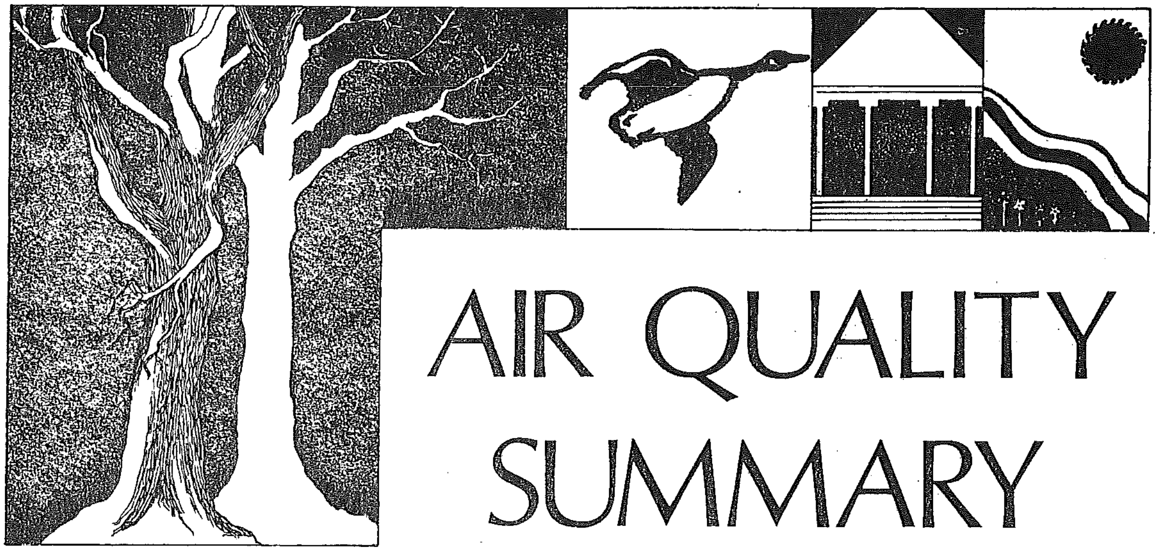
CONNECTICUT



AIR QUALITY SUMMARY

1975

Connecticut

Department of Environmental Protection

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Dear Friend:

The Department of Environmental Protection Connecticut Air Quality Summary for 1975 is the third annual compilation of data on air pollutant levels in Connecticut. This summary is a compilation of technical facts and figures and will be of use to any citizen or group interested in Connecticut's air pollutant levels and the trends of those levels from one year to the next.

Two actions taken by the Department during 1975 may be of interest to Connecticut readers of the summary. First, the Department proposed to make its secondary ambient air quality standards for sulfur dioxide consistent with those of the U. S. Environmental Protection Agency, which in 1973 repealed the secondary sulfur dioxide standards for the annual and twenty-four hour time periods. Second, the Department released in 1975 two reports evaluating the effect on ambient air quality of the burning of higher sulfur fuel by utility companies and businesses respectively.

The progress that has been made in cleaning Connecticut's air has been the result of cooperative efforts of state and municipal agencies, the industrial community and private citizens. I appreciate the part that each individual and group has played in our air pollution control efforts.

The summary indicates that the air pollutants which continue to be of most concern in Connecticut are automotive related: ozone and carbon monoxide. I urge each of you to continue to participate with us in ongoing efforts to attain and maintain clean, healthful air.

Sincerely yours,

Joseph N Gill

Joseph N. Gill
Commissioner

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I. INTRODUCTION

This summary of 1975 ambient air quality levels in Connecticut is a compilation of all air pollutant measurements made at permanent Department of Environmental Protection (DEP) and municipal monitoring sites in the state.

A. TOTAL SUSPENDED PARTICULATE MATTER AND SULFUR DIOXIDE TRENDS

Figures 1 and 2 show the long term trends of Set I pollutant (particulate matter and sulfur dioxide) concentrations in Connecticut. The annual means for all monitoring sites have been grouped into concentration ranges and show a downward trend from 1971 to 1974 for both pollutants.

However, with the 1975 data included a leveling off of this trend is apparent. Changes in meteorological conditions may now be the biggest factor in year to year variations.

There are only a few remaining areas where high levels were recorded in 1975 and efforts will begin to concentrate on identifying and eliminating the causes of these levels.

Figure 1

TOTAL SUSPENDED PARTICULATE MATTER TREND

Percent of all sites in each concentration range

(1) Primary Annual Standard 75 $\mu g/m^3$
(2) Secondary Annual Standard 60 $\mu g/m^3$

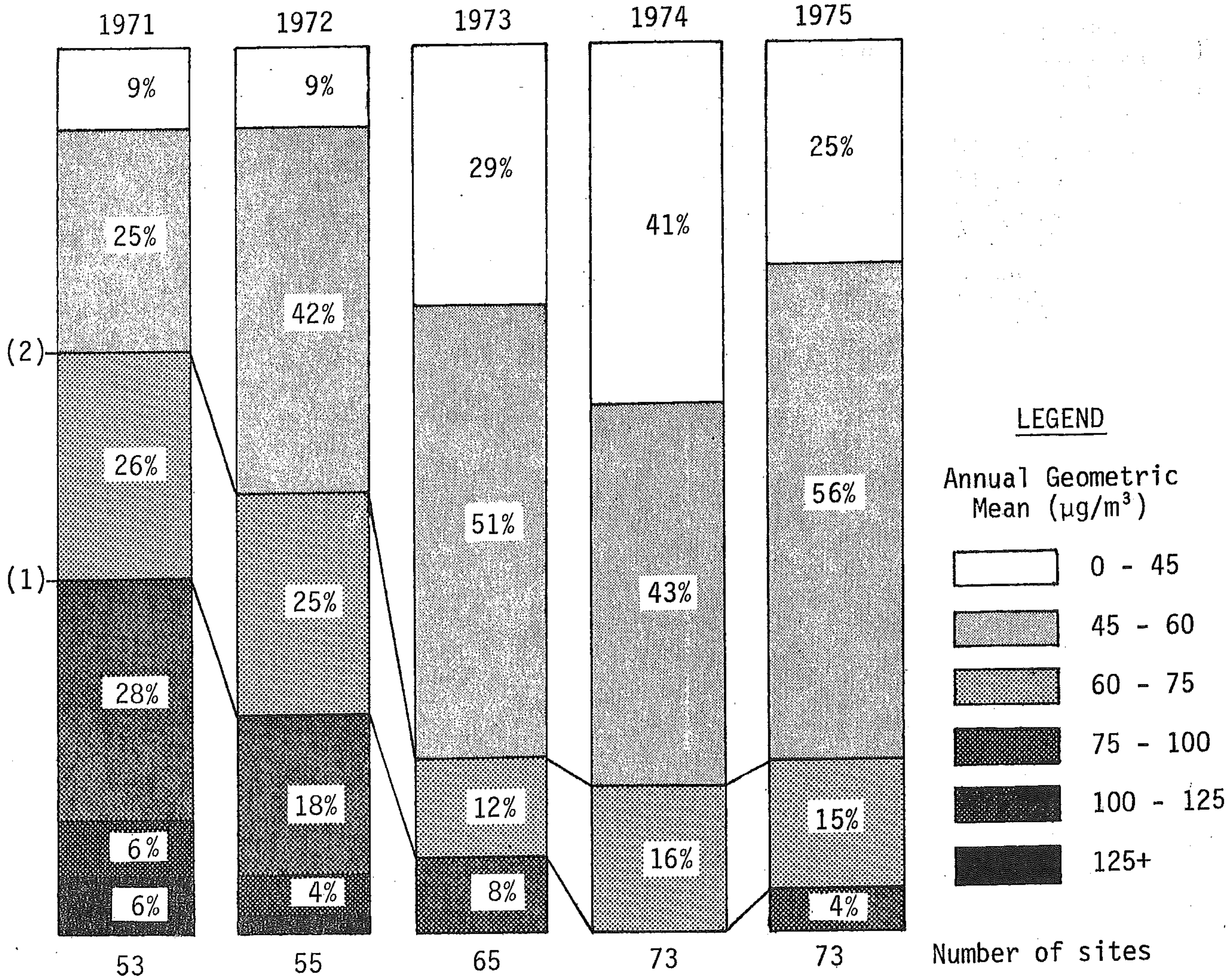
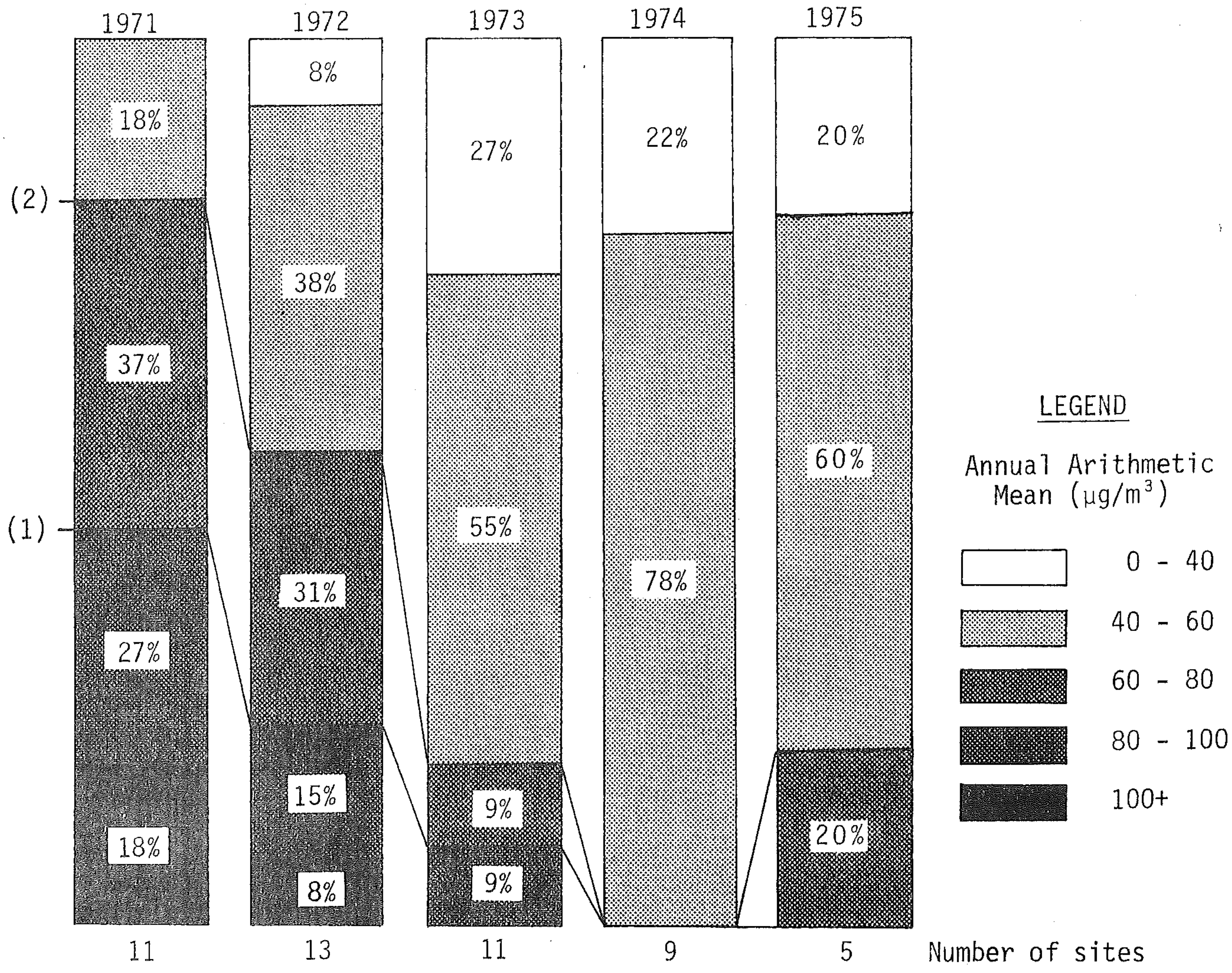


Figure 2

SULFUR DIOXIDE TREND

Percent of all sites in each concentration range

(1) Primary Annual Standard 80 $\mu g/m^3$
(2) Secondary Annual Standard 60 $\mu g/m^3$



B. AIR MONITORING NETWORK

A computerized Air Monitoring network consisting of an IBM System 7 computer and 12 telemetered monitoring sites was put into full operation in 1975. Presently, up to 12 measurement parameters from each site are transmitted via telephone lines to the System 7 unit located in the DEP Hartford office. The data is then compiled into 24-hour summaries twice daily. The telemetered sites are located in the towns of Bridgeport, Danbury, Derby, Enfield, Greenwich, Groton, Hartford, New Britain, New Haven, Stamford, Torrington and Waterbury.

Measured parameters include the pollutants sulfur dioxide, particulates (COHS), carbon monoxide, ozone, and meteorological data consisting of wind speed and wind direction, wind horizontal sigma, temperature, dew point, precipitation, barometric pressure, and solar radiation.

The real-time capabilities of the System 7 telemetry network have enabled the Air Monitoring Unit to report the Air Quality Index for 12 towns on a daily basis while keeping a close watch for high pollution levels which may occur during adverse weather conditions throughout the year.

The complete monitoring network used in 1975 consisted of:

73 Total Suspended Particulate sites
20 Sulfur Dioxide sites
14 Ozone sites
41 Nitrogen Dioxide sites
15 Carbon Monoxide sites

A complete description of all permanent air monitoring sites in Connecticut operated by DEP in 1975 is available from the Department of Environmental Protection, Air Compliance, State Office Building, Hartford, Connecticut 06115.

C. POLLUTANT STANDARDS

Table I lists analysis methods and National Ambient Air Quality Standards (NAAQS) for each pollutant. The NAAQS were established by the U.S. Environmental Protection Agency (EPA) and are divided into two categories: primary, established to protect the public health; and secondary, established to protect plants and animals and to prevent economic damage.

Each standard specifies a concentration and an exposure time developed from studies of the effect of various levels of the different pollutants.

Table 1

ASSESSMENT OF AMBIENT AIR QUALITY

	METHOD OF ANALYSIS		NATIONAL AMBIENT AIR STANDARDS				
POLLUTANT	SAMPLING PERIOD	DATA REDUCTION	STATISTICAL BASE	PRIMARY STANDARD		SECONDARY STANDARD	
				$\mu g/m^3$	ppm	$\mu g/m^3$	ppm
Total Suspended Particulates	24-Hours Every sixth day	24 Hour Average	Annual Geometric Mean	75		60*	
			24-Hour Concentration[2]	260		150	
Sulfur Oxides (Measured as Sulfur Dioxide)	Continuous[1]	1-Hour Average	Annual Arithmetic Mean	80	.03	60†	
			24-Hour Average Concentration[2]	365	.14	260†	
			3-Hour Average Concentration[2]			1300	.5
Nitrogen Dioxide	24-Hours Every sixth day	24-Hour Average	Annual Arithmetic Mean	100	.05	Same as Primary	
Photochemical Oxidants (Ozone)	Continuous[1]	1-Hour Average	1-Hour Average[2]	160	.08	Same as Primary	
Hydrocarbons	Continuous[1]	1-Hour Average	3-Hour Average[2] (6-9 A.M.)	160**	.24	Same as Primary	
				mg/m^3	ppm	mg/m^3	ppm
Carbon Monoxide	Continuous[1]	1-Hour Average	8-Hour Average[2]	10	9	Same as Primary	
			1-Hour Average[2]	40	35	Same as Primary	

[1] EPA assessment criteria requires 75% of possible data to compute valid averages.

[2] Not to be exceeded more than once per year.

*A Guide to be used in assessing implementation plans to achieve the 24-hour standard.

**For use as a guide in devising implementation plans to achieve oxidant standards.

†Secondary Standard applies to State of Connecticut only.

Units: $\mu g/m^3$ = Micrograms per cubic meter
mg/m^3 = Milligrams per cubic meter
ppm = parts per million

D. CONNECTICUT'S AIR QUALITY INDEX

In cooperation with the Connecticut Lung Association and the National Weather Service office at Bradley International Airport, the Air Monitoring Unit of DEP has been disseminating an Air Quality Index every weekday since January 1, 1975.

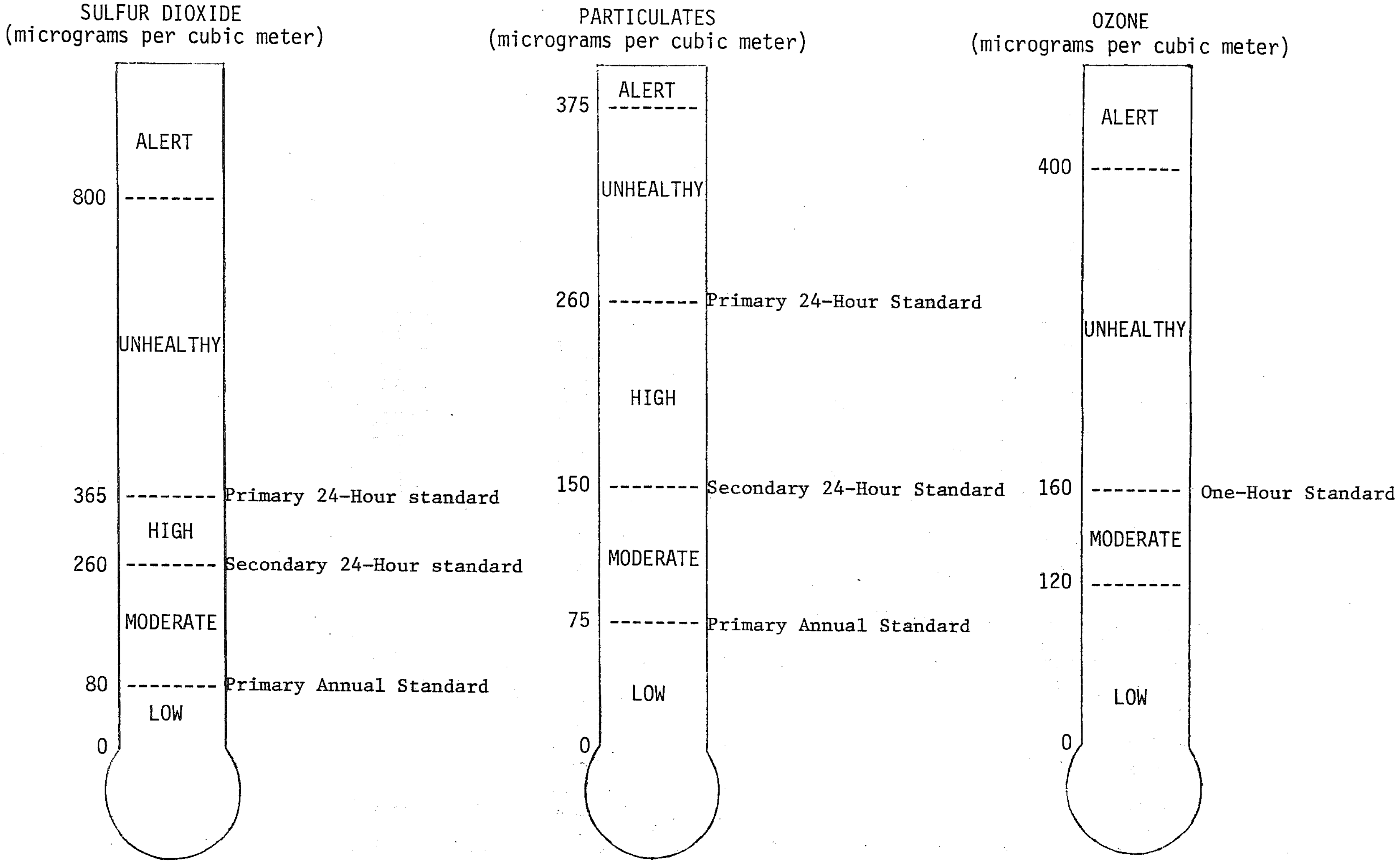
The index reports current and forecasted air pollutant levels in each of Connecticut's larger cities. In colder months (October 15 to April 15) sulfur dioxide and total suspended particulate matter (converted from soiling index) levels are reported. In warmer weather, ozone levels and particulate matter are emphasized.

The information is available to the public each weekday afternoon from the Connecticut Lung Association in East Hartford, and is transmitted to the news media by the National Weather Service with the afternoon forecast over news service wires.

As shown in Figure 3 the index reports the general range of current and expected pollutant levels of each of the Air Monitoring Unit's telemetered monitoring sites by use of terms keyed to health standards or alert levels.

Figure 3

AIR QUALITY INDEX



E. QUALITY ASSURANCE

The integrity of any ambient air quality monitoring network, as it relates to the generation of reliable data, is heavily dependent upon a vigorous and comprehensive Quality Assurance Program. This program encompasses a multitude of activities such as:

- Personnel Training
- Site selection, evaluation and review
- Equipment evaluation, selection and modification when applicable
- Purchasing and inventory control of consumable supplies
- Instrument preventive maintenance, operation and calibration
- Calibration and traceability of working standards
- Sample collection and analysis
- Data recording, documentation, reduction, validation and reporting
- Interagency cross-checks
- Interlaboratory and instrument audits

The development of the above activities is an ongoing process in which detailed procedures are issued, constantly reviewed, updated, and improved.

Perhaps the most important elements in the Quality Assurance Program are the instrument cross-checks, interlaboratory analysis comparisons, and instrument audits performed by EPA. These comparisons yield a good indication of the validity of the data. The following results of instrument and lab audits were compiled in 1975:

Particulates:

-Sample Weights

A total of 16 samples were audited by EPA. EPA has established a ±.007 grams (g) control limit, which is equivalent to a weighing error of approximately 0.2%. Three (3) samples were above this value (+0.009, +0.011, and +0.010g). The average difference was +.0056g in relation to EPA's values. It was noticed, however, that Connecticut's weights were always biased in the positive direction. A re-weighing of 4 of the aforementioned samples at Connecticut's Health Lab indicated a negative bias, with an average difference of -0.0025g. It therefore appears that some material is lost during the transportation of the filters since the last group to weigh the filters usually reports the lowest weights.

