

TECHNICAL SUPPORT DOCUMENT

Air Quality at Memorial Academy Charter School in Barrio Logan, a Neighborhood Community in San Diego

(October 1999 – February 2001)

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Preface

Airborne toxic substances were measured in the Barrio Logan community, in San Diego, as part of a pilot project. The project is intended to help develop tools for future use in important programs, including the Neighborhood Assessment Program, the Community Health Program, and studies required by State law concerning children's health (SB25 – Children's Environmental Health Protection Program).

The Barrio Logan community was selected in conjunction with the San Diego County Air Pollution Control District (District) and with local stakeholders. As part of the planning effort and at the encouragement of local stakeholders, the District engaged a consultant to analyze the data collected during the first six months of the project (October 1999 to March 2000). The District selected Sonoma Technology Inc. (STI) for this work.

Because of the District's contract with STI, the ARB staff did not officially analyze the six-month data set. Instead, the ARB staff analyzed the entire data set (October 1999 through February 2001) and compared its results to STI's conclusions. For the purpose of comparing results to STI, we also analyzed the limited data from October 1999 through March 2000. Throughout this report, the term "Barrio Logan" refers to the monitoring site at Memorial Academy Charter School.

This report documents the work of the ARB staff in detail as a technical support document. Hien Tran and Bob Weller performed the technical analyses. Thanks go to Lawrence C. Larsen, Mena Shah, Bob Effa, and Bob Fletcher for their extensive comments and review of this report.

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NOTE: Except for Tables 3.4 through 3.7, all tables appear at the end of the report.

Executive Summary

1. What is this report about?

Barrio Logan is a community with both residential and industrial facilities. The population is largely Latino, and 40% of households are below the federal poverty level. The residents' interest in learning about the health impact of pollution from industrial operations and the community's proximity to freeways and industrial sources such as shipyards led to a special monitoring study. As a result, ARB, the San Diego County Air Pollution Control District, the Environmental Health Coalition, and other stakeholders designed a study to evaluate air pollution levels around Barrio Logan. During the study, air quality measurements of more than 40 toxic air contaminants plus criteria pollutants (such as ozone, carbon monoxide and particulate matter) were collected at Memorial Academy Charter School, located at 28th Street and Logan Avenue in San Diego. The site was selected partly due to its proximity to potential emission sources including a major freeway and industrial sources such as shipyards.

This report documents the ARB's detailed review of outdoor air measurements at Memorial Academy and our initial evaluation of the potential impacts of air pollutants on public health in the Barrio Logan community. Specifically, it addresses the health impact of outdoor air pollutants at Memorial Academy compared with other areas of San Diego and California in general. This technical document provides details that support the findings and conclusions summarized in a shorter report titled "Air Quality at Memorial Academy Charter School, a Neighborhood Community in San Diego", released June 2002.

2. How did the measured levels of toxic air pollutants at Memorial Academy compared against other urbanized regions?

Generally, air quality in urbanized regions of California is unhealthy. The San Diego region is no exception. No unusual levels of toxic air pollutants were detected at Memorial Academy. The annual averages were similar to those found statewide. As seen in most locations of the State, the winter levels of most toxic air pollutants appear to be higher than the levels during other seasons.

3. How does the potential cancer risk of air toxics at Memorial Academy compare to other sites and to the statewide average?

The potential cancer risk is primarily due to a small number of the toxic air pollutants. The potential cancer risk at Memorial Academy was slightly higher than Chula Vista, similar to El Cajon and Statewide, and much

lower than urban Los Angeles. The higher potential cancer risk at Memorial Academy compared to Chula Vista was due to two compounds – 1,3-butadiene and benzene – which are mainly emitted from motor vehicles. However, the risks at Memorial Academy and Chula Vista were not statistically different. Particulate matter from diesel-fueled engines (diesel PM), the compound with the most significant potential cancer risk, was not measured in this project because a direct measurement method is still being developed. Nonetheless, we feel that we can make comparisons of the potential cancer risk based on other compounds and estimated diesel PM values.

4. For pollutants that pose the greatest health risk, how do the exposure levels at Memorial Academy compare to neighboring sites?

Levels of 1,3-butadiene and benzene were statistically higher at Memorial Academy than at Chula Vista, while perchloroethylene levels were statistically lower at Memorial Academy than at El Cajon. For acetaldehyde and formaldehyde, there were no major differences between Memorial Academy and other sites. Among the pollutants that contribute most to potential cancer risk, four pollutants did not have sufficient data to support meaningful comparisons.

When the results for these pollutants are merged, the potential cancer risk at Memorial Academy was somewhat higher than at Chula Vista, but little different from El Cajon and statewide results.

5. For pollutants with health-based standards established, how do the exposure levels at Memorial Academy compare to neighboring sites?

Typical levels of air pollutants with health-based standards (criteria pollutants) measured at Memorial Academy are comparable to those measured at long-term neighboring sites. While standards for particulate matter and ozone have not been achieved, programs are in place for reducing levels of these pollutants.

6. For metals other than hexavalent chromium, how does Memorial Academy compare with neighboring sites?

Levels of manganese, nickel, strontium, and zinc were statistically higher at Memorial Academy than Chula Vista or El Cajon. However, the measured levels were not high enough to pose a significant health risk.

7. How do the ARB and STI analyses compare?

STI analyzed 6 months of fall and winter data collected from October 1999 through March 2000. The levels of most compounds tend to be higher

during the winter than the summer. It is not surprising, therefore, that the ARB analyses based on the entire year differ in some ways from the STI analyses.

Using statistically reliable and robust techniques applied to a larger data set, the ARB found that more compounds (compared to STI's analyses) differed statistically between Memorial Academy and the other sites in the San Diego area. However, in terms of integrating the results together, the potential cancer risk at Memorial Academy was slightly higher compared to Chula Vista, about the same as El Cajon and statewide, and much lower than urban Los Angeles.

Our review of air quality measurements during the first 17 months of the study at Memorial Academy provides an initial characterization of air quality in the Barrio Logan community. Air quality in Barrio Logan has been studied in greater detail in the months following February 2001. Issues that were unresolved by February 2001 included the potential for adverse effects of local sources, such as major truck traffic or industrial and commercial sources, on neighboring residences. Health effects of toxic air pollutants also require further investigation. Our studies will focus on computer modeling of all sources of pollution in the Barrio Logan area, monitoring for specific emission sources, roadside inspections of diesel trucks, and truck traffic counting. We expect to report on these activities in the near future.

1. Introduction

Barrio Logan is an urban community located just south of downtown San Diego, California. The population is largely Latino (more than 80%), and 40% of household incomes are below the federal poverty level (U.S. EPA, 2000).

Residents of Barrio Logan have expressed interest in learning about the levels of toxic air contaminants (TACs) in their community due to the close proximity of industrial and mobile sources. In Barrio Logan, industrial and residential facilities are intermixed. In addition, I-5 and other heavily traveled roadways run through Barrio Logan.

In 1999, responding to community interests, the California Air Resources Board (ARB) joined with the San Diego County Air Pollution Control District (District) and the Environmental Health Coalition (EHC) to design a special purpose monitoring study. During the study, air quality measurements were collected at Memorial Academy Charter School, located at 28th Street and Logan Avenue. This site was selected partly because it is downwind of the I-5 freeway. Throughout this report, the term “Barrio Logan” refers to the monitoring site at Memorial Academy Charter School.

Besides collecting air quality data, the study includes developing a local emission inventory and calculating model-based predictions of air quality. These tasks are addressed elsewhere. This report documents the ARB’s analysis of ambient air measurements at Memorial Academy and assessment of the potential impacts of air pollutants on public health.

1.1 *Objectives of Data Analysis*

The data analysis objectives for this project are:

- To determine the ambient levels of TACs and other pollutants at Memorial Academy;
- To assess the differences in air pollutants between Memorial Academy and other long-term air pollutant monitoring sites;
- To evaluate the potential cancer and non-cancer health risk of TACs at Memorial Academy and compare it to statewide and local conditions.

The analyses in this report address ambient (outdoor) levels of TACs. Indoor exposures to TACs were not measured during the study.

1.2 *Monitoring Period*

Over 50 pollutants, including 40 TACs were measured from October 1999, through February 2001. For the first six months, daily (24-hour) samples were collected every fourth day. For the remainder of the study, samples were collected every twelfth day. The 1-in-12 day schedule was synchronized with ARB's regular sampling schedule for TACs at Chula Vista and El Cajon.

Criteria pollutants were measured on a different schedule. The gaseous pollutants were measured continuously and reported every hour. Particulate was measured every three days at Memorial Academy during the initial six-month period and every six days thereafter.

1.3 *Data Sources*

Except for Tables 3.4 through 3.7, all tables and figures appear at the end of the text discussion of this report.

Table 1.1 lists the compounds collected at Memorial Academy. The table also lists limits of detection (LODs), the level below which a measurement is not reliable. The measurements include criteria pollutants, meteorological parameters, metals, particulate matter (PM), halogens, various hydrocarbons, and oxygenated substances. The same measurements were also collected at Chula Vista and El Cajon.

In California, a network of about 20 sites has measured TAC levels on a 1-in-12-day schedule since 1990. Two of these sites – Chula Vista and El Cajon – are in the San Diego area (see **Figure 1.1**). Chula Vista is six miles southeast and El Cajon is thirteen miles northeast of Memorial Academy.

Criteria pollutants are measured at a long-term station on 12th Avenue in San Diego, less than one-mile northwest of Memorial Academy. This station (SD12) monitors carbon monoxide (CO), nitrogen oxides (NO_x), and ozone (O₃). Criteria pollutant data at SD12 were selected to compare with Memorial Academy.

Over the years, air quality has steadily improved in most parts of the State, including San Diego. At this time, several substances rarely have ambient levels above the limit of detection (LOD). Because Barrio Logan is the focus of this study, only substances with at least 50% of measurements at Memorial Academy detected above their respective LODs were analyzed for this report.

Table 1.2 lists the percentage of measurements for each substance that were below the LOD. The following compounds were excluded from further analyses because the majority of measurements were below LOD:

- Ethyl Benzene
- Methylene Chloride
- meta-Dichlorobenzene
- ortho-Dichlorobenzene
- para-Dichlorobenzene
- Styrene
- Cobalt
- Hexavalent Chromium
- Molybdenum
- Tin
- Benzo(k)fluoranthene
- Dibenz(a,h)anthracene

During the 17 months of monitoring, only four out of 45 sampling days recorded values for hexavalent chromium at or above the detection level at Memorial Academy, and two days recorded values at or above the detection limit at Chula Vista. El Cajon did not record any values above LOD. **Figures 1.2, 1.3 and 1.4** display hexavalent chromium measurements at the three sites.

The ARB's quality assurance (QA) procedures were applied to the data collected at Memorial Academy (QA Manual, Monitoring and Laboratory Division, ARB, 2000)). Prior to data analysis, values below the LOD were set equal to one-half of the LOD. This is a standard procedure that is necessary when computing average values. Other procedures for handling values less than LOD are being developed. At the same time, our lab staff is continually working to lower the detection limits for measurements. Recent changes in calibration methods for some compounds were accounted for. Unusually high or low measurements were given additional scrutiny by the Monitoring and Laboratory Division (MLD) staff. All values included in the analyses were considered valid.

Table 1.3 lists the unit risk factors and reference exposure levels for the compounds collected at Memorial Academy. The information is used to evaluate the health impact at Memorial Academy. More on this will be discussed later.

2. Methodology

This section outlines the methods used to assess air quality at Memorial Academy, to compare air quality at Memorial Academy to air quality

impacts at other sites, and to evaluate the overall health impact of TACs at Memorial Academy.

2.1 Air Quality at Memorial Academy, Chula Vista, and El Cajon

To characterize air quality in terms of TACs at Memorial Academy and at other sites, we used averages. Annual averages are the summary statistics that relate most effectively to the health impact of exposure to cancer-causing toxic substances (OEHHA, 2000a). To analyze TAC data, the ARB often uses the “mean of monthly means” rather than the simple average of all values in a year. The mean of monthly means is preferred because it is more stable when data are highly seasonal and some months are likely to have more data than other months. Experience indicates that averages computed this way are more representative and less uncertain than simple averages.

Diesel particulate, the largest risk compound, was not monitored in this study because a method of direct measurement is still being developed. Of the 40 TACs that were measured, nine of these typically account for 95% of the non-diesel potential cancer risk. Consequently, we focused our analysis on those top nine. They are:

- Benzene
- 1,3-Butadiene
- Formaldehyde
- Acetaldehyde
- Perchloroethylene
- Carbon Tetrachloride
- Hexavalent Chromium
- Methylene Chloride
- Para-Dichlorobenzene

Of these, hexavalent chromium, methylene chloride, and para-dichlorobenzene had most values below LOD and could not be analyzed.

Additionally, we looked at certain metals associated with activities in the Barrio Logan area. Arsenic was not included in this analysis because limited data were available for the entire 17-month period and the majority of those samples were below the LOD.

For the pollutants with health-based standards established, called “criteria pollutants”, we summarize particulate matter, ozone, nitrogen oxides and carbon monoxide in terms of average, maximum, and the number of days with levels above the State standard, based on a 12-month period (from October 1999 through September 2000). It is typical to study air quality over such a period to account for seasonal variations. Unlike the other

criteria pollutants, which are measured every day, particulate matter is measured once every six days.

2.2 Differences Between Sites

Data sets can be compared using various methods. We chose a statistically reliable method (explained below) to compare the air quality data from different sites.

To address the precision and accuracy of the measured data sets, we note that the same instruments and methods were used to collect and analyze the data in this report. Any inherent bias in the collection or analysis technique is further reduced by choosing to determine statistical differences between sites based on common days.

To maximize the power of comparisons between sites, only matched pairs of data were analyzed. That is, only data on common days at both sites are considered. This approach takes advantage of strong correlations that exist for same-day measurements at different sites in a region. For example, the correlation for same-day measurements of 1,3-butadiene at Memorial Academy and El Cajon was greater than 0.9 (**Figure 2.1**). A high correlation would indicate that high values at one site tend to correspond to high values at another site, and that low values at one site would correspond to low values at another site. **Figures 2.2 through 2.12** display the observations on days common to Memorial Academy and the other two sites.

Strong results in correlation between matched-day measurements are not unexpected, for similar meteorology and sources of emissions usually explain this correlation. Although unmatched values offer some information, one matched pair is typically more informative than five unmatched values in terms of evaluating differences between sites. The proper weight to assign to the unmatched data is difficult to determine, so the most defensible choice was to exclude unmatched measurements in determining differences in pollutant levels between sites.

STI used an alternative to the above method of using matched data only. STI relied on building confidence intervals around the median values of each site and examining whether the intervals overlap. This method would be based on larger uncertainty estimates, making it harder to discern any real differences between sites. Section 3.5 discusses STI results compared to ARB.

The potential cancer risk provides an integrated basis for comparing the impact of multiple TACs at different locations. The risk at Memorial

Academy was compared to the statewide average and Los Angeles, in addition to Chula Vista and El Cajon.

For comparing with Chula Vista and El Cajon, we used matched days to minimize the day-to-day variability due to meteorology.

For comparing with Statewide and Los Angeles, we used all data collected at Memorial Academy, Chula Vista and El Cajon for the period October 1999 through September 2000. Values for Los Angeles and Statewide averages were based on 1998-2000 data, the latest three years of data for those sites.

The 95% confidence level (5% significance level) was chosen for determining whether the measurements between Memorial Academy and other sites were statistically different. This choice of confidence level is consistent with STI's analysis of the six-month data set (STI, 2000), allowing comparisons of the STI and ARB conclusions. We emphasize here that "statistical difference" is purely indicative of the behavior of the measurements taken, and that to evaluate the significance of the health impact, we would need to consider other factors such as potential cancer risk, etc. We also note that aside from our choice of analyzing paired differences, the frequency of sampling pollutants further supports the assumption of independence in the measurements. Air quality measurements for almost all pollutants show very low autocorrelation beyond 4 days. In other words, taking samples 6 or more days apart enable us to assume that the data are independent – an assumption critical in our evaluation of statistical difference.

2.3 Consideration of Health Impact

Toxic air contaminants can cause long-term health problems such as cancer. Risk assessments include a comprehensive analysis of the dispersion of TACs in the environment, the potential for human exposure, and quantitative assessments of both individual and population-wide health risks associated with those levels of exposure. The Office of Environmental Health Hazard Assessment (OEHHA) has developed Unit Risk Factors (URFs) for approximately 120 substances or groups of substances. The URFs represent the current state of scientific knowledge concerning the cancer-causing potential of these substances. A URF, also known as a cancer potency factor, is used when estimating the potential cancer risk of breathing a substance. It is defined as the estimated upper confidence limit (usually 95%) probability of a person developing cancer as a result of constantly breathing one microgram per cubic meter of a pollutant over a 70-year lifetime. In **Table 1.3**, the URFs

have been converted to reflect the units of measurement for the specific pollutants we measured.

Cancer risk estimates represent the chance of excess cancer cases in one million people, assuming these people breathe the average levels of the pollutant over a 70-year lifetime. Cancer risk is commonly expressed as the number of potential chances in a million of developing cancer. Particulate matter from diesel-fueled engines (diesel PM), the primary contributor to health risks from urban toxic air pollutants, was not measured as part of this study. We are still in the process of developing methods to measure diesel PM and some other pollutants that may cause adverse health effects. The potential cancer risk due to a particular substance is estimated by multiplying the URF by the average level of the substance (for the corresponding time period). The annual average level is estimated by using the mean of monthly means, discussed in section 2.1 above. In addition, for comparison purposes, we also calculated the potential cancer risk based on simple arithmetic averages of observations on “matched” days. Since the cancer risk estimates are based on limited data, we caution against misinterpretation and misuse of this information.

When merging the results from individual compounds into an overall potential cancer risk, we also determine whether the risks differ statistically between locations. For this calculation, we take the risk factors as known quantities and use the variability in the measurements to characterize the uncertainties. We recognize the uncertainty behind the URF. However, at this time, these unit risk factors represent the best scientific knowledge on the cancer risk of constant exposure to toxic pollutants through breathing.

3. Results and Discussion

This section presents the results of data analyses conducted by the ARB staff. The discussion addresses the limitations of this work, as well as the similarities and differences between the ARB’s conclusions and STI’s conclusions.

3.1 *Air Quality in Memorial Academy, Chula Vista, and El Cajon*

First, we discuss the health impact of individual toxic air pollutants.

Measured levels of TACs over the entire 17-month period at Memorial Academy are summarized in **Table 3.1a**. The table contains the number of values, the average level (concentration), the minimum concentration, and the maximum concentration for selected substances. Similar statistics were calculated for Chula Vista and El Cajon, and the results for

these sites are summarized in **Table 3.2b** and **Table 3.2c**, respectively. The same information is summarized by month for all three sites in **Table 3.2**.

As discussed in Section 2, the average air quality is determined by the "mean of monthly means." For **Table 3.3**, all the data collected at Memorial Academy, both matched and unmatched days, were used to determine the air quality statistics. This table includes results for four different periods:

- The intensive sampling period from October 1999 through March 2000 (the period analyzed by STI), called "Winter 6 months" in the table;
- The 12-month period from October 1999 through September 2000, called "Annual" in the table;
- The winter season from October 1999 through February 2000, called "Winter 1999" in the table;
- The winter season from October 2000 through February 2001, called "Winter 2000" in the table.

At Memorial Academy, Chula Vista, and El Cajon, most of the compounds showed higher values during the winter than the summer. Two of the most important compounds – benzene and 1,3-butadiene – followed this pattern. See **Figure 3.2 and 3.3**. For some metals, such as manganese and nickel, the winter averages were only slightly higher than annual averages. See **Figure 3.4 and 3.5**.

Between the two winter seasons, average levels for most compounds either declined slightly or remained the same. Exceptions include PM total carbon and benzo(a)pyrene, both of which were higher during the second winter season.

Next, we discuss criteria pollutants (pollutants with health-based standards established): particulate matter, ozone, nitrogen oxides and carbon monoxide.

The San Diego area currently does not meet the state standard for particulate matter. **Table 3.4** summarizes results for this pollutant over a 12-month period. The same period was analyzed for all criteria pollutants. It is expected that on average, one out of 10 days measured at Memorial Academy would exceed the established standard, and one out of 20 days measured at Chula Vista or El Cajon would exceed. Although the number of exceedances may differ between Memorial Academy and the other sites, the average and maximum levels are comparable. Programs are in place to reduce particulate matter statewide.

Table 3.4. Particulate Matter in a 12-month Period (10/99-9/00).

Location	Average*	Maximum*	Number of Days Above State Standard
Memorial Academy	35	61	6
Chula Vista	31	59	2
El Cajon	32	60	3
San Diego - 12th Ave.	35	64	7

* Units of measure are micro-grams per cubic meter (ug/m³) for 24 hours. The State 24-hour standard is 50 ug/m³.

Currently, some areas in the San Diego region and many other areas of the State do not meet the State standard for ozone. As summarized in **Table 3.5**, levels of ozone at Memorial Academy are comparable to the San Diego region. Over a period of a year, about one day measured at Memorial Academy and the long-term site (San Diego-12th Avenue) showed levels of ozone above the established standard.

Table 3.5. Ozone in a 12-month Period (10/99-9/00).

Location	Average* Of Daily Maximum Values	Maximum*	Number of Days Above State Standard
Memorial Academy	42	96	1
Chula Vista	50	91	0
El Cajon	49	106	5
San Diego - 12th Ave.	43	118	1

* Units of measure are parts-per-billion (ppb). The State one-hour standard is 90 ppb. A value of 91 ppb does not exceed the standard due to rounding.

Nitric oxide and nitrogen dioxide make up nitrogen oxides. There are standards established for nitrogen dioxide, but not for nitrogen oxides. **Table 3.6** shows that Memorial Academy's annual levels of nitrogen oxides are slightly higher than those at Chula Vista and El Cajon, but they are similar to San Diego-12th Avenue. All locations in the San Diego region and other areas of the State currently show levels below the

standard for nitrogen dioxide. However, we continue to work toward reducing levels of nitrogen oxides due to its role in the formation of ozone.

Table 3.6. Nitrogen Oxides in a 12-month Period (10/99-9/00).

Location	Average* of Daily Maximum Values**	Maximum*
Memorial Academy	61	234
Chula Vista	31	137
El Cajon	43	184
San Diego - 12th Ave.	54	276

* Units of measure are parts-per-billion (ppb)

** No health-based standard has been determined for nitrogen oxides; the State standard for nitrogen dioxide is 25 ppb for a one-hour average.

Next, we discuss carbon monoxide. Currently, carbon monoxide levels in most areas of California are below the State standard. **Table 3.7** shows Memorial Academy, like other sites in San Diego, is no exception.

Table 3.7. Carbon Monoxide in a 12-month Period (10/99-9/00).

Location	Average* of Daily Maximum Values**	Maximum*	Number of Days Above State Standard
Memorial Academy	1.0	2.7	0
Chula Vista	0.9	2.1	0
El Cajon	Not monitored	Not monitored	Not monitored
San Diego - 12th Ave.	1.2	4.1	0

* Units of measure are parts-per-million (ppm)

** The State standard and the daily maximum values are determined for an 8-hour average (ppm). The standard is 9 ppm.

In summary, typical levels of the air pollutants with established standards (criteria pollutants) measured at Memorial Academy are comparable to those measured at long-term monitoring sites in the San Diego region. While standards for particulate matter and ozone have not been achieved, plans are in place for reducing levels of these pollutants.

3.2 Differences Between Sites

As discussed in section 2.2, only matched pairs (same day measurements) were used to compare air quality levels between Memorial Academy and two nearby sites - Chula Vista and El Cajon. There were approximately 30 matched days. Because the monitoring concluded in February 2001, the winter-winter comparison is based on 5 months rather than 6 months of data.

Figure 2.1 shows a typical strong correlation for matched pairs of measurements at two sites in the same region. That is, low values at one site move with low values at another site, and high values move with high values. The figure shows 30 days of 1,3-butadiene data at Memorial Academy and El Cajon. The correlation in this case was 0.93. This high correlation is mainly due to similar meteorology and similar emission sources (motor vehicles in this case). Analyses that do not account for such correlations lack power to discern real differences between sites. **Figures 2.2** through **2.12** show the actual measurements correlated on matched days for selected other compounds (such as carbon tetrachloride, toluene, manganese, and zinc).

Tables 3.8 a, b, c present differences in pollutant levels between Memorial Academy, Chula Vista, and El Cajon over the entire 17-month period (October 1999 through February 2001). If the measurements between Memorial Academy and Chula Vista or El Cajon were statistically different (at 95% confidence level), the direction of the difference is noted. Similar information is presented for the period of 6 months (October 1999 through March 2000) in **Tables 3.9 a, b, c**; however, statistical differences based on limited 6-month data should not be used. Monitoring results based on 17 months should be examined more closely than results based on 6 months, as more data tend to provide more reliable estimates of environmental concentrations. Note that STI results are presented in the far-right column. More discussion on STI results appears in section 3.5.

Among the volatile organic compounds (VOCs), 1,3-butadiene, benzene, MTBE, toluene, meta/para-xylene and ortho-xylene were statistically higher at Memorial Academy than at Chula Vista. The average levels of formaldehyde and acetaldehyde were not statistically different between Memorial Academy, Chula Vista, and El Cajon.

Average levels of carbon tetrachloride at Memorial Academy are comparable to the San Diego region and statewide levels. The primary sources of carbon tetrachloride in California are chemical product manufacturers, and petroleum refineries. The statewide emissions are small, and background levels account for most of the health risk. Carbon tetrachloride is no longer used for dry cleaning purposes. The use of

carbon tetrachloride in products to be used indoors has been discontinued in the United States. Due to lack of sources, carbon tetrachloride levels throughout the State are constant and attributable to background.

Some metals (including manganese, nickel, strontium, and zinc) were statistically higher at Memorial Academy than Chula Vista or El Cajon. The levels of iron were statistically higher at Memorial Academy than at Chula Vista. To evaluate the potential for non-carcinogenic impacts, the monitoring results at Memorial Academy were compared to chronic reference exposure levels (RELs) approved by OEHHA as of December 2001 (2001). An REL is an indicator of potential non-cancer adverse health effects. It is a concentration level at or below which no adverse health effects are anticipated. (See **Table 1.3** for RELs established for each compound.) The highest levels of the measured metals and other pollutants are below the RELs. Section 3.3 (below) discusses the potential cancer risk for the monitoring results.

For PM nitrate, a constituent of total particulate matter (PM₁₀), Memorial Academy recorded higher levels than both Chula Vista and El Cajon. Results for other constituents were mixed. Out of the 50 days when particulate matter levels were measured at all three sites during 17 months of monitoring, the State health-based air pollution standard for particulate matter was exceeded on 9 days at Memorial Academy (shown in **Figure 3.1**), 4 days at Chula Vista and 5 days at El Cajon. Sources of particulate matter emissions include motor vehicles, wind blown dust, and industrial and commercial operations. Nearly all California counties, including San Diego County, exceed the State standard for particulate matter.

For criteria pollutants, comparisons are also made against San Diego-12th Avenue (in addition to Chula Vista and El Cajon). Levels of carbon monoxide were statistically higher at Memorial Academy than Chula Vista and San Diego-12th. Similarly, NO_x levels were statistically higher at Memorial Academy than the three other sites. Ozone, on the other hand, was statistically lower at Memorial Academy than the other three sites.

3.3 *Potential cancer risk*

The potential cancer risk can be calculated for each measured substance, but the overall (integrated) cancer risk provides a more meaningful basis for comparing air quality impacts at different sites.

As discussed earlier, nine compounds contribute to 95% of the non-diesel potential cancer risk. Consequently, we focused our calculation on these nine compounds. Diesel PM was not measured locally due to lack of a direct measurement method, however regional modeled estimates have

been made, and we incorporated these into some of the comparisons. The estimates were taken from the 2001 California Almanac of Emissions and Air Quality (ARB, 2001).

The potential cancer risk based on measured data from October 1999 through September 2000 is presented in **Figure 3.6**. In **Figure 3.7**, the potential cancer risk is distributed across four categories: 1,3-butadiene, benzene, aldehydes, and chlorinated TACs. The aldehydes consist of acetaldehyde and formaldehyde, while the chlorinated TACs include perchloroethylene and carbon tetrachloride. **Figure 3.8** shows the composite potential cancer risk with modeled diesel PM estimates taken from the 2001 Almanac.

The results show the cumulative potential cancer risk at Memorial Academy is slightly higher than Chula Vista and about the same as El Cajon and Statewide. This finding holds whether we consider the measured data only or include estimated diesel PM.

The difference in potential cancer risks between Memorial Academy and Chula Vista is principally due to differences in the levels of 1,3-butadiene and benzene. Motor vehicles are the predominant emission sources for these pollutants. Below, we discuss whether these risks are statistically different.

