1983

STATE OF CONNECTICUT

ANNUAL AIR QUALITY SUMMARY

QUI TRANSTULIT SUSTINET

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I. INTRODUCTION

The 1983 Air Quality Summary of Ambient Air Quality in Connecticut is a compilation of all air pollutant measurements made at the Department of Environmental Protection (DEP) air monitoring network sites.

A. Overview of Air Pollutant Concentrations in Connecticut

The assessment of ambient air quality in Connecticut is made by comparing the measured concentrations of a pollutant to each of two Federal air quality standards. The first is the primary standard which is established to protect public health with an adequate margin of safety. The second is the secondary standard which is established to protect plants and animals and to prevent economic damage. The specific air quality standards are listed in Table 1 along with the time constraints imposed on each.

The following section briefly describes the status of Connecticut's air quality for the year 1983. More detailed discussions of each of the six pollutants are provided in subsequent sections of this Air Quality Summary.

1. Total Suspended Particulates (TSP)

Measured total suspended particulate (TSP) levels did not exceed the primary annual standard of 75 ug/m^3 or the secondary annual standard of 60 ug/m^3 in Connecticut during 1983. No site exceeded the primary 24-hour standard of 260 ug/m^3 in 1983. Nor did any site exceed the secondary 24-hour standard of 150 ug/m^3, whereas such exceedances were recorded at two (2) sites in 1982 and at fourteen (14) sites in 1981. Two (2) exceedances of a standard are required at a particular site for the standard to be violated. No site recorded violations of any particulate standard in 1983 (see Table 2).

In general, measured TSP levels in Connecticut were lower in 1983 in terms of annual average concentration values than they were in 1982 (see Table 3).

2. Sulfur Dioxide (SO_2)

None of the air quality standards for sulfur dioxide were exceeded in Connecticut in 1983. Measured concentrations were below the 80 ug/m^3 primary annual standard, the 365 ug/m^3 primary 24-hour standard, and the 1300 ug/m^3 secondary 3-hour standard.

The results of continuous SO_2 monitoring indicate that sulfur dioxide levels were significantly lower in 1983 than 1982. Temperature is an important factor in determining SO_2 emissions. The general decrease in measured SO_2 levels may have been due to the fact that, for coastal Connecticut, 1983 was warmer than 1982. This can be shown by the number of "degree days" : a measure of heating requirement. As the number of degree days increases, the amount of fuel that must be burned to heat buildings also increases (see Tables 28 and 29). Consequently, as more fossil fuel is burned, the emissions of sulfur oxides are proportionately increased.

3. Ozone (O_3)

National Ambient Air Quality Standards – (NAAQS) – On February 8, 1979, the EPA established an ambient air quality standard for ozone of 0.12 ppm for a one-hour average. That level is not to be exceeded more than once per year. Furthermore, in order to determine compliance with the 0.12 ppm ozone standard, EPA directs the states to record the number of daily exceedances of 0.12 ppm at a given monitoring site over a consecutive 3-year period and then calculate the average number of daily exceedances for this interval. If the resulting average value is less than or equal to 1.0; that is, if the fourth highest daily value in a consecutive 3-year period is less than 0.12 ppm, the ozone standard is considered to be attained. The definition of the pollutant was also changed, along with the numerical value of the standard, partly because the instruments used to measure photochemical oxidants in the air really measure only ozone. Ozone is merely one of a group of chemicals which are formed photochemically in the air and are called photochemical oxidants. In the past, the two terms have often been used interchangeably. This 1983 Air Quality Summary uses the term "ozone" in conjunction with the new NAAQS to reflect the changes in both the numerical value of the NAAQS and the definition of the pollutant.

The primary 1-hour ozone standard was exceeded at all the DEP monitoring sites in 1983 (see Table 2).

The incidence of ozone levels in excess of the 1-hour 0.12 ppm ozone standard increased from 1982 to 1983 (see Tables 18 and 19). Most of this difference is attributable to the changes in meteorological factors which occur from year-to-year. The formation of ozone is facilitated by high temperatures and strong sunlight in the presence of hydrocarbons and oxides of nitrogen. The prevailing southwest wind transports hydrocarbons and nitrogen oxides generated in the New Jersey – New York City Metropolitan Area into Connecticut. Along the way, these chemicals react in the presence of strong sunlight, forming ozone. Consequently, the ozone levels across Connecticut are highest when the prevailing wind flow is out of the southwest (see Table 21). However, there are recorded exceedences of the NAAQS for ozone on non-southwest wind days. This indicates that pollution control programs currently being implemented in this state are needed to protect the public health of Connecticut's citizenry on days when Connecticut is responsible for its own pollution.

4. Nitrogen Dioxide (NO_2)

The method by which the DEP measures NO_2 was changed in 1981. This change was the reason for the incomplete nature of the 1981 data. 1983 was the second full year the DEP used continuous electronic analyzers to measure NO_2 levels. The annual average NO_2 standard, 100 ug/m^3, was not exceeded in 1983 at any site in Connecticut.

5. Carbon Monoxide (CO)

The primary eight-hour standard of 9 ppm was exceeded at all five of the carbon monoxide monitoring sites in Connecticut during 1983 (see Table 2). The standard was exceeded once at Bridgeport 004, New Haven 007 and Stamford 020, twice at New Britain 002, and three times at Hartford 012. For comparison, there were two exceedances at ~~Hartford 012 and~~ Stamford 020 and ~~three exceedances at~~ New Britain 002 in 1982.

There were no violations of the primary one-hour standard of 35 ppm.

6. Lead (Pb)

The primary and secondary ambient air quality standard for lead is 1.5 ug/m^3, maximum arithmetic mean averaged over three consecutive calendar months. As was the case in 1982, the lead standard was not exceeded at any site in Connecticut during 1983.

A downward trend in measured concentrations of lead has been observed since 1978. This trend is probably due to the increasing use of unleaded gasoline.

TABLE 1

ASSESSMENT OF AMBIENT AIR QUALITY

POLLUTANT	SAMPLING PERIOD	DATA REDUCTION	STATISTICAL BASE	AMBIENT AIR QUALITY STANDARDS: PRIMARY STANDARD ug/m3	PRIMARY STANDARD ppm	SECONDARY STANDARD ug/m3	SECONDARY STANDARD ppm
Total Suspended Particulates	24-Hours Every Sixth Day[1]	24-Hour Average	Annual Geometric Mean 24-Hour Average[3]	75 260		60* 150	
Sulfur Oxides (Measured as Sulfur Dioxide)	Continuous[2]	1-Hour Average	Annual Arithmetic Mean 24-Hour Average[3] 3-Hour Average[3]	80 365	0.03 0.14	 1300	 0.50
Nitrogen Dioxide	Continuous[2]	1-Hour Average	Annual Arithmetic Mean	100	0.05	Same as Primary	
Ozone	Continuous[2]	1-Hour Average	1-Hour Average[4]	235	0.12	Same as Primary	
Lead	24 Hours Every Sixth Day[5]	Monthly Composite	Weighted 3-Month Average	1.5		Same as Primary	
Carbon Monoxide	Continuous[2]	1-Hour Average	8-Hour Average[3] 1-Hour Average[3]	10** 40**	9 35	Same as Primary Same as Primary	

1 EPA assessment criteria require at least 5 samples per calendar quarter, and, if one month has no samples, then the other two months in that quarter must have at least two samples each.
2 EPA assessment criteria require 75% of possible data to compute valid averages.
3 Not to be exceeded more than once per year.
4 Not to be exceeded more than an average of once per year in three years.
5 State of Connecticut assessment criteria require 75% of possible data to compute valid averages.
* A guide to be used in assessing implementation plans to achieve the 24-hour standard.
** Units are mg/m^3

Units: ug/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; ppm = parts per million

TABLE 2

AIR QUALITY STANDARDS EXCEEDED IN CONNECTICUT IN 1983 BASED SOLELY UPON MEASURED CONCENTRATIONS

TOWN	SITE	TOTAL SUSPENDED PARTICULATES: Level Exceeding Secondary Annual Standard: Highest Observed Level (ug/m3)	TOTAL SUSPENDED PARTICULATES: Level Exceeding Secondary 24-Hour Standard: Highest Observed Level (ug/m3)	TOTAL SUSPENDED PARTICULATES: Level Exceeding Secondary 24-Hour Standard: Number of Times Standard Exceeded	OZONE: Level Exceeding 1-Hour Standard: Highest Observed Level (ppm)	OZONE: Level Exceeding 1-Hour Standard: Number of Days Standard Exceeded	CARBON MONOXIDE: Level Exceeding 8-Hour/1-Hour Standards: Highest Observed Level 8-Hour/1-Hour (ppm)	CARBON MONOXIDE: Level Exceeding 8-Hour/1-Hour Standards: Number of Times Standard Exceeded
Ansonia	003	-	-	-	X	X	X	X
Bridgeport	001	-	-	-	X	X	X	X
Bridgeport	004	X	X	X	X	X	9.6/-	1/-
Bridgeport	009	-	-	-	X	X	X	X
Bridgeport	123	-	-	-	0.208	24	X	X
Bristol	001	-	-	-	X	X	X	X
Burlington	001	-	-	-	X	X	X	X
Danbury	002	-	-	-	X	X	X	X
Danbury	123	-	-	-	0.224	25	X	X
East Hartford	003	X	X	X	0.209	15	X	X
East Hartford	004	-	-	-	X	X	X	X
Greenwich	008	-	-	-	X	X	X	X
Greenwich	017	X	X	X	0.269	32	X	X
Groton	005	X	X	X	0.294	36	X	X
Groton	006	-	-	-	X	X	X	X
Haddam	002	-	-	-	X	X	X	X
Hartford	003	-	-	-	X	X	X	X
Hartford	012	X	X	X	X	X	12.8/-	3/-
Hartford	013	-	-	-	X	X	X	X
Hartford	014	-	-	-	X	X	X	X
Madison	002	X	X	X	0.244	23	X	X
Manchester	001	-	-	-	X	X	X	X
Meriden	002	-	-	-	X	X	X	X
Meriden	008	-	-	-	X	X	X	X
Middletown	003	-	-	-	X	X	X	X
Middletown	007	X	X	X	0.216	20	X	X
Milford	002	-	-	-	X	X	X	X
Naugatuck	001	-	-	-	X	X	X	X
New Britain	002	X	X	X	X	X	11.3/-	2/-
New Britain	007	-	-	-	X	X	X	X
New Britain	008	-	-	-	X	X	X	X
New Britain	009	-	-	-	X	X	X	X
New Haven	002	-	-	-	X	X	X	X
New Haven	007	X	X	X	X	X	9.5/-	1/-
New Haven	013	-	-	-	X	X	X	X

TABLE 2, Continued

AIR QUALITY STANDARDS EXCEEDED IN CONNECTICUT IN 1983 BASED SOLELY UPON MEASURED CONCENTRATIONS

		TOTAL SUSPENDED PARTICULATES			OZONE		CARBON MONOXIDE	
		Level Exceeding Secondary Annual Standard	Level Exceeding Secondary 24-Hour Standard		Level Exceeding 1-Hour Standard		Level Exceeding 8-Hour/1-Hour Standards	
TOWN	SITE	Highest Observed Level (ug/m3)	Highest Observed Level (ug/m3)	Number of Times Standard Exceeded	Highest Observed Level (ppm)	Number of Days Standard Exceeded	Highest Observed Level 8-Hour/1-Hour (ppm)	Number of Times Standard Exceeded
New Haven	123	X	X	X	0.204	27	X	X
Norwalk	001	-	-	-	X	X	X	X
Norwalk	005	-	-	-	X	X	X	X
Norwalk	012	-	-	-	X	X	X	X
Norwich	001	-	-	-	X	X	X	X
Stafford	001	X	X	X	0.197	20	X	X
Stamford	001	-	-	-	X	X	X	X
Stamford	007	-	-	-	X	X	X	X
Stamford	020	X	X	X	X	X	9.7/-	1/-
Stamford	021	-	-	-	X	X	X	X
Stratford	005	-	-	-	X	X	X	X
Stratford	007	X	X	X	0.248	45	X	X
Torrington	001	-	-	-	X	X	X	X
Voluntown	001	-	-	-	X	X	X	X
Wallingford	001	-	-	-	X	X	X	X
Waterbury	005	-	-	-	X	X	X	X
Waterbury	006	-	-	-	X	X	X	X
Waterbury	007	-	-	-	X	X	X	X
Waterbury	123	-	-	-	X	X	X	X
Waterford	001	-	-	-	X	X	X	X
Willimantic	002	-	-	-	X	X	X	X

X: Pollutant not monitored at site
-: No violation

B. Trends

Any attempt to assess statewide trends in air pollution levels must account for the tendency of local changes to obscure the statewide pattern. In order to reach some statistically valid conclusions concerning trends in pollutant levels in Connecticut, the DEP has applied a statistical test called a paired *t* test (referred to hereafter as the *t* test) to the annual average data for two pollutants. The *t* test has been applied to 1968–1983 total suspended particulate (TSP) data and to 1978–1983 continuous SO_2 data.

The *t* test is a parametric test which can ascertain statistically significant changes (increases or decreases) in the annual average pollutant concentrations at all the monitoring sites in Connecticut. The *t* test makes it possible to overcome the trend analysis problems which arise due to the changes in the number and location of monitoring sites from year-to-year, as well as problems associated with making equitable comparisons among sites. The annual mean pollutant concentrations for consecutive years are compared at each site; there is no inter-site comparison. Data for two consecutive years are required and the size of the change (increase or decrease) is noted. For example, if a high proportion of sites experienced an increase and/or if the magnitude of the increases at several sites is of much greater importance than the magnitude of the decreases at other sites, the *t* test will show that the increase was statistically significant for those two years.

The results of the *t* test for TSP and continuous SO_2 data are presented in Tables 3 and 4, respectively. These analyses were performed only on data computed for sites at which the U.S. Environmental Protection Agency (EPA) minimum sampling criteria were met. The years of data that were paired, the number of sites used, and the statewide average and standard deviation of the geometric mean pollutant concentrations at the sites are provided in the first four columns of each table. The statistical significance of any change in the statewide pollutant average is provided in the remaining columns. The significance of a change is indicated by an arrow for each confidence limit, and is also given numerically as the number of chances in 10,000 of *not* occurring under the heading "actual significance of change". For example, the statewide annual average for TSP decreased between 1971 and 1972 from 68.4 to 61.9. This change represented a significant decrease at the 95% confidence level, but it did not represent a significant change at the 99% confidence level. The "actual significance of change" is given as 0.0237, meaning that there are 237 chances in 10,000 that this measured decrease in TSP levels did not occur.

1. TSP

The results of the *t* test for TSP (see Table 3) show that total suspended particulate levels in Connecticut decreased significantly from 1968 to 1969. From 1969 through 1971 there was no significant change. Then, from 1971 to 1974 TSP levels decreased significantly again, but from 1974 to 1975 this decreasing trend was reversed and TSP levels demonstrated a significant increase. TSP concentrations remained relatively constant from 1975 to 1977, decreased from 1977 to 1978, and remained unchanged from 1978 to 1979. Between 1979 and 1980 there was a significant drop in measured TSP levels. This has been attributed to the elimination of passive sampling error through the use of retractable lids on the hi-vol monitors. TSP levels again fell significantly from 1980 to 1981 – the largest decrease in concentrations since 1973. TSP levels increased from 1981 to 1982 and decreased from 1982 to 1983.

These trend analyses do not account for the uncertainty associated with the individual annual mean computed for each TSP site. Most TSP sampling is conducted only every sixth day, producing a total of 61 samples per year. Therefore, the t test really compares year–to–year averages of the sampled concentrations, not actual annual averages. However, the every–sixth–day sampling schedule is believed to be sufficient to produce representative annual averages. The every–sixth–day schedule for TSP sampling did not start until 1971. Since fewer samples were taken at each site from 1968 to 1970 than during recent years, the test results from the early years are not as conclusive as the results from the later years.

Significant changes in annual TSP levels can also be caused simply by changes of weather, particularly the wind. Such changes may explain most of the decrease in TSP levels observed between 1968 and 1969, the increase observed between 1974 and 1975, and the decrease from 1977 to 1978. The persistent decrease in TSP levels observed from 1971 to 1974, however, can certainly be attributed to the stationary source emission controls implemented by the DEP during those years.

Figure 1 shows the long–term trend of TSP concentrations in Connecticut in graphical form. The trend chart is based on data obtained from high volume sampling devices. High volume sampler data at a site are included only if there was a sufficient number of samples taken in a year to compute a valid annual geometric mean concentration.

2. SO_2

Connecticut has been measuring ambient levels of sulfur dioxide since prior to the inception of the SO_2 standards in 1971. Several monitoring methods have been employed including bubblers, sulfation plates, and various types of continuous instruments. The bubblers became the EPA reference method, but unfortunately the field data have turned out to be very unreliable. The sulfation plates have been in use for 15 years, but they do not measure SO_2 directly. Sulfation rate–derived SO_2 values were thought to be reliable, but recent information has cast doubt on their reliability. Continuous monitors presently yield reliable data, but this has not always been the case. The earliest continuous monitors (conductometric and coulometric) were subject to interference from many chemicals other than SO_2 and also had difficulties with quality control. Later generations of instruments (flame photometric and pulsed fluorescent) alleviated these problems, and there has been a corresponding increase in the reliability of the data, especially since 1978.

In order to perform a valid trend analysis, the data for the period of interest must be adequate, reliable and from similar sampling methods. Up until 1978, the only method which consistently fit these criteria was the sulfation plate. Between 1978 and 1982 there were approximately three times as much sulfation rate data as continuous SO_2 data and the former method was used for the purpose of analyzing SO_2 trends. However, recent information now indicates that sulfation rate–derived SO_2 values may not be as accurate as once thought. Sulfation rate data are dependent on relative humidity and wind speed –– being extremely sensitive to the latter –– and the precision of the data suffers even under uniform conditions. Furthermore, EPA has requested that DEP use continuous SO_2 data in order to analyze SO_2 trends. Consequently, the SO_2 trend analysis uses only continuous SO_2 data. The data are restricted to the period 1976–1983 because earlier data are judged not to be adequate or reliable. The results are summarized in Table 4 and Figure 2. Table 4 does not present a trend analysis for the period 1976–1977 or the period 1977–1978 because the number of monitors that operated for the duration of each period was 2 and 3, respectively –– too few to establish an accurate statewide trend.

In response to the skyrocketing prices of low sulfur fuels in the late 1970's, most states relaxed their sulfur–in–fuel requirements to the full extent the law allows, creating considerable pressure on Connecticut to follow suit. This caused Connecticut to reevaluate

TABLE 3

TSP TRENDS, 1968-1983
(PAIRED t TEST)

Paired Years	Number Of Sites	Average Of Annual Geometric Means (ug/m^3)	Standard Deviation (ug/m^3)	Significance Level: Trend at 95% Level*	Significance Level: Trend at 99% Level*	Significance Level: Probability That Change Is Not Significant
68	16	74.9	21.7			
69	16	67.8	18.7	↓	N.C.	0.0118
69	21	69.0	23.0			
70	21	71.7	25.5	N.C.	N.C.	0.2738
70	23	67.8	20.6			
71	23	66.2	18.2	N.C.	N.C.	0.4258
71	40	68.4	22.5			
72	40	61.9	17.3	↓	N.C.	0.0237
72	39	59.1	13.4			
73	39	51.9	10.2	↓	↓	0.0001
73	41	51.9	11.6			
74	41	48.3	10.3	↓	N.C.	0.0077
74	40	49.9	10.7			
75	40	52.3	10.1	↑	N.C.	0.0106
75	29	53.3	9.8			
76	29	53.3	9.5	N.C.	N.C.	0.9588
76	35	53.6	8.8			
77	35	53.7	9.2	N.C.	N.C.	0.8715
77	30	54.8	9.8			
78	30	52.7	9.3	↓	N.C.	0.0216
78	32	51.4	12.1			
79	32	49.9	12.5	N.C.	N.C.	0.1530
79	32	49.3	13.2			
80	32	45.4	10.0	↓	↓	0.0001
80	26	45.2	10.1			
81	26	38.0	8.4	↓	↓	0.0001
81	37	38.3	6.8			
82	37	40.5	8.0	↑	↑	0.0001
82	36	41.3	7.3			
83	36	39.5	6.7	↓	↓	0.0001

* Key to Symbols: ↓ = Significant Downward Trend
↑ = Significant Upward Trend
N.C. = No Significant Change

FIGURE 1

TOTAL SUSPENDED PARTICULATE MATTER TREND

"PERCENT OF SITES WITHIN EACH RANGE"

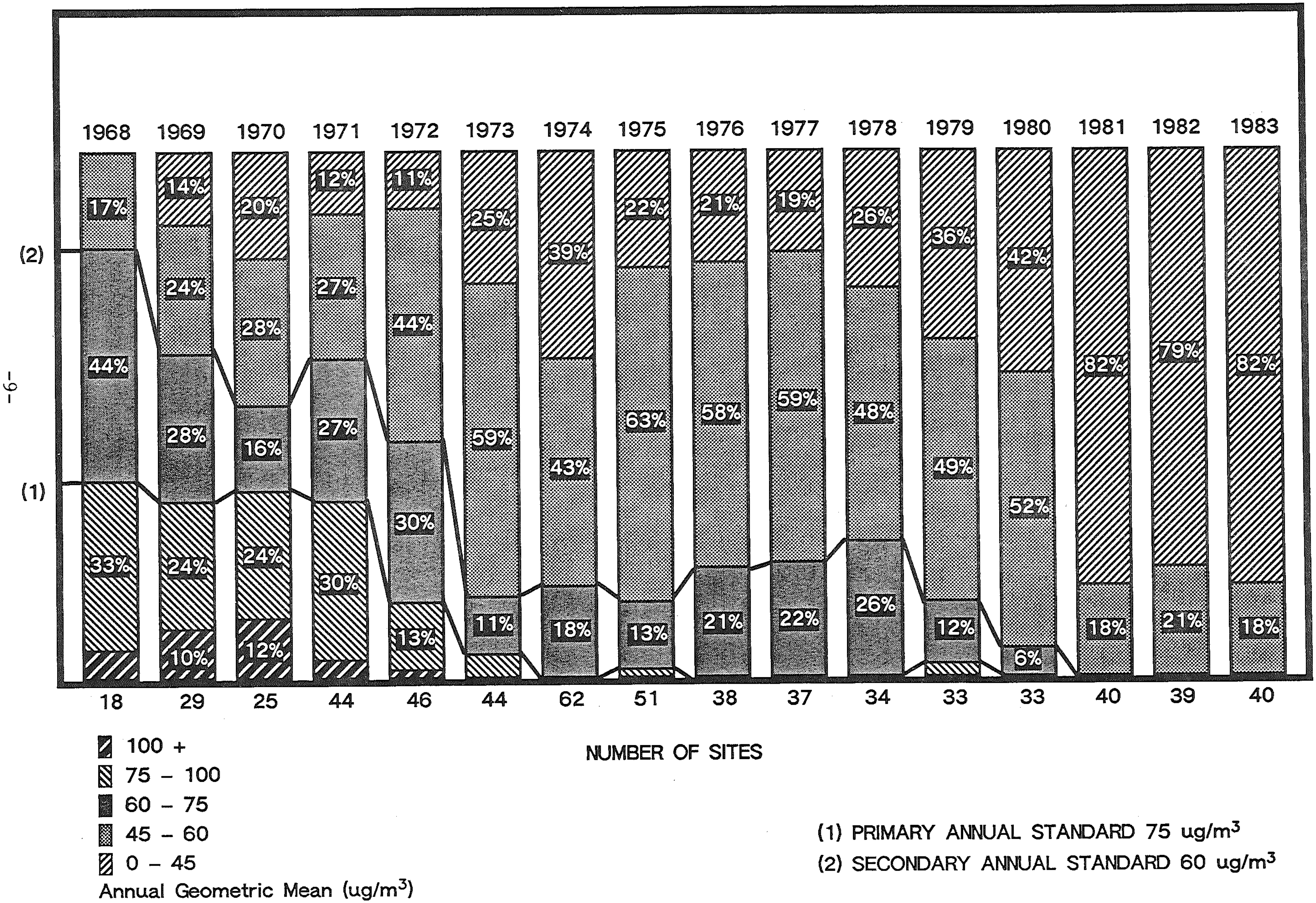


TABLE 4

SO_2 TRENDS FROM CONTINUOUS DATA, 1978-1983
(PAIRED t TEST)

Paired Years	Number Of Sites	Average Of Annual Geometric Means (ug/m³)	Standard Deviation (ug/m³)	Significance Level: Trend at 95% Level*	Trend at 99% Level*	Probability That Change Is Not Significant
78	9	23.8	6.1			
79	9	21.3	5.3	N.C.	N.C.	0.1238
79	10	21.8	4.5			
80	10	19.8	5.2	↓	N.C.	0.0215
80	8	21.1	4.1			
81	8	20.9	4.4	N.C	N.C.	0.9100
81	8	20.9	4.4			
82	8	21.0	4.5	N.C.	N.C.	0.9522
82	8	20.0	5.0			
83	8	18.1	5.1	↓	↓	0.0002

* Key to Symbols:
N.C. = No Significant Change
↓ = Significant Downward Trend
↑ = Significant Upward Trend

FIGURE 2

SULFUR DIOXIDE TREND FROM CONTINUOUS DATA
"PERCENT OF SITES WITHIN EACH RANGE"

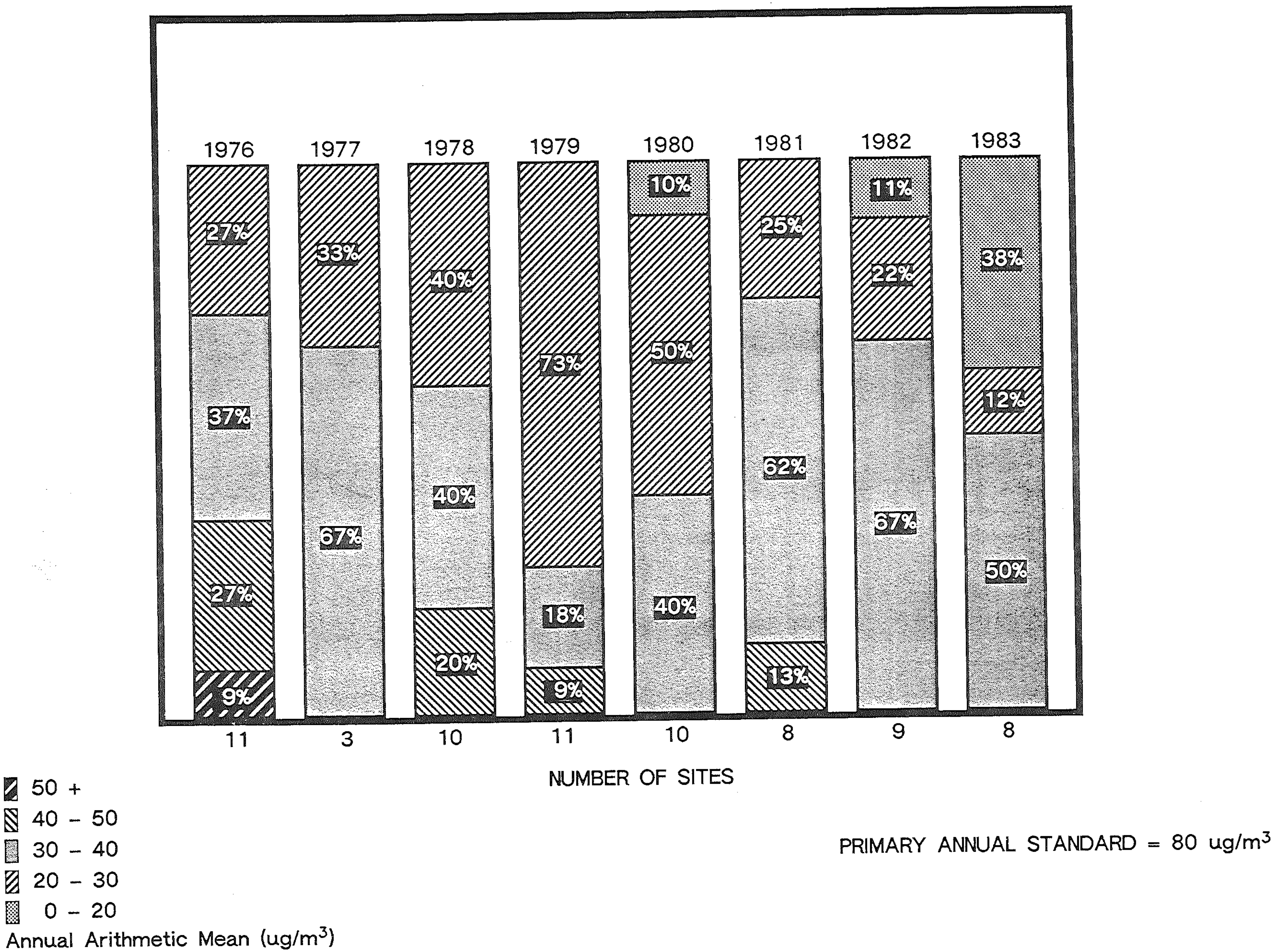


FIGURE 2A

ANNUAL GEOMETRIC MEAN CONCENTRATION OF SO2 (PPB) FROM 1978-1983

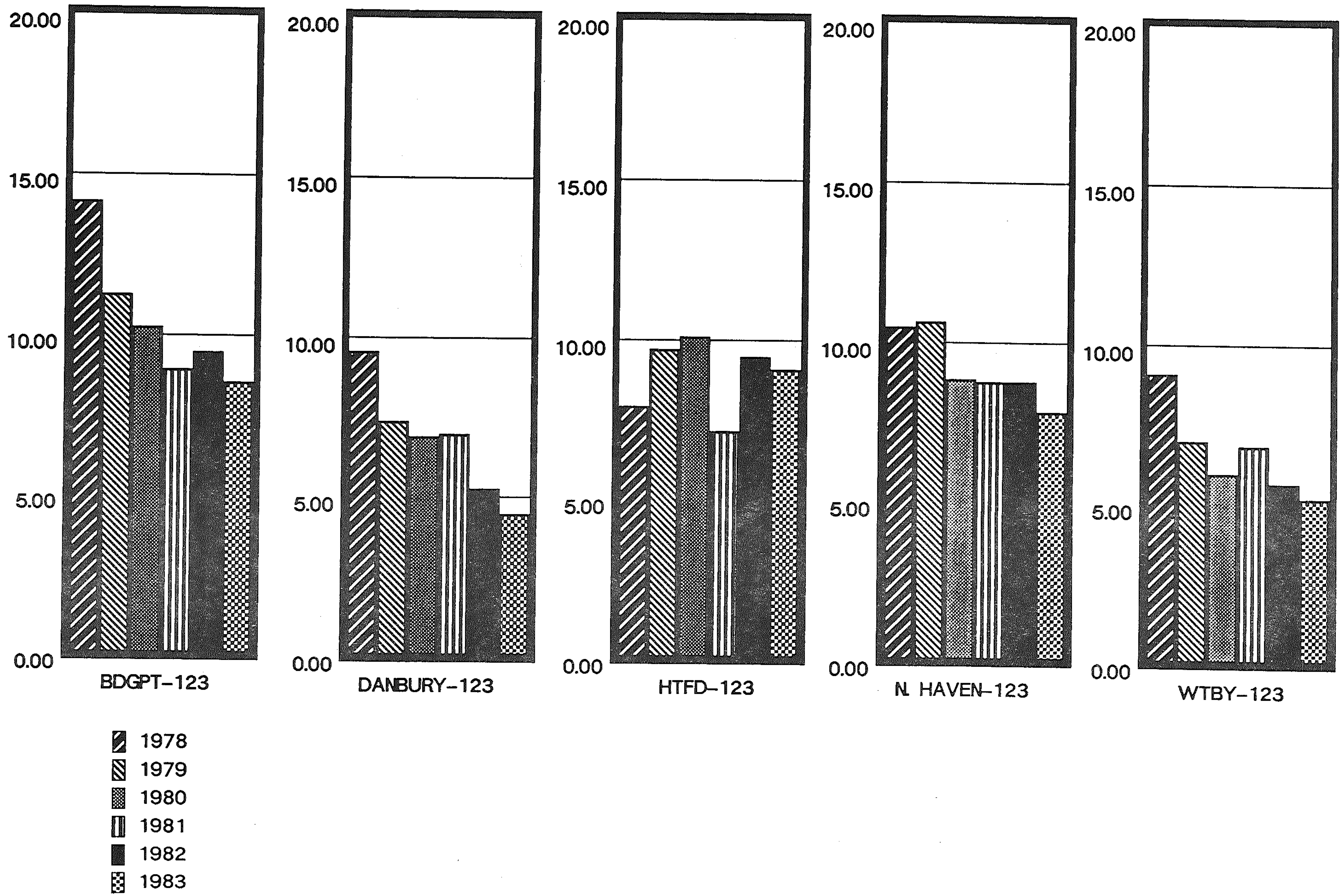


FIGURE 2B

THE AVERAGE OF THE ANNUAL GEOMETRIC MEAN SO2 CONCENTRATIONS AT 5 CONCURRENTLY OPERATING SO2 SITES WITH CONTINUOUS MONITORS

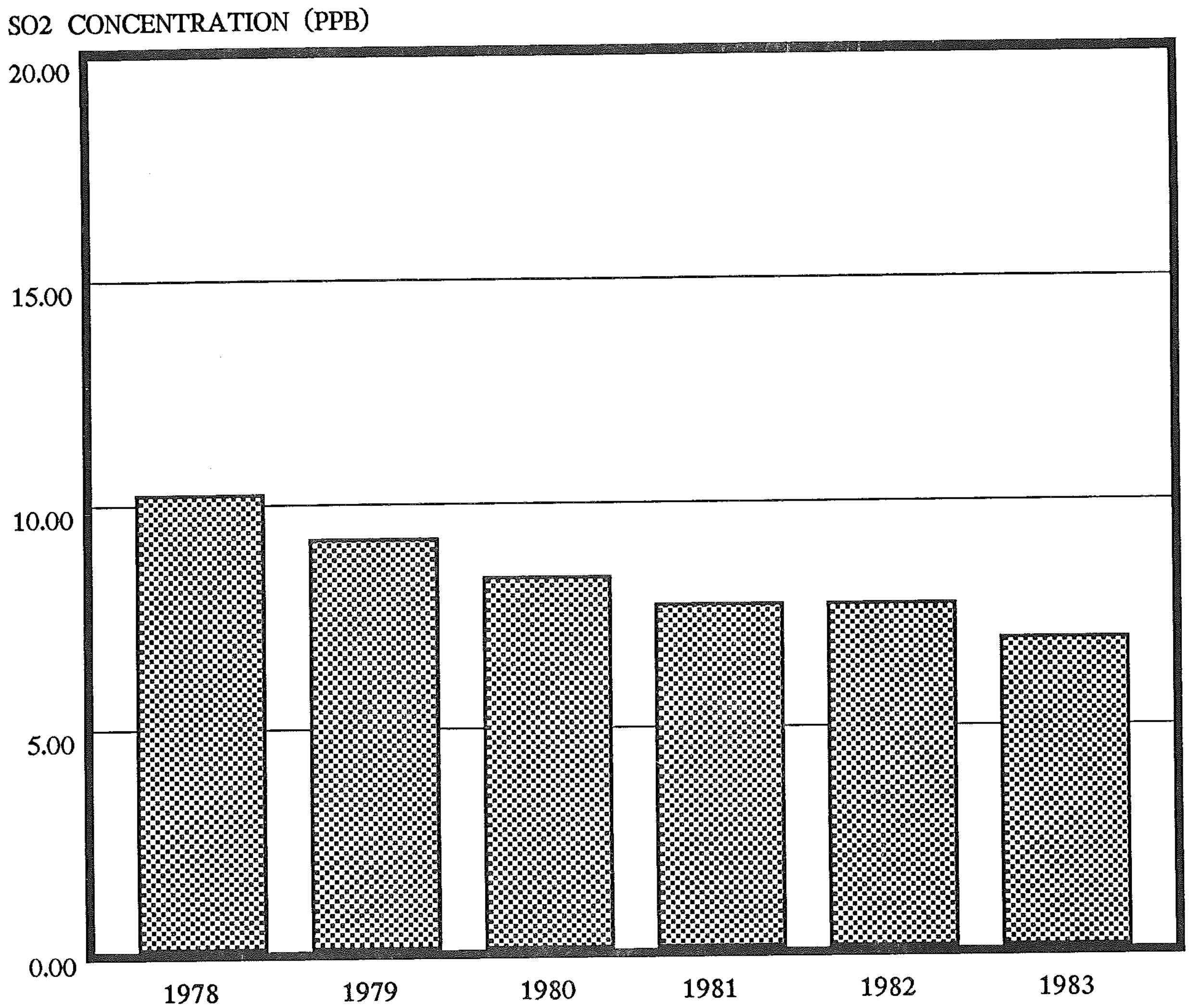


FIGURE 2C

THREE-YEAR RUNNING AVERAGE OF THE ANNUAL GEOMETRIC MEAN

SO2 CONCENTRATIONS AT 5 CONCURRENTLY OPERATING SO2 SITES WITH

CONTINUOUS MONITORS

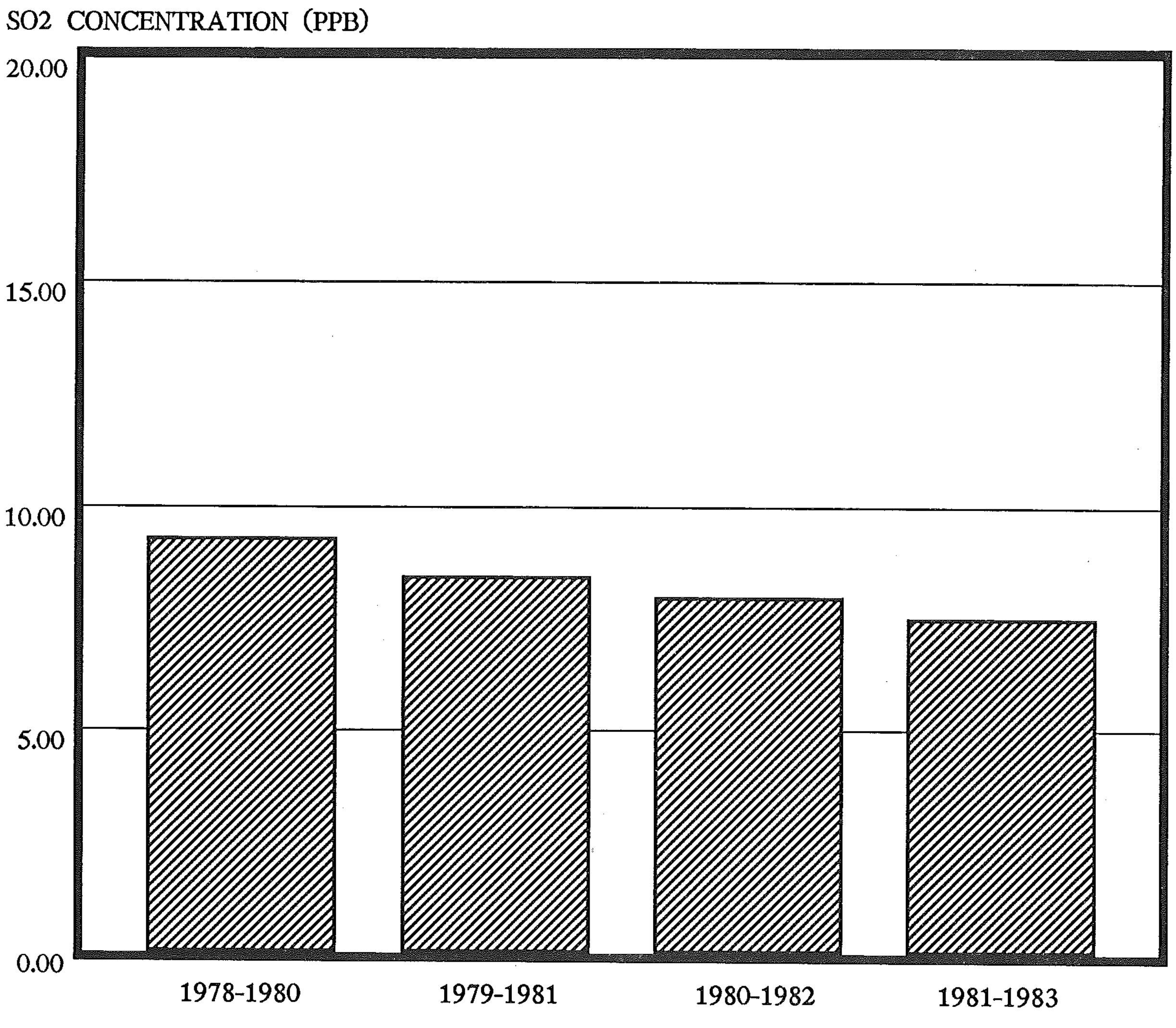
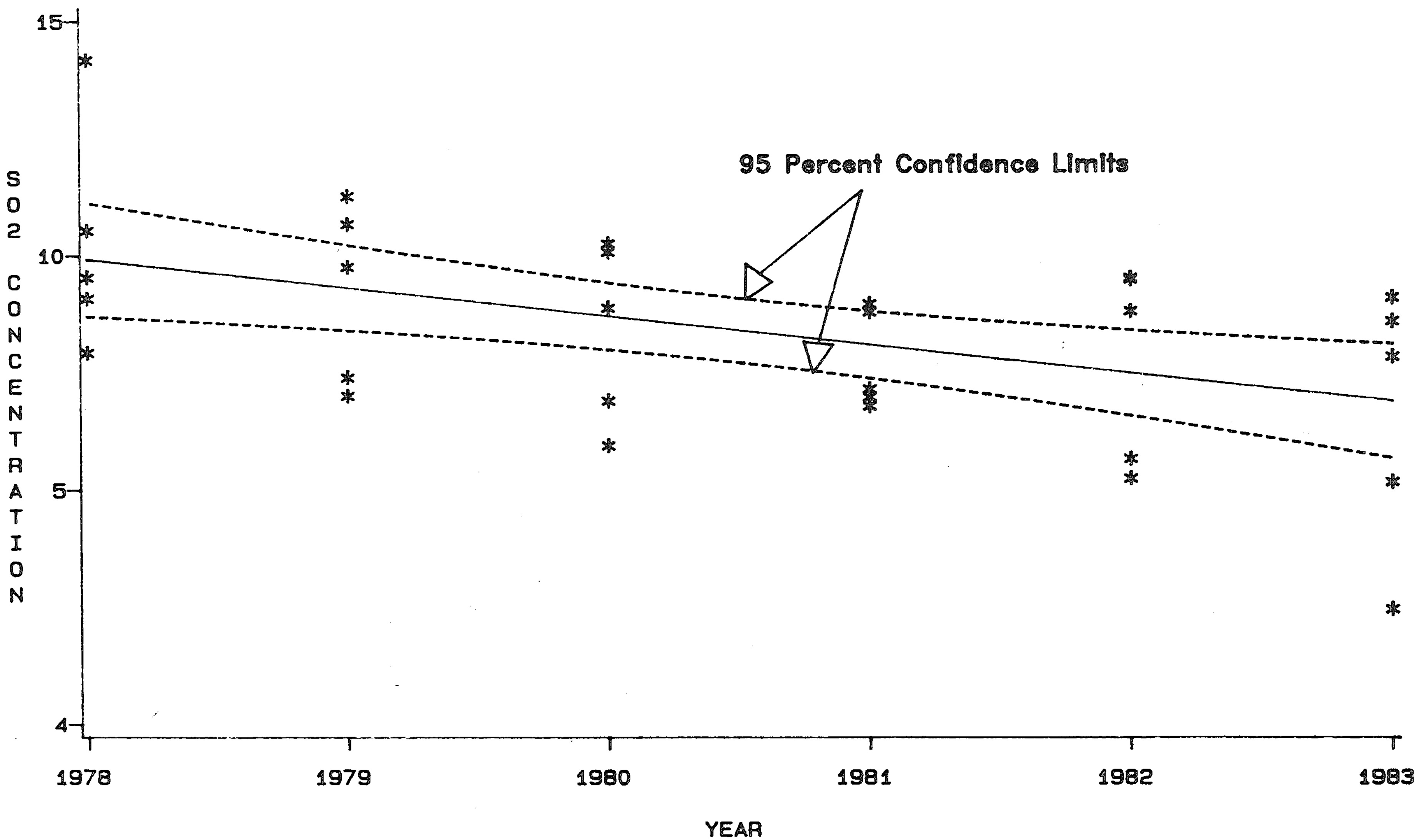


FIGURE 2D

TREND OF ANNUAL GEOMETRIC MEAN CONCENTRATIONS OF SO2 (PPB) AT FIVE CONCURRENTLY OPERATING SITES FROM 1978 – 1983



its philosophy for controlling sulfur oxide emissions in 1981. To meet the challenge of increased costs of fuel in the economy, DEP restructured its air pollution control requirements for fuel burning sources. Under this new "three-pronged" program Connecticut's businesses and industries are (1) now allowed (effective November 1981) to burn a less expensive grade of oil with a higher sulfur content -- one percent (1.0%) sulfur oil and (2) are allowed to burn higher sulfur content oil in exchange for reductions in energy use. The third aspect of the program was the repeal of the 24-hour secondary air quality standard for sulfur oxides.

This action increased statewide sulfur oxide emissions by almost 60%. (Sulfur oxide emissions were not doubled by going from 0.5% to 1.0% sulfur-in-fuel since residential fuel users, which account for almost one-third of annual statewide sulfur oxide emissions, use distillate fuel oil with a sulfur content of 0.5%.) One would expect measured SO_2 levels to increase in 1982 and subsequent years, as compared to 1981, due to the use of 1.0% sulfur oil. However, no significant trend was apparent in 1982 and in 1983 SO_2 levels actually declined (see Table 4). This may be attributable to the year-to-year fluctuations in meteorology or the decreased fuel use caused by the increased price of this energy source.

The long-term trend of SO_2 concentrations is shown in graphical form in Figure 2. An improvement in SO_2 levels is demonstrated by the decrease over time of concentrations in excess of 40 ug/m^3. Table 4 shows the year-to-year trend in ambient SO_2 levels. Decreases in SO_2 concentrations from 1979 to 1980 and from 1982 to 1983 are evident.

Continuous SO_2 monitors were operated each year at five (5) sites between 1978 and 1983. Based on measurements at these five (5) locations, mean SO_2 levels are depicted in Figures 2A and 2B. Figure 2A shows SO_2 levels decreasing at four (4) sites and exhibiting essentially no trend at the fifth site. Figure 2B shows the average of the mean SO_2 concentrations for all the sites steadily decreasing over the 5-year period. Figure 2D is a linear regression analysis of this data which also shows a downward trend in SO_2 levels since 1978. Using the data presented in Figure 2B, Figure 2C shows the three-year running average of the mean SO_2 concentrations. Three-year running averages tend to smooth out the year-to-year effects of meteorology on pollutant levels. Like Figures 2A and 2B, Figure 2C illustrates again that SO_2 levels appear to be decreasing. This long long term trend analysis also demonstrates that SO_2 levels are declining even though fuel burning sources have been allowed to use 1% sulfur oil since 1982.

C. Air Monitoring Network

A computerized Air Monitoring Network consisting of an IBM System 7 computer and 20 telemetered monitoring sites was operated in 1983. As many as 12 measurement parameters are transmitted from a site via telephone lines to the System 7 unit located in the DEP Hartford office. The data are then compiled twice daily into 24-hour summaries. The telemetered sites are located in the towns of Bridgeport, Danbury, East Hartford, Greenwich, Groton, Hartford, Madison, Middletown, Milford, New Britain, New Haven, Stafford, Stamford, Stratford and Waterbury.

Continuously measured parameters include the pollutants sulfur dioxide, particulates (measured as the coefficient of haze), carbon monoxide, nitrogen dioxide and ozone. Meteorological data consists of wind speed and direction, wind horizontal sigma, temperature, dew point, precipitation, barometric pressure and solar radiation (insolation).

The real-time capabilities of the System 7 telemetry network have enabled the Air Monitoring Unit to report the Pollutant Standards Index for a number of towns on a daily basis while continuously keeping a close watch for high pollution levels which may occur during adverse weather conditions.

The complete monitoring network used in 1983 consisted of:

42	Total suspended particulate hi–vol sites (16 are also approved lead sites)
2	Total suspended particulate lo–vol sites
5	Lead lo–vol sites
15	Sulfur dioxide sites (continuous monitors)
10	Ozone sites
3	Nitrogen dioxide sites
5	Carbon monoxide sites

A complete description of all permanent air monitoring sites in Connecticut operated by DEP in 1983 is available from the Department of Environmental Protection, Air Compliance Unit, Monitoring Section, State Office Building, Hartford, Connecticut, 06106.

D. Pollutant Standards Index

The Pollutant Standards Index (PSI) is a daily air quality index recommended for common use in state and local agencies by the U.S. Environmental Protection Agency. Starting on November 15, 1976, Connecticut began reporting the PSI on a 7–day basis, but is currently reporting the PSI on a 5–day basis. The PSI incorporates three pollutants – sulfur dioxide, total suspended particulates and ozone. The index converts each air pollutant concentration into a normalized number where the National Ambient Air Quality Standard for each pollutant corresponds to PSI = 100 and the Significant Harm Level corresponds to PSI = 500.

Figure 3 shows the breakdown of index values for the commonly reported pollutants (TSP, SO_2, and O_3) in Connecticut. For the winter of 1983, Connecticut reported the PSI for the towns of Hartford, New Haven, Bridgeport, Stamford, Greenwich, Danbury, Waterbury, and New Britain. For the summer, the PSI was reported for the towns of Bridgeport, Danbury, East Hartford, Greenwich, Groton, Madison, Middletown, New Haven, Stafford, and Stratford. Each day the pollutant with the highest PSI value of all the pollutants being monitored is reported for each town, along with the dimensionless PSI number and a descriptor word to characterize the daily air quality.

A telephone recording of the PSI is taped each afternoon at approximately 3 PM, five days a week, and can be heard by dialing 566–3449. Predictions for weekends are included on the Friday recordings. For residents outside of the Hartford telephone exchange, the PSI is now available toll–free from the DEP representative at the Governor's State Information Bureau. The number is 1–800–842–2220. This information is also available to the public during weekday afternoons from the Connecticut Lung Association in East Hartford. The number there is 289–5401.

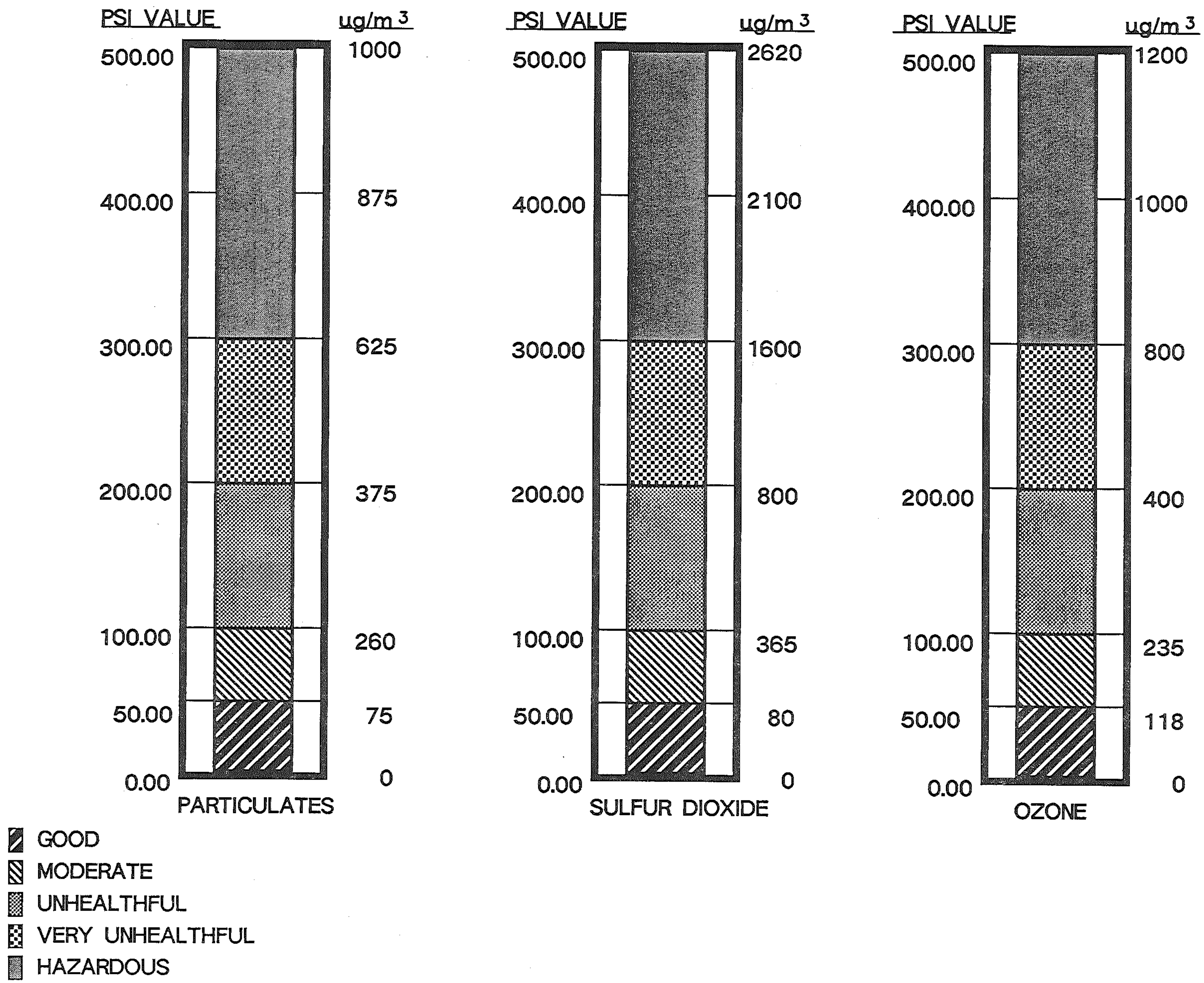
E. Quality Assurance

Quality Assurance requirements for State and Local Air Monitoring Stations (SLAMS) and the National Air Monitoring Stations (NAMS) which, as part of the (SLAMS) network, are specified by the code of Federal Regulations, Title 40, Part 58, Appendix A.

The regulations were enacted to provide a consistent approach to Quality Assurance activities across the country so that ambient data with a defined precision and accuracy is produced.

FIGURE 3

POLLUTANT STANDARDS INDEX



A Quality Assurance program was initiated in Connecticut with written procedures covering, but not limited to, the following:

Equipment Procurement
Equipment Installation
Equipment Calibration
Equipment Operation
Sample Analysis
Maintenance Audits
Performance Audits
Data Handling and Assessment

Quality Assurance procedures for the above activities were fully operational on January 1, 1981 for all NAMS monitoring sites. On January 1, 1983 the above procedures were fully operational for all SLAMS monitoring sites.

Data precision and accuracy values are reported in the form of 95% probability limits as defined by equations found in Appendix A of the Federal regulations cited above.

1. Precision

Precision is a measure of data repeatability (grouping) and is determined in the following manner:

a. **Manual Samplers** (TSP and Lead)

A second (co-located) TSP hi-vol sampler is placed alongside a regular TSP network sampler and operated concurrently. The concentration values from the co-located hi-vol sampler are compared to the network sampler and precision values are generated from the comparison.

b. **Automated Analyzers** (SO_2, O_3, CO and NO_2)

All NAMS and SLAMS analyzers are challenged with a low level pollutant concentration (.08 to .10 PPM) a minimum of once every two weeks. The comparison of analyzer response to input concentration is used to generate automated analyzer precision values.

2. Accuracy

Accuracy is an estimate of the closeness of a measured value to a known value (i.e., how close each value is to the "bull's eye").

a. **Manual Methods (TSP)**

TSP accuracy is assessed by auditing the flow measurement phase of the TSP sampling method. In Connecticut, this is accomplished by attaching a secondary standard calibrated orifice to the hi-vol inlet and comparing the flow rates. A minimum of 25% of the TSP network samplers are audited each quarter.

b. **Manual Methods (Lead)**

Lead accuracy is assessed by analyzing spiked audit strips and comparing the analyzed results to the known spiked values. A low– and a high–valued spike are analyzed during lead filter processing –– approximately once per month.

c. **Automated Analyzers** (SO_2, O_3, CO and NO_2)

Automated analyzer data accuracy is determined by challenging each analyzer with three predetermined concentration levels. Accuracy values are calculated for a number of analyzers, in a pollutant sampling network, at each concentration level. Automated analyzer response is audited at three concentration levels and zero. The results for each concentration for a particular pollutant are used to assess automated analyzer accuracy. The audit concentration levels are as follows:

SO_2, O_3, and NO_2 (PPM)	**CO (PPM)**
0.03 to 0.08	3 to 8
0.15 to 0.20	15 to 20
0.35 to 0.45	35 to 45

Statistical computations are performed on the results of the precision and span checks.

II. TOTAL SUSPENDED PARTICULATES

Health Effects

Particulates are solid particles or liquid droplets small enough to remain suspended in air. They include dust, soot, and smoke -- particles that may be irritating but are usually not poisonous -- and bits of solid or liquid substances that may be highly toxic. The smaller the particles, the more likely they are to reach the innermost parts of the lungs and work their damage.

The harm may be physical: clogging the lung sacs, as in anthracosis, or coal miners' "black lung" from inhaling coal dust; asbestosis or silicosis in people exposed to asbestos fibers or dusts from silicate rocks; and byssinosis, or textile workers' "brown lung" from inhaling cotton fibers.

The harm may also be chemical: changes in the human body caused by chemical reactions with pollution particles that pass through the lung membranes to poison the blood or be carried by the blood to other organs. This can happen with inhaled lead, cadmium, beryllium, and other metals, and with certain complex organic compounds that can cause cancer.

Many studies indicate that particulates and sulfur oxides (they often occur together) increase the incidence and severity of respiratory disease.

Conclusions

Measured TSP levels did not exceed the primary annual standard of 75 ug/m^3 or the secondary annual standard of 60 ug/m^3 during 1983. No site had a measured value exceeding the primary 24-hour standard of 260 ug/m^3 . And the 24-hour secondary standard of 150 ug/m^3 was not exceeded at any monitoring site in 1983, whereas it was exceeded at 2 sites in 1982. In order for the secondary standard to be violated, the second highest TSP level at a site must exceed 150 ug/m^3 . No site violated the standard in 1983, which was also the case in 1982.

Sample Collection and Analysis

High Volume Sampler (Hi-vol) – "Hi-vols" resemble vacuum cleaners in their operation, with an 8" x 10" piece of fiberglass filter paper replacing the vacuum bag. Retractable lids have been installed on the hi-vols in order to eliminate the passive sampling error. The samplers operate (from midnight to midnight) every sixth day at most sites and every third day at certain urban stations.

The matter collected on the filters is analyzed for weight and chemical composition. The air flow through the filter is recorded during sampling. The weight in micrograms (ug) divided by the volume of air in cubic meters (m^3) yields the pollutant concentration for the day, in micrograms per cubic meter.

The chemical composition of the suspended particulate matter is determined at each hi-vol site as follows. Three standardized strips of every hi-vol filter are cut out and prepared for three different analyses. In the first analysis, a composite sample composed of a strip from each of several filters collected in a quarter-year is digested in acid, and the resulting solution is analyzed for metals by means of an atomic absorption spectrophotometer. The results are reported for each individual metal in ug/m^3. In the second analysis, a composite sample is dissolved in water, filtered and the resulting solution is analyzed by means of wet chemistry techniques to determine the concentration of the particular water soluble components. The results are reported for each individual constituent of the water soluble fraction in ug/m^3. In the third analysis, total sulfates are determined by means of the same procedure used in the second analysis, but each of several samples collected in the quarter-year is analyzed ***individually*** and the results from all the samples are averaged. This is the first year that individual, rather than composite, samples have been used to determine total sulfates. Future sulfate analyses will be done in this manner.

Low Volume Sampler (Lo-vol) – The low-volume sampler is a 30-day continuous sampler. It is enclosed in a shelter similar to a hi-vol, uses the same glass fiber filter paper, but operates at an air sampling flow rate approximately one-tenth that used by a standard hi-vol (i.e., 4 cfm as opposed to 40-60 cfm). The air flow through the lo-vol is measured by a temperature compensating dry gas meter. The lo-vol measurement is essentially an arithmetic average for the 30-day sampling interval. The filters are chemically analyzed in the same manner as those from the hi-vol sampler.

Discussion of Data

Monitoring Network – In 1983 both hi-vol and lo-vol particulate samplers were operated in Connecticut (see Figure 4). Because the Federal EPA does not recognize the lo-vol instrument as an equivalent to the reference (hi-vol) method of sampling for TSP, only hi-vol data are analyzed for compliance with the National Ambient Air Quality Standards (NAAQS).

Precision and Accuracy – Precision checks were conducted at three hi-vol sampling sites which had co-located samplers. On the basis of 168 precision checks, the 95% probability limits for precision ranged from −10% to +20%. Accuracy is based on air flow through the monitor. The 95% probability limits for accuracy, based on 84 audits conducted on the hi-vol monitoring system network, ranged from −6% to +6%. (See section I.F. of this Air Quality Summary for a discussion of precision and accuracy.)

Annual Averages – The Federal EPA has established minimum sampling criteria (see Table 1) for use in determining compliance with either the primary or secondary annual NAAQS for TSP. Using the EPA criteria, one finds that neither the primary annual standard nor the secondary annual standard was exceeded. Of the 36 sites that had valid annual geometric means (as determined by EPA minimum sampling criteria) in both 1982 and 1983, twenty-seven (27) sites had lower annual geometric means when compared to 1982. Of the nine (9) sites whose annual geometric means increased, none increased more than 3 ug/m^3 (see Table 5).

Historical Data – A summary of annual average TSP data for 1981-1983 is presented in Table 5. For data going back to 1957, see the 1980 Air Quality Summary. This table also includes an indication of whether the aforementioned EPA minimum sampling criteria were met at each site for each year. If the sampling was insufficient to meet the EPA criteria, an asterisk appears next to the number of samples.

Statistical Projections – The statistical projections presented in Table 5 are prepared by a DEP computer program which analyzes data from all sites operated by DEP. Input to the program includes site location and year, the number of samples (usually a maximum of 61), the annual geometric mean concentration and the geometric standard deviation. The program lists the input and calculates the 95% confidence limits about the mean and the statistical projections of the number of days in each year the primary and secondary 24-hour NAAQS would have been exceeded if sampling had been conducted every day. This analysis, like the ambient standards, is based on the assumption that the particulate data are log-normally distributed.

Because manpower and economic limitations dictate that hi-vol sampling for particulate matter cannot be conducted every day, a degree of uncertainty is introduced as to whether the air quality at a site has either met or exceeded the national standards. This uncertainty for the annual standard can be quantified by determining 95% confidence limits about each of the annual geometric means.

For example (see Table 5), in Danbury at site 002 in 1982, 58 samples were analyzed and a geometric mean of 48.7 ug/m³ was then calculated. The columns labeled "95–PCT–LIMITS" show the lower and upper limits for a 95% confidence interval of 43 and 55 ug/m³, respectively. This means that if a larger sample set (i.e., greater than 58 samples) were collected in 1982 at this site there is a 95% chance that the geometric mean would fall between these limits. If the upper limit happened to be greater than 60 ug/m³, the national ambient secondary standard for particulates, then one could not be confident that the secondary standard was met at the site.

In Table 6, one can examine the 1983 monitoring sites for compliance with air quality standards, using the State's hi-vol confidence limit criteria. The table shows with 95% confidence that no sites exceeded the primary annual standard. The table also shows that the DEP is 95% confident that the secondary standard was not exceeded at any site during 1983.

24-Hour Averages – Table 7 presents the 1st and 2nd high 24-hour concentrations recorded at each site. There were no violations of the primary 24-hour standard recorded in Connecticut during 1983. No measured violations of the secondary 24-hour standard were recorded at any site in 1983, which was also the case in 1982. The 2nd high 24-hour average increased at nine of the 36 paired sites which met the minimum EPA sampling criteria in both 1982 and 1983. None of these increases exceeded 20 ug/m³. The 2nd high 24-hour average decreased at 24 of the sites, and ten of these decreases equaled or exceeded 20 ug/m³. The 2nd high decreased 57 ug/m³ at Danbury 002 and 58 ug/m³ at Ansonia 003. At three sites the 2nd high remained the same.

Table 8 summarizes the statistical predictions from Table 5 regarding the number of days exceeding the 24-hour standards. This table shows that, if sampling had been conducted every day in 1983, there would have been no site with a violation of the primary 24-hour standard and two (2) sites with violations of the secondary 24-hour standard. In 1982, no site was predicted to have exceeded the primary 24-hour standard and eleven (11) sites were predicted to have exceeded the secondary 24-hour standard.

Hi-vol Averages – Quarterly and annual averages of fourteen components or characteristics of the particulate matter collected at each hi-vol sampling location have been computed for the year 1983 and are presented in Table 9. The terms and abbreviations used in the table are defined below.

Ammonium – Ammonium ion	Nitrate – Total nitrates
Be – Beryllium	Pb – Lead
Cd – Cadmium	pH – Acidity
Cr – Chromium	Sample count – Number of samples
Cu – Copper	Sulfate – Total sulfates
Fe – Iron	TSP – Total suspended particulates
Mn – Manganese	V – Vanadium
Ni – Nickel	Z – Zinc

Lo–vol Averages – For a number of years, the DEP has been experimenting and gathering data with the lo–vol particulate monitor. Lo–vols, which operate continuously for 30–day periods, have three advantages and one disadvantage in relation to hi–vols. First, the lo–vol's continuous operation can provide annual averages which include every day of the year, rather than the fractional portion of the year sampled by hi–vols every sixth day or every third day. Second, the lo–vol needs less frequent servicing (12 times/year) than the hi–vol (61 times/year for every–sixth–day sampling). Therefore, it is more cost–effective to operate. Third, the lo–vol has a higher collection efficiency than the hi–vol, especially for small, respirable particles. The disadvantage of the lo–vol is that it does not provide daily samples for direct comparison to the 24–hour TSP standards (although 24–hour averages can be obtained by statistical interpolation).

The two lo–vol sites are located at rural locations. One site is in Mansfield and the other is in Putnam. The use of the lo–vols made it possible to continue to obtain data on annual average particulate levels at these rural sites.

Monthly and annual averages of the chemical components from the lo–vol TSP monitors have been computed for 1983 and are presented in Table 10. The abbreviations used in Table 10 are identical to those used in Table 9.

10 High Days with Wind Data – Table 11 lists the 10 highest 24–hour average TSP readings with the dates of occurrence for each TSP hi–vol site in Connecticut during 1983. This table also shows the average wind conditions which occurred on each of these dates. The resultant wind direction (DIR, in compass degrees clockwise from north) and velocity (VEL, in mph), the average wind speed (SPD, in mph), and the ratio between the velocity and the speed are presented for each of four National Weather Service stations located in or near Connecticut. The resultant wind direction and velocity are vector quantities and are computed from the individual wind direction and speed readings in each day. The closer the wind speed ratio is to 1.000, the more persistent the wind. Note that the Connecticut stations have local influences which change the speed and shift the direction of the near–surface air flow (e.g., the Bradley Field air flow is channeled north–south by the Connecticut River Valley and the Bridgeport air flow is frequently subject to sea breezes).

On a statewide basis, this table shows that 60% of the high TSP days occur with winds out of the southwest quadrant and most of those days have persistent winds. This relationship between southwest winds and high TSP levels is more prevalent in southwestern Connecticut. However, many of the maximum levels at some urban sites do not occur with southwest winds, indicating that these sites are possibly influenced by local sources or transport from different out–of–state sources. As noted above, a large scale southwesterly air flow is often diverted into a southerly flow up the Connecticut River Valley. At many sites in the Connecticut River Valley most of the highest TSP days occur when the winds at Bradley Airport are from the south.

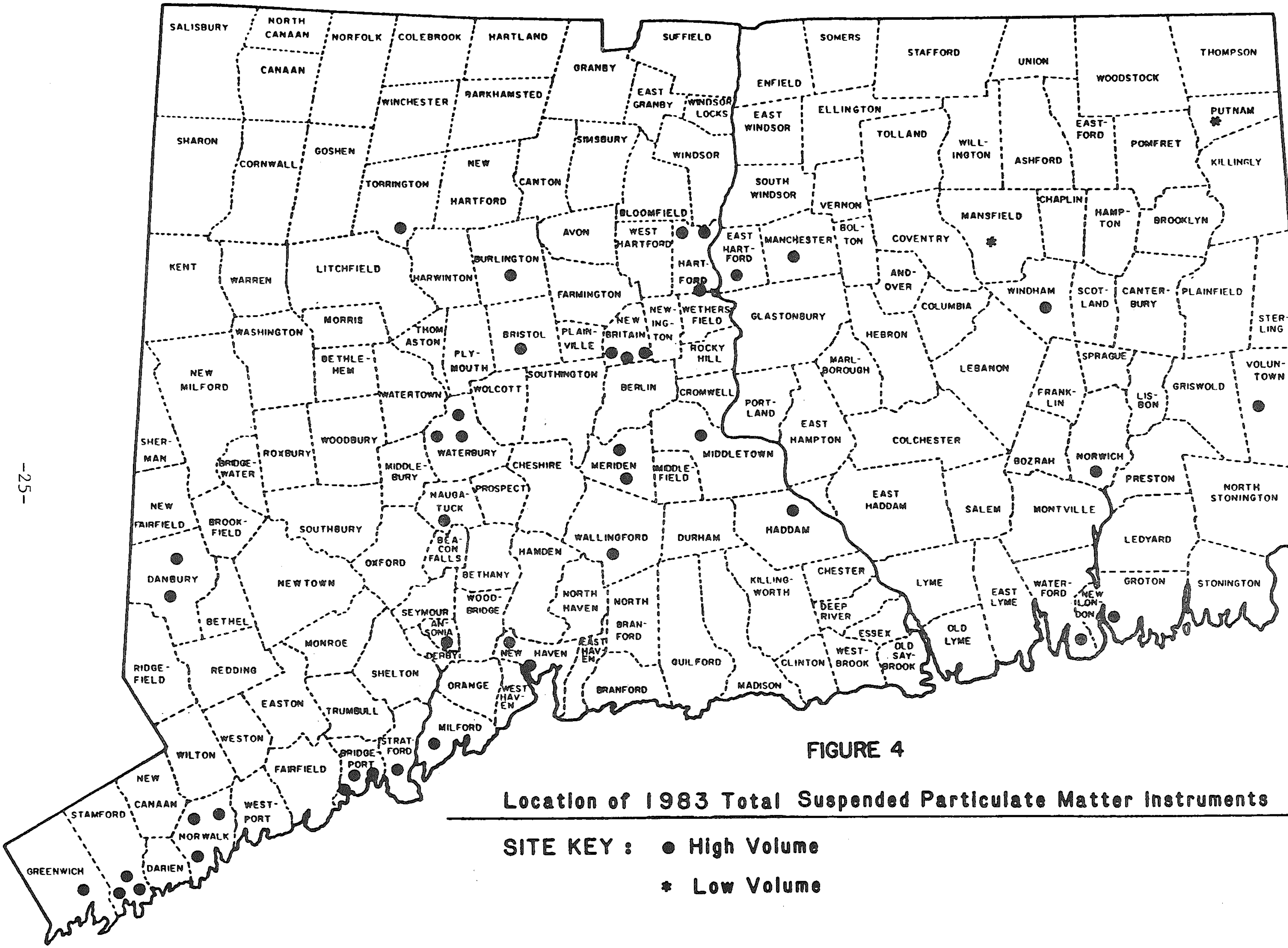


FIGURE 4

Location of 1983 Total Suspended Particulate Matter Instruments

SITE KEY : ● High Volume

*** Low Volume**

TABLE 5

1981-1983 TSP ANNUAL AVERAGES AND STATISTICAL PROJECTIONS

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	GEOM MEAN	95-PCT-LIMITS LOWER	95-PCT-LIMITS UPPER	STD GEOM DEV	PREDICTED DAYS OVER 150 UG/M3	PREDICTED DAYS OVER 260 UG/M3
ANSONIA	003	1981	119	43.6	40	47	1.701	4	
ANSONIA	003	1982	116	43.4	40	47	1.651	2	
ANSONIA	003	1983	60	42.2	38	47	1.540	1	
BRIDGEPORT	001	1981	61	39.6	36	44	1.556		
BRIDGEPORT	001	1982	60	42.4	38	47	1.507		
BRIDGEPORT	001	1983	60	41.0	37	46	1.594	1	
BRIDGEPORT	009	1981	58	38.6	35	43	1.507		
BRIDGEPORT	009	1982	61	39.8	36	44	1.551		
BRIDGEPORT	009	1983	57	39.1	35	43	1.539		
BRIDGEPORT	123	1981	120	52.0	49	56	1.587	4	
BRIDGEPORT	123	1982	115	56.3	53	60	1.530	4	
BRIDGEPORT	123	1983	59	54.1	49	60	1.530	3	
BRISTOL	001	1981	58	34.6	30	39	1.703	1	
BRISTOL	001	1982	59	36.3	32	41	1.684	1	
BRISTOL	001	1983	58	32.2	29	36	1.528		
BURLINGTON	001	1981	119	21.6	20	23	1.697		
BURLINGTON	001	1982	117	19.9	19	21	1.615		
BURLINGTON	001	1983	58	20.3	18	23	1.797		
DANBURY	002	1981	57	42.3	37	48	1.664	2	
DANBURY	002	1982	58	48.7	43	55	1.666	5	
DANBURY	002	1983	56	44.6	40	49	1.509	1	
DANBURY	123	1981	56	39.9	35	46	1.741	3	
DANBURY	123	1982	58	43.2	38	49	1.674	3	
DANBURY	123	1983	53	43.1	38	48	1.590	1	
EAST HARTFORD	004	1982	19*	32.9	26	42	1.677	1	
EAST HARTFORD	004	1983	60	38.8	35	43	1.504		

TABLE 5, CONTINUED

1981-1983 TSP ANNUAL AVERAGES AND STATISTICAL PROJECTIONS

TOWN NAME	SITE	YEAR	SAMPLES	GEOM MEAN	95-PCT-LIMITS LOWER	95-PCT-LIMITS UPPER	STD GEOM DEV	DISTRIBUTION--LOGNORMAL PREDICTED DAYS OVER 150 UG/M3	DISTRIBUTION--LOGNORMAL PREDICTED DAYS OVER 260 UG/M3
GREENWICH	004	1981	59	29.7	26	34	1.670		
GREENWICH	008	1981	60	40.2	36	45	1.613	1	
GREENWICH	008	1982	59	43.4	39	48	1.513		
GREENWICH	008	1983	46*	36.4	33	40	1.466		
GROTON	006	1983	59	35.8	33	39	1.433		
HADDAM	002	1981	58	27.0	24	30	1.614		
HADDAM	002	1982	57	26.9	24	30	1.516		
HADDAM	002	1983	28*	24.7	22	28	1.440		
HARTFORD	003	1981	118	46.7	44	50	1.536	1	
HARTFORD	003	1982	91*	47.6	44	51	1.558	2	
HARTFORD	003	1983	57	46.3	42	51	1.513	1	
HARTFORD	013	1981	61	36.7	33	41	1.591		
HARTFORD	013	1982	59	40.9	37	45	1.511		
HARTFORD	013	1983	60	42.8	38	48	1.580	1	
HARTFORD	014	1981	60	38.9	34	44	1.691	2	
HARTFORD	014	1982	60	39.6	36	43	1.481		
HARTFORD	014	1983	57	40.3	36	45	1.512		
MANCHESTER	001	1981	59	32.4	29	37	1.683	1	
MANCHESTER	001	1982	60	35.4	32	40	1.607		
MANCHESTER	001	1983	59	33.7	31	37	1.481		
MERIDEN	002	1981	60	40.5	35	47	1.827	5	
MERIDEN	002	1982	57	44.7	41	49	1.444		
MERIDEN	002	1983	55	40.6	36	45	1.552		
MERIDEN	008	1981	35*	36.0	30	43	1.677	1	
MERIDEN	008	1982	57	38.8	35	43	1.516		
MERIDEN	008	1983	59	37.2	34	41	1.532		

TABLE 5, CONTINUED

1981-1983 TSP ANNUAL AVERAGES AND STATISTICAL PROJECTIONS

TOWN NAME	SITE	YEAR	SAMPLES	GEOM MEAN	95-PCT-LIMITS LOWER	95-PCT-LIMITS UPPER	STD GEOM DEV	DISTRIBUTION--LOGNORMAL PREDICTED DAYS OVER 150 UG/M3	DISTRIBUTION--LOGNORMAL PREDICTED DAYS OVER 260 UG/M3
MIDDLETOWN	003	1981	59	38.4	34	43	1.666	1	
MIDDLETOWN	003	1982	56	38.9	35	43	1.524		
MIDDLETOWN	003	1983	57	38.2	35	42	1.484		
MILFORD	002	1981	60	40.4	36	45	1.589	1	
MILFORD	002	1982	61	39.7	36	44	1.497		
MILFORD	002	1983	58	40.9	38	44	1.405		
MORRIS	001	1981	114	24.1	22	26	1.707		
MORRIS	001	1982	102	25.5	24	27	1.517		
NAUGATUCK	001	1981	60	40.2	35	46	1.718	3	
NAUGATUCK	001	1982	59	46.8	41	53	1.718	5	
NAUGATUCK	001	1983	59	40.2	36	44	1.506		
NEW BRITAIN	007	1981	115	36.4	34	39	1.562		
NEW BRITAIN	007	1982	120	36.9	34	40	1.607		
NEW BRITAIN	007	1983	59	35.8	32	40	1.590		
NEW BRITAIN	008	1981	59	35.2	31	40	1.674	1	
NEW BRITAIN	008	1982	60	38.2	34	43	1.598	1	
NEW BRITAIN	008	1983	58	35.8	32	40	1.569		
NEW BRITAIN	009	1981	59	35.0	31	39	1.634		
NEW BRITAIN	009	1982	58	40.1	37	44	1.468		
NEW BRITAIN	009	1983	59	36.6	33	41	1.537		
NEW HAVEN	002	1981	54	46.1	41	52	1.645	3	
NEW HAVEN	002	1982	49	48.2	43	54	1.519	1	
NEW HAVEN	002	1983	52	48.8	44	54	1.521	1	
NEW HAVEN	013	1982	111	42.9	40	46	1.491		
NEW HAVEN	013	1983	58	43.8	40	48	1.438		
NEW HAVEN	123	1981	112	50.2	47	54	1.602	4	

TABLE 5, CONTINUED

1981-1983 TSP ANNUAL AVERAGES AND STATISTICAL PROJECTIONS

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	GEOM MEAN	95-PCT-LIMITS LOWER	95-PCT-LIMITS UPPER	STD GEOM DEV	PREDICTED DAYS OVER 150 UG/M3	PREDICTED DAYS OVER 260 UG/M3
NORWALK	001	1981	57	41.0	36	46	1.624	1	
NORWALK	001	1982	57	42.9	39	48	1.539	1	
NORWALK	001	1983	58	40.0	36	44	1.491		
NORWALK	005	1981	118	48.3	45	52	1.625	4	
NORWALK	005	1982	113	48.2	45	52	1.609	3	
NORWALK	005	1983	58	45.3	41	50	1.506	1	
NORWALK	012	1981	60	39.1	35	44	1.586	1	
NORWALK	012	1982	60	43.3	39	48	1.571	1	
NORWALK	012	1983	60	41.1	37	45	1.542		
NORWICH	001	1981	61	36.0	32	41	1.671	1	
NORWICH	001	1982	58	41.4	38	45	1.461		
NORWICH	001	1983	59	39.6	36	43	1.462		
STAMFORD	001	1981	58	43.8	39	49	1.577	1	
STAMFORD	001	1982	58	51.6	46	58	1.642	5	
STAMFORD	001	1983	59	45.4	41	51	1.573	2	
STAMFORD	007	1981	60	41.4	38	46	1.495		
STAMFORD	007	1982	60	43.9	40	48	1.473		
STAMFORD	007	1983	60	44.7	41	49	1.462		
STAMFORD	021	1981	60	40.9	37	45	1.481		
STAMFORD	021	1982	57	44.4	41	48	1.418		
STAMFORD	021	1983	59	45.3	41	50	1.468		
STRATFORD	005	1981	56	45.6	40	52	1.643	3	
STRATFORD	005	1982	59	46.4	42	52	1.560	2	
STRATFORD	005	1983	58	44.4	41	48	1.435		
TORRINGTON	001	1983	56	36.8	33	41	1.526		

TABLE 5, CONTINUED

1981-1983 TSP ANNUAL AVERAGES AND STATISTICAL PROJECTIONS

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	GEOM MEAN	95-PCT-LIMITS LOWER	95-PCT-LIMITS UPPER	STD GEOM DEV	PREDICTED DAYS OVER 150 UG/M3	PREDICTED DAYS OVER 260 UG/M3
VOLUNTOWN	001	1981	115	20.8	19	22	1.652		
VOLUNTOWN	001	1982	117	21.1	20	23	1.558		
VOLUNTOWN	001	1983	59	23.7	21	27	1.624		
WALLINGFORD	001	1981	61	39.6	34	46	1.967	8	1
WALLINGFORD	001	1982	58	43.6	40	48	1.500		
WALLINGFORD	001	1983	57	40.4	37	45	1.512		
WATERBURY	005	1981	50	40.3	36	46	1.608	1	
WATERBURY	005	1982	61	43.5	38	49	1.703	4	
WATERBURY	005	1983	58	38.5	35	42	1.488		
WATERBURY	006	1981	60	39.1	34	45	1.764	3	
WATERBURY	006	1982	60	39.9	35	45	1.727	3	
WATERBURY	006	1983	60	34.2	31	38	1.523		
WATERBURY	007	1981	111	47.9	44	52	1.721	7	
WATERBURY	007	1982	117	49.3	46	53	1.639	4	
WATERBURY	007	1983	60	47.4	43	52	1.472		
WATERFORD	001	1981	58	30.1	26	35	1.784	1	
WATERFORD	001	1982	56	27.3	24	31	1.602		
WATERFORD	001	1983	55	25.6	23	29	1.646		
WILLIMANTIC	002	1981	58	38.9	35	44	1.641	1	
WILLIMANTIC	002	1982	60	37.7	34	42	1.551		
WILLIMANTIC	002	1983	60	35.2	32	39	1.505		

*   SAMPLING NOT RANDOM OR OF INSUFFICIENT SIZE FOR REPRESENTATIVE ANNUAL STATISTICS.

