

1994 Annual Report



AIR QUALITY PROGRAM

Table of Contents

	Page
Executive Summary	3
Criteria Pollutants	8
Standards	9
Stations Exceeding the Standards	10
Washington State Nonattainment Areas	11
Local Air Pollution Authorities	14
Monitoring Site Changes	15
Emission Check Areas	16
Glossary	18
Coastal Area	20
Puget Sound Area	26
Northwest Area	45
Southwest Area	48
Yakima County Area	52
Spokane County Area	55
Central Area	63
Eastern Area	67
Visibility Data	69

Acknowledgments

Phyllis Baas
Tami Dahlgren
Tom Schuettke
Frank Soiza
Frank Van Haren

Design: Apple & Associates

To receive additional copies of this report, please contact:

Carolyn Peterson
Air Quality Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

The Department of Ecology is an equal opportunity agency and does not discriminate on the basis of race, creed, color, disability, age, religion, national origin, sex, marital status, disabled veteran's status, Vietnam Era veteran's status or sexual orientation.

If you have special accommodation needs or require this document in alternative format, please contact Tami Dahlgren at (360) 407-6830 (voice) or (360) 407-6006 (TDD only).

Executive Summary

The Air Quality Program of the Washington State Department of Ecology works to carry out federal and state requirements to improve the air quality the state. In 1993 (and the first half of 1994), we have made substantial progress toward controlling air pollution in the following major areas.

Air Quality Trends

In general, the air quality trends throughout the state are improving. There were few observations above the standard for the pollutants of most concern [particulates (PM₁₀), carbon monoxide (CO) and ozone]. Except in Spokane and Wallula where windblown dust increases PM₁₀ levels, there were no areas of the state where PM₁₀ observations were above the federal standard. The Spokane area exceeded the standard six times in 1993 and the Wallula area one time.

For carbon monoxide, there were no observations above the standard in the Vancouver and Puget Sound nonattainment areas and seven in the Spokane area (down from 22 in 1991). Because of continuing strategies such as oxygenated fuel in the winter months, expanded vehicle emission check programs and commute trip reduction programs this downward trend should continue.

For ozone, the trend line is fairly flat and, though relatively close to the standard, there were no times when the standard was exceeded in 1993. We can attribute this improvement to efforts to reduce pollution from cars and gasoline.

Business Assistance Program

The Compliance Advisory Panel to the Business Assistance Program recently defined its missions and goals. The panel has seven members appointed by the Governor, the Legislature and the Director of Ecology. They represent the statewide regulated community, especially small business. The panel will meet regularly to represent business interests and to ensure consistency in air quality Regulations. The panel is only one of six that have been set up throughout the United States. All fifty states are required to have such a panel by November 1994.

Outreach to dry cleaners to conform with new federal relations was a major thrust of the program in early 1994. Ecology and the Washington State Dry Cleaners Association coordinated a teleconference training session for dry cleaning businesses throughout the state. The training helped businesses meet a U.S. Environmental Protection Agency (EPA) deadline for submitting certain reporting materials and assisted businesses in future pollution prevention and regulatory compliance efforts. There was extensive outreach to Korean-speaking dry cleaners and effective coordination among industry and national, state and local government agencies. Close to 100 people attended the training in six locations.

Motor Vehicle Emission Check Program

Motor vehicles in Washington annually release nearly 1.4 million tons of pollutants into the air. Vehicle emissions make up 55% of the air pollutants in Washington. Motor vehicle emission checks are required in carbon monoxide and ozone nonattainment areas. The Vehicle Emission Inspection Program expanded in 1993 to include more counties and other enhancements. There

Executive Summary

were 196,525 more cars tested in 1993 than in 1992. (See pages 16-17 for emission check areas) In addition, the diesel testing program began in mid 1993 to lower particulate exhaust emissions.

Clark and Pierce Counties were added to the Emission Check Program in 1993. In Pierce County 18,000 vehicles have been inspected monthly; 8,000 have been inspected monthly in Clark County. The EPA estimates a 20% reduction in emissions of carbon monoxide with an emission check program. Since the inspections are every other year, the emission reductions benefits take a few years to be realized. With a 10% reduction in the first year, carbon monoxide emissions were decreased by about 7700 tons in Clark County and 219,600 tons in Pierce County.

On the average in the emission check -programs around the state, there was a 73% improvement in carbon monoxide emission in vehicles which passed their retests after having some sort of emissions-related repairs or adjustments.

Regulating Industrial Sources

The Clean Air Washington Act requires Ecology to develop rules establishing an operating permit program for large industrial and large commercial sources of air pollution. The purpose of the program is to enhance industry's accountability and compliance by clarifying in a single document which air quality requirements apply to a given business or industry.

Growth leads to growth in emissions. More cars cause more exhaust. More production means greater discharges. It is important to balance such growth with air quality goals so that new sources emit no more than necessary. By becoming more comprehensive and consistent, Ecology is doing a better job of permitting new commercial and industrial sources.

Sources operate more cleanly using air pollution control technology and pollution prevention procedures. Proper controls reduce emissions by at least 90%. Without them, emissions from sources permitted last year might have been 5,000 tons greater.

Working with existing facilities is also important. One example of the effect of Ecology's work with industry is the Plum Creek plywood mill in Arden (Stevens County). Particulate emissions from the old scrubber were decreased substantially after Ecology's intervention in 1993. Plum Creek installed an electrostatic precipitator in November 1993, bringing the tons of particulate pollution emitted per year to 18 from 52.

In another instance, the Town of Friday Harbor modified the town's incinerator so that it is now capable of operating within the conditions of its permit.

Gasoline Vapor Recovery

Stage I is a name for the equipment that captures vapors from gasoline storage tanks while they are being filled. In eastern Washington, implementing Stage I gasoline vapor recovery in 1993 translates to a reduction of 634 tons of volatile organic compounds (VOCs) from gasoline facilities. (In western Washington, Stage I is the responsibility of local air pollution control agencies.) This is nearly a 38% decrease in emissions. A small amount of the VOC emissions is benzene, a toxic, cancer-causing compound. The estimated reduction of benzene emissions in eastern Washington is 4.91 tons.

Executive Summary

Chlorofluorocarbons (CfCs)

The Clean Air Washington Act requires people who repair service or dispose of any air conditioning, heating or refrigeration system that uses ozone-depleting chemicals to recover and recycle them. It also bans the sale of nonessential products containing gases harmful to the ozone layer if substitutes for the products are readily available.

In 1993, Ecology's CFC inspector discovered on retail shelves a drop-in replacement for recharging automobile air conditioning systems called OZ-12. Manufactured by a Post Falls, Idaho company, OZ-12 was found to be potentially explosive and high flammable. The National Highway Traffic Safety Administration asked for a voluntary recall of OZ-12.

While this is a safety issue, Ecology's work called attention to the problem of ozone-depleting refrigerants. As of January of 1995, the refrigerant currently used in automobiles, R-12, will no longer be produced.

Agricultural Burning

Hundreds of acres of fields, along with the collected trimmings and cuttings of many more acres, are burned annually in Washington State to eliminate debris and control weeds or plant diseases. This results in an estimated 100,000 tons of pollution each year.

Although it is difficult to estimate, Ecology believes that the agricultural burning interim permit program started in 1992 resulted in significant reductions in smoke from burning agricultural residue. Eastern central regions of Ecology offered technical assistance and answered hundreds of calls from farmers responding to written materials in the interim permit application packets produced in 1992.

Because of these efforts, an estimated 30,000 acres of crop residue were not burned in 1993. Using the standard formula of one acre providing three tons of fuel and 150 pounds of criteria pollutant produced per ton burned, Washington State saw an estimated reduction of 6,750 tons of emissions.

In early 1994, Ecology conducted an unprecedented public involvement campaign to get the ideas of farmers and others on the recently completed draft agricultural burning regulation. Twenty-three workshops were presented statewide, with approximately 700 people attending.

Hundreds of comments were received during the workshops and many letters as well. In general, most comments fit into one of several categories. These included the proposed fees, accountability for research funding, the increasing regulatory load on agriculture, and the need to take economics into account.

As a result of this input, substantial changes were made to the draft regulation as we prepare to go to public hearing later this year.

Slash Burning (Forest Debris Burning)

The Department of Natural Resources has the lead on developing rules for slash burning and has established a system for regulating forest debris burns. The number of requests to do forest prescribed burning during the 1993 spring season dropped substantially from last year's number. A trend toward a rapid decrease in overall burning is now becoming evident. Burning practices have also changed, with more pile burning taking place rather than broadcast burning. Pile

Executive Summary

burning allows for better control because the piles can wait for the best weather conditions (cloudy) and become dry as they wait. Consequently, pile burning has less impact on air quality.

Northport, WA

The small town of Northport, near the Canadian border in the northeast corner of the state, was a hub of air quality activity in 1993 and early 1994. Because of health concerns of local residents, the state Department of Health asked Ecology to conduct air monitoring in order to ascertain whether air pollution was a contributing factor.

In early 1993 five monitors were installed, primarily to identify maximum lead concentrations to help the Department of Health with its blood-lead study. Later in the year, with seven monitoring sites, elevated levels of arsenic and cadmium were found in the Northport area.

Ecology conducted computer modeling to “predict” from where the pollutants were coming and where they would likely be deposited. The modeling confirmed results from the monitoring: Pollutants from the Cominco Ltd. smelter in Trail, British Columbia could easily travel down the Columbia River Valley resulting in high concentrations of pollutants in the study area.

Partly as a result of this study and an agreement signed by state and provincial governments, Ecology will have a chance in the future to review and influence Cominco’s permit. Cominco now plans to build a modern, new facility which will dramatically reduce pollution.

State Implementation Plan

Federal law requires the state to take actions to quickly reduce air pollution to healthful levels in a nonattainment area, and to provide enough control to keep the area clean for 20 years. The framework for achieving these goals is a State Implementation Plan (SIP), a broad, statewide plan developed by Ecology and other affected agencies.

Washington’s SIP contains both regulatory and non-regulatory pieces. Regulatory pieces include specific statutes and state and local regulations for controlling air pollutants. Non-regulatory pieces include such things as emission inventories; planning processes for determining how to reduce emissions of specific pollutants; and attainment demonstrations. Attainment demonstrations show the effects of the planned actions on air quality.

Actions that will be taken by Ecology and other state and local agencies to bring air quality back to healthful levels are outlined in “Attainment Plans.” These plans are developed for each pollutant that exceeds federal air quality standards in each nonattainment area. An Attainment Plan also describes control measures that will be used to reduce air pollution levels in the nonattainment area.

Further work on Attainment Plans continued during 1993:

Carbon Monoxide

Revised Attainment Plans for the Puget Sound, Spokane and Vancouver nonattainment areas were submitted to EPA on January 22, 1993. The plans provided a demonstration that the Puget Sound and Spokane areas will attain the federal health standard for carbon monoxide by December 31, 1995, as required by the federal Clean Air Act. The act does not require an attainment demonstration for the Vancouver area.

Executive Summary

Contingency measures for failure to attain the federal health standard in the Vancouver area were submitted to EPA in November 1993 to fulfill an additional federal requirement. The state's improved vehicle emission check program reduces carbon monoxide emissions from motor vehicles more than is federally required for a basic emission check program. This extra reduction goes beyond federal Clean Air Act requirements and provides a margin of safety that helps ensure attainment of the federal health standard. EPA allows measures that provide a margin of safety to serve as early implementation contingency measures.

Ozone

Monitoring data for the years 1991-93 demonstrated that air quality in the Puget Sound and Vancouver nonattainment areas met the federal health standard for ozone by November 15, 1995, as required by the federal Clean Air Act.

Particulate Matter

Approvals of the Attainment Plans for Thurston County (Olympia-Lacey-Tumwater) and Kent Valley were published in the July 27, 1993, Federal Register. These were among the first half-dozen PM₁₀ Attainment Plans approved nationwide by EPA.

Ecology continued to work with the Spokane County Air Pollution Control Authority, City of Spokane, Spokane County, and others on a plan for attaining the PM₁₀ standard in Spokane by December 31, 1994. Observations in March 1993 demonstrated that traction materials (such as sand), a previously unsuspected PM₁₀ source, could be the major cause of levels above the standard under certain winter conditions. This discovery further complicated the already complex analysis of the PM₁₀ problem in Spokane. It also necessitated the development of control measures for traction materials.

The plan being developed for 1994 adoption and submission to EPA will address all significant sources of PM₁₀ within the nonattainment area. These include unpaved roads, paved roads (primarily snow traction material), and residential wood stoves.

EPA has agreed to defer designating a nonattainment area in the TriCities area. In lieu of a formal designation a Memorandum of Agreement has been signed by EPA Ecology and the Benton Franklin Counties Clean Air Authority to characterize the sources of PM₁₀ in the area, develop a dust control regulation, do public outreach and encourage controls on agricultural lands.

Windblown dust in the Columbia Plateau continues to be a large problem impacting Spokane, the TriCities, smaller towns and rural areas. The Agricultural Research Service at Washington State University has begun an extensive research project to study this source. The Soil Conservation Service is hiring two field staff to work with farmers on controls.

Sulfur Dioxide

On behalf of the Governor, the Director of Ecology requested that EPA reclassify an area of Tacoma from *unclassifiable to attainment* for sulfur dioxide. While there were historical concerns about the air quality in the area due to the ASARCO lead smelter in Ruston, the area has met the standard since ASARCO shutdown.

Criteria Pollutants

Criteria Pollutants						
Pollutant	Particulates PM ₁₀	Carbon Monoxide CO	Ozone O ₃	Nitrogen Dioxide NO ₂	Sulfur Dioxide SO ₂	Lead Pb
Description	Particles less than 10 microns in size	An odorless, tasteless, colorless gas which emitted primarily from any form of combustion	Formed when nitrogen oxides and volatile organic compounds react with one another in the presence of sunlight and warm temperatures. A component of smog.	A poisonous gas produced when nitrogen oxide is a by-product of sufficiently high burning temperatures.	A gas or liquid resulting from the burning of sulfur-containing fuel.	A widely used metal, which may accumulate in the body.
Sources	Wood stoves, Industry, Dust, Construction, Street sand application, Open burning	Mobile sources (autos, trucks, buses), Wood stoves, Open burning, Industrial combustion sources.	Mobile sources, Industry, Power plants, Gasoline storage and transfer, Paint.	Fossil fuel power, Mobile sources, Industry, Explosives manufacturing, Fertilizer manufacturing.	Fossil fuel power plants, Non-ferrous smelters, Kraft pulp production.	Leaded gasoline, Smelting, Battery manufacturing and recycling.
Health Effects	Aggravates ailments such as bronchitis and emphysema, especially bad for those with chronic heart and lung disease, as well as the very young and old, and pregnant women.	Deprives the body of oxygen by reducing the blood's capacity to carry oxygen; causes headaches, dizziness, nausea, listlessness, and in high doses, may cause death.	Irritates eyes, nose, throat and respiratory system; especially bad for those with chronic heart and lung disease, as well as the very young and old, and pregnant women.	Harmful to lungs, irritates bronchial and respiratory systems; increases symptoms in asthmatic patients.	Increases symptoms in asthmatic patients; irritates respiratory system.	Affects motor function and reflexes and learning; causes damage to the central nervous system, kidneys and brain. Children affected more than adults.

Standards

Ambient Air Quality Standards

Pollutant	National Primary	National Secondary	Washington State
Total Suspended Particulates (TSP) Annual Geometric Mean 24 – Hour Average	No Standard No Standard	No Standard No Standard	60 µg/m ³ 150 µg/m ³
Lead (Pb) Quarterly Average	1.5 µg/m ³	1.5 µg/m ³	1.5 µg/m ³
Particulate Matter (PM₁₀) Annual Arithmetic Mean 24 – Hour Average	50 µg/m ³ 150 µg/m ³	50 µg/m ³ 150 µg/m ³	50 µg/m ³ 150 µg/m ³
Sulfur Dioxide (SO₂) Annual Arithmetic Mean 24 – Hour Average 3 – Hour Average 1 – Hour Average	0.03 ppm 0.14 ppm No Standard No Standard	No Standard No Standard 0.50 ppm No Standard	0.02 ppm 0.10 ppm No Standard 0.40 ppm ^a
Carbon Monoxide (CO) 8 – Hour Average 1 – Hour Average	9 ppm 35 ppm	9 ppm 35 ppm	9 ppm 35 ppm
Ozone (O₃) 1 – Hour Average ^b	0.12 ppm	0.12 ppm	0.12 ppm
Nitrogen Dioxide (NO₂) Annual Average	0.05 ppm	0.05 ppm	0.05 ppm

a – 0.25 ppm not to be exceeded more than two times in any 7 consecutive days.

b – Not to be exceeded on more than 1 day in a calendar year as determined under the conditions indicated in Chapter 173-475 WAC

NOTES:

- (1) ppm = parts per million
- (2) µg/m³ = micrograms per cubic meter
- (3) Annual Standards never to be exceeded, short-term standards not to be exceeded more than once per year unless noted.

Stations Exceeding the Standard

Carbon Monoxide (8-hour standard) Primary Standard = 9.5 ppm

There were six exceedances of the carbon monoxide standard during 1993, recorded at two stations located in Spokane.

Station 3278040, Hamilton Street:

November 10, 1993 (10.1 ppm)
November 11, 1993 (9.8 ppm)

Station 3600002, Empire Ford:

February 5, 1993 (9.5 ppm)
November 8, 1993 (9.7 ppm)
November 10, 1993 (11.8 ppm)
November 11, 1993 (12.7 ppm)

Particulate Matter/PM₁₀ (24-hour standard)
Primary Standard = 150 µg/M³

There were 19 exceedances of the PM₁₀ standard during 1993, recorded at eight stations located in Spokane, Wallula, Kennewick, Othello and Cheney.

Spokane

Station 3278040, Auto Glass:

September 11, 1993 (297 µg/M³)*
November 3, 1993 (156 µg/M³)

Station 3250004, Millwood:

November 3, 1993 (176 µg/M³)

Station 3278009, Crown Zellerbach:

March 10, 1993 (166 µg/M³)
March 11, 1993 (174 µg/M³)
September 11, 1993 (300 µg/M³)*
November 3, 1993 (207 µg/M³)

Station 3200018, Nazarene Church:

March 9, 1993 (267 µg/M³)
March 10, 1993 (204 µg/M³)
March 11, 1993 (268 µg/M³)
March 12, 1993 (287 µg/M³)
March 13, 1993 (157 µg/M³)
September 11, 1993 (255 µg/M³) *
November 9, 1993 (152 µg/M³)

Wallula

Station 3600002, Walla Walla Co.:

May 25, 1993 (195 µg/M³)

Kennewick

Station 0340001, Columbia Center:

May 13, 1993 (155 µg/M³)
November 3, 1993 (1166 µg/m³)*

Othello

Station 0160003:

November 3, 1993 (224 µg/M³)

Cheney

Station 3214999, Turnbull Slough:

September 11, 1993 (490 µg/M³)*

(* Exceedances suspected to be caused by windblown dust)

Washington State Nonattainment Areas

Washington State Carbon Monoxide (CO) Nonattainment Areas



■ Nonattainment Areas

Washington State Nonattainment Areas

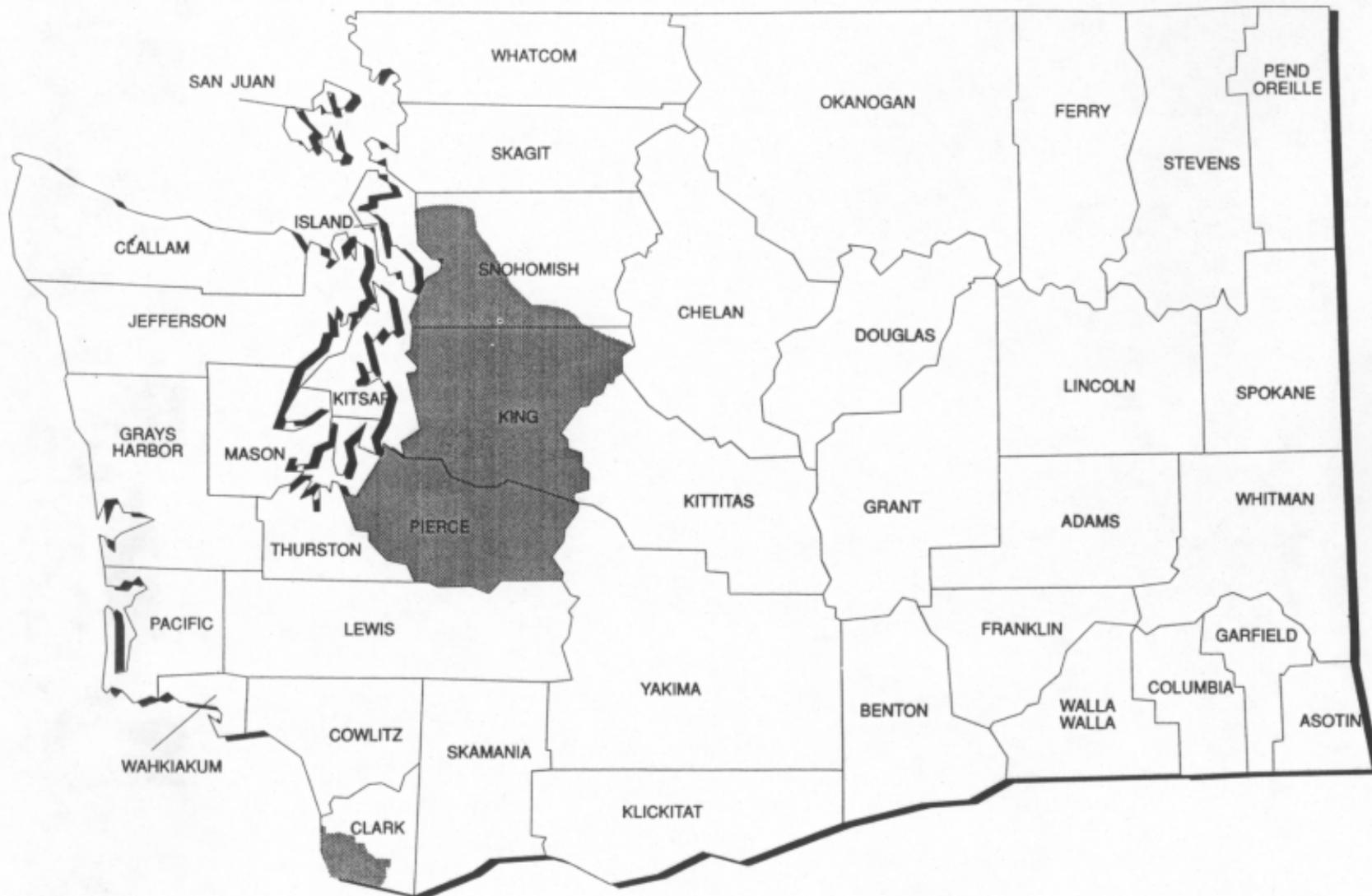
Washington State Particulate Matter (PM₁₀) Areas



■ Nonattainment Areas

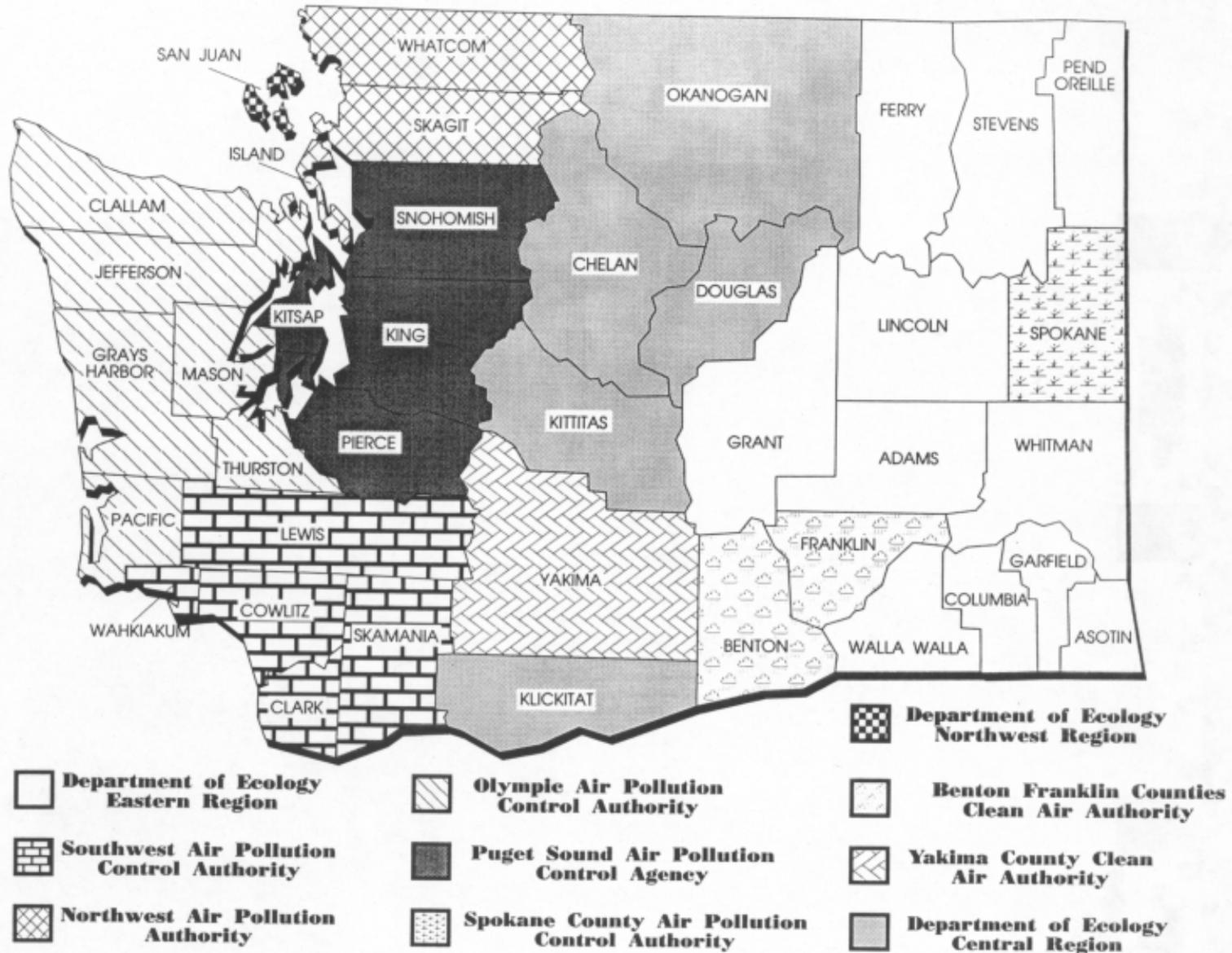
Washington State Nonattainment Areas

Washington State Ozone (O₃) Nonattainment Areas



■ Nonattainment Areas

Local Air Pollution Control Authorities



Monitoring Site Changes

Site Changes

Particulate Matter (PM₁₀)

0160002	Othello, Co. Health Bldg.	Est. 1/19/93
0214002	Clarkston, CF Adams H.S.	Disc. 6/16/93
0214005	Clarkston, STP	Est. 6/16/93
1868B06	Poulsbo, Lions Park	Est. 8/29/93
3200013	Spokane, Country Homes	Disc. 3/5/93

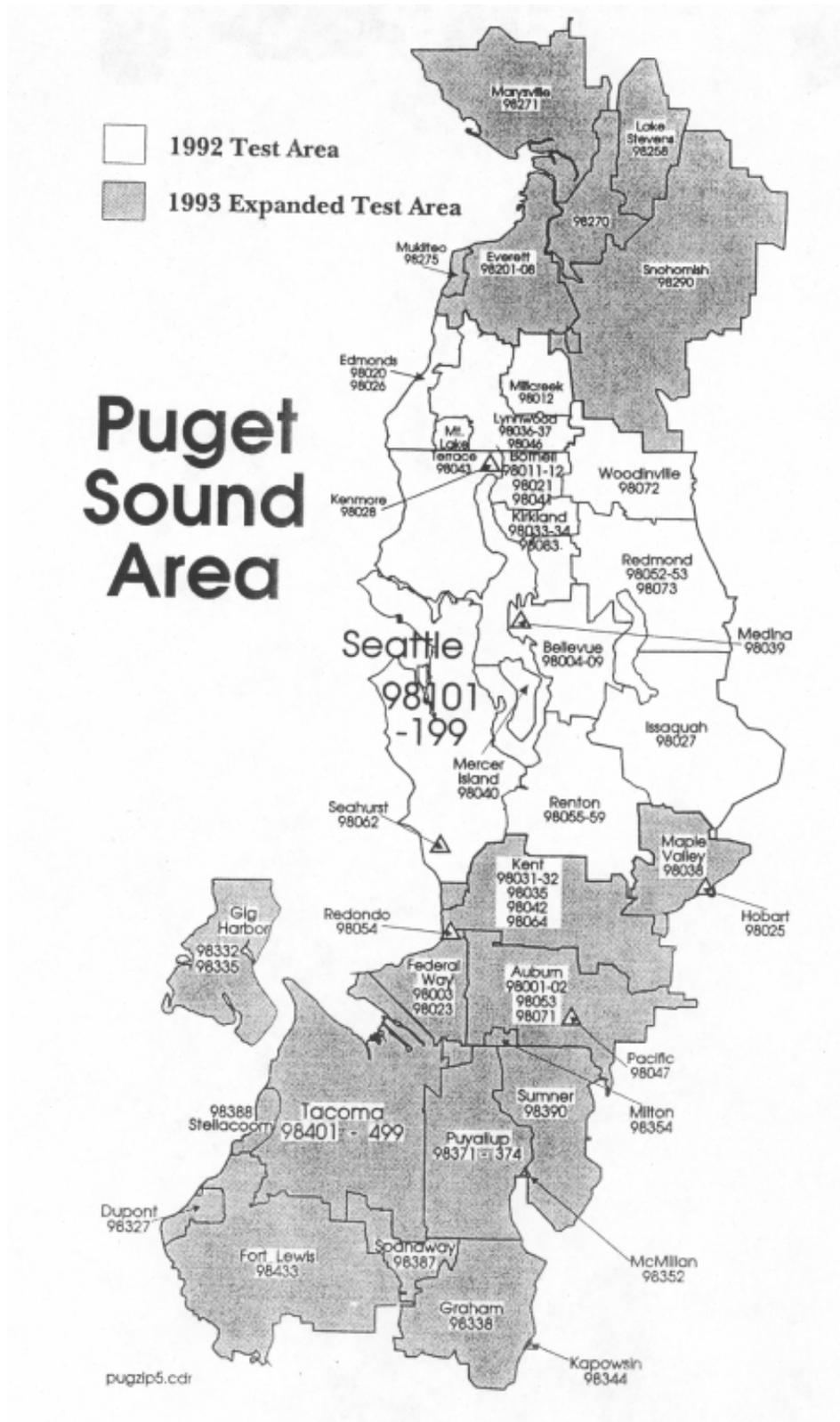
Sulfur Dioxide (SO₂)

1433003	Hoquiam, Posers	Disc. 3/16/93
---------	-----------------	---------------

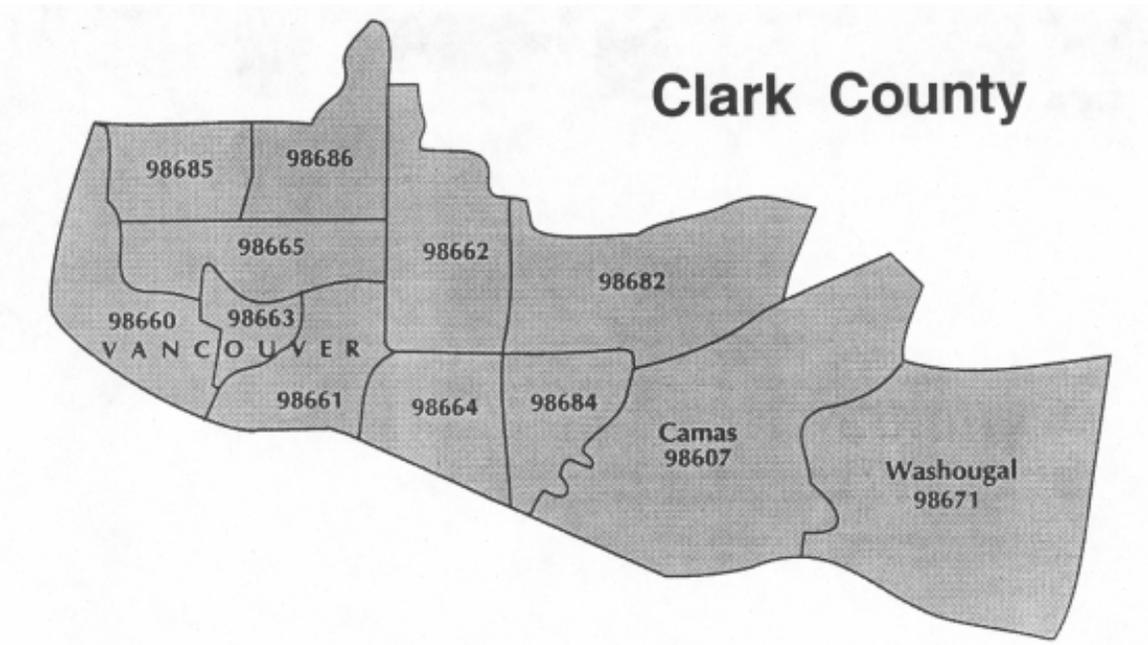
Ozone

3100002	Snohomish Co., Getchell	Est. 4/1/93
2000001	Klickitat Co., Wishram	Est. 8/25/93

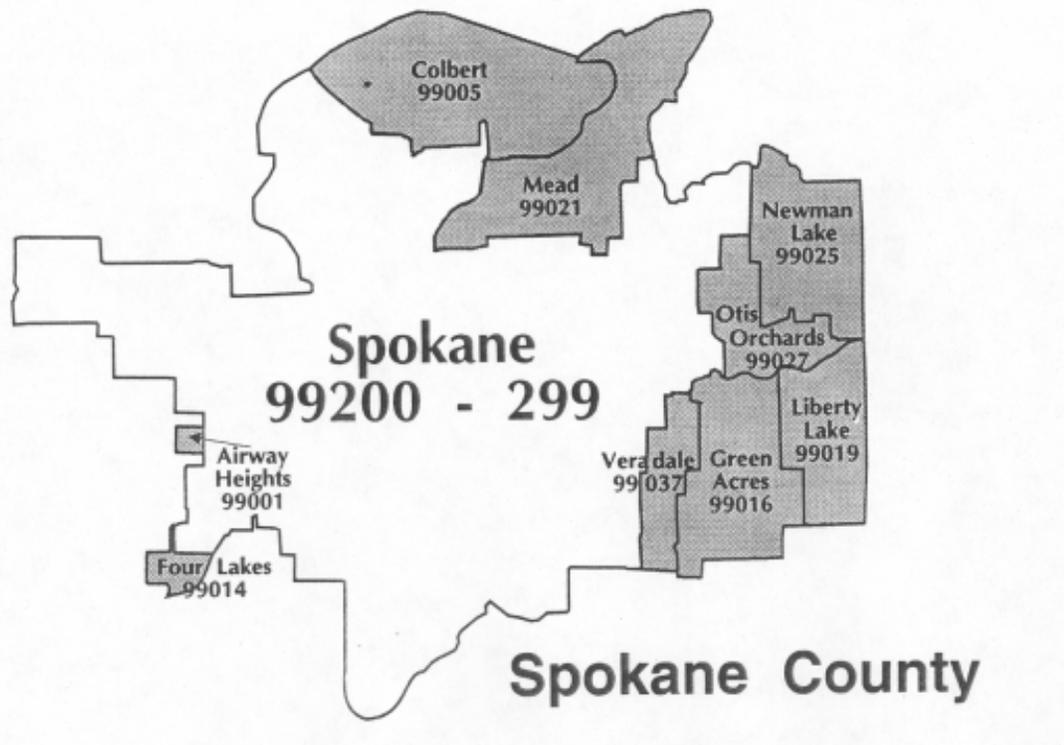
Emission Check Areas



Emission Check Areas



- 1992 Test Areas
- 1993 Expanded Test Areas



Glossary

Air impairment: Unhealthy levels of air pollutants necessitating burn bans. Local air quality authorities may declare air impairments based on monitored levels of pollution and weather forecasts.

