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2000 Nonmethane Organic Compounds (NMOC) and Speciated Nonmethane Organic Compounds (SNMOC) Monitoring Program

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AIRS	Aerometric Information and Retrieval System
AQS	Air Quality Subsystem (of the Aerometric Information and Retrieval System)
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FID	flame ionization detection
GC	gas chromatography
MSA	metropolitan statistical area
MSD	mass selective detection
NAAQS	national ambient air quality standard
NCDC	National Climatic Data Center
ND	nondetect
NMOC	nonmethane organic compounds
PDFID	preconcentration direct flame ionization detection
ppbC	parts per billion (by volume, on a carbon basis)
ppmC	parts per million (by volume, on a carbon basis)
ppbv	parts per billion (by volume)
RPD	relative percent difference
SIC	Standard Industrial Classification
SNMOC	speciated nonmethane organic compounds
TNMOC	total nonmethane organic compounds
TRI	Toxics Release Inventory
UV	ultraviolet
VOC	volatile organic compounds

Monitoring Stations

BXNY	New York City, NY (Bronx)
CAMS12	El Paso, Texas
CAMS13	Fort Worth, Texas

Executive Summary

This report summarizes and interprets ambient air monitoring data collected during the summer of 2000 as part of the National Nonmethane Organic Compound and Speciated Nonmethane Organic Compound Monitoring Program, which is also called the NMOC/SNMOC Monitoring Program. Designed to characterize levels of air pollution in regions with ground-level ozone problems, the NMOC/SNMOC Monitoring Program measures air concentrations of several groups of pollutants that participate in the photochemical reactions that form "smog." The 2000 NMOC/SNMOC Monitoring Program spanned four months (June to September), during which ambient air samples were collected daily between 6:00 a.m. and 9:00 a.m., local time, at three monitoring locations. These samples were analyzed for NMOC and SNMOC. Overall, over 5000 ambient air concentrations were measured during the 2000 program.

This report uses various graphical, numerical, and statistical analyses to identify and illustrate meaningful trends and patterns in this large volume of ambient air monitoring data. Some of the analyses in this report, such as the concise data summary tables, intentionally follow the same data analysis framework used in earlier reports on past National Program elements. This consistent use of certain analyses facilitates comparisons among the 2000 program and earlier NMOC/SNMOC programs. To provide the reader with new perspective on the NMOC/SNMOC monitoring data, however, this report includes several analyses that have been addressed previously, such as a detailed review of annual variations in air quality. Though the analyses in this report highlight many trends in the data collected during the 2000 program, researchers are encouraged to examine the NMOC/SNMOC ambient air monitoring data to better understand the complex ozone formation processes further. Accordingly, the 2000 NMOC/SNMOC monitoring data have been made publicly available in electronic format on the U.S. Environmental Protection Agency's Aerometric Information Retrieval System (AIRS).

1.0 Introduction

The U.S. Environmental Protection Agency (EPA) requires state environmental agencies to develop and implement plans to reduce ozone concentrations in areas that are not in attainment with the ozone national ambient air quality standard (NAAQS). Implementing effective ozone control strategies has proven to be a complicated task, largely because of the numerous variables that affect ozone formation processes. To help state environmental agencies characterize some of these variables, EPA sponsors the Nonmethane Organic Compounds (NMOC) and Speciated Nonmethane Organic Compounds (SNMOC) Monitoring Program. This program is designed to measure ambient air concentrations of four classes of compounds that affect ozone formation:

- Total NMOC;
- SNMOC;
- Volatile organic compounds (VOC); and
- Carbonyls.

For the 2000 NMOC/SNMOC Monitoring Program, the VOC and carbonyl options were not requested by the participating sites. Since the inception of the program in 1984, many state agencies have participated in EPA's program by installing air monitoring stations within their jurisdictions. This report summarizes and interprets results from the 2000 NMOC/SNMOC Monitoring Program, which included up to 4 months of daily measurements of ambient air quality in or near three metropolitan areas. This summary report provides a qualitative overview of air pollution at the NMOC/SNMOC monitoring stations, as well as a quantitative analysis of the monitoring data and several other factors that are known to affect ozone formation processes.

So that new and historical data can easily be compared, the report presents descriptive summary statistics in a format identical to that of previous NMOC/SNMOC reports.

While this report attempts to thoroughly characterize the large volume of NMOC/SNMOC monitoring data, additional analyses could be performed so that the many factors that affect ambient air quality can be fully appreciated. To facilitate further analysis of the NMOC/SNMOC sampling results, the entire set of ambient air monitoring data is presented in the appendices of this report and will be available on the Air Quality Subsystem (AQS) of the Aerometric Information and Retrieval System (AIRS), an electronic database maintained by EPA.

This report is organized into seven text sections and two appendices. Table 1-1 lists the contents of each report section. As with previous NMOC/SNMOC reports, all figures and tables cited in the text appear at the end of their respective sections (figures first, followed by tables).

Table 1-1
Organization of the 2000 NMOC/SNMOC Summary Report

Report Section	Section Title	Overview of Contents
1	Introduction	This section presents general and historical information on the NMOC/SNMOC monitoring program.
2	The 2000 NMOC/SNMOC Program	This section provides background information on the scope of the 2000 NMOC/SNMOC program and information about the: • Sampling locations • Compounds of interest • Air monitoring options • Sampling schedules implemented at each location • Sampling and analytical methods used to measure ambient air concentrations • Data quality parameters used to characterize the quality of the monitoring measurements
3	Data Analysis Methodology	This section presents the methodology used throughout the report to present and interpret the ambient air monitoring data.
4	Analysis of Total NMOC Monitoring Results	These sections use the methodology presented in Section 3 to: • Interpret the air monitoring data for total NMOC and SNMOC • Summarize the monitoring data and identify trends and patterns in levels of air pollution • Note the significance of spatial and temporal variations observed in the measured concentrations
5	Analysis of SNMOC Monitoring Results	
6	Conclusions and Recommendations	This section summarizes the most significant findings of the report and makes several recommendations for further work in characterizing ambient air concentrations of nonmethane organic compounds.
7	References	This section lists the references cited throughout this summary report.

2.0 The 2000 NMOC/SNMOC Monitoring Program

This section of the report presents relevant background information for the 2000 NMOC/SNMOC program. This program included three monitoring stations that collected 3-hour integrated samples of ambient air according to site-specific schedules. Depending on the monitoring options that were selected for each station, air samples were analyzed for either total NMOC, SNMOC, or a combination. The following discussion describes in greater detail the monitoring locations, compounds selected for monitoring, sampling schedules, and sampling and analytical methods of the program.

2.1 Monitoring Locations

EPA sponsors the NMOC/SNMOC monitoring program to help state and local air pollution control agencies better understand how the composition of air pollution affects the formation and transport of ozone within a given region. Agencies can participate in this program by working cooperatively with EPA to identify suitable monitoring locations, select classes of compounds for monitoring, install ambient air monitoring equipment, and send samples to a designated central laboratory for analysis. The participating agencies also must contribute to the overall monitoring costs.

Figure 2-1 shows the locations of the three 2000 NMOC/SNMOC monitoring stations. Each monitoring site has been assigned both an alphanumeric code for purposes of tracking air samples from the field to the laboratory and a unique 9-digit "AIRS Code" for purposes of logging and indexing site descriptions and monitoring results in EPA's AIRS database. For each monitoring location, Table 2-1 lists the alphanumeric codes, the AIRS codes, and other site information described later in this section.

As illustrated in Figures 2-2 through 2-4, the three stations participating in the 2000 program were located in three urban areas: the Dallas–Fort Worth metropolitan area, the El Paso area, and the New York City area. The maps illustrate that a monitor was located in a primarily residential neighborhood (i.e., Fort Worth), while another was located in a more industrial area

(i.e., New York City). The graphics in Figures 2-5 through 2-7 identify the numbers and types of facilities that are located within 10 miles of the monitoring locations and were required to report to the 1998 Toxics Release Inventory (USEPA, 2000). For each monitoring location, the text in Table 2-2 describes site characteristics that may not be readily apparent from the maps. Not surprisingly, chemical concentrations measured during the 2000 NMOC/SNMOC program varied significantly among, and even within, these metropolitan areas. As previous NMOC/SNMOC reports have concluded, the proximity of the monitoring locations to different emissions sources, especially heavily traveled roadways, likely explains the observed spatial variations in ambient air quality.

At every NMOC/SNMOC monitoring location, the air sampling equipment was installed in a small enclosure—usually a trailer or a shed—with sampling inlet probes protruding through the roof. Using this common setup, every NMOC/SNMOC monitor sampled ambient air at heights approximately 2 to 10 meters above local ground level.

2.2 Compounds Selected for Monitoring

The agencies that sponsor NMOC/SNMOC monitoring stations decide what compounds are to be measured. Agencies that participated in the 2000 program selected their monitoring options from the following four groups of compounds:

- *Total NMOC.* In this option, air samples are analyzed to obtain a single value (total NMOC) that characterizes the overall levels of nonmethane organic compounds in the air. Some computer models use total NMOC concentrations as a critical input for forecasting ozone concentrations. Section 2.4.2 describes the NMOC sampling and analytical method in greater detail.

- *SNMOC.* Stations implementing this option collect air samples that are analyzed for ambient air concentrations of 80 hydrocarbons, as well as for the concentration of total NMOC. SNMOC concentrations also are used as inputs to certain ozone forecasting simulations. Table 2-3 lists the 80 compounds identified by this monitoring option and

their respective method detection limits, and Section 2.4.3 describes the SNMOC sampling and analytical method in greater detail.[1]

Table 2-1 indicates the compound groups that sponsoring agencies selected for monitoring at each of the three stations. Two of the stations collected samples that were analyzed for NMOC; one station collected samples analyzed for SNMOC.

2.3 Monitoring Schedules

In addition to selecting locations and compounds for monitoring, the agencies that sponsor NMOC/SNMOC monitoring locations also determine sampling schedules. Table 2-4 summarizes the sampling schedules and sampling frequencies implemented at the three participating locations. Although the sampling schedules vary across the different compound categories and monitoring locations, EPA requires that all monitoring stations adhere to three common scheduling features:

- On each sampling day, ambient air must be continuously sampled for 3 hours, starting at 6:00 a.m., local standard time. This sampling time and duration provides appropriate precursor hydrocarbon input values for ozone transport models.
- Sampling must generally be performed between June 8 and October 2. Ambient air concentrations of ozone are known to peak during the summer months when photochemical reactivity also peaks.
- Roughly 10 percent of all samples must be collected in duplicate and analyzed in replicate. Duplicate and replicate data are critical for evaluating the precision of ambient air monitoring data

[1] The SNMOC analytical method actually reports concentration values for only 78 different compounds for each sample. Since the chromatographic analysis cannot differentiate isobutene from 1-butene or *m*-xylene from *p*-xylene, a single concentration is reported for these pairs. Therefore, the 78 values measured by this method characterize ambient levels of 80 compounds.

2.4 Sampling and Analytical Methods

Sampling and analytical methods used in monitoring programs ultimately determine what compounds can be identified in air samples, and at what levels. During the 2000 NMOC/SNMOC program, different sampling and analytical methods were used to measure air concentrations of total NMOC and SNMOC. The final report for the 1997 NMOC/SNMOC program described all of the available sampling and analytical methods in detail (ERG, 1997); for quick reference, Table 2-5 summarizes the general attributes (detection limits, units of measurement, etc.) of all these methods.

2.4.1 Data Handling Procedures

EPA-recognized conventions were applied in the analysis and presentation of the data collected during the 2000 NMOC/SNMOC program. Specifically, these conventions address units of measure, methods for presentation of the results of duplicate analyses, and methods used to present data when a sample is determined to contain a pollutant of interest at a value lower than the limit of detection of the applicable analytical method.

Units of Measurement

Units of measurement express results of scientific analyses in standard formats. The units used in a particular study, however, depend largely on the conventions followed by other researchers within a particular scientific field. In ambient air monitoring efforts, for example, scientists typically report air concentrations using several different units of measurement, such as parts per billion on a volume basis (ppbv) and parts per billion on a carbon basis (ppbC). This report, which is consistent with previous NMOC/SNMOC reports, adopts the conventions EPA (USEPA, 1988a) and other air monitoring researchers employ:

- Total NMOC and SNMOC monitoring data are expressed in units of ppbC; and
- Volatile Organic Compounds (VOC) and carbonyl monitoring data are expressed in units of ppbv.

For a given compound, concentrations can be converted between these different units of measurement according to the following equation:

$$Concentration\ (ppbC) = Concentration\ (ppbv) \times Number\ of\ Carbons$$

As an example, benzene (C_6H_6) has six carbon atoms. Therefore, by definition, a benzene concentration of 1.0 ppbv also equals a benzene concentration of 6.0 ppbC.

Because failure to consider subtle differences in units of measurement can result in significant misinterpretations of ambient air monitoring results, readers should pay particular attention to the units of measurement, especially when comparing the monitoring results to those of other studies.

Since the VOC and carbonyl options were not selected by the participating sites for the 2000 NMOC/SNMOC, there should not be any confusion between units of measure. This report will analyze data on a ppbC basis.

Detection Limits

The detection limit of an analytical method plays an important role in interpreting ambient air monitoring data. By definition, detection limits represent the lowest levels at which laboratory equipment can *reliably* quantify concentrations of selected compounds to a specified confidence level. Therefore, when samples contain concentrations of chemicals at levels below those chemicals' detection limits, multiple analyses of the same sample may lead to a wide range of results, including highly variable concentrations and "nondetect" observations. The estimated detection limits for the NMOC, SNMOC, VOC, and carbonyl analytical methods were all determined according to EPA guidance in "Definition and Procedure for the Determination of the Method Detection Limit" (FR, 1984).

To interpret air monitoring data in the proper context, data analysts should understand that the variability of analytical methods increases as sample concentrations decrease to trace

levels. Additionally, for this report, data handling techniques were used to present results for samples with concentrations determined to be below the detection limit. As recommended for risk assessments involving environmental monitoring data (USEPA, 1988a), *data analysts replaced all nondetect observations with concentrations equal to one-half of the compound's corresponding detection limit.*

Readers should note that in some instances, at the request of the EPA, quantified results below method detection limits are presented in this report. The actual analytical peaks that are detected on the instruments are reviewed by experienced analysts before inclusion in the monitoring database.

Duplicate Analyses

Duplicate sampling and replicate analysis results in the 2000 NMOC/SNMOC monitoring database were processed to assign each compound just one numerical concentration for each successful sampling date. *Following data processing procedures to address nondetects, data analysts entered the* ***average*** *of the concentrations from duplicate sampling and replicate analyses.*

2.4.2 Total NMOC

Ambient air concentrations of total nonmethane organic compounds were measured using EPA Compendium Method TO-12 (USEPA, 1988b). The TO-12 protocol specifies steps for collecting 3-hour integrated samples of ambient air in passivated stainless steel canisters, which are then analyzed by using cryogenic traps and flame ionization detection (FID).

EPA Compendium Method TO-12 cannot distinguish different hydrocarbon species nor can the methodology distinguish between hydrocarbons and other VOC that generate an FID response; rather, the analysis measures only the total amount of nonmethane organic compounds in the air sample (i.e., total NMOC).

Concentrations are reported in units of ppbC and the detection limit for this method is approximately 5 ppbC.

2.4.3 SNMOC

The laboratory analytical procedures and equipment for the SNMOC and VOC methods have been combined, allowing for simultaneous determination of both the target SNMOC and VOC compounds in a single air sample. The sampling method to collect samples for SNMOC and/or VOC analyses follows the same protocol as the total NMOC sample collection methods: ambient air is collected in the field in passivated stainless steel canisters.

Ambient air concentrations of SNMOC were measured according to EPA's research protocol "Determination of C_2 through C_{12} Ambient Air Hydrocarbons in 39 U.S. Cities from 1984 through 1986" (USEPA, 1989). Unlike the NMOC approach, the SNMOC analytical method involves passing the collected samples through a gas chromatographic (GC) column that separates individual hydrocarbon species before measuring concentrations with the FID. Because of this additional step, the FID can measure ambient air concentrations of *individual* organic compounds, as well as measuring *total* organic compounds. The GC column used during this program distinguishes 80 different compounds, which are listed, along with their estimated detection limits, in Table 2-3. Like the NMOC concentrations, the SNMOC concentrations are expressed in units of ppbC.

2.5 Data Quality Parameters

To characterize the quality of the 2000 NMOC/SNMOC monitoring measurements, Sections 4 and 5 review the completeness, precision, and accuracy of the corresponding sampling and analytical methods. Because the final report for the 1997 program thoroughly describes these data quality parameters, the following paragraphs only define them and briefly discuss their significance.

2.5.1 Completeness

Completeness refers to the number of valid samples (i.e., either quantified concentrations or nondetects) compared to the number of samples expected from the planned sample cycle. Due to a variety of sampling or analytical errors, not all the samples for the various monitoring options were collected and analyzed as scheduled. Although completeness data do not quantify the precision or accuracy of the monitoring methods, they do indicate how efficiently samples were collected and handled during the program. Coordinators of the SNMOC monitoring program generally strive for program completeness greater than 90 percent. Table 2-6 presents completeness data for NMOC and SNMOC sampling.

2.5.2 Precision

In the context of ambient air monitoring, *precision* refers to the agreement between independent air sampling measurements performed according to identical protocols and procedures. More specifically, precision measures the variability observed upon duplicate collection or repeated analysis of ambient air samples. This report compares concentrations from replicate analyses to quantify "analytical precision" and concentrations from duplicate samples to quantify "sampling precision." For any pair of duplicate samples or replicate analyses, precision is quantified by computing a relative percent difference (RPD). Tables 2-7 through 2-8 present precision for NMOC and SNMOC sampling, respectively.

Relative percent difference expresses average concentration differences relative to the average concentrations detected during replicate analyses. The RPD is calculated as follows:

$$RPD = \frac{|X_1 - X_2|}{\overline{X}} \times 100 \qquad \textbf{(1)}$$

Where:

X_1 is the ambient air concentration of a given compound measured in one sample;
X_2 is the concentration of the same compound measured during replicate analysis; and
$\overline{X}$ is the arithmetic mean of X_1 and X_2.

As Equation 1 shows, replicate analyses with low variability have lower RPDs (and better precision), and replicate analyses with high variability have higher RPDs (and poorer precision).

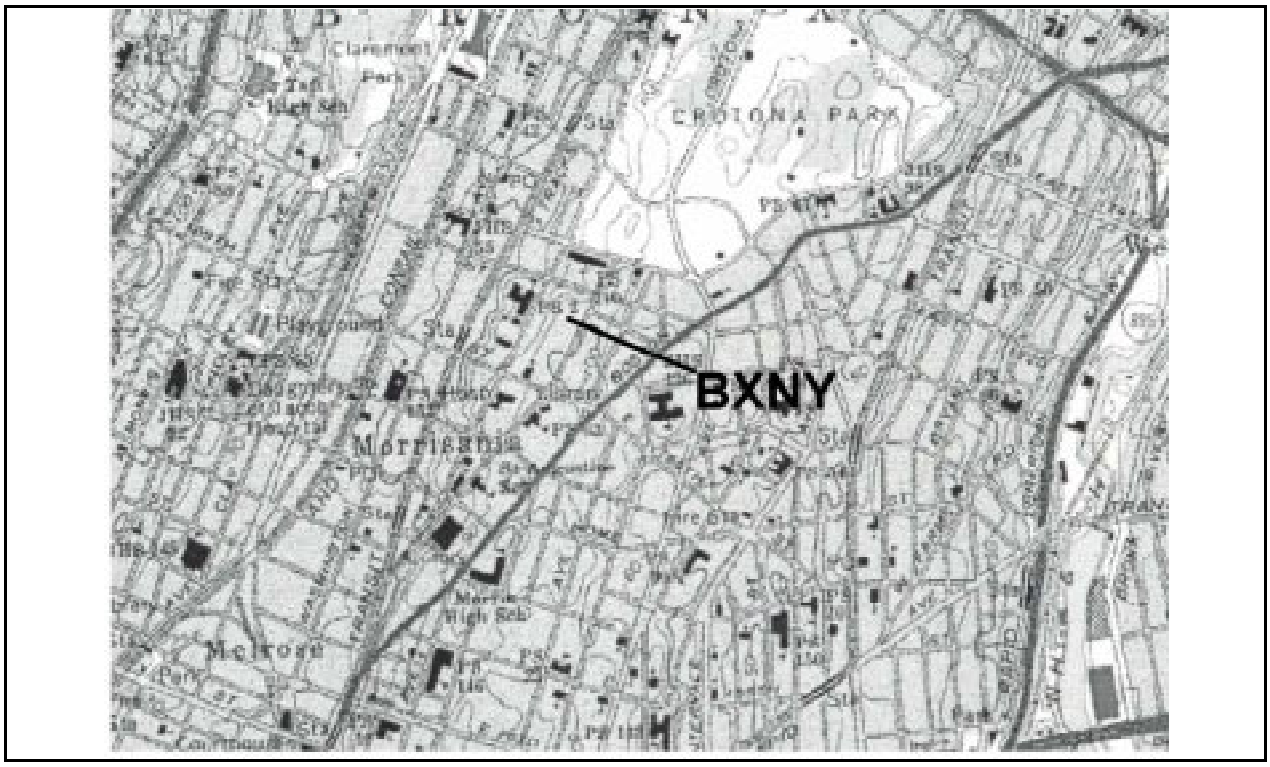
2.5.3 Accuracy

Accuracy of monitoring programs indicates the extent to which measured concentrations represent their corresponding "true" or "actual" values. Highly accurate air sampling and analytical methods generally measure concentrations in very close agreement to actual ambient levels. Because no external audit samples were provided during the 2000 NMOC/SNMOC program, it is impossible to quantify the accuracy of the air monitoring data. However, since all field sampling staff and laboratory analysts strictly followed established quality control and quality assurance guidelines, it is believed that all samples were collected and analyzed according to the specifications of the respective monitoring methods.

Figure 2-1
Location of the 2000 NMOC/SNMOC Monitoring Stations

Figure 2-2

Bronx, New York (BXNY) Monitoring Station



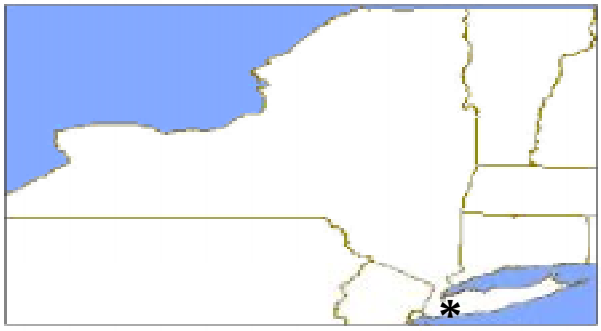
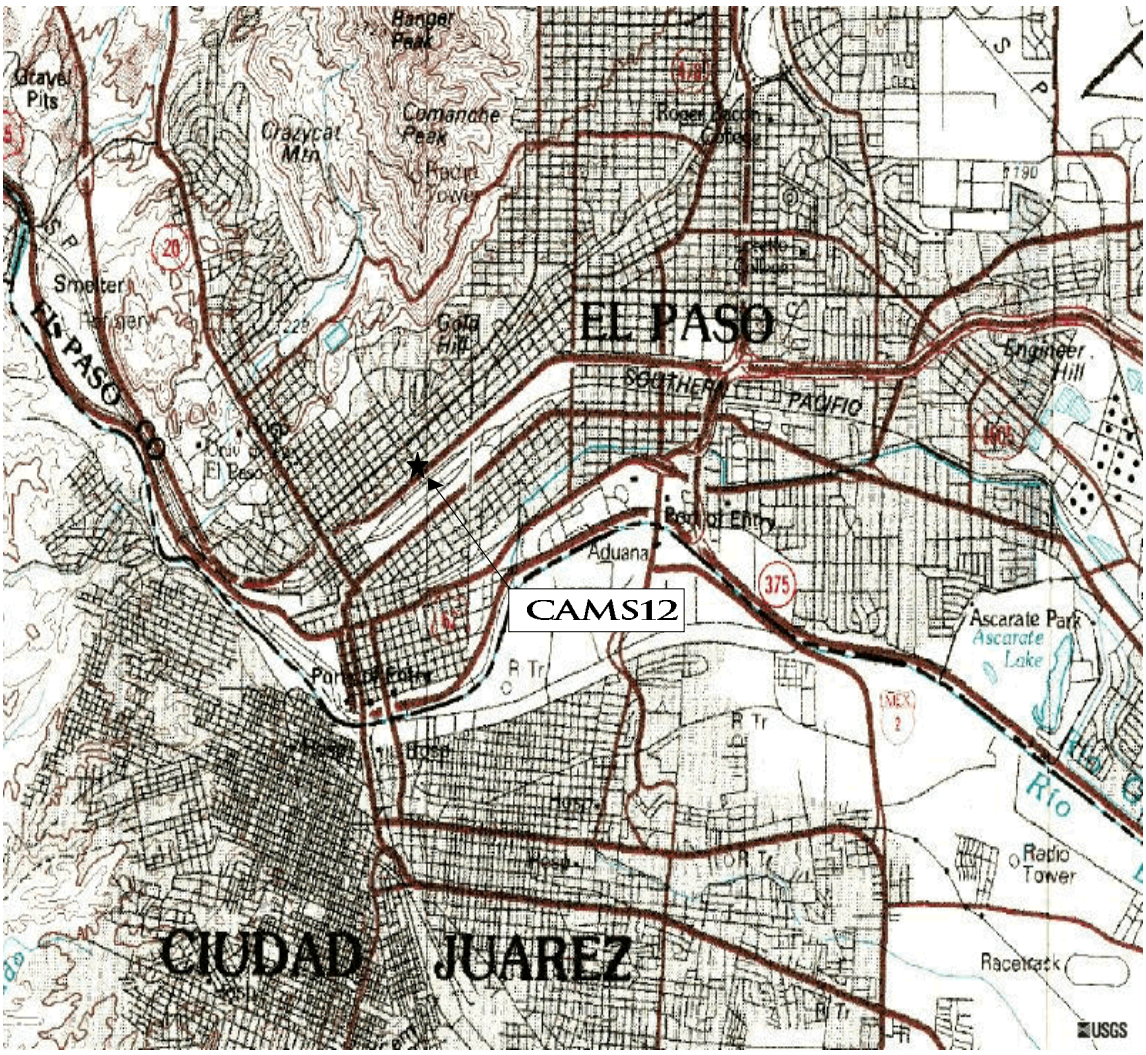


Figure 2-3

El Paso, Texas (CAMS 12) Monitoring Station



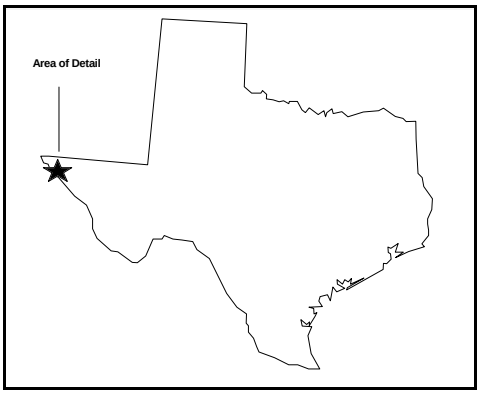


Figure 2-4

Fort Worth, Texas (CAMS 13) Monitoring Station

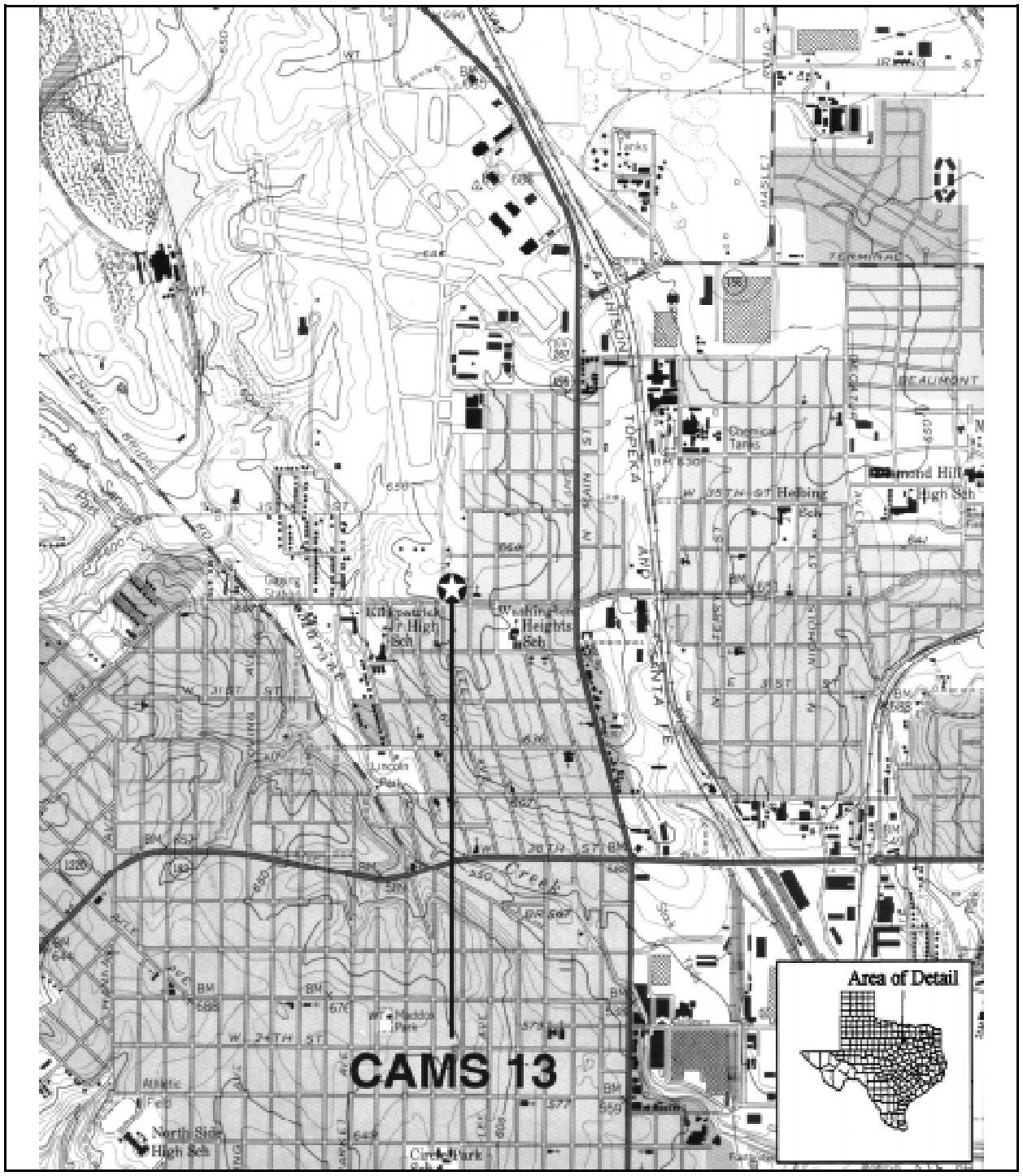


Figure 2-5
Facilities Within 10 Miles of the Bronx, New York (BXNY) Monitoring Station that Reported to TRI in 1998

Each square on this map represents a TRI-reported facility which is within a 10-mile radius of the monitoring site (represented by a triangle) and is classified by the following Standard Industrial Classification Major Groups:

A = Food and Kindred Products
B = Paper and Allied Products
C = Printing and Publishing
D = Chemicals and Allied Products
E = Rubber and Misc. Plastic Products
F = Stone, Clay, Glass and Concrete
G = Primary Metal Industries
H = Fabricated Metal Products
I = Industrial Machinery and Equipment
J = Electrical and Electronic Equipment
K = Instruments and Related Products
L = Miscellaneous Manufacturing Industries
M = Electric, Gas and Sanitary Services
N = Wholesale trade - Nondurable Goods

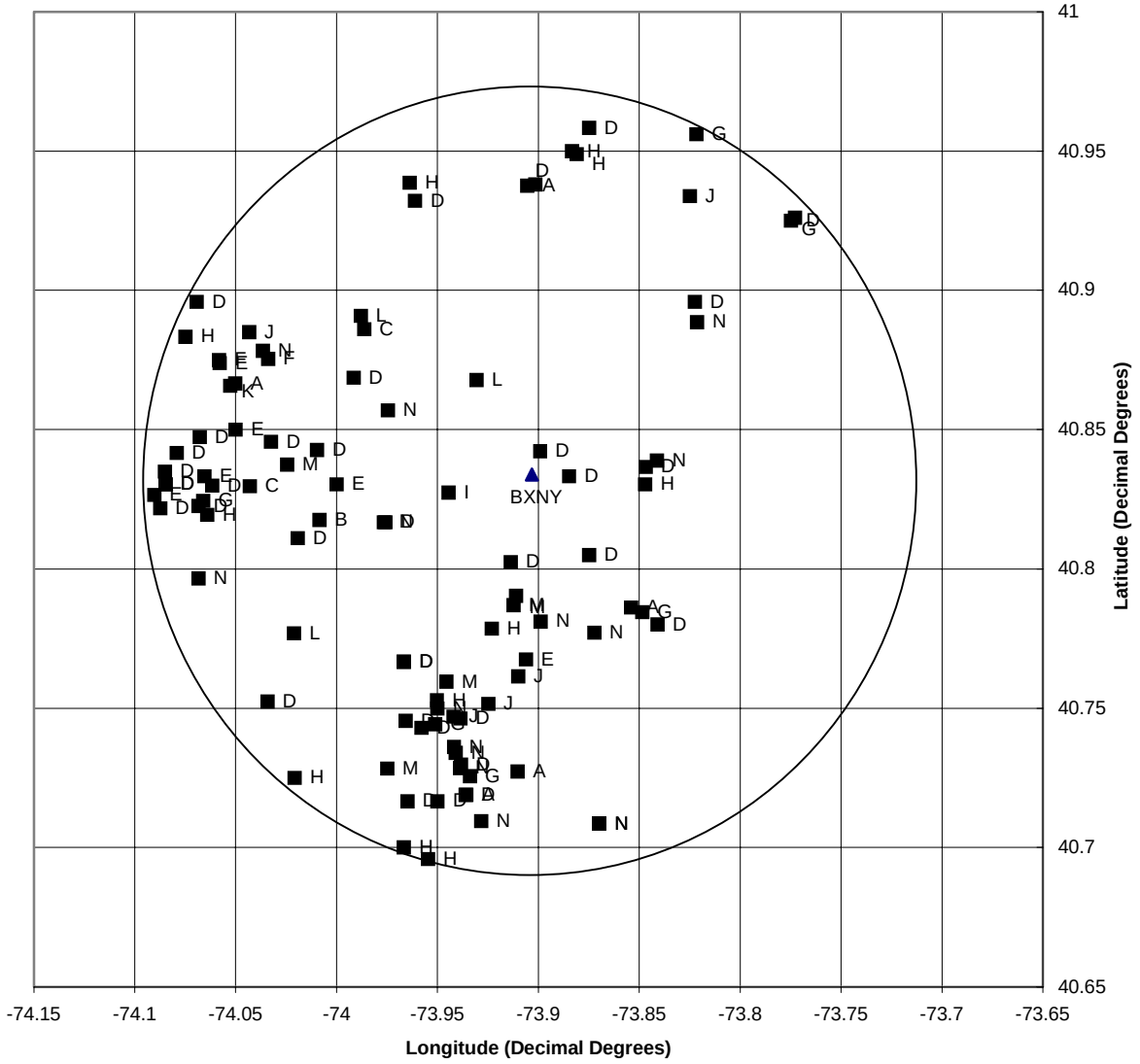


Figure 2-6
Facilities Within 10 Miles of the El Paso, Texas (CAMS 12) Monitoring Station That Reported to TRI in 1998