TABLE 6

CONFIDENCE OF COMPLIANCE WITH ANNUAL TSP STANDARDS DURING 1983

PRIMARY STANDARD (75 ug/m^3)		SECONDARY STANDARD (60 ug/m^3)	
95% Confident Standard Has Been Exceeded	Uncertain Whether Standard Has Been Achieved Or Exceeded	95% Confident Standard Has Been Exceeded	Uncertain Whether Standard Has Been Achieved Or Exceeded
NO SITES	NO SITES	NO SITES	Bridgeport 123

TABLE 7

1983 MAXIMUM 24-HOUR TSP CONCENTRATIONS

SITE	1ST HIGH	2ND HIGH	1ST HIGH, ug/m³	2ND HIGH, ug/m³
Ansonia-003	3/1	2/5	99	88
Bridgeport-001	6/23	8/16	81	77
Bridgeport-009	9/21	8/16	104	82
Bridgeport-123	6/23	9/9	127	111
Bristol-001	1/30	6/17	71	67
Burlington-001	6/17	7/29	60	54
Danbury-002	3/1	6/17	93	88
Danbury-123	9/21	6/17	113	90
E. Htfd-004	6/17	3/1	88	72
Greenwich-008	6/11	6/23	80	73
Groton-006	6/23	1/12	94	75
Haddam-002	12/14	4/30	80	48
Hartford-003	3/1	6/17	104	83
Hartford-013	3/1	9/21	95	90

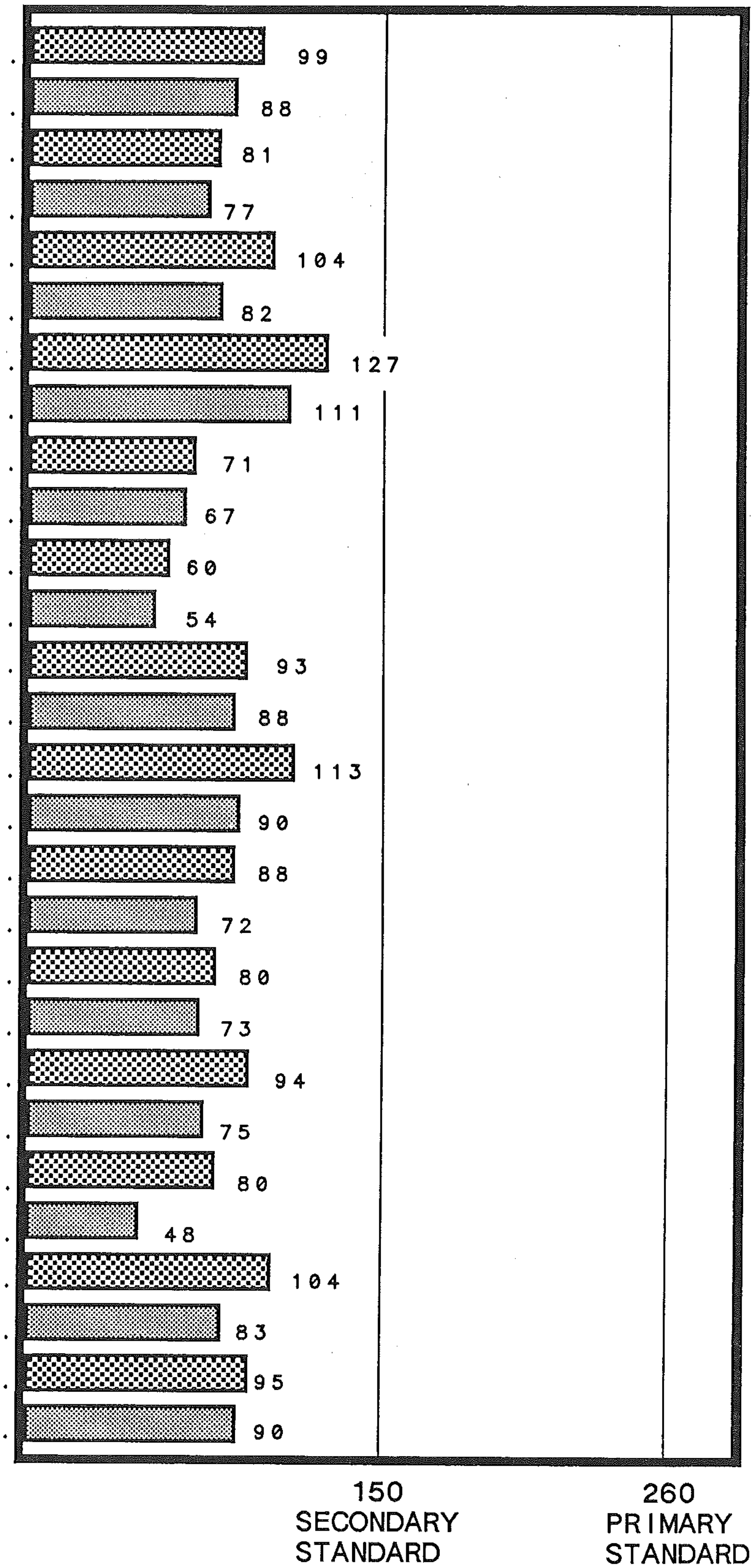
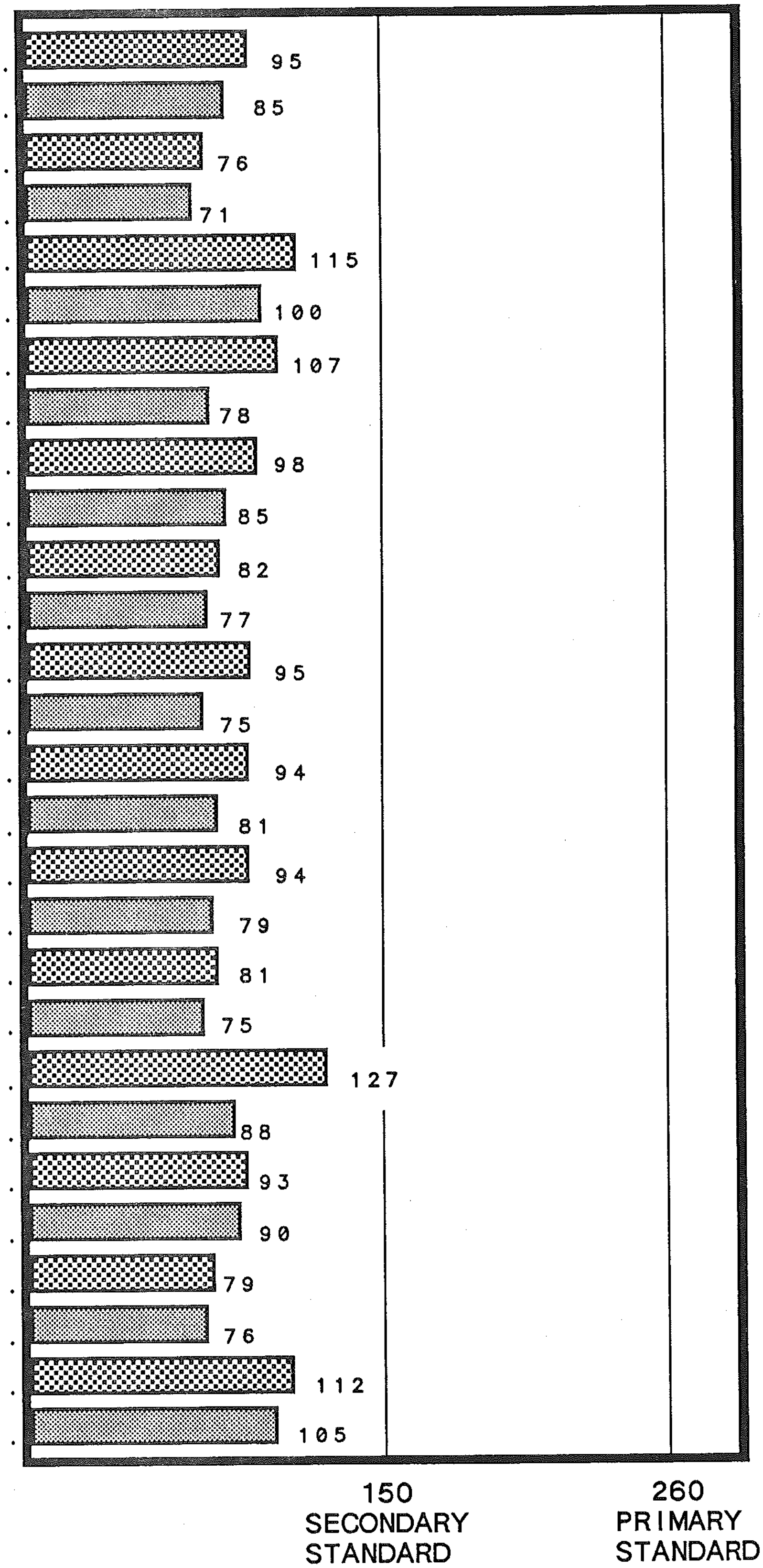


TABLE 7, CONTINUED

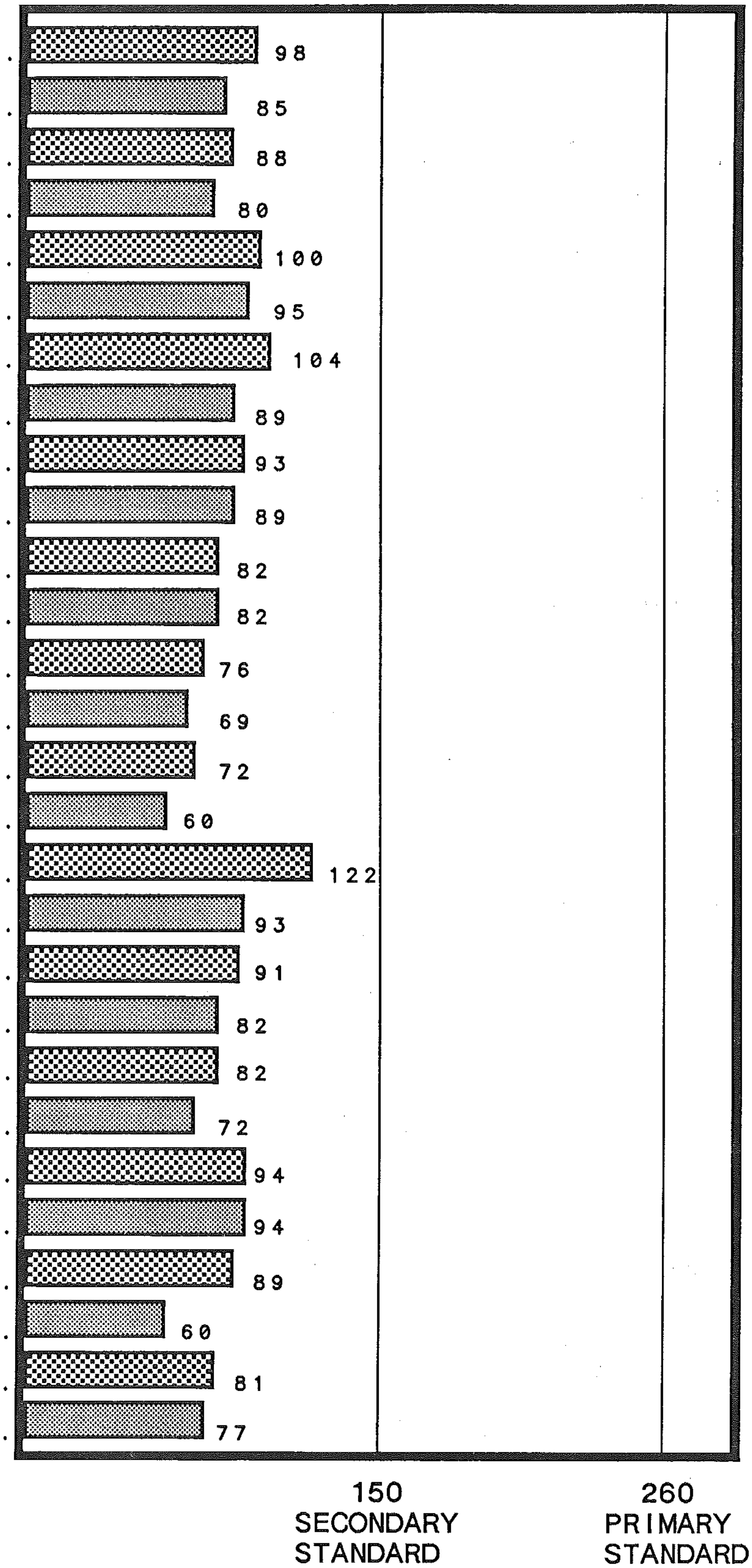
SITE	1ST HIGH	2ND HIGH	Value
Hartford-014	3/1		95
		6/17	85
Manchester-001	3/1		76
		6/23	71
Meriden-002	6/17		115
		3/1	100
Meriden-008	6/17		107
		3/1	78
Middletown-003	6/17		98
		3/1	85
Milford-002	8/16		82
		6/23	77
Naugatuck-001	3/1		95
		8/4	75
N. Britain-007	6/17		94
		3/1	81
N. Britain-008	6/17		94
		8/4	79
N. Britain-009	6/17		81
		6/23	75
New Haven-002	8/16		127
		8/28	88
New Haven-013	3/1		93
		6/23	90
Norwalk-001	4/30		79
		6/11	76
Norwalk-005	6/23		112
		10/3	105



1ST HIGH , ug/m³
2ND HIGH , ug/m³

TABLE 7, CONTINUED

SITE	1ST HIGH		2ND HIGH	
Norwalk-012	6/11	98	6/17	85
Norwich-001	1/6	88	4/30	80
Stamford-001	11/2	100	7/29	95
Stamford-007	10/3	104	6/11	89
Stamford-021	6/23	93	6/11	89
Stratford-005	6/23	82	8/16	82
Torrington-001	6/17	76	9/21	69
Voluntown-001	6/23	72	8/16	60
Wallingford-001	6/17	122	3/1	93
Waterbury-005	3/1	91	8/4	82
Waterbury-006	3/1	82	8/4	72
Waterbury-007	4/12	94	6/23	94
Waterford-001	6/23	89	6/11	60
Willimantic-002	3/1	81	8/28	77



1ST HIGH , ug/m³

2ND HIGH , ug/m³

TABLE 8

Summary of the Statistically Predicted Number of Sites Exceeding the 24-Hour TSP Standards

YEAR	TOTAL OF HI-VOL SITES[1]	SITES WITH ≥ 2 DAYS EXCEEDING THE SECONDARY STANDARD (150 ug/m³) Number of Sites	% of Total Sites	SITES WITH ≥ 2 DAYS EXCEEDING THE PRIMARY STANDARD (260 ug/m³) Number of Sites	% of Total Sites
1971	44	37	84%	19	43%
1972	46	43	93%	13	28%
1973	44	31	70%	11	25%
1974	62	49	79%	5	8%
1975	51	38	75%	2	4%
1976	38	33	87%	1	3%
1977	37	25	68%	0	0%
1978	34	20	59%	5	15%
1979	33	20	61%	2	6%
1980	33	14	42%	0	0%
1981	40	14	35%	0	0%
1982	39	11	28%	0	0%
1983	40	2	5%	0	0%

[1] Only those sites are used which have sufficient data to calculate a valid annual average concentration

TABLE 9

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	ANSONIA	0008	003	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0340	0.003	0.10	0.82	0.31	0.007	0.014	0.04	0.49
SECOND		BDL	0.0124	0.004	0.11	0.52	0.19	0.010	0.009	0.02	0.22
THIRD		BDL	0.0101	0.003	0.07	0.73	0.32	0.014	0.010	0.05	0.46
FOURTH		BDL	0.0247	0.003	0.09	0.54	0.41	0.022	0.011	0.04	0.58
YEAR AVG			0.0207	0.003	0.09	0.66	0.31	0.013	0.011	0.04	0.44

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.43	6.67	0.16		8.80		50	17
SECOND	3.48	10.02	0.16		9.70		42	15
THIRD	1.58	5.71	0.10		9.40		52	15
FOURTH	0.73	3.67	0.14		9.30		43	15
YEAR AVG	2.34	6.51	0.14		9.28		47	

N.B. For sulfate, the first quarter sample count is 15.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	BRIDGEPORT	0060	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0018	0.002	0.05	0.49	0.28	0.004	0.014	0.04	0.06
SECOND		BDL	0.0027	0.006	0.11	0.58	0.22	0.014	0.013	0.02	0.04
THIRD		BDL	0.0023	0.003	0.11	0.82	0.40	0.018	0.010	0.04	0.10
FOURTH		BDL	0.0028	0.005	0.05	0.48	0.45	0.021	0.010	0.03	0.05
YEAR AVG			0.0024	0.004	0.08	0.59	0.34	0.014	0.012	0.03	0.06

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.04	8.76	0.19		8.80		38	15
SECOND	3.51	8.24	0.19		9.50		47	15
THIRD	2.03	2.49	0.15		9.40		56	15
FOURTH	2.06	4.62	0.15		9.30		39	15
YEAR AVG	2.66	5.22	0.17		9.25		45	

N.B. For sulfate, the first, second and fourth quarter sample counts are 8, 7 and 14, respectively.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	BRIDGEPORT	0060	009	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0009	0.002	0.04	0.33	0.21	0.004	0.013	0.04	0.05
SECOND		BDL	0.0036	0.005	0.04	0.56	0.16	0.011	0.011	0.04	0.04
THIRD		BDL	0.0021	0.005	0.04	0.91	0.27	0.019	0.009	0.03	0.07
FOURTH		BDL	0.0038	0.004	0.06	0.55	0.34	0.028	0.011	0.04	0.03
YEAR AVG			0.0026	0.004	0.04	0.60	0.24	0.016	0.011	0.04	0.04

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.57	6.20	0.14		9.10		32	13
SECOND	4.77	9.27	0.14		9.50		41	15
THIRD	1.46	4.97	0.17		9.50		55	15
FOURTH	2.91	6.16	0.13		9.50		42	14
YEAR AVG	3.17	6.68	0.15		9.41		43	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	BRIDGEPORT	0060	123	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0027	0.004	0.03	0.73	0.35	0.008	0.017	0.04	0.07
SECOND		BDL	0.0037	0.008	0.05	1.09	0.28	0.022	0.017	0.04	0.06
THIRD		BDL	0.0072	0.008	0.06	1.45	0.43	0.037	0.025	0.05	0.14
FOURTH		BDL	0.0028	0.006	0.05	0.86	0.48	0.034	0.014	0.04	0.20
YEAR AVG			0.0040	0.006	0.05	1.02	0.38	0.024	0.018	0.04	0.11

QUARTER	WATER SOLUBLES: NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES: TOTAL 11103/91 UG/M3	TSP: ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.28	7.96	0.18		9.40		51	17
SECOND	3.64	10.56	0.20		9.40		64	15
THIRD	3.46	4.18	0.20		9.50		74	14
FOURTH	1.80	4.98	0.16		9.50		50	14
YEAR AVG	3.07	6.96	0.18		9.45		59	

N.B. For sulfate, the first and fourth quarter sample counts are both 15.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	BRISTOL	0070	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0012	0.002	0.03	0.31	0.17	0.002	0.010	0.02	0.04
SECOND		BDL	0.0014	0.003	0.05	0.34	0.13	0.009	0.004	0.01	0.03
THIRD		BDL	0.0018	0.002	0.07	0.56	0.21	0.013	0.006	0.02	0.10
FOURTH		BDL	0.0014	0.002	0.04	0.35	0.23	0.016	0.006	0.02	0.04
YEAR AVG			0.0015	0.002	0.05	0.39	0.18	0.010	0.006	0.02	0.05

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	4.10	6.02	0.18		9.50		33	13
SECOND	3.99	8.85	0.14		9.50		34	15
THIRD	1.07	4.49	0.13		9.20		41	15
FOURTH	1.79	2.58	0.06		9.40		32	13
YEAR AVG	2.72	5.59	0.13		9.40		35	

N.B. For sulfate, the first quarter sample count is 15.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	BURLINGTON	0085	001	F	03

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0004	0.003	0.05	0.20	0.07	0.001	0.005	0.01	0.01
SECOND		BDL	0.0009	0.002	0.06	0.17	0.05	0.006	0.003	0.01	0.02
THIRD		BDL	0.0004	0.001	0.08	0.29	0.22	0.006	0.005	0.01	0.07
FOURTH		BDL	0.0007	0.002	0.06	0.15	0.09	0.007	0.004	0.01	0.07
YEAR AVG			0.0006	0.002	0.06	0.20	0.11	0.005	0.004	0.01	0.04

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.54	4.92	0.11		9.30		20	16
SECOND	2.40	6.62	0.10		9.70		26	15
THIRD	0.54	4.36	0.03		9.60		31	15
FOURTH	0.68	2.17	0.14		9.70		19	13
YEAR AVG	1.59	4.60	0.09		9.57		24	

N.B. For sulfate, the first quarter sample count is 15.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	DANBURY	0175	002	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0009	0.005	0.03	0.75	0.25	0.007	0.011	0.02	0.03
SECOND		BDL	0.0009	0.003	0.08	0.60	0.18	0.013	0.009	0.02	0.03
THIRD		BDL	0.0007	0.003	0.12	0.73	0.29	0.014	0.010	0.03	0.09
FOURTH		BDL				0.62	0.36	0.022	0.007	0.03	0.04
YEAR AVG						0.67	0.27	0.014	0.009	0.02	0.05

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.79	6.79	0.18		9.29		52	14
SECOND	3.25	10.40	0.16		9.60		48	15
THIRD	1.40	4.16	0.21		9.60		52	15
FOURTH	2.37	5.20	0.13		9.50		43	14
YEAR AVG	2.45	6.41	0.17		9.48		49	

N.B. For sulfate, the second quarter sample count is 13.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	DANBURY	0175	123	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0009	0.003	0.08	0.62	0.26	0.005	0.008	0.20	0.04
SECOND		BDL	0.0010	0.003	0.14	0.59	0.19	0.013	0.009	0.03	0.03
THIRD		BDL	0.0005	0.004	0.09	0.84	0.31	0.017	0.013	0.02	0.08
FOURTH		BDL	0.0006	0.003	0.11	0.52	0.41	0.019	0.008	0.03	0.08
YEAR AVG			0.0007	0.003	0.11	0.65	0.29	0.014	0.010	0.06	0.06

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	4.18	5.53	0.17		9.30		41	10
SECOND	4.06	10.09	0.18		9.60		47	15
THIRD	1.45	6.15	0.20		9.60		56	15
FOURTH	2.65	5.25	0.13		9.50		41	13
YEAR AVG	3.00	6.99	0.17		9.52		47	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	EAST HARTFORD	0220	004	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0013	0.003	0.08	0.46	0.25	0.006	0.010	0.03	0.05
SECOND		BDL	0.0011	0.004	0.09	0.49	0.22	0.011	0.007	0.03	0.03
THIRD		BDL	0.0015	0.004	0.14	0.72	0.37	0.015	0.013	0.02	0.12
FOURTH		BDL	0.0022	0.007	0.10	0.48	0.40	0.017	0.009	0.03	0.10
YEAR AVG			0.0015	0.004	0.10	0.54	0.31	0.012	0.010	0.03	0.07

QUARTER	WATER SOLUBLES: NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES: TOTAL 11103/91 UG/M3	TSP: ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.51	6.51	0.14		9.40		36	15
SECOND	3.60	8.38	0.11		9.50		44	15
THIRD	1.61	2.96	0.18		9.40		47	15
FOURTH	2.83	2.78	0.19		9.40		39	15
YEAR AVG	2.89	5.09	0.15		9.42		42	

N.B. For sulfate, the first quarter sample count is 12.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	GREENWICH	0330	008	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0013	0.006	0.05	0.49	0.20	0.005	0.009	0.02	
SECOND		BDL	0.0013	0.003	0.06	0.60	0.19	0.012	0.008	0.02	
THIRD		BDL	0.0006	0.002	0.03	0.81	0.21	0.014	0.006	0.02	
FOURTH		BDL	0.0006	0.004	0.03	0.60	0.24	0.020	0.006	0.01	
YEAR AVG			0.0010	0.004	0.05	0.58	0.21	0.012	0.008	0.02	

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.62	7.42	0.18		9.50		35	15
SECOND	3.97	10.24	0.15		9.40		46	15
THIRD	1.42	0.53	0.15		9.40		43	3
FOURTH	2.94	2.98	0.16		9.40		37	15
YEAR AVG	3.38	6.32	0.16		9.43		39	

N.B. For sulfate, the second quarter sample count is 13.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	GROTON	0350	006	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0004	0.006	0.07	0.43	0.08	0.005	0.012	0.03	0.04
SECOND		BDL	0.0002	0.006	0.08	0.32	0.08	0.007	0.024	0.04	0.03
THIRD		BDL	0.0003	0.006	0.10	0.60	0.14	0.013	0.014	0.03	0.07
FOURTH		BDL	0.0005	0.008	0.06	0.41	0.15	0.015	0.019	0.06	0.11
YEAR AVG			0.0003	0.007	0.08	0.44	0.11	0.010	0.017	0.04	0.06

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.83	5.59	0.18		9.40		37	14
SECOND	3.04	8.31	0.16		9.30		42	15
THIRD	1.18	3.28	0.13		9.20		43	15
FOURTH	1.95	4.36	0.16		9.20		31	15
YEAR AVG	2.24	5.38	0.16		9.27		38	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	HADDAM	0380	002	F	02

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0004	0.004	0.05	0.14	0.07	0.004	0.005	0.01	0.01
SECOND		BDL	0.0007	0.002	0.04	0.23	0.07	0.009	0.007	0.01	0.04
THIRD											
FOURTH		BDL	0.0004	0.001	0.03	0.28	0.12	0.013	0.006	0.02	0.03
YEAR AVG											

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	1.87	5.90	0.11		9.50		23	15
SECOND	2.11	7.24	0.11		9.60		28	17
THIRD								
FOURTH	2.29	0.85	0.06		9.20		33	6
YEAR AVG								

N.B. For sulfate, the second quarter sample count is 7.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	HARTFORD	0420	003	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST											
SECOND		BDL	0.0004	0.010	0.10	0.68	0.19	0.014	0.008	0.03	0.03
THIRD		BDL	0.0009	0.007	0.07	0.94	0.35	0.019	0.014	0.02	0.08
FOURTH		BDL	0.0014	0.008	0.04	0.73	0.43	0.024	0.010	0.05	0.08
YEAR AVG											

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST		8.29						
SECOND	4.06	7.35	0.18		9.40		49	13
THIRD	1.04	5.97	0.16		9.50		58	15
FOURTH	1.91	2.15	0.13		9.40		50	14
YEAR AVG		5.45						

N.B. For sulfate, the first through the fourth quarter sample counts are 8, 7, 13 and 13, respectively.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	HARTFORD	0420	013	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0018	0.006	0.03	0.50	0.28	0.011	0.013	0.04	0.05
SECOND		BDL	0.0013	0.006	0.05	0.59	0.16	0.013	0.009	0.02	0.03
THIRD		BDL	0.0006	0.008	0.05	1.15	0.30	0.023	0.017	0.02	0.07
FOURTH		BDL	0.0007	0.010	0.03	0.70	0.35	0.025	0.008	0.03	0.07
YEAR AVG			0.0011	0.007	0.04	0.73	0.27	0.018	0.012	0.03	0.05

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.03	7.06	0.20		9.30		38	15
SECOND	3.82	10.69	0.22		9.50		47	15
THIRD	1.82	5.99	0.21		9.50		60	15
FOURTH	0.97	2.93	0.18		9.40		43	15
YEAR AVG	2.41	6.67	0.20		9.42		47	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	HARTFORD	0420	014	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0010	0.004	0.09	0.52	0.25	0.013	0.013	0.04	9,95
SECOND		BDL	0.0005	0.004	0.15	0.50	0.18	0.011	0.008	0.02	0.03
THIRD		BDL	0.0012	0.004	0.10	0.71	0.31	0.015	0.009	0.01	0.08
FOURTH		BDL	0.0008	0.003	0.06	0.47	0.42	0.016	0.008	0.03	0.08
YEAR AVG			0.0009	0.004	0.10	0.55	0.29	0.014	0.010	0.03	0.06

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.38	6.61	0.18		9.40		41	15
SECOND	3.48	9.47	0.19		9.50		44	15
THIRD	1.38	4.54	0.13		9.50		49	14
FOURTH	2.23	3.34	0.15		9.40		41	13
YEAR AVG	2.39	6.11	0.16		9.45		44	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	MANCHESTER	0510	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0009	0.003	0.03	0.44	0.16	0.005	0.007	0.03	0.03
SECOND		BDL	0.0003	0.001	0.04	0.34	0.11	0.007	0.006	0.02	0.02
THIRD		BDL	0.0003	0.003	0.07	0.55	0.23	0.009	0.008	0.01	0.10
FOURTH		BDL	0.0008	0.002	0.04	0.25	0.23	0.011	0.006	0.02	0.07
YEAR AVG			0.0006	0.002	0.05	0.39	0.18	0.008	0.007	0.02	0.06

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.91	6.32	0.13		9.30		34	14
SECOND	2.31	6.99	0.13		9.50		38	15
THIRD	1.54	5.58	0.14		9.50		41	15
FOURTH	2.91	2.34	0.15		9.40		32	15
YEAR AVG	2.65	5.29	0.14		9.43		36	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	MERIDEN	0540	002	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0017	0.007	0.04	0.54	0.18	0.012	0.011	0.04	0.11
SECOND		BDL	0.0018	0.002	0.07	0.50	0.21	0.008	0.010	0.02	0.12
THIRD		BDL	0.0009	0.006	0.12	0.64	0.30	0.014	0.011	0.02	0.19
FOURTH		BDL	0.0015	0.005	0.09	0.44	0.40	0.015	0.010	0.03	0.17
YEAR AVG			0.0014	0.005	0.08	0.54	0.27	0.012	0.011	0.03	0.15

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.07	6.47	0.14		9.50		41	15
SECOND	3.53	7.70	0.13		9.60		47	11
THIRD	1.42	5.32	0.13		9.60		52	15
FOURTH	2.54	2.81	0.15		9.60		36	11
YEAR AVG	2.58	5.73	0.14		9.57		44	

N.B. For sulfate, the second quarter sample count is 14.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	MERIDEN	0540	008	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0005	0.006	0.07	0.39	0.17	0.008	0.010	0.03	0.10
SECOND		BDL	0.0006	0.002	0.07	0.35	0.14	0.006	0.008	0.01	0.07
THIRD		BDL	0.0027	0.006	0.12	0.85	0.46	0.020	0.013	0.01	0.27
FOURTH		BDL	0.0013	0.004	0.07	0.43	0.42	0.016	0.009	0.03	0.18
YEAR AVG			0.0013	0.004	0.08	0.50	0.29	0.012	0.010	0.02	0.15

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.78	7.03	0.18		9.70		36	15
SECOND	4.41	7.80	0.15		9.70		44	15
THIRD	1.58	7.20	0.16		9.60		46	14
FOURTH	2.75	3.60	0.16		9.60		37	15
YEAR AVG	2.90	6.44	0.16		9.65		41	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	MIDDLETOWN	0570	003	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0008	0.005	0.06	0.50	0.25	0.011	0.041	0.15	0.06
SECOND		BDL	0.0007	0.001	0.13	0.35	0.15	0.007	0.017	0.03	0.02
THIRD		BDL	0.0006	0.002	0.09	0.63	0.30	0.014	0.004	0.02	0.10
FOURTH		BDL	0.0008	0.003	0.07	0.38	0.36	0.015	0.007	0.03	0.06
YEAR AVG			0.0007	0.003	0.09	0.47	0.27	0.012	0.017	0.06	0.06

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.78	6.44	0.14		9.40		38	14
SECOND	3.42	9.28	0.16		8.60		45	14
THIRD	1.56	7.66	0.17		8.80		43	15
FOURTH	2.49	3.16	0.16		8.90		35	15
YEAR AVG	2.54	6.59	0.16		8.92		40	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	MILFORD	0590	002	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0024	0.003	0.03	0.52	0.17	0.009	0.020	0.07	0.08
SECOND		BDL	0.0007	0.001	0.13	0.35	0.15	0.007	0.017	0.03	0.02
THIRD		BDL	0.0010	0.009	0.04	0.69	0.30	0.013	0.011	0.03	0.09
FOURTH		BDL	0.0018	0.004	0.02	0.51	0.35	0.017	0.019	0.05	0.10
YEAR AVG			0.0015	0.004	0.05	0.52	0.24	0.012	0.017	0.05	0.07

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.66	6.69	0.14		9.30		38	14
SECOND	3.42	10.24	0.16		8.60		45	14
THIRD	1.44	7.21	0.17		9.20		54	14
FOURTH	2.53	3.63	0.17		9.30		38	15
YEAR AVG	2.51	6.94	0.16		9.10		44	

N.B. For sulfate, the second quarter sample count is 15.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NAUGATUCK	0660	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0021	0.004	0.04	0.68	0.30	0.012	0.008	0.02	0.08
SECOND		BDL	0.0006	0.002	0.05	0.84	0.19	0.007	0.009	0.02	0.05
THIRD		BDL	0.0007	0.007	0.06	1.22	0.40	0.029	0.006	0.01	0.14
FOURTH		BDL	0.0017	0.006	0.09	0.73	0.48	0.021	0.007	0.02	0.10
YEAR AVG			0.0013	0.005	0.06	0.86	0.34	0.017	0.008	0.02	0.09

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.97	6.76	0.18		9.20		43	15
SECOND	3.65	10.95	0.17		9.50		43	15
THIRD	1.32	5.85	0.15		9.50		47	14
FOURTH	2.80	4.45	0.13		9.40		42	14
YEAR AVG	2.71	6.86	0.16		9.40		44	

N.B. For sulfate, the fourth quarter sample count is 15.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NEW BRITAIN	0680	007	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0012	0.003	0.09	0.64	0.18	0.009	0.011	0.03	0.04
SECOND		BDL	0.0002	0.001	0.09	0.49	0.13	0.007	0.012	0.01	0.03
THIRD		BDL	0.0007	0.003	0.12	0.80	0.28	0.018	0.004	0.02	0.12
FOURTH		BDL	0.0006	0.003	0.09	0.40	0.33	0.015	0.006	0.02	0.03
YEAR AVG			0.0007	0.003	0.10	0.59	0.23	0.012	0.008	0.02	0.05

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	4.09	6.49	0.18		9.40		34	17
SECOND	4.64	12.03	0.20		9.50		42	15
THIRD	1.34	5.86	0.14		9.40		47	15
FOURTH	2.62	3.81	0.16		9.50		33	14
YEAR AVG	3.21	7.05	0.17		9.45		39	

N.B. For sulfate, the first and fourth quarter sample counts are both 15.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NEW BRITAIN	0680	008	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0009	0.003	0.02	0.37	0.15	0.008	0.004	0.02	0.04
SECOND		BDL	0.0004	0.001	0.04	0.39	0.13	0.007	0.013	0.02	0.02
THIRD		BDL	0.0011	0.002	0.11	0.66	0.27	0.013	0.002	0.01	0.10
FOURTH		BDL	0.0013	0.003	0.13	0.45	0.42	0.015	0.006	0.02	0.08
YEAR AVG			0.0009	0.002	0.07	0.46	0.24	0.011	0.006	0.02	0.06

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.80	5.69	0.18		9.60		41	15
SECOND		12.03			9.50			15
THIRD	1.52	9.55	0.15		9.50		48	13
FOURTH	3.01	3.56	0.17		9.50		36	15
YEAR AVG		7.64			9.53			

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NEW BRITAIN	0680	009	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0008	0.005	0.06	0.36	0.14	0.008	0.006	0.02	0.04
SECOND		BDL	0.0006	0.001	0.07	0.40	0.11	0.005	0.015	0.02	0.04
THIRD		BDL	0.0009	0.002	0.09	0.63	0.24	0.014	0.003	0.01	0.12
FOURTH		BDL	0.0007	0.004	0.06	0.40	0.34	0.015	0.007	0.03	0.07
YEAR AVG			0.0007	0.003	0.07	0.45	0.21	0.011	0.008	0.02	0.07

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.17	5.89	0.14		9.60		36	14
SECOND		8.20					42	15
THIRD	1.51	6.83	0.14		9.40		45	15
FOURTH	2.37	3.62	0.15		9.50		38	15
YEAR AVG		6.14					40	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NEW HAVEN	0700	002	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0009	0.004	0.05	0.74	0.32	0.010	0.009	0.03	0.05
SECOND		BDL	0.0007	0.002	0.06	0.67	0.17	0.008	0.018	0.02	0.04
THIRD		BDL	0.0012	0.004	0.34	1.40	0.47	0.027	0.012	0.04	0.10
FOURTH		BDL	0.0012	0.005	0.32	0.84	0.54	0.025	0.011	0.03	0.09
YEAR AVG			0.0010	0.004	0.20	0.93	0.39	0.018	0.012	0.03	0.07

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.15	6.05	0.16		9.50		43	14
SECOND	3.78	10.91	0.18		9.50		49	10
THIRD	1.67	2.87	0.15		9.52		72	14
FOURTH	3.68	6.02	0.15		9.50		47	14
YEAR AVG	3.02	5.67	0.16		9.51		53	14

N.B. For sulfate, the first and second quarter sample counts are 7 and 6, respectively.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NEW HAVEN	0700	013	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0010	0.001	0.06	0.60	0.21	0.004	0.013	0.04	0.04
SECOND		BDL	0.0008	0.003	0.12	0.51	0.17	0.007	0.008	0.03	0.03
THIRD		BDL	0.0013	0.002	0.10	0.82	0.32	0.016	0.010	0.03	0.08
FOURTH		BDL	0.0010	0.005	0.08	0.62	0.46	0.020	0.014	0.05	0.09
YEAR AVG			0.0010	0.003	0.09	0.64	0.29	0.012	0.011	0.04	0.06

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	APPROX SAMPLE COUNT
FIRST	3.76	6.88	0.17		9.50		46	17
SECOND	4.71	11.22	0.18		9.50		50	13
THIRD	1.53	3.68	0.15		9.50		53	15
FOURTH	3.04	5.90	0.16		9.40		42	15
YEAR AVG	3.23	6.77	0.16		9.47		48	

N.B. For sulfate, the first quarter sample count is 14.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NORWALK	0820	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0009	BDL	0.18	0.38	0.15	0.004	0.020	0.08	0.05
SECOND		BDL	0.0013	0.001	0.27	0.46	0.15	0.008	0.008	0.03	0.06
THIRD		BDL	0.0007	0.010	0.28	0.85	0.27	0.016	0.012	0.04	0.14
FOURTH		BDL	0.0009	0.003	0.09	0.44	0.47	0.017	0.015	0.06	0.09
YEAR AVG			0.0010	0.003	0.20	0.52	0.26	0.011	0.014	0.05	0.08

QUARTER	WATER SOLUBLES: NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES: TOTAL 11103/91 UG/M3	TSP: ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.58	7.57	0.17		9.40		34	17
SECOND	4.65	11.53	0.17		9.60		47	15
THIRD	1.55	5.61	0.18		9.60		54	14
FOURTH	1.80	6.87	0.18		9.60		37	15
YEAR AVG	2.94	7.94	0.17		9.54		43	

N.B. For sulfate, the first quarter sample count is 14.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NORWALK	0820	005	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0007	0.001	0.05	0.61	0.22	0.006	0.017	0.07	0.05
SECOND		BDL	0.0007	0.041	0.10	0.74	0.20	0.011	0.007	0.02	0.05
THIRD		BDL	0.0007	0.010	0.12	0.87	0.34	0.017	0.009	0.03	0.10
FOURTH		BDL				0.72	0.47	0.023	0.012	0.04	0.10
YEAR AVG						0.73	0.31	0.014	0.011	0.04	0.07

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.68	7.43	0.18		9.60		42	15
SECOND	4.70	10.15	0.19		9.60		54	15
THIRD	1.62	5.59	0.14		9.70		52	13
FOURTH	3.30	6.83	0.14		9.60		49	15
YEAR AVG	3.38	7.57	0.16		9.62		49	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NORWALK	0820	012	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0006	0.001	0.03	0.40	0.20	0.003	0.005	0.02	0.03
SECOND		BDL	0.0006	0.002	0.08	0.68	0.17	0.011	0.006	0.02	0.04
THIRD		BDL	0.0006	0.003	0.08	0.96	0.34	0.019	0.011	0.03	0.10
FOURTH		BDL	0.0011	0.003	0.04	0.60	0.46	0.019	0.009	0.03	0.06
YEAR AVG			0.0007	0.002	0.06	0.66	0.29	0.013	0.008	0.02	0.06

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.06	7.11	0.19		9.60		36	15
SECOND	3.98	10.76	0.20		9.70		53	15
THIRD	1.55	5.81	0.18		9.70		56	15
FOURTH	2.66	6.49	0.17		9.70		39	15
YEAR AGE	2.81	7.54	0.18		9.67		46	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	NORWICH	0840	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0003	0.001	0.04	0.32	0.12	0.001	0.004	0.02	0.02
SECOND		BDL	0.0005	0.001	0.06	0.41	0.11	0.006	0.008	0.03	0.02
THIRD		BDL	0.0002	0.003	0.07	0.77	0.19	0.012	0.008	0.03	0.07
FOURTH		BDL	0.0008	0.002	0.04	0.39	0.30	0.014	0.008	0.03	0.05
YEAR AVG			0.0005	0.002	0.05	0.47	0.18	0.008	0.007	0.03	0.04

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.51	6.43	0.13		9.60		38	15
SECOND	4.28	8.71	0.13		9.20		46	15
THIRD	1.33	4.02	0.18		9.00		44	14
FOURTH	2.66	5.39	0.17		9.10		42	15
YEAR AVG	2.97	6.17	0.15		9.23		42	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	STAMFORD	1080	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0010	0.001	0.04	0.43	0.20	0.004	0.009	0.03	0.05
SECOND		BDL	0.0003	0.002	0.08	0.57	0.17	0.010	0.008	0.02	0.03
THIRD		BDL	0.0006	0.005	0.11	1.26	0.30	0.025	0.009	0.02	0.08
FOURTH		BDL	0.0009	0.003	0.10	0.61	0.34	0.025	0.011	0.03	0.09
YEAR AVG			0.0007	0.003	0.08	0.72	0.25	0.016	0.009	0.02	0.06

QUARTER	WATER SOLUBLES: NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES: TOTAL 11103/91 UG/M3	TSP: ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.61	8.58	0.17		8.80		38	15
SECOND	4.34	8.66	0.15		9.00		54	15
THIRD	2.79	4.39	0.09		9.80		53	15
FOURTH	2.96	5.77	0.15		8.80		45	14
YEAR AVG	3.43	6.27	0.14		9.11		50	

N.B. For sulfate, the first and second quarter sample counts are 8 and 7, respectively.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	STAMFORD	1080	007	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0017	0.002	0.04	0.35	0.15	0.003	0.007	0.03	0.07
SECOND		BDL	0.0008	0.002	0.05	0.43	0.11	0.008	0.008	0.02	0.04
THIRD		BDL	0.0012	0.006	0.06	0.87	0.26	0.020	0.013	0.03	0.14
FOURTH		BDL	0.0013	0.003	0.03	0.60	0.28	0.021	0.009	0.02	0.12
YEAR AVG			0.0012	0.003	0.04	0.56	0.20	0.013	0.009	0.02	0.09

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.19	6.67	0.17		9.30		36	15
SECOND	4.17	9.78	0.19		8.80		52	15
THIRD	1.51	5.74	0.14		8.60		57	15
FOURTH	2.68	6.38	0.14		9.00		47	15
YEAR AVG	2.89	7.14	0.16		8.92		48	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	STAMFORD	1080	021	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0011	0.005	0.05	0.42	0.18	0.005	0.009	0.03	0.04
SECOND		BDL	0.0003	0.001	0.07	0.43	0.13	0.008	0.008	0.02	0.03
THIRD		BDL	0.0008	0.007	0.10	0.87	0.28	0.019	0.008	0.02	0.08
FOURTH		BDL	0.0010	0.004	0.07	0.68	0.31	0.023	0.008	0.02	0.05
YEAR AVG			0.0008	0.004	0.07	0.60	0.22	0.014	0.008	0.02	0.05

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.73	7.95	0.16		9.30		39	15
SECOND	4.40	10.81	0.19		8.90		51	15
THIRD	1.57	3.07	0.14		8.80		57	15
FOURTH	4.93	5.43	0.16		9.00		47	15
YEAR AVG	3.66	6.79	0.16		9.00		49	

N.B. For sulfate, the first quarter sample count is 14.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	STRATFORD	1110	005	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0021	0.008	0.05	0.64	0.25	0.004	0.008	0.03	0.06
SECOND		BDL	0.0002	0.002	0.07	0.62	0.24	0.006	0.006	0.02	0.04
THIRD		BDL	0.0014	0.008	0.10	0.67	0.33	0.015	0.009	0.03	0.09
FOURTH		BDL	0.0017	0.004	0.07	0.49	0.44	0.018	0.011	0.03	0.09
YEAR AVG			0.0013	0.005	0.07	0.61	0.31	0.011	0.008	0.03	0.07

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.53	6.41	0.15		9.30		49	14
SECOND	4.64	9.01	0.01		8.80		47	15
THIRD	1.58	4.27	0.14		8.90		51	15
FOURTH	3.13	7.17	0.11		8.80		42	14
YEAR AVG	3.22	6.71	0.10		8.95		47	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	TORRINGTON	1160	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0012	0.014	0.04	0.16	0.29	0.014	0.007	0.02	0.04
SECOND		BDL	BDL	0.001	0.05	0.40	0.37	0.006	0.005	0.01	0.02
THIRD		BDL	0.0009	0.005	0.05	0.76	0.27	0.015	0.004	0.01	0.07
FOURTH		BDL	0.0006	0.004	0.04	0.48	0.29	0.016	0.006	0.02	0.04
YEAR AVG				0.005	0.05	0.47	0.31	0.013	0.005	0.01	0.04

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	1.88	6.26	0.12		9.40		43	11
SECOND	3.56	8.01	0.12		8.90		37	15
THIRD	1.25	2.79	0.15		8.90		41	15
FOURTH	1.43	5.21	0.15		9.00		39	15
YEAR AVG	2.04	5.52	0.14		9.02		40	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	VOLUNTOWN	1205	001	F	03

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0004	0.002	0.04	0.01	0.30	BDL	0.003	0.01	0.01
SECOND		BDL	0.0003	BDL	0.05	0.15	0.03	0.002	0.004	0.01	0.01
THIRD		BDL	0.0001	0.001	0.09	0.35	0.08	0.007	0.003	0.01	0.04
FOURTH		BDL	0.0004	0.001	0.04	0.16	0.07	0.006	0.003	0.01	0.03
YEAR AVG			0.0003		0.06	0.17	0.12		0.003	0.01	0.02

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.47	3.64	0.12		9.70		22	15
SECOND	2.68	4.61	0.13		9.60		30	15
THIRD	1.38	2.99	0.03		9.50		35	15
FOURTH	1.75	2.85	0.03		9.50		20	14
YEAR AVG	2.08	3.53	0.08		9.58		27	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	WALLINGFORD	1210	001	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0007	0.003	0.08	0.43	0.24	0.002	0.010	0.03	0.05
SECOND		BDL	0.0002	0.001	0.04	0.26	0.12	0.003	0.008	0.01	0.02
THIRD		BDL	0.0006	0.005	0.03	0.65	0.28	0.031	0.008	0.02	0.08
FOURTH		BDL	0.0008	0.004	0.03	0.47	0.37	0.017	0.009	0.03	0.07
YEAR AVG			0.0006	0.003	0.04	0.46	0.26	0.014	0.009	0.02	0.06

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	1.92	7.77	0.13		9.60		40	13
SECOND	2.15	9.98	0.18		9.50		45	14
THIRD	1.64	6.89	0.11		9.50		47	15
FOURTH	1.59	5.23	0.18		9.50		42	15
YEAR AVG	1.82	7.41	0.15		9.52		44	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	WATERBURY	1240	005	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0015	0.006	0.06	0.44	0.18	0.003	0.008	0.03	0.17
SECOND		BDL	0.0008	0.004	0.07	0.32	0.13	0.005	0.009	0.01	0.06
THIRD		BDL	0.0011	0.020	0.07	0.69	0.29	0.015	0.010	0.02	0.14
FOURTH		BDL	0.0017	0.010	0.06	0.49	0.42	0.018	0.008	0.02	0.16
YEAR AVG			0.0013	0.010	0.07	0.49	0.25	0.010	0.009	0.02	0.13

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.88	6.70	0.17		8.30		39	14
SECOND	3.25	7.39	0.17		9.60		41	15
THIRD	1.41	4.47	0.15		9.50		47	15
FOURTH	2.07	6.15	0.16		9.50		39	14
YEAR AVG	2.64	5.87	0.16		9.24		42	

N.B. For sulfate, the first and second quarter sample counts are 8 and 7, respectively.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	WATERBURY	1240	006	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0013	0.004	0.06	0.37	0.14	0.002	0.011	0.02	0.14
SECOND		BDL	0.0004	0.003	0.08	0.22	0.11	0.004	0.004	0.01	0.04
THIRD		BDL	0.0010	0.011	0.11	0.53	0.24	0.012	0.007	0.02	0.09
FOURTH		BDL	0.0014	0.005	0.06	0.31	0.25	0.013	0.006	0.02	0.08
YEAR AVG			0.0010	0.006	0.08	0.36	0.18	0.008	0.007	0.02	0.09

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	4.91	6.40	0.18		9.40		32	15
SECOND	3.95	8.10	0.19		9.60		39	15
THIRD	1.54	3.12	0.15		9.50		43	15
FOURTH	2.96	5.47	0.16		9.50		32	15
YEAR AVG	3.26	5.77	0.17		9.50		36	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	WATERBURY	1240	007	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0016	0.006	0.05	0.45	0.27	0.005	0.012	0.03	0.18
SECOND		BDL	0.0010	0.006	0.09	0.58	0.22	0.010	0.005	0.02	0.12
THIRD		BDL	0.0024	0.012	0.11	0.86	0.46	0.019	0.008	0.02	0.25
FOURTH		BDL	0.0032	0.009	0.06	0.58	0.50	0.021	0.010	0.03	0.23
YEAR AVG			0.0020	0.008	0.08	0.61	0.36	0.013	0.009	0.03	0.19

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	3.82	7.33	0.18		9.50		46	17
SECOND	4.19	8.67	0.21		9.50		56	15
THIRD	1.59	5.38	0.16		9.60		57	15
FOURTH	2.61	6.19	0.16		9.50		45	15
YEAR AVG	3.08	6.89	0.18		9.52		51	

N.B. For sulfate, the first quarter sample count is 15.

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	WATERFORD	1260	001	F	02

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0010	0.003	0.01	0.12	0.05	0.004	0.007	0.02	0.06
SECOND		BDL	0.0005	0.003	0.01	0.23	0.09	0.004	0.005	0.02	0.01
THIRD		BDL	0.0011	0.009	0 06	0.56	0.15	0.012	0.006	0.01	0.05
FOURTH		BDL	0.0007	0.002	0.09	0.21	0.12	0.008	0.007	0.02	0.08
YEAR AVG			0.0008	0.004	0.04	0.26	0.10	0.007	0.006	0.02	0.05

QUARTER	WATER SOLUBLES NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	BENZ SOLUBLES TOTAL 11103/91 UG/M3	TSP ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	1.90	4.15	0.09		9.20		17	15
SECOND	2.18	5.74	0.10		9.40		34	15
THIRD	1.21	4.26	0.07		9.20		42	11
FOURTH	1.30	4.93	0.06		9.20		24	15
YEAR AVG	1.68	4.80	0.08		9.25		28	

TABLE 9, Continued

QUARTERLY CHEMICAL CHARACTERIZATION OF 1983 HI-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	WILLIMANTIC	1410	002	F	01

METALS

QUARTER	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
FIRST		BDL	0.0004	0.005	0.04	0.45	0.17	0.002	0.019	0.05	0.04
SECOND		BDL	0.0005	0.004	0.05	0.26	0.11	0.004	0.020	0.02	0.02
THIRD		BDL	0.0009	0.008	0.07	0.53	0.22	0.012	0.013	0.01	0.05
FOURTH		BDL	0.0053	0.001	0.05	0.30	0.25	0.010	0.013	0.03	0.09
YEAR AVG			0.0018	0.004	0.05	0.38	0.19	0.007	0.016	0.03	0.05

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
QUARTER	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
FIRST	2.02	6.17	0.12		9.30		39	15
SECOND	2.76	6.32	0.12		9.60		40	15
THIRD	1.25	3.93	0.14		9.60		40	15
FOURTH	1.05	4.09	0.09		9.40		33	15
YEAR AVG	1.77	5.13	0.12		9.47		38	

TABLE 10

MONTHLY CHEMICAL CHARACTERIZATION OF 1983 LO-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	MANSFIELD	0520	001	F	01

METALS

MONTH	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
JANUARY		BDL	0.0006	0.003	BDL	0.37	0.07	0.004	0.005	0.01	0.03
FEBRUARY		BDL	0.0006	0.005	0.01	0.34	0.09	0.005	0.008	0.02	0.03
MARCH		BDL	0.0003	0.006	BDL	0.33	0.04	0.005	0.006	0.01	0.02
APRIL		BDL	0.0001	0.001	BDL	0.27	0.06	0.005	0.004	0.01	0.01
MAY		BDL	0.0004	0.001	BDL	0.28	0.06	0.006	0.004	0.01	0.01
JUNE		BDL	0.0006	0.001	0.01	0.44	0.09	0.010	0.006	0.02	0.02
JULY		BDL	0.0008	0.004	BDL	0.40	0.09	0.009	0.005	0.02	0.01
AUGUST		BDL	0.0006	0.004	0.01	0.36	0.10	0.007	0.008	0.02	0.02
SEPTEMBER		BDL	0.0004	0.004	0.01	0.56	0.14	0.011	0.007	0.02	0.03
OCTOBER		BDL	0.0003	0.001	0.01	0.26	0.10	0.009	0.005	0.02	0.04
NOVEMBER		BDL	0.0004	0.001	0.01	0.19	0.11	0.007	0.006	0.02	0.05
DECEMBER		BDL	0.0006	0.003	0.01	0.31	0.09	0.014	0.009	0.03	0.09
YEAR AVG			0.0005	0.003		0.34	0.09	0.008	0.006	0.02	0.03

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
MONTH	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
JANUARY	1.45	8.40	0.07		8.00		39	1
FEBRUARY	1.86	4.93	0.08		8.00		31	1
MARCH	1.90	4.39	0.08		8.20		17	1
APRIL	2.03	5.04	0.08		9.60		22	1
MAY	2.09	5.56	0.10		9.60		38	1
JUNE	2.45	7.65	0.12		9.60		50	1
JULY	0.73	6.34	0.10		9.50		40	1
AUGUST	0.98	10.37	0.10		9.50		39	1
SEPTEMBER	0.88	8.97	0.12		9.50		43	1
OCTOBER	1.84	1.42	0.10		9.50		21	1
NOVEMBER	1.44	5.01	0.09		9.50		13	1
DECEMBER	2.08	6.80	0.07		9.50		34	1
YEAR AVG	1.64	6.24	0.09		9.17		32	

TABLE 10, Continued

MONTHLY CHEMICAL CHARACTERIZATION OF 1983 LO-VOL TSP

YEAR	TOWN NAME	AREA	SITE	AGENCY	PROJECT
1983	PUTNAM	0900	002	F	01

METALS

MONTH	AL 12101/92 UG/M3	BE 12105/92 UG/M3	CD 12110/92 UG/M3	CR 12112/92 UG/M3	CU 12114/92 UG/M3	FE 12126/92 UG/M3	PB 12128/92 UG/M3	MN 12132/92 UG/M3	NI 12136/92 UG/M3	V 12164/92 UG/M3	ZN 12167/92 UG/M3
JANUARY		BDL	0.0003	0.011	0.01	0.67	0.17	0.008	0.012	0.02	0.04
FEBRUARY		BDL	0.0002	0.003	0.01	0.53	0.14	0.005	0.008	0.02	0.12
MARCH		BDL	0.0003	0.003	BDL	0.37	0.06	0.003	0.008	0.02	0.02
APRIL		BDL	0.0008	0.003	BDL	0.25	0.07	0.005	0.003	0.01	0.03
MAY		BDL	0.0002	0.005	0.01	0.90	0.08	0.015	0.006	0.02	0.04
JUNE		BDL	0.0004	0.001	BDL	0.31	0.08	0.007	0.004	0.02	0.02
JULY		BDL	0.0004	0.006	BDL	0.41	0.10	0.009	0.062	0.01	0.01
AUGUST		BDL	0.0003	0.007	BDL	0.35	0.12	0.008	0.071	0.02	0.01
SEPTEMBER		BDL	0.0004	0.005	0.01	0.42	0.15	0.008	0.056	0.01	0.06
OCTOBER		BDL	0.0004	0.003	BDL	0.56	0.13	0.018	0.004	0.02	0.01
NOVEMBER		BDL	0.0005	0.003	BDL	0.36	0.13	0.011	0.004	0.01	0.03
DECEMBER		BDL	0.0005	0.003	0.01	0.35	0.16	0.011	0.006	0.02	0.04
YEAR AVG			0.0004	0.004		0.46	0.12	0.009	0.020	0.02	0.04

	WATER SOLUBLES					BENZ SOLUBLES	TSP	
MONTH	NITRATE 12306/92 UG/M3	SULFATE 12403/92 UG/M3	AMMONIUM 12301/91 UG/M3	SODIUM 12184/92 UG/M3	PH 12602/91 PH-UNITS	TOTAL 11103/91 UG/M3	ARITH AV 11101/91 UG/M3	SAMPLE COUNT
JANUARY	4.32	6.16	0.07		8.20		47	1
FEBRUARY	3.46	4.42	0.09		8.40		56	1
MARCH	3.74	6.02	0.09		8.20		33	1
APRIL	3.89	4.20	0.07		9.60		29	1
MAY	2.42	6.63	0.06		9.60		33	1
JUNE	2.84	6.95	0.10		9.50		44	1
JULY	0.61	6.72	0.09		9.60		35	1
AUGUST	0.59	6.10	0.12		9.40		35	1
SEPTEMBER	0.59	6.16	0.12		9.40		33	1
OCTOBER	1.23	8.08	0.07		9.40		42	1
NOVEMBER	1.43	3.20	0.08		9.40		33	1
DECEMBER	1.36	3.21	0.07		9.30		34	1
YEAR AVG	2.21	5.65	0.09		9.17		38	

TABLE 11

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10	
			NE	NW			NW						
ANSONIA 003		60	99	88	86	84	73	72	70	66	65	64	
	DATE		3/ 1/83	2/ 5/83	9/21/83	6/11/83	12/ 8/83	7/29/83	8/ 4/83	8/16/83	11/ 2/83	1/30/83	
METEOROLOGICAL SITE	DIR (DEG)		20	320	190	210	260	220	220	190	140	110	
NEWARK	VEL (MPH)		11.3	18.6	10.2	6.2	9.2	13.3	7.9	5.5	2.2	2.6	
	SPD (MPH)		11.5	19.0	12.8	8.2	9.8	13.9	9.2	6.3	5.2	4.0	
	RATIO		0.982	0.980	0.797	0.755	0.942	0.955	0.863	0.871	0.416	0.638	
METEOROLOGICAL SITE	DIR (DEG)		30	330	190	240	290	210	170	200	190	10	
BRADLEY	VEL (MPH)		5.8	12.5	12.0	2.3	9.2	9.4	0.5	3.9	4.6	3.2	
	SPD (MPH)		6.8	13.1	12.4	5.2	10.1	10.1	3.7	4.6	4.6	3.4	6
	RATIO		0.853	0.959	0.969	0.453	0.911	0.937	0.142	0.851	0.997	0.931	
METEOROLOGICAL SITE	DIR (DEG)		30	340	200	230	290	210	220	200	200	70	
BRIDGEPORT	VEL (MPH)		11.4	12.6	11.4	8.1	7.3	8.4	6.4	5.6	2.7	8.0	
	SPD (MPH)		11.8	12.7	11.6	8.3	8.1	9.1	6.8	5.8	4.6	8.2	
	RATIO		0.971	0.992	0.979	0.970	0.906	0.927	0.944	0.973	0.582	0.973	
METEOROLOGICAL SITE	DIR (DEG)		30	330	210	280	270	230	240	280	250	90	
WORCESTER	VEL (MPH)		3.2	14.6	11.3	9.0	15.1	7.4	4.5	5.7	6.2	1.1	
	SPD (MPH)		6.9	15.0	11.9	9.1	15.2	7.5	4.7	6.2	6.3	3.6	
	RATIO		0.461	0.974	0.950	0.992	0.988	0.987	0.943	0.914	0.974	0.300	
									NE				
BRIDGEPORT 001		60	81	77	75	74	73	73	70	70	70	68	
	DATE		6/23/83	8/16/83	6/11/83	8/28/83	11/ 2/83	11/ 8/83	3/ 1/83	4/30/83	7/29/83	6/17/83	
METEOROLOGICAL SITE	DIR (DEG)		240	190	210	180	140	220	20	170	220	150	
NEWARK	VEL (MPH)		6.8	5.5	6.2	4.7	2.2	1.7	11.3	11.7	13.3	6.2	
	SPD (MPH)		7.3	6.3	8.2	10.2	5.2	4.6	11.5	12.5	13.9	6.5	
	RATIO		0.927	0.871	0.755	0.461	0.416	0.377	0.982	0.934	0.955	0.954	
METEOROLOGICAL SITE	DIR (DEG)		240	200	240	240	190	210	30	190	210	180	7
BRADLEY	VEL (MPH)		6.5	3.9	2.3	1.7	4.6	3.1	5.8	10.7	9.4	7.2	
	SPD (MPH)		7.0	4.6	5.2	5.2	4.6	4.3	6.8	11.1	10.1	7.3	
	RATIO		0.922	0.851	0.453	0.332	0.997	0.718	0.853	0.965	0.937	0.978	
METEOROLOGICAL SITE	DIR (DEG)		230	200	230	60	200	240	30	200	210	90	
BRIDGEPORT	VEL (MPH)		7.8	5.6	8.1	1.5	2.7	4.7	11.4	8.5	8.4	6.0	
	SPD (MPH)		8.1	5.8	8.3	6.2	4.6	6.5	11.8	8.9	9.1	6.3	
	RATIO		0.973	0.973	0.970	0.248	0.582	0.726	0.971	0.959	0.927	0.942	
METEOROLOGICAL SITE	DIR (DEG)		270	280	280	80	250	280	30	210	230	200	
WORCESTER	VEL (MPH)		9.4	5.7	9.0	1.2	6.2	6.4	3.2	10.0	7.4	3.3	
	SPD (MPH)		9.8	6.2	9.1	2.3	6.3	7.0	6.9	10.4	7.5	3.9	
	RATIO		0.963	0.914	0.992	0.508	0.974	0.913	0.461	0.966	0.987	0.857	
								SE	NE				
BRIDGEPORT 009		57	104	82	79	72	67	67	66	65	65	65	
	DATE		9/21/83	8/16/83	11/ 2/83	10/ 3/83	6/23/83	11/20/83	3/ 1/83	6/11/83	7/29/83	8/28/83	
METEOROLOGICAL SITE	DIR (DEG)		190	190	140	230	240	140	20	210	220	180	
NEWARK	VEL (MPH)		10.2	5.5	2.2	8.3	6.8	5.6	11.3	6.2	13.3	4.7	
	SPD (MPH)		12.8	6.3	5.2	8.6	7.3	6.0	11.5	8.2	13.9	10.2	7
	RATIO		0.797	0.871	0.416	0.964	0.927	0.929	0.982	0.755	0.955	0.461	
METEOROLOGICAL SITE	DIR (DEG)		190	200	190	220	240	150	30	240	210	240	
BRADLEY	VEL (MPH)		12.0	3.9	4.6	5.6	6.5	2.5	5.8	2 3	9.4	1.7	
	SPD (MPH)		12.4	4.6	4.6	5.8	7.0	3.7	6.8	5.2	10.1	5.2	
	RATIO		0.969	0.851	0.997	0.971	0.922	0.657	0.853	0.453	0.937	0.332	

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE	SAMPLES		1	2	3	4	5	6	7	8	9	10	
METEOROLOGICAL SITE	DIR (DEG)		200	200	200	240	230	80	30	230	210	60	
BRIDGEPORT	VEL (MPH)		11.4	5.6	2.7	7.2	7.8	5.0	11.4	8.1	8.4	1.5	
	SPD (MPH)		11.6	5.8	4.6	7.8	8.1	5.6	11.8	8.3	9.1	6.2	
	RATIO		0.979	0.973	0.582	0.929	0.973	0.898	0.971	0.970	0.927	0.248	
METEOROLOGICAL SITE	DIR (DEG)		210	280	250	260	270	120	30	280	230	80	
WORCESTER	VEL (MPH)		11.3	5.7	6.2	7.3	9.4	2.9	3.2	9.0	7.4	1.2	
	SPD (MPH)		11.9	6.2	6.3	7.6	9.8	4.3	6.9	9.1	7.5	2.3	
	RATIO		0.950	0.914	0.974	0.959	0.963	0.680	0.461	0.992	0.987	0.508	
BRIDGEPORT 123		59	127	111	107	105	97	97	96	95	92	87	
	DATE		6/23/83	9/ 9/83	4/30/83	7/29/83	1/30/83	6/11/83	8/16/83	10/ 3/83	9/21/83	9/ 3/83	
METEOROLOGICAL SITE	DIR (DEG)		240	240	170	220	110	210	190	230	190	260	
NEWARK	VEL (MPH)		6.8	5.8	11.7	13.3	2.6	6.2	5.5	8.3	10.2	4.8	
	SPD (MPH)		7.3	7.6	12.5	13.9	4.0	8.2	6.3	8.6	12.8	6.2	
	RATIO		0.927	0.756	0.934	0.955	0.638	0.755	0.871	0.964	0.797	0.778	
METEOROLOGICAL SITE	DIR (DEG)		240	230	190	210	10	240	200	220	190	300	8
BRADLEY	VEL (MPH)		6.5	4.0	10.7	9.4	3.2	2.3	3.9	5.6	12.0	2.4	
	SPD (MPH)		7.0	5.5	11.1	10.1	3.4	5.2	4.6	5.8	12.4	3.7	
	RATIO		0.922	0.738	0.965	0.937	0.931	0.453	0.851	0.971	0.969	0.632	
METEOROLOGICAL SITE	DIR (DEG)		230	220	200	210	70	230	200	240	200	210	
BRIDGEPORT	VEL (MPH)		7.8	6.0	8.5	8.4	8.0	8.1	5.6	7.2	11.4	4.4	
	SPD (MPH)		8.1	6.8	8.9	9.1	8.2	8.3	5.8	7.8	11.6	5.2	
	RATIO		0.973	0.886	0.959	0.927	0.973	0.970	0.973	0.929	0.979	0.852	
METEOROLOGICAL SITE	DIR (DEG)		270	260	210	230	90	280	280	260	210	280	
WORCESTER	VEL (MPH)		9.4	5.9	10.0	7.4	1.1	9.0	5.7	7.3	11.3	5.5	
	SPD (MPH)		9.8	6.3	10.4	7.5	3.6	9.1	6.2	7.6	11.9	5.8	
	RATIO		0.963	0.936	0.966	0.987	0.300	0.992	0.914	0.959	0.950	0.949	
BRISTOL 001		58	71	67	64	63	61	58	SE 55	54	53	NE 50	
	DATE		1/30/83	6/17/83	8/ 4/83	6/11/83	4/30/83	7/29/83	11/20/83	11/ 2/83	6/23/83	2/11/83	
METEOROLOGICAL SITE	DIR (DEG)		110	150	220	210	170	220	140	140	240	30	
NEWARK	VEL (MPH)		2.6	6.2	7.9	6.2	11.7	13.3	5.6	2.2	6.8	19.0	
	SPD (MPH)		4.0	6.5	9.2	8.2	12.5	13.9	6.0	5.2	7.3	19.5	
	RATIO		0.638	0.954	0.863	0.755	0.934	0.955	0.929	0.416	0.927	0.972	
METEOROLOGICAL SITE	DIR (DEG)		10	180	170	240	190	210	150	190	240	30	
BRADLEY	VEL (MPH)		3.2	7.2	0.5	2.3	10.7	9.4	2.5	4.6	6.5	12.0	6
	SPD (MPH)		3.4	7.3	3.7	5.2	11.1	10.1	3.7	4.6	7.0	12.4	
	RATIO		0.931	0.978	0.142	0.453	0.965	0.937	0.657	0.997	0.922	0.974	
METEOROLOGICAL SITE	DIR (DEG)		70	90	220	230	200	210	80	200	230	40	
BRIDGEPORT	VEL (MPH)		8.0	6.0	6.4	8.1	8.5	8.4	5.0	2.7	7.8	16.6	
	SPD (MPH)		8.2	6.3	6.8	8.3	8.9	9.1	5.6	4.6	8.1	16.7	
	RATIO		0.973	0.942	0.944	0.970	0.959	0.927	0.898	0.582	0.973	0.997	
METEOROLOGICAL SITE	DIR (DEG)		90	200	240	280	210	230	120	250	270	40	
WORCESTER	VEL (MPH)		1.1	3.3	4.5	9.0	10.0	7.4	2.9	6.2	9.4	9.0	
	SPD (MPH)		3.6	3.9	4.7	9.1	10.4	7.5	4.3	6.3	9.8	9.6	
	RATIO		0.300	0.857	0.943	0.992	0.966	0.987	0.680	0.974	0.963	0.929	

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10	
BURLINGTON 001		58	60	54	53	48	46	44	43	41	SE 41	40	
		DATE	6/17/83	7/29/83	4/30/83	6/11/83	8/ 4/83	1/30/83	8/22/83	7/ 5/83	11/20/83	6/23/83	
METEOROLOGICAL SITE	NEWARK	DIR (DEG)	150	220	170	210	220	110	220	220	140	240	
		VEL (MPH)	6.2	13.3	11.7	6.2	7.9	2.6	6.0	2.4	5.6	6.8	
		SPD (MPH)	6.5	13.9	12.5	8.2	9.2	4.0	10.6	9.1	6.0	7.3	
		RATIO	0.954	0.955	0.934	0.755	0.863	0.638	0.562	0.261	0.929	0.927	
METEOROLOGICAL SITE	BRADLEY	DIR (DEG)	180	210	190	240	170	10	220	200	150	240	
		VEL (MPH)	7.2	9.4	10.7	2.3	0.5	3.2	4.5	3.7	2.5	6.5	7
		SPD (MPH)	7.3	10.1	11.1	5.2	3.7	3.4	6.5	6.0	3.7	7.0	
		RATIO	0.978	0.937	0.965	0.453	0.142	0.931	0.699	0.614	0.657	0.922	
METEOROLOGICAL SITE	BRIDGEPORT	DIR (DEG)	90	210	200	230	220	70	180	280	80	230	
		VEL (MPH)	6.0	8.4	8.5	8.1	6.4	8.0	2.7	2.3	5.0	7.8	
		SPD (MPH)	6.3	9.1	8.9	8.3	6.8	8.2	6.5	5.5	5.6	8.1	
		RATIO	0.942	0.927	0.959	0.970	0.944	0.973	0.417	0.430	0.898	0.973	
METEOROLOGICAL SITE	WORCESTER	DIR (DEG)	200	230	210	280	240	90	210	250	120	270	
		VEL (MPH)	3.3	7.4	10.0	9.0	4.5	1.1	1.6	5.1	2.9	9.4	
		SPD (MPH)	3.9	7.5	10.4	9.1	4.7	3.6	4.2	7.2	4.3	9.8	
		RATIO	0.857	0.987	0.966	0.992	0.943	0.300	0.385	0.711	0.680	0.963	
DANBURY 002		56	NE 93	88	85	NE 74	68	68	67	67	66	NW 65	
		DATE	3/ 1/83	6/17/83	11/ 2/83	3/25/83	1/ 6/83	4/30/83	1/30/83	8/28/83	6/23/83	2/ 5/83	
METEOROLOGICAL SITE	NEWARK	DIR (DEG)	20	150	140	10	330	170	110	180	240	320	
		VEL (MPH)	11.3	6.2	2.2	15.8	9.9	11.7	2.6	4.7	6.8	18.6	
		SPD (MPH)	11.5	6.5	5.2	20.7	11.8	12.5	4.0	10.2	7.3	19.0	
		RATIO	0.982	0.954	0.416	0.766	0.839	0.934	0.638	0.461	0.927	0.980	
METEOROLOGICAL SITE	BRADLEY	DIR (DEG)	30	180	190	10	360	190	10	240	240	330	
		VEL (MPH)	5.8	7.2	4.6	13.4	5.8	10.7	3.2	1.7	6.5	12.5	3
		SPD (MPH)	6.8	7.3	4.6	14.1	6.8	11.1	3.4	5.2	7.0	13.1	
		RATIO	0.853	0.978	0.997	0.948	0.865	0.965	0.931	0.332	0.922	0.959	
METEOROLOGICAL SITE	BRIDGEPORT	DIR (DEG)	30	90	200	360	350	200	70	60	230	340	
		VEL (MPH)	11.4	6.0	2.7	14.6	8.7	8.5	8.0	1.5	7.8	12.6	
		SPD (MPH)	11.8	6.3	4.6	15.5	9.2	8.9	8.2	6.2	8.1	12.7	
		RATIO	0.971	0.942	0.582	0.938	0.944	0.959	0.973	0.248	0.973	0.992	
METEOROLOGICAL SITE	WORCESTER	DIR (DEG)	30	200	250	10	10	210	90	80	270	330	
		VEL (MPH)	3.2	3.3	6.2	14.1	5.6	10.0	1.1	1.2	9.4	14.6	
		SPD (MPH)	6.9	3.9	6.3	15.2	6.8	10.4	3.6	2.3	9.8	15.0	
		RATIO	0.461	0.857	0.974	0.924	0.828	0.966	0.300	0.508	0.963	0.974	
DANBURY 123		53	113	90	78	NW 75	74	NE 73	72	71	69	68	
		DATE	9/21/83	6/17/83	4/30/83	1/24/83	6/23/83	3/ 1/83	11/ 2/83	8/ 4/83	1/ 6/83	6/11/83	
METEOROLOGICAL SITE	NEWARK	DIR (DEG)	190	150	170	260	240	20	140	220	330	210	
		VEL (MPH)	10.2	6.2	11.7	9.3	6.8	11.3	2.2	7.9	9.9	6.2	
		SPD (MPH)	12.8	6.5	12.5	9.9	7.3	11.5	5.2	9.2	11.8	8.2	6
		RATIO	0.797	0.954	0.934	0.936	0.927	0.982	0.416	0.863	0.839	0.755	
METEOROLOGICAL SITE	BRADLEY	DIR (DEG)	190	180	190	300	240	30	190	170	360	240	
		VEL (MPH)	12.0	7.2	10.7	5.1	6.5	5.8	4.6	0.5	5.8	2.3	
		SPD (MPH)	12.4	7.3	11.1	6.0	7.0	6.8	4.6	3.7	6.8	5.2	
		RATIO	0.969	0.978	0.965	0.843	0.922	0.853	0.997	0.142	0.865	0.453	

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10	
METEOROLOGICAL SITE	DIR (DEG)	200	90	200	270	230	30	200	220	350	230	
BRIDGEPORT	VEL (MPH)	11.4	6.0	8.5	9.2	7.8	11.4	2.7	6.4	8.7	8.1	
	SPD (MPH)	11.6	6.3	8.9	9.6	8.1	11.8	4.6	6.8	9.2	8.3	
	RATIO	0.979	0.942	0.959	0.957	0.973	0.971	0.582	0.944	0.944	0.970	
METEOROLOGICAL SITE	DIR (DEG)	210	200	210	280	270	30	250	240	10	280	
WORCESTER	VEL (MPH)	11.3	3.3	10.0	10.6	9.4	3.2	6.2	4.5	5.6	9.0	
	SPD (MPH)	11.9	3.9	10.4	11.5	9.8	6.9	6.3	4.7	6.8	9.1	
	RATIO	0.950	0.857	0.966	0.918	0.963	0.461	0.974	0.943	0.828	0.992	
			NE									
EAST HARTFORD 004	60	88	72	70	68	66	63	63	62	61	59	
	DATE	6/17/83	3/ 1/83	6/23/83	1/30/83	8/16/83	4/18/83	7/29/83	12/26/83	8/ 4/83	9/ 9/83	
METEOROLOGICAL SITE	DIR (DEG)	150	20	240	110	190	250	220	260	220	240	
NEWARK	VEL (MPH)	6.2	11.3	6.8	2.6	5.5	8.2	13.3	12.8	7.9	5.8	
	SPD (MPH)	6.5	11.5	7.3	4.0	6.3	10.4	13.9	13.4	9.2	7.6	
	RATIO	0.954	0.982	0.927	0.638	0.871	0.795	0.955	0.960	0.863	0.756	
METEOROLOGICAL SITE	DIR (DEG)	180	30	240	10	200	240	210	240	170	230	7
BRADLEY	VEL (MPH)	7.2	5.8	6.5	3.2	3.9	5.2	9.4	6.7	0.5	4.0	
	SPD (MPH)	7.3	6.8	7.0	3.4	4.6	6.6	10.1	8.1	3.7	5.5	
	RATIO	0.978	0.853	0.922	0.931	0.851	0.781	0.937	0.828	0.142	0.738	
METEOROLOGICAL SITE	DIR (DEG)	90	30	230	70	200	250	210	270	220	220	
BRIDGEPORT	VEL (MPH)	6.0	11.4	7.8	8.0	5.6	4.8	8.4	12.9	6.4	6.0	
	SPD (MPH)	6.3	11.8	8.1	8.2	5.8	6.6	9.1	13.1	6.8	6.8	
	RATIO	0.942	0.971	0.973	0.973	0.973	0.722	0.927	0.989	0.944	0.886	
METEOROLOGICAL SITE	DIR (DEG)	200	30	270	90	280	260	230	260	240	260	
WORCESTER	VEL (MPH)	3.3	3.2	9.4	1.1	5.7	6.9	7.4	11.3	4.5	5.9	
	SPD (MPH)	3.9	6.9	9.8	3.6	6.2	7.9	7.5	11.5	4.7	6.3	
	RATIO	0.857	0.461	0.963	0.300	0.914	0.870	0.987	0.982	0.943	0.936	
								SE	NE			
GREENWICH 008	46	80	73	71	65	60	59	56	53	50	50	
	DATE	6/11/83	6/23/83	6/17/83	10/ 3/83	4/30/83	11/ 2/83	11/20/83	3/ 1/83	1/ 6/83	9/21/83	
METEOROLOGICAL SITE	DIR (DEG)	210	240	150	230	170	140	140	20	330	190	
NEWARK	VEL (MPH)	6.2	6.8	6.2	8.3	11.7	2.2	5.6	11.3	9.9	10.2	
	SPD (MPH)	8.2	7.3	6.5	8.6	12.5	5.2	6.0	11.5	11.8	12.8	
	RATIO	0.755	0.927	0.954	0.964	0.934	0.416	0.929	0.982	0.839	0.797	
METEOROLOGICAL SITE	DIR (DEG)	240	240	180	220	190	190	150	30	360	190	
BRADLEY	VEL (MPH)	2.3	6.5	7.2	5.6	10.7	4.6	2.5	5.8	5.8	12.0	
	SPD (MPH)	5.2	7.0	7.3	5.8	11.1	4.6	3.7	6.8	6.8	12.4	6
	RATIO	0.453	0.922	0.978	0.971	0.965	0.997	0.657	0.853	0.865	0.969	
METEOROLOGICAL SITE	DIR (DEG)	230	230	90	240	200	200	80	30	350	200	
BRIDGEPORT	VEL (MPH)	8.1	7.8	6.0	7.2	8.5	2.7	5.0	11.4	8.7	11.4	
	SPD (MPH)	8.3	8.1	6.3	7.8	8.9	4.6	5.6	11.8	9.2	11.6	
	RATIO	0.970	0.973	0.942	0.929	0.959	0.582	0.898	0.971	0.944	0.979	
METEOROLOGICAL SITE	DIR (DEG)	280	270	200	260	210	250	120	30	10	210	
WORCESTER	VEL (MPH)	9.0	9.4	3.3	7.3	10.0	6.2	2.9	3.2	5.6	11.3	
	SPD (MPH)	9.1	9.8	3.9	7.6	10.4	6.3	4.3	6.9	6.8	11.9	
	RATIO	0.992	0.963	0.857	0.959	0.966	0.974	0.680	0.461	0.828	0.950	

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
				NW	NE		NW					NW
GROTON 006		59	94	75	67	62	61	58	56	55	54	53
	DATE		6/23/83	1/12/83	3/ 1/83	6/11/83	9/27/83	1/ 6/83	9/ 3/83	8/16/83	8/28/83	5/ 6/83
METEOROLOGICAL SITE	DIR (DEG)		240	300	20	210	290	330	260	190	180	320
NEWARK	VEL (MPH)		6.8	13.0	11.3	6.2	5.0	9.9	4.8	5.5	4.7	5.2
	SPD (MPH)		7.3	14.4	11.5	8.2	7.3	11.8	6.2	6.3	10.2	10.1
	RATIO		0.927	0.907	0.982	0.755	0.681	0.839	0.778	0.871	0.461	0.520
METEOROLOGICAL SITE	DIR (DEG)		240	350	30	240	320	360	300	200	240	340
BRADLEY	VEL (MPH)		6.5	4.4	5.8	2.3	3.6	5.8	2.4	3.9	1.7	4.4
	SPD (MPH)		7.0	6.3	6.8	5.2	5.5	6.8	3.7	4.6	5.2	7.5
	RATIO		0.922	0.688	0.853	0.453	0.662	0.865	0.632	0.851	0.332	0.593
METEOROLOGICAL SITE	DIR (DEG)		230	310	30	230	210	350	210	200	60	290
BRIDGEPORT	VEL (MPH)		7.8	9.0	11.4	8.1	2.2	8.7	4.4	5.6	1.5	2.8
	SPD (MPH)		8.1	9.9	11.8	8.3	5.2	9.2	5.2	5.8	6.2	7.8
	RATIO		0.973	0.905	0.971	0.970	0.421	0.944	0.852	0.973	0.248	0.364
METEOROLOGICAL SITE	DIR (DEG)		270	290	30	280	300	10	280	280	80	310
WORCESTER	VEL (MPH)		9.4	9.1	3.2	9.0	7.9	5.6	5.5	5.7	1.2	5.9
	SPD (MPH)		9.8	9.5	6.9	9.1	8.8	6.8	5.8	6.2	2.3	6.2
	RATIO		0.963	0.960	0.461	0.992	0.898	0.828	0.949	0.914	0.508	0.954
					NE				NW		NW	
HADDAM 002		28	80	48	44	34	30	29	28	28	28	28
	DATE		12/14/83	4/30/83	3/ 1/83	4/ 6/83	1/30/83	12/ 2/83	1/12/83	4/18/83	5/ 6/83	12/26/83
METEOROLOGICAL SITE	DIR (DEG)		220	170	20	110	110	250	300	250	320	260
NEWARK	VEL (MPH)		2.4	11.7	11.3	2.9	2.6	9.6	13.0	8.2	5.2	12.8
	SPD (MPH)		8.6	12.5	11.5	6.8	4.0	10.1	14.4	10.4	10.1	13.4
	RATIO		0.273	0.934	0.982	0.427	0.638	0.956	0.907	0.795	0.520	0.960
METEOROLOGICAL SITE	DIR (DEG)		10	190	30	160	10	210	350	240	340	240
BRADLEY	VEL (MPH)		0.4	10.7	5.8	1.0	3.2	6.0	4.4	5.2	4.4	6.7
	SPD (MPH)		6.6	11.1	6.8	3.9	3.4	6.3	6.3	6.6	7.5	8.1
	RATIO		0.064	0.965	0.853	0.248	0.931	0.947	0.688	0.781	0.593	0.828
METEOROLOGICAL SITE	DIR (DEG)		260	200	30	220	70	270	310	250	290	270
BRIDGEPORT	VEL (MPH)		2.4	8.5	11.4	6.6	8.0	8.7	9.0	4.8	2.8	12.9
	SPD (MPH)		6.0	8.9	11.8	6.9	8.2	8.8	9.9	6.6	7.8	13.1
	RATIO		0.401	0.959	0.971	0.959	0.973	0.987	0.905	0.722	0.364	0.989
METEOROLOGICAL SITE	DIR (DEG)		10	210	30	290	90	260	290	260	310	260
WORCESTER	VEL (MPH)		2.3	10.0	3.2	3.4	1.1	7.8	9.1	6.9	5.9	11.3
	SPD (MPH)		9.5	10.4	6.9	4.3	3.6	8.3	9.5	7.9	6.2	11.5
	RATIO		0.247	0.966	0.461	0.788	0.300	0.938	0.960	0.870	0.954	0.982
			NE							NW		
HARTFORD 003		57	104	83	79	79	78	77	77	74	71	71
	DATE		3/ 1/83	6/17/83	8/ 4/83	9/21/83	7/29/83	6/23/83	8/16/83	9/27/83	8/22/83	11/ 2/83
METEOROLOGICAL SITE	DIR (DEG)		20	150	220	190	220	240	190	290	220	140
NEWARK	VEL (MPH)		11.3	6.2	7.9	10.2	13.3	6.8	5.5	5.0	6.0	2.2
	SPD (MPH)		11.5	6.5	9.2	12.8	13.9	7.3	6.3	7.3	10.6	5.2
	RATIO		0.982	0.954	0.863	0.797	0.955	0.927	0.871	0.681	0.562	0.416
METEOROLOGICAL SITE	DIR (DEG)		30	180	170	190	210	240	200	320	220	190
BRADLEY	VEL (MPH)		5.8	7.2	0.5	12.0	9.4	6.5	3.9	3.6	4.5	4.6
	SPD (MPH)		6.8	7.3	3.7	12.4	10.1	7.0	4.6	5.5	6.5	4.6
	RATIO		0.853	0.978	0.142	0.969	0.937	0.922	0.851	0.662	0.699	0.997