Ambient air: The surrounding air (excluding indoor air).

Area source: A pollution source not confined to one point, but spread out in a large geographical area. Area sources include automobiles, wood stoves and small businesses.

BACT: Best Available Control Technology, or the most effective way that is technically and economically feasible to limit the amount of air pollutants emitted.

Carbon monoxide (CO): A colorless, poisonous gas formed when carbon-containing fuel is not burned completely. Sources include vehicle emissions, industry and wood burning. Related to respiratory and heart diseases.

Class I area: All international parks, national wilderness areas and memorial parks which exceed 5,000 acres, and all national parks which exceed 6,000 acres in size.

Criteria pollutants: A category of pollutants identified by EPA for which standards for protecting human health have been set. Includes carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, particulate matter and lead.

Emission inventory: A data bank of air pollution statistics, identifying the type, size and location of various pollution sources. Categories include point sources and area sources.

Environment 2010: A strategic plan to identify and ultimately solve the environmental problems faced by Washington State both now and in the future.

EPA: Environmental Protection Agency, a federal agency responsible for environmental concerns.

Federal Clean Air Act: The first major legislation to target air pollution. First passed in 1963, with subsequent revisions in 1970, 1977 and 1990.

Lead (Pb): A heavy gray metal found in gasoline, paints, plumbing, etc. Exposure can affect the nervous system.

National Ambient Air Quality Standards (NAAQS): Primary and secondary standards set at a national level for criteria pollutants. The purpose of these standards is to protect human health.

Nephelometer: A device that measures particulate pollution in the air.

Nitrogen dioxide (NO₂): A brownish gas and strong oxidizing agent that is one of the major components of acid rain and smog.

Glossary

Nonattainment area: An area designated by EPA in which National Ambient Air Quality Standards are exceeded.

Offset: A policy requiring reductions in emissions before a PSD permit will be granted.

Ozone (O₃): A poisonous, bluish gas form of oxygen, which is the result of chemical reactions between volatile organic compounds and nitrogen oxides. Destroys crops and impairs breathing.

Particulate matter (PM₁₀): Airborne particles resulting from wood stove burning, outdoor burning, road dust and industry, which can get in lungs and impair the respiratory system.

Point source: Identifiable pollution sources such as large industries that emit significant levels of air pollutants in a particular geographic location

PSD: Prevention of Significant Deterioration. A permit issued by the Department of Ecology before construction can begin on new or expanded facilities that emit air pollutants. The purpose of the permit is to ensure that the air pollution in the area does not reach undesired levels, and that the facility is using BACT.

SPMS: Special Purpose Monitoring Site. Used by state or local agencies mainly for short-term studies of air pollution or non criteria pollutant monitoring.

SLAMS: State and Local Air Monitoring Site: Site for air monitoring and data collection, run by both state and local agencies.

SIP: State Implementation Plan, a plan the state adopts to ensure that state air quality objectives are met.

Sulfur dioxide (SO₂): A gas or liquid resulting from the burning of sulfur-containing fuel. May cause breathing problems.

Telemetry: A method of collecting data from monitoring sites. Data is electronically sent over telephone lines to a central computer at the Department of Ecology.

Toxic air pollutants: Compounds which may induce cancer and/or other health problems at extremely low concentrations.

Volatile organic compounds (VOCs): Unstable or carbon-based compounds that, when combined with nitrogen oxides, will produce ozone.

Coastal Area

PM₁₀ Annual Arithmetic Means (µg/M³)

Station	Location	1986	1987	1988	1989	1990	1991	1992	1993
0566412G	Pt. Ang., City Light				32*	28	28	28	26
1402004G	Aberdeen, A. J. West						23*	26	21
3444003G	Lacey, Mt. View Elementary	36	37	34	30	24	25	26	27

* Average based on less than 12 months of data.

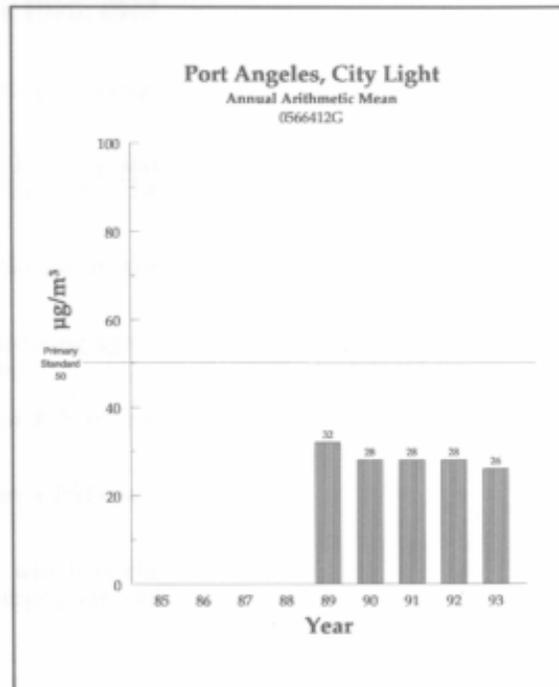
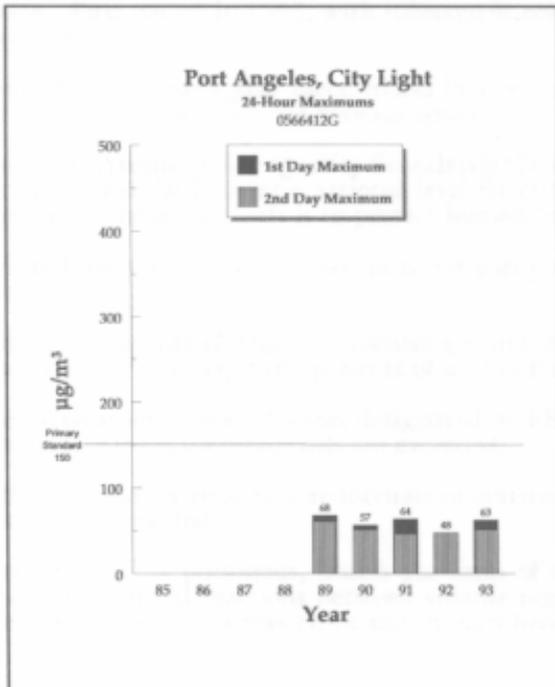
PM₁₀ (µg/M³) For 1993

Station	Location	1st High		2nd High		Annual Arith. Mean
		Conc	Date	Conc	Date	
0566412G	Pt. Ang., City Light	63	2/6	51	1/31	26
1402004G	Aberdeen, A. J. West School	47	2/26	45	2/2	21
3444003G	Lacey, Mt. View Elementary	79	11/25	78	1/11	27

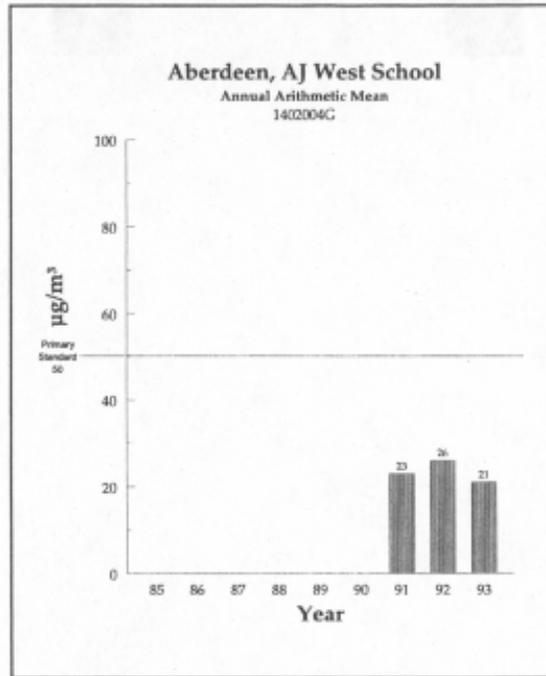
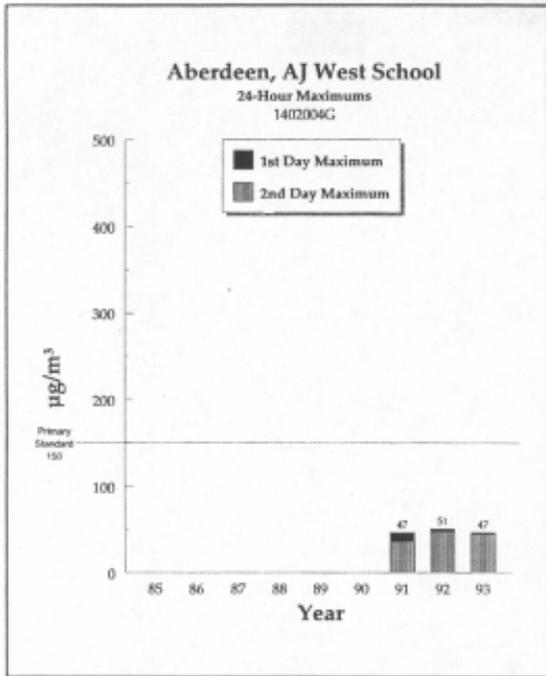
PM₁₀ For 1993

Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
0566412G	Pt. Ang., City Light	Jan-Dec	1/6	55	90
1402004G	Aberdeen, A. J. West School	Jan-Dec	1/6	60	98
3444003G	Lacey, Mt. View Elementary	Jan-Dec	1/6	133	100

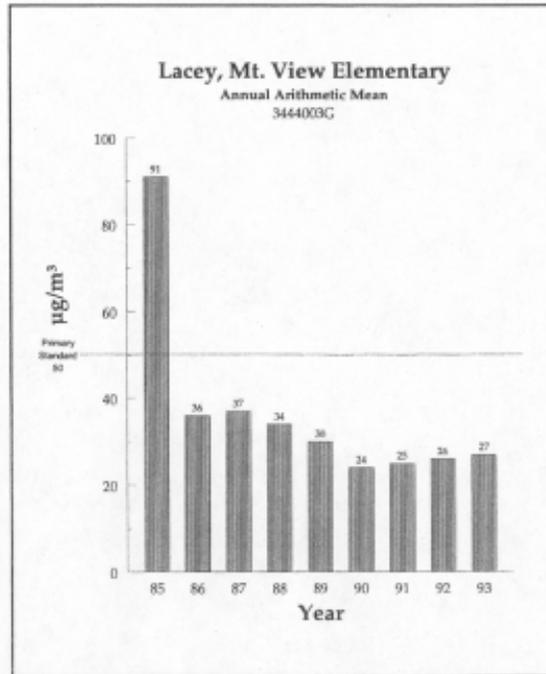
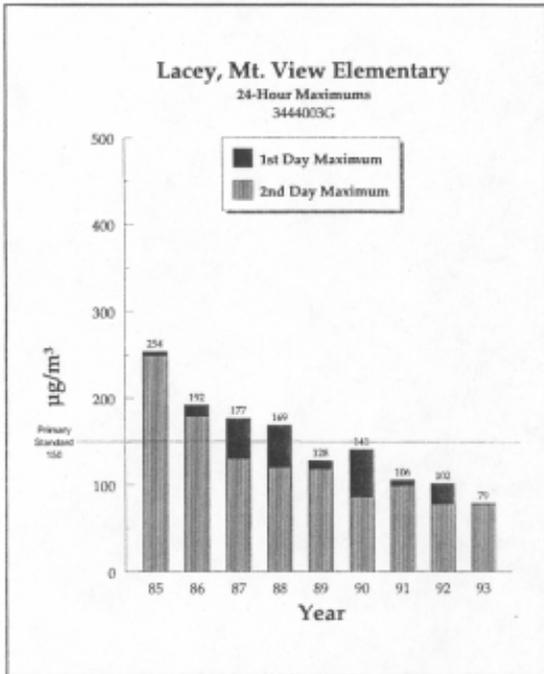
Particulates (PM₁₀)



Coastal Area



Particulates (PM₁₀)



Coastal Area

Carbon Monoxide (ppm) for 1993

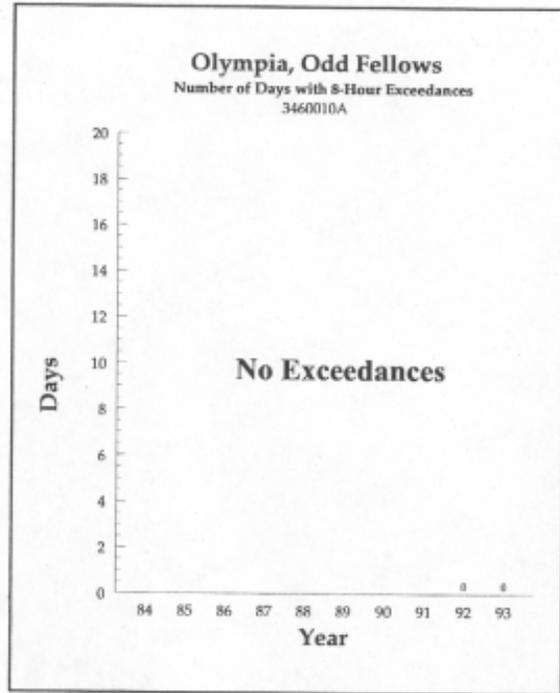
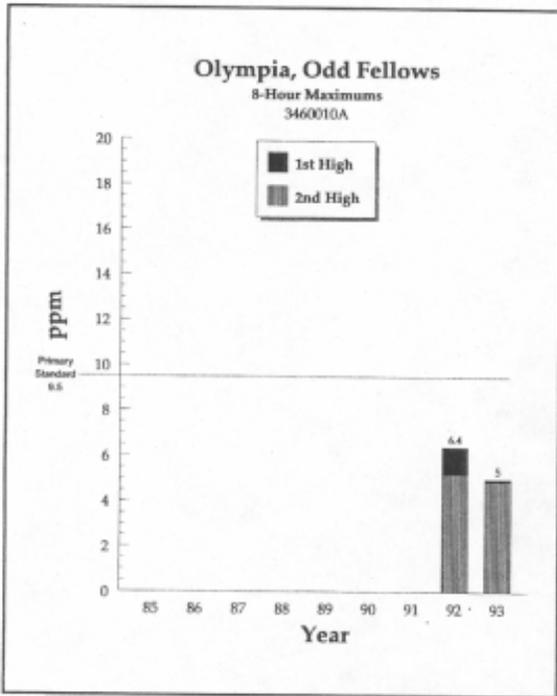
Station	Location	1-Hour Maximums				8-Hour Maximums ¹				8-Hr Exc	Exc. Days		
		1st High	2nd High	1st High	2nd High	1st High	2nd High	2nd Day ²					
3460010A	Olympia, Odd Fellow	8.2	5/7	8.0	4/2	5.0	12/6	4.9	1/11	4.9	1/11	0	0

1. 8-hour readings are non-overlapping.
2. 2nd Day High = Second day with the highest 8-hour average.

Carbon Monoxide (ppm) for 1993

Station	Location	Period of Record	# Hours	# Days	% Valid Data
3460010A	Olympia, Odd Fellows	Jan-Dec	8,471	365	97

Carbon Monoxide (CO)



Coastal Area

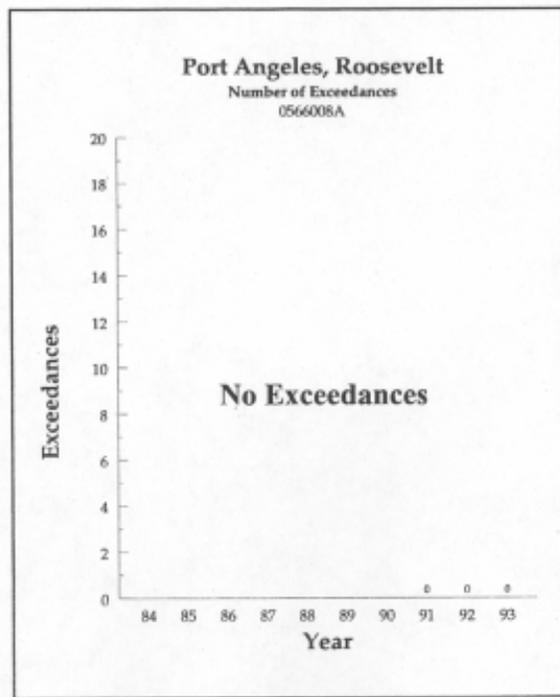
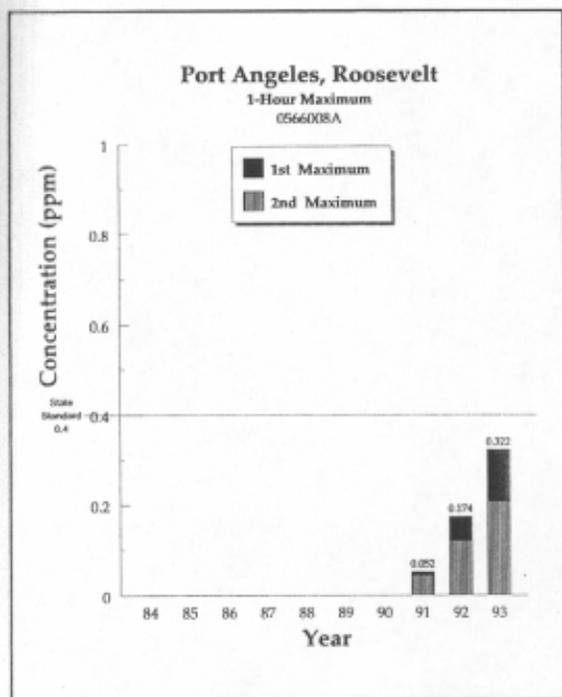
Sulfur Dioxide for 1993

Station	Location	1-Hour Maximum				#1-Hr > .40	3-Hr Max		#3-Hr >.50	24-Hr Max		# 24-Hour		Annual Mean
		1st	Date	2nd	Date		Conc	Date		Conc	Date	>.10	>.14	
0566008A	Port Angeles, Roosevelt	.322	5/7	.207	9/8	0	.190	5/7	0	.037	9/8	0	0	.003
0566410A	Pt Angeles, 3rd & Chstnt	.154	1/20	.142	6/18	0	.130	6/18	0	.044	6/18	0	0	.007
1414001A	Cosmopolis, Sch Bus Gar	.212	9/27	.158	11/26	0	.116	9/27	0	.031	12/28	0	0	.004
1433003A	Hoquiam, Poseys	.015	2/27	.012	2/2	0	.011	2/27	0	.005	2/27	0	0	.002

Sulfur Dioxide for 1993

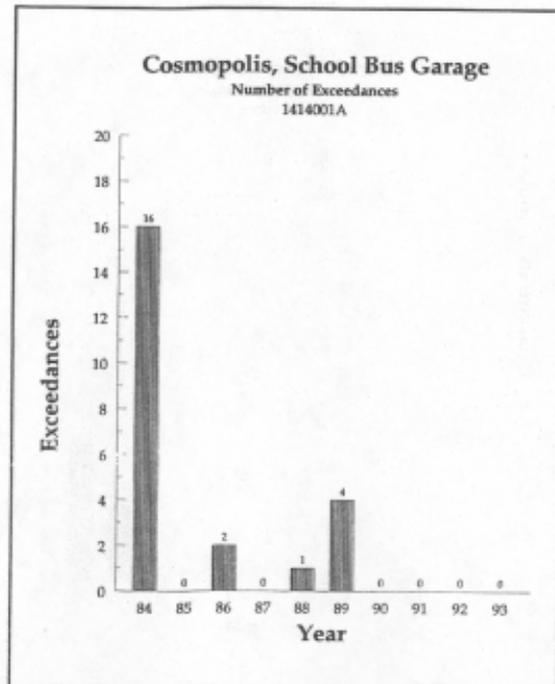
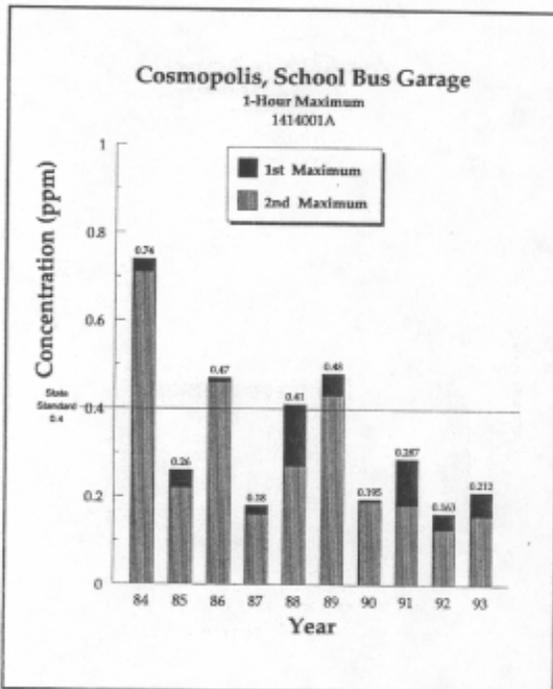
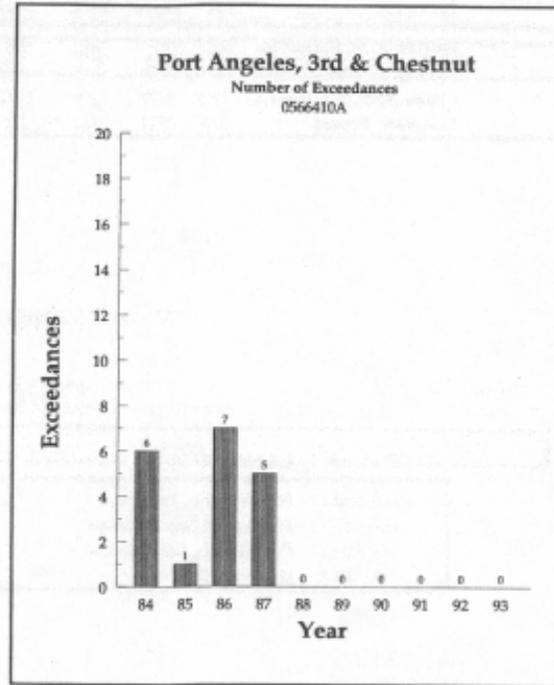
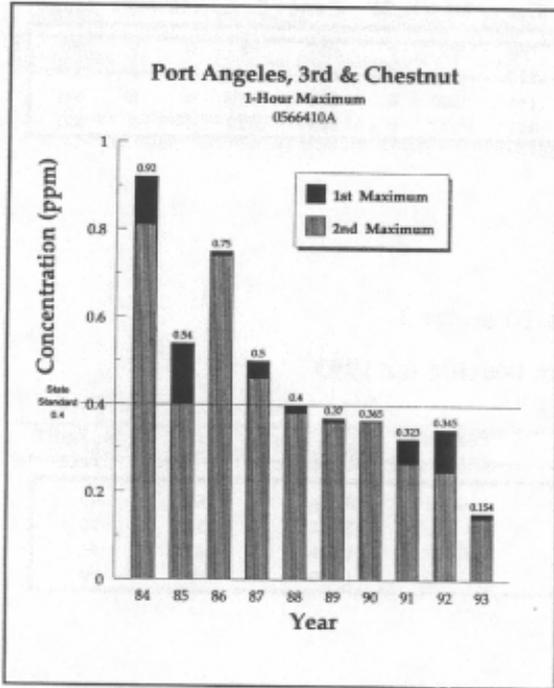
Station	Location	Period of Record	# Hours	# Days	% Valid Data
0566008A	Port Angeles, Roosevelt	Jan-Dec	8,696	362	99
0566410A	Pt Angeles, 3rd & Chstnt	Jan-Dec	7,932	331	90
1414001A	Cosmopolis, Sch Bus Gar	Jan-Dec	8,326	347	95
1433003A	Hoquiam, Poseys	Jan-Mar	1,779	74	99

Sulfur Dioxide (SO₂)



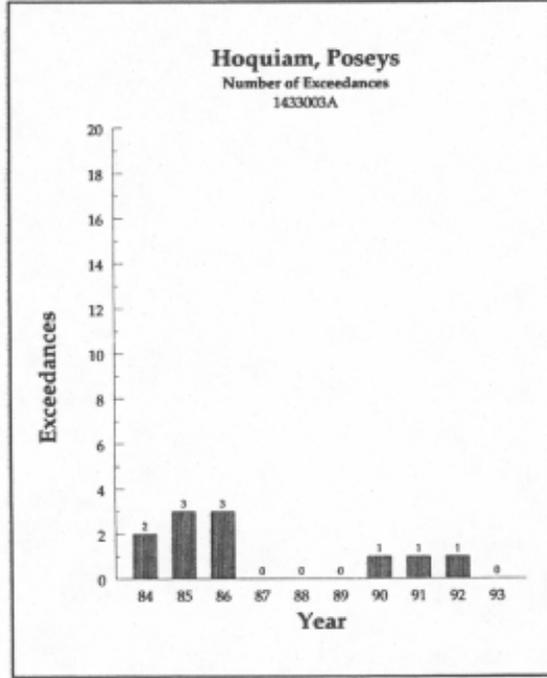
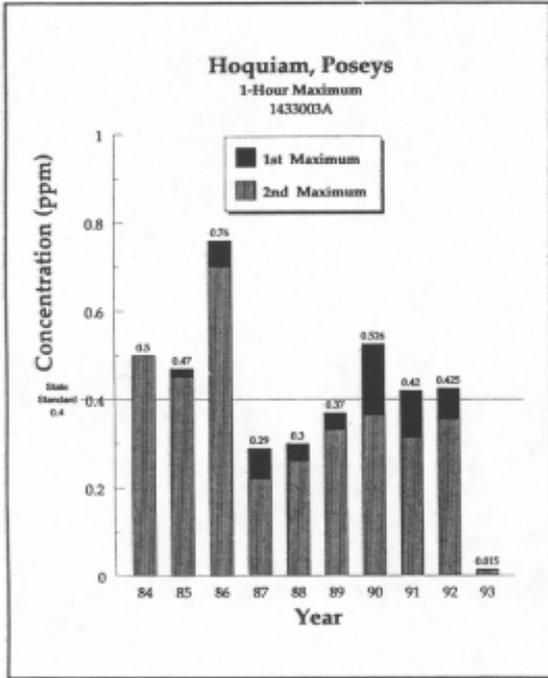
Coastal Area

Sulfur Dioxide (SO₂)



Coastal Area

Sulfur Dioxide (SO₂)



Puget Sound Area

Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) For 1993

Station	Location	1st High		2nd High		Annual Geo. Mean
		Conc	Date	Conc	Date	
1776028A	Seattle, LDS Church	84	2/12	82	1/13	38
1776K71B	Harbor Island	166	12/27	112	2/12	47

Frequency of Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) Exceeding The State Standard During 1993 (# Days Exceeding Level)

Station	Location	≥ 150	≥ 200	≥ 260	≥ 375	≥ 500	≥ 750
		<200	<260	<375	<500	<750	
1776K71B	Harbor Island	1	0	0	0	0	0

Total Suspended Particulates for 1993

Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
1776028A	Seattle, LDS Church	Jan-Dec	1/6	61	100
1776K71B	Harbor Island	Jan-Dec	1/6	61	100

Puget Sound Area

PM₁₀ (µg/m³) For 1993

Station	Location	1st High		2nd High		Annual Arith. Mean
		Conc	Date	Conc	Date	
1708004A	Bellevue, Scan Design	47	12/27	46	11/9	20
1740K73B	Kent, James and Central	92	12/27	84	12/28	28
1744K74B	Lake Forest Park, City Hall	89	12/24	87	12/25	28
1776K55B	Seattle, Duwamish	126	1/11	119	1/12	35
1776K60B	Seattle, Harbor Island	93	12/17	66	2/12	33
1776K61B	Seattle, South Park	81	12/17	71	11/9	26
1800B05B	Kitsap Co., Meadowdale	61	12/17	59	1/31	23
1868B06B	Poulsbo, Lions Park	40	12/17	35	11/9	23*
2700P18B	Puyallup, South Hill	68	1/31	61	12/27	24
1782P01B	Tacoma, Fire Station #12	120	2/5	96	2/1	33
2782P09B	Tacoma, Taylor Way	81	11/9	75	12/27	30
2782P16B	Tacoma, 54 th Ave. NE	72	11/9	65	9/10	26
2782P17B	Tacoma, Alexander Ave.	76	11/9	76	12/28	28
3124S04B	Everett, Hoyt Ave.	72	2/12	49	2/24	23
3148S07B	Marysville, Jr. High School	97	1/16	96	1/1	27

