A scenic view of the Columbia River Gorge

1998 Air Quality Data Summary

Washington State Department of Ecology
Air Quality Program

Publication Number 00-02-005

Prepared by:
Washington State Department of Ecology
Air Quality Program

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Ambient Air Quality Standards

Pollutant	National Primary	National Secondary	Washington State
Total Suspended Particulates			
Annual Geometric Mean	No Standard	No Standard	60 µg/m^3
24 – Hour Average	No Standard	No Standard	150 µg/m^3
Lead (Pb)			
Quarterly Average	1.5 µg/m^3	1.5 µg/m^3	No standard
Particulates [a]			
PM_{10}			
Annual Arithmetic Mean	50 µg/m^3	50 µg/m^3	50 µg/m^3
24 – Hour Average	150 µg/m^3	150 µg/m^3	150 µg/m^3
$PM_{2.5}$			
Annual Arithmetic Mean	15 µg/m^3	15 µg/m^3	No standard
24 – Hour Average	65 µg/m^3	65 µg/m^3	No Standard
Sulfur Dioxide (SO_2)			
Annual Average	0.03 ppm	No standard	0.02 ppm
24 – Hour Average	0.14 ppm	No standard	0.10 ppm
3 – Hour Average	No standard	0.50 ppm	No standard
1 – Hour Average	No standard	No standard	0.40 ppm [b]
Carbon Monoxide (CO) [c]			
8 – Hour Average	9 ppm	9 ppm	9 ppm
1 – Hour Average	35 ppm	35 ppm	35 ppm
Ozone (O_3) [c]			
1 - Hour Average [d]	0.12 ppm	0.12 ppm	0.12 ppm
Nitrogen Dioxide (NO_2)			
Annual Average	0.053 ppm	0.053 ppm	0.05 ppm

a - New particulate standards went into effect on September 16, 1997.

b - 0.25 not to be exceeded more than two times in any 7 consecutive days.

c - Primary standards are listed in this table as they appear in the federal regulations. Ambient concentrations are rounded using the next higher decimal place to determine whether a standard has been exceeded. The data charts in this report are shown with these unrounded numbers.

d - Not to be exceeded on more than 1.0 days per calendar year as determined under the conditions indicated in Chapter 173-475 WAC.

- ppm = parts per million
- µg/m^3 = micrograms per cubic meter
- Annual standards never to be exceeded, short term standards not to be exceeded more than once per year unless noted.

Stations Where the Standard was Exceeded

Particulate Matter (PM_{10}) (24-hour standard = 150 µg/m^3)

There were two exceedances of the PM_{10} standard during 1998, recorded at two stations located in Colville and Wallula.

Station 3316004A, Colville, County Courthouse	02/16/98	187 µg/m^3
Station 3600002J, Wallula, Nedrow Farm	07/10/98	215 µg/m^3

Lead (Pb) (Quarterly Standard = 1.5 µg/m^3)

There was one lead exceedance during 1998, recorded at Harbor Island.

Station 1776K71B, Harbor Island	(2^{nd} Quarter)	2.0 µg/m^3

Ozone (O_3) (8-hour standard = 0.08 ppm)

There were sixteen ozone exceedances during 1998, recorded at six stations located in Pack Forest, Mud Mountain, Enumclaw, Lake Sammamish, Woodland and Yelm.

Station 2700007A, Pack Forest	07/26/98	.101 ppm
	07/27/98	.108 ppm
	07/28/98	.085 ppm
	09/01/98	.086 ppm
Station 1758002A, Mud Mountain	07/26/98	.089 ppm
	07/27/98	.087 ppm
	07/28/98	.091 ppm
	08/03/98	.086 ppm
Station 1700007A, Enumclaw	07/26/98	.099 ppm
	07/27/98	.106 ppm
	07/28/98	.105 ppm
Station 1700002A, Lake Sammamish	07/26/98	.089 ppm
	07/27/98	.086 ppm
	07/28/98	.089 ppm
Station 0800004A, Woodland	07/27/98	.089 ppm
Station 3496001G, Yelm Fire Station	07/27/98	.094 ppm

Site Changes

Particulate Matter (PM_{10})

Sunnyside, Chief Kamiakin Elem. School	Disc.	07/11/98
Seattle, South Park	Disc.	09/03/98
Vancouver, Washington Elem. School	Disc.	09/09/98
Sunnyside, Harrison School	Est.	08/21/98
Spokane, Spokane Auto Glass	Disc.	07/01/98
Leavenworth, Cascade Mid. School	Disc.	05/30/98
Everett, Hoyt Ave.	Disc.	09/03/98
SeaTac, N, Quick Stop	Est.	06/10/98
SeaTac, S, Tyee Valley	Est.	06/04/98

Carbon Monoxide (CO)

Bellevue, Bellevue BP	Est.	12/01/98
Seattle, Northgate	Disc.	06/11/98
Seattle, Northgate 2	Est.	06/11/98
Spokane, Gonzaga Univ.	Est.	12/21/98
Lynnwood, 59th Place	Est.	09/28/98

Nitric Oxide (NO), Nitrogen Dioxide (NO_2), Oxides of Nitrogen (NO_x)

SeaTac, N, Quick Stop	Est.	04/10/98
SeaTac, S, Tyee Valley	Est.	06/23/98

Ozone (O_3)

Enumclaw, Fire Station #3 (Ozone only)	Disc.	06/12/98
Enumclaw, Mud Mountain	Est.	06/22/98
North Bend, U.S. Forest Svc.	Est.	06/01/98
Rainier Nat. Park, Rainier 3	Est.	07/10/98

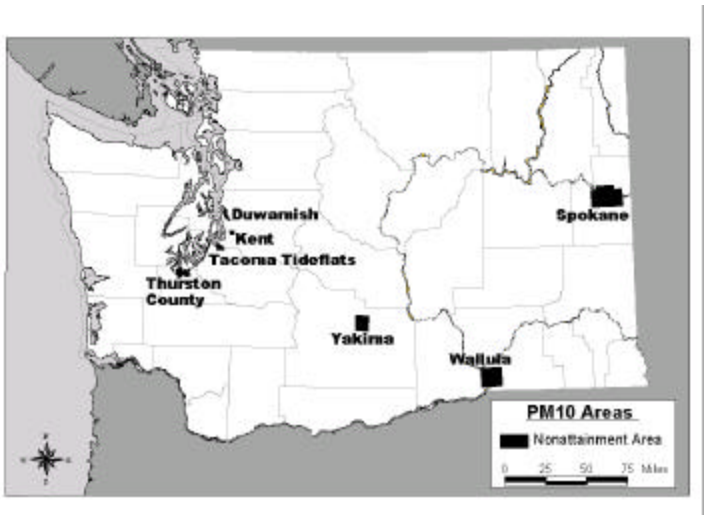
Sulfur Dioxide (SO_2)

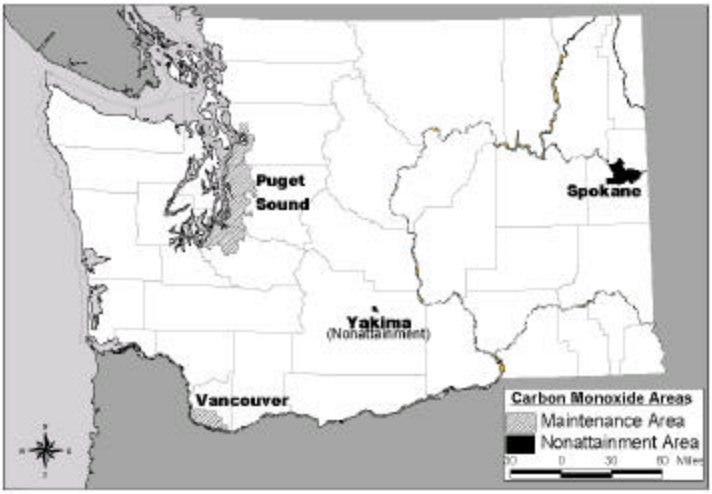
Pt. Angeles, 3rd & Chestnut	Disc.	06/01/98

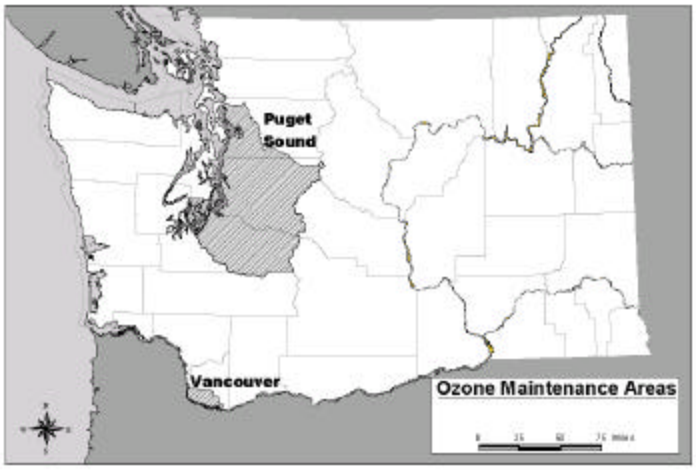
Air Quality Agencies

Note: Tribes may have authority over air quality within the boundaries of their reservations.

Nonattainment and Maintenance Areas







Monitoring Site Locations

Ecology's air monitoring network is established with the intent of determining air quality in areas of the state that have experienced higher levels of air pollution. The number and location of monitors may change each year based on changing conditions in an area (see "Site Changes" on page 4). The data on the following pages is organized by geographic area for the purposes of this report. This table identifies which counties and monitoring sites are located in which geographic areas.

County	Geographic Area	Site No.	Site Location
Asotin	Eastern	0214005A	Clarkston, STP
Benton	Eastern	0340003J	Kennewick VSC, 5929 W Metaline
Stevens	Eastern	3316004A	Court House, Colville
Chelan	Central	0490005A	Columbia School, 600 Alaska
Clallam	Coastal	0566410A	3rd & Chestnut, Pt. Angeles
Clallam	Coastal	0566412G	Pt. Angeles City Light
Clark	Southwest	0600002A	Mt. View High School, 1500 SE Blairmount Dr
Clark	Southwest	0600003A	Hazel Dell, 7701 NE Highway 99
Clark	Southwest	0600005A	Hockinson, 19912 NE 164 St
Clark	Southwest	0688011A	Atlas & Cox Upholstery, 2101 E 4th Plain Blvd
Clark	Southwest	0688012D	Moose Lodge, 8205 East 4th Plain Blvd
Clark	Southwest	0688014D	Vancouver, Wa. Elementary School
Cowlitz	Southwest	0800004A	Woodland, 2800 Dike Road
Cowlitz	Southwest	0800003A	Castle Rock
King	Puget Sound	1700002A	Lake Sammamish State Park, 20050 SE 56th
King	Puget Sound	1700004A	Fire Station #3, 43407 – 212th SE
King	Puget Sound	1700007A	Weyerhaeuser Mill, Enumclaw
King	Puget Sound	1708004A	Scan Design, 504 Bellevue Way NE
King	Puget Sound	1708005A	Bellevue, 8th & 108th , 752 108th Ave NE
King	Puget Sound	1708007A	Bellevue BP, 2421 148th NE
King	Puget Sound	1740K73B	James St & Central Ave
King	Puget Sound	1744K77B	Lake Forest Park Towne Center
King	Puget Sound	1758001A	North Bend, 42404 SE North Bend Way
King	Puget Sound	1758002A	Mud Mountain, 30525 SE Mud Mountain Road
King	Puget Sound	1776020A	Zanadu Comics, 1307 Northeast 45th
King	Puget Sound	1776026A	Fourth & Pike Bldg., 1424 4th Avenue
King	Puget Sound	1776029A	Beacon Hill Reservoir ,Charleston St 15th Ave S
King	Puget Sound	1776033A	Northgate Apts., Bldg 8 310 NE Northgate Way
King	Puget Sound	1776308A	Seattle Municipal Bldg., 5th & James St
King	Puget Sound	1776K71B	Harbor Island Texaco, 2555 – 13th Ave SW
King	Puget Sound	1776K76B	Seattle South Park
King	Puget Sound	1776K55B	Duwamish Pumping Station
King	Puget Sound	1777003A	SeaTac South, Tyee Valley Golf Course
Kitsap	Puget Sound	1800B05B	Meadowdale, 725 Blackbird Dr. NE
Kittitas	Central	1922003A	Ellensburg, 201 N Ruby

Klickitat	Central	2000001A	CRGNSA, ¼ mile off Hwy 14, 1 m W Wishram
Lewis	Southwest	2100006A	Packwood Lake, SE of Hwy 12
Pierce	Puget Sound	2700007A	Pack Forest, 0.6 m N of La Grande on Hwy 7
Pierce	Puget Sound	2700016A	Rainier #2
Pierce	Puget Sound	2700017A	Jackson Visitors Center
Skagit	Northwest	2900004C	March Point, Anacortes
Skagit	Northwest	2900001C	South Texaco, Anacortes
Snohomish	Puget Sound	3124006A	Nevada Bob's. Everett
Snohomish	Puget Sound	3124S04B	Hoyt Ave. & 26th St., Everett
Spokane	Spokane	3200020E	Rockwood
Spokane	Spokane	3200019A	E. 9814 Green Bluff Rd.
Spokane	Spokane	3214999E	Turnbull Slough, Cheney
Spokane	Spokane	3250004E	Spokane, Millwood
Spokane	Spokane	3278009E	Crown Zellerbach
Spokane	Spokane	3278040A	Spokane Auto Glass
Spokane	Spokane	3278046A	N. 4601 Monroe St.
Spokane	Spokane	3278039A	N. 1226 Hamilton St.
Spokane	Spokane	3278043A	Back Door Tavern
Spokane	Spokane	3278045A	Spokane Club
Spokane	Spokane	3278047A	3rd Ave. & Washington N.
Spokane	Spokane	3278048A	3rd Ave. & Washington S.
Spokane	Spokane	3278049A	Jepson Center Bldg., Gonzaga University
Thurston	Coastal	3444004A	OAPCA, South Sound Center
Thurston	Coastal	3496001G	Yelm Fire Station
Thurston	Coastal	3444003G	Mt. View Elementary
Walla Walla	Eastern	3600002J	Nedrow Farms
Walla Walla	Eastern	3692007A	Walla Walla Fire Station
Whatcom	Northwest	3706069C	Chestnut Street, Bellingham
Whatcom	Northwest	3706005C	Bellingham School District
Yakima	Eastern	3978006F	Sunnyside, Chief Kamiakin Elementary
Yakima	Eastern	3978007F	Sunnyside, Harrison Middle School
Yakima	Eastern	3978008F	Yakima, Garfield Elementary
Yakima	Eastern	3978009F	Yakima, YVCC Sndqst.
Yakima	Eastern	3996005A	Yakima County Courthouse

Particulate Matter

PM_{10} Annual Arithmetic Means ($\mu g/m^3$)

Station	Location	1994	1995	1996	1997	1998
0444001A	Leavenworth, Mid. Sch.			25*	21	21*
0490005A	Wenatchee, Col. Sch.	24*	24	24	27	22
1922003A	Ellensburg, Hal Holmes		21*	29	29	24

* Average based on less than 12 months of data.

