.007	0.000	ug/hph
87-90	CRUISE	E-dimethylphenanthrene	1	0.576	0.576	0.576	0.576	0.000	ug/hph
87-90	CRUISE	E-trimethylnaphthalene	1	15.591	15.591	15.591	15.591	0.000	ug/hph
87-90	CRUISE	F-trimethylnaphthalene	1	13.576	13.576	13.576	13.576	0.000	ug/hph
87-90	CRUISE	J-trimethylnaphthalene	1	10.552	10.552	10.552	10.552	0.000	ug/hph
87-90	CRUISE	perinaphthenone	1	0.492	0.492	0.492	0.492	0.000	ug/hph
87-90	IDLE	1+2-ethylnaphthalene	1	9497.072	9497.072	9497.072	9497.072	0.000	ug/mode
87-90	IDLE	1,2-dimethylnaphthalene	1	3642.281	3642.281	3642.281	3642.281	0.000	ug/mode
87-90	IDLE	1,3+1,6+1,7-dimethylnaphthalene	1	26064.240	26064.240	26064.240	26064.240	0.000	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	IDLE	1,4+1,5+2,3-dimethylnaphthalene	1	7589.299	7589.299	7589.299	7589.299	0.000	ug/mode
87-90	IDLE	1,4,5-trimethylnaphthalene	1	225.974	225.974	225.974	225.974	0.000	ug/mode
87-90	IDLE	1,7-dimethylphenanthrene	1	50.286	50.286	50.286	50.286	0.000	ug/mode
87-90	IDLE	1-methylfluorene	1	1131.702	1131.702	1131.702	1131.702	0.000	ug/mode
87-90	IDLE	1-methylnaphthalene	1	30337.195	30337.195	30337.195	30337.195	0.000	ug/mode
87-90	IDLE	1-methylphenanthrene	1	211.434	211.434	211.434	211.434	0.000	ug/mode
87-90	IDLE	1-methylpyrene	1	31.503	31.503	31.503	31.503	0.000	ug/mode
87-90	IDLE	2,3,5+I-trimethylnaphthalene	1	2362.150	2362.150	2362.150	2362.150	0.000	ug/mode
87-90	IDLE	2,4,5-trimethylnaphthalene	1	715.489	715.489	715.489	715.489	0.000	ug/mode
87-90	IDLE	2,6+2,7-dimethylnaphthalene	1	14398.886	14398.886	14398.886	14398.886	0.000	ug/mode
87-90	IDLE	2-methylbiphenyl	1	5690.610	5690.610	5690.610	5690.610	0.000	ug/mode
87-90	IDLE	2-methylnaphthalene	1	45732.676	45732.676	45732.676	45732.676	0.000	ug/mode
87-90	IDLE	2-methylphenanthrene	1	395.007	395.007	395.007	395.007	0.000	ug/mode
87-90	IDLE	3,6-dimethylphenanthrene	1	61.794	61.794	61.794	61.794	0.000	ug/mode
87-90	IDLE	3-methylbiphenyl	1	11733.814	11733.814	11733.814	11733.814	0.000	ug/mode
87-90	IDLE	4-methylbiphenyl	1	4466.824	4466.824	4466.824	4466.824	0.000	ug/mode
87-90	IDLE	4-methylpyrene	1	65.429	65.429	65.429	65.429	0.000	ug/mode
87-90	IDLE	7-methylbenzo[a]pyrene	1	41.196	41.196	41.196	41.196	0.000	ug/mode
87-90	IDLE	9-methylanthracene	1	9.090	9.090	9.090	9.090	0.000	ug/mode
87-90	IDLE	A-methylfluorene	1	1252.263	1252.263	1252.263	1252.263	0.000	ug/mode
87-90	IDLE	A-trimethylnaphthalene	1	6760.513	6760.513	6760.513	6760.513	0.000	ug/mode
87-90	IDLE	acenaphthenequinone	1	58.768	58.768	58.768	58.768	0.000	ug/mode
87-90	IDLE	B-dimethylphenanthrene	1	39.381	39.381	39.381	39.381	0.000	ug/mode
87-90	IDLE	B-methylfluorene	1	445.896	445.896	445.896	445.896	0.000	ug/mode
87-90	IDLE	B-trimethylnaphthalene	1	5402.234	5402.234	5402.234	5402.234	0.000	ug/mode
87-90	IDLE	benzonaphthothiophene	1	1.212	1.212	1.212	1.212	0.000	ug/mode
87-90	IDLE	benzo[bkj]fluoranthene	1	374.409	374.409	374.409	374.409	0.000	ug/mode
87-90	IDLE	benzo[e]pyrene	1	202.350	202.350	202.350	202.350	0.000	ug/mode
87-90	IDLE	biphenyl	1	14767.840	14767.840	14767.840	14767.840	0.000	ug/mode
87-90	IDLE	C-dimethylphenanthrene	1	106.022	106.022	106.022	106.022	0.000	ug/mode
87-90	IDLE	C-trimethylnaphthalene	1	4822.449	4822.449	4822.449	4822.449	0.000	ug/mode
87-90	IDLE	coronene	1	91.482	91.482	91.482	91.482	0.000	ug/mode
87-90	IDLE	D-dimethylphenanthrene	1	23.630	23.630	23.630	23.630	0.000	ug/mode
87-90	IDLE	D-MePy/MeFl	1	45.440	45.440	45.440	45.440	0.000	ug/mode
87-90	IDLE	Dibenzofuran	2	2196.758	2196.758	2196.758	2196.758	0.000	ug/mode
87-90	IDLE	E-trimethylnaphthalene	1	3009.787	3009.787	3009.787	3009.787	0.000	ug/mode
87-90	IDLE	F-trimethylnaphthalene	1	2211.298	2211.298	2211.298	2211.298	0.000	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	IDLE	J-trimethylnaphthalene	1	1690.883	1690.883	1690.883	1690.883	0.000	ug/mode
87-90	IDLE	perinaphthenone	1	86.026	86.026	86.026	86.026	0.000	ug/mode
87-90	IDLE	perylene	1	45.440	45.440	45.440	45.440	0.000	ug/mode
87-90	TRANS	1+2-ethylnaphthalene	2	219.052	184.739	253.365	219.052	34.313	ug/hph
87-90	TRANS	1,2-dimethylnaphthalene	2	57.913	37.611	78.215	57.913	20.302	ug/hph
87-90	TRANS	1,3+1,6+1,7-dimethylnaphthalene	2	471.402	398.363	544.441	471.402	73.039	ug/hph
87-90	TRANS	1,4+1,5+2,3-dimethylnaphthalene	2	148.182	128.105	168.259	148.182	20.077	ug/hph
87-90	TRANS	1,4,5-trimethylnaphthalene	1	7.504	7.504	7.504	7.504	0.000	ug/hph
87-90	TRANS	1,7-dimethylphenanthrene	1	10.681	10.681	10.681	10.681	0.000	ug/hph
87-90	TRANS	1-methylfluorene	1	28.790	28.790	28.790	28.790	0.000	ug/hph
87-90	TRANS	1-methylnaphthalene	2	661.801	579.089	744.514	661.801	82.713	ug/hph
87-90	TRANS	1-methylphenanthrene	1	26.033	26.033	26.033	26.033	0.000	ug/hph
87-90	TRANS	1-methylpyrene	1	12.672	12.672	12.672	12.672	0.000	ug/hph
87-90	TRANS	2,3,5+I-trimethylnaphthalene	1	49.042	49.042	49.042	49.042	0.000	ug/hph
87-90	TRANS	2,4,5-trimethylnaphthalene	1	19.257	19.257	19.257	19.257	0.000	ug/hph
87-90	TRANS	2,6+2,7-dimethylnaphthalene	2	244.240	202.803	285.677	244.240	41.437	ug/hph
87-90	TRANS	2-methylbiphenyl	1	166.383	166.383	166.383	166.383	0.000	ug/hph
87-90	TRANS	2-methylnaphthalene	2	990.775	920.119	1061.432	990.775	70.656	ug/hph
87-90	TRANS	2-methylphenanthrene	1	36.294	36.294	36.294	36.294	0.000	ug/hph
87-90	TRANS	3,6-dimethylphenanthrene	1	8.040	8.040	8.040	8.040	0.000	ug/hph
87-90	TRANS	3-methylbiphenyl	1	285.754	285.754	285.754	285.754	0.000	ug/hph
87-90	TRANS	4-methylbiphenyl	1	97.778	97.778	97.778	97.778	0.000	ug/hph
87-90	TRANS	4-methylpyrene	1	27.603	27.603	27.603	27.603	0.000	ug/hph
87-90	TRANS	7-methylbenzo[a]pyrene	1	4.632	4.632	4.632	4.632	0.000	ug/hph
87-90	TRANS	9-methylanthracene	1	4.977	4.977	4.977	4.977	0.000	ug/hph
87-90	TRANS	A-dimethylphenanthrene	1	0.421	0.421	0.421	0.421	0.000	ug/hph
87-90	TRANS	A-methylfluorene	1	13.170	13.170	13.170	13.170	0.000	ug/hph
87-90	TRANS	A-trimethylnaphthalene	1	145.174	145.174	145.174	145.174	0.000	ug/hph
87-90	TRANS	acenaphthenequinone	1	4.594	4.594	4.594	4.594	0.000	ug/hph
87-90	TRANS	B-dimethylphenanthrene	1	5.015	5.015	5.015	5.015	0.000	ug/hph
87-90	TRANS	B-methylfluorene	1	2.374	2.374	2.374	2.374	0.000	ug/hph
87-90	TRANS	B-trimethylnaphthalene	1	115.925	115.925	115.925	115.925	0.000	ug/hph
87-90	TRANS	benzonaphthothiophene	1	0.574	0.574	0.574	0.574	0.000	ug/hph
87-90	TRANS	benzo[bkj]fluoranthene	1	7.848	7.848	7.848	7.848	0.000	ug/hph
87-90	TRANS	benzo[e]pyrene	1	8.384	8.384	8.384	8.384	0.000	ug/hph
87-90	TRANS	biphenyl	2	392.389	342.863	441.915	392.389	49.526	ug/hph
87-90	TRANS	C-dimethylphenanthrene	1	22.588	22.588	22.588	22.588	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	TRANS	C-trimethylnaphthalene	1	104.861	104.861	104.861	104.861	0.000	ug/hph
87-90	TRANS	coronene	1	0.115	0.115	0.115	0.115	0.000	ug/hph
87-90	TRANS	D-dimethylphenanthrene	1	6.470	6.470	6.470	6.470	0.000	ug/hph
87-90	TRANS	D-MePy/MeFl	1	26.493	26.493	26.493	26.493	0.000	ug/hph
87-90	TRANS	Dibenzofuran	2	69.677	69.677	69.677	69.677	0.000	ug/hph
87-90	TRANS	E-dimethylphenanthrene	1	1.148	1.148	1.148	1.148	0.000	ug/hph
87-90	TRANS	E-trimethylnaphthalene	1	59.570	59.570	59.570	59.570	0.000	ug/hph
87-90	TRANS	F-trimethylnaphthalene	1	49.348	49.348	49.348	49.348	0.000	ug/hph
87-90	TRANS	J-trimethylnaphthalene	1	36.102	36.102	36.102	36.102	0.000	ug/hph
87-90	TRANS	perinaphthenone	1	2.106	2.106	2.106	2.106	0.000	ug/hph
91-93	TRANS	1+2-ethylnaphthalene	1	603.670	603.670	603.670	603.670	0.000	ug/hph
91-93	TRANS	1,2-dimethylnaphthalene	1	86.598	86.598	86.598	86.598	0.000	ug/hph
91-93	TRANS	1,3+1,6+1,7-dimethylnaphthalene	1	706.080	706.080	706.080	706.080	0.000	ug/hph
91-93	TRANS	1,4+1,5+2,3-dimethylnaphthalene	1	280.496	280.496	280.496	280.496	0.000	ug/hph
91-93	TRANS	1,7-dimethylphenanthrene	1	3.652	3.652	3.652	3.652	0.000	ug/hph
91-93	TRANS	1-ethyl-2-methylnaphthalene	1	112.192	112.192	112.192	112.192	0.000	ug/hph
91-93	TRANS	1-methylfluorene	1	117.083	117.083	117.083	117.083	0.000	ug/hph
91-93	TRANS	1-methylnaphthalene	1	689.028	689.028	689.028	689.028	0.000	ug/hph
91-93	TRANS	2,3,5+I-trimethylnaphthalene	1	86.598	86.598	86.598	86.598	0.000	ug/hph
91-93	TRANS	2,4,5-trimethylnaphthalene	1	7.303	7.303	7.303	7.303	0.000	ug/hph
91-93	TRANS	2,6+2,7-dimethylnaphthalene	1	306.090	306.090	306.090	306.090	0.000	ug/hph
91-93	TRANS	2-ethyl-1-methylnaphthalene	1	2907.298	2907.298	2907.298	2907.298	0.000	ug/hph
91-93	TRANS	2-methylbiphenyl	1	8608.495	8608.495	8608.495	8608.495	0.000	ug/hph
91-93	TRANS	2-methylnaphthalene	1	923.160	923.160	923.160	923.160	0.000	ug/hph
91-93	TRANS	3,6-dimethylphenanthrene	1	36.582	36.582	36.582	36.582	0.000	ug/hph
91-93	TRANS	3-methylbiphenyl	1	4940.212	4940.212	4940.212	4940.212	0.000	ug/hph
91-93	TRANS	4-methylbiphenyl	1	2692.663	2692.663	2692.663	2692.663	0.000	ug/hph
91-93	TRANS	4-methylpyrene	1	1.206	1.206	1.206	1.206	0.000	ug/hph
91-93	TRANS	7-methylbenz[a]anthracene	1	3.652	3.652	3.652	3.652	0.000	ug/hph
91-93	TRANS	A-methylfluorene	1	326.826	326.826	326.826	326.826	0.000	ug/hph
91-93	TRANS	A-trimethylnaphthalene	1	119.528	119.528	119.528	119.528	0.000	ug/hph
91-93	TRANS	acenaphthenequinone	1	9.749	9.749	9.749	9.749	0.000	ug/hph
91-93	TRANS	B-dimethylphenanthrene	1	3.652	3.652	3.652	3.652	0.000	ug/hph
91-93	TRANS	B-trimethylnaphthalene	1	102.443	102.443	102.443	102.443	0.000	ug/hph
91-93	TRANS	benzonaphthothiophene	1	2.446	2.446	2.446	2.446	0.000	ug/hph
91-93	TRANS	benzo[a]fluorene	8	1.850	0.700	4.660	1.180	1.290	ug/hph
91-93	TRANS	benzo[bkj]fluoranthene	4	0.360	0.190	0.530	0.360	0.170	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	TRANS	benzo[b]fluorene	5	0.832	0.110	3.540	0.170	1.355	ug/hph
91-93	TRANS	benzo[e]pyrene	1	1.206	1.206	1.206	1.206	0.000	ug/hph
91-93	TRANS	biphenyl	1	371.951	371.951	371.951	371.951	0.000	ug/hph
91-93	TRANS	C-dimethylphenanthrene	1	21.943	21.943	21.943	21.943	0.000	ug/hph
91-93	TRANS	C-trimethylnaphthalene	1	297.547	297.547	297.547	297.547	0.000	ug/hph
91-93	TRANS	coronene	1	7.303	7.303	7.303	7.303	0.000	ug/hph
91-93	TRANS	D-dimethylphenanthrene	1	4.891	4.891	4.891	4.891	0.000	ug/hph
91-93	TRANS	D-MePy/MeFl	1	2.446	2.446	2.446	2.446	0.000	ug/hph
91-93	TRANS	Dibenzofuran	2	78.055	78.055	78.055	78.055	0.000	ug/hph
91-93	TRANS	E-dimethylphenanthrene	1	4.891	4.891	4.891	4.891	0.000	ug/hph
91-93	TRANS	E-trimethylnaphthalene	1	64.622	64.622	64.622	64.622	0.000	ug/hph
91-93	TRANS	F-trimethylnaphthalene	1	95.107	95.107	95.107	95.107	0.000	ug/hph
91-93	TRANS	J-trimethylnaphthalene	1	41.473	41.473	41.473	41.473	0.000	ug/hph
91-93	TRANS	perinaphthenone	1	74.404	74.404	74.404	74.404	0.000	ug/hph
91-93	TRANS	retene	1	20.737	20.737	20.737	20.737	0.000	ug/hph
94-95	CRUISE	1+2-ethylnaphthalene	9	26.251	2.787	54.537	24.412	19.233	ug/hph
94-95	CRUISE	1,2-dimethylnaphthalene	9	8.863	1.562	19.408	6.346	6.134	ug/hph
94-95	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	9	90.997	12.465	198.353	84.309	65.526	ug/hph
94-95	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	9	23.804	5.145	51.363	20.752	16.177	ug/hph
94-95	CRUISE	1,4,5-trimethylnaphthalene	6	2.656	0.037	7.616	1.754	2.572	ug/hph
94-95	CRUISE	1,7-dimethylphenanthrene	7	1.569	0.651	2.107	1.530	0.482	ug/hph
94-95	CRUISE	1-ethyl-2-methylnaphthalene	6	7.703	1.265	13.848	6.769	4.222	ug/hph
94-95	CRUISE	1-methylfluorene	7	6.679	0.755	14.981	5.780	5.145	ug/hph
94-95	CRUISE	1-methylnaphthalene	9	71.325	9.494	166.844	62.730	54.683	ug/hph
94-95	CRUISE	1-methylphenanthrene	6	3.801	1.784	6.862	3.389	1.624	ug/hph
94-95	CRUISE	1-methylpyrene	7	1.700	0.229	4.596	1.135	1.503	ug/hph
94-95	CRUISE	2,3,5+I-trimethylnaphthalene	7	16.070	2.760	37.372	15.816	11.771	ug/hph
94-95	CRUISE	2,4,5-trimethylnaphthalene	7	4.249	0.644	8.674	3.774	2.953	ug/hph
94-95	CRUISE	2,6+2,7-dimethylnaphthalene	9	43.162	6.340	96.385	40.698	31.612	ug/hph
94-95	CRUISE	2-ethyl-1-methylnaphthalene	5	5.390	0.673	12.863	4.404	4.143	ug/hph
94-95	CRUISE	2-methylbiphenyl	2	25.353	18.564	32.142	25.353	6.789	ug/hph
94-95	CRUISE	2-methylnaphthalene	9	119.617	14.027	279.883	105.434	95.375	ug/hph
94-95	CRUISE	2-methylphenanthrene	7	9.103	2.523	16.525	7.993	4.870	ug/hph
94-95	CRUISE	3,6-dimethylphenanthrene	7	1.676	0.540	3.255	1.642	0.905	ug/hph
94-95	CRUISE	3-methylbiphenyl	6	53.717	27.474	78.085	50.694	19.929	ug/hph
94-95	CRUISE	4-methylbiphenyl	6	23.378	10.407	36.125	21.917	9.049	ug/hph
94-95	CRUISE	4-methylpyrene	7	2.937	0.612	7.615	1.742	2.483	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	CRUISE	5+6-methylchrysene	3	0.036	0.006	0.069	0.034	0.026	ug/hph
94-95	CRUISE	7-methylbenz[a]anthracene	3	0.033	0.015	0.068	0.017	0.025	ug/hph
94-95	CRUISE	7-methylbenzo[a]pyrene	5	0.498	0.059	0.843	0.441	0.291	ug/hph
94-95	CRUISE	9-methylanthracene	3	0.041	0.022	0.067	0.034	0.019	ug/hph
94-95	CRUISE	A-dimethylphenanthrene	7	2.018	0.769	3.146	1.852	0.814	ug/hph
94-95	CRUISE	A-methylfluorene	7	6.439	1.088	13.484	4.692	4.765	ug/hph
94-95	CRUISE	A-trimethylnaphthalene	7	22.541	5.386	45.238	23.290	12.946	ug/hph
94-95	CRUISE	acenaphthenequinone	5	8.236	0.664	33.443	2.483	12.622	ug/hph
94-95	CRUISE	B-dimethylphenanthrene	7	1.199	0.096	1.924	1.308	0.542	ug/hph
94-95	CRUISE	B-methylfluorene	7	2.209	0.034	5.025	2.253	1.738	ug/hph
94-95	CRUISE	B-trimethylnaphthalene	7	20.152	4.824	38.586	18.990	12.174	ug/hph
94-95	CRUISE	benzonaphthothiophene	5	0.171	0.030	0.241	0.204	0.080	ug/hph
94-95	CRUISE	benzo[bkj]fluoranthene	5	0.318	0.029	0.920	0.134	0.334	ug/hph
94-95	CRUISE	benzo[e]pyrene	7	2.279	0.202	4.396	2.448	1.260	ug/hph
94-95	CRUISE	biphenyl	9	42.856	9.382	82.679	39.692	22.596	ug/hph
94-95	CRUISE	C-dimethylphenanthrene	7	4.088	1.495	6.549	3.696	1.503	ug/hph
94-95	CRUISE	C-trimethylnaphthalene	7	20.213	3.270	38.932	20.842	12.617	ug/hph
94-95	CRUISE	coronene	3	0.480	0.042	1.354	0.045	0.618	ug/hph
94-95	CRUISE	D-dimethylphenanthrene	7	1.681	0.451	3.065	1.373	0.961	ug/hph
94-95	CRUISE	D-MePy/MeFl	3	3.453	1.190	7.169	2.002	2.648	ug/hph
94-95	CRUISE	Dibenzofuran	10	9.093	0.464	22.537	6.050	7.185	ug/hph
94-95	CRUISE	dibenz[ah+ac]anthracene	2	0.210	0.008	0.412	0.210	0.202	ug/hph
94-95	CRUISE	E-dimethylphenanthrene	6	1.269	0.644	2.026	1.265	0.529	ug/hph
94-95	CRUISE	E-trimethylnaphthalene	7	12.510	1.953	23.730	12.206	7.783	ug/hph
94-95	CRUISE	F-trimethylnaphthalene	7	11.048	1.539	21.883	11.152	7.395	ug/hph
94-95	CRUISE	J-trimethylnaphthalene	7	5.111	0.777	14.168	3.018	4.360	ug/hph
94-95	CRUISE	perinaphthenone	7	26.103	1.138	50.426	29.802	14.670	ug/hph
94-95	CRUISE	perylene	2	0.089	0.017	0.162	0.089	0.073	ug/hph
94-95	CRUISE	retene	4	0.207	0.111	0.397	0.160	0.113	ug/hph
94-95	IDLE	1+2-ethylnaphthalene	5	860.591	329.229	1855.001	666.338	543.791	ug/hph
94-95	IDLE	1,2-dimethylnaphthalene	5	235.849	117.275	422.354	164.259	121.973	ug/hph
94-95	IDLE	1,3+1,6+1,7-dimethylnaphthalene	5	2887.396	1309.638	5494.039	2437.490	1529.152	ug/hph
94-95	IDLE	1,4+1,5+2,3-dimethylnaphthalene	5	720.149	330.553	1383.048	576.374	388.599	ug/hph
94-95	IDLE	1,4,5-trimethylnaphthalene	3	66.764	17.599	154.078	28.615	61.904	ug/hph
94-95	IDLE	1,7-dimethylphenanthrene	3	9.137	4.412	16.132	6.867	5.047	ug/hph
94-95	IDLE	1-ethyl-2-methylnaphthalene	5	85.592	46.654	181.227	60.131	50.529	ug/hph
94-95	IDLE	1-methylfluorene	4	137.741	18.199	286.148	123.310	95.834	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	IDLE	1-methylnaphthalene	5	2130.739	807.356	4138.842	1875.782	1113.152	ug/hph
94-95	IDLE	1-methylphenanthrene	4	144.853	62.106	319.719	98.792	103.021	ug/hph
94-95	IDLE	1-methylpyrene	1	4.632	4.632	4.632	4.632	0.000	ug/hph
94-95	IDLE	2,3,5+I-trimethylnaphthalene	4	856.969	269.360	1576.556	790.979	470.400	ug/hph
94-95	IDLE	2,4,5-trimethylnaphthalene	5	102.030	45.311	220.525	83.596	64.794	ug/hph
94-95	IDLE	2,6+2,7-dimethylnaphthalene	5	1417.162	686.914	2733.284	1132.216	750.781	ug/hph
94-95	IDLE	2-ethyl-1-methylnaphthalene	2	187.016	58.713	315.319	187.016	128.303	ug/hph
94-95	IDLE	2-methylnaphthalene	5	3636.748	1388.388	7340.646	3122.393	2030.691	ug/hph
94-95	IDLE	2-methylphenanthrene	5	102.337	3.998	215.591	66.858	92.118	ug/hph
94-95	IDLE	3,6-dimethylphenanthrene	4	11.252	0.992	28.997	7.509	10.763	ug/hph
94-95	IDLE	3-methylbiphenyl	4	4113.601	1327.345	10833.780	2146.639	3895.229	ug/hph
94-95	IDLE	4-methylbiphenyl	4	2214.207	541.067	6222.787	1046.487	2323.965	ug/hph
94-95	IDLE	4-methylpyrene	5	11.882	2.375	20.532	12.209	7.596	ug/hph
94-95	IDLE	7-methylbenzo[a]pyrene	4	61.972	9.842	137.861	50.094	50.593	ug/hph
94-95	IDLE	A-dimethylphenanthrene	2	9.115	0.679	17.550	9.115	8.436	ug/hph
94-95	IDLE	A-methylfluorene	4	165.370	64.522	330.024	133.467	104.548	ug/hph
94-95	IDLE	A-trimethylnaphthalene	5	506.638	243.530	1017.160	404.782	282.812	ug/hph
94-95	IDLE	acenaphthenequinone	5	3478.948	1440.006	7036.750	1683.694	2377.366	ug/hph
94-95	IDLE	B-dimethylphenanthrene	1	3.434	3.434	3.434	3.434	0.000	ug/hph
94-95	IDLE	B-methylfluorene	3	267.931	52.942	686.369	64.482	295.918	ug/hph
94-95	IDLE	B-trimethylnaphthalene	5	570.654	249.211	1215.174	478.112	353.085	ug/hph
94-95	IDLE	benzo[bkj]fluoranthene	2	60.430	20.602	100.258	60.430	39.828	ug/hph
94-95	IDLE	benzo[e]pyrene	5	54.186	8.799	101.474	62.636	31.952	ug/hph
94-95	IDLE	biphenyl	5	1109.548	542.980	2211.732	929.825	604.595	ug/hph
94-95	IDLE	C-dimethylphenanthrene	4	36.666	4.302	70.583	35.889	29.668	ug/hph
94-95	IDLE	C-trimethylnaphthalene	5	552.908	191.905	1286.520	394.516	401.159	ug/hph
94-95	IDLE	coronene	1	23.823	23.823	23.823	23.823	0.000	ug/hph
94-95	IDLE	D-dimethylphenanthrene	1	15.643	15.643	15.643	15.643	0.000	ug/hph
94-95	IDLE	Dibenzofuran	5	337.757	132.685	628.762	277.197	191.518	ug/hph
94-95	IDLE	E-dimethylphenanthrene	2	22.851	6.105	39.598	22.851	16.747	ug/hph
94-95	IDLE	E-trimethylnaphthalene	5	311.987	131.935	691.715	208.258	204.099	ug/hph
94-95	IDLE	F-trimethylnaphthalene	5	293.799	114.610	691.333	236.123	209.488	ug/hph
94-95	IDLE	J-trimethylnaphthalene	4	47.836	3.054	111.462	38.414	40.540	ug/hph
94-95	IDLE	perinaphthenone	4	104.603	5.091	295.305	59.009	113.116	ug/hph
94-95	IDLE	perylene	1	4.632	4.632	4.632	4.632	0.000	ug/hph
94-95	IDLE	retene	1	3.434	3.434	3.434	3.434	0.000	ug/hph
94-95	IDLE	1+2-ethylnaphthalene	7	1458.255	437.751	2612.627	767.310	970.359	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	IDLE	1,2-dimethylnaphthalene	7	475.490	134.216	949.237	252.050	325.921	ug/mode
94-95	IDLE	1,3+1,6+1,7-dimethylnaphthalene	7	4520.722	1469.152	8442.706	2869.558	2707.618	ug/mode
94-95	IDLE	1,4+1,5+2,3-dimethylnaphthalene	7	1224.557	358.254	2144.792	740.781	721.175	ug/mode
94-95	IDLE	1,4,5-trimethylnaphthalene	3	136.299	80.902	166.870	161.125	39.242	ug/mode
94-95	IDLE	1,7-dimethylphenanthrene	5	24.762	2.048	49.579	29.620	18.952	ug/mode
94-95	IDLE	1-ethyl-2-methylnaphthalene	5	224.002	51.650	572.594	97.565	201.782	ug/mode
94-95	IDLE	1-methylfluorene	6	259.319	17.035	550.082	242.186	215.252	ug/mode
94-95	IDLE	1-methylnaphthalene	7	4422.288	1372.620	7892.622	3069.773	2967.447	ug/mode
94-95	IDLE	1-methylphenanthrene	3	139.852	88.583	185.266	145.708	39.687	ug/mode