To compare the potential cancer risk at Memorial Academy with the San Diego region alone, we calculated the risk based on averages from matched observations. As **Figure 3.9** shows, the potential cancer risk based on annual averages at Memorial Academy is slightly higher than Chula Vista and about the same as El Cajon (and statewide without matched days) – the same finding made based on **Figures 3.6-3.8**

Are the potential cancer risks between Memorial Academy and Chula Vista statistically different? Similar to determining statistical differences between sites for individual compounds, we answered this question using matched data at a confidence level of 95%. To this end, we assumed the risk factors as known quantities and derived a 95% confidence interval for the difference in risks between Memorial Academy and Chula Vista (Memorial Academy minus Chula Vista) of –62 cases to +134 cases. As another way to express this range, the overall potential cancer risk at Memorial Academy is about 40% lower to 80% higher than at Chula Vista. Because this plausible range covers zero, the potential cancer risks are not statistically different.

Similar calculations would reveal that the plausible values for potential cancer risk at Memorial Academy are 95 cases lower to 93 cases higher

(or 50% lower to 50% higher) than that at El Cajon. So the cancer risks are not statistically different. Details are displayed in **Table 3.11**.

3.4 *Limitations of our analysis*

The focus of this data analysis was on ambient (outdoor) exposures to selected substances. The potential cancer risk was calculated based on estimated diesel particulate matter and without arsenic measurements. A method for directly measuring diesel PM is under development, so the risk due to diesel PM was calculated rather than measured. Similarly, a measurement method for acrolein, identified as a priority compound under SB25, is still under development, so acrolein was not included in the study. Further, our methods did not consider differences in the uncertainties of different measurement methods or the uncertainty of the unit risk factors.

The estimates of health risks provided in this report are based on the best available scientific information. Sources of potential uncertainty in these estimates include the unavailability of risk estimates for certain compounds and constraints in scientific understanding of pollutants' health effects. Furthermore, our analysis of health risks from toxic air contaminants focused on one health end-point, cancer, whereas these pollutants may create a variety of respiratory, reproductive, and other adverse health effects.

3.5 *Comparison of results from the ARB and STI analyses*

The ARB used different methods than STI. The ARB methods specifically accounted for correlations between sites, primarily due to common weather on common days. In addition, the data set analyzed by ARB included more data leading to greater precision for comparisons. For these reasons, the ARB analyses of local differences had greater resolution, leading to more statistical differences. **Table 3.10** lists the number of compounds found to be statistically different by STI and by ARB. **Tables 3.8** and **3.9** detail specific compounds that differ between Memorial Academy and other sites based on ARB and STI analyses.

The average levels of many pollutants determined by STI tended to be statistically higher than those determined by the ARB. STI primarily considered winter data from the first six months of the study. Many pollutants are present at higher levels during the winter than during the summer. Therefore, these differences between ARB and STI are not unexpected.

4. Summary

Statistically reliable and robust methods were used to analyze air quality data collected at Memorial Academy. The analyses considered how pollutant levels at Memorial Academy compared to other local sites and to statewide levels. The health impacts of toxic air contaminants were also considered by calculating the potential inhalation cancer risk due to substances measured at Memorial Academy.

Based on analyses of data collected at Memorial Academy from October 1999 through February 2001, no unusually high levels of pollutants were measured at Memorial Academy. Levels of TACs and potential cancer risk at Memorial Academy appear to be similar to statewide average levels.

Overall Observations:

- Levels of most toxic substances were higher in winter than for other seasons during the study. From the first winter to the second, levels of most TACs showed either no change or a slight decrease.
- Levels of some constituents of particulate matter and some VOCs were statistically higher at Memorial Academy than at Chula Vista. Motor vehicles appear to be the main source of these pollutants. Differences for these pollutants between Memorial Academy and El Cajon were negligible.
- Some metals, including manganese, nickel, strontium, and zinc, show large local differences. Levels of manganese, nickel, strontium, and zinc were statistically higher at Memorial Academy than Chula Vista and El Cajon. The levels of iron at Memorial Academy were statistically higher than at Chula Vista. However, the levels of these metals do not pose a significant health risk.
- Oxides of nitrogen at Memorial Academy were statistically higher than Chula Vista, El Cajon and San Diego-12th Avenue. Carbon monoxide at Memorial Academy was statistically higher than Chula Vista and San Diego-12th Avenue. Ozone levels, on the other hand, were lower at Memorial Academy than the other three sites.
- The cumulative potential cancer risk due to measured TACs at Memorial Academy was slightly higher than at Chula Vista and about the same as El Cajon and statewide. The largest differences in known carcinogens are found in the motor vehicle-related substances, especially benzene and 1,3-butadiene. However, the potential cancer

risks at Memorial Academy and Chula Vista were not statistically different.

Under a separate report released in May 2001, Sonoma Technology Inc. (STI) analyzed data for the first six months, October 1999 through March 2000. Although that report did not address the potential cancer risk directly, our findings based on seventeen months are consistent with STI's conclusions regarding the concentration levels of toxic pollutants measured at Memorial Academy.

Our review of air quality measurements during the first 17 months of the study at Memorial Academy provides an initial characterization of air quality in the Barrio Logan community. Air quality in Barrio Logan has been studied in greater detail in the months following February 2001. Issues that were unresolved by February 2001 included the potential for adverse effects of local sources, such as major truck traffic or industrial and commercial sources, on neighboring residences. Interests on health effects of toxic air pollutants also require further investigation. Our studies will focus on computer modeling of all sources of pollution in the Barrio Logan area, monitoring for specific emission sources, roadside inspections of diesel trucks, and truck traffic counting. We expect to report on these activities in the near future.

5. References

1. Air Resources Board (2002), "Air Quality at Memorial Academy Charter School in Barrio Logan, a Neighborhood Community in San Diego," January 2002.
2. Air Resources Board (2001), "The 2001 California Almanac of Emissions and Air Quality."
3. Office of Environmental Health Hazard Assessment (1999) "Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors," April 1999.
4. Office of Environmental Health Hazard Assessment (2001) "Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values," December 2001.
5. Sonoma Technology Incorporated, "Analysis of Air Toxics Data Collected in Barrio Logan, California from October 1999 through March 2000," Final Report to San Diego Air Pollution Control District, San Diego, CA, March 2001.
6. United States Environmental Protection Agency (2000) "Federal Interagency Environmental Justice Demonstration projects – Protecting Community health and Reducing Toxic Air Exposure through Collaborative Partnerships in Barrio Logan (San Diego, CA)," November 2000.

Figure 1.1. Air Quality Monitoring Sites in San Diego Area



Figure 1.2 Hexavalent Chromium Levels at Memorial Academy

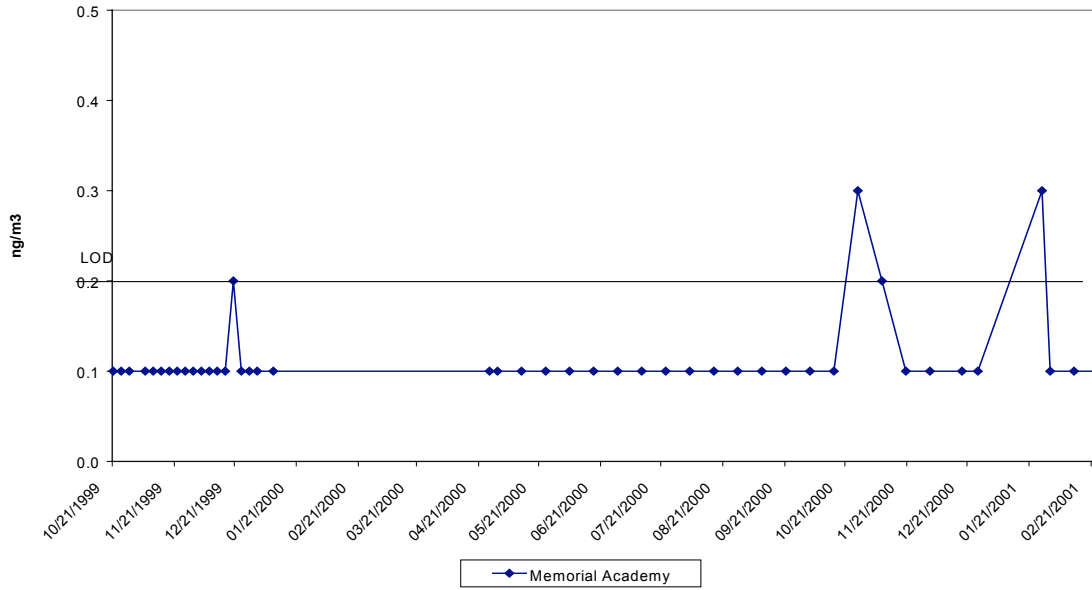


Figure 1.3 Hexavalent Chromium Levels at Chula Vista

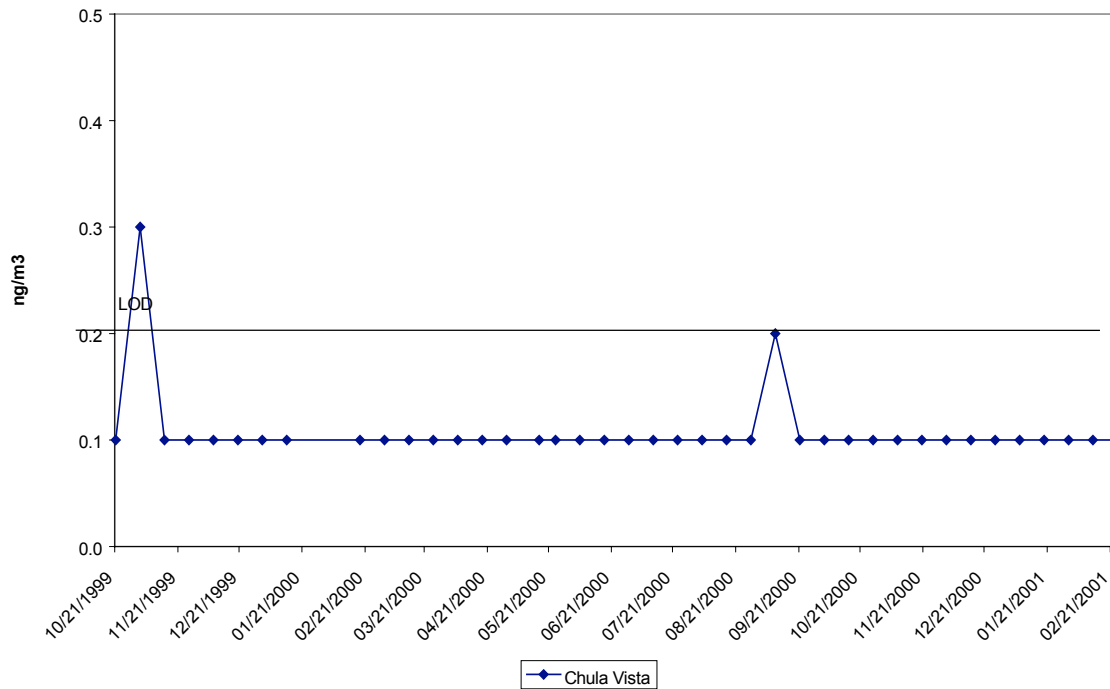


Figure 1.4 Hexavalent Chromium Levels at El Cajon

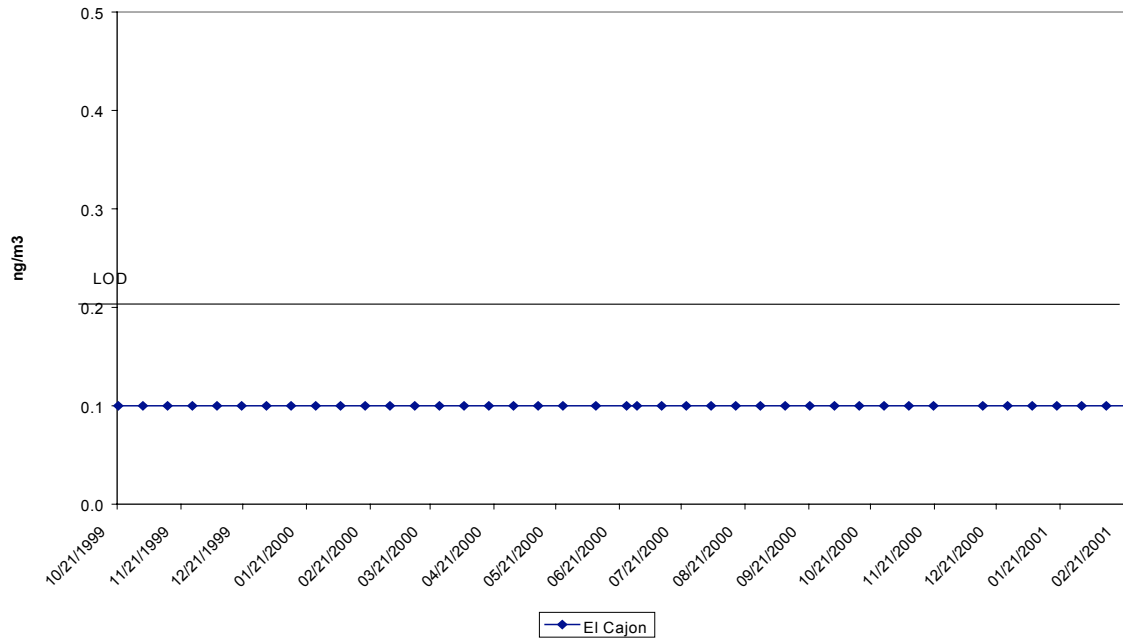


Figure 2.1 Scatterplot of 1,3-Butadiene Levels at Memorial Academy and El Cajon

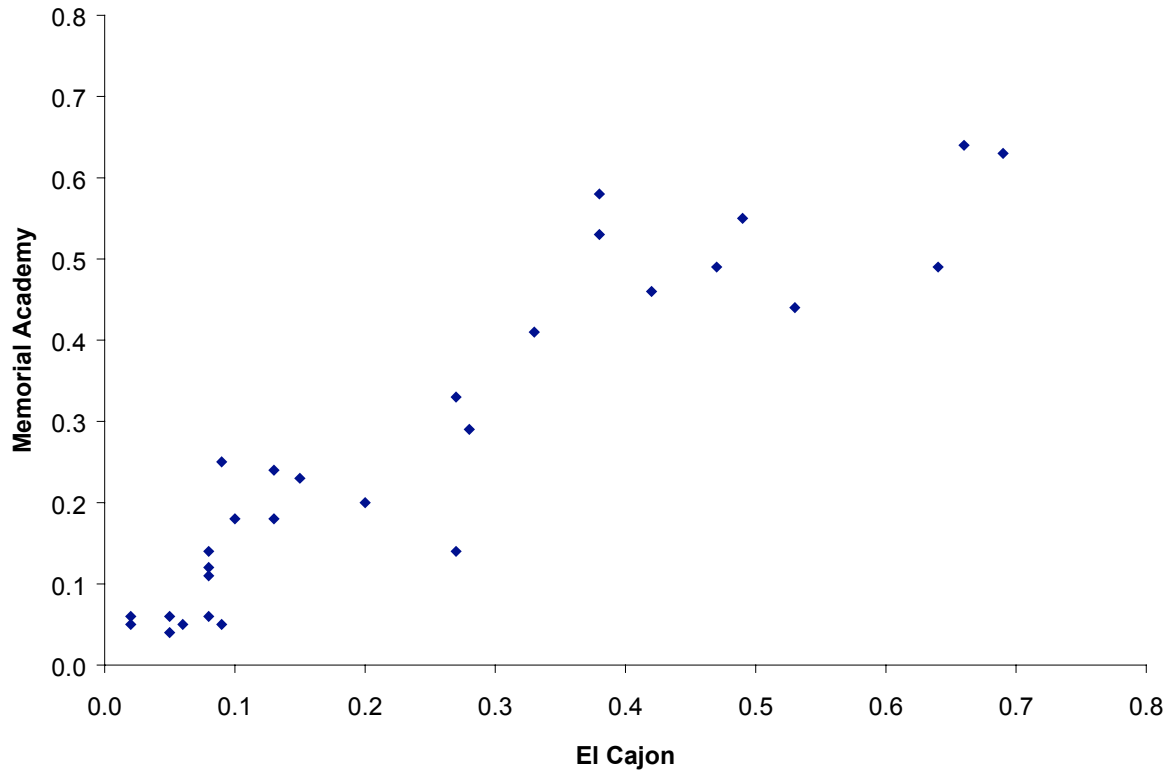


Figure 2.2 1,3-Butadiene Levels on Matched Days at Memorial Academy and a) Chula Vista b) El Cajon

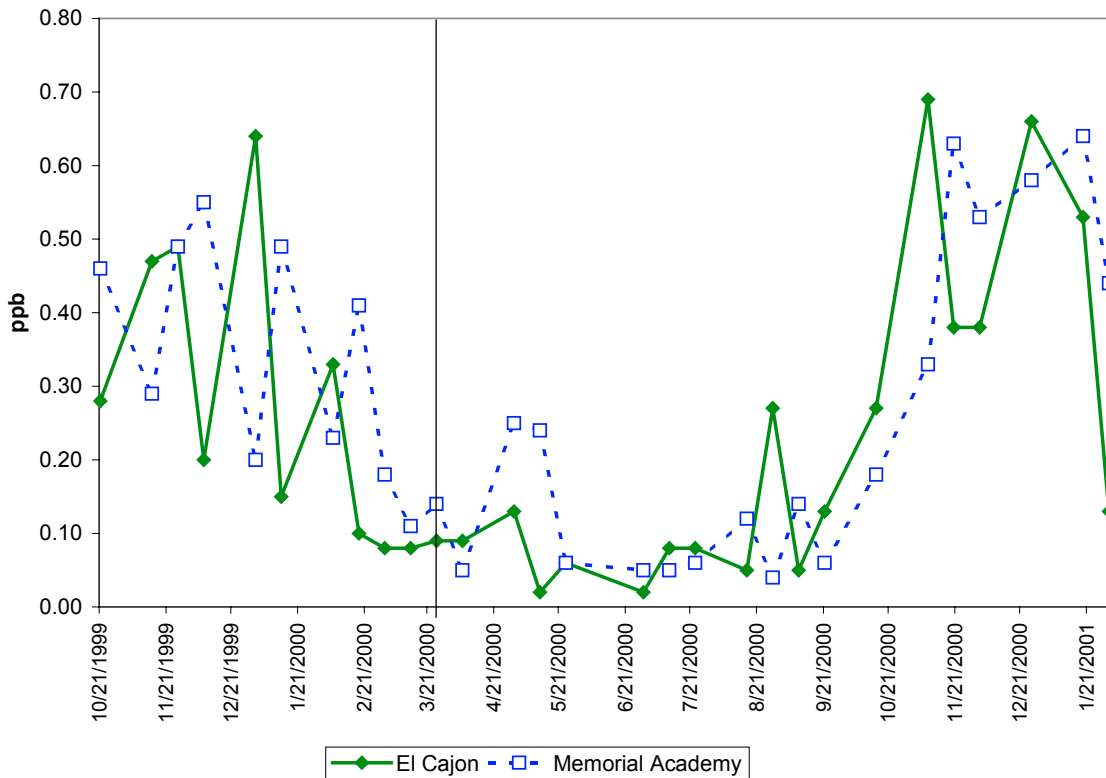
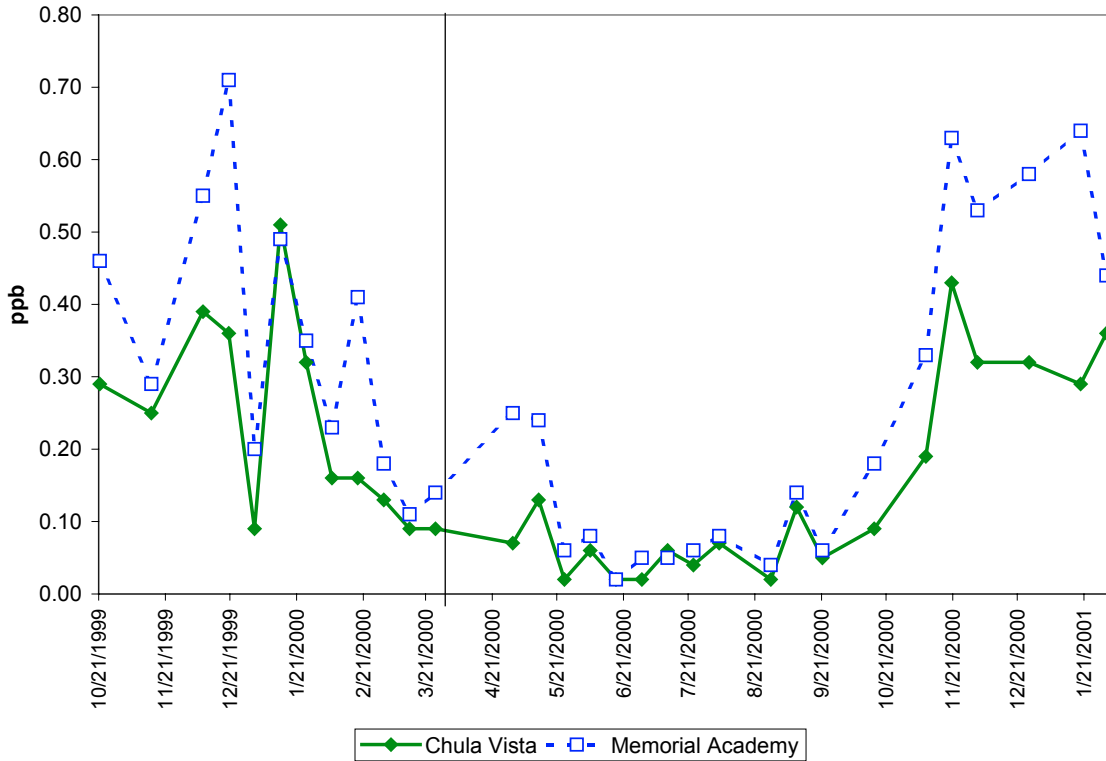


Figure 2.3 Carbon Tetrachloride Levels on Matched Days at Memorial Academy and
a) Chula Vista **b) El Cajon**

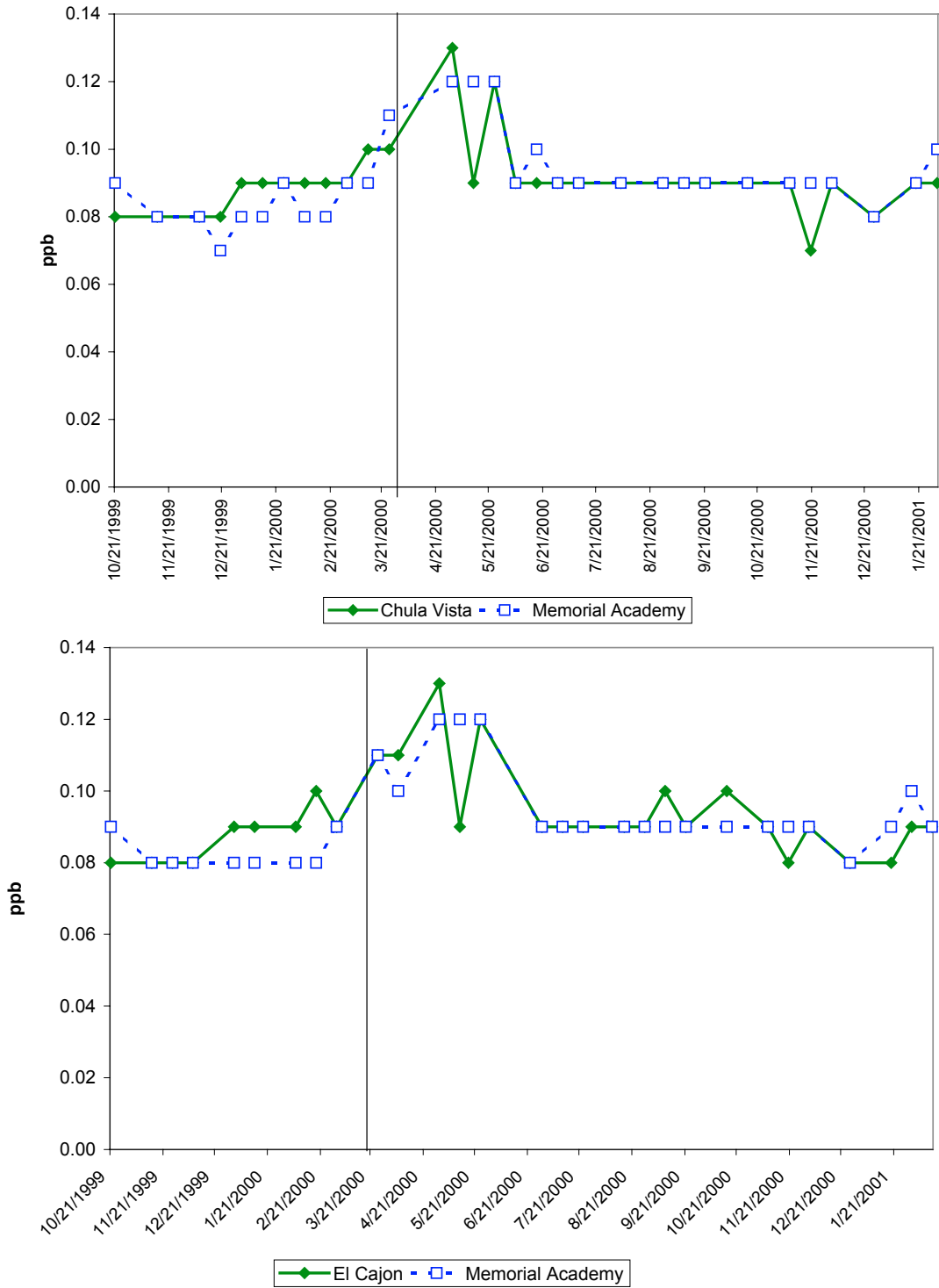


Figure 2.4 Methyl Chloroform Levels on Matched Days at Memorial Academy and
a) Chula Vista **b) El Cajon**

