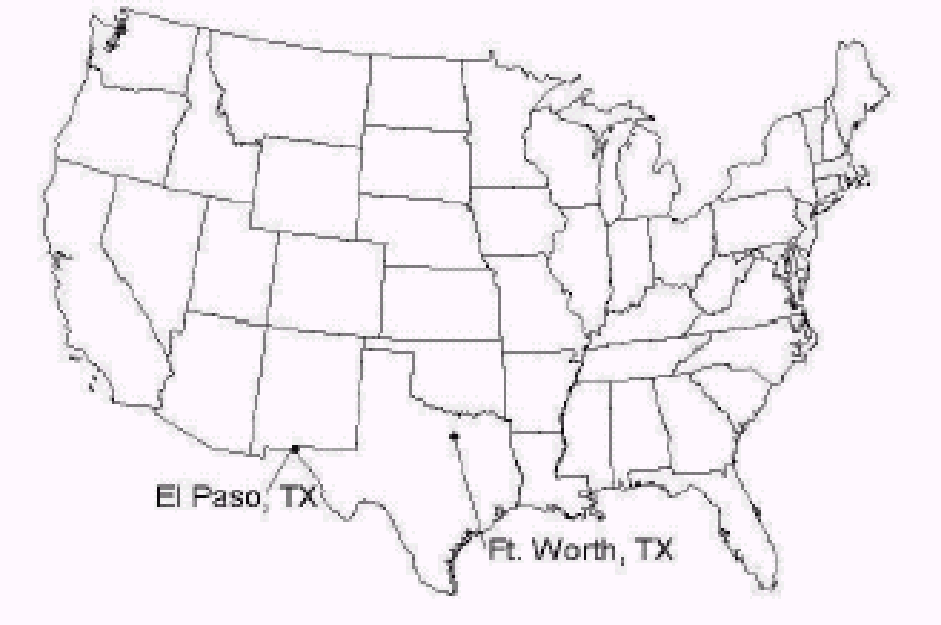
United States Environmental Protection Agency

2001 Nonmethane Organic Compounds (NMOC) and Speciated Nonmethane Organic Compounds (SNMOC) Monitoring Program



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2001 Nonmethane Organic Compounds (NMOC) and Speciated Nonmethane Organic Compounds (SNMOC) Monitoring Program

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DISCLAIMER

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AIRS	Aerometric Information and Retrieval System
AQS	Air Quality Subsystem (of the Aerometric Information and Retrieval System)
EKMA	Empirical Kinetic Modeling Approach
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FID	flame ionization detection
GC	gas chromatography
HAP	hazardous air pollutant
MSA	metropolitan statistical area
MSD	mass selective detection
NAAQS	national ambient air quality standard
NCDC	National Climatic Data Center
ND	nondetect
NEI	National Emissions Inventory
NMOC	nonmethane organic compounds
PAMS	Photochemical Assessment Monitoring Stations
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
UV	ultraviolet
VOC	volatile organic compounds

Monitoring Stations

CAMS12	El Paso, Texas
CAMS13	Fort Worth, Texas

Executive Summary

This report summarizes and interprets ambient air monitoring data collected during the summer of 2001 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 contribute to the photochemical reactions that form "smog." The 2001 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 two monitoring locations. These samples were analyzed for NMOC and SNMOC. Overall, over 8,600 ambient air concentrations were measured during the 2001 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 2001 program and earlier NMOC/SNMOC programs. To provide the reader with new perspectives 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 2001 program, researchers are encouraged to examine the NMOC/SNMOC ambient air monitoring data to better understand the complex ozone formation processes. Accordingly, the 2001 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;
- Air toxics volatile organic compounds (VOC); and
- Carbonyls.

For the 2001 NMOC/SNMOC Monitoring Program, the air toxics 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 2001 NMOC/SNMOC Monitoring Program, which included up to 4 months of daily measurements of ambient air quality in or near two 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.

Although this report attempts to characterize the large volume of NMOC/SNMOC monitoring data thoroughly, additional analyses could be performed so that the many factors affecting 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 2001 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 2001 NMOC/SNMOC Program	This section provides background information on the scope of the 2001 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 2001 NMOC/SNMOC Monitoring Program

This section of the report presents relevant background information for the 2001 NMOC/SNMOC program. This program included two 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 two 2001 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 and 2-3, the two stations participating in the 2001 program were located in two urban areas: the Dallas–Fort Worth metropolitan area and the El Paso area. The graphics in Figures 2-4 and 2-5 identify the numbers and types of facilities that are located within 10 miles of the monitoring locations and were required to report to the 1999 National

Emissions Inventory (USEPA, 2001). The reader should be aware that the emission sources identified in Figure 2-4 do not include sources to the south of the monitoring site, which fall in the country of Mexico. Currently, there are no data available for the municipio south of El Paso.

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 2001 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 2001 program selected the following:

- *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 stations. One station collected samples that were analyzed for NMOC; the other station collected samples analyzed for NMOC and 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 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 choice of sampling time and duration provides appropriate precursor hydrocarbon input values for ozone transport models.

- Sampling must generally be performed between June and October. Ambient air concentrations of ozone are known to peak during the summer months when photochemical reactivity also peaks. El Paso continued through the month of October. Their last sampling date was October 30th.

- 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 2001 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 2001 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 2001 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 method detection limits for the NMOC and SNMOC 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 2001 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 0.23 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 method 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 2001 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 and 2-8 present precision for NMOC and SNMOC sampling, respectively. Overall precision was very good for the individual compounds, as over sixty-five percent of the RPDs calculated were less than 10%. Over eighty percent of the calculated RPDs were less than 15%.

Relative percent difference expresses 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 2001 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 2001 NMOC/SNMOC Monitoring Stations

Figure 2-2
El Paso, Texas (CAMS12) Monitoring Station

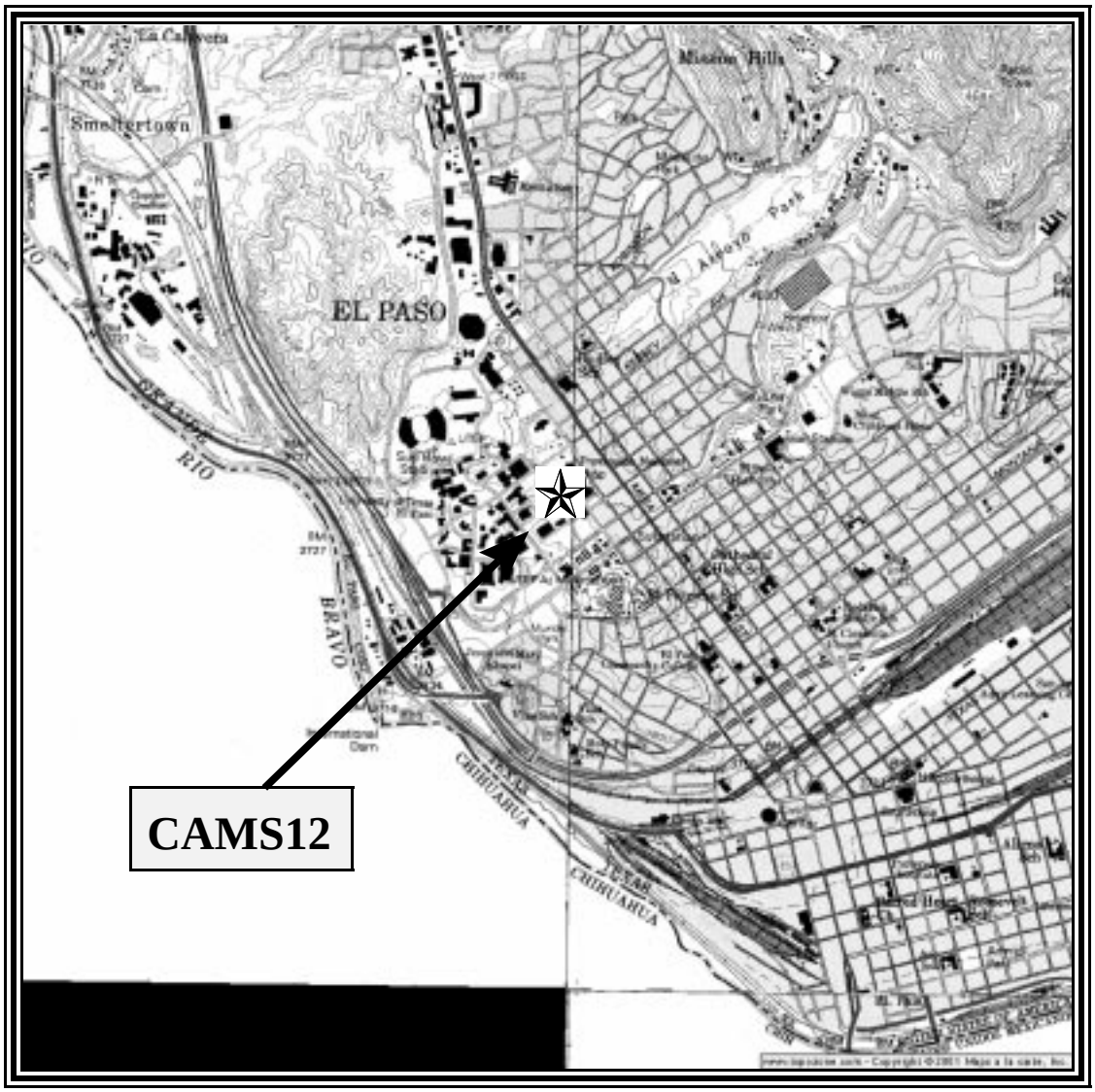


Figure 2-3
Fort Worth, Texas (CAMS13) Monitoring Station

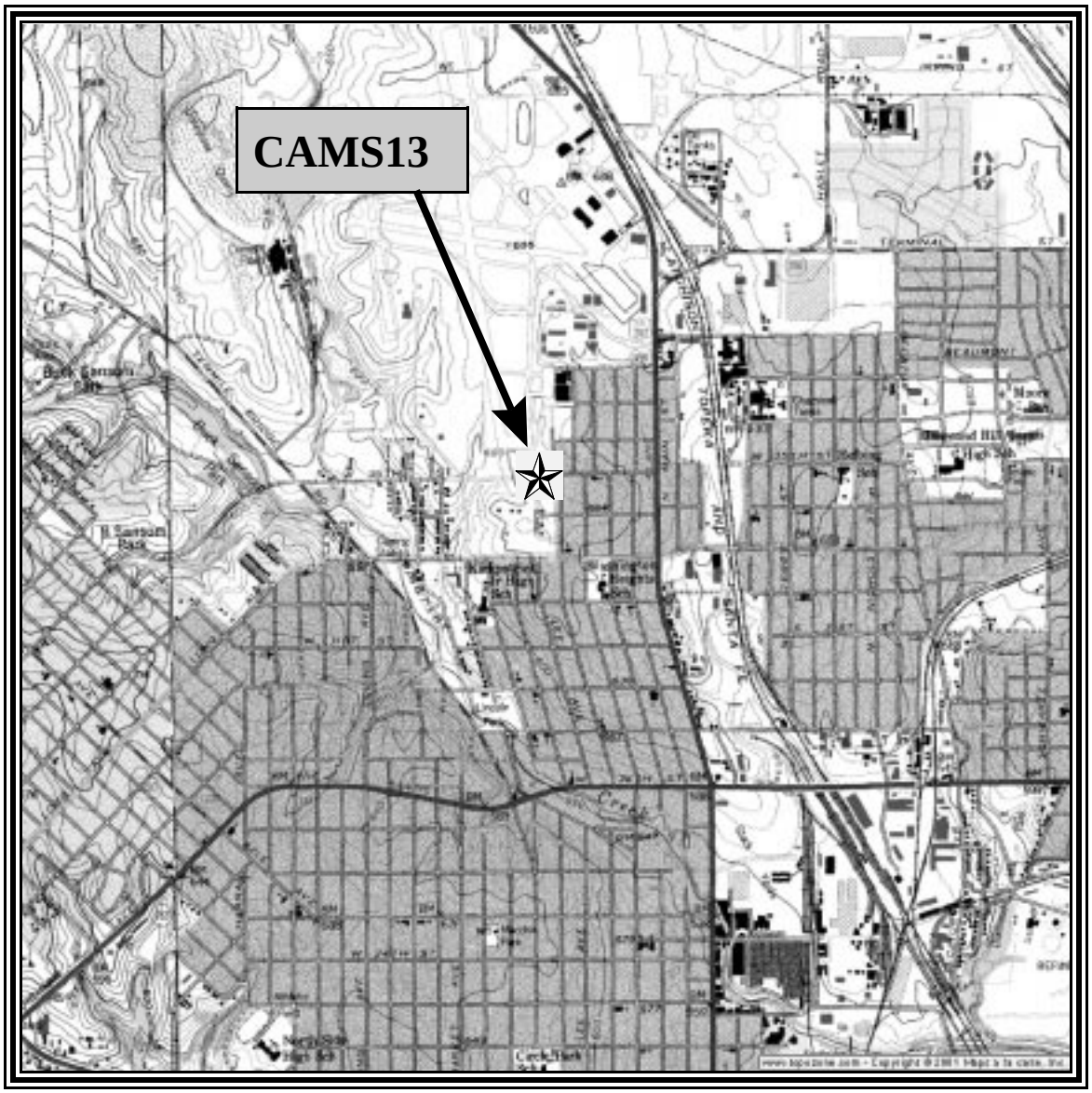


Figure 2-4
Facilities Within 10 Miles of the El Paso, Texas (CAMS12) Monitoring Station That Reported to the 1999 NEI

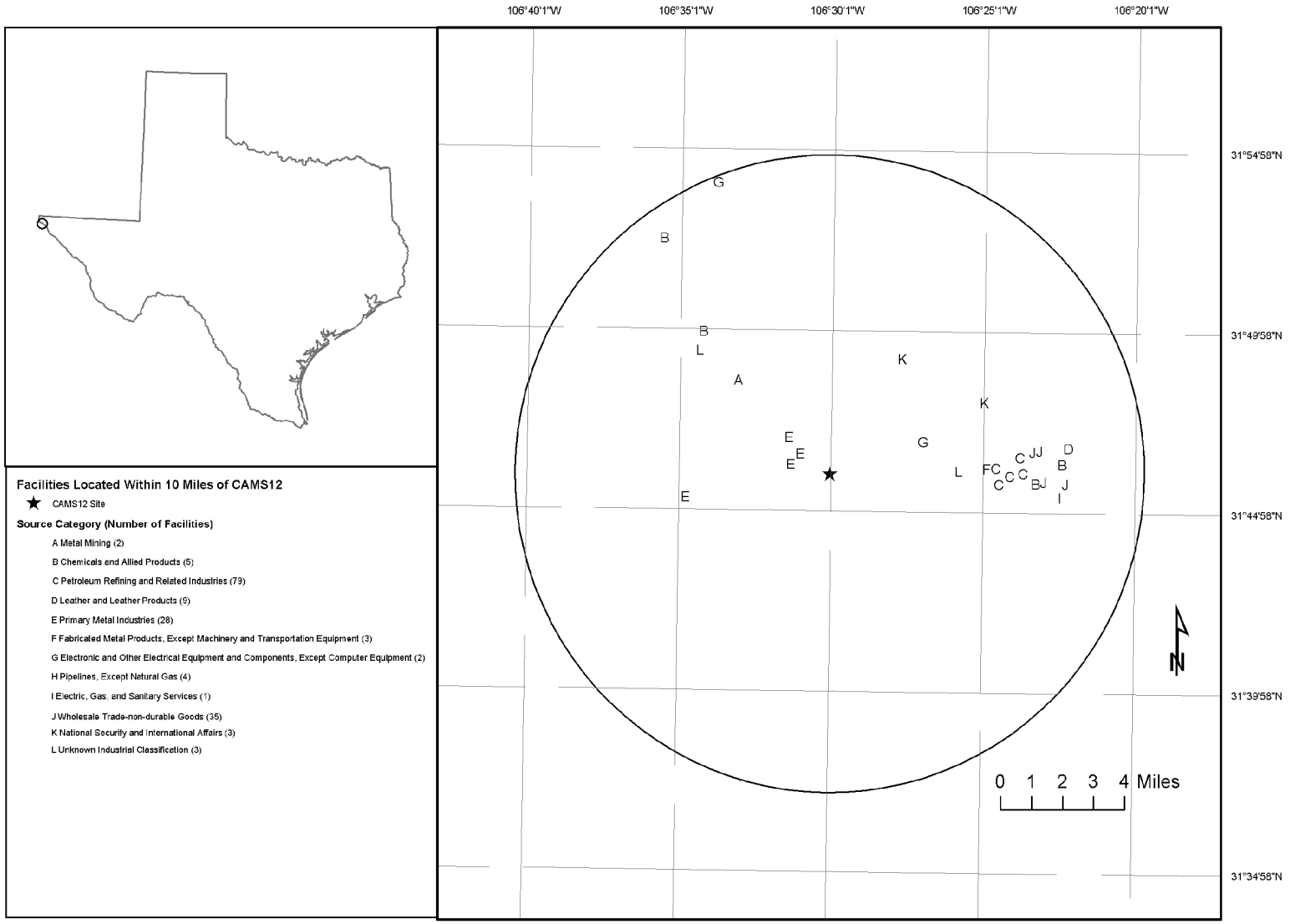


Figure 2-5
Facilities Within 10 Miles of the Fort Worth, Texas (CAMS13) Monitoring Station That Reported to the 1999 NEI

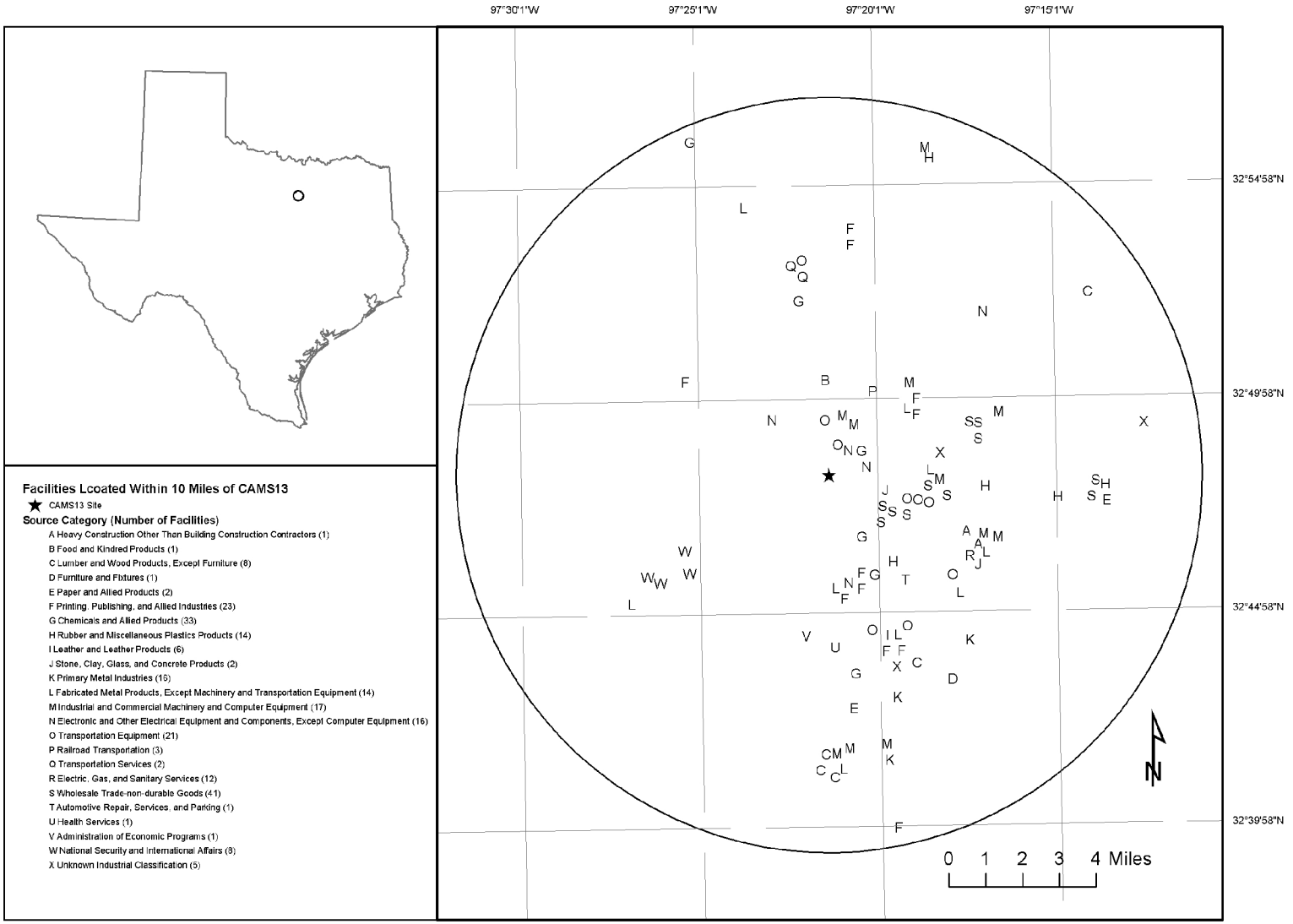


Table 2-1
Background Information for the 2001 NMOC/SNMOC Monitoring Stations

2001 NMOC/ SNMOC Site Code	AIRS Site Code	Location	Sampling Schedule		Monitoring Options Selected	
			Starting Date	Ending Date	NMOC	SNMOC
CAMS12	48-141-0037	El Paso, TX	June 1, 2001	October 30, 2001	✓	
CAMS13	48-439-1002	Fort Worth, TX	June 12 2001	October 1, 2001		✓

Table 2-2
Descriptions of the 2001 NMOC/SNMOC Monitoring Locations

Monitoring Location	Description of Immediate Surroundings
El Paso, TX (CAMS12)	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 (CAMS13)	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	No. of Carbons	Method Limit		Compound	No. of Carbons	Method Limit	
		ppbC	ppbv			ppbC	ppbv
Acetylene	2	0.26	0.13	3-Methyl-1-Butene	5	0.42	0.08
Benzene	6	0.46	0.08	Methylcyclohexane	7	0.37	0.05
1,3-Butadiene	4	0.38	0.10	Methylcyclopentane	6	0.25	0.04
n-Butane	4	0.52	0.13	2-Methylheptane	8	0.50	0.06
cis-2-Butene	4	0.35	0.09	3-Methylheptane	8	0.51	0.06
trans-2-Butene	4	0.29	0.07	2-Methylhexane	7	0.33	0.05
Cyclohexane	6	0.54	0.09	3-Methylhexane	7	0.39	0.06
Cyclopentane	5	0.17	0.03	2-Methylpentane	6	0.18	0.03
Cyclopentene	5	0.42	0.08	3-Methylpentane	6	0.32	0.05
n-Decane	10	0.39	0.04	2-Methyl-1-Pentene	6	0.32	0.05
1-Decene	10	0.39	0.04	4-Methyl-1-Pentene	6	0.42	0.07
m-Diethylbenzene	10	0.42	0.04	*n*-Nonane	9	0.42	0.05
p-Diethylbenzene	10	0.24	0.02	1-Nonene	9	0.42	0.05
2,2-Dimethylbutane	6	0.42	0.07	*n*-Octane	8	0.52	0.06
2,3-Dimethylbutane	6	0.39	0.07	1-Octene	8	0.51	0.06
2,3-Dimethylpentane	7	0.51	0.07	*n*-Pentane	5	0.26	0.05
2,4-Dimethylpentane	7	0.41	0.06	1-Pentene	5	0.22	0.04
n-Dodecane	12	0.45	0.04	*cis*-2-Pentene	5	0.30	0.06
1-Dodecene	12	0.45	0.04	*trans*-2-Pentene	5	0.21	0.04
Ethane	2	0.24	0.12	α-Pinene	10	0.39	0.04
2-Ethyl-1-Butene	6	0.47	0.08	β-Pinene	10	0.39	0.04
Ethylbenzene	8	0.33	0.04	Propane	3	0.48	0.16
Ethylene	2	0.26	0.13	*n*-Propylbenzene	9	0.37	0.04

Table 2-3 (Continued)
SNMOC Method Detection Limits

Compound	No. of Carbons	Method Limit		Compound	No. of Carbons	Method Limit	
		ppbC	ppbv			ppbC	ppbv
m-Ethyltoluene	9	0.26	0.08	Propylene	3	0.25	0.08
o-Ethyltoluene	9	0.41	0.05	Propyne	3	0.48	0.16
p-Ethyltoluene	9	0.38	0.04	**Styrene**	8	0.29	0.04
n-Heptane	7	0.50	0.07	**Toluene**	7	0.73	0.10
1-Heptene	7	0.39	0.06	*n*-Tridecane	13	0.45	0.03
***n*-Hexane**	6	0.31	0.05	1-Tridecene	13	0.45	0.03
1-Hexene	6	0.47	0.08	1,2,3-Trimethylbenzene	9	0.28	0.03
cis-2-Hexene	6	0.31	0.05	1,2,4-Trimethylbenzene	9	0.53	0.06
trans-2-Hexene	6	0.31	0.05	1,3,5-Trimethylbenzene	9	0.28	0.03
Isobutane	4	0.38	0.10	2,2,3-Trimethylpentane	8	0.36	0.05
Isobutene/1-Butene	4	0.31	0.04	**2,2,4-Trimethylpentane**	8	0.36	0.05
Isopentane	5	0.42	0.08	2,3,4-Trimethylpentane	8	0.37	0.05
Isoprene	5	0.21	0.04	*n*-Undecane	11	0.43	0.04
Isopropylbenzene	9	0.51	0.06	1-Undecene	11	0.43	0.04
2-Methyl-1-Butene	5	0.22	0.04	***m*-,*p*-Xylene**	8	0.34	0.04
2-Methyl-2-Butene	5	0.30	0.06	***o*-Xylene**	8	0.33	0.04

Bold indicates hazardous air pollutant (HAP).