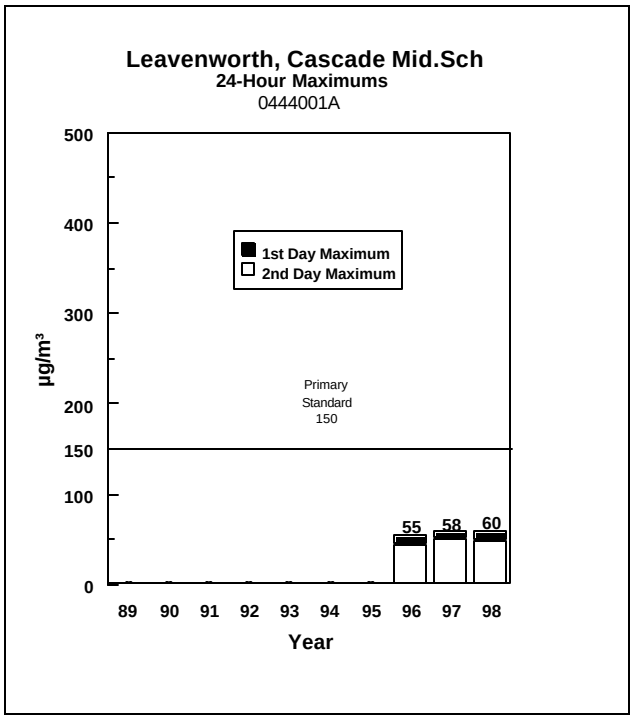
PM_{10} for 1998 ($\mu g/m^3$)

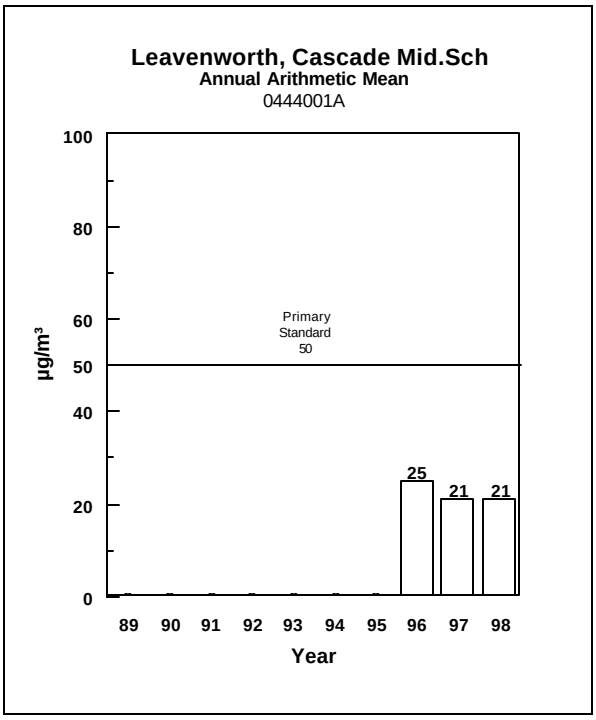
Station	Location	1st High Conc.	Date	2nd High Conc.	Date
0444001A	Leavenworth, Mid. Sch.	60	04/29	49	02/16
0490005A	Wenatchee, Col. Sch.	46	01/29	46	12/13
1922003A	Ellensburg, Hal Holmes	72	04/29	72	05/01

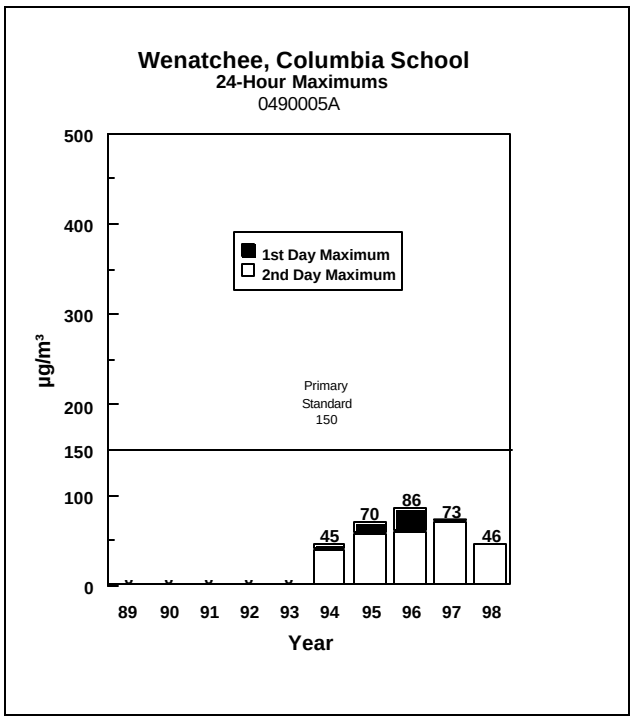
PM_{10} for 1998

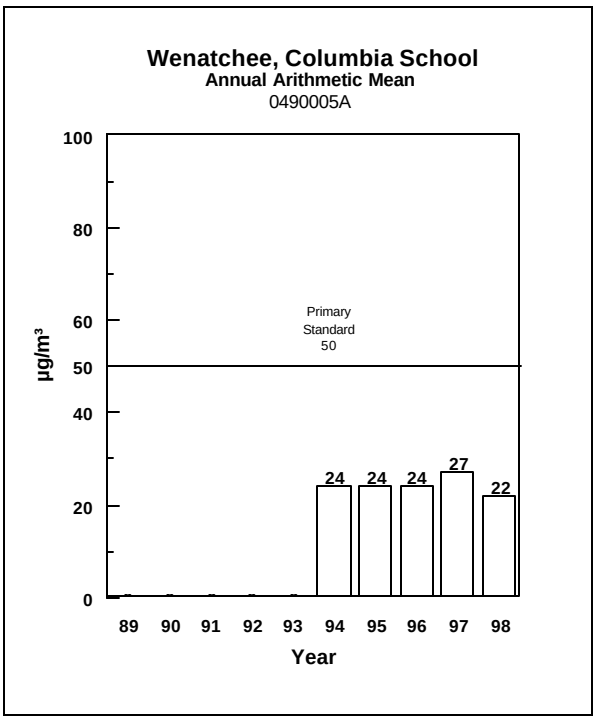
Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
0444001A	Leavenworth, Mid. Sch.	Jan-May	1/6	37	93
0490005A	Wenatchee, Col. Sch.	Jan-Dec	1/6	54	69
1922003A	Ellensburg, Hal Holmes	Jan-Dec	1/3	77	90

Particulate Matter

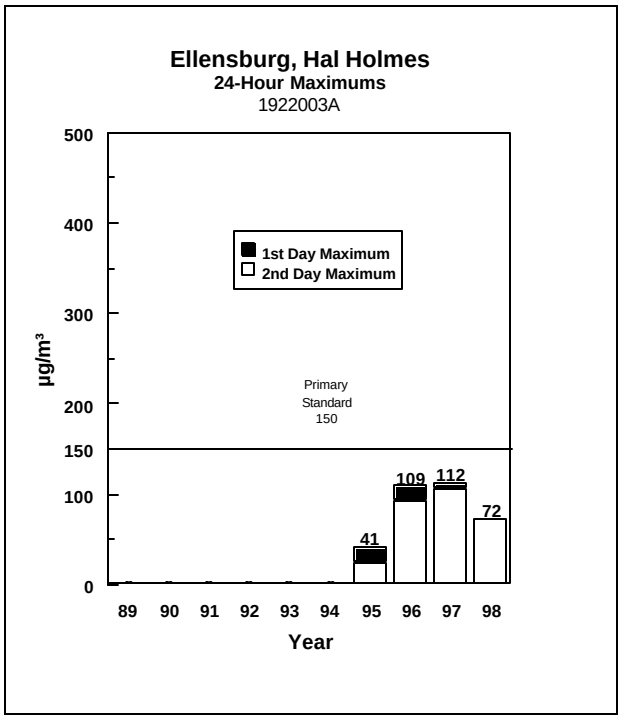


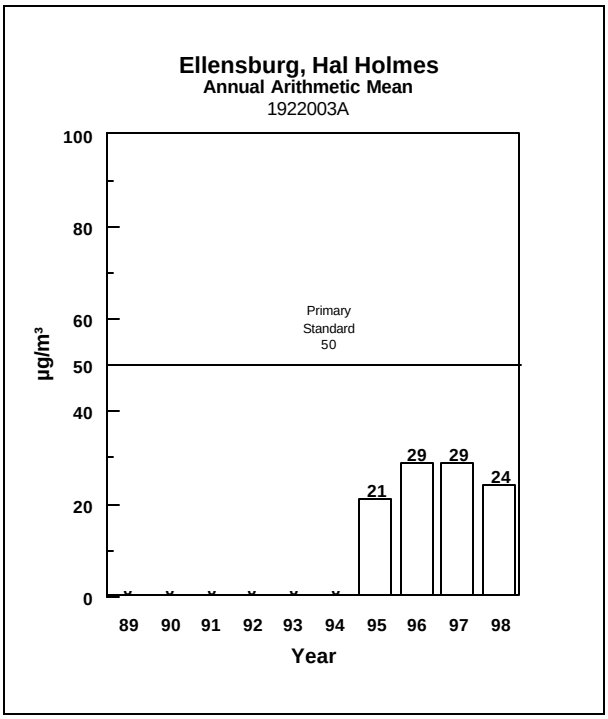






Particulate Matter





Ozone

1-Hour Ozone for 1998 (ppm)

Station	Location	1-Hour Maximums 1st High Date	1st High Conc.	2nd High Date	2nd High Conc.	2nd Day High * Date	2nd Day High * Conc.
2000001A	Wishram, Columbia River Gorge	8/4	.079	8/4	.078	7/27	.077

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

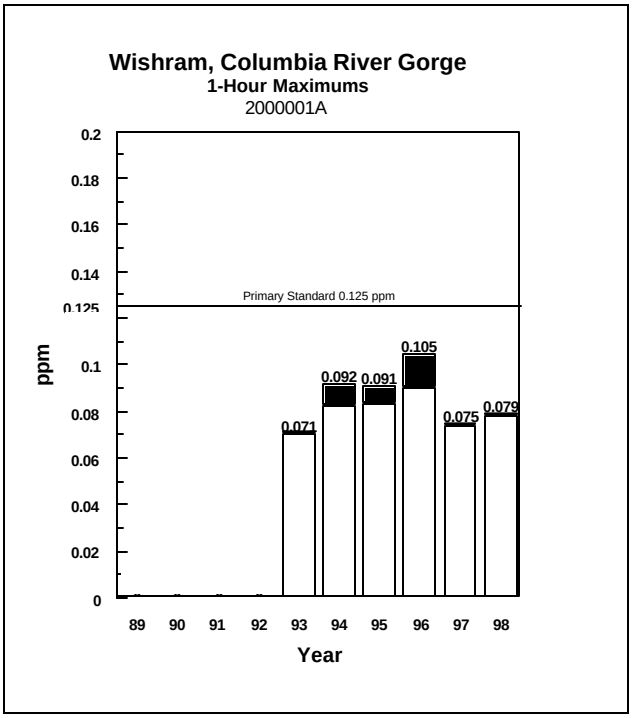
8-Hour Ozone for 1998 (ppm)

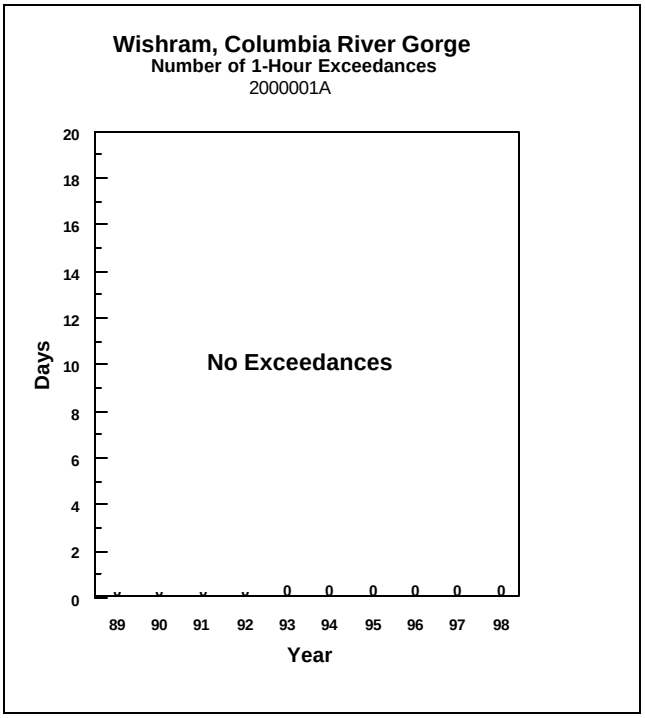
Station	Location	8-Hour Maximums 1st High Conc.	1st High Date	4th High Conc.	4th High Date
2000001A	Wishram, Columbia River Gorge	.076	8/3	.063	7/26

Ozone for 1998

Station	Location	Period of Record	# Hours	# Days	% Valid Data
2000001A	Wishram, Columbia River Gorge	Apr-Oct	4516	188	88

Ozone





Particulate Matter

PM_{10} Annual Arithmetic Means ($\mu g/m^3$)

Station	Location	1989	1990	1991	1992	1991	1994	1995	1996	1997	1998
0566412G	Pt. Ang. Cty. Lgt.	32*	28	28	28	26	22	20	22	23	21
3444003G	Lacey, Mt. View	30	24	25	26	27	19	19	16	18	15

* Average based on less than 12 months of data.

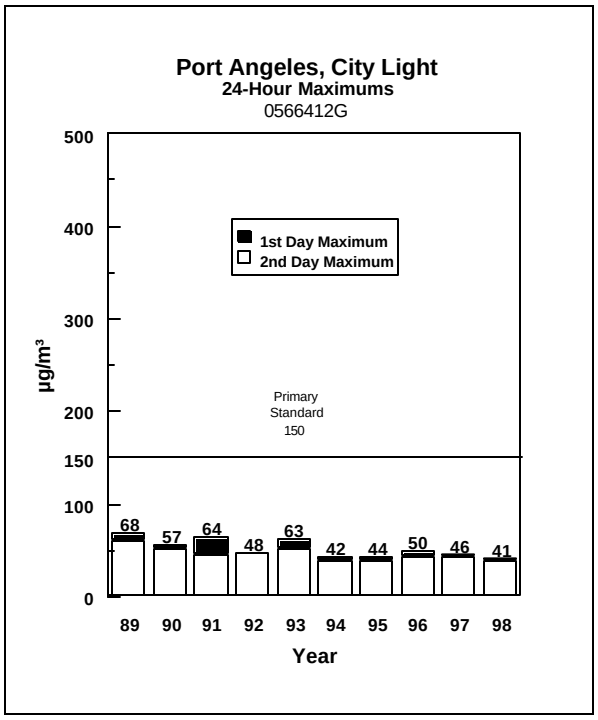
PM_{10} for 1998 ($\mu g/m^3$)

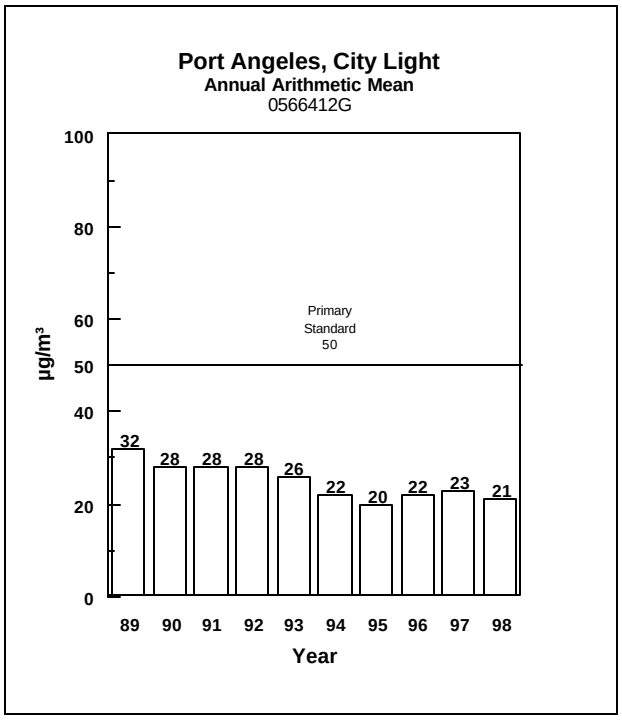
Station	Location	1st High Conc.	Date	2nd High Conc.	Date
0566412G	Pt. Ang. Cty. Lgt.	41	7/28	39	5/05
3444003G	Lacey, Mt. View	54	4/30	46	4/29

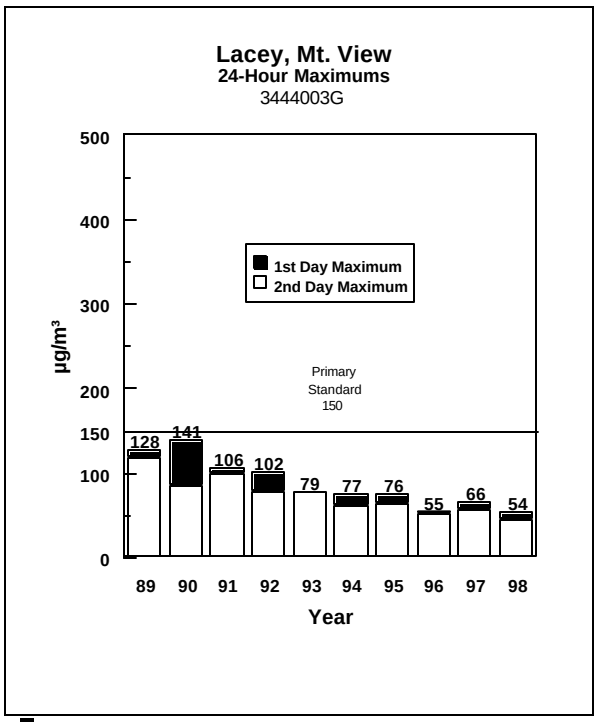
PM_{10} for 1998

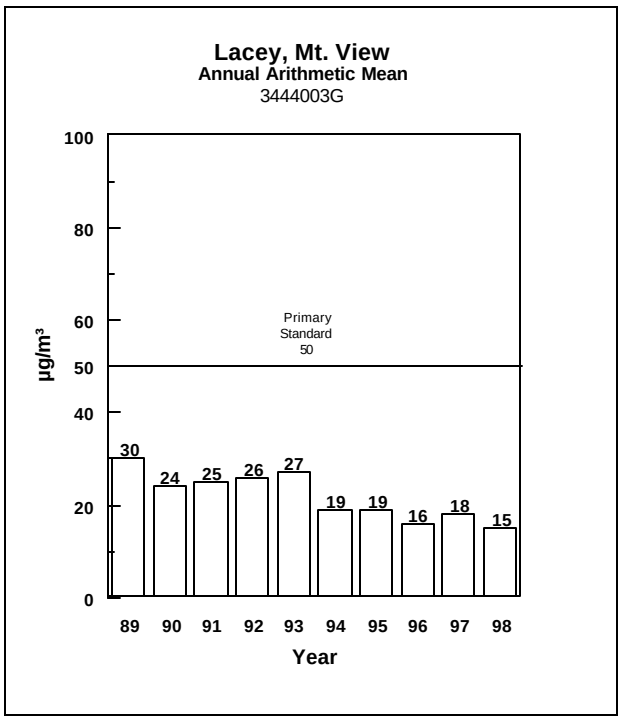
Station	Locations	Period of Record	Samp. Freq.	# Samples	% Valid Data
0566412G	Pt. Ang. Cty. Lgt.	Jan-Dec	1/6	60	100
3444003G	Lacey, Mt. View	Jan-Dec	1/3	96	95