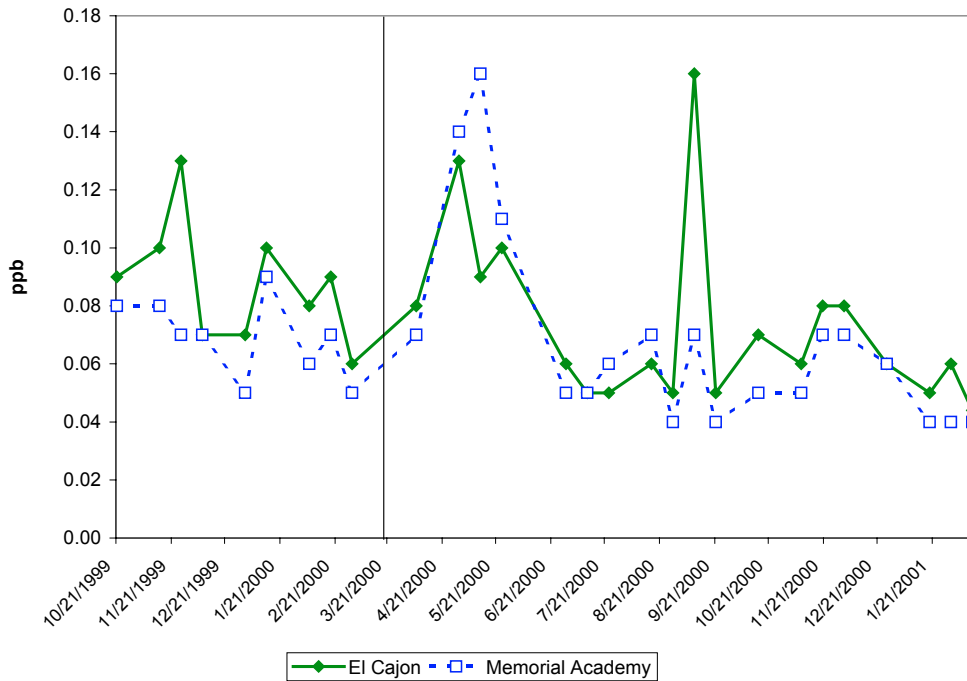
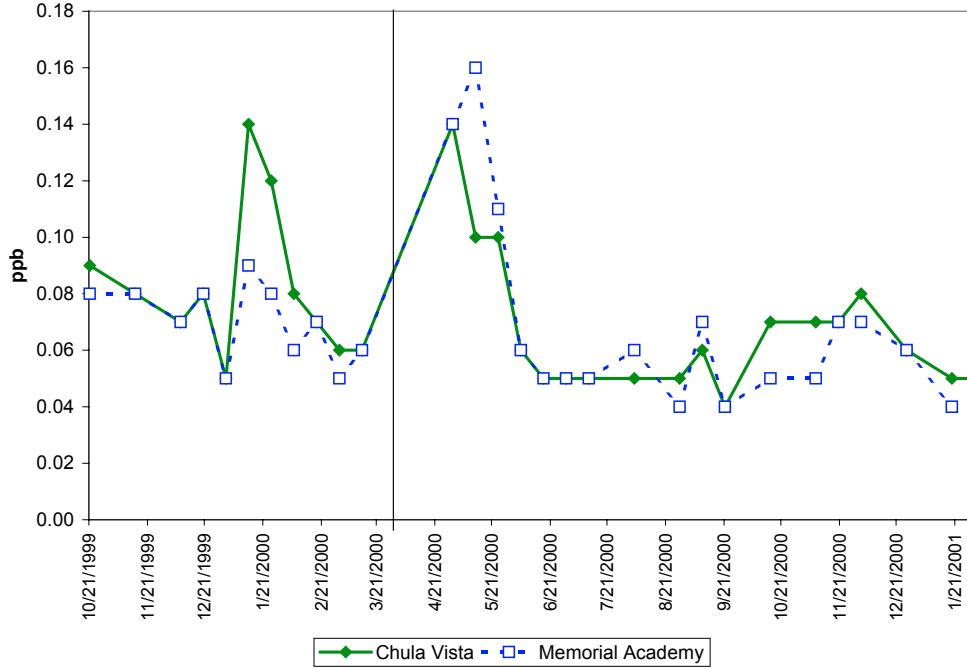
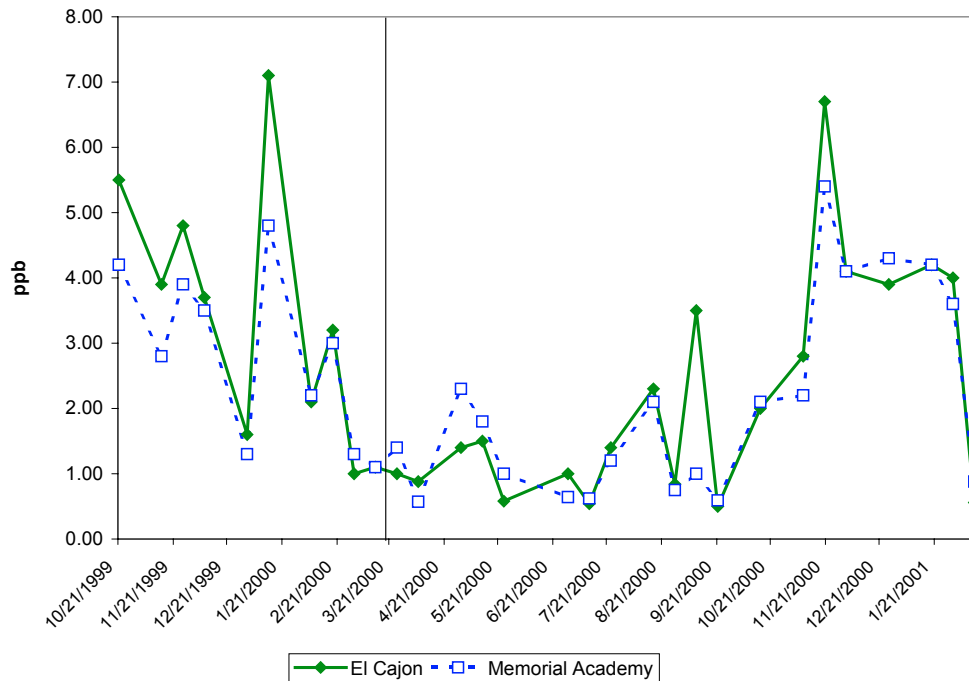
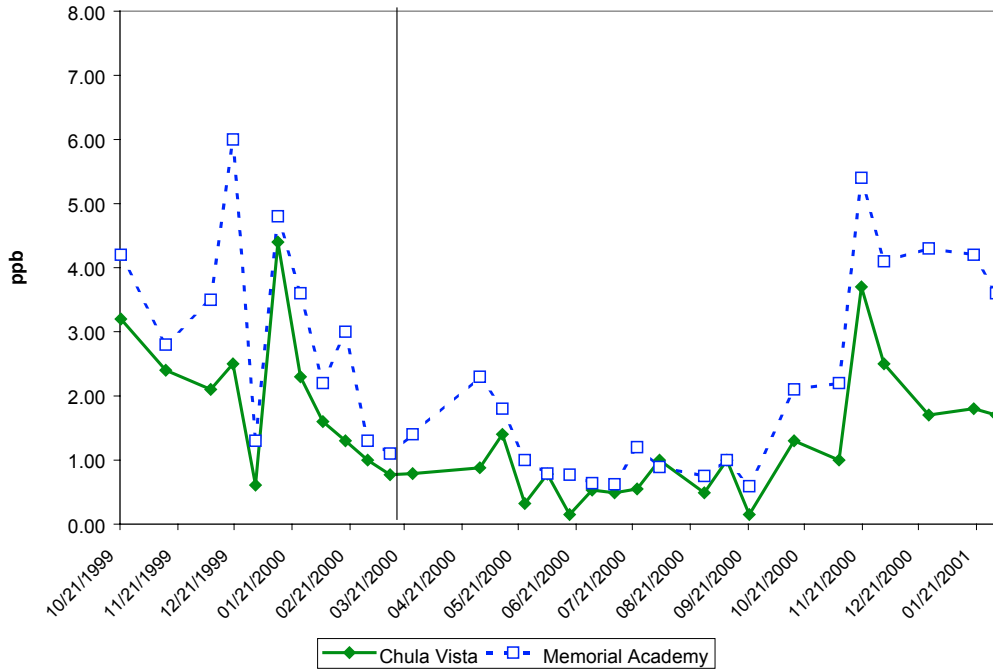
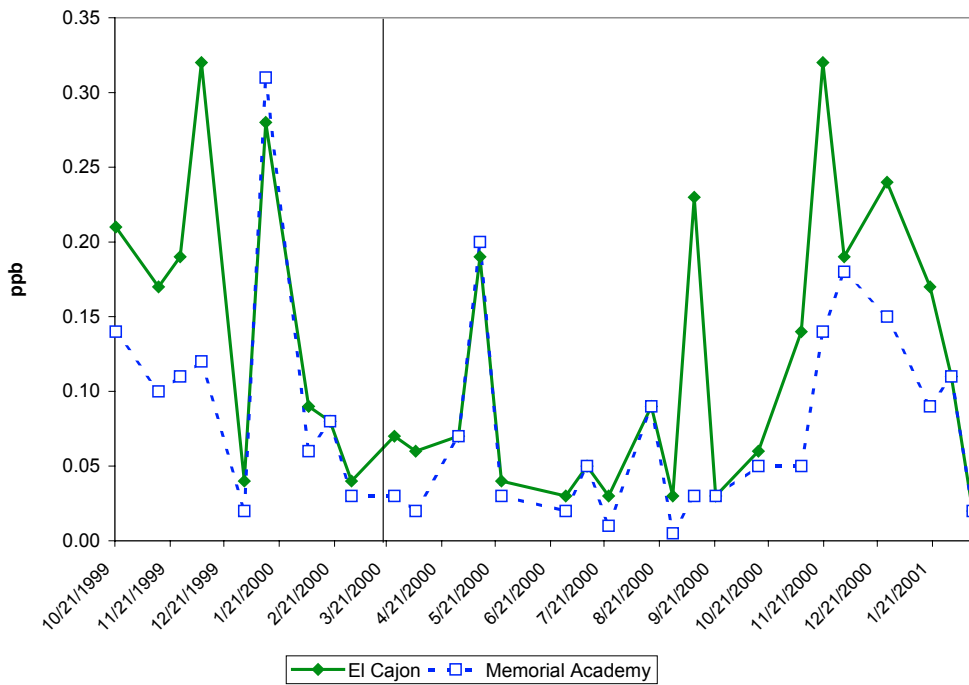
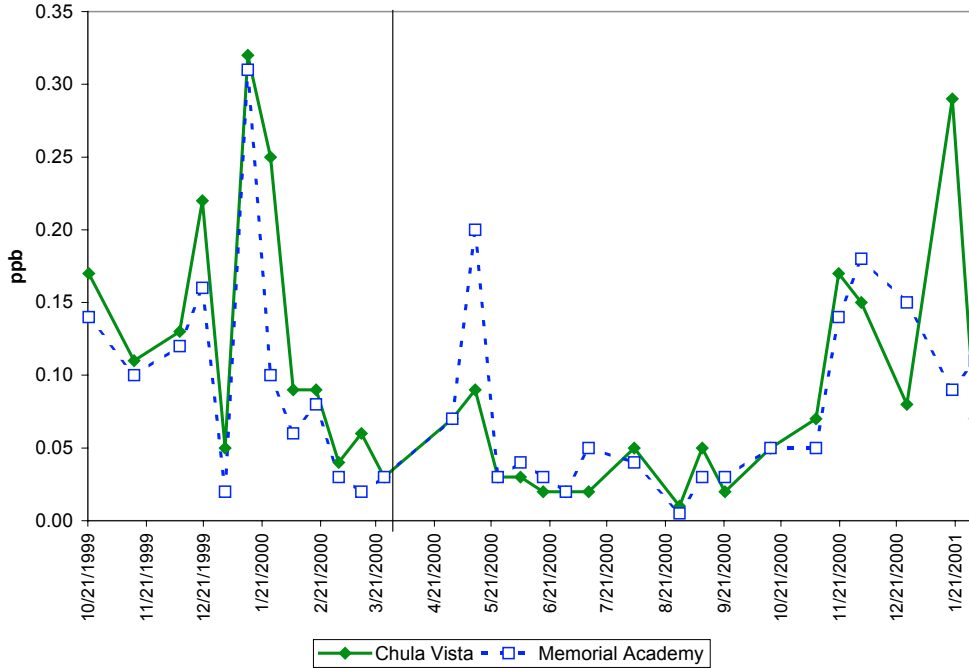


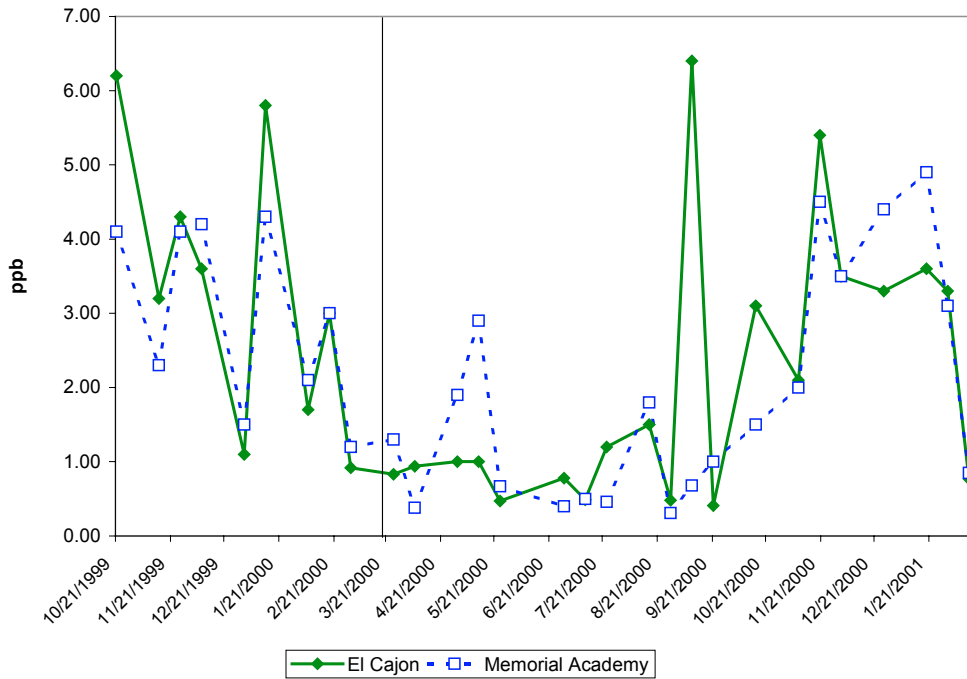
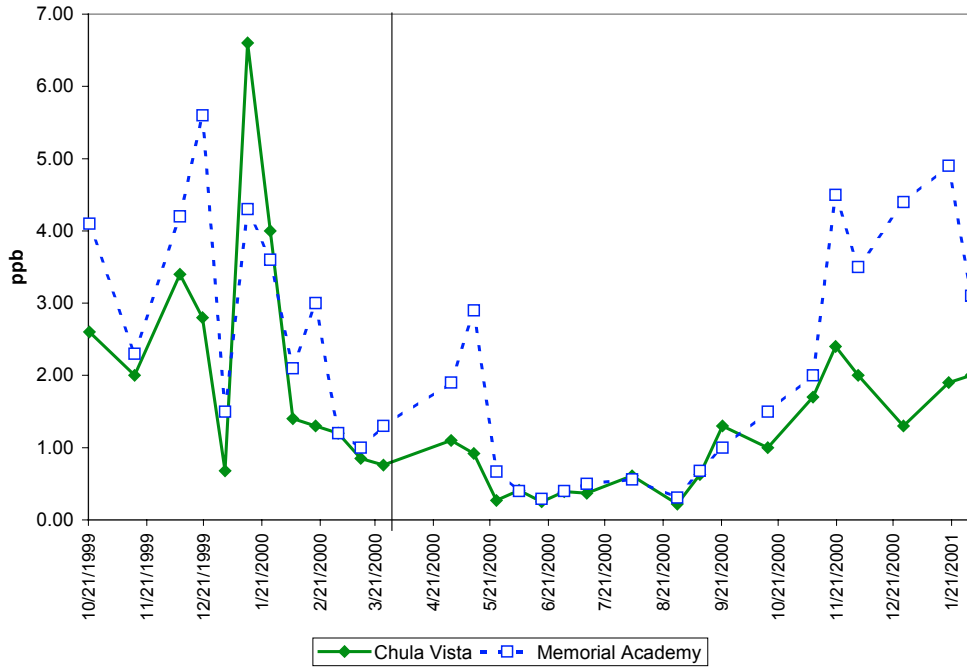
Figure 2.5 Methyl tertiary-Butyl Ether Levels on Matched Days at Memorial Academy and
a) Chula Vista b) El Cajon



**Figure 2.6 Perchloroethylene Levels on Matched Days at Memorial Academy and
a) Chula Vista b) El Cajon**



**Figure 2.7 Toluene Levels on Matched Days at Memorial Academy and
a) Chula Vista b) El Cajon**



**Figure 2.8 Total Chromium Levels on Matched Days at Memorial Academy and
a) Chula Vista b) El Cajon**

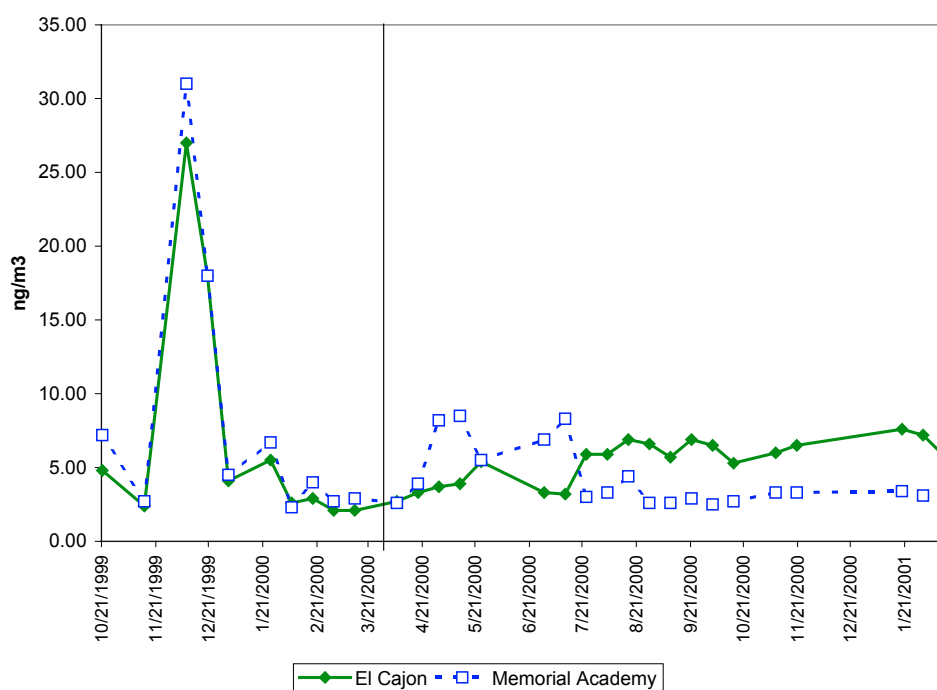
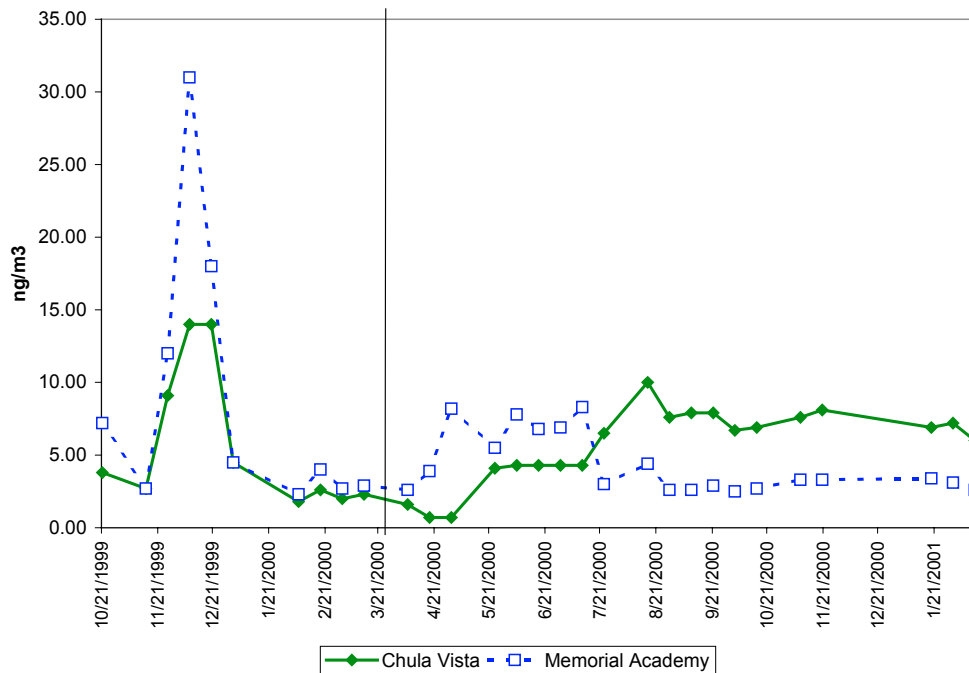


Figure 2.9 Manganese Levels on Matched Days at Memorial Academy and
a) Chula Vista b) El Cajon

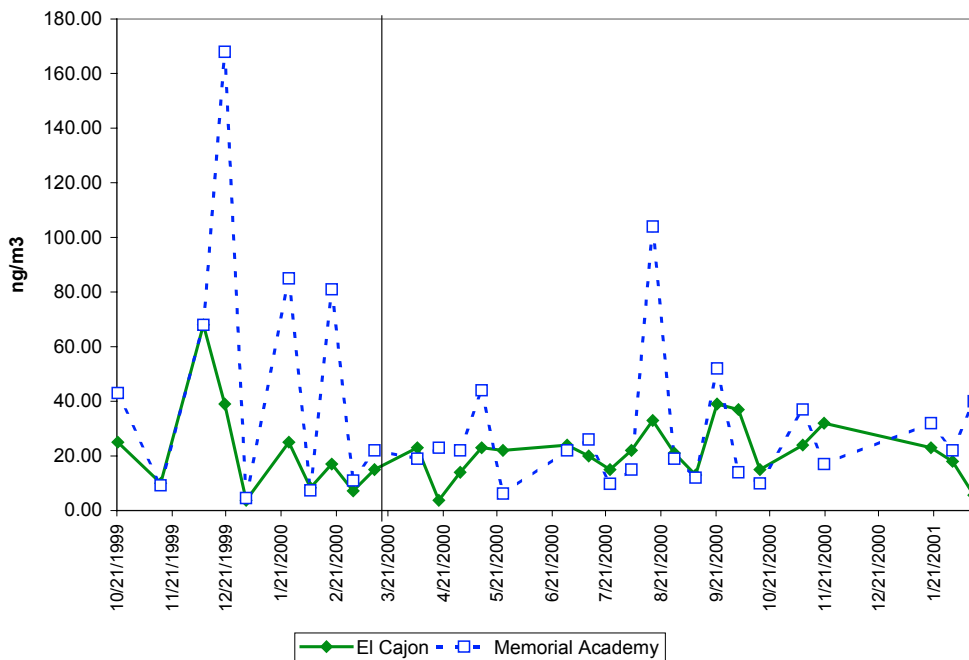
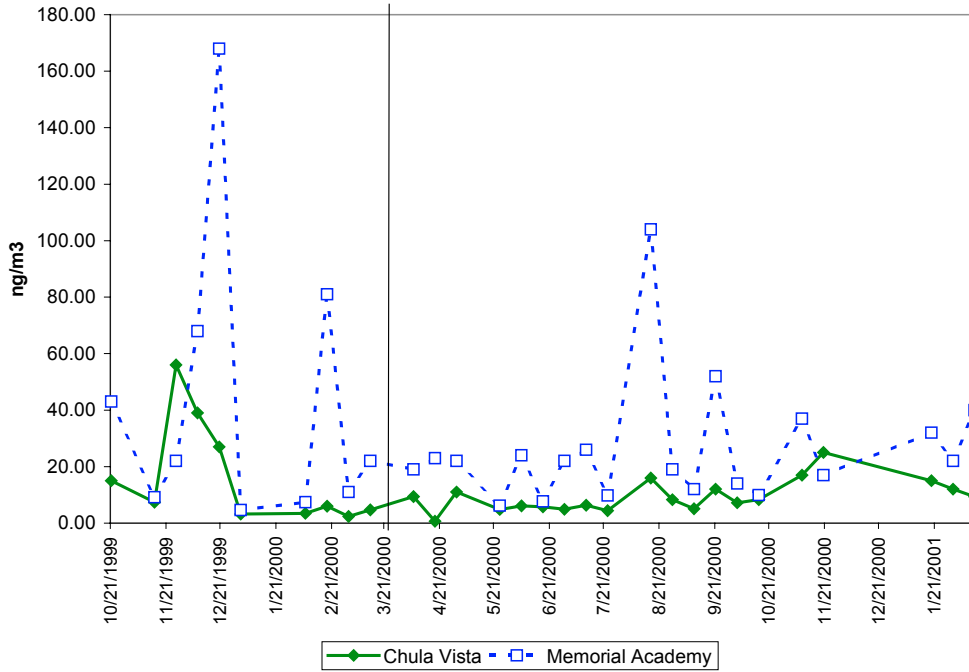


Figure 2.10 Zinc Levels on Matched Days at Memorial Academy and
a) Chula Vista b) El Cajon

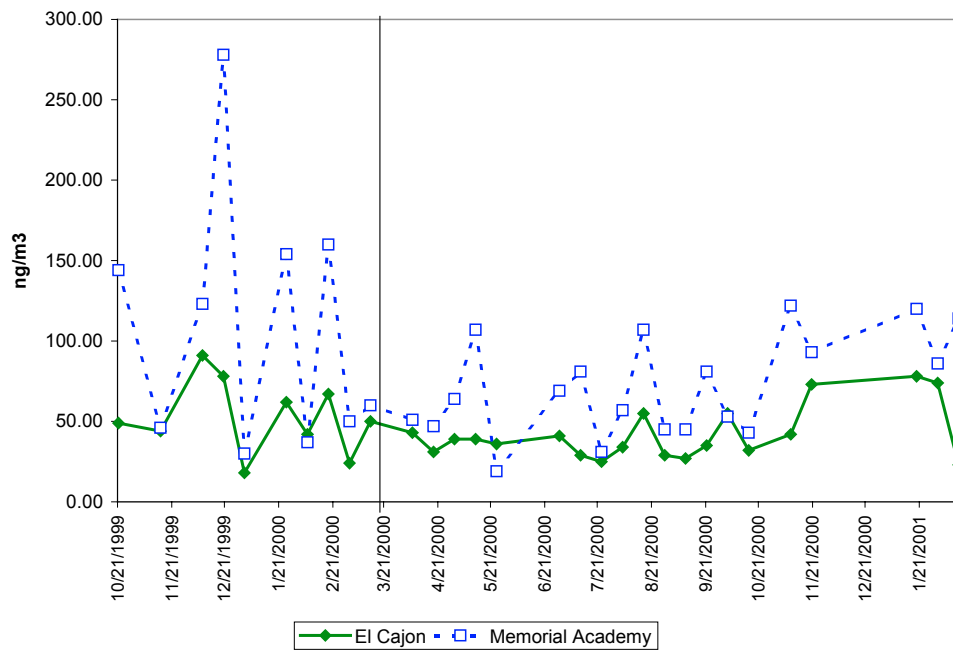
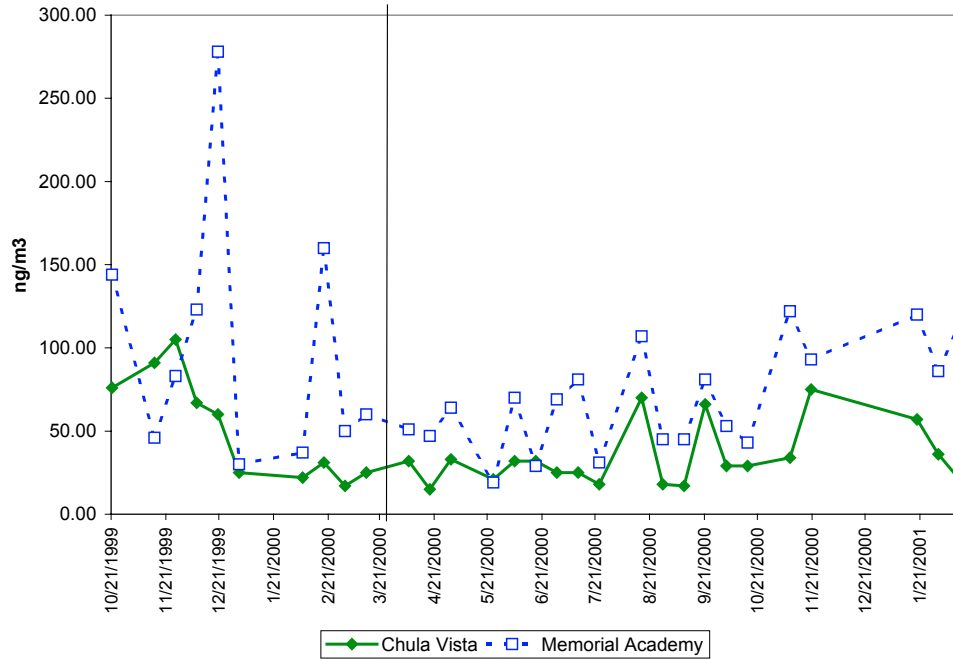


Figure 2.11 PM10 Chloride Levels on Matched Days at Memorial Academy
 and a) Chula Vista b) El Cajon