94-95	IDLE	1-methylpyrene	2	10.667	3.194	18.140	10.667	7.473	ug/mode
94-95	IDLE	2,3,5+I-trimethylnaphthalene	6	1002.746	167.254	1940.626	973.552	546.449	ug/mode
94-95	IDLE	2,4,5-trimethylnaphthalene	6	208.754	46.976	372.108	207.093	148.891	ug/mode
94-95	IDLE	2,6+2,7-dimethylnaphthalene	7	2171.210	662.306	4171.634	1320.028	1341.219	ug/mode
94-95	IDLE	2-ethyl-1-methylnaphthalene	3	79.178	28.033	108.116	101.384	36.269	ug/mode
94-95	IDLE	2-methylbiphenyl	1	3804.799	3804.799	3804.799	3804.799	0.000	ug/mode
94-95	IDLE	2-methylnaphthalene	7	7017.001	2219.215	12943.859	5031.977	4479.638	ug/mode
94-95	IDLE	2-methylphenanthrene	6	230.217	2.065	443.485	238.679	181.553	ug/mode
94-95	IDLE	3,6-dimethylphenanthrene	6	39.988	2.581	88.697	29.074	34.865	ug/mode
94-95	IDLE	3-methylbiphenyl	6	2692.289	382.517	4511.585	2671.005	1321.149	ug/mode
94-95	IDLE	4-methylbiphenyl	6	1233.404	109.438	1899.370	1375.731	578.020	ug/mode
94-95	IDLE	4-methylpyrene	5	13.549	7.873	27.815	9.216	7.497	ug/mode
94-95	IDLE	7-methylbenzo[a]pyrene	6	15.720	4.608	21.165	18.072	5.780	ug/mode
94-95	IDLE	9-methylanthracene	2	13.829	9.675	17.983	13.829	4.154	ug/mode
94-95	IDLE	A-dimethylphenanthrene	4	40.894	5.678	90.975	33.462	35.132	ug/mode
94-95	IDLE	A-methylfluorene	5	304.317	76.146	474.451	441.969	186.122	ug/mode
94-95	IDLE	A-trimethylnaphthalene	6	1029.491	316.441	1997.522	929.028	718.375	ug/mode
94-95	IDLE	acenaphthenequinone	4	1840.900	32.047	2545.275	2393.139	1047.048	ug/mode
94-95	IDLE	B-dimethylphenanthrene	3	36.550	19.419	61.668	28.562	18.149	ug/mode
94-95	IDLE	B-methylfluorene	4	108.835	89.095	133.308	106.468	16.098	ug/mode
94-95	IDLE	B-trimethylnaphthalene	6	1005.315	250.881	1970.246	926.063	659.212	ug/mode
94-95	IDLE	benzonaphthothiophene	1	16.930	16.930	16.930	16.930	0.000	ug/mode
94-95	IDLE	benzo[bkj]fluoranthene	3	109.463	53.811	147.042	127.536	40.149	ug/mode
94-95	IDLE	benzo[e]pyrene	6	73.765	7.455	193.139	58.222	66.361	ug/mode
94-95	IDLE	biphenyl	7	4310.879	585.390	17447.771	2535.868	5511.139	ug/mode
94-95	IDLE	C-dimethylphenanthrene	5	91.944	13.845	168.727	97.947	60.830	ug/mode
94-95	IDLE	C-trimethylnaphthalene	6	1004.326	174.998	2142.147	924.461	736.583	ug/mode
94-95	IDLE	coronene	4	44.282	4.232	96.569	38.163	34.699	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	IDLE	D-dimethylphenanthrene	3	50.545	27.815	62.413	61.406	16.078	ug/mode
94-95	IDLE	D-MePy/MeFl	1	13.907	13.907	13.907	13.907	0.000	ug/mode
94-95	IDLE	Dibenzofuran	7	756.748	244.942	1126.384	995.967	370.063	ug/mode
94-95	IDLE	E-dimethylphenanthrene	3	16.434	7.680	30.440	11.182	10.006	ug/mode
94-95	IDLE	E-trimethylnaphthalene	6	617.279	110.470	1306.974	565.304	467.542	ug/mode
94-95	IDLE	F-trimethylnaphthalene	6	483.270	90.338	994.380	432.378	349.851	ug/mode
94-95	IDLE	J-trimethylnaphthalene	4	274.946	1.598	630.327	233.929	260.761	ug/mode
94-95	IDLE	perinaphthenone	3	276.101	109.690	589.752	128.861	221.923	ug/mode
94-95	IDLE	perylene	4	8.335	1.210	18.895	6.617	7.392	ug/mode
94-95	IDLE	retene	1	2.625	2.625	2.625	2.625	0.000	ug/mode
94-95	TRANS	1+2-ethylnaphthalene	17	160.868	7.498	442.710	147.851	125.667	ug/hph
94-95	TRANS	1,2-dimethylnaphthalene	17	57.748	3.970	210.499	50.252	55.647	ug/hph
94-95	TRANS	1,3+1,6+1,7-dimethylnaphthalene	17	587.255	29.463	2213.962	491.422	577.411	ug/hph
94-95	TRANS	1,4+1,5+2,3-dimethylnaphthalene	17	153.181	9.968	562.040	122.264	149.903	ug/hph
94-95	TRANS	1,4,5-trimethylnaphthalene	12	31.262	0.930	96.452	16.251	32.187	ug/hph
94-95	TRANS	1,7-dimethylphenanthrene	15	6.434	1.513	14.543	4.730	3.829	ug/hph
94-95	TRANS	1-ethyl-2-methylnaphthalene	14	35.968	3.823	127.322	25.934	30.739	ug/hph
94-95	TRANS	1-methylfluorene	15	26.195	5.686	64.038	24.854	16.297	ug/hph
94-95	TRANS	1-methylnaphthalene	17	399.248	35.638	1250.715	347.876	350.894	ug/hph
94-95	TRANS	1-methylphenanthrene	13	12.705	1.598	30.547	13.396	8.372	ug/hph
94-95	TRANS	1-methylpyrene	13	5.246	0.630	11.319	5.522	3.373	ug/hph
94-95	TRANS	2,3,5+I-trimethylnaphthalene	15	112.092	14.776	240.443	122.156	70.146	ug/hph
94-95	TRANS	2,4,5-trimethylnaphthalene	15	15.953	2.210	39.588	11.799	10.906	ug/hph
94-95	TRANS	2,6+2,7-dimethylnaphthalene	17	290.461	16.231	1085.526	233.510	291.206	ug/hph
94-95	TRANS	2-ethyl-1-methylnaphthalene	9	10.324	2.313	16.151	12.554	4.750	ug/hph
94-95	TRANS	2-methylbiphenyl	3	163.762	50.898	367.156	73.231	144.110	ug/hph
94-95	TRANS	2-methylnaphthalene	17	670.602	54.956	2093.569	606.335	587.769	ug/hph
94-95	TRANS	2-methylphenanthrene	15	30.223	7.352	59.572	32.448	13.292	ug/hph
94-95	TRANS	3,6-dimethylphenanthrene	15	6.778	0.774	12.478	6.544	3.258	ug/hph
94-95	TRANS	3-methylbiphenyl	13	209.163	41.388	336.439	209.502	98.346	ug/hph
94-95	TRANS	4-methylbiphenyl	13	95.369	16.432	171.525	117.006	46.083	ug/hph
94-95	TRANS	4-methylpyrene	15	9.102	0.068	20.650	9.261	6.783	ug/hph
94-95	TRANS	5+6-methylchrysene	4	0.969	0.172	2.367	0.669	0.847	ug/hph
94-95	TRANS	7-methylbenz[a]anthracene	5	0.363	0.034	1.098	0.240	0.387	ug/hph
94-95	TRANS	7-methylbenzo[a]pyrene	10	3.603	0.032	7.237	3.624	2.393	ug/hph
94-95	TRANS	9-methylanthracene	3	0.448	0.274	0.612	0.457	0.138	ug/hph
94-95	TRANS	A-dimethylphenanthrene	14	8.747	0.756	15.950	9.117	4.001	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	TRANS	A-methylfluorene	15	31.041	5.750	70.384	23.161	20.596	ug/hph
94-95	TRANS	A-trimethylnaphthalene	15	127.863	21.104	344.132	94.864	98.740	ug/hph
94-95	TRANS	acenaphthenequinone	6	193.892	0.633	298.848	219.022	102.062	ug/hph
94-95	TRANS	B-dimethylphenanthrene	14	4.519	0.648	7.615	4.389	2.113	ug/hph
94-95	TRANS	B-methylfluorene	13	11.383	0.748	26.904	8.747	9.156	ug/hph
94-95	TRANS	B-trimethylnaphthalene	15	113.362	25.633	272.033	106.319	77.699	ug/hph
94-95	TRANS	benzonaphthothiophene	8	1.167	0.170	2.415	1.235	0.684	ug/hph
94-95	TRANS	benzo[bkj]fluoranthene	10	3.692	0.309	15.004	3.178	4.079	ug/hph
94-95	TRANS	benzo[e]pyrene	15	5.776	0.528	11.628	6.461	3.451	ug/hph
94-95	TRANS	biphenyl	17	181.997	28.171	406.482	160.604	104.295	ug/hph
94-95	TRANS	C-dimethylphenanthrene	15	16.171	2.920	27.097	15.950	6.680	ug/hph
94-95	TRANS	C-trimethylnaphthalene	15	109.220	19.209	263.939	105.644	72.932	ug/hph
94-95	TRANS	coronene	5	5.394	0.480	9.610	4.631	3.544	ug/hph
94-95	TRANS	D-dimethylphenanthrene	15	5.324	0.915	10.325	4.998	2.390	ug/hph
94-95	TRANS	D-MePy/MeFl	7	9.877	2.448	20.271	10.633	6.670	ug/hph
94-95	TRANS	Dibenzofuran	24	54.331	14.069	111.195	51.930	25.372	ug/hph
94-95	TRANS	dibenz[ah+ac]anthracene	5	1.478	0.206	4.150	1.063	1.457	ug/hph
94-95	TRANS	E-dimethylphenanthrene	12	4.620	1.322	9.090	4.333	2.497	ug/hph
94-95	TRANS	E-trimethylnaphthalene	15	70.466	8.416	169.305	69.294	49.113	ug/hph
94-95	TRANS	F-trimethylnaphthalene	15	60.717	7.581	149.582	60.826	41.927	ug/hph
94-95	TRANS	J-trimethylnaphthalene	15	22.955	0.657	67.491	12.065	23.640	ug/hph
94-95	TRANS	perinaphthenone	15	94.148	0.387	223.149	67.830	59.897	ug/hph
94-95	TRANS	perylene	4	0.392	0.172	0.892	0.253	0.295	ug/hph
94-95	TRANS	retene	9	1.125	0.309	2.230	1.235	0.695	ug/hph
96-97	TRANS	benzo[bkj]fluoranthene	2	1.033	0.437	1.629	1.033	0.596	ug/hph
98-03	CRUISE	1+2-ethylnaphthalene	8	68.309	23.285	142.345	65.508	39.195	ug/hph
98-03	CRUISE	1,2-dimethylnaphthalene	8	26.931	7.834	51.516	27.107	15.225	ug/hph
98-03	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	8	242.583	75.141	481.720	249.828	136.841	ug/hph
98-03	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	8	73.533	23.907	148.463	73.420	41.996	ug/hph
98-03	CRUISE	1,4,5-trimethylnaphthalene	3	3.280	1.319	5.365	3.154	1.654	ug/hph
98-03	CRUISE	1,7-dimethylphenanthrene	3	4.023	1.462	6.537	4.072	2.072	ug/hph
98-03	CRUISE	1-methylfluorene	3	11.858	6.228	15.562	13.784	4.047	ug/hph
98-03	CRUISE	1-methylnaphthalene	8	165.221	54.871	274.964	177.529	80.960	ug/hph
98-03	CRUISE	1-methylphenanthrene	3	6.793	2.807	11.111	6.462	3.398	ug/hph
98-03	CRUISE	1-methylpyrene	3	1.311	0.829	1.768	1.335	0.384	ug/hph
98-03	CRUISE	2,3,5+I-trimethylnaphthalene	3	24.588	9.937	33.988	29.840	10.498	ug/hph
98-03	CRUISE	2,4,5-trimethylnaphthalene	3	6.995	4.150	8.848	7.988	2.042	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	CRUISE	2,6+2,7-dimethylnaphthalene	8	130.193	40.415	265.834	133.614	75.504	ug/hph
98-03	CRUISE	2-methylbiphenyl	3	42.034	25.036	64.734	36.334	16.700	ug/hph
98-03	CRUISE	2-methylnaphthalene	8	272.029	94.136	442.690	292.471	132.036	ug/hph
98-03	CRUISE	2-methylphenanthrene	3	14.359	5.256	24.382	13.441	7.835	ug/hph
98-03	CRUISE	3,6-dimethylphenanthrene	3	3.589	1.164	5.940	3.663	1.950	ug/hph
98-03	CRUISE	3-methylbiphenyl	3	73.964	46.814	91.472	83.606	19.465	ug/hph
98-03	CRUISE	4-methylbiphenyl	3	26.139	17.614	30.814	29.989	6.037	ug/hph
98-03	CRUISE	4-methylpyrene	3	2.495	1.652	2.959	2.874	0.597	ug/hph
98-03	CRUISE	5+6-methylchrysene	1	0.009	0.009	0.009	0.009	0.000	ug/hph
98-03	CRUISE	7-methylbenzo[a]pyrene	2	0.364	0.233	0.495	0.364	0.131	ug/hph
98-03	CRUISE	9-methylanthracene	2	0.125	0.084	0.165	0.125	0.040	ug/hph
98-03	CRUISE	A-dimethylphenanthrene	3	3.787	0.855	6.857	3.647	2.452	ug/hph
98-03	CRUISE	A-methylfluorene	3	7.929	3.193	16.886	3.710	6.337	ug/hph
98-03	CRUISE	A-trimethylnaphthalene	3	56.942	24.925	80.215	65.685	23.404	ug/hph
98-03	CRUISE	acenaphthenequinone	3	0.994	0.556	1.739	0.686	0.530	ug/hph
98-03	CRUISE	B-dimethylphenanthrene	3	2.495	1.001	4.102	2.384	1.268	ug/hph
98-03	CRUISE	B-methylfluorene	3	2.634	1.833	4.064	2.006	1.013	ug/hph
98-03	CRUISE	B-trimethylnaphthalene	3	48.921	22.348	66.122	58.294	19.060	ug/hph
98-03	CRUISE	benzonaphthothiophene	3	0.205	0.034	0.495	0.085	0.206	ug/hph
98-03	CRUISE	benzo[bkj]fluoranthene	3	0.466	0.218	0.816	0.365	0.254	ug/hph
98-03	CRUISE	benzo[e]pyrene	3	1.075	0.225	1.859	1.143	0.669	ug/hph
98-03	CRUISE	biphenyl	8	88.432	33.280	165.709	61.786	48.599	ug/hph
98-03	CRUISE	C-dimethylphenanthrene	3	8.410	2.936	13.842	8.452	4.452	ug/hph
98-03	CRUISE	C-trimethylnaphthalene	3	46.259	22.698	61.649	54.428	16.919	ug/hph
98-03	CRUISE	D-dimethylphenanthrene	3	2.625	1.024	4.187	2.664	1.292	ug/hph
98-03	CRUISE	D-MePy/MeFl	3	3.101	1.847	3.949	3.507	0.905	ug/hph
98-03	CRUISE	Dibenzofuran	6	12.080	5.907	19.512	10.823	5.625	ug/hph
98-03	CRUISE	dibenz[ah+ac]anthracene	1	0.006	0.006	0.006	0.006	0.000	ug/hph
98-03	CRUISE	E-dimethylphenanthrene	3	2.503	0.779	4.279	2.449	1.430	ug/hph
98-03	CRUISE	E-trimethylnaphthalene	3	28.696	14.005	37.779	34.304	10.485	ug/hph
98-03	CRUISE	F-trimethylnaphthalene	3	22.967	10.287	31.045	27.568	9.078	ug/hph
98-03	CRUISE	J-trimethylnaphthalene	3	15.869	7.272	20.674	19.662	6.093	ug/hph
98-03	CRUISE	perinaphthenone	3	1.322	0.575	2.137	1.254	0.639	ug/hph
98-03	CRUISE	perylene	2	0.026	0.003	0.050	0.026	0.023	ug/hph
98-03	CRUISE	retene	1	0.013	0.013	0.013	0.013	0.000	ug/hph
98-03	IDLE	1+2-ethylnaphthalene	9	4619.272	1469.798	7256.550	5373.254	2011.294	ug/mode
98-03	IDLE	1,2-dimethylnaphthalene	9	1697.578	413.381	2956.466	1879.221	870.046	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	IDLE	1,3+1,6+1,7-dimethylnaphthalene	9	16425.416	4384.899	26688.200	18541.207	7627.861	ug/mode
98-03	IDLE	1,4+1,5+2,3-dimethylnaphthalene	9	4739.560	1335.067	7762.534	5273.448	2185.724	ug/mode
98-03	IDLE	1,4,5-trimethylnaphthalene	3	338.990	184.526	470.484	361.959	117.867	ug/mode
98-03	IDLE	1,7-dimethylphenanthrene	3	59.154	31.285	112.246	33.931	37.557	ug/mode
98-03	IDLE	1-methylfluorene	3	954.787	831.557	1107.480	925.324	114.556	ug/mode
98-03	IDLE	1-methylnaphthalene	9	13118.907	4231.795	21563.423	13390.213	5839.335	ug/mode
98-03	IDLE	1-methylphenanthrene	3	199.749	110.699	338.547	149.999	99.448	ug/mode
98-03	IDLE	1-methylpyrene	1	18.607	18.607	18.607	18.607	0.000	ug/mode
98-03	IDLE	2,3,5+I-trimethylnaphthalene	3	2400.292	1684.537	2851.781	2664.558	511.854	ug/mode
98-03	IDLE	2,4,5-trimethylnaphthalene	3	701.897	571.430	781.534	752.728	93.001	ug/mode
98-03	IDLE	2,6+2,7-dimethylnaphthalene	9	8886.941	2357.802	14255.781	9839.953	4140.043	ug/mode
98-03	IDLE	2-methylbiphenyl	3	6178.823	4754.767	8337.021	5444.682	1551.850	ug/mode
98-03	IDLE	2-methylnaphthalene	9	21433.059	7327.558	33058.381	22082.374	8917.381	ug/mode
98-03	IDLE	2-methylphenanthrene	3	456.888	270.134	774.338	326.191	225.635	ug/mode
98-03	IDLE	3,6-dimethylphenanthrene	3	59.338	27.075	112.246	38.693	37.711	ug/mode
98-03	IDLE	3-methylbiphenyl	3	8279.456	7958.389	8750.000	8129.978	340.020	ug/mode
98-03	IDLE	4-methylbiphenyl	3	3080.969	2944.661	3285.226	3013.021	147.103	ug/mode
98-03	IDLE	4-methylpyrene	3	16.793	9.525	26.415	14.440	7.093	ug/mode
98-03	IDLE	7-methylbenzo[a]pyrene	2	53.222	21.009	85.435	53.222	32.213	ug/mode
98-03	IDLE	9-methylanthracene	1	5.415	5.415	5.415	5.415	0.000	ug/mode
98-03	IDLE	A-dimethylphenanthrene	1	21.610	21.610	21.610	21.610	0.000	ug/mode
98-03	IDLE	A-methylfluorene	3	901.234	414.287	1234.735	1054.679	352.082	ug/mode
98-03	IDLE	A-trimethylnaphthalene	3	5773.337	4208.363	7130.049	5981.598	1201.830	ug/mode
98-03	IDLE	acenaphthenequinone	3	73.046	48.018	88.096	83.025	17.818	ug/mode
98-03	IDLE	B-dimethylphenanthrene	3	67.171	37.503	100.841	63.169	26.012	ug/mode
98-03	IDLE	B-methylfluorene	3	347.059	273.812	403.977	363.389	54.380	ug/mode
98-03	IDLE	B-trimethylnaphthalene	3	4973.278	3795.862	5992.346	5131.626	903.674	ug/mode
98-03	IDLE	benzonaphthothiophene	2	0.895	0.600	1.191	0.895	0.295	ug/mode
98-03	IDLE	benzo[bkj]fluoranthene	3	39.219	17.859	67.385	32.414	20.784	ug/mode
98-03	IDLE	benzo[e]pyrene	3	30.284	15.009	52.379	23.465	16.000	ug/mode
98-03	IDLE	biphenyl	9	9802.327	3943.959	26471.011	6539.125	7111.734	ug/mode
98-03	IDLE	C-dimethylphenanthrene	3	126.509	63.169	247.310	69.047	85.453	ug/mode
98-03	IDLE	C-trimethylnaphthalene	3	4466.264	3597.050	5270.977	4530.766	684.898	ug/mode
98-03	IDLE	coronene	1	2.405	2.405	2.405	2.405	0.000	ug/mode
98-03	IDLE	D-dimethylphenanthrene	3	32.166	12.635	63.027	20.835	22.078	ug/mode
98-03	IDLE	D-MePy/MeFl	3	14.390	7.220	28.210	7.739	9.775	ug/mode
98-03	IDLE	Dibenzofuran	6	1343.383	1151.199	1611.198	1267.750	195.260	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	IDLE	E-dimethylphenanthrene	1	41.417	41.417	41.417	41.417	0.000	ug/mode
98-03	IDLE	E-trimethylnaphthalene	3	2885.498	2323.234	3358.966	2974.295	427.472	ug/mode
98-03	IDLE	F-trimethylnaphthalene	3	2088.941	1642.867	2419.202	2204.755	327.346	ug/mode
98-03	IDLE	J-trimethylnaphthalene	3	1421.598	1138.103	1585.289	1541.402	201.260	ug/mode
98-03	IDLE	perinaphthenone	2	30.310	0.595	60.024	30.310	29.714	ug/mode
98-03	IDLE	perylene	2	6.616	1.802	11.430	6.616	4.814	ug/mode
98-03	TRANS	1+2-ethylnaphthalene	10	158.862	52.900	346.545	138.574	92.203	ug/hph
98-03	TRANS	1,2-dimethylnaphthalene	10	55.849	14.000	146.535	46.072	39.533	ug/hph
98-03	TRANS	1,3+1,6+1,7-dimethylnaphthalene	10	509.487	150.902	1133.190	396.269	327.299	ug/hph
98-03	TRANS	1,4+1,5+2,3-dimethylnaphthalene	10	154.108	44.444	347.763	126.110	96.978	ug/hph
98-03	TRANS	1,4,5-trimethylnaphthalene	3	12.747	6.633	23.788	7.821	7.822	ug/hph
98-03	TRANS	1,7-dimethylphenanthrene	4	13.325	1.836	35.188	8.137	13.032	ug/hph
98-03	TRANS	1-ethyl-2-methylnaphthalene	1	6.401	6.401	6.401	6.401	0.000	ug/hph
98-03	TRANS	1-methylfluorene	4	38.309	21.509	61.735	34.997	17.253	ug/hph
98-03	TRANS	1-methylnaphthalene	10	405.227	153.721	835.201	346.956	213.514	ug/hph
98-03	TRANS	1-methylphenanthrene	4	66.680	5.209	229.363	16.074	94.137	ug/hph
98-03	TRANS	1-methylpyrene	4	7.682	0.600	19.203	5.463	6.993	ug/hph
98-03	TRANS	2,3,5+I-trimethylnaphthalene	4	86.311	31.514	165.565	74.083	51.579	ug/hph
98-03	TRANS	2,4,5-trimethylnaphthalene	4	19.460	2.145	47.652	14.022	17.077	ug/hph
98-03	TRANS	2,6+2,7-dimethylnaphthalene	10	262.933	79.116	600.945	197.743	168.549	ug/hph
98-03	TRANS	2-ethyl-1-methylnaphthalene	1	396.897	396.897	396.897	396.897	0.000	ug/hph
98-03	TRANS	2-methylbiphenyl	4	156.015	11.729	282.375	164.978	99.982	ug/hph
98-03	TRANS	2-methylnaphthalene	10	661.811	265.630	1423.667	521.642	349.943	ug/hph
98-03	TRANS	2-methylphenanthrene	3	28.841	11.129	55.074	20.319	18.925	ug/hph
98-03	TRANS	3,6-dimethylphenanthrene	4	8.778	1.536	18.130	7.723	6.294	ug/hph
98-03	TRANS	3-methylbiphenyl	4	221.644	8.546	448.244	214.893	157.748	ug/hph
98-03	TRANS	4-methylbiphenyl	3	106.464	74.915	153.043	91.433	33.620	ug/hph
98-03	TRANS	4-methylpyrene	4	11.349	3.635	21.348	10.207	6.529	ug/hph
98-03	TRANS	5+6-methylchrysene	1	4.256	4.256	4.256	4.256	0.000	ug/hph
98-03	TRANS	7-methylbenz[a]anthracene	1	3.218	3.218	3.218	3.218	0.000	ug/hph
98-03	TRANS	7-methylbenzo[a]pyrene	3	0.701	0.381	1.124	0.599	0.312	ug/hph
98-03	TRANS	9-methylanthracene	4	5.887	0.152	22.421	0.487	9.547	ug/hph
98-03	TRANS	A-dimethylphenanthrene	2	6.420	5.367	7.474	6.420	1.053	ug/hph
98-03	TRANS	A-methylfluorene	4	88.037	20.768	237.910	46.736	88.883	ug/hph
98-03	TRANS	A-trimethylnaphthalene	4	168.899	93.419	347.916	117.131	104.019	ug/hph
98-03	TRANS	acenaphthenequinone	4	7.340	0.375	22.421	3.282	8.941	ug/hph
98-03	TRANS	B-dimethylphenanthrene	3	4.784	2.623	7.688	4.041	2.134	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	B-methylfluorene	3	11.858	3.405	25.425	6.745	9.689	ug/hph
98-03	TRANS	B-trimethylnaphthalene	4	144.720	80.030	299.274	99.788	89.856	ug/hph
98-03	TRANS	benzonaphthothiophene	4	6.446	0.075	24.531	0.589	10.449	ug/hph
98-03	TRANS	benzo[bkj]fluoranthene	3	2.211	1.347	2.698	2.588	0.613	ug/hph
98-03	TRANS	benzo[e]pyrene	3	1.274	0.562	2.436	0.823	0.829	ug/hph
98-03	TRANS	biphenyl	10	303.308	123.764	569.659	255.918	149.223	ug/hph
98-03	TRANS	C-dimethylphenanthrene	4	18.116	3.897	35.223	16.672	11.867	ug/hph
98-03	TRANS	C-trimethylnaphthalene	4	130.809	59.754	274.610	94.436	84.316	ug/hph
98-03	TRANS	D-dimethylphenanthrene	4	3.930	1.162	5.976	4.292	1.888	ug/hph
98-03	TRANS	D-MePy/MeFl	4	12.724	3.635	24.531	11.364	7.774	ug/hph
98-03	TRANS	Dibenzofuran	8	49.917	29.116	84.457	43.048	21.980	ug/hph
98-03	TRANS	E-dimethylphenanthrene	2	4.242	2.395	6.090	4.242	1.847	ug/hph
98-03	TRANS	E-trimethylnaphthalene	4	80.454	39.479	171.655	55.341	53.251	ug/hph
98-03	TRANS	F-trimethylnaphthalene	4	64.873	26.677	140.064	46.375	44.231	ug/hph
98-03	TRANS	J-trimethylnaphthalene	4	40.263	5.328	91.917	31.902	31.788	ug/hph
98-03	TRANS	perinaphthenone	4	11.089	1.162	36.261	3.467	14.611	ug/hph
98-03	TRANS	retene	1	3.218	3.218	3.218	3.218	0.000	ug/hph
98-03	BUS	1+2-ethylnaphthalene	3	97.249	4.913	165.388	121.446	67.711	ug/hph
98-03	BUS	5+6-methylchrysene	2	0.105	0.018	0.193	0.105	0.088	ug/hph
98-03	BUS	7-methylbenz[a]anthracene	3	0.054	0.044	0.058	0.058	0.007	ug/hph
98-03	BUS	7-methylbenzo[a]pyrene	3	0.513	0.337	0.841	0.360	0.232	ug/hph
98-03	BUS	9-methylanthracene	5	2.470	0.176	6.401	1.650	2.103	ug/hph
98-03	BUS	benzo[bkj]fluoranthene	4	0.605	0.106	1.059	0.628	0.396	ug/hph
98-03	BUS	benzo[e]pyrene	1	0.321	0.321	0.321	0.321	0.000	ug/hph
98-03	BUS	biphenyl	5	109.038	2.076	257.078	34.323	111.189	ug/hph
98-03	BUS	dibenz[ah+ac]anthracene	2	0.535	0.498	0.571	0.535	0.036	ug/hph
98-03	BUS	perylene	2	0.215	0.158	0.273	0.215	0.057	ug/hph
98-03	BUS	retene	5	0.324	0.029	0.474	0.370	0.159	ug/hph