-Flow Rates

The second parameter required to calculate particulate concentrations is the air sampling flow rate. Connecticut participated in five audits, each of which contained 5 flow rate calibration values for a total of 25 values. There were 4 flow rates which were outside the acceptable range defined by EPA, all of which were on the high side with an average of +13.6%. However, these flow rates were below the normal operating range of the hi-vols. All audited values in the area of instrument operation (i.e., between 40 to 60 cfm) were acceptable.

Sulfur Dioxide Bubblers:

Fourteen EPA reagent samples were analyzed at our State Health Laboratory. Three of these samples were found to be outside EPA's acceptable limits. Although the above audits of the SO_2 bubbler reagents were over all satisfactory, problems exist with the method of sampling. Therefore, no SO_2 bubbler data has been reported (see Special Studies, SO_2 Bubbler, page 73).

Ozone:

A total of 24 audits were performed by Region I EPA. An average difference of +0.88% was obtained with the largest average deviation being +11%. On two different occasions calibration cross-checks were performed among New York, New Jersey and Connecticut thru the Interstate Sanitation Commission in New York City.

Nitrogen Dioxide Bubblers:

Fifteen EPA reagent samples were analyzed at the Connecticut State Health Laboratory as part of the interlaboratory audit program; all were within EPA's acceptable limits.

Carbon Monoxide:

Eight (8) state monitors were audited per EPA procedures (sampling 3 tanks of CO in nitrogen, where the CO concentrations of each tank varied and were unknown to the state). Instrument sampling results showed that 7 of the 8 monitors were acceptable in the high range (about 39 ppm), 5 of 8 were acceptable in the mid-range (about 18 ppm) and 4 of 8 were acceptable in the low range (about 7 ppm). Of the monitors audited, 4 were acceptable in all ranges; one instrument (found unacceptable in all ranges), did not have a humidifier modification (already installed in the other monitors) for proper conditioning of the sample air at the time of the audit; and a second instrument (declared unacceptable in the low and mid-ranges), was later found to have an incorrect zero setting at the time of the audit due to a contaminated tank of zero calibration gas. Therefore, it may be concluded that only 2 instruments of the 8 audited failed to give accurate measurements without a reasonable explanation of instrument malfunction.

II. TOTAL SUSPENDED PARTICULATES

Conclusions:

In general, measured total suspended particulate (TSP) levels in Connecticut showed a slight degradation of air quality in 1975 as compared to 1974 (see Figure 1).

Referring to Table III, in 1975 15 sites showed lower annual geometric means than in 1974, with 4 of these decreases being greater than 5 $\mu g/m^3$. The geometric means at 46 sites showed increases in 1975 over 1974, 19 of which increased more than 5 $\mu g/m^3$. When determining compliance with either the primary or secondary annual NAAQS for TSP the federal EPA recommends that only sites with at least 5 observations in each quarter of the year be evaluated. Using this criteria the primary annual standard was exceeded in New Britain at site 02 while the secondary annual standard was exceeded at 7 sites in 1975, 5 less than in 1974.

Table IV presents the second high 24-hour concentrations recorded at each site. There was no violation of the primary 24-hour standard recorded in 1975. Measured values exceeding the secondary 24-hour standard were recorded at 14 sites in 1975, the same number as in 1974.

Discussion of Data:

Table III is the product of a computer program listing all monitoring sites used by the DEP in chronological order. The data for each site includes the number of samples taken (generally, a maximum of 61 samples per year), the geometric mean, 95% confidence limits about the mean, the standard geometric deviation and a statistical prediction of the number of days in each year the 24-hour primary and secondary NAAQS would have been exceeded if sampling had been conducted every day. This analysis, as were the national ambient standards, is based on the assumption that the particulate data are lognormally distributed.

Because manpower and economic limitations dictate that sampling of particulate matter occurs once every sixth day instead of every day, a degree of uncertainty as to whether the air quality at a site has either met or exceeded the national standards is introduced. This uncertainty can be quantified by determining 95% confidence limits about each of the annual geometric means. For example (see Table III), in Ansonia at site 03 in 1975, 58 samples were taken and a geometric mean of 55.7 $\mu g/m^3$ was calculated. However, the columns labeled "95-PCT-LIMITS" show the lower and upper limits for a 95% confidence interval of 50 and 62 $\mu g/m^3$, respectively. This means that if any other set of 58 samples were taken in 1975 at this site there is a 95% chance the geometric means would fall between these limits. Since the national secondary standard for particulates is within this interval, one cannot be 95% confident that the secondary standard was met in 1975.

In Table II all 1975 monitoring sites are examined for compliance with the standard using the statistical confidence limit criteria. The table shows that New Britain 02 exceeded the primary annual standard with 95% confidence and Waterbury 123 exceeded the primary standard with about 93% confidence. It is uncertain whether the standard was either achieved or exceeded at 5 other sites. The table also shows that the secondary standard was exceeded with 95% confidence at 5 sites. Whether the secondary standard was exceeded is uncertain at 26 other sites. Comparing this to the results using the actual measured levels in the conclusions above, the 95% confidence method includes 1 more site exceeding the primary standard and 2 less sites exceeding the secondary standard. (See appendix for further discussion of 95% confidence bands.)

Table IV presents the second high 24-hour concentrations recorded at each site. Although no violations of the primary 24-hour standard were measured, the statistical projections from Table III indicate that 8 sites would have violated the standard had samples been collected every day. Violations of the secondary 24-hour standard were measured at 14 sites in 1975 but again, if samples were collected every day, statistical projections indicate that 38 additional sites would have recorded violations of the secondary standard.

Facts about Total Suspended Particulates:

The major sources of particulate matter emissions affecting ambient TSP levels in Connecticut are power generation and heating fuel combustion, solid waste disposal, motor vehicles, a variety of industrial processes, fugitive dust, and the transport of particulate matter into Connecticut as a result of activities in adjacent states.

Particulate matter reduces insolation(solar radiation reaching the land surface), reduces visibility, soils clothing, and accelerates the corrosion of building materials and paints. In addition, a large portion of the particulate matter of the size collected on High Volume Air Samplers is known to enter and be retained in the human respiratory system. It is important to determine the chemical composition, as well as the concentration of the suspended particulate matter, in order to properly assess the potential adverse health effect of various levels of TSP. For example, some particulate substances such as lead are intrinsically toxic, others may cause or contribute to respiratory ailments, such as aerosol sulfates, while still others are known carcinogens (cancer-causing), such as asbestos. Therefore if two locations have the same TSP level, the one with the greater proportion of toxic substances, such as asbestos, will be more harmful. Connecticut has been chemically analyzing its suspended particulate matter (quarterly composites) for heavy metals, benzene solubles, and water solubles since 1969. This data is available upon request.

Sample Collection and Analysis:

Total suspended particulate levels are obtained from High Volume Samplers. These "Hi-Vols" resemble vacuum cleaners in their operation, with an 8" x 10" piece of fiberglass filter paper replacing the vacuum bag. The samplers operate every sixth day from midnight to midnight.

The matter collected on the filters is analyzed for weight and chemical composition. The flow through the filter is measured before and after sampling and the volume of air which has passed through the filter in 24 hours is calculated. The weight in micrograms (μg) 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 as follows. A standardized strip of each of the Hi-Vol filters collected in each quarter year is cut-out and composited into one sample. This procedure is repeated three times so that for each site, three quarterly composited samples are made. One sample is digested in benzene and the residue is weighed. The weight of this residue represents the organic material in the sample and the result is reported as the benzene soluble fraction of the TSP in $\mu g/m^3$. Another sample is dissolved in water, re-fluxed and the resulting solution is analyzed to determine the water soluble fraction of the TSP using wet chemistry techniques. Results are reported for each individual constituent of the water soluble fraction in $\mu g/m^3$. The last composited sample is digested in acid and the resulting solution is analyzed for the different metals in the TSP using an atomic absorption spectrophotometer. Results are reported for each individual metal in $\mu g/m^3$.

Table II

CONFIDENCE OF TSP ANNUAL GEOMETRIC MEANS

PRIMARY STANDARD				SECONDARY STANDARD			
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	
New Britain	02	Greenwich	01	Hartford	03	Ansonia	03
Waterbury	123[a]	New Britain	03	New Britain	02	Bridgeport	123
		New Britain	123	New Britain	03	Bristol	04
		New Haven	02	Waterbury	01	Derby	123
		Waterbury	01	Waterbury	123	Greenwich	01
						Greenwich	08
						Greenwich	14
						Meriden	01
						Meriden	03
						Meriden	05
						Meriden	06
						Milford	02
						Naugatuck	01
						New Britain	123
						New Haven	01
						New Haven	02
						New Haven	09
						Norwalk	01
						Norwalk	05
						Old Saybrook	01
						Stamford	01
						Stamford	03
						Stamford	07
						Torrington	123
						Waterbury	02
						Waterbury	03

[a] about 93% confident

TABLE III

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION PAGE 1 AIR COMPLIANCE MONITORING

POLLUTANT--PARTICULATES 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	01	1971	11	142.9	114	179	1.403	168	13
ANSONIA	03	1971	41	105.5	93	120	1.539	77	7
ANSONIA	03	1972	59	83.0	75	91	1.501	24	1
ANSONIA	03	1973	55	58.9	52	67	1.707	16	1
ANSONIA	03	1974	53	56.0	50	63	1.602	7	
ANSONIA	03	1975	58	55.7	50	62	1.539	4	
BERLIN	01	1973	56	38.8	35	43	1.557		
BERLIN	01	1974	56	31.8	28	36	1.722	1	
BERLIN	01	1975	56	36.6	33	41	1.533		
BRIDGEPORT	01	1971	57	56.4	51	62	1.513	3	
BRIDGEPORT	01	1972	66	57.5	53	62	1.448	2	
BRIDGEPORT	01	1973	60	45.5	42	50	1.463		
BRIDGEPORT	01	1974	60	48.9	44	54	1.564	2	
BRIDGEPORT	01	1975	60	51.9	48	56	1.418		
BRIDGEPORT	02	1972	10	91.7	54	157	2.138	100	29
BRIDGEPORT	02	1973	60	57.2	52	63	1.531	4	
BRIDGEPORT	02	1974	61	45.7	41	51	1.659	4	
BRIDGEPORT	02	1975	20	44.9	37	55	1.538	1	
BRIDGEPORT	123	1975	38	65.7	58	75	1.535	10	
BRISTOL	01	1971	54	50.1	44	57	1.636	5	
BRISTOL	01	1972	58	51.7	47	57	1.499	2	
BRISTOL	01	1973	58	52.5	47	59	1.572	4	
BRISTOL	01	1974	59	42.3	38	48	1.638	2	
BRISTOL	01	1975	54	49.0	43	56	1.644	4	
BRISTOL	02	1973	19	28.2	23	35	1.583		
BRISTOL	02	1974	61	29.4	26	33	1.695		

POLLUTANT--PARTICULATES

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
BRISTOL	03	1973	18	40.1	32	50	1.584	1	
BRISTOL	03	1974	59	35.2	31	40	1.653	1	
BRISTOL	04	1973	18	50.3	39	66	1.733	8	
BRISTOL	04	1974	59	48.9	44	55	1.607	3	
BRISTOL	04	1975	43	53.8	46	63	1.705	10	
BURLINGTON	01	1973	25	32.5	26	40	1.729	1	
BURLINGTON	01	1974	56	27.1	23	31	1.800	1	
BURLINGTON	01	1975	46	27.5	24	32	1.680		
DANBURY	01	1972	8	84.1	45	159	2.154	77	24
DANBURY	01	1973	38	58.1	49	70	1.782	20	2
DANBURY	01	1974	51	51.5	46	58	1.588	4	
DANBURY	01/123	1975	57	53.9	49	59	1.479	2	
DERBY	123	1975	18	55.0	45	67	1.522	3	
EAST HARTFORD	01	1974	42	42.8	37	49	1.605	1	
EAST HARTFORD	01	1975	58	49.3	44	56	1.679	7	
EAST HARTFORD	02	1974	37	41.2	36	47	1.560	1	
EAST HARTFORD	02	1975	55	46.6	42	52	1.540	1	
EAST WINDSOR	01	1975	38	51.4	45	59	1.533	2	
ENFIELD	01	1971	45	81.3	70	94	1.678	42	5
ENFIELD	01	1972	38	75.5	62	92	1.912	50	10
ENFIELD	01	1973	50	55.6	49	63	1.627	8	
ENFIELD	01	1974	59	50.5	45	57	1.654	5	
ENFIELD	02	1972	10	49.7	42	58	1.258		
ENFIELD	01/123	1975	54	46.6	41	53	1.655	4	

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION PAGE 3 AIR COMPLIANCE MONITORING

POLLUTANT--PARTICULATES

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
FAIRFIELD	02	1971	50	68.1	58	79	1.790	29	4
FAIRFIELD	02	1972	53	44.0	40	49	1.469		
FAIRFIELD	02	1973	45	43.4	40	47	1.311		
FAIRFIELD	02	1974	39	43.8	40	48	1.361		
FAIRFIELD	02	1975	34	44.9	39	52	1.558	1	
GREENWICH	01	1971	55	56.1	50	62	1.537	4	
GREENWICH	01	1972	61	57.7	51	65	1.693	13	1
GREENWICH	01	1973	56	46.5	42	51	1.491	1	
GREENWICH	01	1974	53	52.3	46	59	1.624	5	
GREENWICH	01	1975	27	62.7	51	78	1.761	24	2
GREENWICH	02	1971	54	60.2	55	66	1.478	4	
GREENWICH	02	1972	61	60.6	54	69	1.700	16	1
GREENWICH	02	1973	57	58.6	52	65	1.570	7	
GREENWICH	02	1974	59	51.3	45	58	1.675	7	
GREENWICH	02	1975	58	52.6	46	60	1.676	8	
GREENWICH	03	1971	54	58.4	53	64	1.455	2	
GREENWICH	03	1972	60	56.4	51	63	1.576	5	
GREENWICH	03	1973	58	51.3	46	57	1.575	3	
GREENWICH	03	1974	59	52.6	47	58	1.555	3	
GREENWICH	03	1975	59	50.1	45	55	1.530	2	
GREENWICH	04	1973	47	42.3	36	49	1.749	4	
GREENWICH	04	1974	58	40.1	35	46	1.733	3	
GREENWICH	04	1975	56	37.4	33	43	1.747	2	
GREENWICH	07	1971	56	45.6	41	51	1.587	2	
GREENWICH	07	1972	60	38.6	33	45	1.850	5	
GREENWICH	07	1973	56	36.1	32	41	1.607		
GREENWICH	07	1974	60	43.8	39	49	1.662	3	
GREENWICH	08	1971	51	75.4	68	83	1.464	13	
GREENWICH	08	1972	57	70.4	63	79	1.575	16	1

POLLUTANT--PARTICULATES

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
GREENWICH	08	1973	59	62.7	56	70	1.620	13	1
GREENWICH	08	1974	61	64.5	58	72	1.608	13	1
GREENWICH	08	1975	59	61.5	56	68	1.512	5	
GREENWICH	14	1974	60	63.0	57	69	1.501	7	
GREENWICH	14	1975	28	58.5	52	66	1.363		
GROTON	01	1971	54	85.7	75	97	1.667	50	5
GROTON	01	1972	56	46.2	40	53	1.716	5	
GROTON	01	1973	79	33.2	30	37	1.731	1	
GROTON	01	1974	61	34.5	31	39	1.674	1	
GROTON	01/123	1975	60	38.7	35	43	1.555		
HADDAM	02	1974	44	32.9	29	38	1.649		
HADDAM	02	1975	59	33.3	30	37	1.523		
HARTFORD	02	1973	11	54.2	45	65	1.329		
HARTFORD	02	1974	51	50.7	46	56	1.512	2	
HARTFORD	02	1975	59	50.7	45	57	1.617	4	
HARTFORD	03	1971	169	86.0	82	90	1.515	35	1
HARTFORD	03	1972	139	74.3	70	79	1.602	24	1
HARTFORD	03	1973	33	80.7	71	92	1.474	20	
HARTFORD	03	1974	55	62.4	56	70	1.599	10	
HARTFORD	03	1975	60	68.5	63	75	1.471	8	
HARTFORD	04	1972	40	47.8	40	57	1.757	8	
HARTFORD	04	1973	49	49.6	43	57	1.635	4	
HARTFORD	04	1974	46	46.1	40	53	1.689	4	
HARTFORD	04	1975	58	47.1	43	52	1.527	1	
HARTFORD	05	1971	18	117.6	89	155	1.761	126	29
HARTFORD	05	1974	45	44.2	39	51	1.615	2	
HARTFORD	05	1975	58	50.2	45	56	1.547	2	

POLLUTANT--PARTICULATES

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
KENT	01	1973	27	38.6	30	49	1.923	7	1
KENT	01	1974	56	31.4	27	37	1.859	2	
KENT	01	1975	38	31.9	27	37	1.628		
MANCHESTER	01	1971	26	80.8	66	99	1.666	42	4
MANCHESTER	01	1972	13	45.3	38	54	1.361		
MANCHESTER	01	1973	25	44.5	36	55	1.683	4	
MANCHESTER	01	1974	37	44.7	39	52	1.592	2	
MANCHESTER	01	1975	56	44.2	39	50	1.659	3	
MANSFIELD	01	1971	36	45.2	39	53	1.595	2	
MANSFIELD	01	1972	27	43.3	33	57	2.073	16	2
MANSFIELD	01	1973	18	23.2	19	28	1.497		
MANSFIELD	01	1974	47	34.3	30	39	1.609		
MANSFIELD	01	1975	60	36.5	33	41	1.628	1	
MERIDEN	01	1971	53	40.4	36	45	1.535		
MERIDEN	01	1972	54	72.5	66	80	1.484	13	
MERIDEN	01	1973	36	58.2	48	71	1.839	20	2
MERIDEN	01	1974	55	50.3	45	57	1.607	4	
MERIDEN	01	1975	35	53.2	42	67	2.013	24	4
MERIDEN	02	1971	58	95.4	86	106	1.540	58	4
MERIDEN	02	1972	61	83.2	74	93	1.625	42	4
MERIDEN	02	1973	56	67.1	59	77	1.739	24	3
MERIDEN	02	1974	59	50.4	45	57	1.655	5	
MERIDEN	02	1975	51	52.0	46	59	1.580	4	
MERIDEN	03	1971	55	79.9	68	94	1.924	58	13
MERIDEN	03	1972	54	59.7	53	68	1.658	13	1
MERIDEN	03	1973	57	54.4	47	64	1.890	20	2
MERIDEN	03	1974	53	50.9	44	59	1.798	13	1
MERIDEN	03	1975	28	54.7	43	69	1.858	20	2
MERIDEN	05	1971	55	157.9	130	192	2.179	197	100

POLLUTANT--PARTICULATES

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
MERIDEN	05	1972	62	100.1	83	120	2.214	113	42
MERIDEN	05	1973	52	59.7	52	69	1.766	20	2
MERIDEN	05	1974	57	63.4	54	74	1.871	29	4
MERIDEN	05	1975	52	58.9	50	69	1.840	24	3
MERIDEN	06	1971	52	78.9	71	88	1.542	24	1
MERIDEN	06	1972	38	68.0	56	82	1.822	35	5
MERIDEN	06	1973	51	49.7	42	59	1.894	16	2
MERIDEN	06	1974	54	56.1	49	65	1.755	16	1
MERIDEN	06	1975	53	59.3	50	70	1.916	29	4
MIDDLETOWN	01	1971	60	37.3	33	42	1.666	1	
MIDDLETOWN	01	1972	61	48.8	43	55	1.635	4	
MIDDLETOWN	01	1973	60	51.4	44	60	1.887	16	2
MIDDLETOWN	01	1974	59	34.6	31	39	1.679	1	
MIDDLETOWN	03	1971	62	69.3	63	77	1.551	13	
MIDDLETOWN	03	1972	61	59.2	53	66	1.625	10	
MIDDLETOWN	03	1973	59	55.7	50	62	1.529	4	
MIDDLETOWN	03	1974	61	51.3	46	57	1.613	5	
MIDDLETOWN	03	1975	55	53.7	48	60	1.521	2	
MIDDLETOWN	04	1973	49	51.7	42	64	2.255	35	8
MILFORD	01	1971	55	55.4	49	62	1.587	5	
MILFORD	01	1972	56	52.2	47	58	1.516	2	
MILFORD	01	1973	49	43.8	39	49	1.476		
MILFORD	01	1974	60	46.7	42	52	1.552	1	
MILFORD	01	1975	58	45.7	41	51	1.537	1	
MILFORD	02	1971	57	67.5	61	74	1.501	8	
MILFORD	02	1972	56	58.2	52	66	1.615	8	
MILFORD	02	1973	54	49.9	46	55	1.440		
MILFORD	02	1974	54	51.2	46	57	1.525	2	
MILFORD	02	1975	59	62.5	57	68	1.459	4	