Each square on this map represents a TRI-reported facility which is within a 10-mile radius of the monitoring site (represented by a triangle) and is classified by the following Standard Industrial Classification Major Groups:

A = Food and Kindred Products
B = Chemicals and Allied Products
C = Petroleum and Coal Products
D = Rubber and Misc. Plastic Products
E = Leather and Leather Products
F = Primary Metal Industries
G = Fabricated Metal Products
H = Wholesale trade - Nondurable Goods

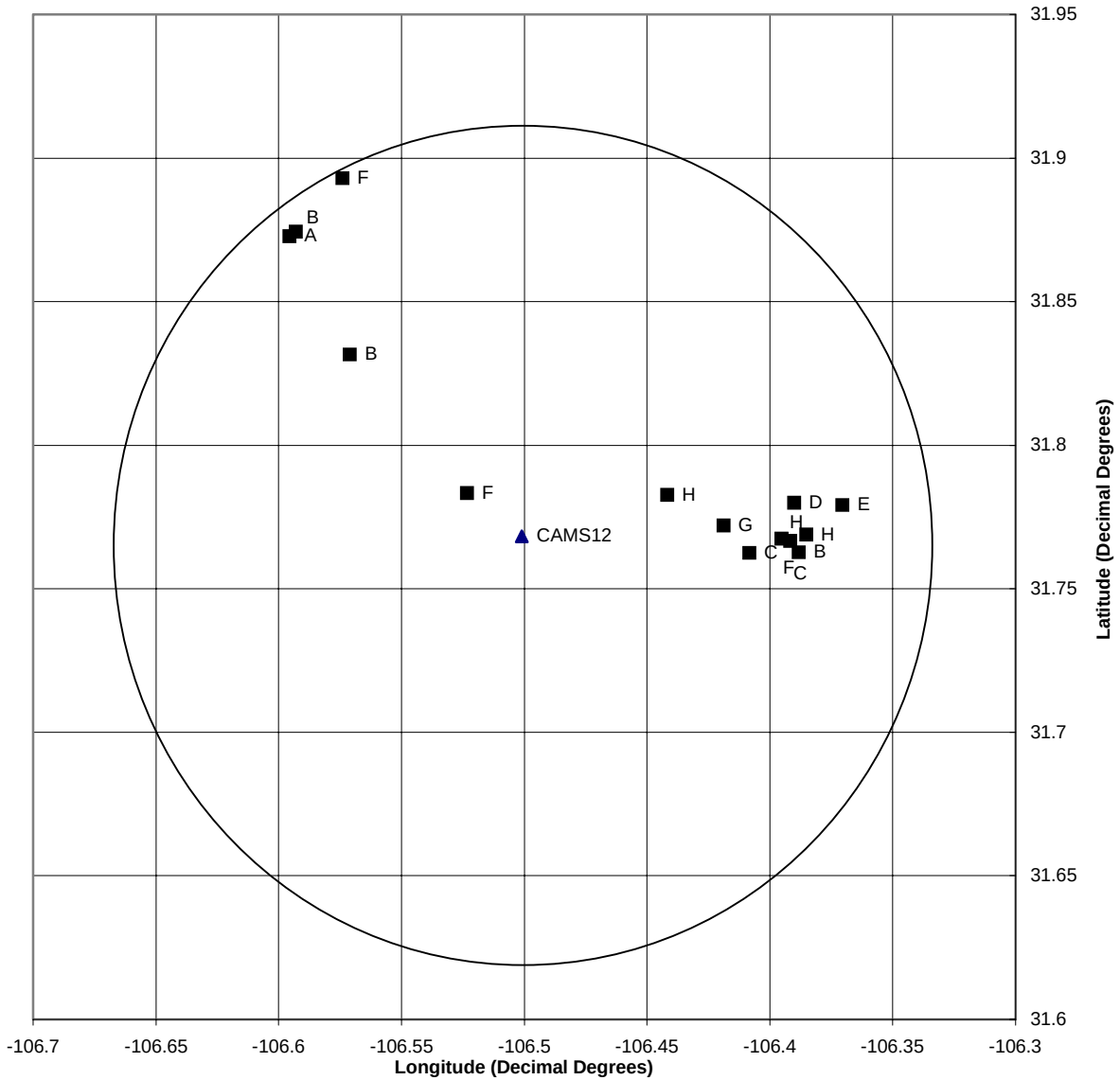


Figure 2-7
Facilities Within 10 Miles of the Fort Worth, Texas (CAMS 13) Monitoring Station That Reported to TRI in 1998

Each square on this map represents a TRI-reported facility which is within a 10-mile radius of the monitoring site (represented by a triangle) and is classified by the following Standard Industrial Classification Major Groups:

A = Food and Kindred Products
B = Lumber and Wood Products
C = Furniture and Fixtures
D = Paper and Allied Products
E = Printing and Publishing
F = Chemicals and Allied Products
G = Petroleum and Coal Products
H = Rubber and Misc. Plastic Products
I = Stone, Clay, Glass and Concrete
J = Primary Metal Industries
K = Fabricated Metal Products
L = Industrial Machinery and Equipment
M = Electrical and Electronic Equipment
N = Transportation Equipment
O = Miscellaneous Manufacturing Industries
P = Wholesale trade - Nondurable Goods

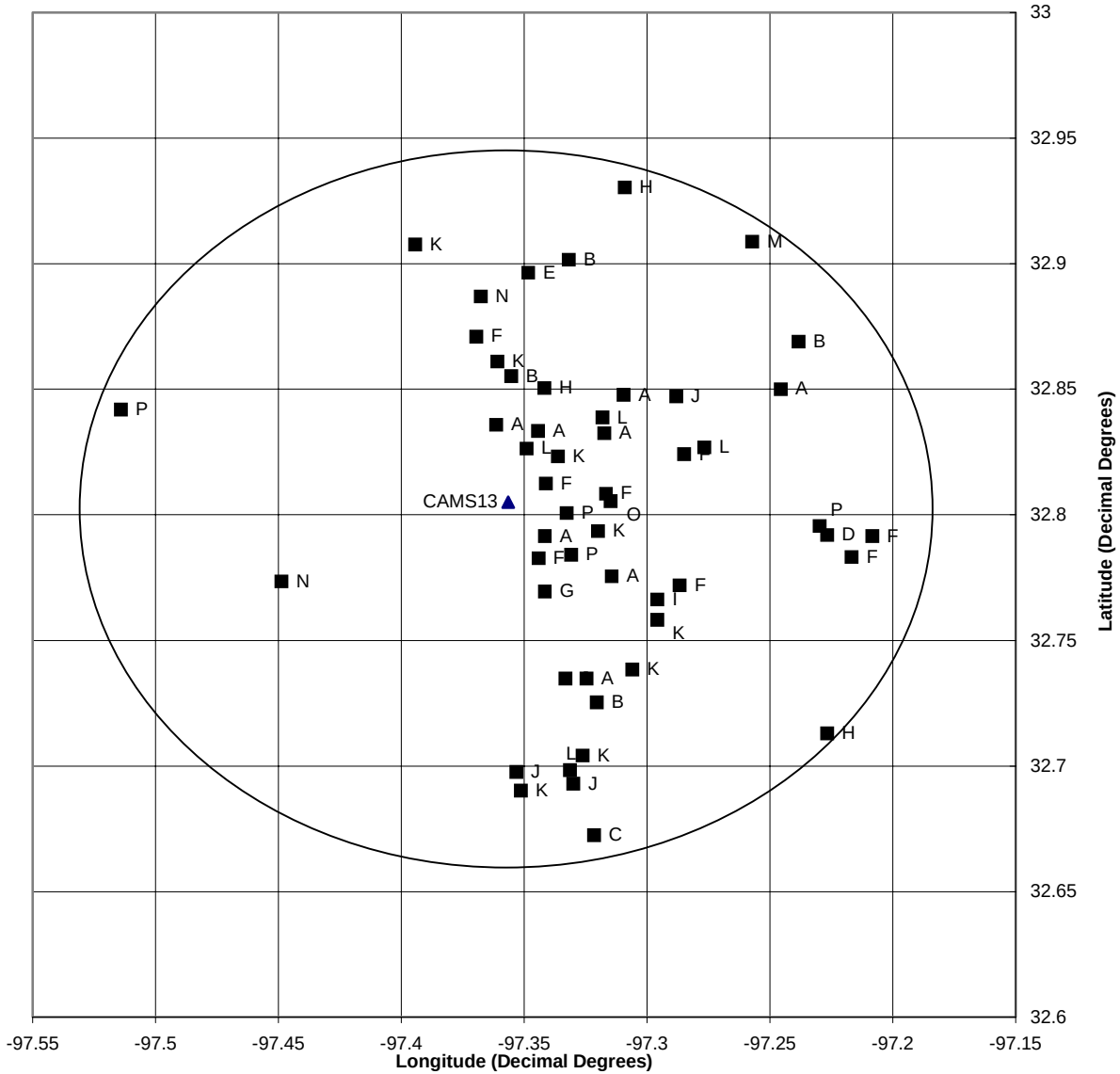


Table 2-1
Background Information for the 2000 NMOC/SNMOC Monitoring Stations

2000 NMOC/ SNMOC Site Code	AIRS Site Code	Location	Sampling Schedule		Monitoring Options Selected	
			Starting Date	Ending Date	NMOC	SNMOC
BXNY	36-005-0083	Bronx, NY	June 19, 2000	September 18, 2000	✓	
CAMS 12	48-141-0037	El Paso, TX	June 8, 2000	September 28, 2000	✓	
CAMS 13	48-439-1002	Fort Worth, TX	June 8, 2000	October 2, 2000		✓

Table 2-2
Descriptions of the 2000 NMOC/SNMOC Monitoring Locations

Monitoring Location	Description of Immediate Surroundings
Bronx, NY (BXNY)	The BXNY monitoring station is located in Bronx, New York., NY at the Botanical Gardens. It is in the center of the Bronx and is located in a commercial setting. The monitoring objective is to obtain photochemical assessment.
El Paso, TX (CAMS 12)	The CAMS 12 monitoring station is located on Rim Road in a primarily commercial setting. It is north of the Hawthorne Street and Rim Road intersection in El Paso, Texas. The police station is adjacent to the site.
Fort Worth, TX (CAMS 13)	The CAMS 13 monitoring station is located in an open field on the property of Meacham Field, an airport in northwest Fort Worth, Texas. Although the surrounding neighborhoods are primarily residential, several heavily traveled roadways (including Main Street and 28th Street) pass within 1 mile of the monitoring station.

Table 2-3
SNMOC Method Detection Limits

Compound	Method Limit		Compound	Method Limit	
	ppbC	ppbv		ppbC	ppbv
Acetylene	0.26	0.13	3-Methyl-1-Butene	0.42	0.08
Benzene	0.46	0.08	Methylcyclohexane	0.37	0.05
1,3-Butadiene	0.38	0.10	Methylcyclopentane	0.25	0.04
n-Butane	0.52	0.13	2-Methylheptane	0.50	0.06
cis-2-Butene	0.35	0.09	3-Methylheptane	0.51	0.06
trans-2-Butene	0.29	0.07	2-Methylhexane	0.33	0.05
Cyclohexane	0.54	0.09	3-Methylhexane	0.39	0.06
Cyclopentane	0.17	0.03	2-Methylpentane	0.18	0.03
Cyclopentene	0.42	0.08	3-Methylpentane	0.32	0.05
n-Decane	0.39	0.04	2-Methyl-1-Pentene	0.32	0.05
1-Decene	0.39	0.04	4-Methyl-1-Pentene	0.42	0.07
m-Diethylbenzene	0.42	0.04	*n*-Nonane	0.42	0.05
p-Diethylbenzene	0.24	0.02	1-Nonene	0.42	0.05
2,2-Dimethylbutane	0.42	0.07	*n*-Octane	0.52	0.06
2,3-Dimethylbutane	0.39	0.07	1-Octene	0.51	0.06
2,3-Dimethylpentane	0.51	0.07	*n*-Pentane	0.26	0.05
2,4-Dimethylpentane	0.41	0.06	1-Pentene	0.22	0.04
n-Dodecane	0.45	0.04	*cis*-2-Pentene	0.30	0.06
1-Dodecene	0.45	0.04	*trans*-2-Pentene	0.21	0.04
Ethane	0.24	0.12	α-Pinene	0.39	0.04
2-Ethyl-1-Butene	0.47	0.08	β-Pinene	0.39	0.04
Ethylbenzene	0.33	0.04	Propane	0.48	0.16
Ethylene	0.26	0.13	*n*-Propylbenzene	0.37	0.04

Table 2-3 (Continued)
SNMOC Method Detection Limits

Compound	Method Limit		Compound	Method Limit	
	ppbC	ppbv		ppbC	ppbv
m-Ethyltoluene	0.26	0.08	Propylene	0.25	0.08
o-Ethyltoluene	0.41	0.05	Propyne	0.48	0.16
p-Ethyltoluene	0.38	0.04	Styrene	0.29	0.04
n-Heptane	0.50	0.07	Toluene	0.73	0.10
1-Heptene	0.39	0.06	*n*-Tridecane	0.45	0.03
n-Hexane	0.31	0.05	1-Tridecene	0.45	0.03
1-Hexene	0.47	0.08	1,2,3-Trimethylbenzene	0.28	0.03
cis-2-Hexene	0.31	0.05	1,2,4-Trimethylbenzene	0.53	0.06
trans-2-Hexene	0.31	0.05	1,3,5-Trimethylbenzene	0.28	0.03
Isobutane	0.38	0.10	2,2,3-Trimethylpentane	0.36	0.05
Isobutene/1-Butene	0.31	0.04	2,2,4-Trimethylpentane	0.36	0.05
Isopentane	0.42	0.08	2,3,4-Trimethylpentane	0.37	0.05
Isoprene	0.21	0.04	*n*-Undecane	0.43	0.04
Isopropylbenzene	0.51	0.06	1-Undecene	0.43	0.04
2-Methyl-1-Butene	0.22	0.04	*m*-,*p*-Xylene	0.34	0.04
2-Methyl-2-Butene	0.30	0.06	*o*-Xylene	0.33	0.04

Concentration in ppbC = concentration in ppbv x number of carbons in compound.

Because Isobutene and 1-Butene elute from the GC column at the same time, the SNMOC analytical method can only report the sum of concentrations for these two compounds and not concentrations of the individual compounds. For the same reason, the sum of *m*-xylene and *p*-xylene concentrations is reported for both compounds as a combined value.

Table 2-4
Sampling Schedules Implemented During the 2000 NMOC/SNMOC Program

Monitoring Option	Monitoring Location	Sampling Schedules
SNMOC	Fort Worth, TX	This site sampled every weekday of the monitoring program, except holidays. All samples were analyzed for the 80 target SNMOC and the calculated total NMOC.
NMOC	Bronx, NY El Paso, TX	These sites sampled every weekday of the monitoring program, except holidays. All samples were analyzed for total NMOC only.

Table 2-5
Summary of Sampling and Analytical Methods

Parameter	NMOC	SNMOC
Sampling apparatus	Stainless steel canisters	Stainless steel canisters
Analytical approach	Cryogenic trap and flame ionization detection	Cryogenic trap at the inlet of a gas chromatography column with flame ionization detection
Output of analysis	Concentration of the total amount of nonmethane organic compounds in the sample	Concentrations of 80 different organic hydrocarbons [b]
Units of measurement [a]	ppbC	ppbC
Detection limit [a]	0.5 ppbC	See Table 2-5

[a] Refer to Section 2.4 for information on the significance of units of measurement and detection limits.

[b] The SNMOC analytical method actually reports only 78 different concentrations for each sample. The method cannot differentiate isobutene from 1-butene or *m*-xylene from *p*-xylene. Therefore, a single concentration is reported for each of these pairs.

Table 2-6
Completeness of the NMOC/SNMOC Monitoring

Type	Code	Location	Number of Samples Expected	Number of Valid Samples	Completeness
SNMOC	CAMS13	Fort Worth, TX	75	69	92 %
NMOC	BXNY CAMS 12	Bronx, NY El Paso, TX	66 64	53 47	80 % 73 %
	Totals		205	169	82 %

Table 2-7
Data Quality Parameters for Total NMOC Measurements

Monitoring Station	Analytical Precision (RPD)	Sampling Precision (RPD)
CAMS 12	24%	NA

NA - Not Applicable. Samples were not run in replicate during the 2000 NMOC season.
No duplicate or replicate analysis was performed at the Bronx, NY location.

Table 2-8
Data Quality Parameters for SNMOC Measurements

Compound	Analytical Precision			Sampling and Analytical Precision		
	Number of Observations RPD (%)	RPD (%)	Average Concentration Difference in Duplicate Analyses (ppbC)	Number of Observations RPD (%)	RPD (%)	Average Concentration Difference in Duplicate Analyses (ppbC)
Acetylene	1	88%	12.82	11	9.21%	0.82
Benzene	1	67%	9.76	11	3.31%	0.63
1,3-Butadiene	1	80%	1.48	11	6.22%	0.04
n-Butane	1	47%	7.74	11	2.63%	0.25
cis-2-Butene	1	73%	1.00	11	7.82%	0.05
trans-2-Butene	1	83%	1.12	11	8.27%	0.05
Cyclohexane	1	46%	0.95	11	5.29%	0.07
Cyclopentane	1	52%	1.16	11	6.90%	0.07
Cyclopentene	1	34%	0.15	10	9.96%	0.06
n-Decane	1	86%	4.32	11	6.58%	0.11
1-Decene	0	ND	ND	0	ND	ND
m-Diethylbenzene	1	47%	0.56	11	16.35%	0.10
p-Diethylbenzene	1	45%	0.31	11	12.58%	0.06
2,2-Dimethylbutane	1	54%	1.24	11	6.26%	0.07
2,3-Dimethylbutane	1	62%	2.60	11	7.24%	0.24
2,3-Dimethylpentane	1	78%	2.01	11	6.80%	0.08
2,4-Dimethylpentane	1	78%	2.56	11	5.14%	0.08
n-Dodecane	1	15%	0.15	11	6.44%	0.02
1-Dodecene	1	34%	0.33	10	24.99%	0.16
Ethane	1	62%	14.54	11	3.20%	0.54
Ethylbenzene	1	44%	2.99	11	6.66%	0.21
2-Ethyl-1-butene	0	ND	ND	0	ND	ND
Ethylene	1	70%	13.54	11	4.21%	0.38
m-Ethyltoluene	1	57%	2.93	11	6.67%	0.15
o-Ethyltoluene	1	61%	1.97	11	10.39%	0.14
p-Ethyltoluene	1	58%	1.64	11	9.33%	0.13
n-Heptane	1	73%	3.22	11	2.54%	0.08
1-Heptene	0	ND	ND	0	ND	ND
n-Hexane	1	70%	7.10	11	3.29%	0.21
1-Hexene	1	46%	0.51	11	13.31%	0.10

Table 2-8 (Continued)
Data Quality Parameters for SNMOC Measurements

Compound	Analytical Precision			Sampling and Analytical Precision		
	Number of Observations RPD (%)	RPD (%)	Average Concentration Difference in Duplicate Analyses (ppbC)	Number of Observations RPD (%)	RPD (%)	Average Concentration Difference in Duplicate Analyses (ppbC)
cis-2-Hexene	1	94%	0.40	7	5.82%	0.01
trans-2-Hexene	1	110%	0.79	8	19.70%	0.05
Isobutane	1	9%	0.55	11	4.43%	0.16
Isobutene/1-Butene	1	84%	7.31	11	3.38%	0.16
Isopentane	1	61%	21.01	11	3.18%	0.67
Isoprene	1	70%	0.92	11	5.03%	0.04
Isopropylbenzene	1	22%	0.13	11	20.33%	0.08
2-Methyl-1-butene	1	91%	2.28	11	4.75%	0.05
2-Methyl-2-butene	1	107%	3.98	11	4.94%	0.08
3-Methyl-1-butene	1	82%	0.51	10	9.42%	0.02
Methylcyclohexane	1	42%	1.55	11	8.14%	0.16
Methylcyclopentane	1	76%	4.22	11	3.10%	0.09
2-Methylheptane	1	66%	1.08	11	8.82%	0.10
2-Methylhexane	1	82%	3.63	11	3.51%	0.09
2-Methylpentane	1	69%	9.76	11	4.22%	0.35
3-Methylheptane	1	69%	1.38	11	9.70%	0.09
3-Methylhexane	1	70%	4.62	11	3.69%	0.14
3-Methylpentane	1	73%	6.41	11	3.04%	0.18
2-Methyl-1-pentene	1	96%	0.57	6	12.83%	0.04
4-Methyl-1-pentene	0	ND	ND	2	18.23%	0.04
n-Nonane	1	65%	1.78	11	8.96%	0.10
1-Nonene	1	54%	0.15	5	13.98%	0.03
n-Octane	1	53%	1.27	11	6.47%	0.07
1-Octene	1	69%	0.25	8	25.39%	0.05
n-Pentane	1	91%	40.51	11	5.87%	0.81
1-Pentene	1	63%	1.06	11	5.14%	0.05
cis-2-Pentene	1	76%	1.26	11	7.68%	0.06
trans-2-Pentene	1	83%	2.63	11	5.90%	0.09
a-Pinene	1	11%	0.56	11	18.31%	0.15
b-Pinene	1	20%	0.41	7	11.86%	0.14

Table 2-8 (Continued)
Data Quality Parameters for SNMOC Measurements

Compound	Analytical Precision			Sampling and Analytical Precision		
	Number of Observations RPD (%)	RPD (%)	Average Concentration Difference in Duplicate Analyses (ppbC)	Number of Observations RPD (%)	RPD (%)	Average Concentration Difference in Duplicate Analyses (ppbC)
Propane	1	47%	13.06	11	5.51%	0.84
n-Propylbenzene	1	52%	0.67	11	10.43%	0.07
Propylene	1	63%	5.86	11	5.40%	0.29
Propyne	0	ND	ND	0	ND	ND
Styrene	1	7%	0.14	11	14.96%	0.10
Toluene	1	69%	23.22	11	3.26%	0.61
n-Tridecane	1	39%	0.22	10	25.52%	0.06
1-Tridecene	0	ND	ND	0	ND	ND
1,2,3-Trimethylbenzene	1	55%	0.95	11	19.61%	0.15
1,2,4-Trimethylbenzene	1	57%	3.80	11	5.62%	0.18
1,3,5-Trimethylbenzene	1	64%	1.58	11	12.63%	0.13
2,2,3-Trimethylpentane	1	81%	2.00	11	12.22%	0.12
2,2,4-Trimethylpentane	1	81%	14.50	11	3.42%	0.34
2,3,4-Trimethylpentane	1	81%	5.63	11	2.85%	0.12
n-Undecane	1	50%	1.22	11	1.93%	0.02
1-Undecene	0	ND	ND	0	ND	ND
m-Xylene/p-Xylene	1	31%	5.77	11	7.46%	0.55
o-Xylene	1	34%	2.23	11	8.17%	0.22
TNMOC (speciated)	1	47%	219.76	11	3.23%	8.98
TNMOC (w/ unknowns)	1	48%	259.88	11	3.43%	10.96

Note: The number of observations for analytical precision indicates the number of replicates in which the compound was detected in both analyses; the number of observations for sampling precision indicates the number of duplicates in which the compound was detected in the four analyses of the duplicate samples. By definition, analytical precision and sampling precision cannot be evaluated for compounds with zero observations, hence compounds with no observations show an RPD of "NA."

3.0 Data Analysis Methodology

This section presents a general overview of the methodology used to summarize and interpret the 2000 NMOC/SNMOC ambient air monitoring data. In addition, basic information is provided concerning various factors that potentially impact ambient air quality. Over 5,300 NMOC and SNMOC samples were collected at the three sites.

3.1 Data Summary Parameters

Because no single parameter can characterize the results of an extensive air monitoring program, four parameters are used together to summarize and present the results of the 2000 NMOC/SNMOC ambient air monitoring program: prevalence, concentration range, central tendency, and variability.

Because previous NMOC/SNMOC reports have used these same four parameters to summarize the monitoring data, readers can directly compare the data summaries in this report to those in earlier final NMOC/SNMOC reports.

However, before comparing NMOC/SNMOC data to other ambient air studies, readers are reminded to consider the conventions used to address units of measure, methods for presentation of the results of duplicate analyses, and methods used to present data when a sample is determined to contain a pollutant of interest at a value lower than the limit of detection of the applicable analytical method. Refer to Section 2.4 for details.

3.1.1 Prevalence

Prevalence of air monitoring data refers to the frequency with which compounds, or groups of compounds, are found at detectable levels by the corresponding sampling and analytical method. Prevalence is typically expressed as a percentage (e.g., a compound detected in 15 of 20 samples has a prevalence of 75 percent). Compounds that are never detected have a prevalence of 0 percent, and those that are always detected have a prevalence of 100 percent.

Because sampling and analytical methods might not reliably quantify concentrations of compounds at levels near their detection limits, summary statistics for compounds with low

prevalence values should be interpreted with caution. Compounds with a prevalence of zero may still be present in ambient air, but at levels below the sensitivity of the corresponding sampling and analytical methods.

For the purposes of this report, a group of "most prevalent" compounds was identified for the SNMOC compound group. This group of most prevalent compounds is discussed in detail in Section 5 of this report. Readers should be careful of two items: 1) not to confuse the most prevalent compounds identified in this report with the most prevalent compounds in urban air; and 2) to remember that "most prevalent" in this report only applies to the CAMS13 site.

The most prevalent compounds were identified using two statistical parameters:

- The count of the number of nondetects; and
- Percent contribution to mass concentration within a compound group.

If a compound was detected in at least 75 percent of all samples **and** if the compound contributed to at least 75 percent of the mass contribution within a compound group, then the compound was identified in the group of most prevalent compounds. Twenty-two compounds were identified as most prevalent and are examined in detail in Section 5.

3.1.2 Concentration Range

The concentration range of ambient air monitoring data refers to the span of measured concentrations, from lowest to highest. To indicate concentration range, summary tables in Sections 4 and 5 present the lowest and highest concentrations measured for each compound at each monitoring location. For many compounds, at least one sample at a given site resulted in a nondetect, so the lowest concentration reported is "ND". For compounds not detected in any samples at a given site, both the lowest and the highest concentrations are reported as "ND".

Because the NMOC/SNMOC program only measures 3-hour average concentrations during the summer months, the lowest and highest concentrations may not be comparable to the values from monitoring programs with different sampling durations and schedules. Ambient air concentrations of the target compounds might rise to higher levels during other times of the day and other times of the year.

3.1.3 Central Tendency

The central tendency of air monitoring data gives a sense of the long-term average ambient air concentrations. This report uses medians, arithmetic means, and geometric means to characterize the central tendencies of concentration distributions. Despite their common use, these three parameters can have significantly different values for the same distribution of ambient air monitoring data. By definition:

- ***Arithmetic means*** are the central tendencies of normally distributed data;
- ***Geometric means*** are the central tendencies of lognormally distributed data; and
- ***Medians*** are the midpoints of any data set.

The central tendencies in this report are based only on ambient air concentrations sampled during the summer of 2000. Because ambient air concentrations of compounds may increase or decrease during the colder winter months, the central tendencies presented in this report may not be comparable to those calculated from *annual* air monitoring efforts.

3.1.4 Variability

Variability in ambient air monitoring data indicates the extent to which concentrations of certain compounds fluctuate with respect to the central tendency. This report characterizes data variability using:

- Standard deviation - commonly used statistical parameter that provides an absolute indicator of variability;

- Coefficients of variation - calculated by dividing the standard deviation by the arithmetic mean, provide a relative measure of variability by expressing variations relative to the magnitude of the mean concentration; better suited for comparing variability across data distributions for different sites and compounds.

All data summary parameters presented in this report were calculated from a database of processed 2000 NMOC/SNMOC ambient air monitoring data. This database was generated by manipulating the raw monitoring data to assign all nondetect observations a concentration equal to one-half the corresponding detection limit. The results of all duplicate sampling events and replicate laboratory analyses were averaged so that only one concentration was considered for each compound for each sampling date.

3.2 Analyses and Interpretations

The following subsections describe the methods used to identify and interpret the spatial and temporal variations in the 2000 NMOC/SNMOC monitoring results.

3.2.1 Composition of Air Samples: Alkane, Olefin, and Aromatics Composition of SNMOC Samples

Like the *magnitude* of air pollution, the *composition* varies from one location to the next. The following discussion explains how the composition of air pollution will be used to understand and appreciate the sources that contribute to levels of air pollution:

This analysis divides the overall SNMOC monitoring results into contributions from alkanes, olefins, and aromatic compounds. Such analyses are useful to understanding ozone formation processes, because current research shows that olefinic and aromatic compounds are significantly more reactive in air than most alkanes (Carter, 1994). Knowing the relative abundances of these three classes of hydrocarbons, state environmental agencies can better focus air pollution prevention policies specifically on compound categories that have the greatest

impact on air quality. This data analysis approach is used only in Section 5, because the SNMOC analytical method quantifies concentrations of the most hydrocarbon compounds.

3.2.2 Statistical Analyses Using Pearson Correlation Coefficients

The following discussion describes how Sections 4 and 5 use Pearson correlation coefficients to measure the degree of correlation between two variables. Pearson correlation coefficients are commonly used as a measure of correlation. Details regarding their calculation can be found in most introductory statistics texts.

Pearson correlation coefficients characterize the extent to which variables are related *in a linear fashion*, and the coefficients calculated in this report are only for *pairwise* correlations (i.e., correlations between two variables). As a result, the statistical analyses do not characterize potential nonlinear or multivariate relationships that may be relevant to ozone formation processes. This report uses Pearson correlation coefficients to measure the degree of correlation between two variables, specifically to answer these basic questions:

- To what extent are 3-hour average pollutant concentrations related to meteorological parameters? Table 3-1 lists the source of meteorological data for each of the 2000 NMOC/SNMOC ambient air monitoring stations.
- To what extent are 3-hour average pollutant concentrations related to ozone concentrations (1-hour maximum) measured at or near the same monitoring location?

By definition, Pearson correlation coefficients always lie between -1 and +1. A correlation coefficient of -1 indicates a perfectly "negative" relationship, and a correlation coefficient of +1 indicates a perfectly "positive" relationship. Negative relationships occur when increases in the magnitude of one variable are associated with proportionate decreases in the magnitude of the other variable, and vice versa. On the other hand, positive relationships occur when the magnitudes of two variables both increase and both decrease proportionately. Data that are completely uncorrelated have Pearson correlation coefficients of zero. Therefore, the sign

(positive or negative) and the magnitude of Pearson correlation coefficients indicate the direction and strength, respectively, of data correlations.

3.2.3 Impact of Emission Sources on Spatial Variations

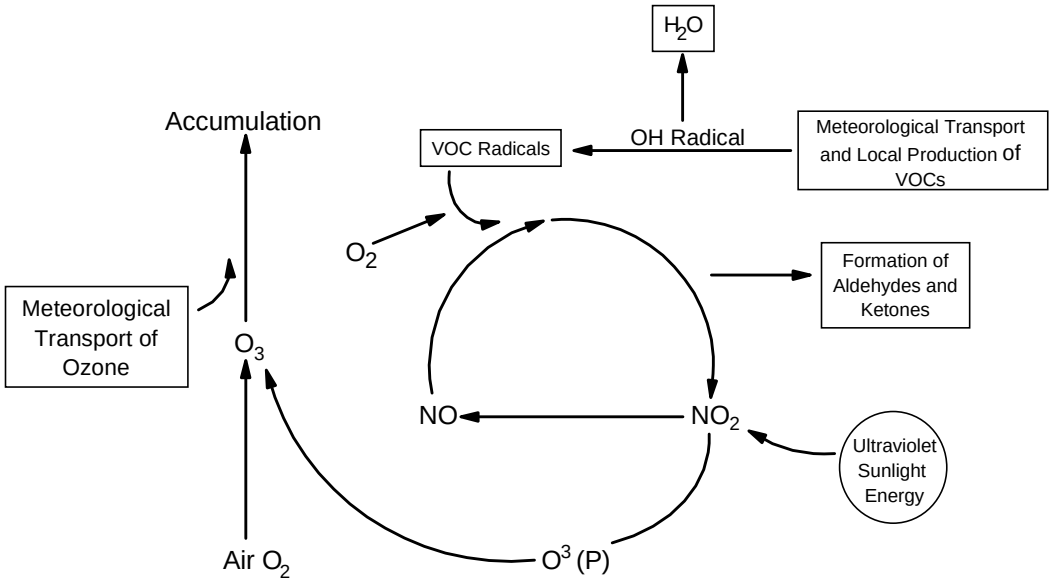
Pollutants found in urban air come from a wide range of emissions sources. Industrial, motor vehicle, and natural emissions sources account for most pollutants found in urban air (Graedel, 1978). The nature and magnitude of these emissions largely determine the chemical composition of urban air pollution. Local meteorology and atmospheric chemistry, on the other hand, determine how quickly emitted chemicals disperse and react in ambient air.

In Section 4, NMOC-to-NO_x concentration ratios (NMOC:NO_x) will be calculated and compared to maximum ozone concentrations. According to the ozone formation cycle, NMOC and NO_x produced at or near the sampling location are important precursor gases (Figure 3-1). Generally, a site that has an NMOC:NO_x ratio less than 4 to 1 is situated in an area (or system) that is considered VOC-limited. An NMOC:NO_x ratio greater than 15 to 1 indicates that the site is situated in an area that is consider NO_x-limited (NRC, 1992). Figure 3-2 is an empirical kinetic modeling approach (EKMA) graph for two sites in New Jersey, one that is NO_x -limited and the other VOC-limited (PAMS, 1994). Figure 3-3 is a conceptual NMOC-to-NO_x ratio graph with ozone isopleths superimposed. An ozone isopleth is a line of constant ozone concentration. The ridge line (or line between the two systems) corresponds to an 8 to 1 NMOC:NO_x ratio.

For NMOC:NO_x ratios to the right of the ridge line (or in the NO_x -limited region of the graph), lowering NO_x concentrations either at constant VOC concentration or in conjunction with lowering VOCs results in lower peak concentrations of ozone. This scenario is characteristic of rural areas and of suburbs downwind of center cities. At these high NMOC:NO_x ratios, there is ample supply of organic peroxy radicals and peroxy radicals to convert nitric oxide to nitrogen oxide, a necessary precursor gas for ozone production. Decreasing the available NO_x leads directly to a decrease in ozone (NRC, 1992).

For NMOC:NO_x ratios to the left of the ridge line (or in the VOC -limited region of the graph), lowering VOC concentrations at constant NO_x concentration results in lower peak concentrations of ozone; this is also true if NO_x and VOC concentrations are decreased proportionately. This scenario is characteristic of highly polluted urban areas. However, in a VOC-limited area, lowering NO_x concentrations at constant VOC will cause, peak ozone concentrations to actually increase until the ridge line is reached. Therefore, lowering the NO_x in some scenarios may actually lead to increasing ozone. The NO_x is competing with the VOCs for the hydroxy radical. As the NO_x concentration is decreased, more of the hydroxy radical is available to react with VOCs, leading to greater formation of ozone (NRC, 1992).