Total records	691
Total with 1 record	271
Total with 2 records	71
Max number of records	24
Total with max number of records	1

Table B-11b. Other PAH Compounds, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	1+2-ethylnaphthalene	3	86.667	80.000	100.000	80.000	9.428	ug/mi
pre-87	FTP	1,2-dimethylnaphthalene	21	66.857	14.000	179.000	61.000	43.222	ug/mi
pre-87	FTP	1,3+1,6+1,7-dimethylnaphthalene	18	507.444	91.000	1157.000	495.500	321.085	ug/mi
pre-87	FTP	1,4+1,5+2,3-dimethylnaphthalene	21	173.762	34.000	450.000	155.000	117.385	ug/mi
pre-87	FTP	1,4,5-trimethylnaphthalene	3	26.667	10.000	60.000	10.000	23.570	ug/mi
pre-87	FTP	1,7-dimethylphenanthrene	22	28.773	3.000	241.000	13.500	50.981	ug/mi
pre-87	FTP	1,8-dimethylnaphthalene	16	2.938	1.000	9.000	3.000	2.076	ug/mi
pre-87	FTP	1-ethyl-2-methylnaphthalene	21	38.571	7.000	125.000	31.000	30.733	ug/mi
pre-87	FTP	1-methylfluorene	22	45.773	6.000	233.000	26.500	53.694	ug/mi
pre-87	FTP	1-methylnaphthalene	22	426.955	70.000	2000.000	313.500	407.860	ug/mi
pre-87	FTP	1-methylphenanthrene	22	45.136	9.000	232.000	28.000	49.259	ug/mi
pre-87	FTP	1-methylpyrene	3	33.333	10.000	70.000	20.000	26.247	ug/mi
pre-87	FTP	2,4,5-trimethylnaphthalene	4	45.000	10.000	140.000	15.000	55.000	ug/mi
pre-87	FTP	2,6+2,7-dimethylnaphthalene	21	234.762	44.000	596.000	250.000	162.524	ug/mi
pre-87	FTP	2-ethyl-1-methylnaphthalene	19	11.684	2.000	34.000	10.000	8.386	ug/mi
pre-87	FTP	2-methylbiphenyl	22	90.682	20.000	470.000	43.500	105.459	ug/mi
pre-87	FTP	2-methylnaphthalene	24	414.816	0.672	1580.000	347.000	380.158	ug/mi
pre-87	FTP	2-methylphenanthrene	22	71.227	13.000	481.000	39.500	96.483	ug/mi
pre-87	FTP	2-phenylnaphthalene	1	10.000	10.000	10.000	10.000	0.000	ug/mi
pre-87	FTP	3,6-dimethylphenanthrene	22	17.273	1.000	145.000	9.500	30.218	ug/mi
pre-87	FTP	3-methylbiphenyl	22	274.227	47.000	1200.000	181.500	250.723	ug/mi
pre-87	FTP	4-methylbiphenyl	22	107.409	18.000	500.000	64.500	105.528	ug/mi
pre-87	FTP	4-methylpyrene	4	42.500	10.000	120.000	20.000	45.484	ug/mi
pre-87	FTP	7-methylbenz[a]anthracene	3	1.000	1.000	1.000	1.000	0.000	ug/mi
pre-87	FTP	7-methylbenzo[a]pyrene	2	2.500	2.000	3.000	2.500	0.500	ug/mi
pre-87	FTP	9-methylanthracene	18	3.111	1.000	12.000	2.000	3.348	ug/mi
pre-87	FTP	A-dimethylphenanthrene	22	22.091	2.000	175.000	11.000	36.144	ug/mi
pre-87	FTP	A-methylfluorene	21	47.381	7.000	241.000	25.000	54.060	ug/mi
pre-87	FTP	A-trimethylnaphthalene	21	128.048	20.000	397.000	112.000	97.381	ug/mi
pre-87	FTP	acenaphthenequinone	1	20.000	20.000	20.000	20.000	0.000	ug/mi
pre-87	FTP	B-dimethylphenanthrene	22	12.636	1.000	106.000	6.000	21.873	ug/mi
pre-87	FTP	B-methylfluorene	20	12.850	2.000	51.000	8.500	12.698	ug/mi
pre-87	FTP	B-trimethylnaphthalene	21	163.762	26.000	523.000	143.000	128.349	ug/mi
pre-87	FTP	benzonaphthothiophene	12	2.000	1.000	9.000	1.000	2.198	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	benzo[bkj]fluoranthene	18	92.833	3.000	395.000	39.000	112.055	ug/mi
pre-87	FTP	benzo[e]pyrene	22	27.285	1.000	121.000	14.615	32.052	ug/mi
pre-87	FTP	biphenyl	22	276.364	40.000	735.000	200.500	198.213	ug/mi
pre-87	FTP	C-dimethylphenanthrene	22	50.545	5.000	375.000	25.000	81.892	ug/mi
pre-87	FTP	C-trimethylnaphthalene	21	207.190	37.000	716.000	171.000	169.073	ug/mi
pre-87	FTP	coronene	14	17.143	1.000	122.000	5.000	31.839	ug/mi
pre-87	FTP	D-dimethylphenanthrene	20	19.750	2.000	142.000	10.000	31.600	ug/mi
pre-87	FTP	Dibenzofuran	4	0.698	0.364	1.017	0.706	0.268	ug/mi
pre-87	FTP	dibenz[ah+ac]anthracene	4	3.750	1.000	6.000	4.000	2.278	ug/mi
pre-87	FTP	E-dimethylphenanthrene	22	17.591	2.000	128.000	10.000	26.842	ug/mi
pre-87	FTP	E-trimethylnaphthalene	21	137.667	24.000	504.000	107.000	118.669	ug/mi
pre-87	FTP	F-trimethylnaphthalene	22	116.636	10.000	432.000	96.000	107.220	ug/mi
pre-87	FTP	indeno[123-cd]fluoranthene	3	1.806	0.991	2.846	1.582	0.774	ug/mi
pre-87	FTP	J-trimethylnaphthalene	4	27.500	10.000	60.000	20.000	19.203	ug/mi
pre-87	FTP	perinaphthenone	4	15.000	10.000	30.000	10.000	8.660	ug/mi
pre-87	FTP	retene	7	3.429	1.000	10.000	1.000	3.849	ug/mi
pre-87	CRUISE	1+2-ethylnaphthalene	4	270.826	13.368	685.764	192.085	280.107	ug/mi
pre-87	CRUISE	1,2-dimethylnaphthalene	4	220.420	8.777	561.110	155.896	229.029	ug/mi
pre-87	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	4	928.070	45.784	2461.999	602.249	992.024	ug/mi
pre-87	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	4	276.749	15.707	710.494	190.397	287.367	ug/mi
pre-87	CRUISE	1,4,5-trimethylnaphthalene	4	22.829	4.726	40.772	22.908	15.945	ug/mi
pre-87	CRUISE	1,7-dimethylphenanthrene	3	61.585	10.578	94.973	79.204	36.637	ug/mi
pre-87	CRUISE	1,8-dimethylnaphthalene	2	18.462	9.692	27.232	18.462	8.770	ug/mi
pre-87	CRUISE	1-ethyl-2-methylnaphthalene	4	46.171	9.002	98.253	38.714	38.122	ug/mi
pre-87	CRUISE	1-methylfluorene	4	61.521	29.032	93.398	61.826	22.881	ug/mi
pre-87	CRUISE	1-methylnaphthalene	4	1127.043	26.735	2671.538	904.949	1128.535	ug/mi
pre-87	CRUISE	1-methylphenanthrene	3	100.977	40.510	132.340	130.082	42.767	ug/mi
pre-87	CRUISE	1-methylpyrene	4	31.925	1.337	78.201	24.081	32.377	ug/mi
pre-87	CRUISE	2,3,5+I-trimethylnaphthalene	4	224.690	25.656	513.655	179.725	207.454	ug/mi
pre-87	CRUISE	2,4,5-trimethylnaphthalene	4	60.791	8.102	111.620	61.721	45.976	ug/mi
pre-87	CRUISE	2,6+2,7-dimethylnaphthalene	4	539.693	23.059	1481.477	327.119	596.623	ug/mi
pre-87	CRUISE	2-ethyl-1-methylnaphthalene	3	3.896	0.450	9.902	1.337	4.262	ug/mi
pre-87	CRUISE	2-methylbiphenyl	3	39.090	6.077	101.500	9.692	44.155	ug/mi
pre-87	CRUISE	2-methylnaphthalene	4	1063.209	32.417	2688.916	765.752	1105.212	ug/mi
pre-87	CRUISE	2-methylphenanthrene	4	135.479	13.034	223.255	152.813	90.617	ug/mi
pre-87	CRUISE	3,6-dimethylphenanthrene	3	44.528	10.128	69.317	54.139	25.101	ug/mi
pre-87	CRUISE	3-methylbiphenyl	4	107.941	14.404	206.151	105.605	85.608	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	4-methylbiphenyl	4	145.355	22.281	325.205	116.968	127.271	ug/mi
pre-87	CRUISE	4-methylpyrene	3	46.240	2.025	80.206	56.489	32.730	ug/mi
pre-87	CRUISE	5+6-methylchrysene	3	2.276	0.225	3.676	2.926	1.482	ug/mi
pre-87	CRUISE	7-methylbenz[a]anthracene	4	1.673	0.225	4.345	1.061	1.638	ug/mi
pre-87	CRUISE	7-methylbenzo[a]pyrene	2	1.681	1.337	2.025	1.681	0.344	ug/mi
pre-87	CRUISE	9-methylanthracene	2	0.788	0.225	1.350	0.788	0.563	ug/mi
pre-87	CRUISE	A-dimethylphenanthrene	3	64.272	10.353	99.250	83.214	38.685	ug/mi
pre-87	CRUISE	A-methylfluorene	4	91.040	32.633	127.996	101.765	38.340	ug/mi
pre-87	CRUISE	A-trimethylnaphthalene	4	311.039	20.480	769.981	226.848	306.004	ug/mi
pre-87	CRUISE	acenaphthenequinone	2	24.478	21.723	27.232	24.478	2.755	ug/mi
pre-87	CRUISE	B-dimethylphenanthrene	3	34.998	5.401	55.814	43.779	21.497	ug/mi
pre-87	CRUISE	B-methylfluorene	4	29.730	12.153	49.287	28.741	13.301	ug/mi
pre-87	CRUISE	B-trimethylnaphthalene	4	347.546	26.106	817.770	273.155	323.964	ug/mi
pre-87	CRUISE	benzonaphthothiophene	3	7.545	0.675	12.603	9.357	5.035	ug/mi
pre-87	CRUISE	benzo[bkj]fluoranthene	4	120.164	8.552	270.362	100.870	112.998	ug/mi
pre-87	CRUISE	benzo[b]chrysene	3	7.936	0.450	15.707	7.652	6.232	ug/mi
pre-87	CRUISE	benzo[e]pyrene	4	45.093	0.450	107.610	36.156	44.958	ug/mi
pre-87	CRUISE	biphenyl	4	401.001	20.386	985.869	298.874	405.763	ug/mi
pre-87	CRUISE	C-dimethylphenanthrene	4	93.932	6.015	198.499	85.607	82.063	ug/mi
pre-87	CRUISE	C-trimethylnaphthalene	4	258.752	20.930	579.825	217.126	228.522	ug/mi
pre-87	CRUISE	coronene	2	55.752	32.633	78.870	55.752	23.119	ug/mi
pre-87	CRUISE	D-dimethylphenanthrene	3	28.321	3.601	48.612	32.751	18.641	ug/mi
pre-87	CRUISE	dibenz[ah+ac]anthracene	4	4.781	0.675	9.692	4.379	3.625	ug/mi
pre-87	CRUISE	E-dimethylphenanthrene	3	36.576	5.626	60.990	43.111	23.070	ug/mi
pre-87	CRUISE	E-trimethylnaphthalene	4	178.253	14.629	408.384	144.999	160.240	ug/mi
pre-87	CRUISE	F-trimethylnaphthalene	4	156.738	15.754	346.224	132.488	133.728	ug/mi
pre-87	CRUISE	J-trimethylnaphthalene	4	37.870	7.202	71.851	36.214	27.375	ug/mi
pre-87	CRUISE	perinaphthenone	3	238.331	26.331	477.118	211.544	185.005	ug/mi
pre-87	CRUISE	perylene	3	11.251	0.225	22.725	10.803	9.191	ug/mi
pre-87	CRUISE	retene	4	4.730	1.800	7.427	4.846	2.079	ug/mi
pre-87	TRANS	1+2-ethylnaphthalene	2	110.250	18.200	202.300	110.250	92.050	ug/mi
pre-87	TRANS	1,2-dimethylnaphthalene	2	43.000	8.700	77.300	43.000	34.300	ug/mi
pre-87	TRANS	1,3+1,6+1,7-dimethylnaphthalene	2	315.300	70.300	560.300	315.300	245.000	ug/mi
pre-87	TRANS	1,4+1,5+2,3-dimethylnaphthalene	2	84.650	19.500	149.800	84.650	65.150	ug/mi
pre-87	TRANS	1,4,5-trimethylnaphthalene	2	6.550	2.000	11.100	6.550	4.550	ug/mi
pre-87	TRANS	1,7-dimethylphenanthrene	1	0.700	0.700	0.700	0.700	0.000	ug/mi
pre-87	TRANS	1-ethyl-2-methylnaphthalene	2	42.450	16.300	68.600	42.450	26.150	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	1-methylfluorene	2	16.200	3.600	28.800	16.200	12.600	ug/mi
pre-87	TRANS	1-methylnaphthalene	2	365.550	74.900	656.200	365.550	290.650	ug/mi
pre-87	TRANS	1-methylphenanthrene	2	17.750	4.400	31.100	17.750	13.350	ug/mi
pre-87	TRANS	1-methylpyrene	2	15.250	5.700	24.800	15.250	9.550	ug/mi
pre-87	TRANS	2,3,5+I-trimethylnaphthalene	2	19.200	9.000	29.400	19.200	10.200	ug/mi
pre-87	TRANS	2,4,5-trimethylnaphthalene	2	10.150	3.200	17.100	10.150	6.950	ug/mi
pre-87	TRANS	2,6+2,7-dimethylnaphthalene	2	137.150	30.500	243.800	137.150	106.650	ug/mi
pre-87	TRANS	2-ethyl-1-methylnaphthalene	1	0.300	0.300	0.300	0.300	0.000	ug/mi
pre-87	TRANS	2-methylbiphenyl	1	82.100	82.100	82.100	82.100	0.000	ug/mi
pre-87	TRANS	2-methylnaphthalene	2	539.350	115.200	963.500	539.350	424.150	ug/mi
pre-87	TRANS	2-methylphenanthrene	2	34.950	8.300	61.600	34.950	26.650	ug/mi
pre-87	TRANS	3,6-dimethylphenanthrene	2	9.950	2.700	17.200	9.950	7.250	ug/mi
pre-87	TRANS	3-methylbiphenyl	1	177.700	177.700	177.700	177.700	0.000	ug/mi
pre-87	TRANS	4-methylbiphenyl	1	78.100	78.100	78.100	78.100	0.000	ug/mi
pre-87	TRANS	4-methylpyrene	2	23.350	8.700	38.000	23.350	14.650	ug/mi
pre-87	TRANS	5+6-methylchrysene	1	0.200	0.200	0.200	0.200	0.000	ug/mi
pre-87	TRANS	7-methylbenzo[a]pyrene	1	0.500	0.500	0.500	0.500	0.000	ug/mi
pre-87	TRANS	9-methylanthracene	1	1.200	1.200	1.200	1.200	0.000	ug/mi
pre-87	TRANS	A-dimethylphenanthrene	2	11.950	3.600	20.300	11.950	8.350	ug/mi
pre-87	TRANS	A-methylfluorene	2	16.050	4.700	27.400	16.050	11.350	ug/mi
pre-87	TRANS	A-trimethylnaphthalene	2	44.100	13.700	74.500	44.100	30.400	ug/mi
pre-87	TRANS	acenaphthenequinone	1	3.100	3.100	3.100	3.100	0.000	ug/mi
pre-87	TRANS	B-dimethylphenanthrene	2	6.100	1.800	10.400	6.100	4.300	ug/mi
pre-87	TRANS	B-methylfluorene	2	4.400	0.500	8.300	4.400	3.900	ug/mi
pre-87	TRANS	B-trimethylnaphthalene	2	38.800	11.900	65.700	38.800	26.900	ug/mi
pre-87	TRANS	benzonaphthothiophene	2	2.000	1.200	2.800	2.000	0.800	ug/mi
pre-87	TRANS	benzo[bkj]fluoranthene	2	3.800	3.000	4.600	3.800	0.800	ug/mi
pre-87	TRANS	benzo[e]pyrene	2	21.600	2.500	40.700	21.600	19.100	ug/mi
pre-87	TRANS	biphenyl	2	102.350	26.800	177.900	102.350	75.550	ug/mi
pre-87	TRANS	C-dimethylphenanthrene	2	22.550	7.300	37.800	22.550	15.250	ug/mi
pre-87	TRANS	C-trimethylnaphthalene	2	38.950	13.500	64.400	38.950	25.450	ug/mi
pre-87	TRANS	coronene	1	12.800	12.800	12.800	12.800	0.000	ug/mi
pre-87	TRANS	D-dimethylphenanthrene	2	8.750	4.000	13.500	8.750	4.750	ug/mi
pre-87	TRANS	D-MePy/MeFl	2	22.200	8.100	36.300	22.200	14.100	ug/mi
pre-87	TRANS	Dibenzofuran	2	25.000	7.500	42.500	25.000	17.500	ug/mi
pre-87	TRANS	E-dimethylphenanthrene	1	13.700	13.700	13.700	13.700	0.000	ug/mi
pre-87	TRANS	E-trimethylnaphthalene	2	26.150	7.100	45.200	26.150	19.050	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	F-trimethylnaphthalene	2	20.050	6.800	33.300	20.050	13.250	ug/mi
pre-87	TRANS	J-trimethylnaphthalene	2	14.950	5.100	24.800	14.950	9.850	ug/mi
pre-87	TRANS	perinaphthenone	2	61.050	24.300	97.800	61.050	36.750	ug/mi
pre-87	TRANS	perylene	1	0.200	0.200	0.200	0.200	0.000	ug/mi
pre-87	TRANS	retene	1	1.900	1.900	1.900	1.900	0.000	ug/mi
87-90	FTP	1+2-ethylnaphthalene	4	80.000	20.000	130.000	85.000	50.498	ug/mi
87-90	FTP	1,2-dimethylnaphthalene	4	45.000	10.000	80.000	45.000	26.926	ug/mi
87-90	FTP	1,4+1,5+2,3-dimethylnaphthalene	4	85.000	10.000	200.000	65.000	72.284	ug/mi
87-90	FTP	1,4,5-trimethylnaphthalene	3	13.333	10.000	20.000	10.000	4.714	ug/mi
87-90	FTP	1,7-dimethylphenanthrene	4	17.500	10.000	30.000	15.000	8.292	ug/mi
87-90	FTP	1-ethyl-2-methylnaphthalene	3	13.333	10.000	20.000	10.000	4.714	ug/mi
87-90	FTP	1-methylfluorene	4	27.500	10.000	40.000	30.000	12.990	ug/mi
87-90	FTP	1-methylnaphthalene	4	712.500	170.000	1320.000	680.000	492.360	ug/mi
87-90	FTP	1-methylphenanthrene	4	22.500	10.000	40.000	20.000	10.897	ug/mi
87-90	FTP	1-methylpyrene	3	16.667	10.000	20.000	20.000	4.714	ug/mi
87-90	FTP	2,4,5-trimethylnaphthalene	3	30.000	10.000	50.000	30.000	16.330	ug/mi
87-90	FTP	2,6+2,7-dimethylnaphthalene	4	107.500	20.000	250.000	80.000	88.424	ug/mi
87-90	FTP	2-ethyl-1-methylnaphthalene	1	10.000	10.000	10.000	10.000	0.000	ug/mi
87-90	FTP	2-methylbiphenyl	4	205.000	110.000	340.000	185.000	87.321	ug/mi
87-90	FTP	2-methylnaphthalene	4	477.500	40.000	920.000	475.000	386.806	ug/mi
87-90	FTP	2-methylphenanthrene	4	42.500	20.000	80.000	35.000	22.776	ug/mi
87-90	FTP	2-phenylnaphthalene	2	10.000	10.000	10.000	10.000	0.000	ug/mi
87-90	FTP	3,6-dimethylphenanthrene	4	15.000	10.000	30.000	10.000	8.660	ug/mi
87-90	FTP	3-methylbiphenyl	4	345.000	140.000	590.000	325.000	163.478	ug/mi
87-90	FTP	4-methylbiphenyl	4	165.000	80.000	250.000	165.000	62.650	ug/mi
87-90	FTP	4-methylpyrene	3	26.667	10.000	40.000	30.000	12.472	ug/mi
87-90	FTP	A-dimethylphenanthrene	4	15.000	10.000	30.000	10.000	8.660	ug/mi
87-90	FTP	A-methylfluorene	4	25.000	10.000	40.000	25.000	11.180	ug/mi
87-90	FTP	A-trimethylnaphthalene	4	90.000	20.000	200.000	70.000	67.082	ug/mi
87-90	FTP	acenaphthenequinone	2	10.000	10.000	10.000	10.000	0.000	ug/mi
87-90	FTP	B-dimethylphenanthrene	3	13.333	10.000	20.000	10.000	4.714	ug/mi
87-90	FTP	B-methylfluorene	3	10.000	10.000	10.000	10.000	0.000	ug/mi
87-90	FTP	B-trimethylnaphthalene	4	90.000	20.000	200.000	70.000	66.708	ug/mi
87-90	FTP	benzo[a]fluorene	2	2.719	1.834	3.604	2.719	0.885	ug/mi
87-90	FTP	benzo[bkj]fluoranthene	2	40.000	40.000	40.000	40.000	0.000	ug/mi
87-90	FTP	benzo[b]fluorene	2	1.167	0.821	1.512	1.167	0.346	ug/mi
87-90	FTP	benzo[e]pyrene	1	10.000	10.000	10.000	10.000	0.000	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	FTP	biphenyl	4	165.000	30.000	350.000	140.000	128.938	ug/mi
87-90	FTP	C-dimethylphenanthrene	4	30.000	10.000	60.000	25.000	18.708	ug/mi
87-90	FTP	C-trimethylnaphthalene	4	75.000	10.000	180.000	55.000	63.443	ug/mi
87-90	FTP	coronene	2	15.000	10.000	20.000	15.000	5.000	ug/mi
87-90	FTP	D-dimethylphenanthrene	1	20.000	20.000	20.000	20.000	0.000	ug/mi
87-90	FTP	E-dimethylphenanthrene	3	13.333	10.000	20.000	10.000	4.714	ug/mi
87-90	FTP	E-trimethylnaphthalene	4	52.500	10.000	130.000	35.000	46.030	ug/mi
87-90	FTP	F-trimethylnaphthalene	3	56.667	30.000	110.000	30.000	37.712	ug/mi
87-90	FTP	J-trimethylnaphthalene	4	27.500	10.000	50.000	25.000	14.790	ug/mi
87-90	FTP	perinaphthenone	2	10.000	10.000	10.000	10.000	0.000	ug/mi
91-93	FTP	1+2-ethylnaphthalene	2	1205.000	370.000	2040.000	1205.000	835.000	ug/mi
91-93	FTP	1,2-dimethylnaphthalene	3	323.333	20.000	800.000	150.000	341.207	ug/mi
91-93	FTP	1,3+1,6+1,7-dimethylnaphthalene	1	165.000	165.000	165.000	165.000	0.000	ug/mi
91-93	FTP	1,4+1,5+2,3-dimethylnaphthalene	3	925.667	57.000	2340.000	380.000	1008.741	ug/mi
91-93	FTP	1,4,5-trimethylnaphthalene	2	70.000	10.000	130.000	70.000	60.000	ug/mi
91-93	FTP	1,7-dimethylphenanthrene	3	145.000	5.000	380.000	50.000	167.183	ug/mi
91-93	FTP	1,8-dimethylnaphthalene	1	1.000	1.000	1.000	1.000	0.000	ug/mi
91-93	FTP	1-ethyl-2-methylnaphthalene	3	57.000	11.000	130.000	30.000	52.198	ug/mi
91-93	FTP	1-methylfluorene	3	193.333	10.000	500.000	70.000	218.225	ug/mi
91-93	FTP	1-methylnaphthalene	3	3736.667	110.000	9590.000	1510.000	4178.208	ug/mi
91-93	FTP	1-methylphenanthrene	3	163.667	11.000	410.000	70.000	175.841	ug/mi
91-93	FTP	1-methylpyrene	2	180.000	120.000	240.000	180.000	60.000	ug/mi
91-93	FTP	2,4,5-trimethylnaphthalene	2	220.000	60.000	380.000	220.000	160.000	ug/mi
91-93	FTP	2,6+2,7-dimethylnaphthalene	3	1779.333	78.000	4580.000	680.000	1995.562	ug/mi
91-93	FTP	2-ethyl-1-methylnaphthalene	3	18.000	4.000	40.000	10.000	15.748	ug/mi
91-93	FTP	2-methylbiphenyl	3	369.333	8.000	580.000	520.000	256.673	ug/mi
91-93	FTP	2-methylnaphthalene	5	1850.309	0.448	7800.000	138.000	3015.193	ug/mi
91-93	FTP	2-methylphenanthrene	3	212.000	16.000	520.000	100.000	220.472	ug/mi
91-93	FTP	2-phenylnaphthalene	1	10.000	10.000	10.000	10.000	0.000	ug/mi
91-93	FTP	3,6-dimethylphenanthrene	3	74.333	3.000	190.000	30.000	82.528	ug/mi
91-93	FTP	3-methylbiphenyl	3	1476.333	69.000	3160.000	1200.000	1276.934	ug/mi
91-93	FTP	4-methylbiphenyl	3	664.667	24.000	1460.000	510.000	596.359	ug/mi
91-93	FTP	4-methylpyrene	2	185.000	30.000	340.000	185.000	155.000	ug/mi
91-93	FTP	7-methylbenz[a]anthracene	1	10.000	10.000	10.000	10.000	0.000	ug/mi
91-93	FTP	9-methylanthracene	1	2.000	2.000	2.000	2.000	0.000	ug/mi
91-93	FTP	A-dimethylphenanthrene	3	94.333	3.000	240.000	40.000	104.104	ug/mi
91-93	FTP	A-methylfluorene	3	170.000	10.000	420.000	80.000	179.072	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	FTP	A-trimethylnaphthalene	3	748.000	34.000	1800.000	410.000	759.549	ug/mi
91-93	FTP	acenaphthenequinone	2	135.000	30.000	240.000	135.000	105.000	ug/mi
91-93	FTP	B-dimethylphenanthrene	3	47.333	2.000	120.000	20.000	51.906	ug/mi
91-93	FTP	B-methylfluorene	3	57.667	3.000	140.000	30.000	59.253	ug/mi
91-93	FTP	B-trimethylnaphthalene	3	608.667	46.000	1460.000	320.000	612.288	ug/mi
91-93	FTP	benzo[a]fluorene	4	0.724	0.241	1.110	0.772	0.313	ug/mi
91-93	FTP	benzo[bkj]fluoranthene	3	12.000	6.000	20.000	10.000	5.888	ug/mi
91-93	FTP	benzo[b]fluorene	4	0.253	0.097	0.434	0.241	0.120	ug/mi
91-93	FTP	benzo[e]pyrene	3	3.232	1.962	4.734	3.000	1.143	ug/mi
91-93	FTP	biphenyl	3	934.333	93.000	2150.000	560.000	880.495	ug/mi
91-93	FTP	C-dimethylphenanthrene	3	276.667	10.000	730.000	90.000	322.215	ug/mi
91-93	FTP	C-trimethylnaphthalene	3	557.000	61.000	1340.000	270.000	560.201	ug/mi
91-93	FTP	D-dimethylphenanthrene	3	91.000	3.000	240.000	30.000	105.934	ug/mi
91-93	FTP	Dibenzofuran	2	0.397	0.297	0.496	0.397	0.100	ug/mi
91-93	FTP	E-dimethylphenanthrene	3	84.333	3.000	220.000	30.000	96.562	ug/mi
91-93	FTP	E-trimethylnaphthalene	3	361.000	43.000	850.000	190.000	350.944	ug/mi
91-93	FTP	F-trimethylnaphthalene	3	314.333	33.000	750.000	160.000	312.395	ug/mi
91-93	FTP	indeno[123-cd]fluoranthene	1	0.308	0.308	0.308	0.308	0.000	ug/mi
91-93	FTP	J-trimethylnaphthalene	2	345.000	100.000	590.000	345.000	245.000	ug/mi
91-93	FTP	perinaphthenone	2	65.000	30.000	100.000	65.000	35.000	ug/mi
91-93	FTP	retene	2	25.000	10.000	40.000	25.000	15.000	ug/mi
91-93	TRANS	benzo[bkj]fluoranthene	1	3.060	3.060	3.060	3.060	0.000	ug/mi
91-93	TRANS	benzo[e]pyrene	1	2.020	2.020	2.020	2.020	0.000	ug/mi
91-93	TRANS	chrysene+triphenylene	1	6.010	6.010	6.010	6.010	0.000	ug/mi
91-93	TRANS	coronene	1	0.990	0.990	0.990	0.990	0.000	ug/mi
91-93	TRANS	dibenz[ah+ac]anthracene	1	0.130	0.130	0.130	0.130	0.000	ug/mi
94-95	FTP	benzo[e]pyrene	1	8.956	8.956	8.956	8.956	0.000	ug/mi
94-95	FTP	indeno[123-cd]fluoranthene	1	3.806	3.806	3.806	3.806	0.000	ug/mi
98-03	FTP	1+2-ethylnaphthalene	11	38.545	10.000	60.000	30.000	17.143	ug/mi
98-03	FTP	1,2-dimethylnaphthalene	10	11.800	5.000	30.000	10.000	6.337	ug/mi
98-03	FTP	1,3+1,6+1,7-dimethylnaphthalene	13	105.769	40.000	350.000	80.000	78.564	ug/mi
98-03	FTP	1,4+1,5+2,3-dimethylnaphthalene	13	32.462	10.000	100.000	20.000	23.715	ug/mi
98-03	FTP	1,4,5-trimethylnaphthalene	2	15.000	10.000	20.000	15.000	5.000	ug/mi
98-03	FTP	1,7-dimethylphenanthrene	1	10.000	10.000	10.000	10.000	0.000	ug/mi
98-03	FTP	1-ethyl-2-methylnaphthalene	4	37.500	10.000	80.000	30.000	26.810	ug/mi
98-03	FTP	1-methylfluorene	3	23.333	20.000	30.000	20.000	4.714	ug/mi
98-03	FTP	1-methylnaphthalene	13	144.846	40.000	320.000	130.000	76.981	ug/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	FTP	1-methylphenanthrene	2	10.000	10.000	10.000	10.000	0.000	ug/mi
98-03	FTP	1-methylpyrene	2	15.000	10.000	20.000	15.000	5.000	ug/mi
98-03	FTP	2,4,5-trimethylnaphthalene	2	15.000	10.000	20.000	15.000	5.000	ug/mi
98-03	FTP	2,6+2,7-dimethylnaphthalene	13	76.231	20.000	180.000	60.000	48.151	ug/mi
98-03	FTP	2-methylbiphenyl	2	20.000	10.000	30.000	20.000	10.000	ug/mi
98-03	FTP	2-methylnaphthalene	13	297.077	70.000	560.000	250.000	158.522	ug/mi
98-03	FTP	2-methylphenanthrene	3	20.000	10.000	30.000	20.000	8.165	ug/mi
98-03	FTP	3,6-dimethylphenanthrene	1	10.000	10.000	10.000	10.000	0.000	ug/mi
98-03	FTP	3-methylbiphenyl	2	85.000	50.000	120.000	85.000	35.000	ug/mi
98-03	FTP	4-methylbiphenyl	2	40.000	20.000	60.000	40.000	20.000	ug/mi
98-03	FTP	4-methylpyrene	3	20.000	10.000	30.000	20.000	8.165	ug/mi
98-03	FTP	A-dimethylphenanthrene	2	10.000	10.000	10.000	10.000	0.000	ug/mi
98-03	FTP	A-methylfluorene	3	20.000	20.000	20.000	20.000	0.000	ug/mi
98-03	FTP	A-trimethylnaphthalene	3	50.000	10.000	100.000	40.000	37.417	ug/mi
98-03	FTP	acenaphthenequinone	2	25.000	20.000	30.000	25.000	5.000	ug/mi
98-03	FTP	B-dimethylphenanthrene	1	10.000	10.000	10.000	10.000	0.000	ug/mi
98-03	FTP	B-methylfluorene	3	33.333	20.000	40.000	40.000	9.428	ug/mi
98-03	FTP	B-trimethylnaphthalene	3	36.667	10.000	70.000	30.000	24.944	ug/mi
98-03	FTP	biphenyl	13	40.154	10.000	100.000	40.000	23.550	ug/mi
98-03	FTP	C-dimethylphenanthrene	3	16.667	10.000	20.000	20.000	4.714	ug/mi
98-03	FTP	C-trimethylnaphthalene	3	36.667	10.000	70.000	30.000	24.944	ug/mi
98-03	FTP	D-dimethylphenanthrene	3	10.000	10.000	10.000	10.000	0.000	ug/mi
98-03	FTP	E-dimethylphenanthrene	3	13.333	10.000	20.000	10.000	4.714	ug/mi
98-03	FTP	E-trimethylnaphthalene	3	23.333	10.000	40.000	20.000	12.472	ug/mi
98-03	FTP	F-trimethylnaphthalene	2	25.000	10.000	40.000	25.000	15.000	ug/mi
98-03	FTP	J-trimethylnaphthalene	3	16.667	10.000	30.000	10.000	9.428	ug/mi
98-03	FTP	perinaphthenone	3	23.333	10.000	40.000	20.000	12.472	ug/mi
98-03	TRANS	1-methylpyrene	2	1.765	1.460	2.070	1.765	0.305	ug/mi
98-03	TRANS	7-methylbenz[a]anthracene	1	0.630	0.630	0.630	0.630	0.000	ug/mi
98-03	TRANS	benzo[a]fluorene	2	0.960	0.680	1.240	0.960	0.280	ug/mi
98-03	TRANS	benzo[b]fluorene	2	0.725	0.710	0.740	0.725	0.015	ug/mi
98-03	TRANS	benzo[e]pyrene	2	0.525	0.440	0.610	0.525	0.085	ug/mi
98-03	TRANS	benzo[ghi]fluoranthene	2	0.990	0.960	1.020	0.990	0.030	ug/mi
98-03	TRANS	Dibenzothiophene	2	14.100	13.700	14.500	14.100	0.400	ug/mi