Particulate Matter









Carbon Monoxide

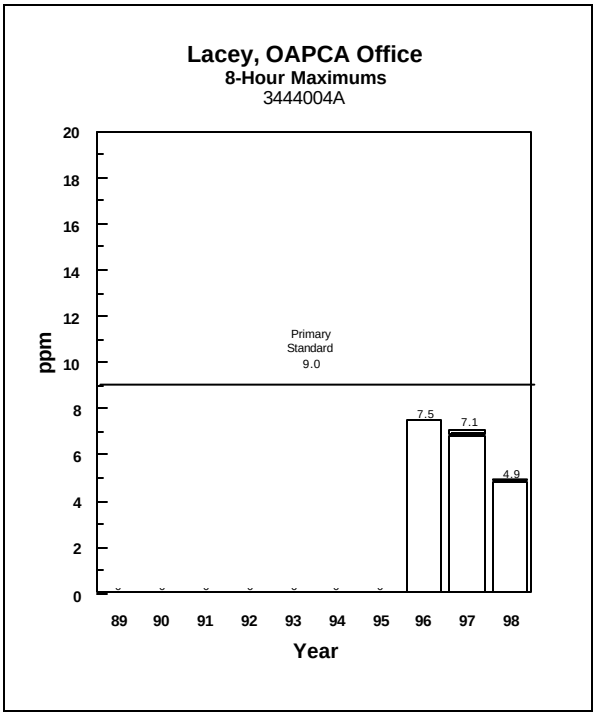
Carbon Monoxide for 1998 (ppm)

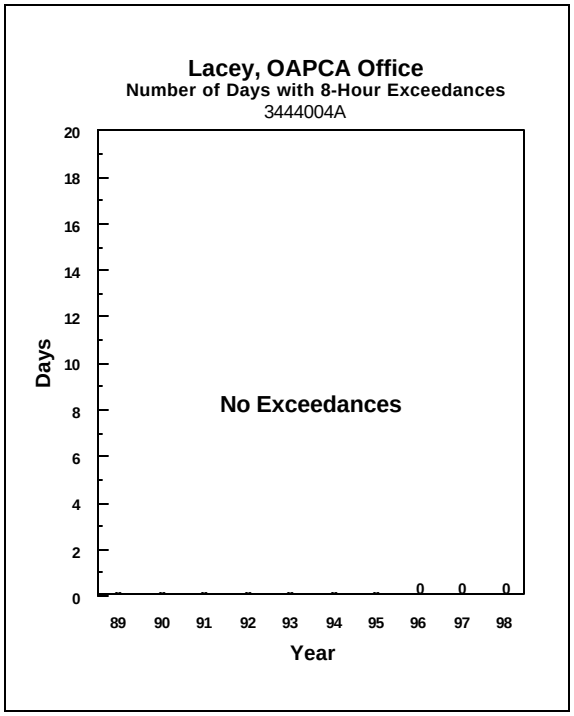
		1-Hour Maximums				8-Hour Maximums						
		1st High		2nd High		1st High		2nd High		2nd Day High*		8-Hr.
Station	Location	Conc.	Date	Conc.	Date	Conc.	Date	Conc.	Date	Conc.	Date	Exc.
3444004A	Lacey, OAPCA	8.7	1/9	8.2	10/21	4.9	10/20	4.8	1/29	4.8	1/29	0

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

Carbon Monoxide for 1998 (ppm)

Station	Location	Period of Record	#Hours	# Days	% Valid Data
3444004A	Lacey, OAPCA	Jan-Dec	8603	358	98





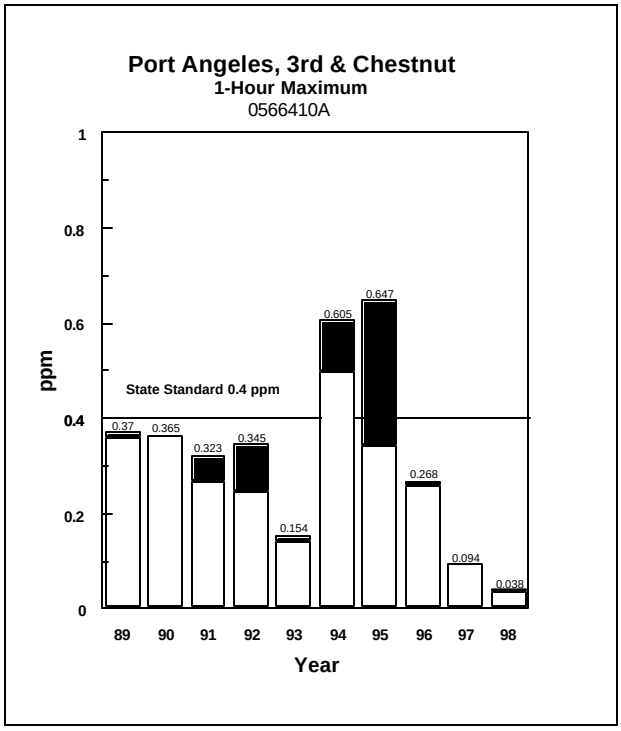
Sulfur Dioxide

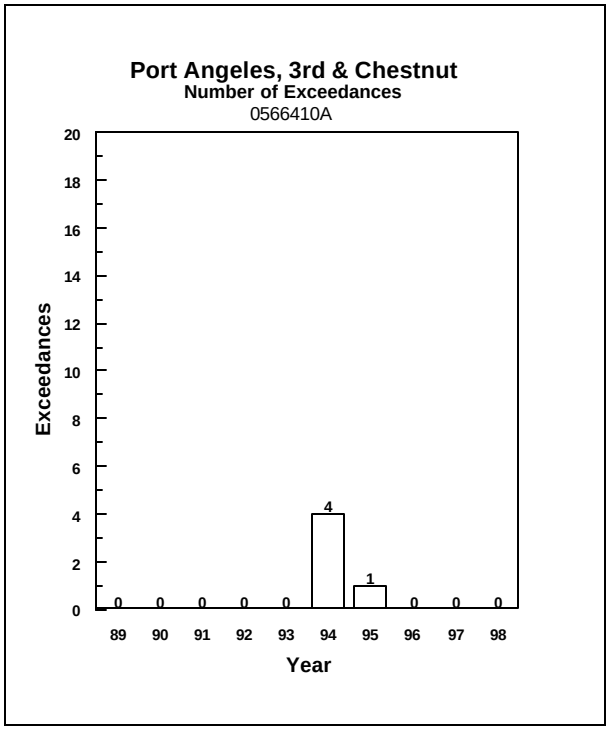
Sulfur Dioxide for 1998 (ppm)

Station	Location	1-Hour Maximum 1st	Date	2nd	Date	#1-Hr >.40	3-Hr Max Conc.	Date	#3 Hr >.50	24-Hr Max Conc.	Date	#24-Hr >.10	>.14	Ann. Mean
0566410A	Port Angeles, 3rd & Chestnut	.038	4/21	.037	4/22	0	024	4/22	0	.007	5/23	0	0	.002

Sulfur Dioxide for 1998

Station	Location	Period of Record	# Hours	# Days	% Valid Data
0566410A	Port Angeles, 3rd & Chestnut	Jan-May	3183	133	91





Ozone

8-Hour Ozone for 1998 (ppm)

Station	Location	8-Hour Maximums 1st High Conc.	1st High Date	4th High Conc.	4th High Date
3496001G	Yelm, Fire Station	.095	7/27	.074	8/31

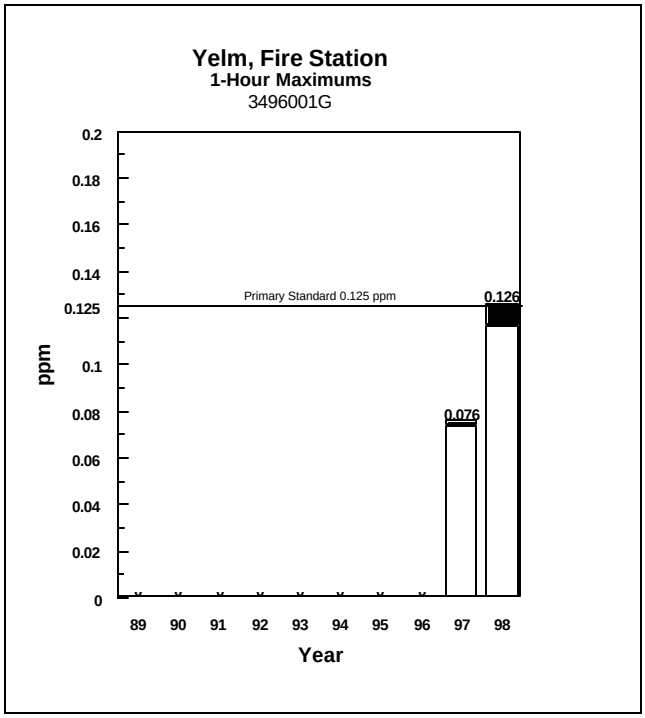
1-Hour Ozone for 1998 (ppm)

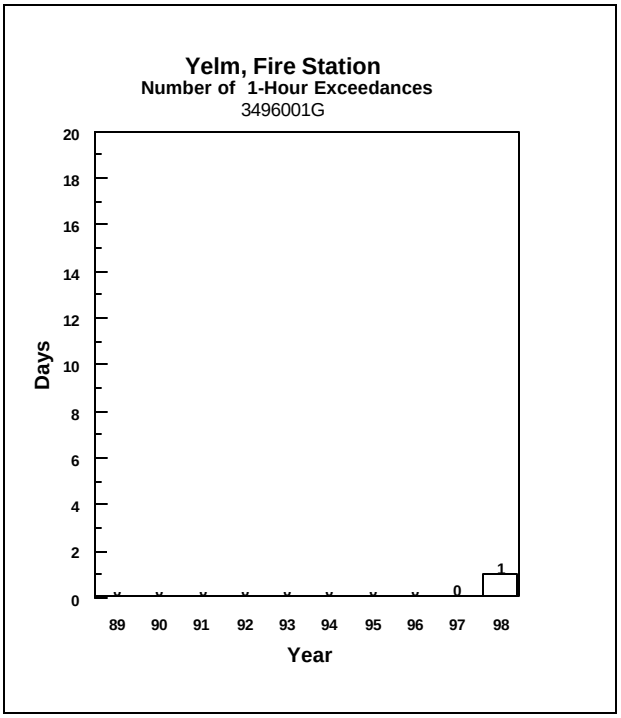
Station	Location	1-Hour Maximums 1st High Conc.	1st High Date	2nd High Conc.	2nd High Date	2nd Day High * Conc.	2nd Day High * Date	Exc. Days
3496001G	Yelm, Fire Station	.126	7/27	.117	7/27	.105	7/28	1

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

Ozone for 1998

Station	Location	Period of Record	# Hours	# Days	% Valid Data
3496001G	Yelm, Fire Station	Apr-Oct	4902	204	98





Particulate Matter

PM_{10} Annual Arithmetic Means ($\mu g/m^3$)

Station	Location	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
0214005A	Clarkston, STP					43*	37	30	32	37	29
0340003J	Kennewick, VSC						15*	18	21	20	18
3316004A	Colville, Co. Crths.								69*	56	30
3600002J	Wallula, Nedrow Fm.	37	41	66	35	38	37	28	34	38	41
3692007A	Walla Walla, Fire Sta.	36*	32	44	28	28	24	22	27*	31	24

* Average based on less than 12 months of data.

PM_{10} for 1998 ($\mu g/m^3$)

Station	Location	1st High Conc.	Date	2nd High Conc.	Date
0214005A	Clarkston, STP	87	4/29	86	9/16
0340003J	Kennewick, VSC	123	7/27	90	4/29
3316004A	Colville, Co. Crths.	187	2/16	82	1/18
3600002J	Wallula, Nedrow Fm.	215	7/10	135	6/28
3692007A	Walla Walla, Fire Sta.	58	7/10	49	8/15

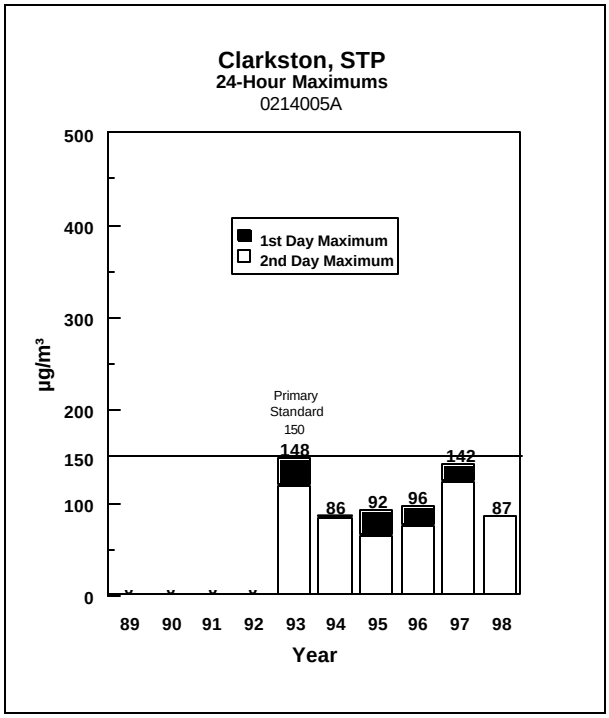
Pm_{10} for 1998

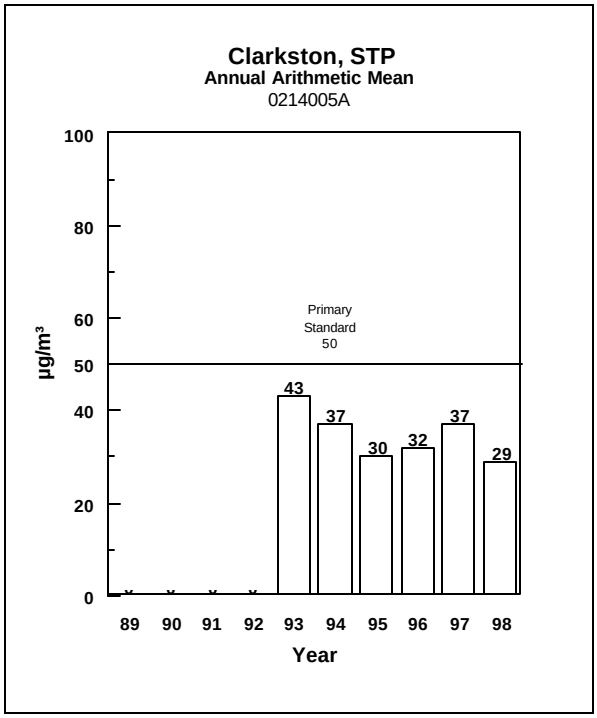
Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
0214005A	Clarkston, STP	Jan-Dec	1/6	56	92
0340003J	Kennewick, VSC	Jan-Dec	1/1	270	92
3316004A	Colville, Co. Crths.	Jan-Dec	1/6	56	92
3600002J	Wallula, Nedrow Fm.	Jan-Dec	1/6	60	98
3692007A	Walla Walla, Fire Sta.	Jan-Dec	1/6	50	82

Particulate Matter

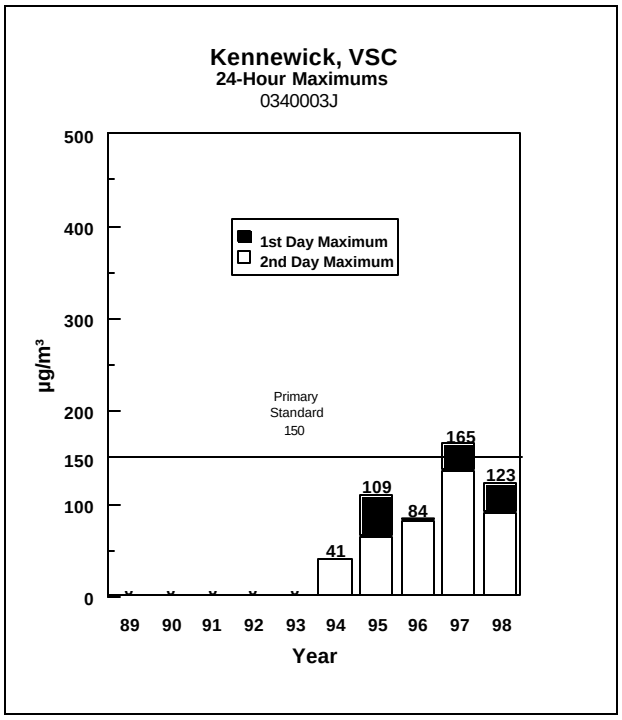
Frequency of PM_{10} ($\mu g/m^3$) Levels Exceeding the Standard During 1998 (# Days Exceeding Level)

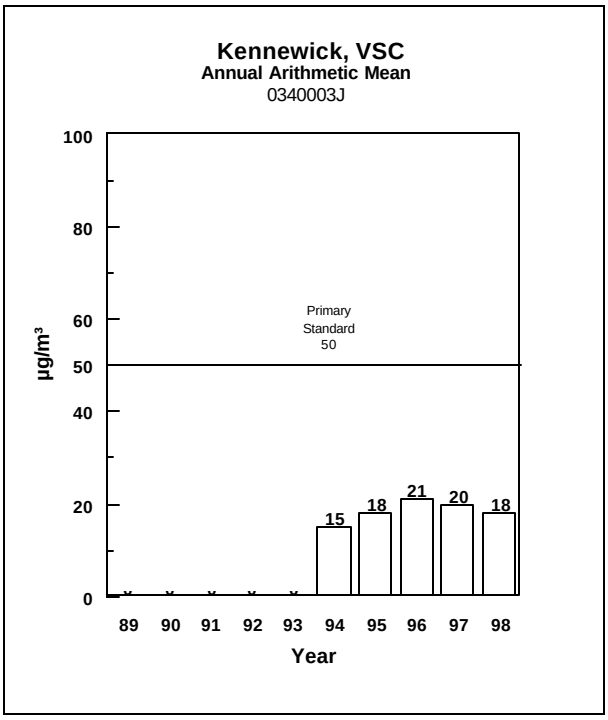
Station	Location	≥150 <200	≥200 <260	≥260 <375	≥375 <500	≥500 <750
3316004A	Colville, Co. Crths.	1	0	0	0	0
3600002J	Wallula, Nedrow Farm	0	1	0	0	0