POLLUTANT--PARTICULATES

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	GEOM MEAN	95-PCT-LIMITS		STD GEOM DEV	PREDICTED DAYS OVER 150 UG/M3	PREDICTED DAYS OVER 260 UG/M3
					LOWER	UPPER			
MILFORD	06	1971	50	43.7	39	49	1.516		
MILFORD	06	1972	58	47.4	42	54	1.693	5	
MILFORD	06	1973	59	41.4	37	46	1.612	1	
MILFORD	06	1974	60	40.9	37	45	1.548		
MILFORD	06	1975	56	41.6	38	46	1.496		
MORRIS	01	1971	50	37.6	32	44	1.761	3	
MORRIS	01	1972	51	34.1	30	39	1.699	1	
MORRIS	01	1973	57	31.4	27	36	1.812	2	
MORRIS	01	1974	60	27.7	24	32	1.746		
MORRIS	01	1975	60	28.8	26	32	1.644		
NAUGATUCK	01	1971	52	86.2	77	97	1.571	42	3
NAUGATUCK	01	1972	61	72.1	64	81	1.673	29	2
NAUGATUCK	01	1973	57	69.4	61	78	1.653	24	2
NAUGATUCK	01	1974	61	61.1	54	69	1.646	13	1
NAUGATUCK	01	1975	60	56.8	51	63	1.603	7	
NEW BRITAIN	01	1971	54	74.2	65	84	1.645	29	2
NEW BRITAIN	01	1972	36	77.6	69	88	1.469	16	
NEW BRITAIN	01	1973	23	59.4	47	76	1.779	20	2
NEW BRITAIN	01	1974	61	52.4	47	59	1.617	5	
NEW BRITAIN	02	1971	56	93.3	83	105	1.605	58	5
NEW BRITAIN	02	1972	63	83.7	74	94	1.664	50	5
NEW BRITAIN	02	1973	56	77.7	69	88	1.660	35	3
NEW BRITAIN	02	1974	58	70.1	63	79	1.600	20	1
NEW BRITAIN	02	1975	58	83.4	76	92	1.484	24	1
NEW BRITAIN	03	1971	58	85.6	74	98	1.787	58	10
NEW BRITAIN	03	1972	61	71.4	63	81	1.736	35	4
NEW BRITAIN	03	1973	57	73.9	64	85	1.751	35	5
NEW BRITAIN	03	1974	60	62.9	56	71	1.676	16	1
NEW BRITAIN	03	1975	60	72.9	66	80	1.487	13	

POLLUTANT--PARTICULATES

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	GEOM MEAN	95-PCT-LIMITS LOWER	UPPER	STD GEOM DEV	PREDICTED DAYS OVER 150 UG/M3	PREDICTED DAYS OVER 260 UG/M3
NEW BRITAIN	04	1971	55	49.1	44	55	1.532	2	
NEW BRITAIN	04	1972	60	53.1	48	59	1.565	4	
NEW BRITAIN	04	1973	59	51.1	45	58	1.726	8	
NEW BRITAIN	04	1974	60	38.0	33	43	1.744	2	
NEW BRITAIN	04	1975	59	44.4	40	49	1.478		
NEW BRITAIN	05	1971	57	48.7	44	54	1.497	1	
NEW BRITAIN	05	1972	61	42.9	37	49	1.816	7	
NEW BRITAIN	05	1973	58	45.5	40	51	1.638	3	
NEW BRITAIN	05	1974	58	38.8	33	45	1.863	5	
NEW BRITAIN	123	1975	13	63.1	50	79	1.475	5	
NEW HAVEN	01	1971	139	69.2	65	73	1.532	13	
NEW HAVEN	01	1972	76	65.1	61	70	1.439	4	
NEW HAVEN	01	1973	48	56.2	51	62	1.404	1	
NEW HAVEN	01	1974	61	57.4	52	64	1.565	7	
NEW HAVEN	01	1975	60	59.0	54	65	1.458	2	
NEW HAVEN	02	1971	88	74.4	68	81	1.610	24	2
NEW HAVEN	02	1972	67	84.1	76	93	1.559	35	2
NEW HAVEN	02	1973	51	62.9	55	72	1.720	20	2
NEW HAVEN	02	1974	56	42.3	35	51	2.150	16	3
NEW HAVEN	02	1975	31	68.3	57	82	1.696	24	2
NEW HAVEN	03	1971	47	48.4	42	55	1.635	4	
NEW HAVEN	03	1972	69	50.2	46	55	1.569	3	
NEW HAVEN	03	1973	61	43.4	40	48	1.489		
NEW HAVEN	03	1974	61	46.4	41	52	1.650	4	
NEW HAVEN	03	1975	59	52.1	47	58	1.544	3	
NEW HAVEN	05	1971	63	67.4	61	74	1.526	10	
NEW HAVEN	05	1972	70	54.8	50	60	1.504	2	
NEW HAVEN	05	1973	58	57.6	51	66	1.704	13	1
NEW HAVEN	05	1974	58	47.2	42	54	1.687	5	

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION PAGE 9 AIR COMPLIANCE MONITORING

POLLUTANT--PARTICULATES 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
NEW HAVEN	05	1975	58	53.4	48	59	1.552	4	
NEW HAVEN	09	1971	63	59.4	54	65	1.510	5	
NEW HAVEN	09	1972	65	52.4	48	58	1.544	3	
NEW HAVEN	09	1973	61	48.8	45	53	1.461		
NEW HAVEN	09	1974	60	50.7	46	56	1.544	2	
NEW HAVEN	09	1975	40	54.8	50	61	1.388		
NORTH CANAAN	01	1974	58	38.0	34	43	1.687	2	
NORTH CANAAN	01	1975	56	48.2	42	55	1.672	5	
NORWALK	01	1971	62	60.9	56	67	1.463	3	
NORWALK	01	1972	60	55.6	51	61	1.488	2	
NORWALK	01	1973	53	52.4	47	59	1.553	3	
NORWALK	01	1974	56	53.4	47	60	1.609	5	
NORWALK	01	1975	57	53.8	48	61	1.619	7	
NORWALK	05	1971	62	71.8	65	79	1.510	13	
NORWALK	05	1972	64	63.8	58	70	1.473	5	
NORWALK	05	1973	63	61.9	56	69	1.594	10	
NORWALK	05	1974	57	66.5	59	75	1.637	16	1
NORWALK	05	1975	56	56.1	51	62	1.480	2	
NORWICH	01	1971	55	66.6	61	73	1.447	5	
NORWICH	01	1972	61	62.1	56	68	1.496	5	
NORWICH	01	1973	48	58.9	52	66	1.551	7	
NORWICH	01	1974	58	47.7	42	54	1.675	5	
NORWICH	01	1975	60	47.8	43	53	1.517	1	
OLD SAYBROOK	01	1973	15	56.7	47	68	1.414	1	
OLD SAYBROOK	01	1974	60	66.1	59	74	1.641	16	1
OLD SAYBROOK	01	1975	60	64.9	59	71	1.490	7	
ORANGE	03	1971	47	40.6	36	46	1.579	1	
ORANGE	03	1972	50	46.3	40	54	1.772	7	

POLLUTANT--PARTICULATES

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
ORANGE	03	1973	56	46.6	41	52	1.619	3	
ORANGE	03	1974	36	48.4	41	58	1.731	7	
PUTNAM	02	1971	55	99.5	88	112	1.624	77	8
PUTNAM	02	1972	55	53.1	47	60	1.612	5	
PUTNAM	02	1973	50	43.3	37	51	1.797	7	
PUTNAM	02	1974	59	34.9	30	40	1.835	3	
PUTNAM	02	1975	59	47.9	43	54	1.652	4	
STAMFORD	01	1971	53	87.0	76	100	1.742	58	8
STAMFORD	01	1972	48	130.8	112	152	1.754	154	42
STAMFORD	01	1973	17	99.3	81	121	1.487	58	3
STAMFORD	01	1974	54	67.1	59	77	1.721	24	2
STAMFORD	01	1975	49	55.4	49	63	1.623	7	
STAMFORD	03	1971	42	125.5	106	149	1.786	139	35
STAMFORD	03	1972	37	111.0	91	135	1.849	113	29
STAMFORD	03	1974	46	47.9	41	56	1.765	8	
STAMFORD	03	1975	51	57.3	50	66	1.683	13	1
STAMFORD	04	1971	42	51.4	42	62	1.932	20	2
STAMFORD	04	1972	47	75.1	65	87	1.685	35	3
STAMFORD	04	1973	31	83.1	67	103	1.864	67	13
STAMFORD	04	1974	57	45.8	39	54	1.992	16	2
STAMFORD	04	1975	47	41.9	35	49	1.837	7	
STAMFORD	07	1974	48	74.7	64	88	1.799	42	7
STAMFORD	07	1975	54	61.6	54	70	1.651	13	1
STAMFORD	10	1971	18	102.2	72	144	2.037	113	35
STAMFORD	10	1972	46	65.6	51	85	2.505	67	24
STAMFORD	10	1973	35	62.1	52	74	1.696	16	1
STRATFORD	01	1971	47	57.6	51	65	1.548	5	
STRATFORD	01	1972	45	46.1	40	53	1.667	4	

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION PAGE 11 AIR COMPLIANCE MONITORING

POLLUTANT--PARTICULATES

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
STRATFORD	01	1973	14	51.0	38	68	1.670	7	
STRATFORD	01	1974	51	38.8	34	45	1.735	2	
STRATFORD	01	1975	46	45.7	39	53	1.713	5	
STRATFORD	02	1971	39	73.7	63	86	1.645	29	2
STRATFORD	02	1972	20	60.3	52	70	1.397	1	
STRATFORD	05	1973	15	57.8	47	71	1.472	2	
STRATFORD	05	1974	44	58.0	50	67	1.630	10	
STRATFORD	05	1975	49	52.7	46	60	1.611	5	
THOMASTON	03	1971	48	73.4	63	86	1.808	42	7
THOMASTON	03	1972	44	65.3	56	77	1.764	24	3
THOMASTON	03	1973	57	39.7	35	45	1.625	1	
THOMASTON	03	1974	59	41.7	36	48	1.767	5	
THOMASTON	03	1975	57	44.7	40	50	1.584	2	
TORRINGTON	01	1971	55	83.9	72	98	1.873	67	13
TORRINGTON	01	1972	60	66.8	58	76	1.761	29	3
TORRINGTON	01	1973	59	47.3	42	53	1.651	4	
TORRINGTON	01	1974	60	53.4	47	60	1.681	8	
TORRINGTON	01/123	1975	58	56.2	50	63	1.573	5	
VOLUNTOWN	01	1973	47	29.3	25	35	1.834	1	
VOLUNTOWN	01	1974	56	25.7	22	30	1.842	1	
VOLUNTOWN	01	1975	41	29.0	24	34	1.764	1	
WALLINGFORD	01	1975	26	43.3	37	51	1.486		
WATERBURY	01	1971	58	86.3	77	97	1.608	42	4
WATERBURY	01	1972	62	79.5	71	89	1.628	35	3
WATERBURY	01	1973	26	76.9	65	91	1.556	24	1
WATERBURY	01	1974	51	72.3	63	83	1.725	35	4
WATERBURY	01	1975	20	82.6	64	107	1.749	50	7

POLLUTANT--PARTICULATES

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
WATERBURY	02	1974	20	53.2	42	68	1.715	10	1
WATERBURY	02	1975	59	65.5	59	73	1.539	10	
WATERBURY	03	1975	52	57.1	51	64	1.536	4	
WATERBURY	123	1975	37	84.7	74	97	1.539	35	2
WATERFORD	01	1974	48	31.1	27	36	1.745	1	
WATERFORD	01	1975	60	32.3	28	37	1.753	1	
WILLIMANTIC	01	1973	28	45.7	39	53	1.476		
WILLIMANTIC	01	1974	61	39.6	35	44	1.597	1	
WILLIMANTIC	01	1975	59	48.7	44	54	1.531	2	
WINCHESTER	01	1971	56	58.2	53	64	1.504	4	
WINCHESTER	01	1972	50	50.0	43	58	1.746	8	
WINCHESTER	01	1973	58	40.6	36	46	1.731	3	
WINCHESTER	01	1974	60	44.7	39	51	1.722	5	
WINCHESTER	01	1975	58	52.0	46	58	1.606	5	

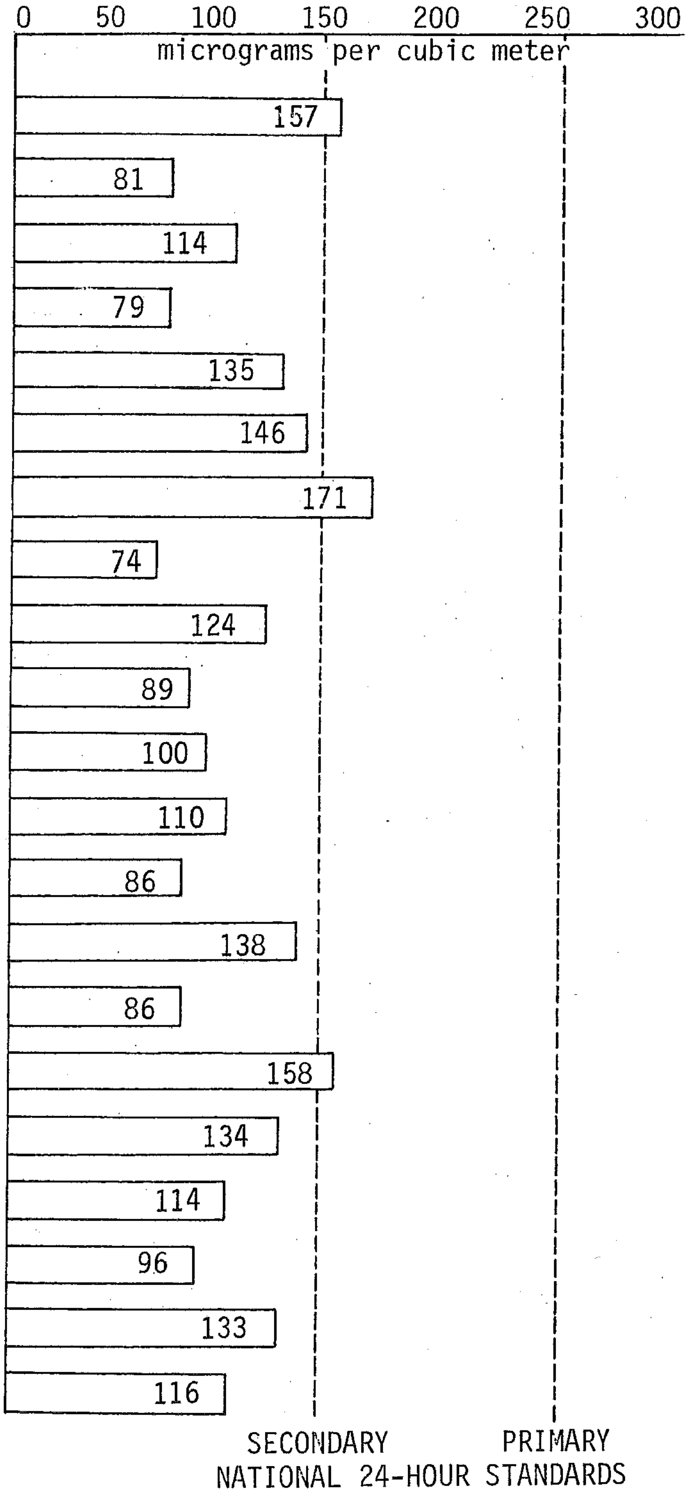
Table IV

TOTAL SUSPENDED PARTICULATES

1975 - CONNECTICUT

SECOND HIGHEST 24-HOUR CONCENTRATION

TOWN	SITE	DATE OF SECOND HIGH	micrograms per cubic meter
ANSONIA	03	2/11	157
BERLIN	01	5/24	81
BRIDGEPORT	01	2/11	114
BRIDGEPORT	02	4/18	79
BRIDGEPORT	123	6/23	135
BRISTOL	01	1/24	146
BRISTOL	04	1/24	171
BURLINGTON	01	6/23	74
DANBURY	01/123	3/7	124
DERBY	123	10/9	89
EAST HARTFORD	01	5/21	100
EAST HARTFORD	02	2/11	110
EAST WINDSOR	01	5/24	86
ENFIELD	01/123	4/18	138
FAIRFIELD	02	6/17	86
GREENWICH	01	1/24	158
GREENWICH	02	5/21	134
GREENWICH	03	11/20	114
GREENWICH	04	5/21	96
GREENWICH	08	1/24	133
GREENWICH	14	2/11	116

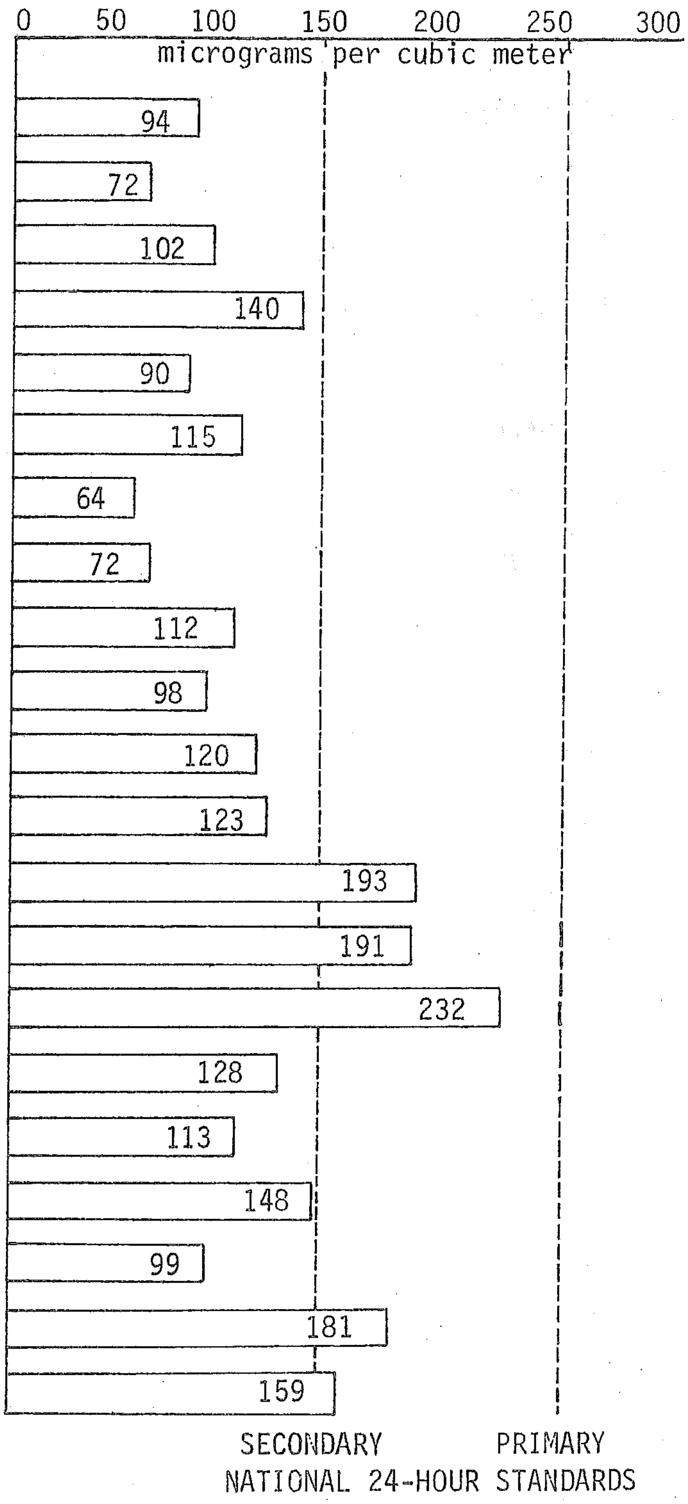


TOTAL SUSPENDED PARTICULATES

1975 - CONNECTICUT

SECOND HIGHEST 24-HOUR CONCENTRATION

TOWN	SITE	DATE OF SECOND HIGH	
GROTON	01/123	2/11	94
HADDAM	02	1/24	72
HARTFORD	02	5/21	102
HARTFORD	03	4/18	140
HARTFORD	04	2/11	90
HARTFORD	05	1/18	115
KENT	01	4/18	64
MORRIS	01	5/24	72
MANCHESTER	01	1/18	112
MANSFIELD	01	3/7	98
MERIDEN	01	7/29	120
MERIDEN	02	1/24	123
MERIDEN	03	2/11	193
MERIDEN	05	11/20	191
MERIDEN	06	5/12	232
MIDDLETOWN	03	2/11	128
MILFORD	01	5/24	113
MILFORD	02	5/24	148
MILFORD	06	1/24	99
NAUGATUCK	01	1/24	181
NEW BRITAIN	02	5/30	159

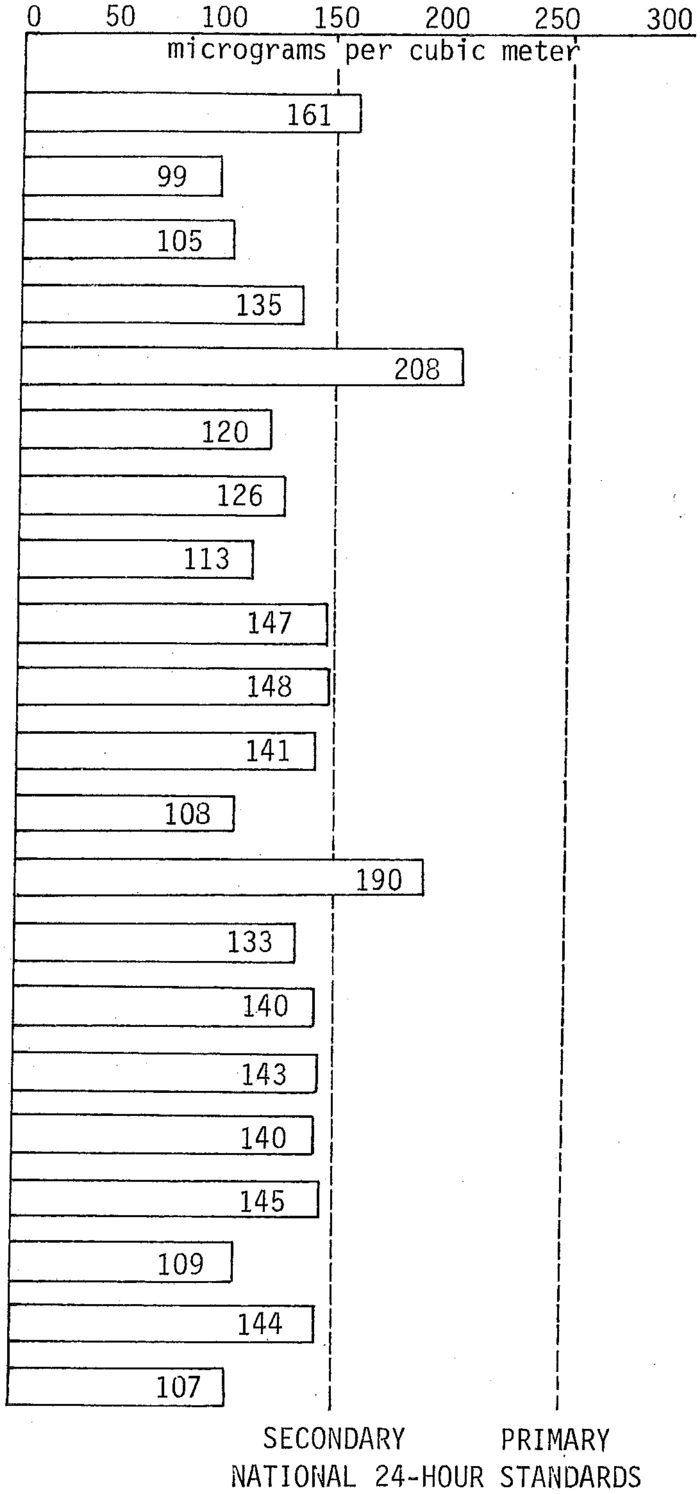


TOTAL SUSPENDED PARTICULATES

1975 - CONNECTICUT

SECOND HIGHEST 24-HOUR CONCENTRATION

TOWN	SITE	DATE OF SECOND HIGH	
NEW BRITAIN	03	5/24	161
NEW BRITAIN	04	2/11	99
NEW BRITAIN	123	10/15	105
NEW HAVEN	01	1/24	135
NEW HAVEN	02	6/11	208
NEW HAVEN	03	2/11	120
NEW HAVEN	05	6/23	126
NEW HAVEN	09	5/21	113
NORTH CANAAN	01	4/30	147
NORWALK	01	2/5	148
NORWALK	05	5/24	141
NORWICH	01	3/7	108
OLD SAYBROOK	01	1/24	190
PUTNAM	02	1/24	133
STAMFORD	01	1/24	140
STAMFORD	03	11/20	143
STAMFORD	04	6/29	140
STAMFORD	07	9/9	145
STRATFORD	01	1/24	109
STRATFORD	05	1/24	144
THOMASTON	03	1/6	107