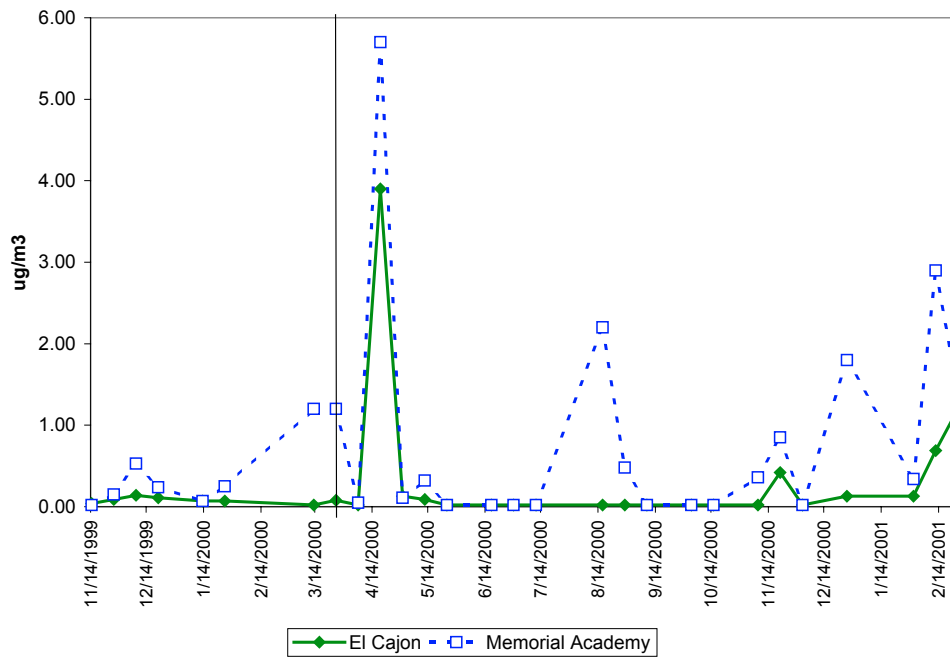
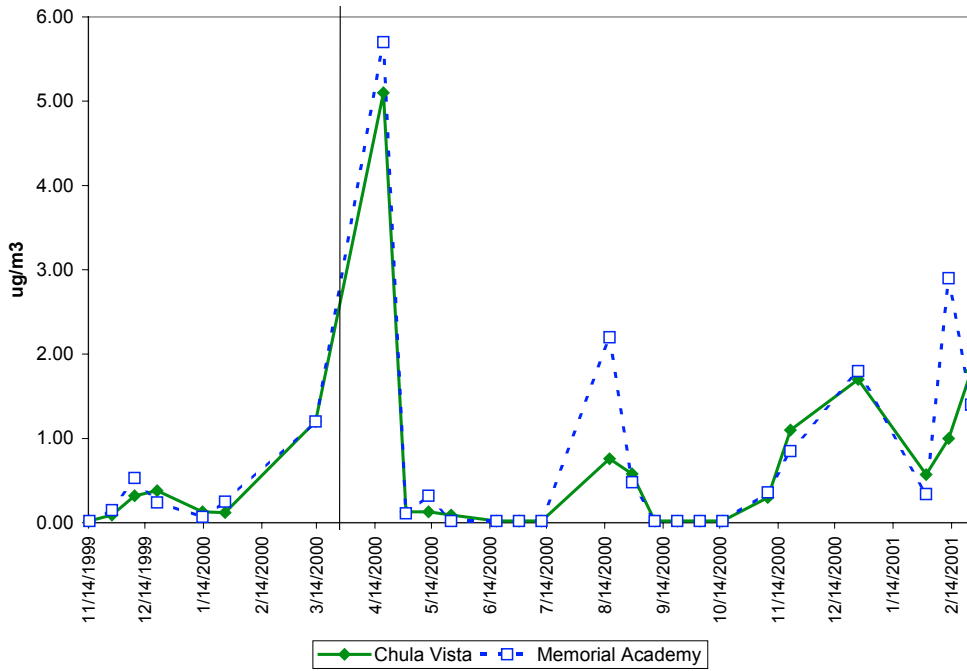
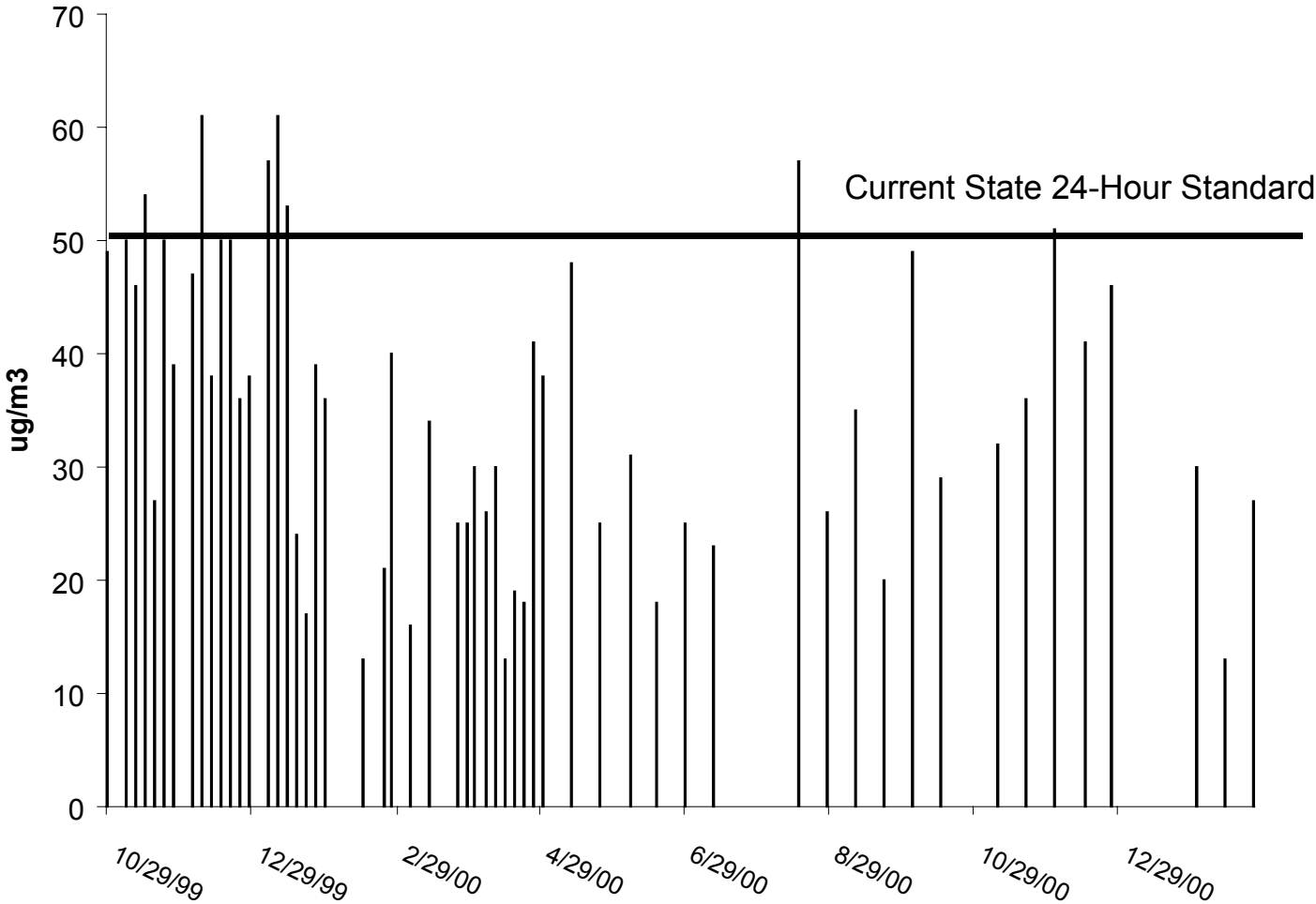


Figure 3.1 Particulate Matter Levels at Memorial Academy, 10/99-2/01



The time period is from 10/1999 through 2/2001.

Figure 3.2 Benzene Levels During Winter (10/99-3/00) and Annual Period (10/99-9/00)

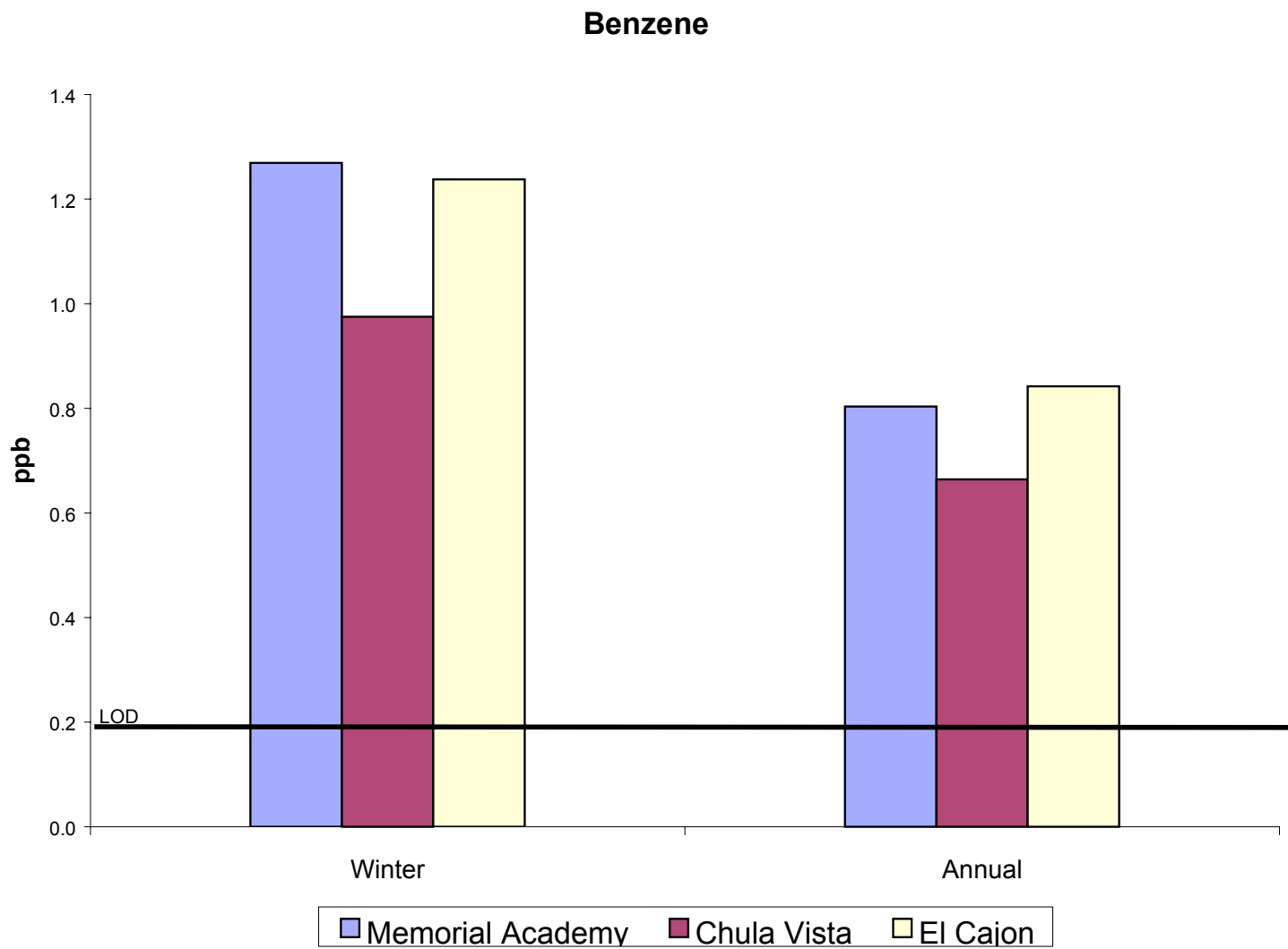


Figure 3.3 1,3-Butadiene Levels During Winter (10/99-3/00) and Annual Period (10/99-9/00)

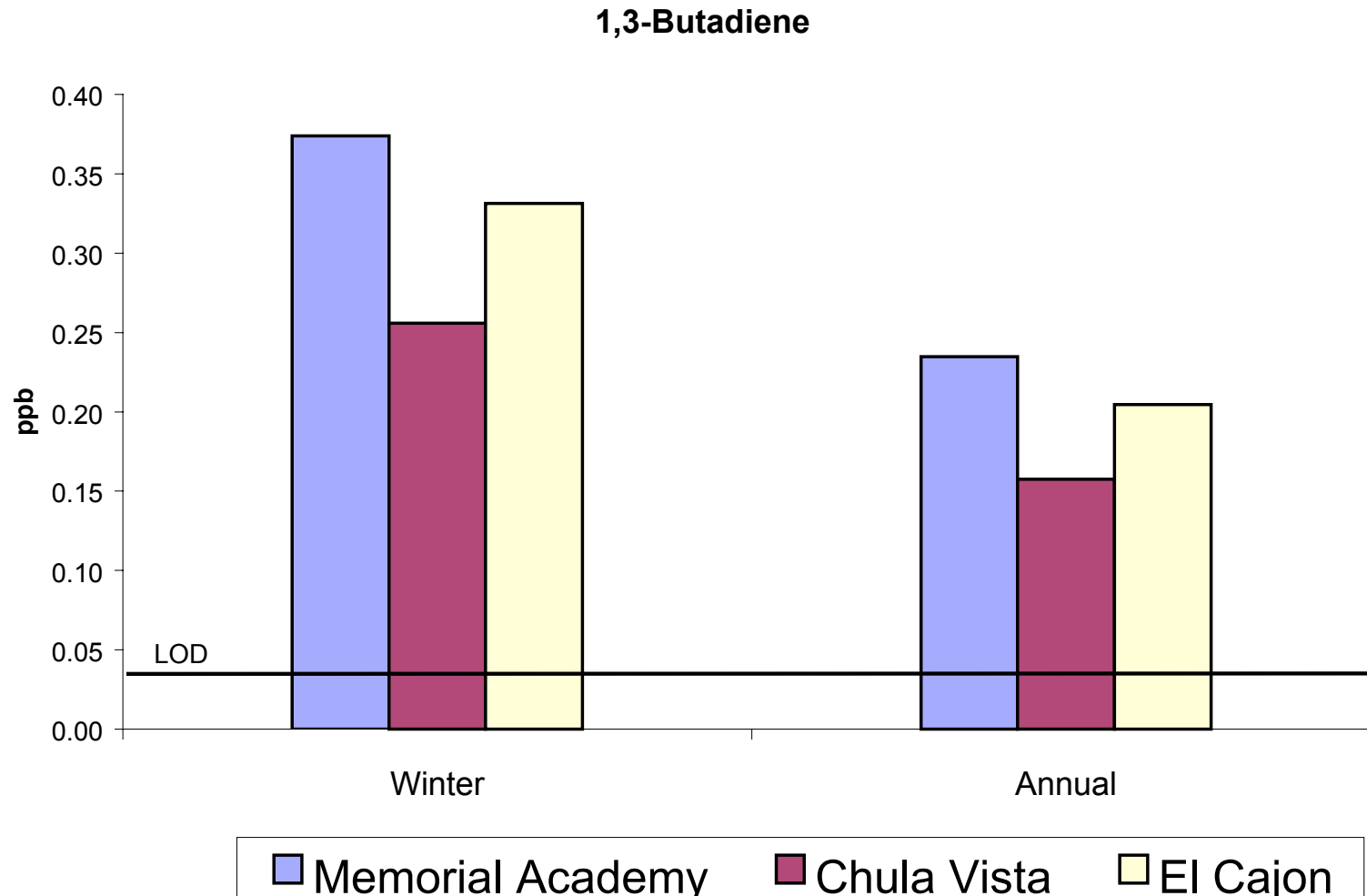


Figure 3.4 Manganese Levels During Winter (10/99-3/00) and Annual Period (10/99-9/00)

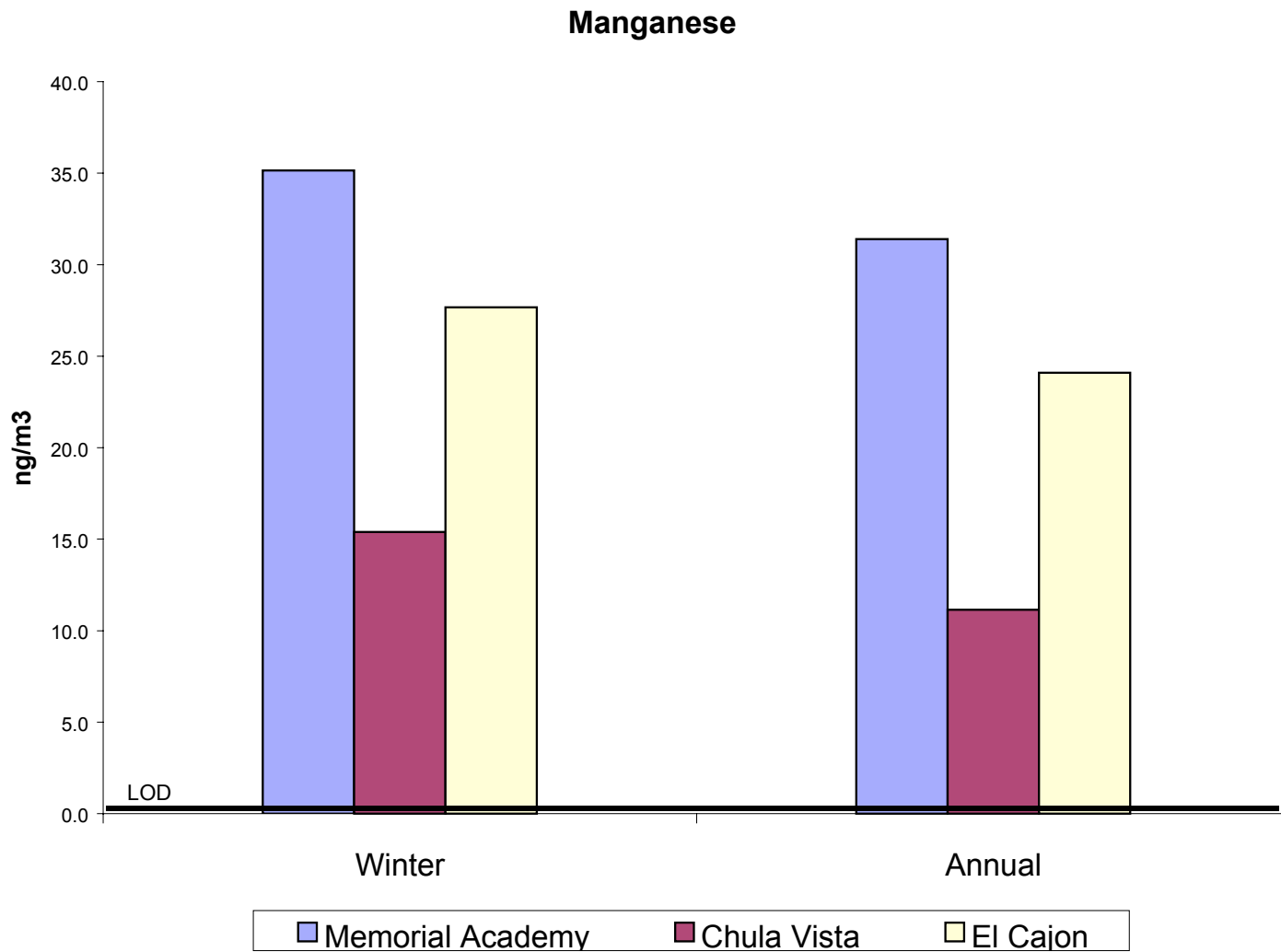


Figure 3.5 Nickel Levels During Winter (10/99-3/00) and Annual Period (10/99-9/00)

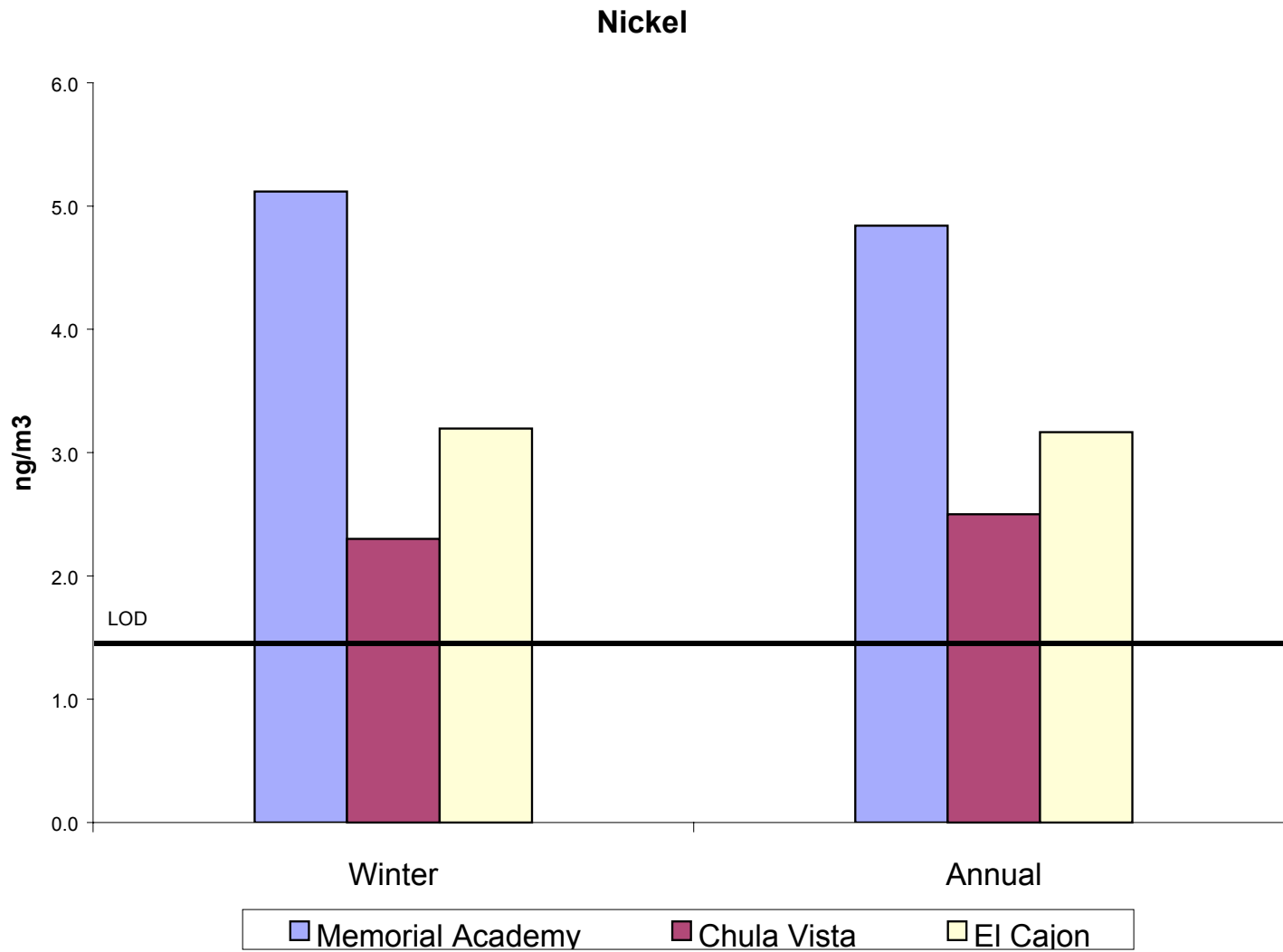
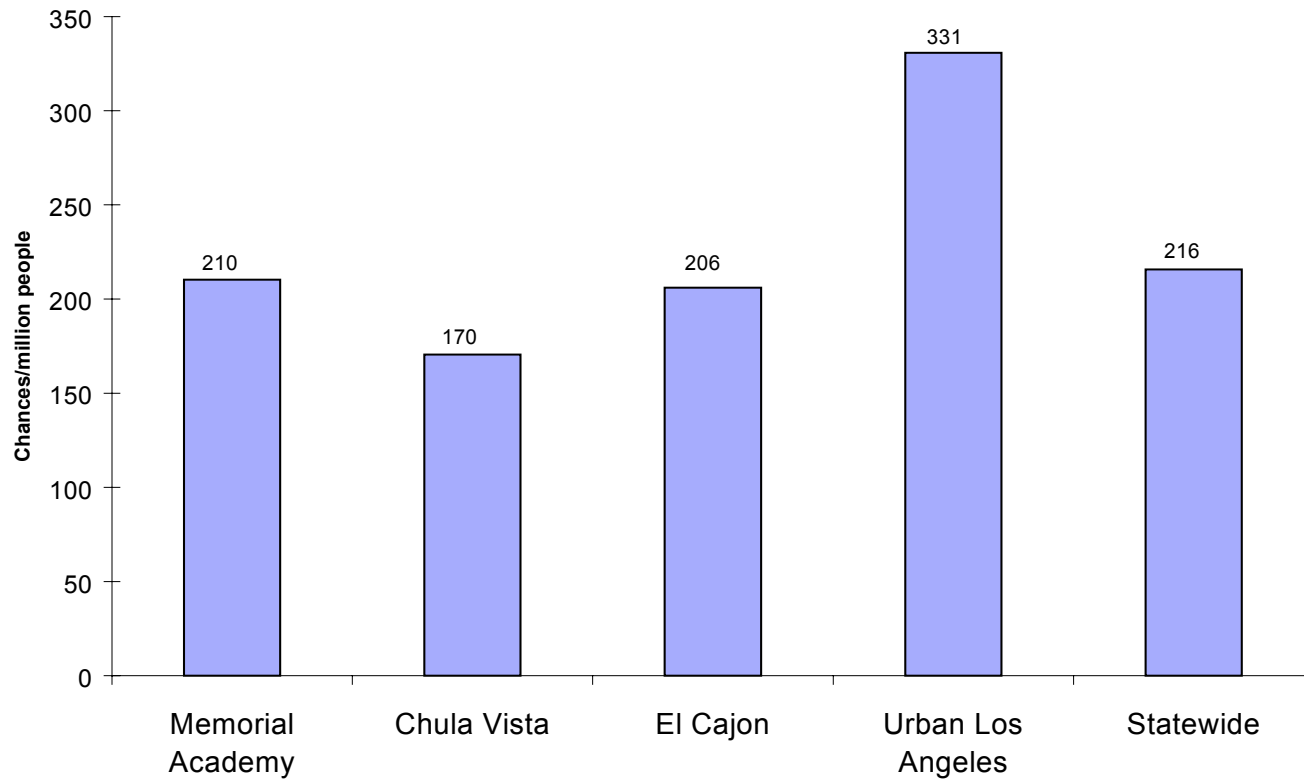
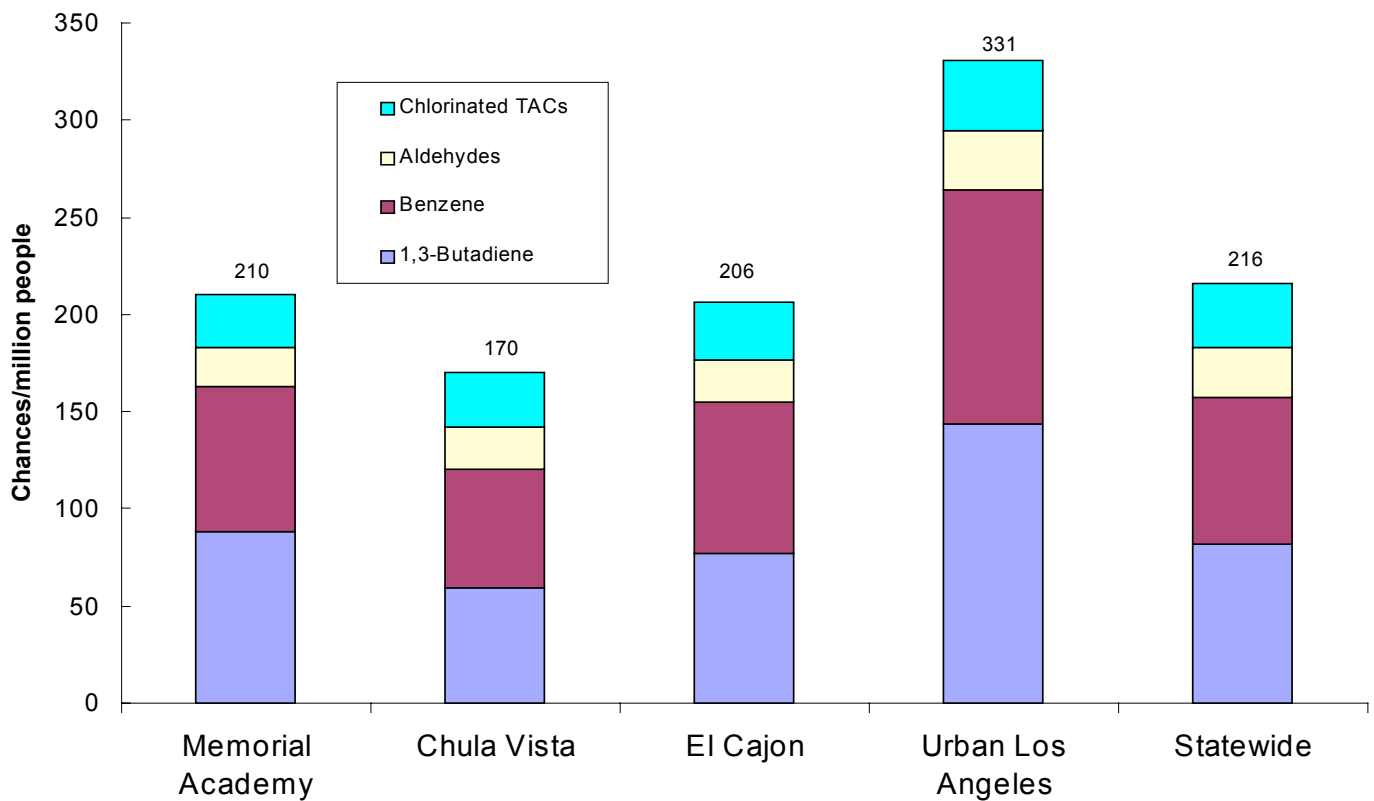


Figure 3.6 Potential Cancer Risk Without Diesel PM due to Top Risk Toxics at Memorial Academy, Chula Vista, El Cajon, Los Angeles-North Main, and Statewide Based on *Annual Averages*



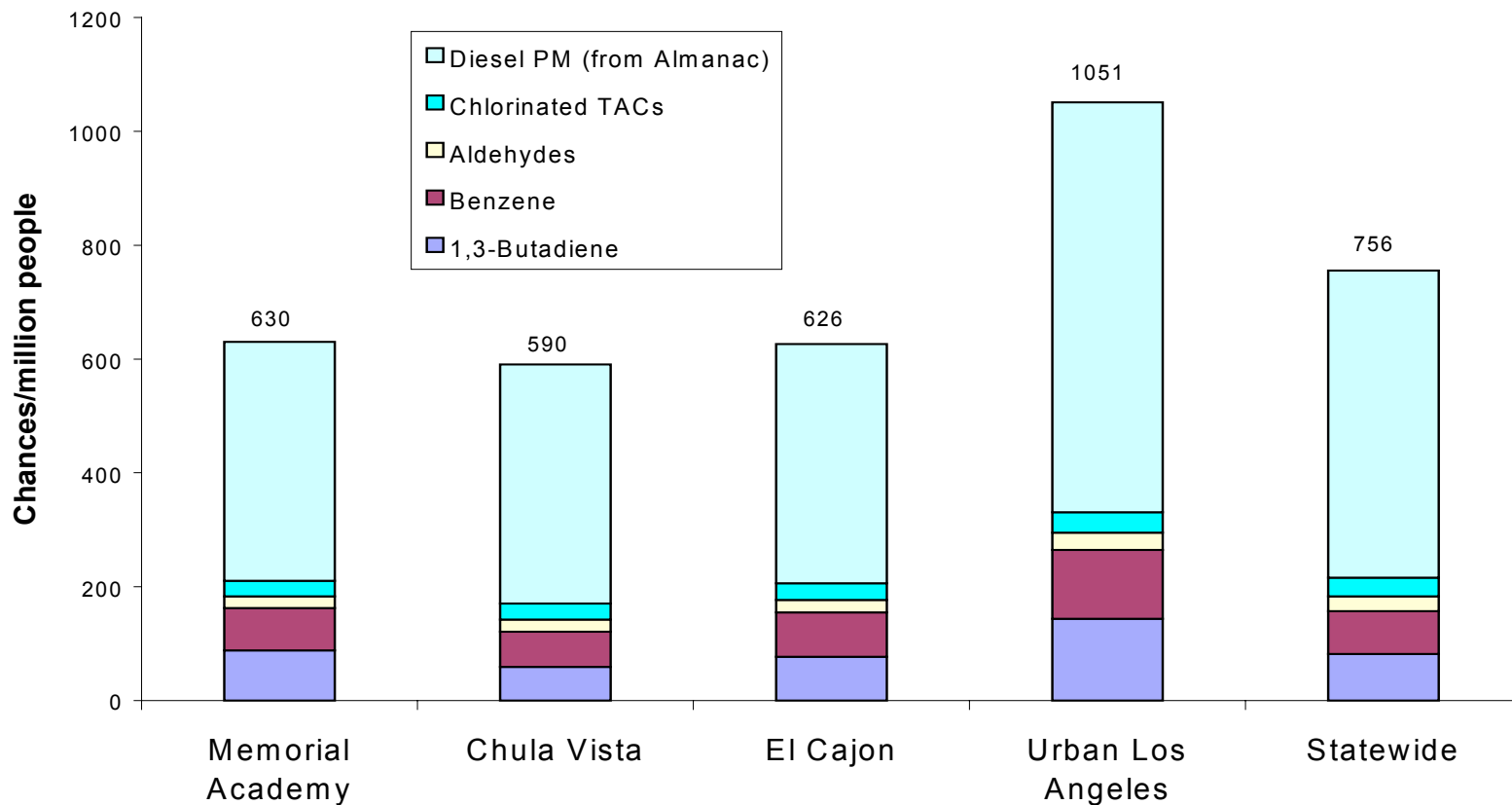
The time period for Memorial Academy, Chula Vista, and El Cajon is from 10/1999 to 9/2000. For Urban Los Angeles and Statewide, data are an average of 1998 to 2000.