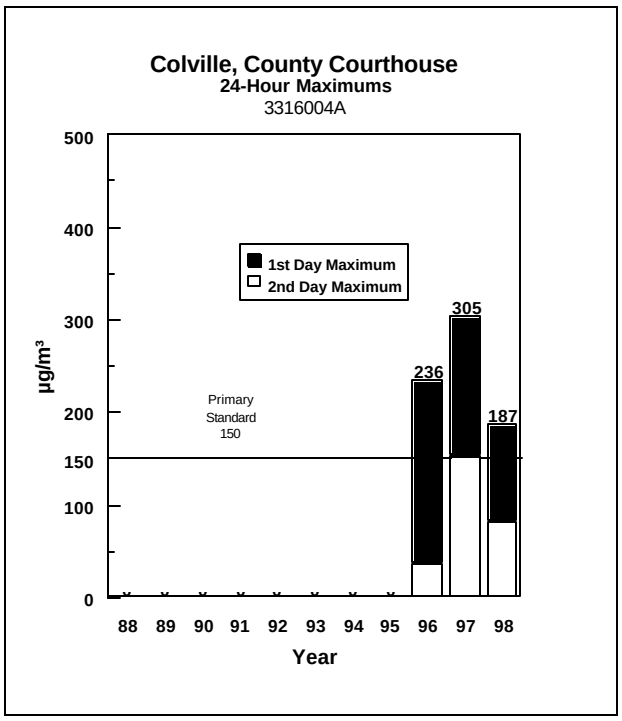


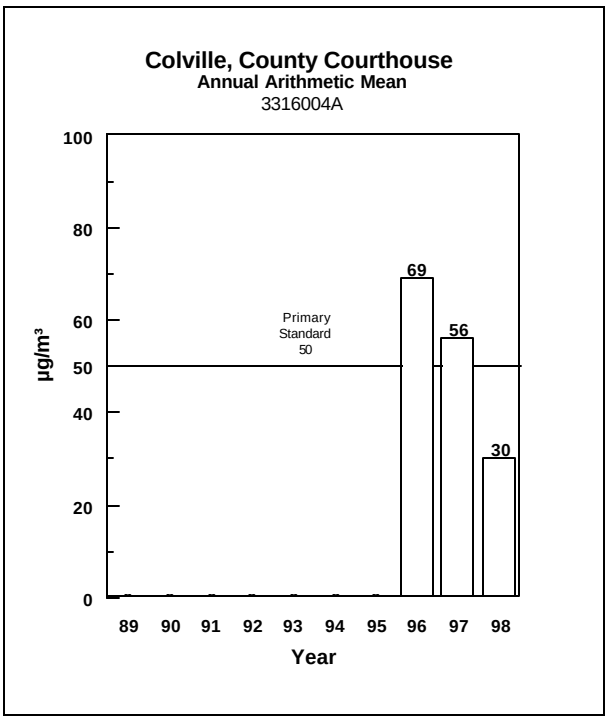


Particulate Matter

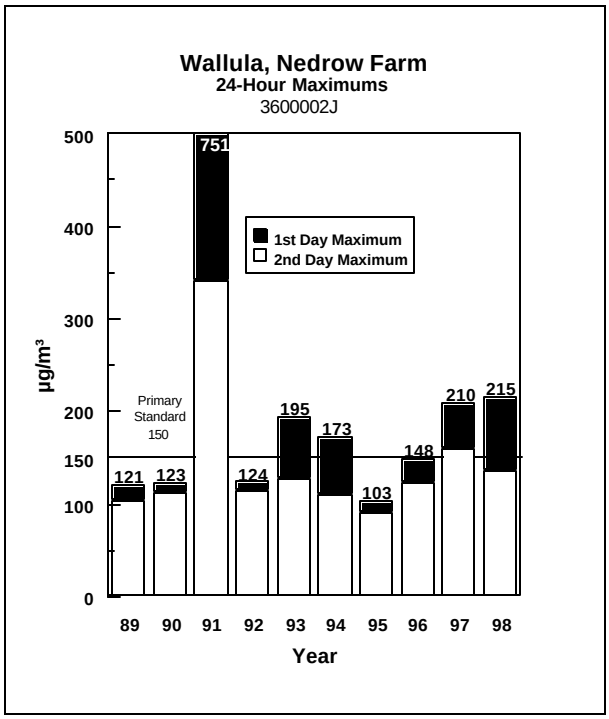


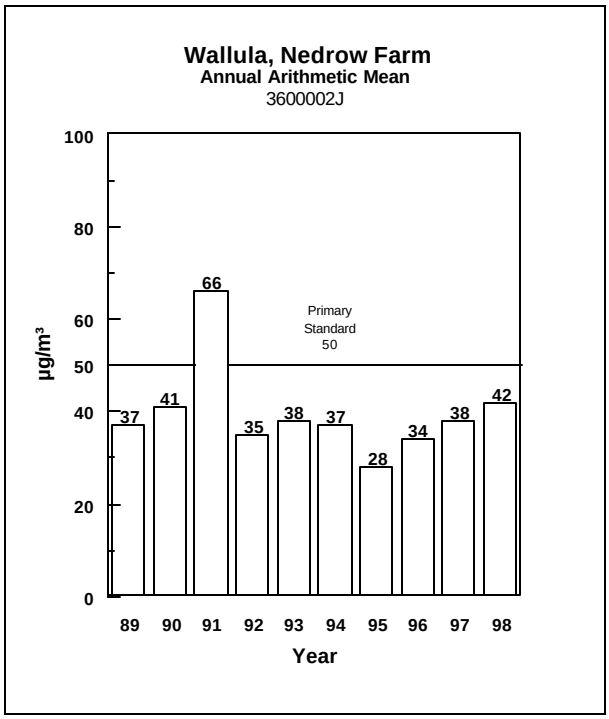


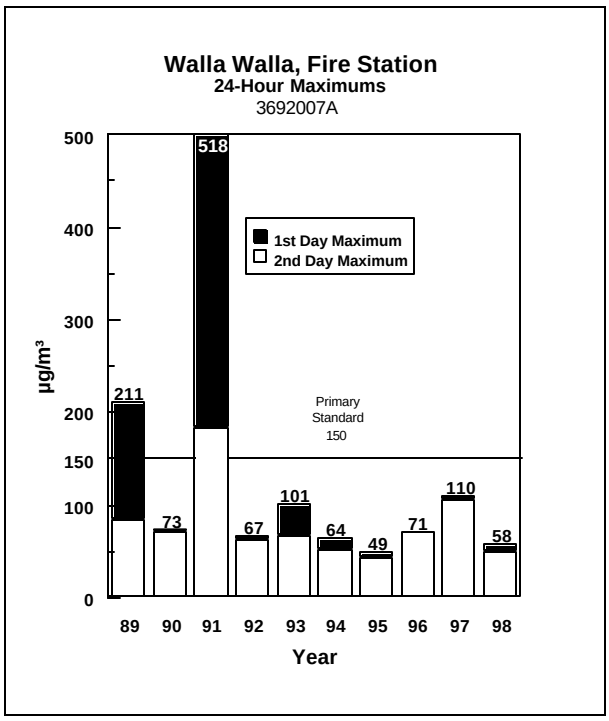


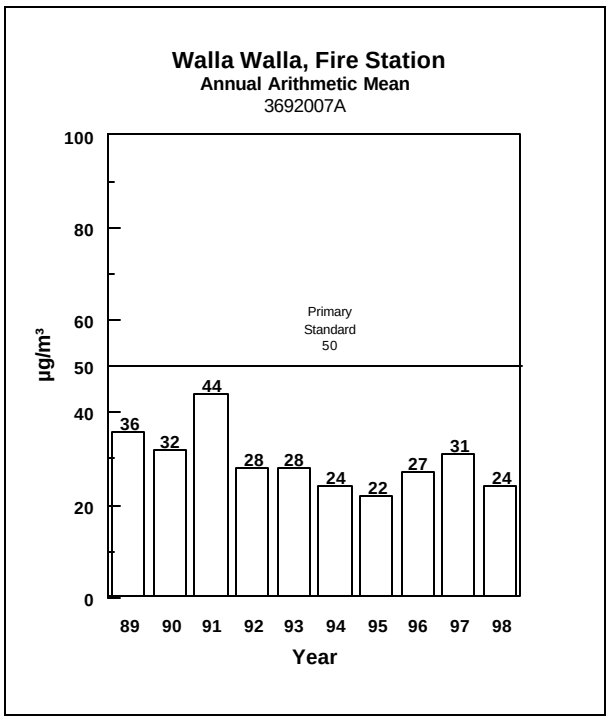


Particulate Matter









Particulate Matter

PM_{10} Annual Arithmetic Means ($\mu g/m^3$)

Station	Location	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
3706005C	Bellingham, Sch. Dist.				18*	21	18*	16	15	16	13

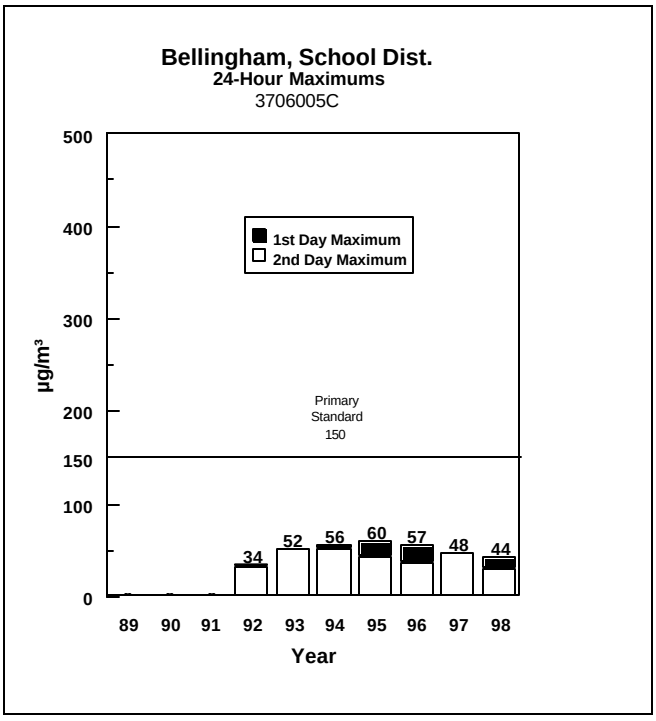
* Average based on less than 12 months of data.

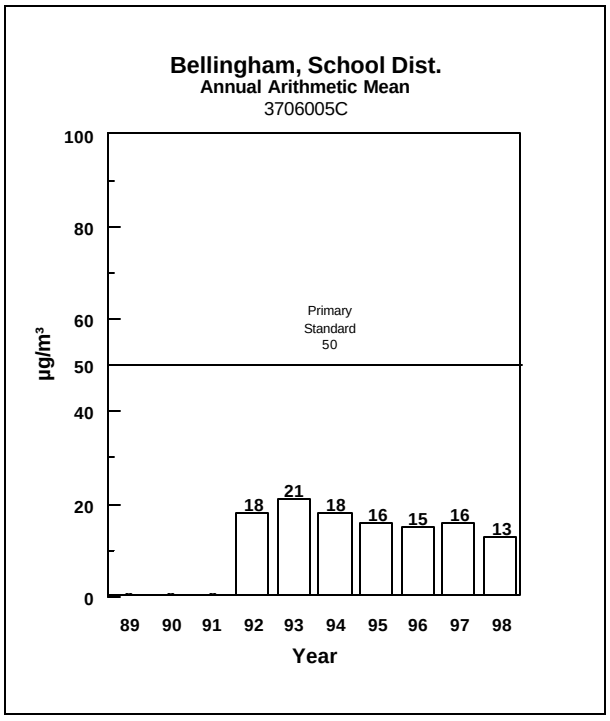
PM_{10} for 1998 ($\mu g/m^3$)

Station	Location	1st High Conc.	Date	2nd High Conc.	Date
3706005C	Bellingham, Sch. Dist.	44	04/29	31	10/20

PM_{10} for 1998

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





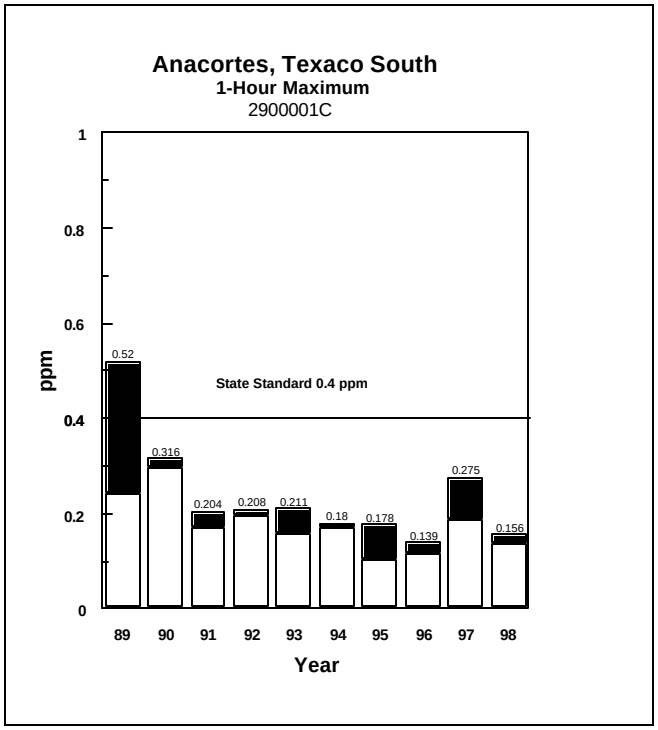
Sulfur Dioxide

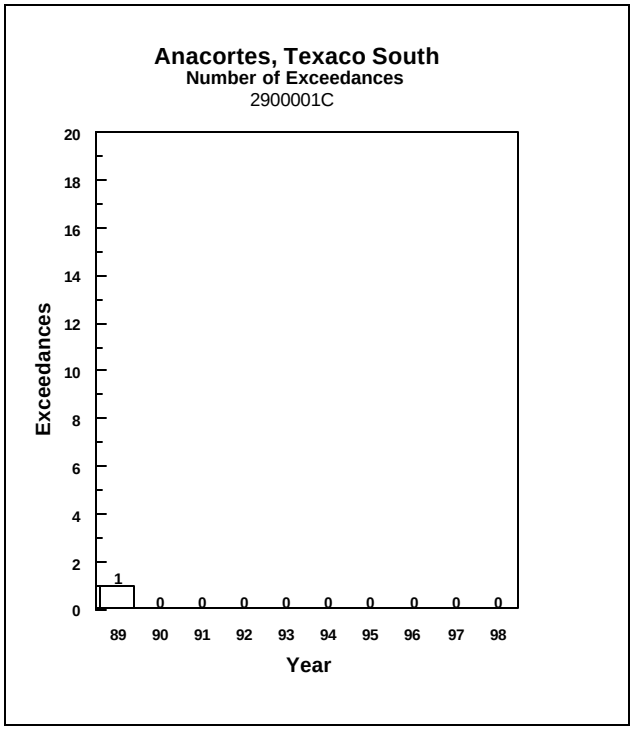
Sulfur Dioxide for 1998 (ppm)

Station	Location	1 Hour Maximum 1st	Date	2nd	Date	#1 Hr. >.40	3 Hr Max Conc.	Date	#3 Hr. >.50	24-Hr Max Conc.	Date	#24 Hr >.10	>.14	Ann. Mean
2900001C	Anacortes, South Texaco	.156	5/12	.138	4/22	0	.880	5/12	0	.138	6/11	0	0	.004
2900004C	Anacortes, March Point	.183	5/4	.172	6/22	0	.106	5/04	0	.172	6/22	0	0	.008
3706069C	Bellingham, Chestnut St	.073	6/23	.069	6/30	0	.064	6/23	0	.069	6/30	0	0	.036