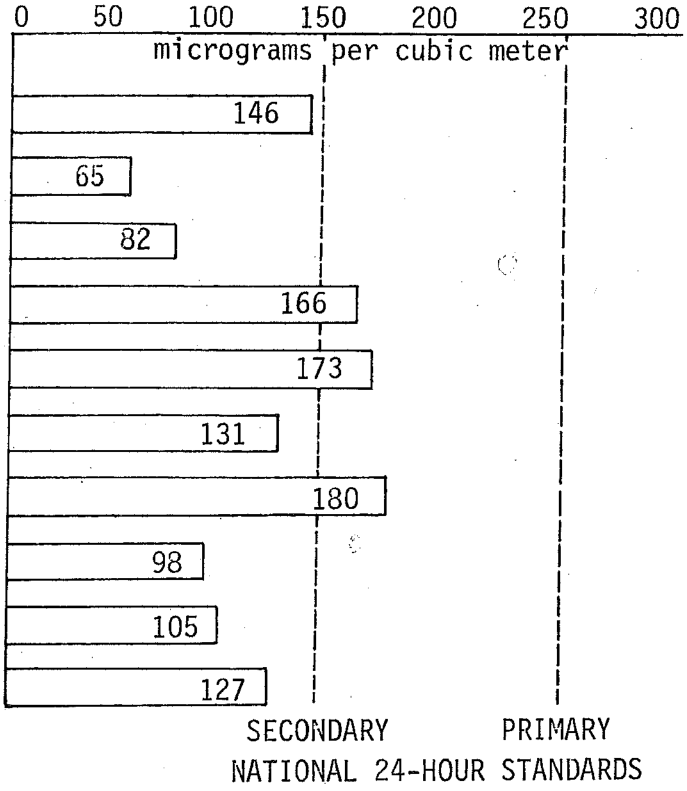


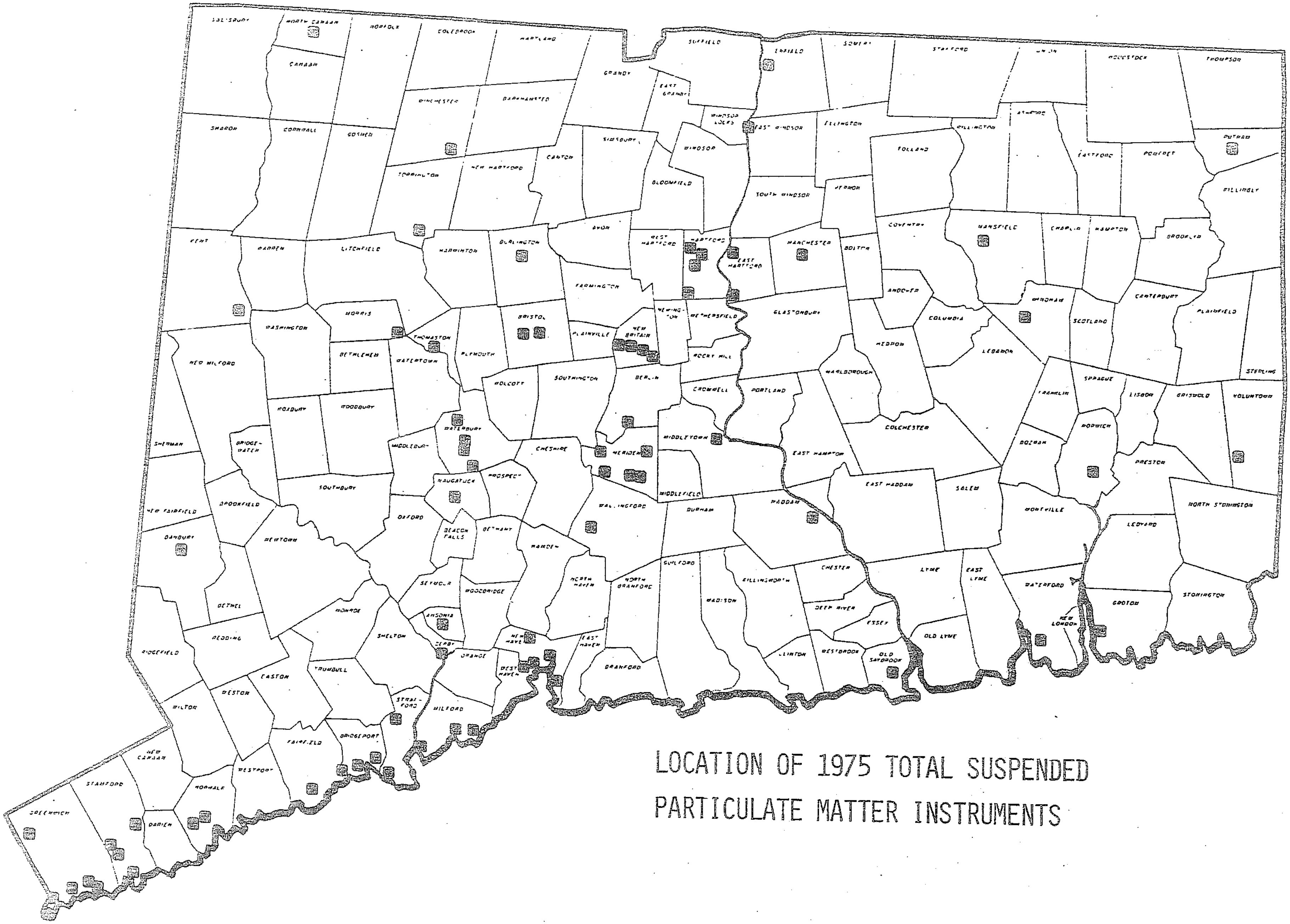
TOTAL SUSPENDED PARTICULATES

1975 - CONNECTICUT

SECOND HIGHEST 24-HOUR CONCENTRATION

TOWN	SITE	DATE OF SECOND HIGH	micrograms per cubic meter
TORRINGTON	01/123	2/11	146
VOLUNTOWN	01	6/23	65
WALLINGFORD	01	11/20	82
WATERBURY	01	2/11	166
WATERBURY	02	1/24	173
WATERBURY	03	11/20	131
WATERBURY	123	7/23	180
WATERFORD	01	6/23	98
WILLIMANTIC	01	1/24	105
WINCHESTER	01	1/6	127





LOCATION OF 1975 TOTAL SUSPENDED PARTICULATE MATTER INSTRUMENTS

Figure 4

III. SULFUR DIOXIDE

Conclusions:

At no monitoring site in Connecticut was the primary annual sulfur dioxide (SO_2) standard exceeded in 1975. The secondary annual SO_2 standard was exceeded at Bridgeport site 01 in 1975.

The primary 24-hour ambient standard for SO_2 was exceeded in Bridgeport at site 01 in 1975. The following three sites recorded violations of the secondary 24-hour ambient standard for SO_2 in 1975:

Bridgeport 01
Bridgeport 03
Milford 02

There was no violation of the 3-hour SO_2 standard recorded at monitoring sites in Connecticut in 1975.

Discussion of Data:

A total of twenty continuous SO_2 monitors recorded data in 14 towns during 1975, twelve of these sites telemetered the data to the central computer in Hartford on a real-time basis. Since revision of the network was ongoing during the first half of 1975, valid annual averages could be determined for only five sites and estimated for three others.

Now that a permanent SO_2 monitoring network is fully operational in Connecticut more complete information on SO_2 levels will be available in years to come.

Facts about Sulfur Dioxide:

Sulfur dioxide is a colorless, odiferous gas with very corrosive qualities. In high concentrations it irritates human mucous membranes, damages vegetation and attacks many materials. The major source of SO_2 in Connecticut is the combustion of sulfur-containing fuel. The areas of highest ambient concentration in Connecticut are usually those areas of highest density of large users in fuel and oil. Short term high levels occur when dispersing conditions are poor.

Highest concentrations are generally found in the colder months when sulfur-containing fuel for heating is used in large quantities. Sulfur dioxide is removed from the atmosphere by a number of mechanisms, so no long-term build-up occurs. However, the removal rate is often slow enough that there is some evidence that SO_2 from out of state sources is transported into Connecticut. Sulfur dioxide is chemically converted in the atmosphere into sulfuric acid aerosols and other particulate sulfate compounds. Information also exists which indicates that sulfur oxide emissions contribute to the strong acidity of rain throughout the northeastern United States.

Method of Collection:

The Air Monitoring Unit uses several types of instruments to continuously measure sulfur dioxide levels. The coulometric method is employed by Philips instruments, the flame photometric method by Bendix instruments. The conductometric method is employed by Davis and Scientific Industries instruments, and is believed to be the least accurate of the three types of continuous SO_2 monitors.

Philips monitoring instruments were used at the following sites in 1975:

Bridgeport	01	New Britain	02
Bridgeport	03	New Haven	04
Milford	02		

Bendix instruments were used at the following sites in 1975:

Bridgeport	123	Hartford	123
Danbury	123	New Britain	123
Derby	123	New Haven	123
Enfield	123	Stamford	03/123
Greenwich	04	Torrington	123
Groton	123	Waterbury	123

At sites Greenwich 01 and Greenwich 08 Scientific Industries SO_2 monitoring instruments were used; at Norwalk 05 a Davis instrument was used. Data from these latter three instruments has been judged incomparable to the rest and is not included here.

Connecticut also used modified West-Gaeke sulfur dioxide bubblers at 43 sites, however, the Department regards all SO_2 bubbler data to date as invalid due to problems associated with the collection, storage and transport of bubbler samples (see section on Special Studies for further discussion of bubbler data).

Table V

ANNUAL ARITHMETIC AVERAGES OF SULFUR DIOXIDE AT SITES WITH CONTINUOUS MONITORS

Primary NAAQS 80 $\mu g/m^3$

Town	Site #	Site Name	1975	1974	1973	1972	1971
Bridgeport	01	City Hall	63	42	44	62	76
Bridgeport	02	Fairfield Avenue Fire House	--	51	31	54	--
Bridgeport	03	McKinley School	47	49	50	50	--
Bridgeport	123	Hallett Street	--[a]	--	--	--	--
Danbury	123	Western Conn. State College	31	--[a]	--	--	--
Derby	123	Dziadik Street	--[a]	--	--	--	--
Enfield	123	Kosciuszko Junior H.S.	(42)[b]	--	--	--	--
Greenwich	01	Town Hall Annex	--	37	53	45	62
Greenwich	04	Bruce Golf Course	--[a]	(29)[b]	29	33	43
Greenwich	08	Cos Cob Pumping Station	--	48	55	43	71
Groton	123	Fort Griswold State Park	(29)[c]	--	--	--	--
Hartford	03	Public Library	--	48	69	61	91
Hartford	07/123	State Office Building	--[a]	--	--	--	--
Milford	02	Devon Community Center	50	31	(25)[b]	--	--
New Britain	02	City Hall	--[a]	--[a]	(80)[c]	120	96
New Britain	123	Lake Street	--[a]	--	--	--	--
New Haven	04	Community Service Building	50	40	54	79	84
New Haven	08	Agricultural Station	--	--	38	41	51
New Haven	123	State Street	--[a]	--	--	--	--
Norwalk	05	Health Department	--	44	50	62	65
Stamford	03/123	Health Department	(50)[b]	--[a]	(78)[b]	90	119
Torrington	123	Franklin Avenue	--[a]	--	--	--	--
Waterbury	01	City Hall	--	(56)[d]	84	93	103
Waterbury	123	Bank Street	--[a]	--	--	--	--

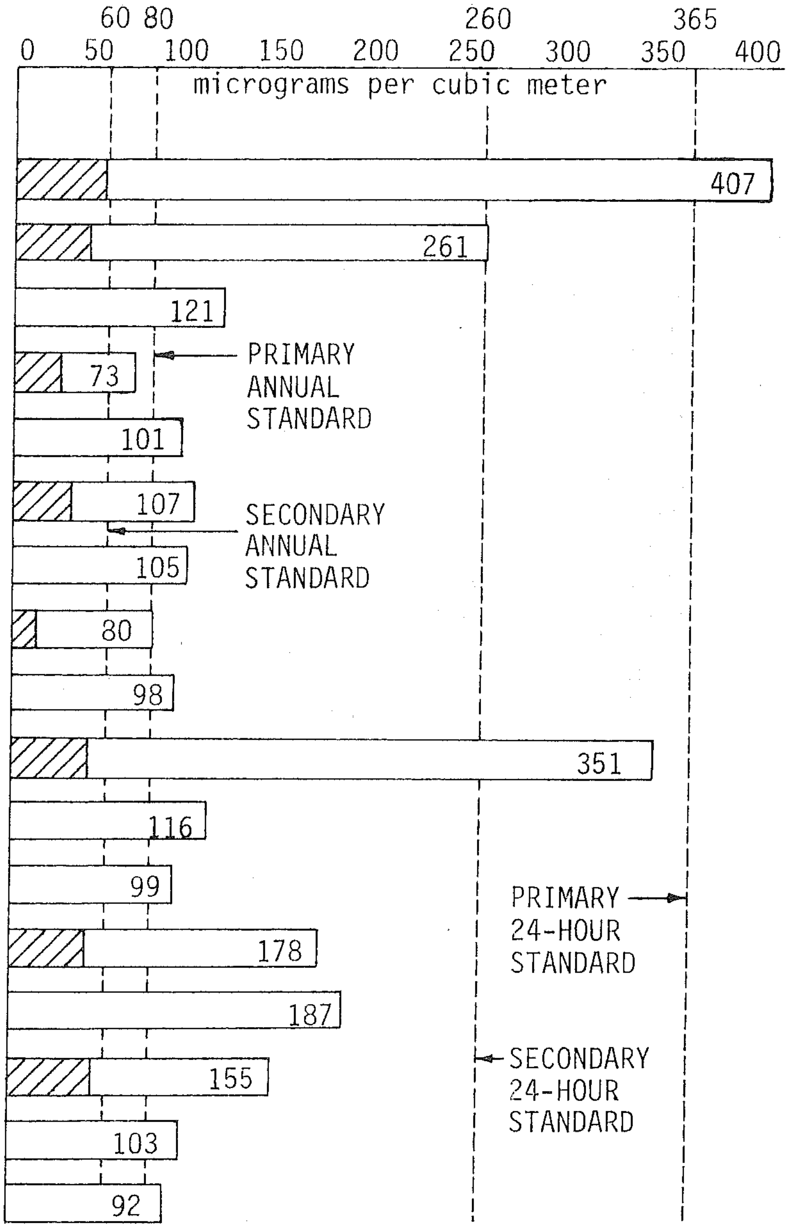
[a] Insufficient data for valid annual average or estimate (less than 6 months)
[b] Estimate based on partial data (6 to 9 months)
[c] Based upon questionable data
[d] September - December data missing

Table VI

CONNECTICUT 1975 SULFUR DIOXIDE

24-HOUR AVERAGE

TOWN	SITE	DATE OF SECOND HIGH
BRIDGEPORT	01	9/1
BRIDGEPORT	03	8/20
BRIDGEPORT	123*	12/30
DANBURY	123	7/13
DERBY	123*	12/6
ENFIELD	123*	12/26
GREENWICH	04*	12/20
GROTON	123*	12/30
HARTFORD	123*	12/15
MILFORD	02	12/27
NEW BRITAIN	02*	1/28
NEW BRITAIN	123*	11/20
NEW HAVEN	04	3/13
NEW HAVEN	123*	12/30
STAMFORD	123*	11/23
TORRINGTON	123*	10/10
WATERBURY	123*	12/2