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 report only 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 2001 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	El Paso, TX	This site 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]	0.23 ppbC	See Table 2-3

[a] Refer to Section 2.4.1 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	76	74	97.3
NMOC	CAMS12	El Paso, TX	104	100	96.2
	Totals		180	174	96.7

Table 2-7
Data Quality Parameters for Total NMOC Measurements

	Analytical		Sampling	
Monitoring Station	Number of Observations	Precision (RPD)	Number of Observations	Precision (RPD)
CAMS12	14	3.44%	11	6.60%

Table 2-8
Data Quality Parameters for SNMOC Measurements

Compound	Analytical Precision		Sampling and Analytical Precision	
	Number of Observations RPD (%)	RPD (%)	Number of Observations RPD (%)	RPD (%)
Acetylene	12	8%	22	9%
Benzene	12	2%	22	3%
1,3-Butadiene	12	5%	22	7%
n-Butane	12	1%	22	5%
cis-2-Butene	12	5%	22	7%
trans-2-Butene	11	4%	22	8%
Cyclohexane	12	3%	22	7%
Cyclopentane	12	5%	22	11%
Cyclopentene	6	21%	13	11%
n-Decane	12	12%	22	9%
1-Decene	0	NA	0	NA
m-Diethylbenzene	10	26%	21	23%
p-Diethylbenzene	10	13%	20	12%
2,2-Dimethylbutane	12	4%	22	7%
2,3-Dimethylbutane	12	4%	22	16%
2,3-Dimethylpentane	12	1%	22	6%
2,4-Dimethylpentane	12	5%	22	7%
n-Dodecane	12	29%	22	12%
1-Dodecene	7	30%	15	32%
Ethane	12	5%	22	10%
Ethylbenzene	12	7%	22	7%
2-Ethyl-1-butene	0	NA	0	NA
Ethylene	12	1%	22	5%
m-Ethyltoluene	12	3%	22	7%
o-Ethyltoluene	11	17%	22	12%
p-Ethyltoluene	12	5%	22	8%
n-Heptane	12	5%	22	8%
1-Heptene	4	25%	4	27%
n-Hexane	12	2%	22	5%
1-Hexene	12	15%	22	18%
cis-2-Hexene	6	5%	14	7%

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

Compound	Analytical Precision		Sampling and Analytical Precision	
	Number of Observations RPD (%)	RPD (%)	Number of Observations RPD (%)	RPD (%)
trans-2-Hexene	0	NA	0	NA
Isobutane	12	3%	22	6%
Isobutene/1-Butene	12	2%	22	5%
Isopentane	12	6%	22	7%
Isoprene	12	4%	22	6%
Isopropylbenzene	11	9%	21	17%
2-Methyl-1-butene	12	37%	22	7%
2-Methyl-2-butene	12	5%	22	6%
3-Methyl-1-butene	7	3%	14	7%
Methylcyclohexane	12	65%	22	36%
Methylcyclopentane	12	1%	22	5%
2-Methylheptane	12	11%	22	12%
2-Methylhexane	12	2%	22	6%
2-Methylpentane	12	3%	22	7%
3-Methylheptane	12	12%	22	12%
3-Methylhexane	12	3%	22	4%
3-Methylpentane	12	2%	22	6%
2-Methyl-1-pentene	7	23%	15	18%
4-Methyl-1-pentene	0	NA	0	NA
n-Nonane	12	3%	22	7%
1-Nonene	7	16%	14	18%
n-Octane	12	6%	22	9%
1-Octene	0	NA	0	NA
n-Pentane	12	3%	22	5%
1-Pentene	12	12%	22	13%
cis-2-Pentene	12	3%	22	6%
trans-2-Pentene	12	2%	22	5%
a-Pinene	10	8%	19	10%
b-Pinene	5	33%	7	8%
Propane	12	6%	22	8%
n-Propylbenzene	12	5%	22	9%

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

Compound	Analytical Precision		Sampling and Analytical Precision	
	Number of Observations RPD (%)	RPD (%)	Number of Observations RPD (%)	RPD (%)
Propylene	12	2%	22	7%
Propyne	0	NA	0	NA
Styrene	12	27%	21	14%
Toluene	12	6%	22	13%
n-Tridecane	3	22%	8	29%
1-Tridecene	0	NA	0	NA
1,2,3-Trimethylbenzene	12	11%	22	8%
1,2,4-Trimethylbenzene	12	2%	22	8%
1,3,5-Trimethylbenzene	12	7%	22	9%
2,2,3-Trimethylpentane	12	15%	22	15%
2,2,4-Trimethylpentane	12	3%	22	8%
2,3,4-Trimethylpentane	12	2%	22	9%
n-Undecane	12	18%	22	7%
1-Undecene	0	NA	0	NA
m-Xylene/p-Xylene	12	3%	22	9%
o-Xylene	12	3%	22	8%
TNMOC (speciated)	12	3%	22	6%
TNMOC (w/ unknowns)	12	4%	22	6%

Bold indicates hazardous air pollutant (HAP).

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 2001 NMOC/SNMOC ambient air monitoring data. In addition, basic information is provided concerning various factors that potentially impact ambient air quality. Over 8,600 NMOC and SNMOC samples were collected at both 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 2001 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) do not confuse the most prevalent compounds identified in this report with the most prevalent compounds in urban air; and 2) 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 the top 75 percent of the mass contribution within a compound group, the compound was identified in the group of most prevalent compounds. Twenty-four 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 resulted in a nondetect, so the lowest concentration reported is "ND". For compounds not detected in any samples, both the lowest and the highest concentrations are reported as "ND".

Because the NMOC/SNMOC program measures only 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 2001. 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 -- 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 2001 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 2001 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 for only *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 2001 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.

Pollutant concentrations will be compared and correlated to emission estimates in the 1999 National Emissions Inventory (NEI). The NEI consists of two inventory databases: 1) the Criteria and 2) the National Toxics Inventory (NTI). Each inventory database is subdivided into four source types: 1) point; 2) nonpoint; 3) onroad mobile; and 4) nonroad mobile. Additionally, estimated site-specific traffic data will be analyzed.

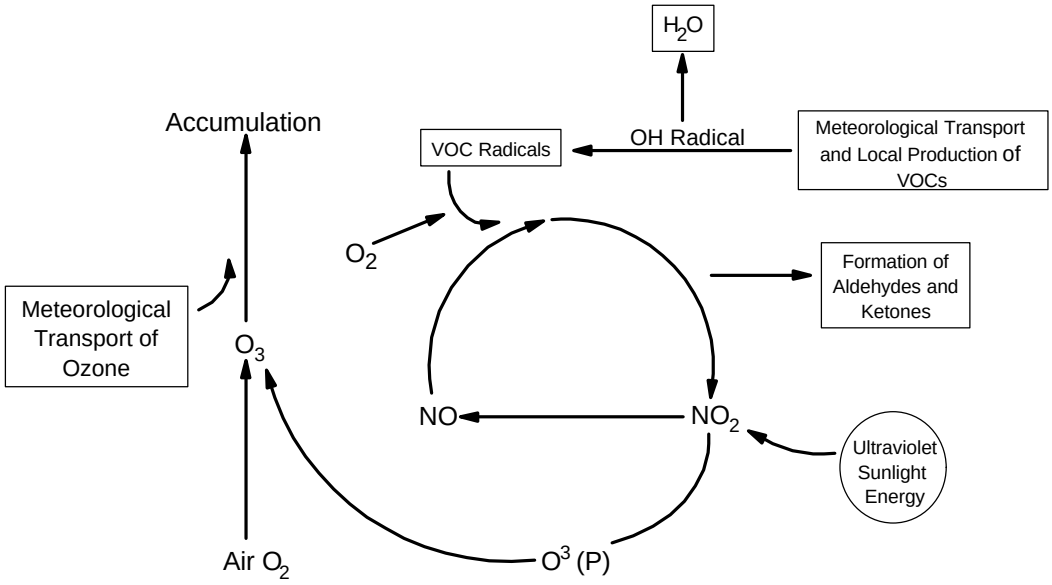
In Section 4, NMOC-to-NO_x concentration ratios (NMOC:NO_x) will be calculated and compared to maximum ozone concentrations. According to the ozone formation cycle, NMOC and NO_x produced at or near the sampling location are important precursor gases (Figure 3-1). Generally, a site that has an NMOC:NO_x 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 considered NO_x-limited (NRC, 1992). Figure 3-2 is an example 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 and leads to greater formation of ozone (NRC, 1992).

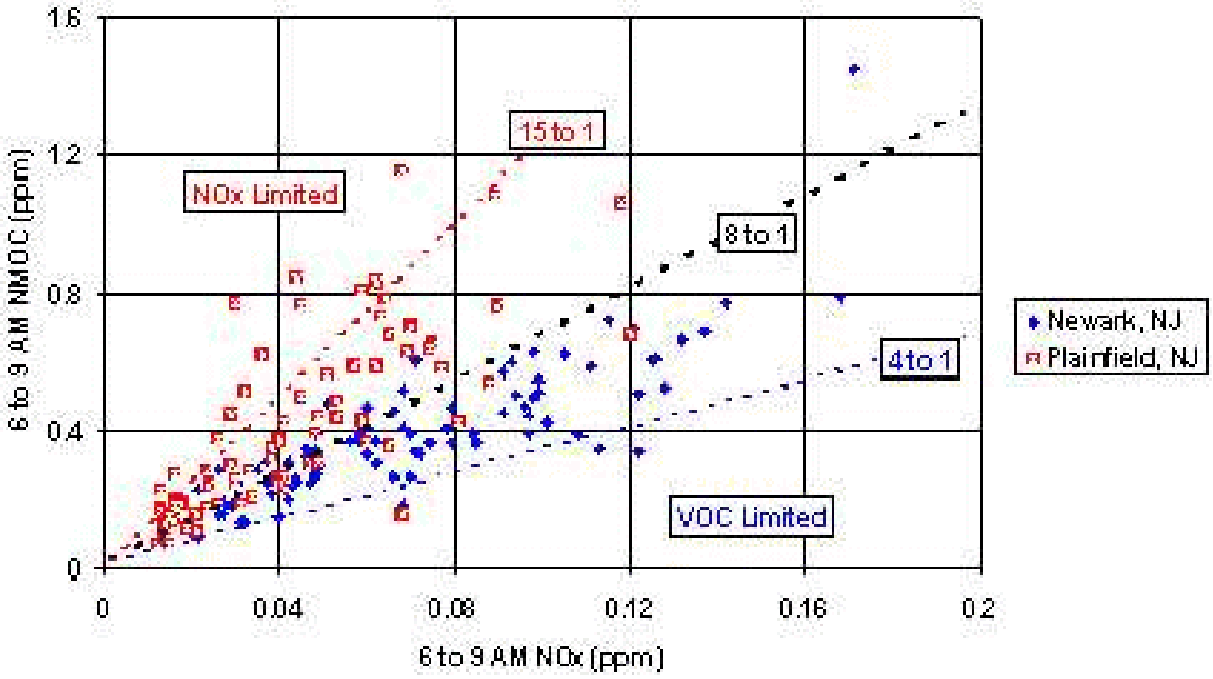
Figure 3-1
Ozone Accumulation Cycle



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)

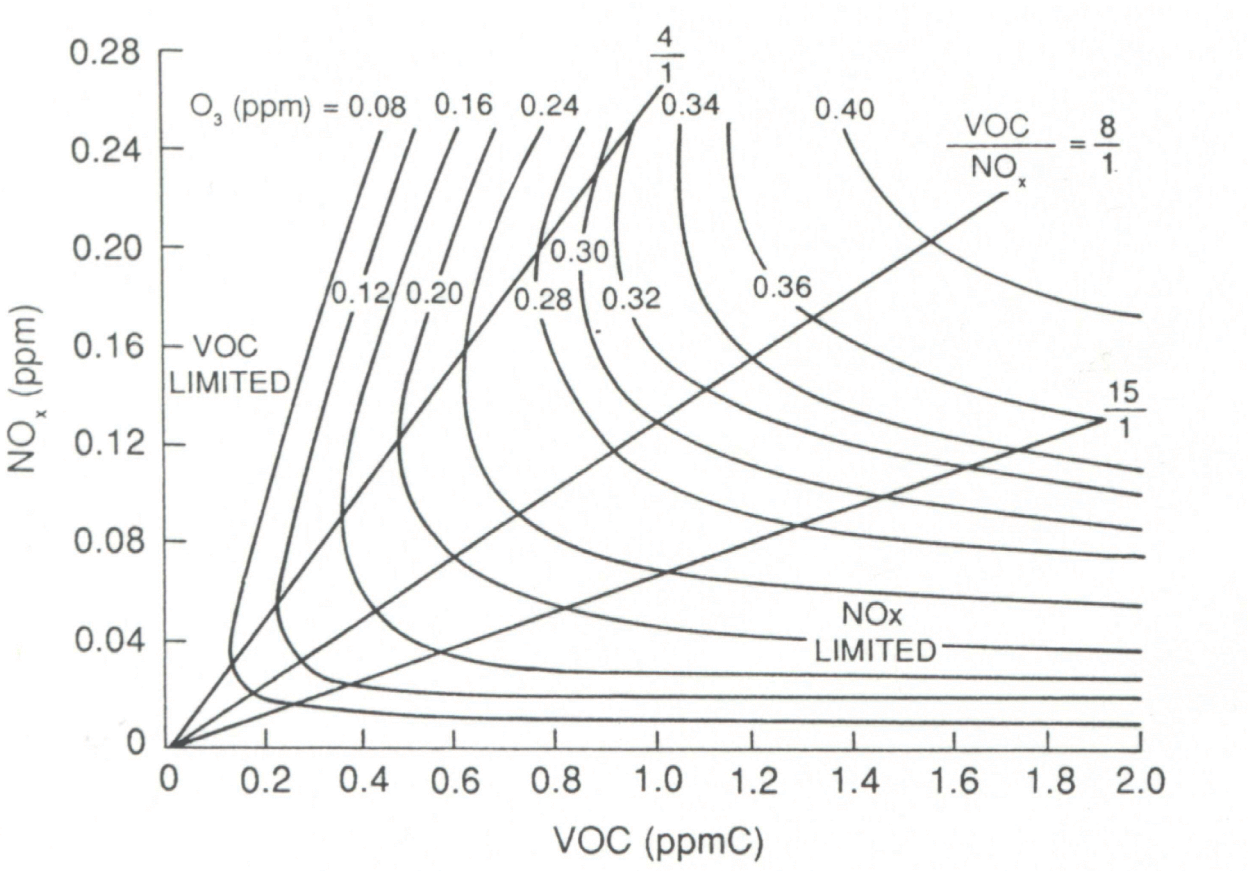


Table 3-1
Sources of Meteorological Data for the 2001 NMOC/SNMOC Statistical Analyses

Monitoring Station	Location of Nearest National Climatic Data Center (NCDC) Meteorological Station
El Paso, TX (CAMS12)	El Paso International Airport
Fort Worth, TX (CAMS13)	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 two monitoring stations during the 2001 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 two 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 2001 total NMOC sampling event at the two sites resulted in a valid, quantified concentration value. Therefore, the prevalence for total NMOC sampling was 100 percent. All total NMOC concentrations measured during the 2001 program were greater than the estimated method detection limit, 0.23 parts per billion on a carbon basis (ppbC).

4.1.2 Concentration Range

As shown in Table 4-1, total NMOC concentrations at the two sites during the 2001 program ranged from 0.067 ppmC (Fort Worth) to 8.990 ppmC (El Paso). The El Paso site had forty-one samples (including duplicates) with concentrations greater than 1.5 ppmC (~38%), whereas the Fort Worth site had only one (less than 1%).

4.1.3 Central Tendency

Central tendency parameters were calculated for both sites and are listed in Table 4-1. El Paso and Fort Worth were not new to the NMOC/SNMOC program. At the El Paso site during 2001, the geometric mean concentration for total NMOC was 0.917 ppmC, and the average was 1.565 ppmC. Last year, these averages at El Paso were 0.708 and 0.937, respectively, and represent increases of 30% and 67%, respectively. At the Fort Worth site, the geometric mean concentration for total NMOC was 0.208 ppmC, and the average was 0.271 ppmC. Last year, these averages were much higher at 0.563 ppmC and 2.139 ppmC, respectively.

4.1.4 Variability

Variability parameters of standard deviation and coefficient of variation were calculated at both sites (Table 4-1). The El Paso site had a majority of the total NMOC sample values less than the standard deviation (approximately 34%). The Fort Worth site was more balanced (54%).

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 monitoring 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 components, relative humidity, and average dew point temperature were analyzed in relation to concentration levels. Additionally, time-specific averages from 6:00 a.m. to 9:00 p.m. (which correlate to the sampling time) for temperature and wind speed components were also analyzed.

NMOC Concentration Versus Maximum Temperature

According to Figure 4-1, NMOC concentrations did not have a consistent trend with maximum temperature at CAMS13 but did at CAMS12. Both sites displayed their highest concentration peak in the 90 to 95 degree category.

Table 4-3 further describes this relation with the Pearson correlations that were calculated for this parameter. The Fort Worth site had a weak negative correlation with maximum temperature (-0.114), whereas the El Paso site had a moderately positive correlation (0.266).

The average maximum temperatures for CAMS12 and CAMS13 on sampling days were 91.06 °F and 90.72 °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 Fort Worth and El Paso.

NMOC Concentration Versus Average Dew Point Temperature

According to Figure 4-2, NMOC concentrationsdid not appear to have a consistent trend with average daily dew point temperature. At both sites, there isn't a noticeable increase in concentration with increasing dew point temperature. The average dew point temperature for CAMS12 and CAMS13 on sampling days was 67.82 °F and 47.56 °F, respectively.
The NMOC concentrations at CAMS12 have a moderately strong correlation with dew point temperature (0.363), whereas the CAMS13 site had a moderately weak correlation (-0.285).

NMOC Concentrations Versus Other Meteorological Parameters

Table 4-3 also lists the average daily wind speeds (by u- and v- vector components), average relative humidity, the 6:00 a.m. to 9:00 a.m. average temperature, and the 6:00 a.m. to 9:00 a.m. wind speeds for both of these sites. Additionally, the Pearson correlations of these meteorological parameters with NMOC concentration have been calculated.

None of these selected parameters exhibited a strong correlation with the concentration. The CAMS12 site has low relative humidity and wind speeds, which is reflective of its climate and elevation. The CAMS13 site has a much higher relative humidity and wind speeds.

It is interesting to note that at this site, the magnitude of the v-component of the wind speed vector is much higher than the magnitude of the u-component. The fact that the v-component is positive and the u-component is negative indicates that the prevailing wind affecting the CAMS13 site is, on average, from south to southeast. As shown in Figure 2-5, there are numerous emission sources to the south and southeast of the CAMS13 site.

4.2.2 Temporal and Spatial 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 4-3 illustrates how the average NMOC concentration measured during the morning hours at both 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 CAMS 13 in June compared to other months.

Both of these sites are located in high mobile traffic regions, as indicated in the estimation of traffic (Table 4-4). Over 11,500 vehicles are estimated to pass the CAMS13 monitor daily, whereas 5,000 vehicles pass the CAMS12 monitor. Also these sites are located in commercial land use areas within these urban locations.

Figure 4-4 shows the impact of the mobile onroad emissions for these two areas, as estimated by the 1999 NEI at the county level. Carbon monoxide (CO) is the highest emitted

pollutant, followed by NO_x and VOCs. Overall emissions from Tarrant County (which includes CAMS13) is much greater than in El Paso County (which includes CAMS12).

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 both 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.

El Paso, Texas (48-147-0037) - CAMS12

Ozone and NO_x data were collected at the same site as the NMOC data; ozone and NO_x data were available for all 101 sampling days. Therefore, NMOC:NO_x ratios were calculated for only 101 days.

The average NMOC:NO_x ratio was 77.55, which would fall into the NO_x-limited area. If the ratios greater than 100 were removed (fifteen), the average NMOC:NO_x ratio would be 30.80 (Table 4-5), which is still in the NO_x-limited area. An effective air quality strategy would be to focus on reducing NO_x emissions. This ratio marks an increase of 95% from the previous year.

The average maximum daily ozone concentration on a sample day at CAMS12 was 61.63 ppbv ± 2.94 ppbv. Daily NMOC:NO_x ratios and maximum daily ozone concentrations were plotted in Figure 4-5 to determine whether 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 thirty-six sampling days (all called "high" ozone days) in which the maximum concentration exceeded the upper bound ozone concentration average (64.57 ppbv).

The NMOC:NO_x ratio was higher (38.59) on a day when the maximum daily ozone concentration exceeded the average upper bound and lower (26.36) on a day when the average upper bound was not exceeded. Since this area was calculated to be a primarily NO_x-limited area, decreasing VOC concentrations would have no real effect on 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, the fact that there are a few industries surrounding the monitoring site indicates that the meteorology, such as high temperature and/or the emissions from the mobile sources, may have a principal role in the increase of ozone concentrations. Also note that there are no sources of emissions to the south of this site presented. The region to the south is Mexico. At the present time, a Mexico emissions inventory is unavailable.

Fort Worth, Texas (48-439-1002) - CAMS13

Ozone and NO_x data were collected at the same site as the NMOC data; ozone data were available for all 74 sampling days; however, NO_x data were available for 65 of the sampling days. Therefore, NMOC:NO_x ratios were calculated for only 65 days.

The average NMOC:NO_x ratio was 31.20, which would fall into the NO_x-limited area. If the ratios that were greater than 100 were removed (twenty-one), the average NMOC:NO_x ratio would be 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. This level marks a decrease of 28% from the previous year.

The average maximum daily ozone concentration on a sample day at CAMS13 was 67.15 ppbv ± 5.16 ppbv. Daily NMOC:NO_x ratios and maximum daily ozone concentrations were plotted in Figure 4-6 to determine whether 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-six sampling days in which the maximum concentration exceeded the upper bound ozone concentration average (72.31 ppbv).

The NMOC:NO_x ratio is lower (20.81) on a day when the maximum daily ozone concentration exceeded the average upper bound and higher (26.61) on a day when the upper bound was not exceeded, which is the opposite trend of CAMS12. Since this area was calculated to be a primarily NO_x-limited area, decreasing VOC concentrations would have no real effect on 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 (91.06 °F), the local industrial and mobile emissions could play a crucial role if the prevailing wind is from the south or southwest.

Figure 4-1
Maximum Temperature and NMOC Concentrations

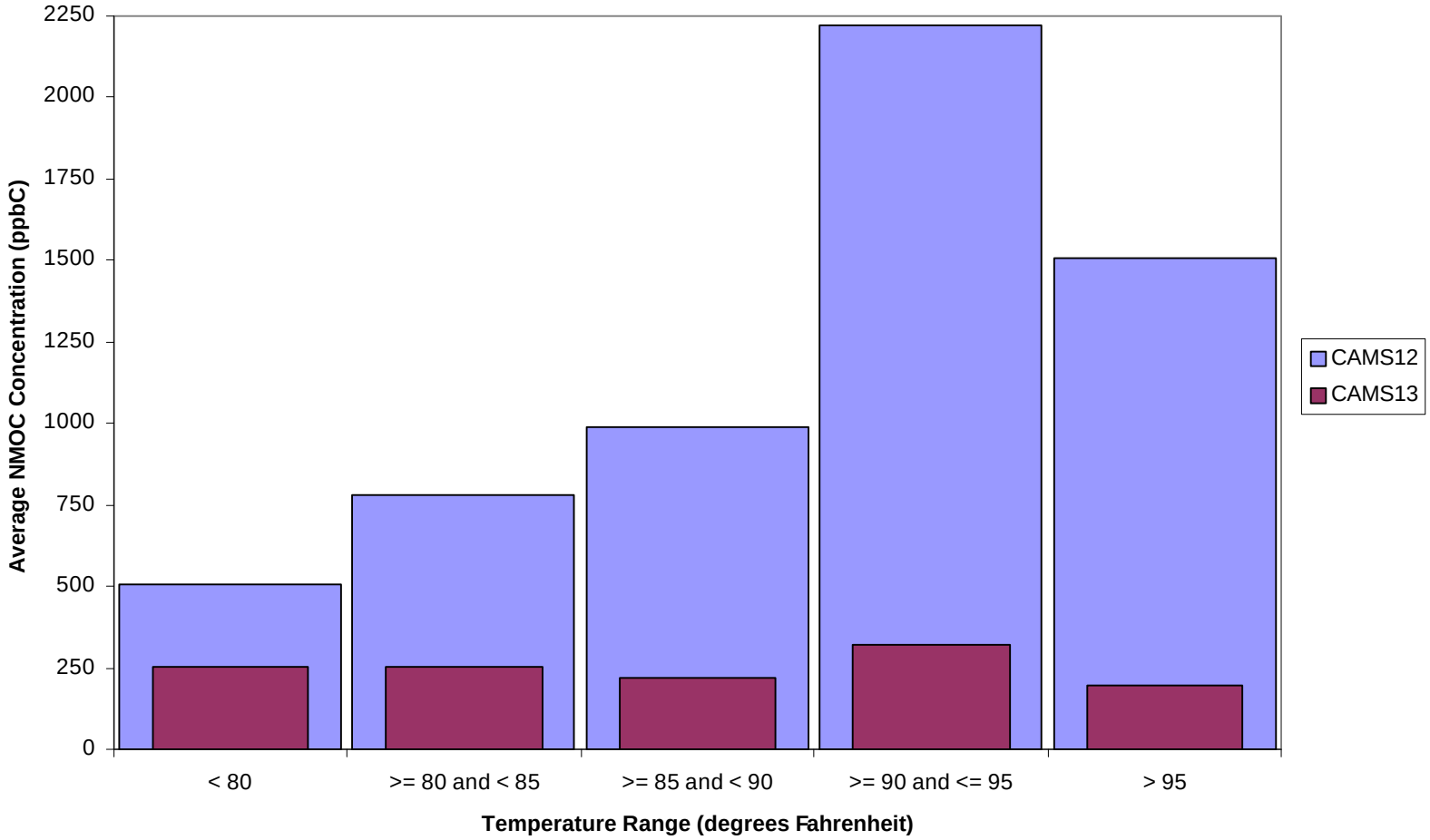


Figure 4-2
Average Dew Point and NMOC Concentrations

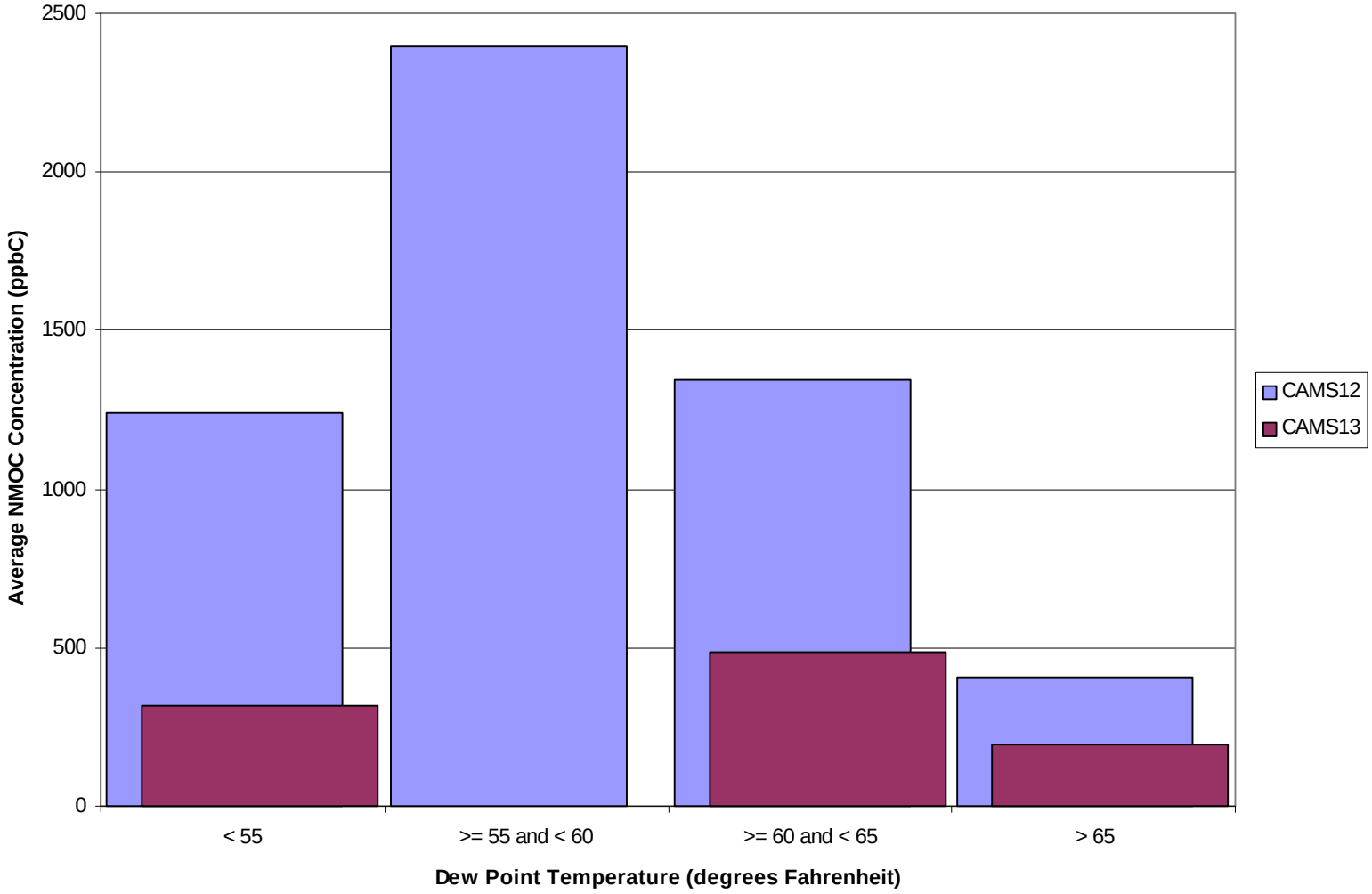


Figure 4-3
Average Monthly NMOC Concentrations Measured from 6:00 a.m. to 9:00 a.m.