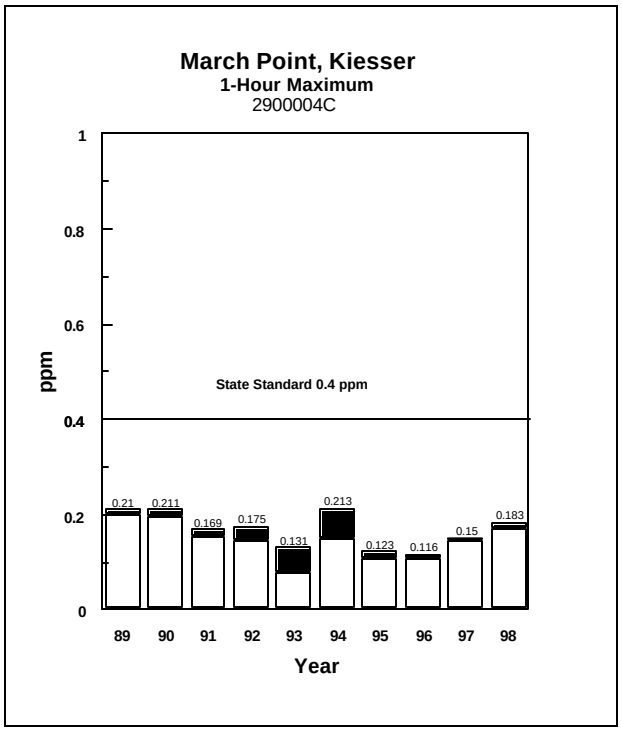
Sulfur Dioxide for 1998

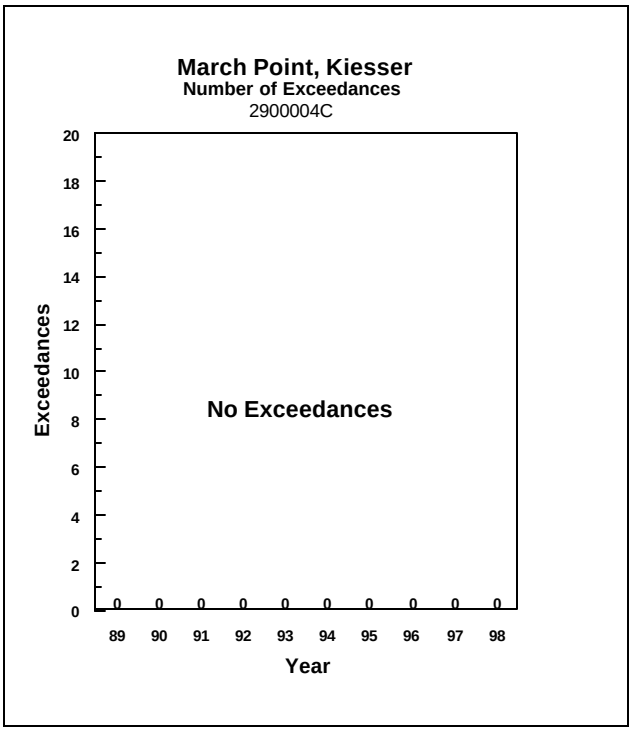
Station	Location	Period of Record	#Hours	# Samples	%Valid Data
2900001C	Anacortes, South Texaco	Jan-Dec	7817	326	89
2900004C	Anacortes, March Point	Jan-Dec	7361	307	84
3706069C	Bellingham, Chestnut Street	Jan-Dec	8533	356	97

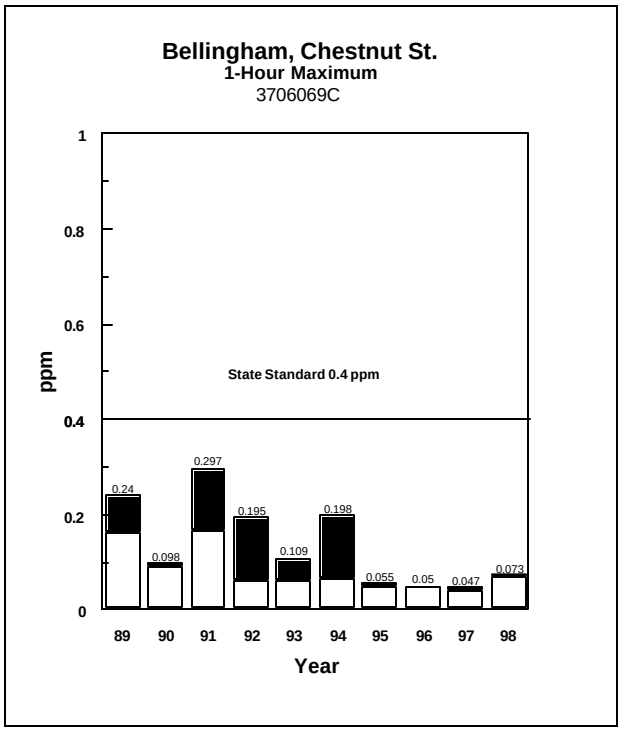


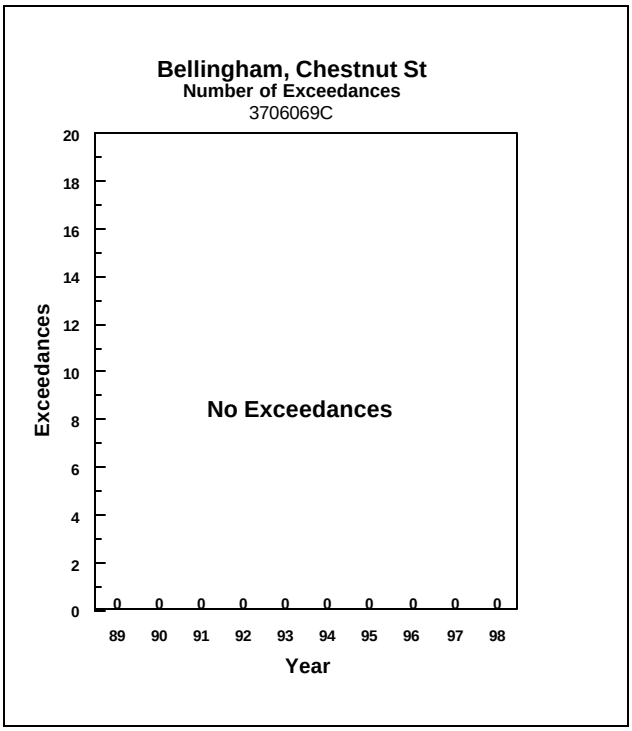


Sulfur Dioxide









Ozone

8-Hour Ozone for 1998 (ppm)

Station	Location	8-Hour Maximums 1st High Conc.	Date	4th High Conc.	Date
3700007	Whatcom Co., FCC Bldg	.074	7/27	.071	7/27

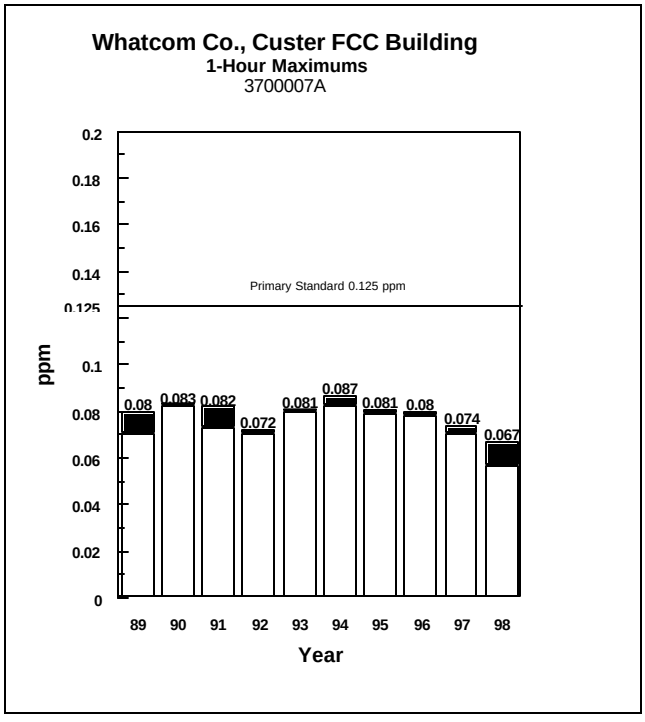
1-Hour Ozone for 1998 (ppm)

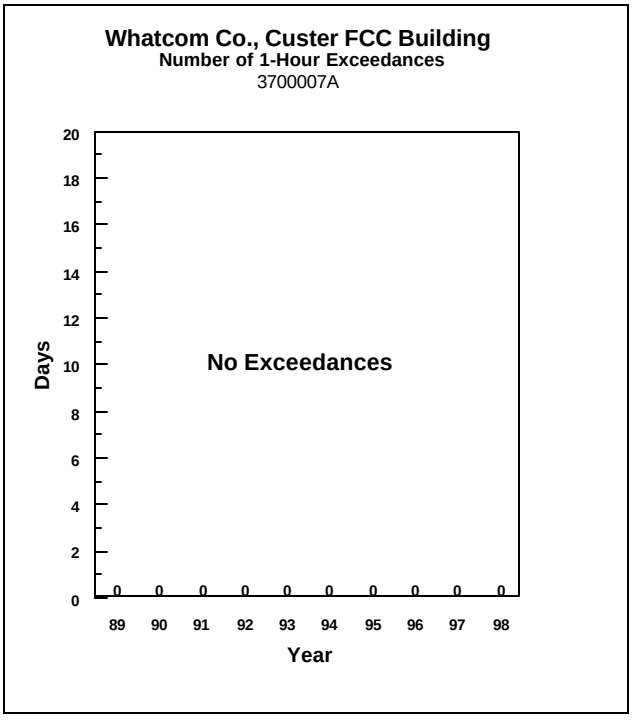
Station	Location	1-Hour Maximums 1st High Conc.	Date	2nd High Conc.	Date	2nd Day High* Conc.	Date
3700007	Whatcom Co., FCC BLdg.	.067	7/26	.057	7/28	.070	7/29

*2nd Day High-Second day with the highest 1-Hour average.

Ozone for 1998

Station	Location	Period of Record	# Hours	# Days	% Valid Data
3700007	Whatcom Co., FCC Bldg.	Jan-Oct	5,004	208	97





Puget Sound Area

Lead

Lead for 1998 (µgm^3)

Station	Location	Quarterly Avg. (µg/m^3) 1st	2nd	3rd	4th
1776K71B	Seattle, Harbor Island Texaco	.04	2.0	.01	.05

Particlulate Matter

PM10 Annual Arithmetic Means (µgm^3)

Station	Location	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
1708004A	Scan Design, Bellevue	26	21	23	23	20	18	16	16	17	15
1740K73B	Central & James, Kent	34	30	32	33	28	25	23	23	23	20
1744K74B	Lake Forest Pk., City Hall	31*	27	28	26	28	20	20	21	19	15
1776K55B	Duwamish Trailer, Seattle	39	36	37	38	35	28	28	27	31	25
1776K61B	South Park, Seattle	30	28	27	29	26	22	21	29	21	17
1777002A	Sea-Tac North										15*
1777003A	Tyee Valley Golf, Sea-Tac										15*
1800B05B	Meadowdale, Kitsap Co.			32*	23	23	20	20	17	17	13
2700P18B	South Hill, Puyallup			38*	29	24	20	19	23	20	15
2782P01B	Fire Station #12, Tacoma	39	34	36	36	33	27	27	25	27	20
2782P16B	54th Ave. N.E., Tacoma	33	29	30	35	26	23	18	18	20	18
2782P17B	Alexander Ave., Tacoma	36	31	29	31	28	23	26	23	27	21
3124S04B	Hoyt Ave., Everett	27*	24	25	24	23	19	17	16	17	14
3146S08B	59th Place, Lynnwood						22*	16	15	16	12
3148S07B	JHS, Marysville			34*	26	27	21	22	19	19	15

* Average based on less than 12 months of data.

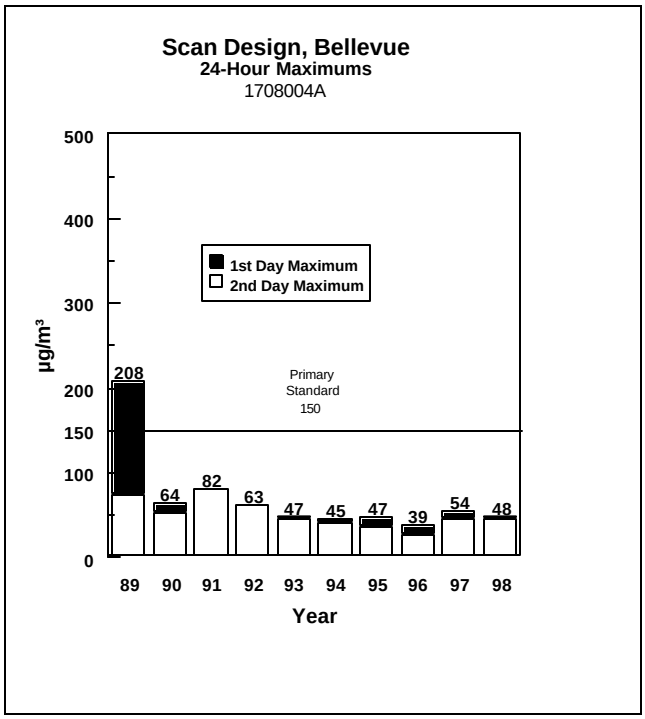
PM10 for 1998 (µgm^3)

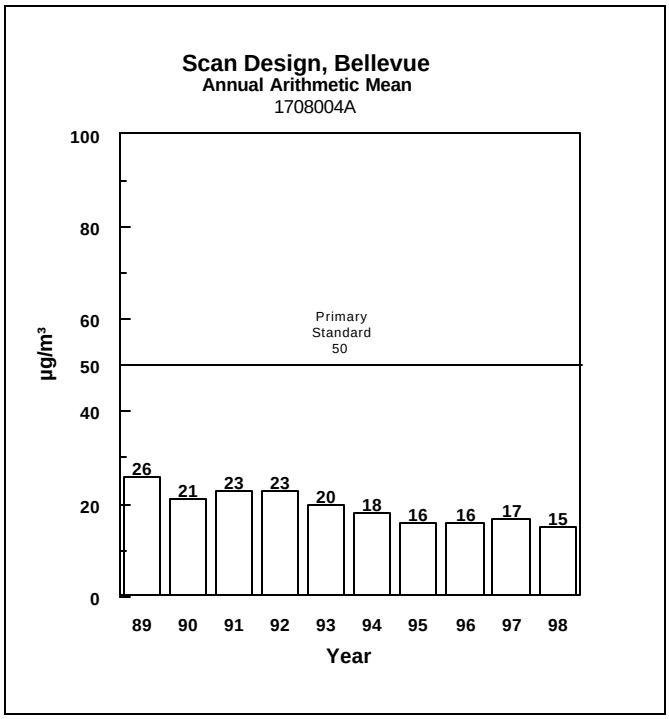
Station	Location	1st High Conc.	Date	2nd High Conc.	Date
1708004A	Scan Design, Bellevue	48	07/06	46	04/29
1740K73B	Central & James, Kent	72	04/29	65	05/01
1744K74B	Lake Forest Park, City Hall	42	05/01	36	01/15
1776K55B	Duwamish Trailer, Seattle	73	12/23	68	05/01
1776K61B	South Park, Seattle	55	04/29	53	07/28
1777002A	Sea-Tac North	35	07/28	25	08/03
1777003A	Tyee Valley Golf, Sea-Tac	36	07/28	32	08/03
1800B05B	Meadowdale, Kitsap Co.	36	04/29	24	02/10
2700P18B	South Hill, Puyallup	47	04/29	40	11/07
2782P01B	Fire Station #12, Tacoma	62	05/01	53	10/21
2782P16B	54th Ave. N.E., Tacoma	85	04/29	62	07/28
2782P17B	Alexander Ave., Tacoma	76	07/28	59	04/28
3124S04B	Hoyt Ave., Everett	41	04/29	26	07/28
3146S08B	59th Place, Lynnwood	32	04/29	25	07/28
3148S07B	JHS, Marysville	57	05/01	43	04/29

Particulate Matter

PM_{10} for 1998

Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
1708004A	Scan Design, Bellevue	Jan-Dec	1/6	61	100
1740K73B	Central & James, Kent	Jan-Dec	1/3	140	100
1744K74B	Lake Forest Park, City Hall	Jan-Dec	1/2	104	94
1776K55B	Duwamish Trailer, Seattle	Jan-Dec	1/3	141	100
1776K61B	South Park, Seattle	Jan-Sep	1/6	40	98
1777002A	Sea-Tac North	Jun-Dec	1/6	34	97
1777003A	Tyee Valley Golf, Sea-Tac	Jun-Dec	1/6	36	100
1800B05B	Meadowdale, Kitsap Co.	Jan-Dec	1/6	61	100
2700P18B	South Hill, Puyallup	Jan-Dec	1/6	59	97
2782P01B	Fire Station #12, Tacoma	Jan-Dec	1/3	141	100
2782P16B	54th Ave. N.E., Tacoma	Jan-Dec	1/6	60	98
2782P17B	Alexander Ave., Tacoma	Jan-Dec	1/3	84	98
3124S04B	Hoyt Ave., Everett	Jan-Dec	1/6	40	98
3146S08B	59th Place, Lynnwood	Jan-Dec	1/6	61	100
3148S07B	JHS, Marysville	Jan-Dec	1/3	106	96





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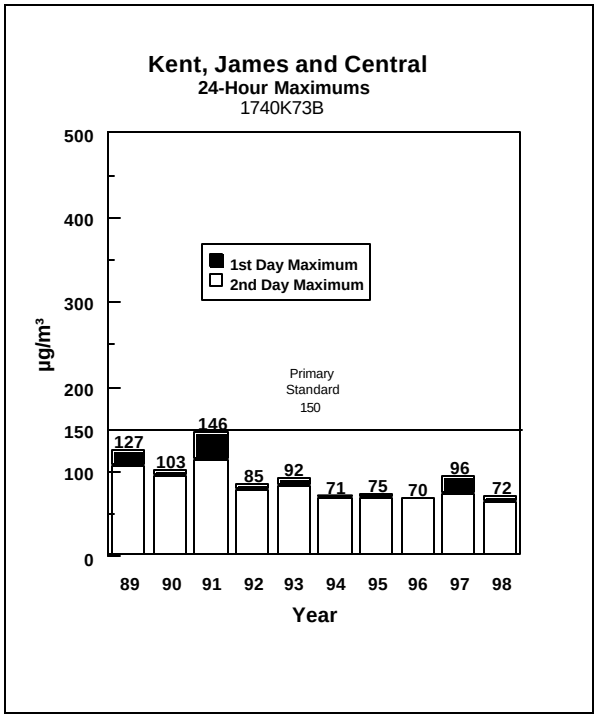