Total records	290
Total with 1 record	35
Total with 2 records	75
Max number of records	24
Total with max number of records	1

Table B-11c. Other PAH Compounds, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	1+2-ethylnaphthalene	1	283.904	283.904	283.904	283.904	0.000	ug/hph
pre-87	CRUISE	1,2-dimethylnaphthalene	1	86.892	86.892	86.892	86.892	0.000	ug/hph
pre-87	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	1	912.399	912.399	912.399	912.399	0.000	ug/hph
pre-87	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	1	245.731	245.731	245.731	245.731	0.000	ug/hph
pre-87	CRUISE	1,4,5-trimethylnaphthalene	1	48.590	48.590	48.590	48.590	0.000	ug/hph
pre-87	CRUISE	1,7-dimethylphenanthrene	1	14.105	14.105	14.105	14.105	0.000	ug/hph
pre-87	CRUISE	1-ethyl-2-methylnaphthalene	1	106.237	106.237	106.237	106.237	0.000	ug/hph
pre-87	CRUISE	1-methylfluorene	1	37.914	37.914	37.914	37.914	0.000	ug/hph
pre-87	CRUISE	1-methylnaphthalene	1	989.457	989.457	989.457	989.457	0.000	ug/hph
pre-87	CRUISE	1-methylphenanthrene	1	22.516	22.516	22.516	22.516	0.000	ug/hph
pre-87	CRUISE	1-methylpyrene	1	32.350	32.350	32.350	32.350	0.000	ug/hph
pre-87	CRUISE	2,3,5+I-trimethylnaphthalene	1	88.510	88.510	88.510	88.510	0.000	ug/hph
pre-87	CRUISE	2,4,5-trimethylnaphthalene	1	11.581	11.581	11.581	11.581	0.000	ug/hph
pre-87	CRUISE	2,6+2,7-dimethylnaphthalene	1	406.510	406.510	406.510	406.510	0.000	ug/hph
pre-87	CRUISE	2-ethyl-1-methylnaphthalene	1	17.404	17.404	17.404	17.404	0.000	ug/hph
pre-87	CRUISE	2-methylbiphenyl	1	65.606	65.606	65.606	65.606	0.000	ug/hph
pre-87	CRUISE	2-methylnaphthalene	1	1569.881	1569.881	1569.881	1569.881	0.000	ug/hph
pre-87	CRUISE	2-methylphenanthrene	1	33.644	33.644	33.644	33.644	0.000	ug/hph
pre-87	CRUISE	3,6-dimethylphenanthrene	1	11.193	11.193	11.193	11.193	0.000	ug/hph
pre-87	CRUISE	3-methylbiphenyl	1	274.328	274.328	274.328	274.328	0.000	ug/hph
pre-87	CRUISE	4-methylbiphenyl	1	116.784	116.784	116.784	116.784	0.000	ug/hph
pre-87	CRUISE	4-methylpyrene	1	64.247	64.247	64.247	64.247	0.000	ug/hph
pre-87	CRUISE	7-methylbenz[a]anthracene	1	0.647	0.647	0.647	0.647	0.000	ug/hph
pre-87	CRUISE	7-methylbenzo[a]pyrene	1	0.971	0.971	0.971	0.971	0.000	ug/hph
pre-87	CRUISE	A-dimethylphenanthrene	1	12.811	12.811	12.811	12.811	0.000	ug/hph
pre-87	CRUISE	A-methylfluorene	1	37.655	37.655	37.655	37.655	0.000	ug/hph
pre-87	CRUISE	A-trimethylnaphthalene	1	139.558	139.558	139.558	139.558	0.000	ug/hph
pre-87	CRUISE	B-dimethylphenanthrene	1	6.147	6.147	6.147	6.147	0.000	ug/hph
pre-87	CRUISE	B-methylfluorene	1	9.187	9.187	9.187	9.187	0.000	ug/hph
pre-87	CRUISE	B-trimethylnaphthalene	1	110.055	110.055	110.055	110.055	0.000	ug/hph
pre-87	CRUISE	benzonaphthothiophene	1	5.952	5.952	5.952	5.952	0.000	ug/hph
pre-87	CRUISE	benzo[bkj]fluoranthene	1	3.106	3.106	3.106	3.106	0.000	ug/hph
pre-87	CRUISE	benzo[e]pyrene	1	4.400	4.400	4.400	4.400	0.000	ug/hph
pre-87	CRUISE	biphenyl	1	289.015	289.015	289.015	289.015	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	C-dimethylphenanthrene	1	32.674	32.674	32.674	32.674	0.000	ug/hph
pre-87	CRUISE	C-trimethylnaphthalene	1	112.384	112.384	112.384	112.384	0.000	ug/hph
pre-87	CRUISE	coronene	1	0.194	0.194	0.194	0.194	0.000	ug/hph
pre-87	CRUISE	D-dimethylphenanthrene	1	9.252	9.252	9.252	9.252	0.000	ug/hph
pre-87	CRUISE	D-MePy/MeFl	1	60.883	60.883	60.883	60.883	0.000	ug/hph
pre-87	CRUISE	Dibenzofuran	2	44.643	44.643	44.643	44.643	0.000	ug/hph
pre-87	CRUISE	dibenz[ah+ac]anthracene	1	0.065	0.065	0.065	0.065	0.000	ug/hph
pre-87	CRUISE	E-dimethylphenanthrene	1	12.034	12.034	12.034	12.034	0.000	ug/hph
pre-87	CRUISE	E-trimethylnaphthalene	1	83.269	83.269	83.269	83.269	0.000	ug/hph
pre-87	CRUISE	F-trimethylnaphthalene	1	58.877	58.877	58.877	58.877	0.000	ug/hph
pre-87	CRUISE	J-trimethylnaphthalene	1	34.938	34.938	34.938	34.938	0.000	ug/hph
pre-87	CRUISE	perinaphthenone	1	349.962	349.962	349.962	349.962	0.000	ug/hph
pre-87	CRUISE	retene	1	1.553	1.553	1.553	1.553	0.000	ug/hph
pre-87	TRANS	1+2-ethylnaphthalene	4	3365.726	607.857	8115.256	2369.896	2983.474	ug/hph
pre-87	TRANS	1,2-dimethylnaphthalene	4	1650.254	194.553	3755.964	1325.250	1452.170	ug/hph
pre-87	TRANS	1,3+1,6+1,7-dimethylnaphthalene	4	16391.017	2017.023	38007.886	12769.580	14476.674	ug/hph
pre-87	TRANS	1,4+1,5+2,3-dimethylnaphthalene	4	4249.512	568.972	9823.789	3302.644	3704.490	ug/hph
pre-87	TRANS	1,4,5-trimethylnaphthalene	4	1188.701	141.175	3815.488	399.070	1527.619	ug/hph
pre-87	TRANS	1,7-dimethylphenanthrene	4	158.709	74.405	294.256	133.088	83.785	ug/hph
pre-87	TRANS	1-ethyl-2-methylnaphthalene	4	1318.683	146.287	4123.784	502.331	1635.124	ug/hph
pre-87	TRANS	1-methylfluorene	4	1026.740	115.813	2910.012	540.569	1138.205	ug/hph
pre-87	TRANS	1-methylnaphthalene	4	8482.105	1756.087	18207.939	6982.198	6586.577	ug/hph
pre-87	TRANS	1-methylphenanthrene	4	435.965	46.002	1261.909	217.974	493.032	ug/hph
pre-87	TRANS	1-methylpyrene	4	86.649	66.835	108.955	85.404	15.476	ug/hph
pre-87	TRANS	2,3,5+I-trimethylnaphthalene	4	2799.488	251.036	8908.672	1019.122	3574.292	ug/hph
pre-87	TRANS	2,4,5-trimethylnaphthalene	4	225.188	30.021	669.904	100.414	262.082	ug/hph
pre-87	TRANS	2,6+2,7-dimethylnaphthalene	4	7893.174	930.127	18871.696	5885.436	7192.256	ug/hph
pre-87	TRANS	2-ethyl-1-methylnaphthalene	4	117.382	20.251	368.661	40.308	145.866	ug/hph
pre-87	TRANS	2-methylbiphenyl	4	356.335	203.546	563.666	329.064	130.645	ug/hph
pre-87	TRANS	2-methylnaphthalene	4	13894.374	2875.850	30101.028	11300.308	10831.367	ug/hph
pre-87	TRANS	2-methylphenanthrene	4	1087.186	63.665	3133.292	575.895	1232.342	ug/hph
pre-87	TRANS	3,6-dimethylphenanthrene	4	226.159	49.301	565.737	144.799	206.598	ug/hph
pre-87	TRANS	3-methylbiphenyl	4	3174.360	840.582	6549.516	2653.671	2196.473	ug/hph
pre-87	TRANS	4-methylbiphenyl	4	1427.832	381.859	2906.518	1211.475	967.865	ug/hph
pre-87	TRANS	4-methylpyrene	4	159.130	119.501	210.469	153.274	34.165	ug/hph
pre-87	TRANS	5+6-methylchrysene	3	1.618	0.453	2.653	1.747	0.903	ug/hph
pre-87	TRANS	7-methylbenz[a]anthracene	3	1.488	0.259	3.364	0.841	1.348	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	7-methylbenzo[a]pyrene	3	13.932	0.194	40.632	0.971	18.882	ug/hph
pre-87	TRANS	A-dimethylphenanthrene	4	230.688	51.695	553.444	158.806	200.796	ug/hph
pre-87	TRANS	A-methylfluorene	4	1174.370	91.680	3140.344	732.728	1224.953	ug/hph
pre-87	TRANS	A-trimethylnaphthalene	4	3497.197	380.954	10954.357	1326.738	4360.716	ug/hph
pre-87	TRANS	B-dimethylphenanthrene	4	120.520	23.874	283.710	87.248	103.057	ug/hph
pre-87	TRANS	B-methylfluorene	4	253.495	5.111	695.331	156.768	273.676	ug/hph
pre-87	TRANS	B-trimethylnaphthalene	4	2734.982	331.846	8395.472	1106.305	3314.812	ug/hph
pre-87	TRANS	benzonaphthothiophene	3	30.689	4.788	67.417	19.863	26.690	ug/hph
pre-87	TRANS	benzo[bkj]fluoranthene	2	2.976	2.459	3.494	2.976	0.518	ug/hph
pre-87	TRANS	benzo[e]pyrene	3	8.389	3.559	15.852	5.758	5.352	ug/hph
pre-87	TRANS	biphenyl	4	2069.138	626.167	3944.241	1853.073	1268.951	ug/hph
pre-87	TRANS	C-dimethylphenanthrene	4	505.825	135.999	1191.839	347.730	418.982	ug/hph
pre-87	TRANS	C-trimethylnaphthalene	4	2707.388	338.446	8375.350	1057.877	3317.231	ug/hph
pre-87	TRANS	coronene	2	2.200	0.324	4.076	2.200	1.876	ug/hph
pre-87	TRANS	D-dimethylphenanthrene	4	86.423	41.732	128.688	87.636	37.602	ug/hph
pre-87	TRANS	D-MePy/MeFl	4	143.246	94.591	197.335	140.528	37.829	ug/hph
pre-87	TRANS	Dibenzofuran	8	611.803	133.476	1483.442	415.148	535.431	ug/hph
pre-87	TRANS	dibenz[ah+ac]anthracene	2	1.520	1.294	1.747	1.520	0.226	ug/hph
pre-87	TRANS	E-dimethylphenanthrene	3	79.775	35.132	140.140	64.053	44.287	ug/hph
pre-87	TRANS	E-trimethylnaphthalene	4	1767.167	233.761	5487.272	673.818	2173.553	ug/hph
pre-87	TRANS	F-trimethylnaphthalene	4	1815.579	181.936	5741.219	669.580	2294.583	ug/hph
pre-87	TRANS	J-trimethylnaphthalene	4	807.116	116.654	2508.031	301.890	991.160	ug/hph
pre-87	TRANS	perinaphthenone	4	510.952	316.383	716.358	505.533	143.137	ug/hph
pre-87	TRANS	perylene	1	0.194	0.194	0.194	0.194	0.000	ug/hph
pre-87	TRANS	retene	1	11.452	11.452	11.452	11.452	0.000	ug/hph
87-90	CRUISE	1+2-ethylnaphthalene	1	801.061	801.061	801.061	801.061	0.000	ug/hph
87-90	CRUISE	1,2-dimethylnaphthalene	1	63.602	63.602	63.602	63.602	0.000	ug/hph
87-90	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	1	655.555	655.555	655.555	655.555	0.000	ug/hph
87-90	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	1	179.968	179.968	179.968	179.968	0.000	ug/hph
87-90	CRUISE	1,4,5-trimethylnaphthalene	1	335.598	335.598	335.598	335.598	0.000	ug/hph
87-90	CRUISE	1,7-dimethylphenanthrene	1	12.850	12.850	12.850	12.850	0.000	ug/hph
87-90	CRUISE	1-ethyl-2-methylnaphthalene	1	148.816	148.816	148.816	148.816	0.000	ug/hph
87-90	CRUISE	1-methylfluorene	1	37.188	37.188	37.188	37.188	0.000	ug/hph
87-90	CRUISE	1-methylnaphthalene	1	518.940	518.940	518.940	518.940	0.000	ug/hph
87-90	CRUISE	1-methylphenanthrene	1	23.689	23.689	23.689	23.689	0.000	ug/hph
87-90	CRUISE	1-methylpyrene	1	44.651	44.651	44.651	44.651	0.000	ug/hph
87-90	CRUISE	2,3,5+I-trimethylnaphthalene	1	123.829	123.829	123.829	123.829	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	CRUISE	2,4,5-trimethylnaphthalene	1	18.951	18.951	18.951	18.951	0.000	ug/hph
87-90	CRUISE	2,6+2,7-dimethylnaphthalene	1	261.807	261.807	261.807	261.807	0.000	ug/hph
87-90	CRUISE	2-ethyl-1-methylnaphthalene	1	650.817	650.817	650.817	650.817	0.000	ug/hph
87-90	CRUISE	2-methylnaphthalene	1	827.410	827.410	827.410	827.410	0.000	ug/hph
87-90	CRUISE	3,6-dimethylphenanthrene	1	14.862	14.862	14.862	14.862	0.000	ug/hph
87-90	CRUISE	4-methylbiphenyl	1	160.368	160.368	160.368	160.368	0.000	ug/hph
87-90	CRUISE	4-methylpyrene	1	66.977	66.977	66.977	66.977	0.000	ug/hph
87-90	CRUISE	7-methylbenzo[a]pyrene	1	39.914	39.914	39.914	39.914	0.000	ug/hph
87-90	CRUISE	A-dimethylphenanthrene	1	6.101	6.101	6.101	6.101	0.000	ug/hph
87-90	CRUISE	A-methylfluorene	1	103.516	103.516	103.516	103.516	0.000	ug/hph
87-90	CRUISE	A-trimethylnaphthalene	1	127.204	127.204	127.204	127.204	0.000	ug/hph
87-90	CRUISE	B-methylfluorene	1	35.825	35.825	35.825	35.825	0.000	ug/hph
87-90	CRUISE	B-trimethylnaphthalene	1	108.902	108.902	108.902	108.902	0.000	ug/hph
87-90	CRUISE	benzonaphthothiophene	1	18.237	18.237	18.237	18.237	0.000	ug/hph
87-90	CRUISE	biphenyl	1	162.380	162.380	162.380	162.380	0.000	ug/hph
87-90	CRUISE	C-dimethylphenanthrene	1	37.188	37.188	37.188	37.188	0.000	ug/hph
87-90	CRUISE	C-trimethylnaphthalene	1	142.066	142.066	142.066	142.066	0.000	ug/hph
87-90	CRUISE	D-dimethylphenanthrene	1	4.089	4.089	4.089	4.089	0.000	ug/hph
87-90	CRUISE	D-MePy/MeFl	1	51.401	51.401	51.401	51.401	0.000	ug/hph
87-90	CRUISE	Dibenzofuran	2	143.429	143.429	143.429	143.429	0.000	ug/hph
87-90	CRUISE	E-dimethylphenanthrene	1	10.838	10.838	10.838	10.838	0.000	ug/hph
87-90	CRUISE	E-trimethylnaphthalene	1	75.803	75.803	75.803	75.803	0.000	ug/hph
87-90	CRUISE	F-trimethylnaphthalene	1	72.364	72.364	72.364	72.364	0.000	ug/hph
87-90	CRUISE	J-trimethylnaphthalene	1	80.541	80.541	80.541	80.541	0.000	ug/hph
87-90	CRUISE	perinaphthenone	1	303.797	303.797	303.797	303.797	0.000	ug/hph
87-90	TRANS	1+2-ethylnaphthalene	1	1851.208	1851.208	1851.208	1851.208	0.000	ug/hph
87-90	TRANS	1,2-dimethylnaphthalene	1	172.699	172.699	172.699	172.699	0.000	ug/hph
87-90	TRANS	1,3+1,6+1,7-dimethylnaphthalene	1	1901.246	1901.246	1901.246	1901.246	0.000	ug/hph
87-90	TRANS	1,4+1,5+2,3-dimethylnaphthalene	1	555.220	555.220	555.220	555.220	0.000	ug/hph
87-90	TRANS	1,4,5-trimethylnaphthalene	1	117.794	117.794	117.794	117.794	0.000	ug/hph
87-90	TRANS	1,7-dimethylphenanthrene	1	35.500	35.500	35.500	35.500	0.000	ug/hph
87-90	TRANS	1-ethyl-2-methylnaphthalene	1	142.001	142.001	142.001	142.001	0.000	ug/hph
87-90	TRANS	1-methylnaphthalene	1	1454.214	1454.214	1454.214	1454.214	0.000	ug/hph
87-90	TRANS	1-methylphenanthrene	1	61.331	61.331	61.331	61.331	0.000	ug/hph
87-90	TRANS	1-methylpyrene	1	122.661	122.661	122.661	122.661	0.000	ug/hph
87-90	TRANS	2,3,5+I-trimethylnaphthalene	1	317.945	317.945	317.945	317.945	0.000	ug/hph
87-90	TRANS	2,4,5-trimethylnaphthalene	1	51.660	51.660	51.660	51.660	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	TRANS	2,6+2,7-dimethylnaphthalene	1	769.844	769.844	769.844	769.844	0.000	ug/hph
87-90	TRANS	2-ethyl-1-methylnaphthalene	1	642.380	642.380	642.380	642.380	0.000	ug/hph
87-90	TRANS	2-methylnaphthalene	1	2193.360	2193.360	2193.360	2193.360	0.000	ug/hph
87-90	TRANS	2-methylphenanthrene	1	96.831	96.831	96.831	96.831	0.000	ug/hph
87-90	TRANS	4-methylpyrene	1	146.869	146.869	146.869	146.869	0.000	ug/hph
87-90	TRANS	7-methylbenzo[a]pyrene	1	66.198	66.198	66.198	66.198	0.000	ug/hph
87-90	TRANS	A-dimethylphenanthrene	1	11.293	11.293	11.293	11.293	0.000	ug/hph
87-90	TRANS	A-methylfluorene	1	209.822	209.822	209.822	209.822	0.000	ug/hph
87-90	TRANS	A-trimethylnaphthalene	1	330.860	330.860	330.860	330.860	0.000	ug/hph
87-90	TRANS	B-dimethylphenanthrene	1	22.585	22.585	22.585	22.585	0.000	ug/hph
87-90	TRANS	B-trimethylnaphthalene	1	306.653	306.653	306.653	306.653	0.000	ug/hph
87-90	TRANS	benzonaphthothiophene	1	38.745	38.745	38.745	38.745	0.000	ug/hph
87-90	TRANS	biphenyl	1	140.444	140.444	140.444	140.444	0.000	ug/hph
87-90	TRANS	C-dimethylphenanthrene	1	64.576	64.576	64.576	64.576	0.000	ug/hph
87-90	TRANS	C-trimethylnaphthalene	1	366.361	366.361	366.361	366.361	0.000	ug/hph
87-90	TRANS	D-dimethylphenanthrene	1	33.878	33.878	33.878	33.878	0.000	ug/hph
87-90	TRANS	D-MePy/MeFl	1	117.794	117.794	117.794	117.794	0.000	ug/hph
87-90	TRANS	Dibenzofuran	2	142.001	142.001	142.001	142.001	0.000	ug/hph
87-90	TRANS	E-dimethylphenanthrene	1	20.963	20.963	20.963	20.963	0.000	ug/hph
87-90	TRANS	E-trimethylnaphthalene	1	192.039	192.039	192.039	192.039	0.000	ug/hph
87-90	TRANS	F-trimethylnaphthalene	1	195.284	195.284	195.284	195.284	0.000	ug/hph
87-90	TRANS	J-trimethylnaphthalene	1	171.076	171.076	171.076	171.076	0.000	ug/hph
87-90	TRANS	perinaphthenone	1	711.758	711.758	711.758	711.758	0.000	ug/hph
94-95	CRUISE	1+2-ethylnaphthalene	1	82.896	82.896	82.896	82.896	0.000	ug/hph
94-95	CRUISE	1,2-dimethylnaphthalene	1	26.928	26.928	26.928	26.928	0.000	ug/hph
94-95	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	1	191.070	191.070	191.070	191.070	0.000	ug/hph
94-95	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	1	49.500	49.500	49.500	49.500	0.000	ug/hph
94-95	CRUISE	1,4,5-trimethylnaphthalene	1	574.860	574.860	574.860	574.860	0.000	ug/hph
94-95	CRUISE	1,7-dimethylphenanthrene	1	11.814	11.814	11.814	11.814	0.000	ug/hph
94-95	CRUISE	1-methylfluorene	1	10.230	10.230	10.230	10.230	0.000	ug/hph
94-95	CRUISE	1-methylnaphthalene	1	171.732	171.732	171.732	171.732	0.000	ug/hph
94-95	CRUISE	1-methylphenanthrene	1	93.654	93.654	93.654	93.654	0.000	ug/hph
94-95	CRUISE	1-methylpyrene	1	1.056	1.056	1.056	1.056	0.000	ug/hph
94-95	CRUISE	2,3,5+I-trimethylnaphthalene	1	54.384	54.384	54.384	54.384	0.000	ug/hph
94-95	CRUISE	2,4,5-trimethylnaphthalene	1	1.584	1.584	1.584	1.584	0.000	ug/hph
94-95	CRUISE	2,6+2,7-dimethylnaphthalene	1	88.836	88.836	88.836	88.836	0.000	ug/hph
94-95	CRUISE	2-ethyl-1-methylnaphthalene	1	132.924	132.924	132.924	132.924	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	CRUISE	2-methylnaphthalene	1	205.062	205.062	205.062	205.062	0.000	ug/hph
94-95	CRUISE	3,6-dimethylphenanthrene	1	2.178	2.178	2.178	2.178	0.000	ug/hph
94-95	CRUISE	5+6-methylchrysene	1	10.758	10.758	10.758	10.758	0.000	ug/hph
94-95	CRUISE	7-methylbenz[a]anthracene	1	2.178	2.178	2.178	2.178	0.000	ug/hph
94-95	CRUISE	A-dimethylphenanthrene	1	1.056	1.056	1.056	1.056	0.000	ug/hph
94-95	CRUISE	A-methylfluorene	1	67.848	67.848	67.848	67.848	0.000	ug/hph
94-95	CRUISE	A-trimethylnaphthalene	1	36.630	36.630	36.630	36.630	0.000	ug/hph
94-95	CRUISE	acenaphthenequinone	1	10.758	10.758	10.758	10.758	0.000	ug/hph
94-95	CRUISE	B-dimethylphenanthrene	1	1.056	1.056	1.056	1.056	0.000	ug/hph
94-95	CRUISE	B-trimethylnaphthalene	1	24.222	24.222	24.222	24.222	0.000	ug/hph
94-95	CRUISE	benzonaphthothiophene	1	1.584	1.584	1.584	1.584	0.000	ug/hph
94-95	CRUISE	benzo[e]pyrene	1	1.584	1.584	1.584	1.584	0.000	ug/hph
94-95	CRUISE	biphenyl	1	20.988	20.988	20.988	20.988	0.000	ug/hph