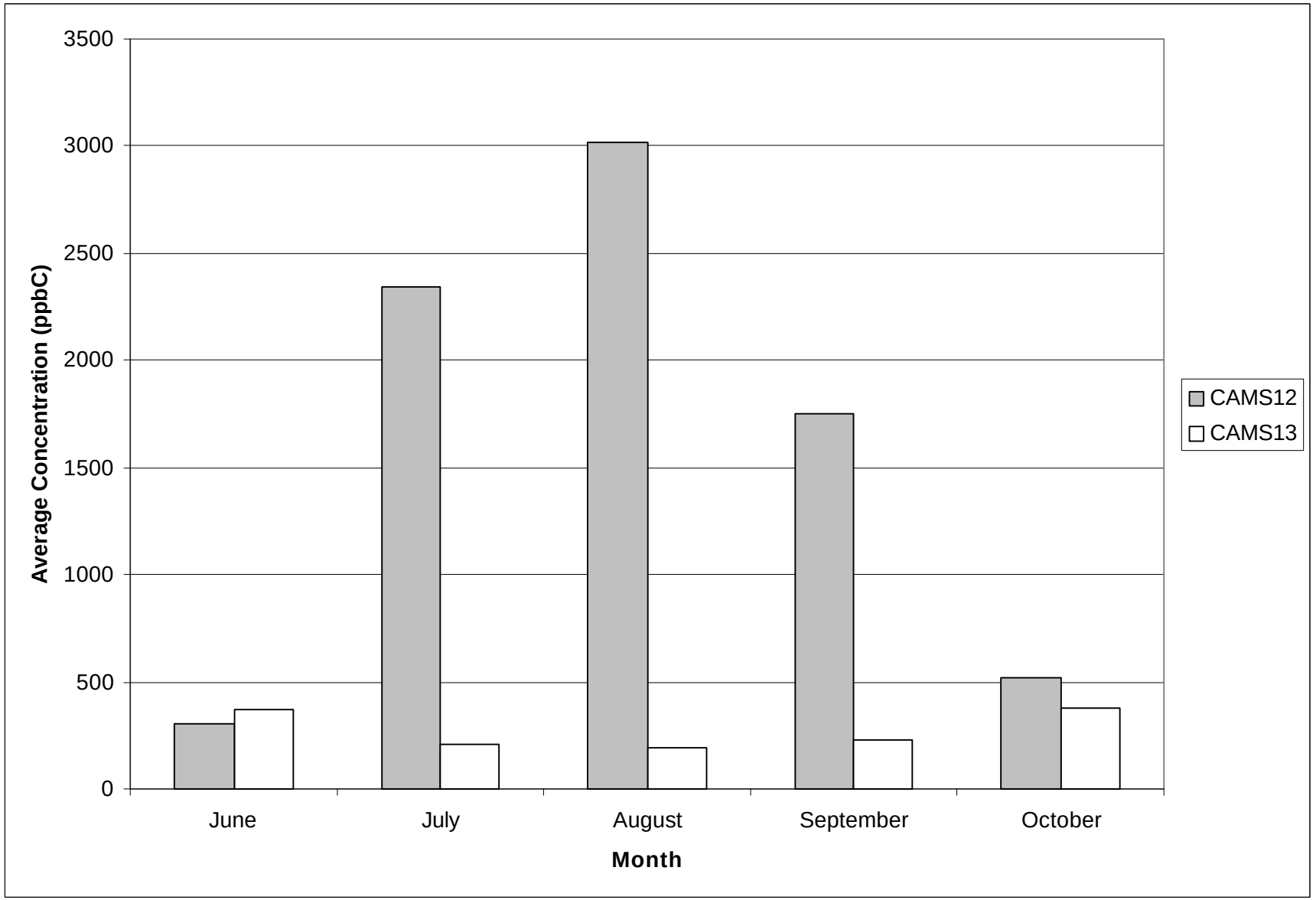


Figure 4-4a
Annual Criteria Point, Area, Onroad, and Nonroad Source Emission Estimates for CAMS12 - El Paso County, TX (FIPSCNTY 141)

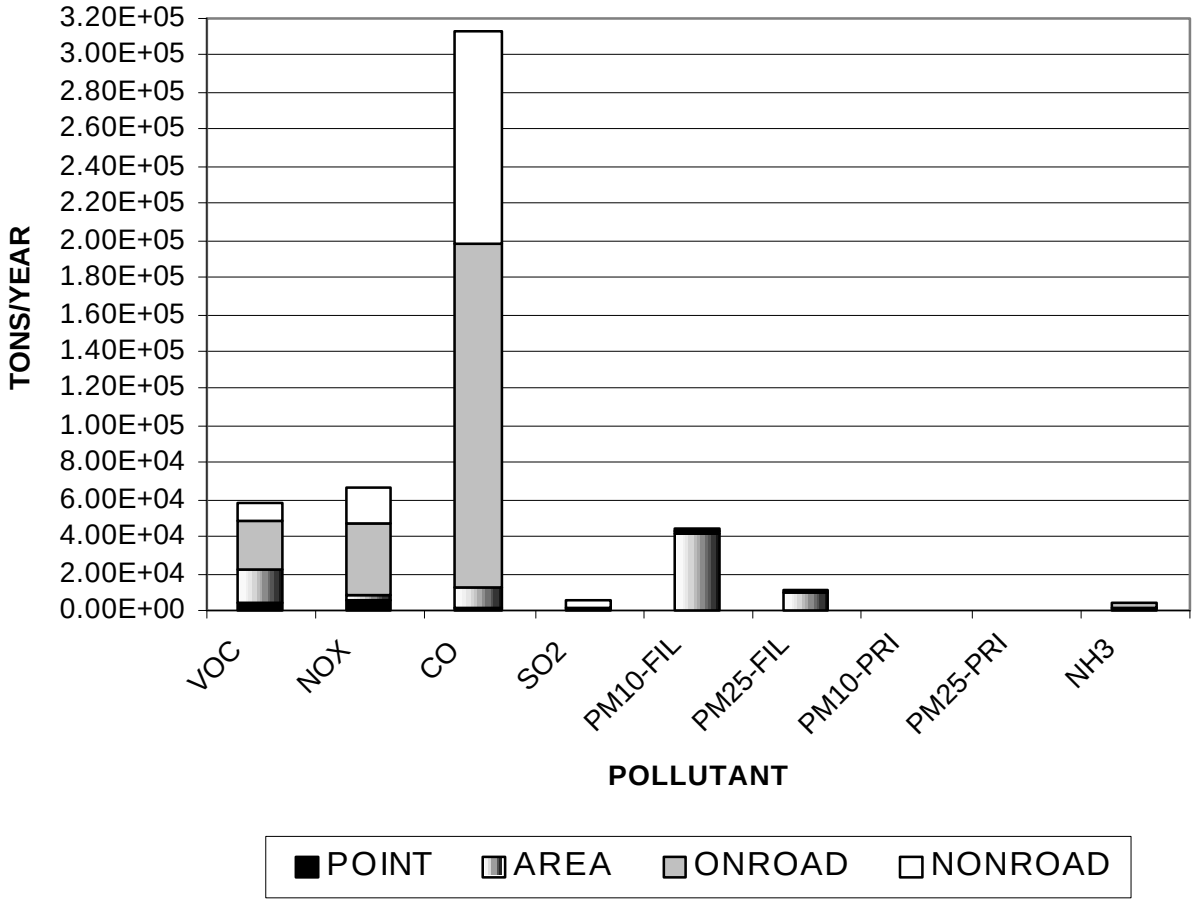


Figure 4-4b
Annual Criteria Point, Area, Onroad, Nonroad, Source Emission Estimates for CAMS13 - Tarrant County, TX (FIPSCNTY 439)

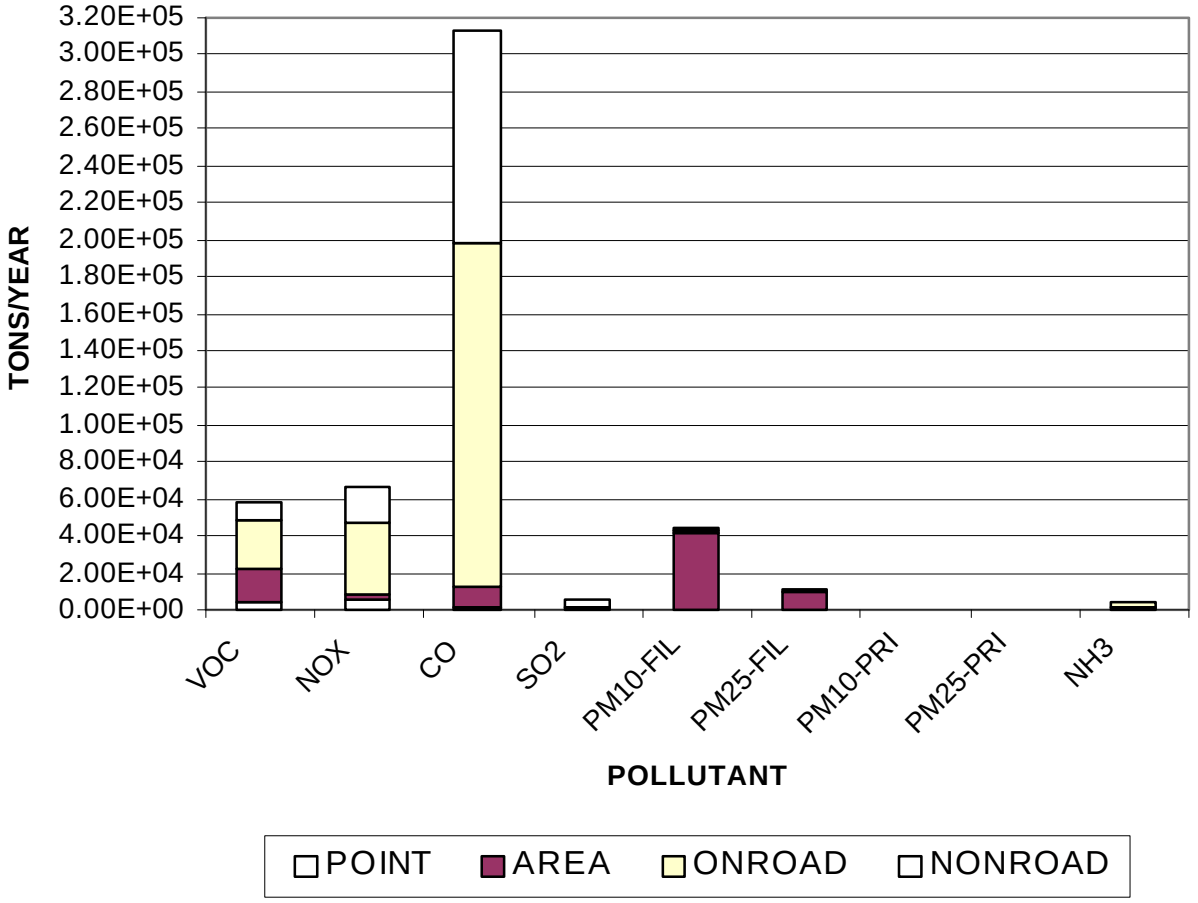


Figure 4-5
NMOC: NO_x Ratios and Maximum Ozone Concentration at CAMS12 (El Paso, TX)

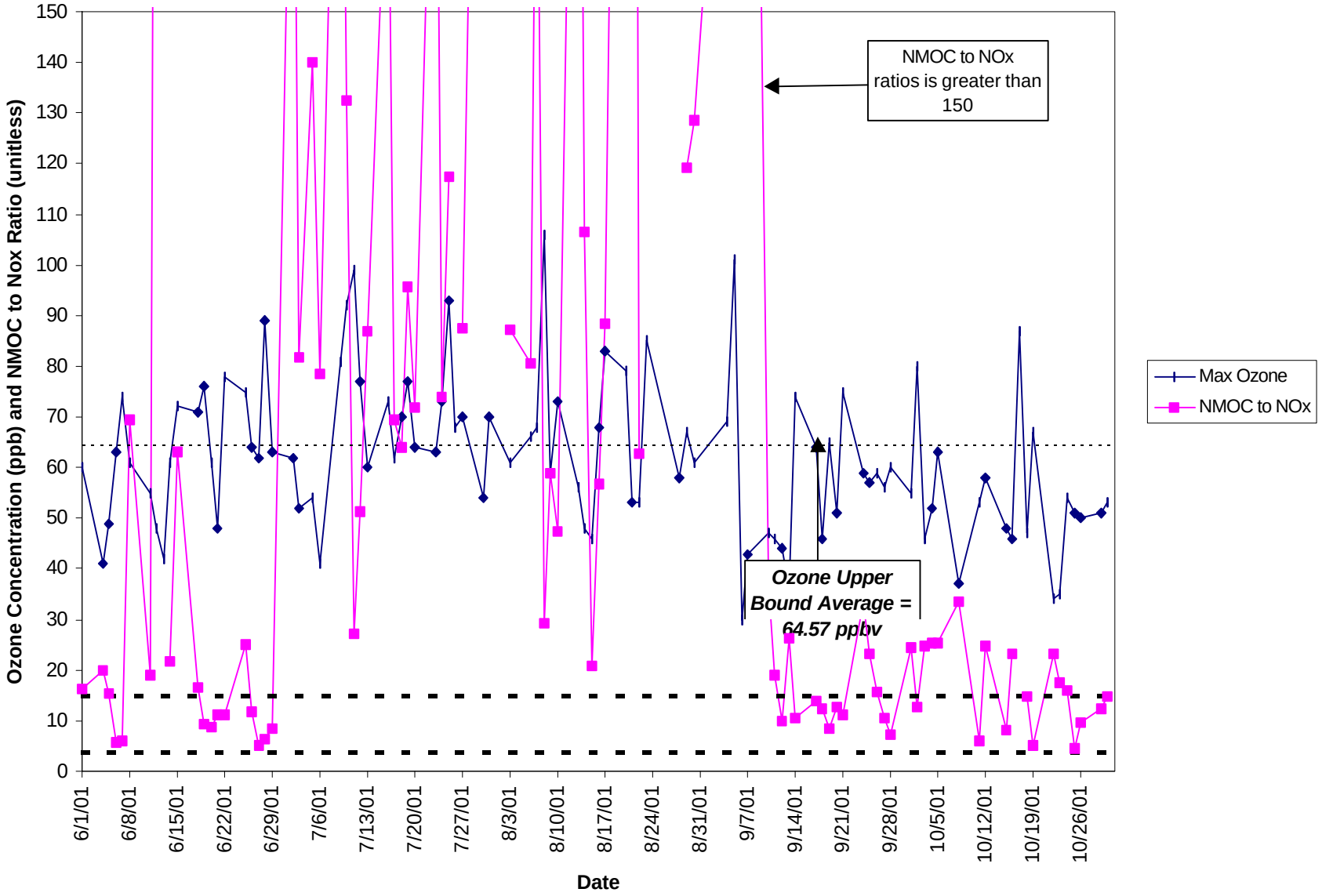


Figure 4-6
NMOC: NO_x Ratios and Maximum Ozone Concentration at CAMS13 (Fort Worth, TX)

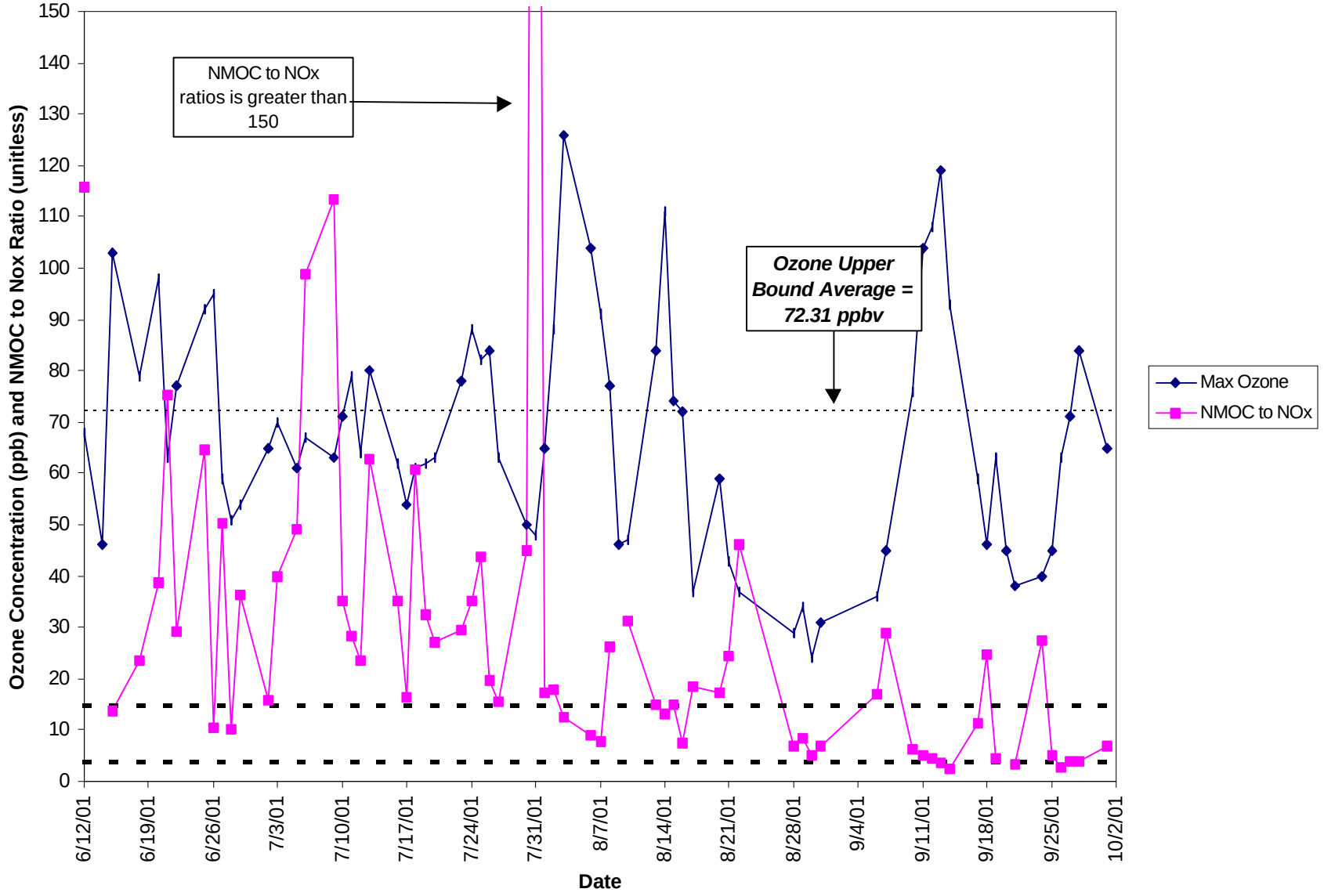


Table 4-1
Summary Statistics for Concentrations of Total NMOC
Measured at the Monitoring Stations

Category	Parameter	El Paso	Fort Worth
Prevalence	Number of valid sampling days	100	74
	Number of nondetects	0	0
	Frequency of detection	100%	100%
Concentration Range	Lowest concentration (ppmC)	0.101	0.067
	25th percentile concentration (ppmC)	0.407	0.164
	50th percentile concentration (ppmC)	0.770	0.206
	75th percentile concentration (ppmC)	2.27	0.264
	Highest concentration (ppmC)	8.990	1.766
Central Tendency	Median concentration (ppmC)	0.770	0.206
	Arithmetic mean concentration (ppmC)	1.565	0.241
	Geometric mean concentration (ppmC)	0.917	0.208
Variability	Standard deviation (ppmC)	1.721	0.202
	Coefficient of variation	1.099	0.839
	Percentage of samples in which Total NMOC value was less than the standard deviation	66%	46%

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

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

Site	Correlation Variable (TNMOC Concentration with ...)	Pearson Correlation	Average for Variable
El Paso (CAMS12)	... Maximum Daily Temperature	0.266	90.72 F
	... Average Daily Dew Point Temperature	0.363	47.56 F
	... Average u-component of Wind Speed	-0.070	0.12 mph
	... Average v-component of Wind Speed	0.134	1.08 mph
	... Average Daily Relative Humidity	0.176	36.18%
	... 6-9 a.m. Average Temperature	0.329	73.41 F
	... 6-9 a.m. Average u-component of Wind Speed	-0.114	0.09 mph
	... 6-9 a.m. Average v-component of Wind Speed	0.017	-0.003 mph
Fort Worth (CAMS13)	... Maximum Daily Temperature	-0.114	91.06 F
	... Average Daily Dew Point Temperature	-0.285	67.82 F
	... Average u-component of Wind Speed	-0.214	-1.95 mph
	... Average v-component of Wind Speed	-0.148	4.81 mph
	... Average Daily Relative Humidity	0.049	61.51%
	... 6-9 a.m. Average Temperature	-0.141	77.40 F
	... 6-9 a.m. Average u-component of Wind Speed	-0.231	-0.21 mph
	... 6-9 a.m. Average v-component of Wind Speed	-0.169	5.52 mph

Table 4-4
Motor Vehicle and Population Profiles

SITE	Estimated Traffic Flow at Monitoring Site (# vehicles per day)	Total MSA population (1999 estimate)	Land Use for Monitoring Location	Location Setting for Monitor
CAMS12 (El Paso, TX)	5,000	701,908	Commercial	Urban
CAMS13 Fort Worth, TX)	11,650	4,909,523	Commercial	Urban

Table 4-5
NMOC and Ozone Summary for All Sites

SITE	Average Maximum 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
CAMS12 (El Paso, TX)	61.63 ppbv (±2.94 ppbv)	36	30.80[b]	38.59[b]	26.36[b]
CAMS13 Fort Worth, TX)	67.15 ppbv (±5.16 ppbv)	26	23.03[b]	20.81[b]	26.61[b]

[a] = An ozone concentration day considered "high" exceeds the upper bound of the average ozone concentration. For example, the average maximum daily ozone concentration during the sampling season at CAMS12 is 61.63 ppbv. The upper bound is 64.57 ppbv, and any day that exceeds this value is considered "high".

[b] = The 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 2001 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 two monitoring stations that measured NMOC, 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 2001 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% 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 24 compounds was identified as the "most prevalent" SNMOC; these compounds are listed below:

Alkanes
n-Butane
2,3-Dimethylbutane
Ethane
n-Hexane
Isopentane
2-Methylpentane
3-Methylpentane
n-Pentane
Propane
2,2,4-Trimethylpentane
Olefins
Acetylene
Ethylene
Isobutene/1-butene
Isoprene
2-Methyl-1-Butene
2-Methyl-2-Butene
1-Pentene
trans-2-Pentene
Propylene
Aromatic Compounds
Benzene
Toluene
1,2,4-Trimethylbenzene
m-,*p*-Xylene
o-Xylene

Specific trends noted in the frequency of detection include:

- Sixteen compounds were detected in 100% of the samples (50% decrease from previous year).
- Sixteen were not detected in any samples (compared to three the previous year).

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 the following limitation 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.

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.

Ethane and isopentane concentrations had the highest average concentrations (14.33 and 13.23 ppbC, respectively). These two compounds also had the highest geometric means as well (11.53 and 10.28, respectively).

5.1.4 Variability

According to Table 5-1, coefficients of variation for most SNMOC compounds were less than 1.5. The highest coefficient of variation is for α-pinene (1.40); the next highest were for β-pinene and *n*-undecane (1.08 and 1.09, respectively).

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 sixty-five percent of the organic compounds found in the average NMOC sample.

The unidentified compounds probably include halogenated hydrocarbons, carbonyls and other oxygenates, and hydrocarbons that are not SNMOC targets.

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 2001 SNMOC monitoring data identified in previous reports: alkanes account for the biggest part of the SNMOC sample. Nearly 41% 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, both stationary and mobile (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, with exeception of one day, are always lower than the acetylene concentrations. 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 (0.926). Benzene and toluene concentrations had a lower correlation (0.552), 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.

Table 5-3 identifies emission sources for the prevalent compounds. A number of the sources listed are similar to the facilities displayed in Figure 2-5.

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 5-4.

As Table 5-4 indicates, correlations between the different compound types are strongly positive. Aromatics and olefins have the highest correlation (0.876) between them on average followed by alkanes and olefins (0.857).

5.6 Comparison to Selected Meteorological Conditions

The following analyses compare local observations of maximum temperature and wind speed to the concentrations of the SNMOC by compound type. Figures 5-4 through 5-5 show the compound group comparison by meteorological parameter. Compound group concentrations tended to decrease as both the maximum temperature and wind speed increased.

Table 5-5 shows calculated correlation coefficients of all the selected meteorological parameters. The dew point temperature had the strongest negative relationship with the alkanes (-0.680) followed by the alkanes with maximum daily temperature (-0.646). These trends suggest that as ambient air temperature increase and as the air becomes more moist, the alkane concentrations decrease. In general, the relative humidity was weakly correlated with all the compound group concentrations.

Aromatic compounds had the strongest negative relationship with the u-component of the wind (-0.406), suggesting that as the prevailing wind increased form the east, this compound group's concentration tended to decrease. Olefin compounds had the strongest negative relationship with dew point temperature (-0.543), suggesting that as the air becomes less saturated, this compound group's concentration tended to increase.

5.7 Comparison to HAP Emissions

Of the 24 prevalent compounds, six are also identified as hazardous air pollutants (HAPs): 2,2,4-Trimethylpentene, Benzene, *n*-Hexane, Toluene, *m*/*p*-Xylene, and *o*-Xylene. Emissions from the 1999 NEI for these prevalent compounds by source type are provided in Table 5-6 for Tarrant County (in which CAMS13 is located). The emissions of the HAP prevalent compounds represent a sizeable portion of the total HAPs within that county. Mobile on-road emissions are shown to be a significant contributor to HAP emissions.