▨ ANNUAL ARITHMETIC MEAN

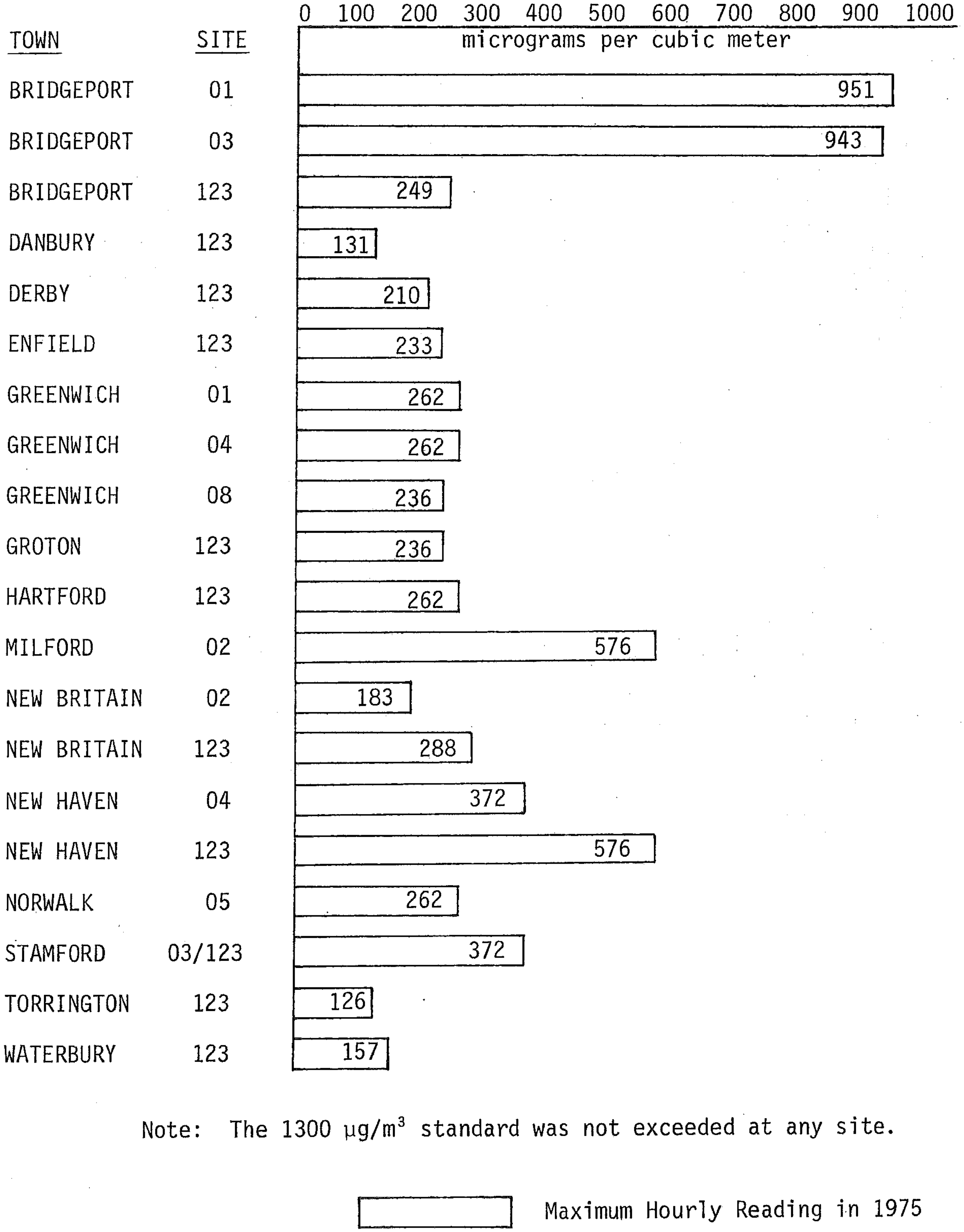
☐ SECOND HIGHEST 24-HOUR AVERAGE

* DENOTES PARTIAL YEAR

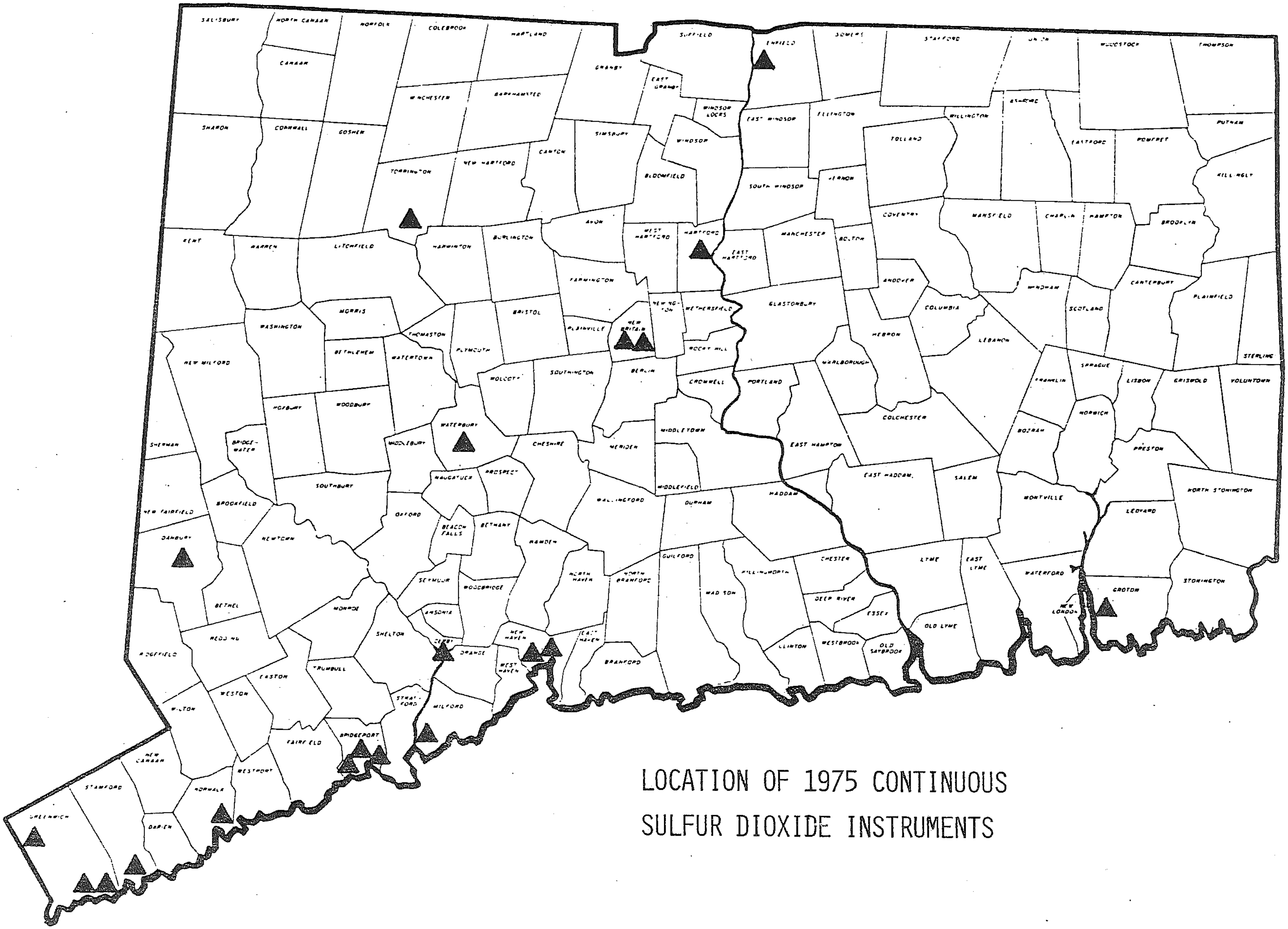
Table VII

CONNECTICUT 1975 SULFUR DIOXIDE

ONE HOUR AVERAGE



Note: The 1300 μg/m^3 standard was not exceeded at any site.



LOCATION OF 1975 CONTINUOUS
SULFUR DIOXIDE INSTRUMENTS

Figure 5

IV. OZONE

Conclusions:

Connecticut experienced high levels of photochemical oxidants (measured as ozone) during the summer months of 1975 (from mid-August to mid-October). At each of the 14 monitoring sites, levels in excess of the National Ambient Air Quality Standard were recorded frequently. Apparently because of Connecticut's position relative to the New York-New Jersey-Connecticut metropolitan region (predominantly downwind in the summer) higher levels of ozone are measured in Connecticut than elsewhere in the region.

In Table VIII, which is a summary comparison of 1975 and 1974 data, there were only 8 sites which were directly comparable since only these locations had a full 5 months of data (May thru September). Eastford 01 and Middletown 03 could not be compared because these sites recorded less than 5 months of data in 1974, while Hartford 07/123 recorded less than 5 months of data in 1975. Also, comparison of the Enfield 123, Hamden 01 and Torrington 123 sites was not possible since they did not operate in 1974. Lower second high 1-hour values were recorded in 1975 than in 1974 at 5 of the 8 sites. There was also a decrease in the frequency of days the national ambient standard for ozone was exceeded at 7 of the 8 monitoring sites in 1975. Of these 7 sites, 4 showed a decrease of greater than 10%. Most probable reasons for the lower 1975 ozone levels as compared to 1974 were differences in meteorological conditions and to a lesser extent, emission reductions.

Discussion of Data:

Because of atmospheric reactions, concentrations of ozone are generally highest in the afternoons of sunny, hot days. Chemical reaction with other substances in the air (notably nitrogen oxides and hydrocarbons) can cause different levels of ozone to be measured at different sites. In order to gather information which will further the understanding of transport, production, destruction and other characteristics of ozone, DEP operated a variety of types of sites in 1975:

1. Urban - Bridgeport, Stamford, Hartford, Middletown
2. New York Flux - Greenwich, Danbury
3. Suburban - New Haven, Windsor, Groton, Torrington, Enfield
4. Rural - Morris, Eastford, Hamden

Facts about Ozone:

The terms ozone and photochemical oxidants are often used interchangeably with the term "smog", though Los Angeles-type smog is chemically somewhat different than Connecticut's.

Ozone is emitted directly only in insignificant amounts. However, various hydrocarbons and oxides of nitrogen, which are both emitted during combustion of petroleum products, especially automobile fuel, and oxygen react in a complex fashion in the atmosphere to produce and destroy oxidants. In the presence of sunlight, the production dominates (hence, the term photochemical), and levels build up during the day and drop at night. While many factors determine the concentrations of ozone, it is oxides of nitrogen that are primarily responsible for the diurnal (daily) cycle of levels, rising to a peak in the afternoon and falling at night.

Other factors that play a part in determining ozone concentrations are: intensity of solar radiation; temperature; mixing volume of the lower atmosphere; and relationships among wind direction, speed and distance and direction to major sources (urban areas).

Method of Measurement:

The Air Compliance Unit uses chemiluminescent instruments to measure levels of ozone which is the major constituent of photochemical oxidants in this area. These instruments measure and record instantaneous concentrations of ozone continuously by means of a fluorescent technique. Properly calibrated, these instruments have been shown to be remarkably reliable and stable.

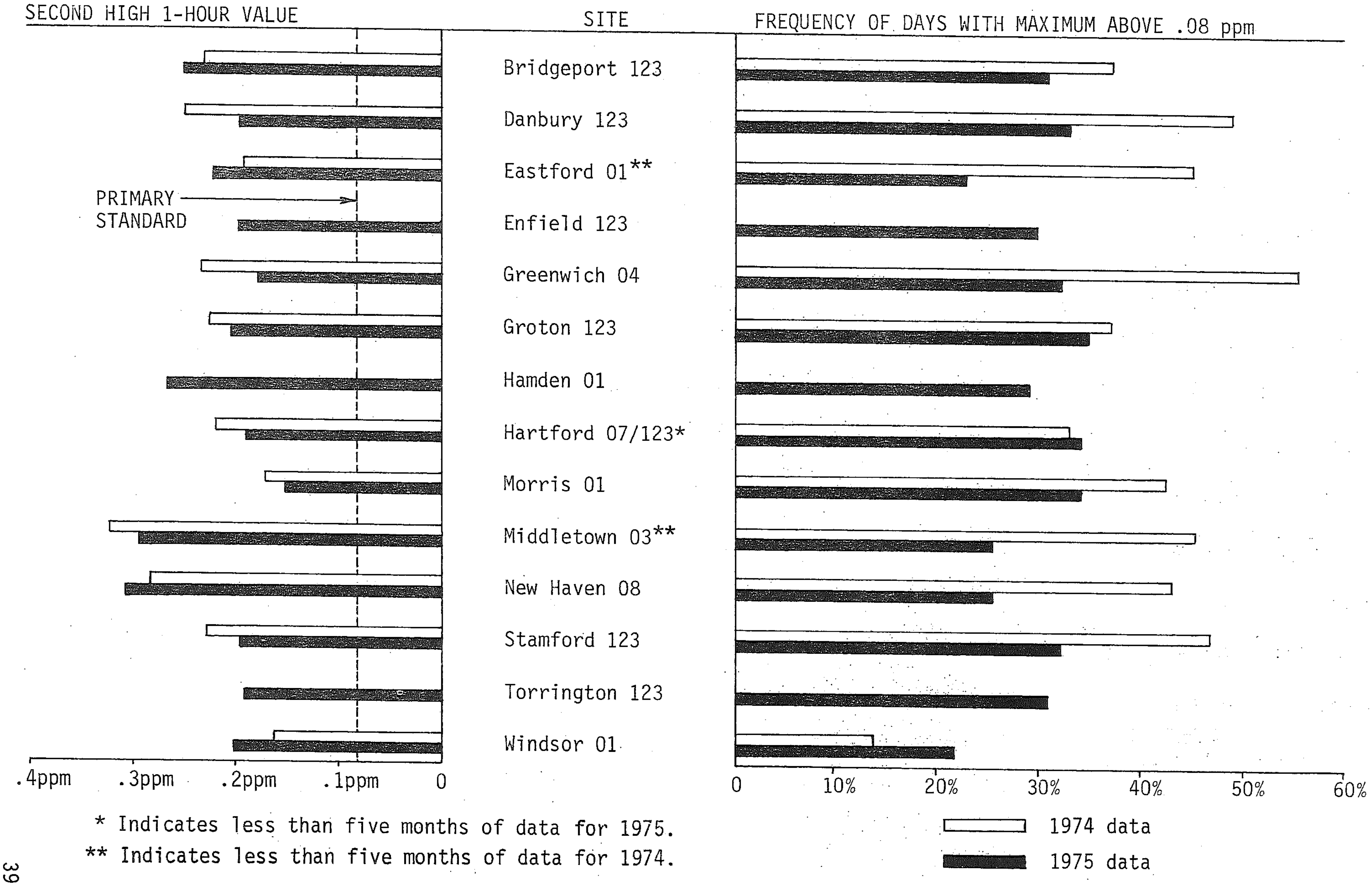
Data:

Most of the ozone instruments are operated approximately from mid-April to mid-October in Connecticut. The following tables are summaries of all Connecticut 1975 ozone data. Table VIII - a comparison of second high hourly averages and frequencies at all sites in 1975 to 1974 data. Table IX - April thru October data from all sites; Table X - Histograms from selected sites.

Table VIII

CONNECTICUT OZONE - SUMMARY

MAY-SEPTEMBER, 1974 & 1975 COMPARISON



* Indicates less than five months of data for 1975.

** Indicates less than five months of data for 1974.

Table IV

CONNECTICUT OZONE - APRIL - 1975

Site	Max. 1-hr. Value (ppm)	Time[1] of Max.	2nd High 1-hr. Value (ppm)	Time[1] of 2nd High	Total # Hourly Values	Total Days[2]	# of days with max. 1-hr. reading in each range					# Days with Maximum Above .08 ppm
							.00 to .08	.081 to .099	.1 to .199	.2 to .299	.3 or Above	
BRIDGEPORT 123	.085	30/16	.080	30/18	657	30	29	1				1
DANBURY 123	.070	30/16	.065	30/15	667	30	30					0
EASTFORD 01	.085	23/19	.085	23/20	492	21	19	2				2
ENFIELD 123	.080	30/16	.075	30/15	719	30	30					0
GREENWICH 04	.080	25/15	.080	30/15	517	23	23					0
GROTON 123	.065	30/14	.060	30/17	353	16	16					0
HAMDEN 01	.080	23/16	.080	25/14	357	16	16					0
HARTFORD 07/123	.075	17/14	.075	18/15	690	30	30					0
MORRIS 01	.070	30/13	.065	30/15	322	14	14					0
MIDDLETOWN 03	.080	23/19	.075	23/17	495	21	21					0
NEW HAVEN 08	.050	23/14	.045	3/9	564	24	24					0
STAMFORD 123	.050	23/14	.050	25/11	399	19	19					0
TORRINGTON 123	.085	30/15	.080	30/13	400	18	17	1				1
WINDSOR 01	.090	30/18	.085	30/17	690	30	29	1				1

[1] Time is given in the following format. The date of occurrence appears on the left side of the slash. The hour (EST) specifying the end of the averaging hour appears on the right side of the slash.

[2] Total days is the number of days with at least one valid reading.

CONNECTICUT OZONE - MAY - 1975

Site	Max. 1-hr. Value (ppm)	Time[1] of Max.	2nd High 1-hr. Value (ppm)	Time[1] of 2nd High	Total # Hourly Values	Total Days[2]	# of days with max. 1-hr. reading in each range					# Days with Maximum Above .08 ppm
							.00 to .08	.081 to .099	.1 to .199	.2 to .299	.3 or Above	
BRIDGEPORT 123	.245	24/15	.220	20/14	593	31	22	3	4	2		9
DANBURY 123	.225	23/16	.175	19/17	658	29	16	2	10	1		13
EASTFORD 01	.215	21/19	.170	21/18	423	21	13	5	2	1		8
ENFIELD 123	.210	20/18	.200	20/19	549	23	13	5	4	1		10
GREENWICH 04	.159	21/14	.156	23/13	608	26	15	3	8			11
GROTON 123	.185	24/13	.155	24/12	503	27	19	2	6			8
HAMDEN 01	.230	20/16	.200	20/15	744	31	17	4	9	1		14
HARTFORD 07/123												
MORRIS 01	.185	23/17	.145	23/14	584	29	18	3	8			11
MIDDLETOWN 03	.200	20/18	.175	20/17	705	31	19	2	9	1		12
NEW HAVEN 08	.240	24/14	.230	24/13	295	13	5	2	5	1		8
STAMFORD 123	.175	19/15	.175	24/13	298	13	7	0	6			6
TORRINGTON 123	.235	23/18	.190	20/19	735	31	14	8	8	1		17
WINDSOR 01	.215	23/17	.205	23/15	610	27	17	5	4	1		10

[1] Time is given in the following format. The date of occurrence appears on the left side of the slash. The hour (EST) specifying the end of the averaging hour appears on the right side of the slash.

[2] Total days is the number of days with at least one valid reading.

CONNECTICUT OZONE - JUNE - 1975

Site	Max. 1-hr. Value (ppm)	Time[1] of Max.	2nd High 1-hr. Value (ppm)	Time[1] of 2nd High	Total # Hourly Values	Total Days[2]	# of days with max. 1-hr. reading in each range					# Days With Maximum Above .08 ppm
							.00 to .08	.081 to .099	.1 to .199	.2 to .299	.3 or Above	
BRIDGEPORT 123	.285	23/15	.260	23/16	720	30	19	4	6	1		11
DANBURY 123	.175	18/16	.165	18/17	704	30	21	2	7			9
EASTFORD 01	.253	23/19	.223	23/18	719	30	25	2	2	1		5
ENFIELD 123	.179	23/20	.142	23/14	688	30	23	4	3			7
GREENWICH 04	.180	23/15	.175	13/16	652	29	20	2	7			9
GROTON 123	.220	24/14	.210	24/13	637	28	20	2	4	2		8
HAMDEN 01	.290	23/16	.270	23/17	709	30	25	2	2	1		5
HARTFORD 07/123	.055	30/20	.050	30/19	25	2	2					0
MORRIS 01	.140	30/14	.135	30/12	196	14	6	3	5			8
MIDDLETOWN 03	.325	23/17	.295	23/16	685	29	24	1	3	0	1	5
NEW HAVEN 08	.310	23/16	.275	23/15	718	30	25	2	2	0	1	5
STAMFORD 123	.125	11/15	.120	11/14	719	30	24	3	3			6
TORRINGTON 123	.150	18/17	.140	23/20	698	30	21	1	8			9
WINDSOR 01	.175	23/21	.150	22/18	718	30	25	2	3			5

[1] Time is given in the following format. The date of occurrence appears on the left side of the slash. The hour (EST) specifying the end of the averaging hour appears on the right side of the slash.

[2] Total days is the number of days with at least one valid reading.

CONNECTICUT OZONE - JULY - 1975

Site	Max. 1-hr. Value (ppm)	Time[1] of Max.	2nd High 1-hr. Value (ppm)	Time[1] of 2nd High	Total # Hourly Values	Total Days[2]	# of days with max. 1-hr. reading in each range					# Days With Maximum Above .08 ppm
							.00 to .08	.081 to .099	.1 to .199	.2 to .299	.3 or Above	
BRIDGEPORT 123	.245	23/16	.220	18/15	728	31	14	3	12	2		17
DANBURY 123	.200	8/17	.185	8/18	744	31	16	2	12	1		15
EASTFORD 01	.175	23/17	.170	23/18	643	31	20	5	6			11
ENFIELD 123	.175	18/20	.155	18/19	636	29	12	3	14			17
GREENWICH 04	.185	8/16	.171	10/15	635	28	12	5	11			16
GROTON 123	.210	18/15	.185	18/14	639	30	16	2	11	1		14
HAMDEN 01	.220	18/17	.200	23/14	713	31	17	3	9	2		14
HARTFORD 07/123	.200	18/19	.190	18/18	742	31	14	6	10	1		17
MORRIS 01	.155	1/10	.145	1/11	733	31	11	3	17			20
MIDDLETOWN 03	.275	23/18	.265	23/17	743	31	17	2	11	1		14
NEW HAVEN 08	.315	23/16	.295	23/17	743	31	18	3	8	1	1	13
STAMFORD 123	.205	23/14	.195	23/13	729	31	14	6	10	1		17
TORRINGTON 123	.170	8/20	.165	8/19	740	31	16	7	8			15
WINDSOR 01	.130	11/15	.125	24/13	598	26	15	3	8			11

[1] Time is given in the following format. The date of occurrence appears on the left side of the slash. The hour (EST) specifying the end of the averaging hour appears on the right side of the slash.

[2] Total days is the number of days with at least one valid reading.

CONNECTICUT OZONE - AUGUST - 1975

Site	Max. 1-hr. Value (ppm)	Time[1] of Max.	2nd High 1-hr. Value (ppm)	Time[1] of 2nd High	Total # Hourly Values	Total Days[2]	# of days with max. 1-hr. reading each range .00 to .08	.081 to .099	.1 to .199	.2 to .299	.3 or Above	# Days with Maximum Above .08 ppm
BRIDGEPORT 123	.160	13/18	.155	10/15	704	31	20	5	6			11
DANBURY 123	.170	29/16	.165	11/18	705	30	20	5	5			10
EASTFORD 01	.115	11/16	.115	13/21	742	31	23	3	5			8
ENFIELD 123	.135	1/13	.130	1/12	741	31	22	3	6			9
GREENWICH 04	.145	13/17	.130	10/14	593	27	20	1	6			7
GROTON 123	.165	18/15	.155	18/17	730	31	15	2	14			16
HAMDEN 01	.180	13/19	.175	29/15	741	31	21	4	6			10
HARTFORD 07/123	.145	29/16	.140	2/13	711	31	21	4	6			10
MORRIS 01	.135	29/18	.110	29/17	469	22	18	1	3			4
MIDDLETOWN 03	.155	29/15	.140	11/19	740	31	23	2	6			8
NEW HAVEN 08	.190	29/14	.155	1/15	451	21	15		6			6
STAMFORD 123	.165	1/14	.150	13/15	444	22	15	3	4			7
TORRINGTON 123	.100	13/20	.095	10/12	526	22	20	1	1			2
WINDSOR 01	.095	2/13	.095	11/13	663	29	25	4				4

[1] Time is given in the following format. The date of occurrence appears on the left side of the slash. The hour (EST) specifying the end of the averaging hour appears on the right side of the slash.

[2] Total days is the number of days with at least one valid reading.

CONNECTICUT OZONE - SEPTEMBER - 1975

Site	Max. 1-hr. Value (ppm)	Time[1] of Max.	2nd High 1-hr. Value (ppm)	Time[1] of 2nd High	Total # Hourly Values	Total Days[2]	# of days with max. 1-hr. reading in each range					# Days with Maximum Above .08 ppm
							.00 to .08	.081 to .099	.1 to .199	.2 to .299	.3 or Above	
BRIDGEPORT 123	.080	8/16	.070	8/17	720	30	30					0
DANBURY 123	.115	8/17	.095	8/16	557	26	25		1			1
EASTFORD 01	.125	11/22	.120	11/23	720	30	29		1			1
ENFIELD 123	.075	11/22	.070	11/21	664	29	29					0
GREENWICH 04	.100	8/14	.085	5/15	710	30	28	1	1			2
GROTON 123	.095	11/18	.085	4/18	478	22	20	2				2
HAMDEN 01	.095	8/16	.090	30/15	719	30	28	2				2
HARTFORD 07/123	.070	8/16	.060	2/14	150	16	16					0
MORRIS 01	.080	8/19	.075	11/20	701	30	30					0
MIDDLETOWN 03	.090	30/16	.085	30/17	718	30	29	1				1
NEW HAVEN 08	.080	30/12	.075	30/14	603	26	26					0
STAMFORD 123	.090	5/18	.075	5/19	415	19	18	1				1
TORRINGTON 123	.080	8/15	.075	6/16	586	26	26					0
WINDSOR 01	.070	11/23	.065	11/22	563	23	23					0

[1] Time is given in the following format. The date of occurrence appears on the left side of the slash. The hour (EST) specifying the end of the averaging hour appears on the right side of the slash.

[2] Total days is the number of days with at least one valid reading.