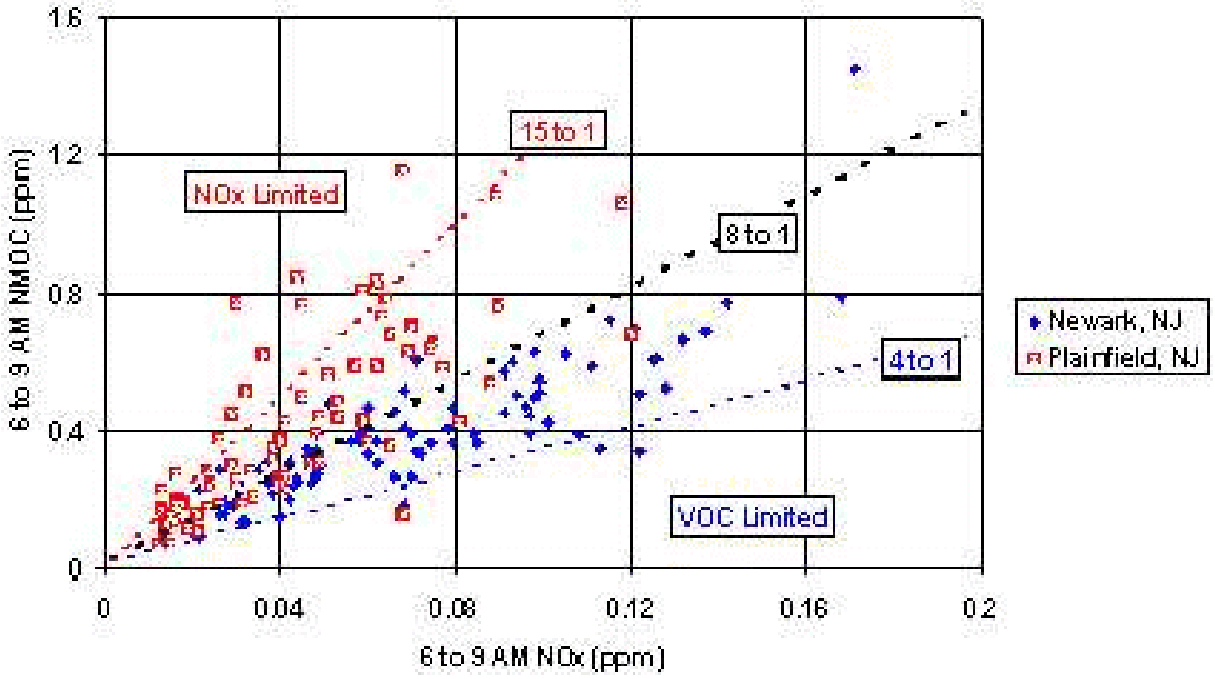
Figure 3-1
Ozone Accumulation Cycle



Net Result: Ozone (O_3) Accumulation

Adapted from Warneck, 1998.

Figure 3-2
Comparison of NO_x/VOC Ratios of Monitoring Sites Using EKMA



Source: PAMS, 1994.

Figure 3-3
Conceptual EKMA Diagram (From NRC, 1992)

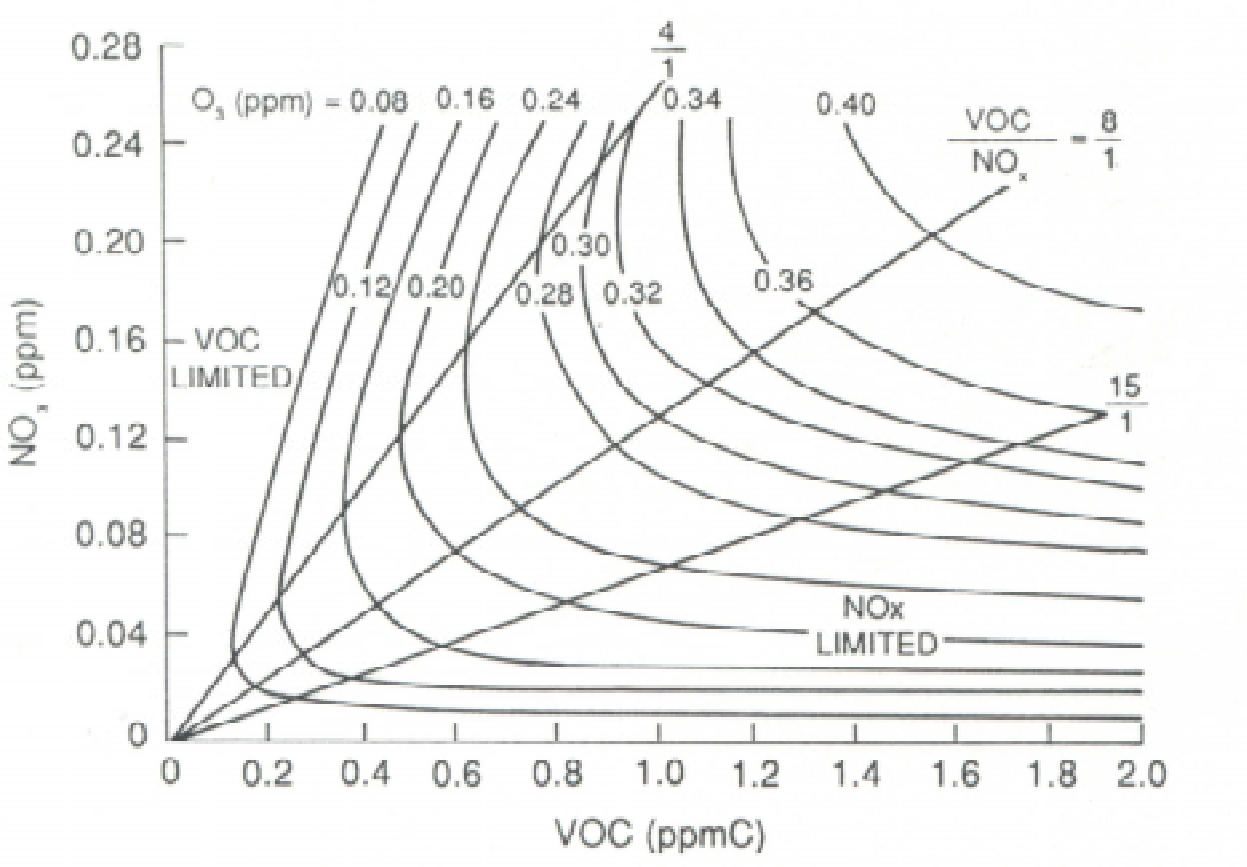


Table 3-1
Sources of Meteorological Data for the 2000 NMOC/SNMOC Statistical Analyses

Monitoring Station	Location of Nearest National Climatic Data Center (NCDC) Meteorological Station
New York City, NY Bronx (BXNY)	New York/John F. Kennedy Airport
El Paso, TX (CAMS 12)	El Paso International Airport
Fort Worth, TX (CAMS 13)	Dallas-Fort Worth International Airport

4.0 Analysis of Total NMOC Monitoring Results

This section summarizes and interprets the total NMOC monitoring data collected at the three monitoring stations during the 2000 NMOC/SNMOC program. The total NMOC sampling and analytical method detects a wide range of organic compounds (e.g., alkanes, olefins, aromatics, oxygenates, halogenated hydrocarbons), measuring overall levels of the air pollution that is known to affect ozone formation processes. This method does not characterize *total* levels of air pollution, because the method does not detect common air pollutants such as inorganic acids, particulate matter, and heavier organic compounds.

4.1 Data Summary

Table 4-1 summarizes the total NMOC monitoring results for the three monitoring stations. The table also presents quartiles of the NMOC concentration distributions measured at these stations. An overview of these summary parameters follows.

4.1.1 Prevalence

Each 2000 total NMOC sampling event at the three sites resulted in a valid, quantified concentration value. Therefore, the prevalence for total NMOC sampling was 100 percent. All but four total NMOC concentrations measured during the 2000 program were at least an order of magnitude greater than the estimated method detection limit, 0.005 parts per million on a carbon basis (ppmC).

4.1.2 Concentration Range

As shown in Table 4-1, total NMOC concentrations at the three sites during the 2000 program ranged from 0.086 ppmC (El Paso) to 18.576 ppmC (Fort Worth). The high values at the Fort Worth site from June 8 to July 7 (2.264 ppmC to 18.576 ppmC) were verified; these values appear to be related to the startup of the monitor. After July 7, the concentrations ranged from 0.09 to 0.61 ppmC. Similarly, the Bronx, NY, and El Paso, TX, sites also had unusually high NMOC concentrations during that time period.

4.1.3 Central Tendency

Central tendency parameters were calculated for the three sites, and are listed in Table 4-1. For the BXNY site, which was new to the 2000 program, the average concentration was 1.154, while the geometric mean was 0.654.

Two sites, El Paso and Fort Worth, were not new to the NMOC/SNMOC program. At the El Paso site during 2000, the geometric mean concentration for total NMOC was 0.708 ppmC, and the average was 0.937 ppmC. Last year, these averages at El Paso were 0.500 and 0.680, respectively, which shows nearly a 40% increase. At the Fort Worth site, the geometric mean concentration for total NMOC was 0.563 ppmC, and the average was 2.139 ppmC. Last year, these averages were significantly lower at 0.020 ppmC and 0.023 ppmC, respectively.

4.1.4 Variability

Variability parameters of standard deviation and coefficient of variation were calculated at all three sites (Table 4-1). The El Paso site was the only site in which the majority of the total NMOC sample values were greater than the standard deviation (approximately 60%). The Fort Worth and Bronx sites had an opposite effect (12% and 20%, respectively).

4.2 Analyses and Interpretations

4.2.1 Comparison to Selected Meteorological Conditions

This report compares average daily observations of measured meteorological parameters to the corresponding air quality measurements. Because of the close proximity of the meteorological stations to the monitoring stations, the meteorological data are believed to be representative of conditions at the stations.

Table 4-2 identifies the meteorological stations used for this report. Figures 4-1 to 4-3 present the average NMOC concentrations that were observed during different meteorological conditions. Pearson correlations were calculated for selected meteorological parameters and are

listed in Table 4-3. Maximum daily temperature, average wind speed, and average dew point temperature were analyzed in relation to concentration levels.

NMOC Concentration Versus Maximum Temperature

According to Figure 4-1, NMOC concentrations did not have a consistent trend with maximum temperature. While the BXNY and CAMS13 sites displayed their highest concentration peaks in the 85 to 90 degree category, CAMS12 displayed its highest concentration peak in the 90 to 95 degree category.

Table 4-3 further highlights the Pearson correlations that were calculated for this parameter. The Fort Worth and Bronx sites had a moderately weak negative correlations with maximum temperature (-0.380 and -0.269, respectively) while the El Paso site had a very weak positive correlation (0.167).

The average maximum temperatures for BXNY, CAMS12, and CAMS 13 on sampling days were 77.65 °F, 92.91 °F, and 94.97 °F, respectively. Ozone concentrations have been shown to become strongly dependent on temperatures above 90 °F (NRC, 1992), but only a weak positive correlation was observed at El Paso.

NMOC Concentration Versus Wind Speed

According to Figure 4-2, NMOC concentrations did not appear to have a consistent trend with the wind speed. As wind speeds increase, the average concentrations vary across all three sites. Table 4-3 confirms this trend with the calculation of the Pearson correlations. All three sites have weakly positive or negative correlations of concentration with wind speed, with Bronx having the strongest negative correlation (-0.106).

The average daily wind speeds for BXNY, CAMS12, and CAMS13 on sampling days were 8.82 mph, 6.92 mph, and 8.66 mph, respectively.

NMOC Concentration Versus Dew Point Temperature

According to Figure 4-3, NMOC concentrations appeared to have a consistent trend with average dew point temperature. At all the sites, there is a noticeable increase in concentration with increasing dew point temperature. Table 4-3 does somewhat confirm this, as only the Bronx site has a very weak positive correlation (0.060). The NMOC concentrations at CAMS12 and CAMS13 sites have moderately strong correlations with dew point temperature (0.329 and 0.358, respectively).

The average dew point temperature for BXNY, CAMS12, and CAMS 13 on sampling days were 59.47 °F, 50.76 °F, and 63.70 °F, respectively.

4.2.2 Temporal Variations

This section evaluates short-term variations in NMOC concentrations. Analyses of such temporal variations can provide insight into seasonal changes in air quality and can verify data trends identified in previous NMOC/SNMOC final reports. Figure 4-4 illustrates how the average NMOC concentration measured during the morning hours at the three sites varied from one summer month to the next. Noticeable variations appear each month for each site when compared to that site's arithmetic mean.

Ozone concentrations are influenced by NMOC concentrations which will typically peak during the hottest months (July and August). Interestingly, NMOC concentrations did not peak during the hottest months, but rather in June. There is also a large difference in the NMOC concentrations at CAMS13 in June compared to other months. Readers should be reminded unusually high NMOC values were measured at this site before July 11.

4.2.3 NMOC:NO_x Concentration Ratios and Ozone Concentration Trends

As discussed in Section 3.2.3, NO_x and NMOC are important precursor gases for formation of ozone. An area that is primarily "NO_x-limited" will require different air quality strategies than an area that is primarily "VOC-limited". Therefore, NMOC:NO_x concentration ratios were calculated for the three urban sites. NO_x and ozone data were retrieved from the Air

Quality Subsystem (AQS) of the Aerometric Information Retrieval System (AIRS) for this analysis.

Bronx, New York (36-005-0074)

Ozone and NO_x data were not sampled at the same site as the NMOC data; therefore, a site two miles away (AIRS Code 36-005-0110) which measured these parameters was chosen for this analysis. Ozone data were available for all 45 sampling days, but NO_x data were available for 33 of the sampling days. Therefore, NMOC:NO_x ratios were only calculated for 33 days.

The average NMOC:NO_x ratio was 32.26, which would fall in the NO_x-limited area. If the ratios greater than 100 are removed, then the average NMOC:NO_x ratio is reduced to 26.41, which is still in a NO_x-limited area. An effective air quality strategy would need to focus on reducing NO_x emissions.

The average maximum daily ozone concentration on a sample day at BXNY was 43.36 ppbv ± 3.98 ppbv. Daily NMOC:NO_x ratios and maximum daily ozone concentrations were plotted in Figure 4-5 to determine if there were noticeable trends between these two parameters. It appears as if the tendicies of the NMOC:NO_x ratios somewhat mirror the maximum daily ozone concentrations. There were eighteen sampling days in which the maximum ozone concentration exceeded the upper bound average (47.34).

If the one sampling day with the unusually high NMOC:NO_x ratios was removed, then there is a noticeably difference between a day when the maximum daily ozone concentration exceeded the average upper bound and a day in which it was not exceeded (32.01 versus 22.05). Additionally, maximum temperature, dew point temperature, and wind speed averages did not vary significantly when ozone concentrations exceeded the upper bound. These observations would suggest that a combination of local sources of NMOC are driving ozone accumulation at this site. As shown in Figure 2-5, there a number of industries near the monitoring site, and the issue of transport from the prevailing wind may not be valid.

El Paso, Texas (48-147-0037)

Ozone and NO_x data were sampled at the same site as the NMOC data; ozone data were available for all 60 sampling days, while NO_x data were available for 57 of the sampling days. Therefore, NMOC:NO_x ratios were only calculated for 57 days.

The average NMOC:NO_x ratio was 47.37, which would fall into the NO_x-limited area. Again, if the ratios greater than 100 are removed, then the NMOC:NO_x ratio would be 24.92, which is still in a NO_x-limited area. An effective air quality strategy would be to focus on reducing NO_x emissions.

The average maximum daily ozone concentration on a sample day at CAMS12 was 68.27 ppbv ± 4.39 ppbv. Daily NMOC:NO_x ratios and maximum daily ozone concentrations were plotted in Figure 4-6 to determine if there were noticeable trends between these two parameters. There appears to be a relationship between the tendencies of the NMOC:NO_x ratios and the maximum ozone concentration. There were nineteen sampling days in which the maximum concentration exceeded the upper bound ozone concentration average (72.66 ppbv).

If the six sampling days with the unusually high NMOC:NO_x ratios were removed, then there is little difference on a day when the maximum daily ozone concentration exceeded the average upper bound and higher (25.89 versus 24.42) a day when the average upper bound was not exceeded. Since this area was calculated to be a primarily NO_x-limited area, decreasing or increasing VOC concentrations would have no real effect on increasing or decreasing ozone concentrations. This observation would suggest that more NO_x has become available in the ambient air on these high ozone days. As shown in Figure 2-3, there are a few industries surrounding the monitoring site, indicating that the meteorology, such as high temperature and/or transport by the prevailing wind, may have a principal role in the increase of ozone concentrations.

Fort Worth, Texas (48-439-1002)

Ozone and NO_x data were sampled at the same site as the NMOC data; ozone data were available for all 66 sampling days, while NO_x data were available for 65 of the sampling days. Therefore, NMOC:NO_x ratios were only calculated for 65 days.

The average NMOC:NO_x ratio was 161.89, which would fall into the NO_x-limited area. If the ratios that were greater than 100 were removed (twenty-one), then the average NMOC:NO_x ratio was 18.03 (Table 4-4), which is still in the NO_x-limited area. An effective air quality strategy would be to focus on reducing NO_x emissions.

The average maximum daily ozone concentration on a sample day at CAMS13 was 68.45 ppbv ± 5.13 ppbv. Daily NMOC:NO_x ratios and maximum daily ozone concentrations were plotted in Figure 4-7 to determine if there were noticeable trends between these two parameters. There does appear to be a similar tendency between the NMOC:NO_x ratios and the maximum ozone concentration. There were twenty-five sampling days in which the maximum concentration exceeded the upper bound ozone concentration average (73.59 ppbv).

If the twenty-one sampling days with the unusually high NMOC:NO_x ratios were removed, then the CAMS13 site would have an opposite trend to the BXNY site. The NMOC:NO_x ratio is lower (13.41) on a day when the maximum daily ozone concentration exceeded the average upper bound and higher (23.56) on a day when the upper bound was not exceeded. Since this area was calculated to be a primarily NO_x-limited area, decreasing or increasing VOC concentrations would have no real effect on increasing or decreasing ozone concentrations. This observation would suggest that more NO_x has become available in the ambient air on these high ozone days. As shown in Figure 2-4, there are quite a few industries near the monitoring site, especially to the east. Although maximum air temperatures were high (96.99 °F), the local industrial emissions could play a crucial role if the prevailing wind is from the east.

Figure 4-1
Maximum Temperature and NMOC Concentrations

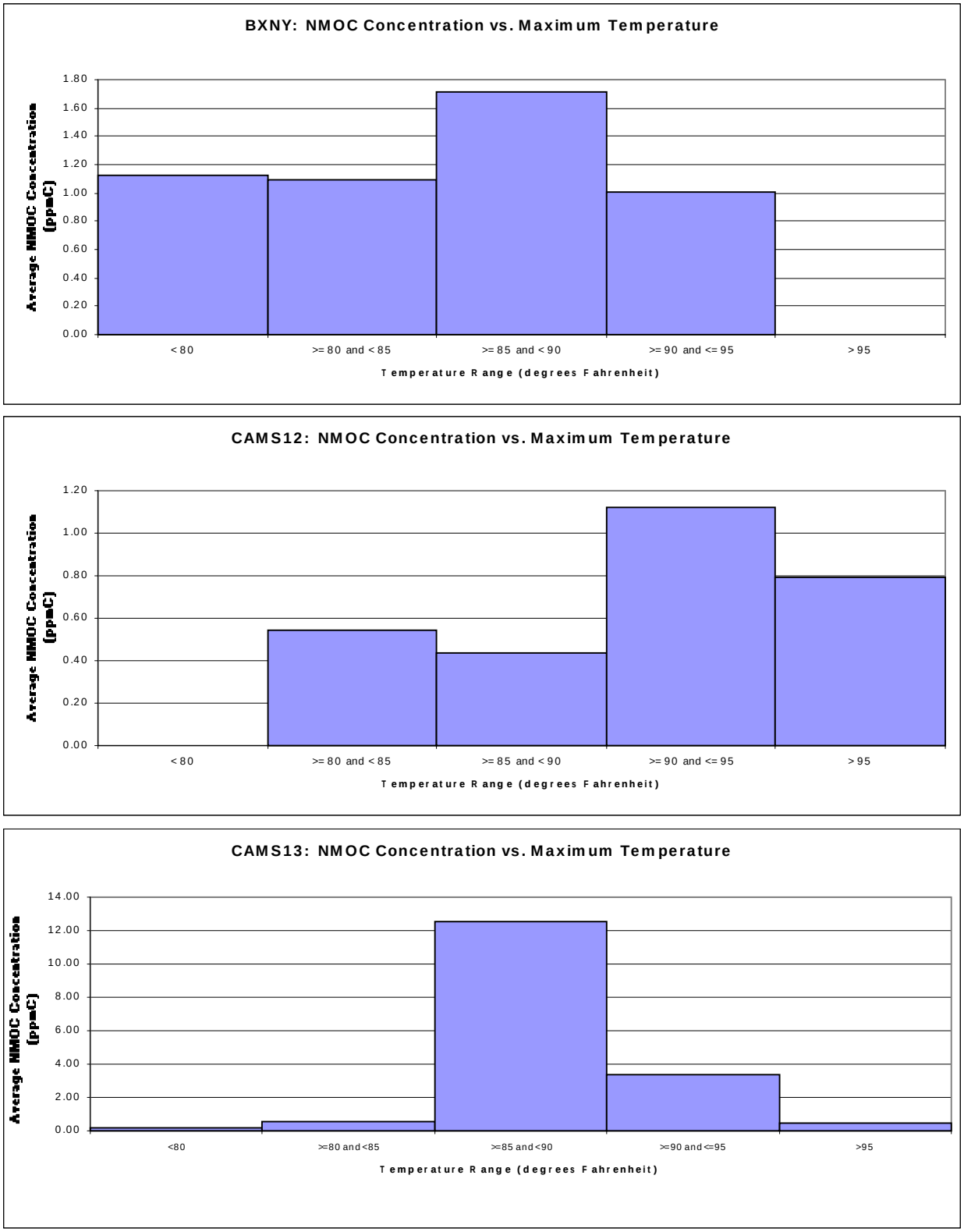


Figure 4-2
Average Wind Speed and NMOC Concentration

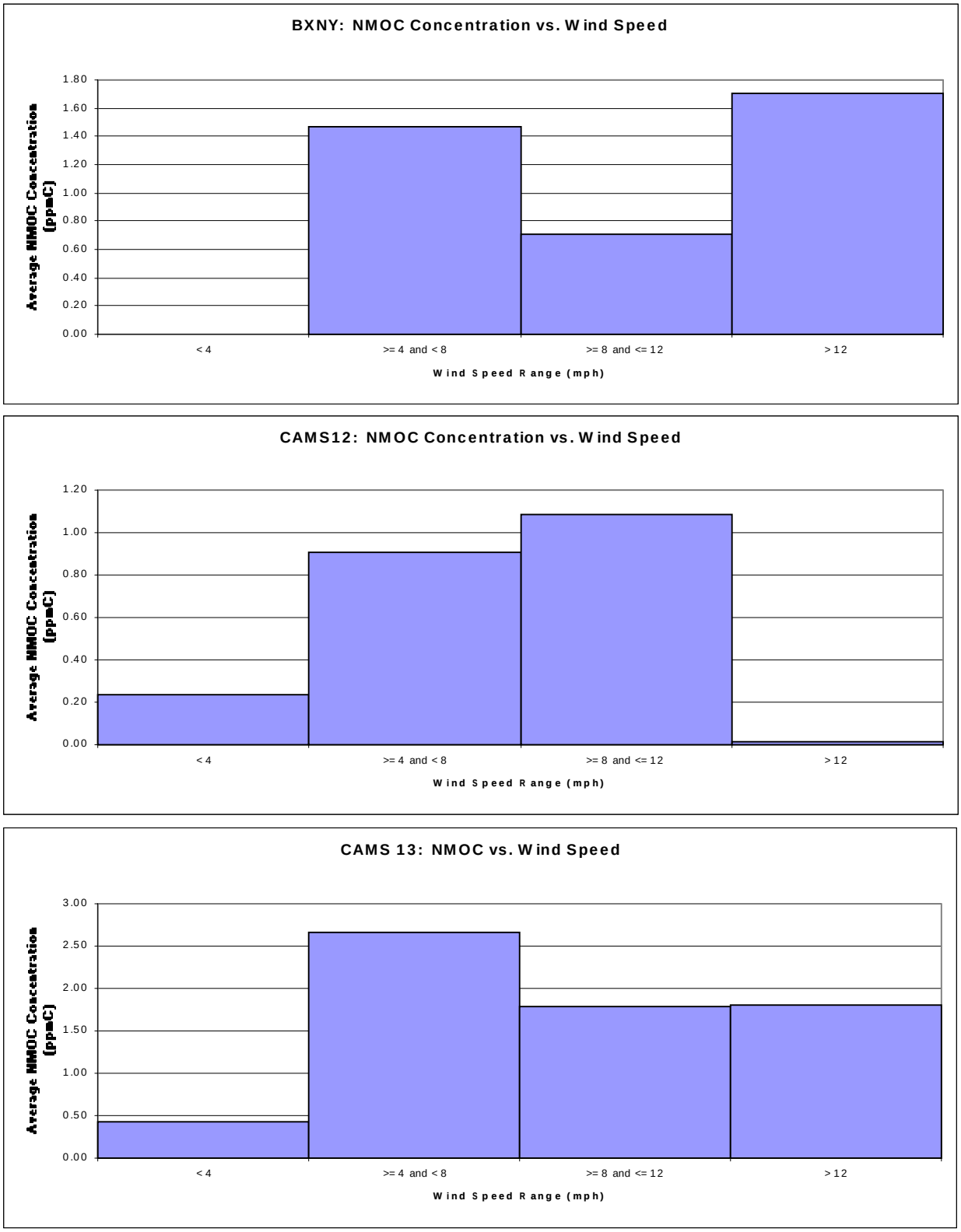
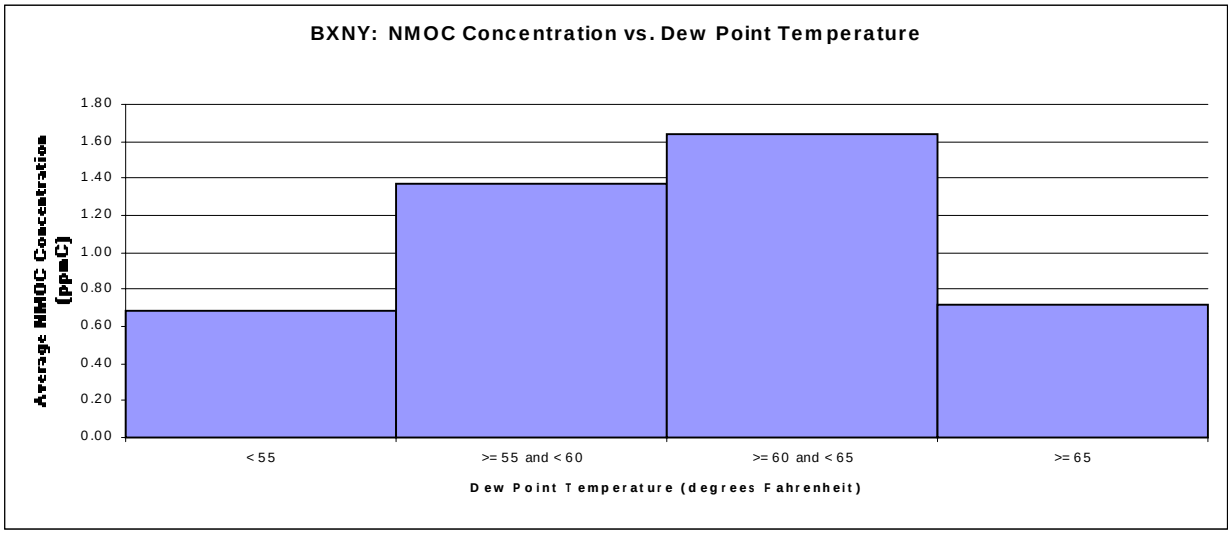
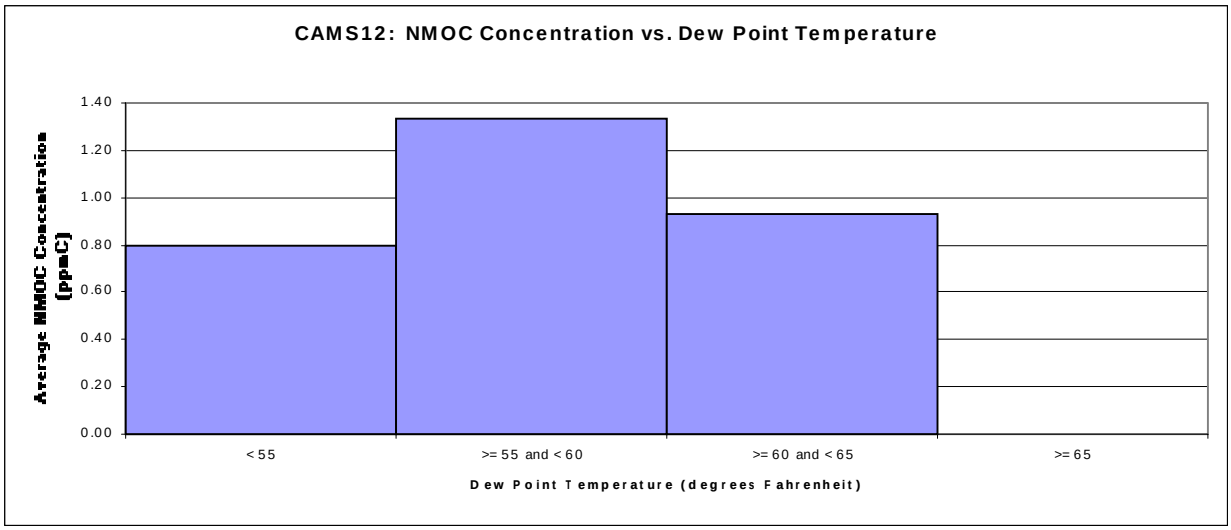


Figure 4-3
Average Dew Point Temperature and NMOC Concentrations





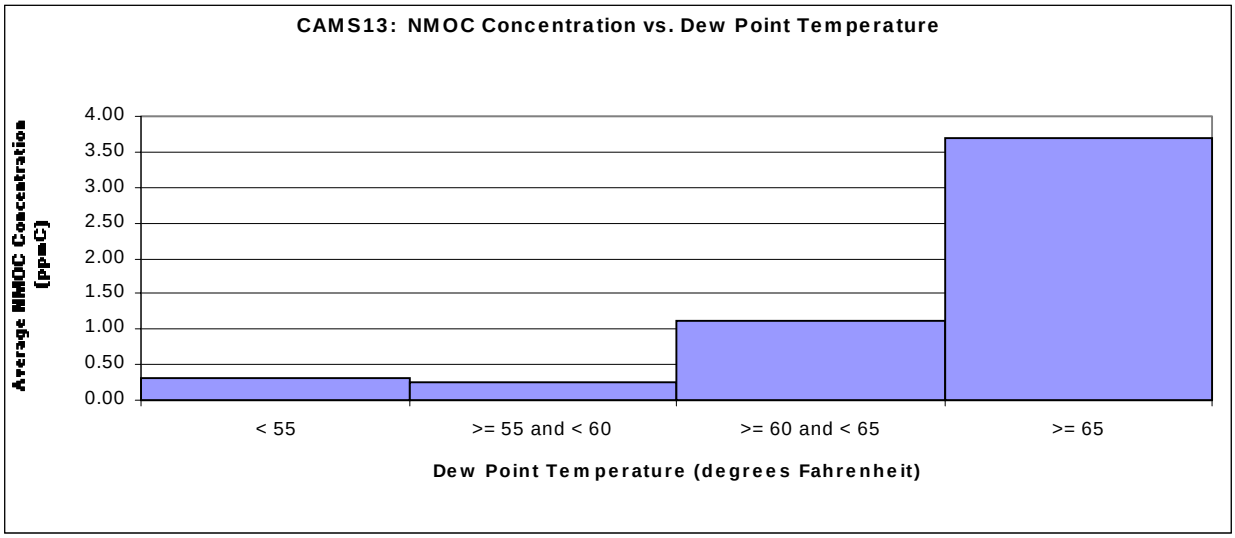
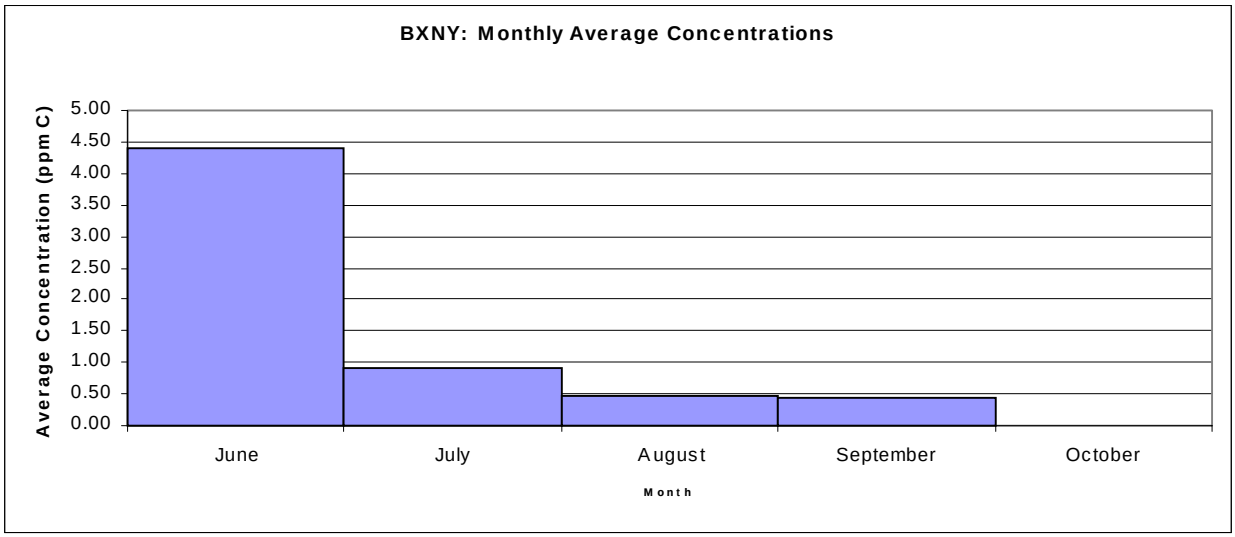
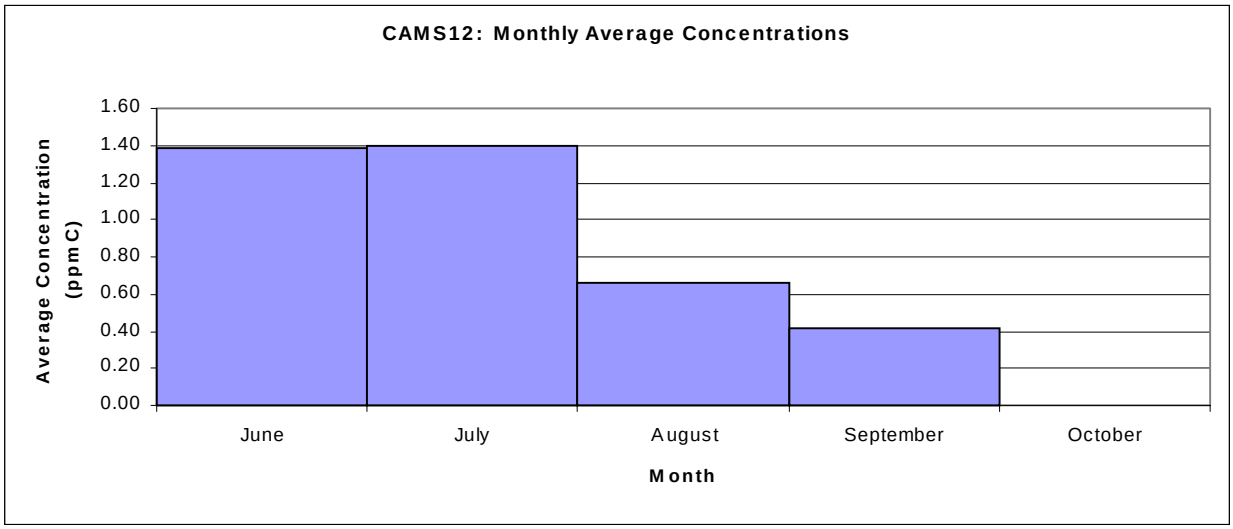


Figure 4-4
Average Monthly NMOC Concentrations Measured from 6:00 a.m. to 9:00 a.m.