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

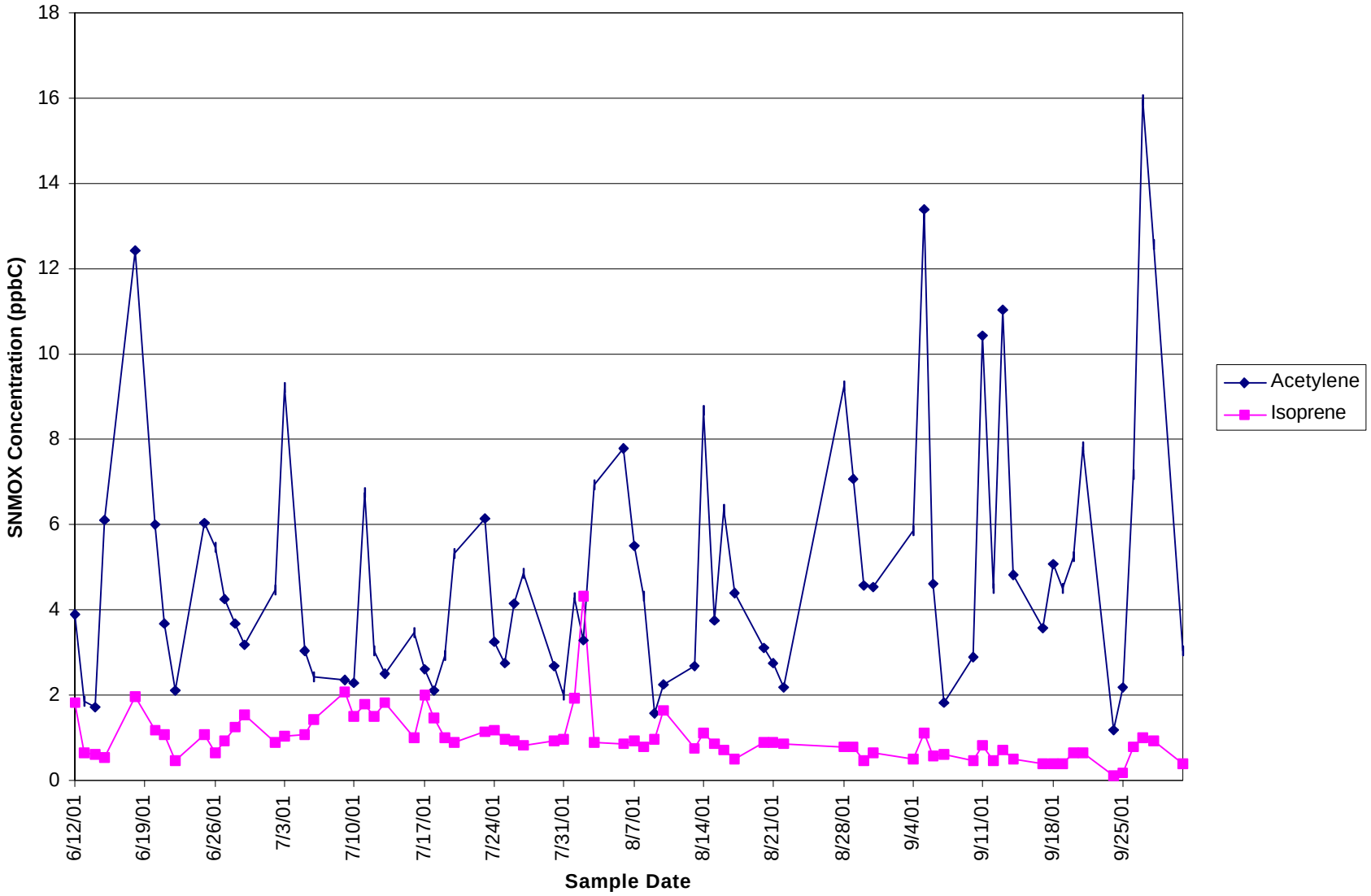


Figure 5-2
Acetylene versus Ethylene at CAMS13 (Fort Worth, TX)

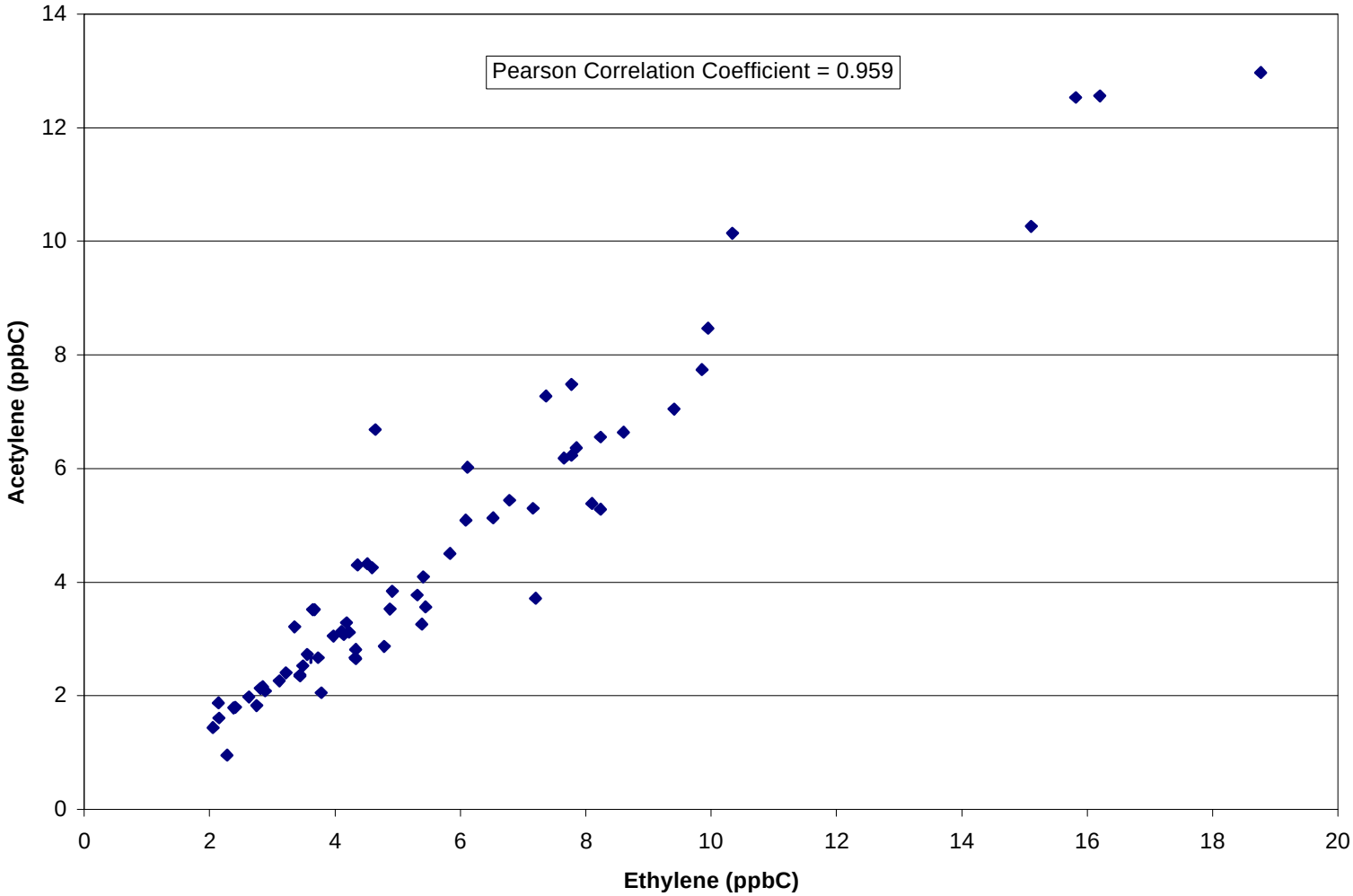


Figure 5-3
Benzene versus Toluene at CAMS13 (Fort Worth, TX)

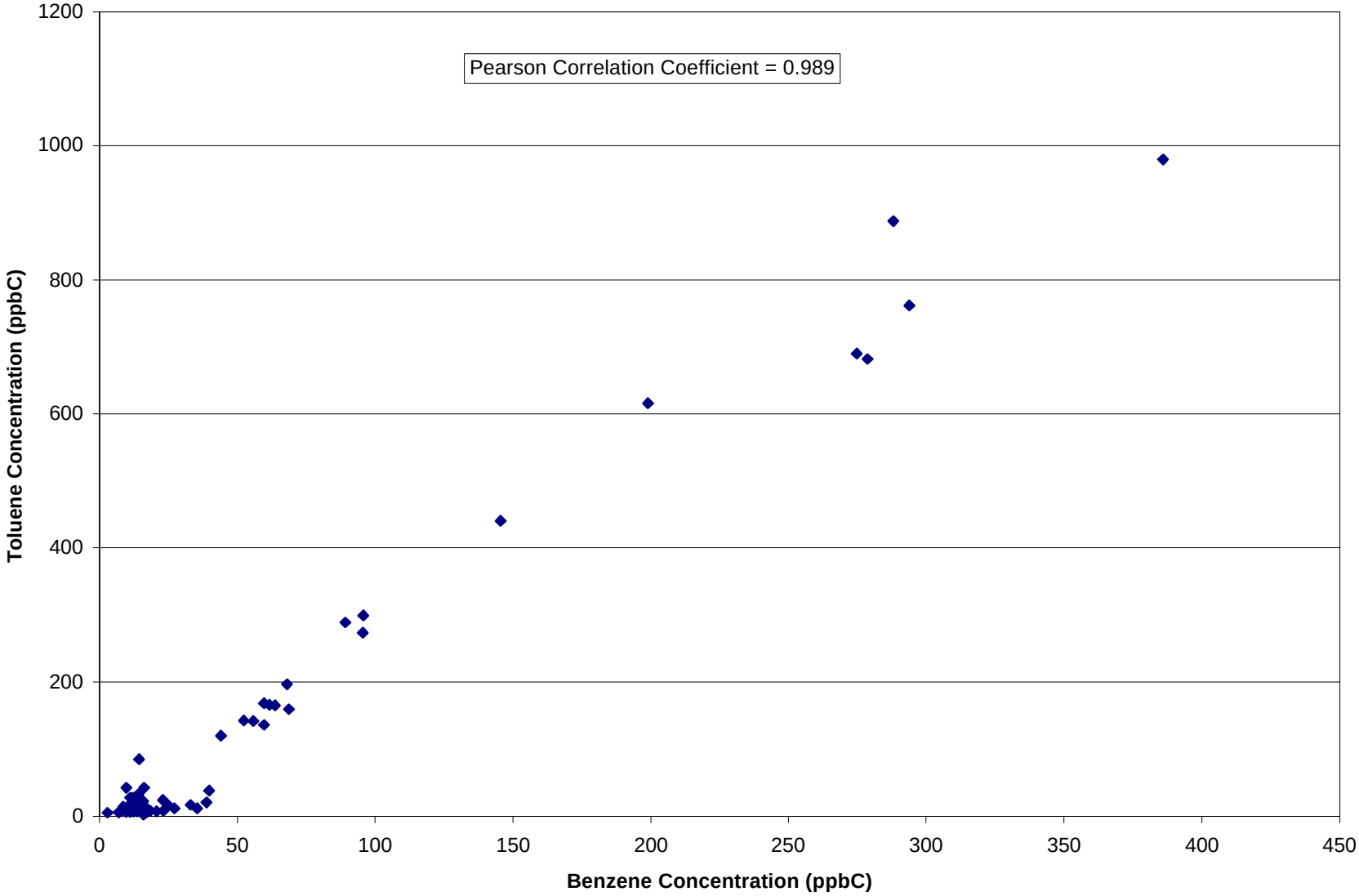


Figure 5-4
CAMS13 (Fort Worth, TX): Average Concentration Compared with Max Temperature

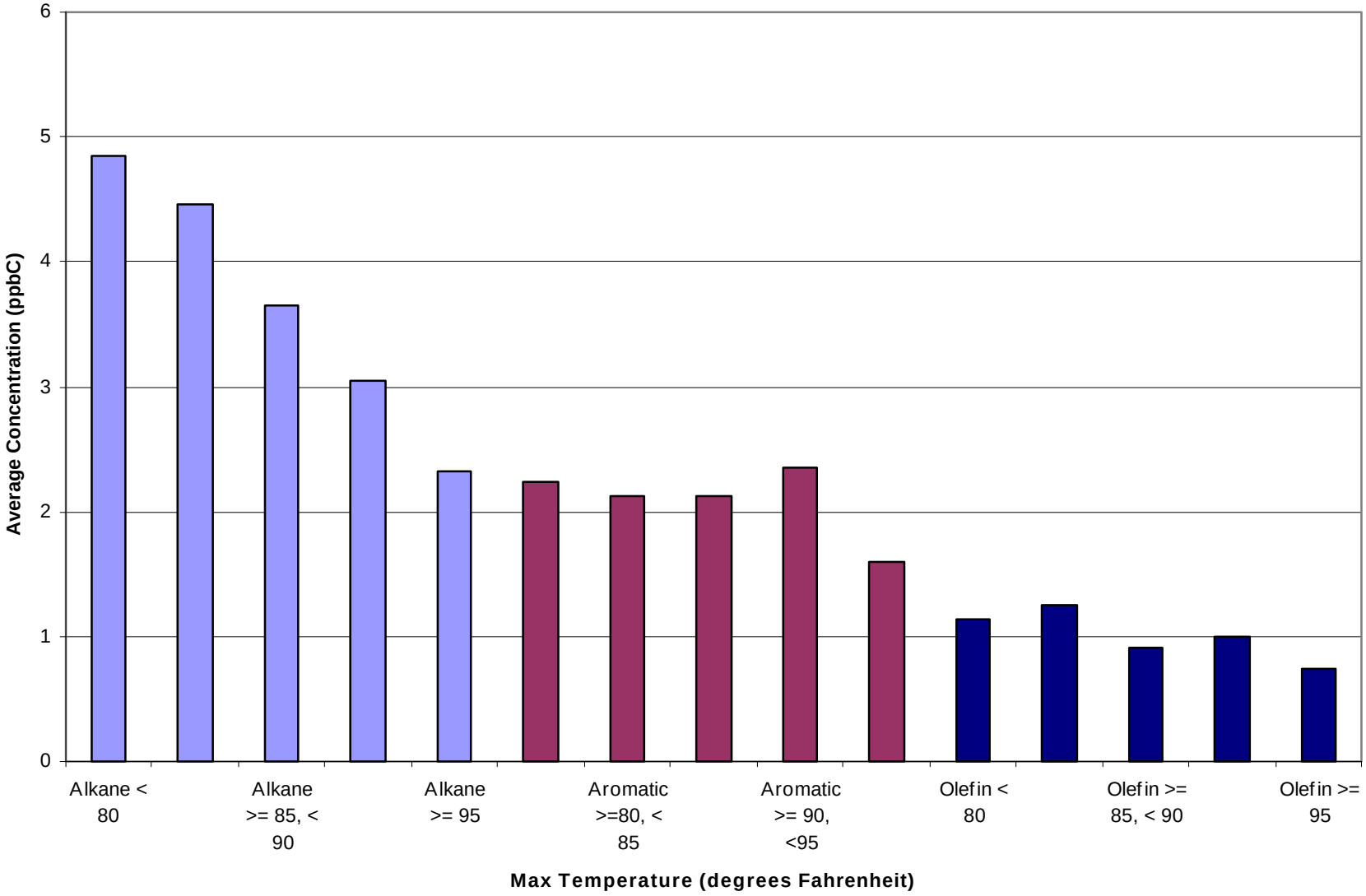


Figure 5-5
CAMS13 (Fort Worth, TX): Average Concentration Compared with Wind Magnitude

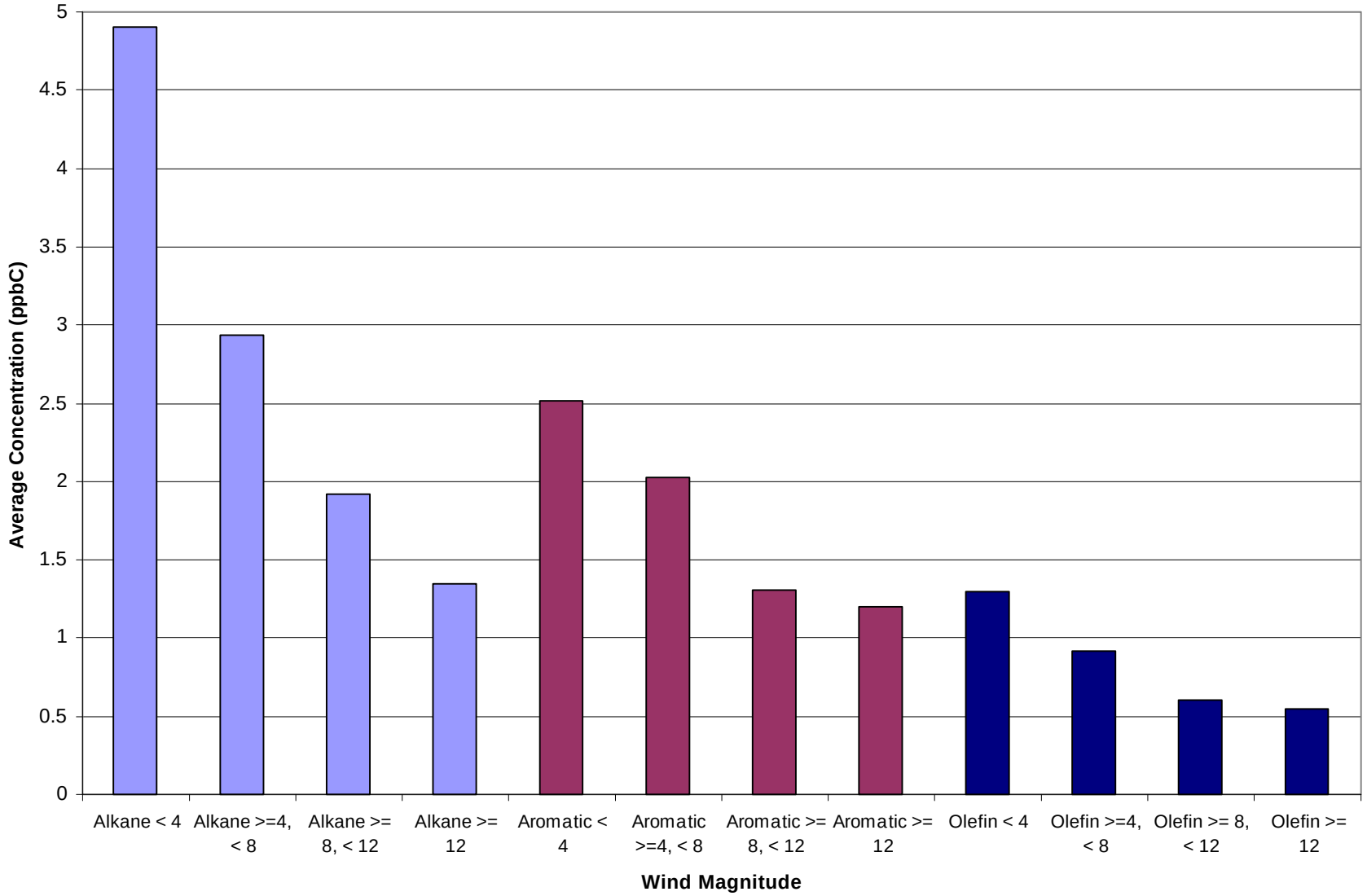


Table 5-1
Summary Statistics for SNMOC Concentrations Measured at CAMS13 (Fort Worth, TX)
Based on 74 Days with Valid Samples

	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	72	3%	0.16	1.36	0.32	0.40	0.35	0.24	0.60
1,2,4-Trimethylbenzene	49	34%	0.53	5.76	1.41	1.80	1.55	1.10	0.61
1,3,5-Trimethylbenzene	64	14%	0.14	2.86	0.57	0.72	0.61	0.48	0.67
1,3-Butadiene	54	27%	0.16	1.63	0.39	0.49	0.42	0.32	0.64
1-Decene	74	0%	0.20	0.20	0.20	0.20	0.19	0.00	0.00
1-Dodecene	73	1%	0.09	1.01	0.23	0.23	0.21	0.12	0.52
1-Heptene	73	1%	0.12	0.88	0.20	0.23	0.22	0.11	0.46
1-Hexene	74	0%	0.22	0.89	0.48	0.48	0.45	0.17	0.34
1-Nonene	74	0%	0.12	0.37	0.21	0.20	0.20	0.04	0.20
1-Octene	74	0%	0.12	0.60	0.26	0.24	0.24	0.06	0.24
1-Pentene	33	55%	0.13	2.74	0.55	0.75	0.63	0.51	0.69
1-Tridecene	74	0%	0.15	0.29	0.23	0.22	0.22	0.01	0.05
1-Undecene	74	0%	0.15	0.22	0.22	0.21	0.21	0.01	0.05
2,2,3-Trimethylpentane	51	31%	0.12	2.51	0.46	0.59	0.46	0.44	0.76
2,2,4-Trimethylpentane	0	100%	1.27	12.68	3.33	4.28	3.60	2.68	0.63
2,2-Dimethylbutane	46	38%	0.37	2.14	0.75	0.91	0.83	0.44	0.48
2,3,4-Trimethylpentane	11	85%	0.37	5.17	1.06	1.50	1.24	1.01	0.67
2,3-Dimethylbutane	21	72%	0.53	23.21	3.57	5.09	3.13	4.84	0.95
2,3-Dimethylpentane	52	30%	0.37	2.84	0.81	1.02	0.90	0.55	0.54
2,4-Dimethylpentane	50	32%	0.36	2.68	0.78	1.00	0.87	0.55	0.55
2-Ethyl-1-butene	74	0%	0.24	0.24	0.24	0.24	0.24	0	0
2-Methyl-1-butene	30	59%	0.11	2.88	0.64	0.83	0.67	0.59	0.71

Table 5-1
Summary Statistics for SNMOC Concentrations Measured at CAMS13 (Fort Worth, TX)
Based on 74 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-Methyl-1-pentene	74	0%	0.12	0.60	0.16	0.21	0.19	0.10	0.50
2-Methyl-2-butene	37	50%	0.25	4.80	0.77	1.08	0.86	0.86	0.80
2-Methylheptane	60	19%	0.15	1.91	0.37	0.46	0.40	0.29	0.63
2-Methylhexane	0	100%	0.59	5.09	1.29	1.59	1.38	0.92	0.58
2-Methylpentane	0	100%	1.81	13.98	4.32	5.35	4.78	2.68	0.50
3-Methyl-1-butene	70	5%	0.12	1.29	0.21	0.29	0.25	0.21	0.74
3-Methylheptane	60	19%	0.14	1.85	0.39	0.46	0.40	0.28	0.60
3-Methylhexane	1	99%	0.56	6.70	1.78	2.10	1.81	1.20	0.57
3-Methylpentane	2	97%	0.93	8.72	2.48	3.07	2.65	1.76	0.57
4-Methyl-1-pentene	74	0%	0.20	0.21	0.21	0.21	0.21	0.00	0.00
a-Pinene	54	27%	0.14	5.80	0.25	0.70	0.40	0.98	1.40
Acetylene	0	100%	1.17	15.95	4.28	4.89	4.17	3.00	0.61
b-Pinene	53	28%	0.08	4.16	0.22	0.50	0.36	0.54	1.08
Benzene	0	100%	1.85	55.36	7.33	8.07	7.02	6.17	0.76
cis-2-Butene	70	5%	0.18	1.74	0.36	0.46	0.40	0.30	0.65
cis-2-Hexene	74	0%	0.12	0.46	0.16	0.17	0.17	0.06	0.32
cis-2-Pentene	60	19%	0.22	2.10	0.45	0.59	0.50	0.38	0.65
Cyclohexane	43	42%	0.41	4.06	0.91	1.04	0.95	0.55	0.53
Cyclopentane	14	81%	0.34	3.49	0.66	0.83	0.72	0.54	0.65
Cyclopentene	73	1%	0.11	2.21	0.21	0.28	0.24	0.25	0.92
Ethane	0	100%	2.06	93.31	12.52	14.33	11.53	11.94	0.83
Ethylbenzene	13	82%	0.17	5.33	0.98	1.26	1.07	0.80	0.64

Table 5-1
Summary Statistics for SNMOC Concentrations Measured at CAMS13 (Fort Worth, TX)
Based on 74 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
Ethylene	0	100%	1.83	16.20	5.09	5.92	5.24	3.11	0.53
Isobutane	0	100%	0.80	19.21	2.91	3.27	2.68	2.53	0.77
Isobutene/1-Butene	0	100%	1.27	8.33	2.57	2.99	2.70	1.49	0.50
Isopentane	0	100%	2.37	57.21	9.15	13.23	10.28	10.64	0.80
Isoprene	22	70%	0.10	4.34	0.91	0.99	0.86	0.59	0.59
Isopropylbenzene	74	0%	0.12	0.84	0.25	0.27	0.24	0.15	0.57
m-Diethylbenzene	74	0%	0.11	1.06	0.21	0.26	0.23	0.16	0.63
m-Ethyltoluene	44	41%	0.37	5.66	0.92	1.21	1.01	0.87	0.72
m-Xylene/p-Xylene	1	99%	0.99	16.69	2.92	3.70	3.17	2.40	0.65
Methylcyclohexane	17	77%	0.51	5.68	1.13	1.29	1.16	0.73	0.57
Methylcyclopentane	0	100%	0.76	5.46	1.74	2.09	1.85	1.09	0.52
n-Butane	0	100%	1.25	38.21	5.01	6.13	4.86	5.14	0.84
n-Decane	15	80%	0.37	3.73	0.80	1.00	0.86	0.64	0.64
n-Dodecane	69	7%	0.12	1.90	0.31	0.38	0.31	0.31	0.80
n-Heptane	8	89%	0.51	4.81	1.26	1.54	1.34	0.88	0.57
n-Hexane	0	100%	1.22	8.95	3.22	3.60	3.14	1.92	0.53
n-Nonane	57	23%	0.22	2.12	0.49	0.59	0.52	0.35	0.59
n-Octane	55	26%	0.27	2.12	0.60	0.71	0.64	0.36	0.51
n-Pentane	0	100%	1.47	29.87	5.08	7.33	5.57	6.08	0.83
n-Propylbenzene	73	1%	0.13	1.65	0.30	0.36	0.32	0.23	0.62
n-Tridecane	74	0%	0.14	0.62	0.23	0.24	0.23	0.07	0.30
n-Undecane	64	14%	0.21	5.71	0.48	0.65	0.52	0.71	1.09

Table 5-1
Summary Statistics for SNMOC Concentrations Measured at CAMS13 (Fort Worth, TX)
Based on 74 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
o-Ethyltoluene	66	11%	0.13	3.02	0.46	0.62	0.50	0.50	0.80
o-Xylene	8	89%	0.36	5.17	1.07	1.38	1.19	0.84	0.61
p-Diethylbenzene	74	0%	0.12	0.54	0.17	0.19	0.18	0.08	0.43
p-Ethyltoluene	68	8%	0.22	2.78	0.53	0.66	0.57	0.42	0.64
Propane	1	99%	0.24	74.17	11.35	12.25	9.64	9.45	0.77
Propylene	0	100%	0.92	25.99	2.18	2.93	2.39	3.04	1.04
Propyne	74	0%	0.24	0.24	0.24	0.24	0.24	0.00	0.00
Styrene	41	45%	0.35	4.69	0.79	0.91	0.83	0.54	0.59
Toluene	0	100%	2.62	33.06	7.31	8.98	7.58	6.00	0.67
trans-2-Butene	64	14%	0.15	2.33	0.26	0.39	0.31	0.35	0.89
trans-2-Hexene	74	0%	0.16	0.16	0.16	0.16	0.16	0.00	0.00
trans-2-Pentene	20	73%	0.29	4.16	0.69	1.02	0.83	0.77	0.75
TNMOC (w/ unknowns)			67.19	1766.13	208.17	240.90	207.96	202.07	0.84

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

Compound Type	Average Concentration (ppmC)	Percent of Total NMOC
Alkane	0.098	41%
Olefin	0.031	13%
Aromatic	0.029	12%
Unidentified	0.084	35%
Total	0.241	100%

Table 5-3
Emission Sources for the Prevalent Compounds

Compound Group	Compound	Emission Sources
Alkanes	*n*-Butane	Manufacture of synthetic rubber; food additive; solvent; refrigerant
	2,3-Dimethylbutane	Solvent for vegetable oil, coating, and paint; used in high octane fuel oil
	Ethane	Production of insulating materials, shortening, and cooking oils
	***n*-Hexane**	Solvent for vegetable oil, paint primers, polish, cleaners, sealants, and thinners
	Isopentane	Non-wood upholstered office side and arm chairs
	2-Methylpentane	Motor vehicle exhaust
	3-Methylpentane	Gasoline engines
	n-Pentane	Motor vehicle exhaust; aerosol paints; blowing of loose mineral wool; lubricating oils

Table 5-3
Emission Sources for the Prevalent Compounds (Continued)

Compound Group	Compound	Emission Sources
	Propane	Vehicle fuel; residential and industrial fuel; refrigerant
	2,2,4-Trimethylpentane	Manufacture/disposal of petroleum and gasoline
Olefins	Acetylene	Motor vehicle exhaust; laboratory chemical; used in welding, cutting, brazing, and soldering
	Ethylene	Motor vehicle exhaust; refrigerant; pesticide and agricultural products; welding and cutting
	Isobutene/1-butene	Production of butyl rubbers and polymers; production of high octane gasolines; used as an anti-oxidant
	Isoprene	Biogenic from vegetation; synthetic natural rubber; elastomer plastics
	2-Methyl-1-Butene	Gas stations; synthesis of organic chemicals; pesticide formulations
	2-Methyl-2-Butene	Additive in high octane fuel manufacturing
	1-Pentene	Refineries producing reformulated gasoline
	trans-2-Pentene	Gasoline use; refining of oil and gas
	Propylene	Used in resins, plastics, and synthetic rubbers
Aromatic Compounds	**Benzene**	Motor vehicle exhaust; benzene production; production in coking, non-ferrous metals, ore mining, wood processing, and coal mining
	Toluene	Motor vehicle exhaust; volatilization of toluene-based solvents and thinners; used to make benzene and urethane
	1,2,4-Trimethylbenzene	Petroleum refining; pharmaceutical production; gasoline additive

Table 5-3
Emission Sources for the Prevalent Compounds (Continued)

Compound Group	Compound	Emission Sources
	***m*-Xylene/*p*-Xylene**	Evaporative losses, spills, and leaks from petroleum refining; coal tar production; solvents; losses during transport and storage of gasoline
	***o*-Xylene**	

BOLD text indicates hazardous air pollutant (HAP)

Table 5-4
Pearson Correlations Among SNMOC Groups

Site	Alkanes-Aromatics	Alkanes-Olefins	Aromatics-Olefins
Fort Worth	0.652	0.857	0.876

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

Site	Parameter	Alkane	Aromatic	Olefin
Fort Worth	Maximum Daily Temperature	-0.646	-0.338	-0.469
	Average 6-9 a.m. Temperature	-0.523	-0.216	-0.371
	Average Dew Point Temperature	-0.680	-0.382	-0.543
	Average u-component	-0.254	-0.406	-0.315
	Average v-component	-0.345	-0.002	-0.047
	Average 6-9 a.m. u-component of Wind Speed	-0.449	-0.371	-0.304
	Average 6-9 a.m. v-component of Wind Speed	-0.321	0.029	-0.020
	Average Relative Humidity	0.086	-0.041	0.027

Table 5-6
Tarrant County Emissions Profile[a]

Emission Source Type	Total Prevalent Compound HAP Estimate[b] (tpy)[c]	Total HAP Estimate (tpy)	% of total HAP
Stationary (point and non-point)	2,996	6,648	45.1%
Mobile on-road	5,994	8,317	72.1%
Mobile non-road	1,144	2,095	54.6%
Total	**10,134**	**17,060**	**59.4%**

[a] = Source: 1999 NEI.
[b] = The prevalent compounds that are HAPs in the NEI are: 2,2,4-Trimethylpentane, Benzene, *n*-Hexane, Toluene, *m*-Xylene/*p*-Xylene, and *o*-Xylene.
[c] = Tons per year

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 stationary and mobile emission sources. These emission sources include, but are not limited to, industries which produce: 1) chemicals; 2) metals; 3) textiles; 4) plastics; and 5) petroleum. The use of National Emissions Inventory data identified more emission sources compared to Toxic Release Inventory data.