CONNECTICUT OZONE - OCTOBER - 1975

Site	Max. 1-hr. Value (ppm)	Time[1] of Max.	2nd High 1-hr. Value (ppm)	Time[1] of 2nd High	Total # Hourly Values	Total Days[2]	.00 to .08	.081 to .099	.1 to .199	.2 to .299	.3 or Above	# Days with Maximum Above .08 ppm
BRIDGEPORT 123	.072	1/14	.068	6/13	378	16	16					0
DANBURY 123	.055	1/15	.055	1/16	58	3	3					0
EASTFORD 01	.085	1/15	.085	1/16	60	3	2	1				1
ENFIELD 123	.071	15/15	.070	1/13	558	25	25					0
GREENWICH 04	.075	14/14	.075	14/15	417	19	19					0
GROTON 123	.096	5/17	.094	5/16	136	6	5	1				1
HAMDEN 01	.085	6/15	.080	1/14	155	7	6	1				1
HARTFORD 07/123	.094	15/13	.090	15/14	404	21	20	1				1
MORRIS 01	.040	1/14	.040	1/15	34	2	2					0
MIDDLETOWN 03	.075	1/14	.075	5/15	154	7	7					0
NEW HAVEN 08	.080	1/14	.070	1/15	128	7	7					0
STAMFORD 123	.052	1/15	.046	1/16	67	2	2					0
TORRINGTON 123	.075	5/16	.075	5/17	113	5	5					0
WINDSOR 01												

[1] Time is given in the following format. The date of occurrence appears on the left side of the slash. The hour (EST) specifying the end of the averaging hour appears on the right side of the slash.

[2] Total days is the number of days with at least one valid reading.

Table X

OZONE

NUMBER OF HOURS ABOVE THE STANDARD BY MONTH AND TIME OF DAY

EASTFORD 01

	MID	1	2	3	4	5	6	7	8	9	10	11	NOON	13	14	15	16	17	18	19	20	21	22	23	TOTAL BY MONTHS
APRIL																		1		1	1				3
MAY	2	1										2	1	1	3	3	6	5	3	2	3	3	2	2	39
JUNE												3	3	3	3	2	2	3	2	3	2	1	1		28
JULY	1										1	1	3	4	5	5	5	5	4	4	3	2	1	1	45
AUGUST	1	1	1											1	3	3	3	3	3	1		2	2	2	26
SEPTEMBER	1																				1	1	1	1	5
OCTOBER																1	1								2
TOTAL BY HOURS	5	2	1								1	6	7	9	14	14	17	17	12	11	10	9	7	6	148

OZONE

NUMBER OF HOURS ABOVE THE STANDARD BY MONTH AND TIME OF DAY

GREENWICH 04

	MID	1	2	3	4	5	6	7	8	9	10	11	NOON	13	14	15	16	17	18	19	20	21	22	23	TOTAL BY MONTHS
APRIL																									
MAY											1	4	5	6	8	7	7	6	3	1					48
JUNE	1										1	3	5	6	8	7	6	4	2	2		1	1	1	48
JULY												1	7	10	11	9	10	6	4	2					60
AUGUST											1	1	1	5	5	7	5	2	1						28
SEPTEMBER															1	2									3
OCTOBER																									
TOTAL BY HOURS	1										3	9	18	27	33	32	28	18	10	5		1	1	1	187

OZONE

NUMBER OF HOURS ABOVE THE STANDARD BY MONTH AND TIME OF DAY

GROTON 123

	MID	1	2	3	4	5	6	7	8	9	10	11	NOON	13	14	15	16	17	18	19	20	21	22	23	TOTAL BY MONTHS
APRIL																									
MAY	1	1									1	2	3	4	4	6	3	4	3	2	1	1	1	1	38
JUNE												2	5	5	6	5	5	4	3	2	2	2	2	1	44
JULY							1			1	2	4	6	8	11	12	12	11	11	10	7	6	4	1	107
AUGUST	2	1	1	1	1						1	4	8	11	13	12	12	12	12	10	6	5	4	3	119
SEPTEMBER																		1	2						3
OCTOBER															1	1	1	1	1						5
TOTAL BY HOURS	3	2	1	1	1		1			1	4	12	22	28	35	36	33	33	32	24	16	14	11	6	316

OZONE

NUMBER OF HOURS ABOVE THE STANDARD BY MONTH AND TIME OF DAY

MORRIS 01

	MID	1	2	3	4	5	6	7	8	9	10	11	NOON	13	14	15	16	17	18	19	20	21	22	23	TOTAL BY MONTHS
APRIL																									
MAY	1	1		1	2	2	1	2	3	6	6	4	5	5	6	7	5	5	4	4	2	2	2	1	77
JUNE	1		1	1	1	2	2	3	3	4	4	5	4	4	6	6	3	3	3	3	2	3	1	1	66
JULY	2	4	4	6	7	8	10	13	14	14	16	15	15	14	12	7	3	2	3	4	4	4		1	182
AUGUST	1			1	1	2	2	2	1	2	2	1	1			1	1	1	1	1	1	1	1	1	25
SEPTEMBER																									
OCTOBER																									
TOTAL BY HOURS	5	5	5	9	11	14	15	20	21	26	28	25	25	23	24	21	12	11	11	12	9	10	4	4	350

OZONE

NUMBER OF HOURS ABOVE THE STANDARD BY MONTH AND TIME OF DAY

NEW HAVEN 08

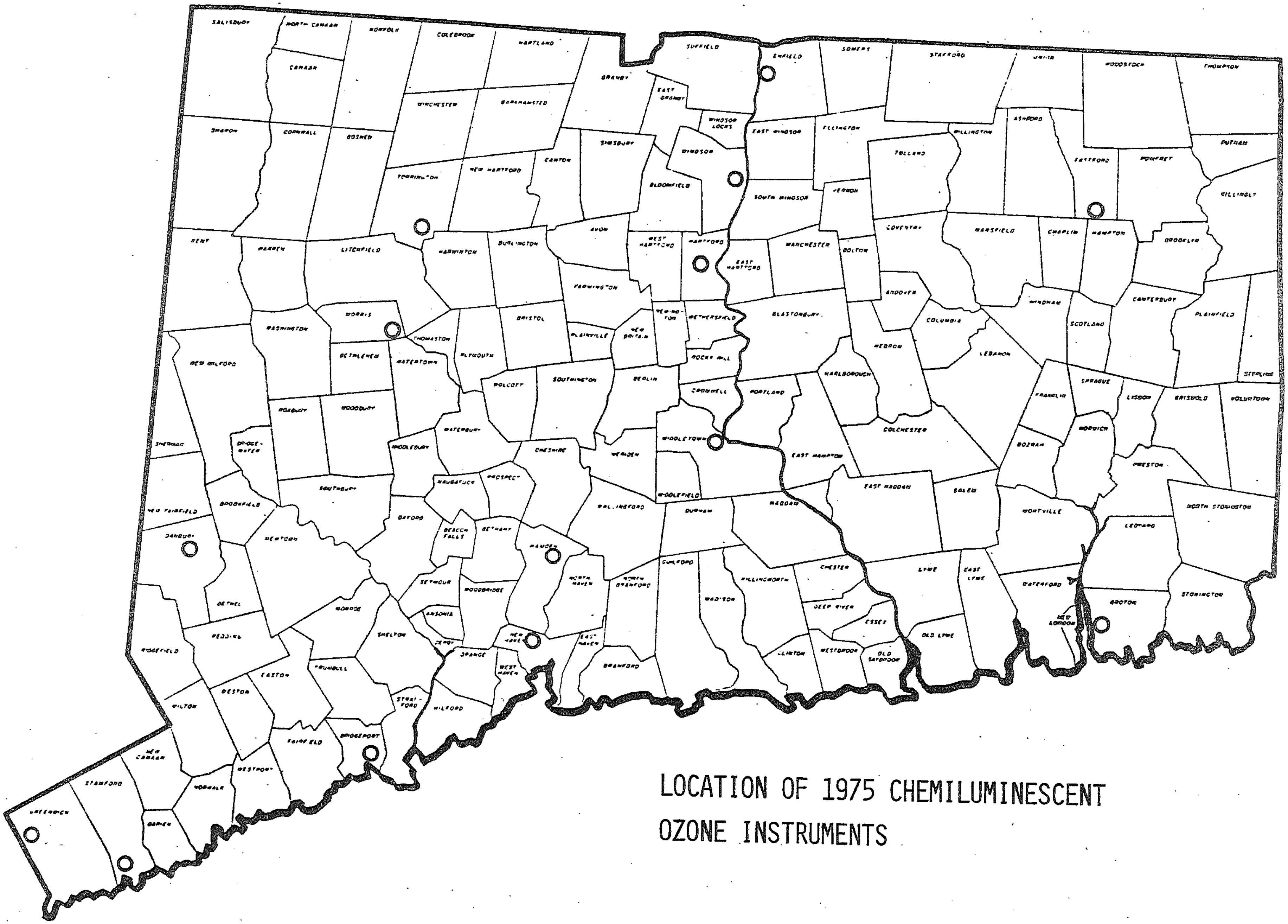
	MID	1	2	3	4	5	6	7	8	9	10	11	NOON	13	14	15	16	17	18	19	20	21	22	23	TOTAL BY MONTHS
APRIL																									
MAY												2	3	4	5	5	6	5	4	3	2				39
JUNE												1	1	2	3	3	3	3	2	2					20
JULY												2	4	7	8	7	10	10	6	7	2	2	1		66
AUGUST												2	2	3	3	3	4	4	2	2	1	1	2	1	30
SEPTEMBER																									
OCTOBER																									
TOTAL BY HOURS												7	10	16	19	18	23	22	14	14	5	3	3	1	155

OZONE

NUMBER OF HOURS ABOVE THE STANDARD BY MONTH AND TIME OF DAY

WINDSOR 01

	MID	1	2	3	4	5	6	7	8	9	10	11	NOON	13	14	15	16	17	18	19	20	21	22	23	TOTAL BY MONTHS
APRIL																		1	1						2
MAY											1	2	3	4	5	8	7	3	2	2	2				39
JUNE													1	2	2	2	2	2	5	3	2	1	1		23
JULY												2	3	3	6	5	7	6	5	3	3	1	1	1	46
AUGUST												1	1	3	2	1									8
SEPTEMBER																									
OCTOBER																									
TOTAL BY HOURS											1	5	8	12	15	16	16	12	13	8	7	2	2	2	118



LOCATION OF 1975 CHEMILUMINESCENT OZONE INSTRUMENTS

Figure 6

V. NITROGEN DIOXIDE

Conclusions:

Nitrogen dioxide levels at all sampling sites in Connecticut were lower than the National Ambient Air Quality Standard of 100 $\mu g/m^3$, annual arithmetic mean.

Discussion of Data:

There were 41 nitrogen dioxide sites in 1975 as compared to 39 in 1974. The sites are distributed in a network which covers urban, residential and suburban locations.

The nitrogen dioxide data is presented in Table XI. The format is the same used to list the total suspended particulate data. Note that, although the distribution of NO_2 data is lognormal, the annual arithmetic mean is shown for direct comparison to the NAAQS for nitrogen dioxide. The 95 percent limits and standard deviation are also arithmetic calculations, but the geometric means and standard deviations were used to give accurate predictions of the number of days the levels of 100 $\mu g/m^3$ and 282 $\mu g/m^3$ would be exceeded at each site if sampling had been conducted on a daily basis. Although there is no 24-hour NAAQS for NO_2, the 282 $\mu g/m^3$ level was selected because at this level a 2nd stage air pollution alert is to be declared according to the State of Connecticut's Administrative Regulations for the Abatement of Air Pollution, while the 100 $\mu g/m^3$ level was selected as an indication of how many days per year the annual NAAQS may have been exceeded if sampling was performed daily.

Facts about Nitrogen Dioxide:

Nitrogen Dioxide (NO_2) is formed whenever air, which contains both oxygen (O_2) and nitrogen (N_2), is subjected to high temperatures. Thus any fuel combustion leads to the formation of NO_2; space heating, industrial and power generation, and automobile engines are the primary sources. Some fuels contain nitrogen compounds which also react during combustion to form NO_2. There are a few minor non-fuel-combustion sources of NO_2 as well.

Nitrogen dioxide in the atmosphere can aggravate respiratory problems. Nitrogen dioxide and other oxides of nitrogen (primarily nitric oxide) with which it exists in equilibrium, play a primary role in the production of photochemical oxidants.

Method of Collection:

The Air Monitoring Unit uses gas bubblers employing the NASN Sodium Arsenite method. These instruments sample for twenty-four hours every sixth day, the same schedule as the suspended particulate instruments.

Table XI

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION PAGE 1 AIR COMPLIANCE MONITORING

POLLUTANT--NITROGEN DIOXIDE

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	MEAN	95-PCT-LIMITS LOWER	UPPER	STD DEVIATION	PREDICTED DAYS OVER 100 UG/M3	PREDICTED DAYS OVER 282 UG/M3
BERLIN	01	1973	58	42.4	34	50	33.258	29	1
BERLIN	01	1974	55	17.4	14	21	15.439	4	
BERLIN	01	1975	51	39.9	33	47	28.066	20	
BRIDGEPORT	01	1973	26	64.8	56	74	23.696	29	
BRIDGEPORT	01	1974	60	57.1	52	63	22.824	20	
BRIDGEPORT	01	1975	56	58.0	52	64	25.255	29	
BRIDGEPORT	03	1973	29	104.0	84	124	54.953	154	8
BRIDGEPORT	03	1975	45	71.8	64	80	27.710	67	
BRIDGEPORT	123	1975	30	72.0	60	84	33.054	67	
BRISTOL	01	1973	20	51.9	43	61	19.452	35	
BRISTOL	01	1974	59	33.4	28	39	23.560	24	2
BRISTOL	01	1975	47	47.1	41	53	21.087	16	
BRISTOL	02	1973	19	36.7	30	43	14.088		
BRISTOL	02	1974	56	26.8	22	32	20.130	13	
BRISTOL	03	1973	19	43.2	33	54	22.401	24	
BRISTOL	03	1974	59	28.6	24	33	19.697	16	1
BRISTOL	04	1973	19	54.0	43	65	22.753	50	2
BRISTOL	04	1974	59	45.1	40	50	21.223	24	
BRISTOL	04	1975	47	52.1	44	60	27.905	35	1
BURLINGTON	01	1973	46	12.8	10	16	11.459		
BURLINGTON	01	1974	58	12.5	9	16	13.047	2	
BURLINGTON	01	1975	51	18.1	14	22	14.730	1	
COLCHESTER	01	1973	60	44.4	38	51	26.153	29	1
COLCHESTER	01	1974	60	31.6	28	35	15.937	1	
COLCHESTER	01	1975	56	37.0	34	40	14.121	2	

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION PAGE 2 AIR COMPLIANCE MONITORING

POLLUTANT--NITROGEN DIOXIDE

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	MEAN	95-PCT-LIMITS LOWER	UPPER	STD DEVIATION	PREDICTED DAYS OVER 100 UG/M3	PREDICTED DAYS OVER 282 UG/M3
DANBURY	01	1973	25	35.3	25	45	25.182	24	1
DANBURY	01	1974	55	45.0	38	52	26.845	29	1
DANBURY	01/123	1975	57	47.5	41	54	25.326	10	
EAST HARTFORD	01	1974	43	57.7	52	63	19.855	16	
EAST HARTFORD	01	1975	56	63.2	57	69	24.617	35	
EAST HARTFORD	02	1973	20	61.3	50	72	24.460	29	
EAST HARTFORD	02	1974	61	52.3	48	57	19.256	10	
EAST HARTFORD	02	1975	52	54.6	48	61	23.877	13	
EAST WINDSOR	01	1975	33	64.2	55	74	28.132	42	
ENFIELD	123	1975	42	46.6	41	53	20.271	8	
GREENWICH	01	1973	53	104.2	84	125	81.016	139	8
GREENWICH	01	1974	58	55.8	47	65	38.463	67	8
GREENWICH	01	1975	54	36.5	29	44	29.920	8	
GREENWICH	04	1973	49	72.2	56	89	61.286	77	4
GREENWICH	04	1974	59	40.0	34	46	23.470	35	3
GREENWICH	04	1975	57	53.4	47	60	25.233	35	
GROTON	01	1973	82	53.8	47	60	32.879	50	4
GROTON	01	1974	61	37.9	35	41	13.644	1	
GROTON	01/123	1975	58	42.1	38	46	16.808	5	
HARTFORD	02	1973	35	63.1	59	67	13.293	4	
HARTFORD	02	1974	60	53.5	46	60	29.767	42	2
HARTFORD	02	1975	56	60.2	54	67	25.479	29	
HARTFORD	123	1975	34	76.5	67	85	27.038	58	

POLLUTANT--NITROGEN DIOXIDE

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	MEAN	95-PCT-LIMITS LOWER	95-PCT-LIMITS UPPER	STD DEVIATION	PREDICTED DAYS OVER 100 UG/M3	PREDICTED DAYS OVER 282 UG/M3
KENT	01	1973	27	16.2	12	21	11.958		
KENT	01	1974	57	14.6	12	17	10.412	1	
KENT	01	1975	41	19.4	16	23	12.016		
LITCHFIELD	01	1973	49	42.3	34	50	30.286	24	1
LITCHFIELD	01	1974	59	30.4	26	35	18.064	10	
LITCHFIELD	01	1975	55	35.3	30	41	23.057	4	
MANSFIELD	01	1974	32	28.7	24	34	13.981	5	
MANSFIELD	01	1975	57	31.6	28	35	15.138	2	
MANSFIELD	02	1973	47	32.2	26	38	21.894	10	
MANSFIELD	02	1974	20	19.6	14	25	11.522		
MERIDEN	02	1974	41	42.8	34	51	28.751	35	3
MERIDEN	02	1975	43	46.6	39	54	27.237	29	1
MIDDLETOWN	03	1973	24	56.2	45	67	27.092	35	
MIDDLETOWN	03	1974	59	56.3	50	62	25.363	24	
MIDDLETOWN	03	1975	55	56.9	52	62	21.615	20	
MILFORD	01	1973	11	51.5	28	75	35.931	50	5
MILFORD	01	1974	60	49.0	42	56	31.452	42	2
MILFORD	01	1975	58	58.7	52	65	27.813	35	
MILFORD	06	1973	46	47.5	39	56	31.636	42	3
NAUGATUCK	01	1973	47	69.2	56	83	48.490	77	4
NAUGATUCK	01	1974	60	46.4	41	52	24.086	50	5
NAUGATUCK	01	1975	55	54.5	49	60	22.220	20	
NEW BRITAIN	02	1974	60	48.9	41	57	32.614	50	7
NEW BRITAIN	02	1975	55	63.5	53	74	42.422	58	2
NEW HAVEN	01	1973	28	68.0	57	79	28.239	88	8

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION PAGE 4 AIR COMPLIANCE MONITORING

POLLUTANT--NITROGEN DIOXIDE

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	MEAN	95-PCT-LIMITS LOWER	UPPER	STD DEVIATION	PREDICTED DAYS OVER 100 UG/M3	PREDICTED DAYS OVER 282 UG/M3
NEW HAVEN	01	1974	61	66.6	61	73	25.360	29	
NEW HAVEN	01	1975	57	74.8	67	82	31.130	100	5
NORWALK	05	1973	54	110.0	94	126	64.647	168	7
NORWALK	05	1974	60	72.1	65	80	31.491	67	
NORWALK	05	1975	57	83.1	74	92	36.844	113	3
NORWICH	01	1973	54	62.9	54	72	35.295	58	2
NORWICH	01	1974	61	45.7	41	50	18.562	10	
NORWICH	01	1975	58	43.9	40	48	17.119	7	
OLD SAYBROOK	01	1973	19	60.7	46	75	30.497	67	4
OLD SAYBROOK	01	1974	61	62.0	55	69	30.664	67	4
OLD SAYBROOK	01	1975	59	69.4	63	76	27.097	58	
PUTNAM	02	1973	44	42.8	35	51	28.029	35	3
PUTNAM	02	1974	61	28.3	25	31	12.823	2	
PUTNAM	02	1975	55	39.1	34	44	21.028	7	
STAMFORD	03	1973	51	83.1	65	101	67.849	100	10
STAMFORD	03	1974	10	60.1	48	73	17.832	7	
STAMFORD	07	1974	49	29.0	20	38	33.079	20	2
STAMFORD	07	1975	50	52.3	45	60	28.173	35	
STAMFORD	123	1974	48	63.6	55	72	30.799	35	
STAMFORD	123	1975	57	71.6	64	79	31.400	67	
STRATFORD	05	1973	52	76.4	66	87	41.360	77	
STRATFORD	05	1974	60	67.0	61	73	26.728	35	
STRATFORD	05	1975	60	72.0	65	78	27.511	58	
TORRINGTON	01	1973	50	52.0	42	62	37.671	35	1
TORRINGTON	01	1974	61	37.0	33	41	18.653	13	