PM₁₀ Annual Arithmetic Means (µg/m³)

Station	Location	1986	1987	1988	1989	1990	1991	1992	1993
1708004A	Bellevue, Scan Design	31	32	26	26	21	23	23	20
1740K73B	Kent, James and Central		43*	37*	34	30	32	33	28
1744K74B	Lake Forest Park, City Hall				31*	27	28	26	28
1776K55B	Seattle, Duwamish	43	44	39	39	36	37	38	35
1776K60B	Seattle, Harbor Island	40	46	37	40	35	35	34	33
1776K61B	Seattle, South Park	39	41	31	30	28	27	29	26
1800B05B	Kitsap Co., Meadowdale						32*	23	23
1868B06B	Poulsbo, Lions Park								23*
2700P18B	Puyallup, South Hill						38*	29	24
1782P01B	Tacoma, Fire Station #12	42	48	42	39	34	36	36	33
2782P09B	Tacoma, Taylor Way	44	46	40	37	33	30	32	30
2782P16B	Tacoma, 54 th Ave. NE	38	44	35	33	29	30	35	26
2782P17B	Tacoma, Alexander Ave.		40*	38	36	31	29	31	28
3124S04B	Everett, Hoyt Ave.				27*	24	25	24	23
3148S07B	Marysville, Jr. High School						34*	26	27

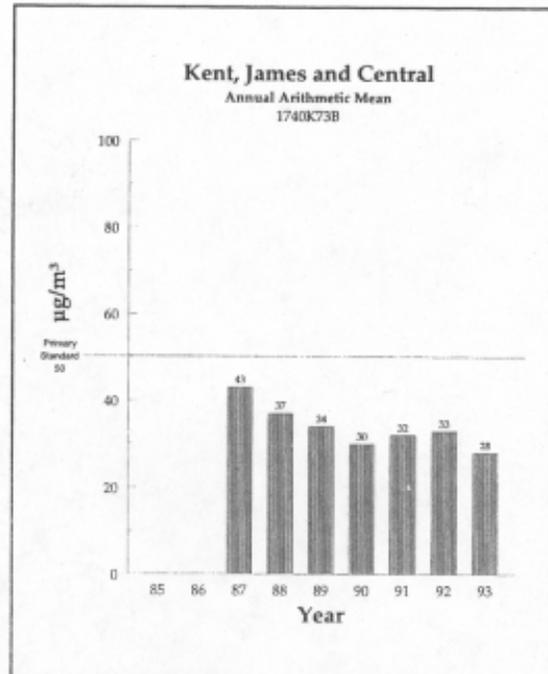
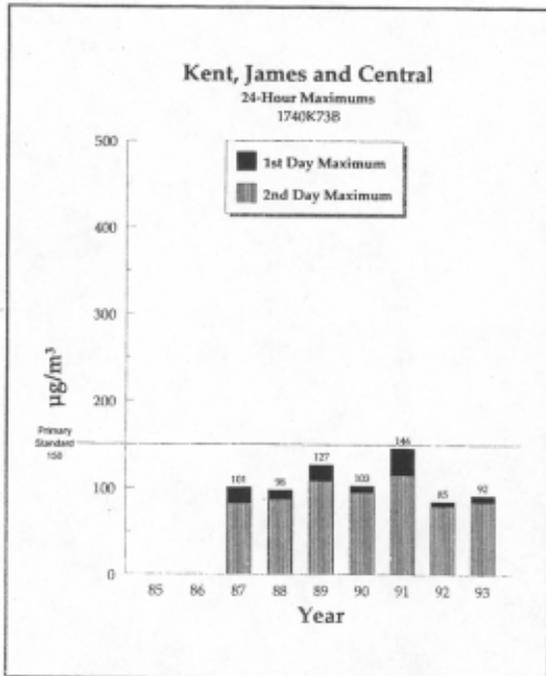
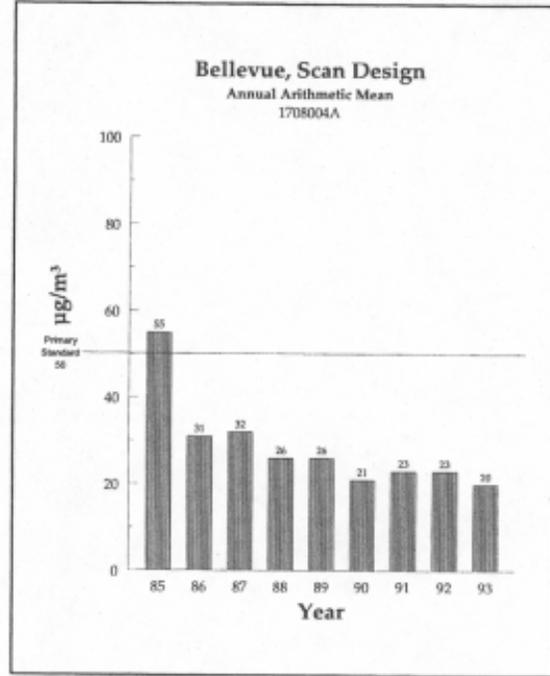
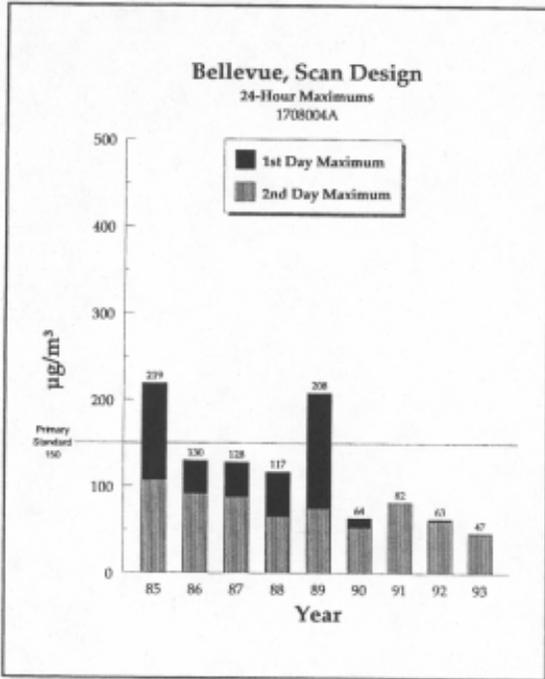
* Average based on less than 12 months of data.

PM₁₀ for 1993

Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
1708004A	Bellevue, Scan Design	Jan-Dec	1/6	61	100
1740K73B	Kent, James and Central	Jan-Dec	1/2	302	100
1744K74B	Lake Forest Park, City Hall	Jan-Dec	1/2	297	100
1776K55B	Seattle, Duwamish	Jan-Dec	1/1	351	96
1776K60B	Seattle, Harbor Island	Jan-Dec	1/6	53	96
1776K61B	Seattle, South Park	Jan-Dec	1/6	61	100
1800B05B	Kitsap Co., Meadowdale	Jan-Dec	1/6	61	100
1868B06B	Poulsbo, Lions Park	Aug-Dec	1/6	21	100
2700P18B	Puyallup, South Hill	Jan-Dec	1/6	60	98
1782P01B	Tacoma, Fire Station #12	Jan-Dec	1/1	350	96
2782P09B	Tacoma, Taylor Way	Jan-Dec	1/6	61	100
2782P16B	Tacoma, 54 th Ave. NE	Jan-Dec	1/6	61	100
2782P17B	Tacoma, Alexander Ave.	Jan-Dec	1/6	147	94
3124S04B	Everett, Hoyt Ave.	Jan-Dec	1/6	59	100
3148S07B	Marysville, Jr. High School	Jan-Dec	1/3	123	100

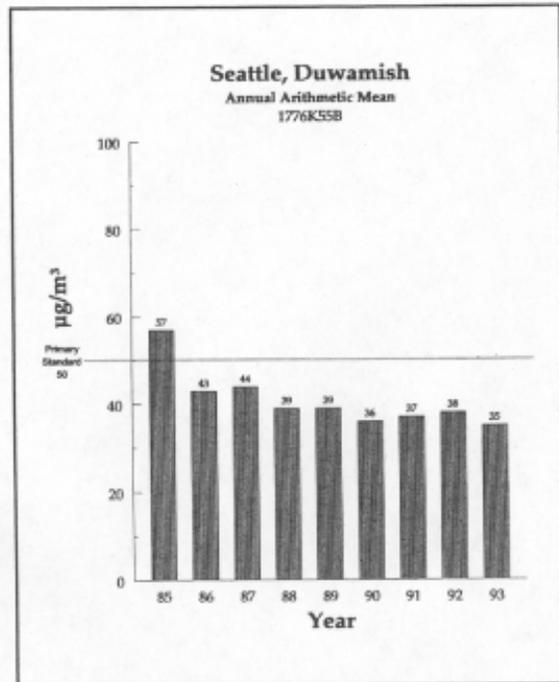
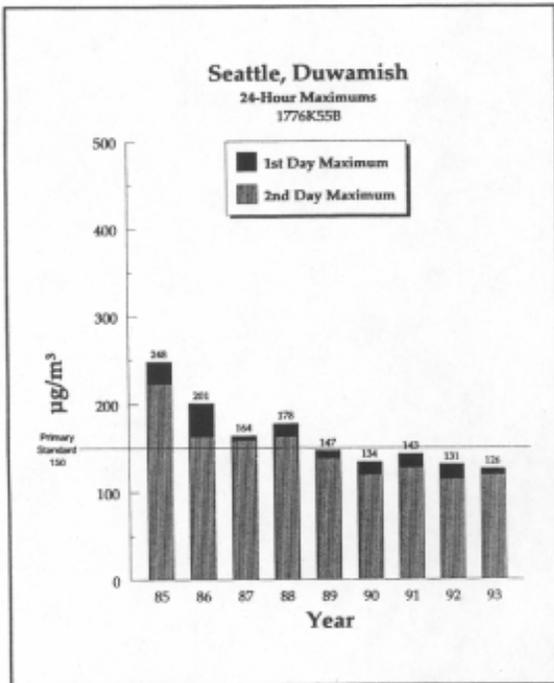
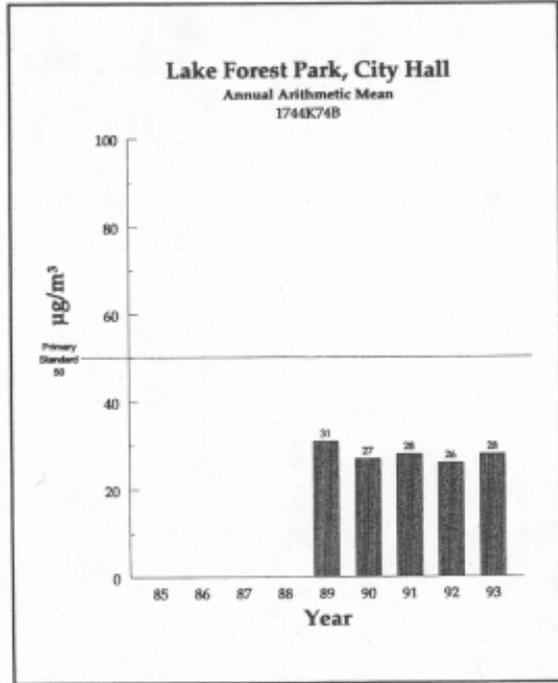
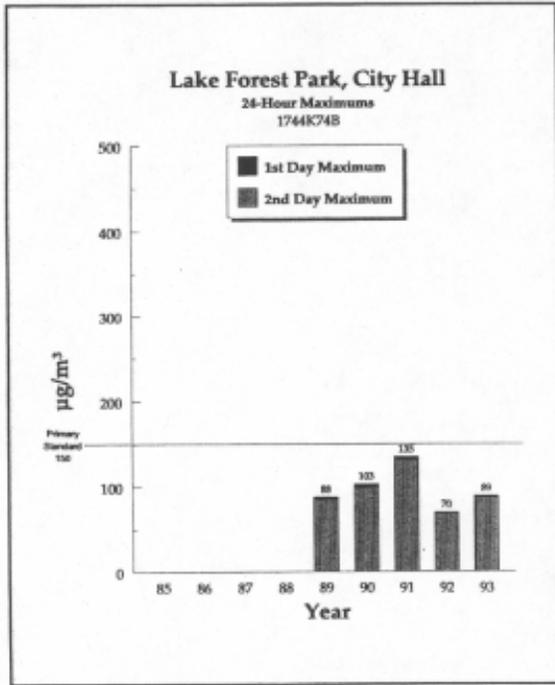
Puget Sound Area

Particulates (PM₁₀)



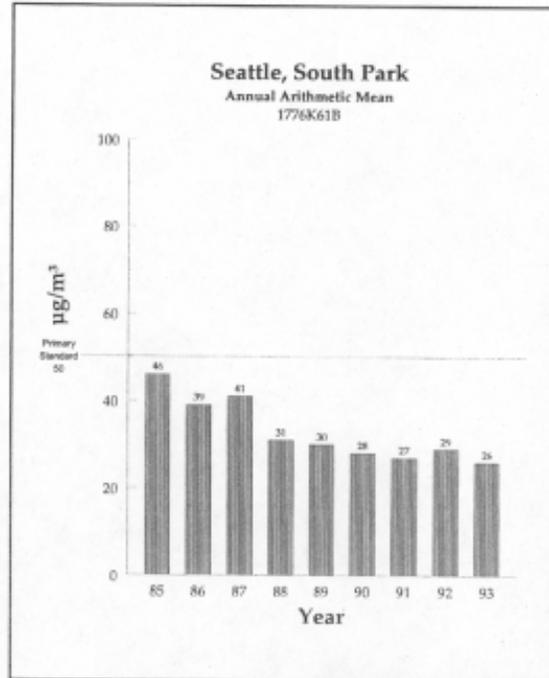
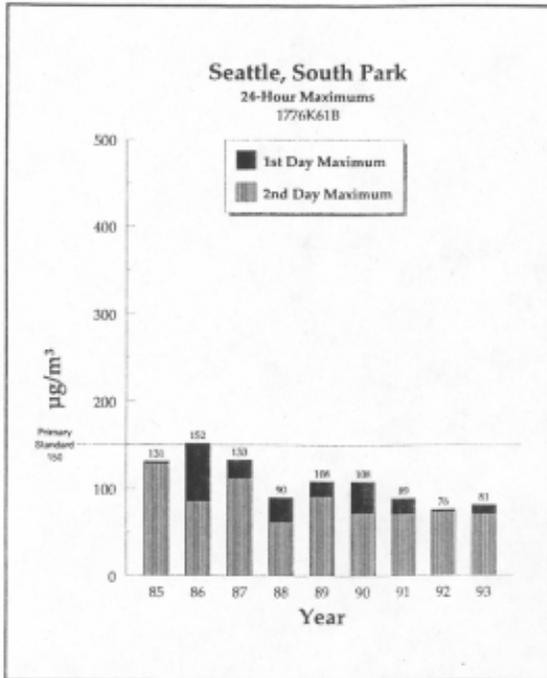
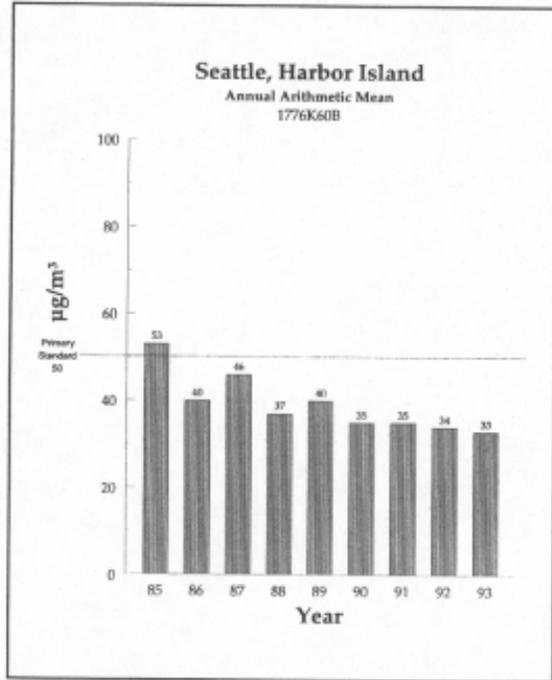
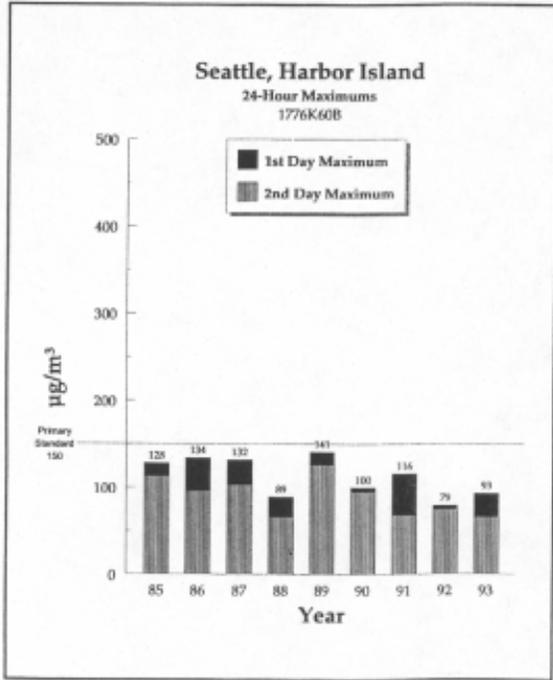
Puget Sound Area

Particulates (PM₁₀)



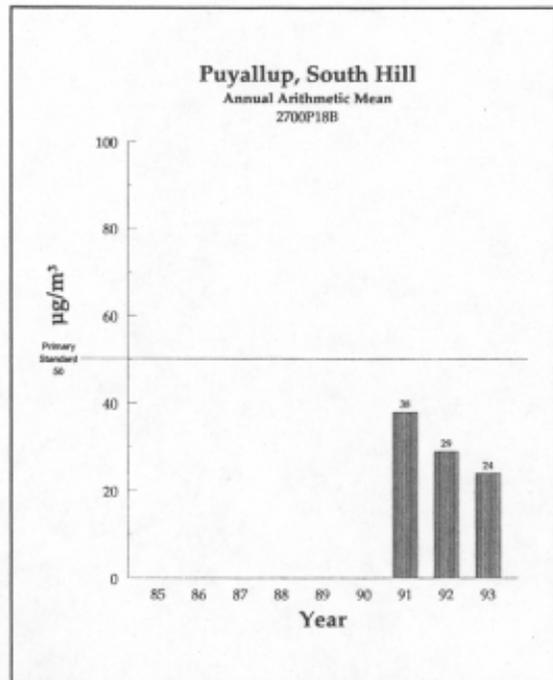
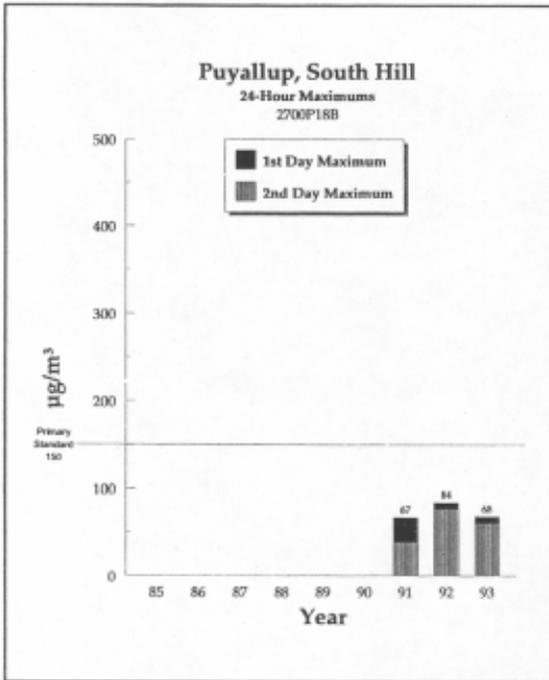
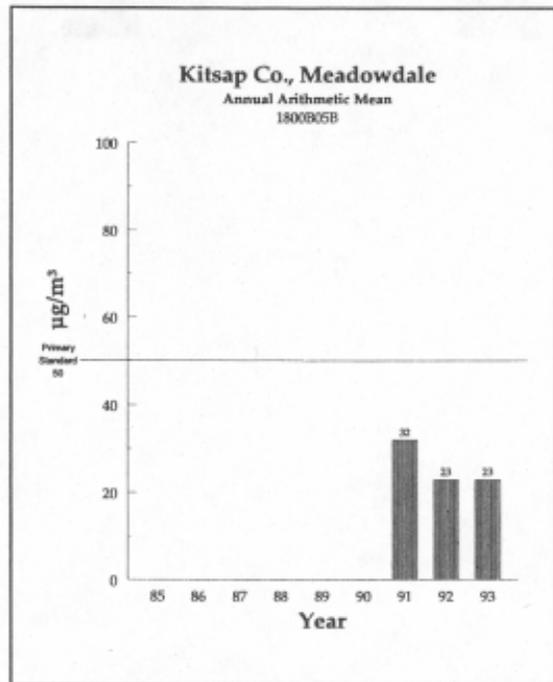
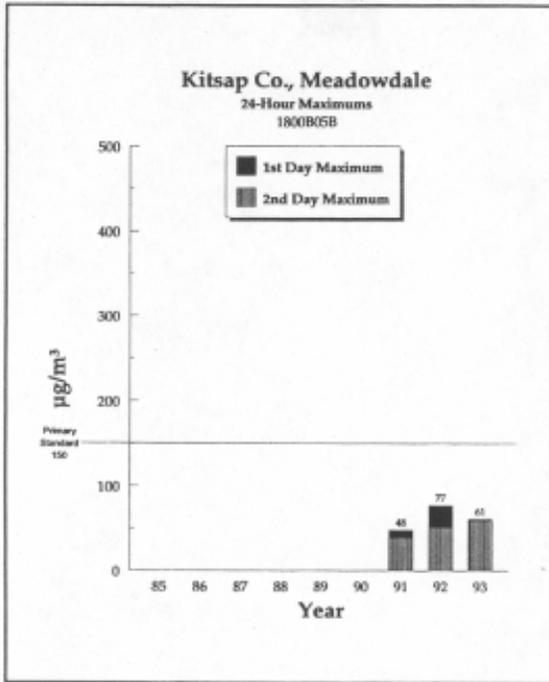
Puget Sound Area

Particulates (PM₁₀)



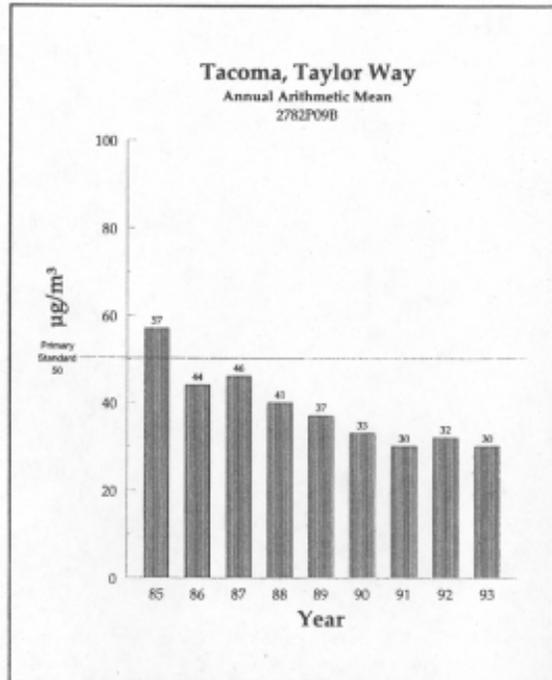
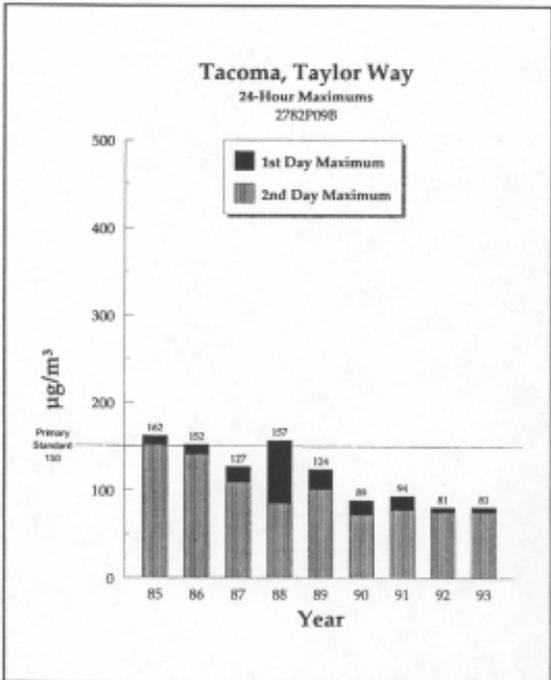
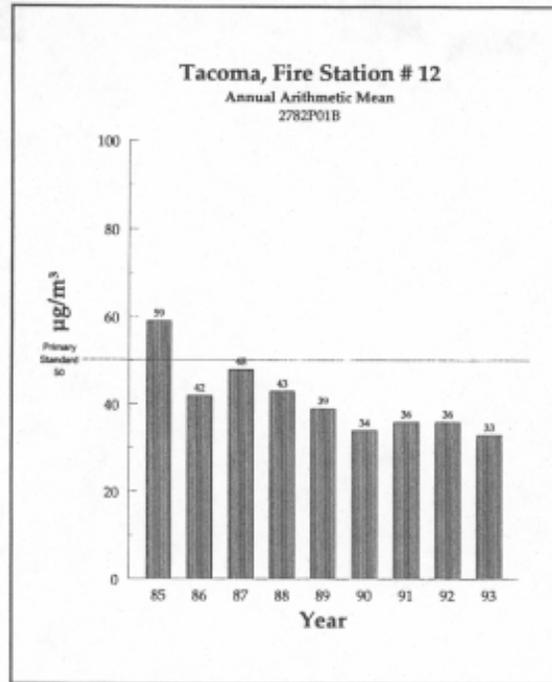
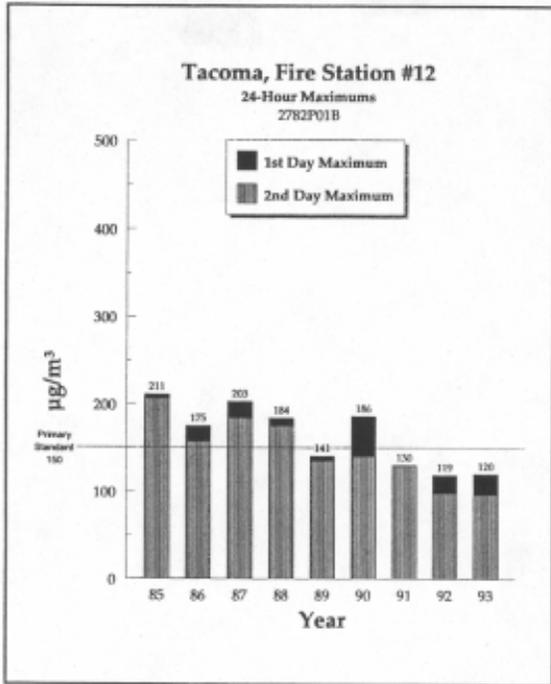
Puget Sound Area

Particulates (PM₁₀)



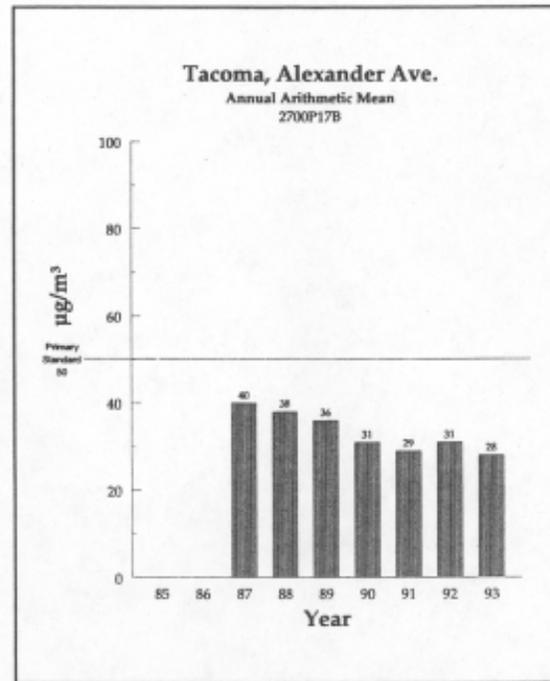
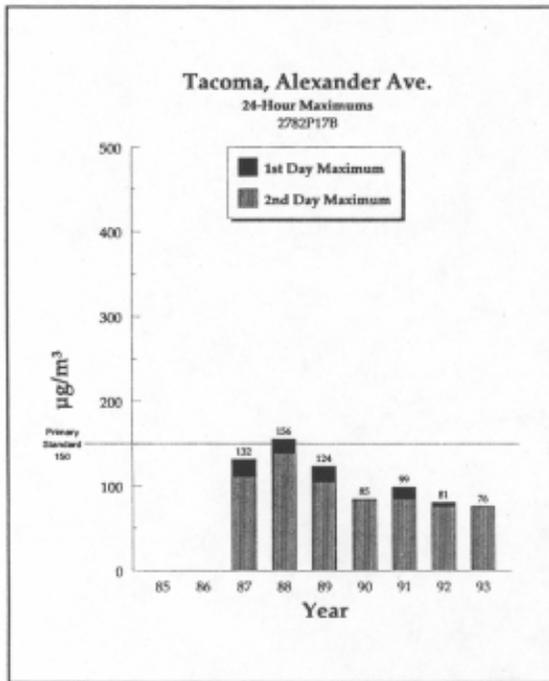
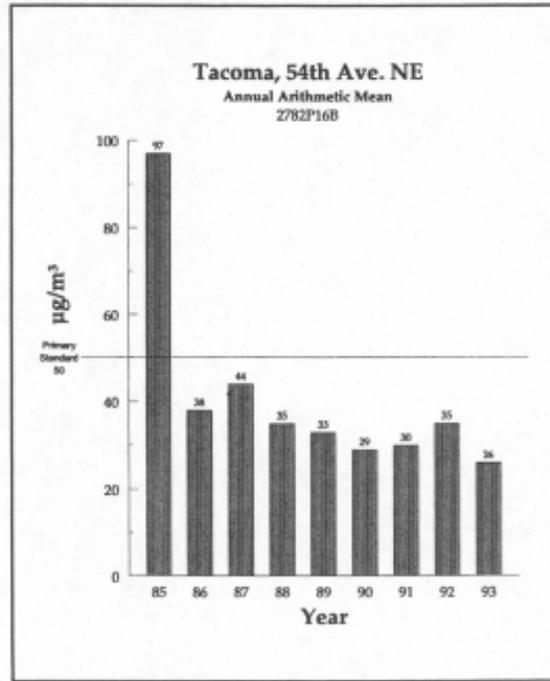
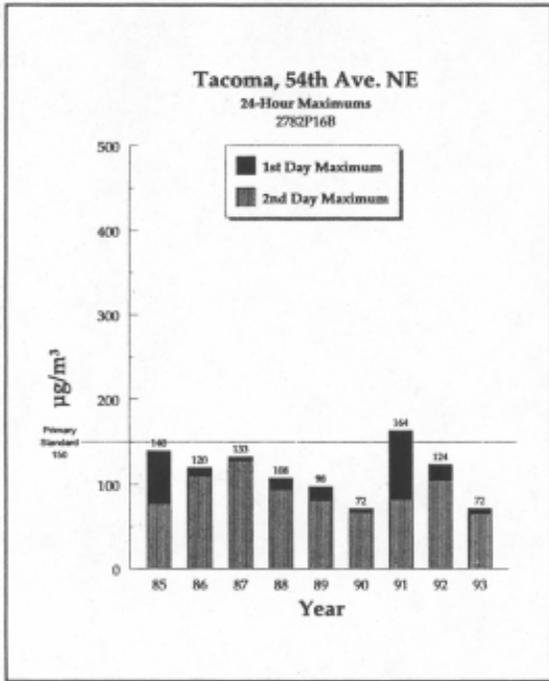
Puget Sound Area