- *Completeness (Section 2.5.1).* The completeness percentage across both sites for SNMOC/NMOC continues to be high (96%) validating the improvements in the shipping and receiving procedures that have been made.

- *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 2001. EKMA calculations determined that both sites were primarily NO_x-limited areas and will require strategies for reducing NO_x emissions. Compared to the 2000 NMOC sampling season, average and geometric mean NMOC concentrations increased at the CAMS12 site, but decreased at the CAMS13 site. Additionally, the meteorological parameters selected for Pearson Correlation analysis did not show any strong tendencies with the NMOC concentrations. The average monthly NMOC concentration at CAMS12 was highest during the month of August, whereas the month of October was highest at the CAMS13 site.

- *SNMOC monitoring data (Section 5).* The SNMOC analytical method identified at least 65 percent of the organic compound sample (on a mass basis) at the Fort Worth site. Alkanes dominated the composition of the SNMOC sample (41 percent). The different SNMOC groups (alkanes, olefins, and aromatics) correlated extremely well with each other. Unlike last season, the olefins and aromatics had the strongest Pearson relationship (0.876). Twenty-four of the eighty compounds contributed to at least 75% of the average

sample mass concentration, and were considered prevalent. The emission sources typically associated with these prevalent compounds were found to be similar to the emission sources surrounding the site.

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. Tarrant County HAP emissions data and estimated vehicle traffic at the site would also verify the significant contribution of mobile on-road emissions.

6.2 Recommendations

Based on lessons learned from analyzing the 2001 NMOC/SNMOC monitoring data, a number of improvements are recommended for future national ambient air monitoring efforts:

- *Increased sampling for air toxics VOC and carbonyl compounds.* The historical limited volume of data does not provide enough information for determining meaningful air quality trends. It would be desirable if the sampling schedule could include weekend sampling 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).

- *Investigate the feasibility of obtaining a Ciudad Juarez, Mexico, local inventory*. There is a noticeable emission data gap for sources south of the El Paso monitoring site, an area which falls into Mexico. The program should make an effort to retrieve/work with the Mexican government to obtain an emissions inventory for the Ciudad Juarez region.

- *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

NMOC Data - June to October 2001 in El Paso, TX

ERG ID	Date	CONCENTRATION (ppmC)
20432	6/1/01	0.480
20479	6/4/01	0.185
20478	6/5/01	0.227
20533	6/6/01	0.187
20532	6/7/01	0.292
20543	6/8/01	0.370
20581	6/11/01	0.342
20596	6/12/01	0.118
20616 - D1	6/13/01	0.079
20617 - D2	6/13/01	0.143
20781	6/14/01	0.101
20782	6/15/01	0.315
20811	6/18/01	0.418
20810	6/19/01	0.405
20897 - D1	6/20/01	0.278
20898 - D2	6/20/01	0.277
21027	6/21/01	0.273
21028	6/22/01	0.240
21045	6/25/01	0.752
21072	6/26/01	0.365
21087 - D1	6/27/01	0.224
21088 - D2	6/27/01	0.273
21172	6/28/01	0.308
21171	6/29/01	0.395
21252	7/2/01	3.59
21253	7/3/01	1.61
21304	7/5/01	2.94
21305	7/6/01	2.04
21417	7/9/01	4.15
21418	7/10/01	2.34
21453 - D1	7/11/01	0.72
21454 - D2	7/11/01	0.92
21478	7/12/01	2.07
21479	7/13/01	2.58
21569	7/16/01	4.04
21570	7/17/01	2.24
21611 - D1	7/18/01	0.82
21612 - D2	7/18/01	0.84
21627	7/19/01	1.66
21628	7/20/01	1.77
21683	7/23/01	3.45
21769	7/24/01	2.54
21768	7/25/01	1.88
21807	7/26/01	1.24
21806	7/27/01	1.75
21846	7/30/01	3.37
21847	7/31/01	2.25
21966	8/3/01	2.15
21965	8/6/01	2.39
22036	8/7/01	2.97
22037	8/8/01	1.48
22063	8/9/01	1.12
22062	8/10/01	1.52
22105	8/13/01	2.58
22106	8/14/01	1.92
22139-D1	8/15/01	0.43
22140-D2	8/15/01	0.43
22188	8/16/01	1.34
22189	8/17/01	3.10
22302	8/20/01	8.99
22303	8/21/01	4.74
22349-D1	8/22/01	2.53
22350-D2	8/22/01	2.63
22429	8/23/01	2.75
22430	8/24/01	4.19
22449	8/28/01	7.38
22459 - D1	8/29/01	3.17
22460 - D2	8/29/01	3.15
22557	8/30/01	2.57
22570	9/4/01	7.19
22600 D1	9/5/01	6.70
22601 D2	9/5/01	6.85
22677	9/6/01	4.21
22678	9/7/01	4.73
22732	9/10/01	0.698
22731	9/11/01	0.388
22749 D1	9/12/01	0.267
22750 D2	9/12/01	0.309
22751	9/13/01	0.166
22752	9/14/01	0.408
22922	9/17/01	0.750
22923	9/18/01	0.514
22924 D1	9/19/01	0.909
22925 D2	9/19/01	0.859
22940	9/20/01	0.448
22941	9/21/01	0.885
23059	9/24/01	0.758
23060	9/25/01	0.660
23080	9/26/01	0.866
23081	9/27/01	1.66
23136	9/28/01	0.933
23137	10/1/01	0.655
23176	10/2/01	0.458
23177	10/3/01	0.402
23209	10/4/01	0.348
23210	10/5/01	0.348
23341	10/8/01	0.526
23365	10/11/01	0.497
23366	10/12/01	0.355
23398	10/15/01	0.543
23399	10/16/01	0.508
23470	10/17/01	0.636
23471	10/18/01	0.781
23495	10/19/01	0.481
23496	10/22/01	0.506
23596	10/23/01	0.461
23597	10/24/01	0.446
23633	10/25/01	0.472
23634	10/26/01	0.862
23696	10/29/01	0.582
23697	10/30/01	0.515

Broken lines (------) indicate sampler change. Samplers were changed after the line presented.

Appendix B

SNMOC

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report
(Reported in ppbC)

Sample No.:	20779	20780	20777	20778	20896	20950D1	20950R1	20951D2
Sampling Date:	6/12/01	6/13/01	6/14/01	6/15/01	6/18/01	6/20/01	6/20/01	6/20/01
Analysis Date:	L1FT009	L1FT010	L1FT011	L1FT012	L1FY022	L1FZ010	L1F~011	L1FZ011
Ethylene	4.39	2.68	2.51	6.50	15.44	7.17	7.09	7.17
Acetylene	3.90	1.87	1.72	6.10	12.42	6.03	5.99	6.02
Ethane	13.61	5.24	5.99	10.11	19.12	14.04	14.00	14.05
Propylene	2.01	1.47	1.17	3.11	7.27	3.45	3.38	3.50
Propane	11.85	3.78	5.07	10.97	18.79	10.30	10.27	10.41
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	2.94	1.16	1.23	1.48	3.16	2.31	2.30	2.32
Isobutene/1-Butene	2.67	1.70	1.72	3.49	7.85	3.81	3.85	3.92
1,3-Butadiene	0.33	0.19	0.19	0.54	1.52	0.67	0.68	0.76
n-Butane	5.96	2.07	2.63	3.13	7.37	4.68	4.71	4.71
trans-2-Butene	0.28	0.18	0.16	0.32	0.89	0.30	0.35	0.31
cis-2-Butene	0.40	0.22	0.24	0.39	0.91	0.36	0.44	0.41
3-Methyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
Isopentane	5.14	2.37	3.03	5.72	33.57	11.44	11.44	11.58
1-Pentene	0.50	0.41	0.42	0.59	1.51	0.66	0.77	0.61
2-Methyl-1-butene	0.53	0.32	0.27	0.72	2.31	1.01	1.05	0.97
n-Pentane	4.38	1.92	2.02	4.31	10.93	5.26	5.31	5.25
Isoprene	1.83	0.65	0.59	0.54	1.97	1.17	1.20	1.14
trans-2-Pentene	0.63	0.37	0.42	0.92	2.32	0.92	0.98	0.92
cis-2-Pentene	0.39	0.25	0.27	0.53	1.23	0.51	0.57	0.51
2-Methyl-2-butene	0.68	0.44	0.37	0.97	2.80	1.09	1.06	1.07
2,2-Dimethylbutane	0.73	0.49	0.40	0.78	1.64	0.86	0.99	0.85
Cyclopentene	ND	ND	ND	0.27	ND	ND	0.40	ND
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	0.55	0.40	0.41	0.70	1.37	0.79	0.84	0.74
2,3-Dimethylbutane	3.41	0.53	0.55	6.11	14.10	7.22	7.50	7.43
2-Methylpentane	4.77	2.58	2.24	5.09	11.01	6.46	6.51	6.57
3-Methylpentane	2.19	0.96	0.93	2.95	7.17	3.82	3.86	3.77
2-Methyl-1-pentene	ND	ND	ND	0.17	0.52	ND	0.19	ND
1-Hexene	0.66	0.54	0.50	0.26	0.37	0.29	0.41	0.30
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	2.47	1.22	1.22	3.21	7.71	4.58	4.58	4.21
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	ND	ND	ND	ND	0.34	0.16	0.17	ND
Methylcyclopentane	1.60	0.85	0.87	2.13	4.74	2.70	2.75	2.70
2,4-Dimethylpentane	0.73	0.39	0.40	1.02	2.06	1.14	1.26	1.14
Benzene	3.72	1.85	5.90	13.56	13.42	5.70	5.62	5.77
Cyclohexane	1.15	0.80	0.67	0.93	2.01	1.14	1.23	1.14
2-Methylhexane	1.13	0.61	0.59	1.60	3.76	1.99	1.99	1.97
2,3-Dimethylpentane	0.65	0.39	0.39	0.98	2.06	1.14	1.25	1.13
3-Methylhexane	1.28	0.66	0.56	1.98	4.72	2.84	2.56	2.83
1-Heptene	ND	0.24	0.20	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	3.04	1.41	1.27	5.02	10.94	6.13	6.09	6.13
n-Heptane	1.07	0.55	0.51	1.45	3.05	1.71	1.89	1.74
Methylcyclohexane	1.12	0.57	0.69	1.19	2.29	1.34	1.52	1.36
2,2,3-Trimethylpentane	0.25	0.14	0.12	0.62	1.32	0.76	0.78	0.79
2,3,4-Trimethylpentane	0.87	0.44	0.37	1.58	3.39	1.87	1.90	1.85
Toluene	10.44	5.88	5.12	10.11	21.24	9.89	9.68	10.16
2-Methylheptane	0.33	0.16	0.17	0.43	1.00	0.58	0.51	0.45
3-Methylheptane	0.29	0.14	0.16	0.41	0.82	0.47	0.49	0.51
1-Octene	0.17	0.18	0.19	ND	0.24	0.12	ND	ND
n-Octane	0.56	0.27	0.32	0.58	1.33	0.67	0.73	0.73
Ethylbenzene	1.87	0.99	0.97	1.49	3.16	1.56	1.60	1.61
m-Xylene/p-Xylene	5.75	3.30	3.77	4.77	9.32	4.64	4.64	4.74
Styrene	1.14	0.93	1.04	1.33	1.78	1.12	1.07	0.72
o-Xylene	1.58	0.87	0.85	1.46	3.28	1.70	1.71	1.75
1-Nonene	ND	0.14	ND	ND	0.26	ND	ND	ND
n-Nonane	0.53	0.26	0.22	0.40	0.95	0.62	0.64	0.60
Isopropylbenzene	0.20	0.12	0.13	0.21	0.20	0.12	0.15	0.13
a-Pinene	ND	ND	ND	ND	0.40	0.16	0.22	ND
n-Propylbenzene	0.31	0.17	0.20	0.38	0.68	0.37	0.44	0.41
m-Ethyltoluene	0.93	0.44	0.41	1.15	2.63	1.39	1.40	1.43
p-Ethyltoluene	0.49	0.24	0.22	0.57	1.27	0.74	0.81	0.77
1,3,5-Trimethylbenzene	0.58	0.26	0.25	0.67	1.54	0.88	0.91	0.92
o-Ethyltoluene	0.47	0.25	0.23	0.24	0.67	0.82	0.81	0.51
b-Pinene	1.12	0.94	1.09	1.21	1.19	0.94	0.91	0.48
1,2,4-Trimethylbenzene	1.94	1.10	1.07	1.93	4.31	2.31	2.32	2.28
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	0.98	0.61	0.56	0.66	1.32	1.41	1.33	1.10
1,2,3-Trimethylbenzene	0.37	0.21	0.21	0.50	0.86	0.44	0.48	0.53
m-Diethylbenzene	0.33	0.29	0.15	0.21	0.36	0.95	0.82	ND
p-Diethylbenzene	0.22	0.15	0.20	ND	0.30	ND	ND	ND
1-Undecene	ND	ND	ND	ND	0.15	0.18	0.18	ND
n-Undecane	0.71	0.60	0.65	0.52	0.81	0.72	0.87	0.45
1-Dodecene	0.47	0.30	0.40	0.46	0.41	0.64	0.62	0.15
n-Dodecane	0.63	0.45	0.79	0.38	0.34	0.60	0.70	0.21
1-Tridecene	ND	ND	ND	ND	ND	0.34	0.38	ND
n-Tridecane	ND	ND	0.21	ND	ND	0.38	0.37	ND
TNMOC (speciated)	**126.19**	**62.11**	**68.37**	**142.09**	**310.16**	**162.58**	**164.51**	**158.63**
TNMOC (w/ unknowns)	**231.35**	**139.25**	**127.66**	**218.57**	**641.04**	**282.96**	**286.48**	**282.61**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report (Reported in ppbC)

Sample No.:	20951R2	20963	20964	21071	21175	21173D1	21173R1	21174D2
Sampling Date:	6/20/01	6/21/01	6/22/01	6/25/01	6/26/01	6/27/01	6/27/01	6/27/01
Analysis Date:	L1F~012	L1FY023	L1FY024	L1F~017	L1GK017	L1GK020	L1GL022	L1GK021
Ethylene	7.16	4.84	3.00	11.27	8.05	5.90	5.73	5.82
Acetylene	6.01	3.66	2.10	6.03	5.47	4.29	4.24	4.30
Ethane	14.02	9.54	12.56	12.58	18.52	14.51	14.31	14.41
Propylene	3.40	2.19	1.36	25.99	3.28	2.46	2.47	2.43
Propane	10.32	11.77	12.62	0.24	22.40	14.05	13.97	13.89
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	2.31	2.01	3.21	3.77	3.90	2.75	2.79	2.74
Isobutene/1-Butene	3.92	2.59	1.50	6.79	3.03	2.44	2.53	2.39
1,3-Butadiene	0.69	0.37	0.22	1.25	0.65	0.47	0.49	0.47
n-Butane	4.68	4.81	8.90	8.74	5.94	5.89	5.86	5.91
trans-2-Butene	0.37	0.26	0.23	2.33	0.23	0.26	0.27	0.24
cis-2-Butene	0.41	0.43	0.29	0.51	0.28	0.29	0.28	0.28
3-Methyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
Isopentane	12.19	10.64	11.82	57.21	9.64	9.48	10.13	9.45
1-Pentene	0.78	0.57	0.48	1.54	0.52	0.59	0.56	0.49
2-Methyl-1-butene	0.98	0.82	0.77	2.47	0.60	0.57	0.69	0.61
n-Pentane	5.29	4.67	17.11	13.59	6.74	9.18	9.04	9.11
Isoprene	1.21	1.06	0.47	1.06	0.64	0.93	0.94	0.86
trans-2-Pentene	0.95	0.82	0.67	1.34	0.56	0.65	0.62	0.65
cis-2-Pentene	0.57	0.51	0.31	0.66	0.37	0.37	0.37	0.38
2-Methyl-2-butene	1.10	0.90	0.64	1.49	0.66	0.86	0.87	0.81
2,2-Dimethylbutane	0.92	0.86	0.53	1.08	0.90	0.62	0.61	0.62
Cyclopentene	ND	ND	ND	2.21	ND	ND	ND	ND
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	0.78	0.80	0.92	3.49	0.62	0.67	0.63	0.67
2,3-Dimethylbutane	7.41	5.45	4.61	8.19	4.12	3.71	3.94	3.68
2-Methylpentane	6.71	5.00	3.72	8.71	4.34	4.45	4.75	3.66
3-Methylpentane	3.83	2.89	1.80	4.12	2.85	2.39	2.37	2.41
2-Methyl-1-pentene	0.27	ND	ND	0.41	ND	ND	ND	ND
1-Hexene	0.47	0.58	0.23	0.89	0.58	0.46	0.45	0.43
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	4.28	3.22	2.48	6.21	3.77	3.35	3.71	3.29
trans-2-Hexene	ND	ND	ND	0.16	ND	ND	ND	ND
cis-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclopentane	2.79	2.12	1.26	3.61	2.12	1.98	1.96	1.99
2,4-Dimethylpentane	1.26	0.96	0.70	1.10	0.78	0.74	0.67	0.66
Benzene	5.51	9.92	6.69	55.36	10.56	6.43	6.50	6.71
Cyclohexane	1.22	1.12	0.88	1.78	1.00	0.85	0.97	0.85
2-Methylhexane	1.94	1.44	0.83	3.63	1.64	1.17	1.61	1.21
2,3-Dimethylpentane	1.20	0.91	0.81	1.36	0.94	0.68	0.84	0.71
3-Methylhexane	2.72	2.05	1.10	2.72	2.17	1.48	1.46	1.45
1-Heptene	ND	ND	ND	0.47	ND	ND	ND	ND
2,2,4-Trimethylpentane	5.97	4.09	3.36	5.37	3.58	3.27	3.36	3.34
n-Heptane	1.66	1.51	0.84	3.38	1.71	1.17	1.24	1.17
Methylcyclohexane	1.41	1.22	0.67	1.75	1.45	0.14	1.12	1.18
2,2,3-Trimethylpentane	0.71	0.45	0.33	0.77	0.47	0.32	0.58	0.40
2,3,4-Trimethylpentane	1.84	1.35	0.91	2.04	1.22	0.94	1.00	0.97
Toluene	9.41	9.68	7.50	33.06	11.57	6.43	6.47	6.45
2-Methylheptane	0.48	0.43	0.17	0.55	0.51	0.35	0.42	0.38
3-Methylheptane	0.50	0.49	0.16	0.68	0.44	0.39	0.47	0.52
1-Octene	ND	0.14	ND	0.60	0.12	ND	0.12	0.12
n-Octane	0.69	0.63	0.32	1.43	0.79	0.58	0.61	0.64
Ethylbenzene	1.56	1.54	0.82	5.33	1.97	0.92	0.87	0.90
m-Xylene/p-Xylene	4.48	4.60	2.45	16.69	6.06	2.72	2.87	2.68
Styrene	0.59	0.89	0.80	4.69	1.09	0.85	0.81	0.72
o-Xylene	1.67	1.52	0.75	5.17	2.07	1.03	1.04	1.03
1-Nonene	ND	ND	ND	0.37	ND	ND	ND	ND
n-Nonane	0.59	0.67	0.36	0.99	0.61	0.66	0.69	0.68
Isopropylbenzene	0.17	0.22	ND	0.27	0.21	0.16	0.14	ND
a-Pinene	ND	0.17	1.08	ND	ND	0.18	0.18	0.12
n-Propylbenzene	0.39	0.37	0.13	0.41	0.33	0.34	0.40	0.34
m-Ethyltoluene	1.41	1.01	0.61	1.95	0.98	1.31	1.27	1.23
p-Ethyltoluene	0.78	0.59	0.26	0.92	0.57	0.79	0.73	0.72
1,3,5-Trimethylbenzene	0.91	0.73	0.29	1.06	0.67	0.98	0.93	0.88
o-Ethyltoluene	0.77	0.59	0.27	0.80	0.44	0.66	0.75	0.76
b-Pinene	0.45	0.56	1.15	4.16	1.00	0.64	0.66	0.50
1,2,4-Trimethylbenzene	2.24	1.82	0.92	4.06	1.71	1.93	1.87	1.82
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	1.20	1.55	0.73	2.51	0.91	1.24	1.21	1.09
1,2,3-Trimethylbenzene	0.46	0.31	0.18	0.82	0.40	0.45	0.51	0.45
m-Diethylbenzene	ND	0.20	ND	0.93	0.49	0.13	0.21	0.15
p-Diethylbenzene	ND	0.17	ND	0.54	0.22	0.14	0.18	0.16
1-Undecene	ND	ND	ND	0.15	ND	ND	ND	ND
n-Undecane	0.48	0.54	0.50	2.49	0.57	0.54	0.55	0.58
1-Dodecene	0.12	ND	0.14	1.01	0.31	0.14	0.16	0.14
n-Dodecane	0.22	0.23	0.23	1.01	0.25	0.27	0.30	0.31
1-Tridecene	ND	ND	ND	0.15	ND	ND	ND	ND
n-Tridecane	ND	ND	ND	0.28	ND	ND	ND	ND
TNMOC (speciated)	**158.76**	**138.06**	**130.76**	**370.71**	**170.57**	**134.55**	**138.30**	**133.99**
TNMOC (w/ unknowns)	**285.13**	**301.42**	**261.23**	**1766.13**	**259.96**	**208.51**	**209.68**	**192.29**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report
(Reported in ppbC)

Sample No.:	21174R2	21176	21179	21303	21302	21414	21413	21415
Sampling Date:	6/27/01	6/28/01	6/29/01	7/2/01	7/3/01	7/5/01	7/6/01	7/9/01
Analysis Date:	L1GL023	L1GK018	L1GK019	L1GR022	L1GR007	L1GR021	L1GR023	L1GX017
Ethylene	5.85	5.09	4.65	5.84	10.50	3.82	3.23	3.11
Acetylene	4.24	3.69	3.17	4.45	9.21	3.03	2.42	2.34
Ethane	14.34	14.05	6.37	12.58	16.84	5.82	7.46	5.31
Propylene	2.39	2.17	1.86	2.84	4.95	1.84	1.46	1.34
Propane	13.90	7.51	5.40	9.87	19.64	3.82	5.91	3.57
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	2.73	1.88	1.35	2.89	3.77	1.19	1.71	1.34
Isobutene/1-Butene	2.38	2.75	2.08	3.52	5.75	2.43	1.78	2.03
1,3-Butadiene	0.48	0.43	0.35	0.52	1.01	0.29	0.24	0.25
n-Butane	5.79	3.50	2.76	6.02	7.16	2.44	3.01	2.40
trans-2-Butene	0.25	0.36	0.25	0.46	0.76	0.22	0.20	0.18
cis-2-Butene	0.28	0.44	0.36	0.54	0.88	0.27	0.30	0.28
3-Methyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
Isopentane	9.62	8.47	7.07	13.25	21.18	5.51	5.51	5.11
1-Pentene	0.54	0.66	0.55	0.90	1.17	0.44	0.34	0.43
2-Methyl-1-butene	0.60	0.83	0.50	0.99	1.58	0.47	0.36	0.36
n-Pentane	9.06	5.11	6.09	5.84	8.00	2.48	2.80	2.42
Isoprene	0.92	1.24	1.54	0.88	1.04	1.09	1.43	2.07
trans-2-Pentene	0.64	0.77	0.61	1.23	1.81	0.55	0.52	0.50
cis-2-Pentene	0.34	0.51	0.36	0.72	1.03	0.36	0.31	0.32
2-Methyl-2-butene	0.84	0.84	0.59	1.32	1.96	0.68	0.48	0.55
2,2-Dimethylbutane	0.64	0.72	0.59	1.02	1.34	0.60	0.57	0.58
Cyclopentene	ND	ND	0.28	ND	0.35	ND	ND	ND
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	0.66	0.61	0.54	0.74	1.10	0.45	0.54	0.39
2,3-Dimethylbutane	3.68	3.85	2.27	6.42	12.00	3.83	2.74	2.54
2-Methylpentane	4.29	4.24	2.98	6.01	9.65	4.10	3.49	3.22
3-Methylpentane	2.41	2.35	1.69	3.20	5.15	1.77	1.70	1.55
2-Methyl-1-pentene	ND	ND	ND	0.19	0.41	ND	0.13	ND
1-Hexene	0.44	0.67	0.49	0.50	0.58	0.29	0.34	0.36
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	3.29	2.44	2.01	3.64	5.46	1.97	1.95	1.78
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	ND	ND	ND	0.14	0.24	ND	ND	ND
Methylcyclopentane	1.95	1.50	1.18	2.13	3.72	1.31	1.19	1.14
2,4-Dimethylpentane	0.64	0.78	0.63	0.97	1.81	0.64	0.59	0.58
Benzene	6.25	12.45	9.19	11.54	12.37	10.68	9.75	9.88
Cyclohexane	0.84	0.96	2.00	1.11	1.48	0.63	0.64	0.65
2-Methylhexane	1.17	1.01	0.80	1.53	2.75	1.01	0.83	0.82
2,3-Dimethylpentane	0.71	0.76	0.68	0.98	1.95	0.67	0.63	0.56
3-Methylhexane	1.44	1.31	1.10	2.21	3.85	1.21	1.02	1.12
1-Heptene	ND	ND	ND	ND	ND	ND	ND	0.20
2,2,4-Trimethylpentane	3.20	3.19	2.68	4.18	8.60	2.77	2.30	1.87
n-Heptane	1.24	0.96	0.86	1.60	2.62	1.01	0.91	0.81
Methylcyclohexane	1.18	1.17	0.98	1.19	1.82	0.78	0.77	0.68
2,2,3-Trimethylpentane	0.31	0.31	0.25	0.85	1.76	0.50	0.44	0.23
2,3,4-Trimethylpentane	0.95	1.00	0.82	1.37	2.80	1.02	0.79	0.72
Toluene	6.32	7.30	8.56	9.20	13.86	6.55	5.31	5.34
2-Methylheptane	0.36	0.33	0.27	0.53	0.64	0.27	0.25	0.26
3-Methylheptane	0.39	0.33	0.29	0.41	0.81	0.33	0.26	0.23
1-Octene	ND	0.14	ND	0.14	ND	0.13	ND	ND
n-Octane	0.64	0.63	0.50	0.61	0.87	0.43	0.40	0.41
Ethylbenzene	0.86	1.22	0.94	1.45	1.91	1.06	0.84	0.87
m-Xylene/p-Xylene	2.72	3.58	2.74	4.02	5.73	2.89	2.36	2.42
Styrene	0.76	1.11	0.77	0.84	1.03	0.91	0.73	0.71
o-Xylene	1.05	1.19	0.93	1.41	2.14	1.03	0.89	0.88
1-Nonene	ND	ND	ND	ND	ND	ND	ND	0.12
n-Nonane	0.70	0.51	0.47	0.49	0.64	0.39	0.52	0.42
Isopropylbenzene	ND	0.13	0.13	0.18	0.20	0.17	0.12	ND
a-Pinene	0.16	ND	0.15	0.56	0.76	0.18	0.34	0.24
n-Propylbenzene	0.37	0.30	0.25	0.37	0.51	0.27	0.27	0.21
m-Ethyltoluene	1.25	0.88	0.74	1.01	1.89	0.74	0.61	0.59
p-Ethyltoluene	0.69	0.49	0.42	0.54	1.06	0.46	0.47	0.41
1,3,5-Trimethylbenzene	0.90	0.63	0.53	0.56	1.06	0.42	0.52	0.50
o-Ethyltoluene	0.71	0.35	0.31	0.55	1.02	0.56	0.54	0.50
b-Pinene	0.63	0.58	0.51	ND	ND	ND	ND	0.83
1,2,4-Trimethylbenzene	1.90	1.54	1.21	1.63	2.83	1.31	1.13	1.10
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	1.20	1.01	0.95	0.69	0.98	0.80	1.34	1.25
1,2,3-Trimethylbenzene	0.43	0.29	0.27	0.32	0.68	0.34	0.21	0.21
m-Diethylbenzene	0.16	0.30	0.24	0.30	0.46	ND	0.22	ND
p-Diethylbenzene	0.19	0.14	0.17	0.18	0.21	ND	0.14	ND
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.53	0.56	0.51	0.50	0.55	0.32	0.37	0.37
1-Dodecene	0.12	0.17	0.14	0.21	0.23	0.23	0.17	0.15
n-Dodecane	0.25	0.56	0.23	0.31	0.28	0.13	0.17	0.12
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	ND	ND	ND	0.14	0.15	ND	ND	ND
TNMOC (speciated)	**133.71**	**124.79**	**100.16**	**153.30**	**240.52**	**91.89**	**88.95**	**81.69**
TNMOC (w/ unknowns)	**195.53**	**186.67**	**193.79**	**265.33**	**358.59**	**212.55**	**164.66**	**189.18**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report (Reported in ppbC)