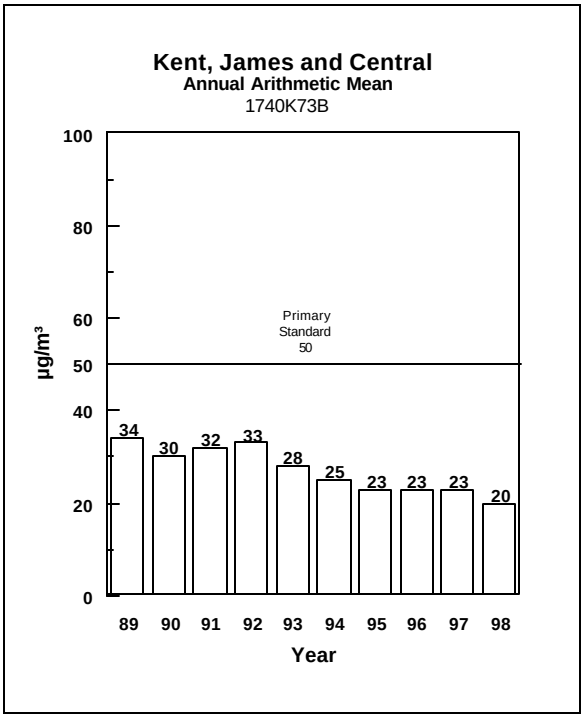

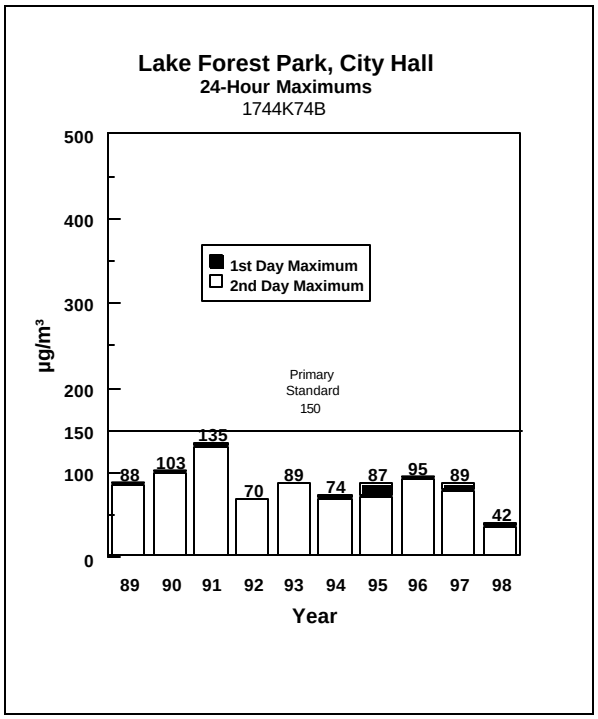

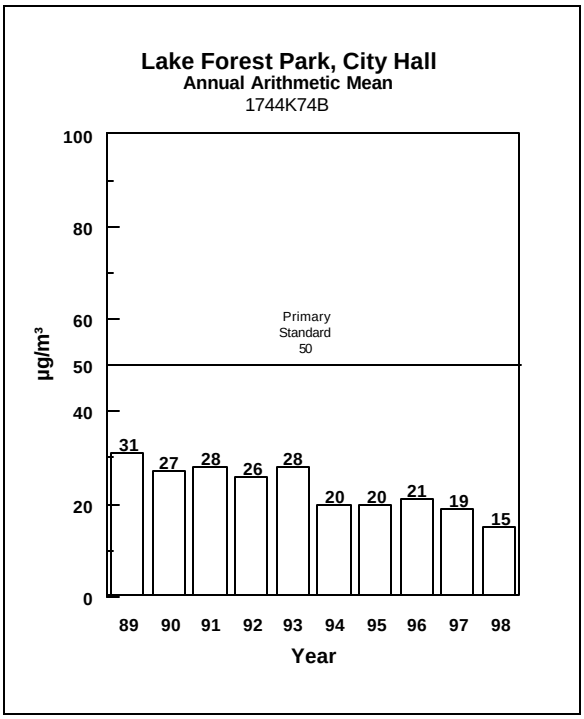

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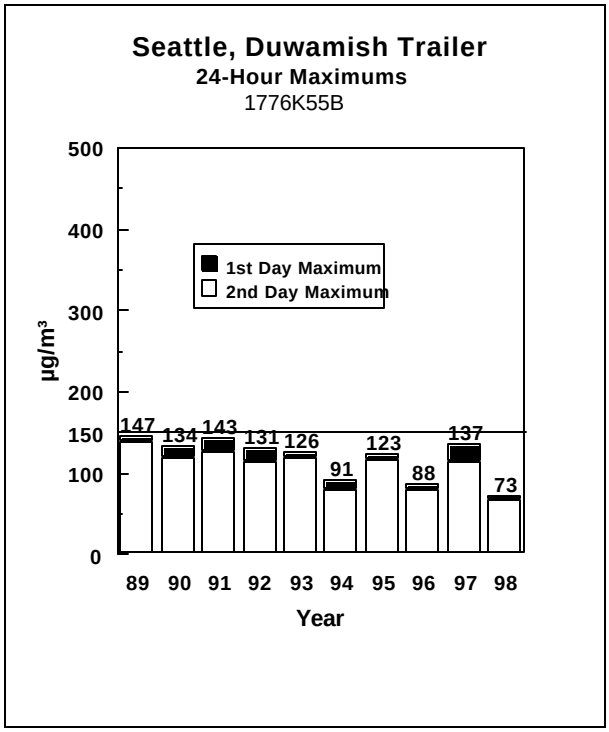
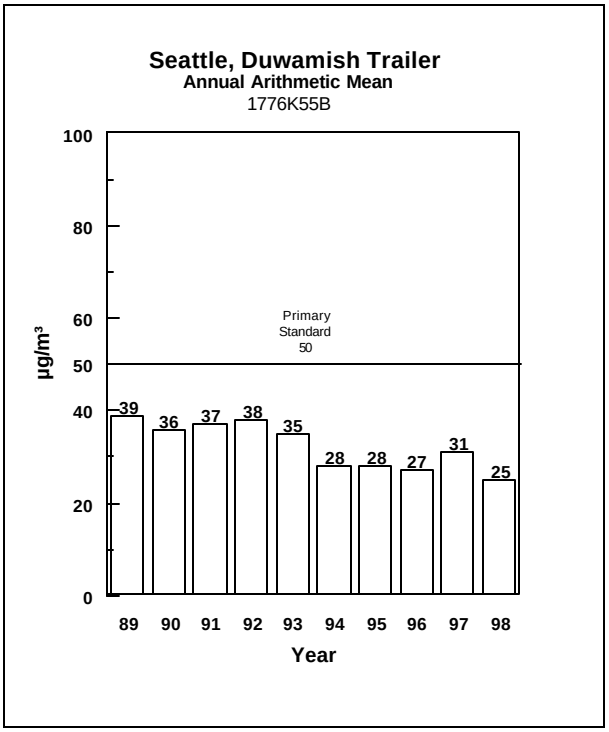
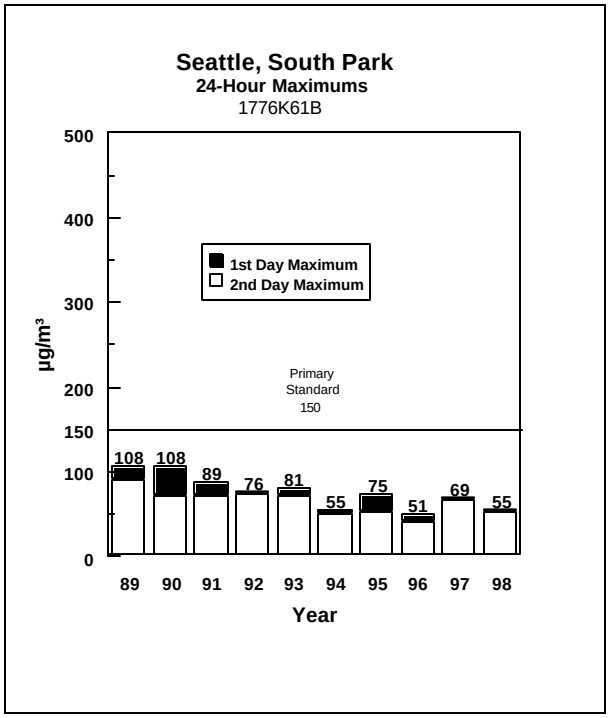
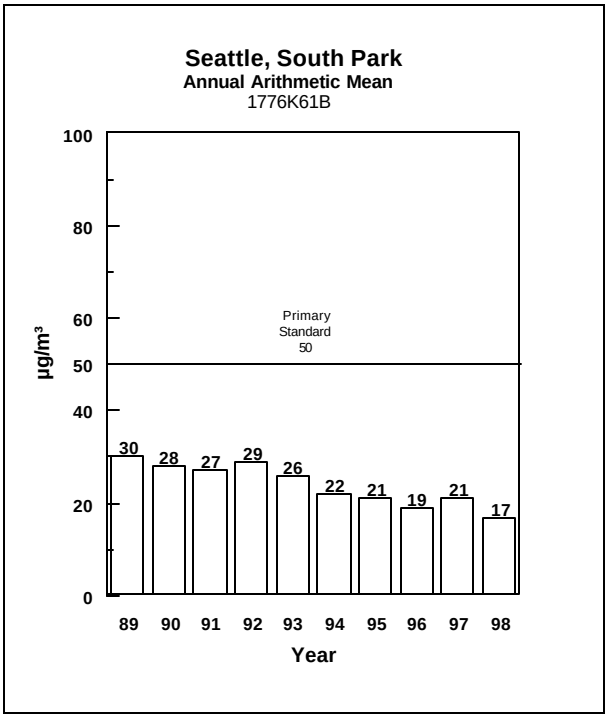
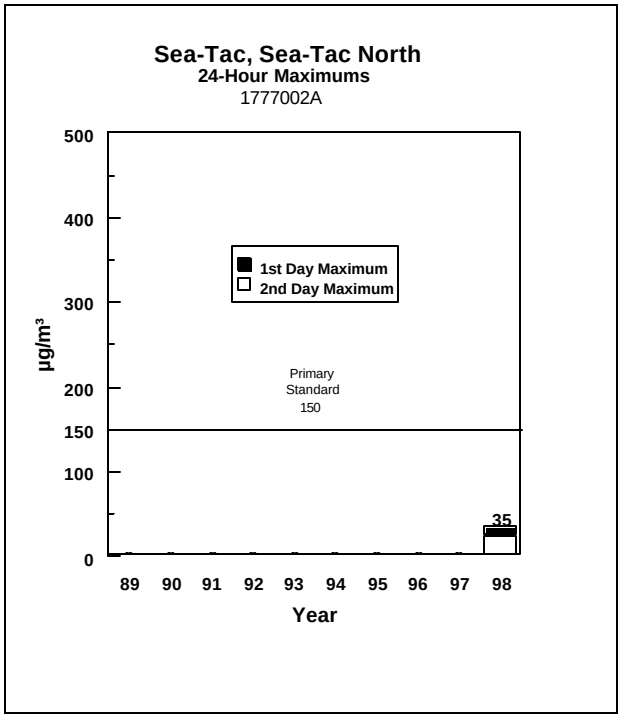