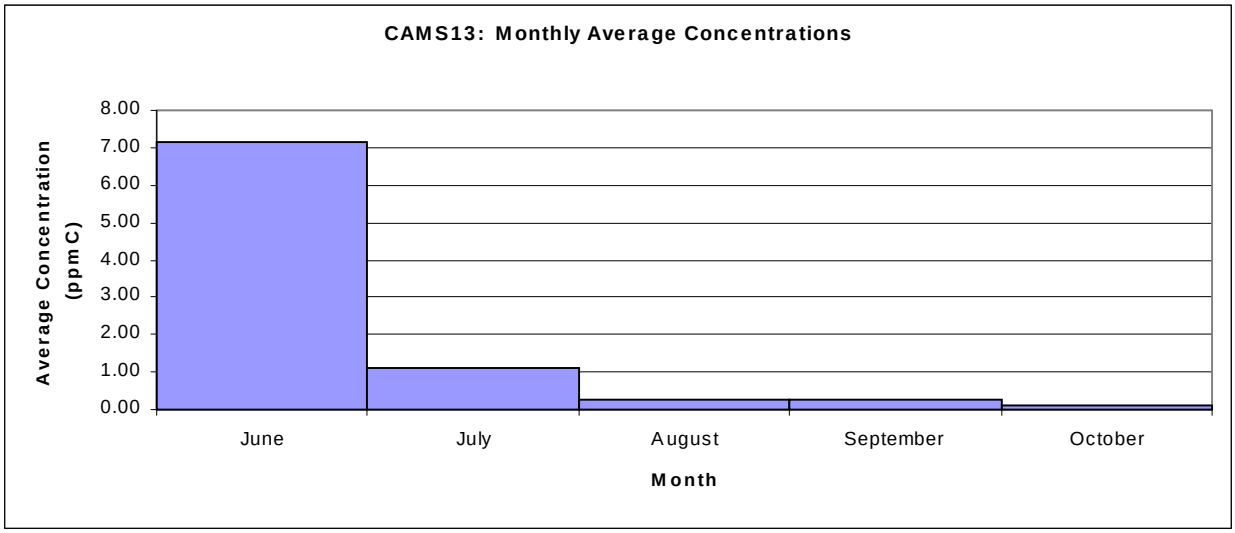


Figure 4-5
NMOC:NO_x Ratios and Maximum Ozone Concentration at BXNY (Bronx, NY)

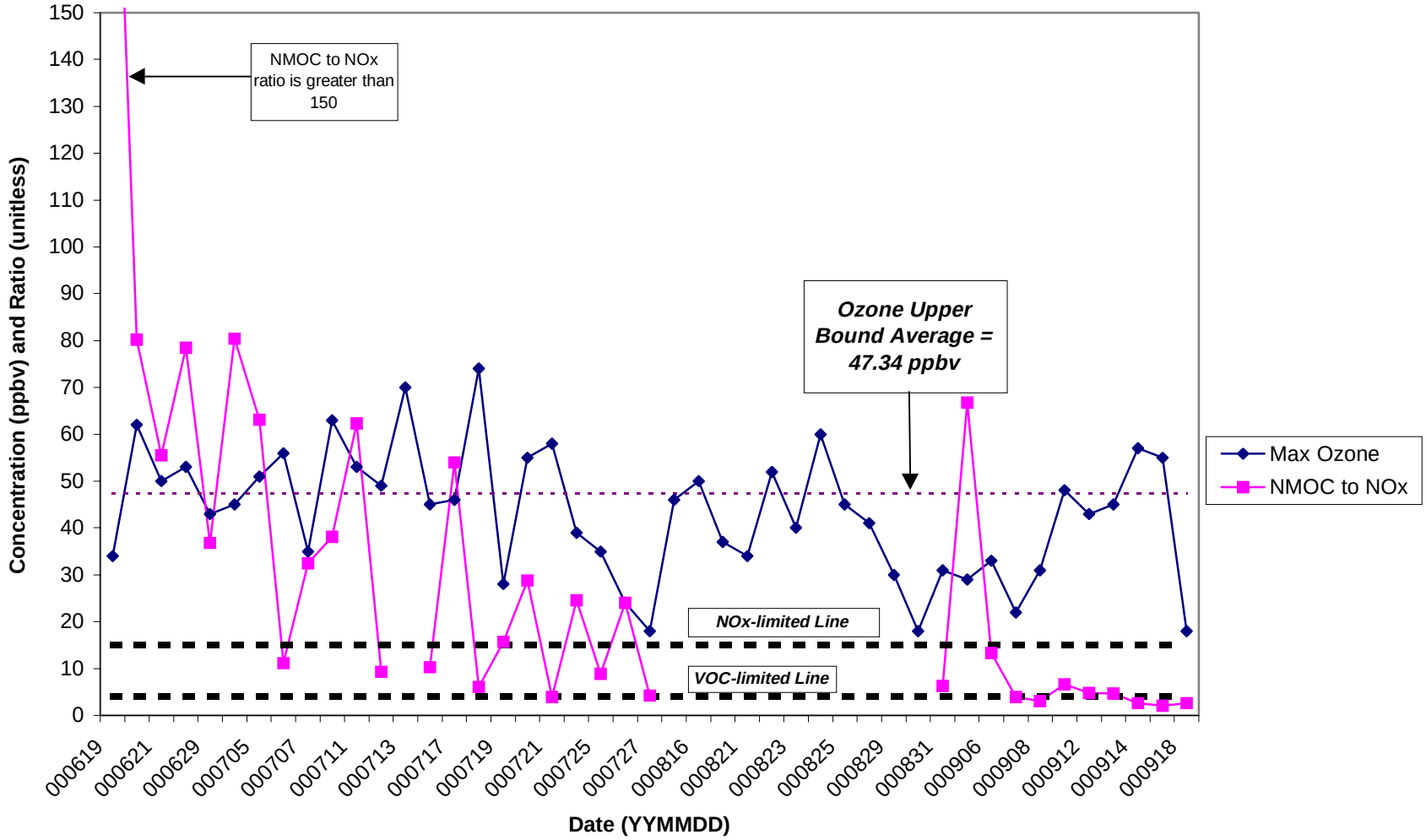


Figure 4-6

NMOC:NO_x Ratios and Maximum Ozone Concentration at CAMS12 (El Paso, TX)

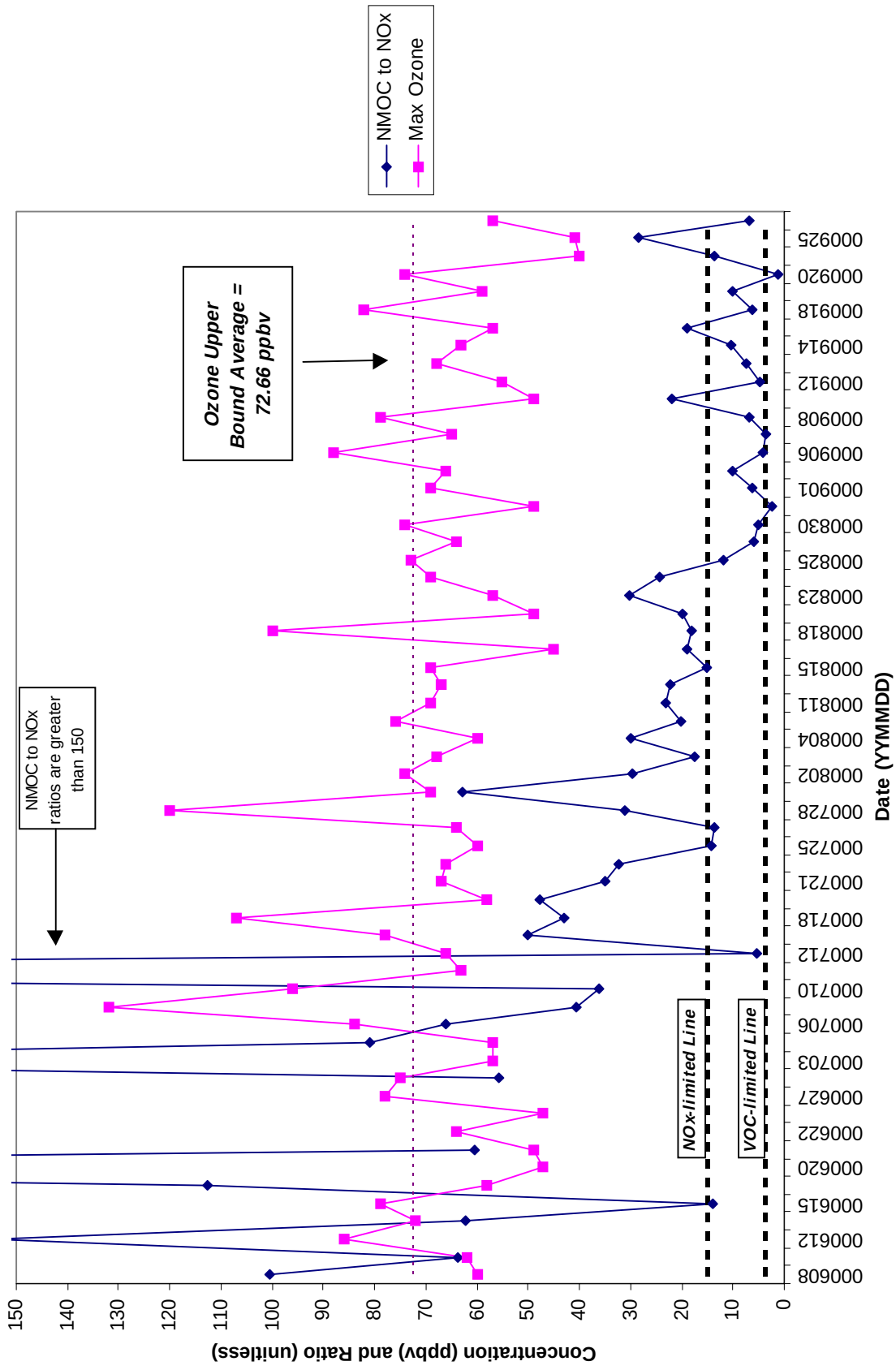


Figure 4-7
NMOC:NO_x Ratios and Maximum Ozone Concentration at CAMS13 (Fort Worth, TX)

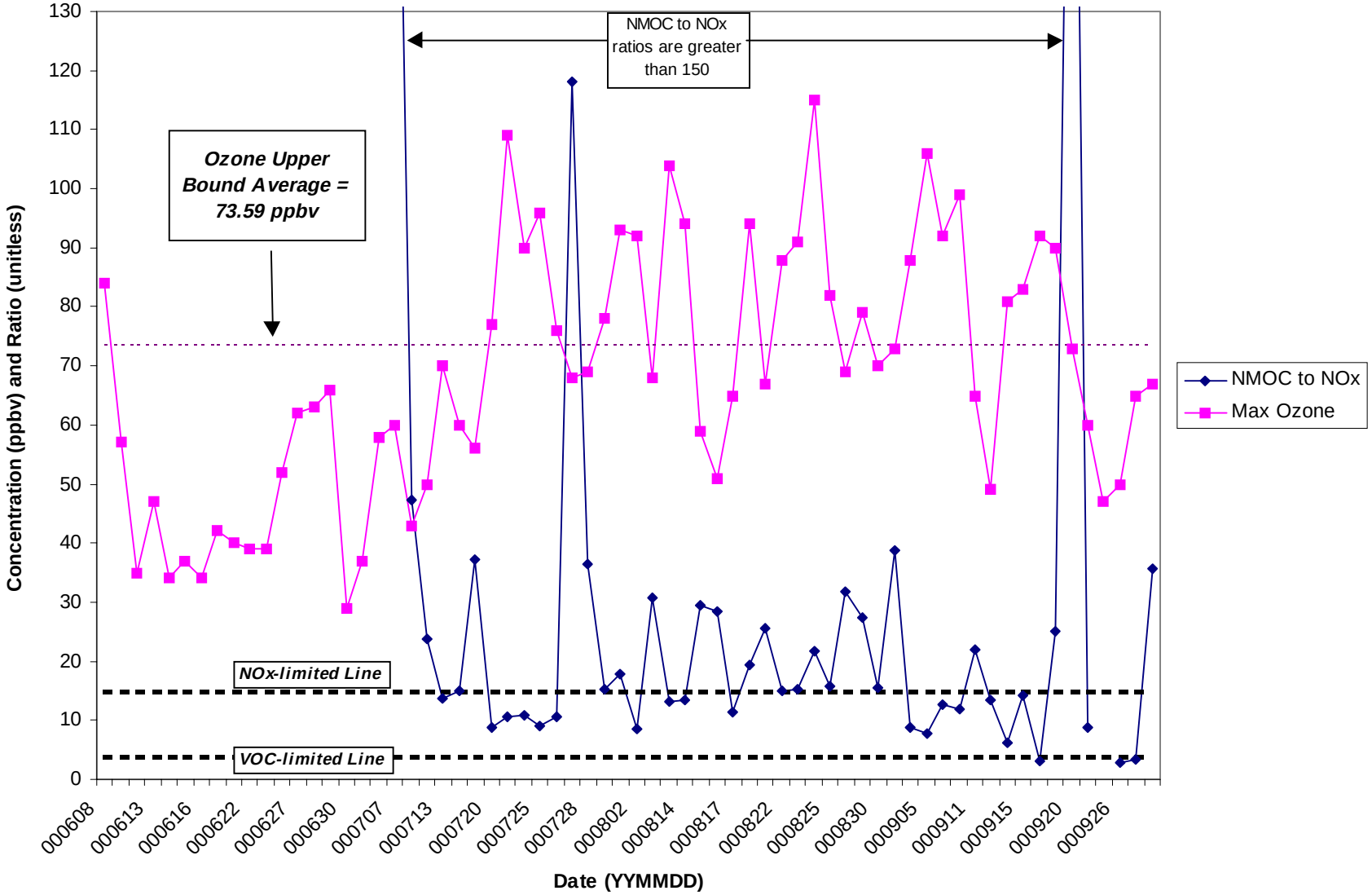


Table 4-1
Summary Statistics for Concentrations of Total NMOC
Measured at the Monitoring Stations

Category	Parameter	Bronx	El Paso	Fort Worth
Prevalence	Number of valid sampling days	45	60	66
	Number of nondetects	0	0	0
	Frequency of detection	100%	100%	100%
Concentration Range	Lowest concentration (ppmC)	0.101	0.086	0.094
	25th percentile concentration (ppmC)	0.272	0.488	0.178
	50th percentile concentration (ppmC)	0.680	0.834	0.288
	75th percentile concentration (ppmC)	1.199	1.361	2.918
	Highest concentration (ppmC)	8.116	2.826	18.576
Central Tendency	Median concentration (ppmC)	0.680	0.834	0.288
	Arithmetic mean concentration (ppmC)	1.154	0.937	2.139
	Geometric mean concentration (ppmC)	0.654	0.708	0.563
Variability	Standard deviation (ppmC)	1.530	0.659	4.111
	Coefficient of variation	1.326	0.703	1.922
	Percentage of samples in which Total NMOC value was less than the standard deviation	80%	38%	88%

Table 4-2
Meteorological Stations Used for Analysis

NMOC Site	World Meteorological Order Number	Station Name	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Elevation (meters)
El Paso	722700	El Paso International Airport	31.817	106.38	1194
Fort Worth	722590	Dallas-Fort Worth International Airport	32.900	97.02	171
Bronx	744860	Newark International Airport	40.390	73.47	21

Table 4-3
Pearson Correlations of Total NMOC (TNMOC) Concentrations with Selected Meteorological Parameters

Site	Correlation Variable (TNMOC Concentration with ...)	Pearson Correlation	Average Sample Day
El Paso (CAMS12)	... Maximum Daily Temperature	0.167	92.91 °F
	... Average Daily Wind Speed	0.014	6.92 mph
	... Average Dew Point Temperature	0.329	50.76 °F
Fort Worth (CAMS13)	... Maximum Daily Temperature	-0.380	94.97 °F
	... Average Daily Wind Speed	-0.091	8.66 mph
	... Average Dew Point Temperature	0.358	63.70 °F
Bronx (BXNY)	... Maximum Daily Temperature	-0.269	77.65 °F
	... Average Daily Wind Speed	-0.106	8.82 mph
	... Average Dew Point Temperature	0.060	59.47 °F

Table 4-4
NMOC and Ozone Summary for All Sites

SITE	Average Ozone Concentration	Number of Days in Which the Ozone Concentration Was High	Average NMOC:NO_x Ratio		
			Time Period	High[a] Ozone Concentration Day	Not a High[a] Ozone Concentration Day
BXNY (Bronx, NY)	43.36 ppbv (± 3.98 ppbv)	18	26.41	32.01	22.05[b]
CAMS12 (El Paso, TX)	68.27 ppbv (± 4.39 ppbv)	19	24.92	25.89[b]	24.42[b]
CAMS13 Fort Worth, TX)	68.45 ppbv (± 5.13 ppbv)	25	18.03[b]	13.41[b]	23.56[b]

[a] = An ozone concentration day considered "high" exceeds the upper bound of the average ozone concentration. For example, the average ozone concentration at BXNY is 43.36 ppbv. The upper bound is 47.37 ppbv, and any day that exceeds this value is considered "high".

[b] = The unusually high measured NMOC:NO_x Ratios (greater than 100) were removed.

5.0 Analysis of SNMOC Monitoring Results

This section summarizes the SNMOC ambient air monitoring data collected during the 2000 NMOC/SNMOC program. As discussed earlier, the SNMOC sampling and analytical method currently measures ambient air concentrations of 80 different hydrocarbons as well as total NMOC, thus providing extensive information on the composition and magnitude of selected components of air pollution at the sampling locations. Of the three monitoring stations that measured SNMOC, only one (Fort Worth) collected SNMOC samples on an almost daily basis.

5.1 Data Summary

Table 5-1 summarizes the SNMOC monitoring data for the Fort Worth site. This summary table reveals several notable trends.

5.1.1 Prevalence

Nearly all of the 80 hydrocarbons identified by the SNMOC sampling and analytical method were detected in more than 75 percent of the total SNMOC samples collected during the 2000 program. Prevalent compounds were identified according to their percentage contribution by mass to a site's average daily concentration. If a compound contributed to the top 75 percent of the average total concentration **and** that compound was detected in at least 75% of the samples, then that compound was identified as prevalent.

$$\text{Percent Contribution} = 100\% \times \frac{(\text{Average concentration of a compound by site})}{(\text{Average group total concentration by site})}$$

A group of 22 compounds was identified as the "most prevalent" SNMOC; these compounds are listed below:

Alkanes
n-Butane
n-Pentane
n-Hexane
Isopentane
Methylcyclopentane
2-Methylpentane
3-Methylpentane
2,2,4-Trimethylpentane
Olefins
cis-2-Butene
trans-2-Butene
Cyclopentene
Isoprene
2-Methyl-1-Butene
2-Methyl-2-Butene
1-Pentene
cis-2-Pentene
trans-2-Pentene
Aromatic Compounds
Benzene
Toluene
1,2,4-Trimethylbenzene
m-,*p*-Xylene
o-Xylene

Specific trends noted in the frequency of detection include:

- Thirty-three compounds were detected in 100% of the samples.
- Propyne, 1-decene, and 2-ethyl-1-butene were not detected in any samples.

5.1.2 Concentration Range

As Table 5-1 indicates, concentration ranges for SNMOC vary widely from one compound to the next. In addition, readers should note two limitations when interpreting the concentration range data in Table 5-1:

- Because the data summary tables only characterize air concentrations measured between 6:00 a.m. and 9:00 a.m., local time, it is highly likely that ambient levels of many SNMOC rose to higher levels or fell to lower levels than the concentration range data indicate.

- There were twenty-one sample days in which the NMOC values were unusually high.

5.1.3 Central Tendency

Not surprisingly, the median, arithmetic mean, and geometric mean concentrations shown in Table 5-1 also vary significantly among the different compounds. These various measures of central tendency are expected to accurately represent actual central tendency levels, due to the high prevalence of most SNMOC. For compounds detected in fewer than half of the SNMOC samples, the magnitude of the central tendency values may be influenced by nondetects, which were all replaced with concentrations equal to one-half their corresponding detection limits.

Again, readers are cautioned to note the unusually high SNMOC concentrations when evaluating average values.

5.1.4 Variability

According to Table 5-1, coefficients of variation for most SNMOC compounds were greater than 1.5. The highest coefficient of variation is for isoprene (7.22); the next highest were for 2-methyl-1-butene and 3-methyl-1-butene (2.20). Note that these compounds are all alkenes, relatively reactive compounds that are more difficult to measure reproducibly.

5.2 Relationship Between "Identified" vs. "Unknown" Compounds

For additional insight into the nature of airborne organic compounds, Table 5-2 lists the total concentration of compounds that the SNMOC analytical method can, and cannot, identify. The percentage of identified and unidentified compounds by SNMOC analytical method characterized over eighty percent of the organic compounds found in the average NMOC sample.

Although the identities of the unidentified compounds are obviously unknown, they probably include halogenated hydrocarbons, carbonyls and other oxygenates, and hydrocarbons that the SNMOC analytical equipment cannot yet identify.

5.3 Composition of Air Samples

The composition of air samples can be used to characterize the reactivity and sources of pollution within airsheds. For instance, air samples having relatively high concentrations of reactive compounds (such as olefins) likely characterize "newer" air masses near emissions sources, and those with relatively low concentrations of reactive compounds likely characterize "older" air masses (e.g., those influenced by long-range transport).

Refer to Table 2-5 for a list of the SNMOC compounds of interest grouped as olefins, alkanes, and aromatics.

Table 5-2 indicates the extent to which alkanes, olefins, and aromatics (as ppbC) constitute total identified SNMOC at each monitoring station. Previous reports based this comparison on ppbv data. While percentages based on concentrations expressed in units of ppbC inherently give greater weight to concentrations of compounds with more carbon atoms, Table 5-2 highlights the same trend in the 2000 SNMOC monitoring data identified in previous reports: alkanes account for the majority of an SNMOC sample. Nearly 54% of the samples were from the alkane compound group, suggesting the influence of long-range transport.

5.4 Analysis of Tracer Compounds

Several compounds may be identified as "tracer" compounds, indicating that their mere presence or relative strength may provide clues to their origin. Acetylene and ethylene are tracers of vehicle exhaust; isoprene is a compound that is a tracer of biogenic emissions; and benzene and toluene are tracers for combustion sources (Stoeckenius, 1994). Acetylene also has no significant terrestrial biogenic sources (McElroy, 1998).

Figures 5-1 through 5-3 are profiles of these tracer compounds. In Figure 5-1 , the isoprene concentrations are always lower than the acetylene concentrations. After July 7 (which is after the unusually high SNMOC values), isoprene concentrations remain fairly constant. However, acetylene concentrations varied significantly throughout the sampling season. This variation may suggest that the biogenic contribution to the overall CAMS13 airshed remains fairly constant, while the anthropogenic contribution tends to influence the ozone concentration. Figure 5-2 is a plot of acetylene versus ethylene concentrations, and the correlation between the two parameters is extremely high (0.959). Benzene and toluene concentrations had an even higher correlation (0.989), as shown in Figure 5-3. The results of the tracer analysis suggest that CAMS13 is influenced more by anthropogenic sources, such as motor vehicles, than by biogenic sources.

5.5 Correlations Between Concentrations of Different Compounds

Pearson correlations were calculated between the concentrations of the different SNMOC compounds. An intercomparison between the compound types (i.e., alkanes, olefins, and aromatics) is presented in Table 5-3.

As Table 5-3 indicates, correlations between the different compound types are strongly positive. This table shows correlations obtained with the unusually high SNMOC data as well as without the unusually high data. With the high data, all the compound groups show correlation coefficients greater than 0.964. Without the high data, the correlation coefficients are still strong. Alkanes and aromatics have the highest correlation between them on average followed by aromatics and olefins.

5.6 Comparison to Selected Meteorological Conditions

The following analyses compare local observations of maximum temperature, wind speed, and dew point temperature to the concentrations of the SNMOC by compound type. Figures 5-4 through 5-6 show the compound group comparison by meteorological parameter.

Compound group concentrations tended to decrease as: 1) the maximum temperature increased; 2) the wind speed increased; and 3) the dew point decreased.

Table 5-4 shows calculated correlation coefficients and summarizes the data both with and without the unusually high data. In examining the data after July 7, the wind speed had the strongest negative relationship with the olefins (-0.512) followed by the alkanes (-0.457). This trend suggests that as wind speeds increase, the SNMOC concentrations decrease, and would support the influence of local sources of air pollution. In general, the maximum temperature and the dew point temperature weakly correlated with compound group concentrations.

Figure 5-1
Acetylene and Isoprene Concentrations at CAMS13 (Fort Worth, TX)

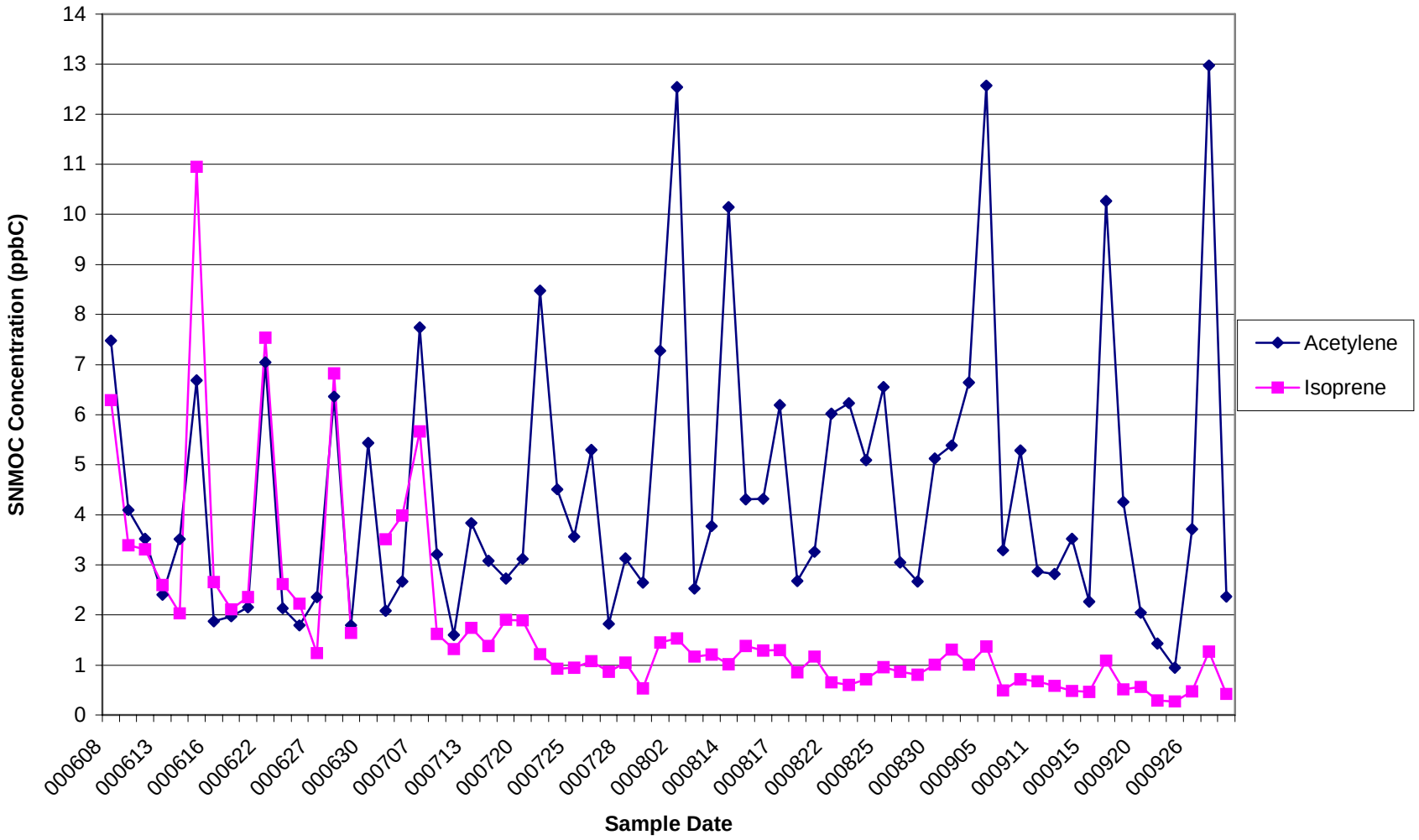


Figure 5-2
Acetylene versus Ethylene at CAMS13 (Fort Worth, TX)

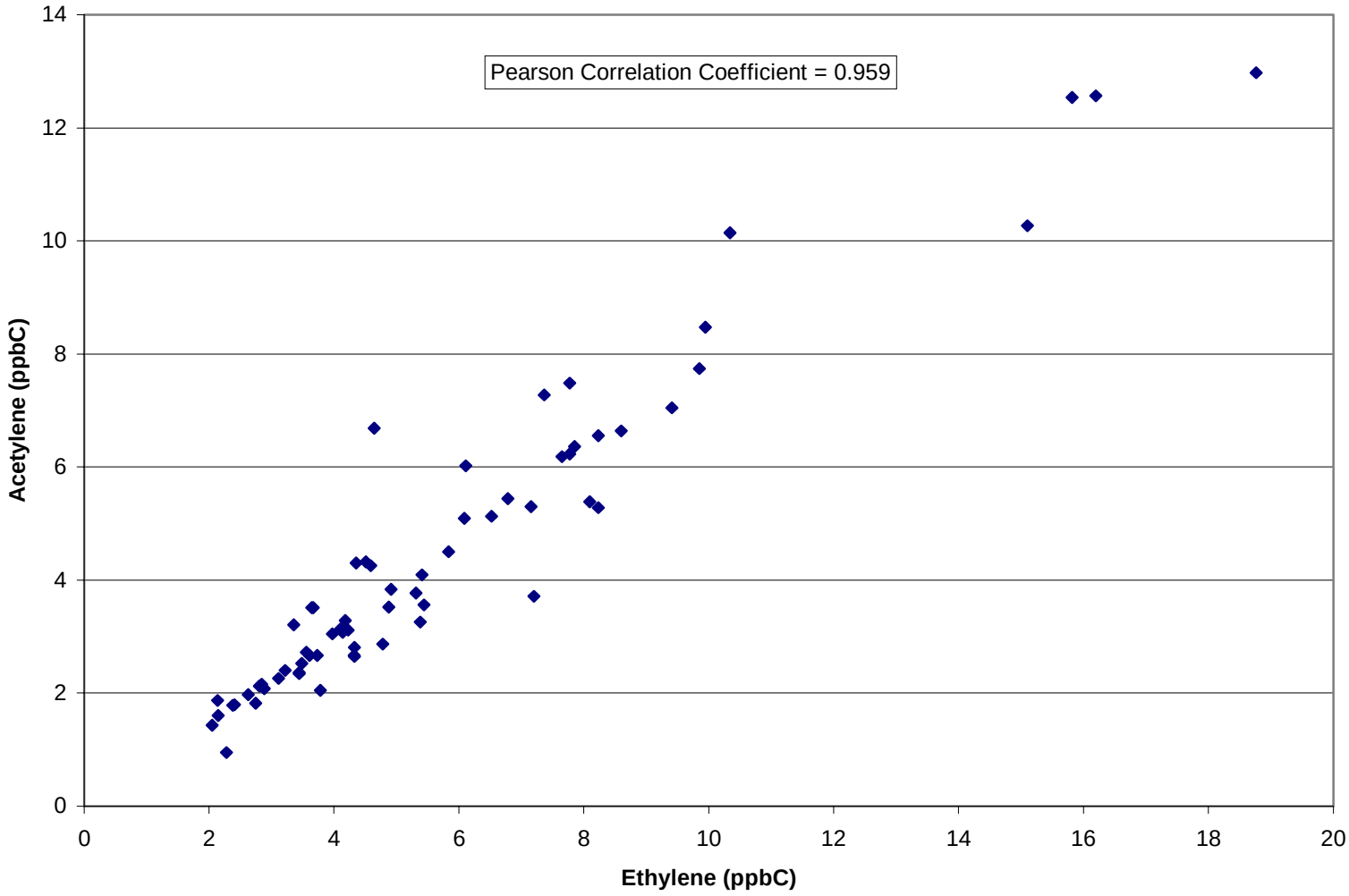


Figure 5-3
Benzene versus Toluene at CAMS13 (Fort Worth, TX)

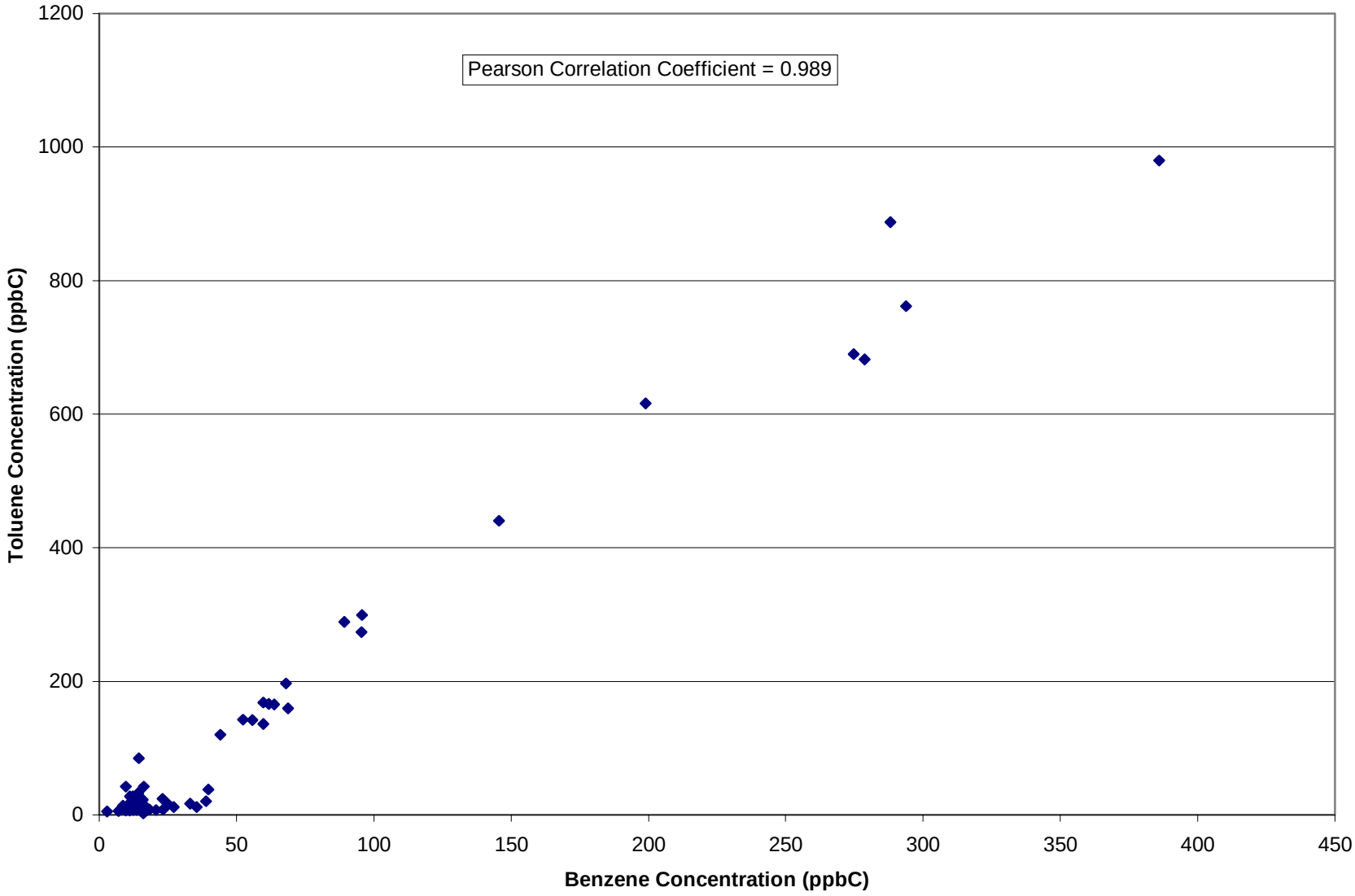


Figure 5-4
CAMS13 (Fort Worth, TX): Average Concentration Compared with Maximum Temperature