94-95	CRUISE	C-dimethylphenanthrene	1	5.940	5.940	5.940	5.940	0.000	ug/hph
94-95	CRUISE	C-trimethylnaphthalene	1	40.920	40.920	40.920	40.920	0.000	ug/hph
94-95	CRUISE	D-dimethylphenanthrene	1	1.056	1.056	1.056	1.056	0.000	ug/hph
94-95	CRUISE	D-MePy/MeFl	1	1.584	1.584	1.584	1.584	0.000	ug/hph
94-95	CRUISE	Dibenzofuran	2	31.218	31.218	31.218	31.218	0.000	ug/hph
94-95	CRUISE	E-dimethylphenanthrene	1	1.056	1.056	1.056	1.056	0.000	ug/hph
94-95	CRUISE	E-trimethylnaphthalene	1	17.754	17.754	17.754	17.754	0.000	ug/hph
94-95	CRUISE	F-trimethylnaphthalene	1	7.524	7.524	7.524	7.524	0.000	ug/hph
94-95	CRUISE	perylene	1	2.706	2.706	2.706	2.706	0.000	ug/hph
94-95	CRUISE	retene	1	1.584	1.584	1.584	1.584	0.000	ug/hph
94-95	TRANS	1+2-ethylnaphthalene	1	57.024	57.024	57.024	57.024	0.000	ug/hph
94-95	TRANS	1,3+1,6+1,7-dimethylnaphthalene	1	217.404	217.404	217.404	217.404	0.000	ug/hph
94-95	TRANS	1,4+1,5+2,3-dimethylnaphthalene	1	75.570	75.570	75.570	75.570	0.000	ug/hph
94-95	TRANS	1-methylnaphthalene	2	318.022	234.630	401.413	318.022	83.392	ug/hph
94-95	TRANS	1-methylphenanthrene	3	18.061	17.226	18.903	18.053	0.684	ug/hph
94-95	TRANS	1-methylpyrene	1	10.626	10.626	10.626	10.626	0.000	ug/hph
94-95	TRANS	2,3,5+I-trimethylnaphthalene	1	43.758	43.758	43.758	43.758	0.000	ug/hph
94-95	TRANS	2,6+2,7-dimethylnaphthalene	1	115.302	115.302	115.302	115.302	0.000	ug/hph
94-95	TRANS	2-ethyl-1-methylnaphthalene	1	328.746	328.746	328.746	328.746	0.000	ug/hph
94-95	TRANS	2-methylanthracene	2	11.044	11.044	11.044	11.044	0.000	ug/hph
94-95	TRANS	2-methylnaphthalene	2	507.342	365.838	648.845	507.342	141.504	ug/hph
94-95	TRANS	2-methylphenanthrene	2	41.203	37.805	44.601	41.203	3.398	ug/hph
94-95	TRANS	3,6-dimethylphenanthrene	1	18.546	18.546	18.546	18.546	0.000	ug/hph
94-95	TRANS	3-methyl-phenanthrene	2	31.699	31.221	32.177	31.699	0.478	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	TRANS	4-methylpyrene	1	14.586	14.586	14.586	14.586	0.000	ug/hph
94-95	TRANS	7-methylbenz[a]anthracene	1	7.986	7.986	7.986	7.986	0.000	ug/hph
94-95	TRANS	9-methylphenanthrene	2	23.841	23.363	24.318	23.841	0.478	ug/hph
94-95	TRANS	A-dimethylphenanthrene	1	6.600	6.600	6.600	6.600	0.000	ug/hph
94-95	TRANS	A-methylfluorene	1	180.246	180.246	180.246	180.246	0.000	ug/hph
94-95	TRANS	A-trimethylnaphthalene	1	78.210	78.210	78.210	78.210	0.000	ug/hph
94-95	TRANS	B-dimethylphenanthrene	1	46.398	46.398	46.398	46.398	0.000	ug/hph
94-95	TRANS	B-trimethylnaphthalene	1	3.960	3.960	3.960	3.960	0.000	ug/hph
94-95	TRANS	benzonaphthothiophene	1	75.570	75.570	75.570	75.570	0.000	ug/hph
94-95	TRANS	benzo[bkj]fluoranthene	1	1.164	1.164	1.164	1.164	0.000	ug/hph
94-95	TRANS	benzo[ghi]fluoranthene	2	13.603	6.180	21.026	13.603	7.423	ug/hph
94-95	TRANS	C-dimethylphenanthrene	1	31.812	31.812	31.812	31.812	0.000	ug/hph
94-95	TRANS	chrysene+triphenylene	1	3.557	3.557	3.557	3.557	0.000	ug/hph
94-95	TRANS	cyclopenta[cd]pyrene	2	2.952	2.188	3.717	2.952	0.765	ug/hph
94-95	TRANS	D-dimethylphenanthrene	1	11.946	11.946	11.946	11.946	0.000	ug/hph
94-95	TRANS	Dibenzofuran	4	31.751	6.372	45.078	37.778	15.819	ug/hph
94-95	TRANS	Dibenzothiophene	1	2.103	2.103	2.103	2.103	0.000	ug/hph
94-95	TRANS	E-dimethylphenanthrene	1	7.986	7.986	7.986	7.986	0.000	ug/hph
94-95	TRANS	E-trimethylnaphthalene	1	21.186	21.186	21.186	21.186	0.000	ug/hph
94-95	TRANS	F-trimethylnaphthalene	1	17.226	17.226	17.226	17.226	0.000	ug/hph
94-95	TRANS	perinaphthenone	1	21.186	21.186	21.186	21.186	0.000	ug/hph
96-97	CRUISE	1+2-ethylnaphthalene	1	24.423	24.423	24.423	24.423	0.000	ug/hph
96-97	CRUISE	1,2-dimethylnaphthalene	1	6.002	6.002	6.002	6.002	0.000	ug/hph
96-97	CRUISE	1,3+1,6+1,7-dimethylnaphthalene	1	45.065	45.065	45.065	45.065	0.000	ug/hph
96-97	CRUISE	1,4+1,5+2,3-dimethylnaphthalene	1	13.993	13.993	13.993	13.993	0.000	ug/hph
96-97	CRUISE	1,4,5-trimethylnaphthalene	1	0.697	0.697	0.697	0.697	0.000	ug/hph
96-97	CRUISE	1,7-dimethylphenanthrene	1	0.561	0.561	0.561	0.561	0.000	ug/hph
96-97	CRUISE	1-methylfluorene	1	2.592	2.592	2.592	2.592	0.000	ug/hph
96-97	CRUISE	1-methylnaphthalene	1	58.922	58.922	58.922	58.922	0.000	ug/hph
96-97	CRUISE	1-methylphenanthrene	1	0.981	0.981	0.981	0.981	0.000	ug/hph
96-97	CRUISE	1-methylpyrene	1	0.303	0.303	0.303	0.303	0.000	ug/hph
96-97	CRUISE	2,3,5+I-trimethylnaphthalene	1	3.297	3.297	3.297	3.297	0.000	ug/hph
96-97	CRUISE	2,4,5-trimethylnaphthalene	1	1.022	1.022	1.022	1.022	0.000	ug/hph
96-97	CRUISE	2,6+2,7-dimethylnaphthalene	1	24.138	24.138	24.138	24.138	0.000	ug/hph
96-97	CRUISE	2-methylbiphenyl	1	95.959	95.959	95.959	95.959	0.000	ug/hph
96-97	CRUISE	2-methylnaphthalene	1	103.494	103.494	103.494	103.494	0.000	ug/hph
96-97	CRUISE	2-methylphenanthrene	1	2.076	2.076	2.076	2.076	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	CRUISE	3,6-dimethylphenanthrene	1	0.384	0.384	0.384	0.384	0.000	ug/hph
96-97	CRUISE	3-methylbiphenyl	1	58.723	58.723	58.723	58.723	0.000	ug/hph
96-97	CRUISE	4-methylbiphenyl	1	19.158	19.158	19.158	19.158	0.000	ug/hph
96-97	CRUISE	4-methylpyrene	1	0.850	0.850	0.850	0.850	0.000	ug/hph
96-97	CRUISE	5+6-methylchrysene	1	0.023	0.023	0.023	0.023	0.000	ug/hph
96-97	CRUISE	7-methylbenzo[a]pyrene	1	1.673	1.673	1.673	1.673	0.000	ug/hph
96-97	CRUISE	9-methylanthracene	1	0.158	0.158	0.158	0.158	0.000	ug/hph
96-97	CRUISE	A-methylfluorene	1	1.497	1.497	1.497	1.497	0.000	ug/hph
96-97	CRUISE	A-trimethylnaphthalene	1	8.951	8.951	8.951	8.951	0.000	ug/hph
96-97	CRUISE	acenaphthenequinone	1	0.072	0.072	0.072	0.072	0.000	ug/hph
96-97	CRUISE	B-dimethylphenanthrene	1	0.923	0.923	0.923	0.923	0.000	ug/hph
96-97	CRUISE	B-methylfluorene	1	0.018	0.018	0.018	0.018	0.000	ug/hph
96-97	CRUISE	B-trimethylnaphthalene	1	7.141	7.141	7.141	7.141	0.000	ug/hph
96-97	CRUISE	benzonaphthothiophene	1	0.068	0.068	0.068	0.068	0.000	ug/hph
96-97	CRUISE	benzo[bkj]fluoranthene	1	0.972	0.972	0.972	0.972	0.000	ug/hph
96-97	CRUISE	benzo[e]pyrene	1	0.701	0.701	0.701	0.701	0.000	ug/hph
96-97	CRUISE	biphenyl	1	53.735	53.735	53.735	53.735	0.000	ug/hph
96-97	CRUISE	C-dimethylphenanthrene	1	1.072	1.072	1.072	1.072	0.000	ug/hph
96-97	CRUISE	C-trimethylnaphthalene	1	9.073	9.073	9.073	9.073	0.000	ug/hph
96-97	CRUISE	coronene	1	0.036	0.036	0.036	0.036	0.000	ug/hph
96-97	CRUISE	D-dimethylphenanthrene	1	0.371	0.371	0.371	0.371	0.000	ug/hph
96-97	CRUISE	D-MePy/MeFl	1	0.850	0.850	0.850	0.850	0.000	ug/hph
96-97	CRUISE	Dibenzofuran	2	7.087	7.087	7.087	7.087	0.000	ug/hph
96-97	CRUISE	E-dimethylphenanthrene	1	0.172	0.172	0.172	0.172	0.000	ug/hph
96-97	CRUISE	E-trimethylnaphthalene	1	3.672	3.672	3.672	3.672	0.000	ug/hph
96-97	CRUISE	F-trimethylnaphthalene	1	3.523	3.523	3.523	3.523	0.000	ug/hph
96-97	CRUISE	J-trimethylnaphthalene	1	2.519	2.519	2.519	2.519	0.000	ug/hph
96-97	CRUISE	perinaphthenone	1	0.018	0.018	0.018	0.018	0.000	ug/hph
96-97	IDLE	1+2-ethylnaphthalene	3	286.652	88.363	610.454	161.140	230.882	ug/mode
96-97	IDLE	1,2-dimethylnaphthalene	3	67.514	48.752	80.822	72.969	13.649	ug/mode
96-97	IDLE	1,3+1,6+1,7-dimethylnaphthalene	3	520.130	362.592	641.408	556.390	116.678	ug/mode
96-97	IDLE	1,4+1,5+2,3-dimethylnaphthalene	3	252.050	202.338	340.523	213.289	62.719	ug/mode
96-97	IDLE	1,4,5-trimethylnaphthalene	1	18.913	18.913	18.913	18.913	0.000	ug/mode
96-97	IDLE	1,7-dimethylphenanthrene	1	8.023	8.023	8.023	8.023	0.000	ug/mode
96-97	IDLE	1-methylfluorene	1	79.678	79.678	79.678	79.678	0.000	ug/mode
96-97	IDLE	1-methylnaphthalene	3	353.709	216.336	476.903	367.886	106.847	ug/mode
96-97	IDLE	1-methylphenanthrene	1	41.272	41.272	41.272	41.272	0.000	ug/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	IDLE	2,3,5+I-trimethylnaphthalene	1	110.054	110.054	110.054	110.054	0.000	ug/mode
96-97	IDLE	2,4,5-trimethylnaphthalene	1	28.087	28.087	28.087	28.087	0.000	ug/mode
96-97	IDLE	2,6+2,7-dimethylnaphthalene	3	275.648	185.867	337.040	304.038	64.899	ug/mode
96-97	IDLE	2-methylbiphenyl	1	385.191	385.191	385.191	385.191	0.000	ug/mode
96-97	IDLE	2-methylnaphthalene	3	674.712	377.827	825.405	820.903	209.937	ug/mode
96-97	IDLE	2-methylphenanthrene	1	84.834	84.834	84.834	84.834	0.000	ug/mode
96-97	IDLE	3,6-dimethylphenanthrene	1	14.902	14.902	14.902	14.902	0.000	ug/mode
96-97	IDLE	3-methylbiphenyl	1	512.441	512.441	512.441	512.441	0.000	ug/mode
96-97	IDLE	4-methylbiphenyl	1	267.108	267.108	267.108	267.108	0.000	ug/mode
96-97	IDLE	4-methylpyrene	1	2.295	2.295	2.295	2.295	0.000	ug/mode
96-97	IDLE	7-methylbenzo[a]pyrene	1	49.296	49.296	49.296	49.296	0.000	ug/mode
96-97	IDLE	9-methylanthracene	1	21.781	21.781	21.781	21.781	0.000	ug/mode
96-97	IDLE	A-methylfluorene	1	75.088	75.088	75.088	75.088	0.000	ug/mode
96-97	IDLE	A-trimethylnaphthalene	1	181.130	181.130	181.130	181.130	0.000	ug/mode
96-97	IDLE	acenaphthenequinone	1	0.572	0.572	0.572	0.572	0.000	ug/mode
96-97	IDLE	B-dimethylphenanthrene	1	28.087	28.087	28.087	28.087	0.000	ug/mode
96-97	IDLE	B-methylfluorene	1	8.023	8.023	8.023	8.023	0.000	ug/mode
96-97	IDLE	B-trimethylnaphthalene	1	185.714	185.714	185.714	185.714	0.000	ug/mode
96-97	IDLE	benzo[bkj]fluoranthene	1	46.428	46.428	46.428	46.428	0.000	ug/mode
96-97	IDLE	biphenyl	1	535.366	535.366	535.366	535.366	0.000	ug/mode
96-97	IDLE	C-dimethylphenanthrene	1	40.694	40.694	40.694	40.694	0.000	ug/mode
96-97	IDLE	C-trimethylnaphthalene	1	233.292	233.292	233.292	233.292	0.000	ug/mode
96-97	IDLE	D-dimethylphenanthrene	1	9.174	9.174	9.174	9.174	0.000	ug/mode
96-97	IDLE	Dibenzofuran	2	92.857	92.857	92.857	92.857	0.000	ug/mode
96-97	IDLE	E-trimethylnaphthalene	1	112.921	112.921	112.921	112.921	0.000	ug/mode
96-97	IDLE	F-trimethylnaphthalene	1	100.886	100.886	100.886	100.886	0.000	ug/mode
96-97	IDLE	J-trimethylnaphthalene	1	71.648	71.648	71.648	71.648	0.000	ug/mode
96-97	IDLE	perylene	1	0.572	0.572	0.572	0.572	0.000	ug/mode
96-97	TRANS	1+2-ethylnaphthalene	2	8.666	2.254	15.077	8.666	6.412	ug/hph
96-97	TRANS	1,2-dimethylnaphthalene	2	0.861	0.629	1.093	0.861	0.232	ug/hph
96-97	TRANS	1,3+1,6+1,7-dimethylnaphthalene	2	6.634	5.140	8.129	6.634	1.495	ug/hph
96-97	TRANS	1,4+1,5+2,3-dimethylnaphthalene	2	3.207	1.632	4.782	3.207	1.575	ug/hph
96-97	TRANS	1,4,5-trimethylnaphthalene	1	0.199	0.199	0.199	0.199	0.000	ug/hph
96-97	TRANS	1,7-dimethylphenanthrene	1	0.121	0.121	0.121	0.121	0.000	ug/hph
96-97	TRANS	1-methylfluorene	1	0.342	0.342	0.342	0.342	0.000	ug/hph
96-97	TRANS	1-methylnaphthalene	2	5.685	5.426	5.943	5.685	0.258	ug/hph
96-97	TRANS	1-methylphenanthrene	1	0.298	0.298	0.298	0.298	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	TRANS	2,3,5+I-trimethylnaphthalene	1	0.518	0.518	0.518	0.518	0.000	ug/hph
96-97	TRANS	2,4,5-trimethylnaphthalene	1	0.188	0.188	0.188	0.188	0.000	ug/hph
96-97	TRANS	2,6+2,7-dimethylnaphthalene	2	3.265	2.978	3.552	3.265	0.287	ug/hph
96-97	TRANS	2-methylbiphenyl	1	138.143	138.143	138.143	138.143	0.000	ug/hph
96-97	TRANS	2-methylnaphthalene	2	9.489	9.427	9.551	9.489	0.062	ug/hph
96-97	TRANS	2-methylphenanthrene	1	0.717	0.717	0.717	0.717	0.000	ug/hph
96-97	TRANS	3,6-dimethylphenanthrene	1	0.022	0.022	0.022	0.022	0.000	ug/hph
96-97	TRANS	3-methylbiphenyl	1	55.831	55.831	55.831	55.831	0.000	ug/hph
96-97	TRANS	4-methylbiphenyl	1	19.699	19.699	19.699	19.699	0.000	ug/hph
96-97	TRANS	7-methylbenzo[a]pyrene	1	1.787	1.787	1.787	1.787	0.000	ug/hph
96-97	TRANS	A-methylfluorene	1	0.607	0.607	0.607	0.607	0.000	ug/hph
96-97	TRANS	A-trimethylnaphthalene	1	1.037	1.037	1.037	1.037	0.000	ug/hph
96-97	TRANS	acenaphthenequinone	1	0.342	0.342	0.342	0.342	0.000	ug/hph
96-97	TRANS	B-dimethylphenanthrene	1	0.563	0.563	0.563	0.563	0.000	ug/hph
96-97	TRANS	B-methylfluorene	1	0.099	0.099	0.099	0.099	0.000	ug/hph
96-97	TRANS	B-trimethylnaphthalene	1	1.290	1.290	1.290	1.290	0.000	ug/hph
96-97	TRANS	benzonaphthothiophene	1	0.033	0.033	0.033	0.033	0.000	ug/hph
96-97	TRANS	benzo[bkj]fluoranthene	1	0.993	0.993	0.993	0.993	0.000	ug/hph
96-97	TRANS	biphenyl	1	22.908	22.908	22.908	22.908	0.000	ug/hph
96-97	TRANS	C-dimethylphenanthrene	1	0.265	0.265	0.265	0.265	0.000	ug/hph
96-97	TRANS	C-trimethylnaphthalene	1	1.798	1.798	1.798	1.798	0.000	ug/hph
96-97	TRANS	D-dimethylphenanthrene	1	0.055	0.055	0.055	0.055	0.000	ug/hph
96-97	TRANS	Dibenzofuran	2	0.838	0.838	0.838	0.838	0.000	ug/hph
96-97	TRANS	E-trimethylnaphthalene	1	0.563	0.563	0.563	0.563	0.000	ug/hph
96-97	TRANS	F-trimethylnaphthalene	1	0.739	0.739	0.739	0.739	0.000	ug/hph
96-97	TRANS	J-trimethylnaphthalene	1	0.441	0.441	0.441	0.441	0.000	ug/hph
96-97	TRANS	perinaphthenone	1	0.320	0.320	0.320	0.320	0.000	ug/hph
98-03	TRANS	1+2-ethylnaphthalene	1	195.356	195.356	195.356	195.356	0.000	ug/hph
98-03	TRANS	1,2-dimethylnaphthalene	2	79.109	46.936	111.282	79.109	32.173	ug/hph
98-03	TRANS	1,3+1,6+1,7-dimethylnaphthalene	2	406.170	17.278	795.062	406.170	388.892	ug/hph
98-03	TRANS	1,4+1,5+2,3-dimethylnaphthalene	2	155.769	24.693	286.845	155.769	131.076	ug/hph
98-03	TRANS	1,4,5-trimethylnaphthalene	1	118.697	118.697	118.697	118.697	0.000	ug/hph
98-03	TRANS	1,7-dimethylphenanthrene	2	32.140	25.950	38.330	32.140	6.190	ug/hph
98-03	TRANS	1-ethyl-2-methylnaphthalene	1	49.451	49.451	49.451	49.451	0.000	ug/hph
98-03	TRANS	1-methylfluorene	2	38.297	23.435	53.159	38.297	14.862	ug/hph
98-03	TRANS	1-methylnaphthalene	2	222.531	56.800	388.263	222.531	165.732	ug/hph
98-03	TRANS	1-methylphenanthrene	2	274.200	195.356	353.045	274.200	78.844	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	1-methylpyrene	2	12.975	3.707	22.243	12.975	9.268	ug/hph
98-03	TRANS	2,3,5+I-trimethylnaphthalene	2	85.928	8.672	163.183	85.928	77.255	ug/hph
98-03	TRANS	2,4,5-trimethylnaphthalene	2	3.078	2.449	3.707	3.078	0.629	ug/hph
98-03	TRANS	2,6+2,7-dimethylnaphthalene	2	197.210	12.313	382.106	197.210	184.897	ug/hph
98-03	TRANS	2-ethyl-1-methylnaphthalene	2	330.404	215.150	445.658	330.404	115.254	ug/hph
98-03	TRANS	2-methylbiphenyl	2	9.235	6.157	12.313	9.235	3.078	ug/hph
98-03	TRANS	2-methylnaphthalene	2	356.057	37.006	675.108	356.057	319.051	ug/hph
98-03	TRANS	3,6-dimethylphenanthrene	2	45.744	20.985	70.503	45.744	24.759	ug/hph
98-03	TRANS	3-methylbiphenyl	2	25.322	22.243	28.400	25.322	3.078	ug/hph
98-03	TRANS	4-methylbiphenyl	2	94.600	3.707	185.492	94.600	90.893	ug/hph
98-03	TRANS	4-methylpyrene	2	19.165	8.672	29.658	19.165	10.493	ug/hph
98-03	TRANS	5+6-methylchrysene	1	18.536	18.536	18.536	18.536	0.000	ug/hph
98-03	TRANS	7-methylbenz[a]anthracene	2	12.379	3.707	21.052	12.379	8.672	ug/hph
98-03	TRANS	7-methylbenzo[a]pyrene	1	7.414	7.414	7.414	7.414	0.000	ug/hph
98-03	TRANS	A-dimethylphenanthrene	2	12.975	6.157	19.794	12.975	6.819	ug/hph
98-03	TRANS	A-methylfluorene	2	97.546	32.173	162.918	97.546	65.373	ug/hph
98-03	TRANS	A-trimethylnaphthalene	2	112.507	11.122	213.892	112.507	101.385	ug/hph
98-03	TRANS	acenaphthenequinone	2	21.019	7.414	34.623	21.019	13.604	ug/hph
98-03	TRANS	B-dimethylphenanthrene	2	2.449	2.449	2.449	2.449	0.000	ug/hph
98-03	TRANS	B-methylfluorene	1	217.599	217.599	217.599	217.599	0.000	ug/hph
98-03	TRANS	B-trimethylnaphthalene	2	71.066	17.278	124.853	71.066	53.788	ug/hph
98-03	TRANS	benzonaphthothiophene	2	26.546	9.864	43.229	26.546	16.682	ug/hph
98-03	TRANS	benzo[bkj]fluoranthene	2	9.897	7.414	12.379	9.897	2.483	ug/hph
98-03	TRANS	benzo[e]pyrene	1	2.449	2.449	2.449	2.449	0.000	ug/hph
98-03	TRANS	biphenyl	2	29.029	17.278	40.779	29.029	11.751	ug/hph
98-03	TRANS	C-dimethylphenanthrene	2	26.579	8.672	44.486	26.579	17.907	ug/hph
98-03	TRANS	C-trimethylnaphthalene	1	248.515	248.515	248.515	248.515	0.000	ug/hph
98-03	TRANS	coronene	1	2.449	2.449	2.449	2.449	0.000	ug/hph
98-03	TRANS	D-dimethylphenanthrene	2	9.268	3.707	14.829	9.268	5.561	ug/hph
98-03	TRANS	D-MePy/MeFl	2	5.561	4.965	6.157	5.561	0.596	ug/hph
98-03	TRANS	Dibenzofuran	4	77.222	57.991	96.453	77.222	19.231	ug/hph
98-03	TRANS	E-dimethylphenanthrene	2	11.717	6.157	17.278	11.717	5.561	ug/hph
98-03	TRANS	E-trimethylnaphthalene	2	66.167	1.258	131.076	66.167	64.909	ug/hph
98-03	TRANS	F-trimethylnaphthalene	2	61.798	6.157	117.439	61.798	55.641	ug/hph
98-03	TRANS	J-trimethylnaphthalene	2	27.804	7.414	48.194	27.804	20.390	ug/hph
98-03	TRANS	perinaphthenone	1	45.744	45.744	45.744	45.744	0.000	ug/hph
98-03	TRANS	perylene	2	6.190	4.965	7.414	6.190	1.225	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	retene	1	3.707	3.707	3.707	3.707	0.000	ug/hph