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TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		30	90	220	200	210	230	200	210	180	200
	VEL (MPH)		11.4	6.0	6.4	11.4	8.4	7.8	5.6	2.2	2.7	2.7
	SPD (MPH)		11.8	6.3	6.8	11.6	9.1	8.1	5.8	5.2	6.5	4.6
	RATIO		0.971	0.942	0.944	0.979	0.927	0.973	0.973	0.421	0.417	0.582
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		30	200	240	210	230	270	280	300	210	250
	VEL (MPH)		3.2	3.3	4.5	11.3	7.4	9.4	5.7	7.9	1.6	6.2
	SPD (MPH)		6.9	3.9	4.7	11.9	7.5	9.8	6.2	8.8	4.2	6.3
	RATIO		0.461	0.857	0.943	0.950	0.987	0.963	0.914	0.898	0.385	0.974
			NE									
HARTFORD 013		60	95	90	89	89	84	80	77	72	70	68
	DATE		3/ 1/83	9/21/83	6/17/83	8/ 4/83	7/29/83	1/30/83	8/22/83	11/ 2/83	6/23/83	8/16/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)		20	190	150	220	220	110	220	140	240	190
	VEL (MPH)		11.3	10.2	6.2	7.9	13.3	2.6	6.0	2.2	6.8	5.5
	SPD (MPH)		11.5	12.8	6.5	9.2	13.9	4.0	10.6	5.2	7.3	6.3
	RATIO		0.982	0.797	0.954	0.863	0.955	0.638	0.562	0.416	0.927	0.871
METEOROLOGICAL SITE BRADLEY	DIR (DEG)		30	190	180	170	210	10	220	190	240	200
	VEL (MPH)		5.8	12.0	7.2	0.5	9.4	3.2	4.5	4.6	6.5	3.9
	SPD (MPH)		6.8	12.4	7.3	3.7	10.1	3.4	6.5	4.6	7.0	4.6
	RATIO		0.853	0.969	0.978	0.142	0.937	0.931	0.699	0.997	0.922	0.851
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		30	200	90	220	210	70	180	200	230	200
	VEL (MPH)		11.4	11.4	6.0	6.4	8.4	8.0	2.7	2.7	7.8	5.6
	SPD (MPH)		11.8	11.6	6.3	6.8	9.1	8.2	6.5	4.6	8.1	5.8
	RATIO		0.971	0.979	0.942	0.944	0.927	0.973	0.417	0.582	0.973	0.973
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		30	210	200	240	230	90	210	250	270	280
	VEL (MPH)		3.2	11.3	3.3	4.5	7.4	1.1	1.6	6.2	9.4	5.7
	SPD (MPH)		6.9	11.9	3.9	4.7	7.5	3.6	4.2	6.3	9.8	6.2
	RATIO		0.461	0.950	0.857	0.943	0.987	0.300	0.385	0.974	0.963	0.914
			NE									
HARTFORD 014		57	95	85	75	69	67	65	63	63	59	59
	DATE		3/ 1/83	6/17/83	1/30/83	8/ 4/83	12/26/83	6/23/83	7/29/83	8/16/83	6/11/83	9/ 9/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)		20	150	110	220	260	240	220	190	210	240
	VEL (MPH)		11.3	6.2	2.6	7.9	12.8	6.8	13.3	5.5	6.2	5.8
	SPD (MPH)		11.5	6.5	4.0	9.2	13.4	7.3	13.9	6.3	8.2	7.6
	RATIO		0.982	0.954	0.638	0.863	0.960	0.927	0.955	0.871	0.755	0.756
METEOROLOGICAL SITE BRADLEY	DIR (DEG)		30	180	10	170	240	240	210	200	240	230
	VEL (MPH)		5.8	7.2	3.2	0.5	6.7	6.5	9.4	3.9	2.3	4.0
	SPD (MPH)		6.8	7.3	3.4	3.7	8.1	7.0	10.1	4.6	5.2	5.5
	RATIO		0.853	0.978	0.931	0.142	0.828	0.922	0.937	0.851	0.453	0.738
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		30	90	70	220	270	230	210	200	230	220
	VEL (MPH)		11.4	6.0	8.0	6.4	12.9	7.8	8.4	5.6	8.1	6.0
	SPD (MPH)		11.8	6.3	8.2	6.8	13.1	8.1	9.1	5.8	8.3	6.8
	RATIO		0.971	0.942	0.973	0.944	0.989	0.973	0.927	0.973	0.970	0.886
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		30	200	90	240	260	270	230	280	280	260
	VEL (MPH)		3.2	3.3	1.1	4.5	11.3	9.4	7.4	5.7	9.0	5.9
	SPD (MPH)		6.9	3.9	3.6	4.7	11.5	9.8	7.5	6.2	9.1	6.3
	RATIO		0.461	0.857	0.300	0.943	0.982	0.963	0.987	0.914	0.992	0.936

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
			NE									
MANCHESTER 001		59	76	71	69	59	59	59	58	56	55	55
	DATE		3/ 1/83	6/23/83	6/17/83	6/ 5/83	6/11/83	8/ 4/83	7/29/83	8/16/83	1/30/83	12/26/83
METEOROLOGICAL SITE	DIR (DEG)		20	240	150	260	210	220	220	190	110	260
NEWARK	VEL (MPH)		11.3	6.8	6.2	5.8	6.2	7.9	13.3	5.5	2.6	12.8
	SPD (MPH)		11.5	7.3	6.5	9.1	8.2	9.2	13.9	6.3	4.0	13.4
	RATIO		0.982	0.927	0.954	0.639	0.755	0.863	0.955	0.871	0.638	0.960
METEOROLOGICAL SITE	DIR (DEG)		30	240	180	250	240	170	210	200	10	240
BRADLEY	VEL (MPH)		5.8	6.5	7.2	2.1	2.3	0.5	9.4	3.9	3.2	6.7
	SPD (MPH)		6.8	7.0	7.3	5.8	5.2	3.7	10.1	4.6	3.4	8.1
	RATIO		0.853	0.922	0.978	0.362	0.453	0.142	0.937	0.851	0.931	0.828
METEOROLOGICAL SITE	DIR (DEG)		30	230	90	210	230	220	210	200	70	270
BRIDGEPORT	VEL (MPH)		11.4	7.8	6.0	7.9	8.1	6.4	8.4	5.6	8.0	12.9
	SPD (MPH)		11.8	8.1	6.3	8.6	8.3	6.8	9.1	5.8	8.2	13.1
	RATIO		0.971	0.973	0.942	0.919	0.970	0.944	0.927	0.973	0.973	0.989
METEOROLOGICAL SITE	DIR (DEG)		30	270	200	270	280	240	230	280	90	260
WORCESTER	VEL (MPH)		3.2	9.4	3.3	2.9	9.0	4.5	7.4	5.7	1.1	11.3
	SPD (MPH)		6.9	9.8	3.9	3.6	9.1	4.7	7.5	6.2	3.6	11.5
	RATIO		0.461	0.963	0.857	0.815	0.992	0.943	0.987	0.914	0.300	0.982
				NE						NW		
MERIDEN 002		55	115	100	77	68	67	66	65	64	63	63
	DATE		6/17/83	3/ 1/83	8/10/83	6/23/83	4/30/83	6/11/83	7/29/83	1/12/83	1/30/83	9/21/83
METEOROLOGICAL SITE	DIR (DEG)		150	20	70	240	170	210	220	300	110	190
NEWARK	VEL (MPH)		6.2	11.3	4.8	6.8	11.7	6.2	13.3	13.0	2.6	10.2
	SPD (MPH)		6.5	11.5	10.8	7.3	12.5	8.2	13.9	14.4	4.0	12.8
	RATIO		0.954	0.982	0.445	0.927	0.934	0.755	0.955	0.907	0.638	0.797
METEOROLOGICAL SITE	DIR (DEG)		180	30	20	240	190	240	210	350	10	190
BRADLEY	VEL (MPH)		7.2	5.8	3.9	6.5	10.7	2.3	9.4	4.4	3.2	12.0
	SPD (MPH)		7.3	6.8	6.8	7.0	11.1	5.2	10.1	6.3	3.4	12.4
	RATIO		0.978	0.853	0.575	0.922	0.965	0.453	0.937	0.688	0.931	0.969
METEOROLOGICAL SITE	DIR (DEG)		90	30	160	230	200	230	210	310	70	200
BRIDGEPORT	VEL (MPH)		6.0	11.4	1.6	7.8	8.5	8.1	8.4	9.0	8.0	11.4
	SPD (MPH)		6.3	11.8	6.5	8.1	8.9	8.3	9.1	9.9	8.2	11.6
	RATIO		0.942	0.971	0.245	0.973	0.959	0.970	0.927	0.905	0.973	0.979
METEOROLOGICAL SITE	DIR (DEG)		200	30	340	270	210	280	230	290	90	210
WORCESTER	VEL (MPH)		3.3	3.2	3.9	9.4	10.0	9.0	7.4	9.1	1.1	11.3
	SPD (MPH)		3.9	6.9	5.8	9.8	10.4	9.1	7.5	9.5	3.6	11.9
	RATIO		0.857	0.461	0.683	0.963	0.966	0.992	0.987	0.960	0.300	0.950
				NE						SE		
MERIDEN 008		59	107	78	66	64	64	61	61	59	58	57
	DATE		6/17/83	3/ 1/83	1/30/83	6/23/83	11/ 2/83	4/30/83	8/ 4/83	11/20/83	8/16/83	6/11/83
METEOROLOGICAL SITE	DIR (DEG)		150	20	110	240	140	170	220	140	190	210
NEWARK	VEL (MPH)		6.2	11.3	2.6	6.8	2.2	11.7	7.9	5.6	5.5	6.2
	SPD (MPH)		6.5	11.5	4.0	7.3	5.2	12.5	9.2	6.0	6.3	8.2
	RATIO		0.954	0.982	0.638	0.927	0.416	0.934	0.863	0.929	0.871	0.755
METEOROLOGICAL SITE	DIR (DEG)		180	30	10	240	190	190	170	150	200	240
BRADLEY	VEL (MPH)		7.2	5.8	3.2	6.5	4.6	10.7	0.5	2.5	3.9	2.3
	SPD (MPH)		7.3	6.8	3.4	7.0	4.6	11.1	3.7	3.7	4.6	5.2
	RATIO		0.978	0.853	0.931	0.922	0.997	0.965	0.142	0.657	0.851	0.453

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE	SAMPLES		1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE	DIR (DEG)		90	30	70	230	200	200	220	80	200	230
BRIDGEPORT	VEL (MPH)		6.0	11.4	8.0	7.8	2.7	8.5	6.4	5.0	5.6	8.1
	SPD (MPH)		6.3	11.8	8.2	8.1	4.6	8.9	6.8	5.6	5.8	8.3
	RATIO		0.942	0.971	0.973	0.973	0.582	0.959	0.944	0.898	0.973	0.970
METEOROLOGICAL SITE	DIR (DEG)		200	30	90	270	250	210	240	120	280	280
WORCESTER	VEL (MPH)		3.3	3.2	1.1	9.4	6.2	10.0	4.5	2.9	5.7	9.0
	SPD (MPH)		3.9	6.9	3.6	9.8	6.3	10.4	4.7	4.3	6.2	9.1
	RATIO		0.857	0.461	0.300	0.963	0.974	0.966	0.943	0.680	0.914	0.992
				NE								
MIDDLETOWN 003		57	98	85	76	67	61	59	55	54	54	53
	DATE		6/17/83	3/ 1/83	6/23/83	7/29/83	4/30/83	8/16/83	1/30/83	8/28/83	12/26/83	6/11/83
METEOROLOGICAL SITE	DIR (DEG)		150	20	240	220	170	190	110	180	260	210
NEWARK	VEL (MPH)		6.2	11.3	6.8	13.3	11.7	5.5	2.6	4.7	12.8	6.2
	SPD (MPH)		6.5	11.5	7.3	13.9	12.5	6.3	4.0	10.2	13.4	8.2
	RATIO		0.954	0.982	0.927	0.955	0.934	0.871	0.638	0.461	0.960	0.755
METEOROLOGICAL SITE	DIR (DEG)		180	30	240	210	190	200	10	240	240	240
BRADLEY	VEL (MPH)		7.2	5.8	6.5	9.4	10.7	3.9	3.2	1.7	6.7	2.3
	SPD (MPH)		7.3	6.8	7.0	10.1	11.1	4.6	3.4	5.2	8.1	5.2
	RATIO		0.978	0.853	0.922	0.937	0.965	0.851	0.931	0.332	0.828	0.453
METEOROLOGICAL SITE	DIR (DEG)		90	30	230	210	200	200	70	60	270	230
BRIDGEPORT	VEL (MPH)		6.0	11.4	7.8	8.4	8.5	5.6	8.0	1.5	12.9	8.1
	SPD (MPH)		6.3	11.8	8.1	9.1	8.9	5.8	8.2	6.2	13.1	8.3
	RATIO		0.942	0.971	0.973	0.927	0.959	0.973	0.973	0.248	0.989	0.970
METEOROLOGICAL SITE	DIR (DEG)		200	30	270	230	210	280	90	80	260	280
WORCESTER	VEL (MPH)		3.3	3.2	9.4	7.4	10.0	5.7	1.1	1.2	11.3	9.0
	SPD (MPH)		3.9	6.9	9.8	7.5	10.4	6.2	3.6	2.3	11.5	9.1
	RATIO		0.857	0.461	0.963	0.987	0.966	0.914	0.300	0.508	0.982	0.992
					NE						SE	
MILFORD 002		58	82	77	76	75	69	67	64	62	60	59
	DATE		8/16/83	6/23/83	9/15/83	6/11/83	8/28/83	10/ 3/83	7/29/83	4/30/83	11/20/83	9/ 3/83
METEOROLOGICAL SITE	DIR (DEG)		190	240	20	210	180	230	220	170	140	260
NEWARK	VEL (MPH)		5.5	6.8	7.2	6.2	4.7	8.3	13.3	11.7	5.6	4.8
	SPD (MPH)		6.3	7.3	10.9	8.2	10.2	8.6	13.9	12.5	6.0	6.2
	RATIO		0.871	0.927	0.663	0.755	0.461	0.964	0.955	0.934	0.929	0.778
METEOROLOGICAL SITE	DIR (DEG)		200	240	30	240	240	220	210	190	150	300
BRADLEY	VEL (MPH)		3.9	6.5	4.3	2.3	1.7	5.6	9.4	10.7	2.5	2.4
	SPD (MPH)		4.6	7.0	5.5	5.2	5.2	5.8	10.1	11.1	3.7	3.7
	RATIO		0.851	0.922	0.784	0.453	0.332	0.971	0.937	0.965	0.657	0.632
METEOROLOGICAL SITE	DIR (DEG)		200	230	30	230	60	240	210	200	80	210
BRIDGEPORT	VEL (MPH)		5.6	7.8	7.0	8.1	1.5	7.2	8.4	8.5	5.0	4.4
	SPD (MPH)		5.8	8.1	7.5	8.3	6.2	7.8	9.1	8.9	5.6	5.2
	RATIO		0.973	0.973	0.934	0.970	0.248	0.929	0.927	0.959	0.898	0.852
METEOROLOGICAL SITE	DIR (DEG)		280	270	360	280	80	260	230	210	120	280
WORCESTER	VEL (MPH)		5.7	9.4	5.7	9.0	1.2	7.3	7.4	10.0	2.9	5.5
	SPD (MPH)		6.2	9.8	7.5	9.1	2.3	7.6	7.5	10.4	4.3	5.8
	RATIO		0.914	0.963	0.769	0.992	0.508	0.959	0.987	0.966	0.680	0.949

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TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
			NE						NE			SE
NAUGATUCK 001		59	95	75	75	73	72	66	65	64	62	61
		DATE	3/ 1/83	8/ 4/83	11/ 2/83	6/17/83	1/30/83	6/23/83	2/11/83	4/30/83	7/29/83	11/20/83
METEOROLOGICAL SITE	DIR	(DEG)	20	220	140	150	110	240	30	170	220	140
NEWARK	VEL	(MPH)	11.3	7.9	2.2	6.2	2.6	6.8	19.0	11.7	13.3	5.6
	SPD	(MPH)	11.5	9.2	5.2	6.5	4.0	7.3	19.5	12.5	13.9	6.0
	RATIO		0.982	0.863	0.416	0.954	0.638	0.927	0.972	0.934	0.955	0.929
METEOROLOGICAL SITE	DIR	(DEG)	30	170	190	180	10	240	30	190	210	150
BRADLEY	VEL	(MPH)	5.8	0.5	4.6	7.2	3.2	6.5	12.0	10.7	9.4	2.5
	SPD	(MPH)	6.8	3.7	4.6	7.3	3.4	7.0	12.4	11.1	10.1	3.7
	RATIO		0.853	0.142	0.997	0.978	0.931	0.922	0.974	0.965	0.937	0.657
METEOROLOGICAL SITE	DIR	(DEG)	30	220	200	90	70	230	40	200	210	80
BRIDGEPORT	VEL	(MPH)	11.4	6.4	2.7	6.0	8.0	7.8	16.6	8.5	8.4	5.0
	SPD	(MPH)	11.8	6.8	4.6	6.3	8.2	8.1	16.7	8.9	9.1	5.6
	RATIO		0.971	0.944	0.582	0.942	0.973	0.973	0.997	0.959	0.927	0.898
METEOROLOGICAL SITE	DIR	(DEG)	30	240	250	200	90	270	40	210	230	120
WORCESTER	VEL	(MPH)	3.2	4.5	6.2	3.3	1.1	9.4	9.0	10.0	7.4	2.9
	SPD	(MPH)	6.9	4.7	6.3	3.9	3.6	9.8	9.6	10.4	7.5	4.3
	RATIO		0.461	0.943	0.974	0.857	0.300	0.963	0.929	0.966	0.987	0.680
				NE								
NEW BRITAIN 007		59	94	81	76	72	71	66	66	64	62	61
		DATE	6/17/83	3/ 1/83	9/21/83	1/30/83	8/ 4/83	7/29/83	11/ 2/83	8/16/83	4/30/83	6/23/83
METEOROLOGICAL SITE	DIR	(DEG)	150	20	190	110	220	220	140	190	170	240
NEWARK	VEL	(MPH)	6.2	11.3	10.2	2.6	7.9	13.3	2.2	5.5	11.7	6.8
	SPD	(MPH)	6.5	11.5	12.8	4.0	9.2	13.9	5.2	6.3	12.5	7.3
	RATIO		0.954	0.982	0.797	0.638	0.863	0.955	0.416	0.871	0.934	0.927
METEOROLOGICAL SITE	DIR	(DEG)	180	30	190	10	170	210	190	200	190	240
BRADLEY	VEL	(MPH)	7.2	5.8	12.0	3.2	0.5	9.4	4.6	3.9	10.7	6.5
	SPD	(MPH)	7.3	6.8	12.4	3.4	3.7	10.1	4.6	4.6	11.1	7.0
	RATIO		0.978	0.853	0.969	0.931	0.142	0.937	0.997	0.851	0.965	0.922
METEOROLOGICAL SITE	DIR	(DEG)	90	30	200	70	220	210	200	200	200	230
BRIDGEPORT	VEL	(MPH)	6.0	11.4	11.4	8.0	6.4	8.4	2.7	5.6	8.5	7.8
	SPD	(MPH)	6.3	11.8	11.6	8.2	6.8	9.1	4.6	5.8	8.9	8.1
	RATIO		0.942	0.971	0.979	0.973	0.944	0.927	0.582	0.973	0.959	0.973
METEOROLOGICAL SITE	DIR	(DEG)	200	30	210	90	240	230	250	280	210	270
WORCESTER	VEL	(MPH)	3.3	3.2	11.3	1.1	4.5	7.4	6.2	5.7	10.0	9.4
	SPD	(MPH)	3.9	6.9	11.9	3.6	4.7	7.5	6.3	6.2	10.4	9.8
	RATIO		0.857	0.461	0.950	0.300	0.943	0.987	0.974	0.914	0.966	0.963
					NE							SE
NEW BRITAIN 008		58	94	79	73	72	72	67	66	66	60	60
		DATE	6/17/83	8/ 4/83	3/ 1/83	1/30/83	4/30/83	9/21/83	7/29/83	11/ 2/83	6/ 5/83	11/20/83
METEOROLOGICAL SITE	DIR	(DEG)	150	220	20	110	170	190	220	140	260	140
NEWARK	VEL	(MPH)	6.2	7.9	11.3	2.6	11.7	10.2	13.3	2.2	5.8	5.6
	SPD	(MPH)	6.5	9.2	11.5	4.0	12.5	12.8	13.9	5.2	9.1	6.0
	RATIO		0.954	0.863	0.982	0.638	0.934	0.797	0.955	0.416	0.639	0.929
METEOROLOGICAL SITE	DIR	(DEG)	180	170	30	10	190	190	210	190	250	150
BRADLEY	VEL	(MPH)	7.2	0.5	5.8	3.2	10.7	12.0	9.4	4.6	2.1	2.5
	SPD	(MPH)	7.3	3.7	6.8	3.4	11.1	12.4	10.1	4.6	5.8	3.7
	RATIO		0.978	0.142	0.853	0.931	0.965	0.969	0.937	0.997	0.362	0.657

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TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE	DIR (DEG)	90	220	30	70	200	200	210	200	210	80
BRIDGEPORT	VEL (MPH)	6.0	6.4	11.4	8.0	8.5	11.4	8.4	2.7	7.9	5.0
	SPD (MPH)	6.3	6.8	11.8	8.2	8.9	11.6	9.1	4.6	8.6	5.6
	RATIO	0.942	0.944	0.971	0.973	0.959	0.979	0.927	0.582	0.919	0.898
METEOROLOGICAL SITE	DIR (DEG)	200	240	30	90	210	210	230	250	270	120
WORCESTER	VEL (MPH)	3.3	4.5	3.2	1.1	10.0	11.3	7.4	6.2	2.9	2.9
	SPD (MPH)	3.9	4.7	6.9	3.6	10.4	11.9	7.5	6.3	3.6	4.3
	RATIO	0.857	0.943	0.461	0.300	0.966	0.950	0.987	0.974	0.815	0.680
				NE							
NEW BRITAIN 009	59	81	75	73	70	68	65	61	59	58	57
	DATE	6/17/83	6/23/83	3/ 1/83	1/30/83	11/26/83	8/ 4/83	7/29/83	8/16/83	11/ 2/83	9/21/83
METEOROLOGICAL SITE	DIR (DEG)	150	240	20	110	240	220	220	190	140	190
NEWARK	VEL (MPH)	6.2	6.8	11.3	2.6	11.4	7.9	13.3	5.5	2.2	10.2
	SPD (MPH)	6.5	7.3	11.5	4.0	11.6	9.2	13.9	6.3	5.2	12.8
	RATIO	0.954	0.927	0.982	0.638	0.981	0.863	0.955	0.871	0.416	0.797
METEOROLOGICAL SITE	DIR (DEG)	180	240	30	10	280	170	210	200	190	190
BRADLEY	VEL (MPH)	7.2	6.5	5.8	3.2	10.5	0.5	9.4	3.9	4.6	12.0
	SPD (MPH)	7.3	7.0	6.8	3.4	11.9	3.7	10.1	4.6	4.6	12.4
	RATIO	0.978	0.922	0.853	0.931	0.878	0.142	0.937	0.851	0.997	0.969
METEOROLOGICAL SITE	DIR (DEG)	90	230	30	70	260	220	210	200	200	200
BRIDGEPORT	VEL (MPH)	6.0	7.8	11.4	8.0	10.7	6.4	8.4	5.6	2.7	11.4
	SPD (MPH)	6.3	8.1	11.8	8.2	10.8	6.8	9.1	5.8	4.6	11.6
	RATIO	0.942	0.973	0.971	0.973	0.996	0.944	0.927	0.973	0.582	0.979
METEOROLOGICAL SITE	DIR (DEG)	200	270	30	90	280	240	230	280	250	210
WORCESTER	VEL (MPH)	3.3	9.4	3.2	1.1	15.5	4.5	7.4	5.7	6.2	11.3
	SPD (MPH)	3.9	9.8	6.9	3.6	15.5	4.7	7.5	6.2	6.3	11.9
	RATIO	0.857	0.963	0.461	0.300	0.995	0.943	0.987	0.914	0.974	0.950
								NW		NE	NW
NEW HAVEN 002	52	127	88	88	88	86	86	84	81	78	75
	DATE	8/16/83	8/28/83	9/ 3/83	9/ 9/83	1/30/83	6/11/83	9/27/83	8/ 4/83	10/ 9/83	5/ 6/83
METEOROLOGICAL SITE	DIR (DEG)	190	180	260	240	110	210	290	220	20	320
NEWARK	VEL (MPH)	5.5	4.7	4.8	5.8	2.6	6.2	5.0	7.9	9.6	5.2
	SPD (MPH)	6.3	10.2	6.2	7.6	4.0	8.2	7.3	9.2	9.8	10.1
	RATIO	0.871	0.461	0.778	0.756	0.638	0.755	0.681	0.863	0.977	0.520
METEOROLOGICAL SITE	DIR (DEG)	200	240	300	230	10	240	320	170	20	340
BRADLEY	VEL (MPH)	3.9	1.7	2.4	4.0	3.2	2.3	3.6	0.5	6.6	4.4
	SPD (MPH)	4.6	5.2	3.7	5.5	3.4	5.2	5.5	3.7	7.6	7.5
	RATIO	0.851	0.332	0.632	0.738	0.931	0.453	0.662	0.142	0.865	0.593
METEOROLOGICAL SITE	DIR (DEG)	200	60	210	220	70	230	210	220	20	290
BRIDGEPORT	VEL (MPH)	5.6	1.5	4.4	6.0	8.0	8.1	2.2	6.4	8.3	2.8
	SPD (MPH)	5.8	6.2	5.2	6.8	8.2	8.3	5.2	6.8	8.8	7.8
	RATIO	0.973	0.248	0.852	0.886	0.973	0.970	0.421	0.944	0.949	0.364
METEOROLOGICAL SITE	DIR (DEG)	280	80	280	260	90	280	300	240	20	310
WORCESTER	VEL (MPH)	5.7	1.2	5.5	5.9	1.1	9.0	7.9	4.5	6.7	5.9
	SPD (MPH)	6.2	2.3	5.8	6.3	3.6	9.1	8.8	4.7	8.6	6.2
	RATIO	0.914	0.508	0.949	0.936	0.300	0.992	0.898	0.943	0.774	0.954

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TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
		NE							SE		
NEW HAVEN 013	58	93	90	77	75	74	72	67	66	63	63
	DATE	3/ 1/83	6/23/83	6/11/83	8/16/83	11/ 2/83	8/28/83	4/30/83	11/20/83	9/ 3/83	10/ 3/83
METEOROLOGICAL SITE	DIR (DEG)	20	240	210	190	140	180	170	140	260	230
NEWARK	VEL (MPH)	11.3	6.8	6.2	5.5	2.2	4.7	11.7	5.6	4.8	8.3
	SPD (MPH)	11.5	7.3	8.2	6.3	5.2	10.2	12.5	6.0	6.2	8.6
	RATIO	0.982	0.927	0.755	0.871	0.416	0.461	0.934	0.929	0.778	0.964
METEOROLOGICAL SITE	DIR (DEG)	30	240	240	200	190	240	190	150	300	220
BRADLEY	VEL (MPH)	5.8	6.5	2.3	3.9	4.6	1.7	10.7	2.5	2.4	5.6
	SPD (MPH)	6.8	7.0	5.2	4.6	4.6	5.2	11.1	3.7	3.7	5.8
	RATIO	0.853	0.922	0.453	0.851	0.997	0.332	0.965	0.657	0.632	0.971
METEOROLOGICAL SITE	DIR (DEG)	30	230	230	200	200	60	200	80	210	240
BRIDGEPORT	VEL (MPH)	11.4	7.8	8.1	5.6	2.7	1.5	8.5	5.0	4.4	7.2
	SPD (MPH)	11.8	8.1	8.3	5.8	4.6	6.2	8.9	5.6	5.2	7.8
	RATIO	0.971	0.973	0.970	0.973	0.582	0.248	0.959	0.898	0.852	0.929
METEOROLOGICAL SITE	DIR (DEG)	30	270	280	280	250	80	210	120	280	260
WORCESTER	VEL (MPH)	3.2	9.4	9.0	5.7	6.2	1.2	10.0	2.9	5.5	7.3
	SPD (MPH)	6.9	9.8	9.1	6.2	6.3	2.3	10.4	4.3	5.8	7.6
	RATIO	0.461	0.963	0.992	0.914	0.974	0.508	0.966	0.680	0.949	0.959
										NW	
NORWALK 001	58	79	76	72	72	69	67	65	63	63	61
	DATE	4/30/83	6/11/83	6/17/83	8/16/83	7/29/83	11/ 2/83	6/23/83	9/ 3/83	9/27/83	9/ 9/83
METEOROLOGICAL SITE	DIR (DEG)	170	210	150	190	220	140	240	260	290	240
NEWARK	VEL (MPH)	11.7	6.2	6.2	5.5	13.3	2.2	6.8	4.8	5.0	5.8
	SPD (MPH)	12.5	8.2	6.5	6.3	13.9	5.2	7.3	6.2	7.3	7.6
	RATIO	0.934	0.755	0.954	0.871	0.955	0.416	0.927	0.778	0.681	0.756
METEOROLOGICAL SITE	DIR (DEG)	190	240	180	200	210	190	240	300	320	230
BRADLEY	VEL (MPH)	10.7	2.3	7.2	3.9	9.4	4.6	6.5	2.4	3.6	4.0
	SPD (MPH)	11.1	5.2	7.3	4.6	10.1	4.6	7.0	3.7	5.5	5.5
	RATIO	0.965	0.453	0.978	0.851	0.937	0.997	0.922	0.632	0.662	0.738
METEOROLOGICAL SITE	DIR (DEG)	200	230	90	200	210	200	230	210	210	220
BRIDGEPORT	VEL (MPH)	8.5	8.1	6.0	5.6	8.4	2.7	7.8	4.4	2.2	6.0
	SPD (MPH)	8.9	8.3	6.3	5.8	9.1	4.6	8.1	5.2	5.2	6.8
	RATIO	0.959	0.970	0.942	0.973	0.927	0.582	0.973	0.852	0.421	0.886
METEOROLOGICAL SITE	DIR (DEG)	210	280	200	280	230	250	270	280	300	260
WORCESTER	VEL (MPH)	10.0	9.0	3.3	5.7	7.4	6.2	9.4	5.5	7.9	5.9
	SPD (MPH)	10.4	9.1	3.9	6.2	7.5	6.3	9.8	5.8	8.8	6.3
	RATIO	0.966	0.992	0.857	0.914	0.987	0.974	0.963	0.949	0.898	0.936
					NE					NW	
NORWALK 005	58	112	105	92	78	76	74	74	70	69	66
	DATE	6/23/83	10/ 3/83	6/11/83	3/ 1/83	11/ 8/83	7/29/83	11/ 2/83	4/30/83	9/27/83	8/ 4/83
METEOROLOGICAL SITE	DIR (DEG)	240	230	210	20	220	220	140	170	290	220
NEWARK	VEL (MPH)	6.8	8.3	6.2	11.3	1.7	13.3	2.2	11.7	5.0	7.9
	SPD (MPH)	7.3	8.6	8.2	11.5	4.6	13.9	5.2	12.5	7.3	9.2
	RATIO	0.927	0.964	0.755	0.982	0.377	0.955	0.416	0.934	0.681	0.863
METEOROLOGICAL SITE	DIR (DEG)	240	220	240	30	210	210	190	190	320	170
BRADLEY	VEL (MPH)	6.5	5.6	2.3	5.8	3.1	9.4	4.6	10.7	3.6	0.5
	SPD (MPH)	7.0	5.8	5.2	6.8	4.3	10.1	4.6	11.1	5.5	3.7
	RATIO	0.922	0.971	0.453	0.853	0.718	0.937	0.997	0.965	0.662	0.142

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TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
	METEOROLOGICAL SITE	DIR (DEG)	230	240	230	30	240	210	200	200	210	220
	BRIDGEPORT	VEL (MPH)	7.8	7.2	8.1	11.4	4.7	8.4	2.7	8.5	2.2	6.4
		SPD (MPH)	8.1	7.8	8.3	11.8	6.5	9.1	4.6	8.9	5.2	6.8
		RATIO	0.973	0.929	0.970	0.971	0.726	0.927	0.582	0.959	0.421	0.944
	METEOROLOGICAL SITE	DIR (DEG)	270	260	280	30	280	230	250	210	300	240
	WORCESTER	VEL (MPH)	9.4	7.3	9.0	3.2	6.4	7.4	6.2	10.0	7.9	4.5
		SPD (MPH)	9.8	7.6	9.1	6.9	7.0	7.5	6.3	10.4	8.8	4.7
		RATIO	0.963	0.959	0.992	0.461	0.913	0.987	0.974	0.966	0.898	0.943
						NE						
NORWALK 012		60	98	85	78	73	73	68	68	68	63	63
		DATE	6/11/83	6/17/83	6/23/83	3/ 1/83	4/30/83	7/29/83	8/16/83	11/ 2/83	1/ 6/83	5/24/83
	METEOROLOGICAL SITE	DIR (DEG)	210	150	240	20	170	220	190	140	330	300
	NEWARK	VEL (MPH)	6.2	6.2	6.8	11.3	11.7	13.3	5.5	2.2	9.9	5.8
		SPD (MPH)	8.2	6.5	7.3	11.5	12.5	13.9	6.3	5.2	11.8	8.1
		RATIO	0.755	0.954	0.927	0.982	0.934	0.955	0.871	0.416	0.839	0.723
	METEOROLOGICAL SITE	DIR (DEG)	240	180	240	30	190	210	200	190	360	360
	BRADLEY	VEL (MPH)	2.3	7.2	6.5	5.8	10.7	9.4	3.9	4.6	5.8	4.4
		SPD (MPH)	5.2	7.3	7.0	6.8	11.1	10.1	4.6	4.6	6.8	5.6
		RATIO	0.453	0.978	0.922	0.853	0.965	0.937	0.851	0.997	0.865	0.787
	METEOROLOGICAL SITE	DIR (DEG)	230	90	230	30	200	210	200	200	350	100
	BRIDGEPORT	VEL (MPH)	8.1	6.0	7.8	11.4	8.5	8.4	5.6	2.7	8.7	6.3
		SPD (MPH)	8.3	6.3	8.1	11.8	8.9	9.1	5.8	4.6	9.2	6.9
		RATIO	0.970	0.942	0.973	0.971	0.959	0.927	0.973	0.582	0.944	0.913
	METEOROLOGICAL SITE	DIR (DEG)	280	200	270	30	210	230	280	250	10	60
	WORCESTER	VEL (MPH)	9.0	3.3	9.4	3.2	10.0	7.4	5.7	6.2	5.6	6.3
		SPD (MPH)	9.1	3.9	9.8	6.9	10.4	7.5	6.2	6.3	6.8	6.6
		RATIO	0.992	0.857	0.963	0.461	0.966	0.987	0.914	0.974	0.828	0.949
												NW
NORWICH 001		59	88	80	80	69	59	58	58	56	56	56
		DATE	1/ 6/83	4/30/83	6/23/83	6/11/83	6/17/83	11/ 8/83	12/26/83	7/29/83	9/21/83	9/27/83
	METEOROLOGICAL SITE	DIR (DEG)	330	170	240	210	150	220	260	220	190	290
	NEWARK	VEL (MPH)	9.9	11.7	6.8	6.2	6.2	1.7	12.8	13.3	10.2	5.0
		SPD (MPH)	11.8	12.5	7.3	8.2	6.5	4.6	13.4	13.9	12.8	7.3
		RATIO	0.839	0.934	0.927	0.755	0.954	0.377	0.960	0.955	0.797	0.681
	METEOROLOGICAL SITE	DIR (DEG)	360	190	240	240	180	210	240	210	190	320
	BRADLEY	VEL (MPH)	5.8	10.7	6.5	2.3	7.2	3.1	6.7	9.4	12.0	3.6
		SPD (MPH)	6.8	11.1	7.0	5.2	7.3	4.3	8.1	10.1	12.4	5.5
		RATIO	0.865	0.965	0.922	0.453	0.978	0.718	0.828	0.937	0.969	0.662
	METEOROLOGICAL SITE	DIR (DEG)	350	200	230	230	90	240	270	210	200	210
	BRIDGEPORT	VEL (MPH)	8.7	8.5	7.8	8.1	6.0	4.7	12.9	8.4	11.4	2.2
		SPD (MPH)	9.2	8.9	8.1	8.3	6.3	6.5	13.1	9.1	11.6	5.2
		RATIO	0.944	0.959	0.973	0.970	0.942	0.726	0.989	0.927	0.979	0.421
	METEOROLOGICAL SITE	DIR (DEG)	10	210	270	280	200	280	260	230	210	300
	WORCESTER	VEL (MPH)	5.6	10.0	9.4	9.0	3.3	6.4	11.3	7.4	11.3	7.9
		SPD (MPH)	6.8	10.4	9.8	9.1	3.9	7.0	11.5	7.5	11.9	8.8
		RATIO	0.828	0.966	0.963	0.992	0.857	0.913	0.982	0.987	0.950	0.898

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
										NE	
STAMFORD 001	59	100	95	93	90	89	84	83	78	76	76
	DATE	11/ 2/83	7/29/83	6/23/83	6/17/83	6/11/83	8/16/83	9/21/83	8/ 4/83	3/ 1/83	4/30/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)	140	220	240	150	210	190	190	220	20	170
	VEL (MPH)	2.2	13.3	6.8	6.2	6.2	5.5	10.2	7.9	11.3	11.7
	SPD (MPH)	5.2	13.9	7.3	6.5	8.2	6.3	12.8	9.2	11.5	12.5
	RATIO	0.416	0.955	0.927	0.954	0.755	0.871	0.797	0.863	0.982	0.934
METEOROLOGICAL SITE BRADLEY	DIR (DEG)	190	210	240	180	240	200	190	170	30	190
	VEL (MPH)	4.6	9.4	6.5	7.2	2.3	3.9	12.0	0.5	5.8	10.7
	SPD (MPH)	4.6	10.1	7.0	7.3	5.2	4.6	12.4	3.7	6.8	11.1
	RATIO	0.997	0.937	0.922	0.978	0.453	0.851	0.969	0.142	0.853	0.965
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)	200	210	230	90	230	200	200	220	30	200
	VEL (MPH)	2.7	8.4	7.8	6.0	8.1	5.6	11.4	6.4	11.4	8.5
	SPD (MPH)	4.6	9.1	8.1	6.3	8.3	5.8	11.6	6.8	11.8	8.9
	RATIO	0.582	0.927	0.973	0.942	0.970	0.973	0.979	0.944	0.971	0.959
METEOROLOGICAL SITE WORCESTER	DIR (DEG)	250	230	270	200	280	280	210	240	30	210
	VEL (MPH)	6.2	7.4	9.4	3.3	9.0	5.7	11.3	4.5	3.2	10.0
	SPD (MPH)	6.3	7.5	9.8	3.9	9.1	6.2	11.9	4.7	6.9	10.4
	RATIO	0.974	0.987	0.963	0.857	0.992	0.914	0.950	0.943	0.461	0.966
								NW			NW
STAMFORD 007	60	104	89	80	79	78	77	73	72	72	70
	DATE	10/ 3/83	6/11/83	8/16/83	9/ 9/83	8/28/83	6/23/83	9/27/83	7/29/83	11/ 2/83	5/12/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)	230	210	190	240	180	240	290	220	140	350
	VEL (MPH)	8.3	6.2	5.5	5.8	4.7	6.8	5.0	13.3	2.2	10.0
	SPD (MPH)	8.6	8.2	6.3	7.6	10.2	7.3	7.3	13.9	5.2	10.5
	RATIO	0.964	0.755	0.871	0.756	0.461	0.927	0.681	0.955	0.416	0.953
METEOROLOGICAL SITE BRADLEY	DIR (DEG)	220	240	200	230	240	240	320	210	190	360
	VEL (MPH)	5.6	2.3	3.9	4.0	1.7	6.5	3.6	9.4	4.6	5.9
	SPD (MPH)	5.8	5.2	4.6	5.5	5.2	7.0	5.5	10.1	4.6	6.6
	RATIO	0.971	0.453	0.851	0.738	0.332	0.922	0.662	0.937	0.997	0.897
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)	240	230	200	220	60	230	210	210	200	320
	VEL (MPH)	7.2	8.1	5.6	6.0	1.5	7.8	2.2	8.4	2.7	5.2
	SPD (MPH)	7.8	8.3	5.8	6.8	6.2	8.1	5.2	9.1	4.6	7.3
	RATIO	0.929	0.970	0.973	0.886	0.248	0.973	0.421	0.927	0.582	0.708
METEOROLOGICAL SITE WORCESTER	DIR (DEG)	260	280	280	260	80	270	300	230	250	350
	VEL (MPH)	7.3	9.0	5.7	5.9	1.2	9.4	7.9	7.4	6.2	7.2
	SPD (MPH)	7.6	9.1	6.2	6.3	2.3	9.8	8.8	7.5	6.3	8.1
	RATIO	0.959	0.992	0.914	0.936	0.508	0.963	0.898	0.987	0.974	0.889
											NE
STAMFORD 021	59	93	89	79	78	78	76	72	72	72	69
	DATE	6/23/83	6/11/83	4/30/83	8/16/83	9/ 9/83	11/ 2/83	6/17/83	7/29/83	10/ 3/83	3/ 1/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)	240	210	170	190	240	140	150	220	230	20
	VEL (MPH)	6.8	6.2	11.7	5.5	5.8	2.2	6.2	13.3	8.3	11.3
	SPD (MPH)	7.3	8.2	12.5	6.3	7.6	5.2	6.5	13.9	8.6	11.5
	RATIO	0.927	0.755	0.934	0.871	0.756	0.416	0.954	0.955	0.964	0.982
METEOROLOGICAL SITE BRADLEY	DIR (DEG)	240	240	190	200	230	190	180	210	220	30
	VEL (MPH)	6.5	2.3	10.7	3.9	4.0	4.6	7.2	9.4	5.6	5.8
	SPD (MPH)	7.0	5.2	11.1	4.6	5.5	4.6	7.3	10.1	5.8	6.8
	RATIO	0.922	0.453	0.965	0.851	0.738	0.997	0.978	0.937	0.971	0.853

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE BRIDGEPORT		DIR (DEG)	230	230	200	200	220	200	90	210	240	30
		VEL (MPH)	7.8	8.1	8.5	5.6	6.0	2.7	6.0	8.4	7.2	11.4
		SPD (MPH)	8.1	8.3	8.9	5.8	6.8	4.6	6.3	9.1	7.8	11.8
		RATIO	0.973	0.970	0.959	0.973	0.886	0.582	0.942	0.927	0.929	0.971
METEOROLOGICAL SITE WORCESTER		DIR (DEG)	270	280	210	280	260	250	200	230	260	30
		VEL (MPH)	9.4	9.0	10.0	5.7	5.9	6.2	3.3	7.4	7.3	3.2
		SPD (MPH)	9.8	9.1	10.4	6.2	6.3	6.3	3.9	7.5	7.6	6.9
		RATIO	0.963	0.992	0.966	0.914	0.936	0.974	0.857	0.987	0.959	0.461
						NE		NW				NE
STRATFORD 005		58	82	82	77	74	67	66	66	66	63	62
		DATE	6/23/83	8/16/83	6/11/83	3/ 1/83	10/ 3/83	1/12/83	4/30/83	7/29/83	8/28/83	2/11/83
METEOROLOGICAL SITE NEWARK		DIR (DEG)	240	190	210	20	230	300	170	220	180	30
		VEL (MPH)	6.8	5.5	6.2	11.3	8.3	13.0	11.7	13.3	4.7	19.0
		SPD (MPH)	7.3	6.3	8.2	11.5	8.6	14.4	12.5	13.9	10.2	19.5
		RATIO	0.927	0.871	0.755	0.982	0.964	0.907	0.934	0.955	0.461	0.972
METEOROLOGICAL SITE BRADLEY		DIR (DEG)	240	200	240	30	220	350	190	210	240	30
		VEL (MPH)	6.5	3.9	2.3	5.8	5.6	4.4	10.7	9.4	1.7	12.0
		SPD (MPH)	7.0	4.6	5.2	6.8	5.8	6.3	11.1	10.1	5.2	12.4
		RATIO	0.922	0.851	0.453	0.853	0.971	0.688	0.965	0.937	0.332	0.974
METEOROLOGICAL SITE BRIDGEPORT		DIR (DEG)	230	200	230	30	240	310	200	210	60	40
		VEL (MPH)	7.8	5.6	8.1	11.4	7.2	9.0	8.5	8.4	1.5	16.6
		SPD (MPH)	8.1	5.8	8.3	11.8	7.8	9.9	8.9	9.1	6.2	16.7
		RATIO	0.973	0.973	0.970	0.971	0.929	0.905	0.959	0.927	0.248	0.997
METEOROLOGICAL SITE WORCESTER		DIR (DEG)	270	280	280	30	260	290	210	230	80	40
		VEL (MPH)	9.4	5.7	9.0	3.2	7.3	9.1	10.0	7.4	1.2	9.0
		SPD (MPH)	9.8	6.2	9.1	6.9	7.6	9.5	10.4	7.5	2.3	9.6
		RATIO	0.963	0.914	0.992	0.461	0.959	0.960	0.966	0.987	0.508	0.929
									NE			NW
TORRINGTON 001		56	76	69	68	67	65	65	59	57	56	54
		DATE	6/17/83	9/21/83	1/30/83	11/ 2/83	4/30/83	7/29/83	3/ 1/83	11/ 8/83	6/11/83	2/ 5/83
METEOROLOGICAL SITE NEWARK		DIR (DEG)	150	190	110	140	170	220	20	220	210	320
		VEL (MPH)	6.2	10.2	2.6	2.2	11.7	13.3	11.3	1.7	6.2	18.6
		SPD (MPH)	6.5	12.8	4.0	5.2	12.5	13.9	11.5	4.6	8.2	19.0
		RATIO	0.954	0.797	0.638	0.416	0.934	0.955	0.982	0.377	0.755	0.980
METEOROLOGICAL SITE BRADLEY		DIR (DEG)	180	190	10	190	190	210	30	210	240	330
		VEL (MPH)	7.2	12.0	3.2	4.6	10.7	9.4	5.8	3.1	2.3	12.5
		SPD (MPH)	7.3	12.4	3.4	4.6	11.1	10.1	6.8	4.3	5.2	13.1
		RATIO	0.978	0.969	0.931	0.997	0.965	0.937	0.853	0.718	0.453	0.959
METEOROLOGICAL SITE BRIDGEPORT		DIR (DEG)	90	200	70	200	200	210	30	240	230	340
		VEL (MPH)	6.0	11.4	8.0	2.7	8.5	8.4	11.4	4.7	8.1	12.6
		SPD (MPH)	6.3	11.6	8.2	4.6	8.9	9.1	11.8	6.5	8.3	12.7
		RATIO	0.942	0.979	0.973	0.582	0.959	0.927	0.971	0.726	0.970	0.992
METEOROLOGICAL SITE WORCESTER		DIR (DEG)	200	210	90	250	210	230	30	280	280	330
		VEL (MPH)	3.3	11.3	1.1	6.2	10.0	7.4	3.2	6.4	9.0	14.6
		SPD (MPH)	3.9	11.9	3.6	6.3	10.4	7.5	6.9	7.0	9.1	15.0
		RATIO	0.857	0.950	0.300	0.974	0.966	0.987	0.461	0.913	0.992	0.974

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
								NW	NE		NE
VOLUNTOWN 001	59	72	60	59	53	52	48	43	40	40	39
	DATE	6/23/83	8/16/83	6/11/83	7/29/83	8/ 4/83	6/17/83	2/ 5/83	2/17/83	8/28/83	3/ 1/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)	240	190	210	220	220	150	320	10	180	20
	VEL (MPH)	6.8	5.5	6.2	13.3	7.9	6.2	18.6	7.6	4.7	11.3
	SPD (MPH)	7.3	6.3	8.2	13.9	9.2	6.5	19.0	8.9	10.2	11.5
	RATIO	0.927	0.871	0.755	0.955	0.863	0.954	0.980	0.856	0.461	0.982
METEOROLOGICAL SITE BRADLEY	DIR (DEG)	240	200	240	210	170	180	330	30	240	30
	VEL (MPH)	6.5	3.9	2.3	9.4	0.5	7.2	12.5	4.9	1.7	5.8
	SPD (MPH)	7.0	4.6	5.2	10.1	3.7	7.3	13.1	7.2	5.2	6.8
	RATIO	0.922	0.851	0.453	0.937	0.142	0.978	0.959	0.675	0.332	0.853
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)	230	200	230	210	220	90	340	50	60	30
	VEL (MPH)	7.8	5.6	8.1	8.4	6.4	6.0	12.6	8.2	1.5	11.4
	SPD (MPH)	8.1	5.8	8.3	9.1	6.8	6.3	12.7	9.9	6.2	11.8
	RATIO	0.973	0.973	0.970	0.927	0.944	0.942	0.992	0.829	0.248	0.971
METEOROLOGICAL SITE WORCESTER	DIR (DEG)	270	280	280	230	240	200	330	60	80	30
	VEL (MPH)	9.4	5.7	9.0	7.4	4.5	3.3	14.6	4.7	1.2	3.2
	SPD (MPH)	9.8	6.2	9.1	7.5	4.7	3.9	15.0	5.8	2.3	6.9
	RATIO	0.963	0.914	0.992	0.987	0.943	0.857	0.974	0.823	0.508	0.461
			NE				NW				SE
WALLINGFORD 001	57	122	93	80	69	65	64	62	61	59	59
	DATE	6/17/83	3/ 1/83	12/26/83	1/30/83	7/29/83	7/23/83	8/16/83	6/23/83	4/30/83	11/20/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)	150	20	260	110	220	280	190	240	170	140
	VEL (MPH)	6.2	11.3	12.8	2.6	13.3	6.8	5.5	6.8	11.7	5.6
	SPD (MPH)	6.5	11.5	13.4	4.0	13.9	9.6	6.3	7.3	12.5	6.0
	RATIO	0.954	0.982	0.960	0.638	0.955	0.704	0.871	0.927	0.934	0.929
METEOROLOGICAL SITE BRADLEY	DIR (DEG)	180	30	240	10	210	280	200	240	190	150
	VEL (MPH)	7.2	5.8	6.7	3.2	9.4	3.0	3.9	6.5	10.7	2.5
	SPD (MPH)	7.3	6.8	8.1	3.4	10.1	6.0	4.6	7.0	11.1	3.7
	RATIO	0.978	0.853	0.828	0.931	0.937	0.489	0.851	0.922	0.965	0.657
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)	90	30	270	70	210	220	200	230	200	80
	VEL (MPH)	6.0	11.4	12.9	8.0	8.4	5.8	5.6	7.8	8.5	5.0
	SPD (MPH)	6.3	11.8	13.1	8.2	9.1	7.8	5.8	8.1	8.9	5.6
	RATIO	0.942	0.971	0.989	0.973	0.927	0.744	0.973	0.973	0.959	0.898
METEOROLOGICAL SITE WORCESTER	DIR (DEG)	200	30	260	90	230	300	280	270	210	120
	VEL (MPH)	3.3	3.2	11.3	1.1	7.4	7.3	5.7	9.4	10.0	2.9
	SPD (MPH)	3.9	6.9	11.5	3.6	7.5	8.5	6.2	9.8	10.4	4.3
	RATIO	0.857	0.461	0.982	0.300	0.987	0.858	0.914	0.963	0.966	0.680
		NE									
WATERBURY 005	58	91	82	75	71	69	68	66	65	64	58
	DATE	3/ 1/83	8/ 4/83	6/17/83	11/ 2/83	6/11/83	1/30/83	4/30/83	7/29/83	8/28/83	10/ 3/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)	20	220	150	140	210	110	170	220	180	230
	VEL (MPH)	11.3	7.9	6.2	2.2	6.2	2.6	11.7	13.3	4.7	8.3
	SPD (MPH)	11.5	9.2	6.5	5.2	8.2	4.0	12.5	13.9	10.2	8.6
	RATIO	0.982	0.863	0.954	0.416	0.755	0.638	0.934	0.955	0.461	0.964
METEOROLOGICAL SITE BRADLEY	DIR (DEG)	30	170	180	190	240	10	190	210	240	220
	VEL (MPH)	5.8	0.5	7.2	4.6	2.3	3.2	10.7	9.4	1.7	5.6
	SPD (MPH)	6.8	3.7	7.3	4.6	5.2	3.4	11.1	10.1	5.2	5.8
	RATIO	0.853	0.142	0.978	0.997	0.453	0.931	0.965	0.937	0.332	0.971

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TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		30	220	90	200	230	70	200	210	60	240
	VEL (MPH)		11.4	6.4	6.0	2.7	8.1	8.0	8.5	8.4	1.5	7.2
	SPD (MPH)		11.8	6.8	6.3	4.6	8.3	8.2	8.9	9.1	6.2	7.8
	RATIO		0.971	0.944	0.942	0.582	0.970	0.973	0.959	0.927	0.248	0.929
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		30	240	200	250	280	90	210	230	80	260
	VEL (MPH)		3.2	4.5	3.3	6.2	9.0	1.1	10.0	7.4	1.2	7.3
	SPD (MPH)		6.9	4.7	3.9	6.3	9.1	3.6	10.4	7.5	2.3	7.6
	RATIO		0.461	0.943	0.857	0.974	0.992	0.300	0.966	0.987	0.508	0.959
			NE			NE						SE
WATERBURY 006		60	82	72	71	69	66	62	62	58	58	57
	DATE		3/ 1/83	8/ 4/83	6/17/83	2/11/83	4/30/83	6/11/83	9/21/83	1/30/83	11/ 2/83	11/20/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)		20	220	150	30	170	210	190	110	140	140
	VEL (MPH)		11.3	7.9	6.2	19.0	11.7	6.2	10.2	2.6	2.2	5.6
	SPD (MPH)		11.5	9.2	6.5	19.5	12.5	8.2	12.8	4.0	5.2	6.0
	RATIO		0.982	0.863	0.954	0.972	0.934	0.755	0.797	0.638	0.416	0.929
METEOROLOGICAL SITE BRADLEY	DIR (DEG)		30	170	180	30	190	240	190	10	190	150
	VEL (MPH)		5.8	0.5	7.2	12.0	10.7	2.3	12.0	3.2	4.6	2.5
	SPD (MPH)		6.8	3.7	7.3	12.4	11.1	5.2	12.4	3.4	4.6	3.7
	RATIO		0.853	0.142	0.978	0.974	0.965	0.453	0.969	0.931	0.997	0.657
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		30	220	90	40	200	230	200	70	200	80
	VEL (MPH)		11.4	6.4	6.0	16.6	8.5	8.1	11.4	8.0	2.7	5.0
	SPD (MPH)		11.8	6.8	6.3	16.7	8.9	8.3	11.6	8.2	4.6	5.6
	RATIO		0.971	0.944	0.942	0.997	0.959	0.970	0.979	0.973	0.582	0.898
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		30	240	200	40	210	280	210	90	250	120
	VEL (MPH)		3.2	4.5	3.3	9.0	10.0	9.0	11.3	1.1	6.2	2.9
	SPD (MPH)		6.9	4.7	3.9	9.6	10.4	9.1	11.9	3.6	6.3	4.3
	RATIO		0.461	0.943	0.857	0.929	0.966	0.992	0.950	0.300	0.974	0.680
			NW								NE	
WATERBURY 007		60	94	94	94	87	86	82	81	80	78	73
	DATE		4/12/83	6/23/83	8/ 4/83	7/29/83	6/17/83	4/30/83	1/30/83	11/ 2/83	3/ 1/83	6/11/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)		310	240	220	220	150	170	110	140	20	210
	VEL (MPH)		11.2	6.8	7.9	13.3	6.2	11.7	2.6	2.2	11.3	6.2
	SPD (MPH)		13.2	7.3	9.2	13.9	6.5	12.5	4.0	5.2	11.5	8.2
	RATIO		0.850	0.927	0.863	0.955	0.954	0.934	0.638	0.416	0.982	0.755
METEOROLOGICAL SITE BRADLEY	DIR (DEG)		330	240	170	210	180	190	10	190	30	240
	VEL (MPH)		6.3	6.5	0.5	9.4	7.2	10.7	3.2	4.6	5.8	2.3
	SPD (MPH)		8.3	7.0	3.7	10.1	7.3	11.1	3.4	4.6	6.8	5.2
	RATIO		0.761	0.922	0.142	0.937	0.978	0.965	0.931	0.997	0.853	0.453
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		310	230	220	210	90	200	70	200	30	230
	VEL (MPH)		11.5	7.8	6.4	8.4	6.0	8.5	8.0	2.7	11.4	8.1
	SPD (MPH)		12.2	8.1	6.8	9.1	6.3	8.9	8.2	4.6	11.8	8.3
	RATIO		0.942	0.973	0.944	0.927	0.942	0.959	0.973	0.582	0.971	0.970
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		300	270	240	230	200	210	90	250	30	280
	VEL (MPH)		10.4	9.4	4.5	7.4	3.3	10.0	1.1	6.2	3.2	9.0
	SPD (MPH)		11.4	9.8	4.7	7.5	3.9	10.4	3.6	6.3	6.9	9.1
	RATIO		0.913	0.963	0.943	0.987	0.857	0.966	0.300	0.974	0.461	0.992

TABLE 11, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE TSP DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN / SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
				NW						SE	
WATERFORD 001	55	89	60	59	58	53	51	50	48	44	41
	DATE	6/23/83	6/11/83	9/27/83	9/ 3/83	9/ 9/83	9/21/83	7/29/83	7/11/83	11/20/83	4/30/83
METEOROLOGICAL SITE	DIR (DEG)	240	210	290	260	240	190	220	310	140	170
NEWARK	VEL (MPH)	6.8	6.2	5.0	4.8	5.8	10.2	13.3	4.1	5.6	11.7
	SPD (MPH)	7.3	8.2	7.3	6.2	7.6	12.8	13.9	7.5	6.0	12.5
	RATIO	0.927	0.755	0.681	0.778	0.756	0.797	0.955	0.545	0.929	0.934
METEOROLOGICAL SITE	DIR (DEG)	240	240	320	300	230	190	210	360	150	190
BRADLEY	VEL (MPH)	6.5	2.3	3.6	2.4	4.0	12.0	9.4	2.5	2.5	10.7
	SPD (MPH)	7.0	5.2	5.5	3.7	5.5	12.4	10.1	3.0	3.7	11.1
	RATIO	0.922	0.453	0.662	0.632	0.738	0.969	0.937	0.843	0.657	0.965
METEOROLOGICAL SITE	DIR (DEG)	230	230	210	210	220	200	210	210	80	200
BRIDGEPORT	VEL (MPH)	7.8	8.1	2.2	4.4	6.0	11.4	8.4	3.5	5.0	8.5
	SPD (MPH)	8.1	8.3	5.2	5.2	6.8	11.6	9.1	5.9	5.6	8.9
	RATIO	0.973	0.970	0.421	0.852	0.886	0.979	0.927	0.591	0.898	0.959
METEOROLOGICAL SITE	DIR (DEG)	270	280	300	280	260	210	230	300	120	210
WORCESTER	VEL (MPH)	9.4	9.0	7.9	5.5	5.9	11.3	7.4	4.6	2.9	10.0
	SPD (MPH)	9.8	9.1	8.8	5.8	6.3	11.9	7.5	5.5	4.3	10.4
	RATIO	0.963	0.992	0.898	0.949	0.936	0.950	0.987	0.844	0.680	0.966
		NE			SE			SE		NW	
WILLIMANTIC 002	60	81	77	67	64	63	63	62	62	60	59
	DATE	3/ 1/83	8/28/83	1/30/83	11/20/83	1/24/83	6/23/83	5/30/83	9/ 9/83	2/ 5/83	4/30/83
METEOROLOGICAL SITE	DIR (DEG)	20	180	110	140	260	240	110	240	320	170
NEWARK	VEL (MPH)	11.3	4.7	2.6	5.6	9.3	6.8	6.9	5.8	18.6	11.7
	SPD (MPH)	11.5	10.2	4.0	6.0	9.9	7.3	7.0	7.6	19.0	12.5
	RATIO	0.982	0.461	0.638	0.929	0.936	0.927	0.975	0.756	0.980	0.934
METEOROLOGICAL SITE	DIR (DEG)	30	240	10	150	300	240	170	230	330	190
BRADLEY	VEL (MPH)	5.8	1.7	3.2	2.5	5.1	6.5	4.6	4.0	12.5	10.7
	SPD (MPH)	6.8	5.2	3.4	3.7	6.0	7.0	5.5	5.5	13.1	11.1
	RATIO	0.853	0.332	0.931	0.657	0.843	0.922	0.847	0.738	0.959	0.965
METEOROLOGICAL SITE	DIR (DEG)	30	60	70	80	270	230	160	220	340	200
BRIDGEPORT	VEL (MPH)	11.4	1.5	8.0	5.0	9.2	7.8	3.1	6.0	12.6	8.5
	SPD (MPH)	11.8	6.2	8.2	5.6	9.6	8.1	4.2	6.8	12.7	8.9
	RATIO	0.971	0.248	0.973	0.898	0.957	0.973	0.734	0.886	0.992	0.959
METEOROLOGICAL SITE	DIR (DEG)	30	80	90	120	280	270	170	260	330	210
WORCESTER	VEL (MPH)	3.2	1.2	1.1	2.9	10.6	9.4	4.3	5.9	14.6	10.0
	SPD (MPH)	6.9	2.3	3.6	4.3	11.5	9.8	5.8	6.3	15.0	10.4
	RATIO	0.461	0.508	0.300	0.680	0.918	0.963	0.746	0.936	0.974	0.966

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$SW = \frac{253}{420} = 60.2\%$ $NE = \frac{40}{420} = 9.5\%$

$NW = \frac{25}{420} = 6.0\%$ $SE = \frac{14}{420} = 3.3\%$

III. SULFUR DIOXIDE

Health Effects

Sulfur oxides are gases that come from the burning of sulfur-containing fuel, mainly coal and oil, and also from the smelting of metals and from certain industrial processes. They have a distinctive odor. Sulfur dioxide (SO_2) comprises about 95 percent of these gases, so scientists use a test for SO_2 alone as a measure of all sulfur oxides.

As the level of sulfur oxides in air increases, there is an obstruction of breathing, a choking effect that doctors call "pulmonary flow resistance." The amount of breathing obstruction has a direct relation to the amount of sulfur compounds in the air. The effect of sulfur pollution is enhanced by the presence of other pollutants, especially particulates and oxidants. Moreover, the harm that results from two or more pollutants is more than additive. Each augments the other, and the combined effect is greater than the sum of the effects that each alone would have.

Many types of respiratory disease are associated with sulfur oxides: coughs and colds, asthma, bronchitis, and emphysema. Some researchers believe that the harm is not only due to the sulfur oxide gases but to other sulfur compounds as well that accompany the oxides.

Conclusions

Sulfur dioxide concentrations in 1983 did not exceed any federal primary or secondary standards. With the exception of one day in Milford (see Table 14), measured concentrations were substantially below the 365 ug/m^3 primary 24-hour standard. Measured concentrations at all sulfur dioxide monitoring sites were well below the 80 ug/m^3 primary annual standard and the 1300 ug/m^3 secondary 3-hour standard.

Method of Measurement

The DEP Air Monitoring Unit used the pulsed fluorescence method (Teco instruments) to continuously measure sulfur dioxide levels at all 15 sites in 1983.

Discussion of Data

Monitoring Network – Fifteen continuous SO_2 monitors were used to record data in twelve towns during 1983 (see Figure 5):

Bridgeport 001
Bridgeport 123
Danbury 123
Enfield 005
Greenwich 017
Groton 007
Hartford 123
Milford 002
New Haven 123
Norwalk 005
Preston 002
Stamford 024
Stamford 123
Waterbury 007
Waterbury 123

All of these sites telemetered the data to the central computer in Hartford on a real-time basis. Waterbury 007, Stamford 024 and the sites in Enfield, Groton, Norwalk and Preston are new sites and did not exist in 1982.

Precision and Accuracy – 308 precision checks were made on SO_2 monitors in 1983, yielding 95% probability limits ranging from −12% to +6%. Accuracy is determined by introducing a known amount of SO_2 into each of the monitors. Three different concentration levels are tested: low, medium, and high. The 95% probability limits for accuracy based on 18 audits were: low, −11% to +12%; medium, −9% to +7%; and high, −8% to +7%.

Annual Averages – SO_2 levels were below the primary annual standard of 80 ug/m^3 at all sites in 1983 (see Table 12). The annual average SO_2 levels increased at seven of the nine monitoring sites that operated from 1982 to 1983. Bridgeport 123 experienced the highest increase of 4 ug/m^3. Waterbury 123 showed an annual average decrease of 1 ug/m^3 and New Haven 123 remained unchanged.

Statistical Projections – A statistical analysis of the sulfur dioxide data is presented in Table 13. This analysis provides information to compensate for any loss of data caused by instrumentation problems. The format of Table 13 is the same as that used to present the total suspended particulate annual averages (see Table 6). However, Table 13 gives the annual arithmetic mean of the valid 24-hour SO_2 averages to allow direct comparison to the annual SO_2 standards. The 95% limits and standard deviations are also arithmetic calculations. Since the distribution of the SO_2 data tends to be lognormal, the geometric means and standard deviations were used to predict the number of days the 24-hour standard of 365 ug/m^3 would be exceeded at each site if sampling had been conducted every day.

It is important to note that these statistical tests require random data to be valid. This means that an equal number of samples must be collected in each season of the year and on each day of the week. For the nine sites that operated in both 1982 and 1983, the distribution and quantity of SO_2 data were comparable in both years -- except for Bridgeport 001, which did not operate in the last quarter of 1983. The data for these sites indicate that there were no violations of the primary SO_2 standard in Connecticut. For example, a statistical prediction of one day exceeding the primary 24-hour standard (365 ug/m^3) at Hartford site 123 indicates that an increase in SO_2 emissions there might jeopardize the attainment of this standard. Two days over the standard are required for the standard to be violated. For the remaining sites the distribution and quantity of SO_2 data were inadequate for representative annual statistics and are so indicated in Table 13.

24-Hour Averages – Table 14 presents the 1st and 2nd high running 24-hour concentrations recorded at each monitoring site. In 1983 no sites recorded SO_2 levels in excess of the 24-hour primary standard of 365 ug/m^3. Second high running 24-hour average concentrations decreased at four of the nine SO_2 monitoring sites that operated during 1982 and 1983. The decreases were at least 23 ug/m^3 and the largest decrease of 36 ug/m^3 was experienced at Stamford 123. Four sites had higher second high running 24-hour average concentrations in 1983 when compared to 1982. These increases ranged from 3 ug/m^3 at Waterbury 123 to 23 ug/m^3 at New Haven 123. Hartford 123 experienced no change in the second high running 24-hour average.

Current EPA policy bases compliance with the primary 24-hour SO_2 standard on non-overlapping running averages. Running averages are averages computed for the 24-hour periods ending at every hour. Assessment of compliance is based on the value of the 2nd highest of the two highest non-overlapping 24-hour periods in the year. Thus, the basis for compliance is the magnitude of the exposure encountered within any two distinct 24-hour periods, not calendar days. However, there is some contention that compliance assessment for 24-hour SO_2 standards should be based on calendar day averages only. Table 15 contains the maximum 24-hour SO_2 readings from both the running averages and the calendar day averages for comparison. The maximum calendar day readings are all lower than the maximum readings from the running averages, and the differences range from 1 ug/m^3 at New Haven 123 to 92 ug/m^3 at Milford 002.

3-Hour Averages – Table 16 presents the 1st and 2nd high 3-hour concentrations recorded at each monitoring site. Measured SO_2 concentrations were far below the federal secondary 3-hour standard of 1300 ug/m^3 at all DEP monitoring sites in 1983. When compared to 1982, the second high running 3-hour average concentrations decreased at six sites and increased at 3 sites in 1983.

10-High Days with Wind Data – Table 17 lists the ten highest 24-hour calendar day SO_2 averages and the dates of occurrence for each SO_2 site in Connecticut during 1983. The table also shows the average wind conditions that occurred on each of these dates. (The origin and use of these wind data are described in the discussion of Table 11 in the TSP section of this Air Quality Summary.)

Once again, as with TSP, most (i.e., 49.3%) of the highest SO_2 days occur during periods of persistent winds out of the southwest quadrant. This relationship is caused, at least in part, by SO_2 transport; but, any transport is limited by the chemical instability of SO_2. In the atmosphere, SO_2 reacts with other gases to produce, among other things, sulfate particulates. Therefore, SO_2 is not likely to be transported very long distances. Previous studies conducted by the DEP have shown that during periods of southwest winds, levels of SO_2 in Connecticut decrease with distance from the New York City metropolitan area. This relationship tends to support the transport hypothesis. On the other hand, these studies also revealed that certain meteorological parameters, most notably mixing height and wind speed, are more conducive to high SO_2 levels on days when there are southwesterly winds than on other days.

The data in Table 17 were used to make a tally, by date, of the frequency of occurrence of high SO_2 levels. Only those nine sites were used which operated both in 1982 and 1983. If a given date recurred at 5 or more sites in this tally, the SO_2 levels and meteorological conditions were investigated further (there were 7 such days). A close look at these 7 days revealed three important points. First, all 7 days occurred during the winter months. This can be attributed to more fuel being burned during the cold weather. Second, 4 of the 7 days had persistent southwest winds for that calendar day. Third, 2 of the other 3 days had either persistent southwest winds for the previous 24 hours or the wind was relatively calm at Bradley and Bridgeport on the day the high SO_2 reading was recorded.

In summary, high levels of SO_2 in Connecticut seem to be caused by a number of related factors. First, Connecticut experiences its highest SO_2 levels during the winter months, when there is an increased amount of fuel combustion. Second, the New York City metropolitan area, a large emission source, is located to the southwest of Connecticut and, in this region, southwest winds occur relatively often in comparison to other wind directions. Also, adverse meteorological conditions are often associated with southwest winds. The net effect is that during the winter months when a persistent southwesterly wind occurs, an air mass picks up increased amounts of SO_2 over the New York City metropolitan area and transports this SO_2 into Connecticut. Here, the SO_2 levels remain high because the relatively low mixing heights associated with the southwest wind will not allow much vertical mixing. The levels of transported SO_2 eventually decline with increasing distance from New York City, as the SO_2 is dispersed and as it slowly reacts to produce sulfate particulates. These sulfate particulates may fall to the ground in either a dry state (dry deposition) or in a wet state after combination with water droplets (wet deposition or "acid rain").

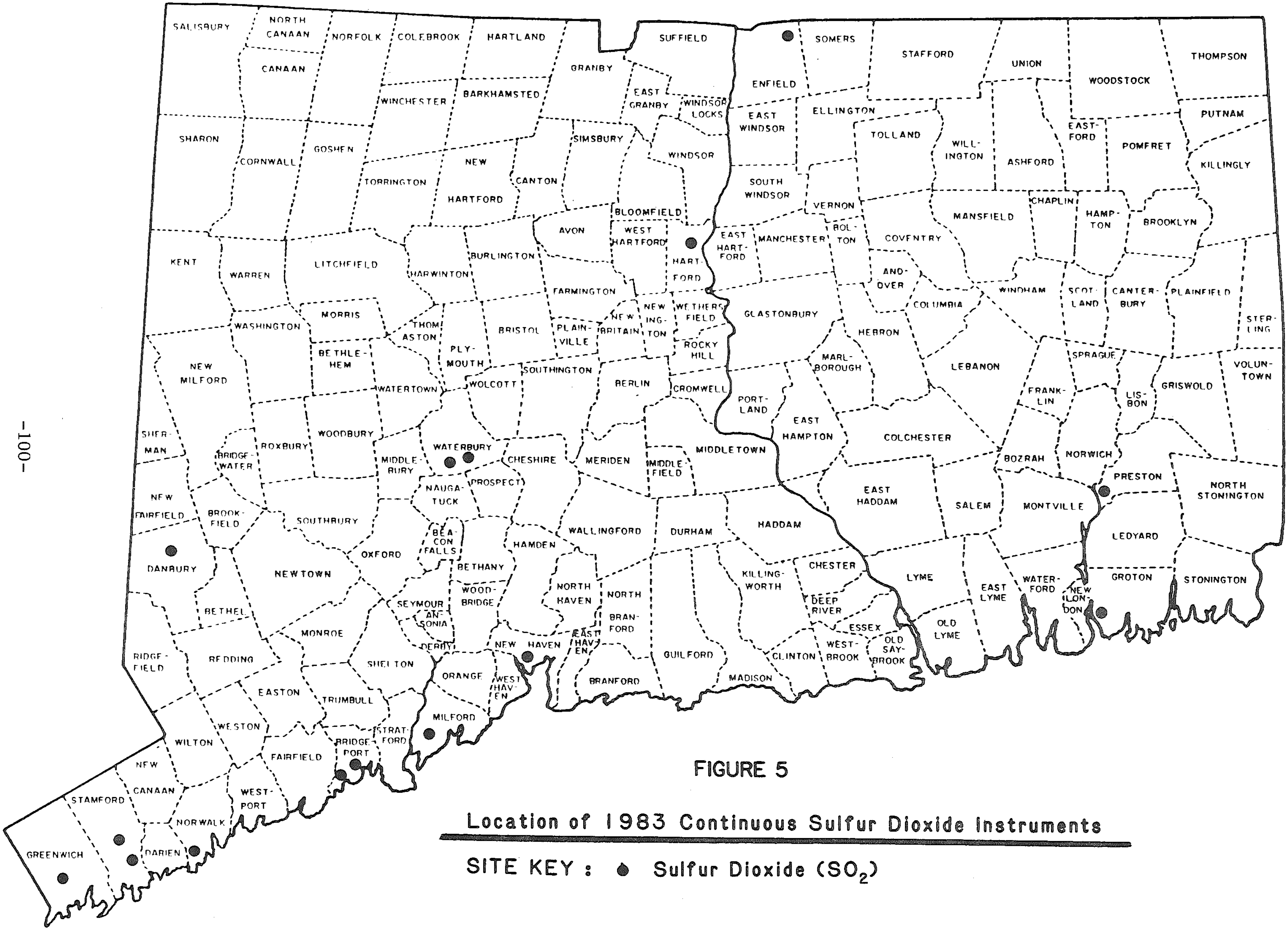


FIGURE 5

Location of 1983 Continuous Sulfur Dioxide Instruments

SITE KEY : ● Sulfur Dioxide (SO_2)

TABLE 12

1983 ANNUAL ARITHMETIC AVERAGES* OF SULFUR DIOXIDE

AT SITES WITH CONTINUOUS MONITORS

(PRIMARY STANDARD: 80 ug/m^3)

TOWN	SITE NAME	ANNUAL AVERAGE
Bridgeport-001	City Hall	28**
Bridgeport-123	Hallett Street	33
Danbury-123	Western CT State College	17
Enfield-005	Department of Corrections	23**
Greenwich-017	Greenwich Point Park	15
Groton-007	Fire Headquarters	24**
Hartford-123	State Office Building	32
Milford-002	Devon Community Center	35
New Haven-123	State Street	31
Norwalk-005	Health Department	22**
Preston-002	Norwich State Hospital	14**
Stamford-024	Fire House	27**
Stamford-123	Health Department	27
Waterbury-007	Fire House	33**
Waterbury-123	Bank Street	19

* The annual averages are expressed in terms of the arithmetic mean because the primary ambient air quality standard for SO_2 is defined as the annual arithmetic mean concentration. This differs from the trend analysis presented earlier in section I.B. of this Air Quality Summary which made use of the annual geometric mean.

** The average is based on less than the required number of observations for a valid annual average.

TABLE 13

1983 SULFUR DIOXIDE ANNUAL AVERAGES AND STATISTICAL PROJECTIONS

DISTRIBUTION -- LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	ARITHMETIC MEAN**	95-PCT-LIMITS LOWER	95-PCT-LIMITS UPPER	STD DEVIATION	PREDICTED DAYS OVER 365 ug/m3
Bridgeport	001	1983	260*	27.6	26	29	17.066	
Bridgeport	123	1983	359	33.3	33	34	22.834	
Danbury	123	1983	356	16.9	17	17	13.031	
Enfield	005	1983	61*	23.1	18	28	20.895	
Greenwich	017	1983	333	15.5	15	16	11.659	
Groton	007	1983	79*	24.2	21	27	13.835	
Hartford	123	1983	360	32.4	32	33	22.793	
Milford	002	1983	342	34.8	34	35	27.169	
New Haven	123	1983	363	30.7	31	31	24.284	
Norwalk	005	1983	226*	22.6	21	24	21.556	
Preston	002	1983	61*	13.9	12	16	7.016	
Stamford	024	1983	34*	28.0	23	33	15.948	
Stamford	123	1983	362	26.7	27	27	18.916	
Waterbury	007	1983	60*	34.0	27	41	29.103	
Waterbury	123	1983	351	18.9	19	19	14.291	

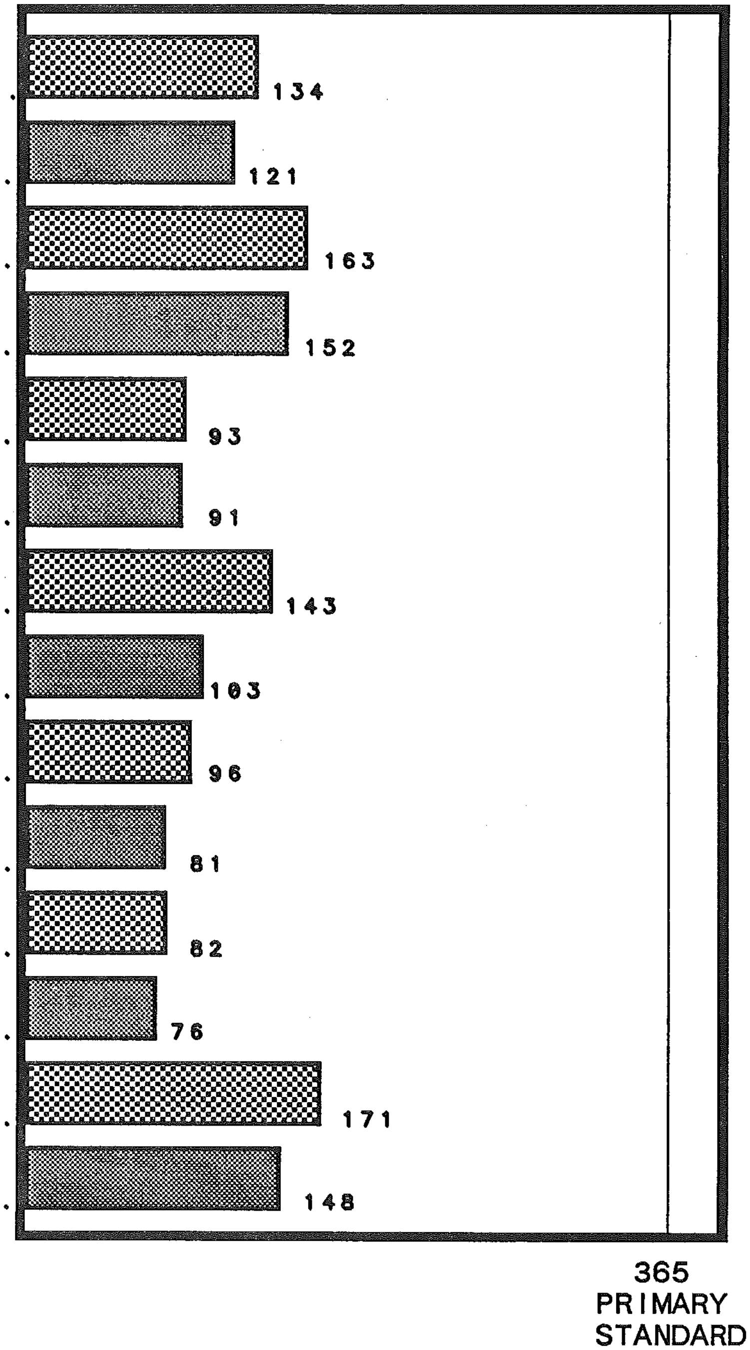
* Sampling not random or of insufficient size for representative annual statistics

** The annual averages in Table 13 vary slightly from those in Table 12 because of the manner in which they were derived. The averages in Table 12 are based on the available hourly readings, while those in Table 13 are based on valid 24-hour averages. (At least 18 hourly readings are required to produce a valid 24-hour average.)