Particulates (PM₁₀)



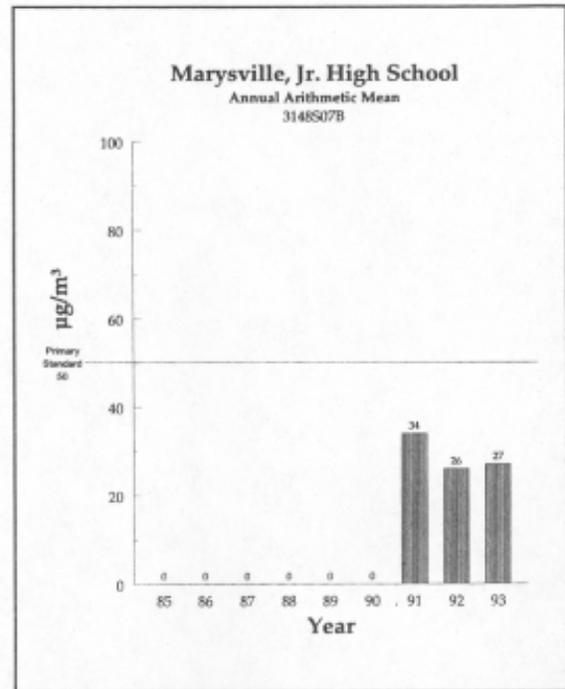
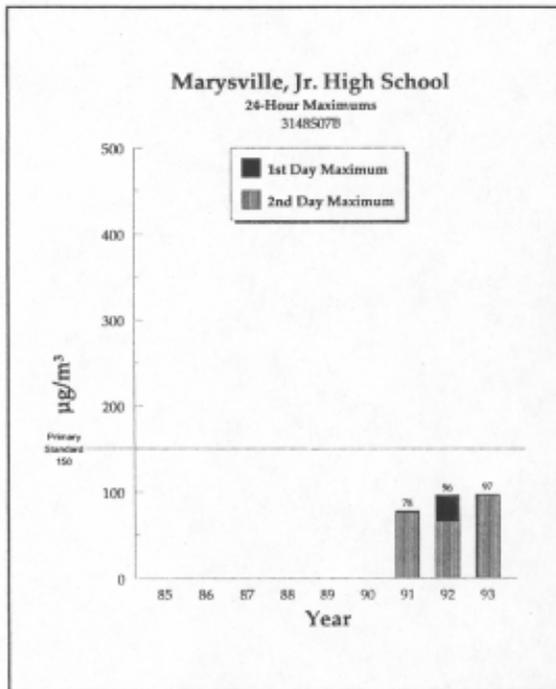
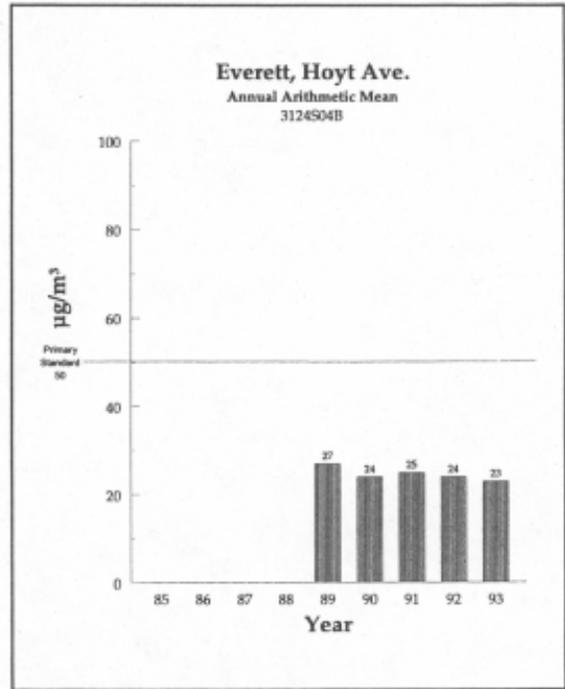
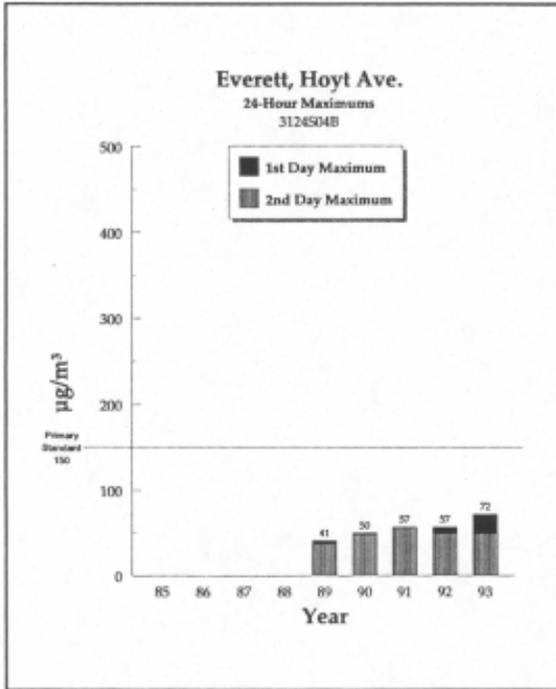
Puget Sound Area

Particulates (PM₁₀)



Puget Sound Area

Particulates (PM₁₀)



Puget Sound Area

Lead Summary for 1993

Station	Location	Quarterly Ave. ($\mu\text{g}/\text{m}^3$)			
		1st	2nd	3rd	4th
1776028D	Seattle, LDS Church	.03	.02	.02	.03
1776K71B	Seattle, Harbor I. Texaco	.12	.33	.18	.37

Carbon Monoxide (ppm) for 1993

Station	Location	1-Hour Maximums				8-Hour Maximums ¹				8-Hr Exc.	Exc. Days		
		1st High		2nd High		1st High		2nd High				2nd Day ²	
		Conc	Date	Conc	Date	Conc	Date	Conc	Date			Conc	Date
1708003A	Bellevue, Sturtevant's	8.3	1/12	7.1	1/12	5.0	2/3	4.9	10/27	4.9	10/27	0	0
1776020A	Seattle, Zanadu Comics	15.7	5/26	9.6	11/10	7.0	10/27	6.7	1/30	6.7	1/30	0	0
1776026A	Seattle, 4th and Pike	8.2	2/4	7.6	12/17	5.9	2/4	5.6	12/22	5.6	12/22	0	0
1776033A	Seattle, Northgate Apts.	10.3	2/4	10.0	1/18	6.3	10/27	5.8	12/22	5.8	12/22	0	0
1776308A	Seattle, James St.	9.1	2/4	9.1	3/3	5.9	2/4	5.2	2/8	5.2	2/8	0	0
2782013A	Tacoma, Pacific Ave.	10.7	2/1	10.1	2/1	7.8	2/1	5.9	12/27	5.9	12/27	0	0
3124006A	Everett, Nevada Bob's	10.2	1/12	9.4	4/14	6.7	3/31	6.5	5/10	6.5	5/10	0	0

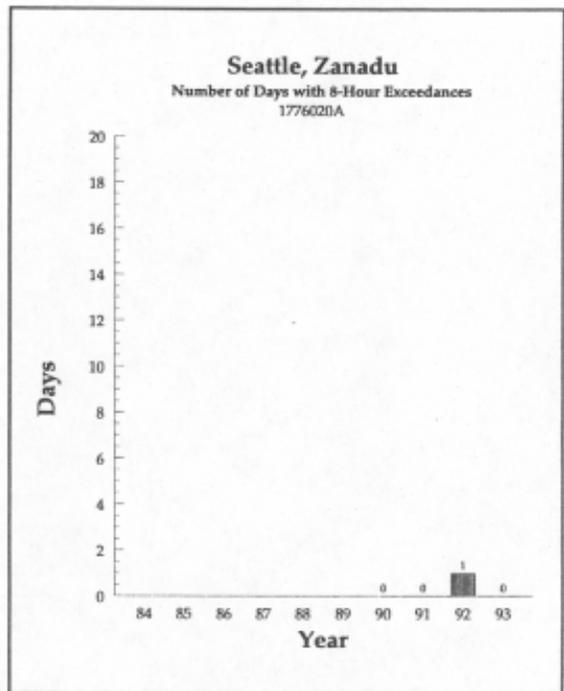
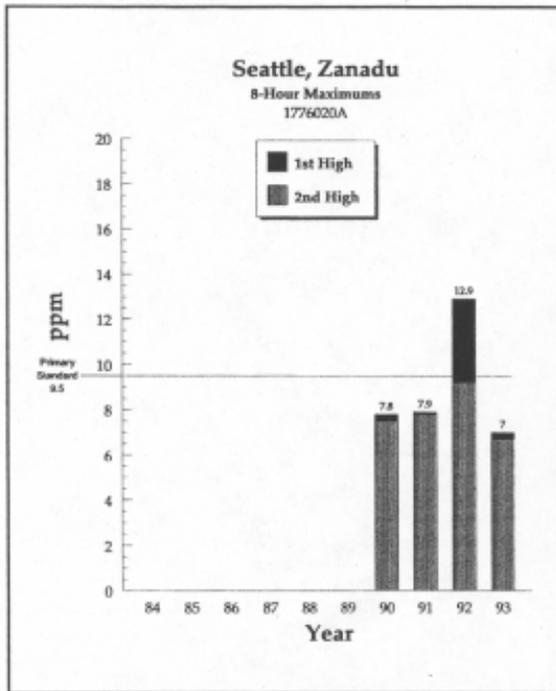
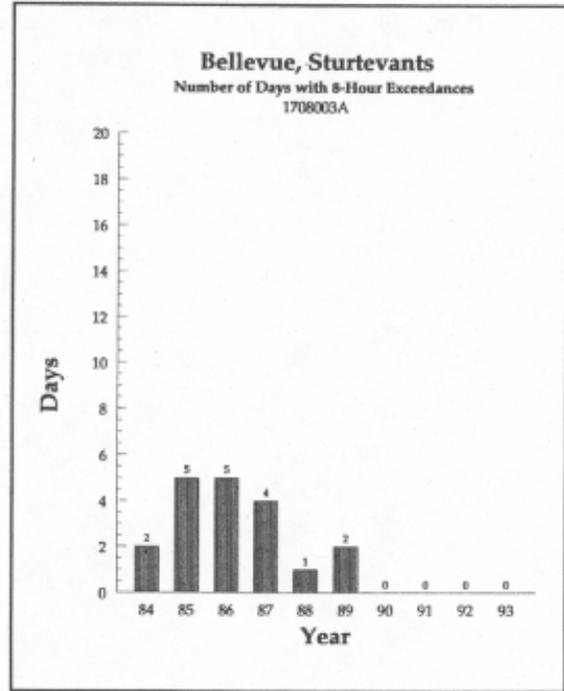
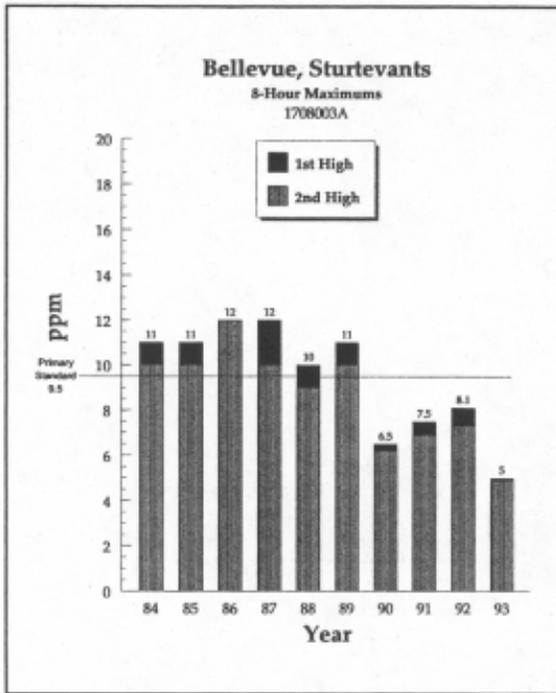
1. 8-hour readings are non-overlapping
2. 2nd Day High = Second day with the highest 8-hour average.

Carbon Monoxide (ppm) for 1993

Station	Location	Period of Record	# Hours	# Days	% Valid Data
1708003A	Bellevue, Sturtevant's	Jan-Dec	8,536	365	97
1776020A	Seattle, Zanadu Comics	Jan-Dec	8,445	365	96
1776026A	Seattle, 4th and Pike	Jan-Dec	8,348	365	95
1776033A	Seattle, Northgate Apts.	Jan-Dec	8,581	365	98
1776308A	Seattle, James St.	Jan-Dec	8,464	365	98

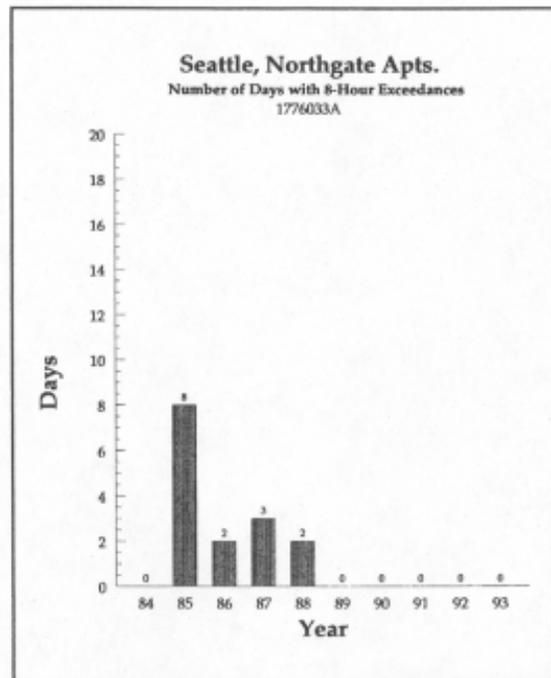
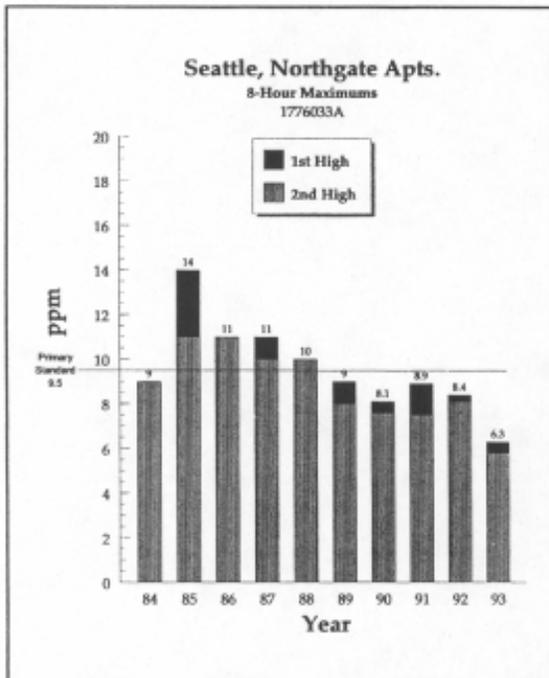
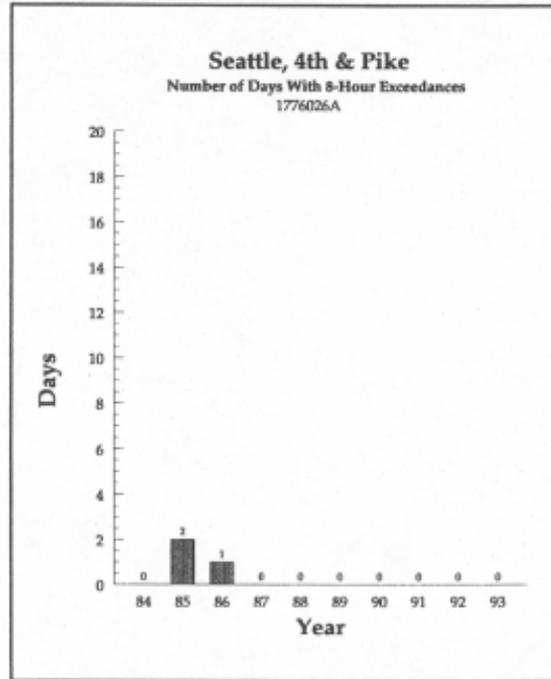
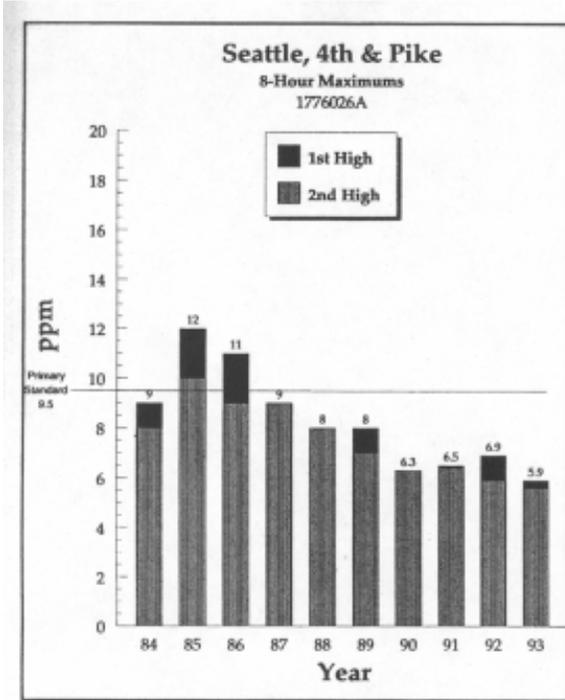
Puget Sound Area

Carbon Monoxide (CO)



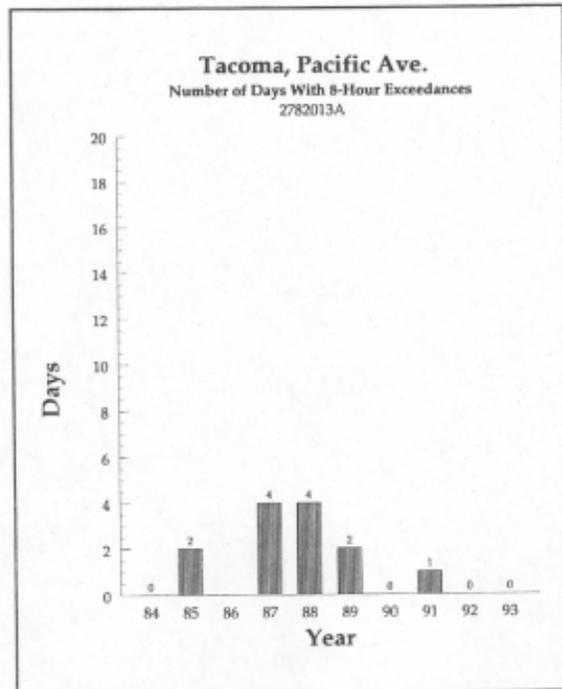
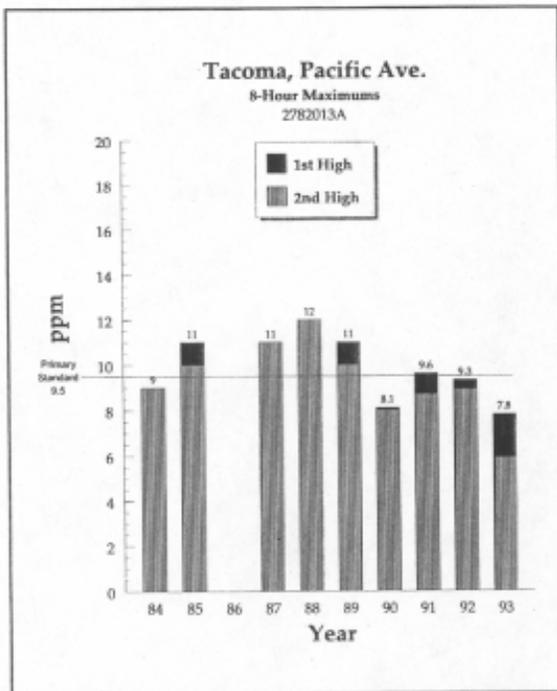
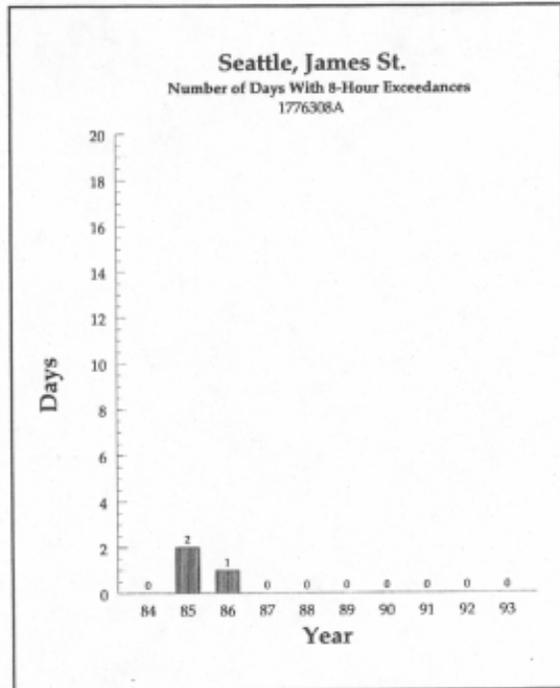
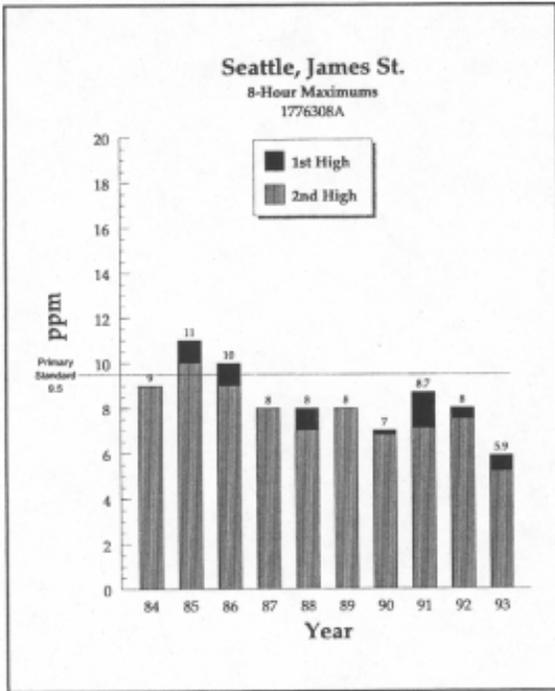
Puget Sound Area

Carbon Monoxide (CO)



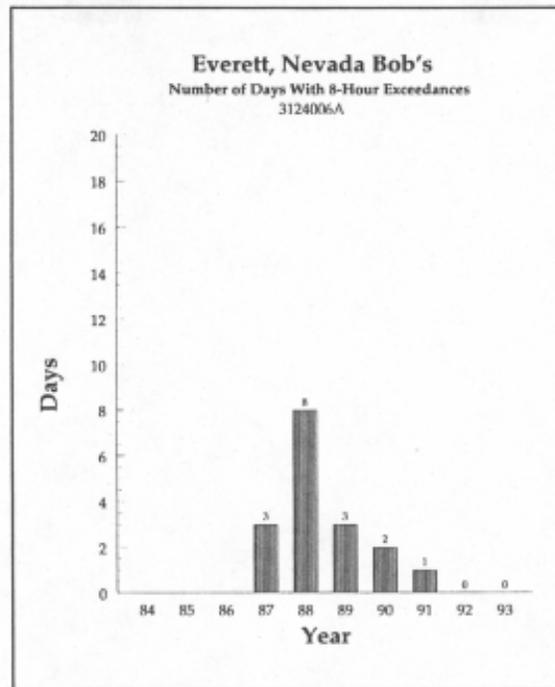
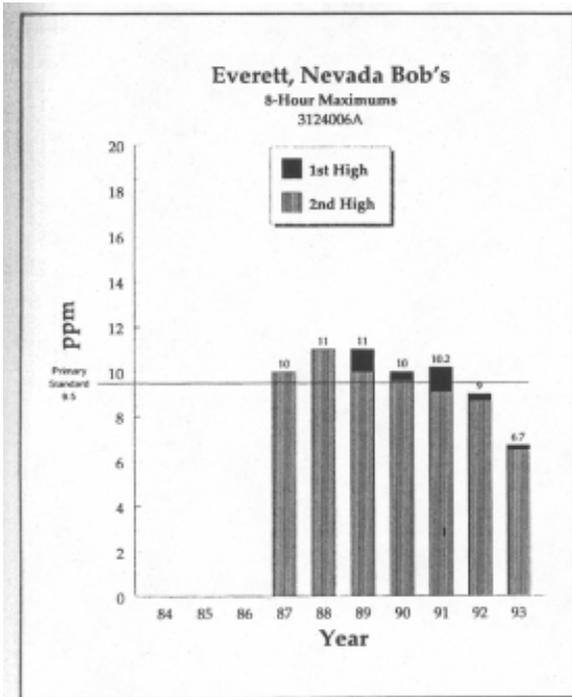
Puget Sound Area

Carbon Monoxide (CO)



Puget Sound Area

Carbon Monoxide (CO)



Sulfur Dioxide for 1993

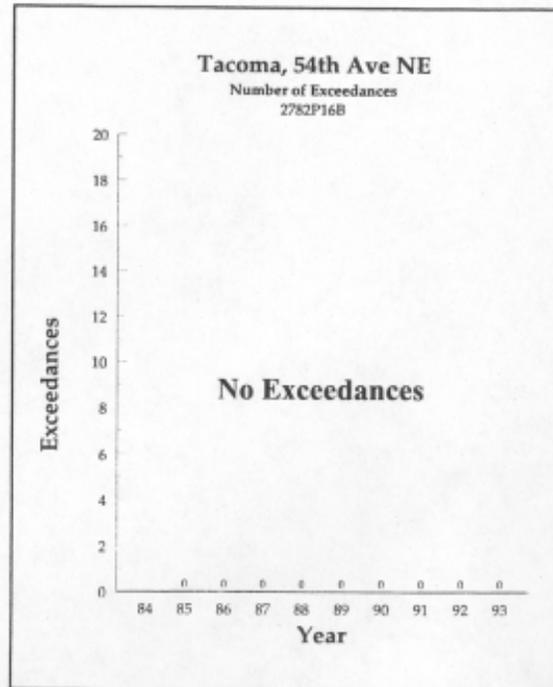
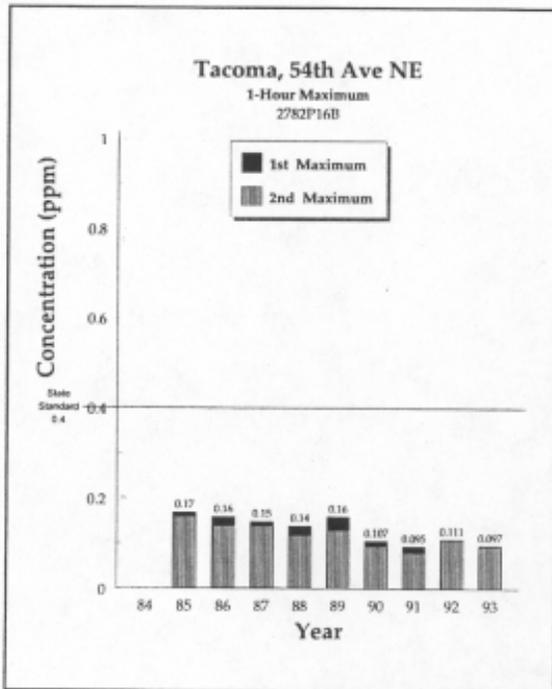
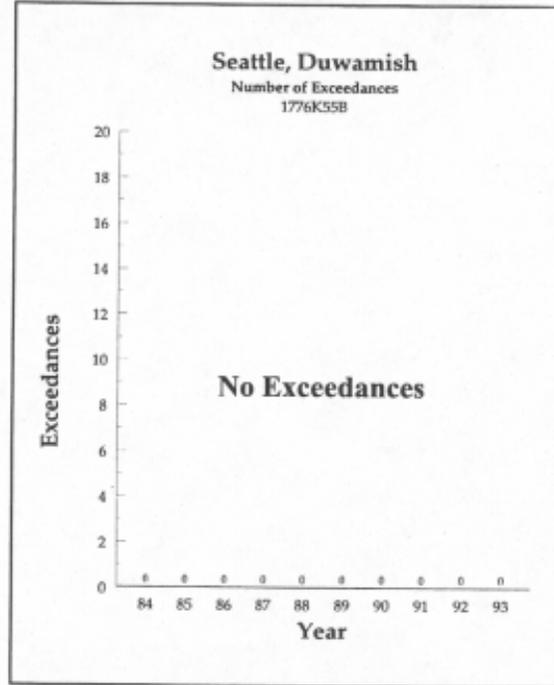
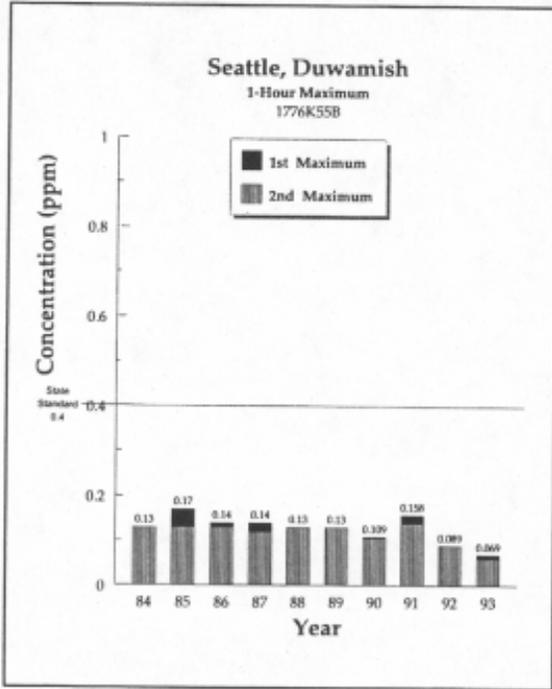
Station	Location	1-Hour Maximum		3-Hr Max		24-Hr Max		# 24-Hour		Annual Mean				
		1st	Date	2nd	Date	#1-Hr >.40	Conc	Date	#3-Hr >.50		Conc	Date	>.10	>.14
1776K55B	Seattle, Duwamish	.069	4/8	.060	1/27	0	.053	4/8	0	.027	1/15	0	0	.009
2782P16B	Tacoma, 54th Ave NE	.097	10/28	.095	9/10	0	.070	10/10	0	.027	10/3	0	0	.009
2782P17B	Tacoma, Alexander Ave	.081	12/27	.080	9/13	0	.066	12/27	0	.024	2/5	0	0	.009
3124S04B	Everett, Hoyt Ave	.068	1/13	.065	2/12	0	.044	2/12	0	.017	8/1	0	0	.006

Sulfur Dioxide for 1993

Station	Location	Period of Record	# Hours	# Days	% Valid Data
1776K55B	Seattle, Duwamish	Jan-Dec	8,319	347	95
2782P16B	Tacoma, 54 th Ave NE	Jan-Dec	8,210	342	94
2782P17B	Tacoma, Alexander Ave	Jan-Dec	8,629	360	98
3124S04B	Everett, Hoyt Ave	Jan-Dec	8,648	360	99