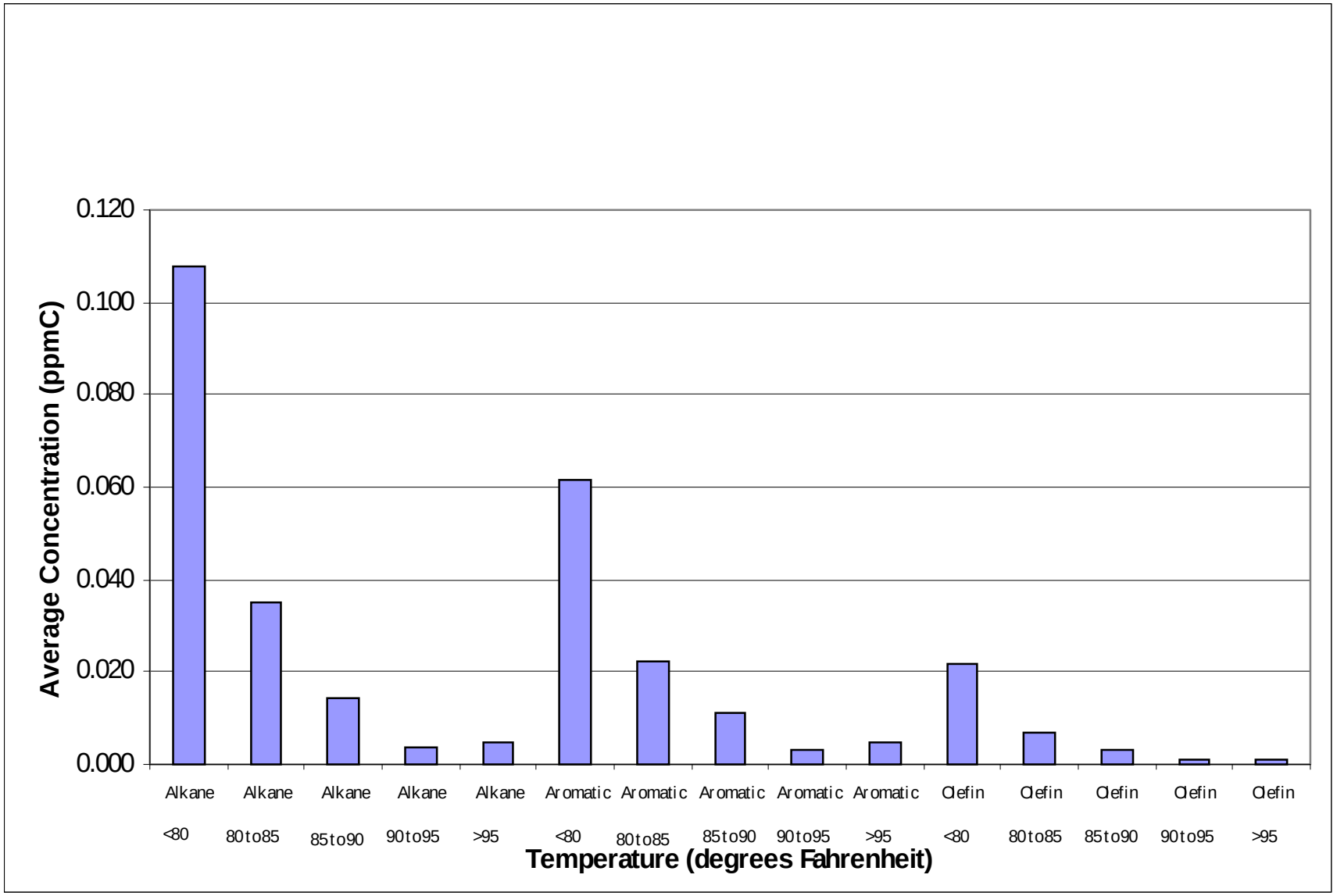


Figure 5-5
CAMS13 (Fort Worth, TX): Average Concentration Compared with Wind Speed

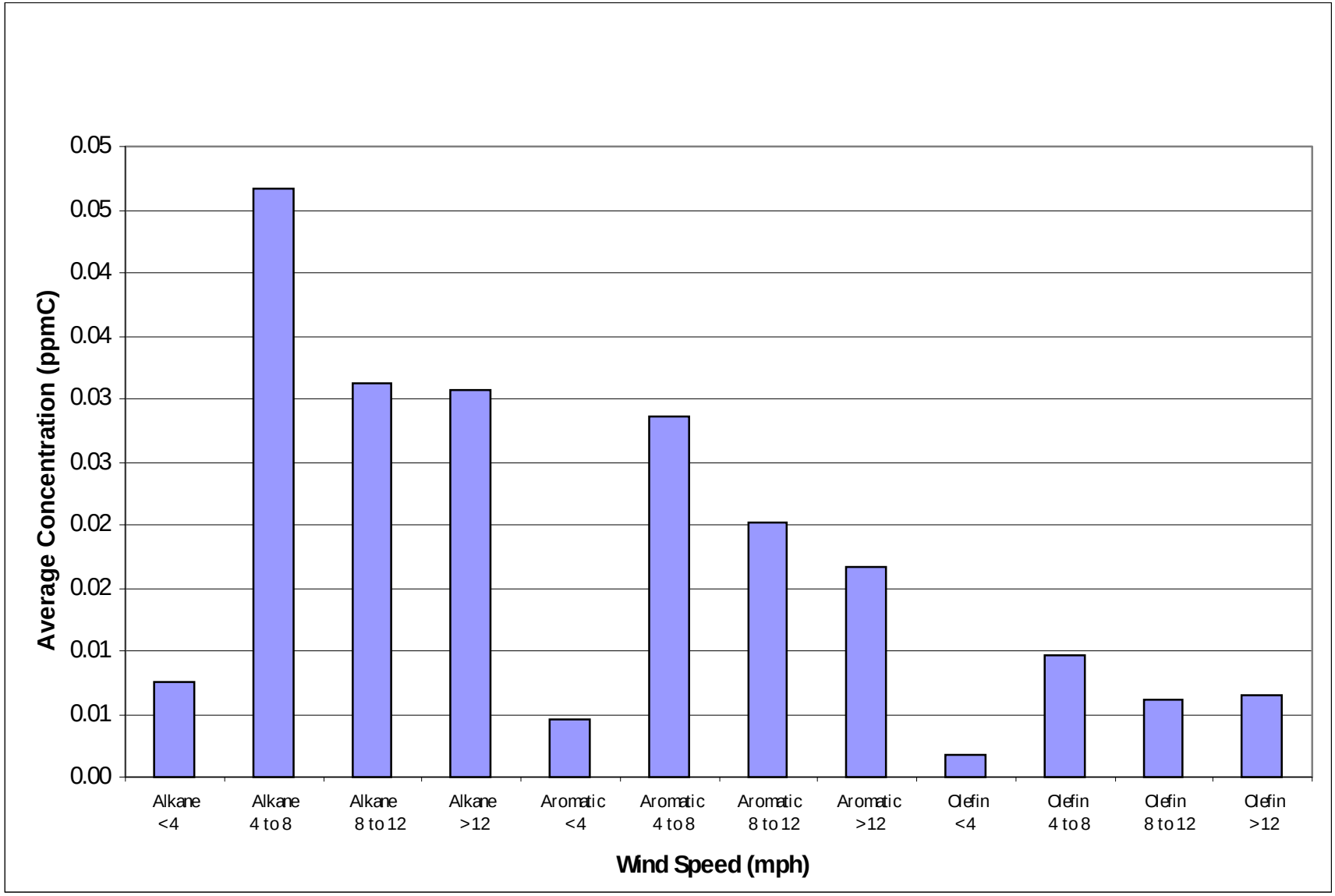


Figure 5-6
CAMS13 (Fort Worth, TX): Average Concentration Compared with Dew Point Temperature

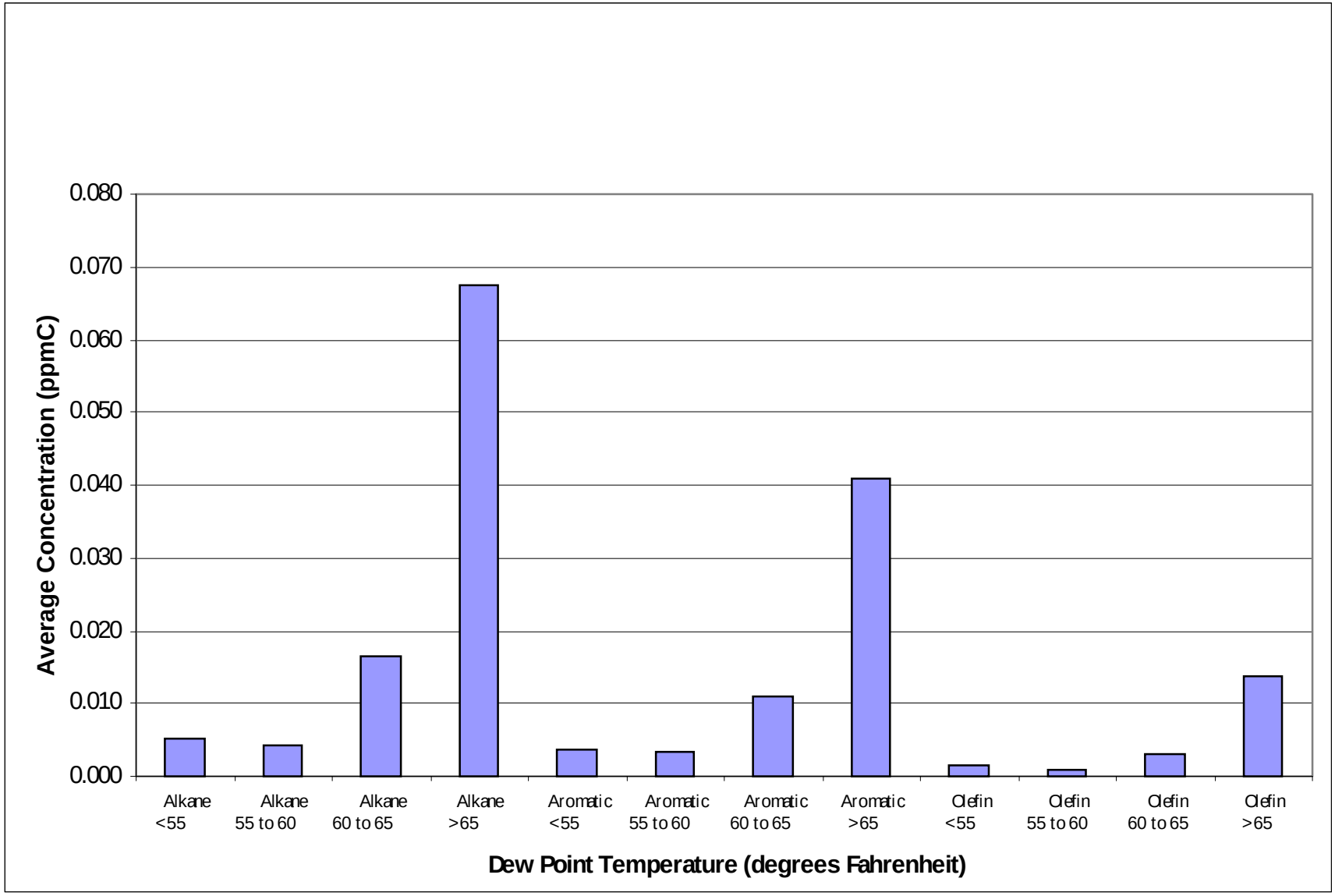


Table 5-1
Summary Statistics for SNMOC Concentrations Measured at CAMS13 (Fort Worth, TX)
Based on 66 Days with Valid Samples

	Prevalence of Compound in Ambient Air		Range of Measured Concentrations		Central Tendency of Measured Concentrations			Variability in Measured Concentrations	
Compound	Number of Non-detects	Frequency of Detections	Lowest (ppbC)	Highest (ppbC)	Median (ppbC)	Arithmetic Mean (ppbC)	Geometric Mean (ppbC)	Standard Deviation (ppbC)	Coefficient of Variation
1,2,3-Trimethylbenzene	10	85%	0.52	53.72	0.86	5.86	1.69	10.94	1.87
1,2,4-Trimethylbenzene	1	98%	1.03	204.38	2.78	25.20	6.11	47.41	1.88
1,3,5-Trimethylbenzene	7	89%	0.58	69.43	1.07	8.21	2.16	15.46	1.88
1,3-Butadiene	18	73%	0.31	1.80	0.38	0.54	0.45	0.36	0.67
1-Decene	66	0%	0.29	0.29	0.29	0.29	0.29	0.00	0.00
1-Dodecene	7	89%	0.44	32.95	0.64	3.81	1.25	6.89	1.81
1-Heptene	47	29%	5.14	40.14	0.31	4.64	0.86	9.40	2.03
1-Hexene	17	74%	0.52	32.85	0.65	3.82	1.15	7.08	1.85
1-Nonene	52	21%	0.35	5.57	0.35	0.59	0.40	0.86	1.45
1-Octene	43	35%	0.33	8.78	0.29	1.02	0.40	1.91	1.87
1-Pentene	1	98%	0.31	110.04	0.79	10.63	1.93	21.53	2.03
1-Tridecene	61	8%	0.51	2.37	0.42	0.45	0.41	0.29	0.65
1-Undecene	48	27%	0.55	2.83	0.42	0.73	0.59	0.59	0.80
2,2,3-Trimethylpentane	6	91%	0.39	61.81	1.03	6.29	1.76	11.99	1.91
2,2,4-Trimethylpentane	0	100%	0.87	320.76	6.26	39.08	11.17	71.63	1.83
2,2-Dimethylbutane	0	100%	0.49	124.20	1.34	12.62	3.02	24.52	1.94
2,3,4-Trimethylpentane	0	100%	0.43	112.34	2.25	13.66	4.08	24.97	1.83
2,3-Dimethylbutane	1	98%	0.71	238.19	2.00	24.38	4.79	48.71	2.00
2,3-Dimethylpentane	2	97%	0.60	83.46	1.16	8.78	2.38	17.18	1.96
2,4-Dimethylpentane	1	98%	0.57	100.80	1.36	11.61	2.93	22.04	1.90
2-Ethyl-1-butene	66	0%	0.52	0.52	0.52	0.52	0.52	0.00	0.00
2-Methyl-1-butene	3	95%	0.33	262.18	0.98	24.38	2.58	53.54	2.20
2-Methyl-1-pentene	43	35%	0.56	60.33	0.52	6.38	1.11	12.85	2.01
2-Methyl-2-butene	4	94%	0.44	469.14	1.22	43.07	3.95	91.99	2.14
2-Methylheptane	0	100%	0.34	54.59	0.91	6.24	1.76	11.86	1.90

Table 5-1
Summary Statistics for SNMOC Concentrations Measured at CAMS13 (Fort Worth, TX)
Based on 66 Days with Valid Samples (Continued)

Compound	Prevalence of Compound in Ambient Air		Range of Measured Concentrations		Central Tendency of Measured Concentrations			Variability in Measured Concentrations	
	Number of Non-detects	Frequency of Detections	Lowest (ppbC)	Highest (ppbC)	Median (ppbC)	Arithmetic Mean (ppbC)	Geometric Mean (ppbC)	Standard Deviation (ppbC)	Coefficient of Variation
2-Methylhexane	1	98%	0.62	210.83	2.13	22.75	4.32	45.68	2.01
2-Methylpentane	0	100%	1.25	945.73	7.98	93.88	17.67	190.83	2.03
3-Methyl-1-butene	42	36%	0.37	48.06	0.37	3.76	0.66	8.27	2.20
3-Methylheptane	0	100%	0.34	52.80	0.96	6.57	1.91	12.14	1.85
3-Methylhexane	0	100%	0.81	225.16	3.63	26.32	7.18	49.41	1.88
3-Methylpentane	0	100%	0.65	568.22	4.28	58.52	9.71	118.10	2.02
4-Methyl-1-pentene	47	29%	1.38	16.04	0.46	1.84	0.69	3.29	1.78
α-Pinene	15	77%	0.29	7.15	3.52	4.46	3.79	2.76	0.62
Acetylene	0	100%	0.95	12.97	0.55	1.19	0.68	1.47	1.24
β-Pinene	23	65%	0.31	2.71	16.06	51.88	25.53	81.12	1.56
Benzene	0	100%	2.85	386.03	0.46	0.70	0.54	0.60	0.85
***cis*-2-Butene**	16	76%	0.49	86.17	0.68	7.70	1.60	15.94	2.07
cis-2-Hexene	44	33%	0.41	43.22	0.39	4.52	0.79	9.16	2.03
***cis*-2-Pentene**	2	97%	0.42	181.43	0.84	17.12	2.41	35.62	2.08
Cyclohexane	1	98%	0.58	128.56	2.38	19.74	5.16	31.11	1.58
Cyclopentane	0	100%	0.37	171.18	1.21	17.38	3.02	34.96	2.01
Cyclopentene	7	89%	0.41	101.01	0.69	8.80	1.53	19.48	2.21
Ethane	0	100%	3.49	49.34	10.27	12.09	10.03	8.22	0.68
Ethylbenzene	0	100%	0.57	167.98	2.39	21.30	4.98	40.58	1.91
Ethylene	0	100%	2.05	18.76	4.55	5.76	4.99	3.50	0.61
Isobutane	0	100%	0.77	256.21	4.91	25.26	7.87	47.84	1.89
Isobutene/1-Butene	0	100%	0.98	50.17	3.38	6.62	4.14	8.84	1.34
Isopentane	0	100%	1.72	3101.38	17.34	274.93	40.76	573.44	2.09
Isoprene	2	97%	0.42	947.92	1.23	16.14	1.42	116.47	7.22
Isopropylbenzene	40	39%	0.64	14.13	0.48	1.99	0.85	3.26	1.64

Table 5-1
Summary Statistics for SNMOC Concentrations Measured at CAMS13 (Fort Worth, TX)
Based on 66 Days with Valid Samples (Continued)

Compound	Prevalence of Compound in Ambient Air		Range of Measured Concentrations		Central Tendency of Measured Concentrations			Variability in Measured Concentrations	
	Number of Non-detects	Frequency of Detections	Lowest (ppbC)	Highest (ppbC)	Median (ppbC)	Arithmetic Mean (ppbC)	Geometric Mean (ppbC)	Standard Deviation (ppbC)	Coefficient of Variation
m-Diethylbenzene	23	65%	0.68	16.04	0.83	2.37	1.22	3.45	1.46
m-Ethyltoluene	0	100%	0.62	140.91	2.04	13.37	3.84	24.34	1.82
***m*-Xylene/*p*-Xylene**	0	100%	2.15	529.06	2.70	36.99	6.17	74.46	2.01
Methylcyclohexane	0	100%	0.55	98.48	2.26	17.91	4.71	33.49	1.87
Methylcyclopentane	0	100%	0.51	351.59	5.86	65.89	13.39	127.39	1.93
***n*-Butane**	0	100%	1.53	1672.76	7.55	140.24	17.67	305.69	2.18
n-Decane	0	100%	0.58	22.80	1.62	3.30	2.07	4.17	1.26
n-Dodecane	32	52%	0.43	4.82	0.43	0.95	0.59	1.08	1.13
n-Heptane	0	100%	0.63	224.05	2.42	25.95	5.18	51.05	1.97
***n*-Hexane**	0	100%	0.96	753.95	5.29	78.88	11.90	160.41	2.03
n-Nonane	0	100%	0.42	37.22	1.03	5.03	1.83	8.77	1.74
n-Octane	0	100%	0.49	77.97	1.21	9.86	2.52	18.69	1.90
***n*-Pentane**	0	100%	2.28	1542.24	10.80	148.92	22.12	307.69	2.07
n-Propylbenzene	25	62%	0.55	38.25	0.68	5.11	1.42	9.40	1.84
n-Tridecane	31	53%	0.44	5.29	0.45	1.15	0.64	1.25	1.09
n-Undecane	0	100%	0.47	20.80	0.96	2.09	1.29	3.10	1.48
o-Ethyltoluene	7	89%	0.56	56.28	0.99	7.00	2.10	12.75	1.82
***o*-Xylene**	0	100%	0.55	171.37	2.28	22.08	4.92	42.08	1.91
p-Diethylbenzene	42	36%	0.54	19.15	0.33	2.47	0.71	4.46	1.81
p-Ethyltoluene	3	95%	0.71	75.42	1.23	9.62	2.61	17.91	1.86
Propane	0	100%	3.01	59.32	10.48	14.65	11.20	11.89	0.81
Propylene	0	100%	0.99	9.75	2.16	2.99	2.56	1.88	0.63
Propyne	66	0%	0.38	0.38	0.38	0.38	0.38	0.00	0.00
Styrene	13	80%	0.41	7.33	0.88	1.36	0.90	1.49	1.10
Toluene	0	100%	2.50	979.90	16.05	122.22	31.37	226.88	1.86

Table 5-1
Summary Statistics for SNMOC Concentrations Measured at CAMS13 (Fort Worth, TX)
Based on 66 Days with Valid Samples (Continued)

Compound	Prevalence of Compound in Ambient Air		Range of Measured Concentrations		Central Tendency of Measured Concentrations			Variability in Measured Concentrations	
	Number of Non-detects	Frequency of Detections	Lowest (ppbC)	Highest (ppbC)	Median (ppbC)	Arithmetic Mean (ppbC)	Geometric Mean (ppbC)	Standard Deviation (ppbC)	Coefficient of Variation
***trans*-2-Butene**	7	89%	0.30	95.31	0.51	7.87	1.35	16.98	2.16
trans-2-Hexene	42	36%	0.40	78.73	0.39	7.64	0.97	16.13	2.11
***trans*-2-Pentene**	1	98%	0.36	398.52	1.49	37.36	4.22	78.67	2.11

Bold face entries indicates a prevalent compound. Please refer to Section 5.1.1 for more details.

Table 5-2
Breakdown of Total NMOC as Alkanes, Olefins, Aromatics, and Unidentified

Compound Type	Average Concentration (ppmC)	Percent of Total NMOC
Alkane	1.16	54%
Olefin	0.24	11%
Aromatic	0.37	17%
Unidentified	0.37	17%
Total	2.14	100%

Table 5-3
Pearson Correlations Among SNMOC Groups

Site	Scenario	Alkanes-Aromatics	Alkanes-Olefins	Aromatics-Olefins
Fort Worth	With unusually high data	0.983	0.966	0.964
	Without unusually high data	0.896	0.773	0.765

Table 5-4
Pearson Correlation Coefficients of SNMOC Compound Type Concentration with Selected Meteorological Parameter

Site	Scenario	Compound Type	Maximum Temperature	Dew Point Temperture	Wind Speed
Fort Worth	With unusually high data	Alkane Aromatic Olefin	-0.391 -0.377 -0.384	+0.372 +0.382 +0.387	-0.096 -0.105 -0.106
	Without unusually high data	Alkane Aromatic Olefin	-0.060 0.106 0.025	-0.253 -0.128 -0.244	-0.457 -0.317 -0.512

6.0 Conclusions and Recommendations

As indicated throughout this report, the NMOC/SNMOC monitoring program offers information for evaluating several factors known to affect ozone formation processes. The following discussion reviews the main conclusions of this report and presents recommendations for ongoing NMOC/SNMOC monitoring efforts.

6.1 Conclusions

Although the NNOC/SNMOC monitoring data alone cannot possibly characterize all factors that contribute to ozone formation, they suggest the following air quality trends that may have direct relevance to air pollution control strategies:

- *Monitoring locations (Section 2.1).* The NMOC/SNMOC monitors were located in areas which adequately characterize numerous industrial emission sources. These emission sources include, but are not limited to, industries which produce: 1) chemicals; 2) metals; 3) textiles; 4) plastics; 5) petroleum; and 6) mobile source emissions.

- *Completeness (Section 2.5.1).* The completeness percentage across the three sites for SNMOC/NMOC suggests that the improvements in the shipping and receiving procedures are warranted and have been made accordingly.

- *NMOC monitoring data (Section 4).* NMOC concentrations were measured at all four sites from 6:00 a.m. to 9:00 a.m. throughout the summer of 2000. EKMA calculations determined that all three sites were primarily NO_x-limited areas, and will require strategies for reducing NO_x emissions. At the CAMS12 sites, when ozone concentrations were high, the NMOC:NO_x ratios did not vary. However, for the BXNY and CAMS13 sites, the NMOC:NO_x ratios did change on a high ozone day, while the BXNY ratios increased, the CAMS13 ratios decreased. Only the wind speed parameter correlated somewhat with the NMOC Concentrations.

- *SNMOC monitoring data (Section 5).* The SNMOC analytical method identified at least 80 percent of the organic compound sample (on a mass basis) at the Fort Worth site. Alkanes dominated the composition of the SNMOC sample (54 percent). The different SNMOC groups (alkanes, olefins, and aromatics) correlated extremely well with each other. The alkanes and aromatics had the strongest Pearson relationship, suggesting that the formation of an alkane is dependent upon the aromatic existing in the air, and vice versa. Twenty-two of the eighty samples contributed to at least 75% of the average sample mass concentration, and were considered prevalent.

Acetylene and isoprene were plotted together to show their relative abundance and variability. For the most part, isoprene concentrations were constant through the sampling season, and were always lower than acetylene concentrations. Acetylene and ethylene concentrations correlated well, as did benzene and toluene concentrations. This correlation would suggest that the airshed at Fort Worth is influenced by anthropogenic sources.

6.2 Recommendations

Based on lessons learned from analyzing the 2000 NMOC/SNMOC monitoring data, a number of improvements are recommended for future national ambient air monitoring efforts:

- *Increased sampling for the VOC and carbonyl data.* The limited number of samples does not provide enough information for determining meaningful air quality trends. It would be desirable if the sampling schedule could mirror the SNMOC schedule at the very least. Special samples should be collected when the ozone concentrations are forecast to be high.

- *Investigate the feasibility of offering continuous monitoring or revised sampling schedules as a program option.* Though the NMOC/SNMOC monitoring program currently characterizes air quality extensively for sponsoring agencies, sampling schedules could be modified to offer even greater insight into the complex nature of air pollution. For instance, scheduling options for weekend sampling, sampling during different hours of the day (in addition to sampling from 6:00 a.m. to 9:00 a.m.), or even continuous sampling would almost certainly reveal notable air quality trends that cannot be characterized with the current sampling schedules. Future NMOC/SNMOC programs should investigate the feasibility and cost of providing these alternate sampling options. At the very least, NMOC/SNMOC sampling should be considered when the ozone concentrations are forecast to be high.

- *Recommend additional analyses of the NMOC/SNMOC monitoring data.* Though extensive, the analyses in this report do not provide a comprehensive account of air quality near the NMOC/SNMOC monitoring stations. As a result, sponsoring agencies are encouraged to supplement the analyses in this report with additional analyses of factors that affect ozone formation processes, such as comparing air quality trends to changes in emissions inventories, using regional dispersion models to predict ozone concentrations, and examining how levels of air pollution vary with a wider range of meteorological conditions (e.g., mixing heights, solar radiation, and upper-air wind patterns).

- *Encourage continued participation in the NMOC/SNMOC program.* Although NMOC and SNMOC monitoring data thoroughly characterize ambient air quality during the summer months, state and local agencies can assess long-term trends in levels of air pollution only through continued participation in similar ambient air monitoring efforts. Because long-term trends can indicate the effectiveness of pollution control strategies and suggest whether air quality is improving or degrading, sponsoring agencies are encouraged to develop thorough monitoring programs or to continue participating in NMOC/SNMOC monitoring efforts.

- *Perform multi-year analysis of all data compiled by NMOC/SNMOC program.* Multi-year analysis of all the existing NMOC/SNMOC data may provide valuable understanding as to whether air pollution control strategies have been effective. Multi-year analysis may also reduce the variability of site averages, as one year may be significantly different from another due to extraordinary circumstances (i.e., high summer temperatures).

7.0 References

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Appendix A

NMOC

Appendix B

SNMOC

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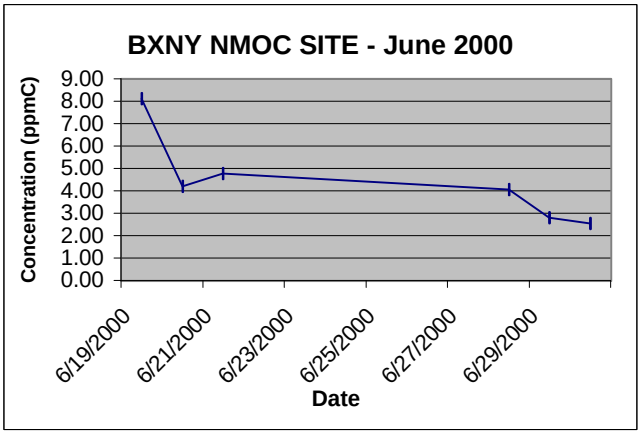
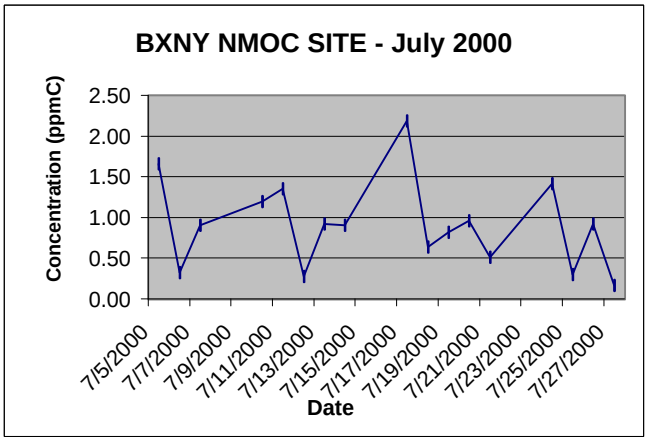
Appendix A

NMOC

2000 NMOC Results - Bronx, New York (BXNY)

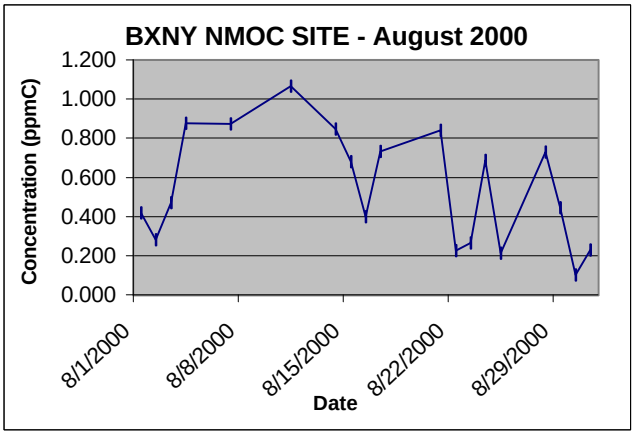
SAMPLE ID	COLLECTION DATE	AVERAGE CONC. (ppmC)	Corrected Conc. (ppmC)
17651	06/19/00	2.705	8.12
17652	06/20/00	1.403	4.21
17653	06/21/00	1.588	4.76
17762	06/28/00	1.354	4.06
17804	06/29/00	0.929	2.79
17805	06/30/00	0.844	2.53
17802	07/05/00	0.552	1.66
17803	07/06/00	0.106	0.319
17833	07/07/00	0.301	0.902
17832	07/10/00	0.400	1.20
17870	07/11/00	0.452	1.355
17871	07/12/00	0.091	0.273
17904	07/13/00	0.308	0.923
17905	07/14/00	0.301	0.904
17911	07/17/00	0.730	2.19
17910	07/18/00	0.213	0.638
17913	07/19/00	0.272	0.817
17912	07/20/00	0.319	0.958
17946	07/21/00	0.171	0.512
17947	07/24/00	0.472	1.42
18019	07/25/00	0.100	0.301
18020	07/26/00	0.307	0.920
18014	07/27/00	0.054	0.162