TABLE 14

1983 MAXIMUM 24-HOUR RUNNING AVERAGE SULFUR DIOXIDE CONCENTRATIONS

SITE	DATE* 1ST HIGH	DATE* 2ND HIGH
Bridgeport-001**	1/7/17	2/28/19
Bridgeport-123	2/14/20	12/28/15
Danbury-123	12/28/10	2/14/20
Enfield-005**	12/28/18	12/28/6
Greenwich-017	2/14/15	12/28/8
Groton-007**	12/28/11	11/2/9
Hartford-123	12/28/18	2/14/18



* Date is month/day/ending hour of occurrence.

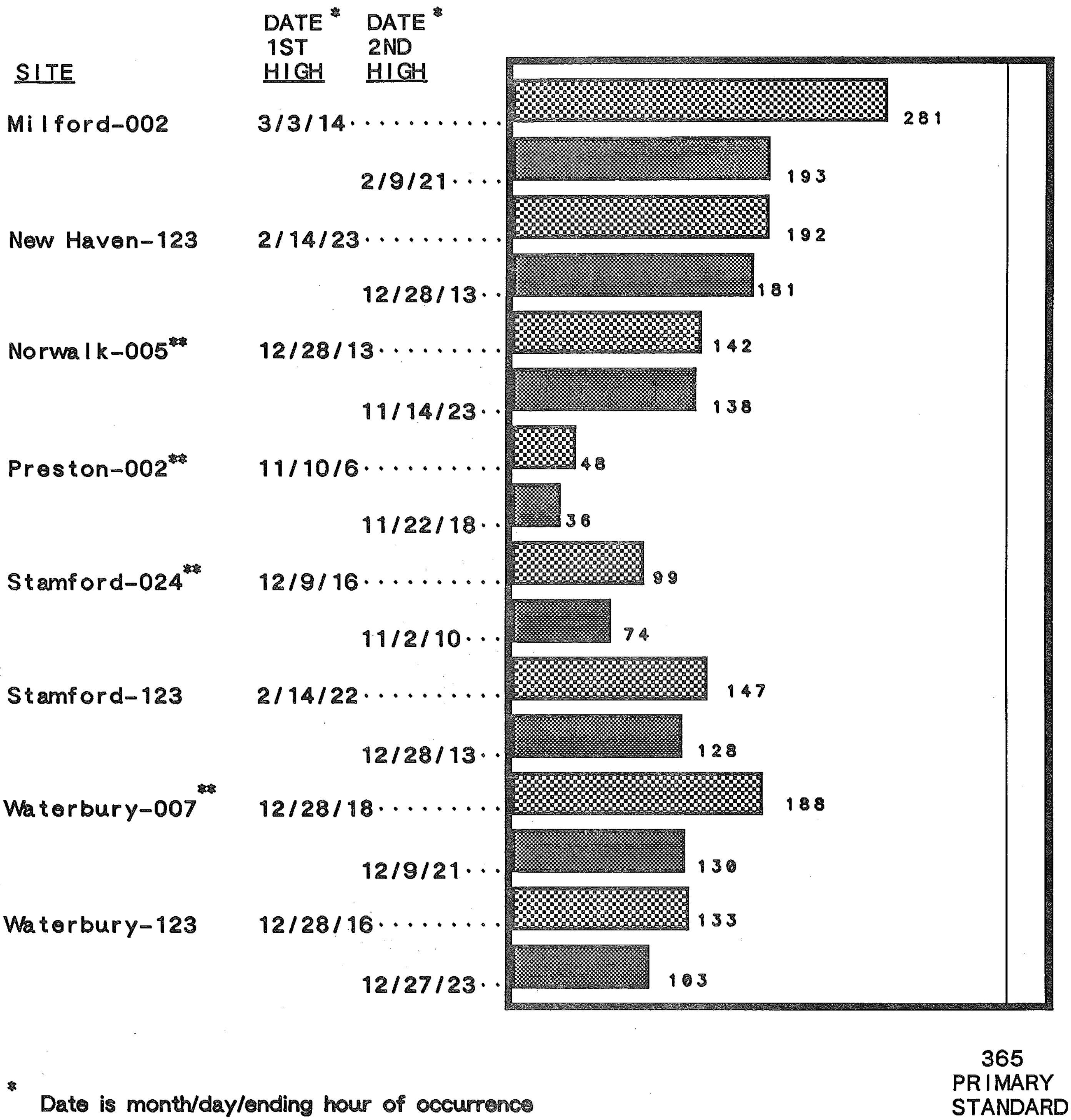
** Database for the site contains less than 75% of the possible observations.

N.B. When a listed concentration occurs more than once at a site, the earliest occurrence has precedence.

1ST HIGH, ug/m^3

2ND HIGH, ug/m^3

TABLE 14, Continued



* Date is month/day/ending hour of occurrence

** Database for the site contains less than 75% of the possible observations.

N.B. When a listed concentration occurs more than once at a site, the earliest occurrence has precedence.

1ST HIGH, ug/m^3

2ND HIGH, ug/m^3

TABLE 15

COMPARISONS OF 1983 FIRST AND SECOND HIGH RUNNING AND CALENDAR DAY 24-HOUR SO2 AVERAGES*

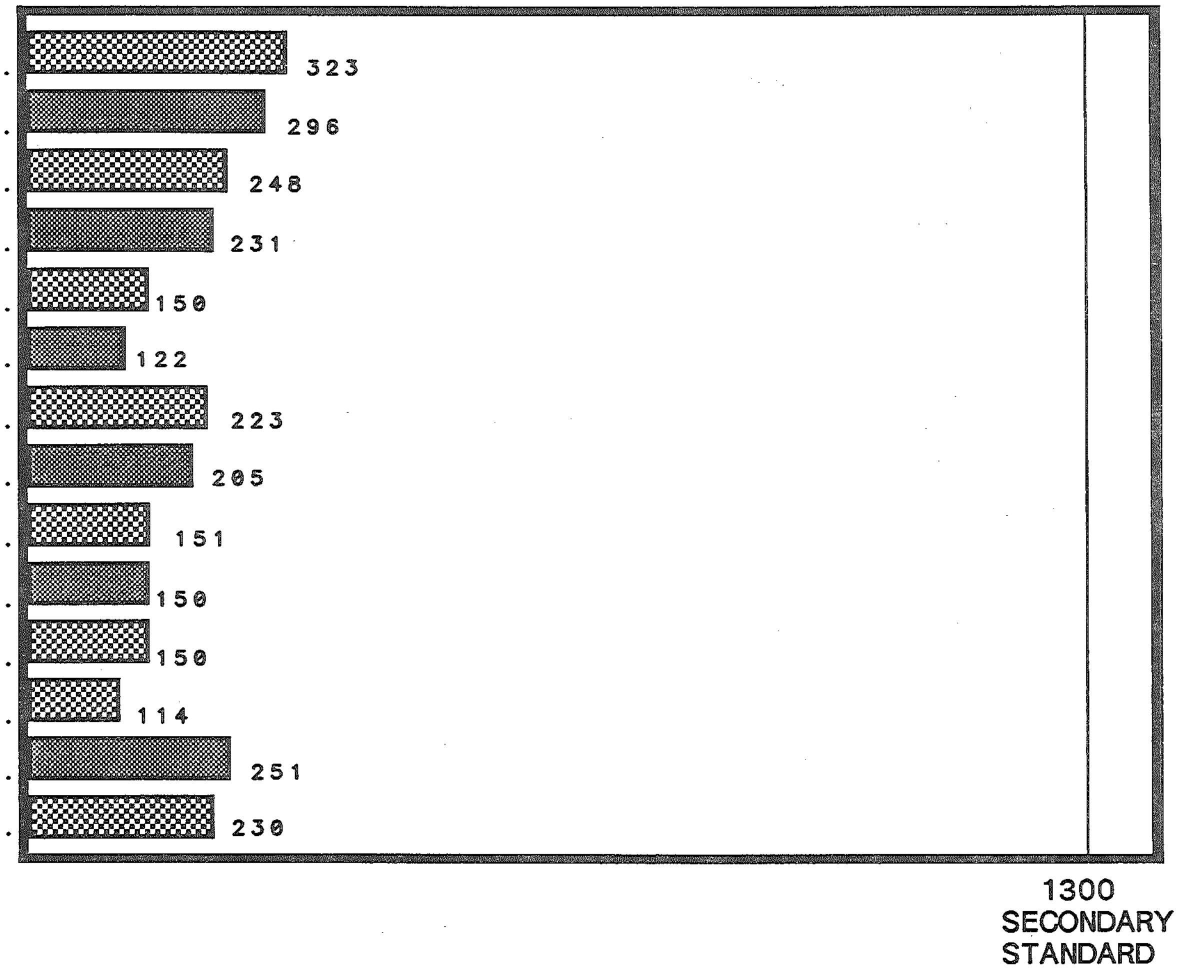
Site	1st High Running Avg.	1st High Calendar Day	2nd High Running Avg.	2nd High Calendar Day
Bridgeport-001**	134	127	121	120
Bridgeport-123	163	146	152	140
Danbury-123	93	89	91	86
Enfield-005**	143	126	103	101
Greenwich-017	96	85	81	76
Groton-007**	82	75	76	66
Hartford-123	171	143	148	142
Milford-002	281	189	193	173
New Haven-123	192	191	181	150
Norwalk-005**	142	138	138	116
Preston-002**	48	33	36	32
Stamford-024**	99	71	74	59
Stamford-123	147	143	128	123
Waterbury-007**	188	156	130	127
Waterbury-123	133	104	103	103

* Units are ug/m^3
** Database for the site contains less than 75% of the possible observations.

TABLE 16

1983 MAXIMUM RUNNING 3-HOUR SULFUR DIOXIDE CONCENTRATIONS

SITE	DATE * 1ST HIGH	DATE * 2ND HIGH
Bridgeport-001**	1/7/9	4/25/8
Bridgeport-123	12/15/17	8/22/17
Danbury-123	2/14/10	2/14/12
Enfield-005**	12/28/10	12/28/9
Greenwich-017	12/28/8	2/28/13
Groton-007**	11/1/13	11/2/9
Hartford-123	2/14/12	12/28/11



1ST HIGH, ug/m^3
2ND HIGH, ug/m^3

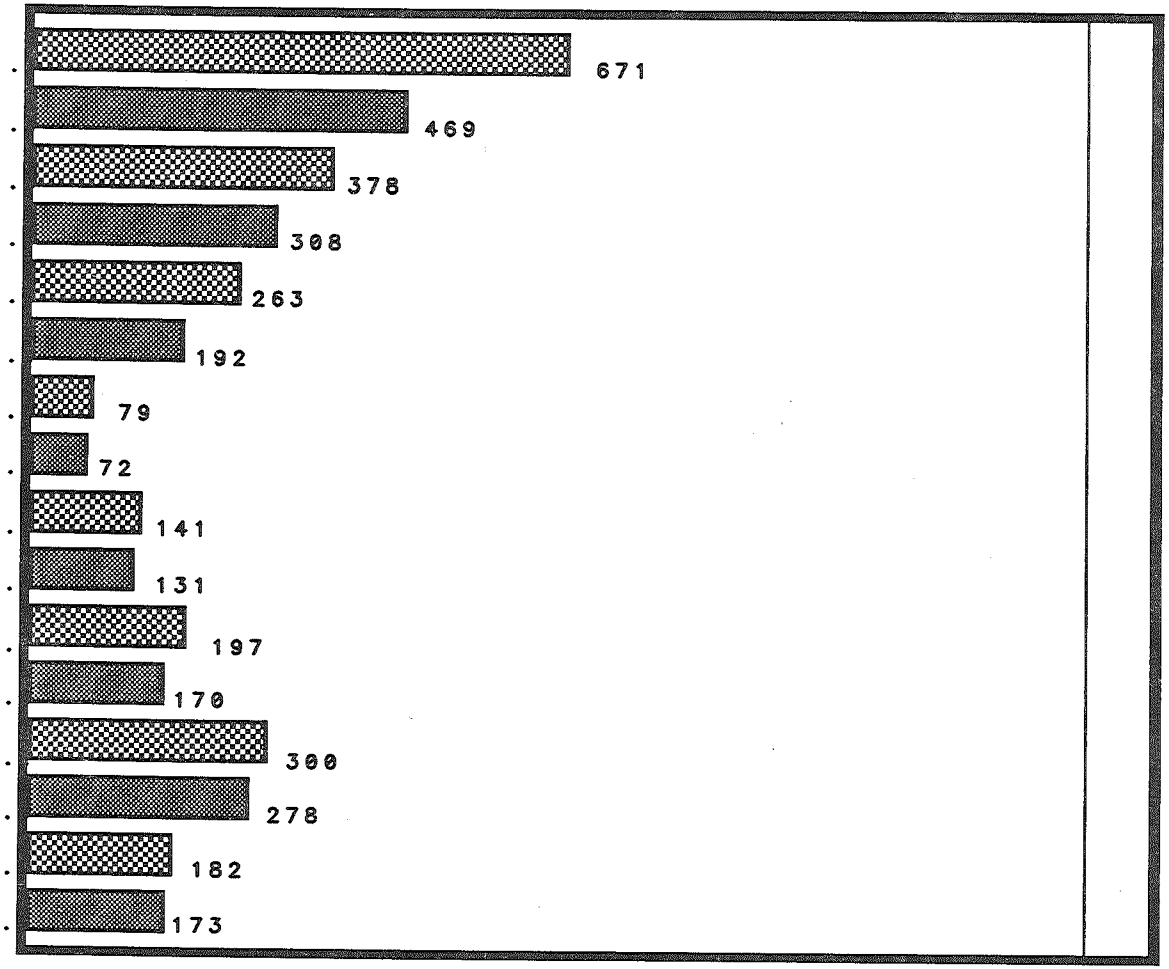
* Date is month/day/ending hour of occurrence.

** Database for the site contains less than 75% of the possible observations.

N.B. When a listed concentration occurs more than once at a site, the earliest occurrence has precedence.

TABLE 16, Continued

SITE	DATE* 1ST HIGH	DATE* 2ND HIGH
Milford-002	3/2/21	3/2/19
New Haven-123	2/14/10	2/14/8
Norwalk-005**	12/21/21	11/14/9
Preston-002**	11/9/17	11/9/20
Stamford-024**	12/8/24	12/8/23
Stamford-123	2/14/10	2/14/8
Waterbury-007**	12/28/9	12/28/11
Waterbury-123	12/28/10	12/28/12



1300
SECONDARY
STANDARD

1ST HIGH , ug/m^3
2ND HIGH , ug/m^3

* Date is month/day/ending hour of occurrence

** Database for the site contains less than 75% of the possible observations.

N.B. When a listed concentration occurs more than once at a site, the earliest occurrence has precedence.

TABLE 17

1983 TEN HIGHEST 24 HOUR AVERAGE SO2 DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN/SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10	
BRIDGEPORT 001		260	127	120	91	88	72	71	69	66	63	63	
		DATE	1/ 7/83	2/28/83	1/ 2/83	3/ 4/83	4/25/83	1/25/83	4/22/83	3/15/83	1/22/83	4/23/83	
METEOROLOGICAL SITE		DIR (DEG)	240	200	260	360	320	240	260	280	30	140	
NEWARK		VEL (MPH)	7.7	4.8	7.7	3.7	13.4	10.2	7.0	7.5	7.1	5.0	
		SPD (MPH)	9.1	5.9	9.2	7.0	14.5	10.8	8.9	11.6	7.5	7.5	
		RATIO	0.854	0.821	0.832	0.519	0.921	0.946	0.784	0.645	0.946	0.671	
METEOROLOGICAL SITE		DIR (DEG)	210	200	240	290	130	240	340	320	30	210	
BRADLEY		VEL (MPH)	4.3	4.3	5.3	1.7	2.5	6.8	1.3	4.2	0.3	3.4	5
		SPD (MPH)	5.0	5.3	6.2	3.9	8.3	7.9	3.7	7.6	2.7	4.7	
		RATIO	0.849	0.804	0.865	0.434	0.302	0.855	0.348	0.553	0.103	0.707	
METEOROLOGICAL SITE		DIR (DEG)	230	220	260	50	90	240	250	320	60	180	
BRIDGEPORT		VEL (MPH)	6.1	4.6	5.9	3.6	4.1	11.4	4.9	2.5	5.0	5.1	
		SPD (MPH)	7.8	4.7	6.5	5.9	7.5	11.5	7.2	8.2	6.0	7.5	
		RATIO	0.785	0.971	0.915	0.616	0.549	0.988	0.678	0.300	0.836	0.682	
METEOROLOGICAL SITE		DIR (DEG)	240	260	260	300	130	270	270	320	230	250	
WORCESTER		VEL (MPH)	5.8	5.3	5.0	8.2	4.7	8.2	4.9	3.9	1.3	4.6	
		SPD (MPH)	6.2	5.6	5.3	8.5	6.0	8.5	5.5	5.8	2.9	5.0	
		RATIO	0.939	0.949	0.944	0.961	0.774	0.972	0.897	0.686	0.455	0.910	
BRIDGEPORT 123		359	146	140	121	115	114	107	105	103	101	99	
		DATE	2/14/83	12/27/83	12/28/83	11/ 9/83	2/21/83	2/28/83	1/ 2/83	1/25/83	12/ 9/83	11/ 1/83	
METEOROLOGICAL SITE		DIR (DEG)	30	240	260	180	230	200	260	240	210	140	
NEWARK		VEL (MPH)	6.7	9.7	3.8	4.4	8.4	4.8	7.7	10.2	6.9	2.0	
		SPD (MPH)	7.3	10.2	10.5	5.5	8.9	5.9	9.2	10.8	7.3	4.7	
		RATIO	0.909	0.949	0.363	0.800	0.938	0.821	0.832	0.946	0.942	0.416	
METEOROLOGICAL SITE		DIR (DEG)	300	200	340	130	200	200	240	240	190	260	
BRADLEY		VEL (MPH)	0.4	4.1	1.8	1.5	6.0	4.3	5.3	6.8	5.4	0.7	
		SPD (MPH)	0.4	4.7	5.9	2.0	6.9	5.3	6.2	7.9	5.9	3.6	6
		RATIO	1.000	0.869	0.310	0.768	0.870	0.804	0.865	0.855	0.910	0.194	
METEOROLOGICAL SITE		DIR (DEG)	50	260	170	220	230	220	260	240	210	50	
BRIDGEPORT		VEL (MPH)	2.9	8.1	1.1	5.3	5.3	4.6	5.9	11.4	7.7	0.7	
		SPD (MPH)	3.3	8.2	13.4	6.0	6.0	4.7	6.5	11.5	8.6	4.3	
		RATIO	0.888	0.989	0.085	0.881	0.873	0.971	0.915	0.988	0.891	0.156	
METEOROLOGICAL SITE		DIR (DEG)	250	260	200	270	260	260	260	270	230	230	
WORCESTER		VEL (MPH)	6.4	7.4	3.6	5.5	6.6	5.3	5.0	8.2	6.1	2.5	
		SPD (MPH)	6.5	7.6	6.8	6.2	7.2	5.6	5.3	8.5	6.3	4.2	
		RATIO	0.994	0.975	0.531	0.890	0.921	0.949	0.944	0.972	0.970	0.596	
DANBURY 123		356	89	86	65	63	62	61	58	58	56	55	
		DATE	2/14/83	12/27/83	12/28/83	1/ 2/83	2/21/83	12/ 9/83	2/15/83	12/31/83	11/19/83	11/ 1/83	
METEOROLOGICAL SITE		DIR (DEG)	30	240	260	260	230	210	330	320	170	140	
NEWARK		VEL (MPH)	6.7	9.7	3.8	7.7	8.4	6.9	5.9	4.7	2.1	2.0	
		SPD (MPH)	7.3	10.2	10.5	9.2	8.9	7.3	6.3	5.0	5.0	4.7	
		RATIO	0.909	0.949	0.363	0.832	0.938	0.942	0.927	0.943	0.426	0.416	4
METEOROLOGICAL SITE		DIR (DEG)	300	200	340	240	200	190	350	250	320	260	
BRADLEY		VEL (MPH)	0.4	4.1	1.8	5.3	6.0	5.4	3.6	0.7	2.6	0.7	
		SPD (MPH)	0.4	4.7	5.9	6.2	6.9	5.9	4.0	1.4	4.2	3.6	
		RATIO	1.000	0.869	0.310	0.865	0.870	0.910	0.887	0.505	0.630	0.194	

TABLE 17, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE SO2 DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN/SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
	METEOROLOGICAL SITE	DIR (DEG)	50	260	170	260	230	210	330	290	200	50
	BRIDGEPORT	VEL (MPH)	2.9	8.1	1.1	5.9	5.3	7.7	7.4	4.3	0.7	0.7
		SPD (MPH)	3.3	8.2	13.4	6.5	6.0	8.6	8.5	5.6	3.4	4.3
		RATIO	0.888	0.989	0.085	0.915	0.873	0.891	0.867	0.767	0.216	0.156
	METEOROLOGICAL SITE	DIR (DEG)	250	260	200	260	260	230	340	290	290	230
	WORCESTER	VEL (MPH)	6.4	7.4	3.6	5.0	6.6	6.1	9.9	9.5	6.0	2.5
		SPD (MPH)	6.5	7.6	6.8	5.3	7.2	6.3	10.6	9.6	6.2	4.2
		RATIO	0.994	0.975	0.531	0.944	0.921	0.970	0.932	0.984	0.967	0.596
ENFIELD 005		61	126	101	55	49	46	42	41	41	40	38
		DATE	12/28/83	12/27/83	12/ 9/83	12/22/83	12/26/83	12/21/83	12/29/83	12/30/83	12/31/83	12/10/83
	METEOROLOGICAL SITE	DIR (DEG)	260	240	210	180	260	40	290	330	320	290
	NEWARK	VEL (MPH)	3.8	9.7	6.9	1.1	12.8	8.9	8.5	13.9	4.7	5.6
		SPD (MPH)	10.5	10.2	7.3	12.1	13.4	10.4	12.7	14.1	5.0	9.3
		RATIO	0.363	0.949	0.942	0.092	0.960	0.861	0.670	0.990	0.943	0.604
	METEOROLOGICAL SITE	DIR (DEG)	340	200	190	10	240	10	310	320	250	270
	BRADLEY	VEL (MPH)	1.8	4.1	5.4	6.1	6.7	4.7	8.3	4.9	0.7	4.0
		SPD (MPH)	5.9	4.7	5.9	7.0	8.1	5.0	11.2	5.6	1.4	6.5
		RATIO	0.310	0.869	0.910	0.870	0.828	0.933	0.741	0.880	0.505	0.614
	METEOROLOGICAL SITE	DIR (DEG)	170	260	210	120	270	30	300	330	290	270
	BRIDGEPORT	VEL (MPH)	1.1	8.1	7.7	5.4	12.9	6.5	8.6	8.0	4.3	6.2
		SPD (MPH)	13.4	8.2	8.6	10.9	13.1	8.1	10.6	8.2	5.6	8.1
		RATIO	0.085	0.989	0.891	0.494	0.989	0.802	0.807	0.976	0.760	0.769
	METEOROLOGICAL SITE	DIR (DEG)	200	260	230	70	260	350	280	300	290	270
	WORCESTER	VEL (MPH)	3.6	7.4	6.1	3.3	11.3	3.1	12.4	8.6	9.5	8.0
		SPD (MPH)	6.8	7.6	6.3	7.8	11.5	5.2	13.5	8.9	9.6	8.5
		RATIO	0.531	0.975	0.970	0.431	0.982	0.590	0.918	0.963	0.984	0.945
GREENWICH 017		333	85	76	71	62	61	56	54	54	51	47
		DATE	2/14/83	12/27/83	1/ 2/83	2/15/83	12/ 9/83	12/28/83	1/ 1/83	2/28/83	1/25/83	1/27/83
	METEOROLOGICAL SITE	DIR (DEG)	30	240	260	330	210	260	250	200	240	40
	NEWARK	VEL (MPH)	6.7	9.7	7.7	5.9	6.9	3.8	8.9	4.8	10.2	10.4
		SPD (MPH)	7.3	10.2	9.2	6.3	7.3	10.5	9.2	5.9	10.8	10.6
		RATIO	0.909	0.949	0.832	0.927	0.942	0.363	0.962	0.821	0.946	0.974
	METEOROLOGICAL SITE	DIR (DEG)	300	200	240	350	190	340	220	200	240	360
	BRADLEY	VEL (MPH)	0.4	4.1	5.3	3.6	5.4	1.8	5.4	4.3	6.8	3.3
		SPD (MPH)	0.4	4.7	6.2	4.0	5.9	5.9	6.8	5.3	7.9	3.9
		RATIO	1.000	0.869	0.865	0.887	0.910	0.310	0.800	0.804	0.855	0.845
	METEOROLOGICAL SITE	DIR (DEG)	50	260	260	330	210	170	250	220	240	50
	BRIDGEPORT	VEL (MPH)	2.9	8.1	5.9	7.4	7.7	1.1	8.4	4.6	11.4	8.1
		SPD (MPH)	3.3	8.2	6.5	8.5	8.6	13.4	9.1	4.7	11.5	8.2
		RATIO	0.888	0.989	0.915	0.867	0.891	0.085	0.930	0.971	0.988	0.992
	METEOROLOGICAL SITE	DIR (DEG)	250	260	260	340	230	200	260	260	270	330
	WORCESTER	VEL (MPH)	6.4	7.4	5.0	9.9	6.1	3.6	6.2	5.3	8.2	1.0
		SPD (MPH)	6.5	7.6	5.3	10.6	6.3	6.8	6.3	5.6	8.5	2.3
		RATIO	0.994	0.975	0.944	0.932	0.970	0.531	0.981	0.949	0.972	0.442

TABLE 17, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE SO2 DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN/SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10	
GROTON 007		79	75	66	63	56	52	51	47	40	39	37	
		DATE	12/27/83	11/ 9/83	11/ 1/83	11/ 2/83	12/28/83	12/ 9/83	12/31/83	10/31/83	11/22/83	12/ 2/83	
METEOROLOGICAL SITE		DIR (DEG)	240	180	140	140	260	210	320	230	260	250	
NEWARK		VEL (MPH)	9.7	4.4	2.0	2.2	3.8	6.9	4.7	5.3	9.9	9.6	
		SPD (MPH)	10.2	5.5	4.7	5.2	10.5	7.3	5.0	6.6	11.2	10.1	
		RATIO	0.949	0.800	0.416	0.416	0.363	0.942	0.943	0.805	0.886	0.956	
METEOROLOGICAL SITE		DIR (DEG)	200	130	260	190	340	190	250	280	260	210	
BRADLEY		VEL (MPH)	4.1	1.5	0.7	4.6	1.8	5.4	0.7	1.3	4.3	6.0	
		SPD (MPH)	4.7	2.0	3.6	4.6	5.9	5.9	1.4	2.7	8.6	6.3	5
		RATIO	0.869	0.768	0.194	0.997	0.310	0.910	0.505	0.485	0.499	0.947	
METEOROLOGICAL SITE		DIR (DEG)	260	220	50	200	170	210	290	230	260	270	
BRIDGEPORT		VEL (MPH)	8.1	5.3	0.7	2.7	1.1	7.7	4.3	3.9	8.1	8.7	
		SPD (MPH)	8.2	6.0	4.3	4.6	13.4	8.6	5.6	4.3	8.5	8.8	
		RATIO	0.989	0.881	0.156	0.582	0.085	0.891	0.760	0.899	0.956	0.987	
METEOROLOGICAL SITE		DIR (DEG)	260	270	230	250	200	230	290	280	280	260	
WORCESTER		VEL (MPH)	7.4	5.5	2.5	6.2	3.6	6.1	9.5	5.9	10.5	7.8	
		SPD (MPH)	7.6	6.2	4.2	6.3	6.8	6.3	9.6	6.2	10.9	8.3	
		RATIO	0.975	0.890	0.596	0.974	0.531	0.970	0.984	0.957	0.961	0.938	
HARTFORD 123		360	143	142	125	124	119	108	103	97	96	92	
		DATE	12/28/83	2/14/83	1/21/83	12/27/83	1/ 5/83	2/15/83	1/22/83	2/13/83	12/ 9/83	1/ 2/83	
METEOROLOGICAL SITE		DIR (DEG)	260	30	20	240	20	330	30	60	210	260	
NEWARK		VEL (MPH)	3.8	6.7	4.4	9.7	8.4	5.9	7.1	1.5	6.9	7.7	
		SPD (MPH)	10.5	7.3	4.6	10.2	8.6	6.3	7.5	4.9	7.3	9.2	
		RATIO	0.363	0.909	0.959	0.949	0.974	0.927	0.946	0.311	0.942	0.832	
METEOROLOGICAL SITE		DIR (DEG)	340	300	100	200	360	350	30	40	190	240	
BRADLEY		VEL (MPH)	1.8	0.4	0.9	4.1	2.3	3.6	0.3	0.3	5.4	5.3	3
		SPD (MPH)	5.9	0.4	2.6	4.7	2.9	4.0	2.7	1.7	5.9	6.2	
		RATIO	0.310	1.000	0.348	0.869	0.785	0.887	0.103	0.192	0.910	0.865	
METEOROLOGICAL SITE		DIR (DEG)	170	50	330	260	40	330	60	240	210	260	
BRIDGEPORT		VEL (MPH)	1.1	2.9	5.4	8.1	7.4	7.4	5.0	3.2	7.7	5.9	
		SPD (MPH)	13.4	3.3	5.8	8.2	7.8	8.5	6.0	4.6	8.6	6.5	
		RATIO	0.085	0.888	0.933	0.989	0.953	0.867	0.836	0.690	0.891	0.915	
METEOROLOGICAL SITE		DIR (DEG)	200	250	330	260	190	340	230	300	230	260	
WORCESTER		VEL (MPH)	3.6	6.4	7.6	7.4	3.5	9.9	1.3	5.1	6.1	5.0	
		SPD (MPH)	6.8	6.5	7.9	7.6	4.7	10.6	2.9	6.5	6.3	5.3	
		RATIO	0.531	0.994	0.962	0.975	0.731	0.932	0.455	0.788	0.970	0.944	
MILFORD 002		342	189	173	169	147	146	121	117	116	112	111	
		DATE	2/ 9/83	3/ 2/83	12/27/83	10/27/83	3/ 3/83	2/ 5/83	2/ 8/83	1/19/83	3/29/83	12/28/83	
METEOROLOGICAL SITE		DIR (DEG)	310	340	240	310	310	320	310	310	300	260	
NEWARK		VEL (MPH)	15.0	22.8	9.7	10.7	19.8	18.6	24.0	18.3	18.8	3.8	
		SPD (MPH)	15.1	24.4	10.2	13.1	20.0	19.0	24.3	18.5	19.5	10.5	
		RATIO	0.992	0.935	0.949	0.819	0.989	0.980	0.987	0.989	0.960	0.363	
METEOROLOGICAL SITE		DIR (DEG)	330	10	200	310	330	330	320	340	330	340	
BRADLEY		VEL (MPH)	13.9	13.3	4.1	5.8	16.7	12.5	12.4	11.1	13.7	1.8	1
		SPD (MPH)	14.1	14.5	4.7	7.3	17.5	13.1	12.7	11.5	14.2	5.9	
		RATIO	0.987	0.914	0.869	0.790	0.952	0.959	0.982	0.965	0.960	0.310	

TABLE 17, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE SO2 DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN/SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		320	340	260	320	330	340	310	320	320	170
	VEL (MPH)		12.0	15.5	8.1	7.2	12.1	12.6	12.6	10.4	13.1	1.1
	SPD (MPH)		12.1	16.5	8.2	8.1	12.4	12.7	12.9	10.6	14.1	13.4
	RATIO		0.993	0.936	0.989	0.889	0.977	0.992	0.978	0.977	0.927	0.085
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		320	360	260	300	320	330	320	320	310	200
	VEL (MPH)		16.5	15.4	7.4	9.6	20.9	14.6	19.4	15.4	15.2	3.6
	SPD (MPH)		16.7	18.3	7.6	10.4	21.0	15.0	19.5	15.5	15.5	6.8
	RATIO		0.987	0.841	0.975	0.928	0.994	0.974	0.992	0.992	0.980	0.531
NEW HAVEN 123		363	191	150	148	137	127	108	103	98	97	91
		DATE	2/14/83	12/28/83	12/27/83	12/31/83	11/ 9/83	1/ 2/83	12/ 9/83	2/21/83	2/15/83	1/ 7/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)		30	260	240	320	180	260	210	230	330	240
	VEL (MPH)		6.7	3.8	9.7	4.7	4.4	7.7	6.9	8.4	5.9	7.7
	SPD (MPH)		7.3	10.5	10.2	5.0	5.5	9.2	7.3	8.9	6.3	9.1
	RATIO		0.909	0.363	0.949	0.943	0.800	0.832	0.942	0.938	0.927	0.854
METEOROLOGICAL SITE BRADLEY	DIR (DEG)		300	340	200	250	130	240	190	200	350	210
	VEL (MPH)		0.4	1.8	4.1	0.7	1.5	5.3	5.4	6.0	3.6	4.3
	SPD (MPH)		0.4	5.9	4.7	1.4	2.0	6.2	5.9	6.9	4.0	5.0
	RATIO		1.000	0.310	0.869	0.505	0.768	0.865	0.910	0.870	0.887	0.849
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		50	170	260	290	220	260	210	230	330	230
	VEL (MPH)		2.9	1.1	8.1	4.3	5.3	5.9	7.7	5.3	7.4	6.1
	SPD (MPH)		3.3	13.4	8.2	5.6	6.0	6.5	8.6	6.0	8.5	7.8
	RATIO		0.888	0.085	0.989	0.760	0.881	0.915	0.891	0.873	0.867	0.785
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		250	200	260	290	270	260	230	260	340	240
	VEL (MPH)		6.4	3.6	7.4	9.5	5.5	5.0	6.1	6.6	9.9	5.8
	SPD (MPH)		6.5	6.8	7.6	9.6	6.2	5.3	6.3	7.2	10.6	6.2
	RATIO		0.994	0.531	0.975	0.984	0.890	0.944	0.970	0.921	0.932	0.939
NORWALK 005		226	138	116	102	100	94	93	89	80	79	78
		DATE	11/14/83	12/27/83	12/28/83	12/21/83	12/ 4/83	11/ 9/83	12/13/83	12/ 9/83	12/31/83	11/10/83
METEOROLOGICAL SITE NEWARK	DIR (DEG)		30	240	260	40	30	180	20	210	320	50
	VEL (MPH)		12.6	9.7	3.8	8.9	11.6	4.4	11.6	6.9	4.7	9.3
	SPD (MPH)		12.8	10.2	10.5	10.4	13.1	5.5	13.8	7.3	5.0	9.5
	RATIO		0.985	0.949	0.363	0.861	0.887	0.800	0.839	0.942	0.943	0.985
METEOROLOGICAL SITE BRADLEY	DIR (DEG)		20	200	340	10	20	130	10	190	250	40
	VEL (MPH)		7.1	4.1	1.8	4.7	9.1	1.5	10.3	5.4	0.7	6.0
	SPD (MPH)		7.5	4.7	5.9	5.0	9.3	2.0	10.8	5.9	1.4	6.3
	RATIO		0.945	0.869	0.310	0.933	0.978	0.768	0.952	0.910	0.505	0.956
METEOROLOGICAL SITE BRIDGEPORT	DIR (DEG)		40	260	170	30	40	220	40	210	290	60
	VEL (MPH)		8.9	8.1	1.1	6.5	15.1	5.3	12.5	7.7	4.3	11.7
	SPD (MPH)		8.9	8.2	13.4	8.1	16.1	6.0	12.5	8.6	5.6	11.8
	RATIO		0.994	0.989	0.085	0.802	0.935	0.881	0.998	0.891	0.760	0.994
METEOROLOGICAL SITE WORCESTER	DIR (DEG)		50	260	200	350	60	270	30	230	290	60
	VEL (MPH)		6.8	7.4	3.6	3.1	11.0	5.5	9.3	6.1	9.5	8.3
	SPD (MPH)		7.0	7.6	6.8	5.2	11.2	6.2	9.3	6.3	9.6	8.5
	RATIO		0.968	0.975	0.531	0.590	0.980	0.890	0.995	0.970	0.984	0.973

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TABLE 17, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE SO2 DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN/SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
PRESTON 002		61	33	32	32	26	26	24	22	22	22	22
		DATE	11/18/83	11/22/83	12/17/83	12/ 9/83	12/10/83	12/18/83	11/10/83	11/20/83	11/30/83	12/19/83
METEOROLOGICAL SITE		DIR (DEG)	270	260	280	210	290	250	50	140	240	340
NEWARK		VEL (MPH)	10.7	9.9	10.6	6.9	5.6	7.0	9.3	5.6	15.3	14.0
		SPD (MPH)	11.5	11.2	10.8	7.3	9.3	8.3	9.5	6.0	15.5	15.1
		RATIO	0.929	0.886	0.979	0.942	0.604	0.836	0.985	0.929	0.984	0.926
METEOROLOGICAL SITE		DIR (DEG)	300	260	300	190	270	230	40	150	250	360
BRADLEY		VEL (MPH)	9.4	4.3	7.0	5.4	4.0	5.0	6.0	2.5	10.4	8.6
		SPD (MPH)	10.1	8.6	7.5	5.9	6.5	6.2	6.3	3.7	10.6	9.5
		RATIO	0.930	0.499	0.936	0.910	0.614	0.805	0.956	0.657	0.974	0.904
METEOROLOGICAL SITE		DIR (DEG)	280	260	280	210	270	270	60	80	250	330
BRIDGEPORT		VEL (MPH)	8.5	8.1	8.7	7.7	6.2	7.5	11.7	5.0	11.8	13.5
		SPD (MPH)	8.6	8.5	8.9	8.6	8.1	9.6	11.8	5.6	11.9	14.4
		RATIO	0.983	0.956	0.976	0.891	0.769	0.782	0.994	0.898	0.990	0.938
METEOROLOGICAL SITE		DIR (DEG)	290	280	290	230	270	260	60	120	250	320
WORCESTER		VEL (MPH)	13.5	10.5	7.8	6.1	8.0	6.5	8.3	2.9	9.8	7.9
		SPD (MPH)	13.7	10.9	8.2	6.3	8.5	7.2	8.5	4.3	10.4	9.3
		RATIO	0.989	0.961	0.956	0.970	0.945	0.910	0.973	0.680	0.942	0.841
STAMFORD 024		34	71	59	56	50	48	47	43	41	39	34
		DATE	12/ 9/83	11/ 2/83	10/ 4/83	12/ 3/83	12/ 2/83	12/ 8/83	12/10/83	11/30/83	12/11/83	12/12/83
METEOROLOGICAL SITE		DIR (DEG)	210	140	220	310	250	260	290	240	50	80
NEWARK		VEL (MPH)	6.9	2.2	7.1	6.2	9.6	9.2	5.6	15.3	10.7	12.9
		SPD (MPH)	7.3	5.2	8.1	7.8	10.1	9.8	9.3	15.5	11.9	15.4
		RATIO	0.942	0.416	0.887	0.797	0.956	0.942	0.604	0.984	0.899	0.839
METEOROLOGICAL SITE		DIR (DEG)	190	190	180	300	210	290	270	250	30	30
BRADLEY		VEL (MPH)	5.4	4.6	5.6	4.3	6.0	9.2	4.0	10.4	6.2	7.8
		SPD (MPH)	5.9	4.6	5.9	6.6	6.3	10.1	6.5	10.6	8.3	8.8
		RATIO	0.910	0.997	0.959	0.657	0.947	0.911	0.614	0.974	0.746	0.891
METEOROLOGICAL SITE		DIR (DEG)	210	200	230	340	270	290	270	250	60	60
BRIDGEPORT		VEL (MPH)	7.7	2.7	6.6	6.7	8.7	7.3	6.2	11.8	14.8	16.1
		SPD (MPH)	8.6	4.6	7.2	7.9	8.8	8.1	8.1	11.9	15.0	16.2
		RATIO	0.891	0.582	0.920	0.842	0.987	0.906	0.769	0.990	0.989	0.990
METEOROLOGICAL SITE		DIR (DEG)	230	250	250	290	260	270	270	250	60	60
WORCESTER		VEL (MPH)	6.1	6.2	5.2	6.6	7.8	15.1	8.0	9.8	7.4	9.2
		SPD (MPH)	6.3	6.3	5.6	7.6	8.3	15.2	8.5	10.4	8.5	9.5
		RATIO	0.970	0.974	0.933	0.864	0.938	0.988	0.945	0.942	0.878	0.971
STAMFORD 123		362	143	123	101	101	95	86	84	76	75	71
		DATE	2/14/83	12/27/83	2/21/83	2/28/83	12/28/83	12/ 9/83	1/ 2/83	1/25/83	2/15/83	2/13/83
METEOROLOGICAL SITE		DIR (DEG)	30	240	230	200	260	210	260	240	330	60
NEWARK		VEL (MPH)	6.7	9.7	8.4	4.8	3.8	6.9	7.7	10.2	5.9	1.5
		SPD (MPH)	7.3	10.2	8.9	5.9	10.5	7.3	9.2	10.8	6.3	4.9
		RATIO	0.909	0.949	0.938	0.821	0.363	0.942	0.832	0.946	0.927	0.311
METEOROLOGICAL SITE		DIR (DEG)	300	200	200	200	340	190	240	240	350	40
BRADLEY		VEL (MPH)	0.4	4.1	6.0	4.3	1.8	5.4	5.3	6.8	3.6	0.3
		SPD (MPH)	0.4	4.7	6.9	5.3	5.9	5.9	6.2	7.9	4.0	1.7
		RATIO	1.000	0.869	0.870	0.804	0.310	0.910	0.865	0.855	0.887	0.192

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TABLE 17, CONTINUED

1983 TEN HIGHEST 24 HOUR AVERAGE SO2 DAYS WITH WIND DATA

UNITS : MICROGRAMS / CUBIC METER

TOWN/SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE	DIR (DEG)	50	260	230	220	170	210	260	240	330	240
BRIDGEPORT	VEL (MPH)	2.9	8.1	5.3	4.6	1.1	7.7	5.9	11.4	7.4	3.2
	SPD (MPH)	3.3	8.2	6.0	4.7	13.4	8.6	6.5	11.5	8.5	4.6
	RATIO	0.888	0.989	0.873	0.971	0.085	0.891	0.915	0.988	0.867	0.690
METEOROLOGICAL SITE	DIR (DEG)	250	260	260	260	200	230	260	270	340	300
WORCESTER	VEL (MPH)	6.4	7.4	6.6	5.3	3.6	6.1	5.0	8.2	9.9	5.1
	SPD (MPH)	6.5	7.6	7.2	5.6	6.8	6.3	5.3	8.5	10.6	6.5
	RATIO	0.994	0.975	0.921	0.949	0.531	0.970	0.944	0.972	0.932	0.788
WATERBURY 007	60	156	127	112	82	78	71	58	53	53	51
	DATE	12/28/83	12/ 9/83	12/27/83	12/31/83	11/ 1/83	12/ 6/83	12/26/83	10/31/83	12/22/83	11/ 2/83
METEOROLOGICAL SITE	DIR (DEG)	260	210	240	320	140	200	260	230	180	140
NEWARK	VEL (MPH)	3.8	6.9	9.7	4.7	2.0	4.9	12.8	5.3	1.1	2.2
	SPD (MPH)	10.5	7.3	10.2	5.0	4.7	10.6	13.4	6.6	12.1	5.2
	RATIO	0.363	0.942	0.949	0.943	0.416	0.459	0.960	0.805	0.092	0.416
METEOROLOGICAL SITE	DIR (DEG)	340	190	200	250	260	10	240	280	10	190
BRADLEY	VEL (MPH)	1.8	5.4	4.1	0.7	0.7	2.3	6.7	1.3	6.1	4.6
	SPD (MPH)	5.9	5.9	4.7	1.4	3.6	4.2	8.1	2.7	7.0	4.6
	RATIO	0.310	0.910	0.869	0.505	0.194	0.551	0.828	0.485	0.870	0.997
METEOROLOGICAL SITE	DIR (DEG)	170	210	260	290	50	170	270	230	120	200
BRIDGEPORT	VEL (MPH)	1.1	7.7	8.1	4.3	0.7	8.1	12.9	3.9	5.4	2.7
	SPD (MPH)	13.4	8.6	8.2	5.6	4.3	9.9	13.1	4.3	10.9	4.6
	RATIO	0.085	0.891	0.989	0.760	0.156	0.812	0.989	0.899	0.494	0.582
METEOROLOGICAL SITE	DIR (DEG)	200	230	260	290	230	160	260	280	70	250
WORCESTER	VEL (MPH)	3.6	6.1	7.4	9.5	2.5	3.9	11.3	5.9	3.3	6.2
	SPD (MPH)	6.8	6.3	7.6	9.6	4.2	5.0	11.5	6.2	7.8	6.3
	RATIO	0.531	0.970	0.975	0.984	0.596	0.772	0.982	0.957	0.431	0.974
WATERBURY 123	351	104	103	79	79	75	73	72	69	59	59
	DATE	12/27/83	12/28/83	1/ 2/83	11/ 1/83	2/14/83	12/ 9/83	11/ 9/83	12/26/83	2/28/83	12/22/83
METEOROLOGICAL SITE	DIR (DEG)	240	260	260	140	30	210	180	260	200	180
NEWARK	VEL (MPH)	9.7	3.8	7.7	2.0	6.7	6.9	4.4	12.8	4.8	1.1
	SPD (MPH)	10.2	10.5	9.2	4.7	7.3	7.3	5.5	13.4	5.9	12.1
	RATIO	0.949	0.363	0.832	0.416	0.909	0.942	0.800	0.960	0.821	0.092
METEOROLOGICAL SITE	DIR (DEG)	200	340	240	260	300	190	130	240	200	10
BRADLEY	VEL (MPH)	4.1	1.8	5.3	0.7	0.4	5.4	1.5	6.7	4.3	6.1
	SPD (MPH)	4.7	5.9	6.2	3.6	0.4	5.9	2.0	8.1	5.3	7.0
	RATIO	0.869	0.310	0.865	0.194	1.000	0.910	0.768	0.828	0.804	0.870
METEOROLOGICAL SITE	DIR (DEG)	260	170	260	50	50	210	220	270	220	120
BRIDGEPORT	VEL (MPH)	8.1	1.1	5.9	0.7	2.9	7.7	5.3	12.9	4.6	5.4
	SPD (MPH)	8.2	13.4	6.5	4.3	3.3	8.6	6.0	13.1	4.7	10.9
	RATIO	0.989	0.085	0.915	0.156	0.888	0.891	0.881	0.989	0.971	0.494
METEOROLOGICAL SITE	DIR (DEG)	260	200	260	230	250	230	270	260	260	70
WORCESTER	VEL (MPH)	7.4	3.6	5.0	2.5	6.4	6.1	5.5	11.3	5.3	3.3
	SPD (MPH)	7.6	6.8	5.3	4.2	6.5	6.3	6.2	11.5	5.6	7.8
	RATIO	0.975	0.531	0.944	0.596	0.994	0.970	0.890	0.982	0.949	0.431

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5

IV. OZONE

Health Effects

Ozone is a poisonous form of oxygen and the principal component of modern smog. Until recently, EPA called this type of pollution "photochemical oxidants." The name has been changed to ozone because ozone is the only oxidant actually measured and is the most plentiful.

Ozone and other oxidants -- including peroxyacetal nitrates (PAN), formaldehydes and peroxides -- are not usually emitted into the air directly. They are formed by chemical reactions in the air from two other pollutants: hydrocarbons and nitrogen oxides. Energy from sunlight is needed for these chemical reactions. This accounts for the term photochemical smog and the daily variation in ozone levels, which increase during the day and decrease at night.

Ozone is a pungent-smelling gas with a faintly bluish color. It irritates the mucous membranes of the respiratory system, causing coughing, choking and impaired lung function. It aggravates chronic respiratory diseases like asthma and bronchitis and is believed capable of hastening the death, by pneumonia, of persons in already weakened health. PAN and the other oxidants that accompany ozone are powerful eye irritants.

Conclusions

As in past years, Connecticut experienced very high concentrations of ozone in the summer months of 1983. Levels in excess of the one-hour NAAQS of 0.12 ppm were frequently recorded at each of the ten monitored sites. As a result, the one-hour standard for ozone was violated at every site. Nine sites experienced levels greater than 0.20 ppm in 1983, as opposed to four sites in 1982. Both the highest and the second highest one-hour concentrations increased at all ten sites.

The incidence of ozone levels in excess of the 1-hour 0.12 ppm standard increased from 1982 to 1983 (see Table 19). There was a total of 437 exceedances in 1982 and 959 in 1983 at those monitored sites that operated in both years. This represents a rise in the frequency of such exceedances from 10.5 per 1000 sampling hours in 1982 to 24.2 per 1000 sampling hours in 1983: a 130% increase. If one eliminates the duplication that results when two or more sites experience an exceedance in the same hour, then the number of exceedances increased from 180 to 351. On this basis, the state saw a 107% increase in the frequency of hourly exceedances of the standard.

The number of days on which the ozone monitors experienced ozone levels in excess of the 1-hour standard increased from 128 days in 1982 to 267 days in 1983 (see Table 18). This represents an increase in the frequency of such occurrences from 7.4 per 100 sampling days in 1982 to 16.2 per 100 sampling days in 1983: a 119% increase. If the duplication that results when two or more sites experience an exceedance on the same day is eliminated, then the number of exceedances increased from 36 to 60. On this basis, the state saw a 76% rise in the frequency of daily exceedances of the standard.

The yearly changes in ozone concentrations can be attributed to year-to-year variations in regional weather conditions, especially wind direction, temperature and the amount of sunlight. A large portion of the peak ozone concentrations in Connecticut is caused by the transport of ozone and/or precursors (i.e., hydrocarbons and nitrogen oxides) from the New York City area and other points to the west and southwest. The percentage of southwest winds during the "ozone season" remained about the same from 1982 to 1983, as is shown by the wind roses from Newark (Figures 9 and 10). The wind roses from Bradley (Figures 7 and 8) are not as representative, since the airport is located in the Connecticut River Valley and the wind gets channeled up or down the valley. The magnitude of the high ozone levels can be associated with yearly variations in temperature. Ozone production is greatest at high temperatures and in strong sunlight. The summer season's daily high temperatures were higher in 1983 than in 1982. This is demonstrated by the number of days exceeding 90°F which increased from five in 1982 to eleven in 1983 at Sikorsky Airport in Bridgeport. At Bradley International Airport, the number of days exceeding 90°F increased from 11 in 1982 to 30 in 1983. The percentage of possible sunshine at Bradley averaged 74% in 1983 and 64% in 1982 for the months June through September. The average for the summer months at Bradley is normally about 62%. This large percentage of possible sunshine and the resulting increase in high temperature days are believed to be major factors in the increase in the number of high ozone days in Connecticut in 1983.

Method of Measurement

The DEP Air Monitoring Unit uses chemiluminescent instruments to measure and record instantaneous concentrations of ozone continuously by means of a fluorescent technique. Properly calibrated, these instruments are shown to be remarkably reliable and stable.

Discussion of Data

Monitoring Network – In order to gather information which will further the understanding of ozone production and transport, and to provide real–time data for the daily Pollutant Standards Index, DEP operated a state–wide ozone monitoring network consisting of four types of sites in 1983 (see Figure 6):

Urban	– Bridgeport, East Hartford, Middletown, New Haven
Advection from Southwest	– Danbury, Greenwich
Suburban	– Groton, Madison, Stratford
Rural	– Stafford

Precision and Accuracy – The ozone monitors had a total of 117 precision checks during 1983. The resulting 95% probability limits were −8% to +9%. Accuracy is determined by introducing a known amount of ozone into each of the monitors. Three different concentration levels are tested: low, medium, and high. The 95% probability limits, based on 13 audits conducted on the monitoring system, were: low, −14% to +7; medium, −8% to +5%; and high, −7% to +5%.

NAAQS – On February 8, 1979 the EPA established a national ambient air quality standard (NAAQS) for ozone of 0.12 ppm for a one–hour average. Compliance with this standard is determined by summing the number of days at each monitoring site over a consecutive three–year period when the 1–hour standard is exceeded and then computing the average number of exceedances over this interval. If the resulting average value is less than or equal to 1.0 (that is, if the fourth highest daily value in a consecutive three–year period is less than or equal to 0.12 ppm) the ozone standard is considered attained at the site. This standard replaces the old photochemical oxidant standard of 0.08 ppm. The definition of the pollutant was changed along with the numerical value of the standard, partly because the instruments used to measure photochemical oxidants in the air really measure only ozone. Ozone is one of a group of chemicals which are formed photochemically in the air and are called photochemical oxidants. In the past, the two terms have often been used interchangeably. This 1983 Air Quality Summary uses the term "ozone" in conjunction with the NAAQS to reflect the change in both the numerical value of the NAAQS and the definition of the pollutant.

The EPA defines the ozone standard to two decimal places. Therefore, the standard is considered exceeded when a level of 0.13 pm is reached. However, since the DEP still measures ozone levels to three decimal places, any one-hour average ozone reading which equals or is greater than 0.125 ppm is considered an exceedance of the 0.12 ppm standard in Connecticut. This interpretation of the ozone standard differs from the one used by the DEP before 1982, when a one-hour ozone concentration of 0.121 ppm was considered an exceedance of the standard.

1-Hour Average – The 1-hour ozone standard was exceeded at all ten DEP monitoring sites in 1983. Moreover, the highest 1-hour average ozone concentrations were higher in 1983 than in 1982 at all ten sites. Groton 005 had the largest increase of ~~96~~ .096 ppm.

The number of days on which the 1-hour standard was exceeded at each site during the summertime "ozone season" is presented in Table 18. The number of times the ozone standard was exceeded is presented in Table 19 for each site. Table 20 shows the year's high and second high concentrations at each site.

10 High Days with Wind Data – Table 21 lists the ten highest 1-hour ozone averages and their dates of occurrence for each ozone site in 1983. The wind data associated with these high readings are also presented. (See the discussion of Table 11 in the TSP section for a description of the origin and use of these wind data.)

Nearly all (i.e., 86%) of the high ozone levels occurred on days with southwesterly winds. This is due to the special features of a southwest wind blowing over Connecticut. The first aspect of a southwest wind is that, during the summer, it usually accompanies high temperatures and bright sunshine, which are important to the production of ozone. The second is that it will transport precursor emissions from New York City and other urban areas to the southwest of Connecticut. It is the combination of these factors that often produces unhealthful ozone levels in Connecticut.

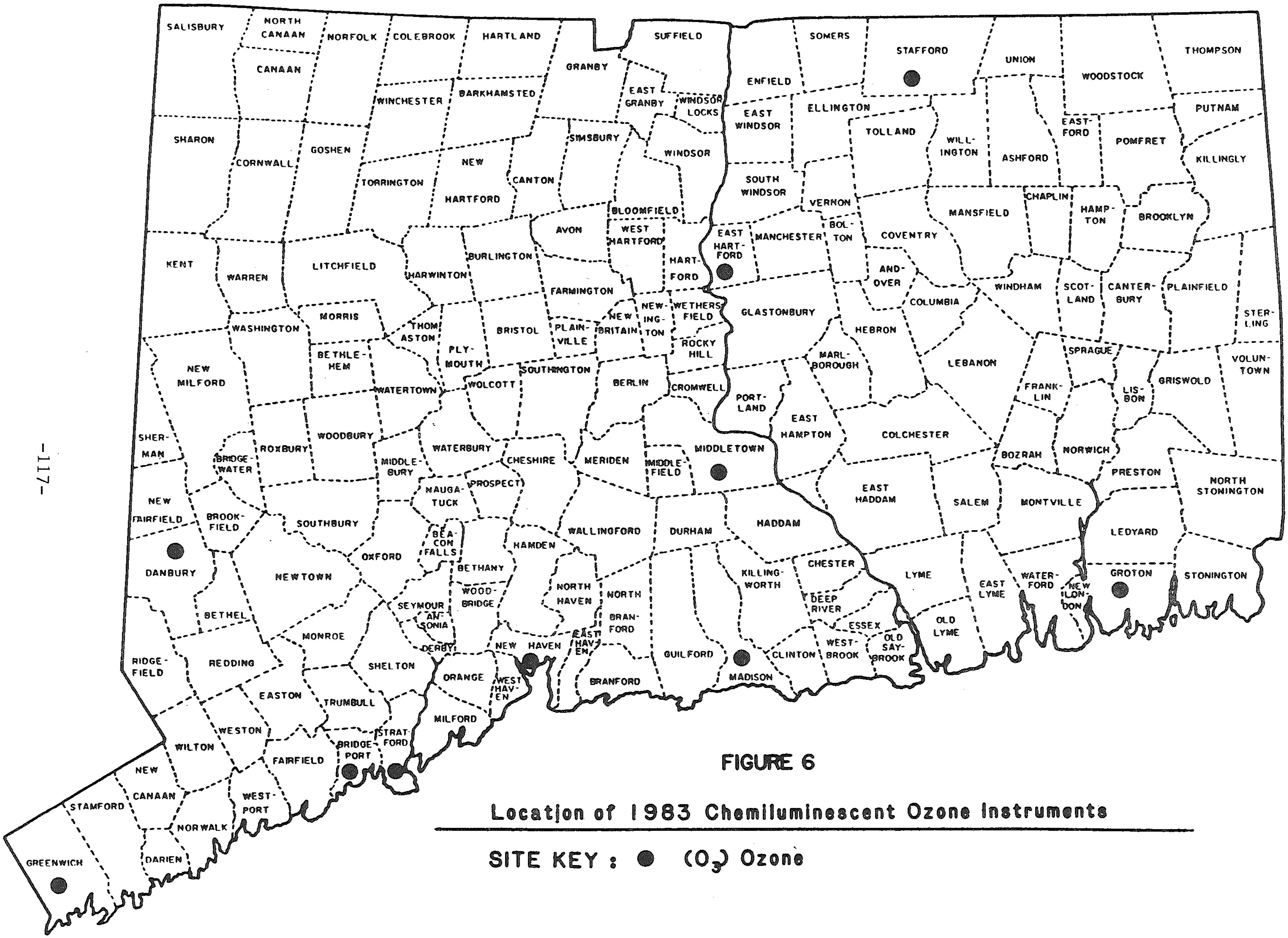


FIGURE 6

Location of 1983 Chemiluminescent Ozone Instruments

SITE KEY : ● (O_3) Ozone

TABLE 18

NUMBER OF DAYS ON WHICH THE 1-HOUR OZONE STANDARD WAS EXCEEDED IN 1983

SITE	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	TOTAL	TOTAL FOR LAST YEAR
Bridgeport-123	0	0	5	5	6	8	24	9
Danbury-123	1*	0	8	6	8	2	25	9
East Hartford-003	1	0	3	3	6	2	15	6
Greenwich-017	X	0	9	7	9	7	32	15
Groton-005	X	0	9	10	7	10	36	18
Madison-002	X	0	8	6	4*	5	23	11
Middletown-007	1	0	6	4	3	6	20	19
New Haven-123	0	0	7	7	6	7	27	9
Stafford-001	1	0	6	4	6	3	20	10
Stratford-007	1	0	13	11	10	10	45	22
				TOTAL SITE DAYS			267	128
				TOTAL INDIVIDUAL DAYS			60	36

X No data available
* Less than 75% of data available

TABLE 19

NUMBER OF EXCEEDANCES OF THE 1-HOUR OZONE STANDARD IN 1983

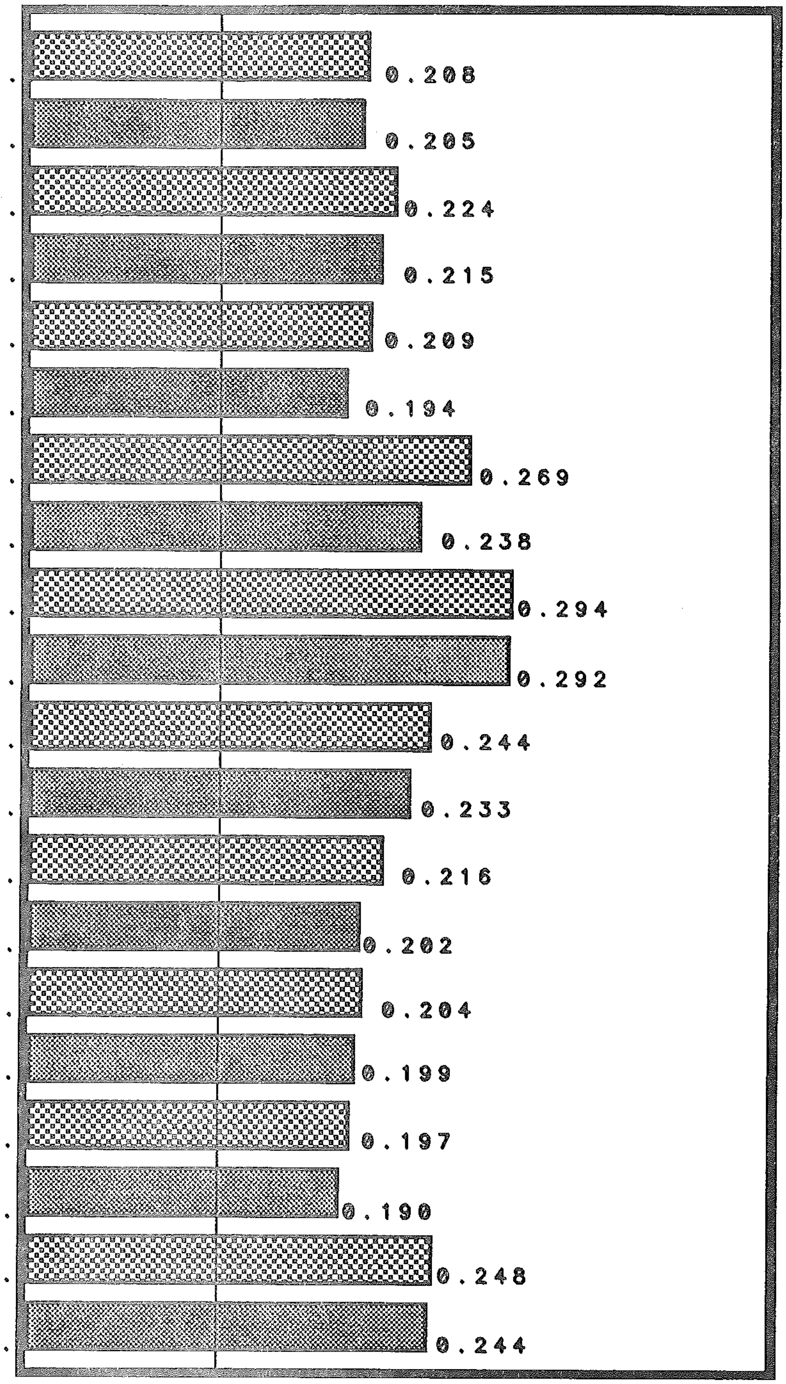
SITE	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	TOTAL	TOTAL FOR LAST YEAR
Bridgeport-123	0	0	18	16	16	17	67	30
Danbury-123	3*	0	39	24	24	4	94	24
East Hartford-003	2	0	9	6	14	4	35	14
Greenwich-017	X	0	41	27	28	20	116	52
Groton-005	X	0	47	48	29	63	187	62
Madison-002	X	0	37	21	9*	14	81	41
Middletown-007	3	0	25	14	12	15	69	47
New Haven-123	0	0	26	20	22	14	82	35
Stafford-001	3	0	19	10	17	11	60	37
Stratford-007	3	0	52	36	37	40	168	95
				TOTAL SITE HOURS			959	437
				TOTAL INDIVIDUAL HOURS			351	180

X No data available
* Less than 75% of the data available

TABLE 20

1983 MAXIMUM 1-HOUR OZONE CONCENTRATIONS

SITE	DATE* 1ST HIGH	DATE* 2ND HIGH	1ST HIGH, ppm	2ND HIGH, ppm
Bridgeport-123	6/27/16	6/27/15	0.208	0.205
Danbury-123	8/27/18	6/14/18	0.224	0.215
E. Hartford-003	6/15/13	6/15/14	0.209	0.194
Greenwich-017	6/15/14	6/15/13	0.269	0.238
Groton-005	6/27/15	6/27/16	0.294	0.292
Madison-002	6/27/15	6/27/16	0.244	0.233
Middletown-007	6/15/15	6/15/14	0.216	0.202
New Haven-123	9/6/14	6/27/17	0.204	0.199
Stafford-001	8/26/17	9/6/18	0.197	0.190
Stratford-007	6/15/14	6/15/15	0.248	0.244



0.120 PRIMARY AND SECONDARY STANDARD

* Date is month/day/ending hour of occurrence

1ST HIGH , ppm

2ND HIGH , ppm

TABLE 21

1983 TEN HIGHEST 1-HOUR AVERAGE OZONE DAYS WITH WIND DATA

UNITS : PARTS PER MILLION

TOWN/SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
BRIDGEPORT 123	214	0.208	0.188	0.186	0.179	0.175	0.175	0.173	0.159	0.155	0.151
	DATE	6/27/83	6/15/83	8/28/83	7/ 2/83	8/17/83	8/27/83	9/10/83	7/ 4/83	9/ 6/83	6/11/83
METEOROLOGICAL SITE	DIR (DEG)	240	200	180	230	220	220	260	180	220	210
NEWARK	VEL (MPH)	11.1	6.2	4.7	10.2	5.5	8.7	9.5	7.3	8.2	6.2
	SPD (MPH)	12.2	7.9	10.2	11.5	8.8	9.2	10.6	8.3	9.1	8.2
	RATIO	0.905	0.784	0.461	0.883	0.624	0.945	0.891	0.871	0.910	0.755
METEOROLOGICAL SITE	DIR (DEG)	210	260	240	220	200	230	260	200	220	240
BRADLEY	VEL (MPH)	5.9	3.4	1.7	5.0	5.9	3.6	4.6	7.3	5.7	2.3
	SPD (MPH)	7.3	5.5	5.2	6.9	6.2	4.9	7.6	7.5	6.0	5.2
	RATIO	0.799	0.621	0.332	0.725	0.949	0.733	0.606	0.975	0.950	0.453
METEOROLOGICAL SITE	DIR (DEG)	230	220	60	220	210	220	230	160	220	230
BRIDGEPORT	VEL (MPH)	5.7	6.8	1.5	8.7	5.8	6.5	6.5	4.4	7.4	8.1
	SPD (MPH)	10.1	7.3	6.2	8.9	5.9	7.0	6.6	6.8	8.2	8.3
	RATIO	0.563	0.929	0.248	0.982	0.985	0.928	0.988	0.652	0.909	0.970
METEOROLOGICAL SITE	DIR (DEG)	280	300	80	250	260	260	290	240	250	280
WORCESTER	VEL (MPH)	8.6	2.3	1.2	7.0	5.7	6.0	11.8	6.9	4.9	9.0
	SPD (MPH)	9.1	5.6	2.3	7.8	5.9	6.2	11.9	8.2	5.2	9.1
	RATIO	0.952	0.409	0.508	0.895	0.973	0.978	0.987	0.842	0.942	0.992
DANBURY 123	195	0.224	0.215	0.205	0.200	0.195	0.190	0.181	0.168	0.165	0.164
	DATE	8/27/83	6/14/83	7/28/83	7/ 4/83	7/12/83	8/ 1/83	4/28/83	6/15/83	6/18/83	6/17/83
METEOROLOGICAL SITE	DIR (DEG)	220	100	210	180	250	190	170	200	150	150
NEWARK	VEL (MPH)	8.7	4.8	5.4	7.3	10.0	5.8	3.9	6.2	5.6	6.2
	SPD (MPH)	9.2	8.1	8.2	8.3	10.2	8.6	6.2	7.9	6.0	6.5
	RATIO	0.945	0.602	0.659	0.871	0.980	0.669	0.636	0.784	0.929	0.954
METEOROLOGICAL SITE	DIR (DEG)	230	300	180	200	200	200	200	260	180	180
BRADLEY	VEL (MPH)	3.6	1.1	9.1	7.3	4.0	3.8	3.9	3.4	5.6	7.2
	SPD (MPH)	4.9	5.3	9.2	7.5	4.6	7.9	6.0	5.5	6.0	7.3
	RATIO	0.733	0.210	0.985	0.975	0.868	0.486	0.652	0.621	0.925	0.978
METEOROLOGICAL SITE	DIR (DEG)	220	90	170	160	220	170	200	220	210	90
BRIDGEPORT	VEL (MPH)	6.5	4.6	3.2	4.4	5.9	3.5	2.8	6.8	4.3	6.0
	SPD (MPH)	7.0	5.0	6.0	6.8	6.2	6.6	4.7	7.3	5.3	6.3
	RATIO	0.928	0.909	0.535	0.652	0.953	0.534	0.588	0.929	0.810	0.942
METEOROLOGICAL SITE	DIR (DEG)	260	160	240	240	230	200	230	300	260	200
WORCESTER	VEL (MPH)	6.0	0.6	6.5	6.9	3.0	7.7	4.2	2.3	5.1	3.3
	SPD (MPH)	6.2	4.3	7.2	8.2	3.6	8.1	4.6	5.6	5.3	3.9
	RATIO	0.978	0.131	0.902	0.842	0.827	0.962	0.909	0.409	0.958	0.857
EAST HARTFORD 003	209	0.209	0.190	0.175	0.170	0.169	0.159	0.139	0.136	0.136	0.135
	DATE	6/15/83	8/17/83	9/ 6/83	6/14/83	8/26/83	8/27/83	7/ 4/83	6/30/83	8/16/83	8/22/83
METEOROLOGICAL SITE	DIR (DEG)	200	220	220	100	210	220	180	180	190	220
NEWARK	VEL (MPH)	6.2	5.5	8.2	4.8	10.2	8.7	7.3	5.9	5.5	6.0
	SPD (MPH)	7.9	8.8	9.1	8.1	10.5	9.2	8.3	8.5	6.3	10.6
	RATIO	0.784	0.624	0.910	0.602	0.968	0.945	0.871	0.699	0.871	0.562
METEOROLOGICAL SITE	DIR (DEG)	260	200	220	300	210	230	200	210	200	220
BRADLEY	VEL (MPH)	3.4	5.9	5.7	1.1	8.3	3.6	7.3	4.0	3.9	4.5
	SPD (MPH)	5.5	6.2	6.0	5.3	8.6	4.9	7.5	6.3	4.6	6.5
	RATIO	0.621	0.949	0.950	0.210	0.960	0.733	0.975	0.638	0.851	0.699

TABLE 21, CONTINUED

1983 TEN HIGHEST 1-HOUR AVERAGE OZONE DAYS WITH WIND DATA

UNITS : PARTS PER MILLION

TOWN/SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE	DIR (DEG)	220	210	220	90	220	220	160	210	200	180
BRIDGEPORT	VEL (MPH)	6.8	5.8	7.4	4.6	9.2	6.5	4.4	6.4	5.6	2.7
	SPD (MPH)	7.3	5.9	8.2	5.0	9.5	7.0	6.8	6.8	5.8	6.5
	RATIO	0.929	0.985	0.909	0.909	0.967	0.928	0.652	0.941	0.973	0.417
METEOROLOGICAL SITE	DIR (DEG)	300	260	250	160	250	260	240	240	280	210
WORCESTER	VEL (MPH)	2.3	5.7	4.9	0.6	8.5	6.0	6.9	4.7	5.7	1.6
	SPD (MPH)	5.6	5.9	5.2	4.3	8.8	6.2	8.2	5.2	6.2	4.2
	RATIO	0.409	0.973	0.942	0.131	0.968	0.978	0.842	0.910	0.914	0.385
GREENWICH 017	177	0.269	0.203	0.198	0.194	0.188	0.180	0.179	0.178	0.178	0.172
	DATE	6/15/83	7/12/83	6/23/83	6/11/83	9/ 5/83	7/ 2/83	8/27/83	6/27/83	8/17/83	6/14/83
METEOROLOGICAL SITE	DIR (DEG)	200	250	240	210	200	230	220	240	220	100
NEWARK	VEL (MPH)	6.2	10.0	6.8	6.2	4.9	10.2	8.7	11.1	5.5	4.8
	SPD (MPH)	7.9	10.2	7.3	8.2	5.9	11.5	9.2	12.2	8.8	8.1
	RATIO	0.784	0.980	0.927	0.755	0.835	0.883	0.945	0.905	0.624	0.602
METEOROLOGICAL SITE	DIR (DEG)	260	200	240	240	250	220	230	210	200	300
BRADLEY	VEL (MPH)	3.4	4.0	6.5	2.3	2.6	5.0	3.6	5.9	5.9	1.1
	SPD (MPH)	5.5	4.6	7.0	5.2	5.3	6.9	4.9	7.3	6.2	5.3
	RATIO	0.621	0.868	0.922	0.453	0.490	0.725	0.733	0.799	0.949	0.210
METEOROLOGICAL SITE	DIR (DEG)	220	220	230	230	220	220	220	230	210	90
BRIDGEPORT	VEL (MPH)	6.8	5.9	7.8	8.1	6.1	8.7	6.5	5.7	5.8	4.6
	SPD (MPH)	7.3	6.2	8.1	8.3	6.5	8.9	7.0	10.1	5.9	5.0
	RATIO	0.929	0.953	0.973	0.970	0.937	0.982	0.928	0.563	0.985	0.909
METEOROLOGICAL SITE	DIR (DEG)	300	230	270	280	270	250	260	280	260	160
WORCESTER	VEL (MPH)	2.3	3.0	9.4	9.0	5.8	7.0	6.0	8.6	5.7	0.6
	SPD (MPH)	5.6	3.6	9.8	9.1	6.0	7.8	6.2	9.1	5.9	4.3
	RATIO	0.409	0.827	0.963	0.992	0.957	0.895	0.978	0.952	0.973	0.131
GROTON 005	178	0.294	0.232	0.223	0.222	0.215	0.208	0.200	0.200	0.200	0.196
	DATE	6/27/83	6/23/83	7/15/83	9/10/83	9/11/83	7/12/83	8/20/83	8/27/83	9/19/83	9/ 4/83
METEOROLOGICAL SITE	DIR (DEG)	240	240	270	260	250	250	280	220	230	230
NEWARK	VEL (MPH)	11.1	6.8	9.1	9.5	7.8	10.0	11.6	8.7	9.5	7.1
	SPD (MPH)	12.2	7.3	10.1	10.6	9.9	10.2	14.1	9.2	10.4	7.5
	RATIO	0.905	0.927	0.902	0.891	0.784	0.980	0.823	0.945	0.914	0.954
METEOROLOGICAL SITE	DIR (DEG)	210	240	310	260	290	200	300	230	190	280
BRADLEY	VEL (MPH)	5.9	6.5	3.3	4.6	4.4	4.0	8.3	3.6	5.8	3.1
	SPD (MPH)	7.3	7.0	5.5	7.6	8.3	4.6	11.1	4.9	6.3	4.3
	RATIO	0.799	0.922	0.596	0.606	0.528	0.868	0.747	0.733	0.922	0.715
METEOROLOGICAL SITE	DIR (DEG)	230	230	250	230	250	220	280	220	230	230
BRIDGEPORT	VEL (MPH)	5.7	7.8	7.7	6.5	7.8	5.9	8.3	6.5	8.3	4.6
	SPD (MPH)	10.1	8.1	8.8	6.6	8.5	6.2	9.1	7.0	9.1	5.5
	RATIO	0.563	0.973	0.873	0.988	0.917	0.953	0.913	0.928	0.922	0.848
METEOROLOGICAL SITE	DIR (DEG)	280	270	290	290	280	230	280	260	260	270
WORCESTER	VEL (MPH)	8.6	9.4	10.1	11.8	8.0	3.0	12.2	6.0	6.0	4.5
	SPD (MPH)	9.1	9.8	10.2	11.9	8.9	3.6	12.4	6.2	6.0	4.6
	RATIO	0.952	0.963	0.990	0.987	0.900	0.827	0.984	0.978	0.991	0.988

TABLE 21, CONTINUED

1983 TEN HIGHEST 1-HOUR AVERAGE OZONE DAYS WITH WIND DATA

UNITS : PARTS PER MILLION

TOWN/SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
MADISON 002	164	0.244	0.224	0.191	0.184	0.183	0.165	0.165	0.163	0.162	0.152
	DATE	6/27/83	6/15/83	6/23/83	9/10/83	7/15/83	6/19/83	7/12/83	9/11/83	6/30/83	8/17/83
METEOROLOGICAL SITE	DIR (DEG)	240	200	240	260	270	220	250	250	180	220
NEWARK	VEL (MPH)	11.1	6.2	6.8	9.5	9.1	3.6	10.0	7.8	5.9	5.5
	SPD (MPH)	12.2	7.9	7.3	10.6	10.1	7.8	10.2	9.9	8.5	8.8
	RATIO	0.905	0.784	0.927	0.891	0.902	0.458	0.980	0.784	0.699	0.624
METEOROLOGICAL SITE	DIR (DEG)	210	260	240	260	310	230	200	290	210	200
BRADLEY	VEL (MPH)	5.9	3.4	6.5	4.6	3.3	2.4	4.0	4.4	4.0	5.9
	SPD (MPH)	7.3	5.5	7.0	7.6	5.5	4.0	4.6	8.3	6.3	6.2
	RATIO	0.799	0.621	0.922	0.606	0.596	0.608	0.868	0.528	0.638	0.949
METEOROLOGICAL SITE	DIR (DEG)	230	220	230	230	250	220	220	250	210	210
BRIDGEPORT	VEL (MPH)	5.7	6.8	7.8	6.5	7.7	4.2	5.9	7.8	6.4	5.8
	SPD (MPH)	10.1	7.3	8.1	6.6	8.8	4.6	6.2	8.5	6.8	5.9
	RATIO	0.563	0.929	0.973	0.988	0.873	0.909	0.953	0.917	0.941	0.985
METEOROLOGICAL SITE	DIR (DEG)	280	300	270	290	290	290	230	280	240	260
WORCESTER	VEL (MPH)	8.6	2.3	9.4	11.8	10.1	2.9	3.0	8.0	4.7	5.7
	SPD (MPH)	9.1	5.6	9.8	11.9	10.2	5.2	3.6	8.9	5.2	5.9
	RATIO	0.952	0.409	0.963	0.987	0.990	0.569	0.827	0.900	0.910	0.973
MIDDLETOWN 007	209	0.216	0.196	0.190	0.177	0.175	0.172	0.170	0.161	0.159	0.147
	DATE	6/15/83	8/17/83	7/ 2/83	9/19/83	9/ 6/83	8/ 8/83	6/27/83	6/11/83	7/12/83	9/10/83
METEOROLOGICAL SITE	DIR (DEG)	200	220	230	230	220	230	240	210	250	260
NEWARK	VEL (MPH)	6.2	5.5	10.2	9.5	8.2	10.3	11.1	6.2	10.0	9.5
	SPD (MPH)	7.9	8.8	11.5	10.4	9.1	10.5	12.2	8.2	10.2	10.6
	RATIO	0.784	0.624	0.883	0.914	0.910	0.979	0.905	0.755	0.980	0.891
METEOROLOGICAL SITE	DIR (DEG)	260	200	220	190	220	220	210	240	200	260
BRADLEY	VEL (MPH)	3.4	5.9	5.0	5.8	5.7	6.6	5.9	2.3	4.0	4.6
	SPD (MPH)	5.5	6.2	6.9	6.3	6.0	7.0	7.3	5.2	4.6	7.6
	RATIO	0.621	0.949	0.725	0.922	0.950	0.934	0.799	0.453	0.868	0.606
METEOROLOGICAL SITE	DIR (DEG)	220	210	220	230	220	220	230	230	220	230
BRIDGEPORT	VEL (MPH)	6.8	5.8	8.7	8.3	7.4	7.0	5.7	8.1	5.9	6.5
	SPD (MPH)	7.3	5.9	8.9	9.1	8.2	7.2	10.1	8.3	6.2	6.6
	RATIO	0.929	0.985	0.982	0.922	0.909	0.980	0.563	0.970	0.953	0.988
METEOROLOGICAL SITE	DIR (DEG)	300	260	250	260	250	250	280	280	230	290
WORCESTER	VEL (MPH)	2.3	5.7	7.0	6.0	4.9	7.5	8.6	9.0	3.0	11.8
	SPD (MPH)	5.6	5.9	7.8	6.0	5.2	7.9	9.1	9.1	3.6	11.9
	RATIO	0.409	0.973	0.895	0.991	0.942	0.951	0.952	0.992	0.827	0.987
NEW HAVEN 123	214	0.204	0.199	0.197	0.190	0.187	0.185	0.178	0.165	0.165	0.164
	DATE	9/ 6/83	6/27/83	7/ 2/83	7/ 4/83	8/17/83	8/ 8/83	9/10/83	7/12/83	8/28/83	7/21/83
METEOROLOGICAL SITE	DIR (DEG)	220	240	230	180	220	230	260	250	180	290
NEWARK	VEL (MPH)	8.2	11.1	10.2	7.3	5.5	10.3	9.5	10.0	4.7	6.7
	SPD (MPH)	9.1	12.2	11.5	8.3	8.8	10.5	10.6	10.2	10.2	11.5
	RATIO	0.910	0.905	0.883	0.871	0.624	0.979	0.891	0.980	0.461	0.580
METEOROLOGICAL SITE	DIR (DEG)	220	210	220	200	200	220	260	200	240	290
BRADLEY	VEL (MPH)	5.7	5.9	5.0	7.3	5.9	6.6	4.6	4.0	1.7	3.6
	SPD (MPH)	6.0	7.3	6.9	7.5	6.2	7.0	7.6	4.6	5.2	7.2
	RATIO	0.950	0.799	0.725	0.975	0.949	0.934	0.606	0.869	0.332	0.497