Total records	405
Total with 1 record	290
Total with 2 records	61
Max number of records	8
Total with max number of records	1

Table B-11d. Other PAH Compounds, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	1+2-ethylnaphthalene	1	211.089	211.089	211.089	211.089	0.000	ug/hph
pre-87	TRANS	1,2-dimethylnaphthalene	1	143.902	143.902	143.902	143.902	0.000	ug/hph
pre-87	TRANS	1,3+1,6+1,7-dimethylnaphthalene	1	1146.942	1146.942	1146.942	1146.942	0.000	ug/hph
pre-87	TRANS	1,4+1,5+2,3-dimethylnaphthalene	1	326.673	326.673	326.673	326.673	0.000	ug/hph
pre-87	TRANS	1,4,5-trimethylnaphthalene	1	402.406	402.406	402.406	402.406	0.000	ug/hph
pre-87	TRANS	1,7-dimethylphenanthrene	1	307.227	307.227	307.227	307.227	0.000	ug/hph
pre-87	TRANS	1-ethyl-2-methylnaphthalene	1	217.346	217.346	217.346	217.346	0.000	ug/hph
pre-87	TRANS	1-methylfluorene	1	602.290	602.290	602.290	602.290	0.000	ug/hph
pre-87	TRANS	1-methylnaphthalene	1	394.166	394.166	394.166	394.166	0.000	ug/hph
pre-87	TRANS	1-methylphenanthrene	1	697.120	697.120	697.120	697.120	0.000	ug/hph
pre-87	TRANS	1-methylpyrene	1	35.883	35.883	35.883	35.883	0.000	ug/hph
pre-87	TRANS	2,3,5+I-trimethylnaphthalene	1	831.801	831.801	831.801	831.801	0.000	ug/hph
pre-87	TRANS	2,4,5-trimethylnaphthalene	1	76.736	76.736	76.736	76.736	0.000	ug/hph
pre-87	TRANS	2,6+2,7-dimethylnaphthalene	1	515.679	515.679	515.679	515.679	0.000	ug/hph
pre-87	TRANS	2-ethyl-1-methylnaphthalene	1	715.563	715.563	715.563	715.563	0.000	ug/hph
pre-87	TRANS	2-methylnaphthalene	1	544.651	544.651	544.651	544.651	0.000	ug/hph
pre-87	TRANS	2-methylphenanthrene	1	1707.398	1707.398	1707.398	1707.398	0.000	ug/hph
pre-87	TRANS	3,6-dimethylphenanthrene	1	398.112	398.112	398.112	398.112	0.000	ug/hph
pre-87	TRANS	3-methylbiphenyl	1	5.603	5.603	5.603	5.603	0.000	ug/hph
pre-87	TRANS	4-methylpyrene	1	71.787	71.787	71.787	71.787	0.000	ug/hph
pre-87	TRANS	7-methylbenz[a]anthracene	1	2.638	2.638	2.638	2.638	0.000	ug/hph
pre-87	TRANS	A-dimethylphenanthrene	1	400.422	400.422	400.422	400.422	0.000	ug/hph
pre-87	TRANS	A-methylfluorene	1	557.164	557.164	557.164	557.164	0.000	ug/hph
pre-87	TRANS	A-trimethylnaphthalene	1	584.175	584.175	584.175	584.175	0.000	ug/hph
pre-87	TRANS	B-dimethylphenanthrene	1	191.317	191.317	191.317	191.317	0.000	ug/hph
pre-87	TRANS	B-methylfluorene	1	123.148	123.148	123.148	123.148	0.000	ug/hph
pre-87	TRANS	B-trimethylnaphthalene	1	558.494	558.494	558.494	558.494	0.000	ug/hph
pre-87	TRANS	benzonaphthothiophene	1	0.981	0.981	0.981	0.981	0.000	ug/hph
pre-87	TRANS	biphenyl	1	42.488	42.488	42.488	42.488	0.000	ug/hph
pre-87	TRANS	C-dimethylphenanthrene	1	800.845	800.845	800.845	800.845	0.000	ug/hph
pre-87	TRANS	C-trimethylnaphthalene	1	578.245	578.245	578.245	578.245	0.000	ug/hph
pre-87	TRANS	D-dimethylphenanthrene	1	132.370	132.370	132.370	132.370	0.000	ug/hph
pre-87	TRANS	D-MePy/MeFl	1	66.185	66.185	66.185	66.185	0.000	ug/hph
pre-87	TRANS	Dibenzofuran	2	106.689	106.689	106.689	106.689	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	E-dimethylphenanthrene	1	165.963	165.963	165.963	165.963	0.000	ug/hph
pre-87	TRANS	E-trimethylnaphthalene	1	457.386	457.386	457.386	457.386	0.000	ug/hph
pre-87	TRANS	F-trimethylnaphthalene	1	447.510	447.510	447.510	447.510	0.000	ug/hph
pre-87	TRANS	J-trimethylnaphthalene	1	278.255	278.255	278.255	278.255	0.000	ug/hph
pre-87	TRANS	perinaphthenone	1	283.204	283.204	283.204	283.204	0.000	ug/hph
pre-87	BUS	1,7-dimethylphenanthrene	1	52.189	52.189	52.189	52.189	0.000	ug/hph
pre-87	BUS	1-methylpyrene	1	34.793	34.793	34.793	34.793	0.000	ug/hph
pre-87	BUS	2-ethyl-1-methylnaphthalene	1	83.734	83.734	83.734	83.734	0.000	ug/hph
pre-87	BUS	3,6-dimethylphenanthrene	1	54.914	54.914	54.914	54.914	0.000	ug/hph
pre-87	BUS	4-methylpyrene	1	8.698	8.698	8.698	8.698	0.000	ug/hph
pre-87	BUS	A-dimethylphenanthrene	1	33.703	33.703	33.703	33.703	0.000	ug/hph
pre-87	BUS	A-methylfluorene	1	23.370	23.370	23.370	23.370	0.000	ug/hph
pre-87	BUS	acenaphthenequinone	1	2.725	2.725	2.725	2.725	0.000	ug/hph
pre-87	BUS	benzo[bkj]fluoranthene	1	6.518	6.518	6.518	6.518	0.000	ug/hph
pre-87	BUS	D-MePy/MeFl	1	7.608	7.608	7.608	7.608	0.000	ug/hph
pre-87	BUS	perinaphthenone	1	160.383	160.383	160.383	160.383	0.000	ug/hph
87-90	BUS	1-methylpyrene	3	1.953	0.868	4.123	0.868	1.534	ug/hph
87-90	BUS	benzo[a]fluorene	3	1.808	0.868	3.689	0.868	1.330	ug/hph
87-90	BUS	benzo[b]fluorene	3	1.230	0.434	2.821	0.434	1.125	ug/hph
87-90	BUS	benzo[e]pyrene	3	2.676	1.085	5.425	1.519	1.952	ug/hph
87-90	BUS	benzo[ghi]fluoranthene	3	2.604	1.302	4.991	1.519	1.690	ug/hph
87-90	BUS	retene	3	1.591	0.868	3.038	0.868	1.023	ug/hph
91-93	TRANS	1+2-ethylnaphthalene	1	1211.782	1211.782	1211.782	1211.782	0.000	ug/hph
91-93	TRANS	1,2-dimethylnaphthalene	1	462.888	462.888	462.888	462.888	0.000	ug/hph
91-93	TRANS	1,3+1,6+1,7-dimethylnaphthalene	1	4555.051	4555.051	4555.051	4555.051	0.000	ug/hph
91-93	TRANS	1,4+1,5+2,3-dimethylnaphthalene	1	1188.886	1188.886	1188.886	1188.886	0.000	ug/hph
91-93	TRANS	1,4,5-trimethylnaphthalene	1	215.114	215.114	215.114	215.114	0.000	ug/hph
91-93	TRANS	1,7-dimethylphenanthrene	1	159.084	159.084	159.084	159.084	0.000	ug/hph
91-93	TRANS	1-ethyl-2-methylnaphthalene	1	670.702	670.702	670.702	670.702	0.000	ug/hph
91-93	TRANS	1-methylfluorene	1	303.804	303.804	303.804	303.804	0.000	ug/hph
91-93	TRANS	1-methylnaphthalene	1	2650.406	2650.406	2650.406	2650.406	0.000	ug/hph
91-93	TRANS	1-methylphenanthrene	1	178.567	178.567	178.567	178.567	0.000	ug/hph
91-93	TRANS	1-methylpyrene	1	32.897	32.897	32.897	32.897	0.000	ug/hph
91-93	TRANS	2,3,5+I-trimethylnaphthalene	1	923.335	923.335	923.335	923.335	0.000	ug/hph
91-93	TRANS	2,4,5-trimethylnaphthalene	1	110.354	110.354	110.354	110.354	0.000	ug/hph
91-93	TRANS	2,6+2,7-dimethylnaphthalene	1	2122.222	2122.222	2122.222	2122.222	0.000	ug/hph
91-93	TRANS	2-ethyl-1-methylnaphthalene	1	54.562	54.562	54.562	54.562	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	TRANS	2-methylbiphenyl	1	208.051	208.051	208.051	208.051	0.000	ug/hph
91-93	TRANS	2-methylnaphthalene	1	4022.741	4022.741	4022.741	4022.741	0.000	ug/hph
91-93	TRANS	2-methylphenanthrene	1	429.516	429.516	429.516	429.516	0.000	ug/hph
91-93	TRANS	3,6-dimethylphenanthrene	1	179.798	179.798	179.798	179.798	0.000	ug/hph
91-93	TRANS	3-methylbiphenyl	1	1365.271	1365.271	1365.271	1365.271	0.000	ug/hph
91-93	TRANS	4-methylbiphenyl	1	577.627	577.627	577.627	577.627	0.000	ug/hph
91-93	TRANS	4-methylpyrene	1	76.010	76.010	76.010	76.010	0.000	ug/hph
91-93	TRANS	5+6-methylchrysene	1	1.210	1.210	1.210	1.210	0.000	ug/hph
91-93	TRANS	7-methylbenz[a]anthracene	1	0.734	0.734	0.734	0.734	0.000	ug/hph
91-93	TRANS	7-methylbenzo[a]pyrene	1	6.091	6.091	6.091	6.091	0.000	ug/hph
91-93	TRANS	9-methylanthracene	1	20.455	20.455	20.455	20.455	0.000	ug/hph
91-93	TRANS	A-dimethylphenanthrene	1	89.899	89.899	89.899	89.899	0.000	ug/hph
91-93	TRANS	A-methylfluorene	1	349.358	349.358	349.358	349.358	0.000	ug/hph
91-93	TRANS	A-trimethylnaphthalene	1	1148.688	1148.688	1148.688	1148.688	0.000	ug/hph
91-93	TRANS	acenaphthenequinone	1	47.498	47.498	47.498	47.498	0.000	ug/hph
91-93	TRANS	B-methylfluorene	1	79.423	79.423	79.423	79.423	0.000	ug/hph
91-93	TRANS	B-trimethylnaphthalene	1	969.386	969.386	969.386	969.386	0.000	ug/hph
91-93	TRANS	benzonaphthothiophene	1	5.854	5.854	5.854	5.854	0.000	ug/hph
91-93	TRANS	benzo[bkj]fluoranthene	1	22.658	22.658	22.658	22.658	0.000	ug/hph
91-93	TRANS	benzo[e]pyrene	1	97.697	97.697	97.697	97.697	0.000	ug/hph
91-93	TRANS	biphenyl	1	1179.878	1179.878	1179.878	1179.878	0.000	ug/hph
91-93	TRANS	C-dimethylphenanthrene	1	344.477	344.477	344.477	344.477	0.000	ug/hph
91-93	TRANS	C-trimethylnaphthalene	1	906.530	906.530	906.530	906.530	0.000	ug/hph
91-93	TRANS	D-dimethylphenanthrene	1	62.122	62.122	62.122	62.122	0.000	ug/hph
91-93	TRANS	D-MePy/MeFl	1	72.835	72.835	72.835	72.835	0.000	ug/hph
91-93	TRANS	Dibenzofuran	2	284.321	284.321	284.321	284.321	0.000	ug/hph
91-93	TRANS	E-trimethylnaphthalene	1	644.393	644.393	644.393	644.393	0.000	ug/hph
91-93	TRANS	F-trimethylnaphthalene	1	681.912	681.912	681.912	681.912	0.000	ug/hph
91-93	TRANS	J-trimethylnaphthalene	1	333.288	333.288	333.288	333.288	0.000	ug/hph
91-93	TRANS	perinaphthenone	1	337.673	337.673	337.673	337.673	0.000	ug/hph
91-93	TRANS	perylene	1	9.266	9.266	9.266	9.266	0.000	ug/hph
91-93	TRANS	retene	1	17.777	17.777	17.777	17.777	0.000	ug/hph
91-93	BUS	1+2-ethylnaphthalene	1	179.690	179.690	179.690	179.690	0.000	ug/hph
91-93	BUS	1,2-dimethylnaphthalene	1	92.621	92.621	92.621	92.621	0.000	ug/hph
91-93	BUS	1,3+1,6+1,7-dimethylnaphthalene	1	825.228	825.228	825.228	825.228	0.000	ug/hph
91-93	BUS	1,4+1,5+2,3-dimethylnaphthalene	1	246.802	246.802	246.802	246.802	0.000	ug/hph
91-93	BUS	1,4,5-trimethylnaphthalene	1	162.497	162.497	162.497	162.497	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	BUS	1,7-dimethylphenanthrene	1	451.440	451.440	451.440	451.440	0.000	ug/hph
91-93	BUS	1-ethyl-2-methylnaphthalene	1	90.958	90.958	90.958	90.958	0.000	ug/hph
91-93	BUS	1-methylfluorene	1	265.658	265.658	265.658	265.658	0.000	ug/hph
91-93	BUS	1-methylnaphthalene	1	433.685	433.685	433.685	433.685	0.000	ug/hph
91-93	BUS	1-methylphenanthrene	1	641.110	641.110	641.110	641.110	0.000	ug/hph
91-93	BUS	1-methylpyrene	1	62.662	62.662	62.662	62.662	0.000	ug/hph
91-93	BUS	2,3,5+I-trimethylnaphthalene	1	379.901	379.901	379.901	379.901	0.000	ug/hph
91-93	BUS	2,4,5-trimethylnaphthalene	1	55.469	55.469	55.469	55.469	0.000	ug/hph
91-93	BUS	2,6+2,7-dimethylnaphthalene	1	425.930	425.930	425.930	425.930	0.000	ug/hph
91-93	BUS	2-ethyl-1-methylnaphthalene	1	96.509	96.509	96.509	96.509	0.000	ug/hph
91-93	BUS	2-methylnaphthalene	1	566.244	566.244	566.244	566.244	0.000	ug/hph
91-93	BUS	2-methylphenanthrene	1	1297.750	1297.750	1297.750	1297.750	0.000	ug/hph
91-93	BUS	3,6-dimethylphenanthrene	1	534.622	534.622	534.622	534.622	0.000	ug/hph
91-93	BUS	4-methylpyrene	1	95.386	95.386	95.386	95.386	0.000	ug/hph
91-93	BUS	5+6-methylchrysene	1	0.562	0.562	0.562	0.562	0.000	ug/hph
91-93	BUS	7-methylbenz[a]anthracene	1	1.102	1.102	1.102	1.102	0.000	ug/hph
91-93	BUS	7-methylbenzo[a]pyrene	1	4.428	4.428	4.428	4.428	0.000	ug/hph
91-93	BUS	9-methylanthracene	1	4.428	4.428	4.428	4.428	0.000	ug/hph
91-93	BUS	A-dimethylphenanthrene	1	227.945	227.945	227.945	227.945	0.000	ug/hph
91-93	BUS	A-methylfluorene	1	333.871	333.871	333.871	333.871	0.000	ug/hph
91-93	BUS	A-trimethylnaphthalene	1	291.708	291.708	291.708	291.708	0.000	ug/hph
91-93	BUS	acenaphthenequinone	1	74.326	74.326	74.326	74.326	0.000	ug/hph
91-93	BUS	B-dimethylphenanthrene	1	864.043	864.043	864.043	864.043	0.000	ug/hph
91-93	BUS	B-methylfluorene	1	60.998	60.998	60.998	60.998	0.000	ug/hph
91-93	BUS	B-trimethylnaphthalene	1	321.667	321.667	321.667	321.667	0.000	ug/hph
91-93	BUS	benzonaphthothiophene	1	1.102	1.102	1.102	1.102	0.000	ug/hph
91-93	BUS	benzo[e]pyrene	1	14.969	14.969	14.969	14.969	0.000	ug/hph
91-93	BUS	biphenyl	1	155.844	155.844	155.844	155.844	0.000	ug/hph
91-93	BUS	C-dimethylphenanthrene	1	921.737	921.737	921.737	921.737	0.000	ug/hph
91-93	BUS	C-trimethylnaphthalene	1	277.301	277.301	277.301	277.301	0.000	ug/hph
91-93	BUS	coronene	1	1.102	1.102	1.102	1.102	0.000	ug/hph
91-93	BUS	D-dimethylphenanthrene	1	148.068	148.068	148.068	148.068	0.000	ug/hph
91-93	BUS	D-MePy/MeFl	1	77.090	77.090	77.090	77.090	0.000	ug/hph
91-93	BUS	Dibenzofuran	2	81.518	81.518	81.518	81.518	0.000	ug/hph
91-93	BUS	E-dimethylphenanthrene	1	237.362	237.362	237.362	237.362	0.000	ug/hph
91-93	BUS	E-trimethylnaphthalene	1	256.219	256.219	256.219	256.219	0.000	ug/hph
91-93	BUS	F-trimethylnaphthalene	1	246.240	246.240	246.240	246.240	0.000	ug/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	BUS	J-trimethylnaphthalene	1	169.711	169.711	169.711	169.711	0.000	ug/hph
91-93	BUS	perinaphthenone	1	481.939	481.939	481.939	481.939	0.000	ug/hph
91-93	BUS	perylene	1	1.102	1.102	1.102	1.102	0.000	ug/hph
91-93	BUS	retene	1	26.611	26.611	26.611	26.611	0.000	ug/hph
98-03	BUS	1+2-ethylnaphthalene	3	37.516	0.198	68.052	44.298	28.113	ug/hph
98-03	BUS	1-methylpyrene	1	0.064	0.064	0.064	0.064	0.000	ug/hph
98-03	BUS	5+6-methylchrysene	2	2.044	1.220	2.868	2.044	0.824	ug/hph
98-03	BUS	7-methylbenz[a]anthracene	4	2.394	0.050	5.607	1.960	2.013	ug/hph
98-03	BUS	7-methylbenzo[a]pyrene	4	2.425	0.460	5.821	1.710	2.208	ug/hph
98-03	BUS	9-methylanthracene	4	6.564	2.482	16.499	3.638	5.767	ug/hph
98-03	BUS	benzo[a]fluorene	2	0.064	0.064	0.064	0.064	0.000	ug/hph
98-03	BUS	benzo[bkj]fluoranthene	3	1.638	0.229	2.718	1.967	1.042	ug/hph
98-03	BUS	benzo[b]fluorene	1	0.043	0.043	0.043	0.043	0.000	ug/hph
98-03	BUS	benzo[e]pyrene	3	11.813	0.150	25.894	9.395	10.648	ug/hph
98-03	BUS	benzo[ghi]fluoranthene	2	0.150	0.086	0.214	0.150	0.064	ug/hph
98-03	BUS	biphenyl	4	5456.101	4.323	21614.000	103.041	9328.863	ug/hph
98-03	BUS	coronene	3	0.205	0.030	0.437	0.148	0.171	ug/hph
98-03	BUS	dibenz[ah+ac]anthracene	1	1.584	1.584	1.584	1.584	0.000	ug/hph
98-03	BUS	perylene	2	0.814	0.755	0.873	0.814	0.059	ug/hph
98-03	BUS	retene	4	2.328	0.193	6.506	1.308	2.514	ug/hph

Total records	165
Total with 1 record	143
Total with 2 records	7
Max number of records	4
Total with max number of records	5

Table B-11e. Other PAH Compounds, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	1+2-ethylnaphthalene	4	117.577	0.637	254.935	107.368	91.436	ug/hph
98-03	BUS	5+6-methylchrysene	3	0.156	0.126	0.197	0.144	0.030	ug/hph
98-03	BUS	7-methylbenz[a]anthracene	3	0.097	0.079	0.120	0.092	0.017	ug/hph
98-03	BUS	7-methylbenzo[a]pyrene	5	1.635	0.321	2.198	1.802	0.681	ug/hph
98-03	BUS	9-methylanthracene	5	4.829	0.935	11.022	1.625	4.434	ug/hph
98-03	BUS	benzo[bkj]fluoranthene	4	1.322	0.113	2.231	1.472	0.766	ug/hph
98-03	BUS	benzo[e]pyrene	5	2.307	0.007	7.906	1.548	2.884	ug/hph
98-03	BUS	biphenyl	7	133.297	1.340	365.150	137.350	129.575	ug/hph
98-03	BUS	bis[2-ethylhexyl]phthalate	2	0.449	0.328	0.570	0.449	0.121	ug/hph
98-03	BUS	coronene	1	0.784	0.784	0.784	0.784	0.000	ug/hph
98-03	BUS	dibenz[ah+ac]anthracene	3	2.648	2.228	3.216	2.499	0.417	ug/hph
98-03	BUS	perylene	3	0.459	0.057	0.791	0.529	0.304	ug/hph
98-03	BUS	retene	4	0.313	0.021	0.804	0.214	0.321	ug/hph

Total records	13
Total with 1 record	1
Total with 2 records	1
Max number of records	7
Total with max number of records	1