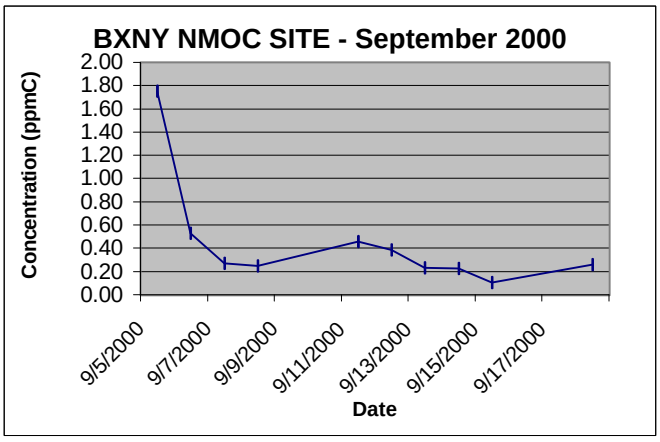


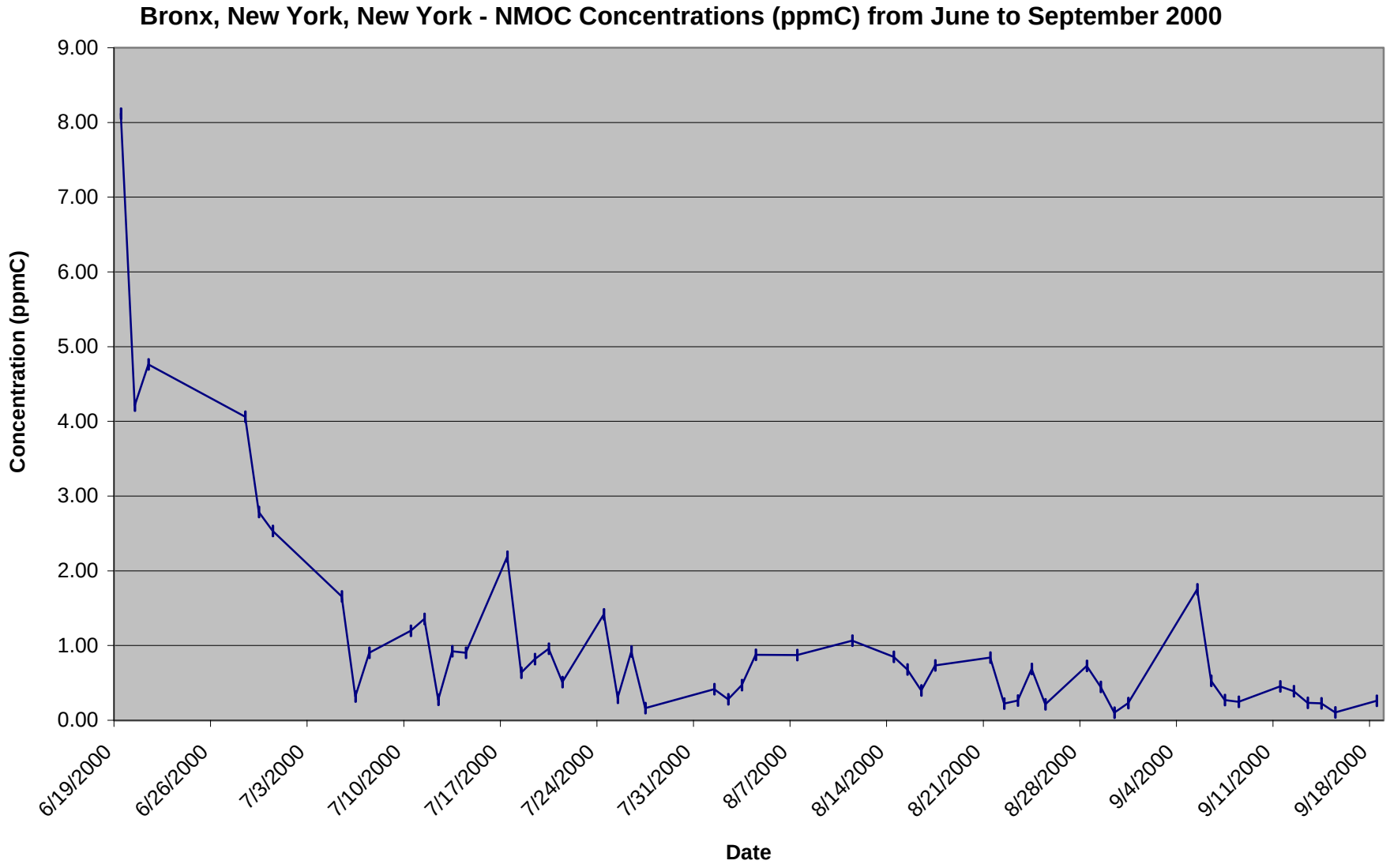


2000 NMOC Results - Bronx, New York (BXNY)

SAMPLE ID	COLLECTION DATE	AVERAGE CONC. (ppmC)	Corrected Conc. (ppmC)
18377	08/01/00	0.139	0.418
18074	08/02/00	0.094	0.281
18075	08/03/00	0.157	0.470
18079	08/04/00	0.293	0.878
18078	08/07/00	0.291	0.872
18164	08/11/00	0.356	1.07
18165	08/14/00	0.283	0.848
18152	08/15/00	0.227	0.680
18151	08/16/00	0.133	0.399
18166	08/17/00	0.244	0.733
18233	08/21/00	0.280	0.839
18232	08/22/00	0.075	0.224
18231	08/23/00	0.088	0.264
18230	08/24/00	0.229	0.688
18242	08/25/00	0.071	0.214
18241	08/28/00	0.243	0.729
18287	08/29/00	0.148	0.445
18288	08/30/00	0.034	0.101
18292	08/31/00	0.076	0.229
18334	09/05/00	0.584	1.75
18335	09/06/00	0.176	0.527
18373	09/07/00	0.091	0.272
18374	09/08/00	0.083	0.248
18380	09/11/00	0.152	0.455
18379	09/12/00	0.129	0.388
18396	09/13/00	0.078	0.233
18397	09/14/00	0.075	0.225
18417	09/15/00	0.035	0.104
18418	09/18/00	0.087	0.261

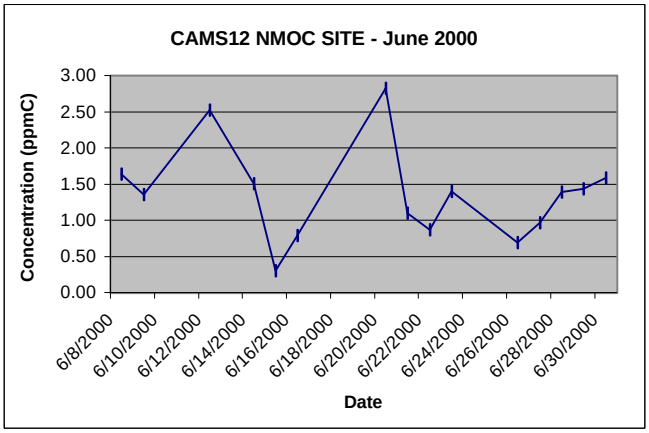


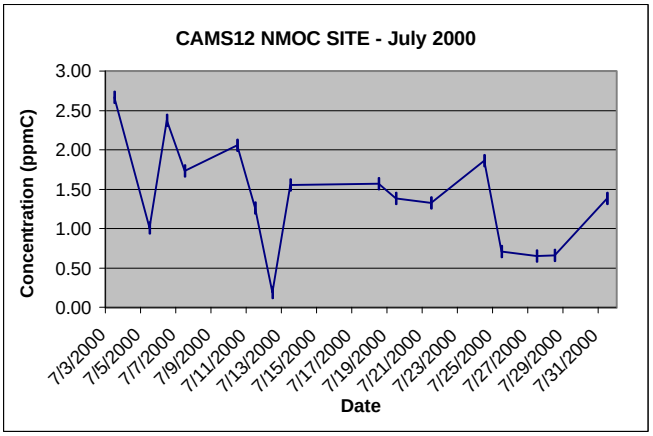



Bronx, New York, New York - NMOC Concentrations (ppmC) from June to September 2000
Concentration (ppmC)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
6/19/2000
6/26/2000
7/3/2000
7/10/2000
7/17/2000
7/24/2000
7/31/2000
8/7/2000
8/14/2000
8/21/2000
8/28/2000
9/4/2000
9/11/2000
9/18/2000
Date

2000 NMOC Results - El Paso, Texas (CAMS12)

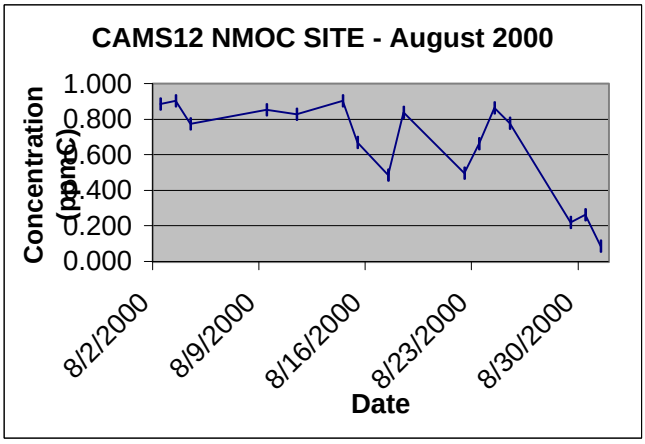
SAMPLE ID	COLLECTION DATE	AVERAGE CONC. (ppmC)	Corrected Conc. (ppmC)
17580	6/8/2000	0.545	1.64
17563	6/9/2000	0.452	1.35
17564	6/12/2000	0.841	2.52
17582	6/14/2000	0.503	1.51
17589	6/15/2000	0.102	0.305
17601	6/16/2000	0.263	0.789
17616	6/20/2000	0.942	2.83
17647	6/21/2000	0.367	1.10
17650	6/22/2000	0.290	0.871
17676	6/23/2000	0.465	1.40
17737-D1	6/26/2000	0.229	0.688
17746	6/27/2000	0.322	0.965
17744	6/28/2000	0.464	1.39
17763	6/29/2000	0.478	1.43
17734	6/30/2000	0.529	1.59
17846	7/3/2000	0.889	2.67
17766	7/5/2000	0.337	1.01
17768	7/6/2000	0.793	2.38
17815	7/7/2000	0.577	1.73
17814	7/10/2000	0.684	2.05
17835	7/11/2000	0.419	1.26
17821	7/12/2000	0.062	0.185
17823	7/13/2000	0.519	1.56
17862	7/18/2000	0.523	1.57
17868	7/19/2000	0.460	1.38
17909	7/21/2000	0.442	1.32
17937	7/24/2000	0.621	1.86
17948	7/25/2000	0.235	0.704
18025	7/27/2000	0.217	0.652
18022	7/28/2000	0.218	0.655
17986	7/31/2000	0.460	1.38

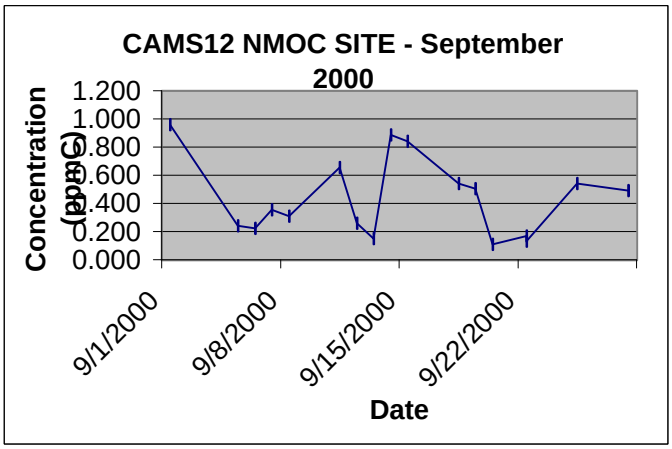




2000 NMOC Results - El Paso, Texas (CAMS12)

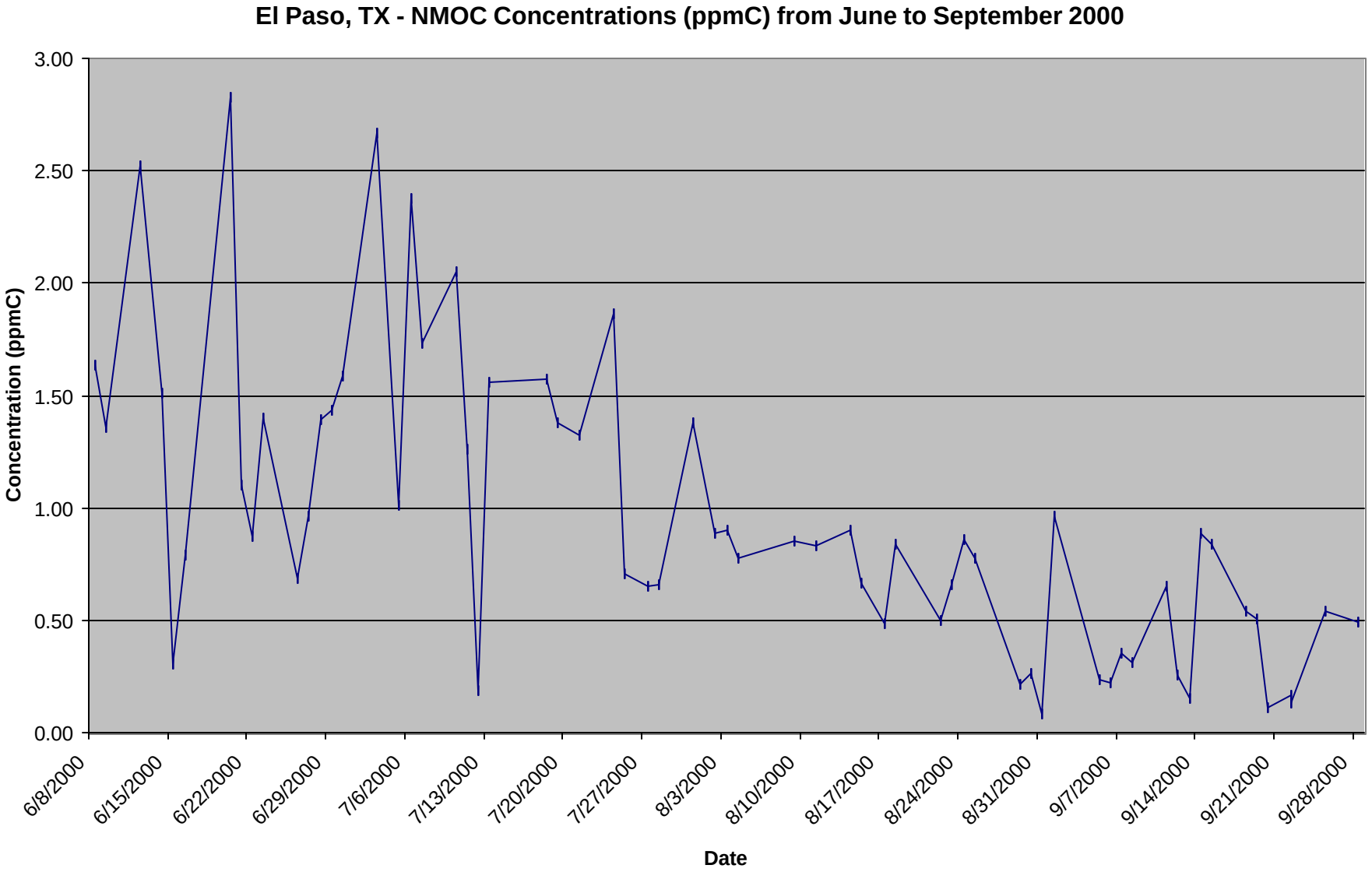
SAMPLE ID	COLLECTION DATE	AVERAGE CONC. (ppmC)	Corrected Conc. (ppmC)
18004	8/2/2000	0.295	0.886
18005	8/3/2000	0.301	0.903
18012	8/4/2000	0.258	0.774
18144	8/9/2000	0.284	0.852
18080	8/11/2000	0.276	0.829
18101	8/14/2000	0.301	0.902
18135	8/15/2000	0.223	0.668
18153	8/17/2000	0.162	0.485
18149	8/18/2000	0.280	0.840
18201	8/22/2000	0.166	0.498
18197	8/23/2000	0.220	0.660
18218	8/24/2000	0.287	0.862
18216	8/25/2000	0.259	0.776
18243	8/29/2000	0.073	0.218
18240	8/30/2000	0.088	0.263
18252	8/31/2000	0.029	0.086
18315	9/1/2000	0.320	0.961
18289	9/5/2000	0.080	0.239
18314	9/6/2000	0.074	0.221
18326	9/7/2000	0.118	0.354
18329	9/8/2000	0.103	0.310
18341	9/11/2000	0.218	0.653
18337	9/12/2000	0.086	0.257
18378	9/13/2000	0.050	0.151
18377	9/14/2000	0.296	0.887
18392	9/15/2000	0.280	0.840
18393	9/18/2000	0.181	0.543
18404	9/19/2000	0.169	0.506
18414	9/20/2000	0.037	0.110
18452-D1	9/22/2000	0.056	0.169
18453-D2	9/22/2000	0.044	0.132
18455	9/25/2000	0.180	0.539
18462	9/28/2000	0.163	0.489





2000 NMOC Results - El Paso, Texas (CAMS12)

SAMPLE ID	COLLECTION DATE	AVERAGE CONC. (ppmC)
17576	6/13/2000	Lab Void
----	6/19/2000	State Holiday
17738-D2	6/26/2000	Lab Void
----	7/4/2000	National Holiday
17836	7/14/2000	State Void
17858	7/17/2000	State Void
17906	7/20/2000	Lab Void
18026	7/26/2000	Lab Void
----	8/7/2000	Lab Void
----	8/8/2000	Lab Void
----	8/10/2000	Lab Void
18147	8/16/2000	Lab Void
18158	8/21/2000	Lab Void
18244	8/28/2000	Lab Void
18422	9/21/2000	Lab Void
----	9/26/2000	Lab Void
----	9/27/2000	Lab Void


El Paso, TX - NMOC Concentrations (ppmC) from June to September 2000
Concentration (ppmC)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
6/8/2000
6/15/2000
6/22/2000
6/29/2000
7/6/2000
7/13/2000
7/20/2000
7/27/2000
8/3/2000
8/10/2000
8/17/2000
8/24/2000
8/31/2000
9/7/2000
9/14/2000
9/21/2000
9/28/2000
Date

Appendix B

SNMOC

SNMOC 2000 REPORT - CAMS 13 - Forth Worth, TX
All concentrations reported in ppbC

Sample No.:	17566	17562	17581	17583	17588	17607
Sampling Date:	6/8/2000	6/9/2000	6/12/2000	6/13/2000	6/14/2000	6/15/2000
Analysis Date:	6/27/2000	7/5/2000	6/27/2000	6/27/2000	6/27/2000	6/27/2000
Ethylene	7.77	5.41	3.64	3.22	3.67	4.64
Acetylene	7.48	4.10	3.52	2.40	3.51	6.68
Ethane	19.42	12.74	10.67	6.66	5.06	13.76
Propylene	9.75	4.55	3.26	2.17	2.26	6.57
Propane	59.32	32.55	21.33	12.09	9.72	46.80
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	232.47	129.92	83.20	58.12	56.02	256.21
Isobutene/1-Butene	41.06	21.58	14.63	10.75	9.94	50.17
1,3-Butadiene	1.24	0.70	0.46	0.37	0.39	1.28
n-Butane	1254.62	685.84	448.16	329.95	299.61	1672.76
trans-2-Butene	66.99	33.63	24.22	16.23	13.90	95.31
cis-2-Butene	63.83	32.99	21.54	16.25	14.36	86.17
3-Methyl-1-butene	26.26	13.58	9.21	7.53	7.64	48.06
Isopentane	1963.80	928.03	625.78	541.17	556.72	3101.38
1-Pentene	71.47	37.30	24.46	19.91	17.66	110.04
2-Methyl-1-butene	115.45	93.62	39.05	263.18	29.26	197.04
n-Pentane	1156.77	478.00	315.58	263.18	253.46	1542.24
Isoprene	6.29	3.39	3.31	2.60	2.03	10.96
trans-2-Pentene	248.76	125.02	84.46	67.55	59.78	398.52
cis-2-Pentene	112.13	56.98	39.88	30.78	27.17	181.43
2-Methyl-2-butene	280.51	137.71	92.37	77.28	68.42	469.14
2,2-Dimethylbutane	67.38	37.19	23.54	22.36	22.89	124.20
Cyclopentene	59.51	29.19	21.51	17.62	15.31	101.01
4-Methyl-1-pentene	11.46	5.77	3.58	3.11	3.12	16.04
Cyclopentane	108.96	55.31	36.85	33.10	28.73	171.18
2,3-Dimethylbutane	135.78	72.55	46.28	45.26	44.57	238.19
2-Methylpentane	559.26	276.85	185.89	150.26	144.19	945.73
3-Methylpentane	348.68	184.67	117.99	99.43	95.50	568.22
2-Methyl-1-pentene	38.55	20.16	13.22	10.73	9.31	60.33
1-Hexene	23.36	11.72	7.55	6.31	5.06	32.85
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	506.38	262.85	171.34	130.82	112.83	753.95
trans-2-Hexene	48.89	24.21	16.71	12.09	9.55	78.73
cis-2-Hexene	28.30	14.46	10.24	7.37	5.95	43.22
Methylcyclopentane	232.99	122.96	79.75	62.18	55.61	351.59
2,4-Dimethylpentane	71.79	37.31	23.68	18.79	17.72	100.80
Benzene	288.00	145.60	95.73	68.06	52.40	386.03
Cyclohexane	77.15	41.06	26.88	21.12	19.49	128.51
2-Methylhexane	147.56	76.57	52.87	34.46	28.19	210.83
2,3-Dimethylpentane	62.22	31.24	19.81	11.94	11.17	83.46
3-Methylhexane	174.14	90.77	60.29	41.00	34.70	225.16
1-Heptene	31.25	19.90	11.27	7.29	5.93	40.14
2,2,4-Trimethylpentane	238.21	131.76	83.14	56.85	55.82	320.76
n-Heptane	186.41	94.22	62.77	40.65	30.05	224.05
Methylcyclohexane	79.20	47.11	32.07	19.68	16.83	98.48
2,2,3-Trimethylpentane	40.43	15.93	16.03	7.13	6.36	61.81
2,3,4-Trimethylpentane	90.40	46.70	32.15	20.68	17.64	112.34
Toluene	887.25	440.48	299.27	197.08	142.68	979.90
2-Methylheptane	38.50	19.63	17.10	8.78	6.11	54.59
3-Methylheptane	45.26	22.91	15.68	10.33	7.46	52.80
1-Octene	7.43	3.32	2.57	1.64	1.20	8.78
n-Octane	69.27	34.29	24.48	15.67	10.51	77.97
Ethylbenzene	153.16	74.49	53.12	35.92	23.28	167.98
m-Xylene/p-Xylene	481.97	233.45	170.98	114.32	77.62	529.06
Styrene	5.92	3.17	2.16	1.53	1.01	6.69
o-Xylene	154.65	76.12	55.92	38.11	25.61	171.37
1-Nonene	1.82	0.74	0.83	0.41	0.48	3.69
n-Nonane	29.47	14.28	10.40	7.90	4.97	33.31
Isopropylbenzene	9.69	5.16	3.83	3.08	1.75	12.32
a-Pinene	2.58	0.83	0.57	0.53	0.71	3.56
n-Propylbenzene	31.23	15.77	11.90	8.65	5.04	35.82
m-Ethyltoluene	107.57	54.38	39.55	29.72	17.50	123.11
p-Ethyltoluene	57.77	28.56	21.34	16.09	9.64	67.13
1,3,5-Trimethylbenzene	45.99	23.72	17.67	13.41	8.16	52.23
o-Ethyltoluene	39.45	20.66	13.87	10.29	7.38	44.82
b-Pinene	1.61	1.66	1.88	0.98	1.43	ND
1,2,4-Trimethylbenzene	148.52	78.43	56.91	42.01	25.36	168.04
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	11.25	5.86	4.34	3.99	3.20	13.29
1,2,3-Trimethylbenzene	29.72	16.27	12.96	8.82	5.96	39.38
m-Diethylbenzene	10.65	6.49	4.69	3.78	2.56	11.24
p-Diethylbenzene	15.68	8.00	6.08	4.01	2.30	14.09
1-Undecene	2.22	2.44	2.83	1.41	2.26	1.58
n-Undecane	5.27	3.09	2.87	1.92	1.59	5.91
1-Dodecene	20.31	14.66	11.74	8.88	6.29	24.72
n-Dodecane	3.16	1.76	2.52	1.24	1.01	3.74
1-Tridecene	0.27	0.24	ND	ND	ND	0.51
n-Tridecane	3.20	2.81	3.33	1.96	1.42	3.25
TNMOC (speciated)	11822.49	5947.34	3991.24	3272.16	2693.96	16487.65
TNMOC (w/ unknowns)	18318.90	7223.54	5250.90	3976.49	3345.40	18576.25

SNMOC 2000 REPORT - CAMS 13 - Forth Worth, TX
All concentrations reported in ppbC

Sample No.:	17606	17648	17681	17677	17691	17696
Sampling Date:	6/16/2000	6/20/2000	6/21/2000	6/22/2000	6/23/2000	6/26/2000
Analysis Date:	7/12/2000	6/28/2000	6/28/2000	6/28/2000	7/5/2000	7/5/2000
Ethylene	2.14	2.62	2.84	9.41	2.81	2.41
Acetylene	1.87	1.97	2.16	7.05	2.13	1.79
Ethane	4.65	4.43	4.44	10.83	5.06	3.69
Propylene	1.41	1.59	1.74	5.16	1.76	1.40
Propane	5.63	6.19	6.33	28.65	7.52	6.01
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	26.39	25.49	31.70	92.88	29.55	23.47
Isobutene/1-Butene	5.99	6.47	6.20	24.54	6.74	5.87
1,3-Butadiene	0.18	0.28	0.24	1.23	0.26	0.23
n-Butane	174.01	198.46	179.24	779.35	193.71	164.43
trans-2-Butene	9.31	10.81	10.05	45.20	10.36	8.66
cis-2-Butene	9.21	10.85	10.04	44.42	10.48	8.90
3-Methyl-1-butene	5.18	5.41	5.01	23.38	4.81	4.27
Isopentane	326.96	413.84	396.23	1726.66	380.03	340.21
1-Pentene	12.32	16.08	15.05	67.39	14.94	13.27
2-Methyl-1-butene	20.27	26.64	208.46	116.57	24.87	21.77
n-Pentane	164.39	218.74	208.46	949.66	199.94	181.38
Isoprene	2.66	2.12	2.36	7.54	2.62	2.23
trans-2-Pentene	43.05	57.32	54.66	253.30	52.90	46.56
cis-2-Pentene	19.62	26.25	24.84	114.30	24.17	21.44
2-Methyl-2-butene	48.95	66.56	62.88	295.87	61.19	54.11
2,2-Dimethylbutane	14.65	19.36	18.33	80.03	17.97	16.84
Cyclopentene	10.69	14.74	13.86	65.09	13.39	11.86
4-Methyl-1-pentene	1.38	2.89	2.63	11.93	2.59	2.06
Cyclopentane	19.34	26.24	25.21	113.40	25.72	22.11
2,3-Dimethylbutane	20.97	36.02	34.82	160.08	35.02	30.94
2-Methylpentane	105.18	131.50	127.98	626.43	124.68	113.87
3-Methylpentane	63.60	87.31	84.60	384.40	83.00	75.80
2-Methyl-1-pentene	6.88	9.74	9.27	43.99	9.24	8.16
1-Hexene	3.78	5.22	5.27	24.60	5.09	4.47
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	82.94	115.87	112.96	520.47	111.57	99.54
trans-2-Hexene	8.71	10.74	10.32	52.00	10.38	9.14
cis-2-Hexene	4.75	6.60	6.34	30.01	6.40	5.66
Methylcyclopentane	39.14	54.00	52.50	239.42	52.65	47.15
2,4-Dimethylpentane	12.09	16.41	15.97	71.91	16.24	14.51
Benzene	44.00	61.69	59.74	274.75	63.67	59.71
Cyclohexane	13.54	19.15	22.11	84.63	48.17	16.59
2-Methylhexane	21.19	29.48	29.07	132.97	30.05	26.52
2,3-Dimethylpentane	7.73	10.38	10.24	45.01	10.59	11.03
3-Methylhexane	25.58	35.57	35.01	154.86	36.09	31.83
1-Heptene	5.14	6.96	7.40	28.19	7.79	6.36
2,2,4-Trimethylpentane	36.66	50.88	47.93	227.06	52.13	45.72
n-Heptane	26.18	36.27	35.93	164.20	36.91	31.91
Methylcyclohexane	13.70	18.91	19.15	81.54	19.64	17.44
2,2,3-Trimethylpentane	6.93	9.58	9.72	37.26	8.48	7.98
2,3,4-Trimethylpentane	12.37	16.88	16.46	74.06	18.26	15.57
Toluene	119.91	165.75	168.12	689.75	165.53	135.84
2-Methylheptane	6.83	7.32	7.04	30.65	7.56	6.57
3-Methylheptane	6.23	8.38	8.20	36.69	10.28	7.64
1-Octene	1.08	1.30	1.20	5.89	1.45	1.23
n-Octane	9.55	13.04	12.66	56.36	13.23	11.31
Ethylbenzene	21.03	29.51	27.91	123.33	28.89	24.37
m-Xylene/p-Xylene	67.08	94.34	88.54	388.12	91.51	75.89
Styrene	0.97	1.11	1.65	3.64	1.39	0.93
o-Xylene	22.04	30.69	29.05	125.63	30.61	25.73
1-Nonene	0.35	0.33	0.31	1.51	0.36	0.22
n-Nonane	4.55	6.08	6.03	25.29	6.33	5.72
Isopropylbenzene	2.03	2.51	2.50	9.55	2.81	2.77
a-Pinene	0.64	0.48	0.66	1.61	0.68	0.52
n-Propylbenzene	5.10	6.80	6.58	27.17	7.21	6.29
m-Ethyltoluene	17.32	22.69	22.24	95.11	24.05	22.16
p-Ethyltoluene	9.83	12.64	12.03	51.47	13.14	11.80
1,3,5-Trimethylbenzene	7.69	10.21	9.91	40.53	11.19	10.51
o-Ethyltoluene	6.83	8.96	8.81	34.37	9.71	9.00
b-Pinene	ND	0.81	0.84	0.62	0.96	0.76
1,2,4-Trimethylbenzene	24.78	32.96	31.83	128.32	34.95	32.25
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	2.36	2.86	3.33	12.34	3.29	3.08
1,2,3-Trimethylbenzene	5.48	7.18	7.55	26.73	8.67	7.68
m-Diethylbenzene	2.27	2.64	2.74	8.58	2.97	3.19
p-Diethylbenzene	2.56	3.24	2.93	11.05	3.48	3.44
1-Undecene	1.55	1.40	1.18	1.41	1.85	0.99
n-Undecane	1.53	1.43	1.94	20.80	2.56	1.75
1-Dodecene	6.36	6.94	6.71	18.97	8.08	6.73
n-Dodecane	0.78	0.79	0.78	3.65	1.09	0.96
1-Tridecene	0.24	ND	ND	ND	0.18	0.19
n-Tridecane	1.34	1.30	1.72	2.75	2.06	1.37
TNMOC (speciated)	1849.58	2418.22	2520.80	10313.58	2377.66	2065.79
TNMOC (w/ unknowns)	2263.93	3273.74	3140.68	11933.89	3041.67	3045.20

SNMOC 2000 REPORT - CAMS 13 - Forth Worth, TX
All concentrations reported in ppbC

Sample No.:	17606	17648	17681	17677	17691	17696
Sampling Date:	6/16/2000	6/20/2000	6/21/2000	6/22/2000	6/23/2000	6/26/2000
Analysis Date:	7/12/2000	6/28/2000	6/28/2000	6/28/2000	7/5/2000	7/5/2000
Ethylene	2.14	2.62	2.84	9.41	2.81	2.41
Acetylene	1.87	1.97	2.16	7.05	2.13	1.79
Ethane	4.65	4.43	4.44	10.83	5.06	3.69
Propylene	1.41	1.59	1.74	5.16	1.76	1.40
Propane	5.63	6.19	6.33	28.65	7.52	6.01
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	26.39	25.49	31.70	92.88	29.55	23.47
Isobutene/1-Butene	5.99	6.47	6.20	24.54	6.74	5.87
1,3-Butadiene	0.18	0.28	0.24	1.23	0.26	0.23
n-Butane	174.01	198.46	179.24	779.35	193.71	164.43
trans-2-Butene	9.31	10.81	10.05	45.20	10.36	8.66
cis-2-Butene	9.21	10.85	10.04	44.42	10.48	8.90
3-Methyl-1-butene	5.18	5.41	5.01	23.38	4.81	4.27
Isopentane	326.96	413.84	396.23	1726.66	380.03	340.21
1-Pentene	12.32	16.08	15.05	67.39	14.94	13.27
2-Methyl-1-butene	20.27	26.64	208.46	116.57	24.87	21.77
n-Pentane	164.39	218.74	208.46	949.66	199.94	181.38
Isoprene	2.66	2.12	2.36	7.54	2.62	2.23
trans-2-Pentene	43.05	57.32	54.66	253.30	52.90	46.56
cis-2-Pentene	19.62	26.25	24.84	114.30	24.17	21.44
2-Methyl-2-butene	48.95	66.56	62.88	295.87	61.19	54.11
2,2-Dimethylbutane	14.65	19.36	18.33	80.03	17.97	16.84
Cyclopentene	10.69	14.74	13.86	65.09	13.39	11.86
4-Methyl-1-pentene	1.38	2.89	2.63	11.93	2.59	2.06
Cyclopentane	19.34	26.24	25.21	113.40	25.72	22.11
2,3-Dimethylbutane	20.97	36.02	34.82	160.08	35.02	30.94
2-Methylpentane	105.18	131.50	127.98	626.43	124.68	113.87
3-Methylpentane	63.60	87.31	84.60	384.40	83.00	75.80
2-Methyl-1-pentene	6.88	9.74	9.27	43.99	9.24	8.16
1-Hexene	3.78	5.22	5.27	24.60	5.09	4.47
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	82.94	115.87	112.96	520.47	111.57	99.54
trans-2-Hexene	8.71	10.74	10.32	52.00	10.38	9.14
cis-2-Hexene	4.75	6.60	6.34	30.01	6.40	5.66
Methylcyclopentane	39.14	54.00	52.50	239.42	52.65	47.15
2,4-Dimethylpentane	12.09	16.41	15.97	71.91	16.24	14.51
Benzene	44.00	61.69	59.74	274.75	63.67	59.71
Cyclohexane	13.54	19.15	22.11	84.63	48.17	16.59
2-Methylhexane	21.19	29.48	29.07	132.97	30.05	26.52
2,3-Dimethylpentane	7.73	10.38	10.24	45.01	10.59	11.03
3-Methylhexane	25.58	35.57	35.01	154.86	36.09	31.83
1-Heptene	5.14	6.96	7.40	28.19	7.79	6.36
2,2,4-Trimethylpentane	36.66	50.88	47.93	227.06	52.13	45.72
n-Heptane	26.18	36.27	35.93	164.20	36.91	31.91
Methylcyclohexane	13.70	18.91	19.15	81.54	19.64	17.44
2,2,3-Trimethylpentane	6.93	9.58	9.72	37.26	8.48	7.98
2,3,4-Trimethylpentane	12.37	16.88	16.46	74.06	18.26	15.57
Toluene	119.91	165.75	168.12	689.75	165.53	135.84
2-Methylheptane	6.83	7.32	7.04	30.65	7.56	6.57
3-Methylheptane	6.23	8.38	8.20	36.69	10.28	7.64
1-Octene	1.08	1.30	1.20	5.89	1.45	1.23
n-Octane	9.55	13.04	12.66	56.36	13.23	11.31
Ethylbenzene	21.03	29.51	27.91	123.33	28.89	24.37
m-Xylene/p-Xylene	67.08	94.34	88.54	388.12	91.51	75.89
Styrene	0.97	1.11	1.65	3.64	1.39	0.93
o-Xylene	22.04	30.69	29.05	125.63	30.61	25.73
1-Nonene	0.35	0.33	0.31	1.51	0.36	0.22
n-Nonane	4.55	6.08	6.03	25.29	6.33	5.72
Isopropylbenzene	2.03	2.51	2.50	9.55	2.81	2.77
a-Pinene	0.64	0.48	0.66	1.61	0.68	0.52
n-Propylbenzene	5.10	6.80	6.58	27.17	7.21	6.29
m-Ethyltoluene	17.32	22.69	22.24	95.11	24.05	22.16
p-Ethyltoluene	9.83	12.64	12.03	51.47	13.14	11.80
1,3,5-Trimethylbenzene	7.69	10.21	9.91	40.53	11.19	10.51
o-Ethyltoluene	6.83	8.96	8.81	34.37	9.71	9.00
b-Pinene	ND	0.81	0.84	0.62	0.96	0.76
1,2,4-Trimethylbenzene	24.78	32.96	31.83	128.32	34.95	32.25
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	2.36	2.86	3.33	12.34	3.29	3.08
1,2,3-Trimethylbenzene	5.48	7.18	7.55	26.73	8.67	7.68
m-Diethylbenzene	2.27	2.64	2.74	8.58	2.97	3.19
p-Diethylbenzene	2.56	3.24	2.93	11.05	3.48	3.44
1-Undecene	1.55	1.40	1.18	1.41	1.85	0.99
n-Undecane	1.53	1.43	1.94	20.80	2.56	1.75
1-Dodecene	6.36	6.94	6.71	18.97	8.08	6.73
n-Dodecane	0.78	0.79	0.78	3.65	1.09	0.96
1-Tridecene	0.24	ND	ND	ND	0.18	0.19
n-Tridecane	1.34	1.30	1.72	2.75	2.06	1.37
TNMOC (speciated)	1849.58	2418.22	2520.80	10313.58	2377.66	2065.79
TNMOC (w/ unknowns)	2263.93	3273.74	3140.68	11933.89	3041.67	3045.20