TABLE 21, CONTINUED

1983 TEN HIGHEST 1-HOUR AVERAGE OZONE DAYS WITH WIND DATA

UNITS : PARTS PER MILLION

TOWN/SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE	DIR (DEG)	220	230	220	160	210	220	230	220	60	230
BRIDGEPORT	VEL (MPH)	7.4	5.7	8.7	4.4	5.8	7.0	6.5	5.9	1.5	6.7
	SPD (MPH)	8.2	10.1	8.9	6.8	5.9	7.2	6.6	6.2	6.2	7.2
	RATIO	0.909	0.563	0.982	0.652	0.985	0.980	0.988	0.953	0.248	0.925
METEOROLOGICAL SITE	DIR (DEG)	250	280	250	240	260	250	290	230	80	280
WORCESTER	VEL (MPH)	4.9	8.6	7.0	6.9	5.7	7.5	11.8	3.0	1.2	4.7
	SPD (MPH)	5.2	9.1	7.8	8.2	5.9	7.9	11.9	3.6	2.3	6.5
	RATIO	0.942	0.952	0.895	0.842	0.973	0.951	0.987	0.827	0.508	0.721
STAFFORD 001	214	0.197	0.190	0.170	0.165	0.155	0.153	0.152	0.151	0.149	0.148
	DATE	8/26/83	9/ 6/83	7/29/83	8/17/83	7/ 2/83	8/ 8/83	6/14/83	4/28/83	9/19/83	6/30/83
METEOROLOGICAL SITE	DIR (DEG)	210	220	220	220	230	230	100	170	230	180
NEWARK	VEL (MPH)	10.2	8.2	13.3	5.5	10.2	10.3	4.8	3.9	9.5	5.9
	SPD (MPH)	10.5	9.1	13.9	8.8	11.5	10.5	8.1	6.2	10.4	8.5
	RATIO	0.968	0.910	0.955	0.624	0.883	0.979	0.602	0.636	0.914	0.699
METEOROLOGICAL SITE	DIR (DEG)	210	220	210	200	220	220	300	200	190	210
BRADLEY	VEL (MPH)	8.3	5.7	9.4	5.9	5.0	6.6	1.1	3.9	5.8	4.0
	SPD (MPH)	8.6	6.0	10.1	6.2	6.9	7.0	5.3	6.0	6.3	6.3
	RATIO	0.960	0.950	0.937	0.949	0.725	0.934	0.210	0.652	0.922	0.638
METEOROLOGICAL SITE	DIR (DEG)	220	220	210	210	220	220	90	200	230	210
BRIDGEPORT	VEL (MPH)	9.2	7.4	8.4	5.8	8.7	7.0	4.6	2.8	8.3	6.4
	SPD (MPH)	9.5	8.2	9.1	5.9	8.9	7.2	5.0	4.7	9.1	6.8
	RATIO	0.967	0.909	0.927	0.985	0.982	0.980	0.909	0.588	0.922	0.941
METEOROLOGICAL SITE	DIR (DEG)	250	250	230	260	250	250	160	230	260	240
WORCESTER	VEL (MPH)	8.5	4.9	7.4	5.7	7.0	7.5	0.6	4.2	6.0	4.7
	SPD (MPH)	8.8	5.2	7.5	5.9	7.8	7.9	4.3	4.6	6.0	5.2
	RATIO	0.968	0.942	0.987	0.973	0.895	0.951	0.131	0.909	0.991	0.910
STRATFORD 007	214	0.248	0.240	0.219	0.212	0.207	0.200	0.199	0.198	0.189	0.187
	DATE	6/15/83	6/27/83	8/17/83	9/10/83	8/ 8/83	9/ 6/83	6/23/83	6/11/83	6/19/83	7/21/83
METEOROLOGICAL SITE	DIR (DEG)	200	240	220	260	230	220	240	210	220	290
NEWARK	VEL (MPH)	6.2	11.1	5.5	9.5	10.3	8.2	6.8	6.2	3.6	6.7
	SPD (MPH)	7.9	12.2	8.8	10.6	10.5	9.1	7.3	8.2	7.8	11.5
	RATIO	0.784	0.905	0.624	0.891	0.979	0.910	0.927	0.755	0.458	0.580
METEOROLOGICAL SITE	DIR (DEG)	260	210	200	260	220	220	240	240	230	290
BRADLEY	VEL (MPH)	3.4	5.9	5.9	4.6	6.6	5.7	6.5	2.3	2.4	3.6
	SPD (MPH)	5.5	7.3	6.2	7.6	7.0	6.0	7.0	5.2	4.0	7.2
	RATIO	0.621	0.799	0.949	0.606	0.934	0.950	0.922	0.453	0.608	0.497
METEOROLOGICAL SITE	DIR (DEG)	220	230	210	230	220	220	230	230	220	230
BRIDGEPORT	VEL (MPH)	6.8	5.7	5.8	6.5	7.0	7.4	7.8	8.1	4.2	6.7
	SPD (MPH)	7.3	10.1	5.9	6.6	7.2	8.2	8.1	8.3	4.6	7.2
	RATIO	0.929	0.563	0.985	0.988	0.980	0.909	0.973	0.970	0.909	0.925
METEOROLOGICAL SITE	DIR (DEG)	300	280	260	290	250	250	270	280	290	280
WORCESTER	VEL (MPH)	2.3	8.6	5.7	11.8	7.5	4.9	9.4	9.0	2.9	4.7
	SPD (MPH)	5.6	9.1	5.9	11.9	7.9	5.2	9.8	9.1	5.2	6.5
	RATIO	0.409	0.952	0.973	0.987	0.951	0.942	0.963	0.992	0.569	0.721

FIGURE 7

WIND ROSE FOR APRIL - SEPTEMBER 1982

BRADLEY INTERNATIONAL AIRPORT

WINDSOR LOCKS, CONNECTICUT

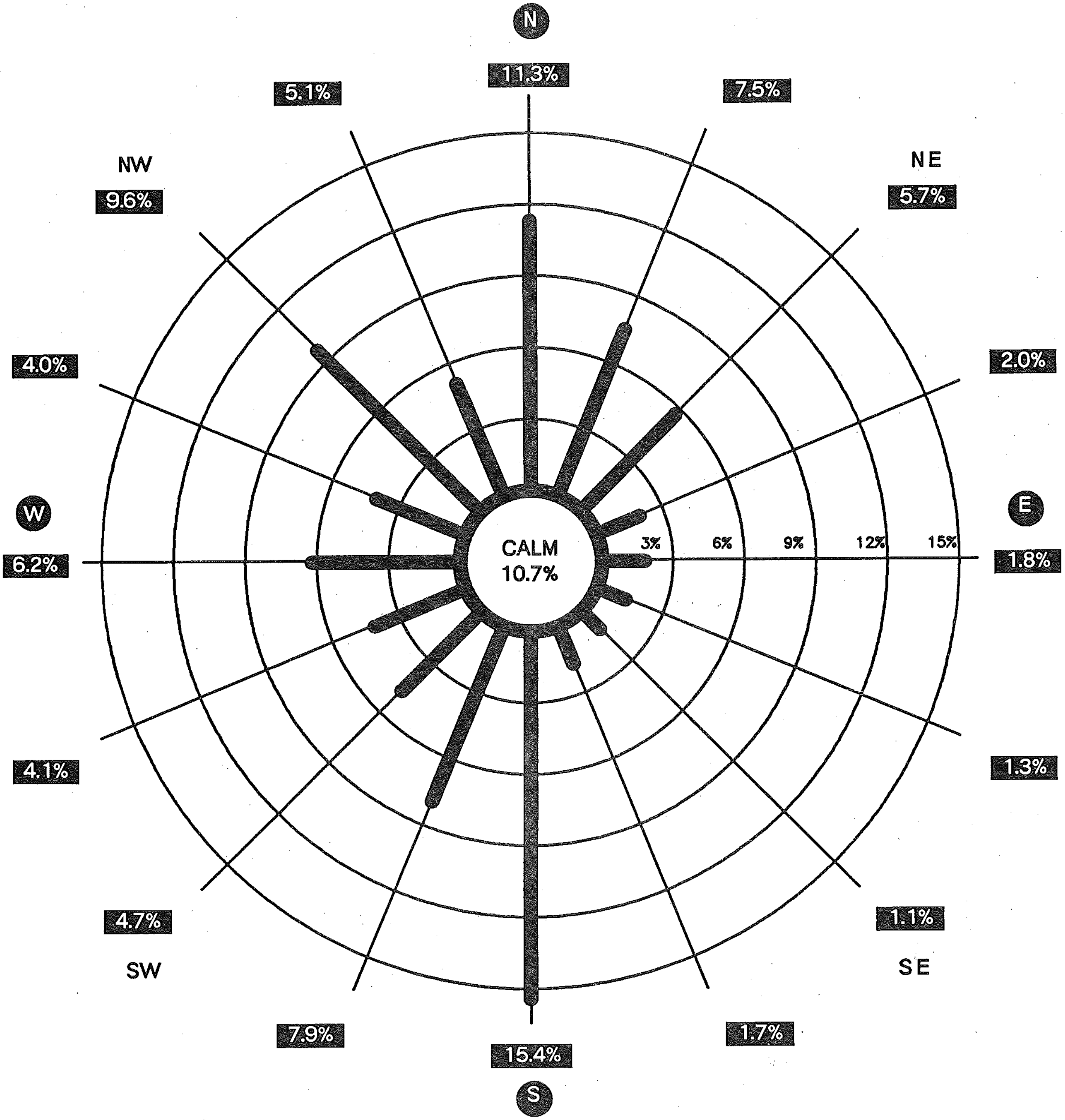


FIGURE 8

WIND ROSE FOR APRIL - SEPTEMBER 1983

BRADLEY INTERNATIONAL AIRPORT

WINDSOR LOCKS, CONNECTICUT

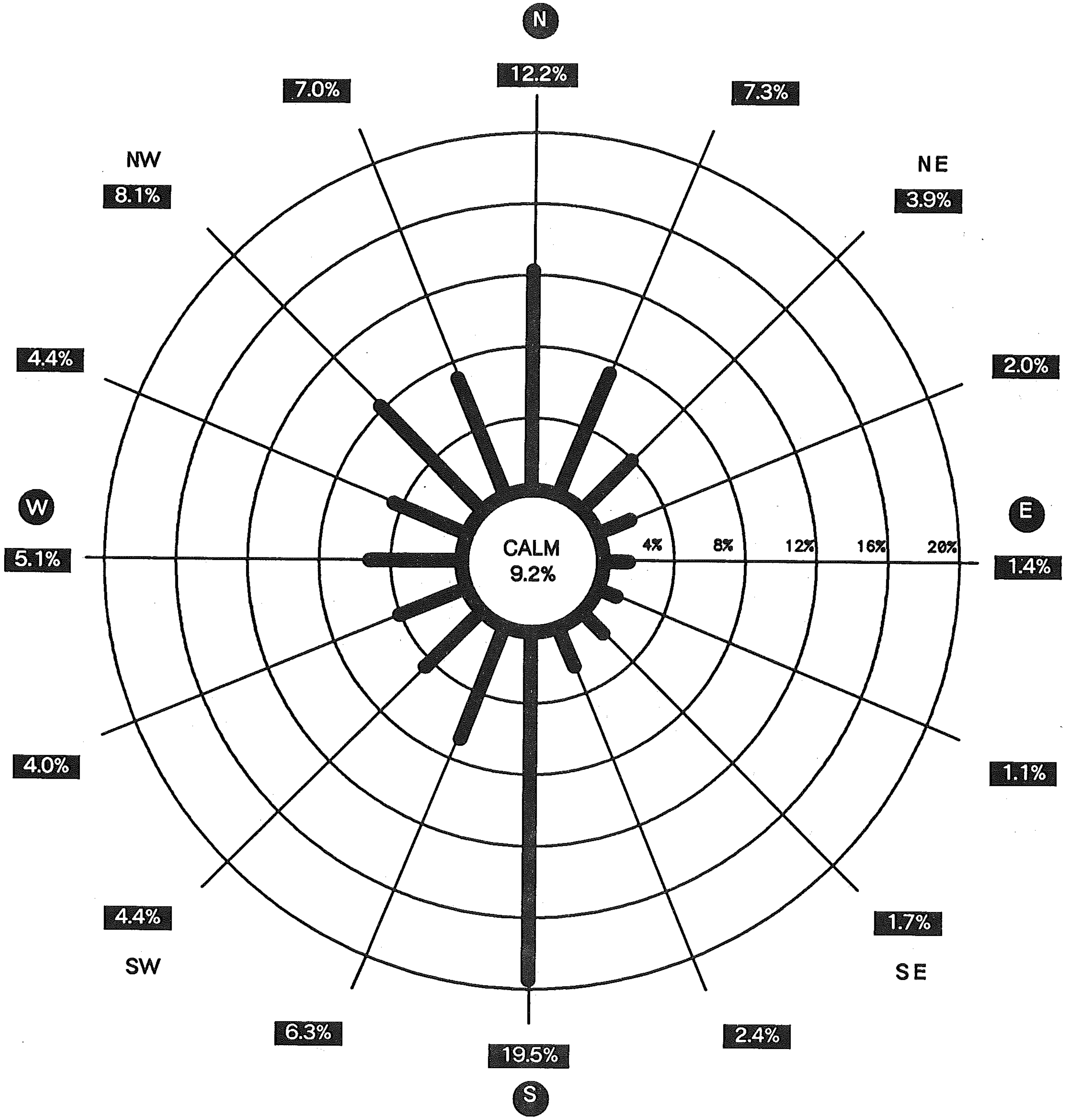


FIGURE 9

WIND ROSE FOR APRIL - SEPTEMBER 1982

NEWARK INTERNATIONAL AIRPORT

NEWARK, NEW JERSEY

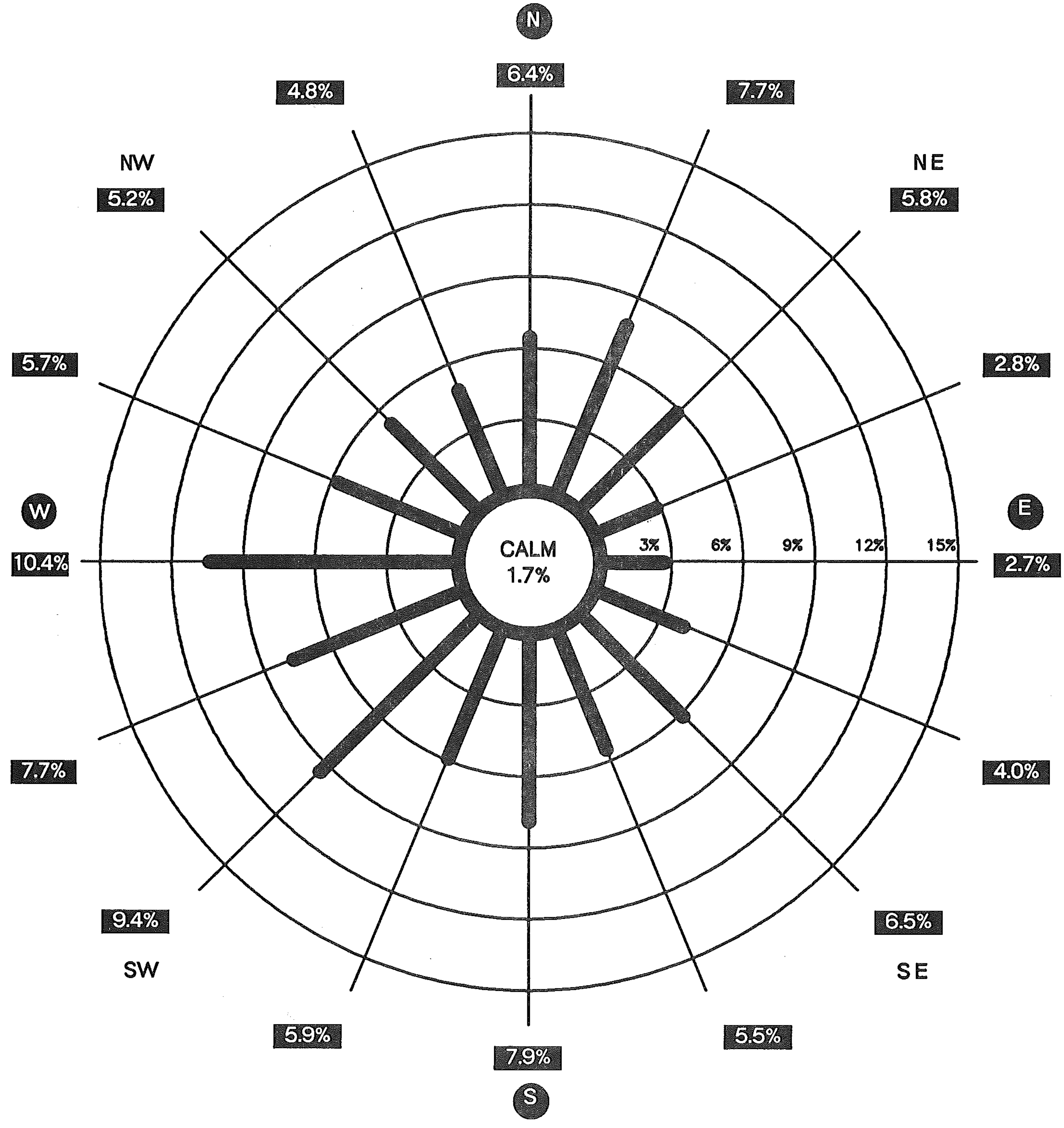
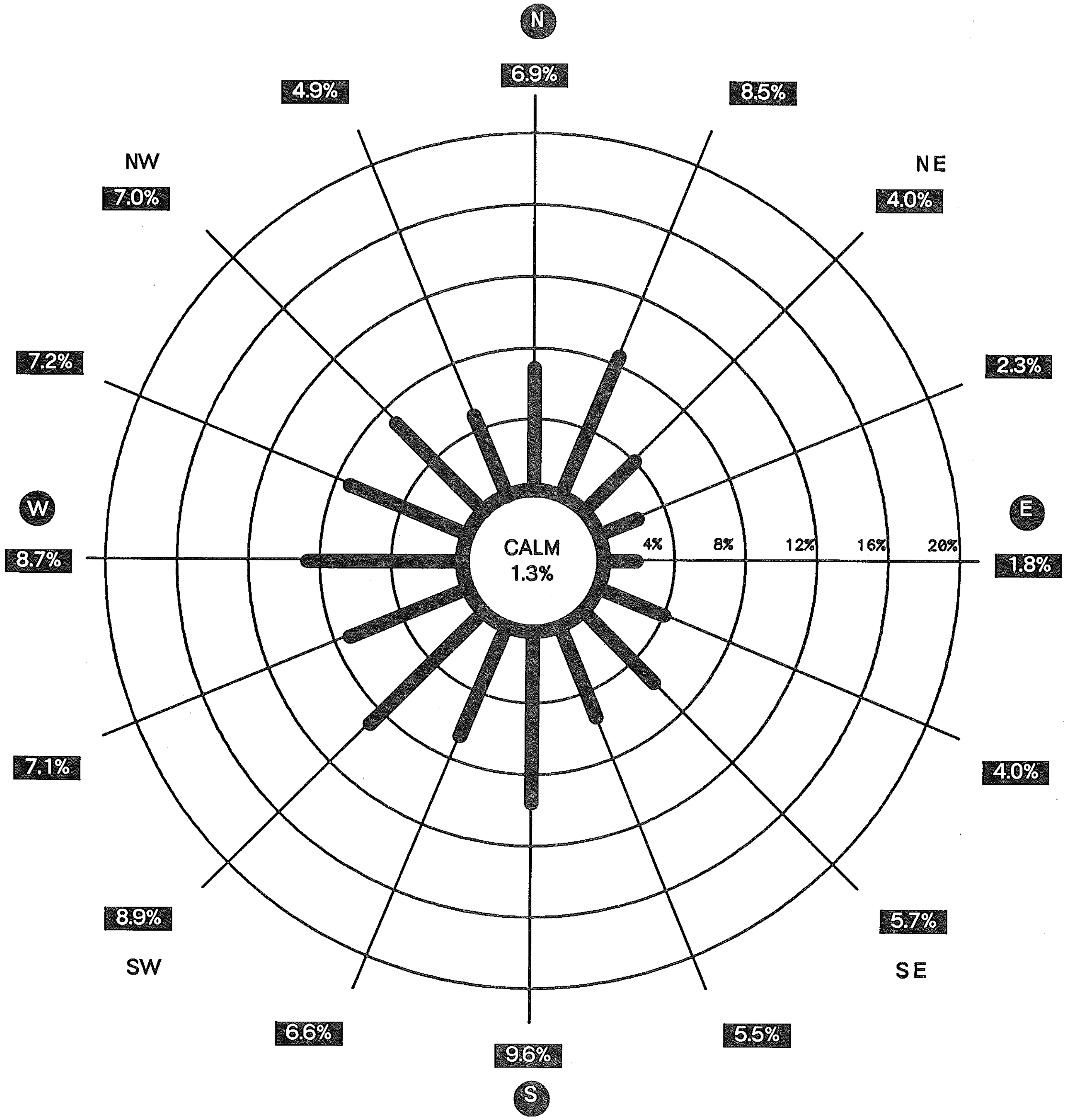


FIGURE 10

WIND ROSE FOR APRIL - SEPTEMBER 1983

NEWARK INTERNATIONAL AIRPORT

NEWARK, NEW JERSEY



V. NITROGEN DIOXIDE

Health Effects

Nitrogen dioxide (NO_2) is a toxic gas with a characteristic pungent odor and a reddish-orange-brown color. It is highly oxidizing and extremely corrosive.

Nitrogen dioxide is not emitted into the atmosphere to any great extent by man-made sources. However, its presence in the atmosphere is accounted for by the photochemical oxidation of nitric oxide (NO), large amounts of which are emitted into the air by high temperature combustion processes. Industrial furnaces, power plants and motor vehicles are the primary sources of nitric oxide emissions.

Exposure to NO_2 is believed to increase the risks of acute respiratory disease and susceptibility to chronic respiratory infection. NO_2 also contributes to heart, lung, liver and kidney damage. At high concentrations, this pollutant can be fatal. At lower levels of 25 to 100 parts per million, it can cause acute bronchitis and pneumonia. Occasional exposure to low levels of NO_2 can irritate the eyes and skin.

Other effects of nitrogen dioxide are its toxicity to vegetation and its ability to combine with water vapor to form nitric acid. Furthermore, NO_2 is an essential ingredient, along with hydrocarbons, in the formation of ozone.

Conclusions

Nitrogen dioxide (NO_2) concentrations at all monitoring sites were well below the NAAQS for NO_2 in 1983. This was the second full year the DEP used continuous electronic analyzers to measure NO_2 levels. NO_2 trend analysis or comparisons can be made when two full years of data are available at a monitoring site. This condition was satisfied at only one site: East Hartford 003.

Sample Collection and Analysis

The DEP Air Monitoring Unit used continuous electronic analyzers employing the chemiluminescent reference method to continuously measure NO_2 levels.

Discussion of Data

Monitoring Network – There were three nitrogen dioxide monitoring sites in 1983 (see Figure 11). The sites –– Bridgeport 123, East Hartford 003 and New Haven 123 –– were located in three urban areas in order to obtain data alongside ozone monitors.

Precision and Accuracy – Sixty-seven precision checks were made on the NO_2 monitors in 1983, yielding 95% probability limits ranging from −13% to +15%. Accuracy is determined by introducing a known amount of NO_2 into each of the monitors. Four audits for accuracy were conducted on the monitoring network in 1983. Three different concentration levels were tested on each monitor: low, medium, and high. The 95% probability limits for the low level test ranged from −10% to +15%; those for the medium level test ranged from −4% to +1%; and those for the high level test ranged from −9% to +3%.

Historical Data – The DEP's historical file of annual average nitrogen dioxide data from gas bubblers for 1973–1980 is available in the 1980 Air Quality Summary.

Annual Averages – The annual average NO_2 standard of 100 ug/m^3 was not exceeded in 1983 at any site in Connecticut (see Table 22). In 1983 three sites had sufficient data to compute valid arithmetic means. However, comparisons with the 1982 annual averages are not possible because of the incomplete nature of the 1982 data. This is also true of 1981, except for East Hartford 003. In fact, the only comparison of annual NO_2 levels that can be made is at East Hartford 003 for the years 1981 and 1983. The arithmetic mean NO_2 concentration at the site increased by 7.8 ug/m^3 or 22% between those two years.

Statistical Projections – The format of Table 22 is the same as that used to present the TSP and sulfur dioxide data. However, Table 22 gives the annual arithmetic mean of the hourly NO_2 concentrations to allow direct comparison to the annual NO_2 standard. The 95% confidence limits about the arithmetic mean for each site demonstrate that it is unlikely that any site exceeded the primary annual standard of 100 ug/m^3 in 1983.

10–High Days with Wind Data – Table 23 presents for each site the ten days in 1983 when the highest hourly NO_2 readings occurred, along with the associated wind conditions for each day. (See the discussion of Table 11 in the TSP section for a description of the original use of the wind data.)

According to National Weather Service local climatological data recorded at Bradley Airport, 15 of the 21 days listed in the table had more then 50% of the possible sunshine. Of the six remaining days, four followed days when the percent of possible sunshine exceeded 80%. This is interpreted to confirm the importance of photochemical oxidation in the formation of NO_2.

High NO_2 levels occurred most often (i.e., 40% of the time) during the winter months and when the winds were southwesterly. Six out of the seven high NO_2 days that occurred at at least 2 of the sites had persistent winds out of the southwest quadrant. And, on average, 60% of the days tabulated for each site had persistent southwest winds.

Given the above observations and the fact that two of the three NO_2 sites are located on the coast of Connecticut, it appears that a combination of pollutant transport and a high percent of possible sunshine (both of which occur on days with persistent southwest winds) tend to produce high NO_2 levels in Connecticut.

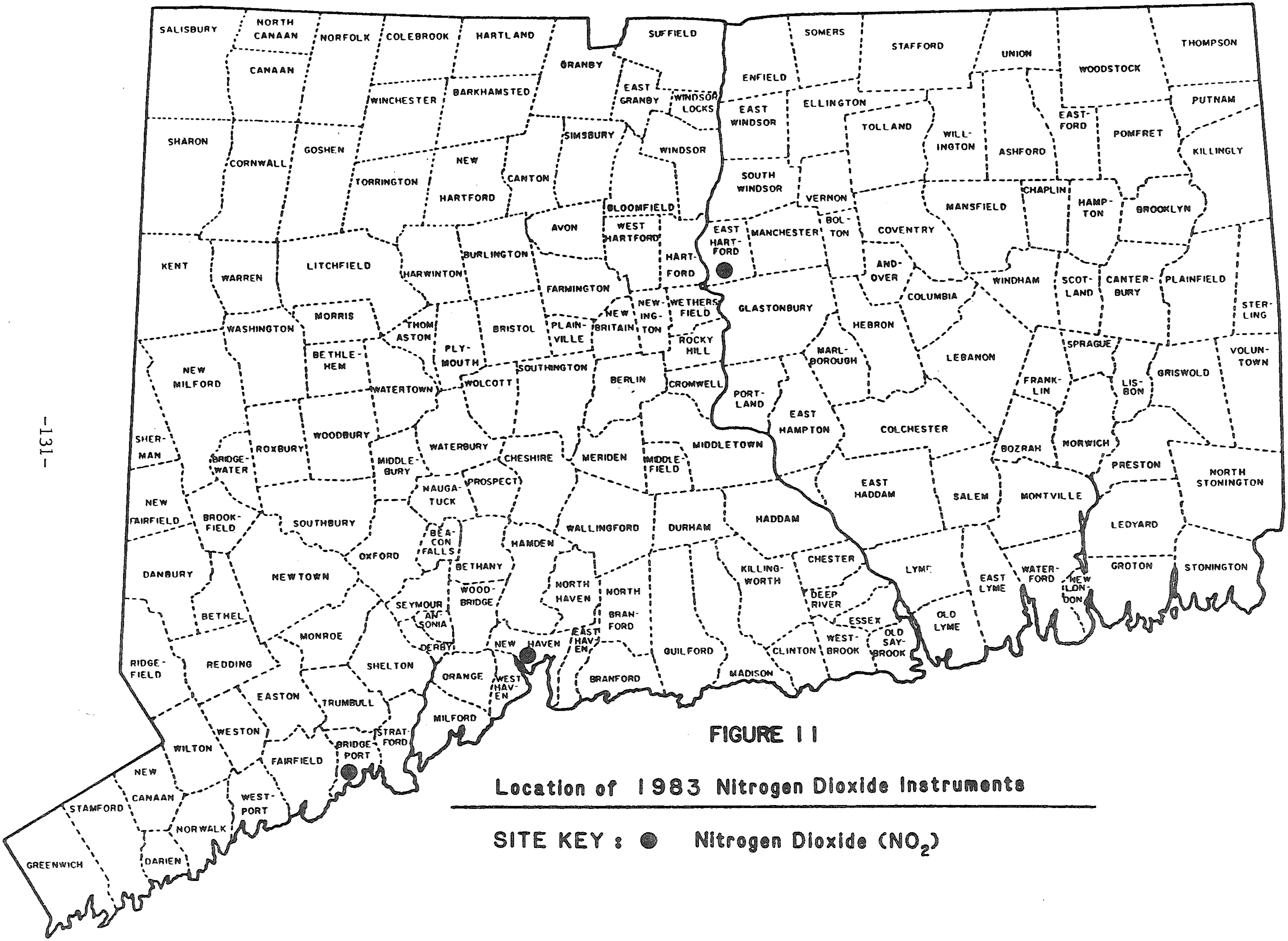


FIGURE 11

Location of 1983 Nitrogen Dioxide Instruments

SITE KEY : ● Nitrogen Dioxide (NO_2)

TABLE 22

1981-1983 NITROGEN DIOXIDE ANNUAL AVERAGES AND STATISTICAL PROJECTIONS

Town Name	Site	Year	Samples	Arithmetic Mean	95-PCT-Limits Lower	95-PCT-Limits Upper	Standard Deviation
Bridgeport	123	1981	4802*	50.3	49.8	50.8	26.743
Bridgeport	123	1982	6480*	53.7	53.3	54.1	30.874
Bridgeport	123	1983	8328	56.4	56.2	56.6	34.704
East Hartford	003	1981	6826	35.7	35.4	36.0	22.546
East Hartford	003	1982	6521*	36.5	36.2	36.8	22.454
East Hartford	003	1983	8576	43.5	43.4	43.6	31.298
Greenwich	017	1981	1644*	32.6	31.4	33.8	26.931
Greenwich	017	1982	2432*	36.5	35.5	37.5	29.416
Hartford	123	1981	1644*	59.0	57.7	60.3	28.766
Madison	002	1981	1618*	26.4	25.3	27.5	25.859
Madison	002	1982	1775*	17.7	17.1	18.3	14.002
New Haven	123	1981	4315*	49.3	48.8	49.8	24.353
New Haven	123	1982	6420*	54.2	54.0	54.4	17.185
New Haven	123	1983	7971	62.8	62.7	62.9	13.541
Stratford	007	1981	3143*	26.6	26.0	27.2	22.057
Stratford	007	1982	3975*	28.0	27.4	28.6	25.275

* Sampling not random or of insufficient size for representative annual statistics

N.B. The arithmetic mean and standard deviation have units of ug/m^3.

TABLE 23

1983 TEN HIGHEST 1-HOUR AVERAGE NO2 DAYS WITH WIND DATA

UNITS : PARTS PER MILLION

TOWN/SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
BRIDGEPORT 123	8328	0.123	0.122	0.120	0.119	0.119	0.105	0.104	0.102	0.102	0.100
	DATE	10/ 4/83	1/31/83	11/20/83	2/14/83	2/28/83	2/21/83	11/ 2/83	4/29/83	9/19/83	7/27/83
METEOROLOGICAL SITE	DIR (DEG)	220	270	140	30	200	230	140	200	230	140
NEWARK	VEL (MPH)	7.1	9.9	5.6	6.7	4.8	8.4	2.2	5.2	9.5	4.5
	SPD (MPH)	8.1	10.2	6.0	7.3	5.9	8.9	5.2	9.2	10.4	7.0
	RATIO	0.887	0.966	0.929	0.909	0.821	0.938	0.416	0.569	0.914	0.643
METEOROLOGICAL SITE	DIR (DEG)	180	320	150	300	200	200	190	210	190	250
BRADLEY	VEL (MPH)	5.6	5.7	2.5	0.4	4.3	6.0	4.6	5.2	5.8	3.9
	SPD (MPH)	5.9	6.3	3.7	0.4	5.3	6.9	4.6	6.6	6.3	5.2
	RATIO	0.959	0.900	0.657	1.000	0.804	0.870	0.997	0.781	0.922	0.762
METEOROLOGICAL SITE	DIR (DEG)	230	280	80	50	220	230	200	220	230	200
BRIDGEPORT	VEL (MPH)	6.6	6.5	5.0	2.9	4.6	5.3	2.7	5.2	8.3	4.2
	SPD (MPH)	7.2	6.8	5.6	3.3	4.7	6.0	4.6	5.9	9.1	6.0
	RATIO	0.920	0.969	0.898	0.888	0.971	0.873	0.582	0.879	0.922	0.698
METEOROLOGICAL SITE	DIR (DEG)	250	310	120	250	260	260	250	250	260	280
WORCESTER	VEL (MPH)	5.2	9.7	2.9	6.4	5.3	6.6	6.2	8.2	6.0	5.1
	SPD (MPH)	5.6	11.8	4.3	6.5	5.6	7.2	6.3	8.3	6.0	5.8
	RATIO	0.933	0.823	0.680	0.994	0.949	0.921	0.974	0.986	0.991	0.887
EAST HARTFORD 003	8576	0.130	0.086	0.085	0.084	0.083	0.081	0.081	0.078	0.077	0.075
	DATE	2/14/83	4/28/83	2/21/83	3/ 1/83	2/15/83	2/28/83	9/ 9/83	10/ 4/83	2/16/83	4/27/83
METEOROLOGICAL SITE	DIR (DEG)	30	170	230	20	330	200	240	220	70	240
NEWARK	VEL (MPH)	6.7	3.9	8.4	11.3	5.9	4.8	5.8	7.1	4.4	6.6
	SPD (MPH)	7.3	6.2	8.9	11.5	6.3	5.9	7.6	8.1	5.9	8.1
	RATIO	0.909	0.636	0.938	0.982	0.927	0.821	0.756	0.887	0.751	0.815
METEOROLOGICAL SITE	DIR (DEG)	300	200	200	30	350	200	230	180	110	280
BRADLEY	VEL (MPH)	0.4	3.9	6.0	5.8	3.6	4.3	4.0	5.6	0.4	3.6
	SPD (MPH)	0.4	6.0	6.9	6.8	4.0	5.3	5.5	5.9	3.2	5.2
	RATIO	1.000	0.652	0.870	0.853	0.887	0.804	0.738	0.959	0.117	0.705
METEOROLOGICAL SITE	DIR (DEG)	50	200	230	30	330	220	220	230	60	220
BRIDGEPORT	VEL (MPH)	2.9	2.8	5.3	11.4	7.4	4.6	6.0	6.6	7.2	8.1
	SPD (MPH)	3.3	4.7	6.0	11.8	8.5	4.7	6.8	7.2	7.6	8.3
	RATIO	0.888	0.588	0.873	0.971	0.867	0.971	0.886	0.920	0.948	0.976
METEOROLOGICAL SITE	DIR (DEG)	250	230	260	30	340	260	260	250	60	300
WORCESTER	VEL (MPH)	6.4	4.2	6.6	3.2	9.9	5.3	5.9	5.2	2.9	7.3
	SPD (MPH)	6.5	4.6	7.2	6.9	10.6	5.6	6.3	5.6	4.5	7.8
	RATIO	0.994	0.909	0.921	0.461	0.932	0.949	0.936	0.933	0.643	0.945
NEW HAVEN 123	7971	0.165	0.129	0.113	0.110	0.106	0.106	0.105	0.105	0.105	0.102
	DATE	9/10/83	10/ 4/83	9/19/83	6/19/83	6/13/83	10/ 9/83	2/21/83	3/15/83	4/28/83	4/29/83
METEOROLOGICAL SITE	DIR (DEG)	260	220	230	220	20	20	230	280	170	200
NEWARK	VEL (MPH)	9.5	7.1	9.5	3.6	2.4	9.6	8.4	7.5	3.9	5.2
	SPD (MPH)	10.6	8.1	10.4	7.8	5.2	9.8	8.9	11.6	6.2	9.2
	RATIO	0.891	0.887	0.914	0.458	0.455	0.977	0.938	0.645	0.636	0.569
METEOROLOGICAL SITE	DIR (DEG)	260	180	190	230	300	20	200	320	200	210
BRADLEY	VEL (MPH)	4.6	5.6	5.8	2.4	1.6	6.6	6.0	4.2	3.9	5.2
	SPD (MPH)	7.6	5.9	6.3	4.0	3.0	7.6	6.9	7.6	6.0	6.6
	RATIO	0.606	0.959	0.922	0.608	0.523	0.865	0.870	0.553	0.652	0.781

TABLE 23, CONTINUED

1983 TEN HIGHEST 1-HOUR AVERAGE NO2 DAYS WITH WIND DATA

UNITS : PARTS PER MILLION

TOWN/SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE	DIR (DEG)	230	230	230	220	250	20	230	320	200	220
BRIDGEPORT	VEL (MPH)	6.5	6.6	8.3	4.2	4.3	8.3	5.3	2.5	2.8	5.2
	SPD (MPH)	6.6	7.2	9.1	4.6	6.2	8.8	6.0	8.2	4.7	5.9
	RATIO	0.988	0.920	0.922	0.909	0.697	0.949	0.873	0.300	0.588	0.879
METEOROLOGICAL SITE	DIR (DEG)	290	250	260	290	320	20	260	320	230	250
WORCESTER	VEL (MPH)	11.8	5.2	6.0	2.9	3.8	6.7	6.6	3.9	4.2	8.2
	SPD (MPH)	11.9	5.6	6.0	5.2	5.8	8.6	7.2	5.8	4.6	8.3
	RATIO	0.987	0.933	0.991	0.569	0.669	0.774	0.921	0.686	0.909	0.986

VI. CARBON MONOXIDE

Health Effects

Carbon monoxide (CO) is a colorless, odorless, poison gas formed when carbon–containing fuel is not burned completely. It is by far the most plentiful air pollutant. Fortunately, this deadly gas does not persist in the atmosphere. It is apparently converted by natural processes to harmless carbon dioxide in ways not yet understood, and this is done quickly enough to prevent any general buildup. However, CO can reach dangerous levels in local areas, such as city–street canyons with heavy auto traffic and little wind.

Clinical experience with accidental CO poisoning has shown clearly how it affects the body. When the gas is breathed, CO replaces oxygen in the red blood cells, reducing the amount of oxygen that can reach the body cells and maintain life. Lack of oxygen affects the brain, and the first symptoms are impaired perception and thinking. Reflexes are slowed, judgement weakened, and drowsiness ensues. An auto driver breathing high levels of CO is more likely to have an accident; an athlete's performance and skill drop suddenly. Lack of oxygen then affects the heart. Death can come from heart failure or general asphyxiation, if a person is exposed to very high levels of CO.

Conclusions

The eight–hour National Ambient Air Quality Standard of 9 parts per million (ppm) was exceeded at all five carbon monoxide monitoring sites in Connecticut during 1983. The standard was exceeded once at Bridgeport 004, New Haven 007 and Stamford 020, twice at New Britain 002, and three times at Hartford 012. In 1982, two exceedances occurred at both ~~Hartford 012 and~~ Stamford 020 and ~~three exceedances occurred at~~ New Britain 002. No site measured an exceedance of the one–hour standard of 35 ppm in 1983.

In order to put the monitoring data into proper perspective, it must be realized that carbon monoxide concentrations vary greatly from place–to–place. More than 95% of the CO emissions in Connecticut come from motor vehicles. Therefore, concentrations are greatest in areas of traffic congestion. The magnitude and frequency of high concentrations observed at any monitoring site are not necessarily indicative of widespread CO levels.

The CO standards are likely to be exceeded in any city in the state where there are areas of traffic congestion. However, as federally–mandated controls reduce emissions from new motor vehicles, and as Connecticut's SIP control strategies are implemented, there should continue to be a decrease in the number of such areas; the remaining areas should shrink in size and have lower CO levels.

Unlike SO_2, TSP and O_3, elevated CO levels are often associated with non–southwesterly winds, indicating that this pollutant is more of a local–scale (not regional–scale) problem.

Method of Measurement

The DEP Air Monitoring Unit uses instruments employing a non–dispersive infrared technique to continuously measure carbon monoxide levels. The instantaneous concentrations are recorded on strip charts from which hourly averages are extracted. Due to the relative inertness of CO, a long sampling line can be used without the danger of scrubbing. The most important consideration in the measurement of CO is the placement of the sampling probe inlet; that is, its proximity to traffic lanes.

Discussion of Data

Monitoring Network – The network in 1983 consisted of five carbon monoxide monitors: Bridgeport 004, Hartford 012, New Britain 002, New Haven 007, and Stamford 020. They are all located in urban areas. All sites are located west of the Connecticut River, with three of them in coastal towns (see Figure 12).

Precision and Accuracy – The carbon monoxide monitors had a total of 128 precision checks during 1983. The resulting 95% probability limits were –8% to +11%. Accuracy is determined by introducing a known amount of CO into each of the monitors. Six audits for accuracy were conducted on the monitoring network in 1983. Three different concentration levels were tested on each monitor: low, medium and high. The 95% probability limits for the low level test ranged from –7% to +6%; those for the medium level test ranged from –4% to +5%; and those for the high level test ranged from –5% to +2%.

8–Hour and 1–Hour Averages – Hartford 012 and New Britain 002 had second high CO concentrations exceeding the 8–hour standard of 9 ppm, which means that the standard was violated at these sites in 1983. This was also true FOR NEW BRITAIN in 1982, ~~except~~ WHEN ~~that~~ Stamford 020 violated the standard as well. Regarding the highest 8–hour averages at each site, none decreased from 1982 to 1983, and all but the one at Stamford 020 increased significantly. The second highest values at each site were also higher in 1983 than in 1982, except at Stamford 020 which had a lower second high concentration.

As for 1–hour averages, no site in the state recorded a value exceeding the primary 1–hour standard of 35 ppm. Bridgeport 004, Hartford 012 and New Haven 007 recorded a highest 1–hour value greater than the year before. Second high 1–hour values were higher in 1983 than in 1982 at Bridgeport 004 and Hartford 012 and lower at the other three sites.

The maximum and second high CO concentrations at each site are presented in Table 24. Table 25 presents highs and a tally of the number of times the standards were exceeded at each site. Seasonal variations in CO levels can be observed using this table.

10–High Days with Wind Data – Table 26 lists for each site the ten days in 1983 when the 1–hour CO averages were highest. The wind data associated with these high readings are also presented. (See the discussion of Table 11 in the TSP section for a description of the origin and use of these wind data.)

The high CO levels tended to occur during the colder months at all five CO sites. Low atmospheric mixing heights and stable atmospheric conditions are two reasons CO levels are high during the fall and winter. A noteworthy feature of the high CO days is that the persistence of a wind is more important than the direction to which or from which it is blowing. Since 95% of the CO emissions in Connecticut come from motor vehicles, it is likely that the high CO levels are caused when persistent winds are blowing CO emissions from the direction of nearby roads toward the monitors.

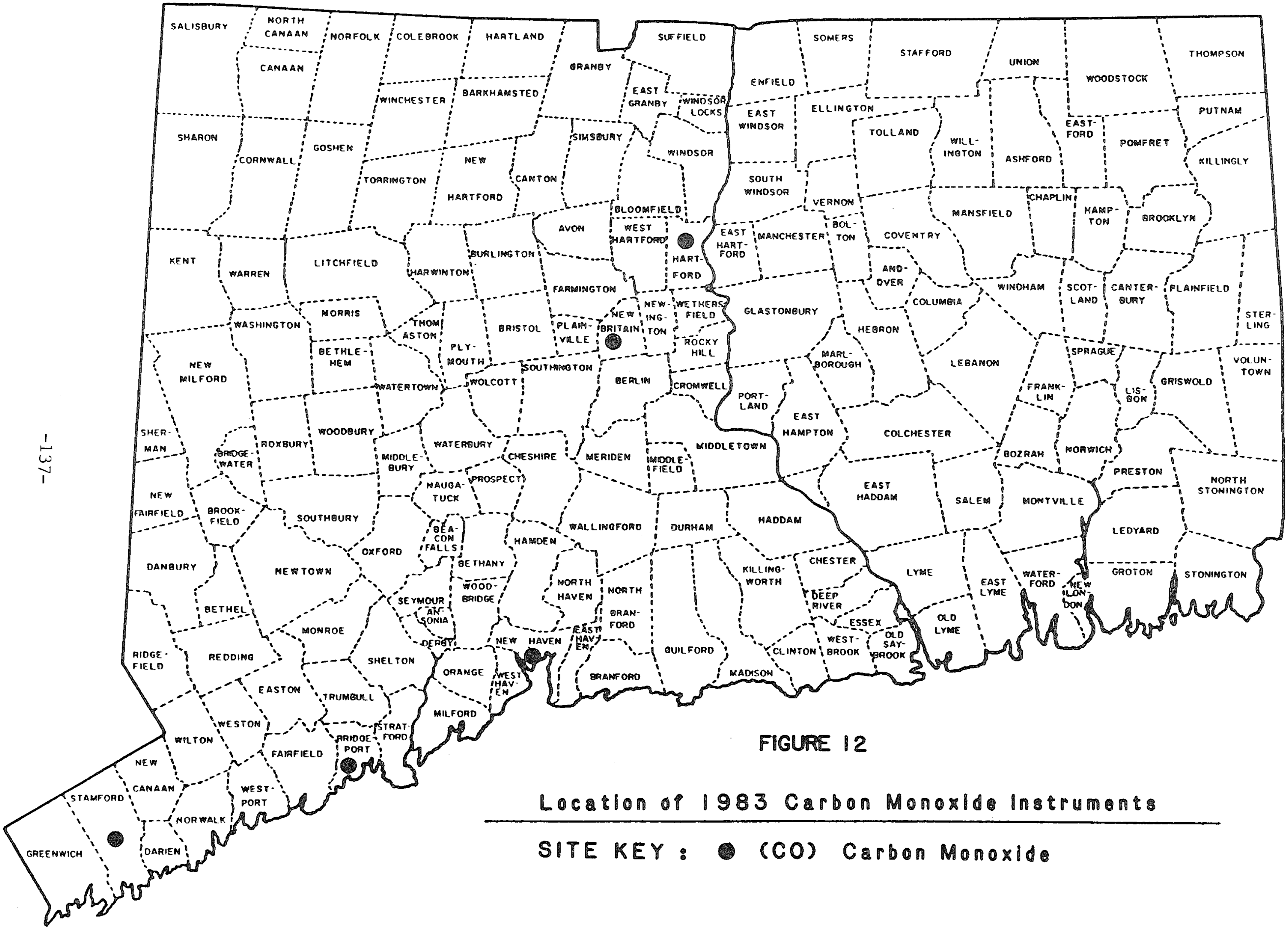


FIGURE 12

Location of 1983 Carbon Monoxide Instruments

SITE KEY : ● (CO) Carbon Monoxide

TABLE 24

1983 CARBON MONOXIDE STANDARDS ASSESSMENT SUMMARY

TOWN-SITE	MAXIMUM 8-HOUR RUNNING AVERAGE	TIME OF MAXIMUM 8-HOUR RUNNING AVERAGE [1]	2ND HIGH 8-HOUR RUNNING AVERAGE	TIME OF 2ND HIGH 8-HOUR RUNNING AVERAGE [1]	MAXIMUM 1-HOUR AVERAGE	TIME OF MAXIMUM 1-HOUR AVERAGE [2]	2ND HIGH 1-HOUR AVERAGE	TIME OF 2ND HIGH 1-HOUR AVERAGE [2]
Bridgeport-004	9.6	2/14/22	7.5	12/9/2	14.0	2/14/17	13.8	2/14/19
Hartford-012	12.8	2/15/1	10.3	2/14/14	19.3	2/14/23	17.5	2/14/22
New Britain-002	11.3	2/14/24	11.0	2/14/13	19.2	2/16/9	17.6	2/14/9
New Haven-007	9.5	2/14/13	8.3	11/10/3	15.5	2/14/10	13.3	1/5/17
Stamford-020	9.7	2/14/22	8.7	2/14/5,15	15.2	1/23/19	14.4	2/14/20

[1] Time of 8-hour averages is reported as follows: month/day/hour (EST), specifying the end of the 8-hour average period

[2] Time of 1-hour averages is reported as follows: month/day/hour (EST), specifying the end of the 1-hour average period

N.B. CO averages are expressed in terms of parts per million (ppm).

TABLE 25

1983 CARBON MONOXIDE SEASONAL FEATURES

TOWN-SITE		JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Bridgeport -004	Max. 1-Hr.	9.9	14.0	7.0	8.1	4.4	4.2	4.8	5.5	7.8	8.0	9.9	11.4
	Max. Running 8-Hr.	6.8	9.6	4.8	5.5	3.6	3.1	3.3	3.6	6.0	6.1	6.3	7.5
	# Times 8-Hr. Exceeded	0	1	0	0	0	0	0	0	0	0	0	0
Hartford -012	Max. 1-Hr.	12.4	19.3	8.8	8.9	9.4	13.1	9.3	8.1	8.8	8.9	10.7	8.4
	Max. Running 8-Hr.	10.2	12.8	6.7	5.9	4.6	4.2	4.7	5.2	5.6	5.7	6.2	7.2
	# Times 8-Hr. Exceeded	1	2	0	0	0	0	0	0	0	0	0	0
New Britain -002	Max. 1-Hr.	13.6	19.2	11.5	8.0	7.1	6.8	10.7	6.2	9.1	9.2	10.5	11.0
	Max. Running 8-Hr.	8.3	11.3	8.3	5.5	5.7	5.7	8.1	3.8	5.5	5.1	5.9	6.5
	# Times 8-Hr. Exceeded	0	2	0	0	0	0	0	0	0	0	0	0
New Haven -007	Max. 1-Hr.	13.3	15.5	5.7	6.1	5.1	4.7	5.3	8.9	6.8	7.8	13.1	10.0
	Max. Running 8-Hr.	7.9	9.5	3.4	4.7	2.7	3.2	2.9	4.2	4.6	5.8	8.3	5.5
	# Times 8-Hr. Exceeded	0	1	0	0	0	0	0	0	0	0	0	0
Stamford -020	Max. 1-Hr.	15.2	14.4	9.6	11.7	6.5	7.7	8.5	6.7	8.2	12.7	10.9	7.8
	Max. Running 8-Hr.	8.3	9.7	6.6	7.8	4.6	5.1	6.4	5.3	5.0	8.3	8.0	5.8
	# Times 8-Hr. Exceeded	0	1	0	0	0	0	0	0	0	0	0	0

N.B. The CO concentrations are in terms of parts per million (ppm)

TABLE 26

1983 TEN HIGHEST 1-HOUR AVERAGE CO DAYS WITH WIND DATA

UNITS : PARTS PER MILLION

TOWN/SITE		SAMPLES	1	2	3	4	5	6	7	8	9	10
BRIDGEPORT 004		8539	14.0	11.4	9.9	9.9	9.0	8.6	8.1	8.0	8.0	7.8
		DATE	2/14/83	12/ 8/83	1/29/83	11/ 2/83	2/28/83	11/ 1/83	4/15/83	10/17/83	10/31/83	9/30/83
METEOROLOGICAL SITE	NEWARK	DIR (DEG)	30	260	360	140	200	140	130	170	230	30
		VEL (MPH)	6.7	9.2	4.4	2.2	4.8	2.0	13.6	3.0	5.3	13.7
		SPD (MPH)	7.3	9.8	8.1	5.2	5.9	4.7	14.4	6.2	6.6	13.8
		RATIO	0.909	0.942	0.551	0.416	0.821	0.416	0.949	0.486	0.805	0.994
METEOROLOGICAL SITE	BRADLEY	DIR (DEG)	300	290	360	190	200	260	150	200	280	10
		VEL (MPH)	0.4	9.2	3.2	4.6	4.3	0.7	10.5	4.3	1.3	4.6
		SPD (MPH)	0.4	10.1	4.2	4.6	5.3	3.6	11.4	4.6	2.7	5.0
		RATIO	1.000	0.911	0.769	0.997	0.804	0.194	0.925	0.925	0.485	0.907
METEOROLOGICAL SITE	BRIDGEPORT	DIR (DEG)	50	290	30	200	220	50	70	200	230	40
		VEL (MPH)	2.9	7.3	0.3	2.7	4.6	0.7	15.0	2.2	3.9	8.6
		SPD (MPH)	3.3	8.1	3.9	4.6	4.7	4.3	15.1	4.9	4.3	8.8
		RATIO	0.888	0.906	0.071	0.582	0.971	0.156	0.992	0.446	0.899	0.983
METEOROLOGICAL SITE	WORCESTER	DIR (DEG)	250	270	40	250	260	230	130	210	280	70
		VEL (MPH)	6.4	15.1	3.7	6.2	5.3	2.5	8.6	5.2	5.9	2.6
		SPD (MPH)	6.5	15.2	4.3	6.3	5.6	4.2	9.1	5.5	6.2	2.6
		RATIO	0.994	0.988	0.848	0.974	0.949	0.596	0.952	0.952	0.957	0.988
HARTFORD 012		8365	19.3	13.1	12.4	12.2	10.7	9.5	9.5	9.4	9.3	9.0
		DATE	2/14/83	6/26/83	1/21/83	1/22/83	11/ 9/83	2/15/83	2/16/83	5/14/83	7/ 3/83	2/13/83
METEOROLOGICAL SITE	NEWARK	DIR (DEG)	30	220	20	30	180	330	70	130	230	60
		VEL (MPH)	6.7	2.4	4.4	7.1	4.4	5.9	4.4	7.7	1.6	1.5
		SPD (MPH)	7.3	8.6	4.6	7.5	5.5	6.3	5.9	8.8	6.5	4.9
		RATIO	0.909	0.280	0.959	0.946	0.800	0.927	0.751	0.873	0.242	0.311
METEOROLOGICAL SITE	BRADLEY	DIR (DEG)	300	230	100	30	130	350	110	190	270	40
		VEL (MPH)	0.4	4.2	0.9	0.3	1.5	3.6	0.4	4.5	2.9	0.3
		SPD (MPH)	0.4	5.8	2.6	2.7	2.0	4.0	3.2	5.3	4.3	1.7
		RATIO	1.000	0.723	0.348	0.103	0.768	0.887	0.117	0.849	0.662	0.192
METEOROLOGICAL SITE	BRIDGEPORT	DIR (DEG)	50	200	330	60	220	330	60	160	220	240
		VEL (MPH)	2.9	3.9	5.4	5.0	5.3	7.4	7.2	6.3	5.9	3.2
		SPD (MPH)	3.3	6.2	5.8	6.0	6.0	8.5	7.6	8.2	6.0	4.6
		RATIO	0.888	0.625	0.933	0.836	0.881	0.867	0.948	0.772	0.972	0.690
METEOROLOGICAL SITE	WORCESTER	DIR (DEG)	250	290	330	230	270	340	60	260	280	300
		VEL (MPH)	6.4	4.1	7.6	1.3	5.5	9.9	2.9	0.8	5.3	5.1
		SPD (MPH)	6.5	5.8	7.9	2.9	6.2	10.6	4.5	3.7	5.6	6.5
		RATIO	0.994	0.709	0.962	0.455	0.890	0.932	0.643	0.207	0.953	0.788
NEW BRITAIN 002		7818	19.2	17.6	13.6	11.5	11.0	11.0	10.7	10.6	10.5	10.2
		DATE	2/16/83	2/14/83	1/21/83	3/ 1/83	1/ 5/83	12/22/83	7/ 6/83	3/10/83	11/ 9/83	2/17/83
METEOROLOGICAL SITE	NEWARK	DIR (DEG)	70	30	20	20	20	180	330	10	180	10
		VEL (MPH)	4.4	6.7	4.4	11.3	8.4	1.1	8.8	10.1	4.4	7.6
		SPD (MPH)	5.9	7.3	4.6	11.5	8.6	12.1	10.8	10.6	5.5	8.9
		RATIO	0.751	0.909	0.959	0.982	0.974	0.092	0.814	0.952	0.800	0.856
METEOROLOGICAL SITE	BRADLEY	DIR (DEG)	110	300	100	30	360	10	330	20	130	30
		VEL (MPH)	0.4	0.4	0.9	5.8	2.3	6.1	6.2	10.1	1.5	4.9
		SPD (MPH)	3.2	0.4	2.6	6.8	2.9	7.0	7.3	10.1	2.0	7.2
		RATIO	0.117	1.000	0.348	0.853	0.785	0.870	0.844	1.000	0.768	0.675

TABLE 26, CONTINUED

1983 TEN HIGHEST 1-HOUR AVERAGE CO DAYS WITH WIND DATA

UNITS : PARTS PER MILLION

TOWN/SITE	SAMPLES	1	2	3	4	5	6	7	8	9	10
METEOROLOGICAL SITE	DIR (DEG)	60	50	330	30	40	120	340	20	220	50
BRIDGEPORT	VEL (MPH)	7.2	2.9	5.4	11.4	7.4	5.4	7.5	7.8	5.3	8.2
	SPD (MPH)	7.6	3.3	5.8	11.8	7.8	10.9	7.6	8.5	6.0	9.9
	RATIO	0.948	0.888	0.933	0.971	0.953	0.494	0.979	0.915	0.881	0.829
METEOROLOGICAL SITE	DIR (DEG)	60	250	330	30	190	70	310	50	270	60
WORCESTER	VEL (MPH)	2.9	6.4	7.6	3.2	3.5	3.3	8.7	12.8	5.5	4.7
	SPD (MPH)	4.5	6.5	7.9	6.9	4.7	7.8	8.9	12.9	6.2	5.8
	RATIO	0.643	0.994	0.962	0.461	0.731	0.431	0.971	0.992	0.890	0.823
NEW HAVEN 007	8145	15.5	13.3	13.1	12.1	12.0	10.1	10.0	9.8	9.6	9.5
	DATE	2/14/83	1/ 5/83	11/ 9/83	1/29/83	2/21/83	2/13/83	12/ 8/83	1/ 7/83	11/ 1/83	11/ 2/83
METEOROLOGICAL SITE	DIR (DEG)	30	20	180	360	230	60	260	240	140	140
NEWARK	VEL (MPH)	6.7	8.4	4.4	4.4	8.4	1.5	9.2	7.7	2.0	2.2
	SPD (MPH)	7.3	8.6	5.5	8.1	8.9	4.9	9.8	9.1	4.7	5.2
	RATIO	0.909	0.974	0.800	0.551	0.938	0.311	0.942	0.854	0.416	0.416
METEOROLOGICAL SITE	DIR (DEG)	300	360	130	360	200	40	290	210	260	190
BRADLEY	VEL (MPH)	0.4	2.3	1.5	3.2	6.0	0.3	9.2	4.3	0.7	4.6
	SPD (MPH)	0.4	2.9	2.0	4.2	6.9	1.7	10.1	5.0	3.6	4.6
	RATIO	1.000	0.785	0.768	0.769	0.870	0.192	0.911	0.849	0.194	0.997
METEOROLOGICAL SITE	DIR (DEG)	50	40	220	30	230	240	290	230	50	200
BRIDGEPORT	VEL (MPH)	2.9	7.4	5.3	0.3	5.3	3.2	7.3	6.1	0.7	2.7
	SPD (MPH)	3.3	7.8	6.0	3.9	6.0	4.6	8.1	7.8	4.3	4.6
	RATIO	0.888	0.953	0.881	0.071	0.873	0.690	0.906	0.785	0.156	0.582
METEOROLOGICAL SITE	DIR (DEG)	250	190	270	40	260	300	270	240	230	250
WORCESTER	VEL (MPH)	6.4	3.5	5.5	3.7	6.6	5.1	15.1	5.8	2.5	6.2
	SPD (MPH)	6.5	4.7	6.2	4.3	7.2	6.5	15.2	6.2	4.2	6.3
	RATIO	0.994	0.731	0.890	0.848	0.921	0.788	0.988	0.939	0.596	0.974
STAMFORD 020	7187	15.2	14.4	12.7	12.1	11.7	11.5	11.4	10.9	10.5	10.2
	DATE	1/23/83	2/14/83	10/31/83	2/ 1/83	4/28/83	1/ 7/83	2/17/83	11/ 1/83	1/20/83	10/17/83
METEOROLOGICAL SITE	DIR (DEG)	20	30	230	280	170	240	10	140	330	170
NEWARK	VEL (MPH)	8.0	6.7	5.3	7.4	3.9	7.7	7.6	2.0	12.4	3.0
	SPD (MPH)	8.8	7.3	6.6	8.5	6.2	9.1	8.9	4.7	13.4	6.2
	RATIO	0.915	0.909	0.805	0.872	0.636	0.854	0.856	0.416	0.931	0.486
METEOROLOGICAL SITE	DIR (DEG)	10	300	280	320	200	210	30	260	320	200
BRADLEY	VEL (MPH)	5.6	0.4	1.3	6.4	3.9	4.3	4.9	0.7	3.9	4.3
	SPD (MPH)	5.8	0.4	2.7	7.0	6.0	5.0	7.2	3.6	4.6	4.6
	RATIO	0.982	1.000	0.485	0.910	0.652	0.849	0.675	0.194	0.851	0.925
METEOROLOGICAL SITE	DIR (DEG)	60	50	230	290	200	230	50	50	330	200
BRIDGEPORT	VEL (MPH)	10.9	2.9	3.9	3.9	2.8	6.1	8.2	0.7	8.1	2.2
	SPD (MPH)	11.5	3.3	4.3	5.2	4.7	7.8	9.9	4.3	8.8	4.9
	RATIO	0.951	0.888	0.899	0.746	0.588	0.785	0.829	0.156	0.924	0.446
METEOROLOGICAL SITE	DIR (DEG)	60	250	280	290	230	240	60	230	320	210
WORCESTER	VEL (MPH)	2.9	6.4	5.9	10.9	4.2	5.8	4.7	2.5	16.0	5.2
	SPD (MPH)	4.2	6.5	6.2	11.1	4.6	6.2	5.8	4.2	16.4	5.5
	RATIO	0.687	0.994	0.957	0.981	0.909	0.939	0.823	0.596	0.978	0.952

VII. LEAD

Health Effects

Lead (Pb) is a soft, dull gray, odorless and tasteless heavy metal. It is an ubiquitous element that is widely distributed in small amounts, particularly in soil and in all living things. Although the metallic form of lead is reactive and rarely occurs in nature, lead is prevalent in the environment in the form of various inorganic compounds, and occasional concentrated deposits of lead compounds occur in the earth's crust.

The presence of lead in the atmosphere is primarily accounted for by the emissions of lead compounds from man-made processes, such as the extraction and processing of metallic ores, the incineration of solid wastes, and the operation of motor vehicles. The combustion of lead-containing gasoline by motor vehicles is the largest source of airborne lead emissions and is responsible for approximately 90% of the total. These emissions are in the form of fine-to-course particulate matter and are comprised of lead sulfate, ammonium lead halides, and lead halides, of which the chief component is lead bromochloride. The halide compounds appear to undergo chemical changes over a period of hours and are converted to lead carbonate, oxide and oxycarbonate.

The most important sources of lead in humans and other animals are ingestion of foods and beverages, inhalation of airborne lead, and the eating of non-food substances. From the standpoint of the general population, the intake of lead into the body is primarily through ingestion. The direct intake of lead from the ambient air is relatively small. Except in special cases, the contribution to the total body burden of lead via inhalation of airborne lead in urban areas is usually less than 30%. In non-urban areas, it is usually less than 5%.

Overexposure to lead in the United States is primarily a problem in children. Age, pica, diet, nutritional status, and multiple sources of exposure serve to increase the risk of lead poisoning in children. This is especially true in the inner cities where the prevalence of lead poisoning is greatest. Overexposure to lead compounds may result in undesirable biologic effects. These effects range from reversible clinical or metabolic symptoms that disappear after cessation of exposure to permanent damage or death from a single extreme dose or prolonged overexposure. Clinical lead poisoning is accompanied by symptoms of intestinal cramps, peripheral nerve paralysis, anemia, and severe fatigue. Very severe exposure results in permanent neurological, renal, or cardiovascular damage or death.

Conclusions

The Connecticut primary and secondary ambient air quality standard for lead and its compounds was not exceeded at any site in Connecticut during 1983.

The monitoring sites where the lead levels were highest were generally in urban locations with moderate to heavy traffic. This is due to the fact that in Connecticut the primary source of lead in the atmosphere is the combustion of leaded gasoline in motor vehicles.

A downward trend in measured concentrations of lead has been observed since 1978. This is probably due to the increasing use of unleaded gasoline. Figure 13 shows that the decrease in lead emissions from gasoline from 1975 to 1982 has been commensurate with a decrease in statewide ambient average led concentrations. In fact, this relationship is so close, it has a correlation coefficient of 0.983 (see Figure 14).

Sample Collection and Analysis

The Air Monitoring Unit uses hi-vol and lo-vol samplers to obtain ambient concentrations of lead. These samplers are used to collect particulate matter onto fiberglass filters. The particulate matter collected on the filters is subsequently analyzed for its chemical composition. Wet chemistry techniques are used to separate the particulate matter into various components. The lead content of the TSP is determined using an atomic absorption spectrophotometer. (The use of these sampling devices and the chemical analysis techniques were fully described in the TSP section.) Unlike TSP samples which are analyzed separately, the lead sample is a composite of all the individual samples obtained at a site in a single month. That is, a cutting is taken from each TSP filter during the month and these cuttings are chemically analyzed for lead en masse.

Discussion of Data

Monitoring Network – In 1983, both hi-vol and lo-vol samplers were operated in Connecticut to monitor lead levels (see Figure 15). There were 16 hi-vol sites operated throughout the State (see Table 32) as part of the State and Local Air Monitoring Stations (SLAMS) network. The DEP also operated five lo-vol monitors in 1983 in cities with populations greater than 200,000. They are Hartford 015 and 016, Stamford 022, New Haven 016, and Bridgeport 010. These "micro-scale" lead sites are situated near some of the busiest city streets in order to monitor "worst-case" lead concentrations. EPA approval for these lo-vol sites is being sought by the Department.

Precision and Accuracy – The hi-vol lead monitors had a total of 22 precision checks in 1983. The resulting 95% probability limits were −16% to +12%. Accuracy for lead is defined as the accuracy of the analysis method. It is determined by chemical analysis of known lead samples. There were 15 audits for accuracy conducted on the monitoring network in 1983. Two different concentration levels were tested: low and high. The 95% probability limits for the low level test ranged from −4% to +4%; those for the high level test ranged from −2% to +2%.

NAAQS – Connecticut's ambient air quality standard for lead and its compounds, measured as elemental lead, is: 1.5 micrograms per cubic meter (ug/m^3), maximum arithmetic mean averaged over three consecutive calendar months. This standard was enacted on November 2, 1981. Previously, Connecticut's lead standard was substantially identical: 1.5 ug/m^3 for a calendar quarter-year average. The change to a 3-month running average means that a more stringent standard now applies, since there are three times as many data blocks within a calendar year which must be below the limiting concentration of 1.5 ug/m^3.

3-Month Running Averages – Three-month running average lead concentrations are given in Table 27 for the year 1983. These values are also presented in graphical form in Figure 16 for the period 1981–83.

The reader should note that TSP episode sampling was performed at Ansonia 003, Bridgeport 123, New Britain 007 and Waterbury 007 during the months of January and February. One additional day of sampling in each month was performed at these sites outside of the normal every-sixth-day schedule in order to measure high ambient TSP concentrations. These samples were inadvertently made a part of the monthly lead composite.

In addition, there were two instances in 1983 when a TSP sample was invalidated after the monthly lead sample was analyzed. This occurred at Middletown 003 in October and at New Britain 007 in November. The corresponding individual lead samples should also have been invalidated, but this was not possible due to the fact that the lead sample that is analyzed is a monthly composite.

FIGURE 13

STATEWIDE ANNUAL LEAD EMISSIONS FROM GASOLINE
AND
STATEWIDE ANNUAL AVERAGE LEAD CONCENTRATIONS

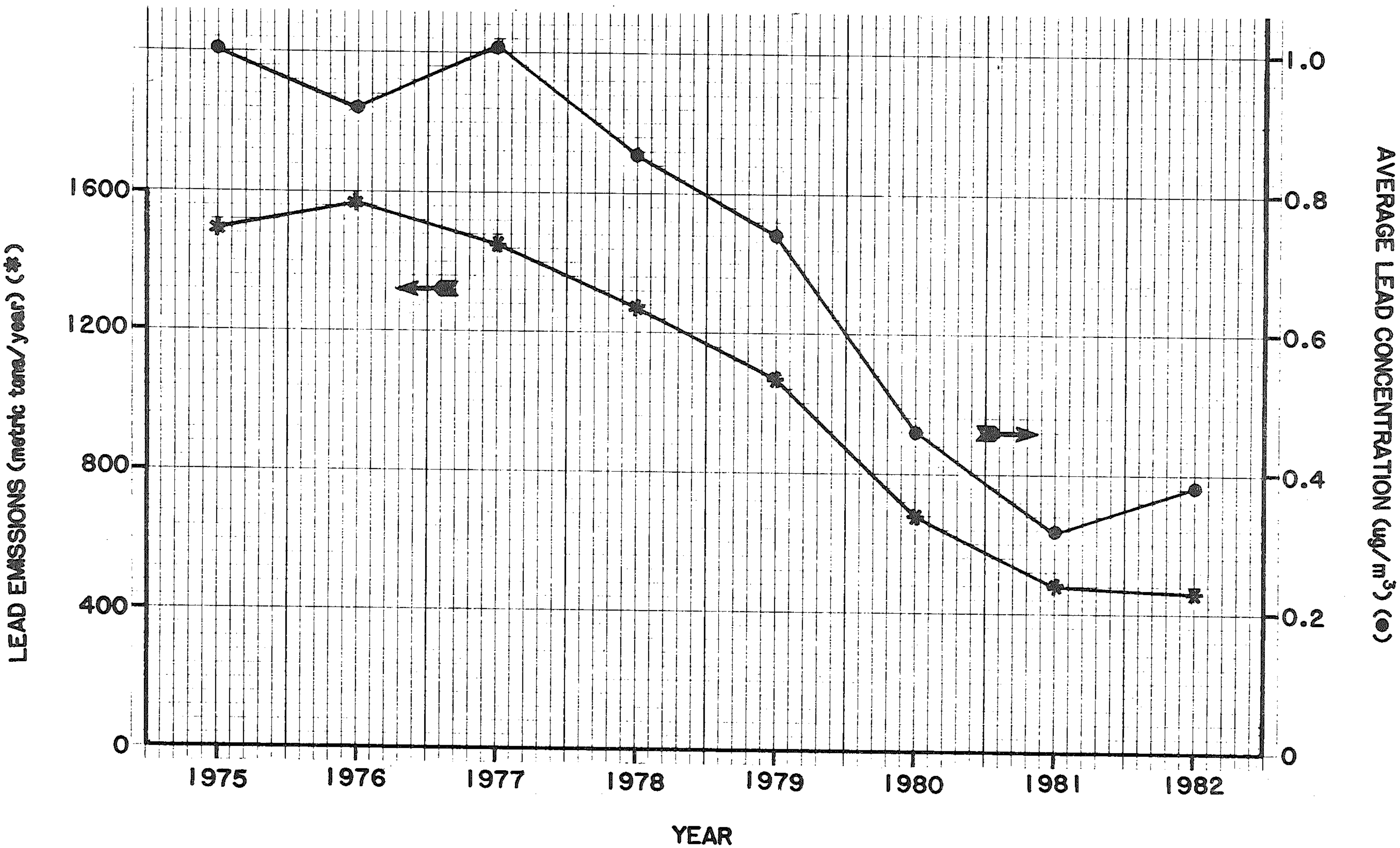
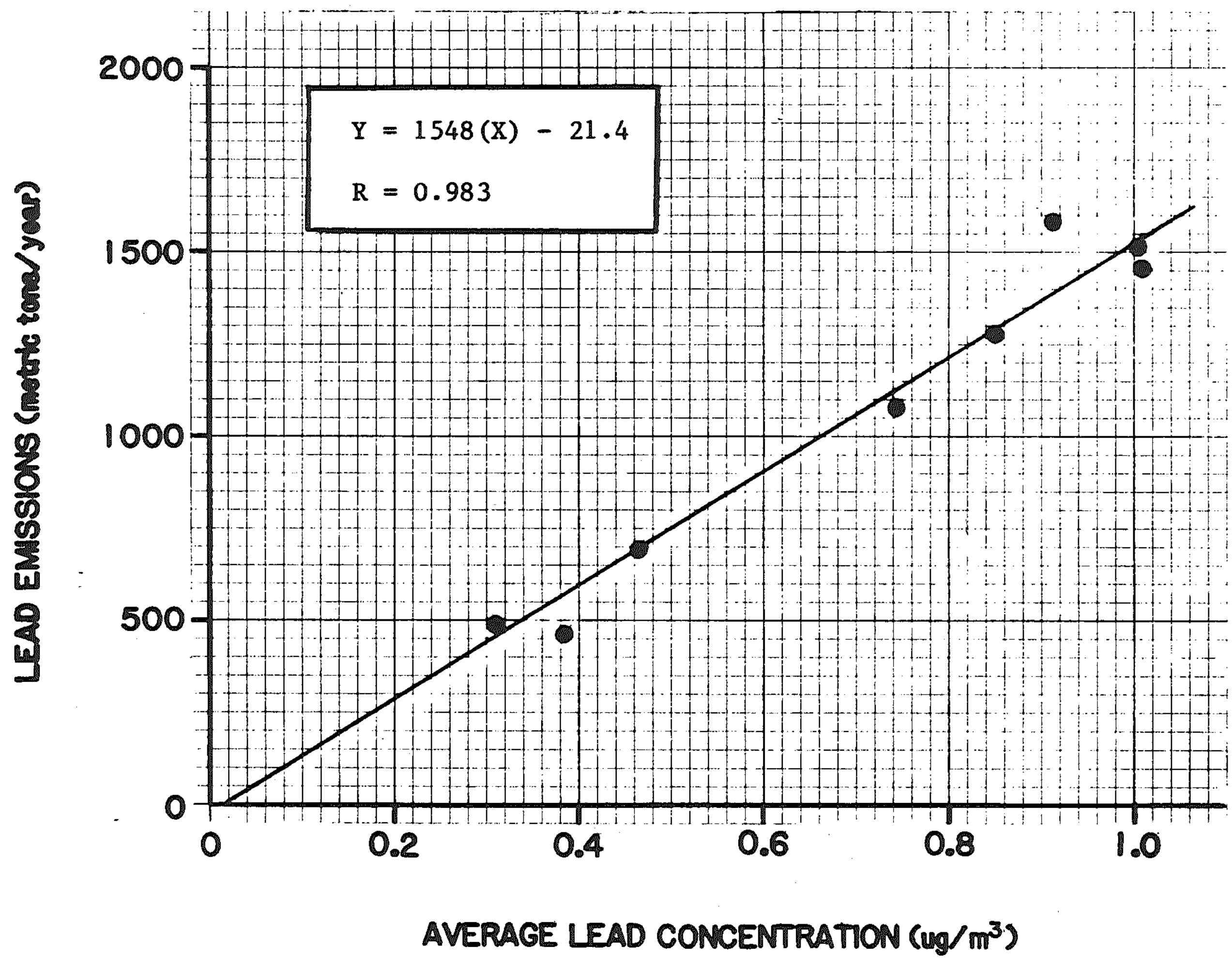


FIGURE 14

STATEWIDE ANNUAL LEAD EMISSIONS FROM GASOLINE
VS
STATEWIDE ANNUAL AVERAGE LEAD CONCENTRATION



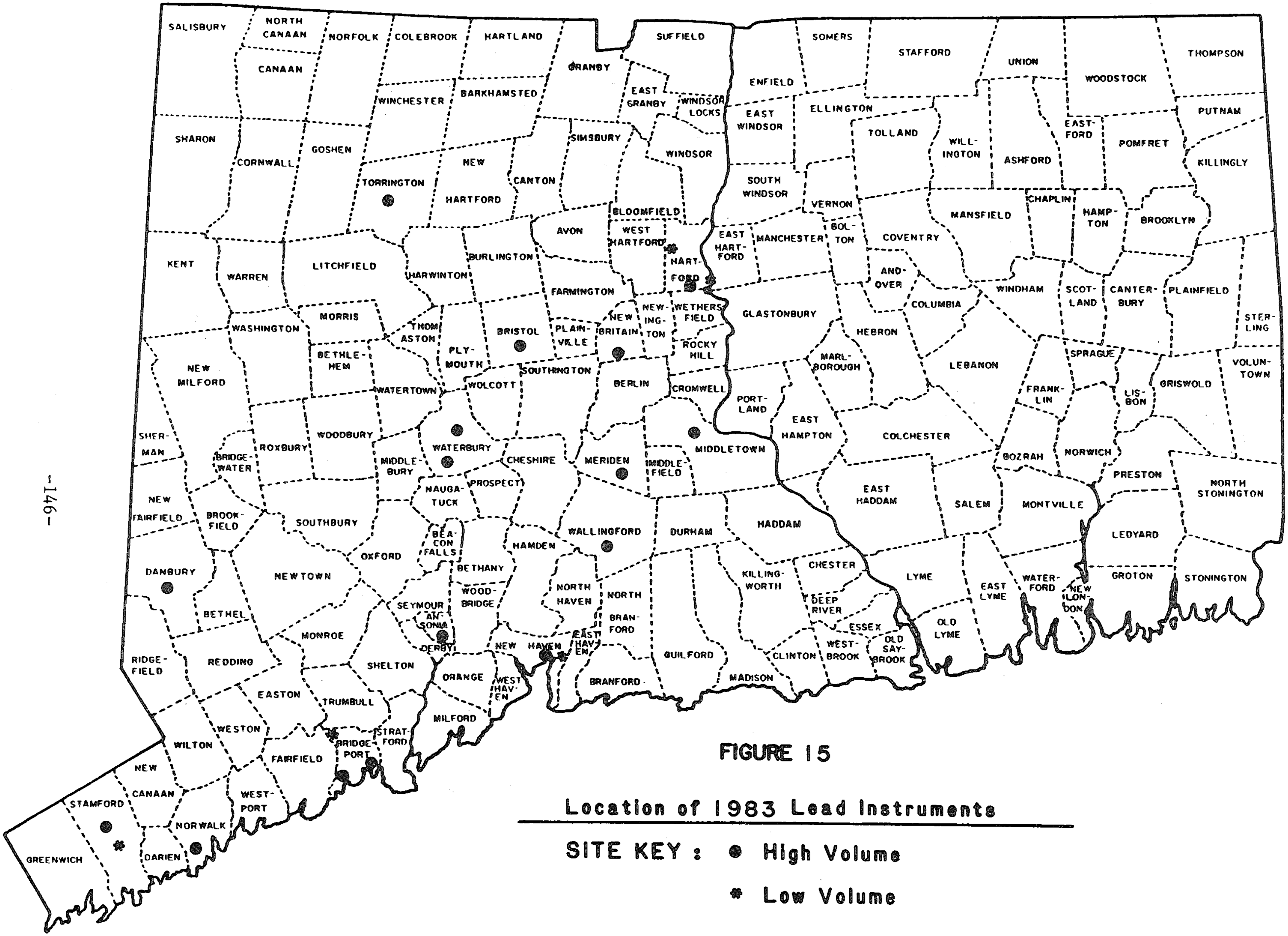


FIGURE 15

Location of 1983 Lead Instruments

SITE KEY : ● **High Volume**

* **Low Volume**

TABLE 27

1983 3-MONTH RUNNING AVERAGE LEAD CONCENTRATIONS (ug/m3)

SITE	Jan.*	Feb.*	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Ansonia-003	0.67	0.65	0.42	0.28	0.21	0.21	0.19	0.25	0.33	0.37	0.43	0.41
Bridgeport-009	0.45	0.36	0.21	0.18	0.16	0.17	0.17	0.21	0.25	0.29	0.34	0.34
Bridgeport-010	0.75	0.49	0.35	0.36	0.37	0.44	0.43	----	----	----	----	----
Bridgeport-123	0.63	0.61	0.42	0.32	0.29	0.29	0.29	0.33	0.41	0.44	0.51	0.47
Bristol-001	0.27	0.26	0.21	0.18	0.15	0.14	0.11	0.15	0.18	0.22	0.27	0.26
Danbury-002	0.43	0.36	0.24	0.19	0.18	0.18	0.18	0.22	0.29	0.34	0.42	0.41
Hartford-014	0.50	0.44	0.30	0.24	0.21	0.20	0.17	0.22	0.28	0.38	0.44	0.44
Hartford-015	0.66	0.69	0.60	0.53	0.42	----	----	----	----	----	----	----
Hartford-016	0.90	0.80	0.57	0.60	0.48	0.49	0.42	0.42	0.45	0.56	0.68	0.70
Meriden-002	0.47	0.33	0.24	0.19	0.20	0.23	0.24	0.27	0.34	0.39	0.42	----
Middletown-003	0.40	0.37	0.29	0.21	0.17	0.16	0.14	0.19	0.26	0.34	0.40	0.37
New Britain-007	0.44	0.46	0.40	0.22	0.17	0.16	0.15	0.20	0.25	0.30	0.35	0.31
New Haven-016	----	----	0.39	0.36	0.30	0.36	0.36	0.40	0.46	0.51	0.55	0.46
New Haven-123	0.66	0.56	0.42	0.35	0.31	0.31	0.28	0.37	0.45	0.54	0.60	0.60
Norwalk-012	0.54	0.40	0.27	0.18	0.18	0.21	0.22	0.27	0.35	0.41	0.48	0.45
Stamford-001	0.48	0.36	0.25	0.20	0.20	0.23	0.24	0.27	0.28	0.31	0.37	0.36
Stamford-022	0.59	0.46	0.31	0.29	0.29	0.36	0.38	0.39	0.40	0.43	0.42	0.37
Torrington-123	0.50	0.45	0.32	0.20	0.17	0.19	0.19	0.20	0.24	0.36	0.53	0.54
Wallingford-001	0.53	0.42	0.29	0.16	0.14	0.15	0.18	0.21	0.24	0.31	0.42	0.43
Waterbury-007	0.73	0.68	0.49	0.33	0.26	0.28	0.30	0.35	0.44	0.49	0.59	0.58
Waterbury-123	0.90	0.77	0.59	0.39	0.36	0.34	0.33	0.35	0.43	0.55	0.82	0.85