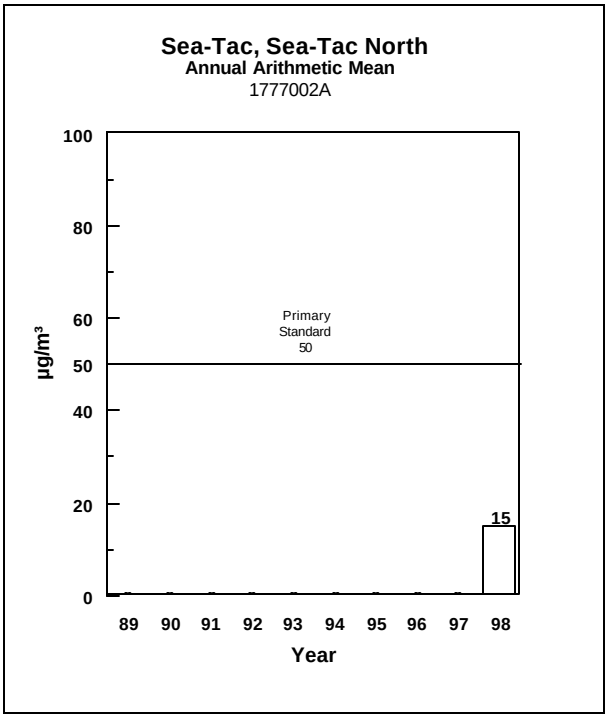


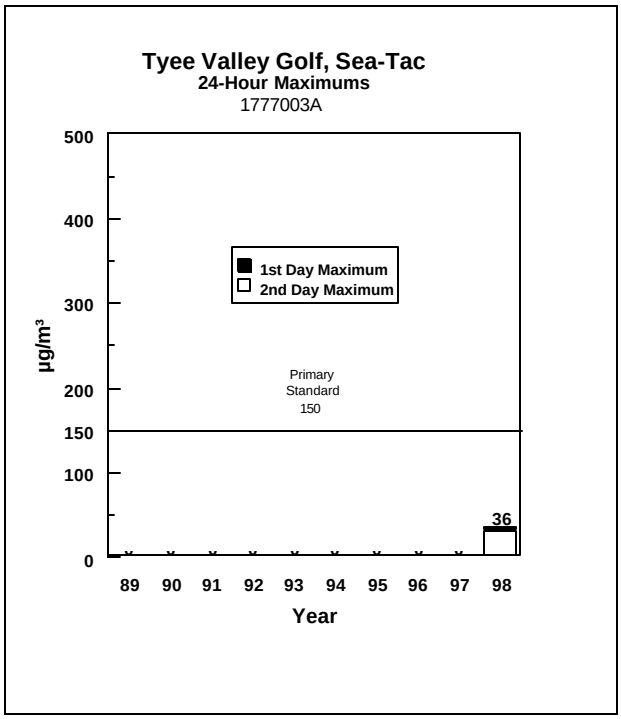


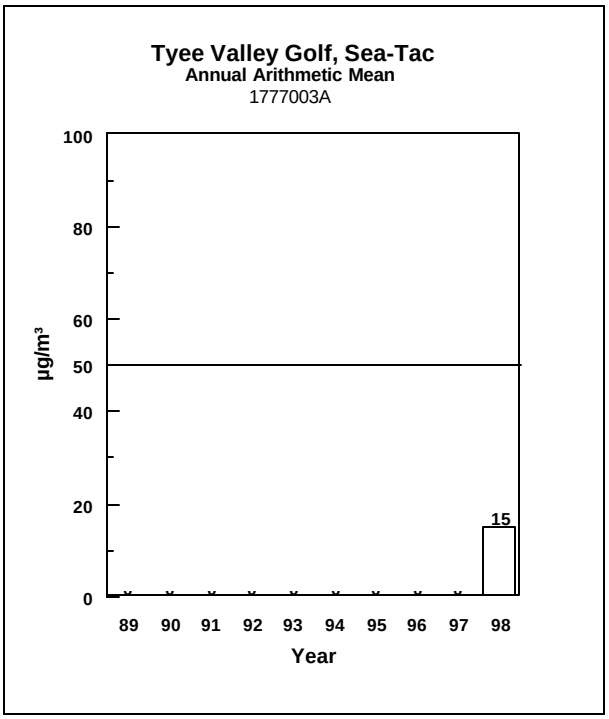


Particulate Matter

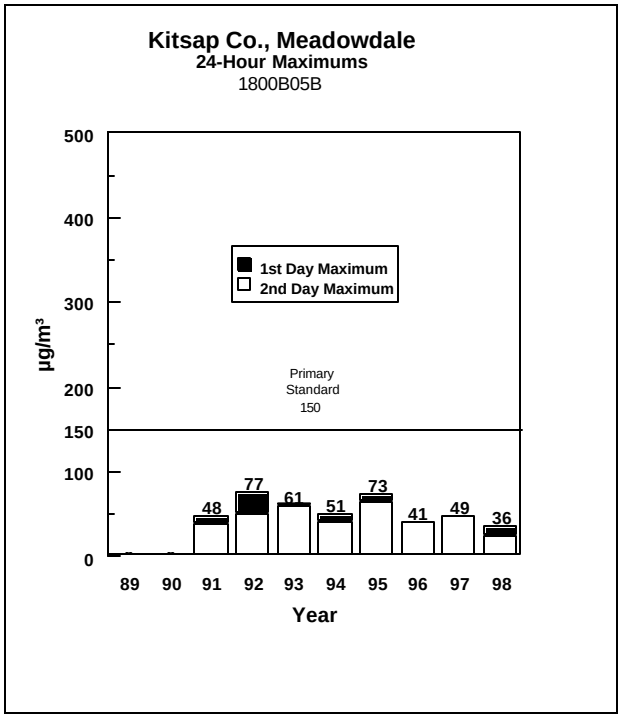


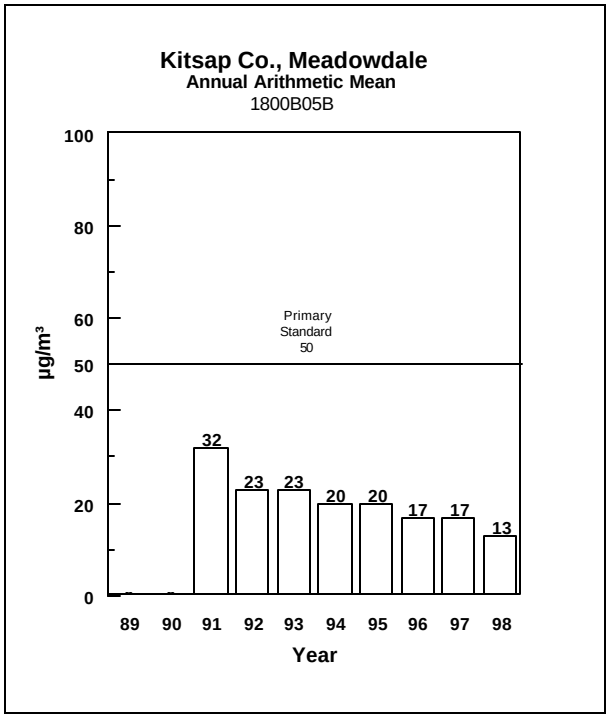


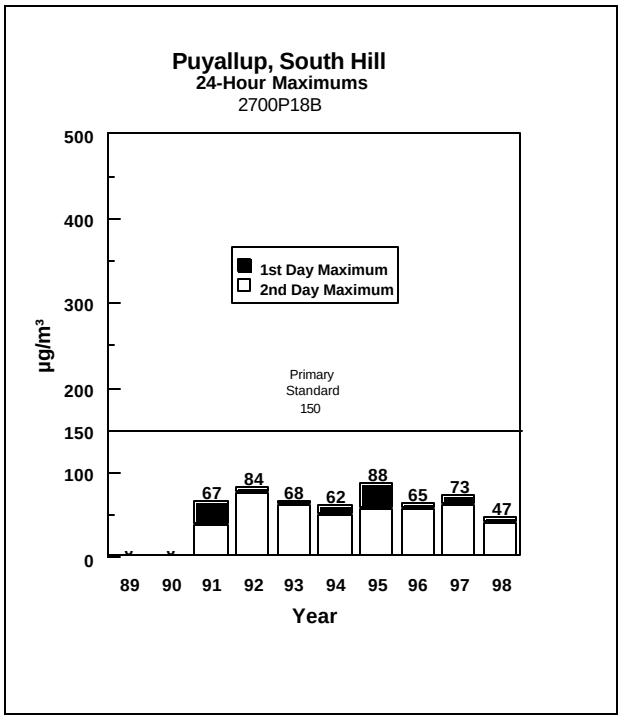


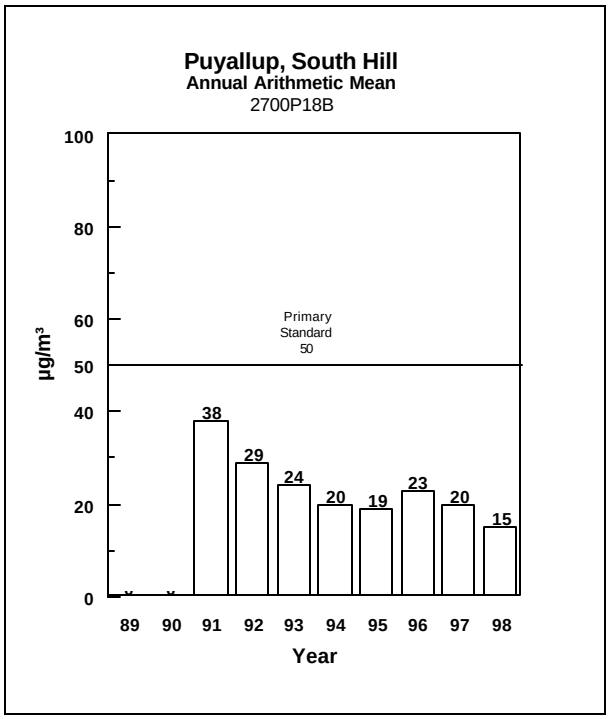


Particulate Matter

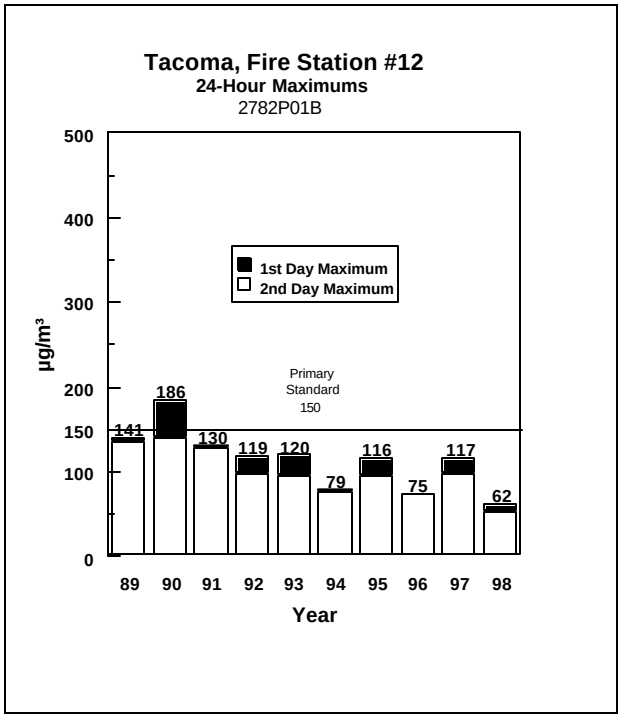


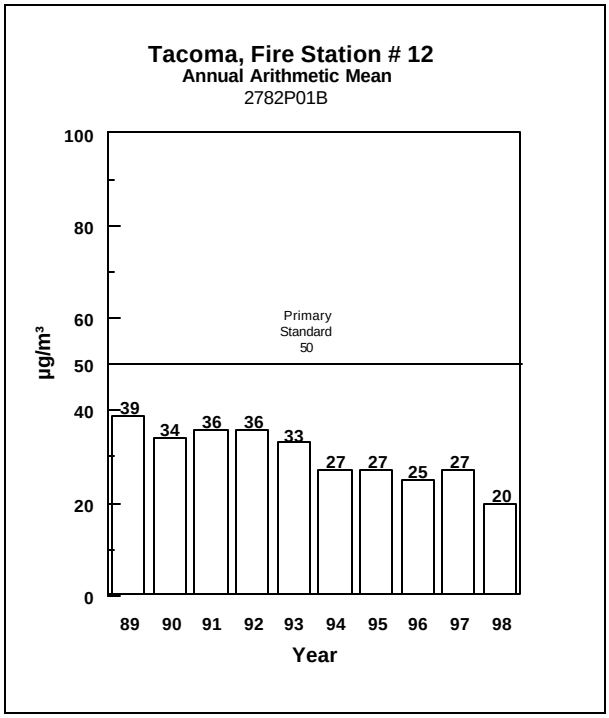


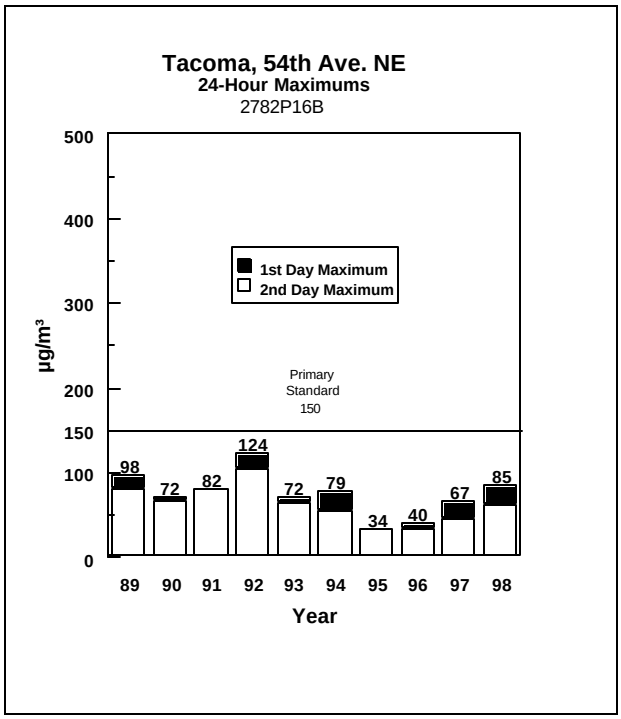


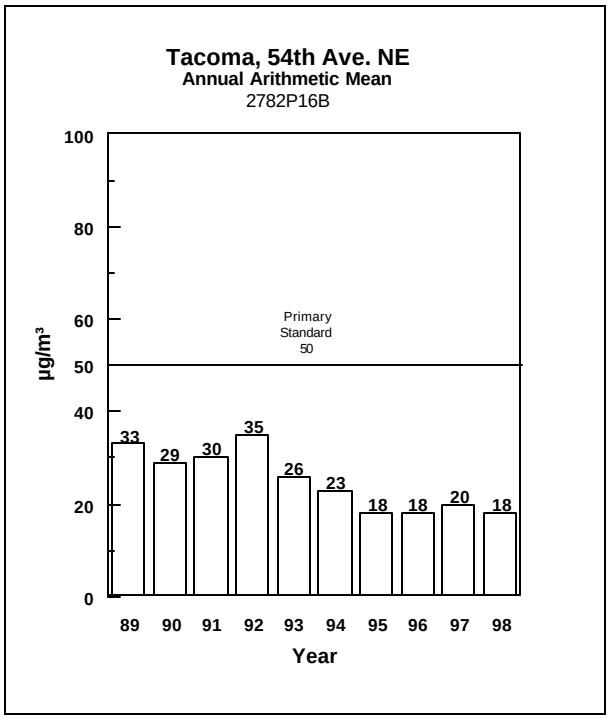


Particulate Matter

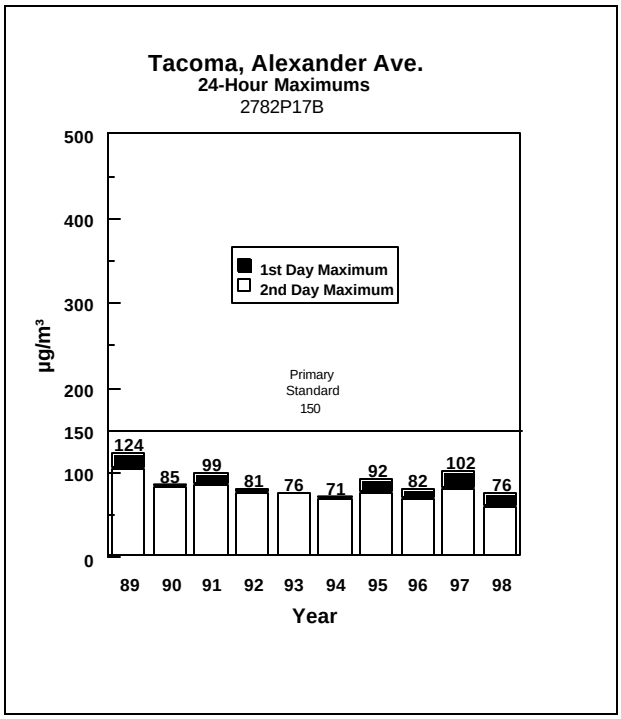


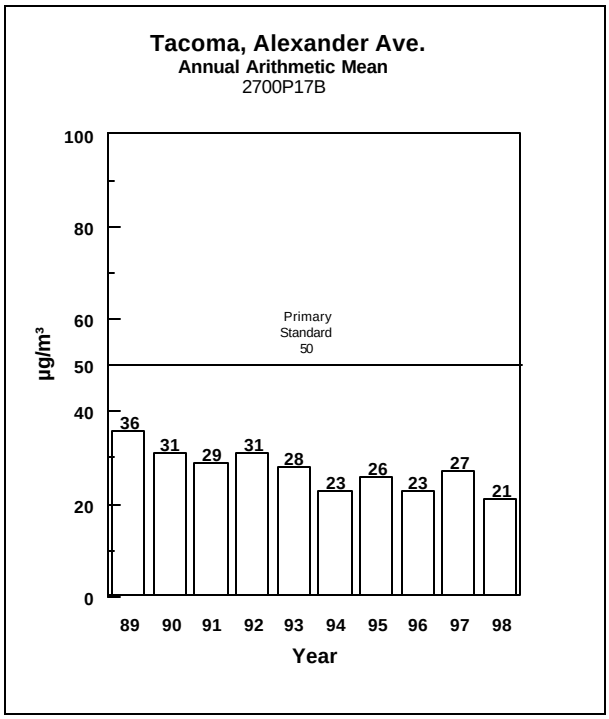


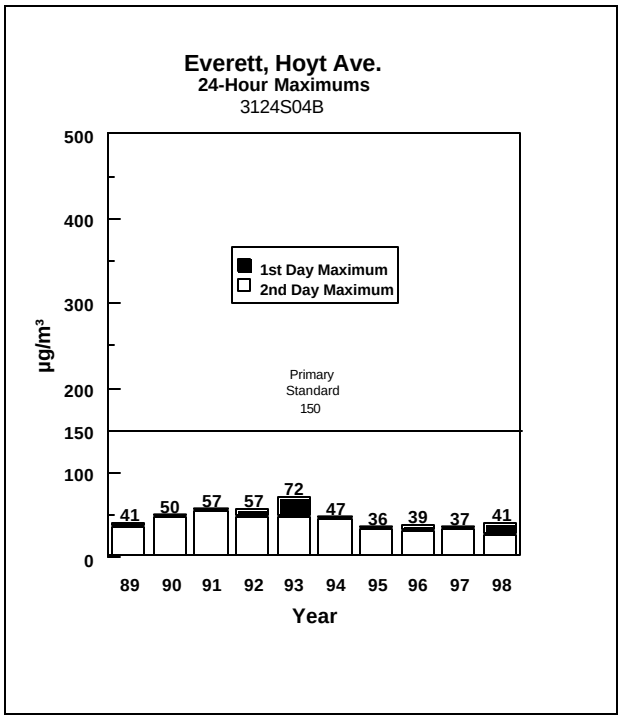


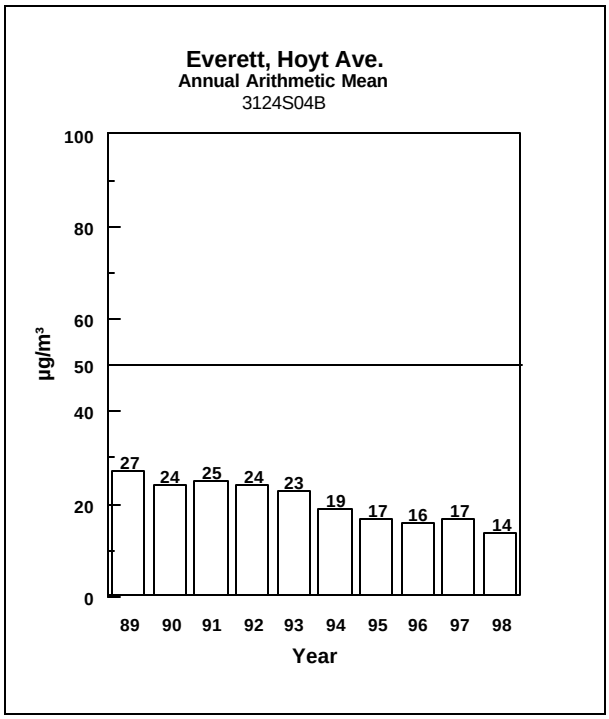


Particulate Matter

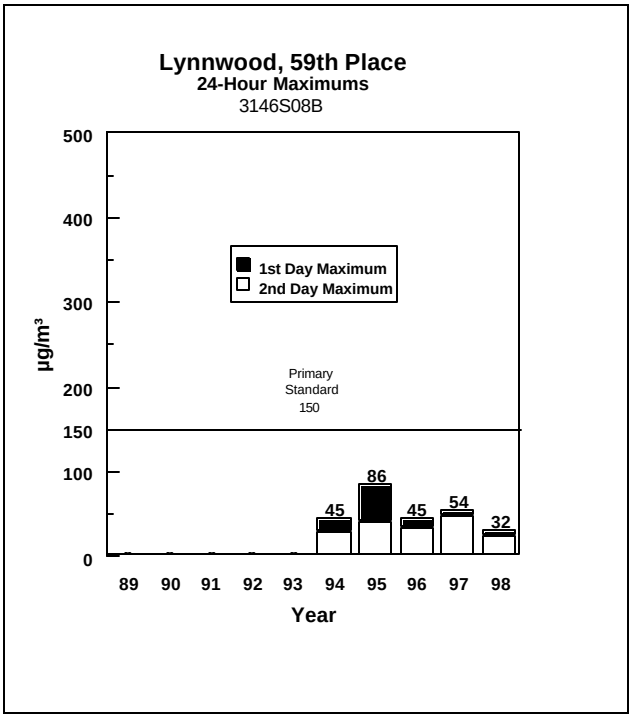


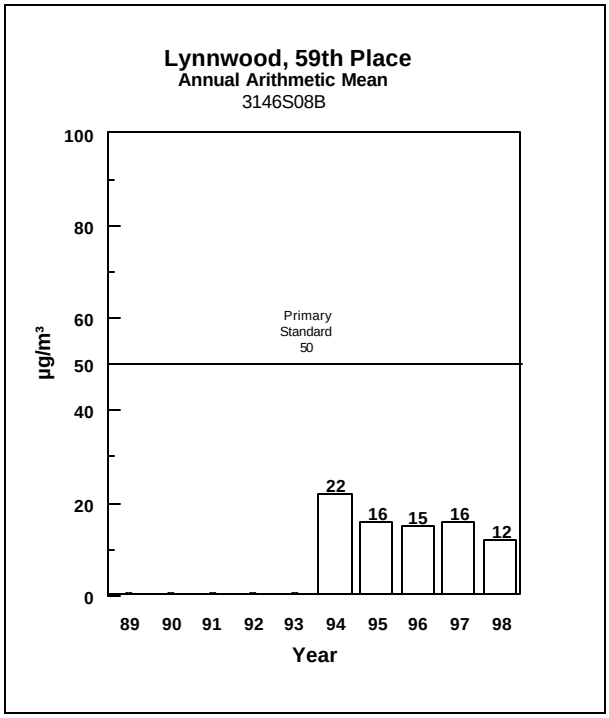


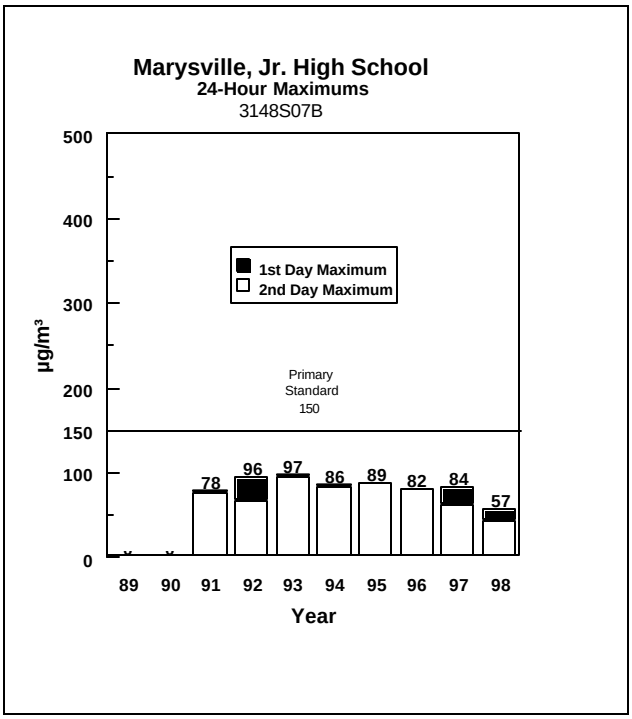


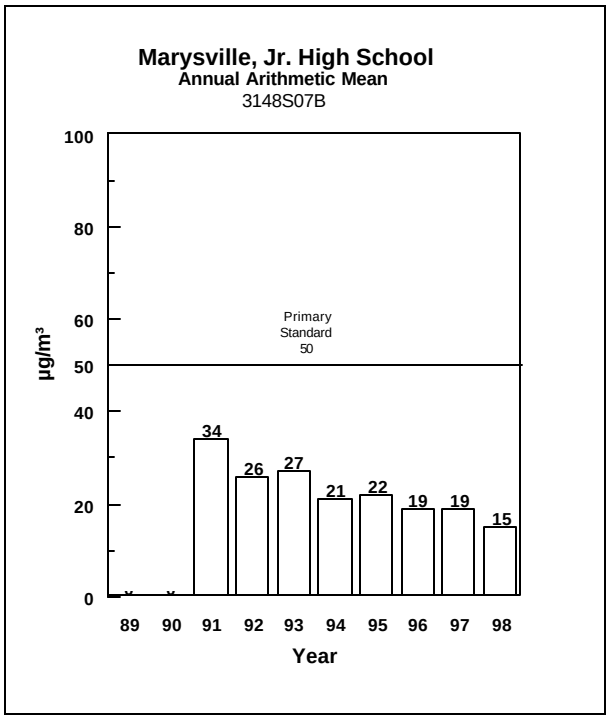


Particulate Matter









Carbon Monoxide

Carbon Monoxide for 1998 (ppm)

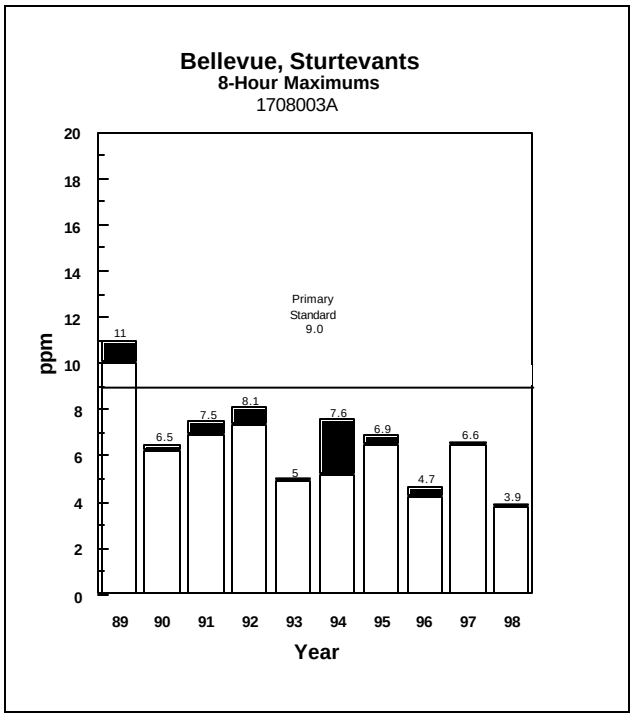
Station	Location	1-Hour Maximums 1st High Conc.	1st High Date	2nd High Conc.	2nd High Date	8-Hour Maximum 1st High Conc.	1st High Date	2nd Day High * Conc.	2nd Day High * Date	2nd Day Conc.	2nd Day Date	8-Hr. Exc.
1708003A	Bellevue, Sturtevants	5.6	10/22	5.5	10/22	3.9	10/21	3.8	10/22	3.8	10/22	0
1708005A	Bellevue, NE 8th & 108th	8.2	10/21	7.9	10/21	6.9	10/21	5.2	12/03	5.2	12/03	0
1708007A	Bellevue, 148th & 24th	7.5	12/03	7.3	12/03	5.9	12/04	4.3	12/22	4.3	12/22	0
1776020A	Seattle, Zanadu Comics	11.2	05/22	7.9	10/21	5.7	10/23	5.5	10/30	5.5	10/30	0