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Sample No.:	17753	17754	17813	17822	17857	17864
Sampling Date:	7/7/2000	7/10/2000	7/11/2000	7/12/2000	7/13/2000	7/14/2000
Analysis Date:	7/21/2000	VOID	7/21/2000	7/21/2000	7/21/2000	VOID
Ethylene	9.86		3.36	2.14	4.91	
Acetylene	7.74		3.21	1.60	3.83	
Ethane	18.84		5.57	3.49	6.75	
Propylene	5.29		1.78	1.11	2.43	
Propane	46.07		5.67	3.01	5.99	
Propyne	ND		ND	ND	ND	
Isobutane	48.26		3.81	1.14	2.42	
Isobutene/1-Butene	16.11		1.91	1.30	2.63	
1,3-Butadiene	1.15		0.26	0.16	0.43	
n-Butane	400.73		5.27	2.26	5.61	
trans-2-Butene	24.51		0.43	0.35	0.55	
cis-2-Butene	23.93		0.59	0.49	0.72	
3-Methyl-1-butene	11.35		ND	ND	0.18	
Isopentane	980.64		16.90	5.05	13.06	
1-Pentene	42.07		0.67	0.47	0.80	
2-Methyl-1-butene	73.33		0.71	0.37	0.85	
n-Pentane	584.73		8.62	2.62	5.86	
Isoprene	5.66		1.62	1.32	1.74	
trans-2-Pentene	157.44		1.21	0.84	1.60	
cis-2-Pentene	71.22		0.82	0.57	0.96	
2-Methyl-2-butene	186.60		1.12	0.60	1.40	
2,2-Dimethylbutane	53.69		1.40	0.85	1.27	
Cyclopentene	0.75		0.56	0.49	0.96	
4-Methyl-1-pentene	6.38		0.20	0.13	0.17	
Cyclopentane	75.30		1.15	0.66	1.09	
2,3-Dimethylbutane	115.67		1.66	1.04	1.85	
2-Methylpentane	435.84		6.01	3.76	7.57	
3-Methylpentane	270.74		3.58	1.67	3.58	
2-Methyl-1-pentene	28.88		0.29	0.18	0.29	
1-Hexene	17.07		0.24	ND	0.19	
2-Ethyl-1-butene	ND		ND	ND	ND	
n-Hexane	369.48		4.40	1.82	3.91	
trans-2-Hexene	36.03		0.28	ND	0.27	
cis-2-Hexene	20.99		0.16	ND	0.18	
Methylcyclopentane	172.63		2.49	1.09	2.32	
2,4-Dimethylpentane	52.87		1.10	0.77	1.31	
Benzene	198.99		9.71	9.71	12.43	
Cyclohexane	78.36		12.63	0.70	1.23	
2-Methylhexane	119.27		1.72	0.66	1.63	
2,3-Dimethylpentane	43.77		0.94	0.65	1.07	
3-Methylhexane	121.67		4.79	1.70	3.03	
1-Heptene	16.52		0.26	ND	ND	
2,2,4-Trimethylpentane	187.34		3.20	2.15	4.70	
n-Heptane	127.26		3.10	0.96	1.83	
Methylcyclohexane	59.62		2.80	1.10	1.68	
2,2,3-Trimethylpentane	22.93		0.51	0.26	0.65	
2,3,4-Trimethylpentane	65.64		1.53	0.96	1.76	
Toluene	615.74		42.12	6.40	11.83	
2-Methylheptane	36.41		0.77	0.57	0.83	
3-Methylheptane	35.17		0.97	0.54	0.96	
1-Octene	ND		0.20	0.13	ND	
n-Octane	52.81		1.35	0.74	1.14	
Ethylbenzene	113.37		3.04	1.52	2.47	
m-Xylene/p-Xylene	347.85		8.66	4.37	6.63	
Styrene	4.03		1.12	0.48	0.54	
o-Xylene	121.94		3.29	1.72	2.48	
1-Nonene	2.80		ND	ND	ND	
n-Nonane	30.66		1.07	0.77	0.89	
Isopropylbenzene	11.92		0.78	0.56	0.64	
a-Pinene	2.78		7.15	0.29	0.40	
n-Propylbenzene	31.20		1.07	0.66	0.86	
m-Ethyltoluene	115.82		3.60	1.84	2.52	
p-Ethyltoluene	60.71		1.76	1.14	1.46	
1,3,5-Trimethylbenzene	57.62		1.67	0.92	1.28	
o-Ethyltoluene	47.15		1.69	0.87	1.20	
b-Pinene	ND		1.66	0.46	0.59	
1,2,4-Trimethylbenzene	166.12		5.22	2.71	3.47	
1-Decene	ND		ND	ND	ND	
n-Decane	16.96		2.02	1.14	1.13	
1,2,3-Trimethylbenzene	37.38		1.39	0.80	0.86	
m-Diethylbenzene	13.57		1.08	0.85	0.86	
p-Diethylbenzene	15.00		0.55	0.35	0.43	
1-Undecene	0.89		ND	ND	ND	
n-Undecane	9.60		2.18	0.77	0.80	
1-Dodecene	3.72		0.76	1.76	0.53	
n-Dodecane	4.03		0.93	0.23	0.20	
1-Tridecene	0.63		ND	ND	ND	
n-Tridecane	3.64		0.83	0.45	0.40	
TNMOC (speciated)	7372.68		225.15	93.22	163.07	
TNMOC (w/ unknowns)	7574.76		284.02	131.08	193.57	

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Sample No.:	17872	17873	17932	17931	17942	18024
Sampling Date:	7/18/2000	7/19/2000	7/20/2000	7/21/2000	7/24/2000	7/25/2000
Analysis Date:	7/26/2000	7/26/2000	7/26/2000	7/26/2000	7/28/2000	8/16/2000
Ethylene	4.14	3.55	4.23	9.95	5.84	5.44
Acetylene	3.08	2.73	3.12	8.47	4.51	3.56
Ethane	5.87	5.62	5.41	18.79	9.66	11.43
Propylene	1.97	1.97	2.07	4.97	3.00	2.59
Propane	4.85	5.97	5.69	14.63	9.97	13.67
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	1.94	18.47	2.06	3.69	3.84	3.51
Isobutene/1-Butene	2.18	2.50	2.22	5.18	2.88	2.52
1,3-Butadiene	0.38	0.30	0.35	1.00	0.49	0.44
n-Butane	4.87	19.56	5.88	8.08	10.65	8.96
trans-2-Butene	0.46	0.75	0.50	0.94	0.76	0.52
cis-2-Butene	0.55	1.07	0.66	1.06	0.92	0.70
3-Methyl-1-butene	ND	0.34	0.16	0.27	0.27	ND
Isopentane	9.44	36.19	11.39	21.53	22.98	14.16
1-Pentene	0.62	1.13	0.69	1.25	1.14	0.78
2-Methyl-1-butene	0.67	1.51	0.72	1.72	1.28	0.82
n-Pentane	4.36	12.42	5.01	12.76	10.97	7.80
Isoprene	1.38	1.90	1.89	1.22	0.93	0.95
trans-2-Pentene	1.16	2.93	1.39	2.39	1.90	1.42
cis-2-Pentene	0.75	1.59	0.82	1.42	1.23	0.83
2-Methyl-2-butene	0.97	2.88	1.16	2.70	1.99	1.03
2,2-Dimethylbutane	1.04	2.02	1.24	1.79	1.90	1.48
Cyclopentene	0.77	0.84	0.69	1.25	0.87	1.46
4-Methyl-1-pentene	0.16	0.27	ND	ND	0.20	ND
Cyclopentane	0.87	1.78	0.93	1.62	1.46	1.01
2,3-Dimethylbutane	1.43	2.55	1.59	2.91	2.58	1.82
2-Methylpentane	5.85	11.14	6.45	11.54	9.89	8.68
3-Methylpentane	2.66	5.82	2.92	6.02	4.98	3.70
2-Methyl-1-pentene	0.22	0.56	0.21	0.52	0.38	ND
1-Hexene	0.16	0.31	0.17	0.35	0.33	1.14
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	2.96	8.71	3.15	6.97	5.56	5.04
trans-2-Hexene	0.16	0.40	0.19	0.42	0.27	ND
cis-2-Hexene	ND	0.32	0.13	0.28	0.20	ND
Methylcyclopentane	1.79	4.02	1.80	3.96	3.01	2.85
2,4-Dimethylpentane	1.02	1.63	1.09	2.08	1.61	1.18
Benzene	9.89	12.33	12.34	13.98	14.18	15.87
Cyclohexane	2.25	45.96	0.99	1.51	1.29	50.00
2-Methylhexane	1.20	2.84	1.25	2.93	2.14	1.70
2,3-Dimethylpentane	0.84	1.69	0.95	1.67	1.28	0.96
3-Methylhexane	2.27	5.23	2.39	4.71	3.47	3.18
1-Heptene	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	3.73	6.51	3.69	9.44	6.28	4.30
n-Heptane	1.52	3.41	1.47	2.99	2.32	2.22
Methylcyclohexane	1.37	3.06	1.36	2.62	2.04	2.10
2,2,3-Trimethylpentane	0.48	1.17	0.68	1.77	0.95	0.59
2,3,4-Trimethylpentane	1.36	2.29	1.34	3.23	2.22	1.52
Toluene	8.54	27.92	9.04	21.34	16.37	22.96
2-Methylheptane	0.66	0.88	0.69	1.20	0.92	0.86
3-Methylheptane	0.64	1.08	0.65	1.08	1.13	0.80
1-Octene	0.16	0.22	0.14	0.22	0.17	0.18
n-Octane	0.88	1.39	0.91	1.62	1.29	1.20
Ethylbenzene	1.73	3.30	1.66	3.49	2.80	3.84
m-Xylene/p-Xylene	4.54	8.59	4.35	8.57	7.95	12.31
Styrene	0.47	1.25	0.48	0.90	0.87	0.58
o-Xylene	1.79	3.27	1.66	3.20	2.83	3.79
1-Nonene	0.17	ND	ND	ND	ND	ND
n-Nonane	0.78	1.30	0.72	1.23	1.09	1.04
Isopropylbenzene	0.42	0.80	0.82	0.86	0.53	0.49
a-Pinene	0.32	1.80	0.26	1.09	0.71	0.22
n-Propylbenzene	0.58	0.98	0.63	0.96	0.79	0.67
m-Ethyltoluene	2.00	3.35	1.77	3.23	2.59	2.20
p-Ethyltoluene	1.15	1.83	1.17	1.76	1.35	1.26
1,3,5-Trimethylbenzene	1.01	1.68	0.88	1.63	1.21	1.08
o-Ethyltoluene	1.00	1.51	0.88	1.32	0.97	0.79
b-Pinene	1.05	0.87	0.51	0.61	0.42	ND
1,2,4-Trimethylbenzene	2.40	4.47	2.27	4.01	3.15	2.67
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	1.70	3.26	0.92	2.01	1.56	1.21
1,2,3-Trimethylbenzene	0.94	0.96	1.09	1.47	1.26	0.70
m-Diethylbenzene	0.72	0.72	0.76	1.01	0.98	0.83
p-Diethylbenzene	0.28	0.35	0.31	0.42	0.32	0.32
1-Undecene	ND	ND	ND	ND	ND	ND
n-Undecane	0.59	3.22	0.66	1.23	1.13	0.79
1-Dodecene	0.50	0.58	0.29	0.65	0.51	0.45
n-Dodecane	0.21	1.19	0.16	0.33	0.34	0.41
1-Tridecene	ND	ND	1.42	ND	ND	ND
n-Tridecane	0.26	0.50	0.25	0.50	0.70	0.34
TNMOC (speciated)	129.05	325.46	137.76	272.47	218.51	253.90
TNMOC (w/ unknowns)	163.53	371.89	165.89	316.75	257.61	292.81

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All concentrations reported in ppbC

Sample No.:	17872	17873	17932	17931	17942	18024
Sampling Date:	7/18/2000	7/19/2000	7/20/2000	7/21/2000	7/24/2000	7/25/2000
Analysis Date:	7/26/2000	7/26/2000	7/26/2000	7/26/2000	7/28/2000	8/16/2000
Ethylene	4.14	3.55	4.23	9.95	5.84	5.44
Acetylene	3.08	2.73	3.12	8.47	4.51	3.56
Ethane	5.87	5.62	5.41	18.79	9.66	11.43
Propylene	1.97	1.97	2.07	4.97	3.00	2.59
Propane	4.85	5.97	5.69	14.63	9.97	13.67
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	1.94	18.47	2.06	3.69	3.84	3.51
Isobutene/1-Butene	2.18	2.50	2.22	5.18	2.88	2.52
1,3-Butadiene	0.38	0.30	0.35	1.00	0.49	0.44
n-Butane	4.87	19.56	5.88	8.08	10.65	8.96
trans-2-Butene	0.46	0.75	0.50	0.94	0.76	0.52
cis-2-Butene	0.55	1.07	0.66	1.06	0.92	0.70
3-Methyl-1-butene	ND	0.34	0.16	0.27	0.27	ND
Isopentane	9.44	36.19	11.39	21.53	22.98	14.16
1-Pentene	0.62	1.13	0.69	1.25	1.14	0.78
2-Methyl-1-butene	0.67	1.51	0.72	1.72	1.28	0.82
n-Pentane	4.36	12.42	5.01	12.76	10.97	7.80
Isoprene	1.38	1.90	1.89	1.22	0.93	0.95
trans-2-Pentene	1.16	2.93	1.39	2.39	1.90	1.42
cis-2-Pentene	0.75	1.59	0.82	1.42	1.23	0.83
2-Methyl-2-butene	0.97	2.88	1.16	2.70	1.99	1.03
2,2-Dimethylbutane	1.04	2.02	1.24	1.79	1.90	1.48
Cyclopentene	0.77	0.84	0.69	1.25	0.87	1.46
4-Methyl-1-pentene	0.16	0.27	ND	ND	0.20	ND
Cyclopentane	0.87	1.78	0.93	1.62	1.46	1.01
2,3-Dimethylbutane	1.43	2.55	1.59	2.91	2.58	1.82
2-Methylpentane	5.85	11.14	6.45	11.54	9.89	8.68
3-Methylpentane	2.66	5.82	2.92	6.02	4.98	3.70
2-Methyl-1-pentene	0.22	0.56	0.21	0.52	0.38	ND
1-Hexene	0.16	0.31	0.17	0.35	0.33	1.14
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	2.96	8.71	3.15	6.97	5.56	5.04
trans-2-Hexene	0.16	0.40	0.19	0.42	0.27	ND
cis-2-Hexene	ND	0.32	0.13	0.28	0.20	ND
Methylcyclopentane	1.79	4.02	1.80	3.96	3.01	2.85
2,4-Dimethylpentane	1.02	1.63	1.09	2.08	1.61	1.18
Benzene	9.89	12.33	12.34	13.98	14.18	15.87
Cyclohexane	2.25	45.96	0.99	1.51	1.29	50.00
2-Methylhexane	1.20	2.84	1.25	2.93	2.14	1.70
2,3-Dimethylpentane	0.84	1.69	0.95	1.67	1.28	0.96
3-Methylhexane	2.27	5.23	2.39	4.71	3.47	3.18
1-Heptene	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	3.73	6.51	3.69	9.44	6.28	4.30
n-Heptane	1.52	3.41	1.47	2.99	2.32	2.22
Methylcyclohexane	1.37	3.06	1.36	2.62	2.04	2.10
2,2,3-Trimethylpentane	0.48	1.17	0.68	1.77	0.95	0.59
2,3,4-Trimethylpentane	1.36	2.29	1.34	3.23	2.22	1.52
Toluene	8.54	27.92	9.04	21.34	16.37	22.96
2-Methylheptane	0.66	0.88	0.69	1.20	0.92	0.86
3-Methylheptane	0.64	1.08	0.65	1.08	1.13	0.80
1-Octene	0.16	0.22	0.14	0.22	0.17	0.18
n-Octane	0.88	1.39	0.91	1.62	1.29	1.20
Ethylbenzene	1.73	3.30	1.66	3.49	2.80	3.84
m-Xylene/p-Xylene	4.54	8.59	4.35	8.57	7.95	12.31
Styrene	0.47	1.25	0.48	0.90	0.87	0.58
o-Xylene	1.79	3.27	1.66	3.20	2.83	3.79
1-Nonene	0.17	ND	ND	ND	ND	ND
n-Nonane	0.78	1.30	0.72	1.23	1.09	1.04
Isopropylbenzene	0.42	0.80	0.82	0.86	0.53	0.49
a-Pinene	0.32	1.80	0.26	1.09	0.71	0.22
n-Propylbenzene	0.58	0.98	0.63	0.96	0.79	0.67
m-Ethyltoluene	2.00	3.35	1.77	3.23	2.59	2.20
p-Ethyltoluene	1.15	1.83	1.17	1.76	1.35	1.26
1,3,5-Trimethylbenzene	1.01	1.68	0.88	1.63	1.21	1.08
o-Ethyltoluene	1.00	1.51	0.88	1.32	0.97	0.79
b-Pinene	1.05	0.87	0.51	0.61	0.42	ND
1,2,4-Trimethylbenzene	2.40	4.47	2.27	4.01	3.15	2.67
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	1.70	3.26	0.92	2.01	1.56	1.21
1,2,3-Trimethylbenzene	0.94	0.96	1.09	1.47	1.26	0.70
m-Diethylbenzene	0.72	0.72	0.76	1.01	0.98	0.83
p-Diethylbenzene	0.28	0.35	0.31	0.42	0.32	0.32
1-Undecene	ND	ND	ND	ND	ND	ND
n-Undecane	0.59	3.22	0.66	1.23	1.13	0.79
1-Dodecene	0.50	0.58	0.29	0.65	0.51	0.45
n-Dodecane	0.21	1.19	0.16	0.33	0.34	0.41
1-Tridecene	ND	ND	1.42	ND	ND	ND
n-Tridecane	0.26	0.50	0.25	0.50	0.70	0.34
TNMOC (speciated)	129.05	325.46	137.76	272.47	218.51	253.90
TNMOC (w/ unknowns)	163.53	371.89	165.89	316.75	257.61	292.81

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Sample No.:	18013	18091	18100	18102	18138	18134
Sampling Date:	8/4/2000	8/7/2000	8/10/2000	8/11/2000	8/14/2000	8/15/2000
Analysis Date:	VOID	VOID	8/22/2000	8/22/2000	8/22/2000	8/22/2000
Ethylene			3.48	5.31	10.34	4.36
Acetylene			2.53	3.77	10.15	4.31
Ethane			4.87	12.01	26.60	8.40
Propylene			1.81	2.78	4.93	2.15
Propane			3.87	23.01	18.71	7.08
Propyne			ND	ND	ND	ND
Isobutane			1.44	2.56	8.66	1.95
Isobutene/1-Butene			1.90	2.64	5.01	2.29
1,3-Butadiene			0.31	0.48	0.98	0.38
n-Butane			2.03	3.99	7.02	3.23
trans-2-Butene			0.37	0.54	0.67	0.42
cis-2-Butene			0.47	0.63	0.72	0.51
3-Methyl-1-butene			ND	0.24	0.37	0.17
Isopentane			5.11	12.77	21.54	7.23
1-Pentene			0.46	0.82	1.04	0.53
2-Methyl-1-butene			0.43	0.79	1.23	0.56
n-Pentane			2.54	7.50	10.70	3.67
Isoprene			1.16	1.21	1.02	1.38
trans-2-Pentene			0.82	1.52	1.85	1.02
cis-2-Pentene			0.57	0.88	1.02	0.65
2-Methyl-2-butene			0.51	1.06	1.42	0.84
2,2-Dimethylbutane			0.84	1.29	1.58	0.92
Cyclopentene			0.78	0.52	2.01	0.40
4-Methyl-1-pentene			ND	0.18	ND	ND
Cyclopentane			0.64	1.02	1.40	0.81
2,3-Dimethylbutane			1.10	2.17	2.65	1.36
2-Methylpentane			4.41	8.17	10.88	4.40
3-Methylpentane			1.81	4.71	5.72	2.49
2-Methyl-1-pentene			ND	0.22	0.36	0.18
1-Hexene			0.15	0.25	0.41	0.16
2-Ethyl-1-butene			ND	ND	ND	ND
n-Hexane			1.87	7.56	6.55	2.74
trans-2-Hexene			ND	0.22	0.32	0.16
cis-2-Hexene			ND	0.14	0.22	ND
Methylcyclopentane			1.15	2.79	3.38	1.54
2,4-Dimethylpentane			0.81	1.52	1.87	0.99
Benzene			7.10	8.70	11.37	7.99
Cyclohexane			0.73	2.15	1.91	0.82
2-Methylhexane			0.80	1.78	2.99	1.25
2,3-Dimethylpentane			0.67	1.16	1.57	0.85
3-Methylhexane			2.02	3.31	4.55	2.62
1-Heptene			ND	ND	ND	ND
2,2,4-Trimethylpentane			2.66	6.25	9.55	3.76
n-Heptane			1.04	1.96	3.07	1.46
Methylcyclohexane			1.02	1.61	2.56	1.23
2,2,3-Trimethylpentane			0.40	0.98	1.69	0.55
2,3,4-Trimethylpentane			1.07	2.32	3.23	1.39
Toluene			6.11	13.87	18.03	8.06
2-Methylheptane			0.54	0.88	1.37	0.63
3-Methylheptane			0.63	0.89	1.41	0.69
1-Octene			0.34	0.61	0.29	0.15
n-Octane			0.67	1.20	1.53	0.81
Ethylbenzene			1.24	2.11	3.22	1.54
m-Xylene/p-Xylene			2.96	5.18	7.58	3.52
Styrene			0.42	0.49	0.84	0.58
o-Xylene			1.22	1.99	3.07	1.47
1-Nonene			ND	ND	ND	ND
n-Nonane			0.76	1.02	1.30	0.60
Isopropylbenzene			0.42	0.45	0.51	0.46
a-Pinene			0.31	1.94	0.35	0.36
n-Propylbenzene			0.44	0.68	0.93	0.55
m-Ethyltoluene			1.33	2.39	3.03	1.70
p-Ethyltoluene			0.84	1.17	1.63	0.89
1,3,5-Trimethylbenzene			0.61	1.00	1.44	0.68
o-Ethyltoluene			0.86	1.20	1.61	0.83
b-Pinene			0.36	2.37	0.54	0.40
1,2,4-Trimethylbenzene			1.61	2.59	4.16	2.12
1-Decene			ND	ND	ND	ND
n-Decane			1.44	1.61	2.36	0.90
1,2,3-Trimethylbenzene			0.54	0.66	0.97	0.64
m-Diethylbenzene			0.68	0.68	0.85	0.59
p-Diethylbenzene			0.29	0.33	0.38	0.23
1-Undecene			ND	ND	ND	0.55
n-Undecane			0.60	0.94	0.96	1.33
1-Dodecene			0.70	0.67	0.62	2.14
n-Dodecane			0.20	0.30	0.26	1.88
1-Tridecene			ND	ND	ND	2.37
n-Tridecane			0.42	0.44	0.36	2.30
TNMOC (speciated)			92.30	193.14	273.40	128.11
TNMOC (w/ unknowns)			122.66	232.91	313.52	162.69

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Sample No.:	18139	18150	18162	18162REP	18204	18193
Sampling Date:	8/16/2000	8/17/2000	8/18/2000	8/18/2000	8/21/2000	8/22/2000
Analysis Date:	8/23/2000	8/23/2000	8/29/2000	9/26/2000	8/29/2000	8/29/2000
Ethylene	4.52	7.65	4.36	4.28	5.39	6.12
Acetylene	4.32	6.19	2.73	2.61	3.26	6.22
Ethane	5.65	9.50	5.42	5.38	6.24	12.89
Propylene	2.10	3.40	1.68	1.63	1.91	2.82
Propane	4.90	6.78	5.75	5.50	6.70	8.20
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	3.58	2.41	1.55	1.53	6.99	2.30
Isobutene/1-Butene	2.30	3.69	1.71	1.69	2.09	2.92
1,3-Butadiene	0.39	0.67	0.28	0.25	0.36	0.52
n-Butane	2.31	3.19	2.17	2.16	5.09	3.82
trans-2-Butene	0.38	0.50	0.26	0.28	0.34	0.42
cis-2-Butene	0.47	0.64	0.32	0.36	0.44	0.51
3-Methyl-1-butene	0.15	0.22	0.12	ND	0.15	0.24
Isopentane	11.25	11.63	5.77	5.62	12.09	14.24
1-Pentene	0.57	0.76	0.39	0.39	0.53	0.72
2-Methyl-1-butene	0.63	0.92	0.37	0.37	0.72	1.02
n-Pentane	3.74	5.15	2.61	2.44	7.97	5.23
Isoprene	1.28	1.30	0.86	0.86	1.16	0.66
trans-2-Pentene	0.98	1.40	0.67	0.69	1.04	1.21
cis-2-Pentene	0.66	0.85	0.41	0.43	0.64	0.79
2-Methyl-2-butene	0.91	1.19	0.48	0.44	1.04	1.19
2,2-Dimethylbutane	0.93	1.14	0.65	0.65	0.88	1.09
Cyclopentene	0.27	0.46	0.52	0.58	0.49	0.60
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND
Cyclopentane	0.80	1.00	0.55	0.50	1.28	0.94
2,3-Dimethylbutane	1.41	1.88	0.94	0.97	1.23	1.67
2-Methylpentane	3.88	6.91	3.85	4.15	5.11	7.00
3-Methylpentane	2.71	3.83	1.73	1.72	2.51	3.53
2-Methyl-1-pentene	ND	ND	ND	ND	ND	0.21
1-Hexene	0.63	0.74	0.49	0.50	0.59	0.57
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	2.92	4.10	1.87	1.85	2.86	3.75
trans-2-Hexene	0.25	0.23	0.14	ND	0.13	0.22
cis-2-Hexene	0.13	0.19	ND	ND	0.14	0.15
Methylcyclopentane	1.65	2.35	1.08	1.05	1.83	2.09
2,4-Dimethylpentane	0.99	1.32	0.71	0.70	0.85	1.08
Benzene	8.59	10.31	11.17	11.02	15.06	16.02
Cyclohexane	10.68	1.67	0.68	0.70	5.28	0.75
2-Methylhexane	1.30	2.02	0.96	0.95	1.33	1.69
2,3-Dimethylpentane	0.86	1.19	0.59	0.63	0.74	0.92
3-Methylhexane	2.08	3.36	1.77	1.94	2.43	3.02
1-Heptene	0.15	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	3.91	6.35	2.85	2.74	3.25	5.43
n-Heptane	1.47	2.09	1.06	1.04	1.48	1.76
Methylcyclohexane	1.15	1.38	0.94	0.99	1.10	1.24
2,2,3-Trimethylpentane	0.74	1.20	0.51	0.50	0.59	0.91
2,3,4-Trimethylpentane	1.48	2.31	0.99	1.07	1.27	1.91
Toluene	10.75	14.06	7.62	7.98	10.31	10.98
2-Methylheptane	0.63	1.00	0.42	0.46	0.49	0.69
3-Methylheptane	0.71	0.92	0.49	0.48	0.54	0.80
1-Octene	0.14	ND	ND	0.10	0.11	0.16
n-Octane	0.81	1.03	0.53	0.62	0.62	0.90
Ethylbenzene	1.99	2.31	1.07	1.20	1.27	1.81
m-Xylene/p-Xylene	4.43	5.13	2.58	2.92	2.97	4.09
Styrene	0.92	0.67	0.31	0.34	0.48	0.42
o-Xylene	1.68	2.10	1.07	1.16	1.15	1.68
1-Nonene	ND	ND	ND	ND	ND	ND
n-Nonane	0.69	1.09	0.55	0.65	0.61	0.79
Isopropylbenzene	0.42	0.40	0.28	0.44	0.30	0.33
a-Pinene	0.34	0.39	0.18	0.29	0.68	0.16
n-Propylbenzene	0.53	0.77	0.35	0.37	0.40	0.51
m-Ethyltoluene	1.75	2.31	1.16	1.18	1.47	1.82
p-Ethyltoluene	0.84	1.21	0.67	0.78	0.73	0.96
1,3,5-Trimethylbenzene	0.77	1.13	0.54	0.57	0.58	0.77
o-Ethyltoluene	0.76	1.13	0.58	0.76	0.64	0.96
b-Pinene	0.48	0.60	0.47	0.43	0.49	ND
1,2,4-Trimethylbenzene	2.11	2.86	1.48	1.53	1.66	2.27
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	1.09	2.34	1.09	1.15	1.04	1.30
1,2,3-Trimethylbenzene	0.76	0.87	0.62	0.44	0.82	0.62
m-Diethylbenzene	0.61	0.70	0.41	0.44	0.53	0.51
p-Diethylbenzene	0.32	0.29	0.20	0.24	0.23	0.25
1-Undecene	ND	ND	ND	ND	ND	ND
n-Undecane	0.64	0.78	0.55	0.54	0.79	0.60
1-Dodecene	0.47	0.61	0.48	0.35	0.67	0.63
n-Dodecane	0.23	0.23	0.23	0.23	0.40	0.27
1-Tridecene	ND	ND	ND	ND	ND	ND
n-Tridecane	0.38	0.30	0.16	0.39	3.82	0.25
TNMOC (speciated)	135.29	169.26	96.03	97.16	148.36	163.08
TNMOC (w/ unknowns)	170.91	206.72	122.87	128.52	186.30	205.51

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Sample No.:	18193REP	18212	18212REP	18220	18236	18237
Sampling Date:	8/22/2000	8/23/2000	8/23/2000	8/24/2000	8/25/2000	8/28/2000
Analysis Date:	9/26/2000	8/29/2000	9/26/2000	9/13/2000	9/13/2000	9/13/2000
Ethylene	6.11	7.93	7.63	6.08	8.24	3.73
Acetylene	5.82	6.29	6.17	5.09	6.55	3.28
Ethane	12.49	15.81	15.48	16.84	18.18	5.71
Propylene	2.85	3.74	3.68	2.48	3.61	1.60
Propane	7.75	12.95	12.19	11.28	12.38	4.61
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	2.23	2.97	2.99	3.67	3.91	1.41
Isobutene/1-Butene	2.93	3.87	3.77	2.74	3.59	1.99
1,3-Butadiene	0.52	0.73	0.70	0.47	0.63	0.30
n-Butane	3.78	4.99	4.95	5.41	5.33	2.29
trans-2-Butene	0.43	0.44	0.47	0.36	0.46	0.31
cis-2-Butene	0.53	0.51	0.58	0.42	1.29	0.40
3-Methyl-1-butene	0.22	0.22	0.25	0.17	0.23	0.11
Isopentane	13.91	14.33	13.92	11.67	13.25	6.40
1-Pentene	0.75	0.71	0.78	0.54	0.68	0.55
2-Methyl-1-butene	0.98	0.99	0.95	0.71	0.97	0.51
n-Pentane	4.97	6.27	5.82	5.66	6.10	3.12
Isoprene	0.66	0.60	0.61	0.72	0.96	0.83
trans-2-Pentene	1.19	1.42	1.50	0.95	1.37	0.92
cis-2-Pentene	0.78	0.75	0.81	0.59	0.76	0.54
2-Methyl-2-butene	1.11	1.12	1.07	0.80	1.05	0.72
2,2-Dimethylbutane	1.13	1.20	1.36	0.99	1.11	0.83
Cyclopentene	0.76	0.44	0.49	0.80	0.58	0.47
4-Methyl-1-pentene	ND	0.13	ND	0.14	0.14	0.19
Cyclopentane	0.93	1.05	1.07	0.82	1.00	0.59
2,3-Dimethylbutane	1.69	1.96	2.00	1.58	2.02	1.19
2-Methylpentane	6.75	7.63	7.93	6.49	7.75	4.19
3-Methylpentane	3.48	4.26	4.19	2.95	3.99	2.00
2-Methyl-1-pentene	ND	0.17	0.14	0.16	0.24	ND
1-Hexene	0.72	0.59	0.76	0.57	0.62	0.55
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	3.66	4.66	4.56	3.47	4.67	2.12
trans-2-Hexene	0.13	0.25	0.22	0.14	0.24	0.13
cis-2-Hexene	0.14	0.18	0.16	0.12	0.15	0.12
Methylcyclopentane	2.08	2.43	2.48	1.95	2.61	1.28
2,4-Dimethylpentane	1.12	1.33	1.37	1.01	1.33	0.77
Benzene	15.60	17.01	16.34	14.64	13.91	13.91
Cyclohexane	0.79	2.32	2.35	4.28	2.46	0.65
2-Methylhexane	1.66	2.17	2.15	1.49	2.12	0.91
2,3-Dimethylpentane	0.94	1.12	1.19	0.78	1.01	0.60
3-Methylhexane	3.14	3.54	3.63	2.91	3.89	2.04
1-Heptene	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	5.29	6.74	6.52	4.59	6.59	3.04
n-Heptane	1.75	2.35	2.31	1.70	2.51	1.10
Methylcyclohexane	1.36	1.56	1.66	1.45	2.04	1.06
2,2,3-Trimethylpentane	0.74	1.30	1.00	0.83	1.20	0.48
2,3,4-Trimethylpentane	1.91	2.37	2.33	1.64	2.28	1.11
Toluene	10.59	13.42	13.49	10.74	14.73	6.87
2-Methylheptane	0.72	0.92	0.88	0.80	0.99	0.49
3-Methylheptane	0.89	0.99	1.07	0.79	1.02	0.52
1-Octene	0.19	0.16	0.22	0.14	0.18	0.11
n-Octane	0.90	1.01	1.11	0.93	1.18	0.60
Ethylbenzene	1.78	2.25	2.30	1.72	2.05	1.13
m-Xylene/p-Xylene	4.08	5.08	5.22	3.76	4.45	2.56
Styrene	0.46	0.54	0.48	0.39	0.32	0.27
o-Xylene	1.66	2.07	2.12	1.54	1.74	1.01
1-Nonene	ND	ND	0.17	ND	ND	ND
n-Nonane	0.82	0.66	0.79	0.84	0.75	0.45
Isopropylbenzene	0.34	0.36	0.59	0.34	0.29	0.39
a-Pinene	0.27	0.16	0.24	0.27	0.24	0.25
n-Propylbenzene	0.51	0.62	0.68	0.42	0.45	0.35
m-Ethyltoluene	1.69	2.09	2.08	1.58	1.76	1.02
p-Ethyltoluene	1.07	1.09	1.25	0.90	0.88	0.74
1,3,5-Trimethylbenzene	0.75	0.98	0.93	0.64	0.73	0.44
o-Ethyltoluene	0.79	0.95	0.89	0.82	0.70	0.59
b-Pinene	ND	0.21	ND	ND	ND	0.33
1,2,4-Trimethylbenzene	2.16	2.65	2.66	1.88	2.18	1.46
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	1.29	0.99	1.09	1.68	1.33	0.68
1,2,3-Trimethylbenzene	0.50	1.01	0.62	0.59	0.65	0.47
m-Diethylbenzene	0.53	0.57	0.56	0.51	0.50	0.67
p-Diethylbenzene	0.30	0.24	0.30	0.21	0.29	0.23
1-Undecene	ND	ND	ND	ND	ND	ND
n-Undecane	0.60	0.72	0.74	0.69	0.67	0.47
1-Dodecene	0.43	0.60	0.38	0.61	0.58	0.59
n-Dodecane	0.23	0.35	0.34	0.29	0.31	0.23
1-Tridecene	ND	ND	ND	ND	ND	ND
n-Tridecane	0.10	0.24	0.16	0.15	0.17	0.13
TNMOC (speciated)	159.40	194.30	191.87	165.35	193.13	101.69
TNMOC (w/ unknowns)	203.23	233.68	237.29	212.37	245.51	146.81