Figure 3.7 Potential Cancer Risk Without Diesel PM due to Top Risk Toxics by Categories at Memorial Academy, Chula Vista, El Cajon, Los Angeles-North Main, and Statewide Based on *Annual Averages*



The time period for Memorial Academy, Chula Vista, and El Cajon is from 10/1999 to 9/2000. For Urban Los Angeles and Statewide, data are an average of 1998 to 2000.

Figure 3.8 Potential Cancer Risk With Estimated Diesel PM due to Top Risk Toxics at Memorial Academy, Chula Vista, El Cajon, Los Angeles-North Main, and Statewide Based on *Annual Averages*



The time period for Memorial Academy, Chula Vista, and El Cajon is from 10/1999 to 9/2000. For Urban Los Angeles and Statewide, data are an average of 1998 to 2000.

Figure 3.9 Potential Cancer Risk Without Diesel PM due to Top Risk Toxics at Memorial Academy, Chula Vista, and El Cajon Based on *Matched Days* from 10/99 through 9/00

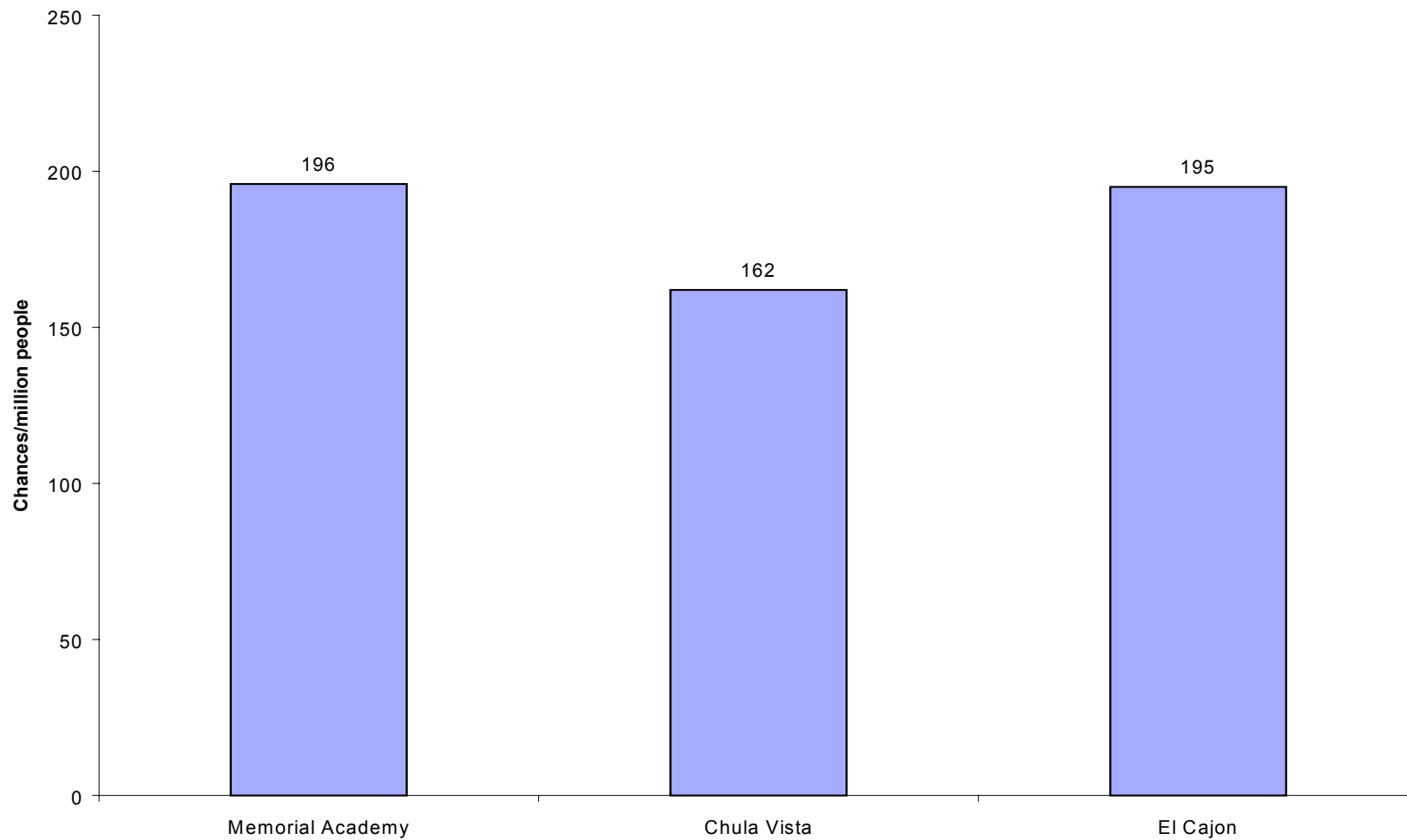


Table 1.1 List of Compounds Collected at Memorial Academy

Type	Compound Name	Abbreviation	LOD	Unit
Criteria	Carbon monoxide	CO	0.1	ppm
Criteria	Oxides of nitrogen	NO _x	0.5	ppb
Criteria	Ozone	O ₃	0.5	ppb
Metal	Hexavalent chromium	Cr6+	0.2	ng/m ³
Metal	Antimony	Sb	1.4	ng/m ³
Metal	Arsenic	As	1.4	ng/m ³
Metal	Total Chromium	Cr	1.4	ng/m ³
Metal	Cobalt	Co	1.4	ng/m ³
Metal	Copper	Cu	1.4	ng/m ³
Metal	Iron	Fe	7.1	ng/m ³
Metal	Lead	Pb	1.4	ng/m ³
Metal	Manganese	Mn	1.4	ng/m ³
Metal	Molybdenum	Mo	1.4	ng/m ³
Metal	Nickel	Ni	1.4	ng/m ³
Metal	Strontium	Sr	1.4	ng/m ³
Metal	Tin	Sn	1.4	ng/m ³
Metal	Zinc	Zn	1.4	ng/m ³
PAHs	Benzo(a)pyrene	BaP	0.05	ng/m ³
PAHs	Benzo(b)fluoranthene	BbF	0.05	ng/m ³
PAHs	Benzo(g,h,i)perylene	BghiP	0.05	ng/m ³
PAHs	Benzo(k)fluoranthene	BkF	0.05	ng/m ³
PAHs	Dibenz(a,h)anthracene	DahA	0.05	ng/m ³
PAHs	Indeno(1,2,3-cd)pyrene	IcdP	0.05	ng/m ³
PM	LTP PM10 mass	LTP PM10 mass	2	ug/m ³
PM	STP PM10 Ammonium	STP PM10 Ammonium	0.1	ug/m ³
PM	STP PM10 Chloride	STP PM10 Chloride	0.03	ug/m ³
PM	STP PM10 Mass	STP PM10 Mass	2	ug/m ³
PM	STP PM10 Nitrate	STP PM10 Nitrate	0.1	ug/m ³
PM	STP PM10 Potassium	STP PM10 Potassium	0.03	ug/m ³
PM	STP PM10 Sulfate	STP PM10 Sulfate	0.1	ug/m ³
PM	STP PM10 Total Carbon	STP PM10 Total Carbon	1	ug/m ³
VOCs	Acetaldehyde	AcCHO	0.1	ppb
VOCs	1,3-Butadiene	Buta	0.04	ppb
VOCs	Benzene	Benz	0.2	ppb
VOCs	Carbon Tetrachloride	CCl ₄	0.02	ppb
VOCs	Chloroform	CHCl ₃	0.02	ppb
VOCs	m-Dichlorobenzene	m-DCB	0.2	ppb
VOCs	o-Dichlorobenzene	o-DCB	0.1	ppb
VOCs	p-Dichlorobenzene	p-DCB	0.2	ppb
VOCs	Ethyl Benzene	EtB	0.6	ppb
VOCs	Formaldehyde	HCHO	0.1	ppb
VOCs	Methyl Chloroform	TCEA	0.01	ppb
VOCs	Methyl Ethyl Ketone	MEK	0.1	ppb
VOCs	Methyl tertiary-Butyl Ether	MTBE	0.3	ppb
VOCs	Methylene Chloride	DCM	1	ppb
VOCs	Perchloroethylene	Perc	0.01	ppb
VOCs	Styrene	Styr	0.1	ppb
VOCs	Toluene	Tolu	0.2	ppb
VOCs	Trichloroethylene	TCE	0.02	ppb
VOCs	o-Xylene	o-Xyl	0.1	ppb
VOCs	m-/p-Xylenes	m/p-Xyl	0.6	ppb

Table 1.2 Percent of Measurements Below Limit of Detection (LOD), 10/99-2/01

	Compound Name	LOD	UNITS	Memorial Academy			Chula Vista			El Cajon		
				# samples	# non-detects	% <LOD	# samples	# non-detects	% <LOD	# samples	# non-detects	% <LOD
VOCs	1,3-Butadiene	0.04	ppb	69	1	1%	40	4	10%	40	3	8%
	Acetaldehyde	0.1	ppb	68	0	0%	38	0	0%	41	1	2%
	Benzene	0.2	ppb	69	7	10%	40	3	8%	40	1	3%
	Carbon Tetrachloride	0.02	ppb	69	0	0%	39	0	0%	39	0	0%
	Chloroform	0.02	ppb	69	10	14%	39	5	13%	39	7	18%
	Ethyl Benzene*	0.6	ppb	69	62	90%	39	38	97%	39	35	90%
	Formaldehyde	0.1	ppb	68	0	0%	38	0	0%	41	1	2%
	Methyl Chloroform	0.01	ppb	66	0	0%	38	0	0%	38	0	0%
	Methyl Ethyl Ketone	0.1	ppb	68	30	44%	38	18	47%	41	17	41%
	Methyl tertiary-Butyl Ether	0.3	ppb	69	0	0%	40	2	5%	40	0	0%
	Methylene Chloride*	1	ppb	69	69	100%	39	35	90%	39	35	90%
	Perchloroethylene	0.01	ppb	69	1	1%	39	0	0%	39	0	0%
	Styrene*	0.1	ppb	52	24	46%	23	16	70%	23	12	52%
	Toluene	0.2	ppb	69	0	0%	39	0	0%	39	0	0%
	Trichloroethylene	0.02	ppb	68	14	21%	39	3	8%	39	15	38%
	meta-Dichlorobenzene*	0.2	ppb	43	42	98%	27	27	100%	28	27	96%
	meta/para-Xylene	0.6	ppb	69	21	30%	39	18	46%	39	14	36%
	ortho-Dichlorobenzene*	0.1	ppb	46	43	93%	31	31	100%	31	27	87%
ortho-Xylene	0.1	ppb	69	9	13%	39	10	26%	39	6	15%	
para-Dichlorobenzene*	0.2	ppb	43	42	98%	30	30	100%	30	29	97%	
METALS	Antimony	1.4	ng/m3	61	22	36%	37	15	41%	42	20	48%
	Arsenic*	1.4	ng/m3	19	14	74%	18	10	56%	24	10	42%
	Total Chromium	1.4	ng/m3	61	0	0%	37	3	8%	42	1	2%
	Cobalt*	1.4	ng/m3	61	55	90%	37	35	95%	42	39	93%
	Copper	1.4	ng/m3	61	0	0%	37	0	0%	42	0	0%
	Hexavalent Chromium*	0.2	ng/m3	45	41	91%	40	38	95%	41	41	100%
	Iron	7.1	ng/m3	61	0	0%	37	0	0%	42	0	0%
	Lead	1.4	ng/m3	61	0	0%	37	0	0%	42	1	2%
	Manganese	1.4	ng/m3	61	0	0%	37	1	3%	42	0	0%
	Molybdenum*	1.4	ng/m3	61	40	66%	37	28	76%	42	30	71%
	Nickel	1.4	ng/m3	61	4	7%	37	21	57%	42	19	45%
	Strontium	1.4	ng/m3	61	0	0%	37	15	41%	42	18	43%
	Tin*	1.4	ng/m3	61	24	39%	37	21	57%	42	24	57%
	Zinc	1.4	ng/m3	61	0	0%	37	0	0%	42	0	0%
PM	STP PM10 Ammonium	0.1	ug/m3	56	15	27%	76	25	33%	83	18	22%
	STP PM10 Chloride	0.03	ug/m3	56	13	23%	76	27	36%	83	41	49%
	STP PM10 Mass	2	ug/m3	56	0	0%	76	0	0%	83	0	0%
	STP PM10 Nitrate	0.1	ug/m3	56	1	2%	76	1	1%	83	1	1%
	STP PM10 Potassium	0.03	ug/m3	56	0	0%	76	0	0%	83	0	0%
	STP PM10 Sulfate	0.1	ug/m3	56	0	0%	76	0	0%	83	0	0%
PAH	STP PM10 Total Carbon	1	ug/m3	56	4	7%	76	7	9%	83	0	0%
	Benzo(a)pyrene	0.05	ng/m3	56	24	43%	40	20	50%	42	18	43%
	Benzo(b)fluoranthene	0.05	ng/m3	56	12	21%	40	16	40%	42	15	36%
	Benzo(g,h,i)perylene	0.05	ng/m3	56	6	11%	40	11	28%	42	17	40%
	Benzo(k)fluoranthene*	0.05	ng/m3	56	28	50%	40	23	58%	42	20	48%
	Dibenz(a,h)anthracene*	0.05	ng/m3	56	42	75%	40	33	83%	42	30	71%
Indeno(1,2,3-cd)pyrene	0.05	ng/m3	56	13	23%	40	15	38%	42	13	31%	

*The majority of values are below LOD.

Table 1.3 Unit Risk Factors (URFs) and Reference Exposure Levels (RELs) for Compounds Collected at Memorial Academy

	Compound Name	LOD	UNITS	URF**	CHRONIC REL***
VOCs	1,3-Butadiene	0.04	ppb	375.84	9
	Acetaldehyde	0.1	ppb	4.86	5
	Benzene	0.2	ppb	92.59	19
	Carbon Tetrachloride	0.02	ppb	264.05	6
	Chloroform	0.02	ppb	25.86	61
	Ethyl Benzene*	0.6	ppb		461
	Formaldehyde	0.1	ppb	7.36	2
	Methyl Chloroform	0.01	ppb		183
	Methyl Ethyl Ketone	0.1	ppb		330
	Methyl tertiary-Butyl Ether	0.3	ppb	0.94	2220
	Methylene Chloride*	1	ppb	3.47	115
	Perchloroethylene	0.01	ppb	39.99	5
	Styrene*	0.1	ppb		211
	Toluene	0.2	ppb		80
	Trichloroethylene	0.02	ppb	10.74	112
	meta-Dichlorobenzene*	0.2	ppb		
	meta/para-Xylene	0.6	ppb		161
	ortho-Dichlorobenzene*	0.1	ppb		
	ortho-Xylene	0.1	ppb		161
	para-Dichlorobenzene*	0.2	ppb	66.09	133
METALS	Antimony	1.4	ng/m3		200
	Arsenic*	1.4	ng/m3	3.3	30
	Total Chromium	1.4	ng/m3		
	Cobalt*	1.4	ng/m3		
	Copper	1.4	ng/m3		2400
	Hexavalent Chromium*	0.2	ng/m3	150	200
	Iron	7.1	ng/m3		
	Lead	1.4	ng/m3	0.012	
	Manganese	1.4	ng/m3		200
	Molybdenum*	1.4	ng/m3		
	Nickel	1.4	ng/m3	0.26	50
	Strontium	1.4	ng/m3		
	Tin*	1.4	ng/m3		
	Zinc	1.4	ng/m3		35000
PM	PM10 Ammonium	0.1	ug/m3		
	PM10 Chloride	0.03	ug/m3		
	PM10 Mass	2	ug/m3		
	PM10 Nitrate	0.1	ug/m3		
	PM10 Potassium	0.03	ug/m3		
	PM10 Sulfate	0.1	ug/m3		
	PM10 Total Carbon	1	ug/m3		
PAH	Benzo(a)pyrene	0.05	ng/m3	1.10	
	Benzo(b)fluoranthene	0.05	ng/m3	0.11	
	Benzo(g,h,i)perylene	0.05	ng/m3		
	Benzo(k)fluoranthene*	0.05	ng/m3	0.11	
	Dibenz(a,h)anthracene*	0.05	ng/m3	0.12	
	Indeno(1,2,3-cd)pyrene	0.05	ng/m3	0.11	
**URF = chances per million persons over a 70-year lifetime per unit of measurement.					
***REL=reference exposure level is a threshold above which there are some health concerns.					
REL values have been converted to match the measurement units.					

*The majority of values are below LOD.

Table 3.1a. Summary Statistics of Air Quality at Memorial Academy, 10/99-2/01

Summary Statistics						
Memorial Academy						
	Compound Name	Units	Number of Samples	Minimum	Maximum	Average
VOCs	1,3-Butadiene	ppb	69	0.02	0.79	0.30
	Acetaldehyde	ppb	68	0.15	2.10	0.86
	Benzene	ppb	69	0.10	3.10	0.99
	Carbon Tetrachloride	ppb	69	0.05	0.13	0.09
	Chloroform	ppb	69	0.01	0.09	0.04
	Formaldehyde	ppb	68	0.53	5.50	2.26
	Methyl Chloroform	ppb	66	0.04	0.16	0.07
	Methyl Ethyl Ketone	ppb	68	0.05	0.90	0.20
	Methyl tertiary-Butyl Ether	ppb	69	0.45	6.00	2.49
	Perchloroethylene	ppb	69	0.01	0.31	0.08
	Toluene	ppb	69	0.24	6.70	2.39
	Trichloroethylene	ppb	68	0.01	0.16	0.04
	meta/para-Xylene	ppb	69	0.3	3.7	1.3
	ortho-Xylene	ppb	69	0.05	1.20	0.43
METALS	Antimony	ng/m3	61	0.7	8	2.7
	Total Chromium	ng/m3	61	2.3	31	6.5
	Copper	ng/m3	61	8	113	36
	Iron	ng/m3	61	53	2521	829
	Lead	ng/m3	61	1	65	19
	Manganese	ng/m3	61	4.6	168	31.4
	Nickel	ng/m3	61	1.7	22	5.2
	Strontium	ng/m3	61	1.5	25	9.6
	Zinc	ng/m3	61	19	278	83
PM	PM10 Ammonium	ug/m3	56	0.03	6.50	0.66
	PM10 Chloride	ug/m3	56	0.02	5.70	0.92
	PM10 Mass	ug/m3	56	13	61	35
	PM10 Nitrate	ug/m3	56	0.1	16.0	4.4
	PM10 Potassium	ug/m3	56	0.06	0.48	0.16
	PM10 Sulfate	ug/m3	56	0.7	9.9	3.1
	PM10 Total Carbon	ug/m3	56	0.5	13.0	5.5
PAH	Benzo(a)pyrene	ng/m3	56	0.03	1.20	0.21
	Benzo(b)fluoranthene	ng/m3	56	0.03	1.10	0.26
	Benzo(g,h,i)perylene	ng/m3	56	0.03	2.20	0.61
	Indeno(1,2,3-cd)pyrene	ng/m3	56	0.03	1.70	0.35

Most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, styrene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

Table 3.1b. Summary Statistics of Air Quality at Chula Vista, 10/99-2/01

Summary Statistics						
	Compound Name	Units	Chula Vista			
			Number of Samples	Minimum	Maximum	Average
VOCs	1,3-Butadiene	ppb	40	0.02	0.51	0.17
	Acetaldehyde	ppb	38	0.20	1.90	0.90
	Benzene	ppb	40	0.10	1.80	0.70
	Carbon Tetrachloride	ppb	39	0.07	0.13	0.09
	Chloroform	ppb	39	0.01	0.43	0.04
	Formaldehyde	ppb	38	0.76	4.50	2.39
	Methyl Chloroform	ppb	38	0.04	0.14	0.07
	Methyl Ethyl Ketone	ppb	38	0.05	1.20	0.18
	Methyl tertiary-Butyl Ether	ppb	40	0.15	4.40	1.39
	Perchloroethylene	ppb	39	0.01	0.32	0.09
	Toluene	ppb	39	0.22	6.60	1.55
	Trichloroethylene	ppb	39	0.01	0.20	0.06
	meta/para-Xylene	ppb	39	0.3	2.2	0.8
	ortho-Xylene	ppb	39	0.05	0.79	0.23
METALS	Antimony	ng/m3	37	0.7	8.8	2.8
	Total Chromium	ng/m3	37	0.7	14	5.5
	Copper	ng/m3	37	11	123	64
	Iron	ng/m3	37	92	1562	424
	Lead	ng/m3	37	3	211	30
	Manganese	ng/m3	37	0.7	56	11.4
	Nickel	ng/m3	37	0.7	11	2.5
	Strontium	ng/m3	37	0.7	16	4.2
	Zinc	ng/m3	37	15	105	41
PM	PM10 Ammonium	ug/m3	76	0.04	5.30	0.68
	PM10 Chloride	ug/m3	76	0.02	5.10	0.63
	PM10 Mass	ug/m3	76	15	64	30
	PM10 Nitrate	ug/m3	76	0.1	13.0	3.5
	PM10 Potassium	ug/m3	76	0.05	0.52	0.14
	PM10 Sulfate	ug/m3	76	0.5	14.0	3.6
	PM10 Total Carbon	ug/m3	76	0.5	17.0	4.3
PAH	Benzo(a)pyrene	ng/m3	40	0.03	0.50	0.13
	Benzo(b)fluoranthene	ng/m3	40	0.03	0.52	0.17
	Benzo(g,h,i)perylene	ng/m3	40	0.03	1.00	0.32
	Indeno(1,2,3-cd)pyrene	ng/m3	40	0.03	0.66	0.22

Most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, styrene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

Table 3.1c. Summary Statistics of Air Quality at El Cajon, 10/99-2/01

Summary Statistics						
			El Cajon			
	Compound Name	Units	Number of Samples	Minimum	Maximum	Average
VOCs	1,3-Butadiene	ppb	40	0.02	0.69	0.23
	Acetaldehyde	ppb	41	0.05	2.70	1.06
	Benzene	ppb	40	0.10	2.20	0.91
	Carbon Tetrachloride	ppb	39	0.08	0.13	0.09
	Chloroform	ppb	39	0.01	0.44	0.05
	Formaldehyde	ppb	41	0.05	5.90	2.52
	Methyl Chloroform	ppb	38	0.04	0.16	0.07
	Methyl Ethyl Ketone	ppb	41	0.05	0.82	0.22
	Methyl tertiary-Butyl Ether	ppb	40	0.50	7.10	2.52
	Perchloroethylene	ppb	39	0.02	0.32	0.11
	Toluene	ppb	39	0.38	6.40	2.31
	Trichloroethylene	ppb	39	0.01	2.40	0.11
	meta/para-Xylene	ppb	39	0.3	4.2	1.3
	ortho-Xylene	ppb	39	0.05	1.00	0.38
METALS	Antimony	ng/m3	42	0.7	7.5	2.8
	Total Chromium	ng/m3	42	0.7	31	6.4
	Copper	ng/m3	42	4	131	44
	Iron	ng/m3	42	61	2601	902
	Lead	ng/m3	42	1	34	12
	Manganese	ng/m3	42	1.5	68	23
	Nickel	ng/m3	42	0.7	13	3.2
	Strontium	ng/m3	42	0.7	29	5.4
	Zinc	ng/m3	42	3	93	46
PM	PM10 Ammonium	ug/m3	83	0.04	5.30	0.58
	PM10 Chloride	ug/m3	83	0.02	3.90	0.26
	PM10 Mass	ug/m3	83	16	84	34
	PM10 Nitrate	ug/m3	83	0.1	14.0	3.0
	PM10 Potassium	ug/m3	83	0.05	1.00	0.16
	PM10 Sulfate	ug/m3	83	0.5	9.2	2.8
	PM10 Total Carbon	ug/m3	83	1.0	30.0	6.6
PAH	Benzo(a)pyrene	ng/m3	42	0.03	1.40	0.29
	Benzo(b)fluoranthene	ng/m3	42	0.03	1.30	0.32
	Benzo(g,h,i)perylene	ng/m3	42	0.03	2.90	0.64
	Indeno(1,2,3-cd)pyrene	ng/m3	42	0.03	1.70	0.41