* 3-month running average includes data from the last 2 months of 1982

FIGURE 16

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=ANSONIA 003

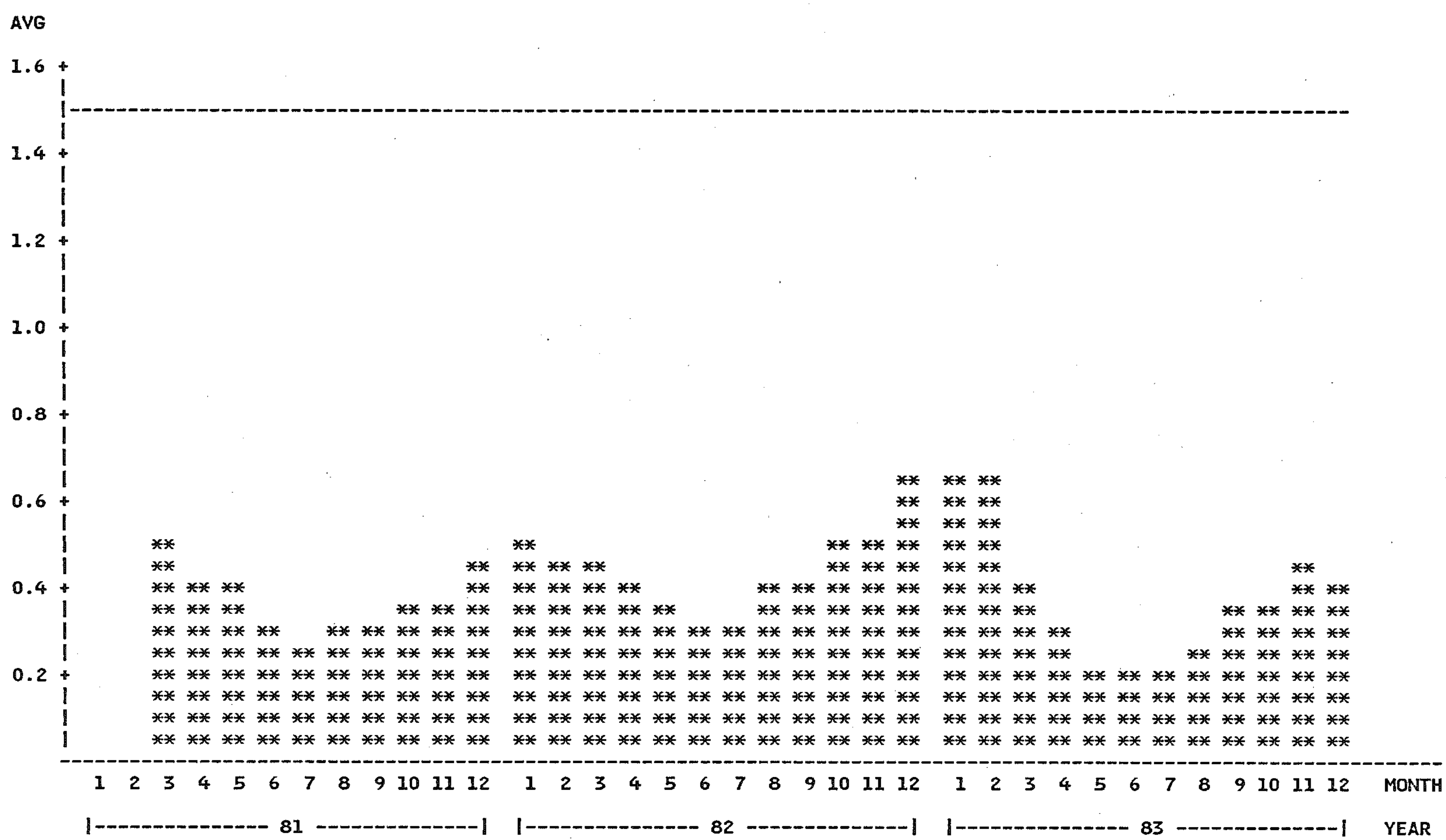


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=BRIDGEPORT 009

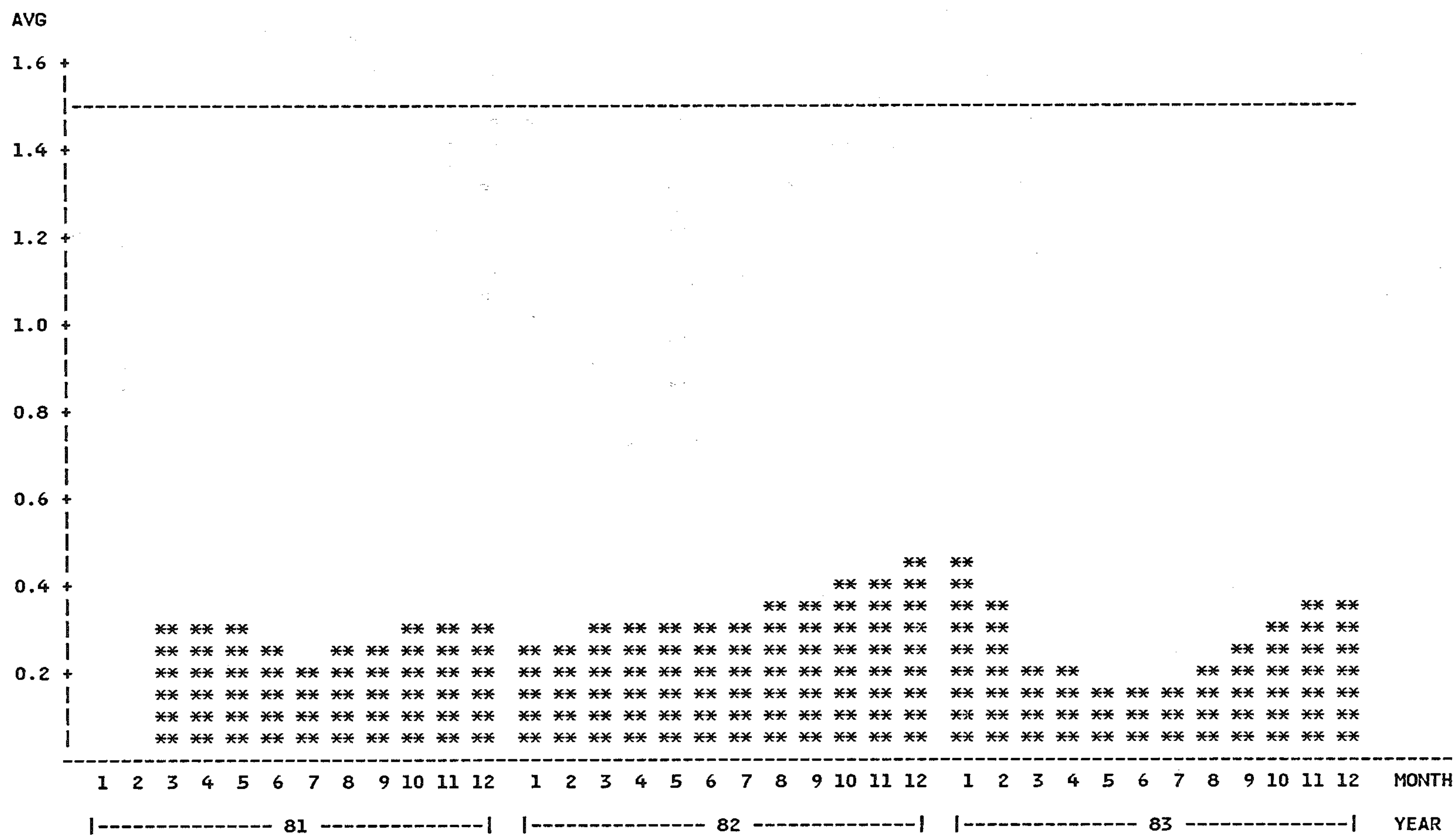


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=BRIDGEPORT 010

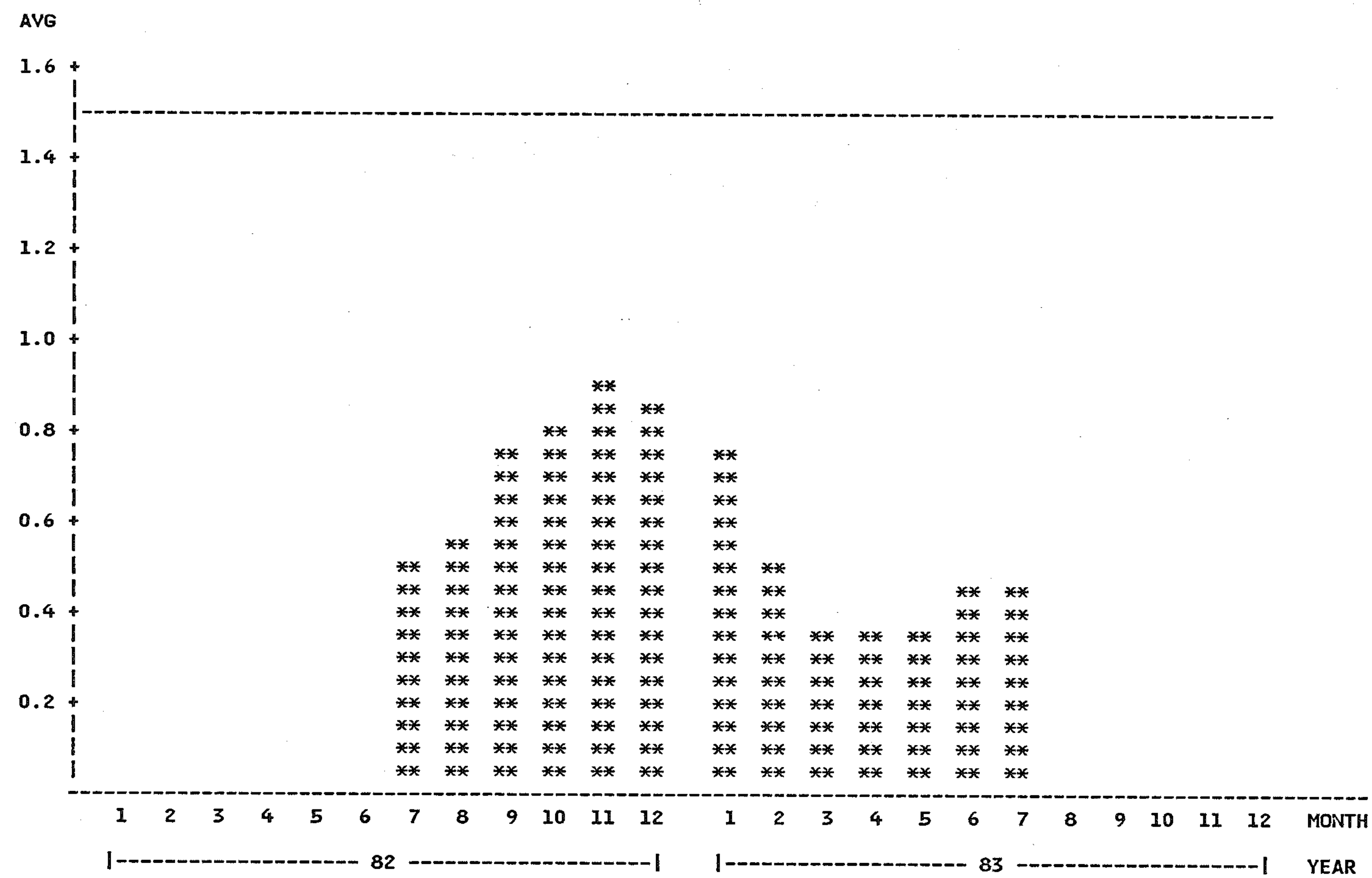


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=BRIDGEPORT 123

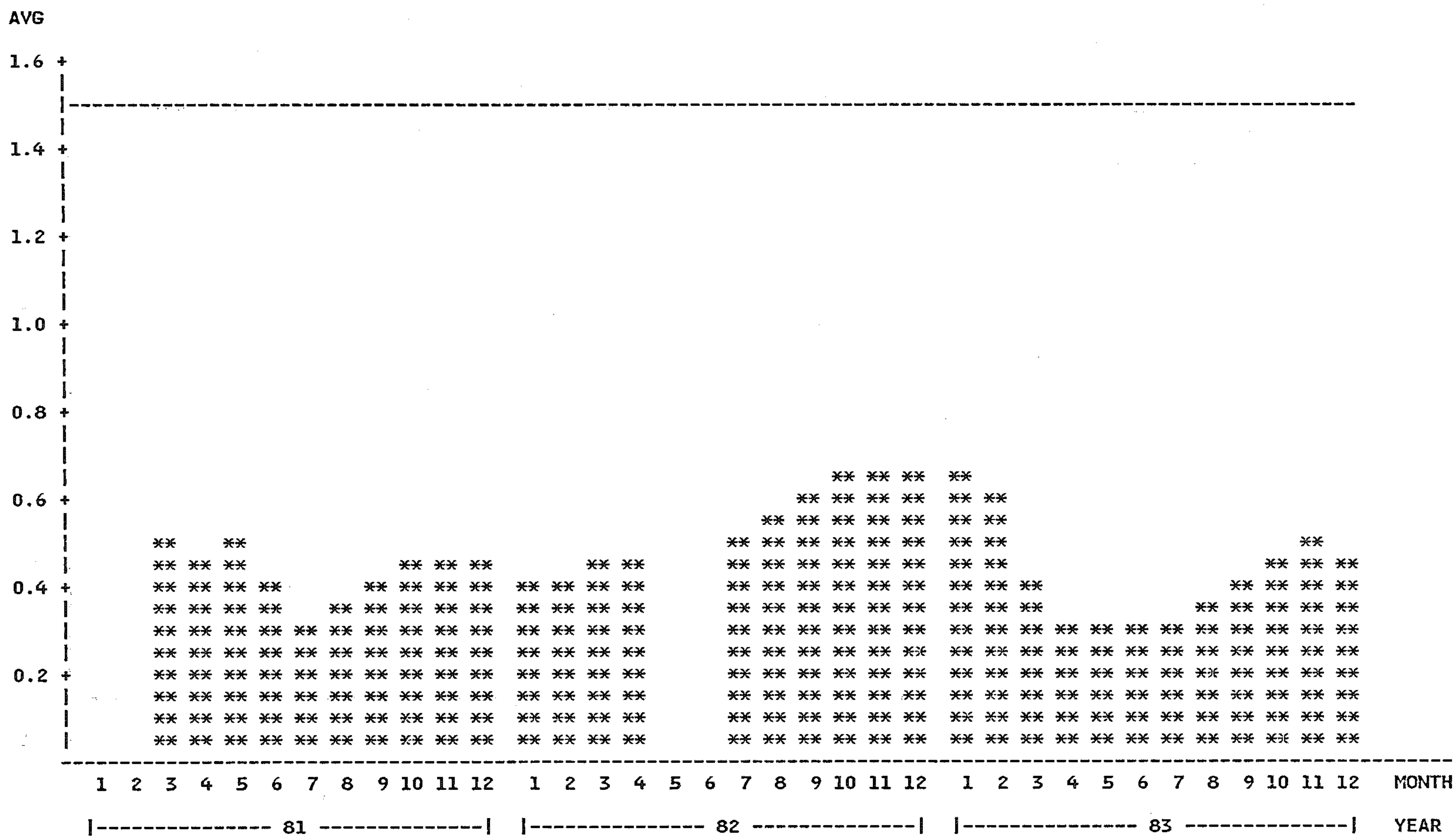


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=BRISTOL 001

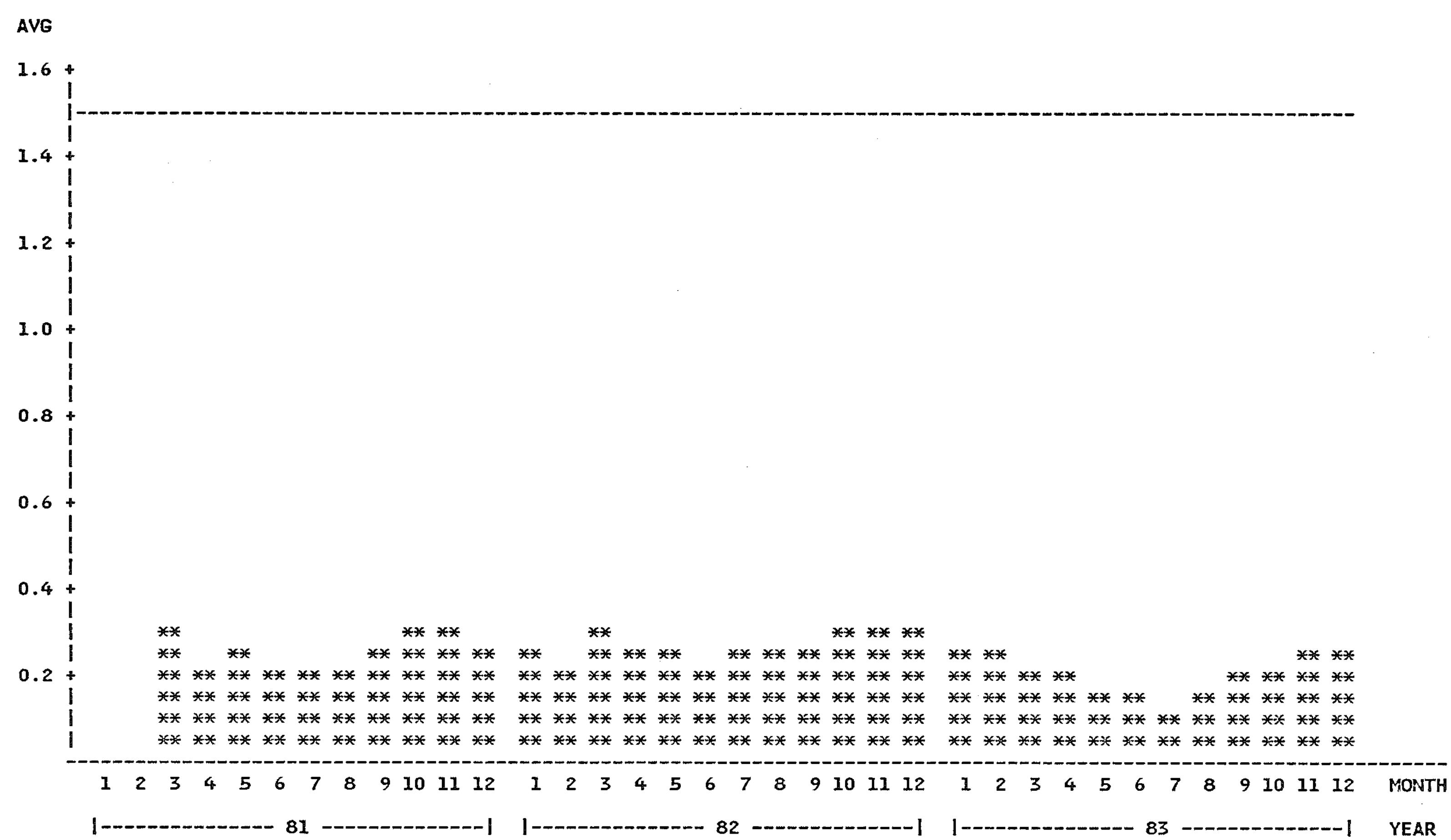


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=DANBURY 002

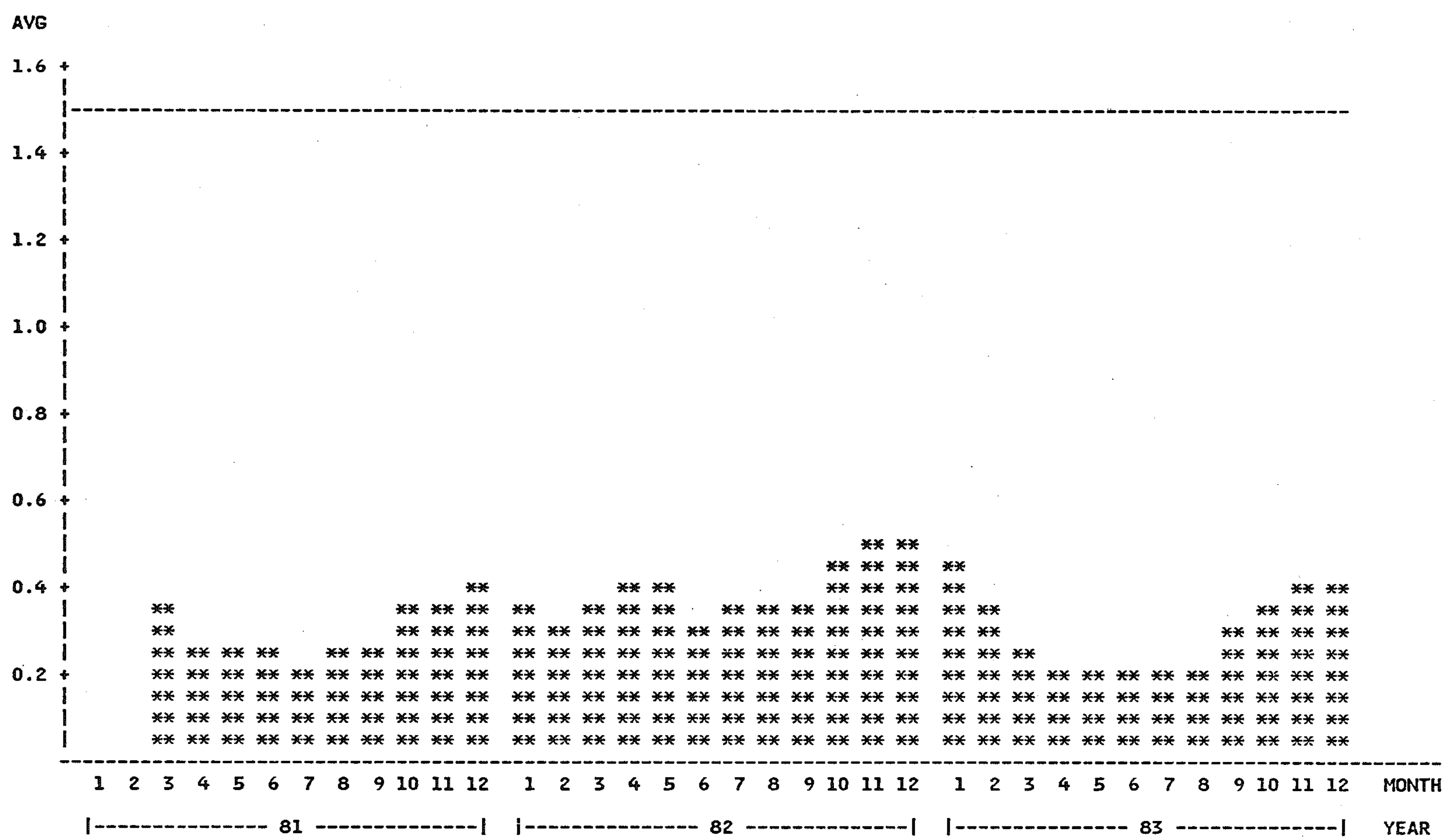


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=HARTFORD 014

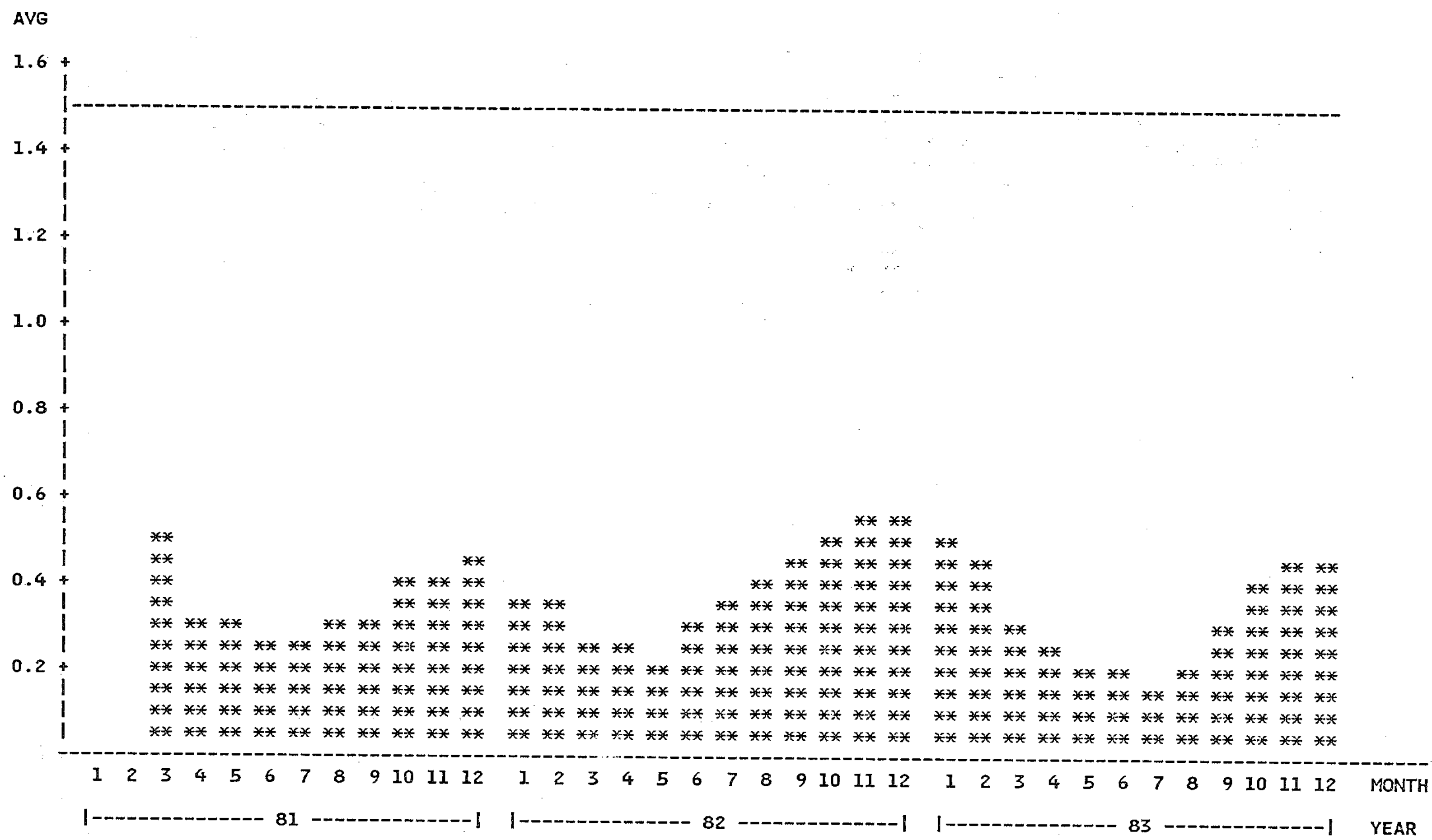


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=HARTFORD 015

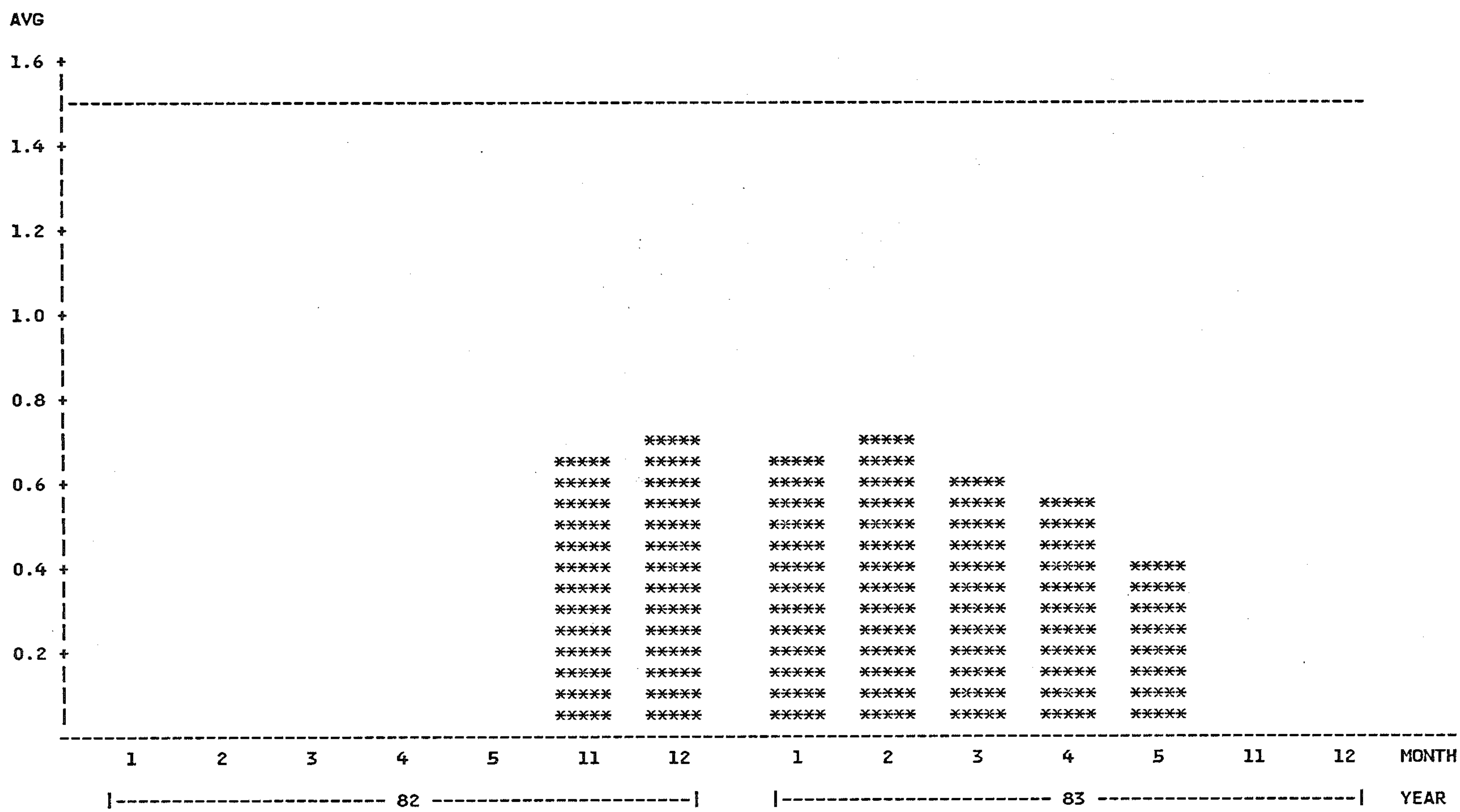


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=HARTFORD 016

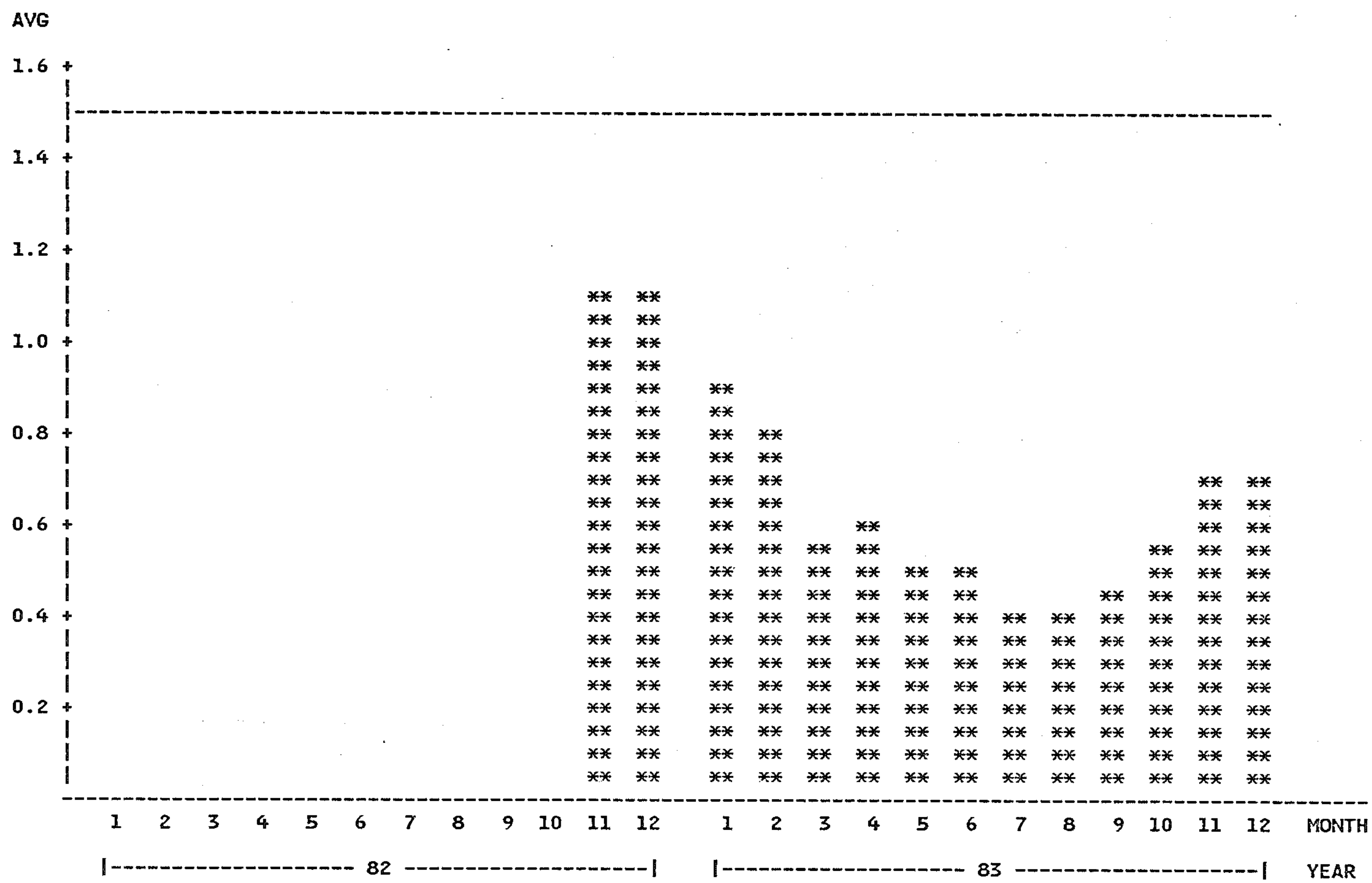


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=MERIDEN 002

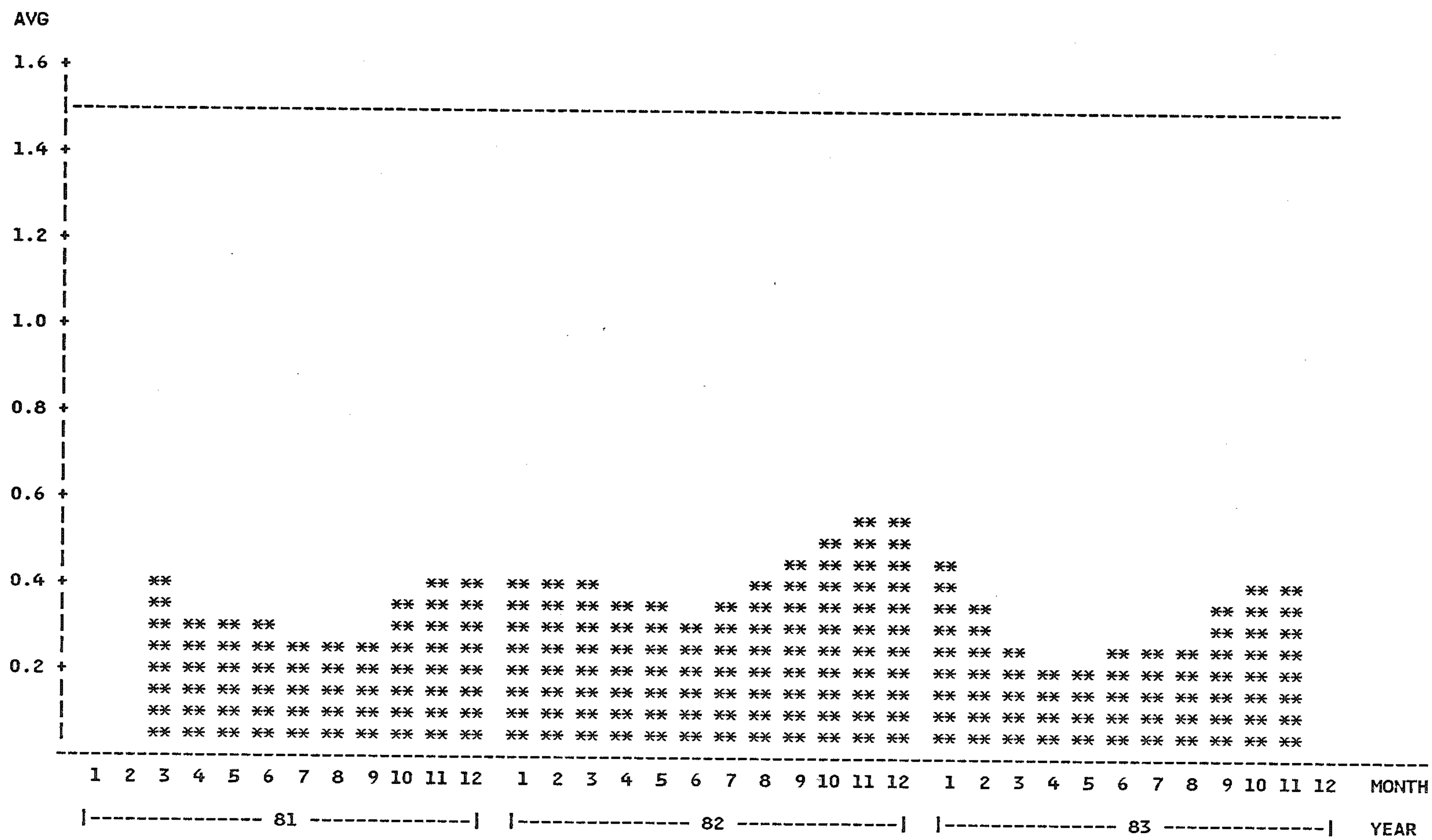


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=MIDDLETOWN 003

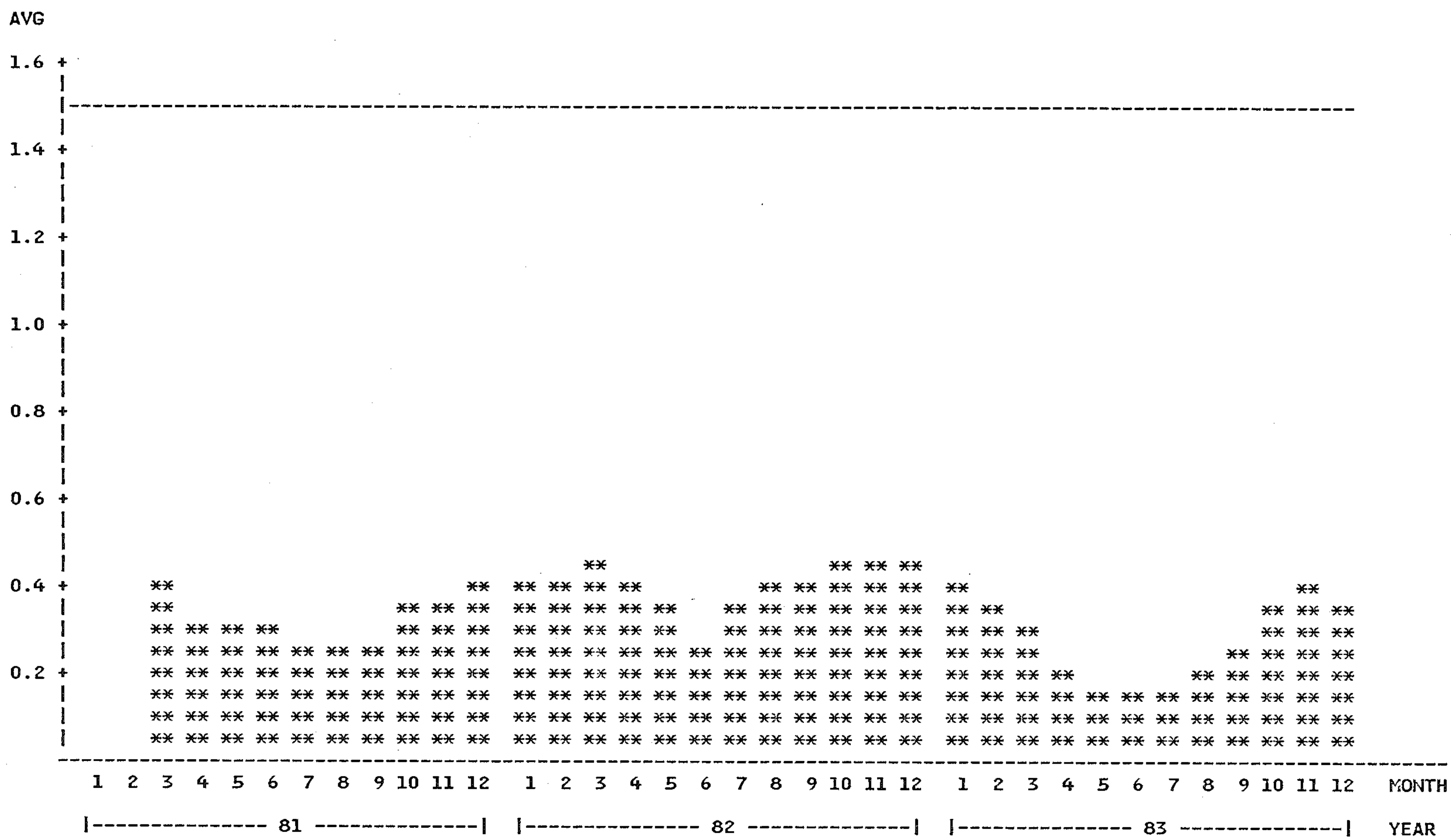


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=NEW BRITAIN 007

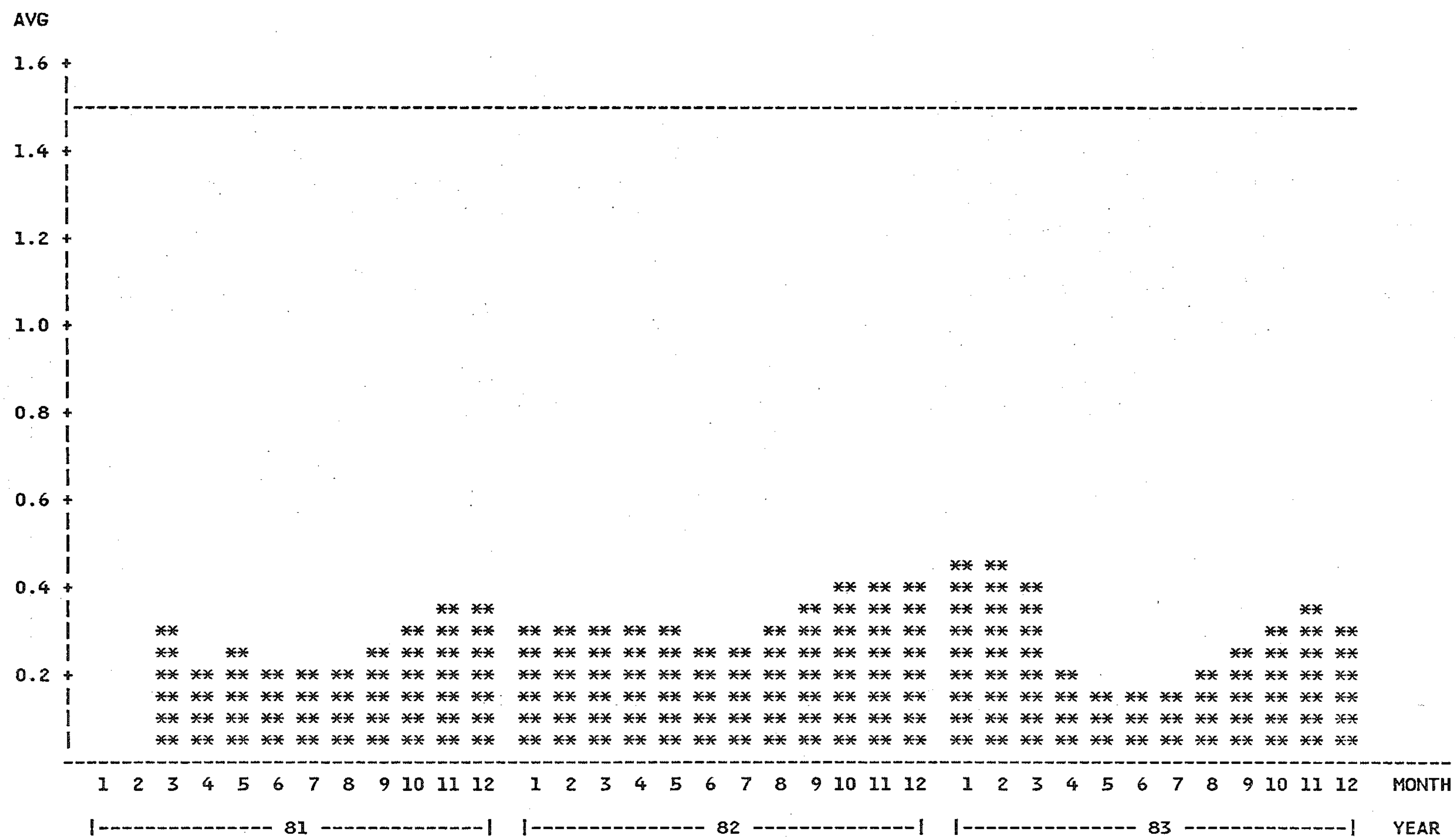


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=NEW HAVEN 016

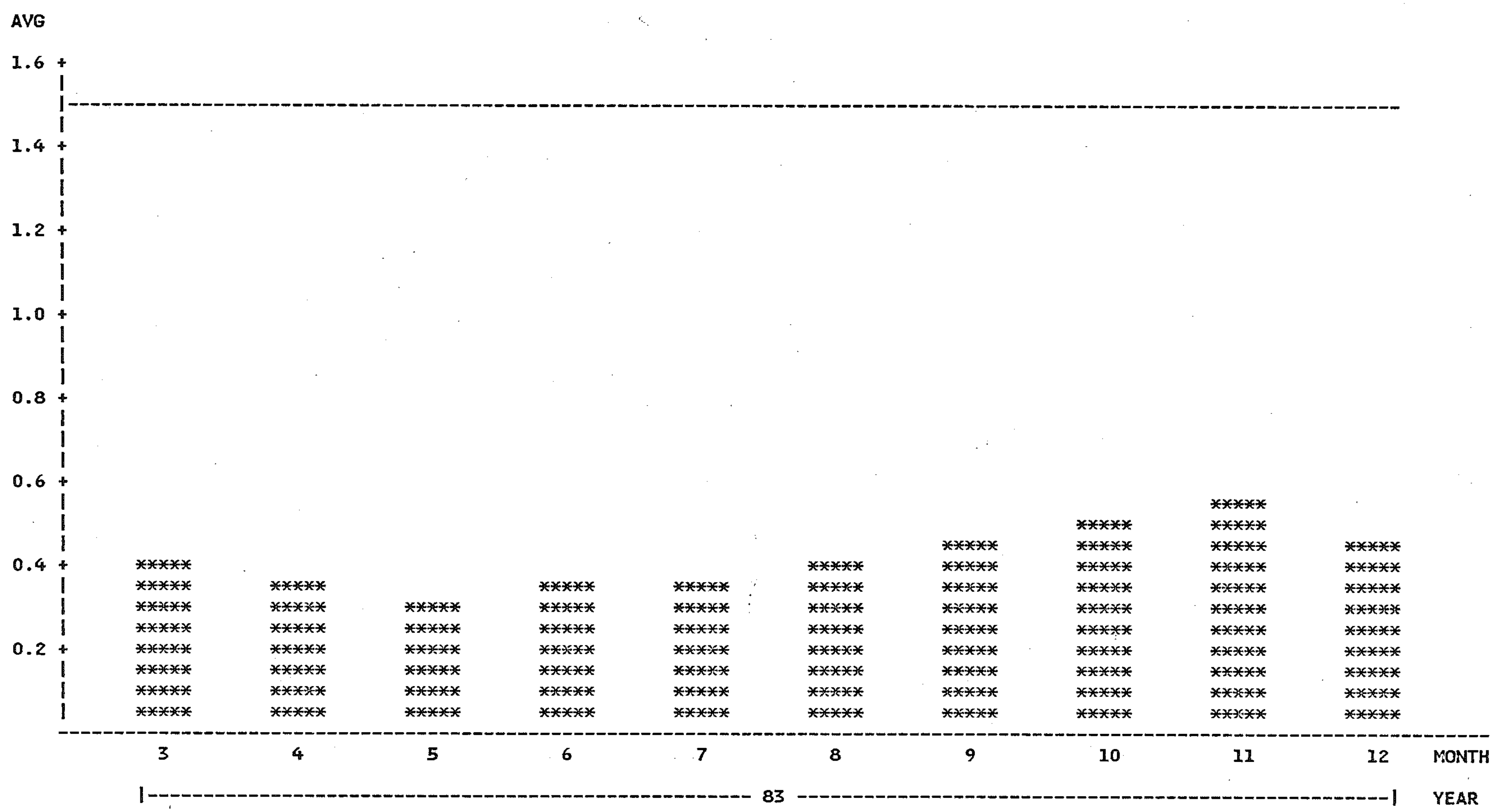


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=NEW HAVEN 123

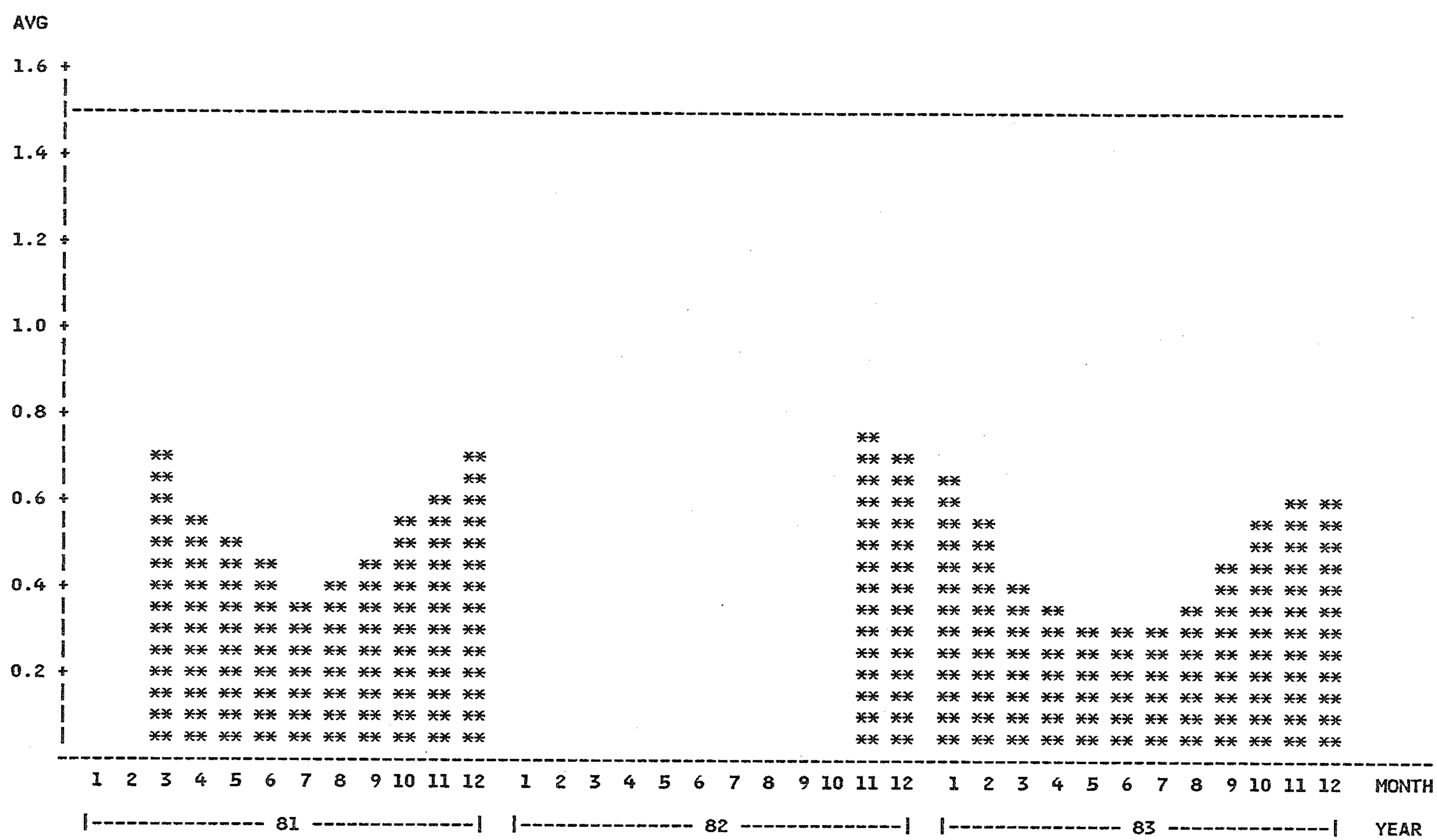


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=NORWALK 012

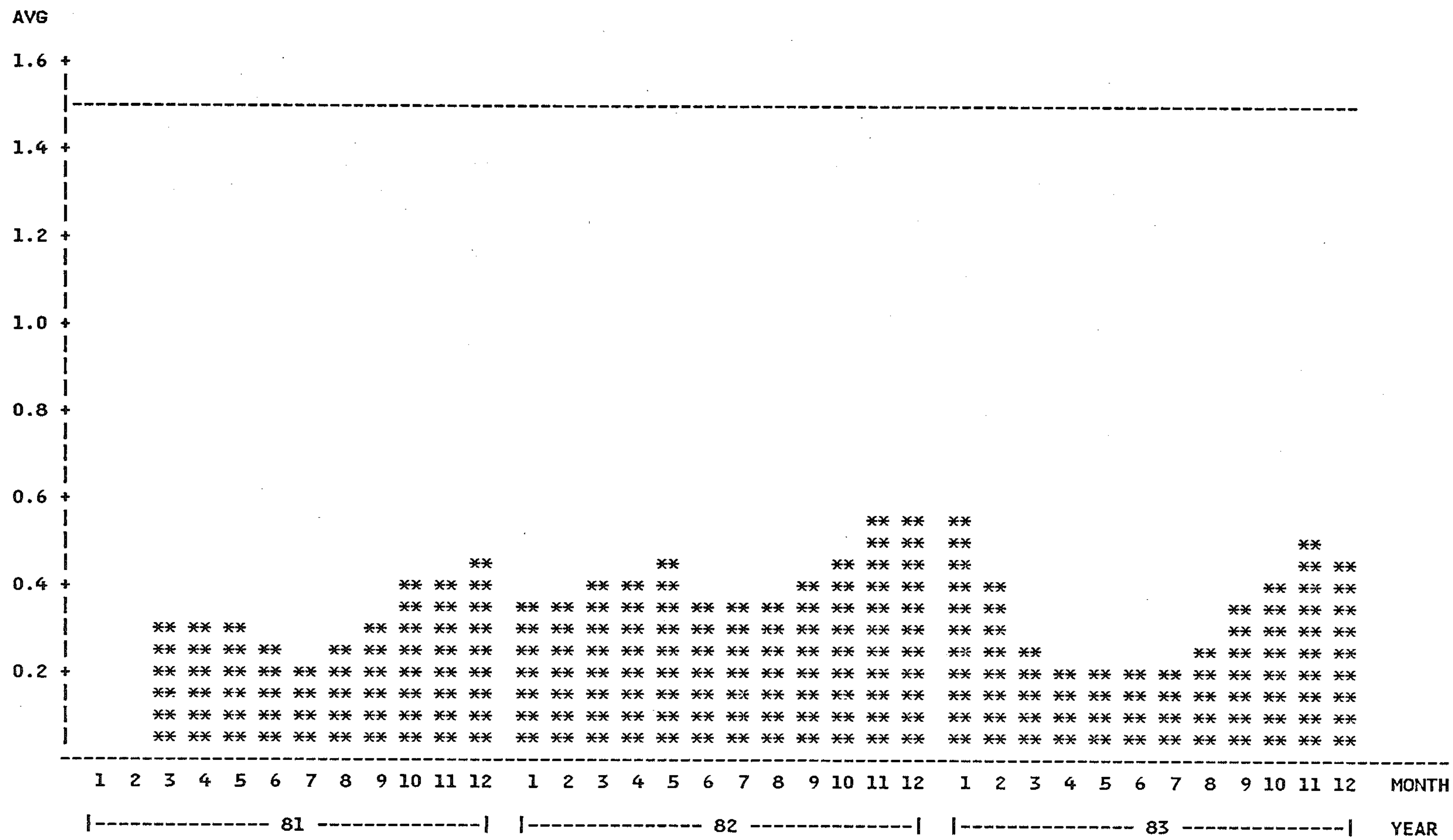


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=STAMFORD 001

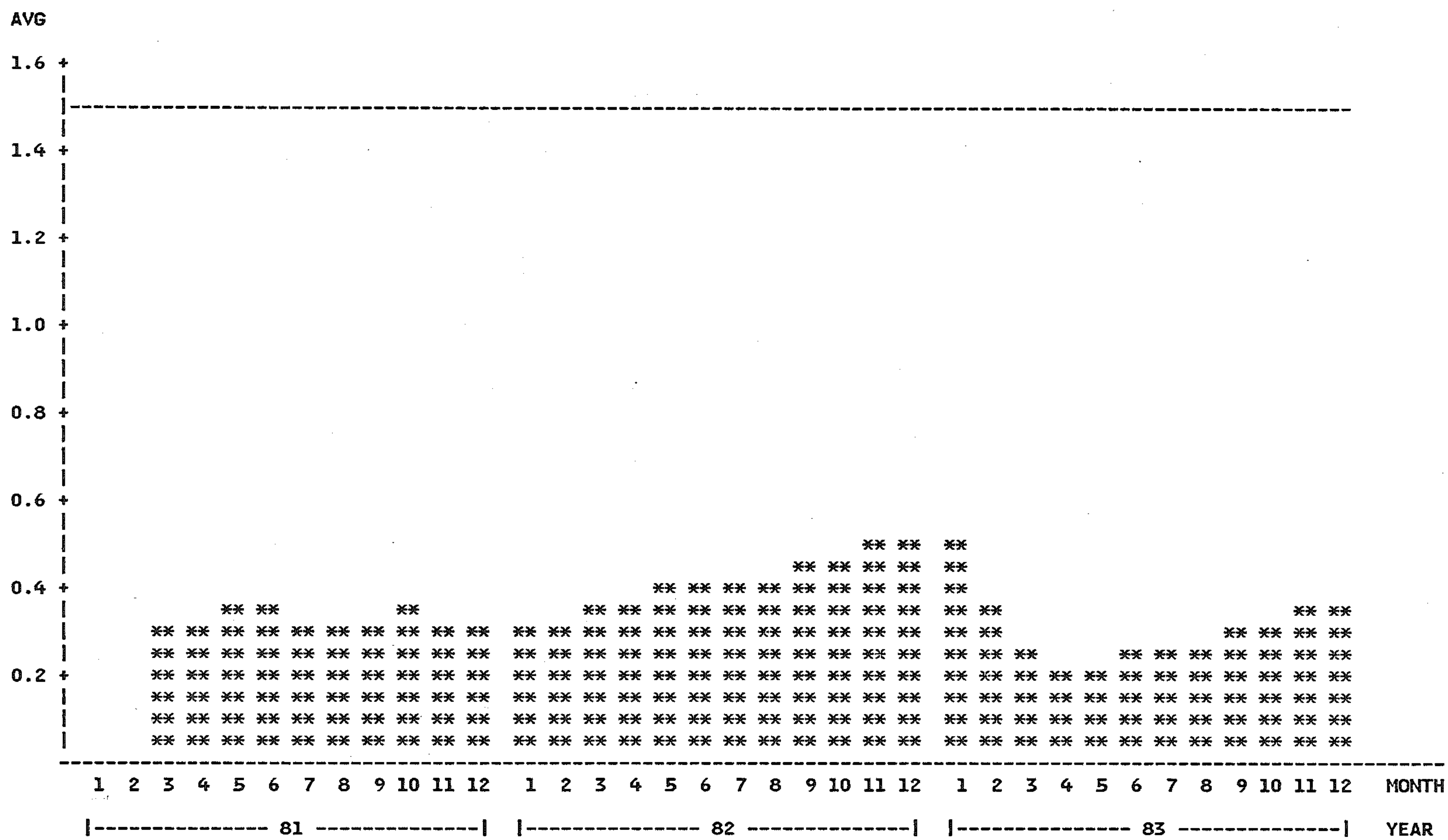


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=STAMFORD 022

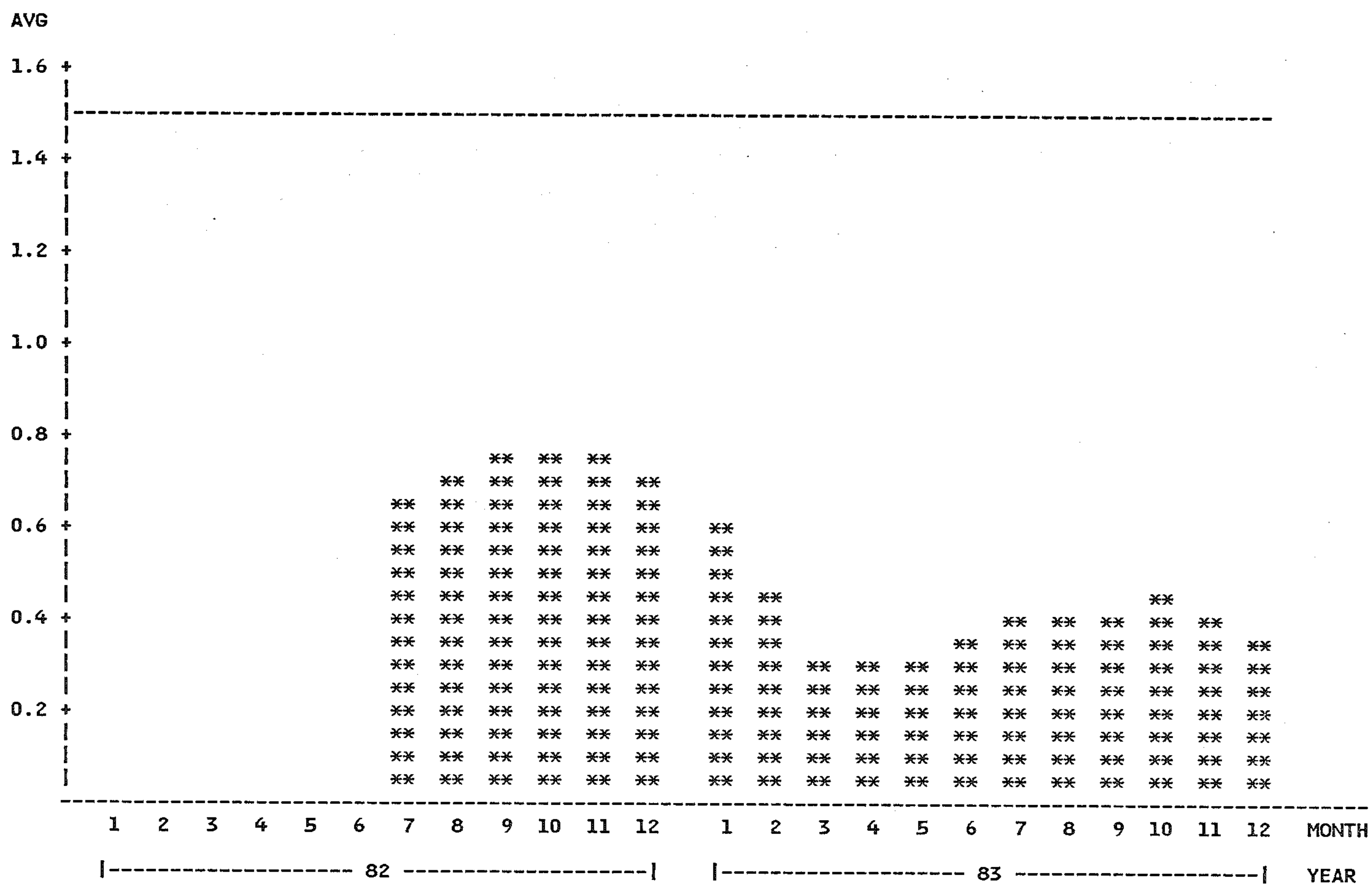


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=TORRINGTON 123

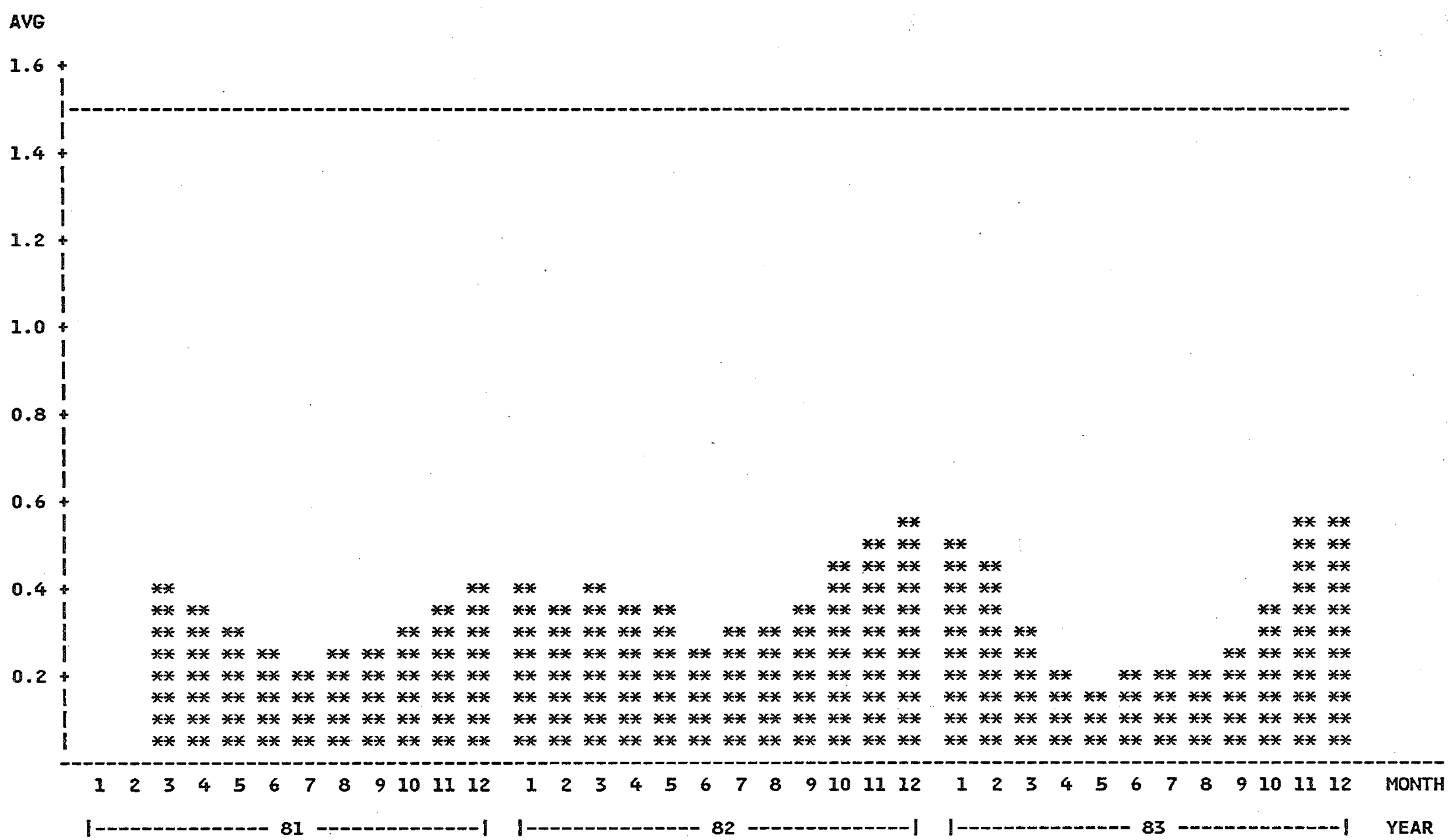


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=WALLINGFORD 001

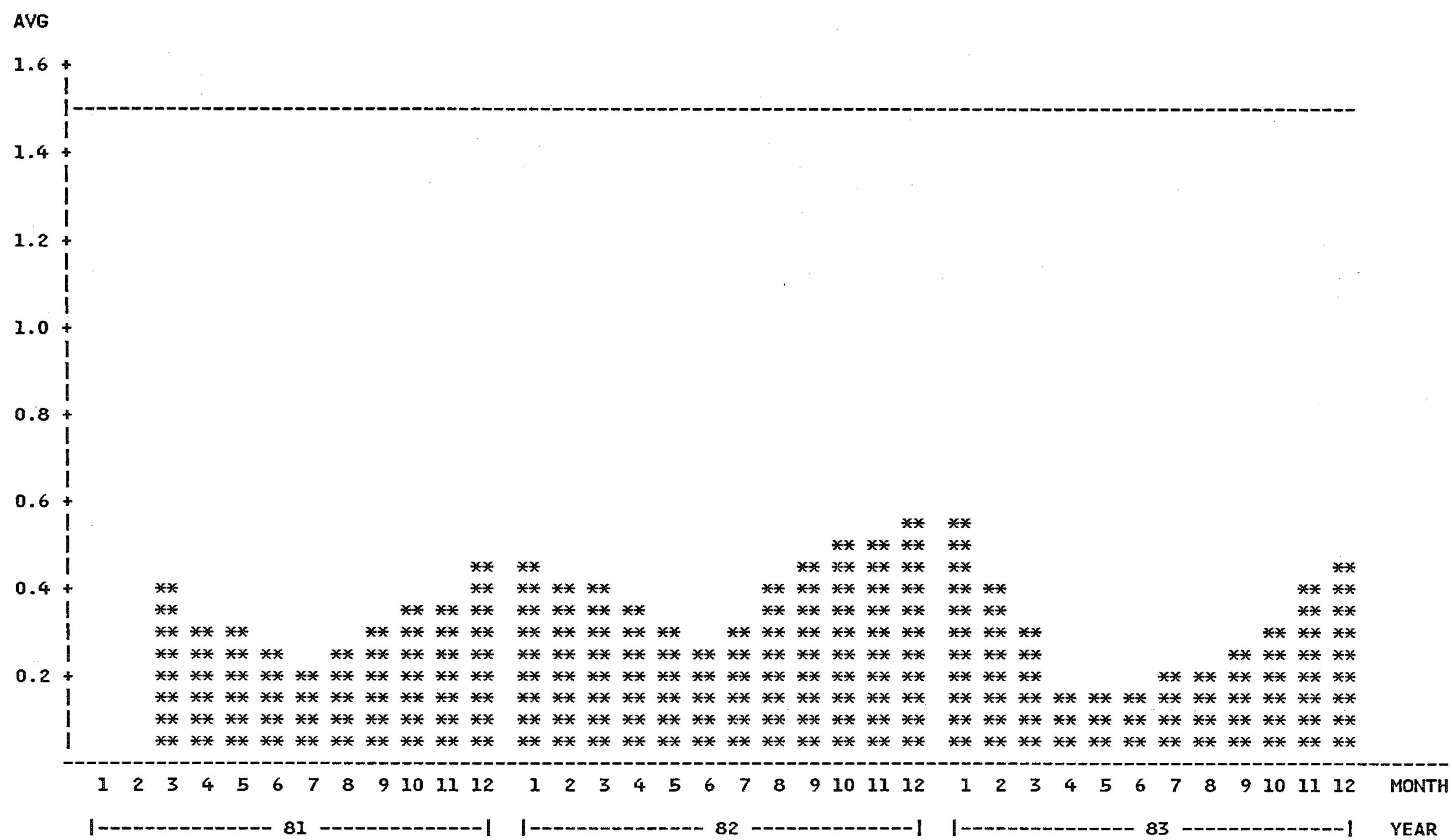


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=WATERBURY 007

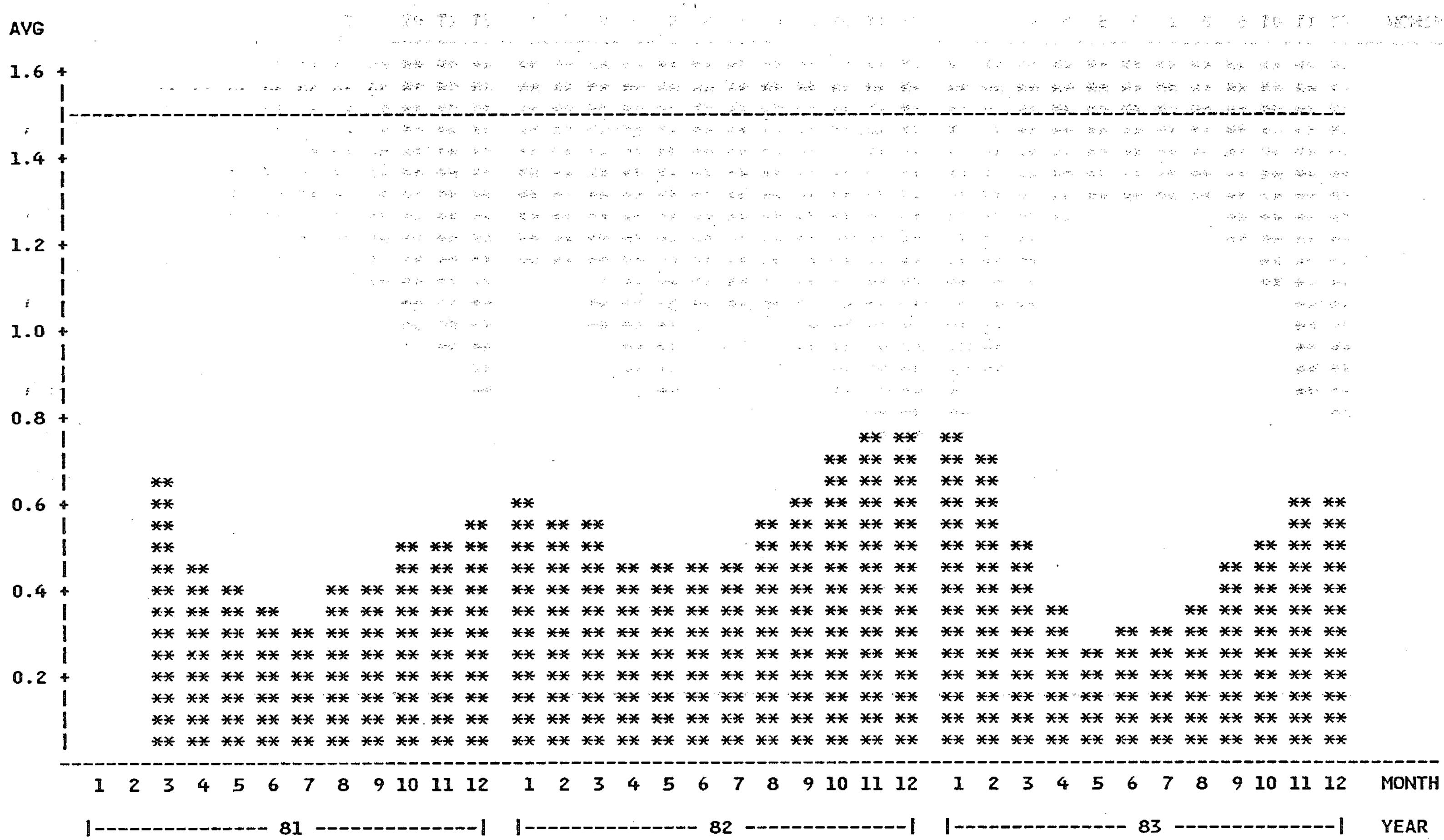
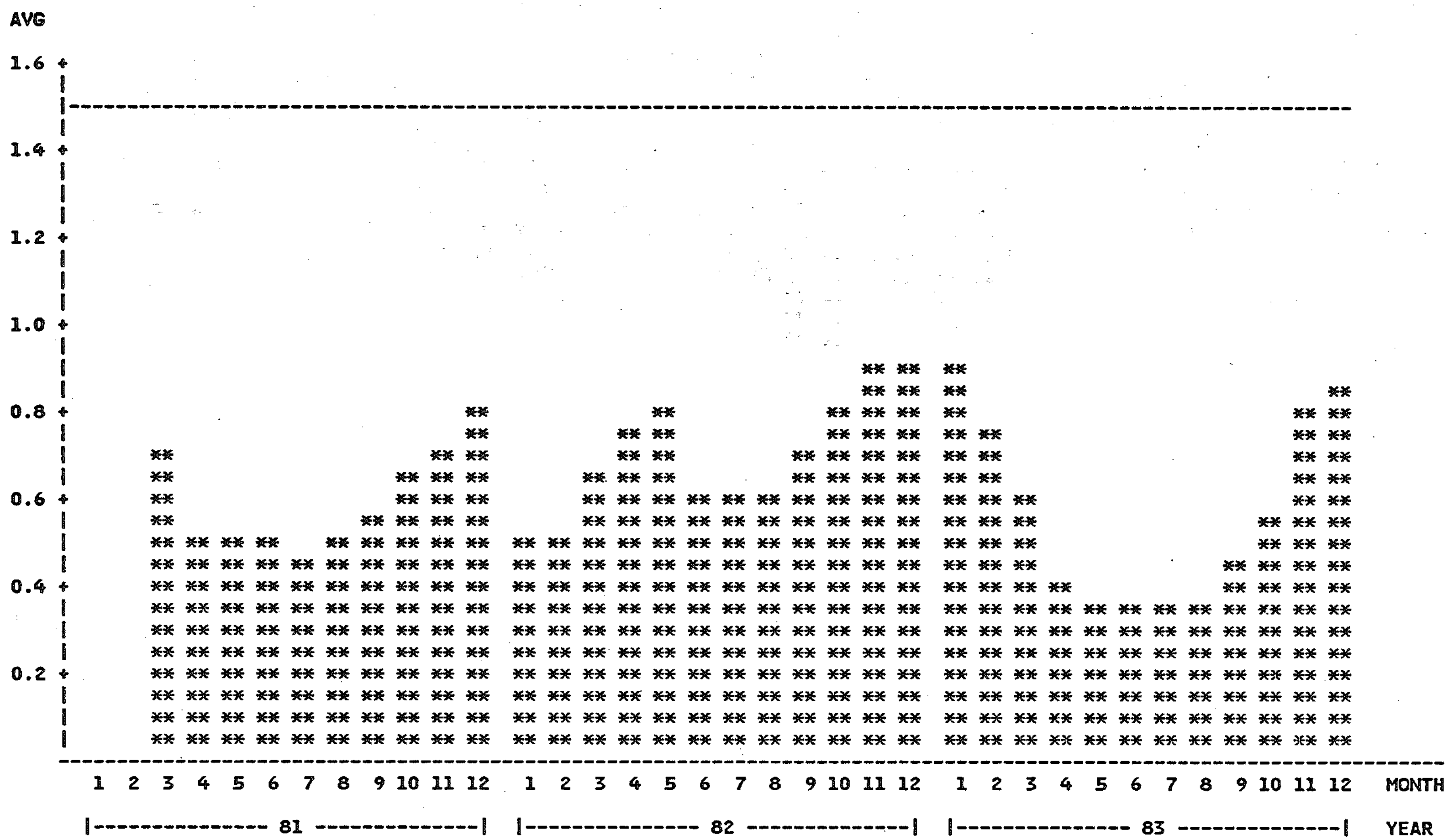


FIGURE 16, CONTINUED

3-MONTH RUNNING AVERAGES FOR LEAD
STATION=WATERBURY 123



VIII. ACID PRECIPITATION

Monitoring Program

Recently, there has been a growing public concern about the occurrence and effects of atmospheric deposition, most notably acid precipitation or "acid rain." It has become apparent that, in order to address this concern, basic data need to be collected on the chemical properties of precipitation. Recognizing this, the State of Connecticut, through the Department of Environmental Protection, has agreed to cooperate with the Water Resources Division of the United States Geological Survey (USGS) to establish the Connecticut Atmospheric Deposition Monitoring Program.

Program Objectives

The program is designed to collect and analyze precipitation on an event basis and has the following objectives:

(1) to determine selected chemical and physical properties of precipitation in Connecticut;

(2) to determine the spatial and temporal distribution of precipitation chemistry in the State;

(3) to determine the relationships between precipitation chemistry and meteorological conditions, such as storm track and air mass movement;

(4) to provide baseline information that can be used to determine trends and estimate loads; and

(5) to use techniques and methodologies consistent with those of the national monitoring networks in order to provide comparative information.

Data Collection Sites

Data collection sites have been established according to siting criteria used in the National Atmospheric Deposition Program (NADP). Use of these criteria ensures the validity of comparisons made between data which are collected through Connecticut's program and data from other atmospheric deposition programs. Other objectives considered during the siting process were the collection of samples representative of different geographic areas of the State, and the sampling of precipitation representative of long–range transport and not merely local sources. Using these criteria, precipitation sampling sites were established in the towns of Plainfield, Marlborough and Litchfield (see Figure 17).

Equipment

Each site is equipped with a Geo Filter automatic wet–dry sensing precipitation collector. This collector is the same type as those used by the NADP and the National Trends Network (NTN). The collector operates when precipitation wets an electronic sensor, completing an electrical circuit. This activates a motor that opens a lid over the sample container when the precipitation event begins and closes the lid when the precipitation ceases. The purpose of the lid is to retard the loss of samples through evaporation and to prevent contamination by dry fallout.

Each site is also equipped with an automatic rain gage which provides a record of the quantity of rain at 15–minute intervals.

In addition to the above equipment, a prototype precipitation quality monitor is being tested at the Plainfield site. Developed by the USGS Hydrologic Instrumentation Facility, the monitor consists of a wet–dry sensing precipitation collector fitted with a funnel in place of a collection container. Precipitation flows from the funnel through tubing to a series of sensors. The sensors continuously measure pH, temperature and specific conductance throughout a precipitation event and record the data at pre–selected intervals. Precipitation quantity is measured by a tipping–bucket type rain gage.

Data Collection

Samples of precipitation are gathered from the automatic collectors as soon as possible following the end of a precipitation event, in most cases within 24 hours. The samples are immediately tested for acidity through pH measurements. The samples are also tested for specific conductance, which is a measure of the ions in solution –– the dissolved solids in solution –– which is a measure of the pollutant load. The results of this testing for the three precipitation sampling sites are tabulated from 1981 in Tables 28, 29 and 30. The results for 1983 are illustrated in Figures 18 through 26.

Samples from selected precipitation events are also sent to a USGS laboratory for further analyses to determine the concentrations of additional chemical constituents, including major anions, cations, nutrients and trace metals.

Through the Connecticut Atmospheric Deposition Monitoring Program, a network capable of providing uninterrupted baseline data on precipitation quality within the State has been developed. Data collected through the program is currently being published monthly by the USGS in its report, ***Water Resources Conditions in Connecticut.*** When using the data, one should note that it is specific only to the time and place of its collection.

Discussion of Data

Presently, data that has been collected in the initial stages of the study is being analyzed to determine, on a preliminary basis, the distribution and magnitude of atmospheric deposition in Connecticut. Because precipitation chemistry is a function of air quality and climate, both of which fluctuate over time and space, several more years of continuous data collection will be necessary to develop an adequate baseline to determine trends accurately and to more fully define the controlling processes. However, a preliminary evaluation of the data indicates that the precipitation occurring within Connecticut has been chemically affected by man–made contaminants. The data show that 19 percent of the precipitation events studied to date have had a pH of 4.0 or below. Further evaluation of the data will provide more information on the source of the contaminants and the effects upon the environment.

It is important to stress that it is presently difficult to forecast statewide trends in the chemical properties of precipitation, or to perform comparative analyses, because of a lack of a large long–term data base. Generally, a 20–year or greater period of record is an acceptable statistical data base. When performing comparative analyses, some hydrologic data bases use 60 years or more of record keeping. Therefore, it should be apparent that data collection under the Connecticut Atmospheric Deposition Monitoring Program must continue until a sufficient period of record has been obtained.

Further information is available from the Water Resources Division, United States Geological Survey, 450 Main Street, Hartford, Connecticut 06103 at (203) 722–2528, or from the Natural Resources Center, Department of Environmental Protection, 165 Capitol Avenue, Hartford, Connecticut 06106 at (203) 566–3540.