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All concentrations reported in ppbC

Sample No.:	18237REP	18293	18254	18254REP	18253	18291
Sampling Date:	8/28/2000	8/29/2000	8/30/2000	8/30/2000	8/31/2000	9/1/2000
Analysis Date:	9/26/2000	9/13/2000	9/14/2000	9/26/2000	9/14/2000	9/14/2000
Ethylene	4.22	3.73	6.55	6.49	8.10	8.66
Acetylene	2.83	2.67	5.20	5.05	5.38	6.86
Ethane	6.01	5.02	10.44	10.21	10.50	29.63
Propylene	1.89	1.68	3.27	3.24	4.00	4.00
Propane	5.21	4.25	7.36	7.03	13.67	18.73
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	1.51	1.90	2.03	1.95	42.51	3.34
Isobutene/1-Butene	2.14	1.80	3.42	3.44	4.59	4.02
1,3-Butadiene	0.32	0.30	0.60	0.61	0.82	0.74
n-Butane	2.39	2.20	3.25	3.22	4.42	5.58
trans-2-Butene	0.40	0.27	0.44	0.49	0.48	0.50
cis-2-Butene	0.52	0.35	0.55	0.55	0.57	0.58
3-Methyl-1-butene	0.13	0.11	0.20	0.22	0.25	0.31
Isopentane	6.38	6.78	10.28	10.04	17.54	17.42
1-Pentene	0.55	0.43	0.62	0.62	0.59	0.87
2-Methyl-1-butene	0.52	0.56	0.87	0.84	1.00	1.08
n-Pentane	2.55	2.61	4.33	4.24	17.14	7.35
Isoprene	0.91	0.81	1.01	0.99	1.31	1.02
trans-2-Pentene	0.99	0.69	1.17	1.12	1.31	1.59
cis-2-Pentene	0.67	0.49	0.73	0.68	0.78	0.84
2-Methyl-2-butene	0.69	0.73	1.12	1.08	1.25	1.13
2,2-Dimethylbutane	1.00	0.73	0.94	0.93	1.16	1.39
Cyclopentene	0.55	0.59	0.55	0.64	0.50	0.60
4-Methyl-1-pentene	ND	ND	0.14	ND	0.13	ND
Cyclopentane	0.68	0.60	0.78	0.75	2.27	1.20
2,3-Dimethylbutane	1.23	1.02	1.71	1.54	1.86	2.62
2-Methylpentane	4.55	4.99	6.62	6.46	7.29	9.24
3-Methylpentane	2.06	1.99	3.23	3.17	4.65	5.56
2-Methyl-1-pentene	ND	ND	0.18	0.15	0.22	0.24
1-Hexene	0.76	0.52	0.65	0.63	0.65	0.75
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	2.17	2.15	3.40	3.32	6.75	6.46
trans-2-Hexene	ND	0.11	0.22	0.14	0.28	0.27
cis-2-Hexene	ND	ND	0.14	0.15	0.20	0.18
Methylcyclopentane	1.23	1.28	1.87	1.85	3.07	3.09
2,4-Dimethylpentane	0.88	0.68	1.08	1.07	1.37	1.65
Benzene	13.57	20.72	35.94	35.00	38.82	33.49
Cyclohexane	0.74	2.42	0.83	0.80	59.62	1.35
2-Methylhexane	0.94	0.90	1.71	1.68	2.30	2.76
2,3-Dimethylpentane	0.77	0.60	0.96	0.95	1.25	1.43
3-Methylhexane	2.17	1.99	3.10	3.04	4.02	4.49
1-Heptene	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	3.07	2.73	5.40	5.29	6.68	8.45
n-Heptane	1.11	1.08	1.76	1.72	2.65	2.76
Methylcyclohexane	1.09	0.89	1.33	1.14	1.69	2.06
2,2,3-Trimethylpentane	0.46	0.47	0.97	0.78	1.24	1.59
2,3,4-Trimethylpentane	1.11	0.99	1.92	1.88	2.31	2.88
Toluene	7.26	6.99	11.87	11.78	20.23	16.77
2-Methylheptane	0.57	0.42	0.67	0.66	0.78	1.16
3-Methylheptane	0.65	0.48	0.77	0.84	0.93	1.17
1-Octene	0.35	0.33	0.17	0.19	0.22	ND
n-Octane	0.76	0.55	0.87	0.88	1.09	1.29
Ethylbenzene	1.26	0.99	1.62	1.73	2.09	2.58
m-Xylene/p-Xylene	3.11	2.30	3.72	4.10	4.83	6.15
Styrene	0.42	0.32	0.39	0.43	0.61	0.46
o-Xylene	1.28	0.91	1.53	1.65	1.92	2.37
1-Nonene	ND	ND	ND	0.13	ND	0.11
n-Nonane	0.56	0.47	0.66	0.73	0.66	0.98
Isopropylbenzene	0.50	0.26	0.30	0.34	0.28	0.33
a-Pinene	0.31	0.45	0.32	0.38	1.27	0.58
n-Propylbenzene	0.52	0.32	0.44	0.49	0.54	0.64
m-Ethyltoluene	1.41	1.02	1.61	1.65	2.02	2.44
p-Ethyltoluene	0.91	0.62	0.88	0.94	0.97	1.34
1,3,5-Trimethylbenzene	0.70	0.46	0.68	0.84	0.91	1.00
o-Ethyltoluene	0.61	0.55	0.82	0.81	0.87	1.03
b-Pinene	0.33	0.35	0.29	0.37	1.14	1.11
1,2,4-Trimethylbenzene	1.62	1.32	2.06	2.15	2.39	2.96
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	0.78	0.77	1.12	1.19	1.18	1.60
1,2,3-Trimethylbenzene	0.57	0.34	0.66	0.47	1.15	0.66
m-Diethylbenzene	0.50	0.39	0.45	0.51	0.46	0.57
p-Diethylbenzene	0.24	0.17	0.24	0.23	0.25	0.28
1-Undecene	ND	ND	ND	ND	ND	ND
n-Undecane	0.49	0.47	0.56	0.55	1.02	0.98
1-Dodecene	0.52	0.44	0.50	0.46	0.46	0.44
n-Dodecane	0.25	0.24	0.23	0.21	0.41	0.44
1-Tridecene	ND	ND	ND	ND	ND	ND
n-Tridecane	0.18	0.14	0.16	0.12	0.17	0.24
TNMOC (speciated)	107.59	106.82	172.40	170.00	335.98	258.44
TNMOC (w/ unknowns)	139.83	143.82	218.61	215.80	396.64	328.34

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All concentrations reported in ppbC

Sample No.:	18291REP	18319	18319REP	18333	18330	18340
Sampling Date:	9/1/2000	9/5/2000	9/5/2000	9/6/2000	9/7/2000	9/11/2000
Analysis Date:	9/27/2000	9/14/2000	9/27/2000	9/14/2000	9/14/2000	9/27/2000
Ethylene	8.54	16.36	16.05	4.18	8.24	4.80
Acetylene	6.42	12.82	12.31	3.29	5.28	2.91
Ethane	29.31	30.85	30.05	6.81	14.62	10.18
Propylene	3.89	7.21	6.95	1.82	3.27	1.93
Propane	17.95	38.13	36.17	11.82	19.84	6.65
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	3.24	8.09	7.67	6.12	5.00	1.91
Isobutene/1-Butene	3.88	6.58	6.39	2.15	3.19	2.21
1,3-Butadiene	0.73	1.27	1.24	0.33	0.53	0.30
n-Butane	5.51	14.67	14.49	5.12	11.44	3.12
trans-2-Butene	0.49	1.22	1.23	0.46	0.80	0.35
cis-2-Butene	0.58	1.34	1.34	0.60	1.04	0.46
3-Methyl-1-butene	0.31	0.71	0.72	0.21	0.41	0.13
Isopentane	17.03	48.38	47.18	17.64	31.39	7.28
1-Pentene	0.91	2.09	2.01	0.68	1.27	0.48
2-Methyl-1-butene	1.05	2.69	2.61	0.80	1.60	0.48
n-Pentane	7.12	33.82	32.75	6.23	10.90	3.18
Isoprene	0.98	1.39	1.34	0.49	0.72	0.70
trans-2-Pentene	1.54	3.94	3.81	1.02	1.84	0.82
cis-2-Pentene	0.81	1.97	1.92	0.65	1.07	0.56
2-Methyl-2-butene	1.08	4.19	4.06	0.69	1.41	0.60
2,2-Dimethylbutane	1.38	2.84	2.85	1.00	1.51	0.74
Cyclopentene	0.60	1.17	1.13	0.58	1.15	0.39
4-Methyl-1-pentene	ND	0.21	0.23	ND	ND	ND
Cyclopentane	1.13	3.05	2.95	0.81	1.26	0.67
2,3-Dimethylbutane	2.27	6.27	4.91	1.59	2.84	1.12
2-Methylpentane	8.98	19.26	18.74	5.92	9.76	3.98
3-Methylpentane	5.39	11.64	11.30	2.80	4.96	2.08
2-Methyl-1-pentene	0.20	0.70	0.71	ND	0.18	ND
1-Hexene	0.85	1.13	1.09	0.59	0.76	0.61
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	6.27	12.43	12.03	3.07	5.24	2.35
trans-2-Hexene	0.24	0.77	0.68	ND	0.23	0.12
cis-2-Hexene	0.18	0.48	0.48	ND	0.16	ND
Methylcyclopentane	3.00	6.41	6.29	1.60	2.50	1.33
2,4-Dimethylpentane	1.62	3.66	3.54	0.95	1.42	0.77
Benzene	32.76	40.29	39.15	27.16	24.98	23.27
Cyclohexane	1.33	2.04	1.99	1.97	1.05	1.04
2-Methylhexane	2.69	5.72	5.56	1.22	2.14	1.07
2,3-Dimethylpentane	1.37	3.06	2.91	0.74	1.14	0.71
3-Methylhexane	4.47	8.28	8.15	2.62	3.68	2.28
1-Heptene	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	8.30	19.57	18.83	3.96	6.10	3.11
n-Heptane	2.71	5.53	5.35	1.38	2.34	1.29
Methylcyclohexane	1.79	3.99	3.37	1.30	1.86	1.17
2,2,3-Trimethylpentane	1.56	2.80	2.69	0.56	1.09	0.63
2,3,4-Trimethylpentane	2.81	7.33	7.08	1.46	2.19	1.24
Toluene	17.12	37.67	37.74	11.98	15.74	7.90
2-Methylheptane	0.98	2.26	1.84	0.59	0.94	0.56
3-Methylheptane	1.24	2.35	2.29	0.75	0.93	0.67
1-Octene	0.23	0.44	0.42	0.14	0.17	0.13
n-Octane	1.33	2.56	2.59	0.86	1.22	0.82
Ethylbenzene	2.90	5.25	5.61	1.48	1.84	1.34
m-Xylene/p-Xylene	6.94	13.66	14.56	3.68	4.65	3.29
Styrene	0.51	1.53	1.72	2.26	1.89	0.38
o-Xylene	2.65	5.18	5.50	1.39	1.85	1.28
1-Nonene	0.14	0.29	0.33	ND	ND	0.11
n-Nonane	1.05	2.39	2.51	0.94	1.58	0.66
Isopropylbenzene	0.43	0.55	0.57	0.33	0.32	0.40
a-Pinene	0.79	4.34	4.69	0.41	0.59	0.28
n-Propylbenzene	0.72	1.23	1.29	0.43	0.54	0.40
m-Ethyltoluene	2.58	4.78	4.91	1.29	1.83	1.33
p-Ethyltoluene	1.36	2.34	2.59	0.73	1.01	0.82
1,3,5-Trimethylbenzene	1.11	2.02	2.20	0.48	0.93	0.59
o-Ethyltoluene	1.29	2.29	2.32	0.56	0.98	0.57
b-Pinene	1.18	2.56	2.87	ND	0.27	ND
1,2,4-Trimethylbenzene	3.15	6.15	6.18	1.70	2.40	1.67
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	1.68	4.13	4.18	1.32	1.75	0.94
1,2,3-Trimethylbenzene	0.79	1.31	1.32	0.45	0.68	0.44
m-Diethylbenzene	0.60	0.83	0.85	0.44	0.56	0.45
p-Diethylbenzene	0.33	0.48	0.60	0.23	0.24	0.21
1-Undecene	ND	ND	ND	ND	ND	ND
n-Undecane	0.96	2.07	2.06	0.77	0.82	0.52
1-Dodecene	0.47	0.72	0.63	0.50	0.63	0.58
n-Dodecane	0.42	0.86	0.84	0.38	0.37	0.25
1-Tridecene	ND	ND	ND	ND	ND	ND
n-Tridecane	0.22	0.47	0.41	0.22	0.22	0.16
TNMOC (speciated)	256.39	516.99	505.86	166.67	247.33	125.71
TNMOC (w/ unknowns)	322.59	619.07	606.55	220.04	306.44	175.63

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Sample No.:	18340REP	18376	18378	18386	18386REP	18383
Sampling Date:	9/11/2000	9/12/2000	9/13/2000	9/14/2000	9/14/2000	9/15/2000
Analysis Date:	10/3/2000	9/27/2000	VOID	9/27/2000	10/3/2000	10/3/2000
Ethylene	4.77	4.33		4.83	4.92	3.11
Acetylene	2.83	2.82		3.52	3.53	2.26
Ethane	10.27	9.91		9.70	9.73	26.36
Propylene	1.98	1.90		2.30	2.33	1.26
Propane	6.68	12.88		8.75	8.84	21.60
Propyne	ND	ND		ND	ND	ND
Isobutane	1.99	2.72		2.33	2.42	4.83
Isobutene/1-Butene	2.27	2.00		2.36	2.36	5.04
1,3-Butadiene	0.35	0.34		0.41	0.44	0.35
n-Butane	3.12	4.07		3.18	3.16	9.51
trans-2-Butene	0.34	0.31		0.33	0.31	0.48
cis-2-Butene	0.45	0.40		0.40	0.38	0.56
3-Methyl-1-butene	0.12	0.12		0.16	0.12	0.14
Isopentane	7.21	9.64		7.36	7.43	11.99
1-Pentene	0.46	0.42		0.42	0.48	0.43
2-Methyl-1-butene	0.51	0.43		0.47	0.44	0.19
n-Pentane	3.25	5.43		3.13	3.19	13.62
Isoprene	0.66	0.58		0.48	0.49	0.47
trans-2-Pentene	0.90	0.69		0.67	0.68	1.46
cis-2-Pentene	0.53	0.46		0.46	0.47	0.57
2-Methyl-2-butene	0.60	0.67		0.56	0.58	1.63
2,2-Dimethylbutane	0.81	0.72		0.84	0.78	0.94
Cyclopentene	0.42	0.44		0.54	0.56	0.45
4-Methyl-1-pentene	ND	ND		ND	ND	ND
Cyclopentane	0.65	0.88		0.61	0.65	0.91
2,3-Dimethylbutane	1.11	0.98		1.35	1.34	1.52
2-Methylpentane	4.27	3.80		4.47	4.38	4.97
3-Methylpentane	2.11	1.92		2.11	2.10	2.40
2-Methyl-1-pentene	ND	ND		ND	ND	ND
1-Hexene	0.59	0.53		0.55	0.55	0.52
2-Ethyl-1-butene	ND	ND		ND	ND	ND
n-Hexane	2.35	2.54		2.55	2.56	3.42
trans-2-Hexene	0.14	ND		ND	0.11	ND
cis-2-Hexene	0.10	ND		ND	ND	ND
Methylcyclopentane	1.36	1.40		1.28	1.30	1.59
2,4-Dimethylpentane	0.77	0.68		1.02	0.99	0.95
Benzene	23.15	18.29		16.25	16.33	14.26
Cyclohexane	1.02	8.67		8.89	9.00	1.21
2-Methylhexane	1.04	0.97		1.05	1.08	1.38
2,3-Dimethylpentane	0.67	0.64		0.89	0.89	1.09
3-Methylhexane	2.39	2.02		2.09	2.10	2.23
1-Heptene	ND	ND		ND	ND	ND
2,2,4-Trimethylpentane	3.10	2.72		4.76	4.85	4.23
n-Heptane	1.31	1.26		1.24	1.26	1.95
Methylcyclohexane	1.18	1.08		0.91	0.95	1.99
2,2,3-Trimethylpentane	0.45	0.39		0.66	0.70	0.57
2,3,4-Trimethylpentane	1.24	1.07		1.78	1.83	1.41
Toluene	7.95	7.96		9.22	9.14	10.23
2-Methylheptane	0.55	0.55		0.57	0.51	0.71
3-Methylheptane	0.65	0.55		0.50	0.64	0.76
1-Octene	0.17	ND		0.13	ND	ND
n-Octane	0.85	0.74		0.75	0.74	1.07
Ethylbenzene	1.24	1.15		1.44	1.40	1.04
m-Xylene/p-Xylene	3.13	2.91		3.39	3.23	2.93
Styrene	0.36	0.37		0.41	0.41	1.31
o-Xylene	1.23	1.09		1.33	1.28	1.16
1-Nonene	0.10	ND		ND	ND	ND
n-Nonane	0.62	0.55		0.57	0.54	0.76
Isopropylbenzene	0.31	0.30		0.34	0.34	0.30
a-Pinene	0.29	0.40		0.98	1.00	ND
n-Propylbenzene	0.41	0.37		0.40	0.40	0.40
m-Ethyltoluene	1.33	1.19		1.48	1.38	1.33
p-Ethyltoluene	0.81	0.77		0.72	0.72	0.71
1,3,5-Trimethylbenzene	0.65	0.63		0.58	0.59	0.61
o-Ethyltoluene	0.70	0.55		0.61	0.61	0.53
b-Pinene	ND	ND		0.51	0.42	ND
1,2,4-Trimethylbenzene	1.59	1.38		1.54	1.56	1.48
1-Decene	ND	ND		ND	ND	ND
n-Decane	0.89	0.86		0.76	0.72	0.91
1,2,3-Trimethylbenzene	0.47	0.40		0.47	0.32	0.60
m-Diethylbenzene	0.44	0.38		0.56	0.43	0.42
p-Diethylbenzene	0.22	0.20		0.15	0.15	0.15
1-Undecene	ND	ND		ND	ND	ND
n-Undecane	0.54	0.57		0.59	0.58	0.68
1-Dodecene	0.59	0.40		0.37	0.47	0.28
n-Dodecane	0.25	0.25		0.27	0.28	0.30
1-Tridecene	ND	0.20		ND	ND	ND
n-Tridecane	0.14	0.13		0.71	0.62	0.13
TNMOC (speciated)	125.97	135.96		134.96	135.07	182.59
TNMOC (w/ unknowns)	177.51	174.50		173.22	174.50	226.96

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Sample No.:	18416	18408	18419	18454	18454REP	18431
Sampling Date:	9/18/2000	9/19/2000	9/20/2000	9/21/2000	9/21/2000	9/25/2000
Analysis Date:	10/3/2000	10/3/2000	10/3/2000	10/9/2000	10/11/2000	10/9/2000
Ethylene	15.10	4.59	3.79	2.15	1.96	2.28
Acetylene	10.27	4.26	2.05	1.58	1.28	0.95
Ethane	23.66	13.82	6.27	6.70	6.35	5.29
Propylene	6.93	1.77	1.33	1.02	0.96	1.26
Propane	22.76	9.92	4.80	3.97	3.73	4.49
Propyne	ND	ND	ND	ND	ND	ND
Isobutane	6.07	3.17	54.91	0.79	0.74	1.21
Isobutene/1-Butene	6.56	1.93	1.96	1.02	0.97	0.98
1,3-Butadiene	1.35	0.34	0.22	0.15	0.12	0.26
n-Butane	10.29	3.86	2.65	1.57	1.50	2.54
trans-2-Butene	0.91	0.26	0.25	0.21	0.18	0.21
cis-2-Butene	0.99	0.37	0.34	0.32	0.28	0.27
3-Methyl-1-butene	0.49	0.10	ND	ND	ND	ND
Isopentane	30.46	6.03	98.36	3.49	3.25	1.72
1-Pentene	1.40	0.38	0.34	0.25	0.25	0.31
2-Methyl-1-butene	1.76	0.38	0.33	0.22	0.21	ND
n-Pentane	24.51	3.02	30.04	2.40	2.27	2.28
Isoprene	1.09	0.51	0.57	0.30	0.27	0.27
trans-2-Pentene	2.40	0.53	0.59	0.39	0.34	0.25
cis-2-Pentene	1.22	0.42	0.45	0.37	0.31	0.29
2-Methyl-2-butene	3.04	0.37	0.37	0.27	0.25	ND
2,2-Dimethylbutane	2.12	0.79	1.28	0.50	0.48	0.57
Cyclopentene	0.64	0.41	0.29	ND	ND	0.17
4-Methyl-1-pentene	0.17	ND	ND	ND	ND	ND
Cyclopentane	2.18	0.61	2.18	0.45	0.36	0.37
2,3-Dimethylbutane	3.62	1.03	1.43	0.73	0.68	0.59
2-Methylpentane	12.25	3.83	4.11	1.24	1.27	1.73
3-Methylpentane	7.33	1.95	2.36	1.29	1.23	0.65
2-Methyl-1-pentene	0.41	ND	ND	ND	ND	ND
1-Hexene	0.96	0.58	0.60	0.48	0.42	0.61
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND
n-Hexane	8.00	2.27	3.81	1.28	1.20	0.96
trans-2-Hexene	0.35	ND	ND	ND	ND	ND
cis-2-Hexene	0.30	ND	ND	ND	ND	ND
Methylcyclopentane	4.21	1.31	1.69	0.78	0.73	0.51
2,4-Dimethylpentane	3.24	0.75	0.73	0.60	0.53	0.49
Benzene	23.04	17.25	14.48	12.73	11.98	16.01
Cyclohexane	1.43	0.80	38.57	0.46	0.41	0.58
2-Methylhexane	3.50	0.93	1.16	0.65	0.59	0.26
2,3-Dimethylpentane	2.24	0.63	0.94	0.60	0.55	0.44
3-Methylhexane	5.38	2.22	3.08	0.83	0.78	1.13
1-Heptene	ND	ND	ND	ND	ND	0.16
2,2,4-Trimethylpentane	15.64	2.97	2.44	2.27	2.08	0.87
n-Heptane	3.65	1.14	1.60	0.70	0.69	0.63
Methylcyclohexane	2.44	1.03	2.94	0.58	0.51	0.83
2,2,3-Trimethylpentane	2.02	0.41	0.30	0.34	0.31	ND
2,3,4-Trimethylpentane	5.30	1.21	0.76	1.12	1.04	0.43
Toluene	24.15	6.29	84.90	7.71	7.15	2.50
2-Methylheptane	1.21	0.52	0.44	0.38	0.35	0.34
3-Methylheptane	1.51	0.55	0.54	0.44	0.41	0.34
1-Octene	0.29	0.11	0.13	ND	ND	0.10
n-Octane	1.78	0.70	0.84	0.53	0.46	0.52
Ethylbenzene	3.62	1.22	1.46	1.12	1.05	0.57
m-Xylene/p-Xylene	9.20	2.69	3.18	3.27	3.51	2.15
Styrene	0.90	0.22	1.17	0.28	0.19	0.27
o-Xylene	3.49	1.06	1.20	1.20	1.07	0.55
1-Nonene	0.17	ND	ND	ND	ND	ND
n-Nonane	1.75	0.63	0.72	0.50	0.47	0.42
Isopropylbenzene	0.40	0.37	0.41	0.31	0.20	0.37
a-Pinene	3.63	0.29	0.26	0.36	0.33	0.17
n-Propylbenzene	0.80	0.34	0.50	0.34	0.30	0.31
m-Ethyltoluene	3.36	1.58	1.77	0.77	0.79	0.62
p-Ethyltoluene	1.72	0.78	0.83	0.62	0.54	0.55
1,3,5-Trimethylbenzene	1.49	0.55	0.64	0.45	0.39	0.46
o-Ethyltoluene	1.83	0.55	0.67	0.42	0.41	0.34
b-Pinene	1.25	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	4.49	1.51	1.73	1.09	0.98	0.80
1-Decene	ND	ND	ND	ND	ND	ND
n-Decane	2.82	0.98	1.54	0.82	0.71	0.58
1,2,3-Trimethylbenzene	1.06	0.56	0.66	0.33	0.33	0.30
m-Diethylbenzene	1.96	0.81	0.60	0.39	0.24	0.71
p-Diethylbenzene	0.33	0.21	0.34	0.22	0.22	0.23
1-Undecene	ND	ND	ND	ND	ND	ND
n-Undecane	1.58	0.73	1.12	0.51	0.50	0.56
1-Dodecene	0.56	0.77	0.56	0.11	ND	0.76
n-Dodecane	0.58	0.61	1.05	0.20	0.22	0.51
1-Tridecene	ND	ND	ND	ND	ND	ND
n-Tridecane	0.37	3.62	3.44	ND	ND	0.59
TNMOC (speciated)	357.94	126.32	405.04	77.14	71.83	68.44
TNMOC (w/ unknowns)	442.37	181.78	470.80	98.15	89.57	102.39

SNMOC 2000 REPORT - CAMS 13 - Forth Worth, TX
All concentrations reported in ppbC

Sample No.:	18475	18469D1	18469R1	18470D2	18470R2	18467
Sampling Date:	9/26/2000	9/27/2000	9/27/2000	9/27/2000	9/27/2000	9/29/2000
Analysis Date:	10/9/2000	10/9/2000	10/11/2000	10/9/2000	10/11/2000	VOID
Ethylene	7.20	12.64	11.80	26.18	24.43	
Acetylene	3.72	8.21	7.64	21.03	15.00	
Ethane	49.34	16.16	15.36	30.70	32.97	
Propylene	3.08	6.34	5.99	12.21	10.35	
Propane	36.64	21.31	19.82	34.36	31.82	
Propyne	ND	ND	ND	ND	ND	
Isobutane	9.38	5.87	5.52	6.42	6.05	
Isobutene/1-Butene	2.56	5.03	4.75	12.34	11.53	
1,3-Butadiene	0.67	1.12	1.04	2.59	2.44	
n-Butane	17.28	12.61	11.83	20.35	18.88	
trans-2-Butene	0.30	0.80	0.75	1.92	1.73	
cis-2-Butene	0.36	0.86	0.77	1.86	1.70	
3-Methyl-1-butene	0.11	0.36	0.35	0.87	0.87	
Isopentane	13.88	23.89	22.37	44.90	42.04	
1-Pentene	0.50	1.15	1.04	2.21	2.08	
2-Methyl-1-butene	0.49	1.36	1.26	3.64	3.44	
n-Pentane	33.47	64.66	60.39	24.15	22.49	
Isoprene	0.47	0.85	0.78	1.78	1.64	
trans-2-Pentene	0.79	1.86	1.68	4.49	4.22	
cis-2-Pentene	0.48	1.03	0.92	2.29	2.14	
2-Methyl-2-butene	0.73	1.72	1.62	5.69	5.34	
2,2-Dimethylbutane	1.16	1.67	1.60	2.92	2.72	
Cyclopentene	0.21	0.36	0.32	0.51	0.47	
4-Methyl-1-pentene	ND	ND	0.14	0.27	0.20	
Cyclopentane	1.12	1.64	1.52	2.80	2.62	
2,3-Dimethylbutane	1.58	2.93	2.70	5.53	5.11	
2-Methylpentane	5.52	9.27	8.74	19.03	17.95	
3-Methylpentane	3.38	5.62	5.26	12.03	11.29	
2-Methyl-1-pentene	ND	0.31	0.30	0.88	0.77	
1-Hexene	0.59	0.86	0.80	1.37	1.11	
2-Ethyl-1-butene	ND	ND	ND	ND	ND	
n-Hexane	5.39	6.56	6.11	13.65	12.78	
trans-2-Hexene	ND	0.33	0.32	1.12	1.03	
cis-2-Hexene	ND	0.23	0.18	0.63	0.62	
Methylcyclopentane	2.02	3.42	3.22	7.63	7.26	
2,4-Dimethylpentane	1.05	1.98	1.82	4.54	4.26	
Benzene	15.01	9.73	9.15	19.49	18.30	
Cyclohexane	1.68	1.61	1.46	2.56	2.37	
2-Methylhexane	1.82	2.62	2.52	6.25	5.84	
2,3-Dimethylpentane	0.88	1.57	1.43	3.57	3.37	
3-Methylhexane	2.55	4.25	3.99	8.87	8.31	
1-Heptene	ND	ND	ND	ND	ND	
2,2,4-Trimethylpentane	4.81	10.59	9.91	25.09	23.69	
n-Heptane	2.66	2.81	2.65	6.03	5.67	
Methylcyclohexane	2.49	2.91	2.83	4.46	4.20	
2,2,3-Trimethylpentane	0.63	1.48	1.38	3.48	3.32	
2,3,4-Trimethylpentane	1.73	4.12	3.94	9.76	9.13	
Toluene	9.44	22.22	20.74	45.44	42.21	
2-Methylheptane	0.97	1.09	1.01	2.16	2.00	
3-Methylheptane	0.95	1.31	1.22	2.70	2.51	
1-Octene	0.39	0.24	0.23	0.49	0.47	
n-Octane	1.55	1.78	1.66	3.05	2.86	
Ethylbenzene	1.47	5.29	4.94	8.28	7.49	
m-Xylene/p-Xylene	4.02	15.43	14.48	21.20	19.43	
Styrene	0.53	1.96	1.76	2.10	1.86	
o-Xylene	1.53	5.43	4.99	7.66	6.96	
1-Nonene	ND	0.21	0.17	0.36	0.33	
n-Nonane	0.92	1.84	1.70	3.61	3.32	
Isopropylbenzene	0.35	0.53	0.44	0.65	0.56	
a-Pinene	2.26	4.71	4.37	5.27	4.87	
n-Propylbenzene	0.49	0.96	0.86	1.63	1.44	
m-Ethyltoluene	1.66	3.65	3.44	6.58	6.12	
p-Ethyltoluene	0.88	2.01	1.74	3.65	3.32	
1,3,5-Trimethylbenzene	0.76	1.67	1.52	3.25	2.83	
o-Ethyltoluene	0.76	2.25	1.67	4.23	3.92	
b-Pinene	1.08	1.86	1.77	2.27	1.96	
1,2,4-Trimethylbenzene	1.89	4.76	4.39	8.56	7.79	
1-Decene	ND	ND	ND	ND	ND	
n-Decane	1.12	2.86	2.68	7.18	6.76	
1,2,3-Trimethylbenzene	0.56	1.26	1.21	2.21	1.72	
m-Diethylbenzene	0.58	0.91	0.68	1.47	1.21	
p-Diethylbenzene	0.33	0.52	0.41	0.82	0.60	
1-Undecene	ND	ND	ND	ND	ND	
n-Undecane	1.20	1.81	1.76	3.02	3.00	
1-Dodecene	0.48	0.82	0.64	1.15	0.51	
n-Dodecane	0.58	0.88	0.84	1.03	0.98	
1-Tridecene	ND	ND	ND	ND	ND	
n-Tridecane	0.29	0.46	0.48	0.68	0.58	
TNMOC (speciated)	274.73	353.35	329.77	573.12	531.15	
TNMOC (w/ unknowns)	329.62	411.96	384.55	671.84	624.35	

SNMOC 2000 REPORT - CAMS 13 - Forth Worth, TX
All concentrations reported in ppbC

Sample No.:	**18482**
Sampling Date:	**10/2/2000**
Analysis Date:	**10/9/2000**
Ethylene	3.44
Acetylene	2.36
Ethane	10.42
Propylene	1.53
Propane	7.35
Propyne	ND
Isobutane	2.26
Isobutene/1-Butene	1.65
1,3-Butadiene	0.26
n-Butane	4.05
trans-2-Butene	0.27
cis-2-Butene	0.40
3-Methyl-1-butene	0.12
Isopentane	6.10
1-Pentene	0.38
2-Methyl-1-butene	0.35
n-Pentane	2.86
Isoprene	0.42
trans-2-Pentene	0.52
cis-2-Pentene	0.48
2-Methyl-2-butene	0.44
2,2-Dimethylbutane	0.71
Cyclopentene	0.28
4-Methyl-1-pentene	ND
Cyclopentane	0.57
2,3-Dimethylbutane	0.95
2-Methylpentane	3.02
3-Methylpentane	1.64
2-Methyl-1-pentene	ND
1-Hexene	0.56
2-Ethyl-1-butene	ND
n-Hexane	1.82
trans-2-Hexene	ND
cis-2-Hexene	ND
Methylcyclopentane	1.08
2,4-Dimethylpentane	0.67
Benzene	2.85
Cyclohexane	0.72
2-Methylhexane	0.77
2,3-Dimethylpentane	0.61
3-Methylhexane	1.64
1-Heptene	ND
2,2,4-Trimethylpentane	2.24
n-Heptane	0.98
Methylcyclohexane	0.95
2,2,3-Trimethylpentane	0.29
2,3,4-Trimethylpentane	0.91
Toluene	5.45
2-Methylheptane	0.46
3-Methylheptane	0.54
1-Octene	ND
n-Octane	0.68
Ethylbenzene	1.12
m-Xylene/p-Xylene	2.90
Styrene	0.42
o-Xylene	1.19
1-Nonene	ND
n-Nonane	0.59
Isopropylbenzene	0.36
a-Pinene	0.15
n-Propylbenzene	0.48
m-Ethyltoluene	1.18
p-Ethyltoluene	0.80
1,3,5-Trimethylbenzene	0.60
o-Ethyltoluene	0.54
b-Pinene	ND
1,2,4-Trimethylbenzene	1.58
1-Decene	ND
n-Decane	0.87
1,2,3-Trimethylbenzene	0.44
m-Diethylbenzene	0.47
p-Diethylbenzene	0.32
1-Undecene	ND
n-Undecane	0.60
1-Dodecene	0.56
n-Dodecane	0.44
1-Tridecene	ND
n-Tridecane	1.91
TNMOC (speciated)	93.53
TNMOC (w/ unknowns)	124.47

TECHNICAL REPORT DATA

(Please read Instructions on reverse before completing)

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EPA-454/R-02-001		

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

Reporting of data results for the Nonmethane Organic Compounds (NMOC) and Speciated Nonmethane Organic Compounds (SNMOC) Monitoring Program, summer 2000.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
ozone, carbonyls, NMOC, SNMOC, VOC	Air Pollution control	

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