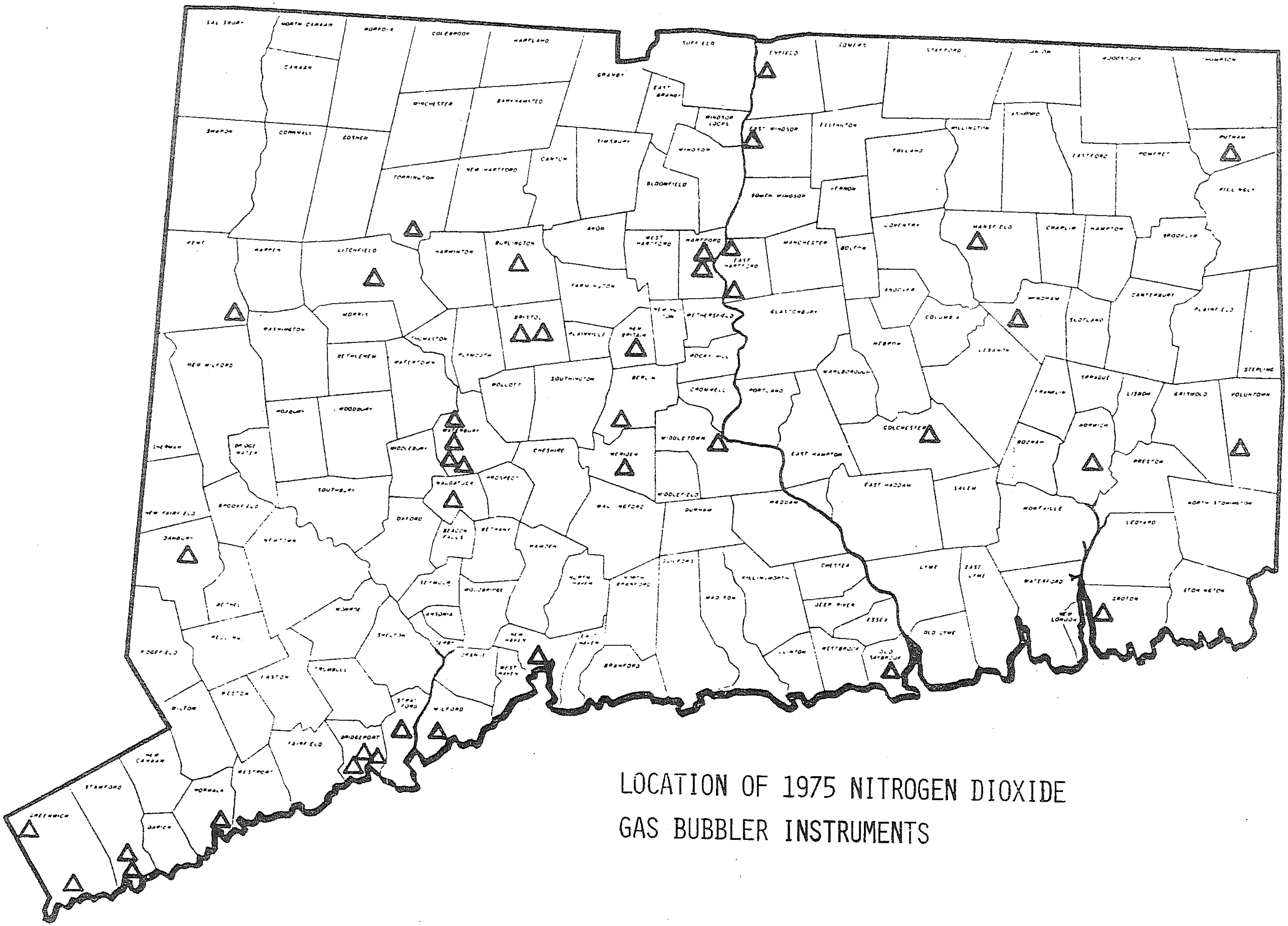
CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

AIR COMPLIANCE MONITORING

POLLUTANT--NITROGEN DIOXIDE

DISTRIBUTION--LOGNORMAL

TOWN NAME	SITE	YEAR	SAMPLES	MEAN	95-PCT-LIMITS LOWER	95-PCT-LIMITS UPPER	STD DEVIATION	PREDICTED DAYS OVER 100 UG/M3	PREDICTED DAYS OVER 282 UG/M3
TORRINGTON	01/123	1975	57	47.8	43	53	20.180	10	
VOLUNTOWN	01	1973	54	25.4	20	31	23.425	4	
VOLUNTOWN	01	1974	58	17.7	15	20	11.070		
VOLUNTOWN	01	1975	42	20.7	16	26	16.769	1	
WATERBURY	01	1973	28	64.0	55	73	23.192	58	
WATERBURY	01	1974	58	63.7	57	70	25.731	67	2
WATERBURY	01	1975	18	46.8	36	57	21.562	20	
WATERBURY	02	1974	20	30.6	24	37	14.515	13	
WATERBURY	02	1975	58	47.1	42	52	21.138	20	
WATERBURY	03	1975	50	56.3	49	64	29.337	42	
WATERBURY	123	1975	40	68.1	63	73	17.784	20	
WILLIMANTIC	01	1973	50	54.2	47	61	26.978	29	
WILLIMANTIC	01	1974	61	42.0	37	47	19.521	10	
WILLIMANTIC	01	1975	59	43.3	40	47	15.860	2	



LOCATION OF 1975 NITROGEN DIOXIDE
GAS BUBBLER INSTRUMENTS

Figure 7

VI. CARBON MONOXIDE

Conclusions:

The eight hour ambient air quality standard was frequently exceeded in many places in Connecticut. The one hour standard however, was not exceeded.

A comparison of 1975 data to 1974 data shows that maximum carbon monoxide (CO) levels were slightly lower in 1975.

Discussion of Data:

The network of carbon monoxide monitors consisted of 13 sites in 1975, 6 more than in 1974. Special, short duration monitoring projects have shown that traffic intersections where large numbers of cars must sit at idle are CO problem areas. However, the data reported in this summary is from the permanent network of sites and will be used for long-term trend evaluations.

On the maximum 8-hour CO levels Table XIII the "Count" is the number of valid 1-hour readings within the month and on the maximum 1-hour CO levels Table XIV the "Time" notation is read as: day/end of 1-hour averaging period. All CO concentrations are in parts per million (ppm).

Facts about Carbon Monoxide:

The major source of carbon monoxide (CO) outdoors is the automobile, while indoors, tobacco smoke is the major contributor. This pollutant is found in ambient concentrations high enough to cause concern in areas of high traffic density. City centers, where tall buildings constrain air flow and where traffic jams are common, are of particular concern. In contrast to ozone, carbon monoxide is very much a local problem.

Carbon monoxide disperses to innocuous concentrations rapidly, and while it is fairly stable in the atmosphere, there is no evidence of a long-term global build-up of CO.

Method of Collection:

The Air Monitoring Unit uses instruments employing non-dispersive infrared techniques (NDIR) to measure carbon monoxide levels. The instruments measure and record instantaneous CO levels continuously.

Table XII

CARBON MONOXIDE ANNUAL SUMMARY

Site	Maximum 8-Hour Average	Time[1]of Maximum 8-Hour	2nd High 8-Hour Average	Time[1]of Maximum 8-Hour	Maximum 1-Hour Average	Time[2]of Maximum 1-Hour	2nd High 1-Hour Average	Time[2]of 2nd High 1-Hour
Bridgeport 04	14.0	2/13/15	11.9	3/7/12	16.5	2/14/13	16.0	2/13/09
Bridgeport 123	8.2	11/10/01	7.4	11/12/01	10.5	11/11/21	10.5	11/19/20
Enfield 123	7.0	11/17/24	5.6	11/12/17	9.0	10/15/07	9.0	11/12/14
Greenwich 01	13.9	11/17/24	11.8	11/19/24	30.0	9/24/22	22.0	11/17/18
Groton 123	9.6	5/30/09	7.8	5/30/01	11.5	5/30/07	11.0	5/30/08
Hartford 07	9.1	2/13/23	8.5	2/14/10	11.5	2/13/17	11.0	2/13/16
Hartford 09	8.3	1/18/13	8.3	2/18/19	13.5	1/18/13	13.0	2/18/18
Hartford 123	7.1	11/12/09	6.4	10/29/13	12.4	10/14/12	12.0	10/29/09
New Britain 02	15.6	12/31/18	15.1	5/9/13	23.5	12/31/17	20.0	12/31/16
New Haven 07	11.8	10/14/24	9.5	10/14/10	17.5	10/14/08	17.5	10/14/09
Norwalk 05	15.1	11/21/01	12.5	12/6/02	22.5	10/22/07	22.5	12/5/20
Stamford 123	8.2	11/18/01	8.2	2/18/24	15.0	11/17/19	13.9	9/23/07
Waterbury 123	14.4	12/6/01	9.7	12/30/23	18.0	6/6/12	18.0	12/5/20

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

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

Note: All concentrations are in p.p.m.

Table XIII

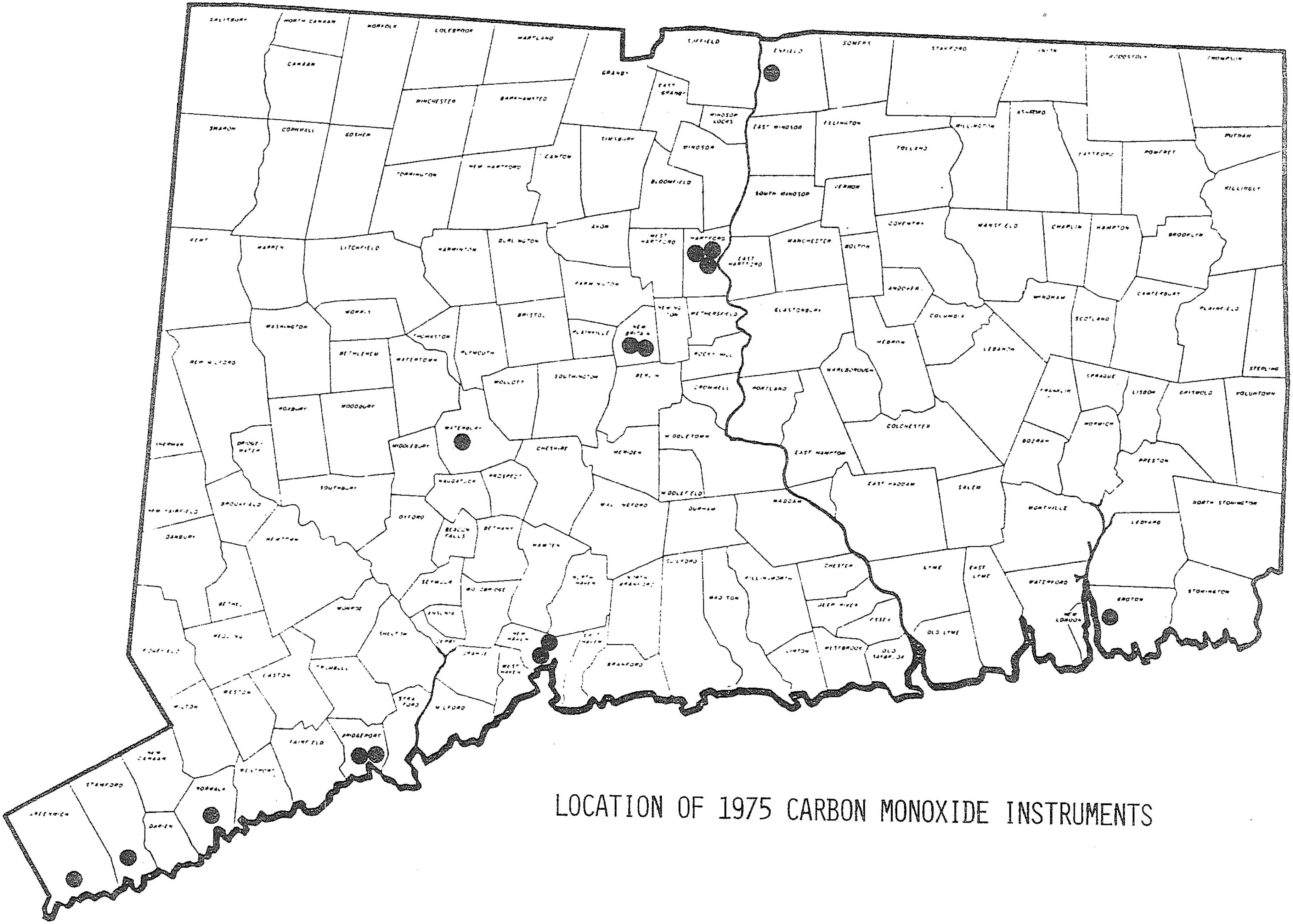
CARBON MONOXIDE
8 - HOUR MAXIMUM BY MONTHS

Site	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bridgeport 04	10.6	14.0	11.9	7.6	6.4	9.8	8.6	11.2	9.5	9.0	8.8	10.0
Count	726	651	741	361	353	718	744	742	678	740	673	648
Bridgeport 123				3.3	2.3	4.2	3.4	2.1	2.5	3.3	8.2	3.9
Count				308	521	486	215	479	695	297	717	738
Enfield 123							5.1	2.4		3.4	7.0	
Count							632	299		379	612	
Greenwich 01	9.1	10.8	10.9	5.7	5.7	5.5	6.4	5.3	6.6	9.0	13.9	8.4
Count	681	672	744	706	640	716	744	711	682	744	720	680
Groton 123					9.6	3.6	2.8	5.9	2.5	4.2	5.2	4.1
Count					116	613	637	731	257	81	624	673
Hartford 07	5.4	9.1	3.5	3.1								
Count	621	506	674	699								
Hartford 09	8.3	8.3	5.5	6.1	4.8	2.3	7.7	5.6	6.8	5.6	6.4	4.6
Count	743	671	744	719	695	720	672	586	720	743	446	453
Hartford 123							3.2	4.1	4.5	6.4	7.1	4.9
Count							418	648	277	446	662	351
New Britain 02				7.2	15.1	8.8				11.0	9.2	15.6
Count				649	739	564				578	544	716
New Haven 07						9.1	5.6	6.8	6.1	11.8	6.8	6.3
Count						636	742	742	718	669	714	717
Norwalk 05	9.9	6.4	6.5	9.5	12.3	6.5	6.5	5.6	6.8	8.3	15.1	12.5
Count	740	672	727	640	651	650	427	347	106	726	624	682
Stamford 123	5.3	8.2	4.8	4.6		1.5	3.6	4.0	4.2	7.6	8.2	4.1
Count	561	621	612	385		720	731	388	588	339	703	465
Waterbury 123					6.3	5.1	3.8	3.8	6.8	7.7	8.7	14.4
Count					62	497	652	721	710	704	700	733

Table XIV

CARBON MONOXIDE
1 - HOUR MAXIMUM BY MONTHS

Site	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bridgeport 04	15.0	16.5	15.5	9.5	10.5	16.0	12.5	16.0	12.0	13.5	15.0	14.0
Time	25/01	14/13	7/09	25/10	16/16	2/13	3/16	8/16	11/07	14/17	7/09	31/15
Bridgeport 123				3.5	4.5	4.5	4.0	4.0	5.5	8.9	10.5	5.5
Time				24/13	5/23	17/02	25/16	28/23	11/07	20/14	11/20	6/17
Enfield 123							6.5	3.0		9.0	9.0	
Time							23/21	2/22		15/07	12/14	
Greenwich 01	16.0	13.0	17.0	10.0	7.5	8.0	8.0	8.0	30.0	20.0	22.0	10.5
Time	23/18	18/22	14/17	2/23	7/21	6/15	25/16	20/20	24/22	28/08	17/18	5/23
Groton 123					11.5	6.0	3.5	6.0	2.8	5.7	6.5	6.5
Time					30/07	24/12	4/22	15/22	21/22	29/08	12/09	12/17
Hartford 07	10.5	11.5	6.0	6.5								
Time	7/17	13/17	14/16	23/08								
Hartford 09	13.5	13.0	8.5	11.5	9.0	7.0	12.5	10.0	10.5	8.5	8.5	7.0
Time	18/14	18/19	7/09	24/17	2/16	18/16	18/16	18/08	19/15	6/09	7/08	5/17
Hartford 123							8.5	10.0	7.6	12.4	11.0	10.5
Time							10/07	21/08	16/08	14/12	12/08	5/09
New Britain 02				11.5	18.0	15.5	13.5				16	23.5
Time				18/07	9.09	9/11	22/21				26/17	31/17
New Haven 07						13.5	8.0	10.0	10.5	17.5	16.0	10.5
Time						3/17	7/08	4/09	7/21	14/08	26/17	17/20
Norwalk 05	18.5	11.0	12.5	13.0	14.5	11.5	11.5	8.5	12.5	22.5	28.0	22.5
Time	24/09	28/08	6/07	1/07	23/07	12/16	29/17	6/16	30/08	22/07	8/23	5/20
Stamford 123	8.5	10.2	11.5	7.0		2.5	4.5	4.0	13.9	11.0	15.0	8.5
Time	7/20	18/23	7/08	23/07		6/21	11/04	2/10	23/07	31/19	17/19	17/09
Waterbury 123					7.5	18.0	6.9	5.0	9.0	15.0	12.5	18.0
Time					28/22	6/12	31/20	1/22	26/19	22/08	20/22	5/20



LOCATION OF 1975 CARBON MONOXIDE INSTRUMENTS

Figure 8

VII. SPECIAL MONITORING STUDIES

In an effort to improve monitoring techniques and gain a better understanding of the ambient air quality in Connecticut, the Air Monitoring Unit conducted several special studies in 1975. Although a majority of these studies pertained to the air pollutants for which EPA has established national ambient standards, some work has been done concerning other recognized pollutants. The following sections will discuss these special studies.

A. Comparison of Low Volume and High Volume TSP Measurements

In order to overcome the uncertainties introduced by partial annual sampling for total suspended particulate (TSP) matter, a continuous 30-day low volume (i.e., lo-vol) sampler has been developed and field tested. This low volume sampler, which is enclosed in a shelter similar to a hi-vol and uses the same glass fiber filter paper, 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 to 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 entire 30-day sampling interval.

In order to establish the validity of the lo-vol TSP sampling technique a field study was conducted. TSP samples were collected on the roof (elevation above ground level of about 50 feet) of the State Office Building, located in Hartford, for 12 consecutive 30-day periods from November 11, 1974 to November 5, 1975. This was accomplished by using a standard 24-hour hi-vol (individual hi-vol measurements were taken every day) and the continuous 30-day lo-vol. The results of this study are summarized in Table XV. The monthly average TSP concentrations obtained using the lo-vol were greater than or approximately equal to the arithmetic mean of 30 consecutive hi-vol measurements for 10 of the 12 intervals investigated; the variation in TSP levels ranged from -22 to +23%. The lo-vol produced annual arithmetic mean (obtained by averaging the 12 consecutive lo-vol measurements) was 8% greater than the corresponding hi-vol annual arithmetic mean (obtained by averaging the 360 consecutive hi-vol measurements). Similarly, the lo-vol produced annual geometric mean was 4% greater than the corresponding annual geometric mean obtained using the 12 30-day hi-vol averages.

A statistical examination of the data found no significant difference between the monthly TSP levels produced by using either the continuous 30-day lo-vol or the average of 30 consecutive hi-vol measurements.

Since the lo-vol collection fiber only has to be changed at 30-day intervals or 12 times a year as opposed to 61 times a year for a standard hi-vol fewer man-hours would be required to determine monthly and annual average TSP concentrations.

Presently, quarterly composited TSP hi-vol samples are analyzed for several chemical species. The lo-vol sample requires less manipulation since it does not have to be composited and, therefore, introduces less potential error. Furthermore, since the lo-vol collects approximately 2 to 3 times as much sample by weight than a standard 24-hour hi-vol, the lo-vol should provide a more accurate chemical characterization of the TSP.

As a result of this study hi-vols will be replaced with lo-vols at certain sampling locations, especially those which provide information concerning background TSP concentrations. The lo-vol samples will be used for assessment of the current annual air quality standard for TSP, in addition to being chemically analyzed for sulfates, nitrates and heavy metals.

Table XV

COMPARISON OF LOW VOLUME AND HIGH VOLUME TSP MEASUREMENTS

Sampling Period	TSP Concentration, μg/m³ Lo-Vol	Hi-vol*	Lo-vol/Hi-vol
November 11, 1974 - December 10, 1974	47	43	1.09
December 11, 1974 - January 10, 1975	61	56	1.09
January 11, 1975 February 8, 1975	74	65	1.14
February 10, 1975 - March 10, 1975	79	64	1.23
March 11, 1975 - April 9, 1975	72	64	1.13
April 10, 1975 - May 10, 1975	51	55	0.93
May 10, 1975 - June 8, 1975	73	63	1.16
June 9, 1975 - July 8, 1975	59	49	1.20
July 9, 1975 - August 8, 1975	53	52	1.02
August 9, 1975 September 6, 1975	36	46	0.78
September 7, 1975 October 6, 1975	37	38	0.97
October 7, 1975 November 5, 1975	45	43	1.05
Annual Arithmetic Mean	57	53	1.08
Annual Geometric Mean	55	53	1.04

*The arithmetic average of
30 consecutive 24-hour
hi-vol measurements

B. Survey to Determine the Particle Size Distribution of Total Suspended Particulate Matter

One of the most important properties of suspended particulate matter is the particle size distribution. The degree to which suspended particles penetrate the respiratory system is a direct function of the particle size; the smaller particles (i.e., those below 1 μ) deposit in the pulmonary region of the respiratory tract where they remain for long periods of time. The size distribution of the particles, therefore, must be determined before their hazardous effects on health can be properly assessed. Furthermore, the sizes and chemical composition of suspended particles affect visibility, particle-particle and particle-gas interactions, soiling, deterioration of materials, and a wide range of other atmospheric, meteorological and geophysical phenomena including precipitation formation and the scattering of solar radiation back into space.

Technological advances toward increased burning efficiency of fossil fuels and improved control techniques for stack effluents will probably decrease larger particle emissions, but will also increase the percentage of particles in the respirable range. Thus, while the air appears cleaner and TSP levels decrease, the more harmful submicron particulate fraction may increase. Therefore, particulate control strategies should require decreases in both TSP concentrations and the submicron fraction.

The current method used to measure TSP levels (hi-vol method) does not provide accurate sizing or fractioning of the collected mass and, therefore, no assessment can be made of the particle size distribution.

An Anderson impactor sampler is a device used to measure the particle size distribution of suspended particulate matter by separating the particles according to size using differences in their aerodynamic dimensions. Five stages are used in series. Each stage has a different air inlet geometry so that air velocities increase progressively with descending stages. Particulates with a large aerodynamic mass are impacted on the upper stages where the air velocities are low, whereas particles with small aerodynamic mass are impacted on the lower stages where the air velocities are high.

Anderson impactor data have been collected at certain locations throughout Connecticut (see Table XVI). A large portion of Connecticut's suspended particulate matter (between 25 to 50% by weight) are submicron particulates. Anderson data will continue to be collected in Hartford so that changes in total suspended particulate levels along with the change in the submicron fraction can be ascertained.