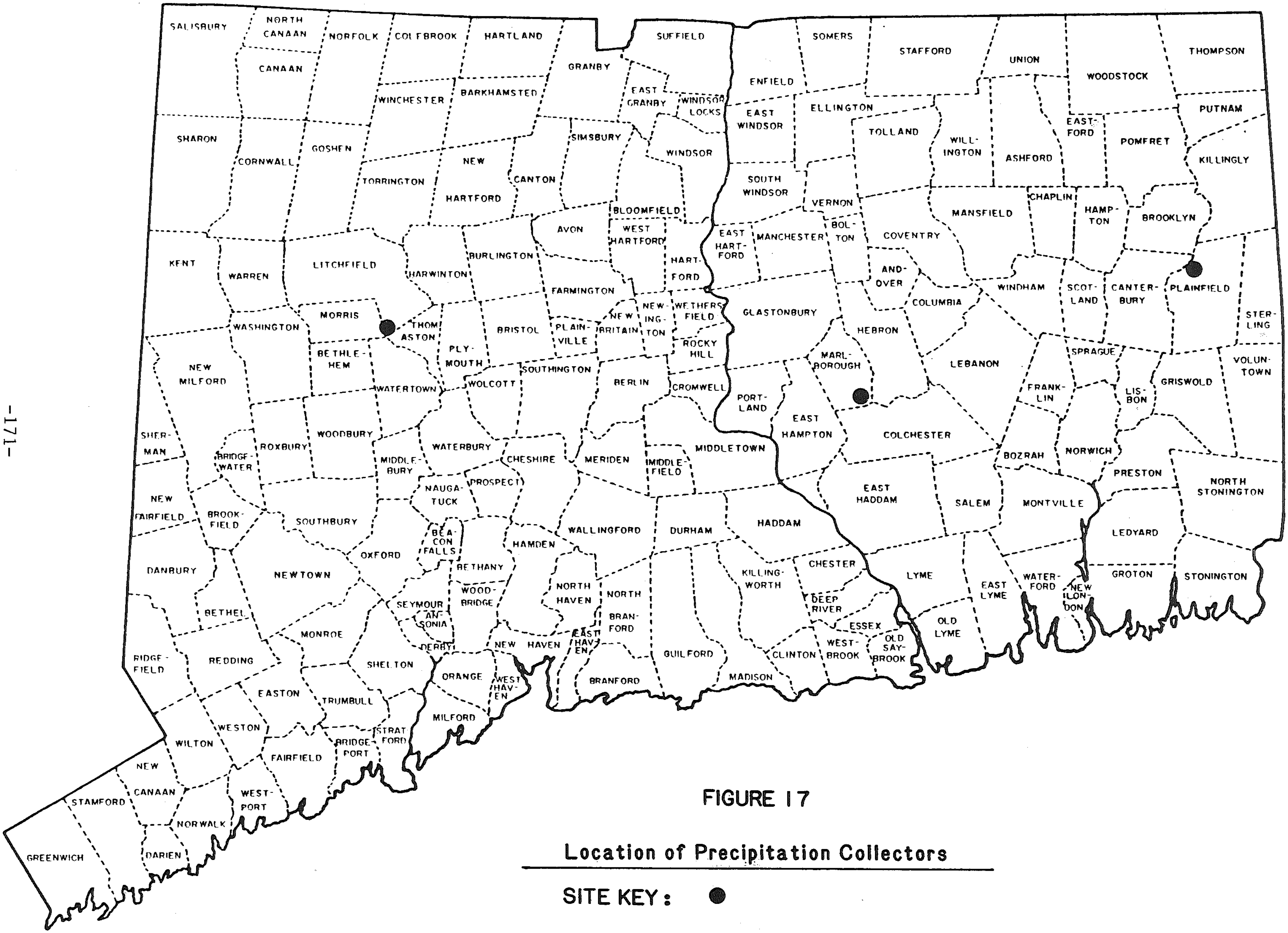


FIGURE 17

Location of Precipitation Collectors

SITE KEY: ●

TABLE 28

ATMOSPHERIC DEPOSITION DATA FOR THE PLAINFIELD SITE

Event Number	Period of Collection	Specific Conductance	pH	Inches of Precipitation
1	10/23/81 - 10/27/81	15	4.5	2.30
2	11/14/81 - 11/16/81	15	4.5	1.01
3	12/1/81 - 12/2/81	14	4.5	2.68
4	12/14/81	12	4.4	0.58
5	12/15/81 - 12/16/81	12	4.6	2.90
6	12/27/81 - 12/28/81	51	4.0	0.20
1	1/4/82 - 1/5/82	15	4.8	2.70
2	4/26/82 - 4/27/82	11	4.8	0.99
3	5/29/82 - 5/31/82	18	4.4	1.43
4	6/2/82	5	5.0	2.86
5	6/4/82 - 6/6/82	10	5.1	4.28
6	7/28/82 - 7/29/82	18	4.4	0.11
7	8/9/82	25	4.4	0.96
8	8/9/82 - 8/10/82	31	4.2	0.71
9	11/28/82 - 11/29/82	8	4.8	0.98
10	12/16/82	16	4.9	0.85
1	1/5/83 - 1/6/83	15	4.4	0.49
2	1/13/83	18	4.7	0.78
3	1/22/83 - 1/24/83	8	4.9	1.17
4	1/29/83 - 1/31/83	26	4.2	0.36
5	2/3/83	14	4.7	1.21
6	2/6/83 - 2/7/83	13	4.7	0.44
7	2/11/83 - 2/12/83	6	4.9	0.04
8	2/17/83	17	4.5	1.09
9	3/2/83	26	4.2	0.37
10	3/6/83 - 3/9/83	47	4.0	1.37
11	3/19/83 - 3/21/83	20	4.5	1.91
12	3/27/83 - 3/28/83	22	4.4	1.11
13	4/3/83	32	4.2	0.02
14	4/10/83	13	4.6	2.37
15	4/16/83 - 4/17/83	16	4.4	0.96
16	4/19/83 - 4/20/83	13	4.5	2.84
17	4/24/83	15	4.9	2.42
18	5/31/83	30	4.2	1.47
19	6/4/83	41	4.0	0.99
20	6/27/83 - 6/28/83	68	3.8	1.22
21	7/6/83	27	4.3	0.38
22	7/22/83	79	3.8	0.25
23	7/25/83	38	4.0	0.29
24	8/11/83 - 8/12/83	39	4.0	1.60
25	9/12/83	87	3.7	0.54
26	9/23/83	14	4.7	0.95
27	10/1/83 - 10/2/83	17	4.4	1.33

TABLE 28, Continued

Event Number	Period of Collection	Specific Conductance	pH	Inches of Precipitation
28	10/12/83 - 10/13/83	4	5.4	1.10
29	10/18/83	45	4.0	0.28
30	10/23/83 - 10/25/83	8	4.8	1.15
31	11/3/83 - 11/4/83	30	4.2	0.60
32	11/10/83	17	4.4	1.08
33	11/15/83 - 11/16/83	8	4.8	2.46
34	11/21/83	14	4.6	0.69
35	11/24/83 - 11/26/83	5	5.2	2.89
36	11/28/83 - 11/29/83	25	4.3	0.97

TABLE 29

ATMOSPHERIC DEPOSITION DATA FOR THE MORRIS DAM SITE

Event Number	Period of Collection	Specific Conductance	pH	Inches of Precipitation
1	12/16/82	22	4.5	1.18
1	1/5/83 - 1/6/83	18	4.4	0.64
2	1/10/83 - 1/11/83	6	4.9	2.39
3	1/23/83	13	4.5	1.45
4	2/2/83 - 2/3/83	19	4.4	1.89
5	2/6/83 - 2/7/83	50	4.0	0.45*
6	2/11/83 - 2/12/83	9	4.9	1.30*
7	2/17/83	46	4.0	0.21
8	3/2/83	22	4.3	0.27
9	3/7/83 - 3/9/83	37	4.1	1.22
10	3/19/83 - 3/21/83	14	4.5	1.29
11	3/27/83 - 3/28/83	18	4.4	1.29
12	4/3/83	11	4.7	1.07
13	4/10/83	9	4.6	2.70
14	4/16/83 - 4/17/83	10	4.5	2.61
15	4/19/83 - 4/20/83	23	4.3	1.27
16	4/24/83	16	4.5	1.35
17	5/15/83 - 5/16/83	35	4.1	0.87
18	5/29/83 - 5/30/83	39	4.1	0.81
19	6/4/83	49	3.9	1.39
20	6/28/83	58	3.9	1.71
21	7/5/83	67	3.9	1.54
22	7/25/83	46	4.1	0.75
23	8/11/83 - 8/12/83	49	3.9	1.60
24	9/12/83	65	3.8	0.24
25	9/23/83	20	4.5	0.94
26	10/1/83 - 10/2/83	9	4.6	1.18
27	10/12/83 - 10/13/83	6	4.9	3.34
28	10/18/83	30	4.1	0.33
29	10/23/83 - 10/25/83	9	4.8	2.32
30	11/3/83 - 11/4/83	80	3.8	0.11
31	11/10/83	40	4.2	0.94
32	11/15/83 - 11/16/83	10	4.6	1.64
33	11/21/83	14	4.6	0.57
34	11/24/83 - 11/25/83	21	4.5	1.45
35	11/28/83 - 11/29/83	24	4.3	0.71
36	12/6/83	32	4.2	1.04
37	12/12/83 - 12/14/83	26	4.5	3.41

*Water equivalent of snowfall

TABLE 30

ATMOSPHERIC DEPOSITION DATA FOR THE MARLBOROUGH SITE

Event Number	Period of Collection	Specific Conductance	pH	Inches of Precipitation
1	5/29/83 - 5/31/83	36	4.1	1.39
2	6/4/83	42	4.1	0.99
3	6/27/83 - 6/28/83	75	3.8	2.63
4	7/5/83 - 7/6/83	89	3.7	0.27
5	7/21/83	46	4.0	0.39
6	7/24/83	40	4.0	0.91
7	8/11/83 - 8/12/83	27	4.2	1.75
8	9/23/83	11	4.7	1.18
9	10/1/83 - 10/2/83	5	4.8	2.22
10	10/12/83 - 10/13/83	10	4.8	1.22
11	10/18/83	32	4.2	0.19
12	10/23/83 - 10/24/83	4	5.3	1.97
13	11/3/83 - 11/4/83	38	4.0	0.75
14	11/10/83	20	4.4	1.27
15	11/15/83 - 11/16/83	6	4.9	1.73
16	11/21/83	12	4.7	0.49
17	11/24/83 - 11/25/83	7	4.9	2.43
18	11/28/83 - 11/29/83	21	4.4	1.04
19	12/6/83	30	4.3	0.68
20	12/12/83 - 12/14/83	40	4.6	1.89

Figure 18

INCHES OF PRECIPITATION

PLAINFIELD SITE, 1983

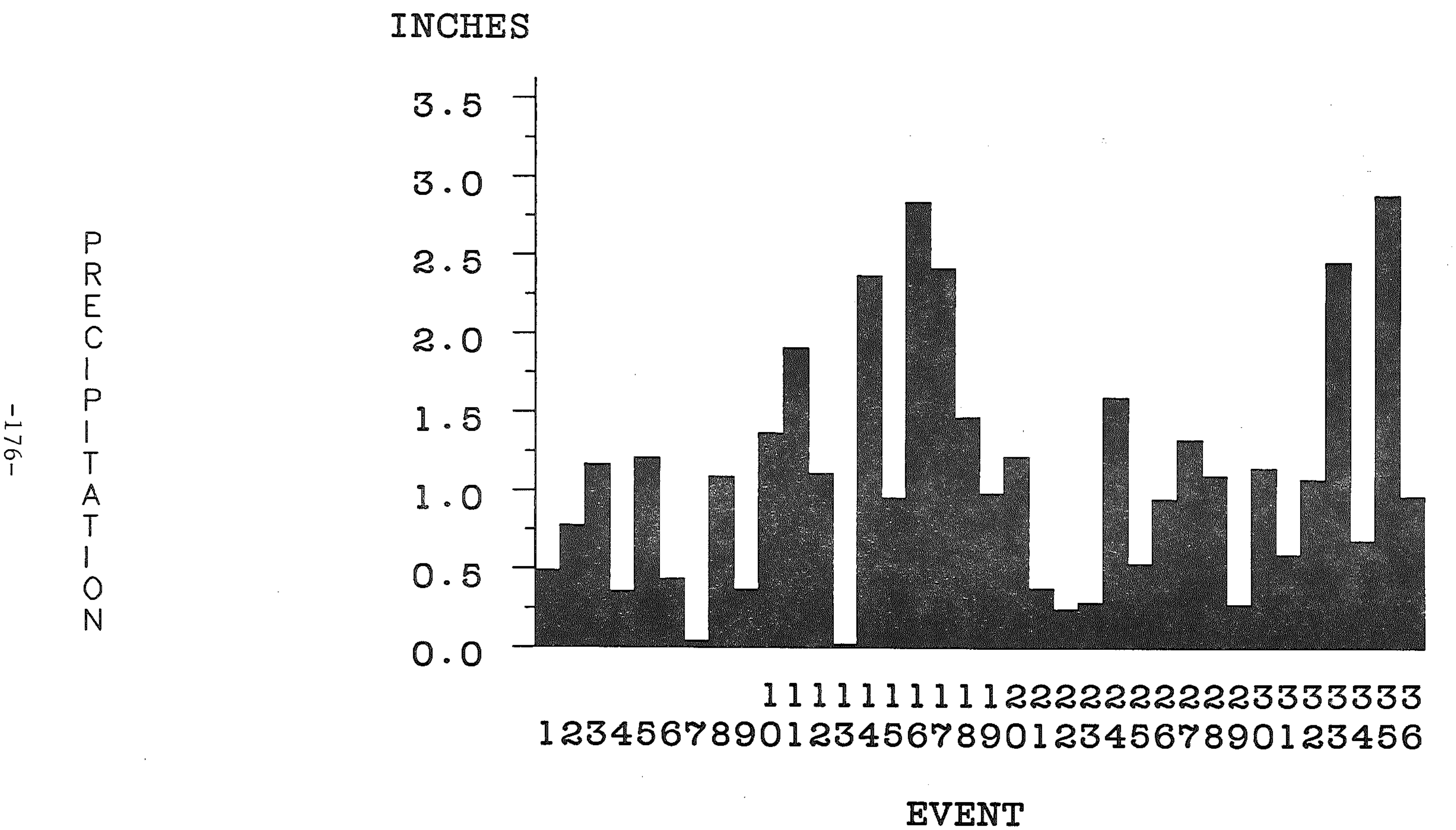


Figure 19

PH OF PRECIPITATION
PLAINFIELD SITE, 1983

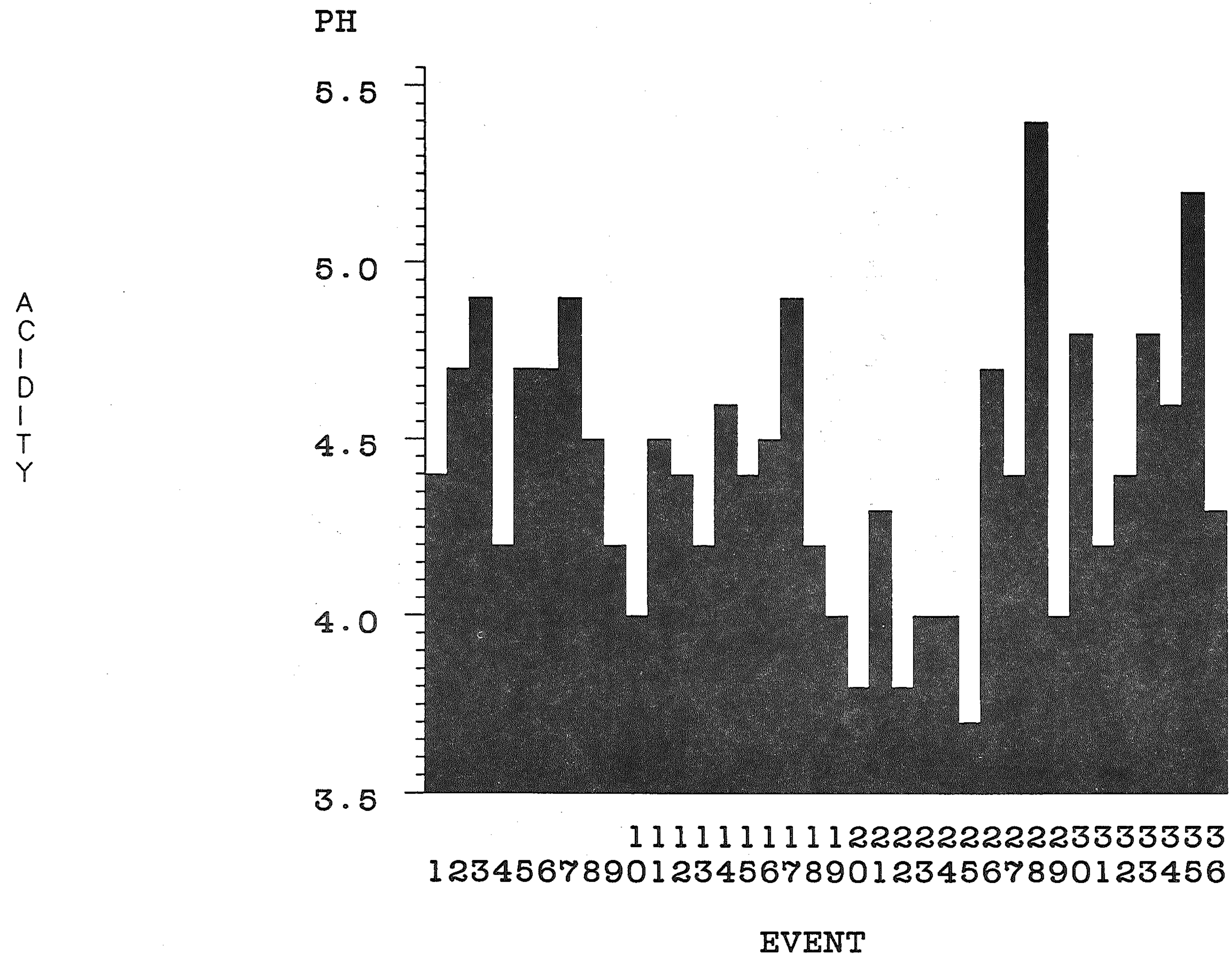


Figure 20

SPECIFIC CONDUCTANCE OF PRECIPITATION
PLAINFIELD SITE, 1983

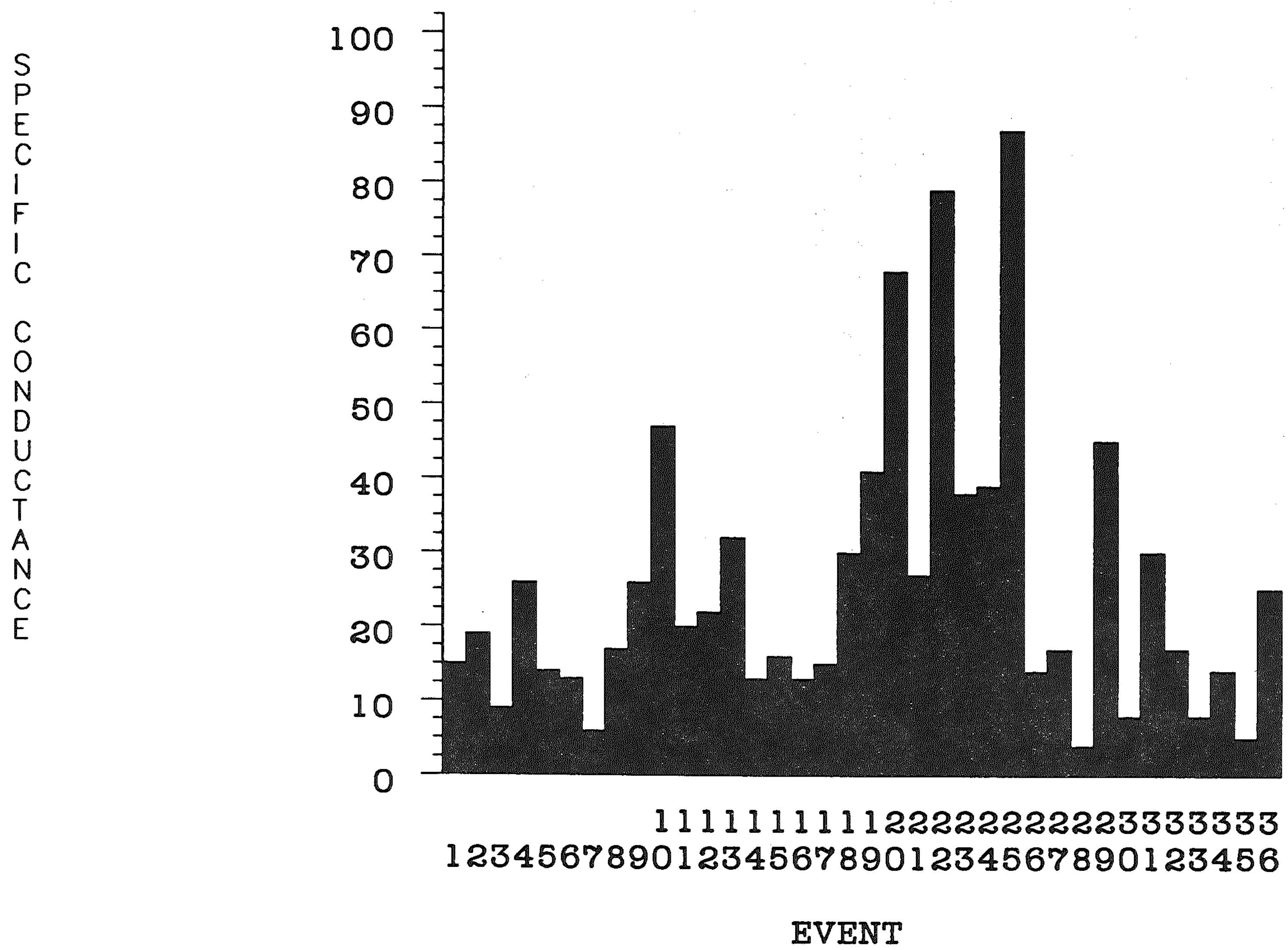


Figure 21

INCHES OF PRECIPITATION
MORRIS DAM SITE, 1983

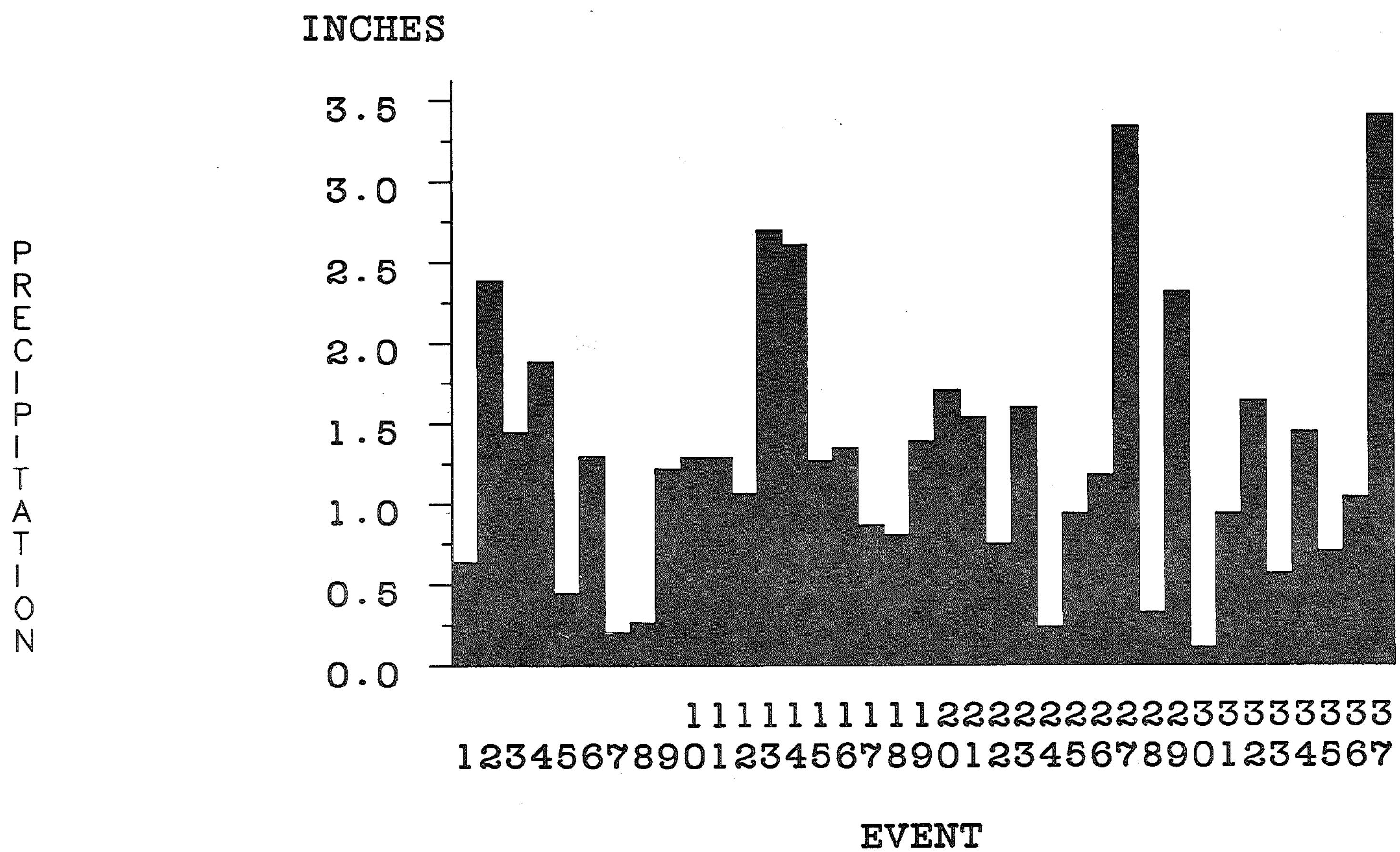
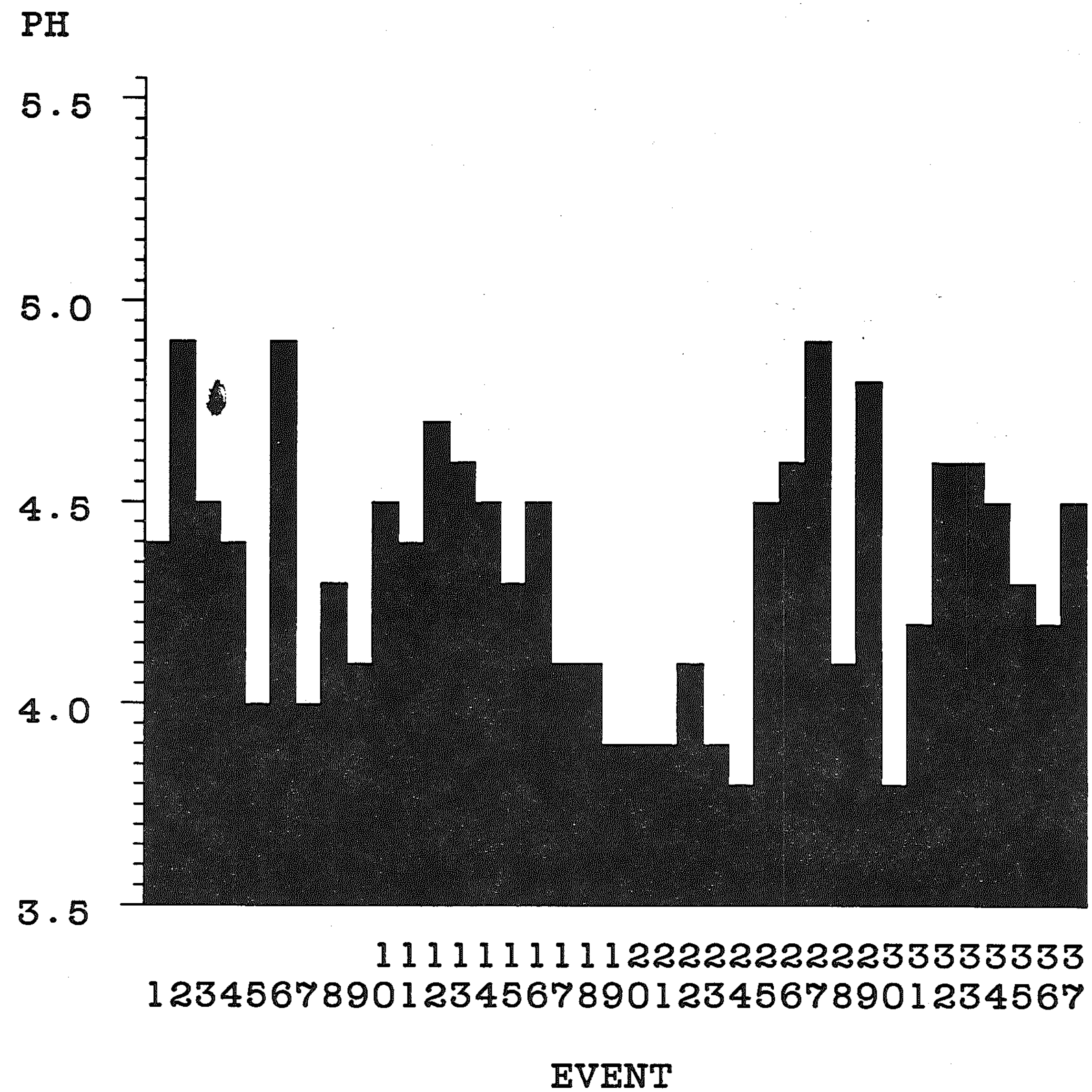


Figure 22

PH OF PRECIPITATION
MORRIS DAM SITE, 1983



ACIDITY

Figure 23

SPECIFIC CONDUCTANCE OF PRECIPITATION

MORRIS DAM SITE, 1983

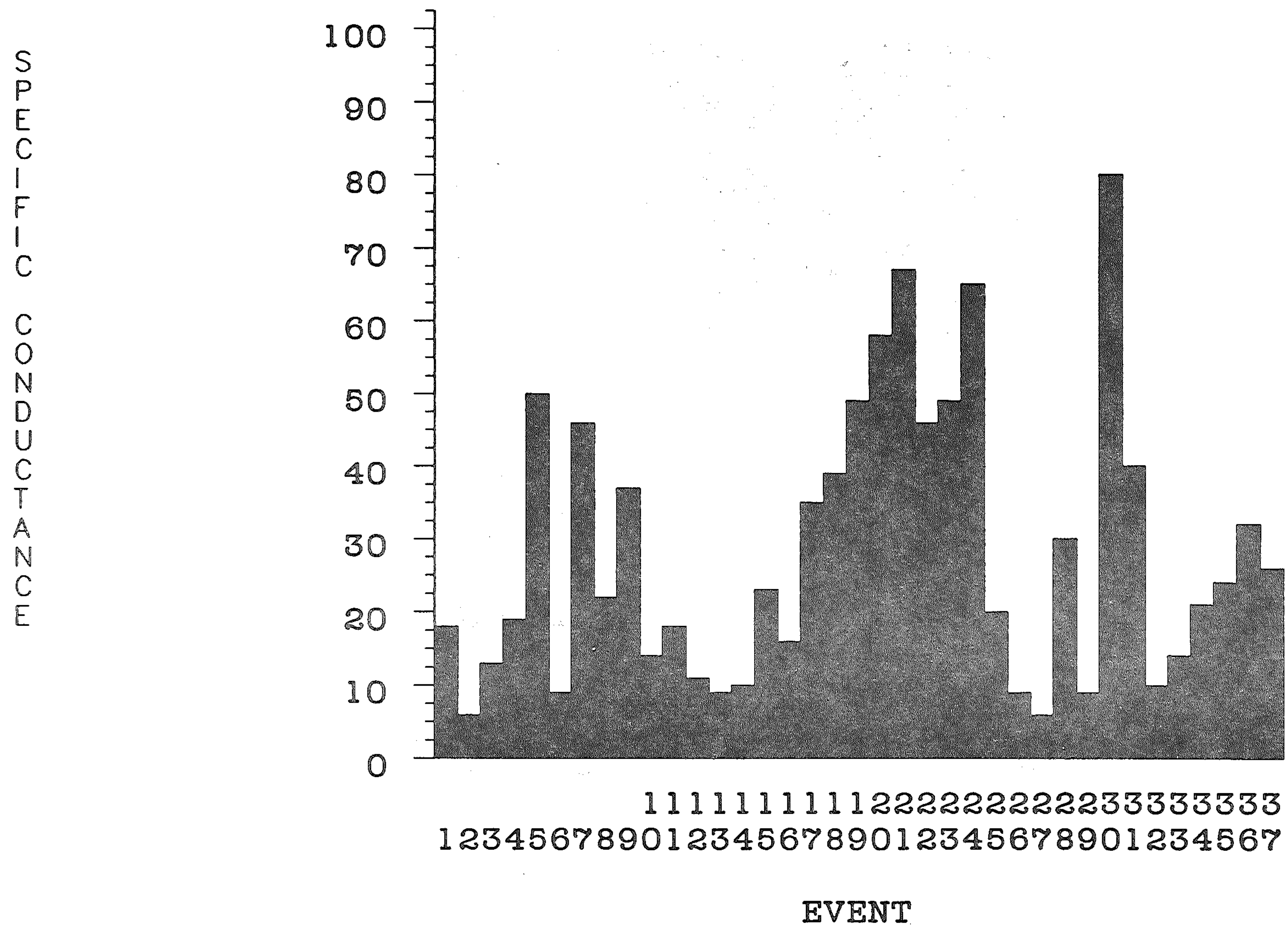


Figure 24

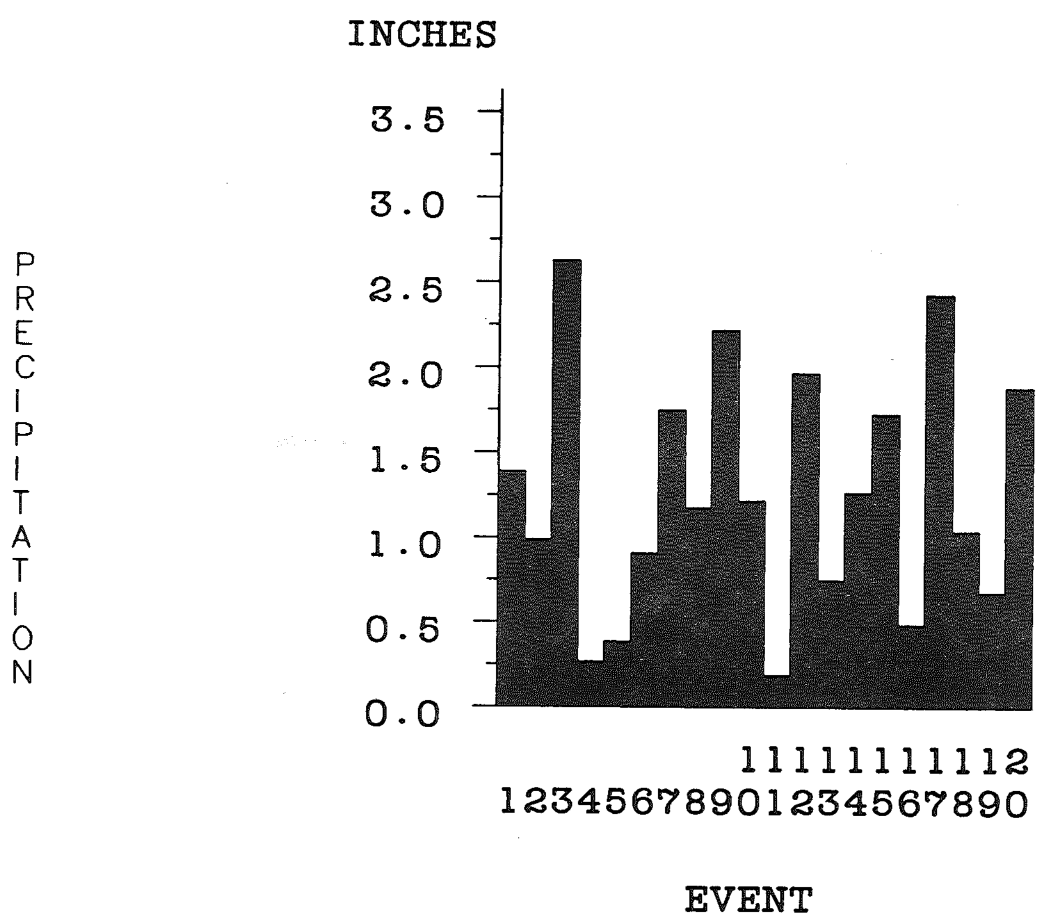

INCHES OF PRECIPITATION
MARLBOROUGH SITE, 1983
PRECIPITATION
INCHES
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
EVENT

Figure 25

PH OF PRECIPITATION
MARLBOROUGH SITE, 1983

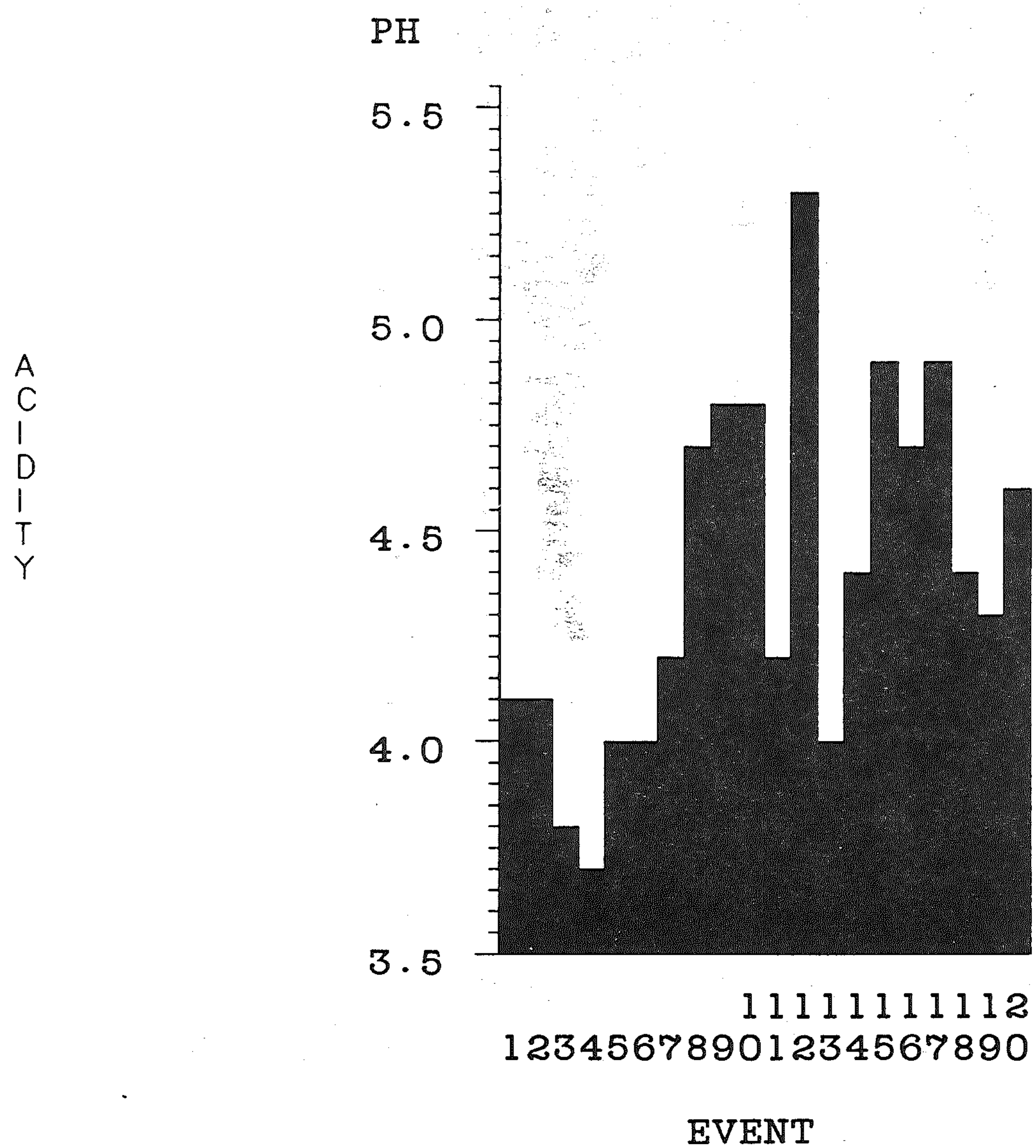
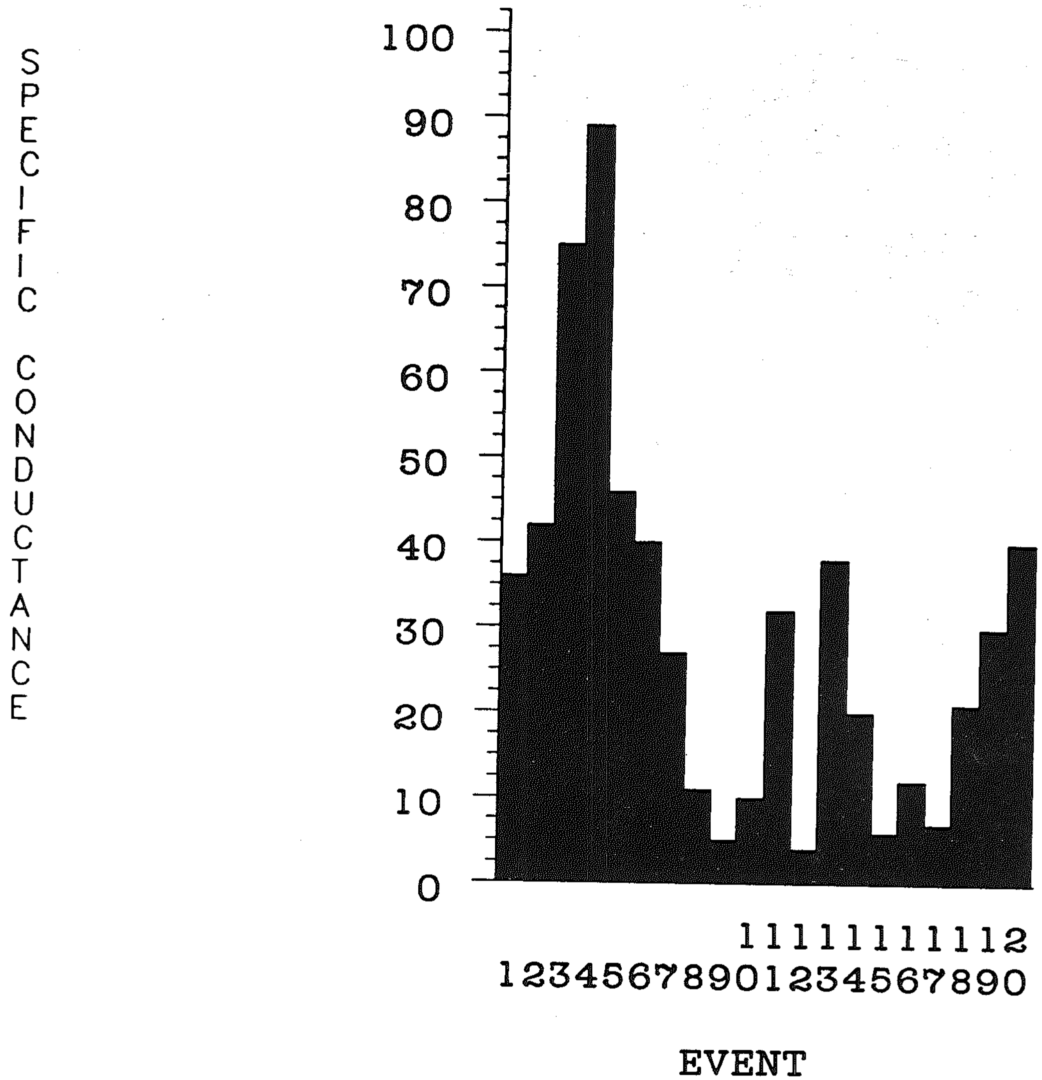


Figure 26

SPECIFIC CONDUCTANCE OF PRECIPITATION
MARLBOROUGH SITE, 1983



IX. CLIMATOLOGICAL DATA

Weather is often the most significant factor influencing short–term changes in air quality. It also has an affect on long–term trends. Climatological information from the National Weather Service station at Bradley International Airport in Windsor Locks is shown in Table 31 for the years 1982 and 1983. Table 32 contains information from the National Weather Service station located at Sikorsky Memorial Airport near Bridgeport. All data are compared to "mean" or "normal" values. Wind speeds and temperatures are shown as monthly and yearly averages. Precipitation data includes both the number of days with more than 0.01 inches of precipitation and the total water equivalent. Also shown are degree days* (heating requirement) and the number of days with temperatures exceeding 90°F.

Wind roses for Bradley Airport and Newark Airport have been developed from 1983 National Weather Service surface observations and are shown in Figures 28 and 30, respectively. Wind roses from these stations for 1982 are shown in Figures 27 and 29, respectively.

* The degree day value for each day is arrived at by subtracting the average temperature of the day from 65°F. This number (65) is used as a base value because it is assumed that there is no heating requirement when the outside temperature is 65°F.

TABLE 31

1982 AND 1983 CLIMATOLOGICAL DATA
BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS

	AVERAGE TEMPERATURES °F			NUMBER OF DAYS DURING WHICH MAX. TEMP. EXCEEDED 90 °F			DEGREE DAYS			PRECIPITATION IN INCHES WATER EQUIVALENT			NUMBER OF DAYS WITH MORE THAN .01 INCHES OF PRECIPITATION			AVERAGE WIND SPEED (MPH)		
	1982	1983	Mean[a]	1982	1983	Mean[b]	1982	1983	Normal[d]	1982	1983	Mean[a]	1982	1983	Mean[c]	1982	1983	Mean[c]
Jan.	18.8	27.1	26.6	0	0	0	1427	1170	1234	4.76	4.68	3.56	11	10	11	8.5	7.1	9.2
Feb.	29.2	29.1	27.7	0	0	0	996	1002	1047	2.83	3.83	3.24	7	7	10	7.5	7.9	9.5
March	36.7	39.2	37.1	0	0	0	871	793	874	2.23	6.86	3.76	13	17	12	7.5	9.3	10.0
April	45.8	48.9	48.1	0	0	*	569	483	486	4.12	9.90	3.80	11	13	11	10.9	8.0	10.2
May	61.4	56.8	59.2	0	0	1	128	261	197	3.30	4.82	3.53	10	19	12	6.2	7.8	9.0
June	65.0	69.9	68.0	0	8	4	64	24	20	13.60	2.61	3.56	15	7	11	7.0	6.1	8.1
July	74.4	74.9	73.2	10	13	9	1	0	0	2.60	1.07	3.50	4	5	10	6.0	6.9	7.5
Aug.	69.5	72.7	71.0	1	8	5	30	7	8	4.41	2.55	3.81	5	12	10	6.2	6.2	7.2
Sept.	63.0	66.5	63.6	0	9	2	96	106	102	2.41	2.10	3.64	9	6	9	5.4	5.8	7.3
Oct.	51.5	52.5	53.1	0	0	*	416	404	391	3.31	5.52	3.18	7	11	8	6.2	6.6	7.8
Nov.	45.8	42.7	42.1	0	0	0	575	662	702	3.12	6.09	3.76	12	11	11	7.2	7.2	8.4
Dec.	36.0	28.1	30.3	0	0	0	894	1135	1113	1.32	5.97	3.79	13	11	12	6.8	7.6	8.7
YEAR	49.8	50.7	50.0	11	38	21	6067	6047	6174	48.01	56.00	43.13	117	129	127	7.1	7.2	8.6

* Less than 0.5
a 1905-1983
b 1960-1983
c 1955-1983
d 1951-1980

Extracted From: Local Climatological Data Charts
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Data Service

TABLE 32

1982 AND 1983 CLIMATOLOGICAL DATA
SIKORSKY INTERNATIONAL AIRPORT
STRATFORD

	AVERAGE TEMPERATURES °F			NUMBER OF DAYS DURING WHICH MAX. TEMP. EXCEEDED 90°F			DEGREE DAYS			PRECIPITATION IN INCHES WATER EQUIVALENT			NUMBER OF DAYS WITH MORE THAN .01 INCHES OF PRECIPITATION			AVERAGE WIND SPEED (MPH)		
	1982	1983	Mean[a]	1982	1983	Mean[b]	1982	1983	Normal[c]	1982	1983	Mean[d]	1982	1983	Mean[e]	1982	1983	Mean[f]
Jan.	22.9	31.4	28.4	0	0	0	1297	1034	1101	5.50	3.72	3.64	10	7	11	---	---	13.2
Feb.	32.8	32.3	30.4	0	0	0	897	914	963	2.47	2.40	3.30	7	8	10	---	---	13.6
March	37.9	40.5	37.9	0	0	0	832	754	831	2.76	9.21	3.99	13	15	11	---	---	13.5
April	46.3	48.1	48.0	0	0	0	556	501	492	3.83	10.72	3.93	10	11	11	---	---	13.0
May	59.6	55.8	58.4	0	0	*	164	280	220	3.02	4.77	3.67	11	15	11	---	---	11.6
June	63.9	67.7	67.7	0	2	1	72	29	20	11.53	3.72	3.36	15	5	9	---	---	10.5
July	72.9	74.3	73.3	5	3	3	1	0	0	3.31	1.66	3.63	4	6	8	---	---	10.0
Aug.	69.3	73.1	71.9	0	2	1	19	8	0	3.14	2.57	4.00	7	8	9	---	---	10.1
Sept.	64.1	67.3	65.2	0	4	*	66	73	49	1.30	2.20	3.54	6	4	9	---	---	11.2
Oct.	52.9	55.1	54.7	0	0	0	371	320	285	1.52	4.63	3.37	7	10	7	---	---	11.9
Nov.	47.0	46.5	44.2	0	0	0	530	550	585	3.13	6.58	3.78	9	12	10	---	---	12.7
Dec.	38.7	33.1	33.2	0	0	0	809	981	955	1.10	4.74	3.72	11	12	11	---	---	13.0
YEAR	50.7	52.1	51.1	5	11	6	5614	5444	5501	42.61	56.92	43.93	110	113	117	---	---	12.0

* Less than 0.5
a 1903-1983
b 1966-1983
c 1951-1980
d 1894-1983
e 1949-1983
f ~~1961-1983~~ 1958-1980

Extracted From: Local Climatological Data Charts
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Data Service

FIGURE 27

ANNUAL WIND ROSE 1982

BRADLEY INTERNATIONAL AIRPORT

WINDSOR LOCKS, CONNECTICUT

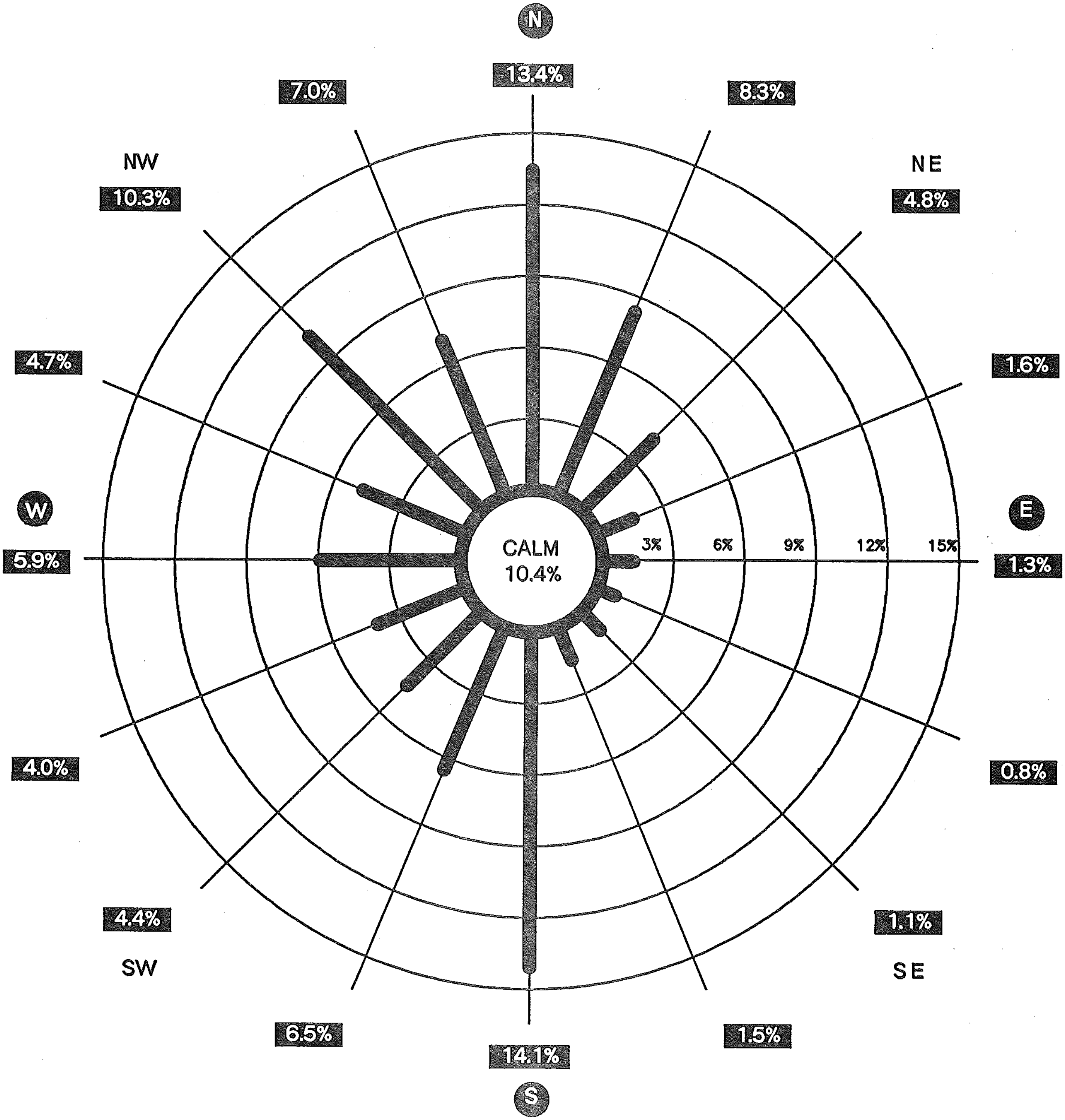


FIGURE 28

ANNUAL WIND ROSE 1983

BRADLEY INTERNATIONAL AIRPORT

WINDSOR LOCKS, CONNECTICUT

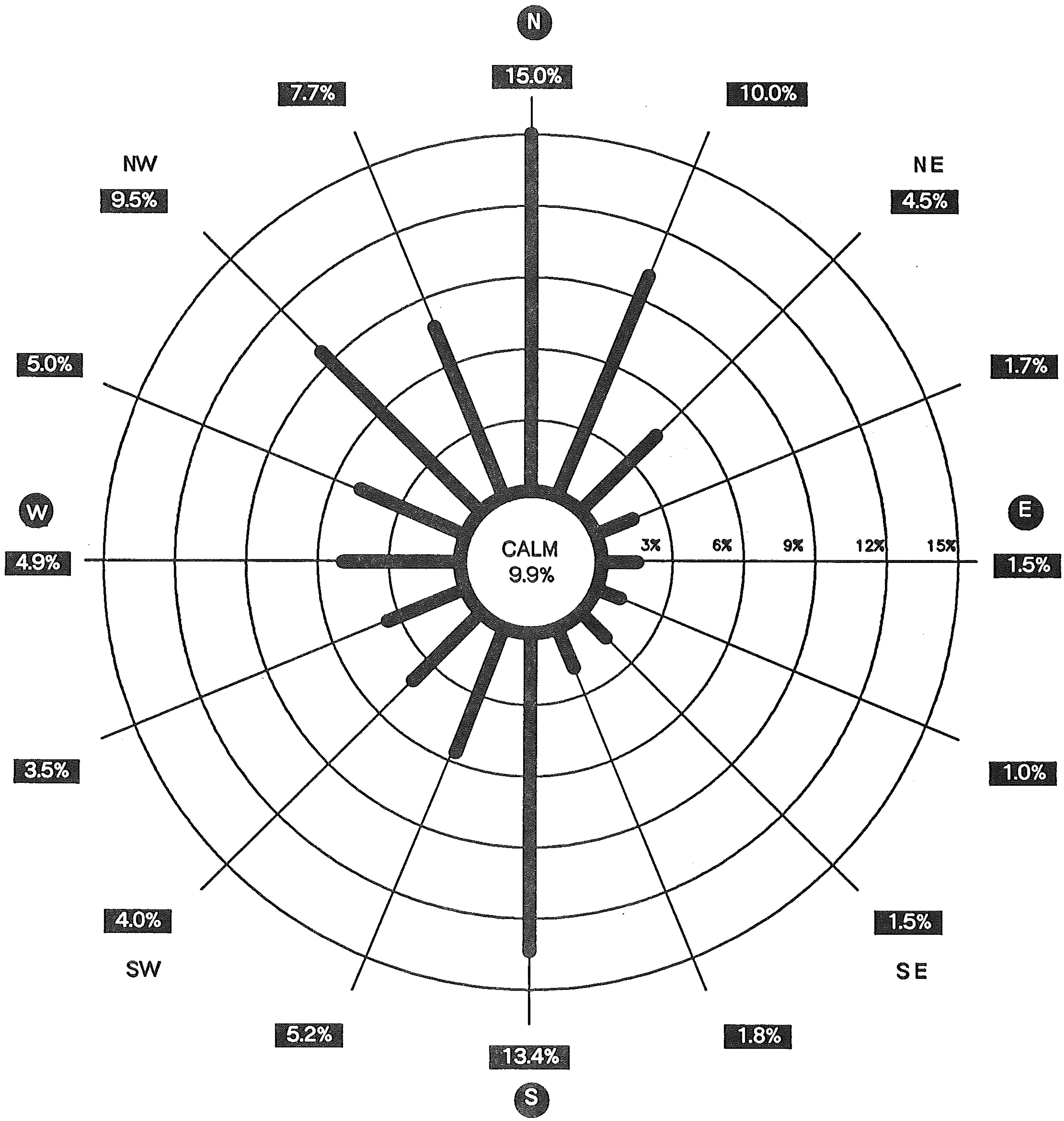


FIGURE 29

ANNUAL WIND ROSE 1982

NEWARK INTERNATIONAL AIRPORT

NEWARK, NEW JERSEY

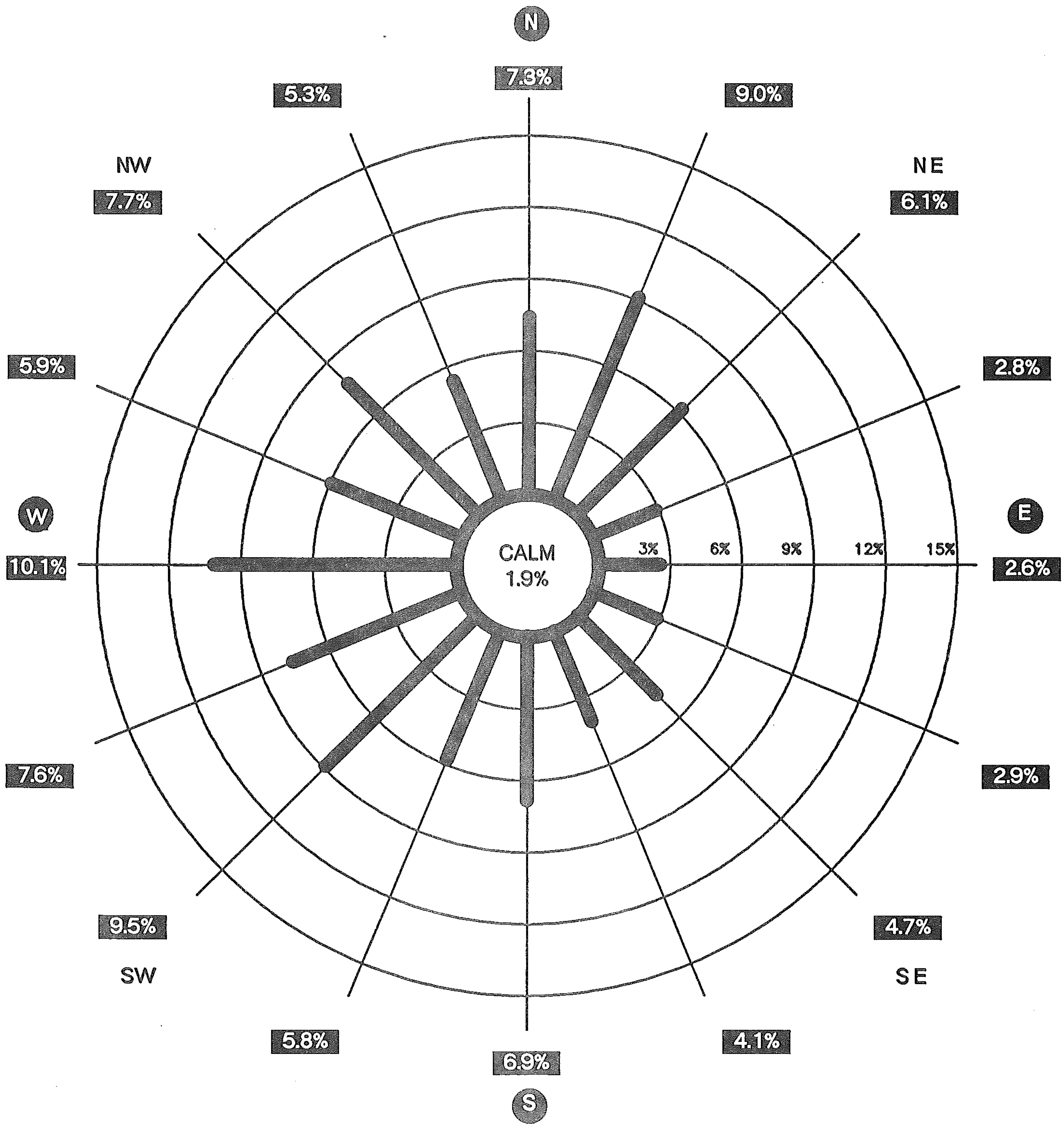
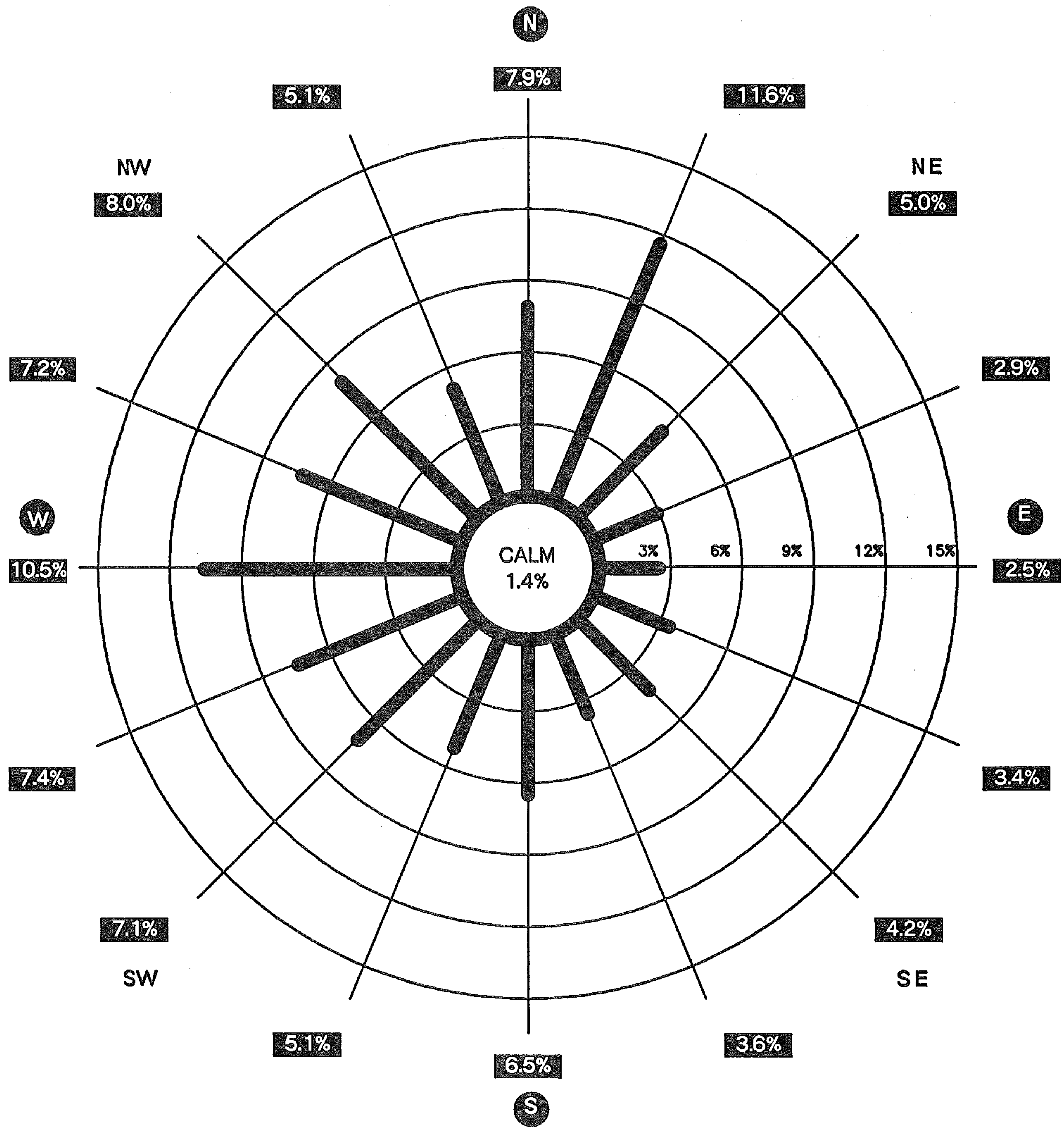


FIGURE 30

ANNUAL WIND ROSE 1983

NEWARK INTERNATIONAL AIRPORT

NEWARK, NEW JERSEY



X. ATTAINMENT AND NON-ATTAINMENT OF NAAQS IN CONNECTICUT'S AQCR'S

The attainment status designations for Connecticut's four Air Quality Control Regions (AQCR's, see Figure 31) with regard to the National Ambient Air Quality Standards (NAAQS) have been determined for 1983 for the following pollutants: total suspended particulates (TSP); sulfur dioxide (SO_2); ozone (O_3); nitrogen dioxide (NO_2); carbon monoxide (CO); and lead (Pb). Table 33 shows the attainment status of each AQCR by pollutant. The AQCR's are classified as attainment, non-attainment or unclassifiable. A region is classified non-attainment for a particular pollutant if any monitoring site in the region recorded a violation of any NAAQS for the pollutant at any time during 1981, 1982, or 1983, or if a violation was statistically predicted to have occurred at any site in the AQCR during that period. (For the pollutant lead, only two years of data are examined.) Regions are unclassifiable for a particular pollutant if during the three-year period (two years for lead) there was either no monitoring or insufficient monitoring of the pollutant in a calendar year.

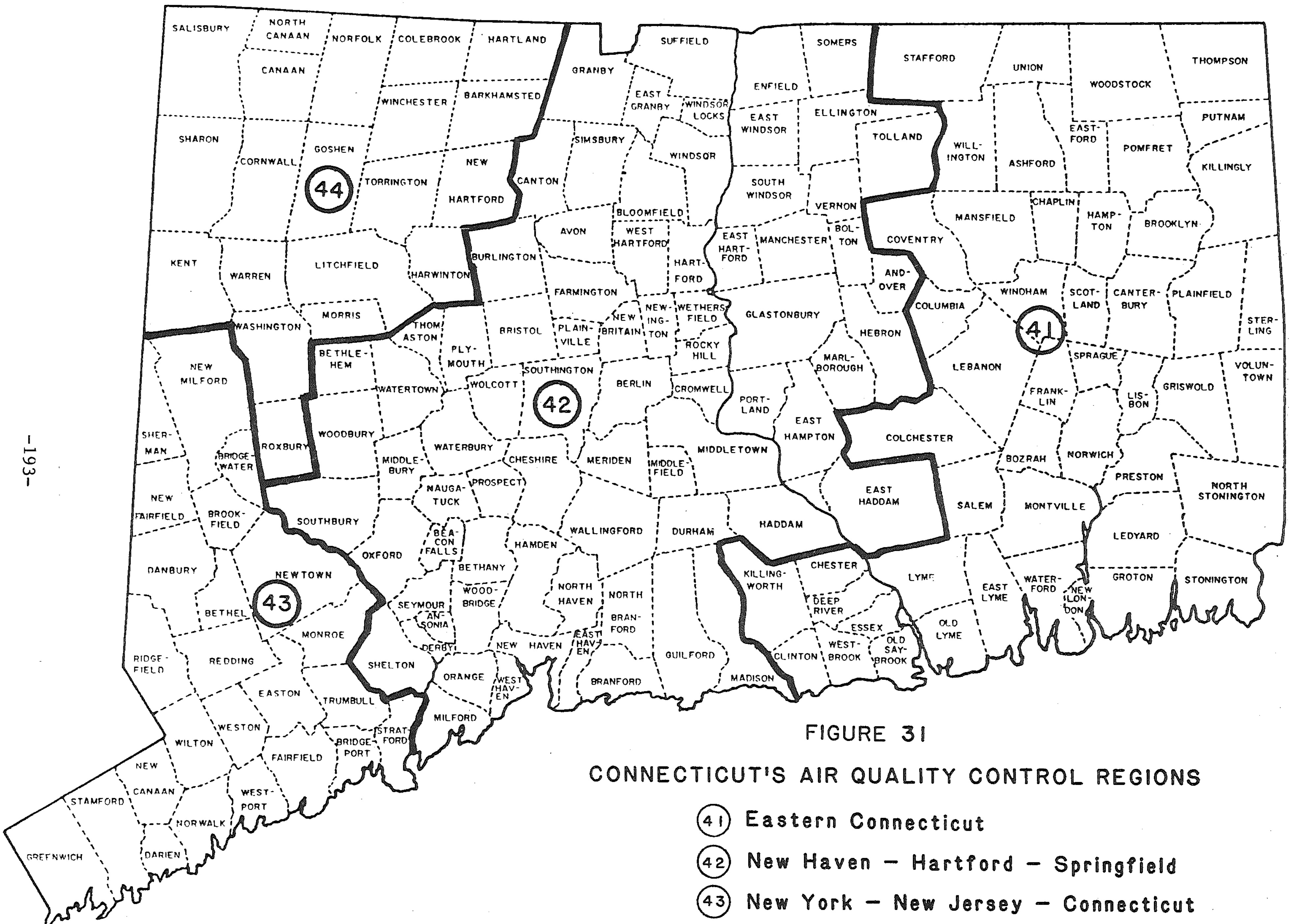


FIGURE 31

CONNECTICUT'S AIR QUALITY CONTROL REGIONS

(41) Eastern Connecticut

(42) New Haven – Hartford – Springfield

(43) New York – New Jersey – Connecticut

(44) Northwestern Connecticut

TABLE 33

CONNECTICUT'S COMPLIANCE WITH THE NAAQS (BY AQCR) FOR 1983

Pollutant	Primary or Secondary	NAAQS	AQCR 41	AQCR 42	AQCR 43	AQCR 44
TSP	Primary	Annual	A	A	A	A
		24-Hour	A	A	A	A
	Secondary	Annual	A	A	A	A
		24-Hour	A	X	X	A
SO_2	Primary	Annual	U	A	A	U
		24-Hour	U	A	A	U
	Secondary	3-Hour	U	A	A	U
Ozone	Both	1-Hour	X	X	X	U
NO_2	Both	Annual	U	U	U	U
CO	Both	1-Hour	U	A	A	U
		8-Hour	U	X	X	U
Lead	Both	3-Month	U	A	A	A

X = Non-Attainment
U = Unclassifiable
A = Attainment

XI. CONNECTICUT SLAMS AND NAMS NETWORK

On May 10, 1979, the U.S. Environmental Protection Agency made public its final rulemaking for ambient air monitoring and data reporting requirements in the "Federal Register" (Vol. 44, No. 92). These regulations are meant to ensure the acceptability of air measurement data, the comparability of data from all monitoring stations, the cost–effectiveness of monitoring networks, and timely data submission for assessment purposes. The regulations address a number of key areas including quality assurance, monitoring methodologies, network design and probe siting. Detailed requirements and specific criteria are provided which form the framework for ambient air quality monitoring. These regulations apply to all parties conducting ambient air quality monitoring for the purpose of supporting or complying with environmental regulations. In particular, state/local control agencies and industrial/private concerns involved in air monitoring are directly influenced by specific requirements, compliance dates and recommended guidelines.

Quality Assurance

The regulations specify the minimum quality assurance requirements for State and Local Air Monitoring Stations (SLAMS) networks, National Air Monitoring Stations (NAMS) networks, and Prevention of Significant Deterioration (PSD) air monitoring. Two distinct and equally important functions make up the quality assurance program: assessment of the quality of monitoring data by estimating their precision and accuracy, and control of the quality of the data by implementation of quality control policies, procedures, and corrective actions. (See Part E of Section I, Quality Assurance).

The data assessment requirements entail the determination of precision and accuracy for both continuous and manual methods. A one–point precision check must be carried out at least once every other week on each automated analyzer used to measure SO_2, NO_2, CO and O_3. Standards from which the precision check test data are derived must meet specifications detailed in the regulations. For manual methods, precision checks are to be accomplished by operating co–located duplicate samplers. In 1983, Connecticut maintained three co–located TSP monitors (Bridgeport 009, Hartford 003, and Waterbury 005) and two co–located lead samplers (New Haven 123 and Waterbury 123).

Accuracy determinations are accomplished by performing analyzer audits via special audit gases for automated analyzers, via reference flow devices for hi–vols, and via spiked strip analyses for lead. For SLAMS analyzers, accuracy audits must be performed on each analyzer at least once per calendar year. Each PSD analyzer must be audited at least once each calendar quarter.

All precision and accuracy data are derived through calculation methods specified by the regulations, with the results reported quarterly on Data Assessment Report Forms. The NAMS network is actually part of the SLAMS network; so the SLAMS accuracy determinations also apply to the NAMS network. The distinguishing characteristics of NAMS are: 1) only continuous instruments are used to monitor gaseous pollutants; 2) the regulations specify a minimum number and locations for them; and 3) the data, in addition to being included in the annual report, are reported quarterly to EPA.

In order to control the quality of data, the monitoring program must have operational procedures for each of the following activities:

1. Installation of equipment,
2. Selection of methods, analyzers, or samplers,
3. Zero/span checks and analyzer adjustments,
4. Calibration,
5. Control limits for zero/span and other control checks, and respective corrective actions when such limits are exceeded,
6. Control checks and their frequency,
7. Preventive and remedial maintenance,
8. Calibration and zero/span checks for multi-range analyzers,
9. Recording and validating data, and
10. Documentation of quality control information.

Monitoring Methodologies

Except as otherwise stated within the regulations, the monitoring method used must be "reference" or "equivalent," as designated by the EPA. Table 34 lists methods used in Connecticut's network in 1983 which were on the EPA-approved list as of 9/18/80. Additional updates to these approved methods are provided through the "Federal Register."

Network Design

The regulations also describe monitoring objectives and general criteria to be applied in establishing the SLAMS networks and for choosing general locations for new monitors. Criteria are also presented for determining the location and number of monitors. These criteria serve as the framework for all State Implementation Plan (SIP) monitoring networks that must be complete and in operation by January 1, 1983.

The SLAMS network must be designed to meet four basic monitoring objectives: (1) to determine the highest pollutant concentration in the area; (2) to determine representative concentrations in areas of high population density; (3) to determine the ambient impact of significant sources or source categories; and (4) to determine general background concentration levels. Proper siting of a monitor requires precise specification of the monitoring objectives, which usually includes a desired spatial scale of representativeness. The spatial scales of representativeness are specified in the regulations for each pollutant and monitoring objective. The 1983 SLAMS and NAMS networks in Connecticut are presented and described in Table 35.

Probe Siting

Location and exposure of monitoring probes has been an area of confusion for a number of years because of conflicting guidelines and a lack of guidance or recommended criteria. The probe siting criteria promulgated in the regulations are specific. They are also sufficiently inclusive to define the requirements for ensuring the uniform collection of compatible and comparable air quality data.

These criteria are detailed by pollutant and include vertical and horizontal probe placement, spacing from obstructions and trees, spacing from roadways, probe material and sample residence time, as well as various other considerations. A summary of the probe siting criteria is presented in Table 36. The siting criteria generally apply to all spatial scales except where noted. The most notable exception is spacing from roadways which is dependent on traffic volume.

For the reactive gases SO_2, NO_2, and O_3, the regulations specify borosilicate glass, FEP teflon or their equivalent as the only acceptable probe materials. Additionally, in order to minimize the effects of particulate deposition on probe walls, sampling probes for reactive gases must have residence times of less than 20 seconds.

TABLE 34

U.S. EPA APPROVED MONITORING METHODS USED IN CONNECTICUT IN 1983

	Manual Methods	Automated Methods	
Pollutant	Reference	Reference	Equivalent
TSP	High Volume Method		
SO_2			Thermo Electron 43 (0.5)
CO		Bendix 8501-5CA (50)	
O_3		Bendix 8002 (0.5)	
NO_2		Thermo Electron 14 B/E (0.5) Monitor Labs 8440E (0.5) Bendix 8101-C (0.5)	
Lead	High Volume Method		

( ) = approved range in ppm

TABLE 35

1983 SLAMS AND NAMS SITES

SULFUR DIOXIDE

Town	Urban Area	Site	SLAMS or NAMS	Sampling & Analytic Method	Operating Schedule	Monitoring Objective	Spatial Scale and Representativeness
Bridgeport	Bridgeport	001	S	Pulsed Fluorescence	Contin.	Population	Neighborhood
Bridgeport	Bridgeport	012	S	Pulsed Fluorescence	Contin.	Population	Neighborhood
Bridgeport	Bridgeport	123	N	Pulsed Fluorescence	Contin.	High Conc.	Neighborhood
Danbury	Danbury	123	S	Pulsed Fluorescence	Contin.	Population	Neighborhood
Enfield	Springfield (Somers CT)	005	S	Pulsed Fluorescence	Contin.	Background	Regional
Greenwich	Stamford	017	S	Pulsed Fluorescence	Contin.	Background	Urban
Groton	New London/ Norwich	007	S	Pulsed Fluorescence	Contin.	Population	Neighborhood
Hartford	Hartford	123	S	Pulsed Fluorescence	Contin.	Population	Neighborhood
Milford	Bridgeport	002	S	Pulsed Fluorescence	Contin.	Source	Middle
New Haven	New Haven	123	N	Pulsed Fluorescence	Contin.	High Conc.	Neighborhood
Norwalk	Norwalk	005	S	Pulsed Fluorescence	Contin.	Population	Neighborhood
Preston	New London/ Norwich	002	S	Pulsed Fluorescence	Contin.	Background	Regional
Stamford	Stamford	024	S	Pulsed Fluorescence	Contin.	High Conc.	Neighborhood
Stamford	Stamford	123	S	Pulsed Fluorescence	Contin.	High Conc.	Neighborhood
Waterbury	Waterbury	007	S	Pulsed Fluorescence	Contin.	High Conc.	Neighborhood
Waterbury	Waterbury	123	S	Pulsed Fluorescence	Contin.	Population	Neighborhood

NITROGEN OXIDES

Town	Urban Area	Site	SLAMS or NAMS	Sampling & Analytic Method	Operating Schedule	Monitoring Objective	Spatial Scale and Representativeness
Bridgeport	Bridgeport	123	S	Chemiluminescent	Contin.	High Conc.	Neighborhood
E. Hartford	Hartford	003	S	Chemiluminescent	Contin.	High Conc.	Neighborhhod
New Haven	New Haven	123	S	Chemiluminescent	Contin.	High Conc.	Neighborhood

OZONE

Town	Urban Area	Site	SLAMS or NAMS	Sampling & Analytic Method	Operating Schedule	Monitoring Objective	Spatial Scale and Representativeness
Bridgeport	Bridgeport	123	N	Chemiluminescent	Contin.	Population	Neighborhood
Danbury	Danbury	123	S	Chemiluminescent	Contin.	Population	Urban
E. Hartford	Hartford	003	N	Chemiluminescent	Contin.	Population	Neighborhood
Greenwich Pt.	Stamford	017	S	Chemiluminescent	Contin.	Background	Regional
Groton	New London	005	S	Chemiluminescent	Contin.	High Conc.	Urban
Middletown	~~Meriden~~ Hartford	007	N	Chemiluminescent	Contin.	High Conc.	Urban
New Haven	New Haven	123	N	Chemiluminescent	Contin.	Population	Neighborhood
Stafford	~~Hartford~~ none	001	N	Chemiluminescent	Contin.	High Conc.	Urban
Stratford	Bridgeport (NYC down-wind)	007	N	Chemiluminescent	Contin.	High Conc.	Urban

CARBON MONOXIDE

Town	Urban Area	Site	SLAMS or NAMS	Sampling & Analytic Method	Operating Schedule	Monitoring Objective	Spatial Scale and Representativeness
Bridgeport	Bridgeport	004	S	NDIR	Contin.	High Conc.	Micro
Hartford	Hartford	012	S	NDIR	Contin.	High Conc.	Micro
New Britain	New Britain	002	S	NDIR	Contin.	High Conc.	Micro
New Haven	New Haven	007	S	NDIR	Contin.	High Conc.	Micro
Stamford	Stamford	020	S	NDIR	Contin.	High Conc.	Micro

TABLE 35, Continued

TOTAL SUSPENDED PARTICULATES

Town	Urban Area	Site	SLAMS or NAMS	Samp. Meth.	Analytic Method	Operating Schedule	Monitoring Objective	Spatial Scale and Representativeness
Ansonia	Bridgeport	003	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Bridgeport	Bridgeport	001	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Bridgeport	Bridgeport	009	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Bridgeport	Bridgeport	123	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Bristol	Bristol	001	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Burlington	NONE	001	S	Hi-Vol	Gravimetric	6-day	Background	Regional
Danbury	Danbury	002	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Danbury	Danbury	123	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
East Hartford	Hartford	004	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Greenwich	Stamford	008	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Groton	New London/ Norwich	006	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Hartford	Hartford	003	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Hartford	Hartford	013	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Hartford	Hartford	014	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Manchester	Hartford	001	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Meriden	Meriden	002	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Meriden	Meriden	008	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Middletown	~~Meriden~~ Hartford	003	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Milford	~~New Haven~~ Bridgeport	002	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Naugatuck	Waterbury	001	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
New Britain	~~Hartford~~ New Britain	007	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
New Britain	~~Hartford~~ New Britain	008	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
New Britain	~~Hartford~~ New Britain	009	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
New Haven	New Haven	002	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
New Haven	New Haven	013	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Norwalk	Norwalk	001	S	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Norwalk	Norwalk	005	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Norwalk	Norwalk	012	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Norwich	New London/ Norwich	001	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Stamford	Stamford	001	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Stamford	Stamford	007	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Stamford	Stamford	021	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Stratford	Bridgeport	005	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Torrington	NONE	001	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Voluntown	NONE	001	S	Hi-Vol	Gravimetric	6-day	Background	Regional
Wallingford	New Haven	001	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Waterbury	Waterbury	005	N	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Waterbury	Waterbury	006	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood
Waterbury	Waterbury	007	N	Hi-Vol	Gravimetric	6-day	High Conc.	Neighborhood
Willimantic	~~Waterbury~~ none	002	S	Hi-Vol	Gravimetric	6-day	Population	Neighborhood

TABLE 35, Continued

LEAD

Town	Urban Area	Site	SLAMS or NAMS	Samp. Meth.	Analytic Method	Operating Schedule	Monitoring Objective	Spatial Scale and Representativeness
Ansonia	Bridgeport	003	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Bridgeport	Bridgeport	009	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Bridgeport	Bridgeport	123	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Bristol	Bristol	001	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Danbury	Danbury	002	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Hartford	Hartford	014	S N	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Meriden	Meriden	002	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Middletown	~~Meriden~~ Hartford	003	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
New Britain	New Britain	007	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
New Haven	New Haven	123	S	Hi-Vol	Atomic Abs.	6-day	High Conc.	Middle
Norwalk	Norwalk	012	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Stamford	Stamford	001	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Torrington	Torrington	123	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Wallingford	New Haven	001	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Waterbury	Waterbury	007	S	Hi-Vol	Atomic Abs.	6-day	Population	Neighborhood
Waterbury	Waterbury	123	S	Hi-Vol	Atomic Abs.	6-day	High Conc.	Middle

TABLE 36

SUMMARY OF PROBE SITING CRITERIA

Pollutant	Scale	Distance from Supporting Structure, Meters: Vertical	Distance from Supporting Structure, Meters: Horizontal[a]	Height Above Ground, Meters	Other Spacing Criteria
TSP	All		>2	2 - 15	1. Should be >20 meters from trees. 2. Distance from sampler to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler.[b] 3. Must have unrestricted airflow 270 degrees around the sampler. 4. No furnace or incineration flues should be nearby.[c] 5. Must have minimum spacing from roads. This varies with height of monitor and spatial scale.
SO_2	All	3 - 15	>1	>1	1. Should be >20 meters from trees. 2. Distance from inlet probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the inlet probe.[b] 3. Must have unrestricted airflow 270 degrees around the inlet probe, or 180 degrees if probe is on the side of a building. 4. No furnace or incineration flues should be nearby.[c]
CO	Micro	3 ± 1/2	>1	>1	1. Must be >10 meters from intersection and should be at a midblock location. 2. Must be 2-10 meters from edge of nearest traffic lane. 3. Must have unrestricted airflow 180 degrees around the inlet probe.
	Middle Neighborhood	3 - 15	>1	>1	1. Must have unrestricted airflow 270 degrees around the inlet probe, or 180 degrees if probe is on the side of a building. 2. Spacing from roads varies with traffic.[d]

TABLE 36, Continued

Pollutant	Scale	Distance from Supporting Structure, Meters: Vertical	Distance from Supporting Structure, Meters: Horizontal[a]	Height Above Ground, Meters	Other Spacing Criteria
O_3	All	>1	>1	3 - 15	1. Should be >20 meters from trees. 2. Distance from inlet probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the inlet probe. 3. Must have unrestricted airflow 270 degrees around the inlet probe, or 180 degrees if probe is on the side of a building. 4. Spacing from roads varies with traffic.[d]
NO_2	All	3 - 15	>1	>1	1. Should be >20 meters from trees. 2. Distance from inlet probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the inlet probe.[b] 3. Must have unrestricted airflow 270 degrees around the inlet probe, or 180 degrees if probe is on the side of a building. 4. Spacing from roads varies with traffic.[d]

[a] When probe is located on rooftop, this separation distance is in reference to walls, parapets, or penthouses located on the roof.
[b] Sites not meeting this criterion would be classified as middle scale.
[c] Distance is dependent on height of furnace or incineration flue, type of fuel or waste burned, and quality of fuel (sulfur and ash content). This is to avoid undue influences from minor pollutant sources.
[d] Distance is dependent upon traffic ADT, pollutant and spatial scale.