Table B-12a. Regulated Pollutants, Heavy Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	CO	12	1.074	0.714	1.606	1.024	0.285	g/hph
pre-87	CRUISE	CO2	12	477	320	634	489	90.204	g/hph
pre-87	CRUISE	NOx	24	3.130	2.013	4.611	3.042	0.793	g/hph
pre-87	CRUISE	PM2.5	1	0.276	0.276	0.276	0.276	0.000	g/hph
pre-87	CRUISE	THC	13	0.446	0.122	0.602	0.426	0.139	g/hph
pre-87	IDLE	CO	12	10.994	5.718	23.971	8.523	5.348	g/hph
pre-87	IDLE	CO2	12	1,611	1,244	1,887	1,597	166.031	g/hph
pre-87	IDLE	NOx	24	10.118	6.451	14.554	9.216	2.553	g/hph
pre-87	IDLE	THC	12	5.185	2.883	7.501	5.218	1.668	g/hph
pre-87	IDLE	CO	8	25.096	5.870	75.480	13.660	22.781	g/mode
pre-87	IDLE	CO2	8	2,153	1,088	3,301	2,099	890.628	g/mode
pre-87	IDLE	NOx	16	12.689	1.790	31.840	9.185	8.686	g/mode
pre-87	IDLE	THC	8	7.923	2.430	13.100	7.550	3.885	g/mode
pre-87	TRANS	CO	10	3.471	2.630	4.467	3.389	0.676	g/hph
pre-87	TRANS	CO2	10	758	535	1,060	771	138.867	g/hph
pre-87	TRANS	NOx	20	4.709	2.726	6.541	4.605	1.141	g/hph
pre-87	TRANS	PM2.5	4	0.605	0.521	0.640	0.630	0.049	g/hph
pre-87	TRANS	THC	14	0.878	0.153	1.786	0.813	0.529	g/hph
pre-87	STEADYST	NOx	15	5.514	1.810	8.120	5.860	2.195	g/hph
pre-87	BUS	CO	1	2.496	2.496	2.496	2.496	0.000	g/hph
pre-87	BUS	NOx	1	12.800	12.800	12.800	12.800	0.000	g/hph
pre-87	BUS	THC	1	0.090	0.090	0.090	0.090	0.000	g/hph
87-90	CRUISE	CO	1	1.288	1.288	1.288	1.288	0.000	g/hph
87-90	CRUISE	CO2	1	538	538	538	538	0.000	g/hph
87-90	CRUISE	NOx	2	4.712	4.672	4.753	4.712	0.041	g/hph
87-90	CRUISE	PM2.5	1	0.488	0.488	0.488	0.488	0.000	g/hph
87-90	CRUISE	THC	1	0.166	0.166	0.166	0.166	0.000	g/hph
87-90	IDLE	CO	1	1.910	1.910	1.910	1.910	0.000	g/mode
87-90	IDLE	CO2	1	565	565	565	565	0.000	g/mode
87-90	IDLE	NOx	2	4.620	4.590	4.650	4.620	0.030	g/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
87-90	IDLE	PM2.5	1	1.142	1.142	1.142	1.142	0.000	g/mode
87-90	IDLE	THC	1	0.340	0.340	0.340	0.340	0.000	g/mode
87-90	TRANS	CO	1	2.553	2.553	2.553	2.553	0.000	g/hph
87-90	TRANS	CO2	1	756	756	756	756	0.000	g/hph
87-90	TRANS	NOx	2	6.181	6.139	6.223	6.181	0.042	g/hph
87-90	TRANS	PM2.5	1	1.147	1.147	1.147	1.147	0.000	g/hph
87-90	TRANS	THC	1	0.453	0.453	0.453	0.453	0.000	g/hph
91-93	TRANS	CO	17	1.654	0.840	2.686	1.700	0.658	g/hph
91-93	TRANS	NMHC	1	0.067	0.067	0.067	0.067	0.000	g/hph
91-93	TRANS	NO	1	4.563	4.563	4.563	4.563	0.000	g/hph
91-93	TRANS	NOx	17	4.463	3.900	4.900	4.500	0.299	g/hph
91-93	TRANS	PM2.5	1	0.216	0.216	0.216	0.216	0.000	g/hph
91-93	TRANS	THC	17	0.279	0.104	0.614	0.220	0.138	g/hph
94-95	CRUISE	CO	14	0.864	0.306	2.700	0.597	0.704	g/hph
94-95	CRUISE	CO2	12	532	330	664	501	94	g/hph
94-95	CRUISE	NOx	24	7.086	4.123	10.040	6.615	1.937	g/hph
94-95	CRUISE	PM2.5	3	0.064	0.053	0.071	0.067	0.008	g/hph
94-95	CRUISE	THC	14	0.103	0.041	0.223	0.096	0.053	g/hph
94-95	IDLE	CO	10	6.657	4.816	10.681	6.045	1.737	g/hph
94-95	IDLE	CO2	10	1,591	1,368	2,059	1,580	194	g/hph
94-95	IDLE	NOx	20	28.416	19.961	36.457	29.987	6.569	g/hph
94-95	IDLE	THC	10	2.107	1.622	2.614	2.115	0.316	g/hph
94-95	IDLE	CO	8	5.256	0.600	12.570	4.735	3.631	g/mode
94-95	IDLE	CO2	8	1,606	75	3,270	1,358	966	g/mode
94-95	IDLE	NOx	16	29.707	1.080	64.110	26.650	17.035	g/mode
94-95	IDLE	PM2.5	1	0.784	0.784	0.784	0.784	0.000	g/mode
94-95	IDLE	THC	8	2.261	0.090	4.610	2.295	1.495	g/mode
94-95	TRANS	CO	42	1.743	0.544	5.294	1.423	0.935	g/hph
94-95	TRANS	CO2	12	820	633	1,009	839	111	g/hph
94-95	TRANS	NOx	49	6.618	3.802	14.249	5.769	2.918	g/hph
94-95	TRANS	PM2.5	7	0.189	0.117	0.260	0.195	0.052	g/hph
94-95	TRANS	THC	42	0.238	0.046	0.601	0.201	0.164	g/hph
94-95	STEADYST	CO	45	0.577	0.359	0.910	0.576	0.167	g/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
94-95	STEADYST	NOx	45	2.795	1.700	4.519	2.774	0.955	g/hph
94-95	STEADYST	THC	45	0.163	0.080	0.452	0.101	0.120	g/hph
96-97	TRANS	CO	4	1.133	0.750	1.490	1.145	0.290	g/hph
96-97	TRANS	CO2	2	560	558	562	560	2	g/hph
96-97	TRANS	NOx	4	4.480	4.370	4.570	4.490	0.072	g/hph
96-97	TRANS	THC	4	0.133	0.060	0.230	0.120	0.063	g/hph
96-97	STEADYST	CO	3	0.416	0.412	0.418	0.418	0.003	g/hph
96-97	STEADYST	NOx	3	3.440	3.340	3.491	3.491	0.071	g/hph
96-97	STEADYST	THC	3	0.330	0.317	0.340	0.334	0.009	g/hph
96-97	BUS	CO	3	1.103	0.090	2.045	1.173	0.800	g/hph
96-97	BUS	CO2	3	651	629	679	645	21	g/hph
96-97	BUS	NOx	3	5.192	4.668	5.612	5.297	0.393	g/hph
96-97	BUS	THC	3	0.299	0.017	0.492	0.388	0.204	g/hph
98-03	FTP	CO	1	1.090	1.090	1.090	1.090	0.000	g/hph
98-03	FTP	CO2	1	604.000	604.000	604.000	604.000	0.000	g/hph
98-03	FTP	NOx	1	3.670	3.670	3.670	3.670	0.000	g/hph
98-03	CRUISE	CO	9	0.477	0.038	0.962	0.557	0.358	g/hph
98-03	CRUISE	CO2	9	532	475	665	498	63	g/hph
98-03	CRUISE	NOx	12	7.507	2.775	13.629	7.211	3.854	g/hph
98-03	CRUISE	PM2.5	3	0.066	0.047	0.084	0.068	0.015	g/hph
98-03	CRUISE	THC	7	0.076	0.052	0.152	0.057	0.035	g/hph
98-03	IDLE	CO	3	0.167	0.130	0.190	0.180	0.026	g/mode
98-03	IDLE	CO2	3	84	66	99	87	13	g/mode
98-03	IDLE	NOx	6	1.215	1.130	1.360	1.190	0.074	g/mode
98-03	IDLE	PM2.5	3	0.447	0.201	0.896	0.244	0.318	g/mode
98-03	IDLE	THC	3	0.093	0.080	0.120	0.080	0.019	g/mode
98-03	TRANS	CO	25	1.184	0.412	4.714	1.076	0.756	g/hph
98-03	TRANS	CO2	8	740	539	1,025	673	198	g/hph
98-03	TRANS	NO	1	5.903	5.903	5.903	5.903	0.000	g/hph
98-03	TRANS	NOx	28	4.410	3.579	5.913	4.068	0.756	g/hph
98-03	TRANS	PM2.5	4	0.180	0.048	0.353	0.159	0.119	g/hph
98-03	TRANS	THC	25	0.159	0.075	0.412	0.125	0.089	g/hph
98-03	STEADYST	CO	7	0.460	0.206	0.865	0.522	0.240	g/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	STEADYST	CO2	3	477	476	477	477	0	g/hph
98-03	STEADYST	NOx	11	4.847	3.055	6.200	5.600	1.152	g/hph
98-03	STEADYST	THC	11	0.151	0.103	0.196	0.153	0.036	g/hph
98-03	BUS	CO	16	1.517	0.042	4.124	1.360	1.168	g/hph
98-03	BUS	CO2	16	805	637	1,152	687	208	g/hph
98-03	BUS	NOx	16	11.192	7.716	14.456	11.655	2.112	g/hph
98-03	BUS	PM10	5	0.034	0.004	0.090	0.005	0.037	g/hph
98-03	BUS	PM2.5	5	0.013	0.001	0.053	0.002	0.020	g/hph
98-03	BUS	THC	12	0.174	0.002	0.532	0.094	0.180	g/hph

Total records	105
Total with 1 record	24
Total with 2 records	4
Max number of records	49
Total with max number of records	1

Table B-12b. Regulated Pollutants, Light-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	FTP	CO	26	1.884	0.860	7.810	1.485	1.369	g/mi
pre-87	FTP	NOx	26	1.926	0.690	4.000	1.640	0.986	g/mi
pre-87	FTP	PM10	22	0.557	0.016	1.597	0.469	0.365	g/mi
pre-87	FTP	PM2.5	22	0.531	0.015	1.557	0.457	0.344	g/mi
pre-87	FTP	THC	26	0.544	0.150	1.430	0.392	0.390	g/mi
pre-87	CRUISE	CO	7	2.127	0.990	5.240	1.520	1.356	g/mi
pre-87	CRUISE	CO2	7	385	276	502	422	77	g/mi
pre-87	CRUISE	NOx	7	1.604	0.970	2.070	1.770	0.418	g/mi
pre-87	CRUISE	PM10	7	1.959	0.914	3.582	1.794	0.893	g/mi
pre-87	CRUISE	PM2.5	1	2.321	2.321	2.321	2.321	0.000	g/mi
pre-87	CRUISE	THC	7	0.249	0.130	0.450	0.230	0.103	g/mi
87-90	FTP	CO	10	1.426	0.680	2.629	1.358	0.588	g/mi
87-90	FTP	NMHC	1	0.073	0.073	0.073	0.073	0.000	g/mi
87-90	FTP	NOx	10	3.394	0.810	9.294	2.353	2.827	g/mi
87-90	FTP	THC	10	0.309	0.100	0.700	0.254	0.188	g/mi
87-90	CRUISE	CO	1	0.970	0.970	0.970	0.970	0.000	g/mi
87-90	CRUISE	CO2	1	281	281	281	281	0	g/mi
87-90	CRUISE	NOx	1	0.980	0.980	0.980	0.980	0.000	g/mi
87-90	CRUISE	PM10	1	0.541	0.541	0.541	0.541	0.000	g/mi
87-90	CRUISE	THC	1	0.100	0.100	0.100	0.100	0.000	g/mi
91-93	FTP	CO	6	3.136	0.900	7.787	1.654	2.596	g/mi
91-93	FTP	NOx	6	3.210	1.470	7.494	2.059	2.128	g/mi
91-93	FTP	PM10	3	0.289	0.084	0.596	0.186	0.221	g/mi
91-93	FTP	PM2.5	3	0.273	0.077	0.566	0.175	0.211	g/mi
91-93	FTP	THC	6	0.524	0.110	1.300	0.396	0.404	g/mi
91-93	STEADYST	CO	35	0.841	0.116	3.406	0.371	0.906	g/hph
91-93	STEADYST	NOx	35	3.996	1.897	6.509	3.770	1.176	g/hph
91-93	STEADYST	THC	35	0.119	0.029	0.425	0.065	0.102	g/hph
91-93	STEADYST	CO	5	122.000	102.000	159.000	114.000	20.090	g
91-93	STEADYST	NOx	5	221.800	210.000	233.000	219.000	8.232	g

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
91-93	STEADYST	THC	5	39.000	31.000	57.000	33.000	9.633	g
94-95	FTP	CO	1	1.824	1.824	1.824	1.824	0.000	g/mi
94-95	FTP	NOx	1	1.560	1.560	1.560	1.560	0.000	g/mi
94-95	FTP	PM10	1	0.203	0.203	0.203	0.203	0.000	g/mi
94-95	FTP	PM2.5	1	0.200	0.200	0.200	0.200	0.000	g/mi
94-95	FTP	THC	1	0.199	0.199	0.199	0.199	0.000	g/mi
96-97	FTP	CO	1	0.059	0.059	0.059	0.059	0.000	g/mi
96-97	FTP	NOx	1	0.849	0.849	0.849	0.849	0.000	g/mi
96-97	FTP	PM10	1	0.101	0.101	0.101	0.101	0.000	g/mi
96-97	FTP	PM2.5	1	0.096	0.096	0.096	0.096	0.000	g/mi
96-97	FTP	THC	1	0.017	0.017	0.017	0.017	0.000	g/mi
96-97	STEADYST	NOx	5	0.361	0.201	0.500	0.350	0.112	g/hph
96-97	STEADYST	CO	1	33.000	33.000	33.000	33.000	0.000	g/hr
96-97	STEADYST	NOx	1	18.000	18.000	18.000	18.000	0.000	g/hr
96-97	STEADYST	THC	1	5.000	5.000	5.000	5.000	0.000	g/hr
98-03	FTP	CO	17	1.548	0.176	3.300	1.448	0.741	g/mi
98-03	FTP	CO2	12	629	590	711	615	37	g/mi
98-03	FTP	NOx	17	4.823	0.601	9.123	4.703	3.090	g/mi
98-03	FTP	THC	17	0.373	0.094	0.610	0.386	0.120	g/mi
98-03	CRUISE	CO	13	1.022	0.644	2.420	0.953	0.496	g/mi
98-03	CRUISE	CO2	10	552	519	619	539	34	g/mi
98-03	CRUISE	NOx	13	4.890	1.289	7.690	4.859	2.262	g/mi
98-03	CRUISE	THC	13	0.170	0.133	0.224	0.177	0.024	g/mi
98-03	CRUISE	CO	1	12.600	12.600	12.600	12.600	0.000	g
98-03	CRUISE	NOx	1	13.200	13.200	13.200	13.200	0.000	g
98-03	CRUISE	THC	1	0.990	0.990	0.990	0.990	0.000	g
98-03	TRANS	CO	3	1.168	1.119	1.268	1.119	0.070	g/hph
98-03	TRANS	CO2	3	668	658	677	669	7	g/hph
98-03	TRANS	NOx	3	3.778	3.579	4.027	3.729	0.186	g/hph
98-03	TRANS	THC	3	0.075	0.075	0.075	0.075	0.000	g/hph
98-03	TRANS	CO	11	1.101	0.322	3.840	0.483	1.028	g/mi
98-03	TRANS	CO2	10	430	330	660	342	123	g/mi
98-03	TRANS	NOx	11	5.384	0.790	11.550	5.101	2.504	g/mi

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	TRANS	SO2	2	133.750	118.000	149.500	133.750	15.750	g/mi
98-03	TRANS	THC	11	0.220	0.086	0.870	0.161	0.209	g/mi
98-03	STEADYST	CO	3	10.933	2.800	24.400	5.600	9.591	g
98-03	STEADYST	NOx	3	10.200	2.300	22.400	5.900	8.751	g
98-03	STEADYST	THC	3	1.773	0.520	3.000	1.800	1.013	g
04	FTP	CO	4	2.275	1.600	2.700	2.400	0.415	g/mi
04	FTP	CO2	4	588	240	793	660	219	g/mi
04	FTP	NOx	4	3.325	0.200	6.100	3.500	2.209	g/mi
04	FTP	THC	4	0.498	0.360	0.660	0.485	0.108	g/mi

Total records	72
Total with 1 record	23
Total with 2 records	1
Max number of records	35
Total with max number of records	3

Table B-12c. Regulated Pollutants, Light/Medium Heavy-Duty

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	CRUISE	CO	1	2.070	2.070	2.070	2.070	0.000	g/hph
pre-87	CRUISE	PM2.5	1	0.813	0.813	0.813	0.813	0.000	g/hph
pre-87	TRANS	CO	4	5.214	1.717	8.033	5.553	2.700	g/hph
pre-87	TRANS	NO	4	7.935	7.545	8.397	7.898	0.304	g/hph
pre-87	TRANS	NOx	4	7.667	7.214	8.184	7.635	0.346	g/hph
pre-87	TRANS	PM2.5	3	1.637	1.520	1.726	1.666	0.086	g/hph
87-90	CRUISE	PM2.5	1	1.058	1.058	1.058	1.058	0.000	g/hph
87-90	TRANS	CO	1	8.464	8.464	8.464	8.464	0.000	g/hph
87-90	TRANS	NO	1	8.768	8.768	8.768	8.768	0.000	g/hph
87-90	TRANS	NOx	1	8.846	8.846	8.846	8.846	0.000	g/hph
87-90	TRANS	PM2.5	1	1.186	1.186	1.186	1.186	0.000	g/hph
91-93	STEADYST	CO	9	0.871	0.705	1.239	0.794	0.154	g/hph
91-93	STEADYST	NOx	9	3.778	3.523	3.998	3.775	0.137	g/hph
91-93	STEADYST	THC	9	0.162	0.110	0.239	0.151	0.039	g/hph
94-95	CRUISE	CO	1	1.480	1.480	1.480	1.480	0.000	g/hph
94-95	CRUISE	PM2.5	1	0.103	0.103	0.103	0.103	0.000	g/hph
94-95	CRUISE	THC	1	0.311	0.311	0.311	0.311	0.000	g/hph
94-95	TRANS	CO	25	1.169	0.671	3.632	0.942	0.616	g/hph
94-95	TRANS	CO2	7	620	586	644	624	16	g/hph
94-95	TRANS	NMHC	1	0.302	0.302	0.302	0.302	0.000	g/hph
94-95	TRANS	NOx	24	4.842	4.555	5.552	4.720	0.285	g/hph
94-95	TRANS	PM2.5	2	0.245	0.196	0.294	0.245	0.049	g/hph
94-95	TRANS	THC	25	0.241	0.122	0.538	0.184	0.118	g/hph
96-97	CRUISE	CO	1	0.199	0.199	0.199	0.199	0.000	g/hph
96-97	CRUISE	CO2	1	1,003	1,003	1,003	1,003	0	g/hph
96-97	CRUISE	NOx	2	5.892	5.832	5.951	5.892	0.060	g/hph
96-97	CRUISE	PM2.5	1	0.082	0.082	0.082	0.082	0.000	g/hph
96-97	CRUISE	THC	1	0.146	0.146	0.146	0.146	0.000	g/hph
96-97	IDLE	CO	1	0.410	0.410	0.410	0.410	0.000	g/mode
96-97	IDLE	CO2	1	66	66	66	66	0	g/mode

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
96-97	IDLE	NOx	2	1.370	1.350	1.390	1.370	0.020	g/mode
96-97	IDLE	PM2.5	1	0.379	0.379	0.379	0.379	0.000	g/mode
96-97	IDLE	THC	1	0.140	0.140	0.140	0.140	0.000	g/mode
96-97	TRANS	CO	1	1.059	1.059	1.059	1.059	0.000	g/hph
96-97	TRANS	CO2	1	1,177	1,177	1,177	1,177	0	g/hph
96-97	TRANS	NOx	2	10.893	10.883	10.903	10.893	0.010	g/hph
96-97	TRANS	PM2.5	1	0.011	0.011	0.011	0.011	0.000	g/hph
96-97	TRANS	THC	1	0.410	0.410	0.410	0.410	0.000	g/hph
98-03	TRANS	CO	3	1.970	1.268	3.110	1.533	0.813	g/hph
98-03	TRANS	CO2	1	650	650	650	650	0	g/hph
98-03	TRANS	NO	2	4.143	3.400	4.885	4.143	0.743	g/hph
98-03	TRANS	NOx	3	4.012	3.356	4.653	4.027	0.530	g/hph
98-03	TRANS	PM2.5	2	0.110	0.087	0.134	0.110	0.024	g/hph
98-03	TRANS	THC	3	0.145	0.075	0.229	0.130	0.064	g/hph
98-03	STEADYST	CO	2	1.220	1.030	1.410	1.220	0.190	g/hph
98-03	STEADYST	NOx	6	3.510	3.000	4.000	3.600	0.370	g/hph
98-03	STEADYST	THC	6	0.112	0.080	0.180	0.105	0.035	g/hph

Total records	47
Total with 1 record	24
Total with 2 records	7
Max number of records	25
Total with max number of records	2

Table B-12d. Regulated Pollutants, Transit Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
pre-87	TRANS	CO	1	0.709	0.709	0.709	0.709	0.000	g/hph
pre-87	TRANS	NO	1	2.960	2.960	2.960	2.960	0.000	g/hph
pre-87	TRANS	NOx	1	2.984	2.984	2.984	2.984	0.000	g/hph
pre-87	TRANS	PM2.5	1	0.463	0.463	0.463	0.463	0.000	g/hph
pre-87	TRANS	THC	1	0.100	0.100	0.100	0.100	0.000	g/hph
pre-87	BUS	CO	1	1.297	1.297	1.297	1.297	0.000	g/hph
pre-87	BUS	NO	1	4.910	4.910	4.910	4.910	0.000	g/hph
pre-87	BUS	NOx	1	4.922	4.922	4.922	4.922	0.000	g/hph
pre-87	BUS	PM2.5	1	0.937	0.937	0.937	0.937	0.000	g/hph
pre-87	BUS	THC	1	0.213	0.213	0.213	0.213	0.000	g/hph
87-90	BUS	CO	4	1.469	1.139	1.706	1.515	0.224	g/hph
87-90	BUS	CO2	4	593.875	588.504	604.779	591.108	6.566	g/hph
87-90	BUS	NOx	4	5.409	4.383	5.924	5.664	0.614	g/hph
87-90	BUS	PM2.5	4	0.383	0.199	0.613	0.361	0.171	g/hph
87-90	BUS	THC	4	0.534	0.408	0.584	0.573	0.073	g/hph
91-93	TRANS	CO	1	1.507	1.507	1.507	1.507	0.000	g/hph
91-93	TRANS	PM2.5	1	0.187	0.187	0.187	0.187	0.000	g/hph
91-93	TRANS	THC	1	0.265	0.265	0.265	0.265	0.000	g/hph
91-93	BUS	CO	1	5.265	5.265	5.265	5.265	0.000	g/hph
91-93	BUS	NO	1	6.975	6.975	6.975	6.975	0.000	g/hph
91-93	BUS	NOx	1	6.905	6.905	6.905	6.905	0.000	g/hph
91-93	BUS	PM2.5	1	0.515	0.515	0.515	0.515	0.000	g/hph
91-93	BUS	THC	1	0.499	0.499	0.499	0.499	0.000	g/hph
98-03	BUS	CO	24	0.616	0.019	2.782	0.300	0.836	g/hph
98-03	BUS	CO2	24	778	543	1,536	619	357	g/hph
98-03	BUS	NO2	6	2.390	0.342	7.554	1.594	2.477	g/hph
98-03	BUS	NOx	26	8.232	4.344	15.044	5.671	4.211	g/hph
98-03	BUS	PM10	4	0.066	0.003	0.168	0.046	0.068	g/hph
98-03	BUS	PM2.5	6	0.049	0.001	0.141	0.039	0.048	g/hph
98-03	BUS	SO2	11	32.707	1.498	132.680	5.992	49.543	g/hph

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	THC	23	0.043	0.002	0.195	0.017	0.052	g/hph

Total records	31
Total with 1 record	18
Total with 2 records	0
Max number of records	26
Total with max number of records	1

Table B-12e. Regulated Pollutants, School Bus

Model Years	Cycle	Pollutant	Number of Records	Average	Minimum	Maximum	Median	Standard Deviation	Units
98-03	BUS	CO	8	1.115	0.050	2.328	0.704	0.794	g/hph
98-03	BUS	CO2	9	611	511	699	606	55	g/hph
98-03	BUS	NMHC	1	0.130	0.130	0.130	0.130	0.000	g/hph
98-03	BUS	NOx	9	5.731	3.376	6.770	6.070	1.016	g/hph
98-03	BUS	PM10	5	0.040	0.006	0.067	0.053	0.027	g/hph
98-03	BUS	PM2.5	5	0.035	0.005	0.060	0.052	0.024	g/hph
98-03	BUS	THC	5	0.162	0.130	0.208	0.159	0.026	g/hph

Total records	7
Total with 1 record	1
Total with 2 records	0
Max number of records	9
Total with max number of records	2

APPENDIX C. UNIT CONVERSION (g/mi to g/hp-hr)

Engine Model Year	Vehicle Type	Conversion Factor
pre-1987	HHD	0.32
1987	HHD	0.32
1988	HHD	0.323
1989	HHD	0.326
1990	HHD	0.329
1991	HHD	0.332
1992	HHD	0.335
1993	HHD	0.337
1994	HHD	0.34
1995	HHD	0.343
1996	HHD	0.346
1997	HHD	0.346
1998	HHD	0.346
1999	HHD	0.346
2000	HHD	0.346
2001	HHD	0.346
2002	HHD	0.346
2003	HHD	0.346
2004	HHD	0.346
pre-1987	L/MHD	0.647
1987	L/MHD	0.647
1988	L/MHD	0.649
1989	L/MHD	0.651
1990	L/MHD	0.652
1991	L/MHD	0.654
1992	L/MHD	0.656
1993	L/MHD	0.657
1994	L/MHD	0.659
1995	L/MHD	0.66
1996	L/MHD	0.662
1997	L/MHD	0.662
1998	L/MHD	0.662
1999	L/MHD	0.662
2000	L/MHD	0.662
2001	L/MHD	0.662
2002	L/MHD	0.662
2003	L/MHD	0.662
2004	L/MHD	0.662
pre-1987	SCHOOL BUS	0.376
1987	SCHOOL BUS	0.376
1988	SCHOOL BUS	0.374
1989	SCHOOL BUS	0.372
1990	SCHOOL BUS	0.371
1991	SCHOOL BUS	0.369
1992	SCHOOL BUS	0.361
1993	SCHOOL BUS	0.354
1994	SCHOOL BUS	0.348
1995	SCHOOL BUS	0.341
1996	SCHOOL BUS	0.335
1997	SCHOOL BUS	0.335
1998	SCHOOL BUS	0.335

Engine Model Year	Vehicle Type	Conversion Factor
1999	SCHOOL BUS	0.335
2000	SCHOOL BUS	0.335
2001	SCHOOL BUS	0.335
2002	SCHOOL BUS	0.335
2003	SCHOOL BUS	0.335
2004	SCHOOL BUS	0.335
pre-1987	TRANSIT BUS	0.218
1987	TRANSIT BUS	0.218
1988	TRANSIT BUS	0.217
1989	TRANSIT BUS	0.217
1990	TRANSIT BUS	0.217
1991	TRANSIT BUS	0.216
1992	TRANSIT BUS	0.216
1993	TRANSIT BUS	0.215
1994	TRANSIT BUS	0.215
1995	TRANSIT BUS	0.214
1996	TRANSIT BUS	0.214
1997	TRANSIT BUS	0.214
1998	TRANSIT BUS	0.214
1999	TRANSIT BUS	0.214
2000	TRANSIT BUS	0.214
2001	TRANSIT BUS	0.214
2002	TRANSIT BUS	0.214
2003	TRANSIT BUS	0.214
2004	TRANSIT BUS	0.214

APPENDIX D. DATA COLLECTION

This Appendix was originally Chapter II of E75-1, "Compilation of Diesel Emissions Speciation Data," published in 2007. This chapter is copied here to clearly explain to the readers of the E75-2 report the origins of the data contained in this report, describe the studies that generated the original E75-1 database, and to help readers to avoid misinterpretation or misuse of the results of E75-2 when comparing with similar studies. E75-1 included the development of the original full Diesel Speciation Database, and this database includes some testing results generated with research-grade fuels and aftertreatment hardware that are not commercially available. As described in Chapter II of E75-2, to enable more general use, the database used for the E75-2 analyses contains parsed and re-organized data with a focus on results generated using commercial diesel fuel that was available during the respective years of testing.