Most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, styrene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
VOC	1,3-Butadiene (ppb)	10	1999	3	0.46	0.54	0.49	1	0.29	0.29	0.29	1	0.42	0.42	0.42
		11	1999	6	0.25	0.49	0.36	2	0.25	0.35	0.30	3	0.28	0.47	0.38
		12	1999	7	0.50	0.79	0.63	2	0.36	0.39	0.38	2	0.40	0.49	0.45
		1	2000	8	0.15	0.64	0.38	3	0.09	0.51	0.31	2	0.20	0.64	0.42
		2	2000	7	0.08	0.41	0.24	2	0.16	0.16	0.16	2	0.15	0.33	0.24
		3	2000	7	0.07	0.24	0.15	3	0.09	0.13	0.10	3	0.08	0.10	0.09
		4	2000	7	0.04	0.27	0.14	2	0.06	0.07	0.07	3	0.02	0.09	0.07
		5	2000	2	0.06	0.24	0.15	2	0.02	0.13	0.08	2	0.02	0.13	0.08
		6	2000	3	0.02	0.08	0.05	3	0.02	0.06	0.03	2	0.04	0.06	0.05
		7	2000	2	0.05	0.06	0.06	2	0.04	0.06	0.05	2	0.02	0.08	0.05
		8	2000	3	0.04	0.12	0.08	2	0.02	0.07	0.05	3	0.05	0.08	0.07
		9	2000	2	0.06	0.14	0.10	3	0.05	0.12	0.09	2	0.05	0.27	0.16
	10	2000	3	0.08	0.22	0.16	3	0.04	0.17	0.10	3	0.05	0.13	0.10	
	11	2000	2	0.33	0.63	0.48	2	0.19	0.43	0.31	2	0.27	0.69	0.48	
	12	2000	3	0.43	0.58	0.51	3	0.26	0.32	0.30	3	0.38	0.40	0.39	
	1	2001	3	0.44	0.64	0.52	3	0.17	0.36	0.27	3	0.38	0.66	0.52	
	2	2001	1	0.15	0.15	0.15	2	0.13	0.15	0.14	2	0.13	0.18	0.16	
	Acetaldehyde (ppb)	10	1999	3	1.10	2.10	1.70	1	1.50	1.50	1.50	1	2.20	2.20	2.20
		11	1999	7	0.41	2.00	1.11	3	0.89	1.80	1.43	3	0.05	2.50	1.48
		12	1999	7	0.65	1.80	1.23	2	1.40	1.40	1.40	2	0.53	1.30	0.92
		1	2000	6	0.42	1.90	0.99	2	1.20	1.90	1.55	2	0.82	1.50	1.16
		2	2000	6	0.34	1.10	0.65	1	0.81	0.81	0.81	2	0.35	0.61	0.48
		3	2000	7	0.31	1.10	0.57	3	0.42	0.69	0.54	3	0.45	0.90	0.64
		4	2000	7	0.15	1.10	0.52	3	0.20	1.00	0.54	3	0.27	1.00	0.66
		5	2000	2	0.34	1.00	0.67	1	0.29	0.29	0.29	2	0.38	0.71	0.55
		6	2000	3	0.31	0.55	0.42	3	0.33	0.58	0.50	3	0.40	1.10	0.78
7		2000	2	0.42	0.74	0.58	1	0.52	0.52	0.52	2	0.61	1.20	0.91	
8		2000	3	0.33	0.84	0.58	3	0.34	0.94	0.67	3	0.60	1.50	0.92	
9		2000	2	0.39	0.74	0.57	2	0.34	0.75	0.55	2	0.53	0.73	0.63	
10		2000	3	0.41	0.86	0.70	3	0.70	1.10	0.93	3	0.79	1.30	0.99	
11		2000	2	0.91	1.40	1.16	2	0.90	1.00	0.95	2	1.20	2.70	1.95	
12	2000	3	1.50	1.50	1.50	3	1.00	1.60	1.23	3	1.00	2.00	1.47		
1	2001	3	0.57	1.30	0.91	3	0.80	1.80	1.20	3	1.20	2.70	2.03		
2	2001	2	0.52	0.63	0.58	2	0.54	0.66	0.60	2	0.51	0.63	0.57		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
VOC	Benzene (ppb)	10	1999	3	1.50	2.10	1.70	1	1.10	1.10	1.10	1	1.60	1.60	1.60
		11	1999	6	0.86	1.70	1.24	2	1.00	1.40	1.20	3	1.30	1.80	1.60
		12	1999	7	1.50	2.40	1.90	2	1.30	1.40	1.35	2	1.30	1.60	1.45
		1	2000	8	0.46	3.10	1.42	3	0.41	1.80	1.14	2	0.64	2.20	1.42
		2	2000	7	0.36	1.20	0.81	2	0.55	0.72	0.64	2	0.72	1.10	0.91
		3	2000	7	0.28	0.85	0.55	3	0.37	0.49	0.43	3	0.37	0.51	0.45
		4	2000	7	0.10	0.85	0.44	2	0.33	0.52	0.43	3	0.10	0.46	0.32
		5	2000	2	0.33	0.85	0.59	2	0.10	0.54	0.32	2	0.22	0.52	0.37
		6	2000	3	0.10	0.26	0.19	3	0.10	0.28	0.20	2	0.20	0.35	0.28
		7	2000	2	0.10	0.25	0.18	2	0.23	0.28	0.26	2	0.21	0.46	0.34
		8	2000	3	0.10	0.66	0.37	2	0.10	0.35	0.23	3	0.27	0.72	0.47
		9	2000	2	0.10	0.40	0.25	3	0.33	1.40	0.70	2	0.22	1.60	0.91
	10	2000	3	0.32	0.77	0.55	3	0.23	0.63	0.43	3	0.26	0.57	0.44	
	11	2000	2	0.90	1.80	1.35	2	0.64	1.30	0.97	2	1.00	2.20	1.60	
	12	2000	3	1.30	1.80	1.63	3	0.89	1.30	1.04	3	1.20	1.60	1.37	
	1	2001	3	1.30	2.10	1.63	3	0.90	1.10	1.03	3	1.60	2.10	1.80	
	2	2001	1	0.55	0.55	0.55	2	0.52	0.56	0.54	2	0.36	0.62	0.49	
	Carbon Tetrachloride (ppb)	10	1999	3	0.08	0.09	0.08	1	0.08	0.08	0.08	1	0.08	0.08	0.08
		11	1999	6	0.08	0.08	0.08	2	0.08	0.08	0.08	3	0.08	0.08	0.08
		12	1999	7	0.05	0.09	0.07	2	0.08	0.08	0.08	2	0.08	0.08	0.08
		1	2000	8	0.08	0.09	0.09	3	0.09	0.09	0.09	2	0.09	0.09	0.09
		2	2000	7	0.07	0.10	0.09	2	0.09	0.09	0.09	2	0.09	0.10	0.10
		3	2000	7	0.09	0.11	0.10	3	0.09	0.10	0.10	2	0.09	0.11	0.10
		4	2000	7	0.10	0.13	0.12	2	0.12	0.13	0.13	3	0.11	0.13	0.12
		5	2000	2	0.12	0.12	0.12	2	0.09	0.12	0.11	2	0.09	0.12	0.11
		6	2000	3	0.09	0.10	0.09	3	0.09	0.09	0.09	2	0.09	0.09	0.09
7		2000	2	0.09	0.09	0.09	1	0.09	0.09	0.09	2	0.09	0.09	0.09	
8		2000	3	0.09	0.09	0.09	2	0.09	0.09	0.09	3	0.09	0.09	0.09	
9		2000	2	0.09	0.09	0.09	3	0.09	0.09	0.09	2	0.09	0.10	0.10	
10		2000	3	0.09	0.09	0.09	3	0.09	0.09	0.09	3	0.09	0.10	0.09	
11		2000	2	0.09	0.09	0.09	2	0.07	0.09	0.08	2	0.08	0.09	0.09	
12	2000	3	0.08	0.09	0.09	3	0.08	0.09	0.08	3	0.08	0.09	0.09		
1	2001	3	0.09	0.10	0.09	3	0.09	0.09	0.09	3	0.08	0.10	0.09		
2	2001	1	0.09	0.09	0.09	2	0.08	0.08	0.08	2	0.09	0.09	0.09		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
VOC	Chloroform (ppb)	10	1999	3	0.05	0.08	0.07	1	0.04	0.04	0.04	1	0.11	0.11	0.11
		11	1999	6	0.04	0.06	0.05	2	0.06	0.06	0.06	3	0.06	0.08	0.07
		12	1999	7	0.04	0.07	0.05	2	0.03	0.07	0.05	2	0.04	0.04	0.04
		1	2000	8	0.01	0.05	0.03	3	0.01	0.43	0.15	2	0.02	0.06	0.04
		2	2000	7	0.01	0.05	0.03	2	0.02	0.03	0.03	2	0.03	0.03	0.03
		3	2000	7	0.01	0.05	0.03	3	0.02	0.04	0.03	2	0.01	0.02	0.02
		4	2000	7	0.01	0.05	0.03	2	0.03	0.03	0.03	3	0.01	0.04	0.02
		5	2000	2	0.02	0.05	0.04	2	0.01	0.03	0.02	2	0.01	0.02	0.02
		6	2000	3	0.03	0.08	0.06	3	0.01	0.05	0.03	2	0.03	0.04	0.04
		7	2000	2	0.03	0.06	0.05	1	0.03	0.03	0.03	2	0.03	0.04	0.04
		8	2000	3	0.02	0.07	0.05	2	0.01	0.05	0.03	3	0.01	0.11	0.07
		9	2000	2	0.01	0.03	0.02	3	0.03	0.06	0.04	2	0.01	0.44	0.23
	10	2000	3	0.03	0.09	0.06	3	0.03	0.04	0.03	3	0.03	0.05	0.04	
	11	2000	2	0.05	0.06	0.06	2	0.03	0.04	0.04	2	0.05	0.06	0.06	
	12	2000	3	0.04	0.06	0.05	3	0.02	0.04	0.03	3	0.03	0.05	0.04	
	1	2001	3	0.03	0.04	0.03	3	0.02	0.03	0.02	3	0.04	0.05	0.05	
	2	2001	1	0.01	0.01	0.01	2	0.01	0.02	0.02	2	0.01	0.03	0.02	
	Formaldehyde (ppb)	10	1999	3	3.70	5.50	4.53	1	4.00	4.00	4.00	1	4.90	4.90	4.90
		11	1999	7	2.10	3.60	2.71	3	3.20	3.90	3.57	3	0.05	5.10	3.02
		12	1999	7	2.00	4.50	3.27	2	3.30	3.60	3.45	2	1.80	3.10	2.45
		1	2000	6	1.20	3.90	2.27	2	2.40	4.50	3.45	2	1.60	3.50	2.55
		2	2000	6	0.91	2.20	1.54	1	2.00	2.00	2.00	2	0.82	1.40	1.11
		3	2000	7	0.75	2.40	1.29	3	1.30	1.50	1.43	3	1.20	2.10	1.63
		4	2000	7	0.53	2.90	1.48	3	0.76	2.90	1.75	3	0.59	2.70	1.70
		5	2000	2	1.00	2.90	1.95	1	1.20	1.20	1.20	2	1.00	2.10	1.55
		6	2000	3	0.90	2.30	1.63	3	1.30	2.20	1.77	3	1.30	2.80	2.27
7		2000	2	1.40	2.00	1.70	1	2.10	2.10	2.10	2	1.80	3.40	2.60	
8		2000	3	1.40	3.50	2.47	3	1.30	3.00	2.27	3	1.70	4.20	2.70	
9		2000	2	1.00	2.70	1.85	2	1.10	2.30	1.70	2	1.30	2.70	2.00	
10		2000	3	1.60	2.80	2.03	3	1.90	2.40	2.10	3	1.60	2.90	2.20	
11		2000	2	2.50	3.60	3.05	2	2.10	3.40	2.75	2	2.80	5.90	4.35	
12	2000	3	3.30	3.70	3.50	3	2.90	3.50	3.17	3	2.60	3.70	3.23		
1	2001	3	1.80	3.60	2.43	3	2.40	3.50	2.80	3	2.90	5.00	4.23		
2	2001	2	1.00	1.30	1.15	2	0.90	1.20	1.05	2	0.84	1.40	1.12		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
VOC	Methyl Chloroform (ppb)	10	1999	3	0.07	0.09	0.08	1	0.09	0.09	0.09	1	0.09	0.09	0.09
		11	1999	6	0.06	0.11	0.08	2	0.08	0.08	0.08	3	0.10	0.13	0.12
		12	1999	7	0.07	0.09	0.07	2	0.07	0.08	0.08	2	0.07	0.07	0.07
		1	2000	8	0.05	0.09	0.07	3	0.05	0.14	0.10	2	0.07	0.10	0.09
		2	2000	7	0.05	0.08	0.06	2	0.07	0.08	0.08	2	0.08	0.09	0.09
		3	2000	4	0.05	0.06	0.06	2	0.06	0.06	0.06	1	0.06	0.06	0.06
		4	2000	7	0.07	0.16	0.11	2	0.12	0.14	0.13	3	0.08	0.13	0.10
		5	2000	2	0.11	0.16	0.14	2	0.10	0.10	0.10	2	0.09	0.10	0.10
		6	2000	3	0.05	0.06	0.05	3	0.05	0.06	0.05	2	0.06	0.06	0.06
		7	2000	2	0.05	0.06	0.06	1	0.05	0.05	0.05	2	0.05	0.05	0.05
		8	2000	3	0.04	0.07	0.06	2	0.05	0.05	0.05	3	0.05	0.06	0.06
		9	2000	2	0.04	0.07	0.06	3	0.04	0.06	0.05	2	0.05	0.16	0.11
	10	2000	3	0.05	0.05	0.05	3	0.05	0.07	0.06	3	0.05	0.07	0.06	
	11	2000	2	0.05	0.07	0.06	2	0.07	0.07	0.07	2	0.06	0.08	0.07	
	12	2000	3	0.06	0.07	0.06	3	0.05	0.08	0.06	3	0.05	0.08	0.06	
	1	2001	3	0.04	0.05	0.04	3	0.05	0.05	0.05	3	0.05	0.07	0.06	
	2	2001	1	0.04	0.04	0.04	2	0.05	0.05	0.05	2	0.04	0.05	0.05	
	Methyl Ethyl Ketone (ppb)	10	1999	3	0.24	0.41	0.35	1	0.35	0.35	0.35	1	0.48	0.48	0.48
		11	1999	7	0.10	0.42	0.26	3	0.21	0.33	0.29	3	0.05	0.58	0.37
		12	1999	7	0.16	0.63	0.44	2	0.30	1.20	0.75	2	0.14	0.50	0.32
		1	2000	6	0.05	0.46	0.15	2	0.15	0.49	0.32	2	0.21	0.36	0.29
		2	2000	6	0.05	0.23	0.12	1	0.12	0.12	0.12	2	0.05	0.20	0.13
		3	2000	7	0.05	0.19	0.08	3	0.05	0.05	0.05	3	0.05	0.15	0.08
		4	2000	7	0.05	0.17	0.07	3	0.05	0.05	0.05	3	0.05	0.14	0.08
		5	2000	2	0.05	0.15	0.10	1	0.05	0.05	0.05	2	0.05	0.05	0.05
		6	2000	3	0.05	0.05	0.05	3	0.05	0.05	0.05	3	0.05	0.05	0.05
7		2000	2	0.05	0.17	0.11	1	0.05	0.05	0.05	2	0.05	0.12	0.09	
8		2000	3	0.05	0.05	0.05	3	0.05	0.05	0.05	3	0.05	0.21	0.14	
9		2000	2	0.05	0.05	0.05	2	0.05	0.05	0.05	2	0.05	0.11	0.08	
10		2000	3	0.05	0.05	0.05	3	0.05	0.18	0.09	3	0.05	0.21	0.10	
11		2000	2	0.80	0.90	0.85	2	0.21	0.24	0.23	2	0.32	0.75	0.54	
12	2000	3	0.27	0.42	0.37	3	0.15	0.34	0.26	3	0.26	0.37	0.31		
1	2001	3	0.15	0.61	0.36	3	0.11	0.29	0.23	3	0.38	0.82	0.65		
2	2001	2	0.11	0.27	0.19	2	0.11	0.15	0.13	2	0.05	0.13	0.09		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
VOC	Methyl tertiary-Butyl Ether (ppb)	10	1999	3	3.60	5.40	4.40	1	3.20	3.20	3.20	1	5.50	5.50	5.50
		11	1999	6	2.30	3.90	3.05	2	2.40	2.80	2.60	3	3.90	4.90	4.53
		12	1999	7	3.50	6.00	4.60	2	2.10	2.50	2.30	2	3.70	4.10	3.90
		1	2000	8	1.20	5.20	3.29	3	0.61	4.40	2.44	2	1.60	7.10	4.35
		2	2000	7	0.89	3.00	1.96	2	1.30	1.60	1.45	2	2.10	3.20	2.65
		3	2000	7	0.69	2.80	1.41	3	0.77	1.00	0.85	3	1.00	1.10	1.03
		4	2000	7	0.45	2.60	1.39	2	0.69	0.88	0.79	3	0.54	1.40	0.94
		5	2000	2	1.00	1.80	1.40	2	0.32	1.40	0.86	2	0.58	1.50	1.04
		6	2000	3	0.64	0.79	0.73	3	0.15	0.78	0.49	2	0.76	1.00	0.88
		7	2000	2	0.62	1.20	0.91	2	0.49	0.55	0.52	2	0.54	1.40	0.97
		8	2000	3	0.75	2.10	1.25	2	0.49	1.00	0.75	3	0.84	2.30	1.48
		9	2000	2	0.59	1.00	0.80	3	0.15	1.00	0.68	2	0.50	3.50	2.00
	10	2000	3	0.78	2.30	1.73	3	0.63	1.30	0.98	3	0.83	2.00	1.38	
	11	2000	2	2.20	5.40	3.80	2	1.00	3.70	2.35	2	2.80	6.70	4.75	
	12	2000	3	3.30	4.30	3.90	3	1.70	2.50	1.97	3	2.90	4.10	3.63	
	1	2001	3	2.90	4.20	3.57	3	1.70	1.80	1.77	3	4.00	5.00	4.40	
	2	2001	1	0.88	0.88	0.88	2	0.60	1.10	0.85	2	0.56	1.30	0.93	
	Perchloroethylene (ppb)	10	1999	3	0.12	0.17	0.14	1	0.17	0.17	0.17	1	0.21	0.21	0.21
		11	1999	6	0.07	0.16	0.10	2	0.11	0.13	0.12	3	0.17	0.24	0.20
		12	1999	7	0.11	0.26	0.16	2	0.13	0.22	0.18	2	0.13	0.32	0.23
		1	2000	8	0.02	0.31	0.12	3	0.05	0.32	0.21	2	0.04	0.28	0.16
		2	2000	7	0.02	0.11	0.06	2	0.09	0.09	0.09	2	0.08	0.09	0.09
		3	2000	7	0.02	0.08	0.04	3	0.03	0.06	0.04	2	0.04	0.07	0.06
		4	2000	7	0.02	0.08	0.04	2	0.07	0.16	0.12	3	0.03	0.07	0.05
		5	2000	2	0.03	0.20	0.12	2	0.03	0.09	0.06	2	0.04	0.19	0.12
6		2000	3	0.02	0.04	0.03	3	0.02	0.03	0.02	2	0.03	0.03	0.03	
7		2000	2	0.01	0.05	0.03	1	0.02	0.02	0.02	2	0.03	0.05	0.04	
8		2000	3	0.01	0.09	0.05	2	0.01	0.05	0.03	3	0.03	0.09	0.07	
9		2000	2	0.03	0.03	0.03	3	0.02	0.07	0.05	2	0.03	0.23	0.13	
10		2000	3	0.03	0.05	0.04	3	0.02	0.19	0.09	3	0.04	0.06	0.05	
11	2000	2	0.05	0.14	0.10	2	0.07	0.17	0.12	2	0.14	0.32	0.23		
12	2000	3	0.09	0.18	0.14	3	0.07	0.15	0.10	3	0.11	0.24	0.18		
1	2001	3	0.06	0.11	0.09	3	0.07	0.29	0.15	3	0.11	0.17	0.14		
2	2001	1	0.02	0.02	0.02	2	0.05	0.06	0.06	2	0.02	0.04	0.03		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
VOC	Toluene (ppb)	10	1999	3	3.50	4.90	4.17	1	2.60	2.60	2.60	1	6.20	6.20	6.20
		11	1999	6	2.10	4.10	3.17	2	2.00	3.10	2.55	3	3.20	5.00	4.17
		12	1999	7	3.30	6.70	4.67	2	2.80	3.40	3.10	2	2.70	3.60	3.15
		1	2000	8	0.91	6.50	3.31	3	0.68	6.60	3.76	2	1.10	5.80	3.45
		2	2000	7	1.00	3.00	2.01	2	1.30	1.40	1.35	2	1.70	3.00	2.35
		3	2000	7	0.81	2.30	1.30	3	0.76	1.20	0.94	2	0.83	0.92	0.88
		4	2000	7	0.24	2.40	1.16	2	1.10	2.20	1.65	3	0.45	1.00	0.80
		5	2000	2	0.67	2.90	1.79	2	0.27	0.92	0.60	2	0.47	1.00	0.74
		6	2000	3	0.29	0.40	0.36	3	0.25	0.41	0.35	2	0.38	0.78	0.58
		7	2000	2	0.46	0.50	0.48	1	0.37	0.37	0.37	2	0.49	1.20	0.85
		8	2000	3	0.31	1.80	0.89	2	0.22	0.61	0.42	3	0.48	1.70	1.23
		9	2000	2	0.68	1.00	0.84	3	0.52	1.30	0.82	2	0.41	6.40	3.41
		10	2000	3	0.49	2.10	1.36	3	0.30	2.10	1.13	3	0.51	3.10	2.04
		11	2000	2	2.00	4.50	3.25	2	1.70	2.40	2.05	2	2.10	5.40	3.75
12	2000	3	2.70	4.40	3.53	3	1.30	2.00	1.77	3	1.90	3.50	2.90		
1	2001	3	2.80	4.90	3.60	3	1.70	2.00	1.87	3	3.30	3.60	3.47		
2	2001	1	0.85	0.85	0.85	2	1.00	1.30	1.15	2	0.77	1.20	0.99		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
VOC	Trichloroethylene (ppb)	10	1999	3	0.02	0.09	0.06	1	0.04	0.04	0.04	1	0.03	0.03	0.03
		11	1999	6	0.02	0.09	0.05	2	0.03	0.06	0.05	3	0.02	0.19	0.08
		12	1999	7	0.01	0.05	0.03	2	0.14	0.20	0.17	2	0.01	0.03	0.02
		1	2000	8	0.01	0.11	0.05	3	0.03	0.19	0.12	2	0.01	0.03	0.02
		2	2000	6	0.01	0.05	0.03	2	0.03	0.04	0.04	2	0.01	0.03	0.02
		3	2000	7	0.01	0.11	0.05	3	0.01	0.05	0.03	2	0.01	0.04	0.03
		4	2000	7	0.01	0.16	0.04	2	0.03	0.04	0.04	3	0.03	0.08	0.06
		5	2000	2	0.03	0.04	0.04	2	0.03	0.04	0.04	2	0.02	0.03	0.03
		6	2000	3	0.01	0.03	0.02	3	0.01	0.03	0.02	2	0.01	0.03	0.02
		7	2000	2	0.01	0.02	0.02	1	0.03	0.03	0.03	2	0.01	0.02	0.02
		8	2000	3	0.01	0.04	0.03	2	0.02	0.03	0.03	3	0.01	0.02	0.01
		9	2000	2	0.01	0.02	0.02	3	0.01	0.03	0.02	2	0.01	2.40	1.21
	10	2000	3	0.01	0.04	0.02	3	0.03	0.14	0.07	3	0.01	0.77	0.27	
	11	2000	2	0.04	0.05	0.05	2	0.03	0.20	0.12	2	0.01	0.03	0.02	
	12	2000	3	0.03	0.09	0.05	3	0.03	0.15	0.07	3	0.01	0.04	0.02	
	1	2001	3	0.03	0.06	0.05	3	0.02	0.08	0.05	3	0.03	0.05	0.04	
	2	2001	1	0.02	0.02	0.02	2	0.03	0.07	0.05	2	0.01	0.01	0.01	
	meta/para-Xylene (ppb)	10	1999	3	2.00	2.80	2.30	1	1.30	1.30	1.30	1	2.70	2.70	2.70
		11	1999	6	1.10	2.00	1.50	2	0.90	1.60	1.25	3	1.50	2.30	2.03
		12	1999	7	1.80	3.20	2.41	2	1.40	1.50	1.45	2	1.70	1.80	1.75
		1	2000	8	0.30	2.70	1.48	3	0.30	2.20	1.37	2	0.30	3.00	1.65
		2	2000	7	0.30	1.80	1.02	2	0.30	0.73	0.52	2	0.82	1.40	1.11
		3	2000	7	0.30	1.20	0.63	3	0.30	0.30	0.30	2	0.30	0.30	0.30
		4	2000	7	0.30	1.10	0.65	2	0.30	0.62	0.46	3	0.30	0.30	0.30
		5	2000	2	0.30	1.00	0.65	2	0.30	0.66	0.48	2	0.30	0.91	0.61
		6	2000	3	0.30	0.30	0.30	3	0.30	0.30	0.30	2	0.30	0.30	0.30
		7	2000	2	0.30	0.30	0.30	1	0.30	0.30	0.30	2	0.30	0.78	0.54
		8	2000	3	0.30	1.20	0.60	2	0.30	0.30	0.30	3	0.30	1.10	0.57
		9	2000	2	0.30	0.30	0.30	3	0.30	0.30	0.30	2	0.30	2.50	1.40
		10	2000	3	0.30	1.50	0.93	3	0.30	1.30	0.78	3	0.30	1.30	0.80
11		2000	2	1.60	3.20	2.40	2	0.68	1.90	1.29	2	1.60	4.20	2.90	
12		2000	3	1.60	2.50	2.10	3	0.30	1.30	0.84	3	1.20	2.30	1.63	
1		2001	3	1.90	3.70	2.57	3	0.94	1.30	1.15	3	2.40	2.90	2.60	
2		2001	1	0.30	0.30	0.30	2	0.69	0.81	0.75	2	0.41	0.87	0.64	