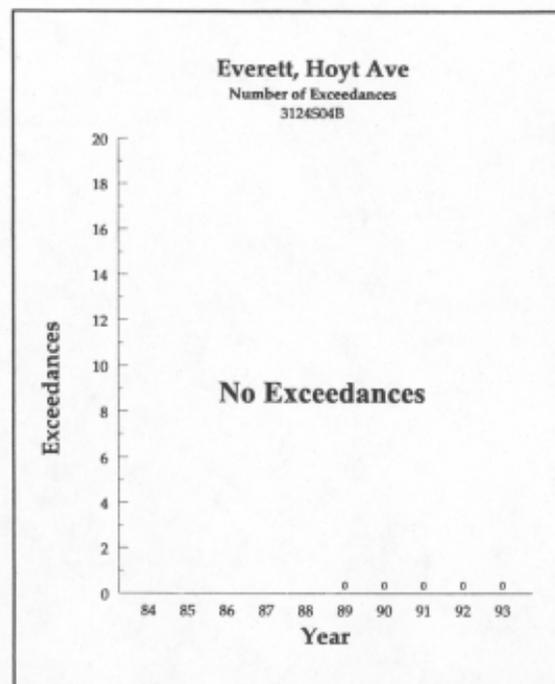
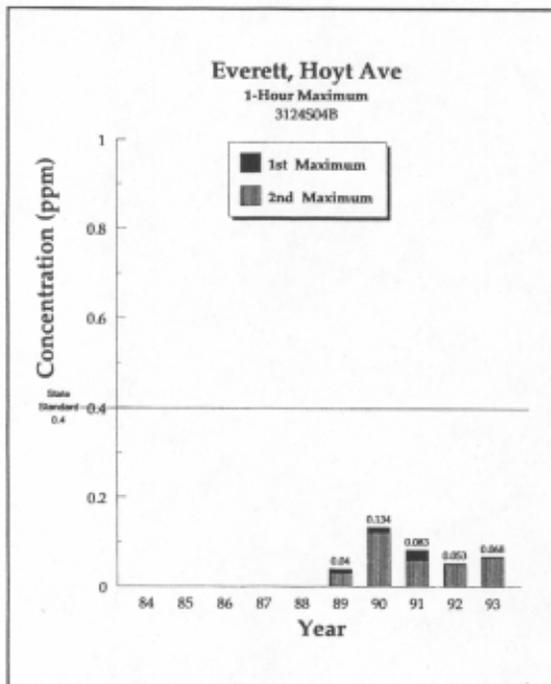
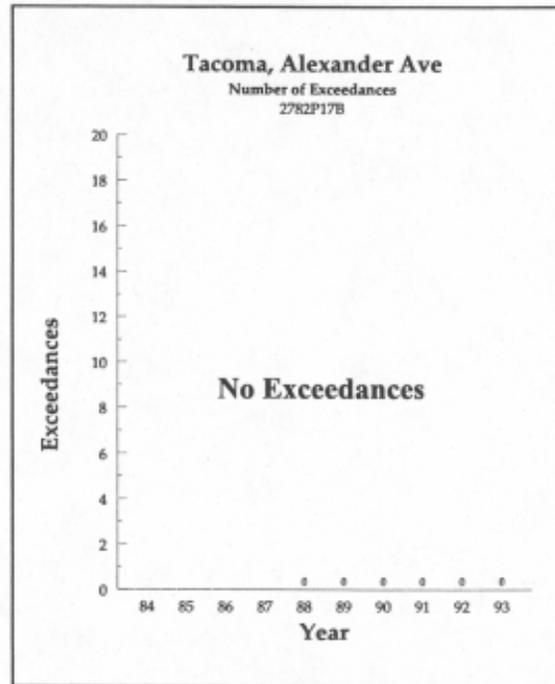
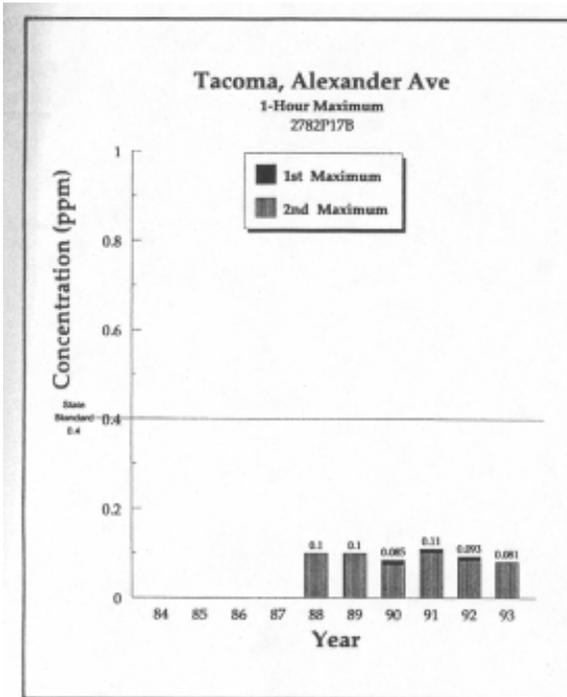
Puget Sound Area

Sulfur Dioxide (SO₂)



Puget Sound Area

Sulfur Dioxide (SO₂)



Puget Sound Area

Ozone (ppm) for 1993

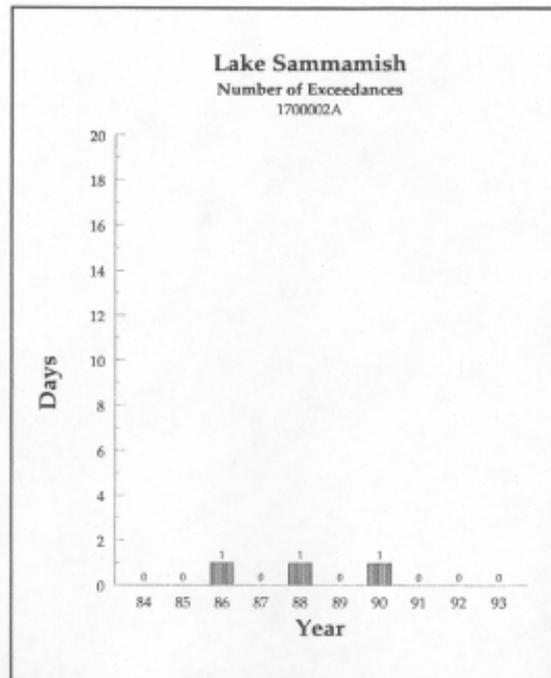
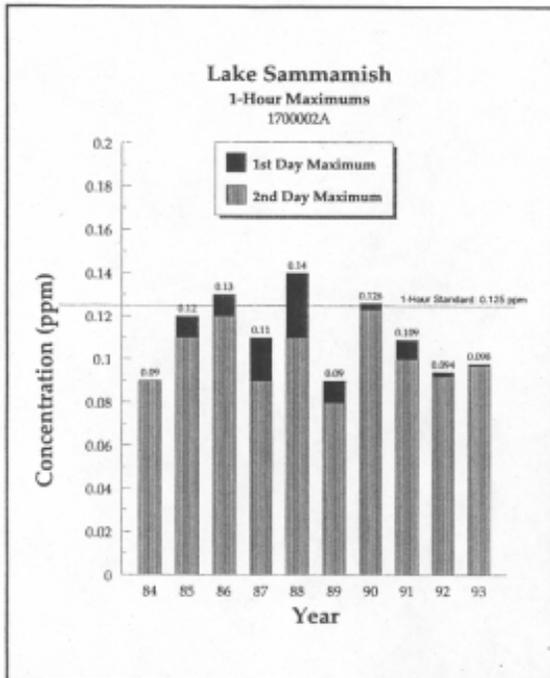
Station	Location	1st High		2nd High		2nd Dat High ¹		# Hrs >.124	Exc. Days
		Conc	Date	Conc	Date	Conc	Date		
1700002A	King Co, Lk Sammamish St Pk	.098	8/4	.097	8/5	.097	8/5	0	0
1700007A	King Co, Enumclaw	.103	8/4	.098	8/5	.098	8/5	0	0
2700007A	Pierce Co, Pack Forest	.103	8/4	.100	8/3	.100	8/3	0	0
3100002A	Snohomish Co, Getchell	.093	9/10	.089	9/10	.088	8/5	0	0

1. 2nd Day High = Second day with the highest 8-hour average.

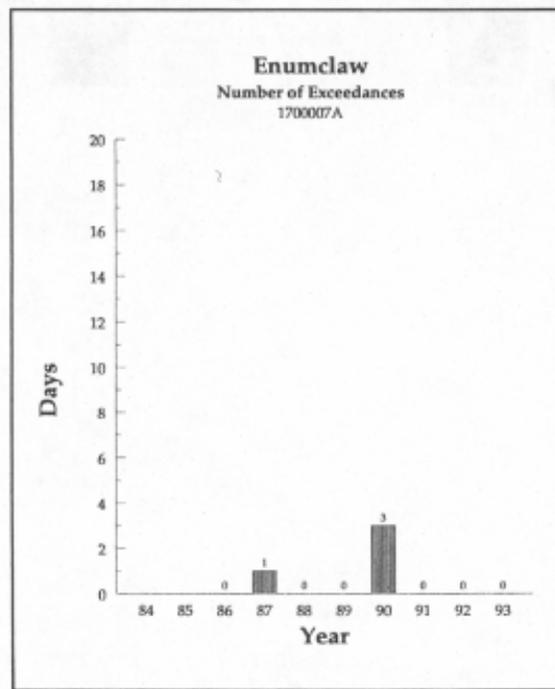
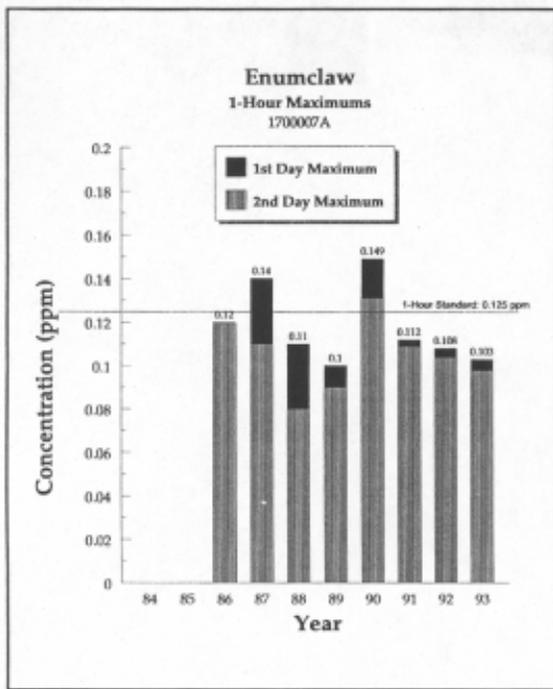
Ozone for 1993

Station	Location	Period of Record	# Hours	# Days	% Valid Data
1700002A	King Co, Lk Sammamish St Pk	Apr-Oct	4,731	197	92
1700007A	King Co, Enumclaw	Apr-Oct	4,951	206	96
2700007A	Pierce Co, Pack Forest	Apr-Oct	4,997	208	98
3100002A	Snohomish Co, Getchell	Apr-Oct	5,036	210	98

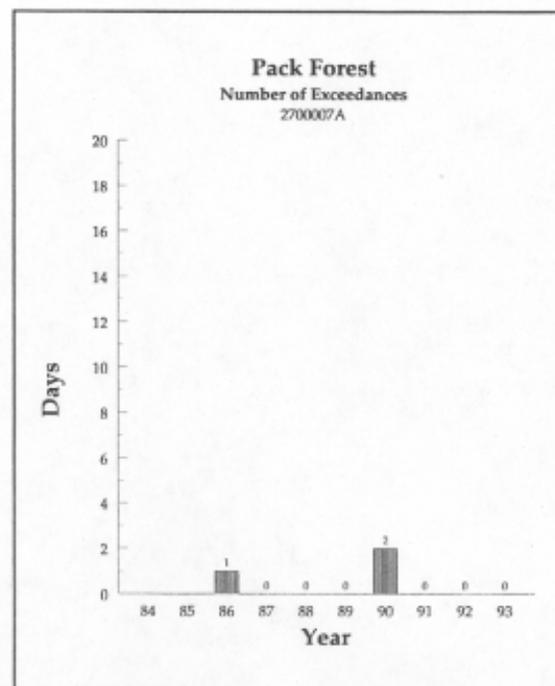
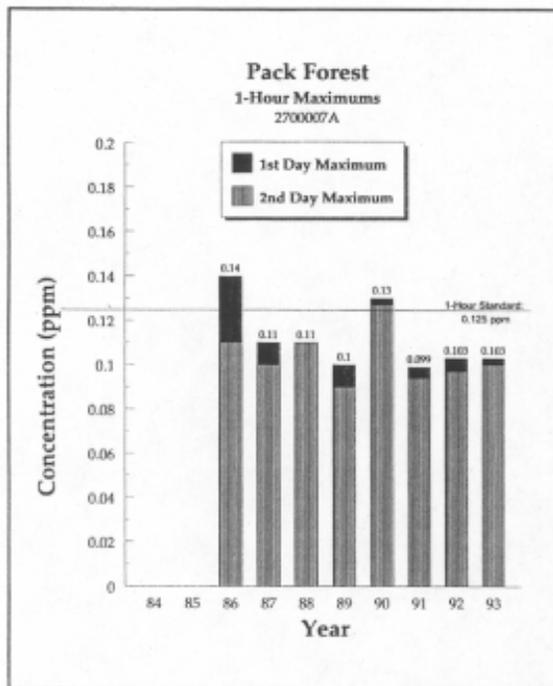
Ozone (O₃)



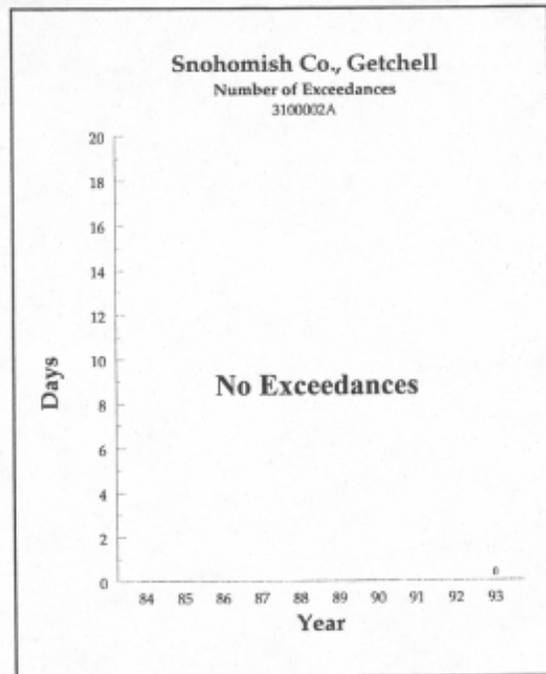
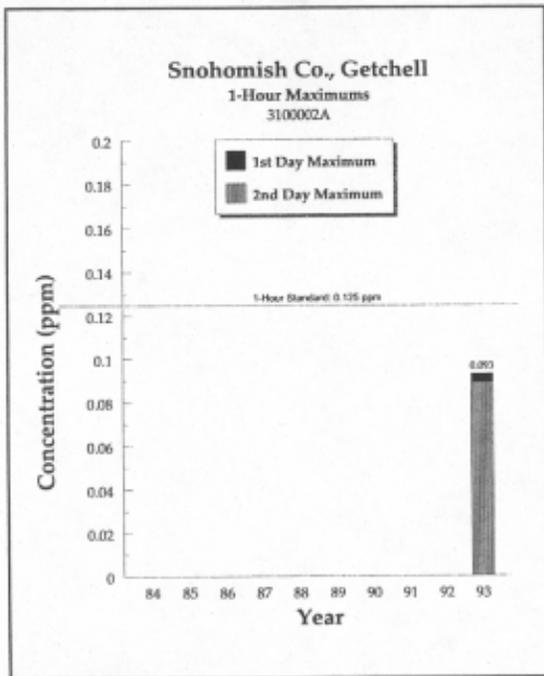
Puget Sound Area



Ozone (O₃)



Puget Sound Area



Northwest Area

PM₁₀ Annual Arithmetic Means (µg/m³)

Station	Location	1986	1987	1988	1989	1990	1991	1992	1993
3706005C	Bellingham, School Dist.							18*	21

* Average based on less than 12 months of data

PM₁₀ (µg/m³) For 1993

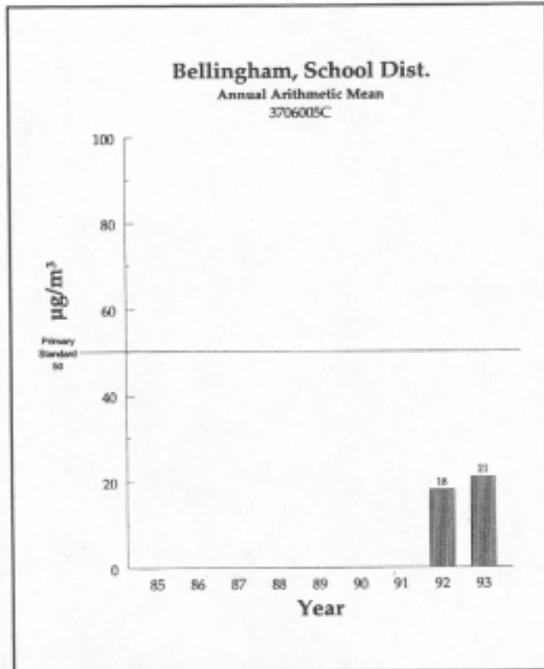
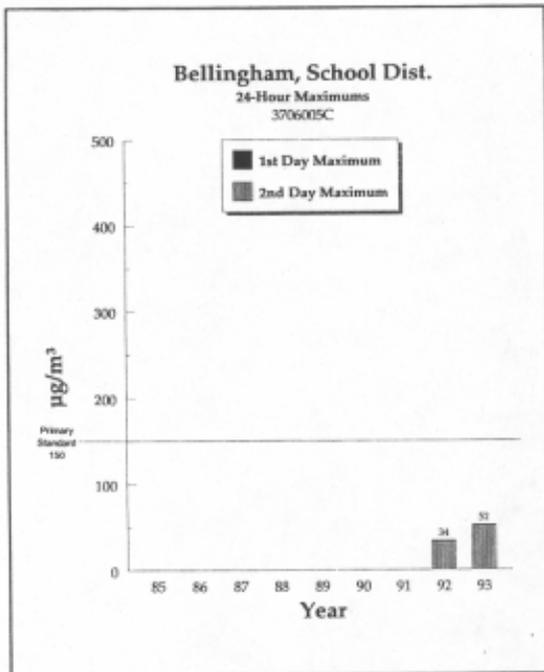
Station	Location	1st High		2nd High		Annual Arith. Mean
		Conc	Date	Conc	Date	
3706005C	Bellingham, School Dist.	52	9/28	51	12/21	21

* Average based on less than 12 months of data

PM₁₀ for 1993

Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
3706005C	Bellingham, School Dist.	May-Dec	1/6	60	98

Particulates (PM₁₀)



Northwest Area

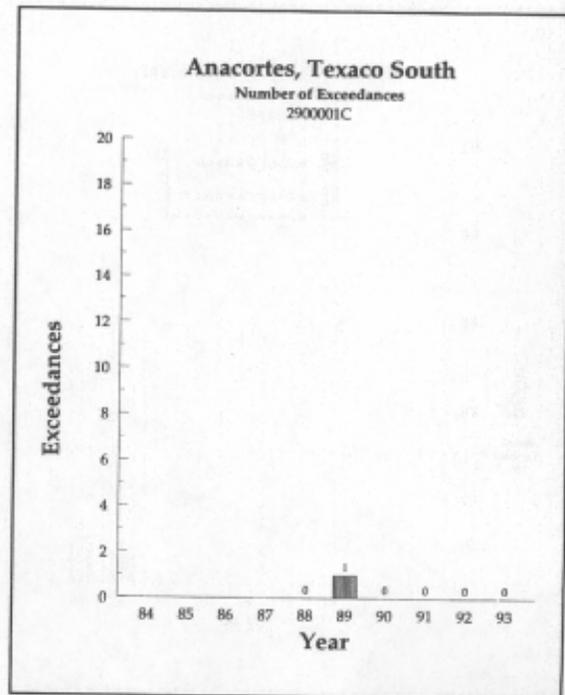
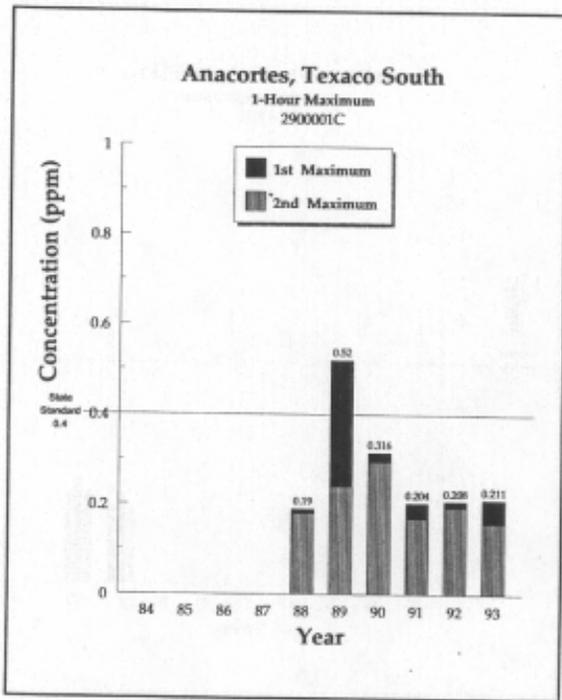
Sulfur Dioxide for 1993

Station	Location	1-Hour Maximum				3-Hr Max		24-Hr Max		# 24-Hour		Annual Mean		
		1st	Date	2nd	Date	#1-Hr >.40	Conc	Date	#3-Hr >.50	Conc	Date		>.10	>.14
2900001C	Anacortes, Texaco South	.211	12/15	.159	12/16	0	.138	12/15	0	.042	1/6	0	0	.005
2900004C	March Pt., Kiesser	.131	5/25	.079	5/26	0	.078	5/25	0	.018	5/25	0	0	.005
3706069C	Bellingham, Chestnut St.	.109	10/6	.062	4/23	0	.060	10/6	0	.017	8/23	0	0	.005

Sulfur Dioxide for 1993

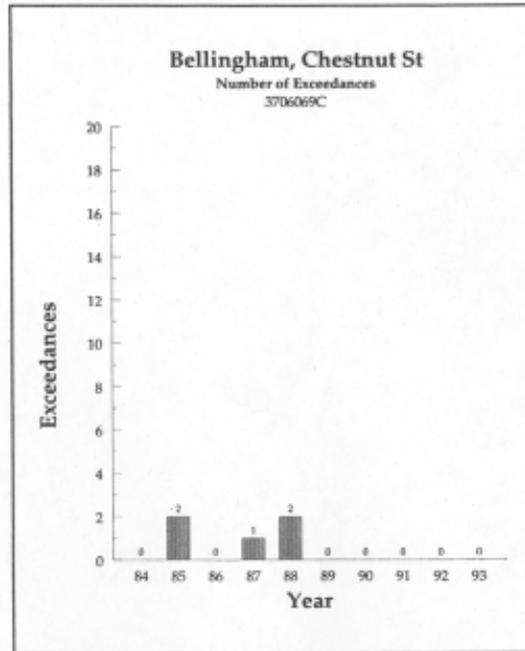
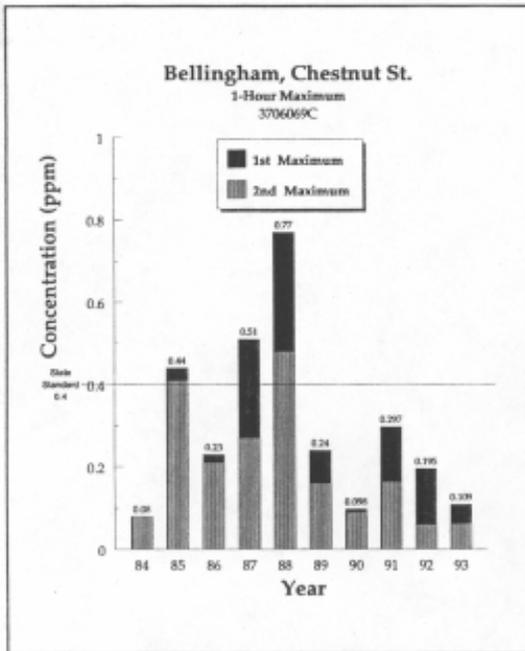
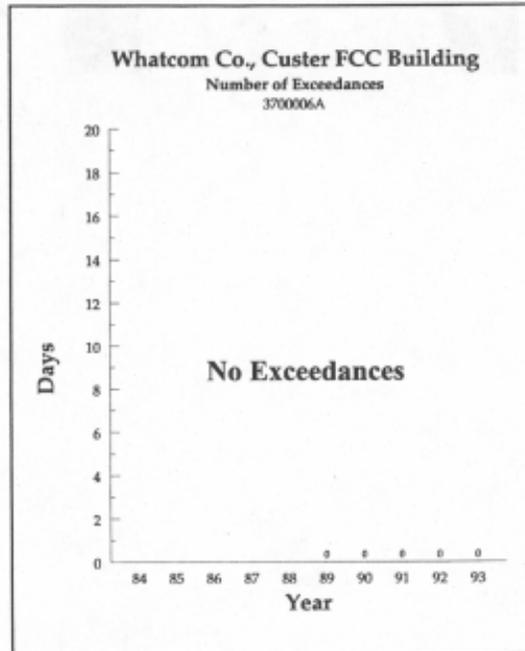
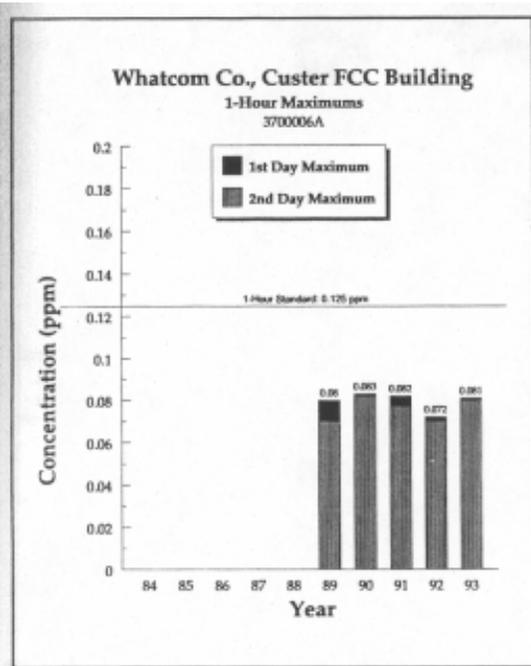
Station	Location	Period of Record	# Hours	# Days	% Valid Data
2900001C	Anacortes, Texaco South	Jan-Dec	8,577	357	98
2900004C	March Pt., Kiesser	Jan-Dec	7,233	301	84
3706069C	Bellingham, Chestnut St.	Jan-Dec	8,604	359	98

Sulfur Dioxide (SO₂)



Northwest Area

Ozone (O₃)



Ozone (ppm) for 1993

Station	Location	1-Hour Maximums						# Hrs >.124	Violation Days
		1st High		2nd High		2nd Day High ¹			
		Conc	Date	Conc	Date	Conc	Date		
370006A	Whatcom Co., Custer FCC Bldg	.081	9/3	.080	9/8	.080	9/8	0	

1. 2nd Day High = Second day with the highest 1-hour average.

Southwest Area

PM₁₀ Annual Arithmetic Means (µg/m³)

Station	Location	1986	1987	1988	1989	1990	1991	1992	1993
0688012D	Vancouver, Moose Lodge					24*	25	23	22
0688014D	Vancouver, Wa. Elementary School						37*	22	22
0844004D	Longview, City Shops	37*	35	32*	30	26	27	24	25

* Average based on less than 12 months of data

PM₁₀ (µg/m³) For 1993

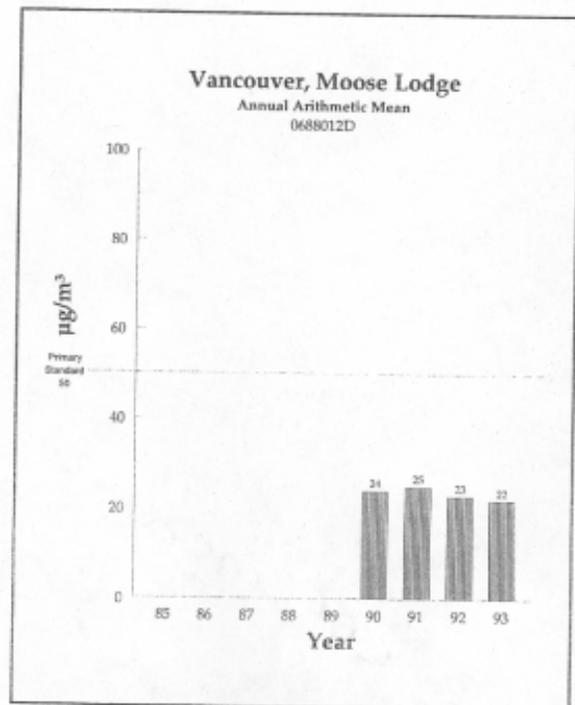
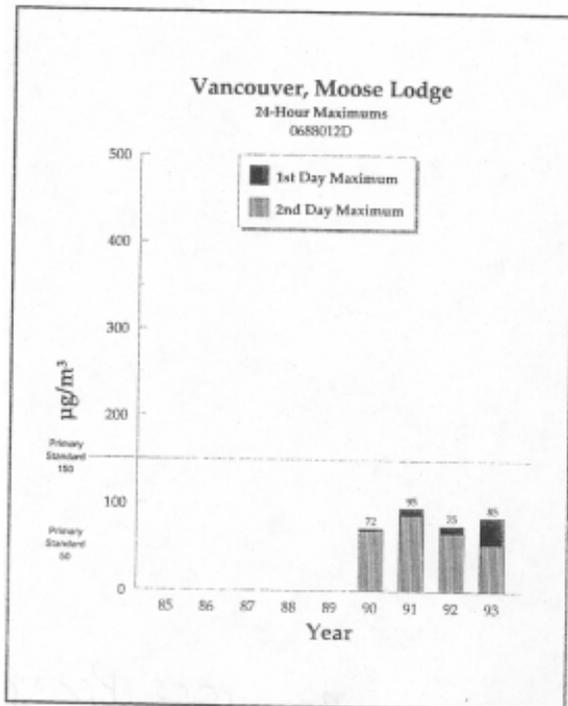
Station	Location	1st High		2nd High		Annual Arith. Mean
		Conc	Date	Conc	Date	
0688012D	Vancouver, Moose Lodge	85	12/27	54	11/9	22
0688014D	Vancouver, Wa. Elementary School	83	12/27	56	11/9	22
0844004D	Longview, City Shops	84	1/13	56	11/9	25