Sample No.:	21416	21552D1	21552R1	21553D2	21553R2	21554	21555	21571
Sampling Date:	7/10/01	7/11/01	7/11/01	7/11/01	7/11/01	7/12/01	7/13/01	7/16/01
Analysis Date:	L1GX018	L1GX019	L1GZ021	L1GX020	L1GZ022	L1GZ016	L1GZ018	L1GZ019
Ethylene	3.04	8.11	8.09	8.11	8.16	4.04	2.99	5.34
Acetylene	2.29	6.74	6.71	6.75	6.75	3.02	2.50	3.45
Ethane	6.29	16.47	16.46	16.62	16.59	8.32	4.58	12.36
Propylene	1.32	3.78	3.77	3.73	3.71	1.80	1.36	2.05
Propane	5.50	17.77	17.42	17.88	17.56	7.93	3.97	11.74
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	1.78	3.28	3.32	3.28	3.33	2.21	1.47	3.46
Isobutene/1-Butene	1.74	4.13	4.06	4.14	4.11	2.15	1.87	2.64
1,3-Butadiene	0.25	0.71	0.71	0.77	0.72	0.27	0.25	0.36
n-Butane	3.22	7.17	7.10	7.10	7.12	4.41	2.36	6.33
trans-2-Butene	0.20	0.50	0.52	0.49	0.49	0.25	0.24	0.27
cis-2-Butene	0.25	0.60	0.59	0.61	0.60	0.29	0.34	0.32
3-Methyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
Isopentane	5.54	35.29	33.44	17.84	15.57	8.16	4.91	8.54
1-Pentene	0.32	0.94	0.93	0.99	0.88	0.57	0.55	0.54
2-Methyl-1-butene	0.32	1.23	1.15	1.19	1.19	0.51	0.41	0.62
n-Pentane	2.72	6.95	6.98	7.01	6.91	3.82	2.44	4.87
Isoprene	1.51	1.75	1.74	1.80	1.78	1.48	1.81	1.01
trans-2-Pentene	0.47	1.37	1.32	1.35	1.34	0.58	0.49	0.65
cis-2-Pentene	0.31	0.83	0.78	0.80	0.79	0.38	0.33	0.42
2-Methyl-2-butene	0.49	1.54	1.55	1.57	1.55	0.58	0.52	0.70
2,2-Dimethylbutane	0.54	1.18	1.13	1.08	1.09	0.67	0.60	0.71
Cyclopentene	ND	0.35	0.34	0.22	0.26	ND	ND	ND
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	0.42	0.98	1.00	0.95	0.96	0.58	0.43	0.69
2,3-Dimethylbutane	0.67	8.97	8.64	8.90	8.54	3.51	2.67	4.17
2-Methylpentane	3.32	7.57	7.45	7.68	7.49	3.91	2.67	4.56
3-Methylpentane	1.76	4.41	4.34	4.38	4.35	2.18	1.48	2.31
2-Methyl-1-pentene	0.12	0.15	0.28	0.26	0.21	0.14	0.13	0.17
1-Hexene	0.35	0.58	0.57	0.61	0.31	0.44	0.43	0.52
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	1.88	4.93	4.89	4.95	4.96	2.72	1.82	3.03
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	ND	0.21	0.18	0.19	0.17	ND	ND	ND
Methylcyclopentane	1.21	3.15	3.15	3.15	3.10	1.60	1.02	1.83
2,4-Dimethylpentane	0.54	1.59	1.51	1.43	1.46	0.71	0.57	0.74
Benzene	9.71	8.41	8.11	8.46	8.02	9.78	11.12	2.97
Cyclohexane	0.64	1.35	1.37	1.36	1.37	1.02	0.66	0.98
2-Methylhexane	0.82	2.15	2.12	2.13	2.07	1.10	0.67	1.15
2,3-Dimethylpentane	0.55	1.47	1.43	1.44	1.38	0.74	0.57	0.78
3-Methylhexane	1.06	3.08	2.98	3.07	2.99	1.31	0.90	1.42
1-Heptene	0.30	0.69	0.55	0.66	0.56	ND	0.19	ND
2,2,4-Trimethylpentane	1.89	6.45	5.95	6.44	5.84	2.68	1.80	3.14
n-Heptane	0.81	2.20	1.94	2.17	2.15	1.18	0.69	1.15
Methylcyclohexane	0.74	1.87	1.93	1.95	1.88	0.97	0.80	1.16
2,2,3-Trimethylpentane	0.15	0.90	0.86	0.78	0.86	0.61	0.35	0.61
2,3,4-Trimethylpentane	0.76	2.30	2.29	2.28	2.23	0.96	0.65	1.09
Toluene	4.70	13.06	12.59	13.12	12.58	7.70	4.05	6.66
2-Methylheptane	0.25	0.67	0.65	0.77	0.64	0.28	0.23	0.34
3-Methylheptane	0.25	0.64	0.64	0.63	0.62	0.29	0.23	0.30
1-Octene	ND	ND	ND	ND	ND	ND	ND	0.19
n-Octane	0.42	0.94	0.88	0.93	0.95	0.48	0.36	0.57
Ethylbenzene	0.77	1.79	1.72	1.78	1.70	0.87	0.63	ND
m-Xylene/p-Xylene	2.11	5.26	5.09	5.23	5.07	2.71	1.95	3.01
Styrene	0.62	0.91	0.96	0.77	0.77	0.82	0.37	1.01
o-Xylene	0.79	2.06	1.95	2.03	1.94	1.00	0.71	1.08
1-Nonene	ND	0.18	0.15	0.20	0.25	0.18	ND	0.18
n-Nonane	0.35	0.76	0.68	0.71	0.69	0.49	0.40	0.51
Isopropylbenzene	ND	0.29	0.16	0.21	0.15	ND	ND	ND
a-Pinene	0.18	0.28	0.29	0.27	0.28	0.46	ND	ND
n-Propylbenzene	0.24	0.48	0.48	0.44	0.44	0.32	0.22	0.28
m-Ethyltoluene	0.54	1.56	1.52	1.61	1.57	0.90	0.61	0.83
p-Ethyltoluene	0.34	0.97	0.95	0.89	0.82	0.49	0.40	0.58
1,3,5-Trimethylbenzene	0.32	0.95	0.99	1.00	1.00	0.46	0.44	0.61
o-Ethyltoluene	0.25	1.03	1.12	0.84	0.87	0.67	0.35	0.61
b-Pinene	0.77	0.63	0.66	0.38	0.36	0.08	0.13	ND
1,2,4-Trimethylbenzene	0.95	2.40	2.40	2.41	2.40	1.19	0.96	1.34
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	0.57	1.14	1.13	1.05	1.11	0.81	0.98	0.69
1,2,3-Trimethylbenzene	0.19	0.51	0.51	0.49	0.52	0.32	0.21	0.30
m-Diethylbenzene	0.25	0.35	0.52	0.14	0.13	0.27	0.14	ND
p-Diethylbenzene	ND	0.24	0.21	0.27	0.18	0.20	0.12	0.15
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.28	0.46	0.44	0.44	0.44	0.42	0.39	0.47
1-Dodecene	0.12	ND	ND	ND	ND	0.15	ND	0.21
n-Dodecane	0.12	0.22	0.20	0.19	0.18	0.21	0.13	0.23
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	ND	ND	ND	ND	ND	ND	ND	ND
TNMOC (speciated)	**81.16**	**221.83**	**216.51**	**203.34**	**197.09**	**109.31**	**77.60**	**118.98**
TNMOC (w/ unknowns)	**187.00**	**365.90**	**348.88**	**321.31**	**322.03**	**165.30**	**146.66**	**268.11**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report (Reported in ppbC)

Sample No.:	21572	21607D1	21608D2	21606	21904	21905	21770	21771
Sampling Date:	7/17/01	7/18/01	7/18/01	7/19/01	7/20/01	7/23/01	7/24/01	7/25/01
Analysis Date:	L1GZ017	L1HE022	L1HE023	L1HE024	L1HE014	L1HE017	L1HE021	L1HE018
Ethylene	3.54	3.04	2.92	3.92	4.78	5.81	4.07	4.01
Acetylene	2.62	2.11	2.11	2.94	5.33	6.13	3.24	2.76
Ethane	7.32	6.70	6.71	11.25	12.15	9.81	11.04	10.68
Propylene	1.57	1.35	1.34	1.54	2.18	2.71	1.90	1.71
Propane	8.58	5.57	5.71	11.19	11.42	7.93	11.28	7.42
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	1.84	1.67	1.62	2.73	2.40	2.01	3.14	2.38
Isobutene/1-Butene	1.85	1.51	1.41	1.69	2.27	3.39	2.26	3.17
1,3-Butadiene	0.24	0.20	0.22	0.23	0.37	0.51	0.27	0.24
n-Butane	3.45	2.82	2.79	5.23	4.91	4.00	4.87	3.40
trans-2-Butene	0.25	ND	ND	ND	0.16	0.22	ND	ND
cis-2-Butene	0.35	0.22	0.26	0.22	0.19	0.34	0.24	0.32
3-Methyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
Isopentane	6.07	4.87	4.71	7.07	8.28	10.46	6.51	5.13
1-Pentene	0.42	0.35	0.41	0.41	0.13	0.71	1.01	0.50
2-Methyl-1-butene	0.48	0.60	3.03	0.61	0.69	0.83	0.52	0.51
n-Pentane	2.98	2.57	2.99	3.88	5.22	4.52	3.59	2.88
Isoprene	2.01	1.44	1.47	1.01	0.88	1.15	1.17	0.97
trans-2-Pentene	0.53	0.42	0.43	0.47	0.58	0.90	0.51	0.50
cis-2-Pentene	0.47	0.26	0.29	0.29	0.31	0.49	0.27	0.33
2-Methyl-2-butene	0.61	0.49	0.48	0.51	0.70	1.06	0.54	0.25
2,2-Dimethylbutane	0.59	0.42	0.50	0.56	0.63	0.83	1.04	0.66
Cyclopentene	ND	ND	0.17	ND	ND	ND	ND	ND
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	0.55	0.40	0.47	0.50	0.60	0.72	0.47	0.47
2,3-Dimethylbutane	3.22	2.27	2.38	3.21	3.59	6.17	3.54	2.80
2-Methylpentane	3.42	2.83	3.05	3.57	4.25	6.34	3.84	3.24
3-Methylpentane	1.74	1.31	1.45	1.92	2.25	3.24	1.83	1.66
2-Methyl-1-pentene	ND	ND	ND	ND	ND	0.15	0.12	ND
1-Hexene	0.51	0.31	0.36	0.35	0.27	0.33	0.81	0.50
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	2.05	1.64	1.69	2.35	3.03	3.49	2.21	2.03
trans-2-Hexene	ND	ND	0.16	ND	ND	ND	ND	ND
cis-2-Hexene	ND	ND	ND	ND	ND	0.14	ND	ND
Methylcyclopentane	1.39	1.06	1.07	1.40	1.71	2.21	1.34	1.28
2,4-Dimethylpentane	0.62	0.44	0.48	0.56	0.55	1.01	0.58	0.57
Benzene	2.69	3.41	3.47	10.02	9.24	2.98	2.46	6.18
Cyclohexane	0.79	0.57	0.60	0.78	0.68	0.92	0.68	0.77
2-Methylhexane	0.91	0.69	0.67	0.85	1.03	1.67	1.16	0.84
2,3-Dimethylpentane	0.68	0.48	0.48	0.58	0.57	0.99	0.55	0.65
3-Methylhexane	1.09	0.68	0.68	1.36	1.39	2.40	1.03	1.12
1-Heptene	ND	0.27	0.15	0.31	ND	ND	0.43	0.35
2,2,4-Trimethylpentane	2.44	1.62	1.65	2.28	2.84	5.30	2.63	2.38
n-Heptane	0.81	0.65	0.68	0.99	0.96	1.60	0.98	0.78
Methylcyclohexane	0.99	0.76	0.87	0.99	0.94	1.30	1.04	0.89
2,2,3-Trimethylpentane	0.48	0.16	0.21	0.36	0.27	0.70	0.35	0.23
2,3,4-Trimethylpentane	0.85	0.65	0.65	0.71	0.88	1.72	1.03	0.85
Toluene	4.78	3.23	3.41	5.20	6.10	8.09	5.56	4.52
2-Methylheptane	0.28	0.21	0.22	0.27	0.26	0.49	0.28	0.26
3-Methylheptane	0.28	0.16	0.21	0.29	0.27	0.45	0.30	0.25
1-Octene	ND	ND	0.14	ND	ND	ND	0.28	0.13
n-Octane	0.49	0.38	0.41	0.59	0.51	0.69	0.57	0.44
Ethylbenzene	0.77	0.70	0.54	0.88	0.84	1.39	0.87	0.68
m-Xylene/p-Xylene	2.24	1.58	1.67	2.47	2.41	3.94	2.31	2.07
Styrene	0.75	0.87	0.81	0.67	0.81	0.94	1.36	0.89
o-Xylene	0.86	0.61	0.64	0.90	0.96	1.59	0.90	0.80
1-Nonene	ND	ND	ND	ND	ND	0.16	0.26	0.18
n-Nonane	0.37	0.31	0.32	0.39	0.48	0.57	0.36	0.37
Isopropylbenzene	0.24	0.14	0.13	0.14	ND	0.13	ND	0.14
a-Pinene	0.22	0.14	0.15	0.20	0.28	ND	0.14	ND
n-Propylbenzene	0.25	0.21	0.21	0.26	0.21	0.37	0.37	0.27
m-Ethyltoluene	0.68	0.49	0.54	0.74	0.86	1.27	0.58	0.69
p-Ethyltoluene	0.46	0.27	0.31	0.46	0.47	0.68	0.33	0.40
1,3,5-Trimethylbenzene	0.46	0.27	0.36	0.48	0.63	0.76	0.37	0.47
o-Ethyltoluene	0.38	ND	0.32	0.18	0.32	0.63	0.37	0.30
b-Pinene	ND	0.93	0.77	0.49	0.68	0.87	1.26	0.45
1,2,4-Trimethylbenzene	1.07	0.84	0.83	1.12	1.29	2.08	1.14	1.04
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	0.66	0.45	0.45	0.37	0.90	0.86	0.50	0.93
1,2,3-Trimethylbenzene	0.24	0.18	0.28	0.23	0.29	0.39	0.31	0.20
m-Diethylbenzene	0.31	ND	0.43	0.16	0.15	0.12	0.17	0.15
p-Diethylbenzene	ND	ND	0.16	ND	ND	0.18	ND	ND
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.34	0.32	0.32	0.29	0.33	0.34	0.28	0.37
1-Dodecene	0.12	0.07	ND	ND	0.09	0.16	0.13	ND
n-Dodecane	0.15	0.14	0.13	0.12	0.14	0.15	0.18	0.17
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	ND	ND	ND	ND	ND	ND	ND	ND
TNMOC (speciated)	**87.41**	**69.31**	**74.54**	**105.75**	**117.91**	**134.47**	**103.69**	**91.54**
TNMOC (w/ unknowns)	**148.35**	**122.64**	**119.86**	**215.68**	**216.35**	**256.34**	**164.35**	**234.10**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report (Reported in ppbC)

Sample No.:	21907	21906	21902	21903	21963D1	21963R1	21964D2	21964R2
Sampling Date:	7/26/01	7/27/01	7/30/01	7/31/01	8/1/01	8/1/01	8/1/01	8/1/01
Analysis Date:	L1HE020	L1HE019	L1HE015	L1HE016	L1HP012	L1HV013	L1HP013	L1HV014
Ethylene	5.11	6.42	3.39	2.68	4.59	4.60	4.67	4.52
Acetylene	4.16	4.86	2.67	2.01	3.46	3.56	6.59	3.55
Ethane	13.01	13.83	4.40	3.40	8.12	8.33	4.17	7.75
Propylene	2.07	2.74	1.41	1.15	2.19	2.23	2.10	2.18
Propane	11.67	14.02	4.13	3.07	16.90	17.48	9.86	10.12
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	3.52	3.19	0.93	0.80	1.99	1.98	1.89	1.87
Isobutene/1-Butene	2.18	2.76	2.00	1.38	2.40	2.42	2.29	2.29
1,3-Butadiene	0.32	0.53	0.24	0.21	0.39	0.35	0.39	0.33
n-Butane	5.38	6.71	1.54	1.25	3.21	3.16	3.17	3.12
trans-2-Butene	ND	ND	0.17	ND	0.41	0.34	0.39	0.35
cis-2-Butene	0.27	0.31	0.19	0.19	0.44	0.46	0.44	0.43
3-Methyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
Isopentane	9.58	10.41	5.17	3.49	8.04	8.12	7.57	8.09
1-Pentene	0.51	0.39	0.44	0.32	0.55	0.54	0.61	0.56
2-Methyl-1-butene	0.64	0.79	0.45	0.34	0.71	0.66	0.79	0.79
n-Pentane	4.68	5.91	2.28	1.65	4.49	4.51	4.40	4.44
Isoprene	0.94	0.82	0.91	0.95	1.91	1.96	1.93	1.96
trans-2-Pentene	0.60	0.73	0.53	0.41	0.85	0.84	0.82	0.81
cis-2-Pentene	0.38	0.37	0.29	0.22	0.56	0.54	0.54	0.52
2-Methyl-2-butene	0.51	1.02	0.58	0.50	0.84	0.87	0.85	0.87
2,2-Dimethylbutane	0.75	0.64	0.44	0.37	0.81	0.77	0.87	0.80
Cyclopentene	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	0.64	0.68	0.38	0.37	0.68	0.65	0.63	0.70
2,3-Dimethylbutane	4.94	4.70	2.58	2.06	3.99	0.66	4.11	0.61
2-Methylpentane	4.75	4.54	3.02	2.53	4.22	4.14	4.04	4.11
3-Methylpentane	2.57	2.84	1.41	1.13	2.23	2.24	2.28	2.17
2-Methyl-1-pentene	0.14	ND	0.14	ND	ND	0.20	ND	0.13
1-Hexene	0.42	0.22	0.30	0.26	0.66	0.48	0.50	0.52
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	2.96	3.50	1.52	1.26	2.45	2.52	2.37	2.45
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	ND	0.14	ND	ND	ND	0.12	ND	ND
Methylcyclopentane	1.71	2.05	0.96	0.76	1.55	1.56	1.56	1.56
2,4-Dimethylpentane	0.79	0.69	0.43	0.36	0.79	0.81	0.84	0.80
Benzene	7.98	7.34	7.46	6.01	5.57	5.82	5.42	5.75
Cyclohexane	0.84	0.88	0.48	0.41	0.95	0.87	0.90	0.87
2-Methylhexane	1.35	1.44	0.69	0.63	1.07	1.10	1.03	1.11
2,3-Dimethylpentane	0.80	0.76	0.44	0.37	0.78	0.77	0.78	0.76
3-Methylhexane	1.92	2.01	0.95	0.86	1.50	1.54	1.54	1.65
1-Heptene	ND	0.30	0.16	0.12	ND	0.26	ND	0.39
2,2,4-Trimethylpentane	3.92	3.52	1.74	1.63	2.99	2.80	2.84	2.74
n-Heptane	1.25	1.25	0.60	0.54	1.06	1.08	1.06	1.07
Methylcyclohexane	1.14	1.24	0.59	0.51	1.06	1.07	1.09	1.05
2,2,3-Trimethylpentane	0.48	0.43	0.24	0.15	0.26	0.28	0.37	0.40
2,3,4-Trimethylpentane	1.27	1.13	0.68	0.55	0.96	0.97	0.98	0.97
Toluene	7.58	7.31	4.32	3.21	6.59	6.92	6.47	6.95
2-Methylheptane	0.39	0.37	0.19	0.15	0.39	0.40	0.36	0.42
3-Methylheptane	0.40	0.34	0.20	0.20	0.40	0.37	0.48	0.41
1-Octene	ND	ND	0.12	ND	ND	ND	ND	ND
n-Octane	0.69	0.61	0.39	0.30	0.64	0.70	0.69	0.73
Ethylbenzene	1.53	0.96	0.70	0.52	0.89	0.90	0.88	0.96
m-Xylene/p-Xylene	3.17	2.94	2.13	1.56	2.64	2.67	2.61	2.76
Styrene	0.92	0.78	0.64	0.59	0.77	0.77	0.74	0.89
o-Xylene	1.27	1.18	0.76	0.69	1.05	1.07	1.07	1.01
1-Nonene	0.24	0.15	0.14	ND	ND	ND	ND	ND
n-Nonane	0.56	0.51	0.28	0.25	0.55	0.56	0.55	0.58
Isopropylbenzene	ND	0.14	0.13	0.13	0.20	0.15	0.21	0.21
a-Pinene	ND	0.16	0.27	ND	0.44	0.45	0.42	0.41
n-Propylbenzene	0.32	0.27	0.18	0.17	0.33	0.33	0.34	0.33
m-Ethyltoluene	1.06	1.05	0.57	0.45	1.02	1.04	0.98	1.00
p-Ethyltoluene	0.60	0.54	0.31	0.27	0.56	0.56	0.57	0.56
1,3,5-Trimethylbenzene	0.59	0.64	0.36	0.26	0.59	0.64	0.58	0.60
o-Ethyltoluene	0.58	0.43	0.13	0.20	0.46	0.44	0.63	0.65
b-Pinene	0.54	0.49	0.43	0.44	0.42	ND	0.59	ND
1,2,4-Trimethylbenzene	1.60	1.63	0.93	0.72	1.36	1.41	1.37	1.41
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	0.79	0.85	0.43	0.38	0.70	0.70	0.67	0.66
1,2,3-Trimethylbenzene	0.35	0.34	0.21	0.19	0.30	0.32	0.32	0.34
m-Diethylbenzene	0.13	0.20	ND	0.12	0.22	0.19	0.13	0.20
p-Diethylbenzene	0.17	0.21	ND	ND	0.19	0.17	0.19	0.17
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.38	0.34	0.23	0.21	0.41	0.41	0.39	0.36
1-Dodecene	ND	ND	0.15	ND	ND	ND	ND	ND
n-Dodecane	0.16	0.15	0.13	0.13	0.20	0.18	0.17	0.16
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	ND	ND	ND	ND	ND	ND	ND	ND
TNMOC (speciated)	**130.12**	**138.69**	**71.23**	**55.99**	**116.91**	**115.01**	**108.06**	**106.85**
TNMOC (w/ unknowns)	**215.72**	**215.81**	**210.19**	**137.18**	**183.99**	**175.80**	**179.53**	**173.91**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report (Reported in ppbC)