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
VOC	ortho-Xylene (ppb)	10	1999	3	0.74	1.10	0.89	1	0.46	0.46	0.46	1	0.94	0.94	0.94
		11	1999	6	0.39	0.70	0.53	2	0.34	0.57	0.46	3	0.54	0.84	0.73
		12	1999	7	0.67	1.20	0.89	2	0.56	0.57	0.57	2	0.65	0.66	0.66
		1	2000	8	0.18	1.00	0.56	3	0.13	0.79	0.49	2	0.19	1.00	0.60
		2	2000	7	0.21	0.67	0.39	2	0.19	0.28	0.24	2	0.31	0.47	0.39
		3	2000	7	0.14	0.42	0.24	3	0.16	0.18	0.17	2	0.16	0.21	0.19
		4	2000	7	0.05	0.35	0.21	2	0.15	0.18	0.17	3	0.05	0.17	0.12
		5	2000	2	0.13	0.37	0.25	2	0.05	0.17	0.11	2	0.05	0.20	0.13
		6	2000	3	0.05	0.05	0.05	3	0.05	0.05	0.05	2	0.14	0.23	0.19
		7	2000	2	0.05	0.11	0.08	1	0.05	0.05	0.05	2	0.05	0.20	0.13
		8	2000	3	0.05	0.29	0.15	2	0.05	0.11	0.08	3	0.05	0.28	0.15
		9	2000	2	0.05	0.14	0.10	3	0.05	0.15	0.08	2	0.05	0.61	0.33
		10	2000	3	0.05	0.32	0.22	3	0.05	0.29	0.13	3	0.05	0.43	0.23
		11	2000	2	0.40	0.76	0.58	2	0.17	0.43	0.30	2	0.34	0.93	0.64
12	2000	3	0.42	0.55	0.47	3	0.12	0.30	0.22	3	0.23	0.57	0.37		
		1	2001	3	0.49	1.00	0.71	3	0.27	0.40	0.32	3	0.64	1.00	0.78
		2	2001	1	0.54	0.54	0.54	2	0.19	0.23	0.21	2	0.11	0.24	0.18
METALS	Antimony (ng/m3)	1999	10	3	4.7	4.7	4.7	1	4.7	4.7	4.7	1	4.7	4.7	4.7
		1999	11	7	0.7	4.7	3.1	3	2.9	4.7	4.1	2	4.7	4.7	4.7
		1999	12	7	0.7	4.5	2.4	2	2.1	4.3	3.2	3	0.7	0.7	0.7
		2000	1	6	2.0	8.0	5.9	2	6.1	8.8	7.5	3	4.9	6.7	5.8
		2000	2	5	1.6	3.3	2.6	2	1.6	1.9	1.8	2	2.2	2.5	2.4
		2000	3	5	1.7	3.3	2.3	3	0.7	1.6	1.0	3	0.7	2.6	1.3
		2000	4	7	0.7	3.9	2.0	3	0.7	1.9	1.1	3	1.5	7.5	5.0
		2000	5	2	0.7	3.5	2.1	2	0.7	5.0	2.9	2	5.1	5.5	5.3
		2000	6	3	0.7	2.8	1.7	3	4.8	5.1	4.9	3	1.8	2.1	2.0
		2000	7	2	0.7	1.4	1.1	2	0.7	4.8	2.8	2	0.7	1.6	1.2
		2000	8	3	0.7	2.9	2.1	3	0.7	2.3	1.2	3	0.7	0.7	0.7
		2000	9	2	0.7	0.7	0.7	2	0.7	0.7	0.7	2	0.7	0.7	0.7
		2000	10	2	0.7	0.7	0.7	3	0.7	4.4	1.9	3	0.7	0.7	0.7
		2000	11	2	0.7	2.3	1.5	2	2.3	4.9	3.6	2	0.7	3.2	2.0
		2000	12	1	3.1	3.1	3.1	no data	no data	no data	no data	3	0.7	3.4	1.6
2001	1	3	0.7	4.4	2.7	2	2.5	3.5	3.0	3	5.3	7.2	6.0		
2001	2	1	3.5	3.5	3.5	2	2.5	3.2	2.9	2	3.9	4.2	4.1		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
METALS	Total Chromium (ng/m3)	10	1999	3	5.9	7.2	6.7	1	3.8	3.8	3.8	1	4.8	4.8	4.8
		11	1999	7	2.7	21.0	9.9	3	2.7	9.1	5.0	2	2.4	9.1	5.8
		12	1999	7	12.0	31.0	17.1	2	14.0	14.0	14.0	3	18.0	31.0	25.3
		1	2000	6	2.7	6.7	5.2	2	4.5	5.6	5.1	3	4.1	5.6	5.1
		2	2000	5	2.3	4.0	2.8	2	1.8	2.6	2.2	2	2.6	2.9	2.8
		3	2000	5	2.3	3.4	2.8	3	1.4	2.3	1.9	3	1.7	2.1	2.0
		4	2000	7	2.6	8.2	5.3	3	0.7	1.6	1.0	3	2.7	3.7	3.2
		5	2000	2	5.5	8.5	7.0	2	0.7	4.1	2.4	2	3.9	5.4	4.7
		6	2000	3	6.8	7.8	7.2	3	4.3	4.3	4.3	3	2.9	3.6	3.3
		7	2000	2	3.0	8.3	5.7	2	4.3	6.5	5.4	2	3.2	5.9	4.6
		8	2000	3	2.6	4.4	3.4	3	7.6	10.0	8.7	3	5.9	6.9	6.5
		9	2000	2	2.6	2.9	2.8	2	7.9	7.9	7.9	2	5.7	6.9	6.3
	10	2000	2	2.5	2.7	2.6	3	6.7	7.9	7.2	3	5.1	6.5	5.6	
	11	2000	2	3.3	3.3	3.3	2	7.6	8.1	7.9	2	6.0	6.5	6.3	
	12	2000	1	3.3	3.3	3.3	no data	no data	no data	no data	3	0.7	8.2	4.9	
	1	2001	3	2.5	3.4	3.0	2	6.9	7.2	7.1	3	7.2	7.6	7.5	
	2	2001	1	2.6	2.6	2.6	2	6.0	6.0	6.0	2	5.8	6.0	5.9	
	Copper (ng/m3)	10	1999	3	35	56	46	1	58	58	58	1	43	43	43
		11	1999	7	22	58	32	3	35	123	76	2	18	31	25
		12	1999	7	27	65	45	2	46	114	80	3	21	52	38
		1	2000	6	15	46	27	2	26	84	55	3	22	65	45
		2	2000	5	17	41	28	2	52	76	64	2	40	62	51
		3	2000	5	17	28	20	3	15	32	23	3	20	62	35
		4	2000	7	14	113	47	3	11	105	64	3	16	40	27
		5	2000	2	8	71	39	2	11	79	45	2	24	38	31
		6	2000	3	16	36	28	3	63	105	91	3	15	32	21
		7	2000	2	20	51	36	2	76	96	86	2	36	47	42
		8	2000	3	18	35	28	3	31	73	59	3	31	64	49
		9	2000	2	31	35	33	2	46	115	81	2	36	50	43
10		2000	2	37	54	46	3	48	95	71	3	39	131	89	
11		2000	2	33	38	36	2	52	98	75	2	63	81	72	
12		2000	1	39	39	39	no data	no data	no data	no data	3	4	62	40	
1		2001	3	28	65	47	2	57	61	59	3	50	88	69	
2		2001	1	43	43	43	2	27	29	28	2	22	28	25	

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
METALS	Iron (ng/m3)	10	1999	3	53	1786	910	1	386	386	386	1	591	591	591
		11	1999	7	324	1928	894	3	228	707	403	2	242	1213	728
		12	1999	7	988	2521	1700	2	1199	1562	1381	3	1491	2601	2074
		1	2000	6	162	1241	595	2	92	817	455	3	109	1118	688
		2	2000	5	273	855	437	2	120	203	162	2	215	465	340
		3	2000	5	247	335	291	3	98	168	136	3	223	362	277
		4	2000	7	244	1516	640	3	194	658	358	3	176	654	477
		5	2000	2	161	2483	1322	2	176	364	270	2	1051	1293	1172
		6	2000	3	378	1091	844	3	203	276	237	3	869	1375	1166
		7	2000	2	291	1589	940	2	180	243	212	2	596	1087	842
		8	2000	3	391	1651	835	3	324	675	458	3	890	1386	1056
		9	2000	2	562	591	577	2	215	475	345	2	515	1829	1172
	10	2000	2	494	531	513	3	328	428	374	3	283	1781	888	
	11	2000	2	919	927	923	2	682	1169	926	2	1013	1403	1208	
	12	2000	1	726	726	726	no data	no data	no data	no data	3	61	1836	1023	
	1	2001	3	422	1379	963	2	625	749	687	3	794	1110	998	
	2	2001	1	812	812	812	2	168	369	269	2	218	220	219	
	Lead (ng/m3)	10	1999	3	20	27	23	1	12	12	12	1	9	9	9
		11	1999	7	10	46	24	3	19	27	24	2	9	24	17
		12	1999	7	19	38	31	2	60	66	63	3	14	21	18
		1	2000	6	9	65	28	2	15	69	42	3	10	34	20
		2	2000	5	8	36	19	2	6	6	6	2	10	14	12
		3	2000	5	7	12	9	3	3	6	4	3	4	11	8
		4	2000	7	3	20	12	3	5	32	14	3	9	13	11
		5	2000	2	1	23	12	2	5	7	6	2	10	10	10
		6	2000	3	5	15	10	3	7	8	8	3	5	8	6
		7	2000	2	9	19	14	2	4	7	5	2	5	8	6
		8	2000	3	7	17	12	3	5	113	42	3	7	12	9
		9	2000	2	3	9	6	2	5	8	7	2	7	8	8
		10	2000	2	6	11	8	3	7	211	78	3	10	14	12
11		2000	2	15	21	18	2	16	125	71	2	9	16	13	
12		2000	1	10	10	10	no data	no data	no data	no data	3	1	22	12	
1		2001	3	11	24	18	2	19	30	25	3	13	26	18	
2		2001	1	50	50	50	2	52	106	79	2	7	11	9	

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
METALS	Manganese (ng/m3)	10	1999	3	30	49	41	1	15	15	15	1	25	25	25
		11	1999	7	9	46	22	3	7	56	25	2	10	58	34
		12	1999	7	20	168	74	2	27	39	33	3	39	68	51
		1	2000	6	5	85	30	2	3	22	13	3	4	35	21
		2	2000	5	7	81	33	2	4	6	5	2	8	17	13
		3	2000	5	6	22	11	3	2	5	4	3	7	15	11
		4	2000	7	6	80	27	3	1	11	7	3	4	23	14
		5	2000	2	6	44	25	2	4	5	4	2	22	23	23
		6	2000	3	8	24	18	3	5	6	6	3	18	26	23
		7	2000	2	10	26	18	2	4	6	5	2	15	20	18
		8	2000	3	15	104	46	3	8	16	11	3	21	33	25
		9	2000	2	12	52	32	2	5	12	9	2	13	39	26
	10	2000	2	10	14	12	3	7	10	9	3	6	37	19	
	11	2000	2	17	37	27	2	17	25	21	2	24	32	28	
	12	2000	1	13	13	13	no data	no data	no data	no data	3	2	47	23	
	1	2001	3	6	32	20	2	12	15	14	3	18	32	24	
	2	2001	1	40	40	40	2	7	9	8	2	4	6	5	
	Nickel (ng/m3)	10	1999	3	2	6	4	1	5.2	5.2	5.2	1	2	2	2
		11	1999	7	2	11	5	3	2	9	6	2	2	13	8
		12	1999	7	2	5	3	2	2	4	3	3	3	4	4
		1	2000	6	3	12	6	2	4	6	5	3	3	9	6
		2	2000	5	4	16	9	2	2	3	3	2	4	5	4
		3	2000	5	2	9	5	3	1	5	3	3	3	6	4
		4	2000	7	2	8	5	3	1	3	2	3	1	3	2
		5	2000	2	2	6	4	2	1	8	4	2	1	13	7
		6	2000	3	4	5	4	3	1	11	4	3	3	3	3
		7	2000	2	4	7	5	2	1	1	1	2	1	2	1
		8	2000	3	3	6	4	3	1	1	1	3	1	5	2
		9	2000	2	3	6	5	2	0.7	0.7	0.7	2	0.7	8.0	4.4
		10	2000	2	7	22	14	3	1	1	1	3	1	9	3
11		2000	2	4	4	4	2	1	1	1	2	1	1	1	
12		2000	1	4	4	4	no data	no data	no data	no data	3	1	5	2	
1		2001	3	3	7	5	2	1	3	2	3	1	1	1	
2		2001	1	8	8	8	2	1	1	1	2	1	1	1	

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
METALS	Strontium (ng/m3)	10	1999	3	17	23	19	1	9	9	9	1	14	14	14
		11	1999	7	6	21	11	3	5	14	9	2	2	14	8
		12	1999	7	9	25	15	2	14	16	15	3	11	29	19
		1	2000	6	3	24	10	2	11	12	12	3	6	9	7
		2	2000	5	3	10	6	2	3	3	3	2	4	6	5
		3	2000	5	3	7	5	3	3	4	4	3	4	6	5
		4	2000	7	3	14	7	3	4	8	6	3	3	9	6
		5	2000	2	2	21	11	2	4	4	4	2	4	7	6
		6	2000	3	3	12	9	3	2	6	3	3	7	12	10
		7	2000	2	6	10	8	2	1	2	2	2	1	7	4
		8	2000	3	8	17	11	3	0.7	0.7	0.7	3	0.7	0.7	0.7
		9	2000	2	4	7	6	2	0.7	0.7	0.7	2	0.7	0.7	0.7
	10	2000	2	4	5	5	3	0.7	0.7	0.7	3	0.7	0.7	0.7	
	11	2000	2	7	7	7	2	1	1	1	2	1	1	1	
	12	2000	1	10	10	10	no data	no data	no data	no data	3	1	6	3	
	1	2001	3	4	10	8	2	1	1	1	3	1	6	2	
	2	2001	1	8	8	8	2	1	1	1	2	1	1	1	
	Zinc (ng/m3)	10	1999	3	107	151	134	1	76	76	76	1	49	49	49
		11	1999	7	46	124	74	3	81	105	92	2	44	93	69
		12	1999	7	80	278	151	2	60	67	64	3	70	91	80
		1	2000	6	30	154	74	2	25	78	52	3	18	71	50
		2	2000	5	37	160	79	2	22	31	27	2	42	67	55
		3	2000	5	37	60	49	3	17	34	25	3	24	50	36
		4	2000	7	19	210	71	3	15	33	27	3	31	43	38
		5	2000	2	19	107	63	2	19	21	20	2	36	39	38
		6	2000	3	29	70	56	3	25	32	30	3	34	41	37
		7	2000	2	31	81	56	2	18	25	22	2	25	29	27
		8	2000	3	45	107	70	3	18	70	42	3	29	55	39
		9	2000	2	45	81	63	2	17	66	42	2	27	35	31
		10	2000	2	43	53	48	3	29	44	34	3	24	55	37
11		2000	2	93	122	108	2	34	75	55	2	42	73	58	
12		2000	1	62	62	62	no data	no data	no data	no data	3	3	73	41	
1		2001	3	63	120	90	2	36	57	47	3	69	78	74	
2		2001	1	114	114	114	2	21	24	23	2	23	24	24	

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
PM	PM10 Ammonium (ug/m3)	10	1999	1	0.77	0.77	0.77	2	0.40	1.60	1.00	2	0.43	1.50	0.97
		11	1999	6	0.05	6.50	1.66	5	0.18	5.30	1.98	5	0.11	5.30	1.66
		12	1999	7	0.05	1.30	0.38	5	0.16	2.80	1.05	5	0.05	1.60	0.60
		1	2000	7	0.05	2.90	0.72	6	0.23	1.50	0.61	6	0.15	0.79	0.35
		2	2000	3	0.11	2.00	0.75	4	0.05	1.70	0.46	4	0.05	1.80	0.50
		3	2000	4	0.05	0.53	0.29	4	0.16	3.80	1.21	6	0.05	0.66	0.33
		4	2000	8	0.05	0.56	0.22	4	0.05	0.80	0.32	5	0.05	1.10	0.41
		5	2000	2	0.05	2.30	1.18	5	0.05	1.70	0.44	5	0.15	1.90	0.72
		6	2000	3	0.35	1.50	0.87	5	0.16	2.20	1.04	5	0.28	2.50	1.03
		7	2000	1	0.16	0.16	0.16	5	0.05	0.31	0.18	5	0.05	0.43	0.24
		8	2000	2	0.14	0.19	0.17	5	0.05	0.25	0.09	5	0.05	0.51	0.21
		9	2000	2	0.05	1.30	0.68	5	0.05	1.80	0.79	5	0.05	1.50	0.55
	10	2000	2	0.05	2.50	1.28	5	0.05	1.50	0.62	5	0.05	1.10	0.39	
	11	2000	2	0.05	0.05	0.05	5	0.05	1.40	0.32	5	0.05	0.37	0.11	
	12	2000	3	0.16	2.10	1.25	1	0.05	0.05	0.05	5	0.05	4.30	0.94	
	1	2001	1	0.10	0.10	0.10	6	0.05	1.80	0.66	6	0.10	2.40	0.86	
	2	2001	2	0.03	0.23	0.13	4	0.04	0.81	0.30	4	0.04	0.42	0.21	
	PM10 Chloride (ug/m3)	10	1999	1	0.02	0.02	0.02	2	0.02	0.02	0.02	2	0.02	0.05	0.04
		11	1999	6	0.02	1.50	0.40	5	0.02	0.09	0.04	5	0.02	0.09	0.05
		12	1999	7	0.24	0.90	0.58	5	0.07	1.40	0.46	5	0.04	0.29	0.13
		1	2000	7	0.06	1.20	0.42	6	0.07	3.30	0.73	6	0.05	2.50	0.51
		2	2000	3	0.02	2.80	1.04	4	0.08	4.10	1.69	4	0.06	1.90	0.89
		3	2000	4	1.20	4.20	2.48	4	0.02	3.50	1.19	6	0.02	1.60	0.35
		4	2000	8	0.05	5.70	2.17	4	0.02	5.10	1.34	5	0.02	3.90	0.82
		5	2000	2	0.02	0.32	0.17	5	0.09	1.80	0.47	5	0.02	0.15	0.06
		6	2000	3	0.02	0.82	0.29	5	0.02	1.70	0.67	5	0.02	0.33	0.11
7		2000	1	0.02	0.02	0.02	5	0.02	3.00	0.66	5	0.02	1.30	0.28	
8		2000	2	0.48	2.20	1.34	5	0.02	2.10	0.75	5	0.02	0.02	0.02	
9		2000	2	0.02	0.02	0.02	5	0.02	1.00	0.22	5	0.02	0.31	0.08	
10		2000	2	0.02	0.02	0.02	5	0.02	0.22	0.09	5	0.02	0.02	0.02	
11		2000	2	0.36	0.85	0.61	5	0.02	1.10	0.29	5	0.02	0.42	0.10	
12	2000	3	0.02	1.80	0.61	1	1.70	1.70	1.70	5	0.02	0.18	0.07		
1	2001	1	0.34	0.34	0.34	6	0.02	0.87	0.30	6	0.02	0.58	0.19		
2	2001	2	1.40	2.90	2.15	4	0.02	2.10	1.23	4	0.02	1.20	0.73		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
PM	PM10 Mass (ug/m3)	10	1999	1	49	49	49	2	38	39	39	2	35	45	40
		11	1999	6	27	54	44	5	26	56	38	5	22	57	41
		12	1999	7	36	61	46	5	24	59	44	5	28	60	43
		1	2000	7	17	61	41	6	19	45	28	6	19	44	30
		2	2000	3	13	40	25	4	15	31	20	4	18	30	24
		3	2000	4	16	34	25	4	20	42	32	6	16	34	27
		4	2000	8	13	41	27	4	18	38	28	5	17	38	28
		5	2000	2	25	48	37	5	19	37	30	5	29	38	33
		6	2000	3	18	31	25	5	24	30	27	5	28	32	30
		7	2000	1	23	23	23	5	18	34	26	5	21	36	29
		8	2000	2	26	57	42	5	25	43	33	5	29	44	35
		9	2000	2	20	35	28	5	18	38	29	5	25	38	31
	10	2000	2	29	49	39	5	19	27	24	5	19	31	28	
	11	2000	2	32	36	34	5	26	52	35	5	30	49	39	
	12	2000	3	41	51	46	1	29	29	29	5	21	69	43	
	1	2001	1	30	30	30	6	17	64	33	6	31	84	50	
	2	2001	2	13	27	20	4	15	32	23	4	16	43	27	
	PM10 Nitrate (ug/m3)	10	1999	1	5.4	5.4	5.4	2	2.5	3.5	3.0	2	1.5	3.8	2.7
		11	1999	6	2.3	16.0	7.7	5	1.8	12.0	5.8	5	1.4	13.0	5.1
		12	1999	7	0.1	8.6	2.9	5	0.1	13.0	5.8	5	1.2	8.8	4.0
		1	2000	7	1.4	13.0	8.0	6	1.4	7.2	3.4	6	0.1	2.5	1.7
		2	2000	3	1.2	9.2	4.1	4	0.6	7.3	2.7	4	1.0	6.6	2.7
		3	2000	4	0.9	4.3	2.9	4	1.8	6.2	3.9	6	1.3	4.8	2.9
		4	2000	8	0.6	7.7	3.4	4	0.7	8.3	4.5	5	0.9	5.8	3.0
		5	2000	2	0.3	7.2	3.7	5	0.8	7.6	4.0	5	0.5	5.5	2.9
		6	2000	3	0.4	4.9	2.4	5	0.3	5.2	2.2	5	0.5	6.6	2.7
7		2000	1	2.1	2.1	2.1	5	0.7	3.8	2.1	5	1.1	5.7	2.7	
8		2000	2	3.6	7.0	5.3	5	0.6	6.8	4.0	5	0.7	6.0	3.8	
9		2000	2	1.5	6.7	4.1	5	1.5	4.6	2.9	5	1.4	5.1	2.6	
10		2000	2	1.9	2.5	2.2	5	0.3	2.8	1.6	5	0.8	1.7	1.2	
11		2000	2	2.3	2.3	2.3	5	1.6	5.5	2.9	5	1.1	2.1	1.7	
12	2000	3	1.6	7.9	5.7	1	1.0	1.0	1.0	5	0.7	14.0	4.3		
1	2001	1	1.7	1.7	1.7	6	0.8	11.0	4.6	6	1.4	10.0	4.9		
2	2001	2	0.3	5.0	2.7	4	0.6	3.8	2.5	4	0.6	4.6	2.3		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
PM	PM10 Potassium (ug/m3)	10	1999	1	0.1	0.1	0.1	2	0.2	0.2	0.2	2	0.1	0.2	0.2
		11	1999	6	0.1	0.3	0.2	5	0.1	0.2	0.1	5	0.1	0.3	0.2
		12	1999	7	0.1	0.3	0.2	5	0.1	0.2	0.2	5	0.1	0.3	0.2
		1	2000	7	0.1	0.3	0.2	6	0.1	0.3	0.2	6	0.1	0.4	0.2
		2	2000	3	0.1	0.1	0.1	4	0.1	0.1	0.1	4	0.1	0.1	0.1
		3	2000	4	0.1	0.2	0.1	4	0.1	0.2	0.2	6	0.1	0.2	0.1
		4	2000	8	0.1	0.2	0.1	4	0.1	0.2	0.1	5	0.1	0.2	0.1
		5	2000	2	0.1	0.2	0.1	5	0.1	0.2	0.2	5	0.1	0.2	0.1
		6	2000	3	0.1	0.2	0.1	5	0.1	0.2	0.1	5	0.1	0.2	0.1
		7	2000	1	0.1	0.1	0.1	5	0.1	0.3	0.2	5	0.1	0.4	0.2
		8	2000	2	0.2	0.5	0.3	5	0.1	0.2	0.2	5	0.1	0.2	0.1
		9	2000	2	0.1	0.2	0.1	5	0.1	0.2	0.1	5	0.1	0.1	0.1
		10	2000	2	0.1	0.2	0.1	5	0.1	0.1	0.1	5	0.1	0.1	0.1
		11	2000	2	0.1	0.1	0.1	5	0.1	0.2	0.1	5	0.1	0.2	0.2
	12	2000	3	0.2	0.2	0.2	1	0.1	0.1	0.1	5	0.1	0.3	0.2	
	1	2001	1	0.1	0.1	0.1	6	0.1	0.5	0.2	6	0.2	1.0	0.4	
	2	2001	2	0.1	0.1	0.1	4	0.1	0.1	0.1	4	0.1	0.2	0.1	
	PM10 Sulfate (ug/m3)	10	1999	1	4.4	4.4	4.4	2	2.7	5.1	3.9	2	3.0	3.9	3.5
		11	1999	6	1.1	9.2	3.9	5	1.3	6.8	3.5	5	1.3	6.0	3.1
		12	1999	7	0.7	2.2	1.2	5	0.8	2.6	1.8	5	0.7	1.7	1.2
		1	2000	7	1.3	2.9	2.1	6	1.1	2.6	2.0	6	0.9	2.4	1.6
		2	2000	3	1.3	2.1	1.7	4	0.9	2.6	1.3	4	0.7	1.9	1.0
		3	2000	4	1.1	7.4	3.7	4	1.8	14.0	6.2	6	0.8	5.5	2.8
		4	2000	8	1.3	5.3	3.3	4	1.2	4.8	3.3	5	1.1	4.8	2.9
		5	2000	2	2.1	9.9	6.0	5	2.2	13.0	5.9	5	1.6	8.3	5.2
		6	2000	3	4.6	6.0	5.5	5	4.9	10.0	7.2	5	4.1	9.2	6.1
7		2000	1	2.9	2.9	2.9	5	3.3	7.1	4.7	5	2.4	6.9	4.2	
8		2000	2	5.3	6.5	5.9	5	3.1	5.8	4.9	5	2.4	5.6	4.4	
9		2000	2	3.0	5.0	4.0	5	1.4	7.9	4.6	5	2.3	6.2	3.9	
10	2000	2	2.7	9.5	6.1	5	1.4	7.8	4.1	5	0.9	5.0	3.0		
11	2000	2	1.0	1.2	1.1	5	1.0	2.6	1.5	5	0.7	1.6	1.1		
12	2000	3	1.2	4.7	2.5	1	0.9	0.9	0.9	5	0.8	4.4	1.7		
1	2001	1	0.9	0.9	0.9	6	0.5	2.3	1.3	6	0.5	1.9	1.2		
2	2001	2	0.8	1.7	1.3	4	0.8	3.0	1.9	4	0.6	3.1	1.6		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
PM	PM10 Total Carbon (ug/m3)	10	1999	1	6.9	6.9	6.9	2	4.0	6.1	5.1	2	3.8	8.5	6.2
		11	1999	6	4.7	9.4	6.8	5	3.5	8.4	5.8	5	3.1	12.0	7.8
		12	1999	7	8.0	12.0	9.7	5	4.7	9.0	7.3	5	7.1	13.0	10.0
		1	2000	7	1.8	13.0	7.9	6	2.2	9.7	5.4	6	2.5	14.0	7.6
		2	2000	3	1.9	6.5	3.7	4	0.5	4.2	2.6	4	3.7	7.4	4.9
		3	2000	4	1.9	2.8	2.3	4	1.6	4.5	3.1	6	2.6	4.7	3.6
		4	2000	8	0.5	4.8	2.1	4	0.5	4.0	2.5	5	1.0	4.9	3.3
		5	2000	2	1.3	5.8	3.6	5	0.5	3.7	1.8	5	2.0	4.1	3.1
		6	2000	3	0.5	2.6	1.6	5	0.5	1.7	1.0	5	1.8	3.3	2.4
		7	2000	1	1.8	1.8	1.8	5	0.5	2.6	1.4	5	1.6	3.6	2.6
		8	2000	2	1.2	4.2	2.7	5	1.1	3.6	2.6	5	1.9	4.5	3.4
		9	2000	2	2.3	3.7	3.0	5	1.9	4.9	3.2	5	1.8	4.6	3.3
		10	2000	2	5.1	6.5	5.8	5	2.7	5.0	3.5	5	3.3	5.3	4.1
		11	2000	2	7.2	11.0	9.1	5	5.4	12.0	8.2	5	8.4	18.0	11.8
12	2000	3	9.5	12.0	10.4	1	7.3	7.3	7.3	5	5.1	15.0	10.9		
1	2001	1	10.0	10.0	10.0	6	5.6	17.0	9.0	6	14.0	30.0	18.0		
2	2001	2	1.3	4.2	2.8	4	2.5	7.1	4.4	4	3.8	8.0	6.2		
PAH	Benzo(a)pyrene (ng/m3)	10	1999	1	0.18	0.18	0.18	1	0.07	0.07	0.07	1	0.13	0.13	0.13
		11	1999	6	0.06	0.73	0.31	3	0.06	0.36	0.18	3	0.12	1.10	0.45
		12	1999	7	0.40	1.20	0.66	2	0.35	0.36	0.36	2	0.73	0.74	0.74
		1	2000	7	0.07	0.45	0.19	3	0.14	0.36	0.23	3	0.35	0.88	0.53
		2	2000	3	0.05	0.12	0.08	2	0.06	0.06	0.06	2	0.09	0.33	0.21
		3	2000	4	0.03	0.05	0.03	3	0.03	0.03	0.03	3	0.03	0.08	0.04
		4	2000	8	0.03	0.03	0.03	3	0.03	0.03	0.03	3	0.03	0.03	0.03
		5	2000	2	0.03	0.03	0.03	2	0.03	0.03	0.03	2	0.03	0.03	0.03
		6	2000	3	0.03	0.03	0.03	3	0.03	0.03	0.03	3	0.03	0.03	0.03
		7	2000	1	0.03	0.03	0.03	2	0.03	0.03	0.03	2	0.03	0.03	0.03
		8	2000	2	0.03	0.03	0.03	3	0.03	0.03	0.03	3	0.03	0.03	0.03
		9	2000	2	0.03	0.03	0.03	2	0.03	0.03	0.03	2	0.03	0.03	0.03
		10	2000	2	0.03	0.03	0.03	3	0.03	0.17	0.07	3	0.03	0.26	0.12
		11	2000	2	0.19	0.43	0.31	2	0.15	0.37	0.26	2	0.23	1.10	0.67
12	2000	3	0.23	0.84	0.46	1	0.34	0.34	0.34	3	0.32	0.67	0.51		
1	2001	1	0.87	0.87	0.87	3	0.17	0.50	0.38	3	0.42	1.40	1.07		
2	2001	2	0.03	0.11	0.07	2	0.09	0.14	0.12	2	0.12	0.14	0.13		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
PAH	Benzo(b)fluoranthene (ng/m3)	10	1999	1	0.18	0.18	0.18	1	0.11	0.11	0.11	1	0.14	0.14	0.14
		11	1999	6	0.11	0.68	0.34	3	0.11	0.38	0.26	3	0.18	1.20	0.58
		12	1999	7	0.42	1.10	0.67	2	0.39	0.49	0.44	2	0.67	0.79	0.73
		1	2000	7	0.10	1.10	0.45	3	0.26	0.48	0.39	3	0.45	0.83	0.63
		2	2000	3	0.11	0.23	0.17	2	0.11	0.14	0.13	2	0.17	0.36	0.27
		3	2000	4	0.06	0.13	0.09	3	0.06	0.09	0.07	3	0.06	0.11	0.08
		4	2000	8	0.03	0.08	0.04	3	0.03	0.03	0.03	3	0.03	0.07	0.04
		5	2000	2	0.03	0.10	0.06	2	0.03	0.03	0.03	2	0.03	0.03	0.03
		6	2000	3	0.03	0.05	0.03	3	0.03	0.03	0.03	3	0.03	0.03	0.03
		7	2000	1	0.03	0.03	0.03	2	0.03	0.03	0.03	2	0.03	0.03	0.03
		8	2000	2	0.03	0.06	0.04	3	0.03	0.03	0.03	3	0.03	0.03	0.03
		9	2000	2	0.03	0.03	0.03	2	0.03	0.03	0.03	2	0.03	0.03	0.03
	10	2000	2	0.06	0.07	0.07	3	0.03	0.36	0.15	3	0.03	0.41	0.18	
	11	2000	2	0.23	0.35	0.29	2	0.24	0.35	0.30	2	0.35	1.00	0.68	
	12	2000	3	0.28	0.70	0.43	1	0.37	0.37	0.37	3	0.40	0.71	0.58	
	1	2001	1	0.70	0.70	0.70	3	0.33	0.52	0.45	3	0.54	1.30	1.01	
	2	2001	2	0.05	0.16	0.11	2	0.19	0.28	0.24	2	0.20	0.30	0.25	
	Benzo(g,h,i)perylene (ng/m3)	10	1999	1	0.61	0.61	0.61	1	0.30	0.30	0.30	1	0.53	0.53	0.53
		11	1999	6	0.29	1.40	0.76	3	0.23	0.71	0.47	3	0.49	1.60	0.88
		12	1999	7	1.20	2.20	1.69	2	0.92	1.00	0.96	2	1.50	1.50	1.50
		1	2000	7	0.31	2.10	0.89	3	0.53	0.90	0.66	3	0.85	2.20	1.32
		2	2000	3	0.28	0.59	0.40	2	0.25	0.33	0.29	2	0.33	0.86	0.60
		3	2000	4	0.15	0.30	0.21	3	0.07	0.13	0.11	3	0.11	0.27	0.18
		4	2000	8	0.03	0.22	0.11	3	0.06	0.08	0.07	3	0.09	0.11	0.10
		5	2000	2	0.07	0.26	0.17	2	0.03	0.07	0.05	2	0.03	0.10	0.06
		6	2000	3	0.03	0.12	0.06	3	0.03	0.03	0.03	3	0.03	0.06	0.05
7		2000	1	0.03	0.03	0.03	2	0.03	0.03	0.03	2	0.03	0.08	0.05	
8		2000	2	0.05	0.14	0.10	3	0.03	0.06	0.04	3	0.03	0.07	0.04	
9		2000	2	0.03	0.07	0.05	2	0.03	0.03	0.03	2	0.03	0.10	0.06	
10		2000	2	0.10	0.17	0.14	3	0.03	0.75	0.30	3	0.03	0.66	0.31	
11		2000	2	0.65	1.00	0.83	2	0.42	1.00	0.71	2	0.66	2.30	1.48	
12	2000	3	0.67	1.60	1.03	1	0.67	0.67	0.67	3	0.85	1.40	1.15		
1	2001	1	1.60	1.60	1.60	3	0.52	0.88	0.72	3	1.10	2.90	2.07		
2	2001	2	0.19	0.46	0.33	2	0.25	0.42	0.34	2	0.24	0.44	0.34		