Table XVI

Fraction of the Total Suspended Particulate Matter Levels in the Most Respirable Range

Location	Percent of Total Suspended Particulate Matter Concentrations Below 1µ*
Stamford	33
New Haven	52
Greenwich	33
Bridgeport	44
Hartford	27
North Canaan	25
Old Saybrook	29
Waterbury	34

*1µ=10^{-6} meters; those suspended particles with diameters of less than 1µ can be considered to be in the most respirable portion as they penetrate deep into the pulmonary region of the respiratory tract.

C. Ambient Air Asbestos Survey

An ambient air asbestos survey is being conducted to define the magnitude of the hazard posed by airborne asbestos fibers. Approximately 30 monitoring sites have been selected; locations included "typical" rural regions, urban areas, non-urban locales and stations contiguous to known sources of asbestos emissions (e.g., vehicle brake erosion at toll booths and asbestos-related industry).

The newly developed low volume particulate sampler, which runs continuously for a 30-day period is being used to collect ambient TSP samples for subsequent asbestos determination. Membrane collection filters are being used. The asbestos determination is being performed by the Batelle-Columbus Laboratories using electron microscopy. Separate analyses are being made by each filter for serpentine (e.g., chrysotile) and amphibole (e.g., amosite, tremolite, crocidolite, etc...) asbestos types. Serpentine asbestos will be reported as mass per cubic meter of air sampled, while amphibole asbestos will be reported as both mass and number of fibers per cubic meter of air sampled.

This survey is still in progress, but should be completed by the end of fiscal year 1975-1976.

D. Sulfur Dioxide Bubbler Data

The current EPA reference method for the non-continuous manual measurement of atmospheric SO_2 is the modified West-Gaeke Bubbler Method. This procedure involves the collection of SO_2 in a solution of tetrachloromercurate (TCM). After collection, the solution is taken to the laboratory and analyzed colorimetrically by reaction with pararosaniline and formaldehyde. The thermal stability of SO_2 in TCM can be somewhat enhanced by the addition of the disodium salts of ethylene-diamine-tetracacetic acid, a procedure which is currently used by the Connecticut Air Monitoring Unit. However, internal bubbler temperatures in excess of 90°F can adversely affect the thermal stability of the SO_2-TCM solution.

Briefly, radiation heating and the heat generated by the bubbler's mechanical pump is not always adequately dissipated. During the warmer months, samplers located out-of-doors and in direct sunlight or in poorly ventilated areas have been reported to experience internal temperatures well in excess of 120°F. At temperatures between 90 and 110°F, SO_2 sample decay rates of 10 to 40% per day have been observed. At 105°F, Connecticut observed that over 15% of the absorbed SO_2 was lost after only 12 hours and over 40% was lost after 24 hours. Thus, a day or two delay between sample collection and laboratory analysis when the samples have been subjected to elevated temperatures (i.e., temperatures above 90°F) can introduce large errors in the SO_2 determination due to the loss of absorbed SO_2. Furthermore, it appears that SO_2 is lost while the sampling is still in progress, particularly during the warmer months. Several other state air pollution control agencies (e.g., Texas and Illinois) have expressed concern over the thermal stability of the SO_2-tetrachloromercurate solution and have conducted studies to quantify the effect of temperature on SO_2-TCM solution stability. In a January 30, 1976 EPA memo Roger Strelow, Assistant Administrator, for Air and Waste Management and Wilson K. Talley, Assistant Administrator for Research and Development stated: "...much of the SO_2 collected in bubbler samples may be lost because the sample containers are kept at high temperatures...the average of all the ratios [of continuously measured SO_2 to bubbler averages] is about two... It should be remembered that other AQCR's [Air Quality Control Regions] may be exceeding standards, but would not be picked up...if their SO_2 monitoring practices would result in more than half of the SO_2 being lost from the bubbler samples."

The results of these studies support the conclusions reached by the Connecticut DEP. The Department, therefore, regards all previous SO_2 bubbler data as invalid and will not present this data until the problems associated with the collection, storage and transport of bubbler samples can be corrected.

E. 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. "Airborne Sulfates, Summary Report", Housman, Connecticut DEP, March, 1975.
2. "The Precision of T.S.P. Measurements as a Function of Sampling Frequency", Kramer, Connecticut DEP, March, 1975.
3. "A Low Volume Particulate Ambient Air Sampler", Bruckman, Hyne, Norton, Connecticut DEP, October, 1975.
4. "A New Method of Sampling for Suspended Particulates", Hyne, Norton, Connecticut DEP, September, 1975.
5. "Aerial Ozone Measurements Over New Jersey, New York, and Connecticut", Wolff, Stasiuk, Coffey, Pasceri, June, 1975.
6. "Ozone Transport", Rubino, Bruckman, Magyar, June, 1975.
7. "U.S. EPA Symposium 1975 Oxidant Transport Studies", Wolff, Lioy, Wight, Pasceri, January, 1975.
8. "Anatomy of Two Ozone Transport Episodes in the Washington, D.C. to Boston, Massachusetts Corridor", Wolff, Lioy, Meyers, Cederwall, Wight, Pasceri, Taylor, February, 1976.
9. "Aerial Investigation of the Ozone Plume Phenomenon", Wolff, Lioy, Wight, Pasceri, March, 1976.

VIII. CLIMATOLOGICAL DATA

Weather is usually the most significant factor influencing short term changes in air quality and may also have an affect on long-term trends. In Tables XVII and XVIII monthly averages of the 1975 climatological data at Bradley International Airport and Sikorsky Memorial Airport are compared to the "normal". The normal is determined from meteorological data recorded from 1941 to 1970. These comparisons show that 1975 had slightly higher temperatures and more precipitation than a normal year might have had.

Windroses, which would normally be included in a document such as this, were not available at the time of publication.

Table XVII

1975 CLIMATOLOGICAL DATA

Bradley International Airport
Windsor Locks

	Average Temperatures°F		Number Of Days On Which Max. Temperature Exceeded 90°F		Degree Days		Precipitation In Inches Water Equivalent		Number Of Days With More Than .01 Inches Of Precipitation		
	1975	Normal	1975	Normal	1975	Normal	1975	Normal	1975	Normal	
January	31.2	24.8	0	0	1040	1246	4.30	3.28	14	10	January
February	29.7	26.8	0	0	986	1070	3.22	3.17	13	11	February
March	35.9	35.6	0	0	894	911	3.82	3.82	15	11	March
April	45.8	47.7	0	*	567	519	2.99	3.75	6	11	April
May	64.6	58.3	4	1	111	226	3.29	3.50	14	11	May
June	68.3	67.8	3	4	43	24	3.83	3.53	10	11	June
July	76.1	72.7	9	8	0	0	6.11	3.41	11	10	July
August	71.8	70.4	7	5	11	12	4.60	3.94	13	10	August
September	61.7	62.8	0	2	121	106	9.02	3.55	14	10	September
October	55.7	52.6	0	*	292	384	5.28	3.03	8	8	October
November	48.2	41.3	0	0	503	711	4.57	4.33	10	12	November
December	28.5	28.2	0	0	1125	1141	4.31	4.06	13	13	December
Year	51.5	49.1	23	20	5693	6350	55.34	43.37	141	127	

* - Less than 1/2

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

Table XVIII

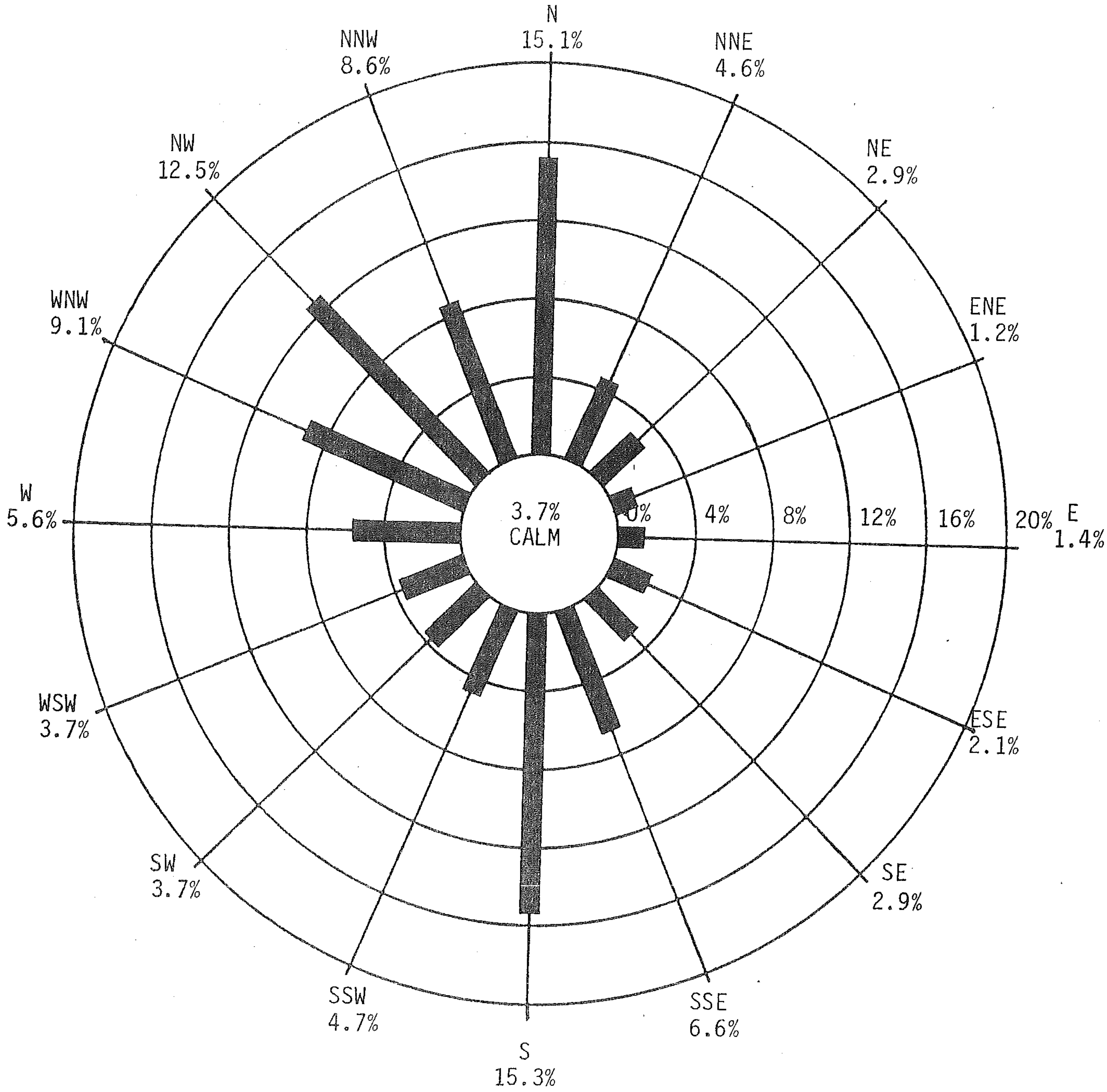
1975 CLIMATOLOGICAL DATA

Sikorsky Memorial Airport
Bridgeport

	Average Temperatures°F		Number Of Days On Which Max. Temperature Exceeded 90°F		Degree Days		Precipitation In Inches Water Equivalent		Number Of Days With More Than .01 Inches Of Precipitation		
	1975	Normal	1975	Normal	1975	Normal	1975	Normal	1975	Normal	
January	35.3	30.2	0	0	916	1079	4.70	2.71	13	11	January
February	32.2	30.9	0	0	907	955	3.11	2.71	11	10	February
March	36.8	37.9	0	0	866	840	3.05	3.49	16	11	March
April	44.7	48.4	0	0	604	498	2.49	3.39	7	11	April
May	61.9	58.3	0	*	141	225	3.27	3.57	9	11	May
June	67.2	67.9	0	1	34	24	3.39	2.56	10	9	June
July	74.5	73.8	1	4	0	0	6.48	3.44	11	8	July
August	74.0	72.7	6	1	0	0	1.91	3.80	8	9	August
September	64.5	66.5	0	*	59	42	6.18	2.88	11	9	September
October	59.0	56.8	0	0	190	261	3.96	2.79	9	6	October
November	50.5	46.0	0	0	432	570	4.41	3.83	9	10	November
December	35.5	33.8	0	0	908	967	4.50	3.44	14	11	December
Year	52.7	51.9	7	7	5159	5461	48.77	38.61	127	117	

* - Less than 1/2

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

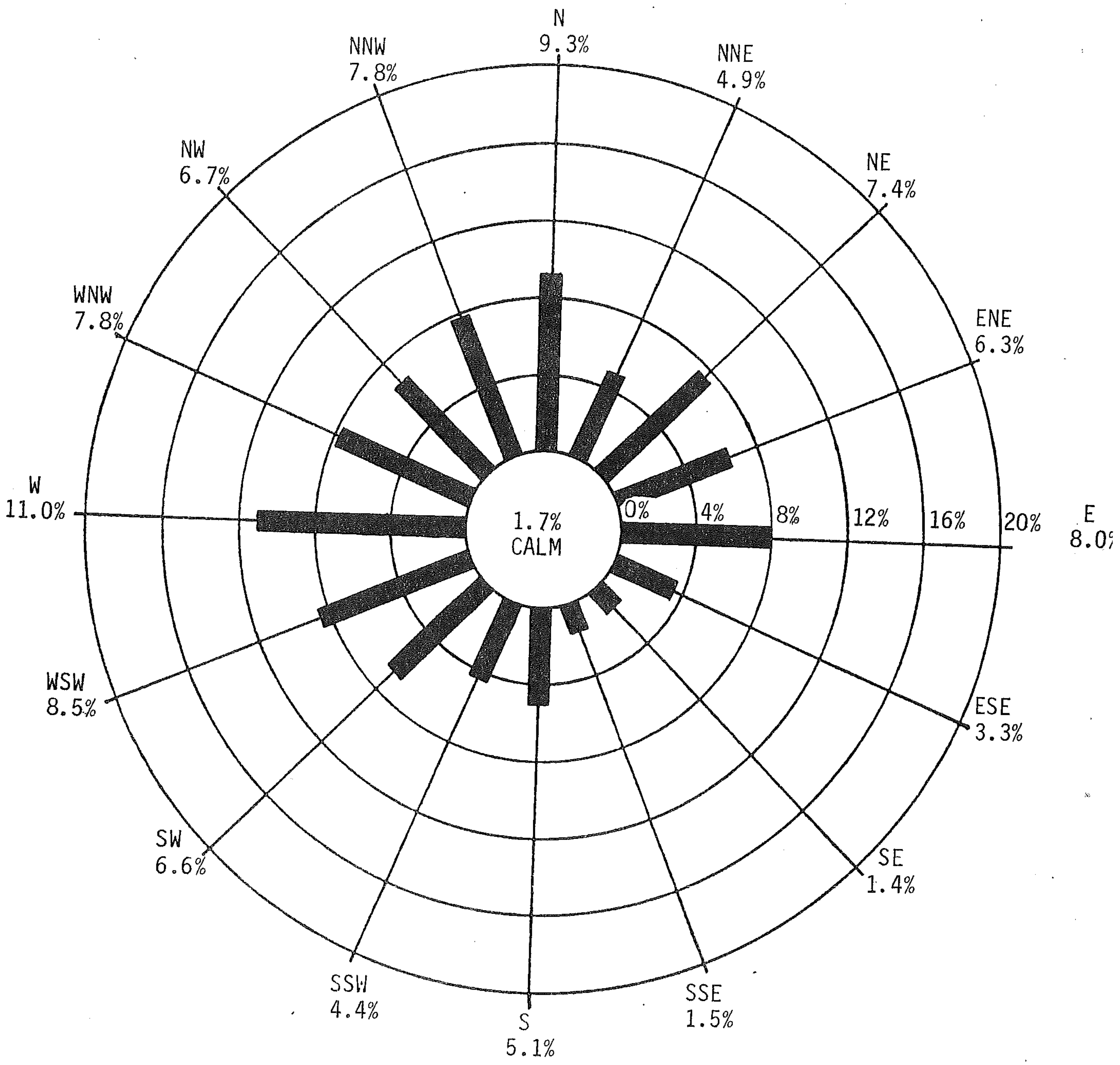


WIND ROSE

BRADLEY AIRPORT

ANNUAL 1975

WIND FREQUENCY APPEARS BENEATH EACH DIRECTIONAL ABBREVIATION



WIND ROSE

SIKORSKY MEMORIAL AIRPORT

ANNUAL 1975

WIND FREQUENCY APPEARS BENEATH EACH DIRECTIONAL ABBREVIATION

APPENDIX

95% CONFIDENCE BAND

The frequency of air monitoring necessary to characterize total suspended particulate (TSP) matter levels for a given time period and region is an important issue, especially when determining compliance with current national air quality standards. If air quality measurements are taken every day, one could determine with 100% confidence whether or not these standards have been either achieved or violated (disregarding measurement errors and the fact that even with 365 samples you only have midnight-to-midnight data, not running 24-hour averages). Manpower limitations and prohibitive cost do not permit sampling every day, as is indicated by the present procedure where TSP samples are collected by the standard high volume 24-hour sampler (i.e., hi-vol) once every sixth day (61 samples a year). However, when there are not 365 measurements each year, the degree of certainty associated with meeting air quality standards is lower. For example, the 95% confidence intervals about the national primary annual air quality standard for TSP (75 μg/m^3, annual geometric mean) are 67 and 84 μg/m^3, respectively (Figure 9), assuming a geometric standard deviation of 1.6 (typical values for Connecticut vary between 1.4 and 1.7) for a sampling frequency of every 6th day. Thus, annual geometric means falling between 67 and 84 μg/m^3 lie in a "region of uncertainty" as to whether or not the annual TSP standard has either been achieved or exceeded. Even if the sampling frequency were increased to once every 3rd day (or 122 measurements a year), the 95% confidence interval about the standard would be 70 to 80 μg/m^3, respectively which still represents a considerable possible uncertainty (i.e., ±5 μg/m^3). The Department, therefore, has calculated and presented 95% confidence bands for each annual geometric mean TSP concentration (see Table III) for the purpose of further qualifying the precision of reported annual TSP levels.

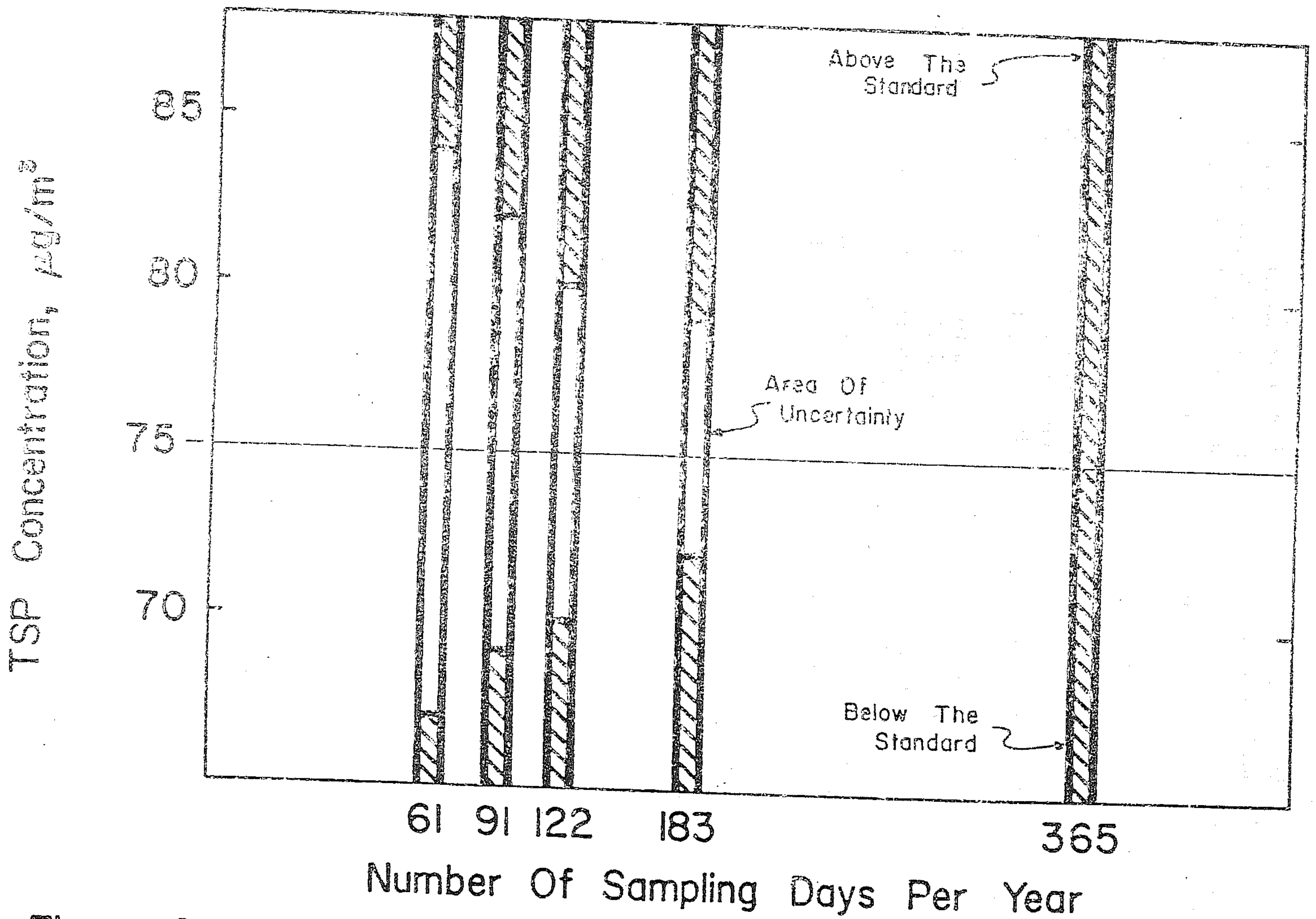


Figure 9 95% Confidence intervals around the geometric mean of 75µg/m³ for various sampling frequencies (assuming a geometric standard deviation of 1.6).