Sample No.:	21962	21961	22038	22034	22035	22135	22136	22137
Sampling Date:	8/2/01	8/3/01	8/6/01	8/7/01	8/8/01	8/9/01	8/10/01	8/13/01
Analysis Date:	L1HP014	L1HP015	L1HP024	L1HV005	L1HV006	L1HV007	L1HV010	L1HV011
Ethylene	5.54	9.11	11.22	6.91	4.38	2.07	3.18	3.72
Acetylene	3.30	6.93	7.77	5.50	4.31	1.58	2.26	2.69
Ethane	13.64	18.44	22.64	11.98	15.02	3.65	4.70	11.70
Propylene	2.35	4.21	4.67	2.99	1.77	0.92	1.42	1.55
Propane	13.17	15.12	15.01	10.29	14.30	2.89	3.88	9.72
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	3.63	3.05	5.26	3.27	3.24	1.11	1.03	3.18
Isobutene/1-Butene	2.15	4.11	4.35	3.17	2.18	1.34	1.62	1.85
1,3-Butadiene	0.42	0.80	0.81	0.50	0.31	0.16	0.26	0.23
n-Butane	4.99	5.74	7.57	5.80	6.46	1.44	1.71	4.99
trans-2-Butene	0.25	0.45	0.46	0.37	0.27	0.19	0.24	0.19
cis-2-Butene	0.35	0.54	0.60	0.51	0.34	0.27	0.32	0.25
3-Methyl-1-butene	ND	0.18	0.42	0.29	0.14	ND	0.12	0.14
Isopentane	7.70	15.81	19.98	14.67	8.81	6.32	4.73	7.88
1-Pentene	0.48	0.90	1.02	0.83	0.52	0.21	0.37	0.52
2-Methyl-1-butene	0.45	0.91	1.10	0.73	0.43	0.21	0.31	0.28
n-Pentane	4.30	7.35	14.49	7.00	4.55	2.35	2.00	4.84
Isoprene	4.34	0.91	0.87	0.94	0.77	0.98	1.66	0.76
trans-2-Pentene	0.61	1.22	1.48	0.96	0.64	0.40	0.54	0.41
cis-2-Pentene	0.41	0.71	0.80	0.60	0.44	0.33	0.37	0.32
2-Methyl-2-butene	0.62	1.24	1.41	0.87	0.54	0.35	0.49	0.30
2,2-Dimethylbutane	0.79	1.26	1.54	1.99	0.73	1.27	0.57	0.71
Cyclopentene	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	0.55	0.93	1.41	0.98	0.68	0.43	0.36	0.60
2,3-Dimethylbutane	0.91	0.69	9.62	1.92	1.10	0.53	0.59	0.76
2-Methylpentane	3.30	7.25	8.85	8.16	3.62	1.81	2.60	3.95
3-Methylpentane	2.24	4.25	5.31	4.18	2.19	1.14	1.41	1.96
2-Methyl-1-pentene	ND	0.23	0.25	0.17	ND	ND	ND	ND
1-Hexene	0.57	0.74	0.70	0.60	0.61	0.39	0.47	0.44
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	3.81	4.94	6.02	4.31	2.67	1.25	1.51	2.45
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	ND	ND	0.23	ND	ND	ND	ND	ND
Methylcyclopentane	1.94	2.81	3.27	2.25	1.63	0.84	1.00	1.19
2,4-Dimethylpentane	0.66	1.60	1.73	1.19	0.74	0.48	0.54	0.60
Benzene	7.41	9.38	12.13	9.00	7.09	5.78	6.49	8.13
Cyclohexane	0.88	1.18	1.41	1.13	0.88	0.66	0.60	0.67
2-Methylhexane	1.54	2.24	2.85	2.00	1.17	0.61	0.81	0.96
2,3-Dimethylpentane	0.81	1.54	1.66	1.18	0.76	0.48	0.56	0.62
3-Methylhexane	2.11	2.79	3.45	2.63	1.43	0.89	1.01	1.26
1-Heptene	0.25	ND	ND	ND	0.23	0.22	0.28	0.24
2,2,4-Trimethylpentane	2.35	7.59	7.68	4.95	2.75	1.36	1.81	2.17
n-Heptane	1.51	2.07	2.71	2.00	1.11	0.56	0.71	0.93
Methylcyclohexane	1.12	1.53	1.84	1.40	1.09	0.63	0.70	0.78
2,2,3-Trimethylpentane	0.27	0.91	0.96	0.66	0.38	0.15	0.19	0.31
2,3,4-Trimethylpentane	0.77	2.57	3.14	1.63	1.00	0.54	0.71	0.81
Toluene	6.12	11.78	16.19	10.09	5.95	3.35	3.75	5.24
2-Methylheptane	0.41	0.76	0.75	0.53	0.36	0.19	0.30	0.34
3-Methylheptane	0.37	0.62	0.76	0.62	0.36	0.22	0.33	0.32
1-Octene	ND	ND	ND	ND	ND	ND	ND	ND
n-Octane	0.62	1.06	1.31	0.87	0.59	0.36	0.43	0.54
Ethylbenzene	0.99	1.62	2.15	1.45	0.74	0.48	0.55	0.79
m-Xylene/p-Xylene	2.89	4.93	6.42	4.02	2.44	1.47	1.63	2.21
Styrene	0.73	1.00	1.57	0.74	0.69	0.57	0.78	0.68
o-Xylene	1.07	2.00	2.58	1.59	0.99	0.58	0.70	0.88
1-Nonene	ND	0.19	0.19	ND	ND	ND	ND	ND
n-Nonane	0.48	1.13	2.12	0.66	0.46	0.31	0.33	0.49
Isopropylbenzene	0.21	0.31	0.40	0.31	0.22	ND	0.15	ND
a-Pinene	0.20	1.98	1.48	0.31	ND	0.22	0.26	0.36
n-Propylbenzene	0.26	0.54	0.66	0.43	0.28	0.19	0.24	0.26
m-Ethyltoluene	0.76	1.92	2.26	1.34	0.83	0.48	0.62	0.67
p-Ethyltoluene	0.46	0.92	1.37	0.79	0.53	0.32	0.34	0.44
1,3,5-Trimethylbenzene	0.44	1.05	1.66	0.80	0.52	0.31	0.35	0.44
o-Ethyltoluene	0.39	1.07	2.12	0.76	0.44	0.34	0.36	0.39
b-Pinene	0.80	1.39	0.78	0.46	0.51	0.69	ND	ND
1,2,4-Trimethylbenzene	1.11	2.67	3.24	2.04	1.32	0.69	0.90	1.11
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	0.60	1.85	3.11	0.90	0.74	0.63	0.54	0.83
1,2,3-Trimethylbenzene	0.30	0.64	0.67	0.40	0.30	0.16	0.20	0.23
m-Diethylbenzene	0.20	0.19	0.30	0.17	0.23	ND	0.19	0.18
p-Diethylbenzene	0.15	0.29	0.24	0.23	0.19	ND	ND	0.12
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.36	1.78	1.11	0.51	0.47	0.50	0.29	0.43
1-Dodecene	0.16	0.30	0.27	0.22	0.20	0.29	0.19	0.23
n-Dodecane	0.21	0.71	0.85	0.34	0.41	0.32	0.15	0.24
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	ND	0.14	0.33	ND	ND	ND	ND	ND
TNMOC (speciated)	**122.76**	**197.04**	**253.55**	**161.01**	**121.01**	**59.43**	**67.66**	**102.48**
TNMOC (w/ unknowns)	**178.71**	**270.51**	**352.40**	**206.16**	**166.27**	**93.14**	**104.48**	**147.83**

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Sample No.:	22138	22178D1	22178R1	22179D2	22179R2	22342	22355	22335
Sampling Date:	8/14/01	8/15/01	8/15/01	8/15/01	8/15/01	8/16/01	8/17/01	8/20/01
Analysis Date:	L1HV012	L1HV008	L1H%012	L1HV009	L1H%013	L1IC005	L1IC006	L1IC007
Ethylene	10.08	5.52	5.32	5.60	5.38	8.21	5.27	3.78
Acetylene	8.68	3.81	3.62	3.80	3.71	6.36	4.40	3.11
Ethane	24.65	16.61	15.70	16.64	15.87	24.00	13.78	6.26
Propylene	4.20	2.19	2.05	2.28	2.14	3.64	2.26	1.75
Propane	24.95	12.14	11.55	12.03	11.59	20.21	11.52	4.94
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	8.02	3.10	2.99	3.05	2.96	4.09	7.21	1.46
Isobutene/1-Butene	4.11	2.36	2.23	2.25	2.09	3.94	2.82	2.42
1,3-Butadiene	0.68	0.43	0.40	0.39	0.36	0.77	0.44	0.32
n-Butane	12.40	5.11	4.89	5.17	4.97	9.15	17.97	2.38
trans-2-Butene	0.74	0.30	0.29	0.32	0.29	0.46	0.70	0.18
cis-2-Butene	0.93	0.39	0.38	0.41	0.36	0.55	0.88	0.23
3-Methyl-1-butene	0.68	0.18	0.19	0.20	0.19	0.34	0.98	0.15
Isopentane	32.08	9.82	9.36	9.60	9.20	15.84	35.23	6.82
1-Pentene	1.83	0.62	0.51	0.63	0.57	0.85	1.94	0.37
2-Methyl-1-butene	1.62	0.49	0.47	0.50	0.45	1.04	1.33	0.44
n-Pentane	14.41	5.20	4.93	5.17	4.93	8.00	9.40	3.06
Isoprene	1.12	0.85	0.79	0.91	0.85	0.73	0.49	0.91
trans-2-Pentene	2.07	0.73	0.68	0.71	0.71	1.35	2.55	0.57
cis-2-Pentene	1.13	0.48	0.46	0.51	0.44	0.73	1.38	0.32
2-Methyl-2-butene	2.08	0.50	0.47	0.67	0.71	1.43	2.49	0.65
2,2-Dimethylbutane	2.14	0.87	0.81	0.84	0.82	1.11	1.50	0.51
Cyclopentene	0.29	ND	ND	0.44	0.39	0.26	0.35	0.18
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	1.60	0.67	0.54	0.58	0.56	0.91	0.87	0.43
2,3-Dimethylbutane	12.32	0.97	0.84	1.05	0.95	7.09	15.97	0.76
2-Methylpentane	11.44	4.40	4.15	4.27	4.12	6.89	6.34	3.61
3-Methylpentane	6.68	2.69	2.36	2.60	2.46	3.95	3.59	1.67
2-Methyl-1-pentene	0.33	ND	ND	0.26	0.20	0.21	0.22	ND
1-Hexene	0.37	0.62	0.32	0.59	0.52	0.62	0.23	0.34
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	6.92	4.22	4.11	4.44	4.12	4.96	3.80	1.87
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	0.26	ND	ND	ND	ND	0.18	0.14	ND
Methylcyclopentane	3.86	2.11	2.00	2.09	2.00	2.81	2.31	1.18
2,4-Dimethylpentane	1.92	0.79	0.71	0.82	0.72	1.12	2.10	0.53
Benzene	10.36	3.43	3.13	3.37	3.07	6.09	6.49	7.32
Cyclohexane	1.56	0.87	0.84	0.89	0.83	1.30	0.84	0.51
2-Methylhexane	3.32	1.37	1.26	1.32	1.25	2.23	2.04	0.92
2,3-Dimethylpentane	1.91	0.83	0.77	0.82	0.76	1.18	1.77	0.57
3-Methylhexane	4.46	1.70	1.55	1.83	1.81	3.19	2.86	1.29
1-Heptene	ND	0.46	0.28	0.27	0.18	ND	ND	ND
2,2,4-Trimethylpentane	8.91	2.85	2.81	3.04	2.78	5.35	7.40	2.69
n-Heptane	3.34	1.50	1.38	1.44	1.30	2.15	1.50	0.75
Methylcyclohexane	2.27	1.19	1.12	1.12	1.11	1.87	0.91	0.71
2,2,3-Trimethylpentane	1.20	0.39	0.39	0.42	0.40	0.68	0.78	0.34
2,3,4-Trimethylpentane	3.03	1.06	0.98	1.06	0.95	1.74	2.18	0.91
Toluene	19.20	7.68	7.17	7.64	7.02	10.99	9.48	4.47
2-Methylheptane	0.85	0.49	0.40	0.45	0.46	0.16	0.36	0.26
3-Methylheptane	1.05	0.43	0.38	0.43	0.39	0.56	0.39	0.25
1-Octene	ND	ND	ND	ND	ND	ND	ND	ND
n-Octane	1.44	0.77	0.73	0.78	0.74	1.04	0.55	0.43
Ethylbenzene	2.50	0.94	0.91	0.95	0.90	1.52	1.03	0.96
m-Xylene/p-Xylene	7.36	2.97	2.82	2.90	2.88	4.84	3.74	2.07
Styrene	1.28	0.77	0.78	0.60	0.60	1.30	0.76	0.80
o-Xylene	3.08	1.10	1.06	1.09	1.05	1.85	1.46	0.83
1-Nonene	ND	ND	ND	ND	ND	ND	ND	ND
n-Nonane	1.38	0.63	0.58	0.63	0.61	0.84	0.48	0.32
Isopropylbenzene	0.80	0.17	0.14	0.20	0.25	0.30	0.21	0.14
a-Pinene	1.47	ND	ND	ND	ND	1.14	1.59	ND
n-Propylbenzene	1.65	0.29	0.28	0.31	0.30	0.44	0.31	0.17
m-Ethyltoluene	5.66	0.83	0.80	0.83	0.82	1.60	1.12	0.73
p-Ethyltoluene	2.78	0.56	0.51	0.53	0.49	0.89	0.54	0.46
1,3,5-Trimethylbenzene	2.86	0.56	0.52	0.55	0.59	0.95	0.56	0.41
o-Ethyltoluene	3.02	0.51	0.40	0.41	0.33	0.77	ND	0.34
b-Pinene	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5.72	1.29	1.20	1.26	1.25	2.23	1.45	1.10
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	1.92	0.88	0.84	0.78	0.76	1.13	0.71	0.48
1,2,3-Trimethylbenzene	1.36	0.24	0.24	0.30	0.27	0.37	0.39	0.24
m-Diethylbenzene	0.32	0.27	0.14	0.12	0.16	0.17	1.06	0.11
p-Diethylbenzene	0.34	0.21	0.17	0.14	0.14	0.25	0.19	0.16
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.95	0.50	0.48	0.61	0.51	0.51	0.51	0.29
1-Dodecene	0.23	0.21	0.17	0.20	0.12	0.25	0.15	0.18
n-Dodecane	0.50	0.34	0.31	0.42	0.30	0.33	0.30	0.16
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	ND	ND	ND	ND	ND	ND	ND	ND
TNMOC (speciated)	**312.67**	**126.39**	**118.63**	**126.49**	**120.00**	**201.93**	**214.52**	**82.52**
TNMOC (w/ unknowns)	**368.13**	**165.54**	**165.75**	**163.95**	**161.31**	**251.98**	**283.05**	**113.75**

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Sample No.:	22348	22361	22451		22456	22561D1	22561R1	22562D2
Sampling Date:	8/21/01	8/22/01	8/23/01	8/24/01	8/28/01	8/29/01	8/29/01	8/29/01
Analysis Date:	L1IC008	L1IC009	VOID	Not Sampled	L1IC010	L1IS011	L1IU014	L1IS012
Ethylene	3.96	3.03			9.56	7.14	7.15	7.06
Acetylene	2.74	2.19			9.25	7.10	7.09	7.05
Ethane	4.76	4.37			12.48	11.11	10.99	10.85
Propylene	1.90	1.53			4.44	3.09	3.06	3.06
Propane	3.61	5.42			10.03	22.99	22.78	19.62
Propyne	ND	ND			ND	ND	ND	ND
Isobutane	1.16	1.28			1.93	2.94	2.91	2.64
Isobutene/1-Butene	1.90	1.72			4.90	3.03	2.98	3.05
1,3-Butadiene	0.28	0.23			0.89	0.60	0.62	0.62
n-Butane	1.69	2.05			4.16	4.06	4.05	4.04
trans-2-Butene	0.21	0.23			0.59	0.41	0.41	0.40
cis-2-Butene	0.24	0.28			0.66	0.53	0.53	0.50
3-Methyl-1-butene	0.12	ND			0.42	0.30	0.30	0.29
Isopentane	5.53	3.64			16.13	21.23	20.98	19.21
1-Pentene	0.35	0.42			1.04	1.16	0.56	0.61
2-Methyl-1-butene	0.38	0.35			1.33	0.96	0.94	0.97
n-Pentane	2.30	2.07			6.50	8.38	8.31	8.25
Isoprene	0.90	0.85			0.80	0.80	0.79	0.76
trans-2-Pentene	0.54	0.54			1.77	1.35	1.32	1.35
cis-2-Pentene	0.31	0.37			0.96	0.80	0.79	0.77
2-Methyl-2-butene	0.65	0.58			1.98	1.60	1.55	1.65
2,2-Dimethylbutane	0.48	0.55			1.06	0.97	1.01	0.94
Cyclopentene	0.16	0.16			0.23	0.18	0.18	0.26
4-Methyl-1-pentene	ND	ND			ND	ND	ND	ND
Cyclopentane	0.39	0.41			1.01	1.11	1.11	1.08
2,3-Dimethylbutane	0.85	0.58			8.75	0.81	0.87	0.90
2-Methylpentane	2.94	2.74			7.41	5.80	6.07	5.97
3-Methylpentane	1.54	1.44			4.56	3.93	3.88	3.87
2-Methyl-1-pentene	0.14	ND			0.32	0.28	0.21	0.35
1-Hexene	0.27	0.39			0.25	0.27	0.28	0.26
2-Ethyl-1-butene	ND	ND			ND	ND	ND	ND
n-Hexane	1.68	1.48			5.08	4.14	4.06	4.12
trans-2-Hexene	ND	ND			ND	ND	ND	ND
cis-2-Hexene	ND	ND			0.17	0.20	0.21	0.21
Methylcyclopentane	1.08	0.95			3.00	2.69	2.68	2.67
2,4-Dimethylpentane	0.53	0.52			1.30	1.18	1.16	1.16
Benzene	7.41	1.93			8.93	6.06	5.98	6.25
Cyclohexane	0.54	0.52			1.02	3.16	3.14	2.64
2-Methylhexane	0.94	0.76			2.29	2.12	2.15	2.08
2,3-Dimethylpentane	0.56	0.51			1.31	1.23	1.22	1.21
3-Methylhexane	1.30	0.97			3.22	2.99	3.06	2.89
1-Heptene	ND	0.21			ND	0.55	ND	0.51
2,2,4-Trimethylpentane	2.42	1.98			5.77	4.28	4.85	4.46
n-Heptane	1.01	0.68			2.03	1.89	1.98	1.60
Methylcyclohexane	0.83	0.70			1.31	1.41	1.47	1.39
2,2,3-Trimethylpentane	0.32	0.24			0.73	0.48	0.66	0.66
2,3,4-Trimethylpentane	0.84	0.75			1.97	1.78	1.85	1.80
Toluene	5.39	3.74			10.89	23.10	25.74	19.78
2-Methylheptane	0.28	0.28			0.57	0.60	0.62	0.56
3-Methylheptane	0.35	0.25			0.66	0.62	0.64	0.61
1-Octene	ND	ND			ND	ND	ND	ND
n-Octane	0.55	0.43			0.80	0.90	1.00	0.86
Ethylbenzene	0.71	0.66			1.67	1.35	1.44	1.43
m-Xylene/p-Xylene	1.85	1.93			5.04	4.04	4.49	4.18
Styrene	0.60	0.73			0.91	0.53	0.98	0.71
o-Xylene	0.78	0.73			1.94	1.73	1.88	1.76
1-Nonene	ND	ND			ND	0.24	0.29	0.24
n-Nonane	0.45	0.35			0.64	0.70	0.73	0.69
Isopropylbenzene	0.19	0.21			0.30	0.32	0.32	0.29
a-Pinene	0.15	0.23			0.56	0.34	0.34	0.31
n-Propylbenzene	0.22	0.26			0.47	0.54	0.60	0.57
m-Ethyltoluene	0.66	0.63			1.62	1.97	2.10	1.98
p-Ethyltoluene	0.41	0.52			0.81	1.01	1.13	0.98
1,3,5-Trimethylbenzene	0.41	0.32			0.93	1.13	1.24	1.25
o-Ethyltoluene	0.40	0.28			0.42	1.01	1.05	1.24
b-Pinene	ND	ND			ND	ND	ND	ND
1,2,4-Trimethylbenzene	1.13	0.97			2.36	2.82	2.93	2.85
1-Decene	ND	ND			ND	ND	ND	ND
n-Decane	0.80	0.48			0.91	4.26	4.46	3.13
1,2,3-Trimethylbenzene	0.22	0.29			0.53	0.64	0.62	0.62
m-Diethylbenzene	0.13	0.11			0.23	0.24	0.25	0.23
p-Diethylbenzene	0.17	0.14			0.26	0.28	0.26	0.26
1-Undecene	ND	ND			ND	ND	ND	ND
n-Undecane	0.29	0.41			0.58	7.38	7.55	3.95
1-Dodecene	ND	0.24			0.18	ND	ND	ND
n-Dodecane	0.13	0.31			0.31	2.79	2.70	1.04
1-Tridecene	ND	ND			ND	ND	ND	ND
n-Tridecane	ND	ND			ND	0.18	0.15	ND
TNMOC (speciated)	**75.98**	**64.12**			**185.10**	**205.76**	**209.69**	**189.53**
TNMOC (w/ unknowns)	**105.11**	**107.98**			**244.02**	**231.43**	**240.92**	**214.22**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report
(Reported in ppbC)

Sample No.:	22562R2	22563	22564		22674	22675D1	22675R1	22676D2
Sampling Date:	8/29/01	8/30/01	8/31/01	9/3/01	9/4/01	9/5/01	9/5/01	9/5/01
Analysis Date:	L1IU015	L1IX005	L1IX006	Not Sampled	L1IX007	L1IX008	L1JB010	L1IX009
Ethylene	6.97	5.76	5.09		6.47	9.78	7.41	9.70
Acetylene	7.06	4.57	4.54		5.85	15.70	11.31	15.69
Ethane	10.77	7.56	8.37		15.39	20.71	15.38	20.75
Propylene	3.02	2.80	2.43		3.26	4.55	3.36	4.49
Propane	19.50	6.78	5.64		12.02	16.03	10.91	16.01
Propyne	ND	ND	ND		ND	ND	ND	ND
Isobutane	2.62	2.22	1.94		3.52	4.08	3.21	4.11
Isobutene/1-Butene	3.00	2.94	2.88		4.08	4.81	3.78	5.05
1,3-Butadiene	0.60	0.47	0.44		0.60	0.91	0.70	0.92
n-Butane	3.93	2.98	3.13		6.74	6.25	4.91	6.28
trans-2-Butene	0.37	0.34	0.31		0.54	0.62	0.50	0.66
cis-2-Butene	0.44	0.40	0.38		0.64	0.73	0.59	0.75
3-Methyl-1-butene	0.30	0.18	0.19		0.35	0.42	0.36	0.41
Isopentane	19.01	7.92	7.97		16.91	17.72	13.52	17.61
1-Pentene	0.64	0.45	0.55		0.95	1.13	0.80	0.99
2-Methyl-1-butene	0.99	0.65	0.66		1.04	1.36	1.07	1.35
n-Pentane	8.20	3.66	3.30		8.67	9.46	7.26	9.37
Isoprene	0.76	0.45	0.65		0.50	1.26	0.99	1.24
trans-2-Pentene	1.35	0.83	0.90		1.55	1.71	1.40	1.74
cis-2-Pentene	0.75	0.52	0.55		0.84	0.97	0.80	0.96
2-Methyl-2-butene	1.63	0.98	0.96		1.63	1.84	1.50	1.93
2,2-Dimethylbutane	0.89	0.70	0.69		1.04	1.20	0.96	1.18
Cyclopentene	0.25	ND	ND		0.36	0.37	0.28	0.32
4-Methyl-1-pentene	ND	ND	ND		ND	ND	ND	ND
Cyclopentane	1.05	0.58	0.67		0.92	1.25	0.94	1.26
2,3-Dimethylbutane	1.21	1.04	5.01		7.37	8.98	7.46	9.12
2-Methylpentane	5.92	3.94	4.26		6.64	7.36	5.73	7.47
3-Methylpentane	3.86	2.45	2.54		3.89	4.82	3.75	4.87
2-Methyl-1-pentene	0.31	0.15	0.18		0.19	0.33	0.28	0.30
1-Hexene	0.21	0.43	0.50		0.62	0.29	0.55	0.53
2-Ethyl-1-butene	ND	ND	ND		ND	ND	ND	ND
n-Hexane	4.07	2.81	2.54		4.26	5.12	4.12	5.06
trans-2-Hexene	ND	ND	ND		ND	ND	ND	ND
cis-2-Hexene	0.21	ND	ND		ND	0.22	0.20	0.23
Methylcyclopentane	2.65	1.75	1.72		2.43	3.08	2.44	3.11
2,4-Dimethylpentane	1.14	0.88	0.86		1.19	1.55	1.26	1.45
Benzene	6.43	7.60	6.88		9.29	5.92	5.67	5.83
Cyclohexane	2.59	0.74	0.79		1.01	1.19	0.96	1.24
2-Methylhexane	2.14	1.29	1.25		1.82	2.39	2.12	2.39
2,3-Dimethylpentane	1.20	0.87	0.86		1.26	1.53	1.32	1.52
3-Methylhexane	2.98	1.94	1.96		2.49	3.31	2.98	3.25
1-Heptene	ND	ND	ND		ND	ND	ND	ND
2,2,4-Trimethylpentane	5.00	3.37	4.24		5.33	6.58	5.37	6.47
n-Heptane	1.90	1.20	1.17		1.64	2.25	2.12	2.19
Methylcyclohexane	1.51	0.94	0.93		1.34	1.52	1.42	1.58
2,2,3-Trimethylpentane	0.64	0.42	0.48		0.63	0.82	0.74	0.80
2,3,4-Trimethylpentane	1.75	1.17	1.49		1.83	2.27	1.87	2.25
Toluene	21.06	5.49	6.48		8.38	12.40	10.35	12.32
2-Methylheptane	0.59	0.33	0.35		0.45	0.76	0.56	0.59
3-Methylheptane	0.60	0.37	0.41		0.48	0.58	0.56	0.58
1-Octene	ND	ND	ND		ND	ND	ND	ND
n-Octane	0.89	0.55	0.48		0.70	0.91	0.75	0.88
Ethylbenzene	1.40	0.90	0.84		1.20	1.91	2.18	1.96
m-Xylene/p-Xylene	4.30	2.54	2.53		3.49	5.53	4.24	5.69
Styrene	ND	0.56	0.74		0.64	0.82	0.88	1.96
o-Xylene	1.79	1.00	1.02		1.35	2.12	1.64	2.20
1-Nonene	0.25	ND	ND		0.13	0.12	0.16	0.19
n-Nonane	0.68	0.38	0.37		0.43	1.47	1.13	1.50
Isopropylbenzene	0.29	0.25	0.25		0.29	0.42	0.37	0.44
a-Pinene	0.32	0.30	0.31		1.37	1.32	1.17	1.35
n-Propylbenzene	0.55	0.26	0.28		0.32	0.70	0.49	0.64
m-Ethyltoluene	2.01	0.89	0.98		1.22	2.12	1.65	2.14
p-Ethyltoluene	0.99	0.53	0.57		0.64	1.36	1.10	1.39
1,3,5-Trimethylbenzene	1.19	0.56	0.61		0.69	1.59	0.96	1.70
o-Ethyltoluene	1.23	0.41	0.55		0.56	1.57	1.13	1.65
b-Pinene	ND	ND	ND		ND	ND	ND	ND
1,2,4-Trimethylbenzene	2.94	1.37	1.44		1.83	3.27	2.35	3.35
1-Decene	ND	ND	ND		ND	ND	ND	ND
n-Decane	3.06	0.62	0.76		0.68	2.68	2.11	3.01
1,2,3-Trimethylbenzene	0.63	0.32	0.24		0.35	0.69	0.51	0.69
m-Diethylbenzene	0.28	0.22	0.19		0.20	0.30	0.36	0.32
p-Diethylbenzene	0.20	0.17	ND		0.19	0.31	0.28	0.29
1-Undecene	ND	ND	ND		ND	ND	ND	ND
n-Undecane	3.96	0.44	0.39		0.78	0.96	0.77	0.78
1-Dodecene	ND	ND	ND		0.12	0.20	0.38	0.12
n-Dodecane	1.06	0.34	0.24		0.60	0.68	0.82	0.35
1-Tridecene	ND	ND	ND		ND	ND	ND	ND
n-Tridecane	ND	ND	ND		ND	ND	0.30	ND
TNMOC (speciated)	**190.02**	**105.49**	**109.90**		**174.16**	**227.12**	**179.45**	**228.48**
TNMOC (w/ unknowns)	**215.70**	**133.32**	**128.87**		**205.65**	**260.12**	**206.43**	**266.05**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report (Reported in ppbC)