* Average based on less than 12 months of data

PM₁₀ for 1993

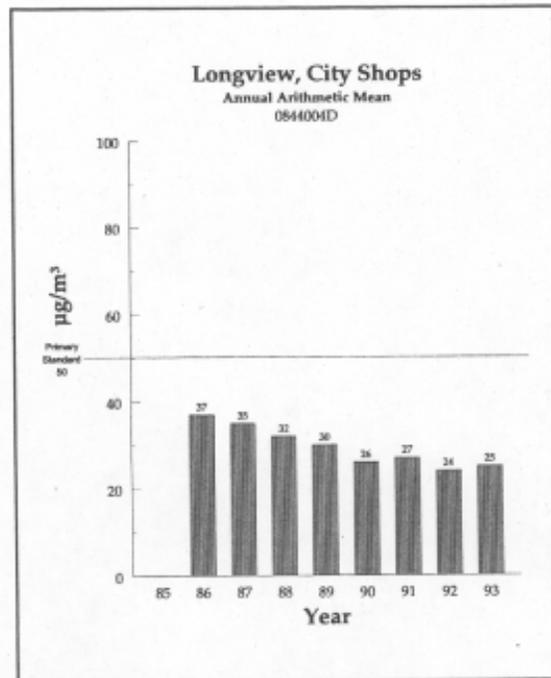
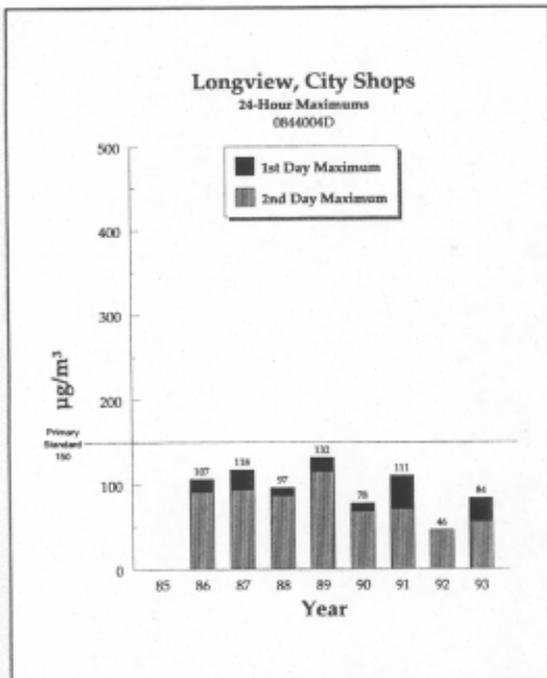
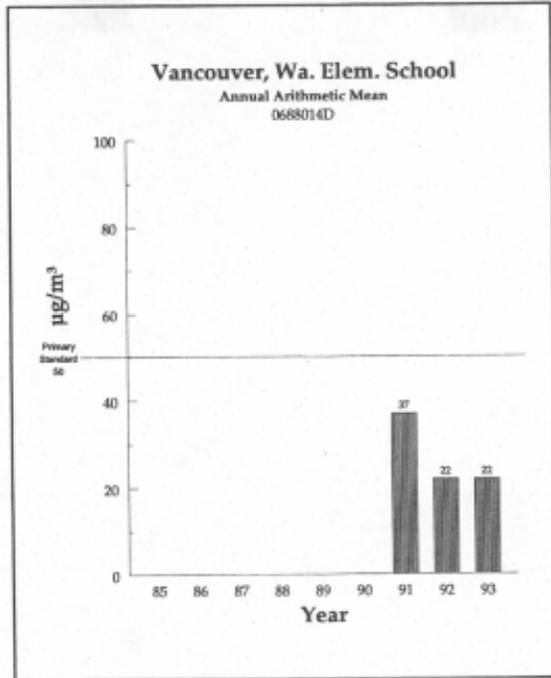
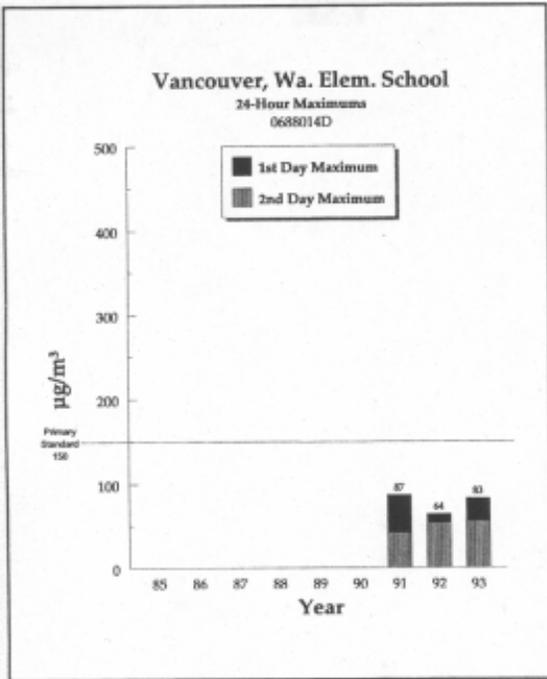
Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
0688012D	Vancouver, Moose Lodge	Jan-Dec	1/6	61	100
0688014D	Vancouver, Wa. Elementary School	Jan-Dec	1/6	61	100
0844004D	Longview, City Shops	Jan-Dec	1/6	61	100

Particulates (PM₁₀)



Southwest Area

Particulates (PM₁₀)



Southwest Area

Carbon Monoxide (ppm) for 1993

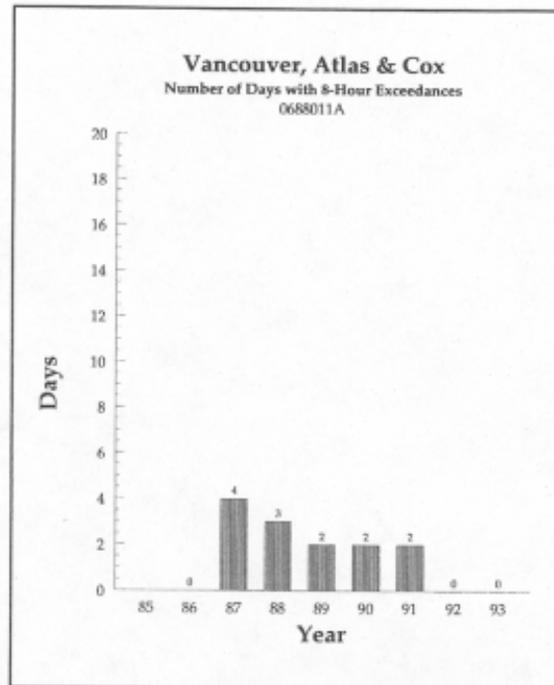
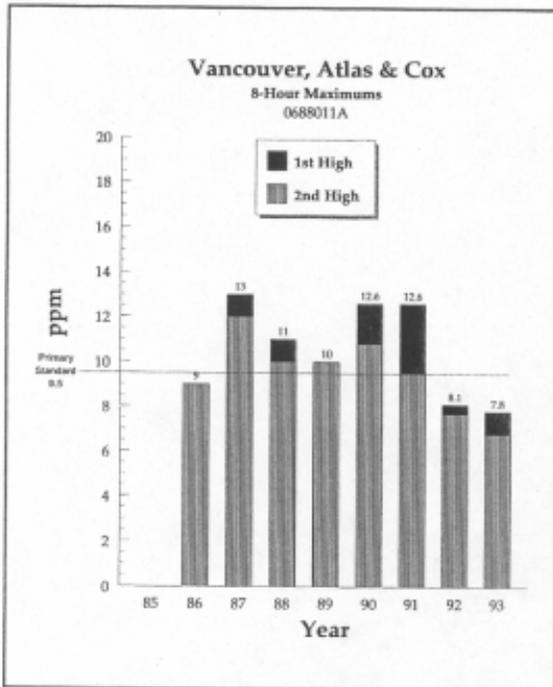
Station	Location	1-Hour Maximums				8-Hour Maximums ¹				8-Hr Exc.	Exc. Days		
		1st High		2nd High		1st High		2nd High				2nd Day ²	
		Conc	Date	Conc	Date	Conc	Date	Conc	Date			Conc	Date
0688011A	Vancouver, Atlas & Cox	11.7	11/8	10.3	11/5	7.8	11/8	6.8	11/5	6.8	11/5	0	0

1. 8-hour readings are non-overlapping.
2. 2nd Day High = Second day with the highest 8-hour average.

Carbon Monoxide (ppm) for 1993

Station	Location	Period of Record	# Hours	# Days	% Valid Data
0688011A	Vancouver, Atlas & Cox	Jan-Dec	8,528	365	97

Carbon Monoxide (CO)



Southwest Area

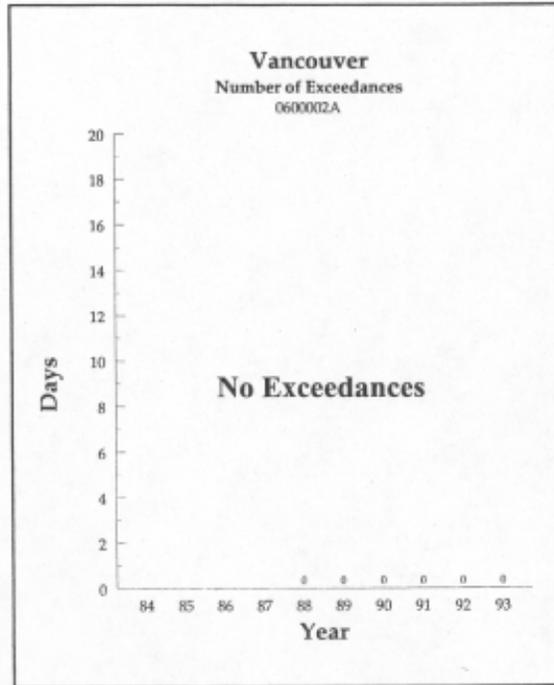
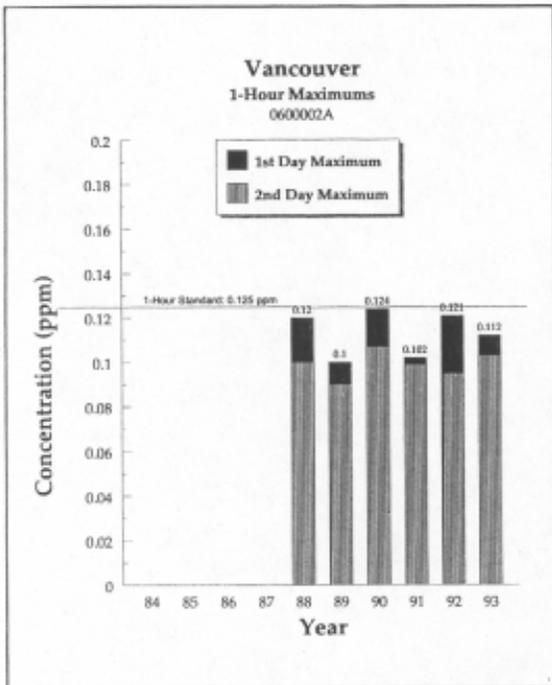
Ozone (ppm) for 1993

Station	Location	1-Hour Maximums							
		1st High		2nd High		2nd Day High ¹		# Hrs >.124	Exc. Days
		Conc	Date	Conc	Date	Conc	Date		
0600002A	Vancouver, Mt. View High Sch.	.112	8/4	.103	8/4	.072	8/5	0	0

Ozone for 1993

Station	Location	Period of Record	# Hours.	# Days	% Valid Data
0600002A	Vancouver, Mt. View High Sch.	Apr-Oct	4,807	200	93

Ozone (O₃)



Yakima County Area

PM₁₀ Annual Arithmetic Means (µg/m³)

Station	Location	1986	1987	1988	1989	1990	1991	1992	1993
3978005F	Sunnyside Intermediate Sch.						42*	33	34
3996008F	Yakima, Garfield Elem.				51*	34	44	32	38
3996009F	Yakima, YVCC - Sundquist				66*	33	37	33	31

* Average based on less than 12 months of data

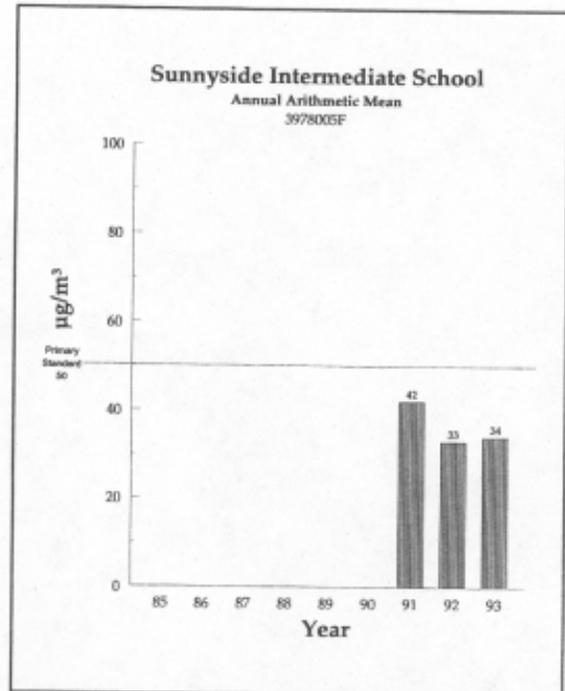
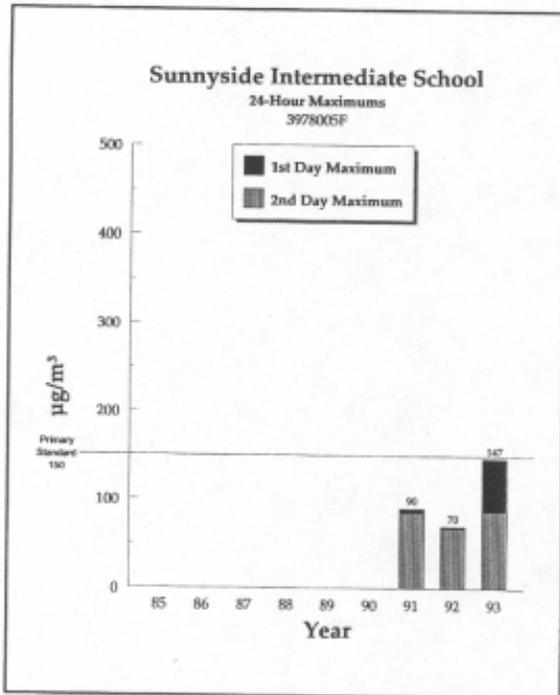
PM₁₀ (µg/m³) For 1993

Station	Location	1st High		2nd High		Annual Arith. Mean
		Conc	Date	Conc	Date	
3978005F	Sunnyside Intermediate Sch.	147	11/3	87	10/22	34
3996008F	Yakima, Garfield Elem.	97	11/3	90	11/15	38
3996009F	Yakima, YVCC - Sundquist	93	2/6	89	3/2	31

PM₁₀ for 1993

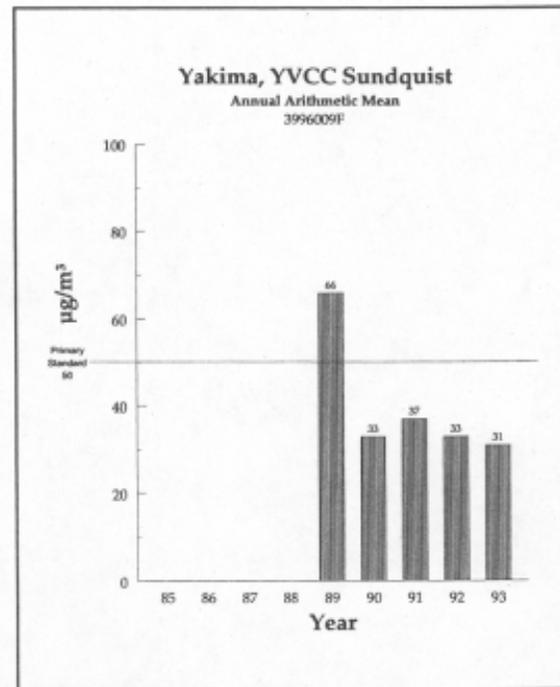
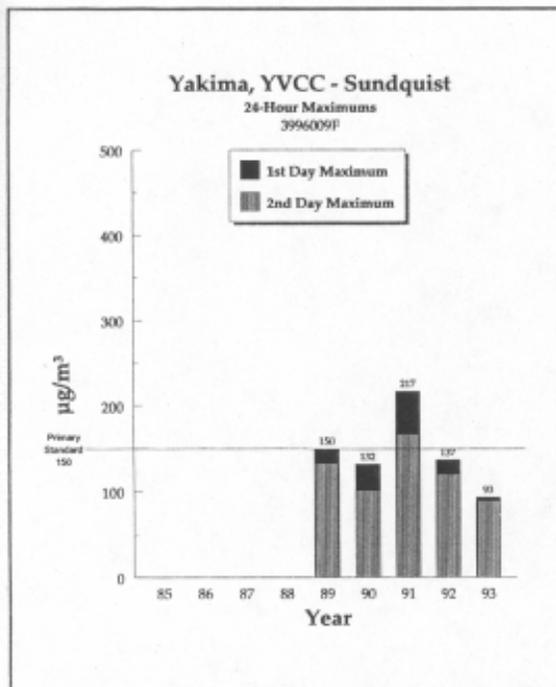
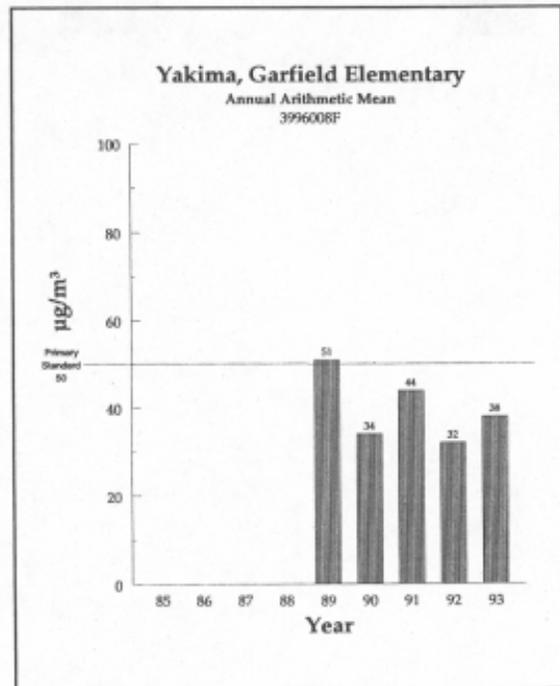
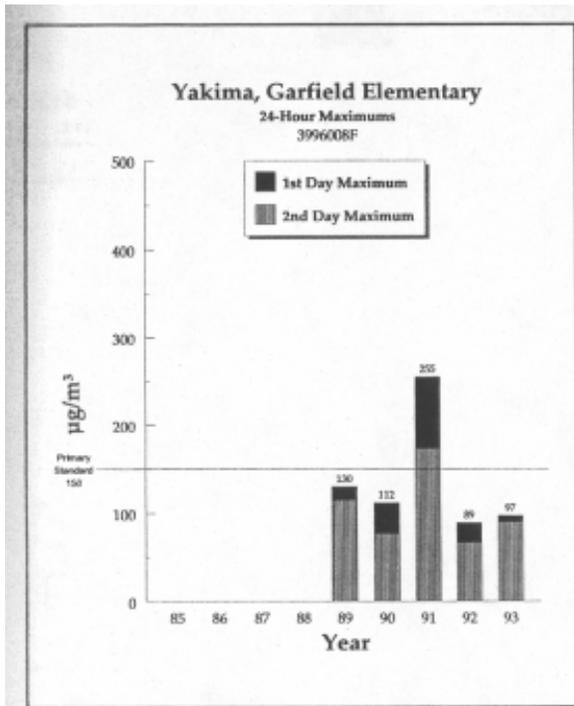
Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
3978005F	Sunnyside Intermediate Sch.	Jan-Dec	1/6	55	90
3996008F	Yakima, Garfield Elem.	Jan-Dec	1/6	61	100
3996009F	Yakima, YVCC - Sundquist	Jan-Dec	1/6	170	93

Particulates (PM₁₀)



Yakima County Area

Particulates (PM₁₀)



Yakima County Area

Carbon Monoxide (ppm) for 1993

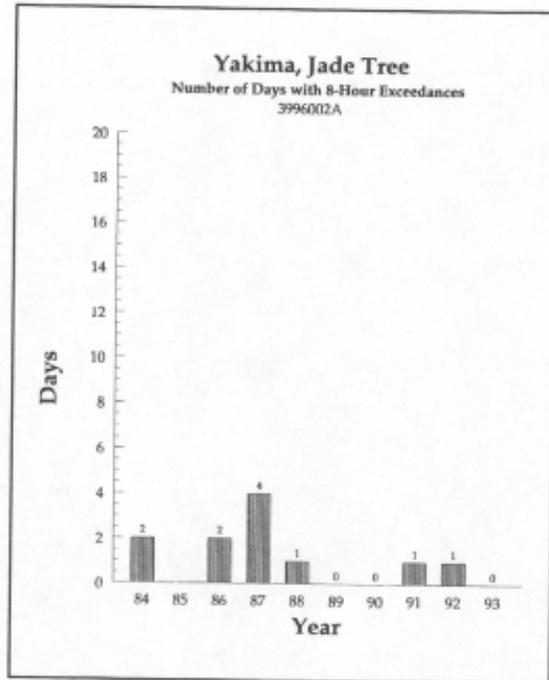
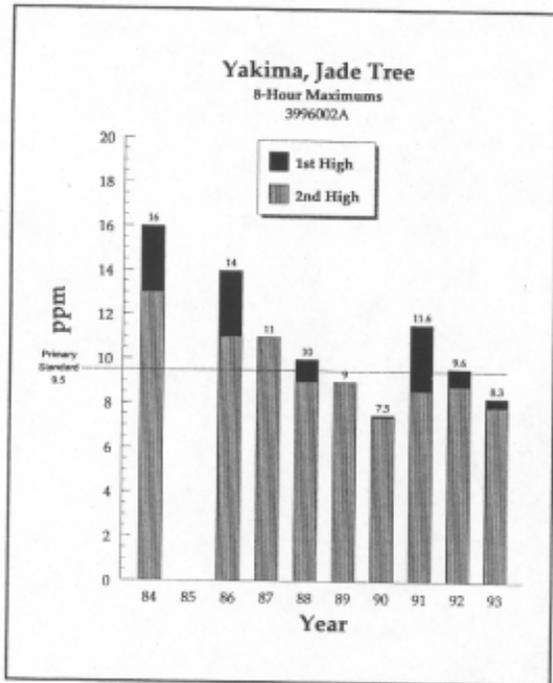
Station	Location	1-Hour Maximums				8-Hour Maximums ¹				8-Hr Exc.	Exc. Days		
		1st High		2nd High		1st High		2nd High				2nd Day ²	
		Conc	Date	Conc	Date	Conc	Date	Conc	Date			Conc	Date
3996002A	Yakima, Jade Tree	13.3	12/10	13/1	11/30	8.3	12/1	7.9	11/30	7.9	11/30	0	0

1. 8-hour readings are non-overlapping.
2. 2nd Day High = Second day with the highest 8-hour average.

Carbon Monoxide (ppm) for 1993

Station	Location	Period of Record	# Hours.	# Days	% Valid Data
3996002A	Yakima, Jade Tree	Jan-Dec	8,598	365	98

Carbon Monoxide (CO)



Spokane County Area

PM₁₀ Annual Arithmetic Means (µg/m³)

Station	Location	1986	1987	1988	1989	1990	1991	1992	1993
3200013E	Spokane, Country Homes	52	54	42	34*	34	33	30*	42*
3200018E	Spokane, Nazarene Church							29*	34
3214999E	Cheney, Turnbull Slough						27*	17	18
3250004E	Spokane, Millwood		56*	52	43	45	41*	35	39
3278009E	Spokane, Crown Z.	50	56	52	45	48	46*	45	43
3278040A	Spokane, Auto Glass	45	49	48	41	39	37	39	43

* Average based on less than 12 months of data

PM₁₀ (µg/m³) For 1993

Station	Location	1st High		2nd High		Annual Arith. Mean
		Conc	Date	Conc	Date	
3200013E	Spokane, Country Homes	67	2/6	64	2/18	43*
3200018E	Spokane, Nazarene Church	287	3/12	268	3/11	34
3214999E	Cheney, Turnbull Slough	490	9/11	83	9/9	18
3250004E	Spokane, Millwood	176	11/3	123	9/28	39
3278009E	Spokane, Crown Z.	300	9/11	207	11/3	43
3278040A	Spokane, Auto Glass	297	9/11	156	11/3	43

Frequency of PM₁₀ (µg/m³) Levels Exceeding The State Standard During 1993 (# Days Exceeding Level)

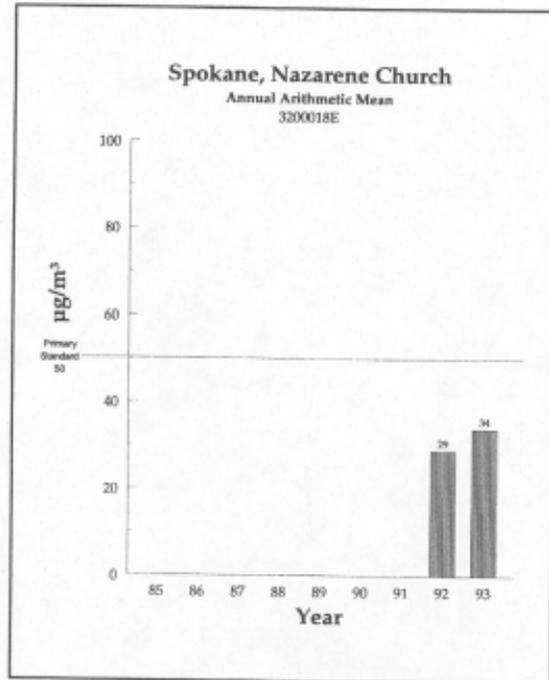
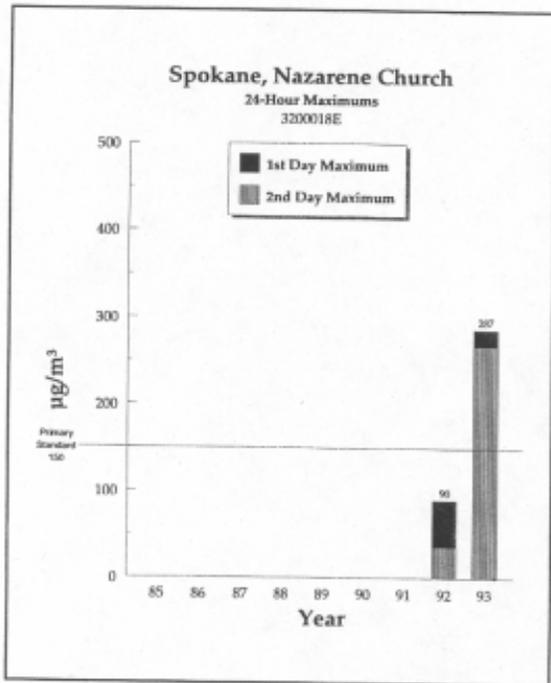
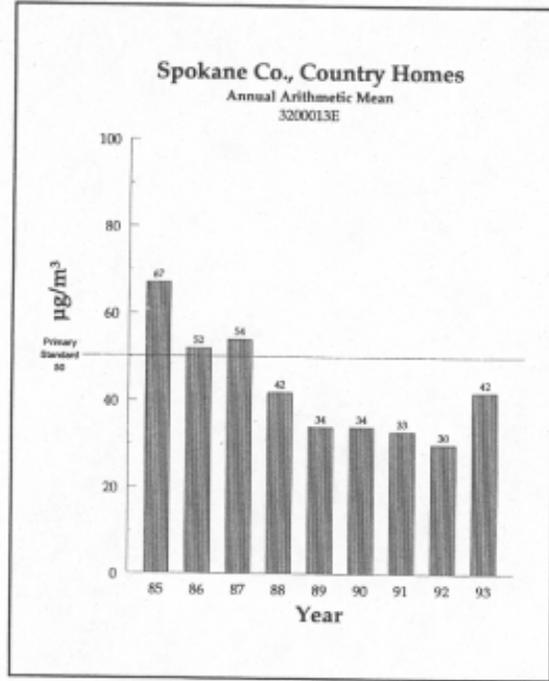
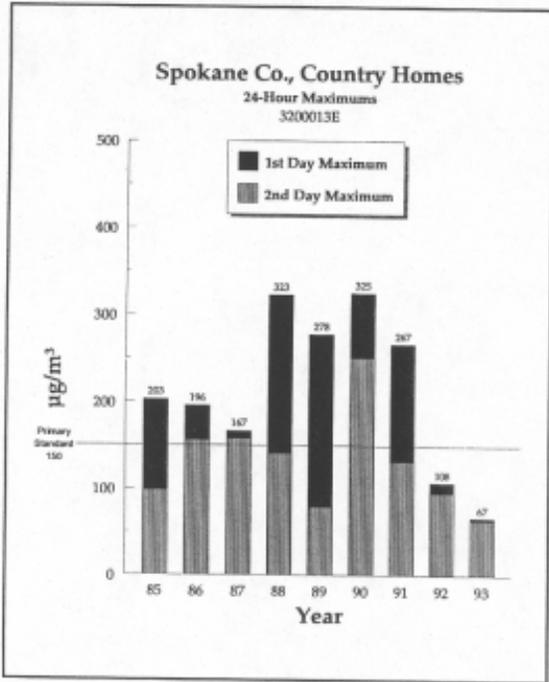
Station	Location	≥150 <200	≥200 <260	≥260 <375	≥375 <500	≥500
		3200018E	Spokane, Nazarene Church	2	2	3
3214999E	Cheney, Turnbull Slough	0	0	0	1	1
3250004E	Spokane, Millwood	1	1	0	0	0
3278009E	Spokane, Crown Z.	2	2	1	0	0
3278040A	Spokane, Auto Glass	1	1	1	0	0

PM₁₀ for 1993

Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
3200018E	Spokane, Nazarene Church	Jan-Dec	1/2	315	95
3214999E	Cheney, Turnbull Slough	Jan-Dec	1/6	184	94
3250004E	Spokane, Millwood	Jan-Dec	1/6	60	98
3278009E	Spokane, Crown Z.	Jan-Dec	1/1	346	95
3278040A	Spokane, Auto Glass	Jan-Dec	1/6	61	100

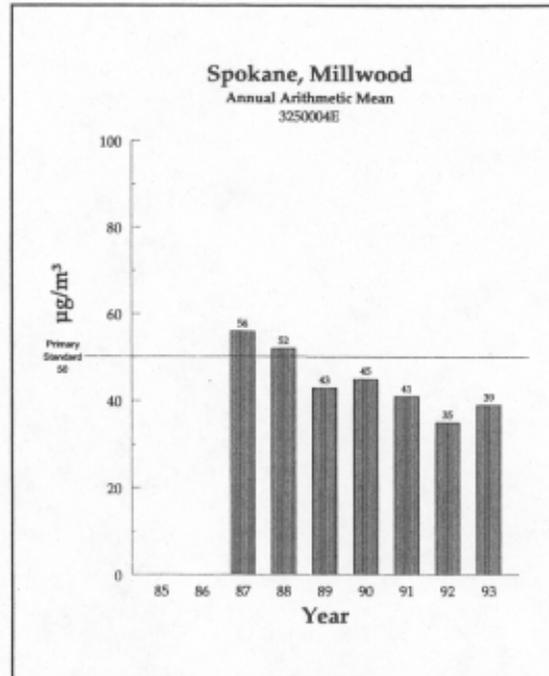
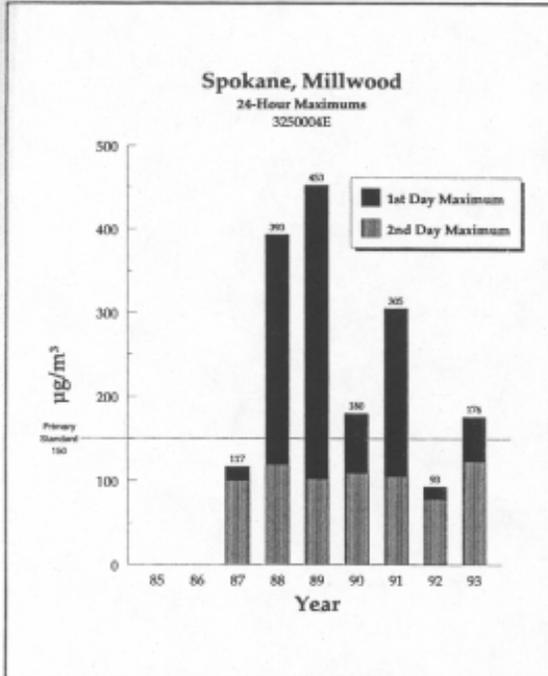
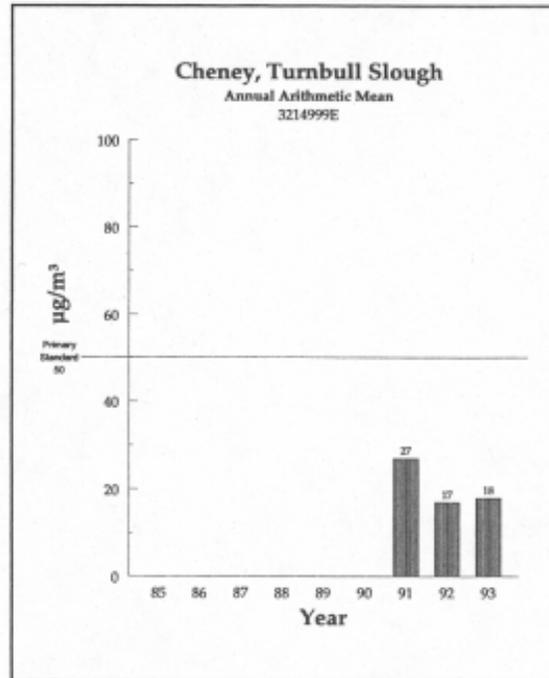
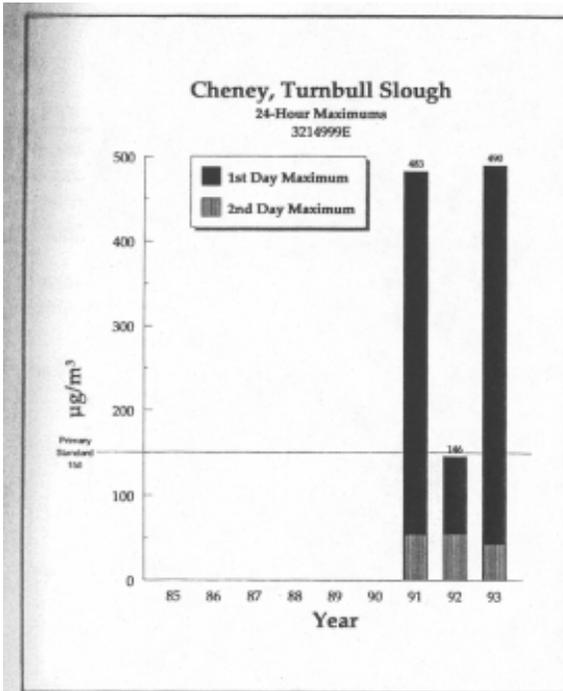
Spokane County Area