Table 3.2

Summary Monthly Statistics of Air Quality in Memorial Academy, Chula Vista and El Cajon

				Memorial Academy				Chula Vista				El Cajon			
Type	Chemical Name	Month	Year	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average	Number of Samples	Minimum	Maximum	Average
PAH	Indeno(1,2,3-cd)pyrene (ng/m3)	10	1999	1	0.24	0.24	0.24	1	0.13	0.13	0.13	1	0.23	0.23	0.23
		11	1999	6	0.14	0.83	0.42	3	0.13	0.42	0.30	3	0.26	1.20	0.60
		12	1999	7	0.60	1.70	0.95	2	0.49	0.66	0.58	2	0.85	1.00	0.93
		1	2000	7	0.13	1.50	0.59	3	0.33	0.60	0.48	3	0.57	1.20	0.84
		2	2000	3	0.14	0.32	0.22	2	0.14	0.15	0.15	2	0.24	0.51	0.38
		3	2000	4	0.08	0.18	0.12	3	0.06	0.12	0.09	3	0.07	0.14	0.10
		4	2000	8	0.03	0.11	0.05	3	0.03	0.06	0.04	3	0.03	0.12	0.07
		5	2000	2	0.03	0.12	0.07	2	0.03	0.03	0.03	2	0.03	0.05	0.04
		6	2000	3	0.03	0.03	0.03	3	0.03	0.03	0.03	3	0.03	0.03	0.03
		7	2000	1	0.03	0.03	0.03	2	0.03	0.03	0.03	2	0.03	0.03	0.03
		8	2000	2	0.03	0.06	0.04	3	0.03	0.03	0.03	3	0.03	0.03	0.03
		9	2000	2	0.03	0.03	0.03	2	0.03	0.03	0.03	2	0.03	0.03	0.03
		10	2000	2	0.06	0.09	0.08	3	0.03	0.48	0.19	3	0.03	0.45	0.19
		11	2000	2	0.32	0.54	0.43	2	0.34	0.50	0.42	2	0.50	1.50	1.00
12	2000	3	0.41	1.00	0.61	1	0.46	0.46	0.46	3	0.54	0.91	0.75		
1	2001	1	0.86	0.86	0.86	3	0.43	0.66	0.57	3	0.75	1.70	1.35		
2	2001	2	0.07	0.19	0.13	2	0.25	0.36	0.31	2	0.22	0.34	0.28		

Please note: most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

Table 3.3 Average Air Quality at Memorial Academy, Chula Vista and El Cajon in Various Time Periods

	Compound Name	LOD	UNITS	Memorial Academy				Chula Vista				El Cajon			
				Winter 6 mo.	Annual	Winter 1999	Winter 2000	Winter 6 mo.	Annual	Winter 1999	Winter 2000	Winter 6 mo.	Annual	Winter 1999	Winter 2000
VOCs	1,3-Butadiene	0.04	ppb	0.37	0.23	0.42	0.36	0.26	0.16	0.29	0.25	0.33	0.20	0.38	0.37
	Acetaldehyde	0.1	ppb	1.04	0.80	1.14	0.97	1.21	0.86	1.34	0.98	1.15	0.94	1.25	1.40
	Benzene	0.2	ppb	1.27	0.80	1.41	1.14	0.97	0.66	1.08	0.87	1.24	0.84	1.40	1.30
	Carbon Tetrachloride	0.02	ppb	0.08	0.09	0.08	0.09	0.09	0.09	0.08	0.09	0.09	0.09	0.09	0.09
	Chloroform	0.02	ppb	0.04	0.04	0.05	0.04	0.06	0.04	0.07	0.03	0.05	0.06	0.06	0.05
	Formaldehyde	0.1	ppb	2.60	2.22	2.86	2.43	2.98	2.39	3.29	2.37	2.61	2.37	2.81	3.03
	Methyl Chloroform	0.01	ppb	0.07	0.07	0.07	0.05	0.08	0.08	0.08	0.06	0.08	0.08	0.09	0.06
	Methyl Ethyl Ketone	0.1	ppb	0.23	0.15	0.26	0.36	0.31	0.18	0.37	0.19	0.28	0.18	0.32	0.34
	Methyl tertiary-Butyl Ether	0.3	ppb	3.12	2.10	3.46	2.77	2.14	1.41	2.40	1.58	3.66	2.44	4.19	3.02
	Perchloroethylene	0.01	ppb	0.10	0.08	0.12	0.08	0.13	0.09	0.15	0.11	0.16	0.11	0.18	0.15
	Toluene	0.2	ppb	3.11	2.01	3.47	2.52	2.38	1.54	2.67	1.70	3.37	2.32	3.86	3.04
	Trichloroethylene	0.02	ppb	0.04	0.04	0.04	0.04	0.07	0.05	0.08	0.08	0.03	0.13	0.03	0.09
	meta/para-Xylene	0.6	ppb	1.6	1.0	1.7	1.7	1.0	0.7	1.2	1.0	1.6	1.1	1.8	2.0
	ortho-Xylene	0.1	ppb	0.58	0.36	0.65	0.50	0.40	0.24	0.44	0.24	0.58	0.38	0.66	0.51
METALS	Antimony	1.4	ng/m3	3.5	2.5	3.7	2.3	3.7	3.0	4.2	2.8	3.3	2.9	3.7	2.9
	Total Chromium	1.4	ng/m3	7.4	6.3	8.4	3.0	5.3	5.1	6.0	7.0	7.6	6.2	8.7	6.0
	Copper	1.4	ng/m3	33	34	36	42	59	65	67	58	39	37	40	59
	Iron	7.1	ng/m3	804	832	907	787	487	400	557	564	783	882	884	867
	Lead	1.4	ng/m3	22	17	25	21	25	19	29	63	14	11	15	13
	Manganese	1.4	ng/m3	35	31	40	22	16	11	18	13	26	24	29	20
	Nickel	1.4	ng/m3	5.1	4.8	5.2	6.9	4.1	3.1	4.4	0.9	4.6	3.9	4.7	1.5
	Strontium	1.4	ng/m3	11.1	9.9	12.3	7.5	8.6	5.6	9.6	0.7	9.8	7.1	10.6	1.4
	Zinc	1.4	ng/m3	93	78	102	84	56	43	62	39	56	46	60	46
PM	PM10 Ammonium	0.1	ug/m3	0.76	0.65	0.85	0.56	1.05	0.76	1.02	0.39	0.73	0.63	0.82	0.50
	PM10 Chloride	0.03	ug/m3	0.82	0.75	0.49	0.75	0.69	0.69	0.59	0.72	0.33	0.28	0.32	0.22
	PM10 Mass	2	ug/m3	38	34	41	34	33	31	34	29	34	33	35	37
	PM10 Nitrate	0.1	ug/m3	5.2	4.3	5.6	2.9	4.1	3.7	4.1	2.5	3.2	3.1	3.2	2.9
	PM10 Potassium	0.03	ug/m3	0.15	0.16	0.16	0.13	0.14	0.14	0.14	0.13	0.17	0.15	0.18	0.19
	PM10 Sulfate	0.1	ug/m3	2.8	3.7	2.7	2.4	3.1	4.1	2.5	1.9	2.2	3.3	2.1	1.7
	PM10 Total Carbon	1	ug/m3	6.2	4.3	7.0	7.6	4.9	3.5	5.2	6.5	6.7	4.8	7.3	10.2
PAH	Benzo(a)pyrene	0.05	ng/m3	0.24	0.13	0.28	0.35	0.15	0.09	0.18	0.23	0.35	0.19	0.41	0.50
	Benzo(b)fluoranthene	0.05	ng/m3	0.31	0.18	0.36	0.32	0.23	0.13	0.27	0.30	0.40	0.22	0.47	0.54
	Benzo(g,h,i)perylene	0.05	ng/m3	0.76	0.42	0.87	0.78	0.47	0.25	0.54	0.55	0.83	0.45	0.96	1.07
	Indeno(1,2,3-cd)pyrene	0.05	ng/m3	0.42	0.23	0.48	0.42	0.29	0.16	0.33	0.39	0.51	0.27	0.59	0.71
Criteria	Carbon Monoxide	0.10	ppm	1.36	0.98	1.46	1.36	1.11	0.90	1.18	1.15	not measured			
	Oxides of Nitrogen	0.50	ppb	93.30	61.70	103.00	83.90	49.30	32.40	53.90	47.60	65.50	44.20	72.70	60.10
	Ozone	0.50	ppb	39.54	42.89	37.83	37.68	47.73	50.58	45.45	43.18	43.83	49.30	41.46	38.97

Most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, styrene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

NOTE: Winter 6 mo. = 10/99-3/00. Annual = 10/99-9/00. Winter 1999 = 10/99-2/00. Winter 2000 = 10/00-2/01.

Table 3.4. Particulate Matter in a 12-month Period (10/99-9/00).

Location	Average*	Maximum*	Number of Days Above State Standard
Memorial Academy	35	61	6
Chula Vista	31	59	2
El Cajon	32	60	3
San Diego - 12th Ave.	35	64	7

* Units of measure are micro-grams per cubic meter (ug/m3) for 24 hours. The State 24-hour standard is 50 ug/m3.

Table 3.5. Ozone in a 12-month Period (10/99-9/00).

Location	Average* Of Daily Maxima	Maximum*	Number of Days Above State Standard
Memorial Academy	42	96	1
Chula Vista	50	91	0
El Cajon	49	106	5
San Diego - 12th Ave.	43	118	1

* Units of measure are parts-per-billion (ppb). The State one-hour standard is 90 ppb.
A value of 91 ppb does not exceed the standard due to rounding.

Table 3.6. Nitrogen Oxides in a 12-month Period (10/99-9/00).

Location	Average* of Daily Maximum Values**	Maximum*
Memorial Academy	61	234
Chula Vista	31	137
El Cajon	43	184
San Diego - 12th Ave.	54	276

* Units of measure are parts-per-billion (ppb)

** No health-based standard has been determined for nitrogen oxides; the State standard for nitrogen dioxide is 25 ppb for a one-hour average.

Table 3.7. Carbon Monoxide in a 12-month Period (10/99-9/00).

Location	Average* of Daily Maximum Values**	Maximum*	Number of Days Above State Standard
Memorial Academy	1.0	2.7	0
Chula Vista	0.9	2.1	0
El Cajon	Not monitored	Not monitored	Not monitored
San Diego - 12th Ave.	1.2	4.1	0

* Units of measure are parts-per-million (ppm)

** The State standard and the daily maximum values are determined for an 8-hour average (ppm). The standard is 9 ppm.

Table 3.8a. Statistical Differences in Pollutant Levels Between Memorial Academy and Chula Vista at the 95% Level (Oct 1999 - Feb 2001)

		ARB - 17 months (10/99-2/01), matched days					STI - 6 months*	
	<i>Compound Name</i>	<i>Units</i>	<i>Memorial Academy</i>		<i>Chula Vista</i>	<i>Statistical Difference</i>	<i>Matched Samples</i>	<i>Statistical Difference</i>
VOCs	1,3-Butadiene	ppb	0.28	>	0.18	yes	31	
	Acetaldehyde	ppb	0.86		0.82		34	
	Benzene	ppb	0.91	>	0.71	yes	31	
	Carbon Tetrachloride	ppb	0.09		0.09		30	(yes)
	Chloroform	ppb	0.04		0.05		30	
	Formaldehyde	ppb	2.27		2.23		34	
	Methyl Chloroform	ppb	0.07		0.07		29	yes
	Methyl Ethyl Ketone	ppb	0.21		0.16		34	
	Methyl tertiary-Butyl Ether	ppb	2.37	>	1.43	yes	31	
	Perchloroethylene	ppb	0.08		0.10		30	
	Toluene	ppb	2.26	>	1.55	yes	30	
	Trichloroethylene	ppb	0.04	<	0.06	yes	29	
	meta/para-Xylene	ppb	1.3	>	0.7	yes	30	
	ortho-Xylene	ppb	0.40	>	0.24	yes	30	
METALS	Antimony	ng/m3	2.3		2.7		30	
	Total Chromium	ng/m3	5.8		5.7		30	(yes)
	Copper	ng/m3	36	<	69	yes	30	
	Iron	ng/m3	796	>	437	yes	30	(yes)
	Lead	ng/m3	16		25		30	(yes)
	Manganese	ng/m3	31.8	>	11.8	yes	30	(yes)
	Nickel	ng/m3	5.6	>	2.4	yes	30	
	Strontium	ng/m3	9.2	>	4.0	yes	30	yes
Zinc	ng/m3	79	>	40	yes	30		
PM	PM10 Ammonium	ug/m3	0.91	>	0.63	yes	26	
	PM10 Chloride	ug/m3	0.73		0.60		26	yes
	PM10 Mass	ug/m3	36	>	31	yes	26	yes
	PM10 Nitrate	ug/m3	4.4	>	3.4	yes	26	
	PM10 Potassium	ug/m3	0.17	>	0.13	yes	26	
	PM10 Sulfate	ug/m3	3.7		3.4		26	
PAH	PM10 Total Carbon	ug/m3	5.4	>	4.3	yes	26	
	Benzo(a)pyrene	ng/m3	0.18		0.14		25	
	Benzo(b)fluoranthene	ng/m3	0.22		0.18		25	
	Benzo(g,h,i)perylene	ng/m3	0.52	>	0.35	yes	25	
Criteria	Indeno(1,2,3-cd)pyrene	ng/m3	0.29		0.23		25	
	Carbon Monoxide	ppm	1.08	>	0.97	yes	480	
	Oxides of Nitrogen	ppb	69.00	>	39.00	yes	448	
	Ozone	ppb	40.58	<	47.60	yes	475	

*STI results are from a separate report. See References for information.

Most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, styrene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

Table 3.8b. Statistical Differences in Pollutant Levels Between Memorial Academy and El Cajon at the 95% Level (Oct 1999 - Feb 2001)

	Compound Name	Units	ARB - 17 months (10/99-2/01), matched days				STI - 6 months*	
			Memorial Academy		El Cajon	Statistical Difference	Matched Samples	Statistical Difference
VOCs	1,3-Butadiene	ppb	0.27		0.25		30	
	Acetaldehyde	ppb	0.83		0.97		36	
	Benzene	ppb	0.90		0.95		30	
	Carbon Tetrachloride	ppb	0.09		0.09		29	
	Chloroform	ppb	0.04		0.05		29	
	Formaldehyde	ppb	2.23		2.34		36	
	Methyl Chloroform	ppb	0.07		0.08		28	yes
	Methyl Ethyl Ketone	ppb	0.21		0.19		36	
	Methyl tertiary-Butyl Ether	ppb	2.30	<	2.59	yes	30	
	Perchloroethylene	ppb	0.08	<	0.12	yes	29	
	Toluene	ppb	2.20		2.43		29	
	Trichloroethylene	ppb	0.04		0.14		28	
	meta/para-Xylene	ppb	1.2		1.3		29	
	ortho-Xylene	ppb	0.39		0.40		29	
	METALS	Antimony	ng/m3	2.6		2.8		30
Total Chromium		ng/m3	5.5		6.0		30	yes
Copper		ng/m3	38		43		30	
Iron		ng/m3	851		876		30	
Lead		ng/m3	17	>	11	yes	30	(yes)
Manganese		ng/m3	34.8	>	21.5	yes	30	
Nickel		ng/m3	5.7	>	3.1	yes	30	
Strontium		ng/m3	9.7	>	5.0	yes	30	yes
PM	Zinc	ng/m3	84	>	46	yes	30	
	PM10 Ammonium	ug/m3	0.95		0.76		28	
	PM10 Chloride	ug/m3	0.73	>	0.27	yes	28	(yes)
	PM10 Mass	ug/m3	36		35		28	yes
	PM10 Nitrate	ug/m3	4.6	>	3.2	yes	28	
	PM10 Potassium	ug/m3	0.17		0.16		28	
	PM10 Sulfate	ug/m3	3.8	>	3.0	yes	28	
PAH	PM10 Total Carbon	ug/m3	5.4	<	6.5	yes	28	
	Benzo(a)pyrene	ng/m3	0.17	<	0.30	yes	27	
	Benzo(b)fluoranthene	ng/m3	0.21	<	0.32	yes	27	
	Benzo(g,h,i)perylene	ng/m3	0.49		0.65		27	
Criteria	Indeno(1,2,3-cd)pyrene	ng/m3	0.27	<	0.41	yes	27	
	Carbon Monoxide	ppm			no data			
	Oxides of Nitrogen	ppb	69.00	>	51.00	yes	447	
	Ozone	ppb	40.40	<	45.31	yes	470	

*STI results are from a separate report. See References for information.

Most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, styrene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

Table 3.8c. Statistical Differences in Pollutant Levels Between Memorial Academy and San Diego-12th Avenue at the 95% Level, 10/99-2/01.

	<i>Compound Name</i>	<i>Units</i>	<i>Memorial Academy</i>		<i>San Diego 12th Street</i>	<i>Statistical Difference</i>	<i>Matched Samples</i>
Criteria	Carbon Monoxide	ppm	1.080	<	1.250	yes	480
	Oxides of Nitrogen	ppb	69.00	>	67.00	yes	435
	Ozone	ppb	40.40	<	40.61	yes	460
	PM10 Mass	ug/m3	35.40		37.80		29

Table 3.9a. Statistical Differences in Pollutant Levels Between Memorial Academy and Chula Vista at the 95% Level (Oct 1999 - March 2000)

	Compound Name	Units	ARB - 6 months (10/99-3/00), matched days				STI - 6 months*	
			Memorial Academy		Chula Vista	Statistical Difference	Matched Samples	Statistical Difference
VOCs	1,3-Butadiene	ppb	0.34	>	0.24	yes	12	
	Acetaldehyde	ppb	1.20		1.04		10	
	Benzene	ppb	1.15	>	0.90	yes	12	
	Carbon Tetrachloride	ppb	0.09		0.09		12	(yes)
	Chloroform	ppb	0.04		0.07		12	
	Formaldehyde	ppb	2.70		2.64		10	
	Methyl Chloroform	ppb	0.07		0.08		11	yes
	Methyl Ethyl Ketone	ppb	0.27		0.28		10	
	Methyl tertiary-Butyl Ether	ppb	2.93	>	1.91	yes	12	
	Perchloroethylene	ppb	0.10	<	0.13	yes	12	
	Toluene	ppb	2.85		2.30		12	
	Trichloroethylene	ppb	0.05		0.08		11	
	meta/para-Xylene	ppb	1.4	>	0.9	yes	12	
	ortho-Xylene	ppb	0.54	>	0.36	yes	12	
	METALS	Antimony	ng/m3	3.5		3.1		10
Total Chromium		ng/m3	8.7		5.7		10	(yes)
Copper		ng/m3	33	<	58	yes	10	
Iron		ng/m3	808	>	474	yes	10	(yes)
Lead		ng/m3	22		22		10	(yes)
Manganese		ng/m3	43.6		16.4		10	(yes)
Nickel		ng/m3	5.6	>	3.6	yes	10	
Strontium		ng/m3	11.8	>	7.7	yes	10	yes
Zinc		ng/m3	101		52		10	
PM	PM10 Ammonium	ug/m3	1.98	>	1.45	yes	7	
	PM10 Chloride	ug/m3	0.35		0.32		7	yes
	PM10 Mass	ug/m3	47	>	42	yes	7	yes
	PM10 Nitrate	ug/m3	8.2	>	5.8	yes	7	
	PM10 Potassium	ug/m3	0.20	>	0.16	yes	7	
	PM10 Sulfate	ug/m3	3.6		3.1		7	
	PM10 Total Carbon	ug/m3	7.7		6.9		7	
PAH	Benzo(a)pyrene	ng/m3	0.25		0.24		7	
	Benzo(b)fluoranthene	ng/m3	0.39		0.33		7	
	Benzo(g,h,i)perylene	ng/m3	0.91		0.67		7	
	Indeno(1,2,3-cd)pyrene	ng/m3	0.52		0.41		7	
Criteria	Carbon Monoxide	ppm	1.37	>	1.11	yes	152	
	Oxides of Nitrogen	ppb	91.00	>	49.00	yes	163	
	Ozone	ppb	38.18	<	46.07	yes	163	

*STI results are from a separate report. See References for information.

NOTE: This table is presented for comparison purpose only. For assessing statistical difference, the complete data set from 10/99-2/01 should be used. Results are presented in Tables 3.8a, b, and c.

Most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, styrene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

Table 3.9b. Statistical Differences in Pollutant Levels Between Memorial Academy and El Cajon at the 95% Level (Oct 1999 - March 2000)

	Compound Name	Units	ARB - 6 months (10/99-3/00), matched days				STI - 6 months*	
			Memorial Academy		El Cajon	Statistical Difference	Matched Samples	Statistical Difference
VOCs	1,3-Butadiene	ppb	0.32		0.30		11	
	Acetaldehyde	ppb	1.05		0.88		11	
	Benzene	ppb	1.10		1.12		11	
	Carbon Tetrachloride	ppb	0.09		0.09		10	
	Chloroform	ppb	0.04		0.05		10	
	Formaldehyde	ppb	2.43		2.04		11	
	Methyl Chloroform	ppb	0.07	<	0.09	yes	9	yes
	Methyl Ethyl Ketone	ppb	0.25		0.21		11	
	Methyl tertiary-Butyl Ether	ppb	2.68		3.18		11	
	Perchloroethylene	ppb	0.10	<	0.15	yes	10	
	Toluene	ppb	2.81		3.07		10	
	Trichloroethylene	ppb	0.05		0.04		9	
	meta/para-Xylene	ppb	1.4		1.4		10	
	ortho-Xylene	ppb	0.52		0.53		10	
	METALS	Antimony	ng/m3	4.0	>	3.0	yes	10
Total Chromium		ng/m3	8.2	>	7.2	yes	10	yes
Copper		ng/m3	35		37		10	
Iron		ng/m3	827		714		10	
Lead		ng/m3	22	>	14	yes	10	(yes)
Manganese		ng/m3	49.9		21.8		10	
Nickel		ng/m3	6.0	>	4.1	yes	10	
Strontium		ng/m3	12.1	>	9.4	yes	10	yes
Zinc	ng/m3	108	>	53	yes	10		
PM	PM10 Ammonium	ug/m3	1.77		1.12		8	
	PM10 Chloride	ug/m3	0.46		0.08		8	(yes)
	PM10 Mass	ug/m3	44		41		8	yes
	PM10 Nitrate	ug/m3	7.7	>	4.5	yes	8	
	PM10 Potassium	ug/m3	0.19		0.20		8	
	PM10 Sulfate	ug/m3	3.5	>	2.8	yes	8	
	PM10 Total Carbon	ug/m3	7.1	<	8.3	yes	8	
PAH	Benzo(a)pyrene	ng/m3	0.22	<	0.50	yes	8	
	Benzo(b)fluoranthene	ng/m3	0.35	<	0.55	yes	8	
	Benzo(g,h,i)perylene	ng/m3	0.82		1.07		8	
	Indeno(1,2,3-cd)pyrene	ng/m3	0.47	<	0.67	yes	8	
Criteria	Carbon Monoxide	ppm			no data			
	Oxides of Nitrogen	ppb	92.00	>	65.00	yes	160	
	Ozone	ppb	38.18	<	42.25	yes	163	

*STI results are from a separate report. See References for information.

NOTE: This table is presented for comparison purpose only. For assessing statistical difference, the complete data set from 10/99-2/01 should be used. Results are presented in Tables 3.8a, b, and c.

Most values for ethylbenzene, methylene chloride, meta dichlorobenzene, ortho dichlorobenzene, para dichlorobenzene, styrene, arsenic, cobalt, hexavalent chromium, molybdenum, benzo(k)fluoranthene, dibenz(a,h)anthracene, tin are below LOD.

Table 3.9c. Statistical Differences in Pollutant Levels Between Memorial Academy and San Diego-12th Avenue at the 95% Level, 10/99-3/00.

	<i>Compound Name</i>	<i>Units</i>	<i>Memorial Academy</i>		<i>San Diego-12th Street</i>	<i>Statistical Difference</i>	<i>Matched Samples</i>
Criteria	Carbon Monoxide	ppm	1.360	<	1.610	yes	153
	Oxides of Nitrogen	ppb	95.00	>	90.00	yes	148
	Ozone	ppb	37.31	<	37.81	yes	153
	PM10 Mass	ug/m3	44.38		44.75		8

NOTE: This table is presented for comparison purpose only. For assessing statistical difference, the complete data set from 10/99-2/01 should be used. Results are presented in Tables 3.8a, b, and c.

Table 3.10. Number of Compounds With Statistical Differences: Comparisons Between ARB and STI

	VOCs, PM, PAHs	Metals	Criteria Pollutants
Memorial Academy vs Chula Vista			
STI - 6 months, all days	4	5	n/a
ARB - 6 months, matched days	10	4	3
ARB - 17 months, matched days	13	6	3
Memorial Academy vs El Cajon			
STI - 6 months, all days	3	3	n/a
ARB - 6 months, matched days	8	6	2
ARB - 17 months, matched days	9	5	2

NOTE: Statistical differences indicate an “observed” phenomenon in the data. To assess the impact on health, other factors should be taken into account. For example, measurements may differ statistically for a compound, but when they are below the threshold determined to be harmful, the differences are of no concern. In this report, we’ve considered the non-cancer risk and the overall (integrated) cancer risk, which provides a more meaningful basis for comparing air quality impacts at different sites. Please see sections 2.3 and 3.3 for details.

Table 3.11. Statistical Difference in Potential Cancer Risks Without Diesel PM Due to Top Risk Toxics: Memorial Academy Compared to Neighboring Sites Based on Matched Days (10/99-9/00)

	<i>Plausible Range (95% Confidence Interval)</i>	<i>Statistical Difference?</i>
Memorial Academy minus Chula Vista	62 cases lower to 134 cases higher (40% lower to 80% higher) than Chula Vista	No
Memorial Academy minus El Cajon	95 cases lower to 93 cases higher (50% lower to 50% higher) than El Cajon	No