XII. EMISSIONS INVENTORY

Connecticut's computerized emissions inventory contains two separate components -- a ***point*** source file of 12,000 stationary sources and an ***area*** source file of small sources. Area sources, such as home furnaces and transportation activities, are too small to be treated individually. The Compilation of Air Pollutant Emission Factors, designated as AP–42, was used to compute estimated emissions for both point and area sources. Emission factors for motor vehicles were calculated at an annual average temperature of 50°F using MOBILE3.

Table 37 summarizes the actual annual in–state emissions of each of the five (5) major air pollutants in Connecticut -- TSP, SO_2, CO, VOC, and NO_2 -- by county, for 1983. The table reveals two things. First, the most populous counties have the largest pollutant totals; second, excluding SO_2, which is largely generated by utilities, area sources (mobile sources in particular) account for the bulk of the total emissions.

County names and geographic locations are displayed in Figure 32, which also serves as a reference for the charts that follow.

Figures 33 through 47 give various visual displays of the level of emissions for each of the major air pollutants. Figures 33, 36, 39, 42, and 45 are pie charts that show the percent of each air pollutant for Connecticut's eight (8) counties. Figures 34, 37, 40, 43, 46 are pictorial displays of emissions by county, where the darker areas indicate higher emission levels. Figures 35, 38, 41, 44, 47 are three dimensional graphs of each county's contribution to statewide emissions.

TABLE 37

1983 CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION
EMISSIONS INVENTORY BY COUNTY*

		TSP	SO2	CO	VOC	NOX
		TONS PER YEAR				
Fairfield	Area	7,241.9	6,000.3	193,108.6	36,126.4	26,068.7
	Point	1,781.4	29,233.1	3,621.1	5,338.5	9,277.3
		9,023.3	35,233.4	196,729.7	41,464.9	35,346.0
Hartford	Area	9,301.4	6,657.6	220,981.6	40,494.0	31,087.5
	Point	736.5	3,725.7	658.9	4,357.4	2,954.7
		10,037.9	10,383.3	221,640.5	44,851.4	34,042.2
Litchfield	Area	2,381.5	1,558.3	41,815.4	8,893.3	5,788.3
	Point	253.1	643.0	55.1	628.9	262.9
		2,634.6	2,201.3	41,870.5	9,522.2	6,051.2
Middlesex	Area	2,033.6	1,208.0	36,778.9	7,883.2	5,977.0
	Point	681.8	6,605.3	542.2	955.5	5,045.1
		2,715.4	7,813.3	37,321.1	8,838.7	11,022.1
New Haven	Area	7,140.5	5,827.6	161,398.1	31,904.0	25,349.6
	Point	1,225.7	24,628.2	1,051.8	5,527.8	7,852.3
		8,366.2	30,455.8	162,449.9	37,431.8	33,201.9
New London	Area	4,790.2	2,148.7	84,324.4	17,346.1	10,902.0
	Point	1,047.1	12,810.3	403.9	1,552.8	3,710.2
		5,837.3	14,959.0	84,728.3	18,898.9	14,612.2
Tolland	Area	2,139.9	1,010.3	36,484.0	7,751.3	5,144.3
	Point	87.3	853.0	62.4	91.3	389.3
		2,227.2	1,863.3	36,546.4	7,842.6	5,533.6
Windham	Area	2,889.4	843.9	39,018.5	8,414.9	3,596.7
	Point	227.9	653.7	881.1	1,227.1	310.3
		3,117.3	1,497.6	39,899.6	9,642.0	3,907.0
TOTAL	AREA	37,918.3	25,254.7	813,909.5	158,813.3	113,914.0
	POINT	6,084.9	79,152.3	7,276.5	19,679.3	29,802.1
		44,003.2	104,407.0	821,186.0	178,492.6	143,716.1

* This inventory is based on actual operating data for 1983, such as actual fuel use and actual material throughputs. MOBILE3 is used to produce mobile source emission factors for an average annual temperature of 50oF. NOX emissions are expressed as NO2.

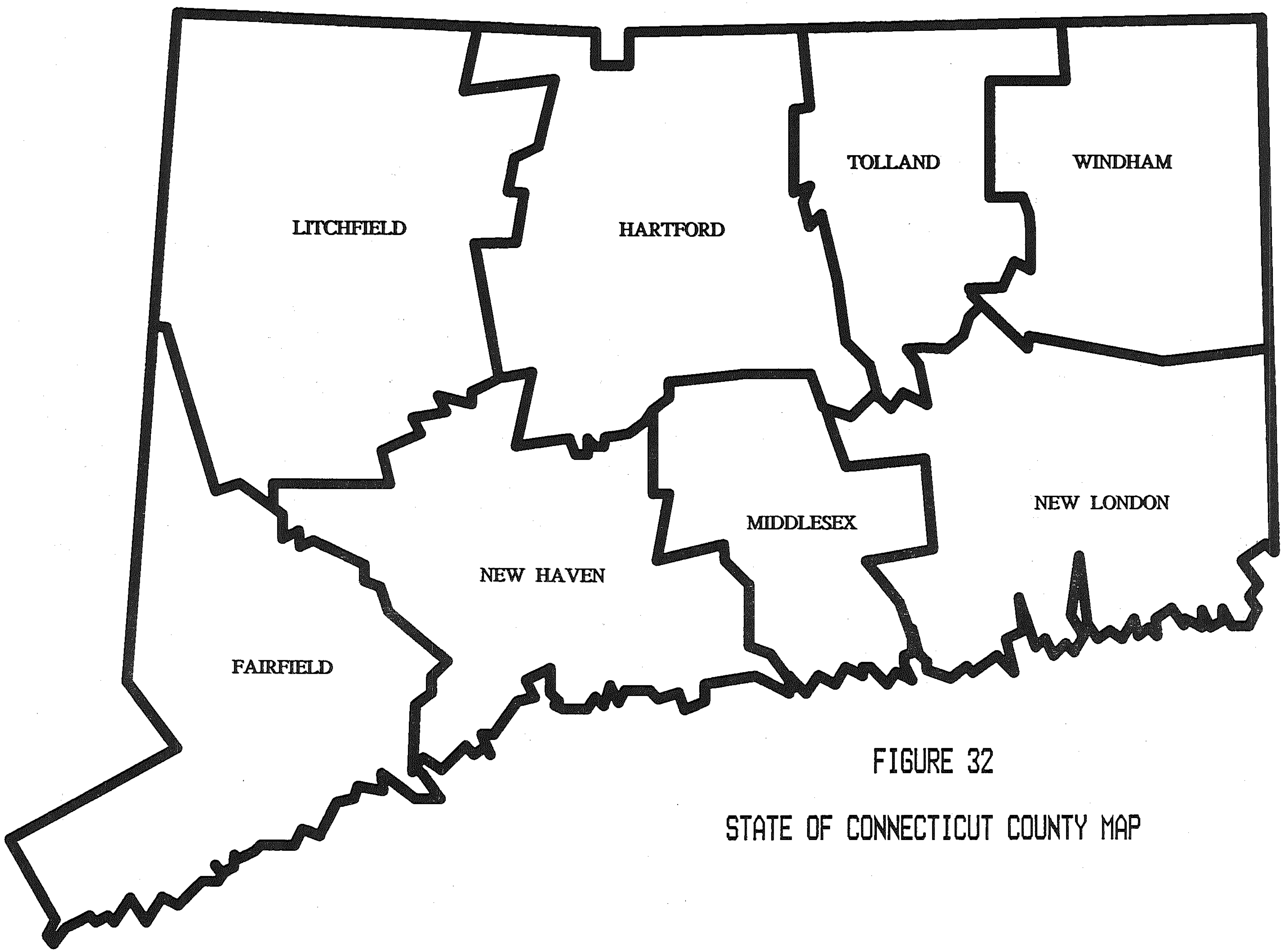


FIGURE 32

STATE OF CONNECTICUT COUNTY MAP

FIGURE 33

1983 CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

EMISSIONS INVENTORY BY COUNTY

TOTAL SUSPENDED PARTICULATES

TOTAL TONS PER YEAR - 44,003

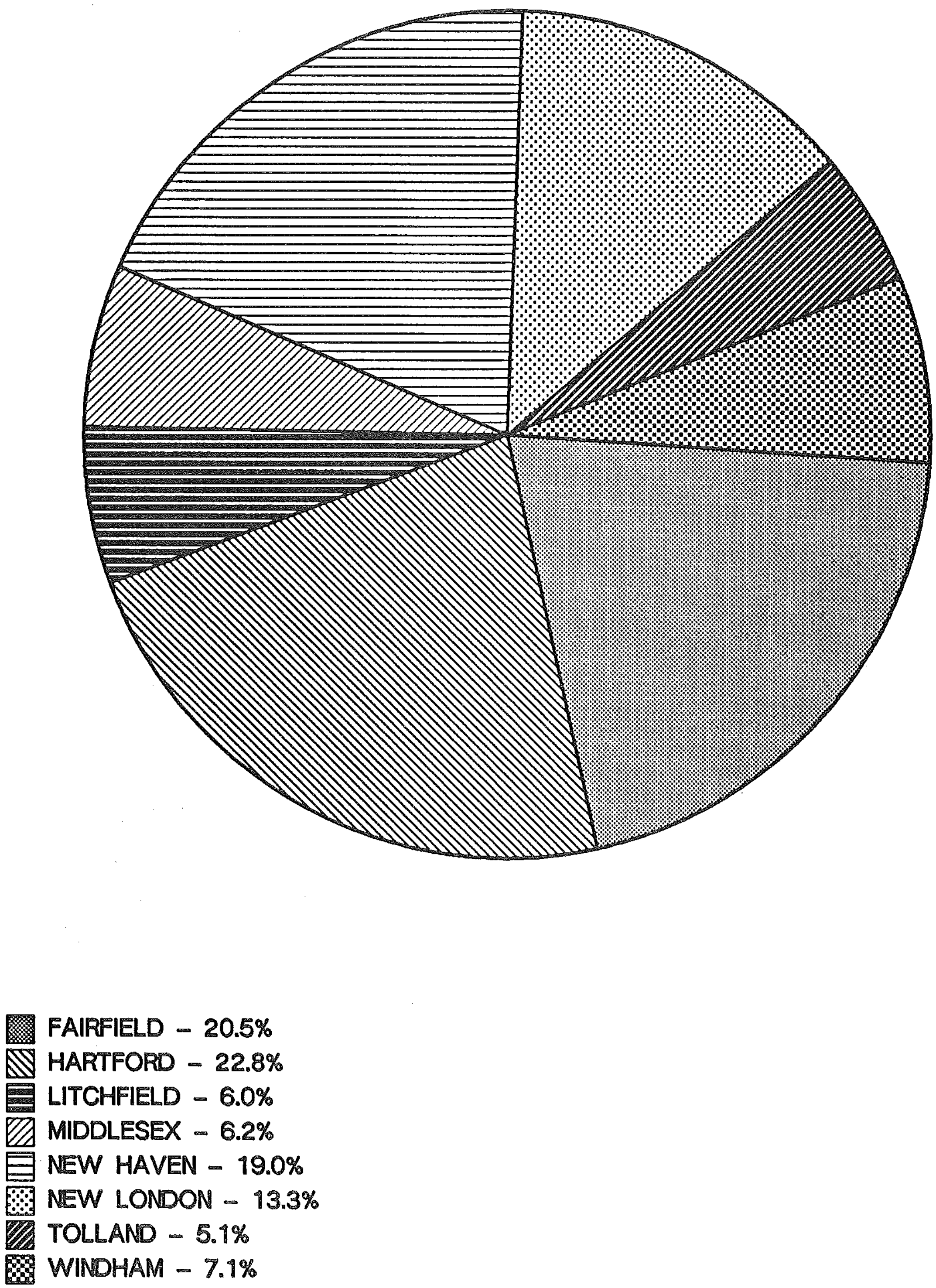


Figure 34

1983 TOTAL SUSPENDED PARTICULATES

Total Emissions by County

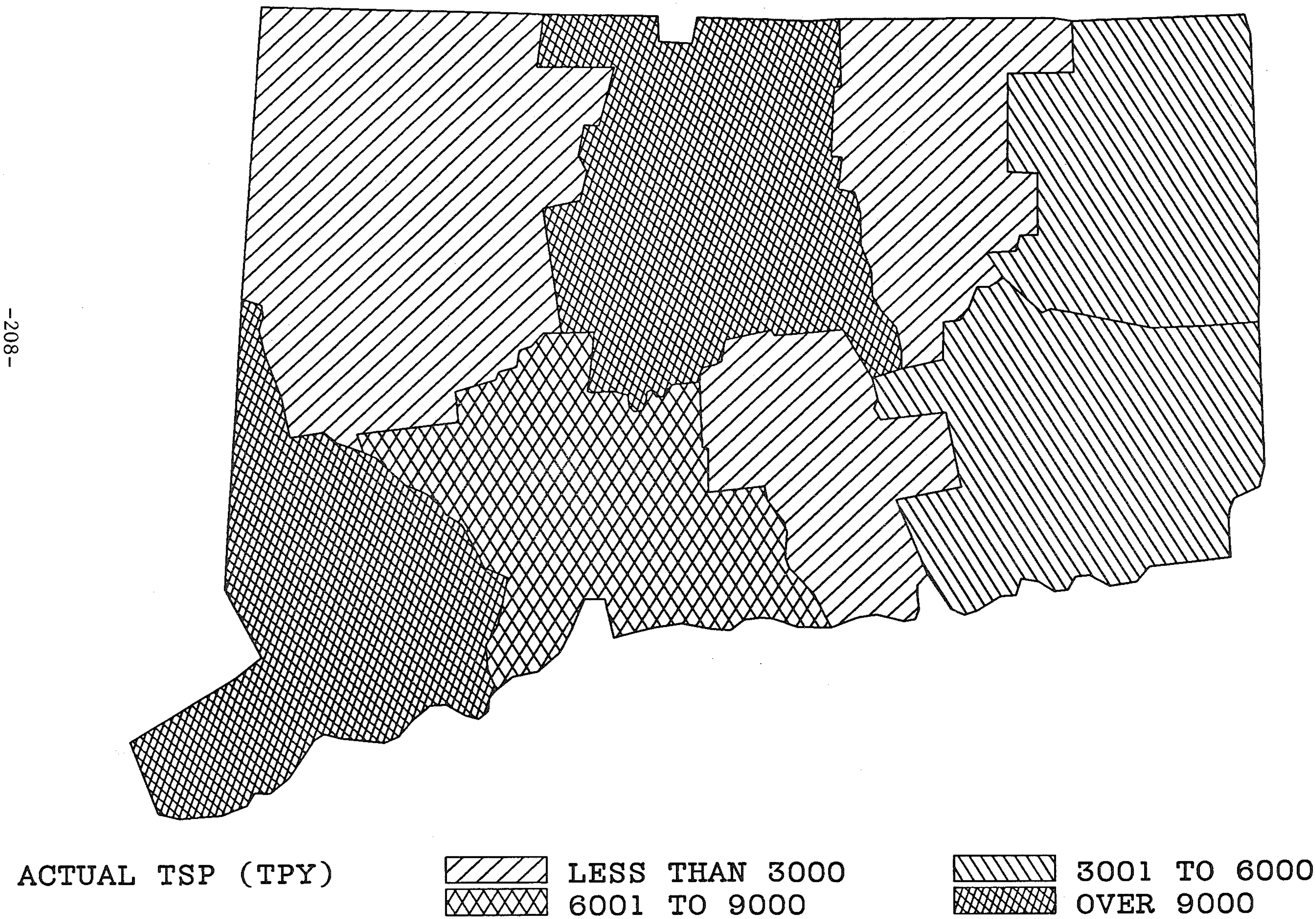
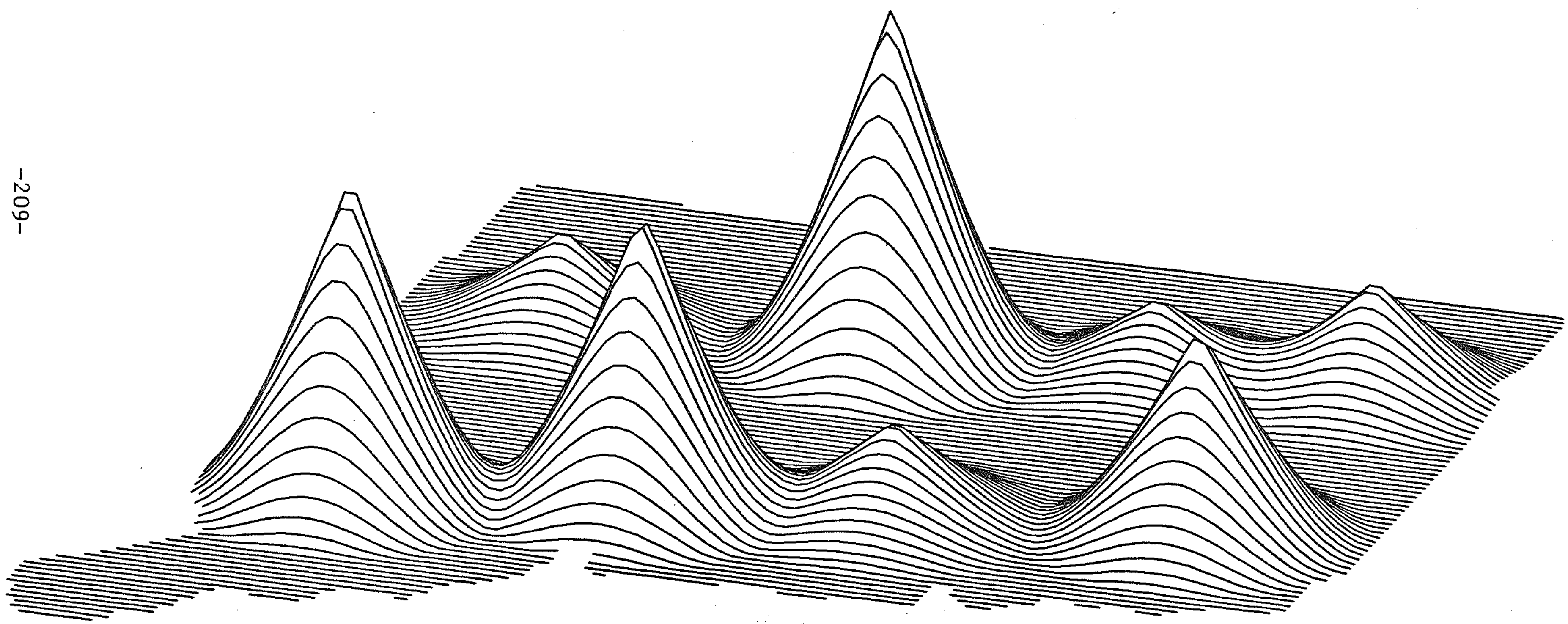


Figure 35

1983 TOTAL SUSPENDED PARTICULATES

Total Emissions by County



Three Dimensional View of TSP Emissions

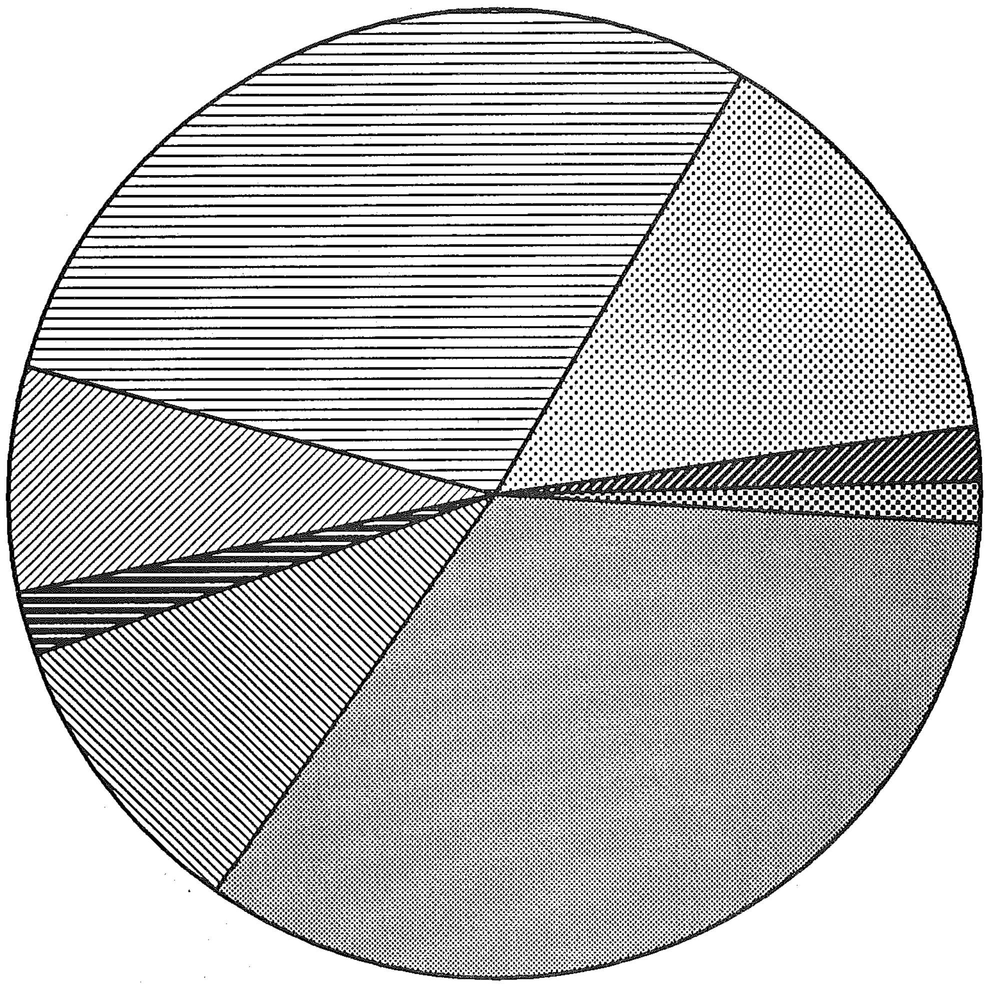
FIGURE 36

1983 CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

EMISSIONS INVENTORY BY COUNTY

SULFUR DIOXIDE

TOTAL TONS PER YEAR - 104,407



FAIRFIELD - 33.8%
HARTFORD - 9.9%
LITCHFIELD - 2.1%
MIDDLESEX - 7.5%
NEW HAVEN - 29.2%
NEW LONDON - 14.3%
TOLLAND - 1.8%
WINDHAM - 1.4

Figure 37

1983 SULFUR DIOXIDE
Total Emissions by County

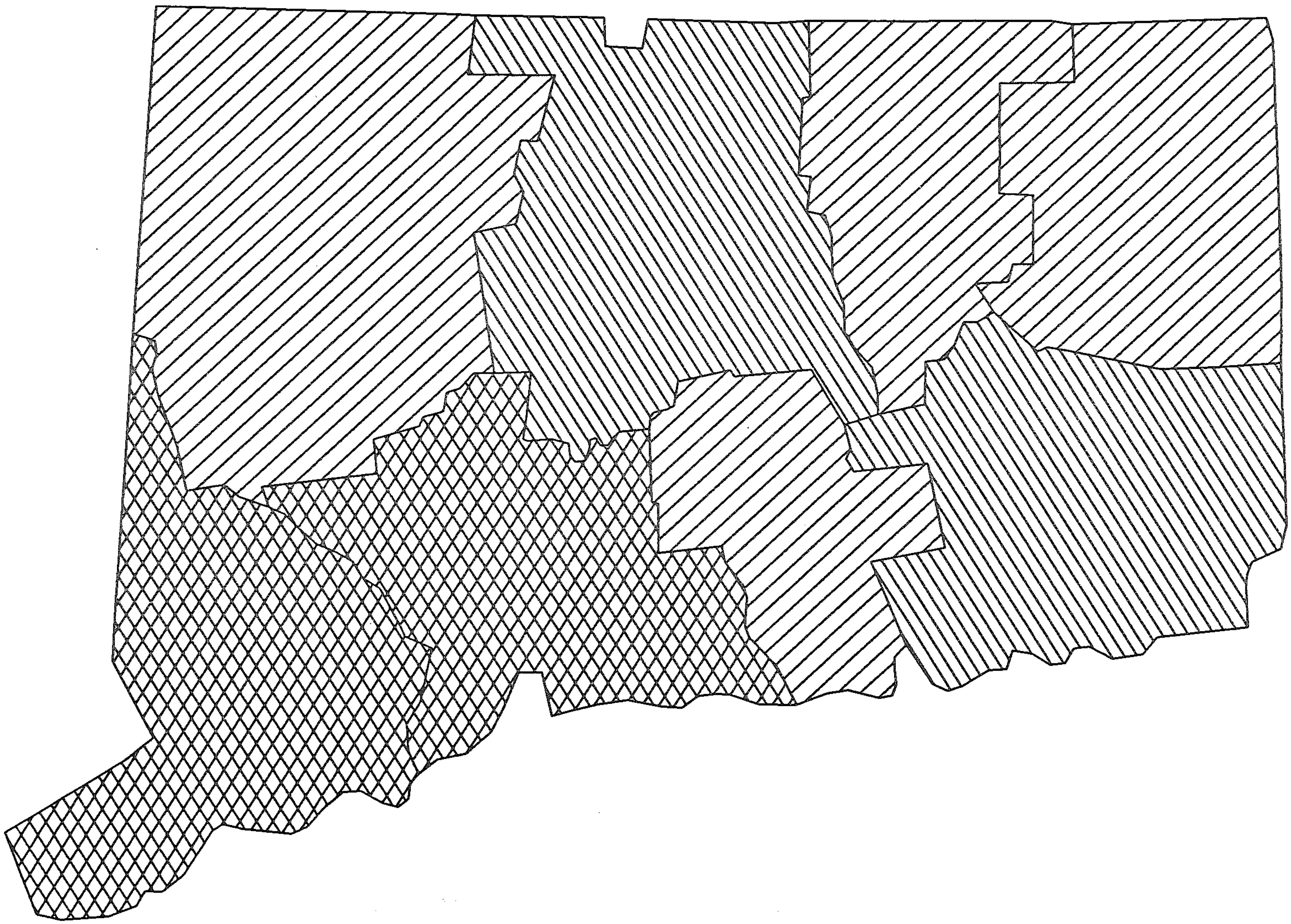
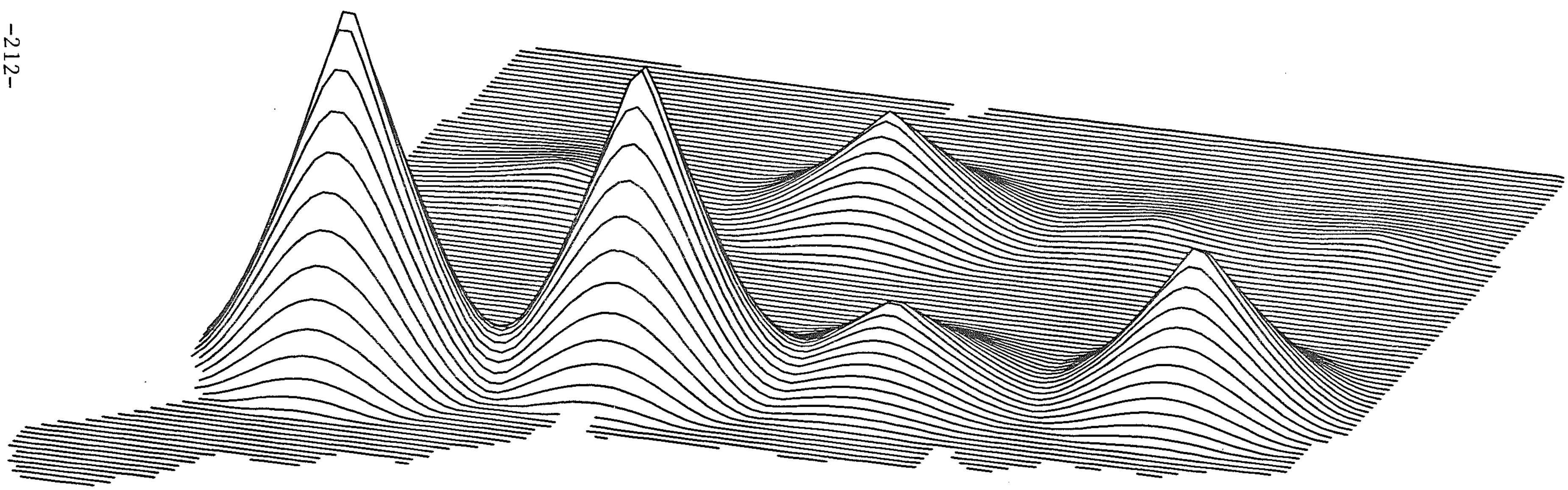


Figure 38

1983 SULFUR DIOXIDE
Total Emissions by County



Three Dimensional View of SO2 Emissions

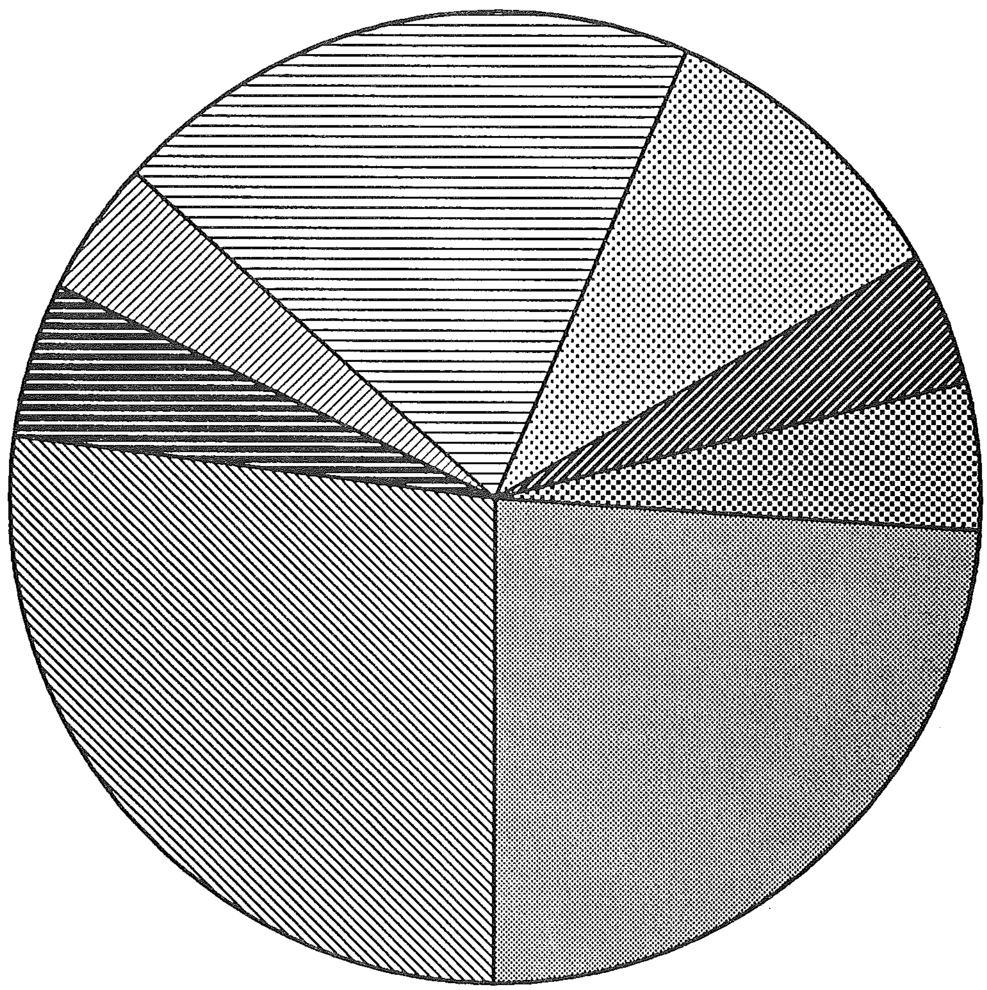
FIGURE 39

1983 CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

EMISSIONS INVENTORY BY COUNTY

CARBON MONOXIDE

TOTAL TONS PER YEAR - 821,186



FAIRFIELD - 24.0%
HARTFORD - 27.0%
LITCHFIELD - 5.1%
MIDDLESEX - 4.5%
NEW HAVEN - 19.8%
NEW LONDON - 10.3%
TOLLAND - 4.4%
WINDHAM - 4.9%

Figure 40

1983 CARBON MONOXIDE

Total Emissions by County

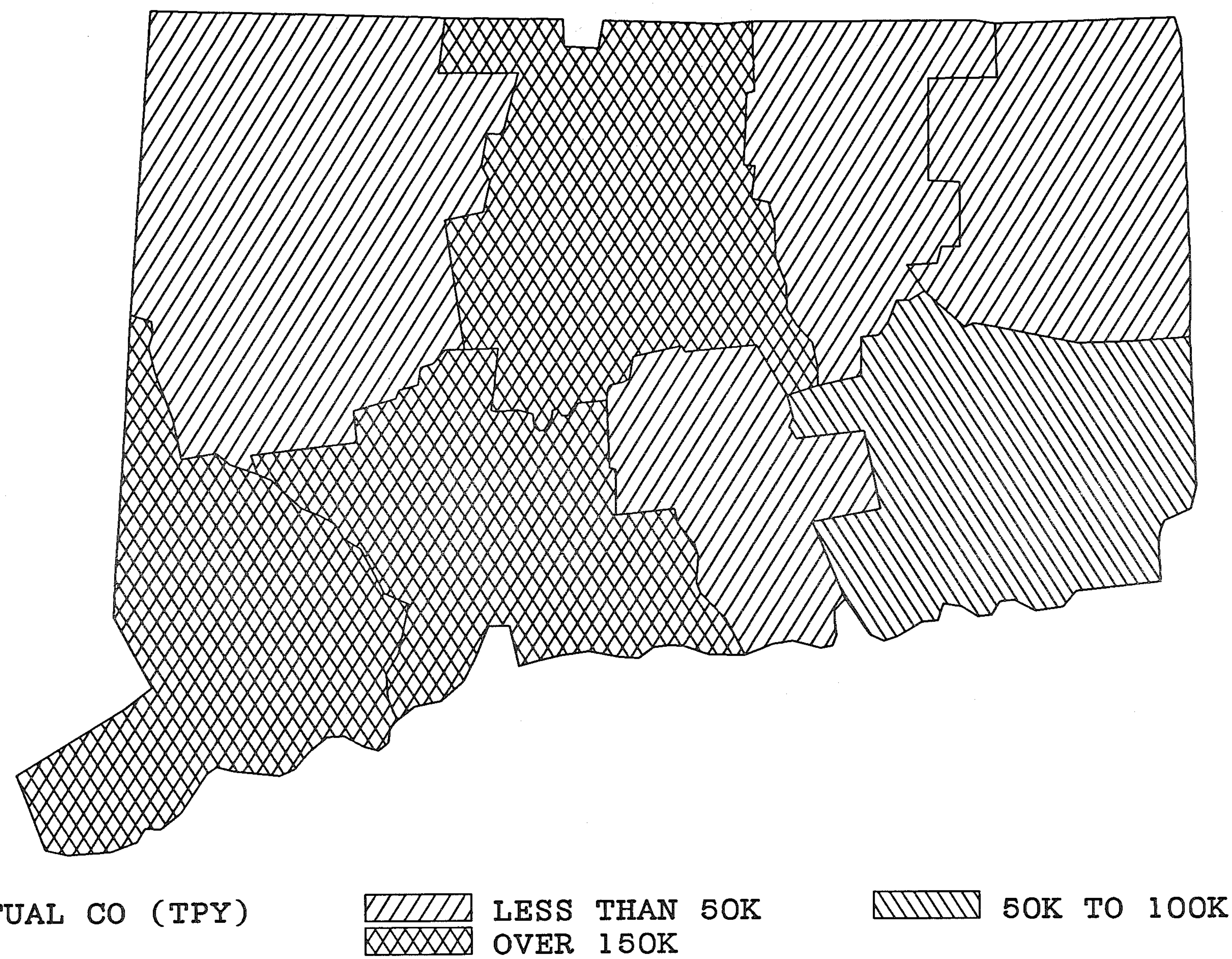
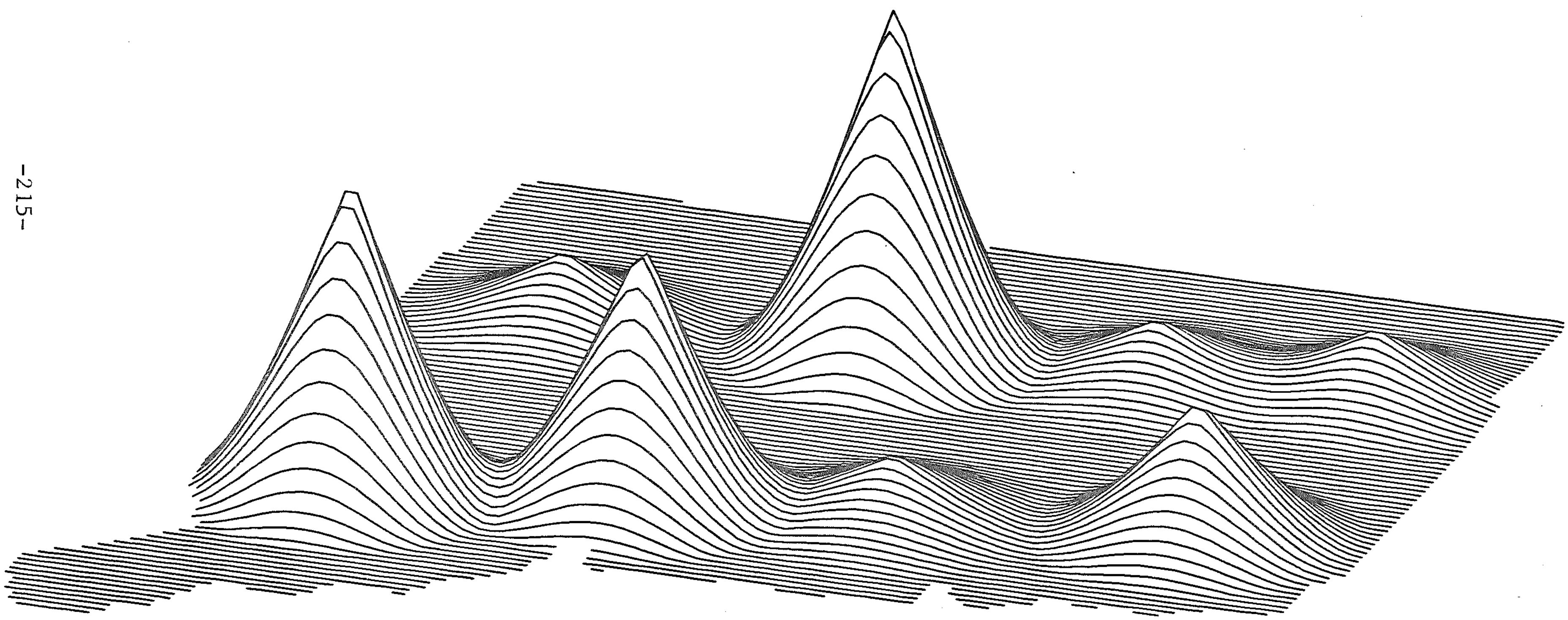


Figure 41

1983 CARBON MONOXIDE

Total Emissions by County



Three Dimensional View of CO Emissions

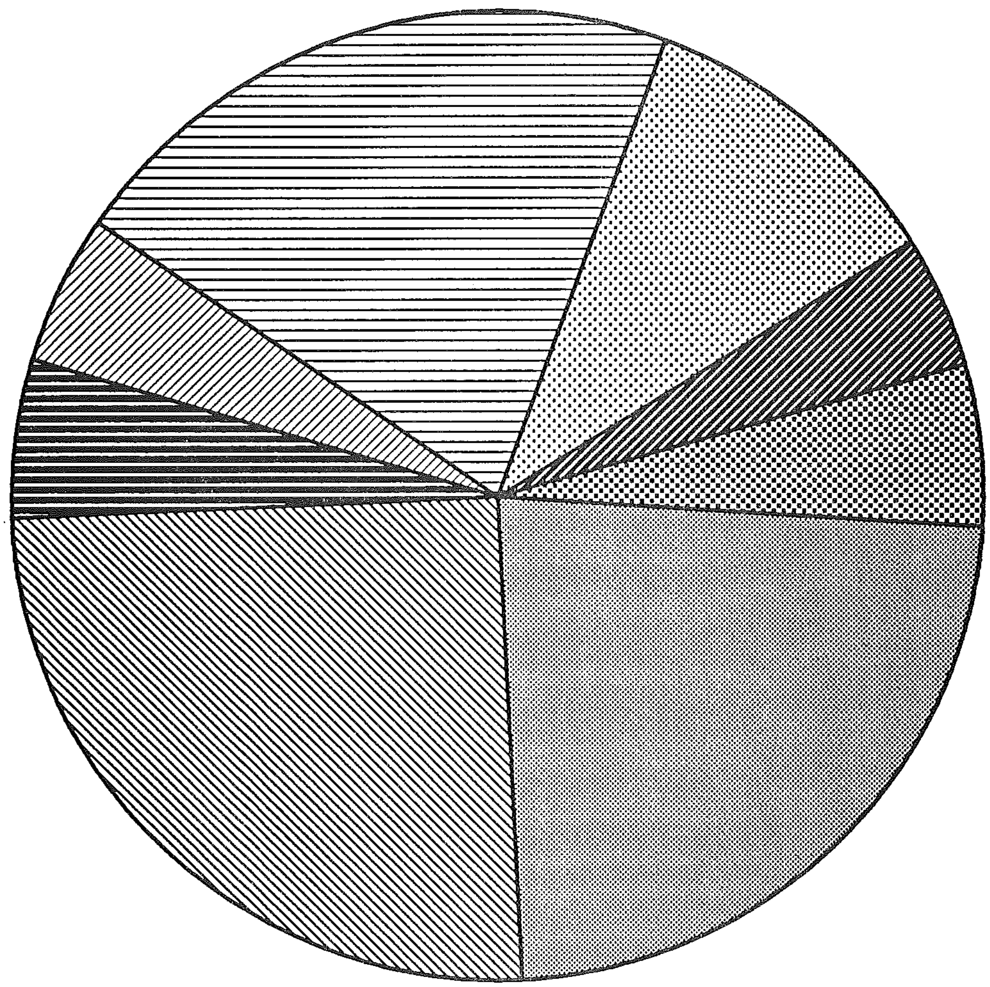
FIGURE 42

1983 CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

EMISSIONS INVENTORY BY COUNTY

VOLATILE ORGANIC COMPOUNDS

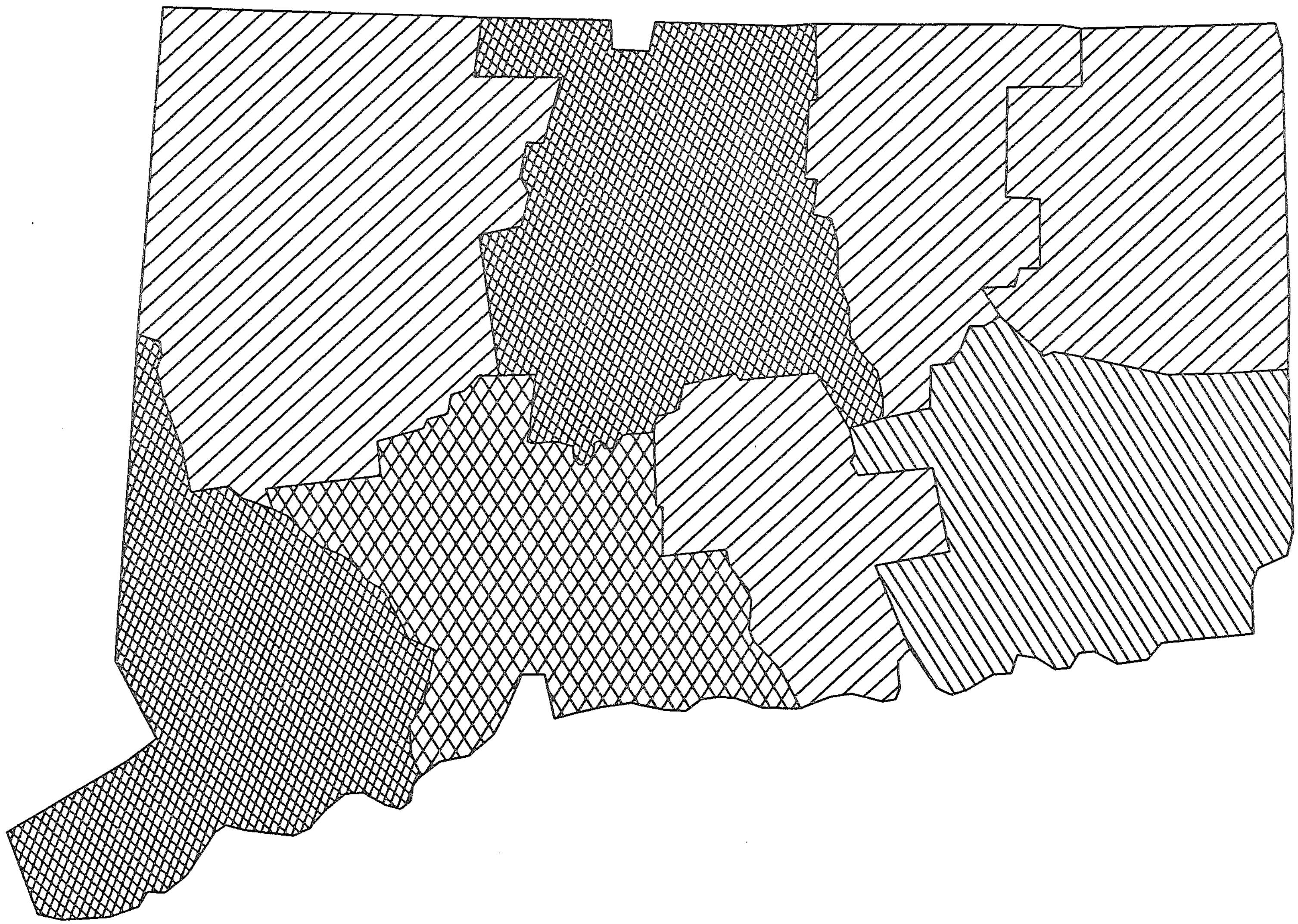
TOTAL TONS PER YEAR - 178,493



FAIRFIELD - 23.2%
HARTFORD - 25.1%
LITCHFIELD - 5.3%
MIDDLESEX - 5.0%
NEW HAVEN - 21.0%
NEW LONDON - 10.6%
TOLLAND - 4.4%
WINDHAM - 5.4%

Figure 43

1983 VOLATILE ORGANIC COMPOUNDS
Total Emissions by County



ACTUAL VOC (TPY)

LESS THAN 10,000

10,001 TO 20,000

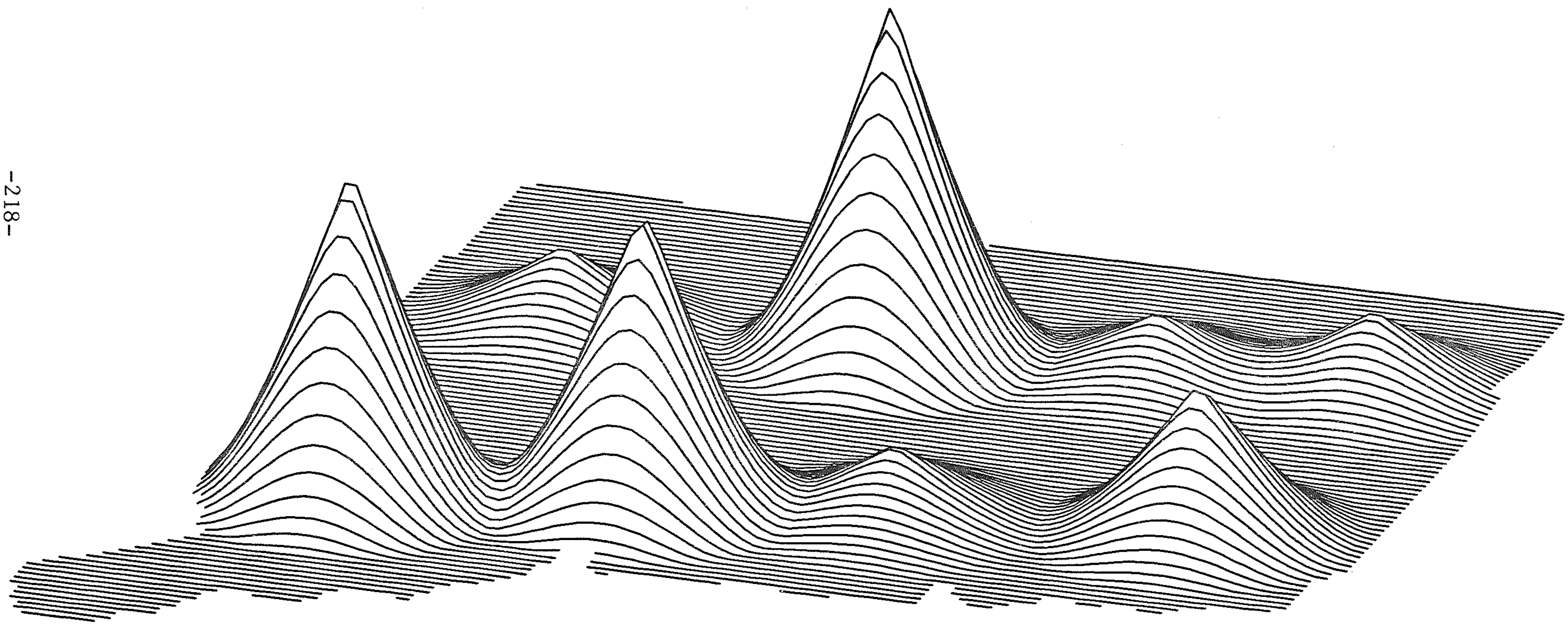
30,001 TO 40,000

OVER 40,000

Figure 44

1983 VOLATILE ORGANIC COMPOUNDS

Total Emissions by County



Three Dimensional View of VOC Emissions

FIGURE 45

1983 CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

EMISSIONS INVENTORY BY COUNTY

NITROGEN OXIDES, EXPRESSED AS NO2

TOTAL TONS PER YEAR - 143,716

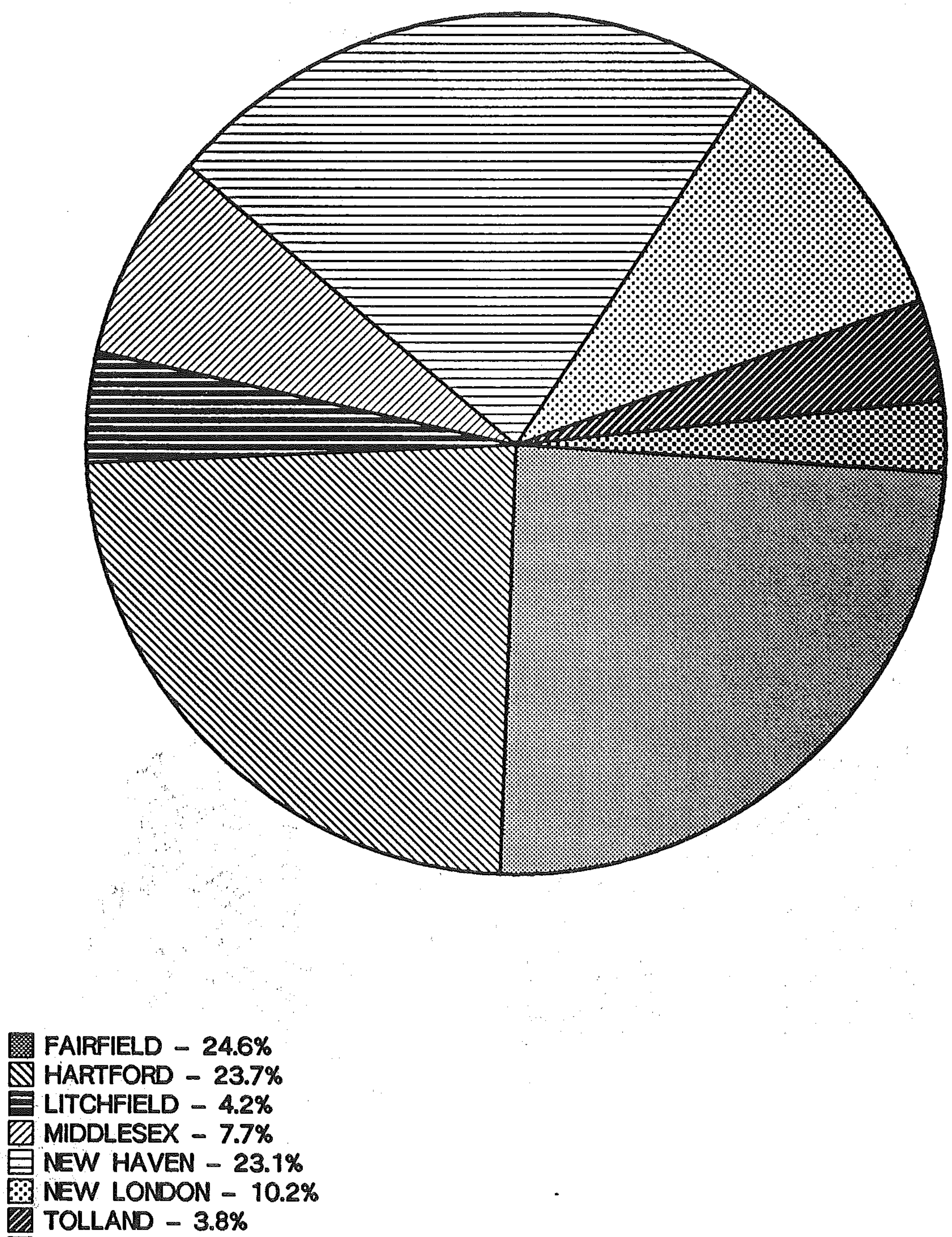
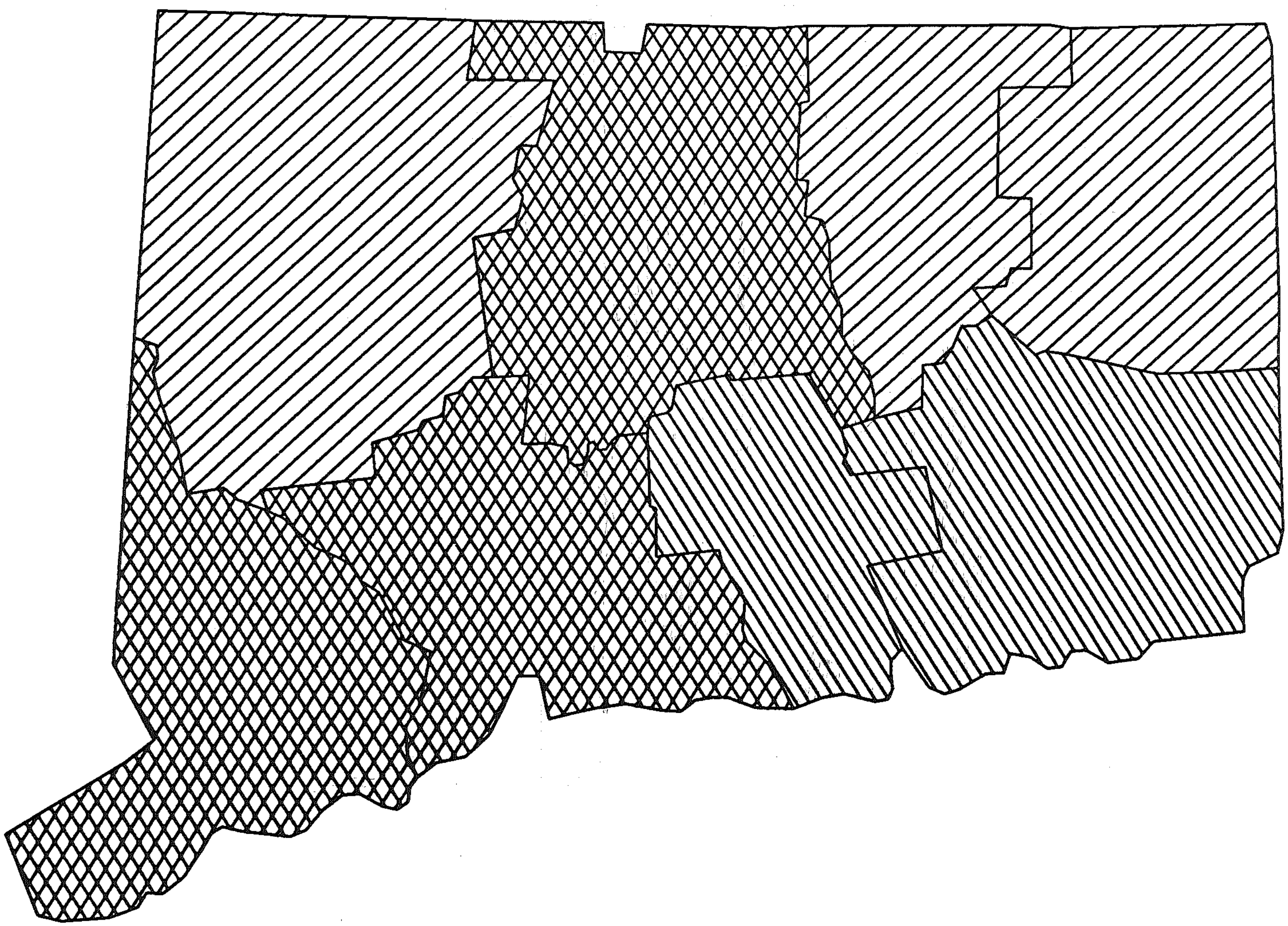


Figure 46

1983 NITROGEN OXIDES

(Expressed as Nitrogen Dioxide)

Total Emissions by County



ACTUAL NO2 (TPY)

LESS THAN 10,000

OVER 30,000

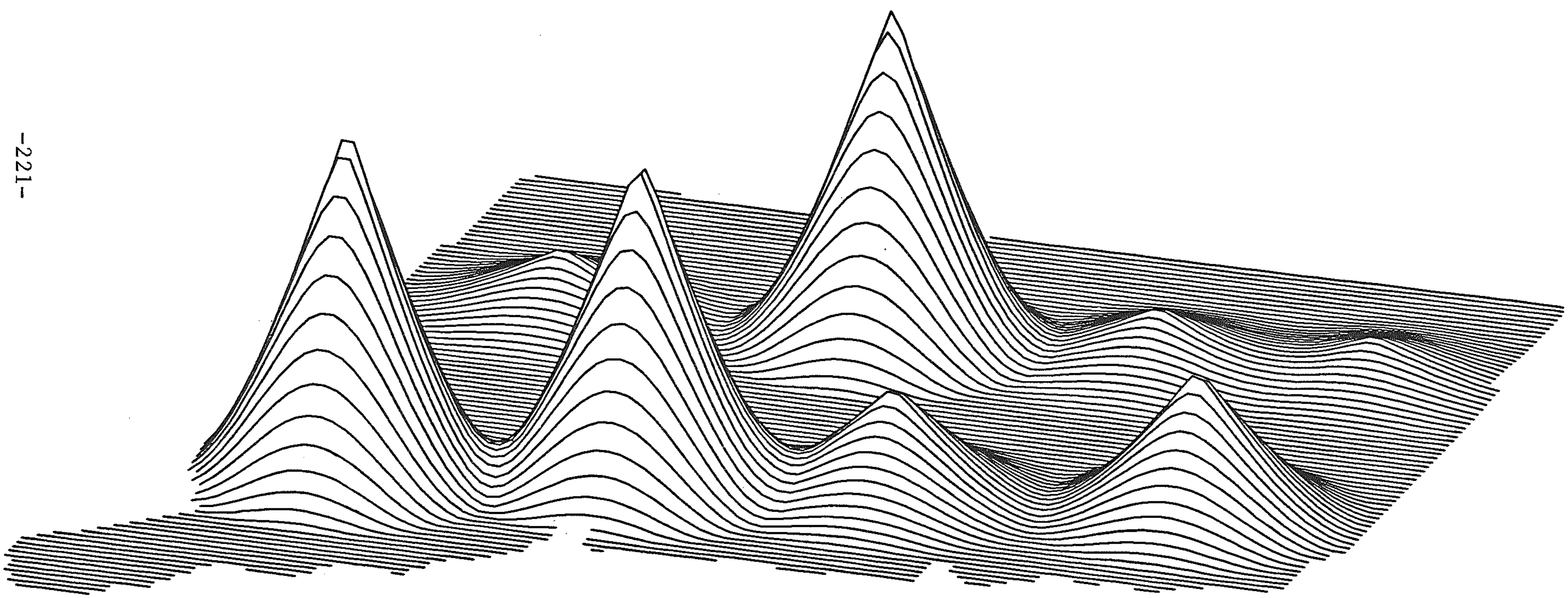
10,001 TO 20,000

Figure 47

1983 NITROGEN OXIDES

(Expressed as Nitrogen Dioxide)

Total Emissions by County



Three Dimensional View of NO2 Emissions

XIII. PUBLICATIONS

The following is a partial listing of technical papers and study reports dealing with various aspects of Connecticut air pollutant levels and air quality data.

1. Bruckman, L., Asbestos: An Evaluation of Its Environmental Impact in Connecticut, internal report issued by the Connecticut Department of Environmental Protection, Hartford, Connecticut, March 12, 1976.

2. Lepow, M. L., L. Bruckman, R.A. Rubino, S. Markowitz, M. Gillette and J. Kapish, *"Role of Airborne Lead in Increased Body Burden of Lead in Hartford Children,"* Environ. Health Perspect., May, 1974, pp. 99–102.

3. Bruckman, L. and R.A. Rubino, *"Rationale Behind a Proposed Asbestos Air Quality Standard,"* paper presented at the 67th Annual Meeting of the Air Pollution Control Association, Denver, Colorado, June 9–11, 1974, J. Air Pollut. Cntr. Assoc., 25: 1207–15 (1975).

4. Rubino, R.A., L. Bruckman and J. Magyar, *"Ozone Transport,"* paper presented at the 68th Annual Meeting of the Air Pollution Control Association, Boston, Massachusetts, June 15–20, 1975, J. Air Pollut. Cntr. Assoc.: 26, 972–5 (1976).

5. Bruckman, L., R.A. Rubino and T. Helfgott, *"Rationale Behind a Proposed Cadmium Air Quality Standard,"* paper presented at the 68th Annual Meeting of the Air Pollution Control Association, Boston, Massachusetts, June 15–20, 1975.

6. Rubino, R.A., L. Bruckman, A. Kramar, W. Keever and P. Sullivan, *"Population Density and Its Relationship to Airborne Pollutant Concentrations and Lung Cancer Incidence in Connecticut,"* paper presented at the 68th Annual Meeting of the Air Pollution Control Association, Boston, Massachusetts, June 15–20, 1975.

7. Lepow, M.L., L. Bruckman, M. Gillette, R.A. Rubino and J.Kapish, *"Investigations into Sources of Lead in the Environment of Urban Children,"* Environ. Res., 10: 415–26 (1975).

8. Bruckman, L., E. Hyne and P. Norton, *"A Low Volume Particulate Ambient Air Sampler,"* paper presented at the APCA Specialty Conference entitled "Measurement Accuracy as it Relates to Regulation Compliance," New Orleans, Louisiana, October 26–28, 1975, APCA publication SP–16, Air Pollution Control Association, Pittsburgh, Pennsylvania, 1976.

9. Bruckman, L. and R.A. Rubino, *"High Volume Sampling Errors Incurred During Passive Sample Exposure Periods,"* J. Air Pollut. Cntr. Assoc., 26: 881–3 (1976).

10. Bruckman, L., R.A. Rubino and B. Christine, *"Asbestos and Mesothelioma Incidence in Connecticut,"* J. Air Pollut. Cntr. Assoc., 27: 121–6 (1977).

11. Bruckman, L., Suspended Particulate Transport in Connecticut: An Investigation Into the Relationship Between TSP Concentrations and Wind Direction in Connecticut, internal report issued by the Connecticut Department of Environmental Protection, Hartford, Connecticut, December 24, 1976.

12. Bruckman, L. and R.A. Rubino, "*Monitored Asbestos Concentrations in Connecticut,*" paper presented at the 70th Annual Meeting of the Air Pollution Control Association, Toronto, Ontario, June 20–24, 1977.

13. Bruckman, L., "*Suspended Particulate Transport,*" paper presented at the 70th Annual Meeting of the Air Pollution Control Association, Toronto, Ontario, June 20–24, 1977.

14. Bruckman, L., "*A Study of Airborne Asbestos Fibers in Connecticut," paper presented at the "Workshop in Asbestos: Definitions and Measurement Methods*" sponsored by the National Bureau of Standards/U.S. Department of Commerce, July 18–20, 1977.

15. Bruckman, L., "*Monitored Asbestos Concentrations Indoors,*" paper presented at The Fourth Joint Conference of Sensing Environmental Pollutants, New Orleans, Louisiana, November 6–11, 1977.

16. Bruckman, L., "*Suspended Particulate Transport: Investigation into the Causes of Elevated TSP Concentrations Prevalent Across Connecticut During Periods of SW Wind Flow,*" paper presented at the Joint Conference on Applications of Air Pollution Meteorology, Salt Lake City, Utah, November 28 – December 2, 1977.

17. Bruckman, L., E. Hyne, W. Keever, "*A Comparison of Low Volume and High Volume Particulate Sampling,*" internal report issued by the Connecticut Department of Environmental Protection, Hartford, Connecticut, 1976.

18. "*Data Validation and Monitoring Site Review,*" (part of the Air Quality Maintenance Planning Process), internal report issued by the Connecticut Department of Environmental Protection, Hartford, Connecticut, June 15, 1976.

19. "*Air Quality Data Analysis,*" (part of the Air Quality Maintenance Planning Process), internal report issued by the Connecticut Department of Environmental Protection, Hartford, Connecticut, August 16, 1976.

20. Bruckman, L., "*Investigation into the Causes of Elevated SO_2 Concentrations Prevalent Across Connecticut During Periods of SW Wind Flow,*" paper presented at the 71st Annual Meeting of the Air Pollution Control Association, Paper #78–16.4, Houston, Texas, June 25–29, 1978.

21. Anderson, M.K., "*Power Plant Impact on Ambient Air: Coal vs. Oil Combustion,*" paper presented at the 68th Annual Meeting of the Air Pollution Control Association, Paper #75–33.5, Boston, MA, June 15–20, 1975.

22. Anderson, M.K., G. D. Wight, "*New Source Review: An Ambient Assessment Technique,*" paper presented at the 71st Annual Meeting of the Air Pollution Control Association, Paper #78–2.4, Houston, TX, June 25–29, 1978.

23. Wolff, G.T., P.J. Lioy, G.D. Wight, R.E. Pasceri, "*Aerial Investigation of the Ozone Plume Phenomenon,*" J. Air Pollut.8 Control Association, 27: 460–3 (1977).

24. Wolff, G.T., P.J. Lioy, R.E. Meyers, R.T. Cederalll, G.D. Wight, R.E. Pasceri, R.S. Taylor, "*Anatomy of Two Ozone Transport Episodes in the Washington, D.C., to Boston, Mass., Corridor,*" Environ. Sci. Technol., 11–506–10 (1977).

25. Wolff, G.T., P.J. Lioy, G.D. Wight, R.E. Meyers, and R.T Cederwall, *"Transport of Ozone Associated With an Air Mass,"* In: Proceed. 70 Annual Meeting APCA, Paper 377–20.3, Toronto, Canada, June, 1977.

26. Wight, G.D., G.T. Wolff, P.J. Lioy, R.E. Meyers, and R.T.Cederwall, *"Formation and Transport of Ozone in the Northeast Quadrant of the U.S.,"* In: Proceed. ASTM Sym. Air Quality and Atmos. Ozone, Boulder, Colo., Aug. 1977.

27. Wolff, G.T., P.J. Lioy, and G.D. Wight, *"An Overview of the Current Ozone Problem in the Northeastern and Midwestern U.S.,"* In: Proceed. Mid–Atlantic States APCA Conf. on Hydrocarbon Control Feasibility, p. 98, New York, N.Y., April, 1977.

28. Wolff, G.T., P.J. Lioy, G.D. Wight, R.E. Meyers, and R.T.Cederwall, *"An Investigation of Long-Range Transport of Ozone Across the Midwestern and Eastern U.S.,"* Atmos. Environ. 11:797 (1977).

XIV. ERRATA

During the preparation of this document, a number of errors were discovered and corrected. In order to prevent any confusion in the mind of the reader over conflicting data presented in this and previous editions of this document, the errors and corrections are presented below:

- Regarding 1968 TSP data, all references to site Greenwich 003 should be ignored. This site had insufficient data for a valid annual average concentration.

- Regarding 1969 TSP data, the annual geometric mean concentration for site Naugatuck 001 has been changed from 92.6 to 92.5 ug/m^3.

- Regarding 1971 TSP data, the annual geometric mean concentration for site Norwalk 001 has been changed from 57.0 to 57.1 ug/m^3.

- Regarding 1972 TSP data,

    1. The annual geometric mean concentration for site New Haven 001 has been changed from 54.8 to 54.9 ug/m^3, and

    2. All references to site Enfield 003 should be ignored. This site was not part of the official particulate sampling network.

- Regarding 1968–1972 TSP data, all references to the following monitoring sites should be ignored: Bridgeport A 001, Hartford A 001, New Haven A 001, and Waterbury A 001. Questions about the handling of the sample filters are serious enough to invalidate all data from these sites.

- Regarding 1977 TSP data, the annual geometric mean concentration for site Ansonia 003 has been changed from 63.1 to 57.3 ug/m^3.

- Regarding 1978 TSP data, the annual geometric mean concentration for site Norwalk 005 has been changed from 57.0 to 59.0 ug/m^3.

- Regarding 1979 TSP data, the following corrections have been made:

    1. For site Ansonia 003, the number of samples for the year has been changed from 115 to 116 and the standard geometric deviation of the data is 1.525.

    2. For site Burlington 001, the number of samples for the year has been changed from 116 to 117; the annual geometric mean concentration has been changed from 24.4 to 24.2 ug/m^3; and the standard geometric deviation of the data is now 1.746.

- Tables and figures in pre–1983 editions of this document that include data from the foregoing sites should be appropriately footnoted. In addition, where it is appropriate, versions of such tables or figures should be ignored in favor of their counterparts in the 1983 Air Quality Summary.

- Regarding the 1982 Air Quality Summary:

1. In Section I.A.5 on page 3, the third sentence should read: "The standard was exceeded twice at Hartford 012, three times at New Britain 002, and twice at Stamford 020."

2. In Table 1, for carbon monoxide, the number of times the standard was exceeded should read "2/–" for Hartford 012 and "2/–" for Stamford 020. Also, for total suspended particulates, the number of times the secondary 24–hour standard was exceeded should read "–" for Wallingford 001.

3. In Section I.B. on page 6, a portion of the third sentence in the third paragraph should be rewritten to read: "...the statewide average and standard deviation of the mean pollutant concentrations at the sites..."

4. In Section I.B.1 on page 7, all references to low–volume samplers should be deleted from the third paragraph.

5. In Table 2:

   a. For the 1968–1969 period: the number of sites is 16; the averages of the annual geometric means are 74.9 and 67.8, respectively; the standard deviations are 21.7 and 18.7, respectively; and the actual significance of change is 0.00671.

   b. For the 1975–1976 period: the average of the annual geometric means for both years is 53.3; the standard deviation for 1976 is 9.5; and the actual significance of change is 0.93101.

   c. For the 1976–1977 period: the average of the annual geometric means for 1977 is 53.6; the standard deviation for 1977 is 9.1; and the actual significance of change is 0.85049.

   d. For the 1977–1978 period: the averages of the annual geometric means are 54.6 and 52.8, respectively; the standard deviation for 1977 is 9.8; and the actual significance of change is 0.03330.

   e. For the 1978–1979 period: the average of the annual geometric means for 1978 is 51.5; the trend at the 95% level is significantly down; and the actual significance of change is 0.04065.

6. In Figure 1, a number of changes were made and a number of errors were discovered in the data for the years 1968 and 1975–1982. The correct data for this figure are reflected in Figure 1 in the 1983 Air Quality Summary.

7. In Table 3A:

   a. For the 1978–1979 period: the number of sites is 9; the averages of the yearly means are 9.10 and 8.14, respectively; the standard deviations are 2.34 and 2.04, respectively; and the actual significance of change is 0.10.

   b. For the 1979–1980 period: the number of sites is 10; the averages of the yearly means are 8.30 and 7.56, respectively; the standard deviations are 1.74 and 1.99, respectively; the trend at the 95% level is significantly downward; and the actual significance of change is 0.022.

c. For the 1980–1981 period: the number of sites is 8; the averages of the yearly means are 8.04 and 7.97, respectively; the standard deviations are 1.58 and 1.67, respectively; and the actual significance of change is 0.30.

d. For the 1981–1982 period: the number of sites is 8; the averages of the yearly means are 7.97 and 8.01, respectively; the standard deviations are 1.67 and 1.70, respectively; and the actual significance of change is 0.27.

8. In Section I.C on page 19, the first sentence in the second paragraph should include nitrogen dioxide as one of the measured pollutants, and the fourth paragraph should show that there were 41 particulate hi–vol sites and 6 nitrogen dioxide sites in 1982.

9. In Section I.E on page 20, the references to carbon monoxide in the first paragraph and to CO in the second paragraph should be deleted.

10. In Section I.F.2. on page 24, the reference to lead in paragraph a. should be deleted from the heading. Paragraph b. should be changed to c. Also, a new paragraph I.F.2.b. should be inserted – – it can be found in the 1983 Air Quality Summary as paragraph I.E.2.b.

11. In Table 9, the sections on sites Torrington 123 and Waterbury 123 should be either deleted or footnoted to indicate that these two sites are no longer considered to be valid TSP hi–vol sites.

12. In Table 10, the pH reading for Putnam 002 in December is given as 0.09. This should be considered spurious.

13. In Table 12, the 1982 annual arithmetic averages for several of the sites have been amended as follows: Bridgeport 001 is 31; Danbury 123 is 20; Greenwich 017 is 21; Hartford 123 is 36; Milford 002 is 37; New Haven 123 is 32; Stamford 123 is 31; and Waterbury 123 is 21.

14. In Table 13, the standard deviation for the site New Haven 123 is 24.665.

15. In Table 19, the number of hours the standard was exceeded in 1982 should be 24 for Danbury 123 and 62 for Groton 005.

16. In Table 22, all the data are erroneous. The correct data can be found in Table 22 in the 1983 Air Quality Summary.

17. In Table 23, "1–HOUR" should replace "24–HOUR" in the heading.

18. In Section VIII on page 177, the last sentence in the second paragraph should be deleted.

19. In Table 28:

a. In the section titled "Precipitation In Inches Water Equivalent," the subheading "Mean" should have the superscript "a";

b. In the section titled "Number of Days with More Than .01 Inches of Precipitation," the subheading "Mean" should have the superscript "c";

c. In the section titled "Average Wind Speed (MPH)," the subheading 'Mean" should have the superscript "c";

d. The footnote "b" should read "1960-1982"; and

e. The footnote "c" should read "1955-1982."

20. In Table 29, the footnote "f" should read "1960-1982."

21. In Table 32:

a. The operating schedule for TSP site Norwalk 001 should be "6-day";

b. The operating schedule for TSP site Norwalk 005 should be "3-day";

c. The spatial scale and representativeness for the sulfur dioxide site Milford 002 should be "middle"; and

d. The monitoring objectives for a number of sites should be changed as indicated below:

Pollutant	Town/Site	Objective
NO_2	Bridgeport 123	High Conc.
	East Hartford 003	High Conc.
	New Haven 123	High Conc.
Ozone	New Haven 123	Population
	Stratford 007	High Conc.
TSP	Bridgeport 009	Population
	Danbury 002	High Conc.
	Danbury 123	Population
	New Britain 007	High Conc.
	New Britain 008	Population
	Stratford 007	High Conc.
	Waterbury 005	Population
	Waterbury 007	High Conc.
SO_2	Bridgeport 123	High Conc.
	Milford 002	Source
	New Haven 123	High Conc.

- Regarding previous Air Quality Summaries:

1. In Section I.B. of the 1978-1981 editions, a portion of the third sentence in the third paragraph should be rewritten to read: "...the statewide average and standard deviation of the mean pollutant concentrations at the sites..."

2. Figure 1 and all references thereto should be ignored in favor of their counterparts in the 1983 edition.

3. Table 2 in the 1978–1981 editions should be ignored in favor of relevant portions of Table 3 in the 1983 edition.

4. Paragraph I.F.2.b in the 1983 edition should be inserted into the appropriate areas of Section I.F in the 1978–1981 editions.

5. Table 7 in the 1981 edition is incomplete. The site Stamford 021 should be inserted with a first high of 85 on July 9 and a second high of 83 on March 29.

6. Table 22 in the 1981 edition contains erroneous data. The correct data can be found in Table 22 in the 1983 edition.

7. In the 1978–1981 editions, the last sentence in the second paragraph should be deleted.

8. In the 1981 edition, the same corrections should be made to Table 32 that were listed in Item 21 of the foregoing section regarding the 1982 Air Quality Summary.

Items originally listed in the 1982 Air Quality Summary

- Regarding the 1975 TSP data, all references to the following monitoring sites should be ignored: Enfield 123, Enfield 001/123, Danbury 001, Danbury 123, Danbury 001/123, Groton 001, Groton 123, Groton 001/123, Torrington 001, Torrington 123, Torrington 001/123. These sites either had insufficient data for a valid annual average concentration or they included data from two different sites.

- Regarding 1976 TSP data, all references to the following monitoring sites should be ignored: Stamford 003, Stamford 123, Stamford 003/123. These sites either had insufficient data for a valid annual average concentration or they included data from two different sites.

- Regarding 1980 TSP data, the following corrections have been made:

  1. **Bridgeport 001**: The number of samples for the year has been changed from 57 to 58, and the annual geometric mean concentration has been changed from 47.8 to 47.6 ug/m^3 .

  2. **Bridgeport 123**: the annual geometric mean concentration has been changed from 64.2 to 63.8 ug/m^3.

  3. **Greenwich 016**: All references to this site should be ignored. This site is considered to have been unsuitably located for acceptable particulate monitoring.

  4. **Morris 001**: The standard deviation of the sampling data has been changed from 1.567 to 1.557.

- Regarding 1981 TSP data, the following corrections have been made:

  1. **Bristol 001**: The number of samples for the year has been changed from 55 to 58, and the annual geometric mean concentration has been changed from 34.1 to 34.6 ug/m^3.

- Regarding TSP data for the years 1975 through 1981, all references to sites Torrington 123 and Waterbury 123 should be ignored. These sites are now considered to have been unsuitably located for acceptable particulate monitoring.

- The above corrections, where relevant, are implicit in Table 2 and Table 8 of the 1982 Air Quality Summary. Accordingly, versions of these tables found in post–1974 (and pre–1982) editions of this document contain erroneous information and should be ignored or appropriately footnoted.

- Regarding Table 2, some of the earlier editions of this document have contained versions of this table which appeared to present annual "arithmetic" mean data. This is incorrect. All versions of this table contain annual "geometric" mean data.