Particulates (PM₁₀)



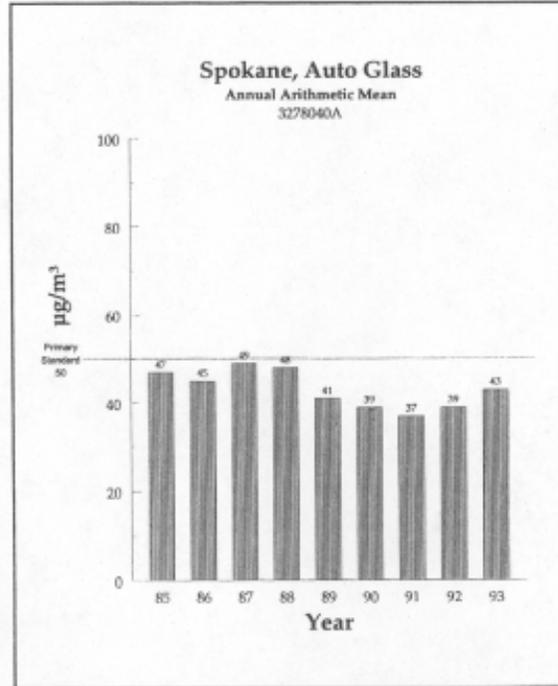
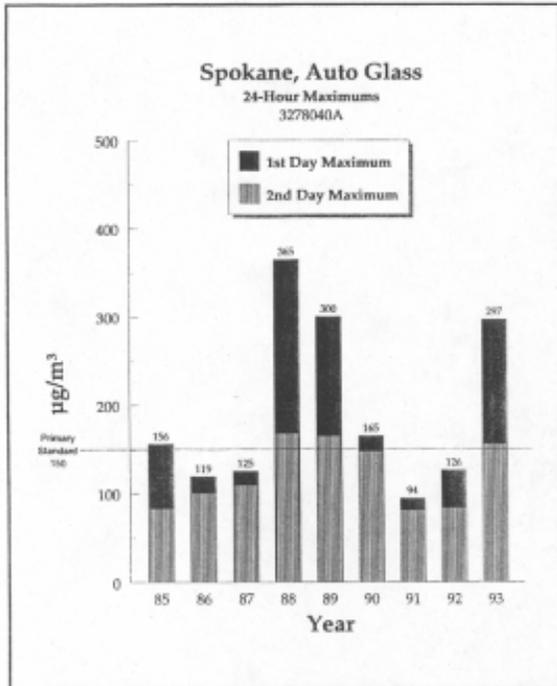
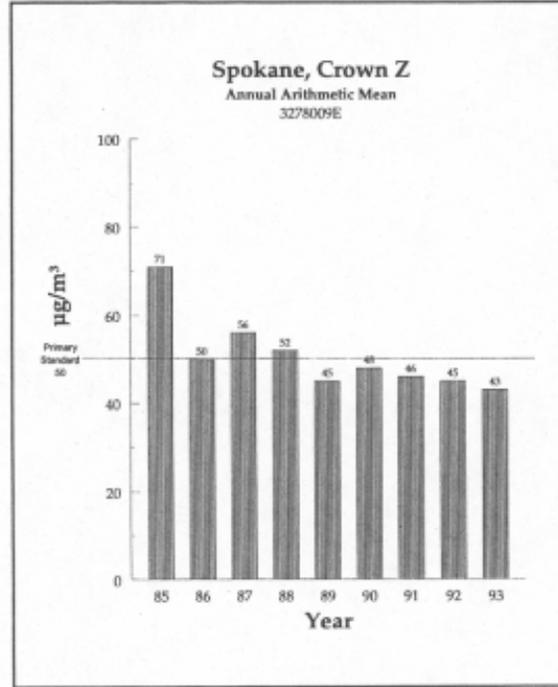
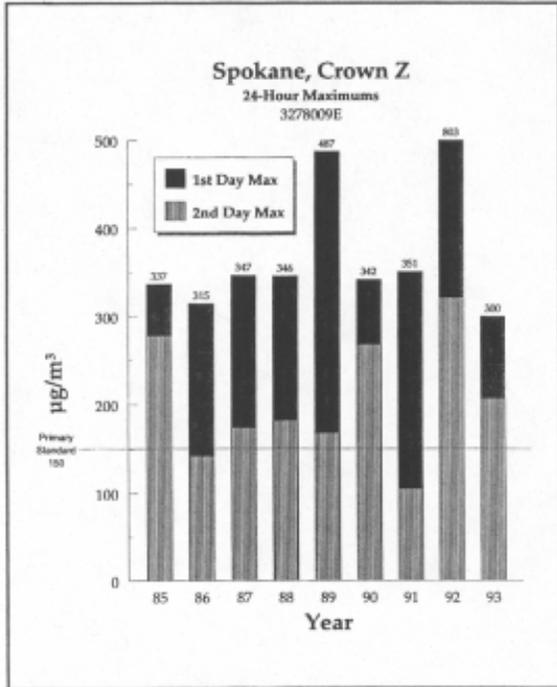
Spokane County Area

Particulates (PM₁₀)



Spokane County Area

Particulates (PM₁₀)



Spokane County Area

Carbon Monoxide (ppm) for 1993

Station	Location	1-Hour Maximums				8-Hour Maximums ¹				8-Hr Exc.	Exc. Days		
		1st High		2nd High		1st High		2nd High				2nd Day ²	
		Conc	Date	Conc	Date	Conc	Date	Conc	Date			Conc	Date
3278039A	Spokane, Hamilton St.	13.7	3/5	13.3	11/29	10.1	11/10	9.8	11/11	9.8	11/11	2	2
3278043A	Spokane, Backdoor Tav.	12.4	11/11	11.7	11/11	8.5	11/11	7.8	11/10	7.8	11/10	0	0
3278044A	Spokane, Empire Ford	21.2	11/11	18.3	11/10	12.7	11/11	11.8	11/10	11.8	11/10	4	4
3278045A	Spokane, Spokane Club	11.5	10/4	10.6	2/5	7.9	3/22	6.4	11/29	6.4	11/29	0	0

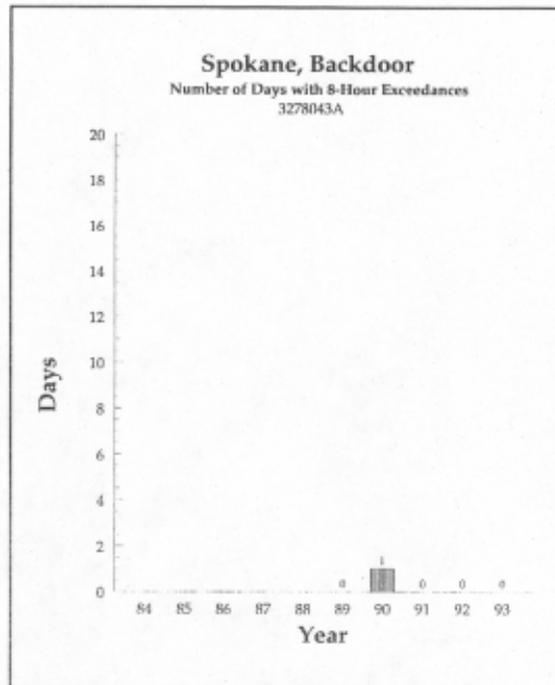
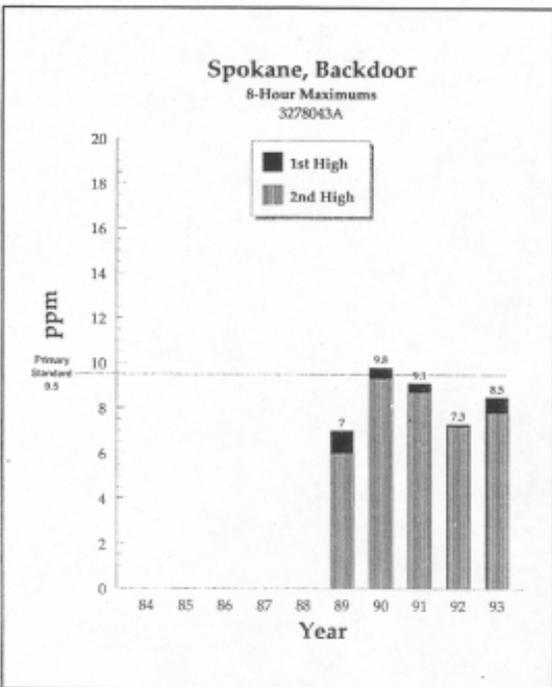
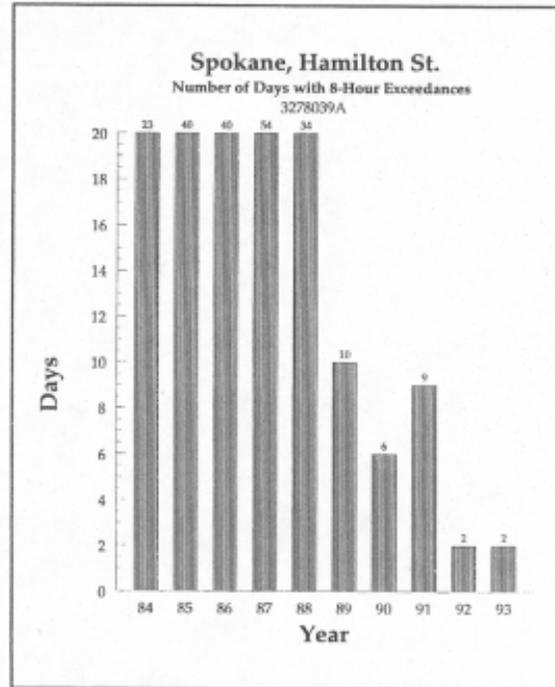
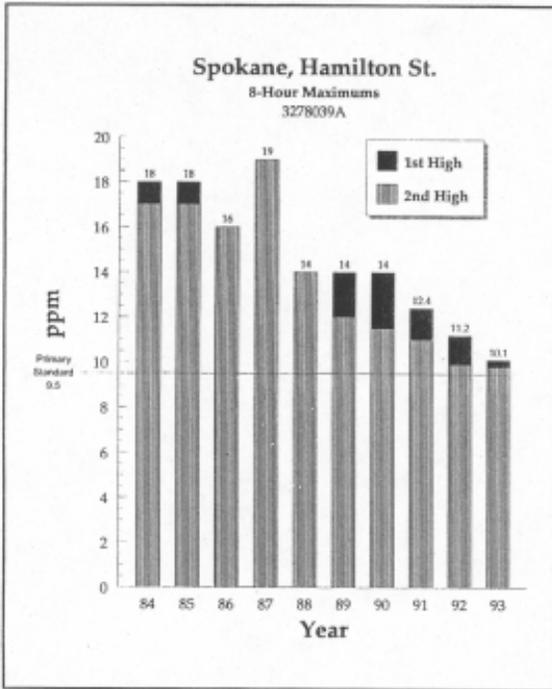
1. 8-hour readings are non-overlapping.
2. 2nd Day High - Second day with the highest 8-hour average.

Carbon Monoxide for 1993

Station	Location	Period of Record	# Hours	# Days	% Valid Data
3278039A	Spokane, Hamilton St.	Jan-Dec	7,527	365	86
3278043A	Spokane, Backdoor Tav.	Jan-Dec	7,499	365	86
3278044A	Spokane, Empire Ford	Jan-Dec	8,652	365	99
3278045A	Spokane, Spokane Club	Jan-Dec	8,541	365	98

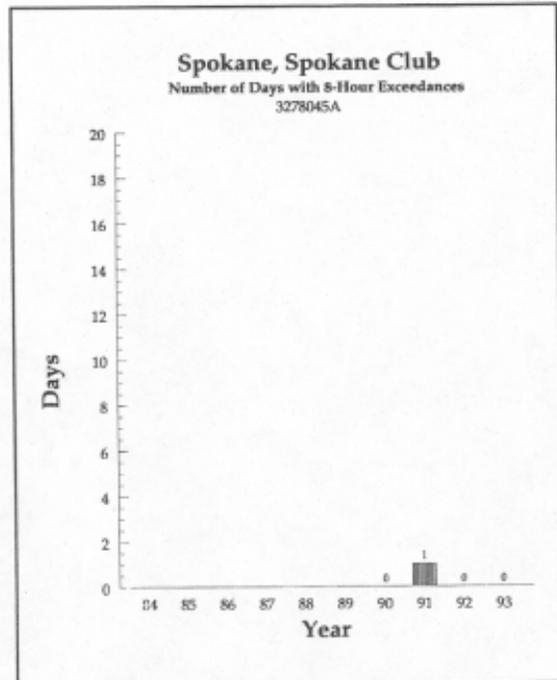
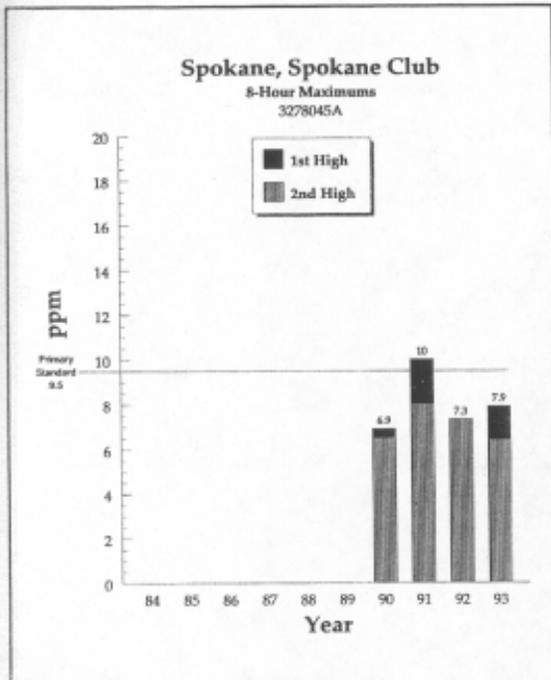
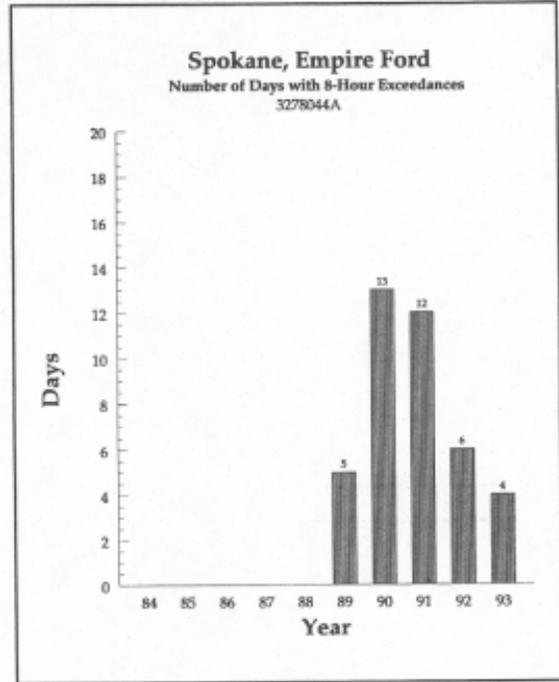
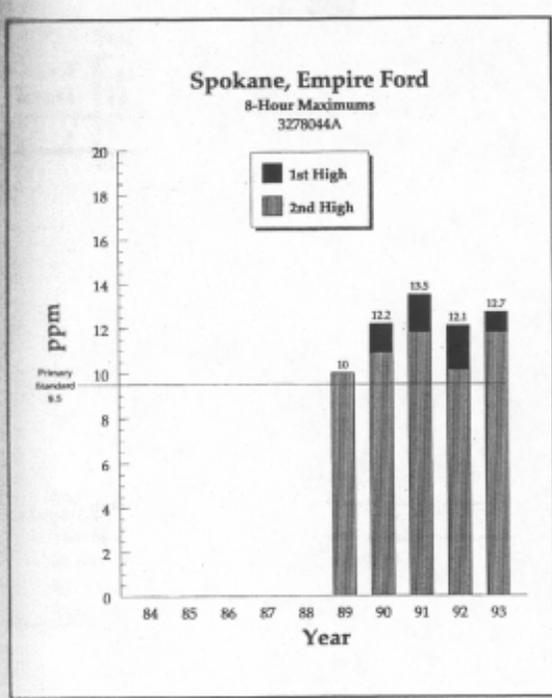
Spokane County Area

Carbon Monoxide (CO)



Spokane County Area

Carbon Monoxide (CO)



Spokane County Area

Ozone (ppm) for 1993

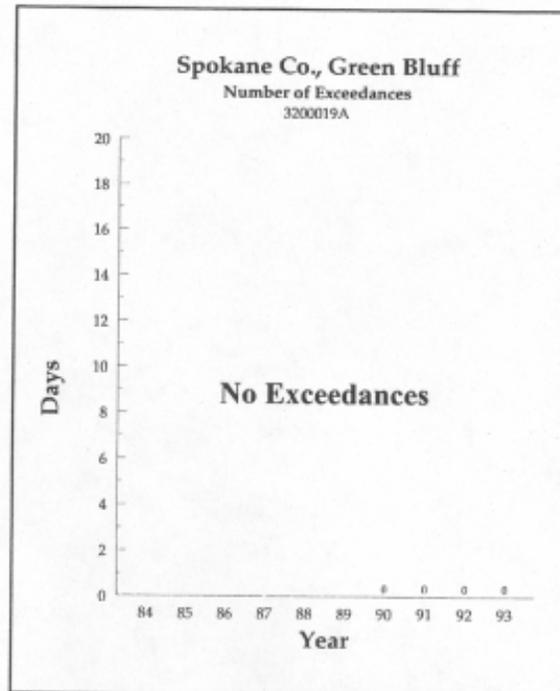
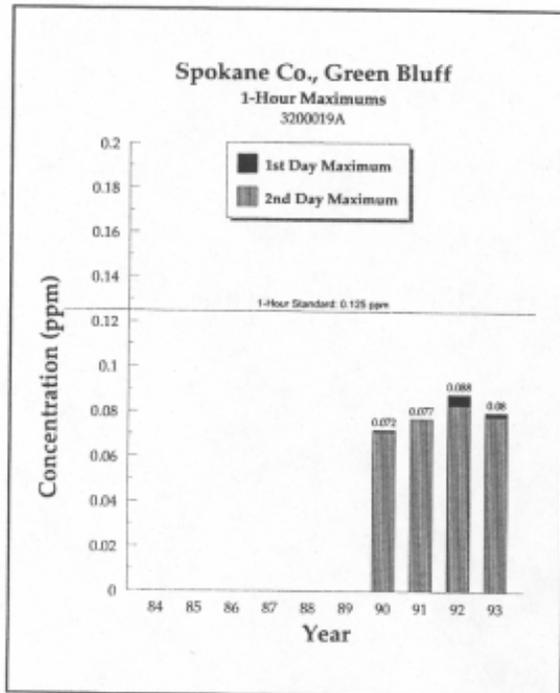
Station	Location	1-Hour Maximums							
		1st High	2nd High		2nd Day High ¹		# Hrs >.124	Exc. Days	
Conc	Date	Conc	Date	Conc	Date	Conc			Date
3200019A	Spokane Co., Green Bluff	.080	5/15	.078	5/15	.069	5/17	0	0

1. 2nd Day High = Second day with the highest 8-hour average.

Ozone for 1993

Station	Location	Period of Record	# Hours	# Days	% Valid Data
3200019A	Spokane Co., Green Bluff	Apr-Oct	4,933	206	96

Ozone (O₃)



Central Area

PM₁₀ Annual Arithmetic Means (µg/m³)

Station	Location	1986	1987	1988	1989	1990	1991	1992	1993
0160002	Othello, Co. Health Bldg.								36*
0214002A	Clarkston, C.F. Adams H.S.		49*	41*	33*	33	39	29	26*
0214005A	Clarkston, STP								43*
0490004A	Wenatchee, Community College			30*	21	21	22	21	25

* Average based on less than 12 months of data.

PM₁₀ for 1993

Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
0160002	Othello, Co. Health Bldg.	Jan-Dec	1/6	56	92
0214002A	Clarkston, C.F. Adams H.S.	Jan-Dec	1/6	28	100
0214005A	Clarkston, STP	Jan-Dec	1/6	33	100
0490004A	Wenatchee, Community College	Jan-Dec	1/6	48	79

PM₁₀ (µg/m³) For 1993

Station	Location	1st High		2nd High		Annual Arith. Mean
		Conc	Date	Conc	Date	
0160002	Othello, Co. Health Bldg.	224	11/3	109	5/13	36
0214002A	Clarkston, C.F. Adams H.S.	70	1/13	45	5/25	26*
0214005A	Clarkston, STP	148	11/3	119	11/9	43*
0490004A	Wenatchee, Community College	62	2/6	51	3/7	25

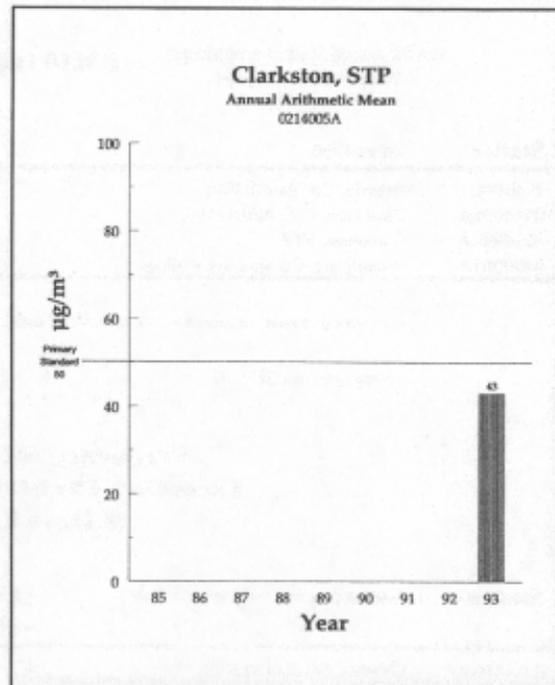
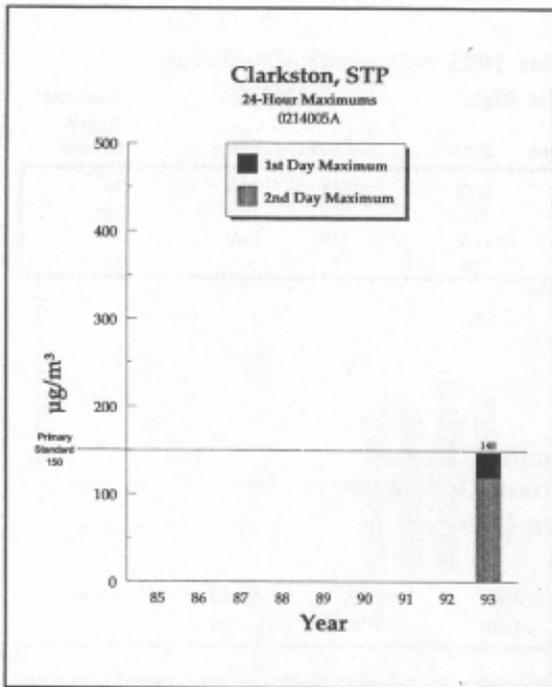
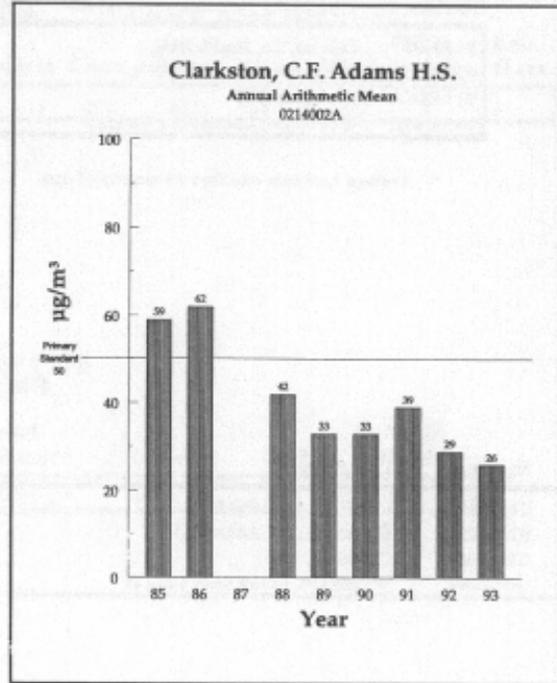
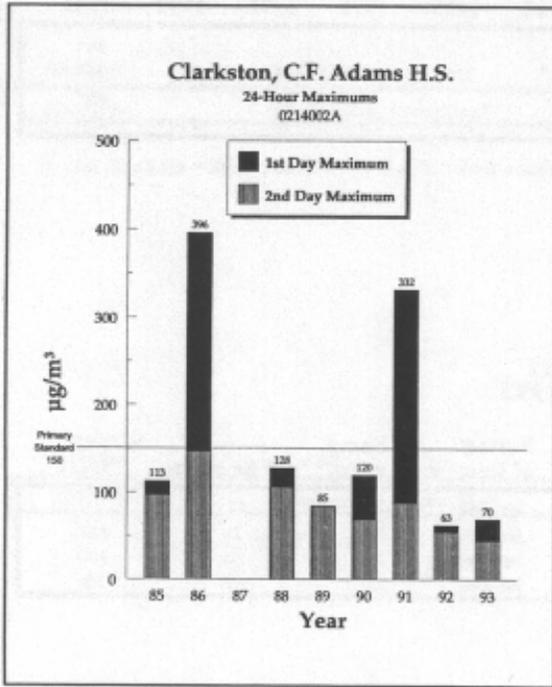
* Average based on less than 12 months of data.

Frequency of PM₁₀ (µg/m³) Levels Exceeding The State Standard During 1993 (# Days Exceeding Level)

Station	Location	≥150 <200	≥200 <260	≥260 <375	≥375 <500	≥500
0160002A	Othello, Co. Health Bldg.	0	1	0	0	0

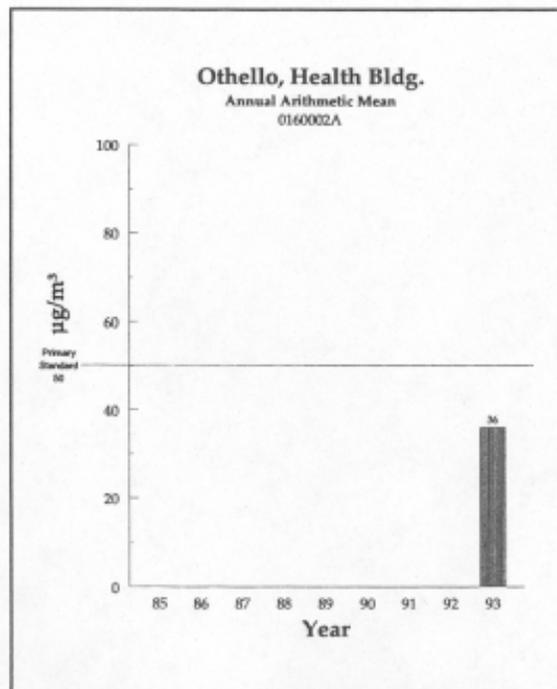
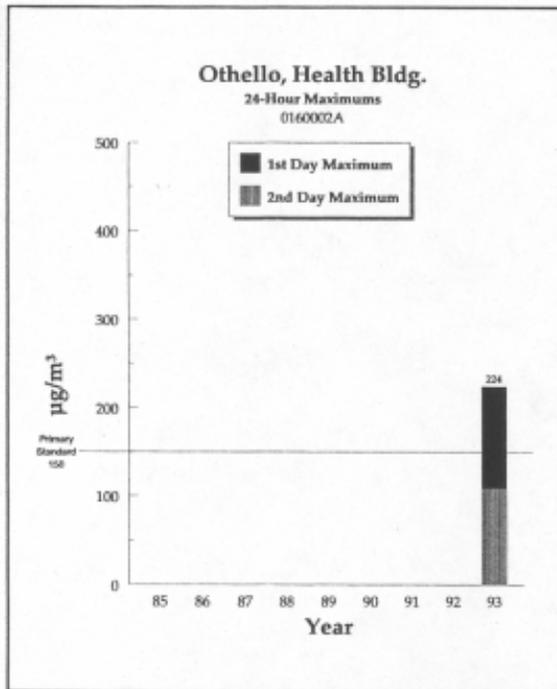
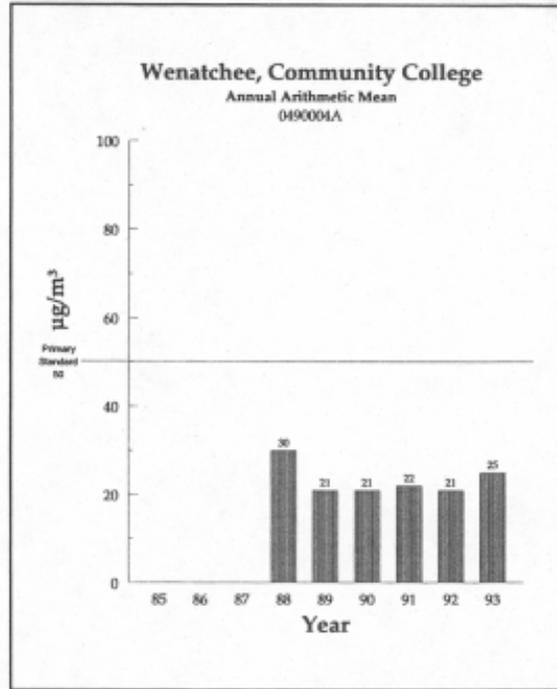
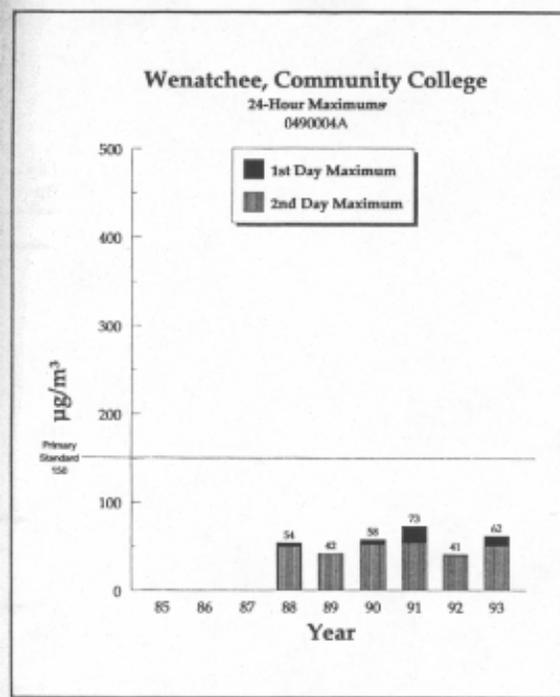
Central Area

Particulates (PM₁₀)



Central Area

Particulates (PM₁₀)



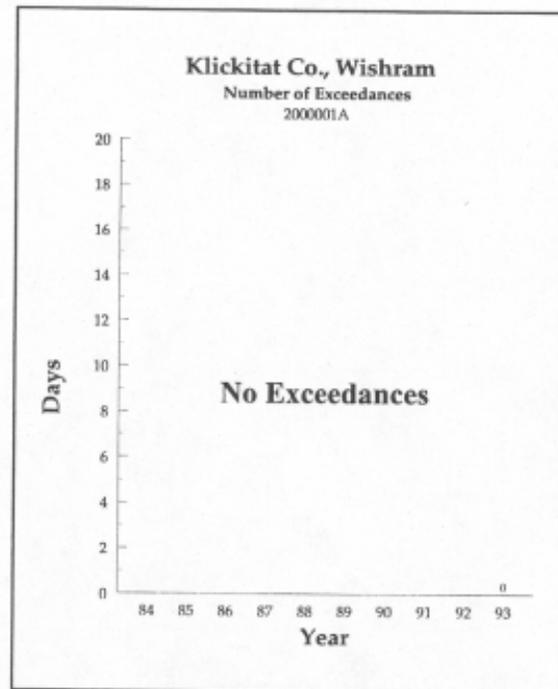
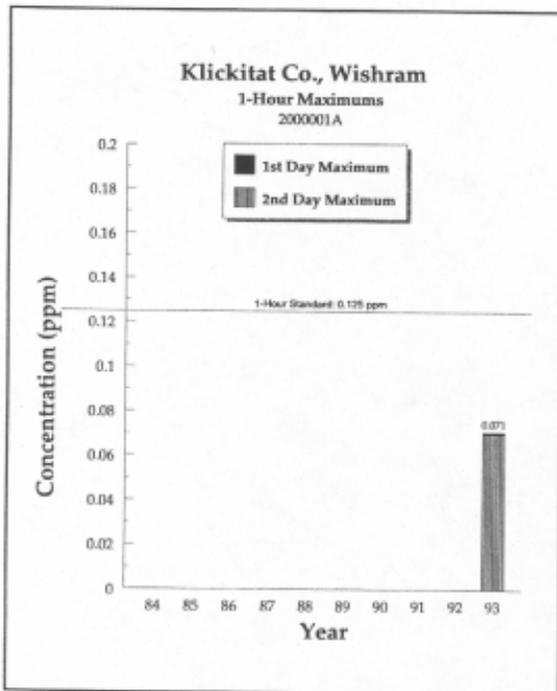
Central Area

Ozone (ppm) for 1993

Station	Location	1-Hour Maximums							
		1st High		2nd High		2nd Day High ¹		# Hrs >.124	Exc. Days
Conc	Date	Conc	Date	Conc	Date	Conc	Date		
2000001A	Klickitat Co., Wishram	.071	9/3	.070	9/9	.070	9/9	0	0

1. 2nd Day High = Second day with the highest 8-hour average.