Sample No.:	22676R2	22684	22685	22736	22737	22734D1	22734R1	22735D2
Sampling Date:	9/5/01	9/6/01	9/7/01	9/10/01	9/11/01	9/12/01	9/12/01	9/12/01
Analysis Date:	L1JB011	L1IX010	L1IX011	L1IX012	L1IX013	L1IX014	L1JB007	L1IX015
Ethylene	7.35	4.97	3.20	4.82	11.70	6.83	5.24	6.76
Acetylene	10.89	4.62	1.81	2.89	10.44	5.30	3.70	5.25
Ethane	15.10	10.52	3.61	21.25	22.19	23.68	17.83	23.26
Propylene	3.33	2.23	1.07	2.11	5.43	2.83	2.20	2.87
Propane	10.98	8.80	2.94	20.89	21.71	16.66	11.41	16.71
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	3.20	2.14	0.85	4.84	5.21	5.70	4.50	5.76
Isobutene/1-Butene	3.96	2.55	1.41	2.58	5.45	2.46	2.03	2.44
1,3-Butadiene	0.71	0.39	0.19	0.39	1.08	0.51	0.41	0.47
n-Butane	4.87	4.38	1.33	11.49	12.71	7.45	5.86	7.53
trans-2-Butene	0.52	0.34	0.19	0.32	1.30	0.39	0.35	0.41
cis-2-Butene	0.63	0.44	0.30	0.41	1.60	0.52	0.46	0.54
3-Methyl-1-butene	0.31	0.18	ND	0.27	1.29	0.46	0.36	0.44
Isopentane	13.33	7.74	3.62	13.60	46.16	22.18	16.94	22.29
1-Pentene	0.90	0.55	0.31	0.61	2.74	1.22	0.91	1.35
2-Methyl-1-butene	1.08	0.57	0.31	0.69	2.88	0.87	0.69	0.89
n-Pentane	7.17	4.33	1.47	15.92	22.44	11.44	8.82	12.05
Isoprene	0.98	0.56	0.61	0.45	0.81	0.54	0.45	0.50
trans-2-Pentene	1.37	0.82	0.46	0.85	4.16	1.21	1.05	1.26
cis-2-Pentene	0.85	0.53	0.32	0.46	2.10	0.70	0.60	0.69
2-Methyl-2-butene	1.51	0.88	0.45	0.92	4.80	0.95	0.75	0.94
2,2-Dimethylbutane	0.98	0.70	0.37	0.94	2.08	1.23	1.02	1.25
Cyclopentene	0.26	0.20	ND	0.17	0.78	ND	0.18	ND
4-Methyl-1-pentene	ND	ND	ND	ND	0.21	ND	ND	ND
Cyclopentane	1.00	0.64	0.34	0.68	2.12	1.36	1.12	1.36
2,3-Dimethylbutane	7.40	3.94	0.60	1.06	23.21	11.63	8.98	11.55
2-Methylpentane	5.84	3.82	2.07	4.77	13.98	7.89	6.11	7.89
3-Methylpentane	3.79	2.26	1.16	2.60	8.72	5.23	4.11	5.19
2-Methyl-1-pentene	0.26	0.12	ND	ND	0.56	0.18	0.15	0.17
1-Hexene	0.56	0.48	0.26	0.44	0.77	0.56	0.55	0.58
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	4.08	2.72	1.27	3.68	8.46	5.80	4.72	5.80
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	0.20	0.12	ND	ND	0.35	ND	0.13	0.16
Methylcyclopentane	2.43	1.68	0.82	1.74	5.29	3.27	2.58	3.24
2,4-Dimethylpentane	1.23	0.75	0.39	1.00	2.56	1.50	1.32	1.56
Benzene	5.77	9.75	5.95	6.75	9.56	4.60	4.58	4.69
Cyclohexane	0.97	0.77	0.50	1.00	1.65	1.22	1.01	1.24
2-Methylhexane	2.13	1.17	0.59	1.16	3.46	2.15	1.97	2.10
2,3-Dimethylpentane	1.31	0.78	0.45	1.15	2.46	1.53	1.33	1.53
3-Methylhexane	3.30	1.74	0.85	1.55	4.68	3.02	2.78	2.90
1-Heptene	ND	ND	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	5.46	2.90	1.41	4.30	11.77	7.37	6.41	7.33
n-Heptane	2.06	1.19	0.53	1.36	2.92	1.81	2.01	1.71
Methylcyclohexane	1.41	0.94	0.56	1.18	2.09	1.50	1.35	1.41
2,2,3-Trimethylpentane	0.82	0.32	0.17	0.46	1.40	0.85	0.91	0.86
2,3,4-Trimethylpentane	1.80	0.97	0.51	1.29	4.19	2.47	2.10	2.47
Toluene	10.56	6.14	2.62	5.17	18.02	11.49	10.48	11.81
2-Methylheptane	0.66	0.32	0.19	0.32	0.88	0.53	0.45	0.56
3-Methylheptane	0.56	0.45	0.19	0.31	0.76	0.50	0.48	0.51
1-Octene	ND	ND	ND	ND	ND	ND	ND	ND
n-Octane	0.76	0.52	0.30	0.55	1.17	0.83	0.73	0.83
Ethylbenzene	2.05	0.97	0.41	0.59	2.16	1.60	1.26	1.64
m-Xylene/p-Xylene	4.31	3.00	1.22	1.77	6.39	4.58	3.50	4.63
Styrene	1.62	0.69	0.51	0.58	0.83	0.88	0.62	0.72
o-Xylene	1.68	1.12	0.52	0.71	2.54	1.80	1.35	1.81
1-Nonene	0.14	ND	0.12	ND	0.24	0.14	0.15	0.15
n-Nonane	1.16	0.40	0.23	0.37	1.00	0.69	0.55	0.69
Isopropylbenzene	0.39	0.29	0.16	0.19	0.59	0.40	0.39	0.45
a-Pinene	1.10	0.25	ND	1.35	2.99	1.35	1.09	1.40
n-Propylbenzene	0.51	0.30	0.19	0.21	0.69	0.51	0.40	0.48
m-Ethyltoluene	1.63	0.94	0.51	0.71	2.69	1.89	1.41	1.82
p-Ethyltoluene	1.04	0.59	0.31	0.35	1.33	0.97	0.70	0.93
1,3,5-Trimethylbenzene	1.22	0.56	0.28	0.41	1.49	0.99	0.75	1.01
o-Ethyltoluene	1.11	0.55	0.28	0.35	1.27	0.86	0.72	1.04
b-Pinene	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	2.45	1.46	0.66	1.07	3.55	2.58	1.82	2.53
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	2.19	0.59	0.44	0.60	1.61	1.21	1.01	1.18
1,2,3-Trimethylbenzene	0.63	0.33	0.19	0.22	0.77	0.55	0.52	0.54
m-Diethylbenzene	0.34	0.18	0.13	0.16	0.32	0.19	0.28	0.24
p-Diethylbenzene	0.28	0.16	0.13	0.14	0.30	0.21	0.21	0.19
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.69	0.55	0.25	0.51	1.04	0.77	0.57	0.65
1-Dodecene	0.14	0.12	ND	ND	0.13	0.12	0.30	ND
n-Dodecane	0.49	0.56	0.19	0.32	0.46	0.38	0.45	0.37
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	0.19	ND	ND	ND	ND	ND	0.25	ND
TNMOC (speciated)	**179.98**	**116.56**	**53.27**	**159.98**	**352.64**	**213.07**	**170.36**	**213.53**
TNMOC (w/ unknowns)	**215.84**	**135.42**	**67.19**	**193.78**	**397.62**	**241.76**	**196.54**	**236.51**

Fort Worth, Texas (CAMS13) 2001 Speciated Hydrocarbon Final Data Report (Reported in ppbC)

Sample No.:	22735R2	22817	22801	22802	22904	22905	22938	22939
Sampling Date:	9/12/01	9/13/01	9/14/01	9/17/01	9/18/01	9/19/01	9/20/01	9/21/01
Analysis Date:	L1JB008	L1IX016	L1JB009	L1JB012	L1IX019	L1JB013	L1IX021	L1JB014
Ethylene	5.15	12.86	7.16	4.69	2.40	5.77	7.19	8.62
Acetylene	3.76	11.02	4.82	3.57	5.07	4.50	5.27	7.81
Ethane	17.71	18.35	40.11	14.08	2.06	10.70	17.14	15.74
Propylene	2.14	5.50	3.29	1.93	1.23	2.46	3.19	3.94
Propane	11.24	20.46	19.59	10.75	3.65	11.93	21.30	10.41
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	4.46	4.80	5.74	3.68	0.96	2.45	5.02	2.93
Isobutene/1-Butene	2.01	4.27	2.91	2.44	1.55	2.72	3.51	4.88
1,3-Butadiene	0.38	0.93	0.53	0.35	0.21	0.51	0.64	0.87
n-Butane	5.88	7.46	7.79	5.34	1.58	4.56	9.16	5.32
trans-2-Butene	0.34	0.51	0.31	0.25	0.17	0.47	0.51	0.54
cis-2-Butene	0.42	0.57	0.40	0.33	0.22	0.55	0.68	0.64
3-Methyl-1-butene	0.36	0.50	0.25	0.13	ND	0.41	0.40	0.37
Isopentane	16.89	24.09	14.53	8.14	4.15	14.84	18.48	14.42
1-Pentene	0.92	1.17	0.67	0.51	0.40	0.92	1.21	0.85
2-Methyl-1-butene	0.70	1.05	0.50	0.51	0.32	0.94	1.14	1.24
n-Pentane	9.22	26.70	16.08	4.03	1.82	7.77	9.16	7.09
Isoprene	0.42	0.73	0.49	0.40	0.40	0.38	0.66	0.66
trans-2-Pentene	1.06	1.53	0.89	0.65	0.44	1.44	1.64	1.60
cis-2-Pentene	0.61	0.82	0.50	0.43	0.32	0.72	0.90	0.88
2-Methyl-2-butene	0.75	1.64	0.84	0.55	0.39	1.54	1.71	1.73
2,2-Dimethylbutane	1.01	1.69	1.18	0.75	0.44	0.73	1.19	0.98
Cyclopentene	0.19	0.21	0.14	ND	ND	0.40	0.33	0.29
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	1.10	1.65	1.08	0.64	0.43	0.77	0.89	0.95
2,3-Dimethylbutane	9.00	12.93	6.70	0.88	0.55	7.24	7.54	8.64
2-Methylpentane	6.09	10.56	6.46	3.82	2.09	4.80	6.75	6.40
3-Methylpentane	4.08	6.50	4.01	2.29	1.29	2.91	4.17	4.18
2-Methyl-1-pentene	0.16	0.25	0.15	0.12	ND	0.36	0.28	0.31
1-Hexene	0.55	0.79	0.60	0.47	0.39	0.44	0.56	0.58
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	4.72	6.45	4.76	2.70	1.35	3.57	4.92	4.68
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	0.13	0.18	ND	ND	ND	0.15	0.16	0.19
Methylcyclopentane	2.57	4.00	2.35	1.59	0.92	1.90	2.73	2.86
2,4-Dimethylpentane	1.39	1.97	1.38	0.80	0.53	0.97	1.19	1.37
Benzene	4.53	10.73	7.85	7.30	5.35	6.02	5.95	7.41
Cyclohexane	1.03	1.48	1.32	0.76	0.53	0.65	1.08	1.11
2-Methylhexane	1.89	2.99	2.38	1.30	0.66	1.40	1.96	2.40
2,3-Dimethylpentane	1.36	2.01	1.40	0.85	0.53	0.97	1.14	1.40
3-Methylhexane	2.65	4.04	3.34	1.82	1.04	1.96	2.70	3.27
1-Heptene	ND	ND	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	6.22	9.65	6.23	3.13	1.65	4.02	4.28	5.85
n-Heptane	1.77	2.60	2.48	1.38	0.70	1.26	1.73	2.13
Methylcyclohexane	1.34	2.19	2.35	1.10	0.66	0.93	1.53	1.67
2,2,3-Trimethylpentane	0.87	1.20	0.76	0.43	0.19	0.71	0.56	1.05
2,3,4-Trimethylpentane	2.05	3.49	2.07	1.02	0.60	2.53	1.42	2.01
Toluene	10.21	16.91	10.38	5.49	2.74	8.84	8.17	8.96
2-Methylheptane	0.45	0.79	0.76	0.40	0.23	0.36	0.65	0.74
3-Methylheptane	0.49	0.77	0.64	0.41	0.26	0.37	0.84	0.79
1-Octene	ND	ND	ND	ND	ND	ND	ND	ND
n-Octane	0.72	1.16	1.12	0.52	0.32	0.48	1.23	0.83
Ethylbenzene	1.25	2.30	1.74	1.19	0.47	1.52	1.16	1.30
m-Xylene/p-Xylene	3.46	6.65	3.40	2.02	1.30	2.83	3.41	3.90
Styrene	0.41	1.69	0.88	0.48	0.35	0.66	0.78	0.76
o-Xylene	1.36	2.63	1.32	0.87	0.56	1.12	1.37	1.55
1-Nonene	0.16	0.22	0.16	0.12	ND	0.21	ND	0.12
n-Nonane	0.60	0.93	0.70	0.35	0.26	0.41	0.81	0.47
Isopropylbenzene	0.38	0.58	0.37	0.32	0.20	0.30	0.39	0.58
a-Pinene	1.05	3.82	5.80	ND	ND	3.49	0.54	0.40
n-Propylbenzene	0.41	0.72	0.37	0.24	0.21	0.26	0.36	0.42
m-Ethyltoluene	1.34	2.87	1.65	0.75	0.53	1.22	1.31	1.60
p-Ethyltoluene	0.68	1.17	0.78	0.50	0.35	0.57	0.73	0.80
1,3,5-Trimethylbenzene	0.74	1.47	0.77	0.46	0.33	0.57	0.77	0.85
o-Ethyltoluene	0.80	1.07	0.87	0.35	0.22	0.68	0.71	0.71
b-Pinene	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	1.80	3.85	1.75	1.21	0.84	1.45	1.97	2.35
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	0.80	1.49	1.08	0.49	0.45	0.66	0.80	0.61
1,2,3-Trimethylbenzene	0.48	0.74	0.51	0.26	0.18	0.37	0.43	0.47
m-Diethylbenzene	0.26	ND	ND	0.22	0.14	0.14	0.21	0.30
p-Diethylbenzene	0.19	0.33	0.18	0.17	ND	0.12	0.20	0.26
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.58	1.04	0.82	0.35	0.26	0.45	0.47	0.40
1-Dodecene	0.21	0.13	0.30	0.13	ND	0.18	0.16	0.16
n-Dodecane	0.46	0.54	0.72	0.36	0.24	0.38	0.32	0.53
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	0.21	ND	0.36	0.19	ND	0.24	ND	0.23
TNMOC (speciated)	**168.60**	**286.35**	**223.77**	**113.71**	**57.61**	**148.09**	**189.73**	**180.33**
TNMOC (w/ unknowns)	**189.24**	**329.41**	**264.90**	**134.47**	**73.82**	**179.84**	**214.39**	**205.49**

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Sample No.:	23010	23009	23057D1	23057R1	23058D2	23058R2	23082D1	23082R1
Sampling Date:	9/24/01	9/25/01	9/26/01	9/26/01	9/26/01	9/26/01	9/27/01	9/27/01
Analysis Date:	L1JC006	L1JB016	L1JB017	L1JC007	L1JB018	L1JC008	L1JB019	L1JC009
Ethylene	1.83	2.57	9.14	9.26	9.15	9.21	16.34	16.36
Acetylene	1.17	2.19	7.05	7.34	7.01	7.30	16.24	16.37
Ethane	23.81	38.68	17.86	18.31	18.13	18.17	31.02	31.23
Propylene	0.95	1.19	4.48	4.49	4.54	4.44	7.37	7.24
Propane	17.35	25.41	13.67	13.48	13.75	13.51	21.84	21.23
Propyne	ND	ND	ND	ND	ND	ND	ND	ND
Isobutane	5.38	7.31	7.27	7.16	7.14	7.25	5.72	5.63
Isobutene/1-Butene	1.86	1.27	5.23	5.30	5.23	5.30	8.40	8.36
1,3-Butadiene	ND	0.17	0.87	0.87	0.86	0.84	1.61	1.64
n-Butane	11.34	16.20	14.31	14.34	14.18	14.42	9.49	9.44
trans-2-Butene	ND	0.21	1.39	1.41	1.40	1.40	1.19	1.21
cis-2-Butene	ND	0.30	1.75	1.75	1.71	1.75	1.29	1.27
3-Methyl-1-butene	ND	0.15	1.09	1.11	1.10	1.12	0.73	0.70
Isopentane	7.39	12.91	39.27	39.30	39.38	39.19	32.53	32.06
1-Pentene	0.23	0.36	2.64	2.54	2.73	2.54	1.65	1.64
2-Methyl-1-butene	ND	0.32	2.36	2.35	2.37	2.32	2.31	2.32
n-Pentane	7.36	8.86	18.27	18.18	18.35	18.18	30.31	29.66
Isoprene	ND	0.19	0.78	0.74	0.80	0.79	1.00	1.00
trans-2-Pentene	0.29	0.51	3.63	3.62	3.62	3.64	3.15	3.09
cis-2-Pentene	0.27	0.30	1.87	1.87	1.88	1.88	1.65	1.59
2-Methyl-2-butene	0.28	0.51	3.81	3.84	3.84	3.83	3.69	3.64
2,2-Dimethylbutane	0.55	0.63	1.72	1.80	1.74	1.72	2.13	2.13
Cyclopentene	ND	0.11	0.62	0.67	0.68	0.67	0.69	0.65
4-Methyl-1-pentene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane	0.64	0.66	1.71	1.71	1.75	1.70	2.88	0.18
2,3-Dimethylbutane	0.78	1.22	17.43	17.57	17.38	16.76	16.75	16.90
2-Methylpentane	3.98	4.58	9.86	10.12	9.90	9.98	12.37	12.42
3-Methylpentane	1.87	2.52	6.32	6.42	6.39	6.37	8.24	8.07
2-Methyl-1-pentene	ND	ND	0.38	0.45	0.48	0.40	0.59	0.58
1-Hexene	0.41	0.31	0.82	0.74	0.76	0.79	0.83	0.83
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	3.45	4.37	6.76	6.88	6.78	6.70	8.93	8.81
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	ND	ND	0.28	0.29	0.30	0.28	0.46	0.45
Methylcyclopentane	1.14	1.38	3.89	3.96	3.91	3.89	5.50	5.41
2,4-Dimethylpentane	0.68	1.04	2.32	2.39	2.35	2.38	2.74	2.68
Benzene	5.42	4.88	5.38	5.45	5.42	5.48	8.91	8.86
Cyclohexane	1.02	1.14	1.19	1.22	1.22	1.21	1.87	1.79
2-Methylhexane	0.99	1.26	2.84	2.97	2.74	2.88	5.04	5.11
2,3-Dimethylpentane	0.77	1.29	2.42	2.47	2.42	2.44	2.83	2.82
3-Methylhexane	1.33	1.64	3.87	4.05	3.65	3.82	6.64	6.74
1-Heptene	0.45	ND	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	1.79	4.52	9.78	10.56	9.36	10.35	12.26	13.05
n-Heptane	1.65	1.89	2.50	2.78	2.32	2.75	4.49	5.02
Methylcyclohexane	1.60	1.93	1.70	1.76	1.73	1.70	3.05	3.10
2,2,3-Trimethylpentane	ND	0.71	1.66	1.87	1.46	1.83	2.24	2.58
2,3,4-Trimethylpentane	0.57	1.42	4.14	4.84	4.21	4.77	4.83	5.51
Toluene	2.67	4.81	15.46	20.69	14.93	19.75	26.67	36.46
2-Methylheptane	0.42	0.69	0.90	1.00	0.84	0.86	1.69	2.13
3-Methylheptane	0.38	0.57	0.70	1.04	0.71	0.76	1.40	2.09
1-Octene	ND	ND	ND	ND	ND	ND	0.24	ND
n-Octane	0.72	0.96	1.05	1.22	1.02	1.10	1.93	2.24
Ethylbenzene	0.38	0.21	2.36	2.26	2.24	2.08	3.35	3.71
m-Xylene/p-Xylene	0.99	1.14	5.78	6.58	5.70	5.89	9.81	10.71
Styrene	0.50	0.51	1.17	1.25	1.10	1.16	1.53	1.59
o-Xylene	0.36	0.47	2.25	2.44	2.21	2.26	3.89	4.19
1-Nonene	ND	ND	0.25	0.20	0.28	0.24	0.32	0.37
n-Nonane	0.39	0.46	1.01	1.08	1.03	1.02	1.65	1.67
Isopropylbenzene	ND	0.14	0.61	0.63	0.62	0.60	1.06	0.16
a-Pinene	ND	1.42	1.83	1.88	1.91	1.84	1.07	1.07
n-Propylbenzene	ND	0.16	0.73	0.77	0.72	0.74	1.07	1.06
m-Ethyltoluene	0.37	0.53	2.65	2.67	2.62	2.58	3.94	3.77
p-Ethyltoluene	0.34	0.29	1.36	1.41	1.35	1.34	2.04	2.10
1,3,5-Trimethylbenzene	ND	0.32	1.51	1.54	1.53	1.44	2.39	2.33
o-Ethyltoluene	0.23	0.19	1.49	1.53	1.36	1.49	2.19	2.16
b-Pinene	0.57	ND	ND	0.52	ND	0.47	ND	0.41
1,2,4-Trimethylbenzene	0.53	0.57	3.29	3.47	3.36	3.31	5.84	5.66
1-Decene	ND	ND	ND	ND	ND	ND	ND	ND
n-Decane	0.51	0.48	1.67	1.78	1.82	1.59	2.35	2.24
1,2,3-Trimethylbenzene	0.24	0.17	0.82	0.76	0.75	0.71	1.20	1.36
m-Diethylbenzene	ND	0.12	0.41	0.38	0.40	0.37	0.91	0.58
p-Diethylbenzene	ND	0.12	0.26	0.28	0.30	0.35	0.46	0.57
1-Undecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Undecane	0.47	0.40	1.21	1.25	0.85	0.87	1.47	1.47
1-Dodecene	0.32	ND	0.25	0.33	0.26	0.27	0.32	0.37
n-Dodecane	0.57	0.32	1.08	0.89	0.62	0.64	1.14	1.11
1-Tridecene	ND	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	0.39	ND	0.35	0.47	0.27	0.40	0.51	0.70
TNMOC (speciated)	**119.93**	**172.13**	**294.77**	**306.52**	**292.88**	**300.02**	**392.22**	**401.58**
TNMOC (w/ unknowns)	**164.91**	**185.10**	**327.98**	**341.80**	**326.37**	**334.77**	**455.14**	**469.88**

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Sample No.:	23083D2	23083R2	23092D1	23092R1	23093D2	23093R2	23150
Sampling Date:	9/27/01	9/27/01	9/28/01	9/28/01	9/28/01	9/28/01	10/1/01
Analysis Date:	L1JB020	L1JC010	L1JB021	L1JC011	L1JC004	L1JC012	L1JE023
Ethylene	16.27	15.82	12.94	13.01	12.93	12.68	4.80
Acetylene	15.33	15.85	12.59	12.76	12.65	12.34	3.04
Ethane	31.25	30.35	27.70	27.73	27.85	27.42	93.31
Propylene	7.34	6.68	6.00	5.87	5.79	5.69	1.97
Propane	21.92	20.66	18.34	17.66	17.43	17.55	74.17
Propyne	ND	ND	ND	ND	ND	ND	ND
Isobutane	5.71	5.19	7.28	6.97	6.81	6.91	19.21
Isobutene/1-Butene	8.36	8.21	6.57	6.55	6.59	6.54	2.24
1,3-Butadiene	1.65	1.62	1.30	1.28	1.30	1.28	0.36
n-Butane	9.51	9.21	12.67	12.48	12.53	12.32	38.21
trans-2-Butene	1.19	1.15	1.09	1.10	1.08	1.09	0.25
cis-2-Butene	1.30	1.22	1.28	1.32	1.27	1.26	0.35
3-Methyl-1-butene	0.74	0.75	0.81	0.81	0.83	0.81	ND
Isopentane	32.49	31.82	34.17	33.86	33.90	33.62	20.69
1-Pentene	1.78	1.74	2.09	2.04	2.04	1.98	0.49
2-Methyl-1-butene	2.36	2.36	2.21	2.15	2.10	1.99	0.28
n-Pentane	30.07	29.41	24.82	24.41	24.41	24.14	18.11
Isoprene	1.04	1.00	0.92	0.94	0.92	0.95	0.39
trans-2-Pentene	3.15	3.07	3.02	3.00	2.98	2.92	0.51
cis-2-Pentene	1.64	1.62	1.54	1.55	1.53	1.53	0.44
2-Methyl-2-butene	3.69	3.63	3.17	3.11	3.16	3.08	0.31
2,2-Dimethylbutane	2.17	2.12	1.95	1.95	1.98	1.91	1.27
Cyclopentene	0.65	0.71	0.70	0.54	0.60	0.55	ND
4-Methyl-1-pentene	0.18	ND	ND	ND	ND	ND	ND
Cyclopentane	2.86	2.79	2.69	2.69	2.61	2.62	1.22
2,3-Dimethylbutane	16.88	16.91	15.43	15.37	16.88	16.24	1.75
2-Methylpentane	12.33	12.43	11.10	10.99	11.17	10.94	8.43
3-Methylpentane	8.15	8.14	7.22	7.13	7.20	7.16	4.82
2-Methyl-1-pentene	0.66	0.55	0.44	0.45	0.47	0.46	ND
1-Hexene	0.93	0.86	0.80	0.84	0.83	0.83	0.67
2-Ethyl-1-butene	ND	ND	ND	ND	ND	ND	ND
n-Hexane	8.93	8.91	7.72	7.58	7.77	7.60	8.95
trans-2-Hexene	ND	ND	ND	ND	ND	ND	ND
cis-2-Hexene	0.46	0.47	0.35	0.32	0.38	0.34	ND
Methylcyclopentane	5.48	5.46	4.52	4.49	4.55	4.43	3.67
2,4-Dimethylpentane	2.60	2.72	2.41	2.39	2.41	2.29	0.95
Benzene	8.92	8.79	7.19	7.04	7.24	7.12	3.41
Cyclohexane	1.88	1.83	1.62	1.61	1.60	1.59	4.06
2-Methylhexane	5.01	5.19	3.63	3.62	3.78	3.62	2.58
2,3-Dimethylpentane	2.84	2.86	2.35	2.36	2.37	2.33	1.07
3-Methylhexane	6.59	6.83	4.83	4.75	4.92	4.69	3.10
1-Heptene	ND	ND	ND	ND	ND	ND	0.88
2,2,4-Trimethylpentane	12.17	13.23	9.96	10.15	10.73	9.85	1.95
n-Heptane	4.55	5.18	3.25	3.27	3.80	3.10	4.17
Methylcyclohexane	3.08	3.14	2.30	2.36	2.50	2.30	5.68
2,2,3-Trimethylpentane	2.35	2.89	2.02	1.61	2.01	1.60	0.20
2,3,4-Trimethylpentane	4.77	5.58	3.59	3.46	4.17	3.44	0.67
Toluene	26.68	36.65	18.90	19.07	26.49	18.37	4.89
2-Methylheptane	1.79	2.02	1.26	1.10	1.52	1.21	1.06
3-Methylheptane	1.89	2.03	1.30	1.22	1.48	1.22	0.78
1-Octene	ND	ND	ND	ND	ND	ND	ND
n-Octane	2.03	2.27	1.48	1.37	1.82	1.44	1.71
Ethylbenzene	3.61	3.56	2.31	2.27	2.93	2.40	0.65
m-Xylene/p-Xylene	9.86	10.38	7.30	6.77	8.58	7.26	2.12
Styrene	1.26	1.53	1.76	1.62	1.86	1.66	0.48
o-Xylene	3.97	4.04	2.90	2.67	3.25	2.87	0.84
1-Nonene	0.37	0.34	0.29	0.21	0.28	0.23	ND
n-Nonane	1.73	1.71	1.58	1.43	1.64	1.53	0.82
Isopropylbenzene	1.11	1.05	0.76	0.74	0.78	0.74	0.29
a-Pinene	1.04	1.03	2.37	2.25	2.52	2.32	0.76
n-Propylbenzene	1.05	1.05	0.78	0.70	0.81	0.76	0.27
m-Ethyltoluene	3.82	3.92	2.98	2.75	2.90	2.85	0.77
p-Ethyltoluene	2.05	2.14	1.55	1.51	1.63	1.60	0.51
1,3,5-Trimethylbenzene	2.38	2.32	1.84	1.67	1.81	1.75	0.60
o-Ethyltoluene	2.14	2.14	1.78	1.66	1.77	1.73	0.45
b-Pinene	ND	ND	ND	0.57	0.62	0.55	ND
1,2,4-Trimethylbenzene	5.81	5.75	4.41	4.03	4.38	4.25	1.17
1-Decene	ND	ND	ND	ND	ND	ND	ND
n-Decane	2.71	2.68	2.42	2.11	2.01	2.17	0.77
1,2,3-Trimethylbenzene	1.21	1.32	0.92	0.82	0.88	0.86	0.27
m-Diethylbenzene	0.59	0.61	0.52	0.43	0.47	0.40	0.19
p-Diethylbenzene	0.53	0.48	0.30	0.31	0.39	0.36	0.19
1-Undecene	ND	0.15	ND	ND	ND	ND	ND
n-Undecane	1.44	1.49	2.31	2.19	1.65	1.59	0.55
1-Dodecene	0.27	0.32	0.19	0.23	0.30	0.23	0.27
n-Dodecane	1.26	1.13	1.80	1.79	1.10	1.13	0.40
1-Tridecene	ND	ND	ND	ND	ND	ND	ND
n-Tridecane	0.50	0.77	0.51	0.62	0.71	0.60	0.23
TNMOC (speciated)	**392.27**	**401.79**	**341.04**	**335.68**	**352.61**	**333.16**	**359.66**
TNMOC (w/ unknowns)	**446.67**	**461.67**	**382.08**	**375.09**	**397.69**	**372.09**	**377.62**

TECHNICAL REPORT DATA

(Please read Instructions on reverse before completing)

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16. ABSTRACT

Reporting of data results for the Nonmethane Organic Compounds (NMOC) and Speciated Nonmethane Organic Compounds (SNMOC) Monitoring Program, summer 2001.

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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