CHAPTER II. DATA COLLECTION

The principal task for this project was to conduct an in-depth literature search to identify studies in which measurements of speciated diesel exhaust emissions from diesel engines were made. There were no restrictions regarding the model year of the engine. Only those emission tests conducted with diesel fuels and lubricants representative of those commercially used in the U.S. were included. In performing the literature search for this project, Pechan accessed peer-reviewed materials such as journal papers (e.g., Environmental Science and Technology [ES&T]) and papers and reports from the Society of Automotive Engineers (SAE), CRC, NREL, California Air Resources Board (CARB), EPA, and research institutes (e.g., University of Wisconsin, West Virginia University, University of California at Riverside). The bulk of the reports used in this effort were published by SAE.

Copies of the source materials identified were procured by purchase from the Internet, from interlibrary loan, or from Pechan's in-house data collections. After review and analysis of the report content and speciation methodology employed, the suitability of each reference was briefly summarized for this project in a separate spreadsheet. Data from a total of 81 out of the 243 references reviewed are included in the database. The studies for which data have been included in the Diesel Speciation Database are briefly summarized below in Table II-1, along with the corresponding Project ID of the study as included in the Diesel Speciation Database, the number and type of vehicles tested, the model years of these vehicles, and the reference citations for these studies. It should be noted that the number and types of vehicles included in this table do not necessarily represent all of the vehicles tested in a given study. Rather, this represents the vehicles included in the Diesel Speciation Database. Additional vehicles from these studies may have been excluded for a number of reasons, including: the vehicles did not meet the study criteria; speciated emissions were not collected; data for other vehicles were not available; only certain phases of project data were included; or other reasons as determined during the data review process.

A brief description of each of these studies is provided below.

Table II-1. Summary of Studies and Vehicles Included in Diesel Speciation Database

Study Name	Project ID(s)	Vehicles Tested	Vehicle/Engine Model Years	Relevant References
Southwest Research Institute (SwRI) School Bus Study	1004	2 school buses	2001	Ullman, et al., 2003
SwRI study for the Ad Hoc Diesel Fuel Test Program	1002	1 LDDV	N/A	Ball, et al., 2001a; Ball, et al., 2001b; Ball, et al., 2001c
New York City Clean Diesel Demonstration Program	1003, 1005	2 diesel transit buses	1999	Lanni, et al., 2001; Chatterjee, et al., 2002; and Lanni, et al., 2003
California Institute of Technology	1013, 1023	2 MHDDT 2 HHDDT	1995 1987	Schauer, et al., 1999; Hildemann, et al., 1991; Rogge, et al., 1993a; Rogge, et al., 1993b

Study Name	Project ID(s)	Vehicles Tested	Vehicle/Engine Model Years	Relevant References
BP Southern California ULSD/DPF/CNG Heavy-duty study	1001, 1012	3 HDDT 1 transit bus 1 school bus	1996-1999 1998 1998	Lev-On, et al., 2002a; Lev-On, et al., 2002b; and LeTavec, et al., 2002; Alleman, 2005
SwRI Fischer-Tropsch study	1021	2 HDD engines	1999, 2000	Fanick, et al., 2001
CRC Mass vehicle tests	1015, 0116, 1025	16 LDDVs	1977-1994	Cadle, et al., 1999; Knapp, et al., 2003
CRC AVFL-10a & 10b	1024, AVFL-10a	4 LDDV/T ~110 L/HDDV	2004 1978-2000	Merritt, 2003; Fanick, 2005
CE-CERT	1006, 1007, 1008, 1011, 1022	14 HDDT 28 LDDV/T	1996-2000 1983-1999	Durbin, 2002a; Durbin, 2002b; Durbin, et al., 2003;Cocker, et al., 2004; Shah, et al., 2004; Shah, et al., 2005; Norbeck, et al., 1998
Gasoline-diesel PM Split Study	1010	30 HDDT 2 buses	1982-2001 1982, 1992	NREL, 2005
CRC E55/59	1009, 1018	1 MHDDT 8 HHDDT	1997 1985-2003	Gautam, et al., 2003; Clark, et al., 2005
Desert Research Institute	1014, 1017	4 LDDV 4 Diesel trucks	1991, 1998, 1999, 2000 N/A	Zielinska, et al., 2004; Lowenthal et al., 1994
Environment Canada	1019, 1020	1 LDDT 2 urban buses	1998 1989, 1998	Graham et al., 1998; Graham and Welburn, 2000

A. SOUTHWEST RESEARCH INSTITUTE (SwRI) SCHOOL BUS STUDY

In late 2002, Southwest Research Institute completed a study commissioned by International Truck and Engine Corporation (International) and ConocoPhillips to characterize the regulated pollutants and toxic air contaminants for three school bus configurations. This study measured emission results for numerous chemical compounds and elements. International was interested in a comparative emissions profile of its Green Diesel Technology school bus that is certified by EPA and CARB as meeting 2007 emission standards for particulates and hydrocarbons. ConocoPhillips was interested in knowing the impact of its ultra-low-sulfur fuel on the exhaust emissions of school buses equipped with low emitting diesel technology.

This work characterized the exhaust emissions from a diesel-powered bus, tested in a low-emitting diesel configuration (using the Green Diesel Technology) and also in a conventional diesel engine configuration. The second bus tested had a compressed natural gas engine. The conventional diesel school bus was manufactured by American Transportation and used a model year 2001 International DT530 model C275 engine. This engine is EPA 1998 certified. The low emitting school bus configurations was identical with the exception that it was equipped with an Engelhard catalyzed diesel particulate filter, and the engine control module was calibrated for low oxides of nitrogen (NO_x). This engine and filter combination meets EPA and CARB 2007 certification standards for PM and hydrocarbons (HC).

The conventional diesel configuration used Chevron Phillips number 2 diesel fuel that met the requirements of EPA certification testing. This fuel contained 371 parts per million (ppm) sulfur and 33 percent aromatics by weight. The ultra low sulfur diesel fuel used in the low emitting

configuration was from ConocoPhillips and contained 14 ppm sulfur and 31 percent aromatics by weight. It was taken from a commercially available, ultra-low sulfur diesel refinery run that contained cracked stock.

This program used the City-Suburban Heavy Vehicle Cycle (CSHVC) because it was considered to be most representative of school bus operation. Three consecutive cycles of the CSHVC, totaling 85 minutes, were performed during a single test. This was necessary to accumulate adequate sample for analysis. Samples of gaseous compounds were taken from the primary dilution tunnel. Whereas, samples for semi-volatile compounds and particulate bound compounds were taken after double dilution to ensure that the sample entering the collection media was below 52°C.

The emissions measured in this study included regulated emissions, NO, methane, particulate matter sulfate and soluble organic fraction, and CO_2. In addition, 41 toxic air contaminants that CARB associates with diesel exhaust are detailed, as are many individual polycyclic aromatic hydrocarbons, dioxins, furans, chlorobenzene derivatives and elements.

B. SwRI STUDY FOR THE AD HOC DIESEL FUEL TEST PROGRAM

This aim of this study was to quantify engine-out emissions of potentially toxic compounds from a modern diesel engine. Five diesel fuels were examined in this study:

- an ultra-low sulfur (~1 ppm sulfur), low-aromatic hydrocracked diesel;
- the same ultra-low sulfur diesel containing 15 percent by volume dimethoxy methane;
- a Fischer-Tropsch diesel fuel (the Fischer-Tropsch data are included in the database, but it should be noted that this is not a commercially available fuel);
- a CARB diesel fuel (at 176 ppm sulfur); and
- an EPA number 2 certification diesel fuel (at 337 ppm sulfur).

Testing for this project was performed by Southwest Research Institute. The project included a number of sponsors: Ford Motor Company, DaimlerChysler, Equilon Enterprises, Marathon Ashland Petroleum Co., PDVSA Intevep., and the U.S. Department of Energy.

A DaimlerChrysler OM611 light-duty diesel engine was controlled with a Rapid Prototyping Electronic Control System (RPECS) that allowed variation of common rail injection parameters, pilot injection and Exhaust Gas Recirculation (EGR). Program modifications were made to the RPECS to allow individual cylinder fuel injection timing and quantity control. This allowed balancing the indicated mean effective pressure and combustion phasing of each cylinder. The engine was operated over speed/load modes representative of typical operating modes found in the US Federal Test Procedure (FTP) driving schedule. Each test point was run in triplicate. Measurements of PM, soluble organic fraction, NO_x, carbon monoxide (CO), total hydrocarbon (THC), benzene, 1,3-butadiene, formaldehyde, acetaldehyde, 17 PM bound polycyclic aromatic hydrocarbons (PAHs), and 10 gaseous phase PAHs were made. No nitro-PAHs (NPAHs) were reported.

C. NEW YORK CITY CLEAN DIESEL DEMONSTRATION PROGRAM

The New York City Metropolitan Transit Authority (MTA) initiated a Clean Diesel Demonstration Program. The Demonstration Program was aimed at implementing various diesel emission control, alternative fuel, and hybrid electric drive technologies to reduce transit bus emissions. As part of this program, emission testing was performed on several of the transit vehicles included in the Demonstration Program, under the supervision of the New York State Department of Environmental Conservation (NYSDEC), Environment Canada, and several industrial partners. NYSDEC and Environment Canada established a protocol for measuring both regulated and unregulated emissions from the selected in-use buses.

The program evaluated emissions from in-use buses powered by Detroit Diesel Corp. (DDC) Series 50 Diesel and Series 50G Compressed Natural Gas (CNG) engines. Two diesel-powered buses were tested and three CNG buses were tested. (The CNG results are not included in the diesel speciation database.) The transit buses that were evaluated were equipped with 1999 model year DDC Series 50 engines equipped with Johnson Matthey Continuously Regenerating Diesel Particulate Filters (CRDPF). They were fueled with 30 ppm sulfur, number 1 diesel fuel and driven over the Central Business District (CBD) and New York Bus (NYB) driving schedules. Some testing was also done with the standard 300 ppm sulfur, number 1 diesel fuel on these engines equipped with a diesel oxidation catalyst (DOC) that the fleet normally uses.

The emissions measured in this study included regulated pollutants, CO_2, NO_2, EC, OC, carbonyls, speciated hydrocarbons, PAHs, NPAHs, SO_4, and soluble organic fraction (SOF).

D. CALIFORNIA INSTITUTE OF TECHNOLOGY

A significant body of work initiated at the California Institute of Technology studied the composition of diesel particulate matter and other unregulated exhaust compounds. Gas and particle-phase tailpipe emissions were quantified using a two-stage dilution sampling system. Testing was performed on two pre-1998 medium-duty diesel trucks with no aftertreatment, using CARB diesel fuel. The vehicles were driven through the hot-start portion of the Federal Test Procedure driving cycle. Emission rates of numerous gas-phase and particulate-phase alkanes, alkenes, aromatics, terpanes, hopanes and steranes, carbonyls, and acids were quantified along with fine particle mass and chemical composition (elemental and organic carbon and trace elements). High molecular weight carbonyls up to tridecanal were measured. PM was characterized using a traditional filter sampler and with a denuder/filter/polyurethane foam (PUF) sampler.

E. BP SOUTHERN CALIFORNIA ULSD/DPF/CNG HEAVY-DUTY STUDY

This project, funded in part by the South Coast Air Quality Management District (SCAQMD) and CARB and carried out in 2001, evaluated ultra-low sulfur diesel fuels and passive diesel particulate filters (DPF) in several different truck and bus fleets operating in Southern California. A chemical characterization study was carried out to compare the exhaust emissions using the test fuels with and without aftertreatment. This project included the measurement of regulated emissions and CO_2, and the speciation of VOC, particle-bound and semi-volatile organics, inorganic ions, elements, PM_{10}, and $PM_{2.5}$.

Six vehicles (4 diesel and 2 CNG) were selected for the chemical characterization phase of the study – a school bus, two grocery trucks, and three transit buses. The vehicles were tested with the original exhaust system and subsequently fitted with DPFs provided by Engelhard and Johnson Matthey. The testing was carried out using a representative California diesel fuel, Arco ECD-1, and Arco ECD. One diesel vehicle was also tested with Fischer-Tropsch (F-T) diesel fuel. The Arco ECD fuel contained 4 ppm sulfur and 8 percent aromatics by weight, ECD-1 had 13 ppm sulfur and 18 percent aromatics by weight, CARB diesel had 115 ppm sulfur and 16 percent aromatics by weight, and the F-T fuel had < 1 ppm sulfur and 0.16 percent aromatics by weight. The vehicles were all 1998 or newer.

The school bus and grocery trucks were tested on the City Suburban Heavy Vehicle Route (CSHVR) test cycle, while the CBD cycle was used for the transit buses. To ensure adequate particulate matter collection, vehicles with aftertreatment devices were tested on back-to-back cycles with a single set of filter media.

F. SwRI STUDY FOR SYNTROLEUM

This study, carried out by SwRI, was done to support a petition to the U.S DOE to include Fischer-Tropsch as an alternative fuel in the Energy Policy Act of 1992 (EPAct). It compared emissions from a Cummins B-Series engine in a heavy light-duty truck when running on four different fuels. No emission aftertreatment devices were used, but this model year 1999 engine was certified for 1999 heavy-duty emission standards. Two engines were tested—one installed in a vehicle and driven on a chassis dynamometer, and the other on an engine dynamometer. The fuels tested included a conventional low sulfur number 2 diesel fuel with 300 ppm sulfur and 28 percent aromatics by volume, a CARB diesel with 150 ppm sulfur and 8 percent aromatics by volume, a Swedish diesel with less than 10 ppm sulfur and 4 percent aromatics by volume, and a Fischer-Tropsch fuel with less than 10 ppm sulfur and less than 1 percent aromatics by volume. Measured emissions included regulated emissions, methane, 1,3-butadiene, benzene, aldehydes, CO_2, N_2O, and particulates by size distributions.

The engine mounted directly on the dynamometer was operated over the US heavy-duty transient cycle while the vehicle was driven over the Urban Dynamometer Driving Schedule (UDDS), the Highway Fuel Economy Test (HFET), and the US06 cycles.

G. CRC MASS VEHICLE TESTS

Several studies funded by the CRC and DOE have been carried out to measure unregulated exhaust emissions from large numbers of in-use light-duty vehicles. Although most of the vehicles tested were gasoline fueled, there were a few diesel-fueled vehicles included in the studies as well.

One of these studies carried out in Denver, Colorado; San Antonio, Texas; and the South Coast Air Quality Management District, California included 49 diesel-fueled vehicles. The newest vehicles tested were from the 1997 model year. In addition to regulated exhaust emissions, organic carbon, SO_4, NO_3, common elements, particulate and semi-volatile PAHs, hopanes and

steranes were quantified. Hopanes and steranes are important because they are naturally present in petroleum and have been found to be present in motor oil. This has led to their use as marker compounds for PM emissions from motor vehicles in ambient PM source apportionment studies. Testing was carried out on the FTP-UDDS. It was expected that trace elements associated with catalyst attrition, could be detected if more sensitive analytical methods were employed

A second study was carried out in Cary, North Carolina using the IM240 test. This study included eight 1989 model year or older light-duty diesel vehicles. In addition to regulated emissions, measurements were made for CO_2, PM_{10}, organic and elemental carbon, carbonyls, PAH, NPAH, oxy-PAH, hopanes and steranes.

H. CRC AVFL-10a

The purpose of this study was to conduct an in-depth literature review to identify the state of knowledge of regulated and unregulated exhaust emissions from current, advanced technology diesel engines. The effort was focused on gathering engine-out emissions data without regard to engine application, fuel type, manufacturer, aftertreatment device employed, power output, or other factors. These data were used to create a relational database. This database of engine-out diesel exhaust emissions should facilitate the examination of the body of databases on different query criteria. In addition, a bibliography of each source reviewed in this project was prepared, with a brief synopsis of the content of each individual paper.

The emphasis for this project was placed initially on advanced technology engines--those developed to meet 2007 and future standards. Therefore, it was anticipated that the majority of the effort would be concentrated on reports published after the 1996 time frame. In fact, the project compiled data from sources as old as 1991. The bulk of studies, however, were published from 1998 to 2003. In total, Project AVFL-10a included a review of 155 sources and data were extracted from 72 of these. Most of the studies utilized to create the AVFL-10a database were published by the Society of Automotive Engineers (SAE), yet represent a global perspective with good representation from Asia and Europe.

I. CE-CERT

Some recent work at the Center for Environmental Research and Technology (CE-CERT), University of California has provided some unregulated emissions data from light-duty trucks. In one study, several fuel choices including CARB diesel (72 ppm sulfur, 23 percent aromatics), EC-D diesel (3 ppm sulfur, 11 percent aromatics), and three different blends of 20 percent biodiesel (two soybean methyl esters and one yellow grease methyl ester) with 80 percent CARB diesel were tested in several 1983 to 1993 light diesel trucks. Although the focus was mainly on regulated emissions, data on organic and elemental carbon as well as particle phase ions, trace elements and PAH compounds are provided in the supplemental information. Unregulated emissions presented in the supporting information of this study were not analyzed.

In another CE-CERT study, the regulated emissions as well as carbonyls, speciated hydrocarbons and PAH emissions were also quantified for 4 model year 1998 and 1999 light trucks. One of the trucks was tested with CARB diesel (17-48 ppm sulfur, 20 percent aromatics) and the other

three were equipped with an Engelhard diesel particulate filter and fueled with Arco ECD diesel (13-26 ppm sulfur, 9 to 10 percent aromatics) and in one case, with commercial Arco ECD-1 diesel (15 ppm sulfur, 20 percent aromatics). Although significant hydrocarbon speciation was carried out, only results for a few species and totals for C_1 to C_{13} NMOGs are reported. Data on EC, OC, particulate bound ion, and trace elements are reported.

J. GASOLINE/DIESEL PM SPLIT STUDY

The Gasoline/Diesel PM Split Study was undertaken to evaluate the sources and range of uncertainties associated with the methods and procedures used for sample collection and chemical analysis in the process of estimating the relative contributions of gasoline and diesel tailpipe emissions to ambient fine particulate matter concentrations. This project was sponsored by the U.S. Department of Energy's Office of FreedomCAR and Vehicle Technologies. Vehicle emissions testing was performed in Riverside, CA, in 2001 by Bevilacqua-Knight, Inc. (BKI) with the U.S. Environmental Protection Agency (EPA), and by West Virginia University. Chemical analysis of the emissions was performed by both Desert Research Institute (DRI) and the University of Wisconsin-Madison (UWM). In addition to the testing of heavy-duty diesel vehicles, this project also included testing of light-duty gasoline vehicles.

For the heavy-duty diesel emissions testing, West Virginia University's (WVU's) transportable heavy-duty vehicle emissions testing laboratory was used. Thirty heavy-duty diesel trucks were tested, with vehicle model years ranging from pre-1990 through 1998 and newer model year groups. The trucks also ranged from the light-heavy vehicle class to the heavy-heavy vehicle class. Fifteen of the trucks were from well-maintained fleets and were of recent model years. The remaining trucks represented a mix of in-use vehicles. Two transit buses were also tested, representing older and newer engine technologies.

The heavy-duty diesel trucks were tested over the following driving cycles:

- the City-Suburban Heavy Vehicle Route (CSHVR);
- the highway cycle; and
- at idle operation.

The buses were tested over the following cycles:

- the CSHVR;
- an idle period; and
- the Manhattan test cycle.

One of the project objectives was to compare the analysis of organic species from multiple laboratories. To accomplish this, samples were collected in parallel by DRI and UWM for each test, and were analyzed independently. The chemical analyses of the engine emissions and ambient samples included gravimetric mass, elements, ions, EC, OC, polycyclic aromatic hydrocarbons, hopanes, steranes, alkanes, and polar organic compounds.

K. CRC E-55/59

The CRC E-55/59 test program objective was to improve the understanding of the California heavy-duty vehicle emissions inventory by obtaining emissions from a representative vehicle fleet, and to include unregulated emissions measured for a subset of the tested fleet. The challenge of measuring the wide expanse of unregulated emissions and their low levels precluded obtaining unregulated measurements for all trucks recruited for this program. Sponsors of this project include CARB, EPA, Engine Manufacturers Association, DOE/NREL, and SCAQMD. The project consisted of four segments, designated as Phases 1, 1.5, 2, and 3. Seventy-five vehicles were recruited in total for the program, and recruitment covered the model year range of 1974 through 2004. The number and types of vehicles tested in each phase are as follows:

- Phase 1: 25 heavy heavy-duty diesel trucks (HHDDT);
- Phase 1.5: 13 HHDDTs;
- Phase 2: ten HHDDTs, seven medium heavy-duty diesel trucks (MHDDT), and two medium heavy-duty gasoline trucks (MHDGT); and
- Phase 3: nine MHDDT, eight HHDDT, and two MHDGT.

The vehicles tested in this study were procured in the Los Angeles area, based on model years specified by the sponsors and by engine types determined from a survey. WVU measured regulated emissions data from these vehicles and gathered emissions samples. Emission samples from a subset of the vehicles were analyzed by DRI for chemical species detail. The California Trucking Association assisted in the selection of vehicles to be included in this study. Speciation data were obtained from a total of nine different vehicles.

Emissions were measured using WVU's Transportable Heavy-Duty Vehicle Emissions Testing Laboratory. The laboratory employed a chassis dynamometer, with flywheels and eddy-current power absorbers, a full-scale dilution tunnel, heated probes and sample lines and research grade gas analyzers. PM was measured gravimetrically. Additional sampling ports on the dilution tunnel supplied dilute exhaust for capturing unregulated species and PM size fractions. Background data for gaseous emissions were gathered for each vehicle test and separate tests were performed to capture background samples of PM and unregulated species.

The HHDDTs were tested under unladen, 56,000 lb., and 30,000 lb. truck load weights. The driving cycles used for the HHDDT testing included:

- AC50/80;
- UDDS;
- Five modes of an HHDDT test schedule proposed by CARB: Idle, Creep, Transient, Cruise, and HHDDT_S (a high speed cruise mode of shortened duration); and
- The U.S. EPA transient test.

The proposed CARB HHDDT test cycle is based on California truck activity data, and was developed to improve the accuracy of emissions inventories. It should be noted that the transient

portion of this proposed CARB test schedule is not the same as the EPA certification transient test.

L. DESERT RESEARCH INSTITUTE

Researchers at DRI collected a series of emission samples for toxicity testing and detailed chemical characterization from a variety of gasoline and diesel-fueled in-use vehicles operated on the Unified Driving Cycle on a chassis dynamometer. Three current technology diesel vehicles from model years 1998, 1999, and 2000 were tested, as well as a 1991 model year diesel pick-up truck that was a high PM emitter. Emission rates of organic and elemental carbon (OC/EC), elements (metals and associated analytes), ions, and a variety of particulate and semi-volatile organic compounds (PAH, NPAH, oxy-PAH, hopanes, and steranes) were reported for these vehicles. Speciated organic analysis also was conducted on the fuels and lube oils obtained from these vehicles after the emissions testing. This work was sponsored by the DOE's Office of Heavy Vehicle Technologies through NREL.

In a separate study performed by DRI, emissions of heavy duty diesel-powered vehicles were measured at the Phoenix Transit Yard in South Phoenix in 1992 using the West Virginia University Transportable Heavy-Duty Vehicle Emissions Testing Laboratory. Thirteen heavy-duty trucks and buses were tested over this period. The vehicles were operated with diesel No. 2 and Jet A fuels, with and without a fuel additive, and with and without particulate control traps. Vehicles were tested over the Central Business District (CBD) driving cycle. Particulate matter in the diluted exhaust was sampled proportionally from a total-exhaust dilution tunnel. Emission rates and compositions of $PM_{2.5}$ particulate mass, elements, ions, bulk organic and elemental carbon, and gaseous and particulate PAHs were averaged for various classes of fuels and PM control.

M. ENVIRONMENT CANADA

The Emissions Research and Measurement Division (ERMD) of Environment Canada tested a light duty diesel truck on a chassis dynamometer over the four-phase Federal Test Procedure (FTP). The vehicle was tested at two temperatures using a commercially available low sulfur diesel fuel (LSD) and LSD blended with 10%, 20%, and 30% soybean oil methyl ester.

Samples of dilute exhaust were obtained using a constant volume sampling system and mass emission rates for the following emissions were determined:

- criteria emissions (CO, NO_x, THC) and CO_2;
- methane and non-methane organic compounds;
- methyl and ethyl esters of soybean oil;
- carbonyl compounds; and
- total particulate matter (TPM).

For another study, two in-use urban buses were tested over the Central Business District cycle at two temperatures (20 °C and –10 °C). The old technology bus was equipped with a 2-stroke diesel engine and was tested in two configurations – with the original equipment manufacturer

(OEM) muffler and with a retrofit oxidation catalyst. This bus was certified to the 1988 heavy-duty diesel engine emission standards. The new technology bus was equipped with a 4-stroke diesel engine with a close-coupled oxidation catalyst and was certified to stringent 1998 urban bus emission standards. Both buses see on-road service with the local public transit authority in Ottawa, Ontario, Canada.

Emission rates were determined for the gaseous criteria pollutants (CO, NO_x, THC), CO_2, methane and non-methane hydrocarbons, carbonyl compounds, vapor phase organic acids, sulfur dioxide (SO_2), NH_3, $PM_{2.5}$ mass emissions, particle phase organic and inorganic ions, metals, organic and elemental carbon and for particle phase organic compounds.