Ozone (O₃)



Eastern Area

PM₁₀ Annual Arithmetic Means (µg/m³)

Station	Location	1986	1987	1988	1989	1990	1991	1992	1993
0340001J	Kennewick, Columbia Ctr.	28	27	35	29	43	40	26	32
3600002J	Walla Walla Co., Wallula	56*	55	56	37	41	66	35	38
3692007A	Walla Walla, Fire Station				36*	32	44	28	28

* Average based on less than 12 months of data.

PM₁₀ (µg/m³) for 1993

Station	Location	1st High		2nd High		Annual Arith. Mean
		Conc	Date	Conc	Date	
0340001J	Kennewick, Columbia Ctr.	1166	11/3	155	5/13	32
3600002J	Walla Walla Co., Wallula	195	5/25	128	11/3	38
3692007A	Walla Walla, Fire Station	101	11/3	66	9/26	28

Frequency of PM₁₀ (µg/m³) Levels Exceeding The State Standard During 1993 (# Days Exceeding Level)

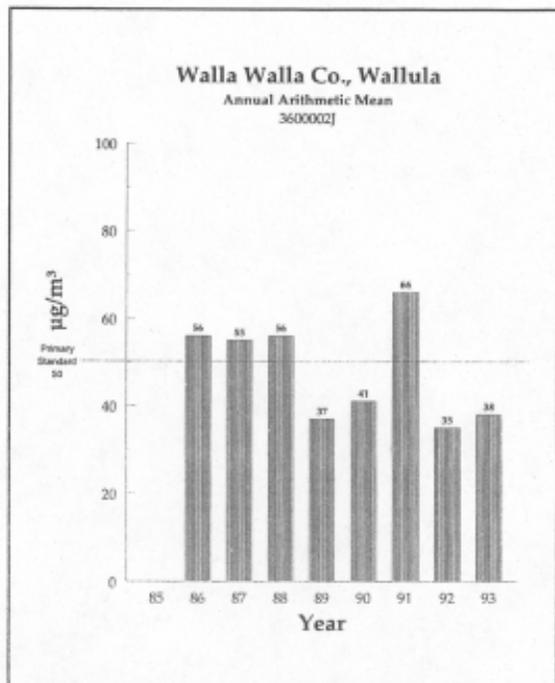
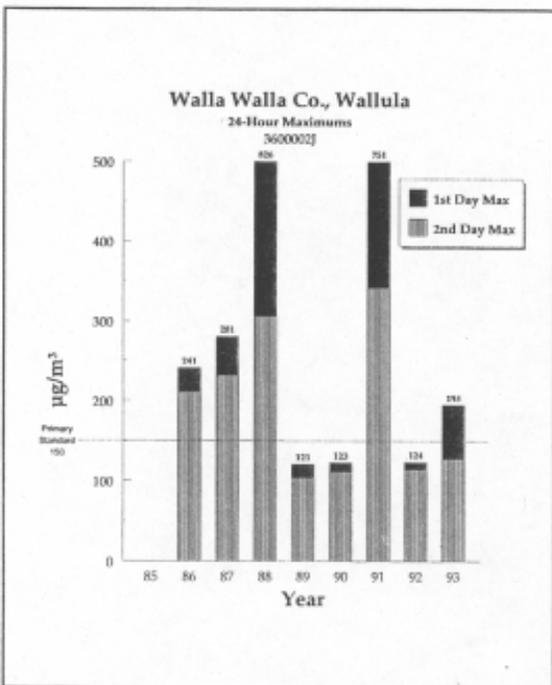
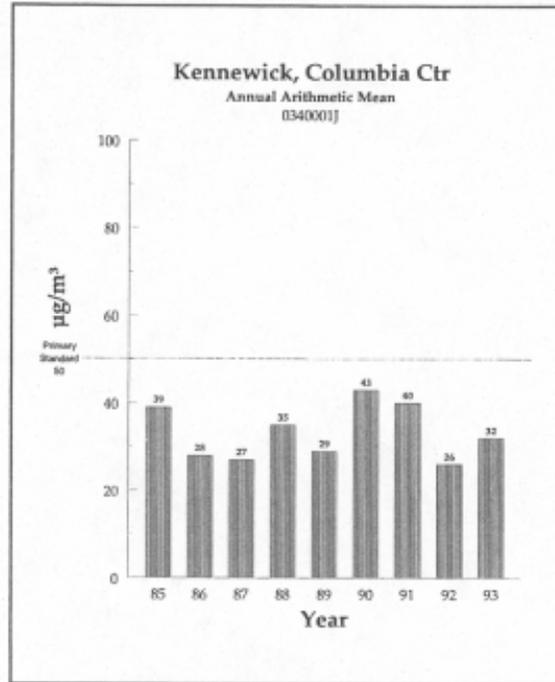
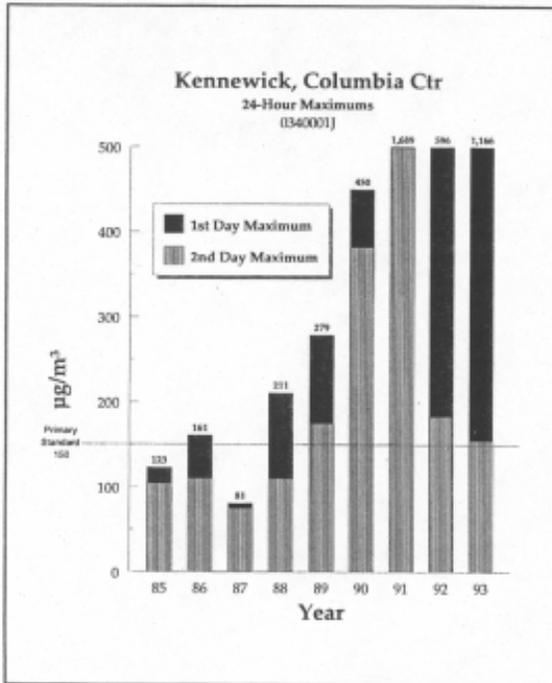
Station	Location	≥150	≥200	≥260	≥375	≥500
		<200	<260	<375	<500	
0340001J	Kennewick, Columbia Ctr.	1	0	0	0	1
3600002J	Walla Walla Co., Wallula	1	0	0	0	0

PM₁₀ For 1993

Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
0340001J	Kennewick, Columbia Ctr.	Jan-Dec	1/2	326	89
3600002J	Walla Walla Co., Wallula	Jan-Dec	1/6	60	98
3692007A	Walla Walla, Fire Station	Jan-Dec	1/6	42	69

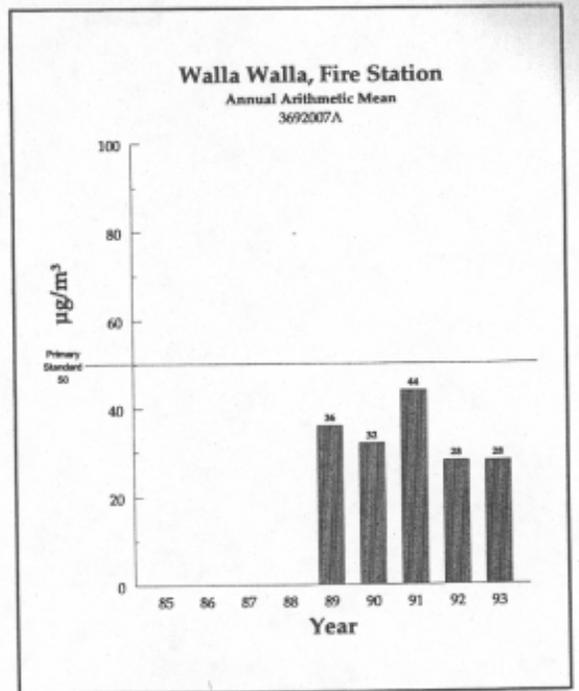
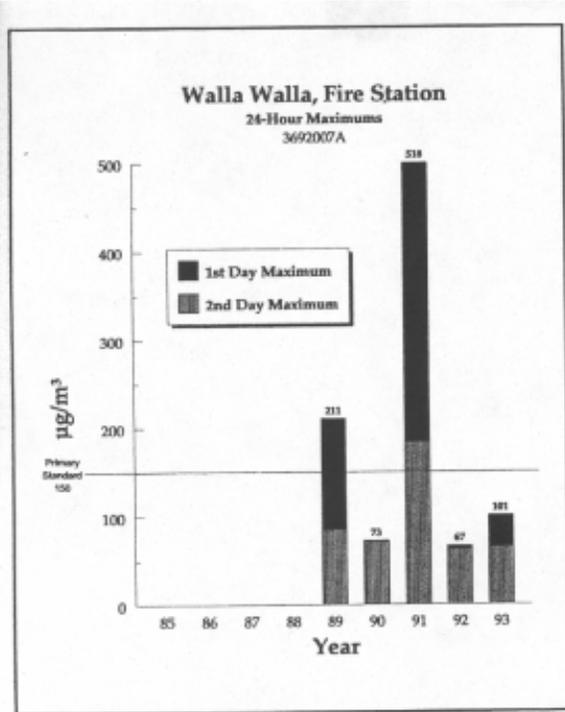
Eastern Area

Particulates (PM₁₀)



Eastern Area

Particulates (PM₁₀)



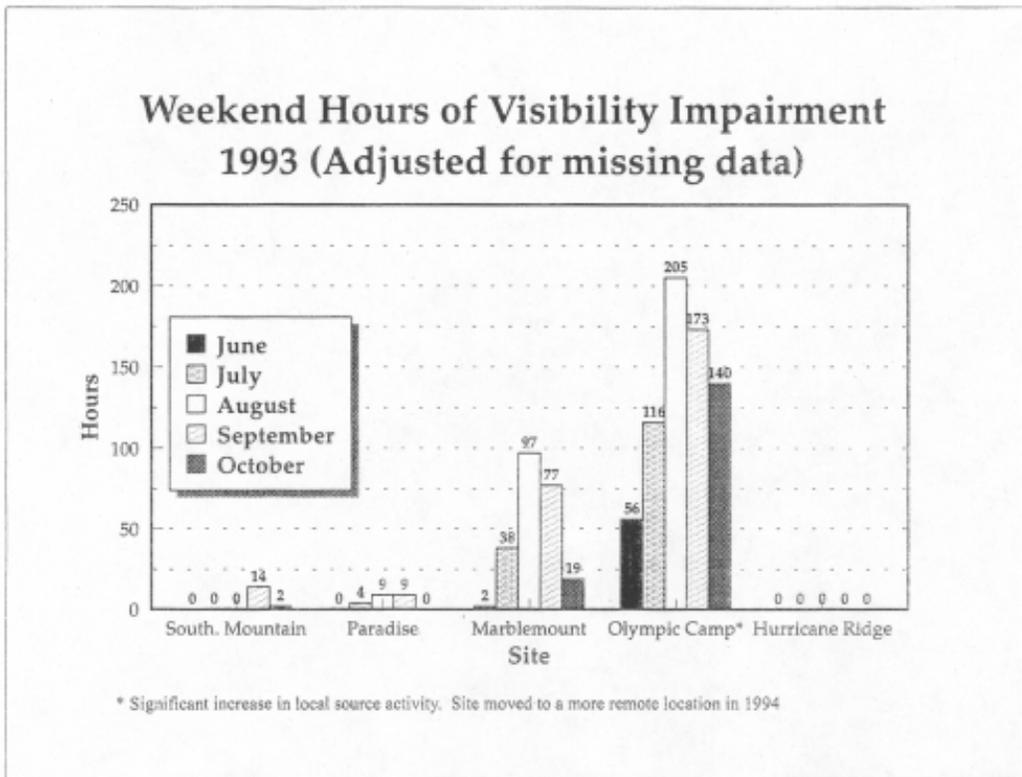
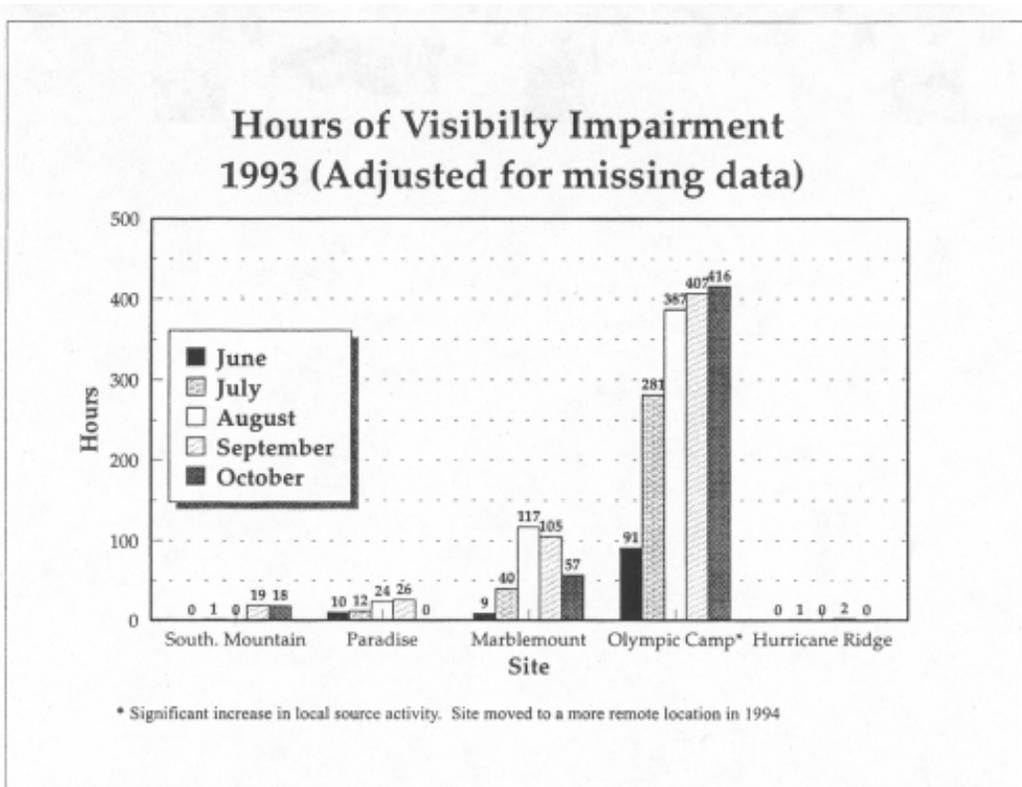
Visibility Data

Visibility Monitoring

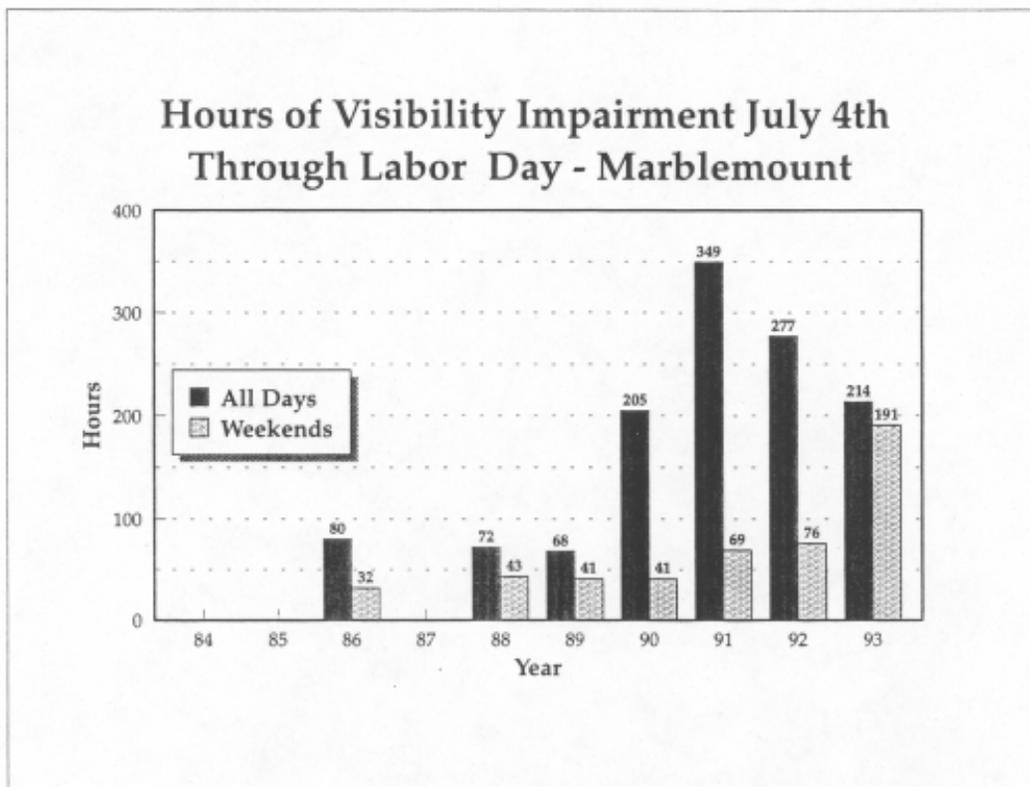
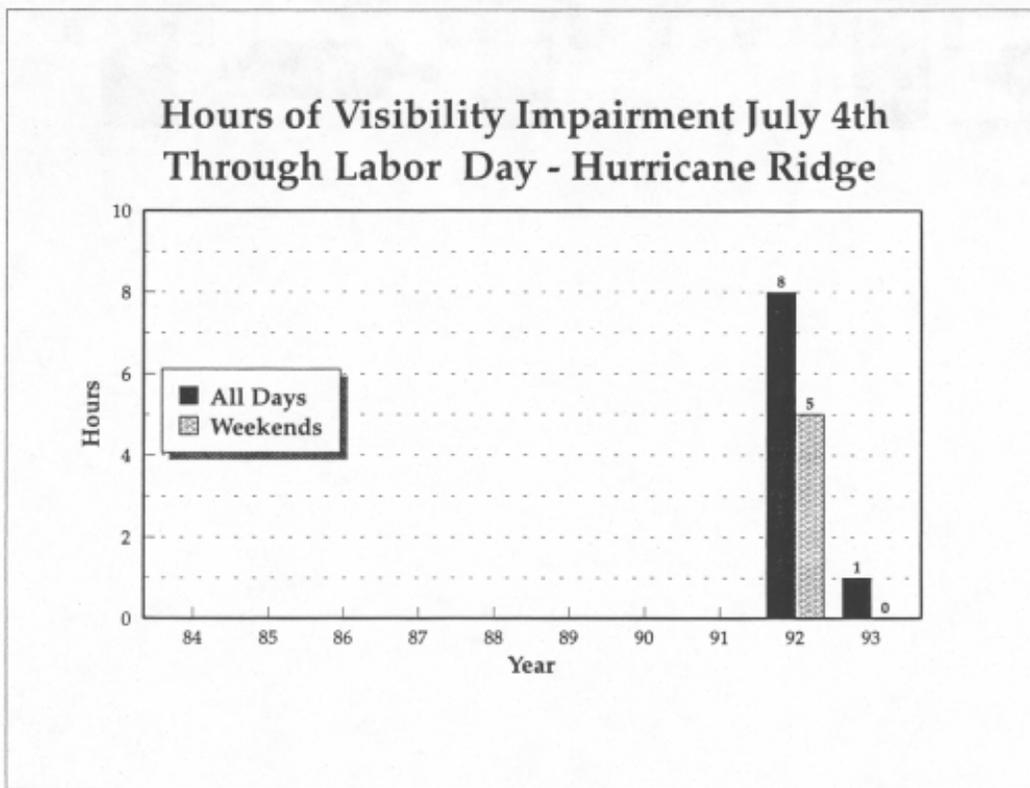
Ecology, in cooperation with the National Park Service and the U.S. Forest Service, monitors visibility conditions in Washington's "class I areas" during the summer months. Class I areas are areas that are given more stringent air quality protection than other areas of the state (see map). Although monitoring is generally conducted from early June through October, the period of most concern is July 4th - Labor Day. This "visibility protection period" coincides with the period of heaviest visitation to the class 1 areas of the state.

Data from visibility monitoring for the 1993 season involved the operation of five sites in western Washington. Sites operated were South Mountain, Paradise Visitor Center, Olympic Camp (Carbon River), Marblemount and Hurricane Ridge (see map for site locations). The site at Hurricane Ridge which had been operated in 1982 and 1983 was re-established in 1992.

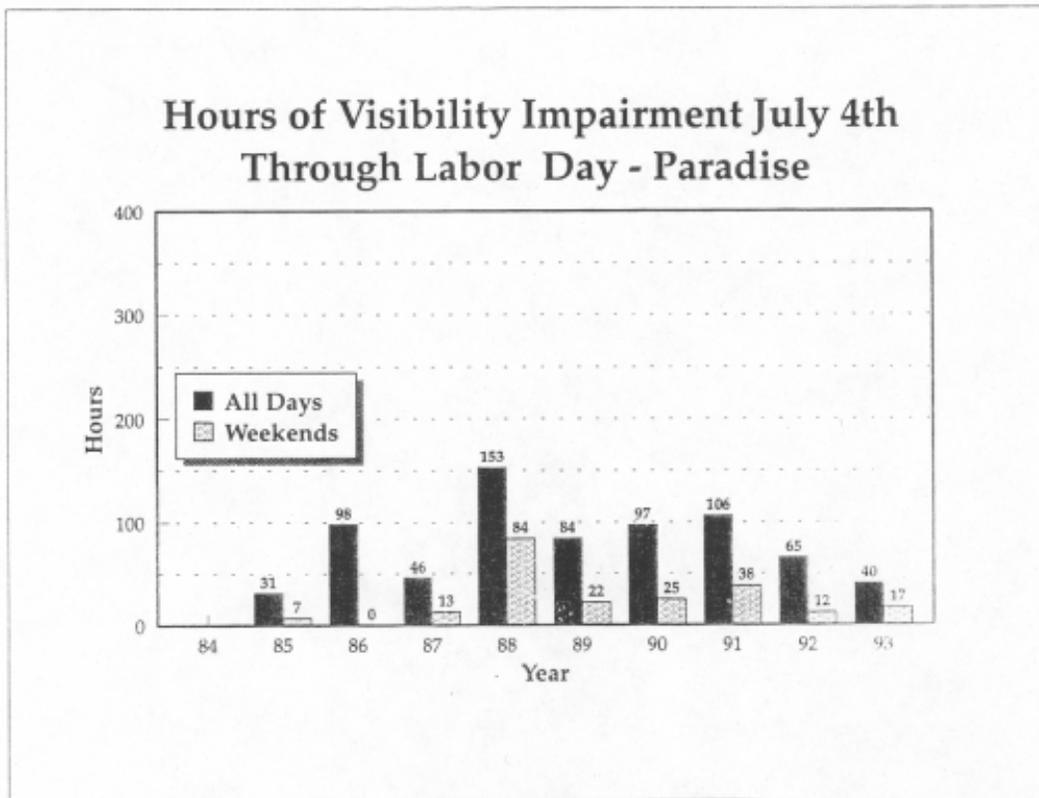
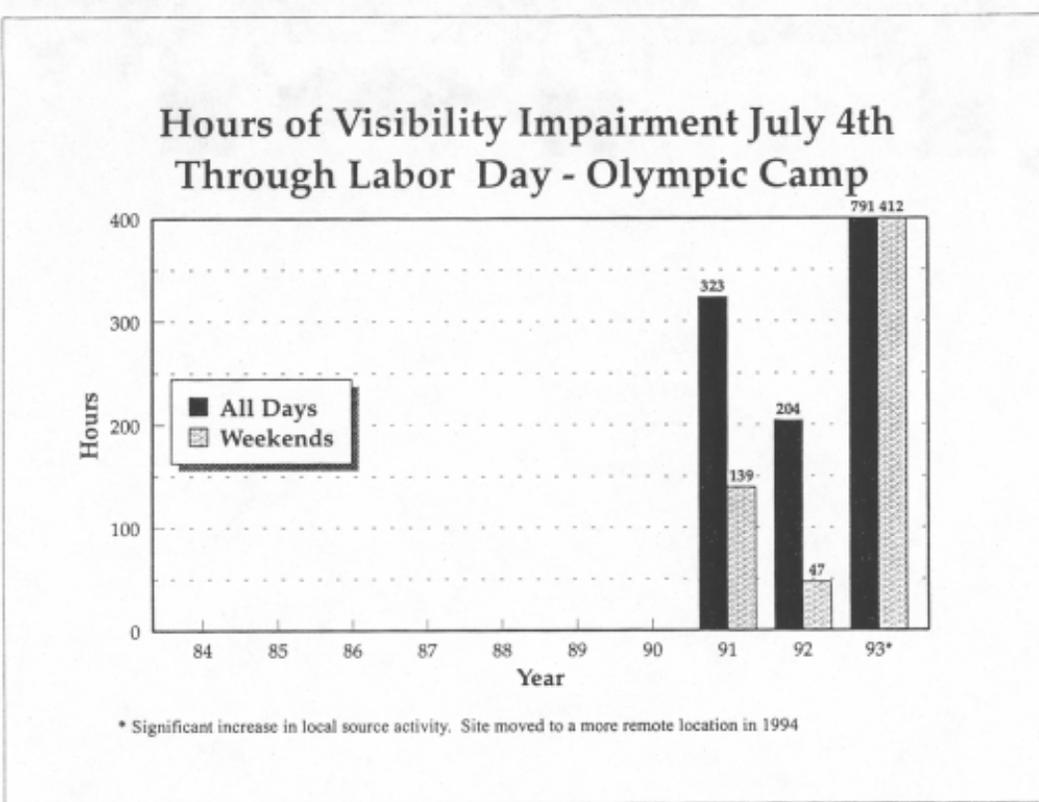
Visibility Data



Visibility Data

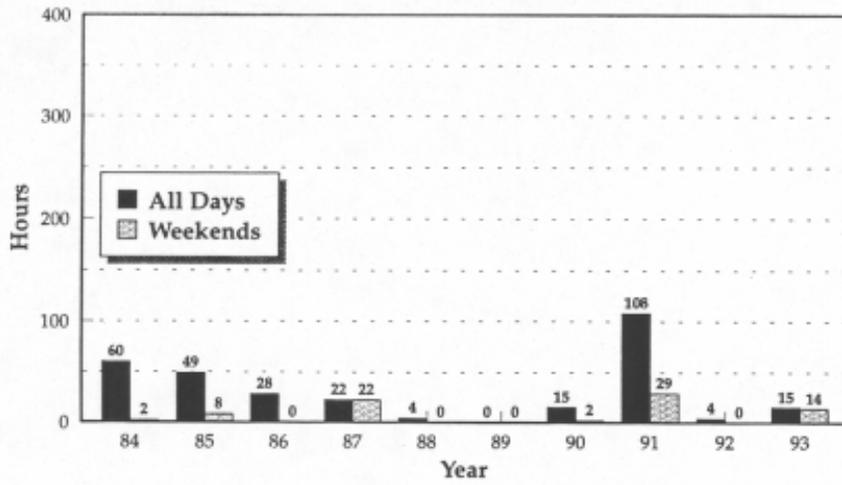


Visibility Data

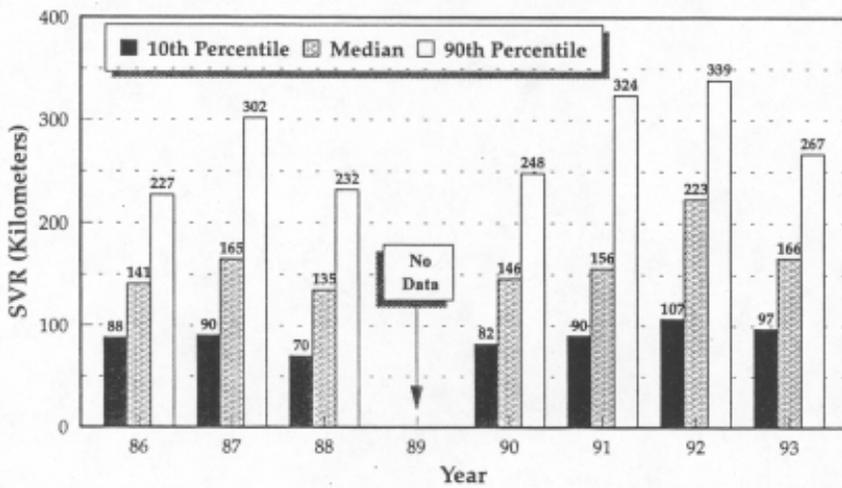


Visibility Data

Hours of Visibility Impairment July 4th Through Labor Day - South Mountain



Standard Visual Range (SVR) July 4th Through Labor Day - South Mountain



Visibility Data