1776026A	Seattle, 4th & Pike Bldg.	5.8	10/21	5.7	10/21	3.7	10/22	3.6	01/30	3.6	01/30	0
1776033A	Seattle, Northgate Apts. #2	8.1	10/21	6.6	10/22	4.5	10/22	4.1	10/21	4.0	12/03	0
1776308A	Seattle Municipal Bldg.	8.3	01/28	7.0	10/21	4.9	10/22	3.9	10/23	3.8	10/03	0
2782013A	Tacoma, Pacific Ave.	10.9	10/21	9.3	01/13	6.7	10/21	5.8	10/22	5.8	10/02	0
3124006A	Everett, Nevada Bob's	9.1	10/22	7.9	10/06	5.3	10/22	5.1	12/03	5.1	10/02	0
3146002A	Lynnwood	16.2	11/16	14.2	10/21	8.1	10/20	6.1	11/16	6.1	11/16	0

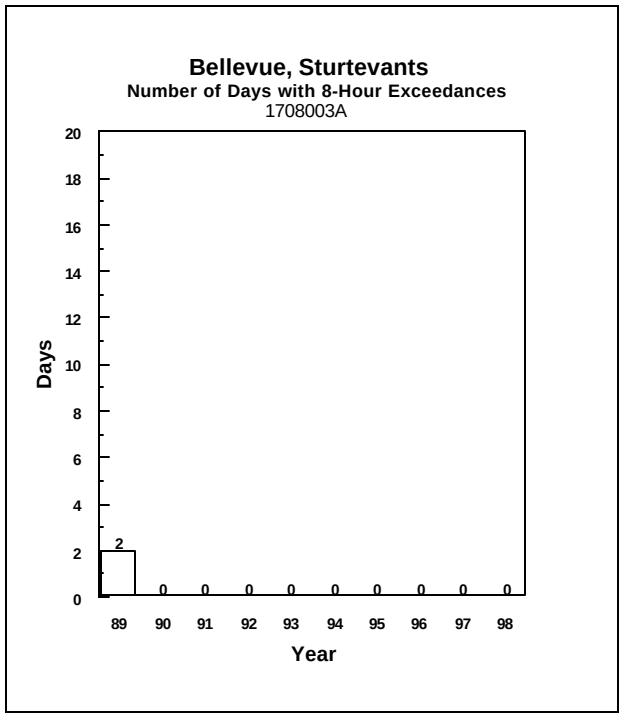
* 2nd Day High = Second day with the highest 8-hour average.

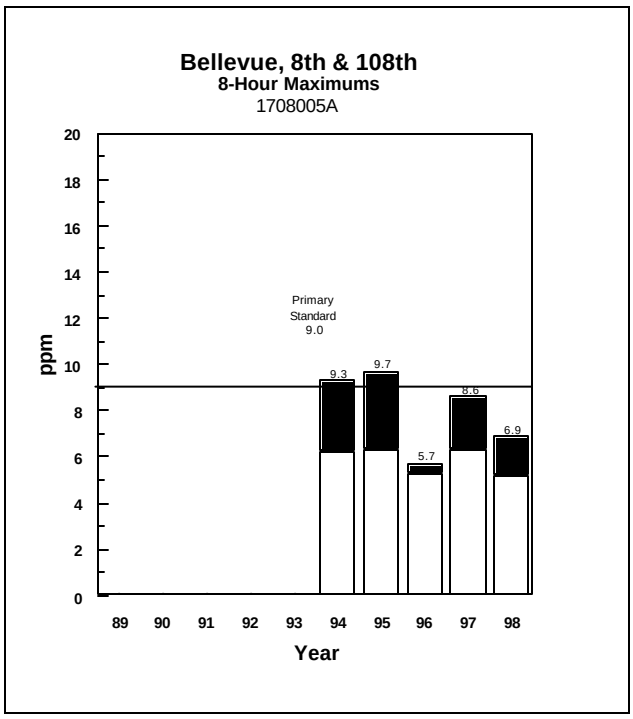
Carbon Monoxide for 1998

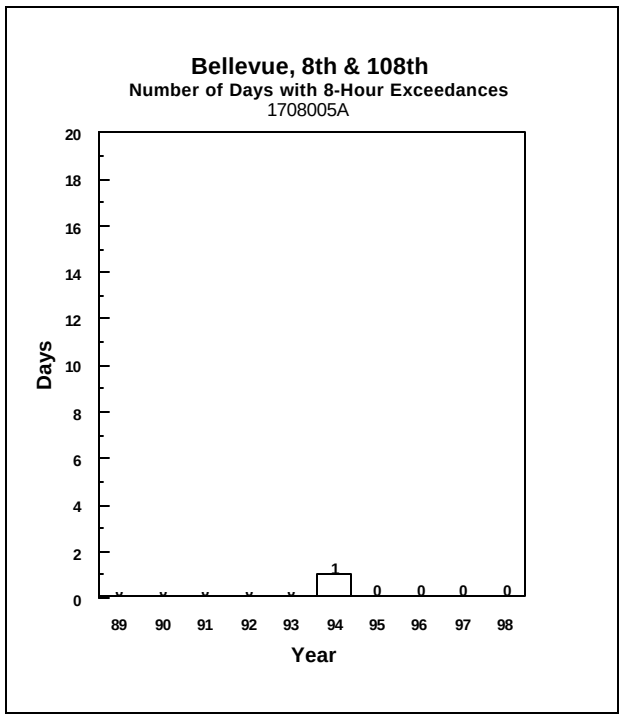
Station	Location	Period of Record	# Hours	# Days	% Valid Data
1708003A	Bellevue, Sturtevants	Jan-Dec	8665	361	99
1708005A	Bellevue, NE 8th & 108th	Jan-Dec	8707	363	99
1708007A	Bellevue, 148th & 24th	Dec	735	31	99
1776020A	Seattle, Zanadu Comics	Jan-Dec	8703	363	99
1776026A	Seattle, 4th & Pike Bldg.	Jan-Dec	8451	352	97
1776033A	Seattle, Northgate Apts. #2	Jun-Dec	4738	197	97
1776308A	Seattle, Municipal Bldg.	Jan-Dec	8703	363	99
2782013A	Tacoma, Pacific Ave.	Jan-Dec	8729	364	99
3124006A	Everett, Nevada Bob's	Jan-Dec	5534	231	90
3146002A	Lynnwood	Oct-Dec	2194	91	99

Carbon Monoxide

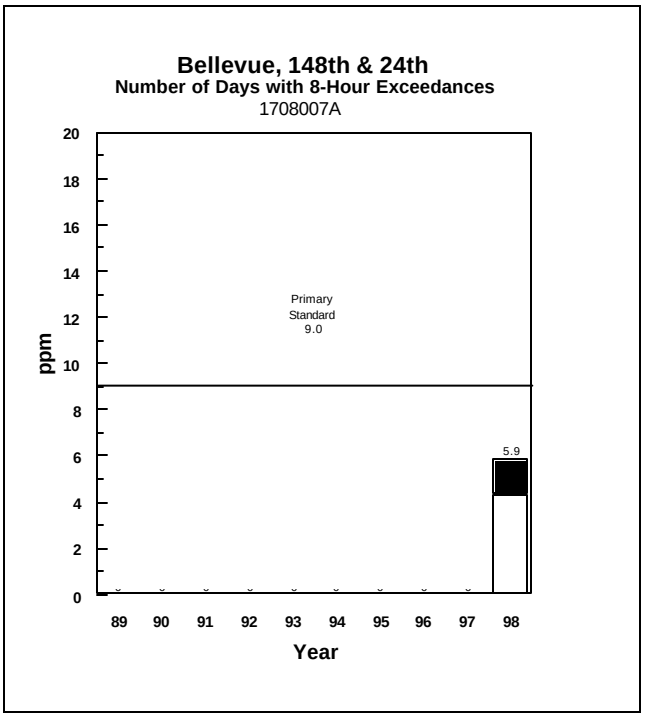


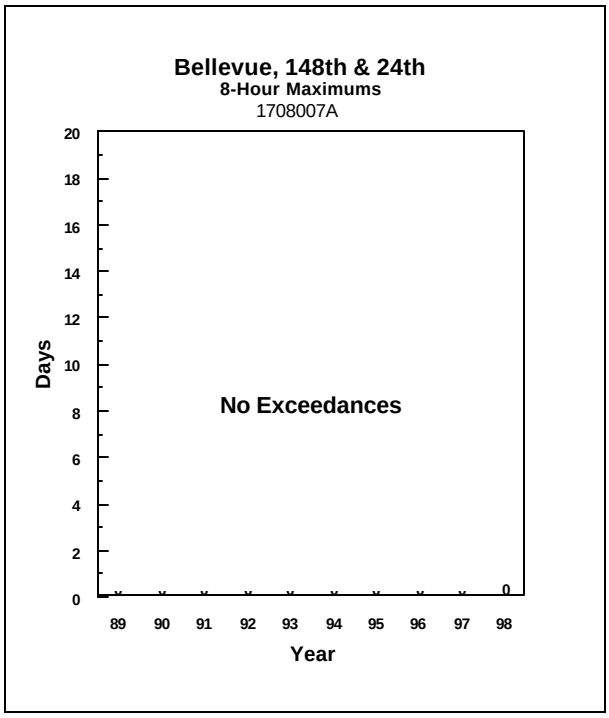


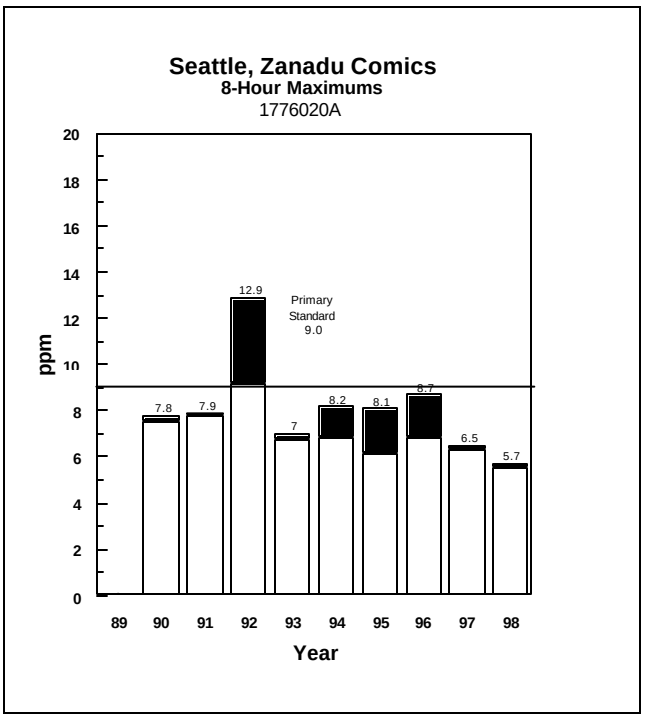


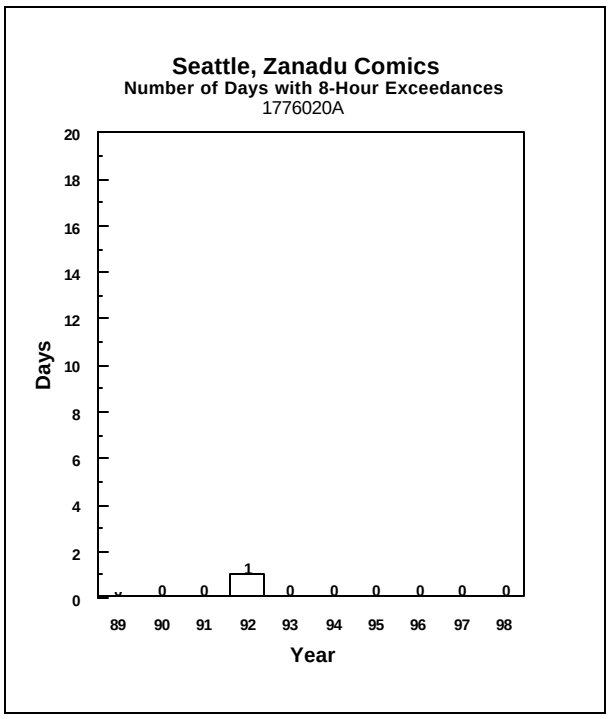


Carbon Monoxide

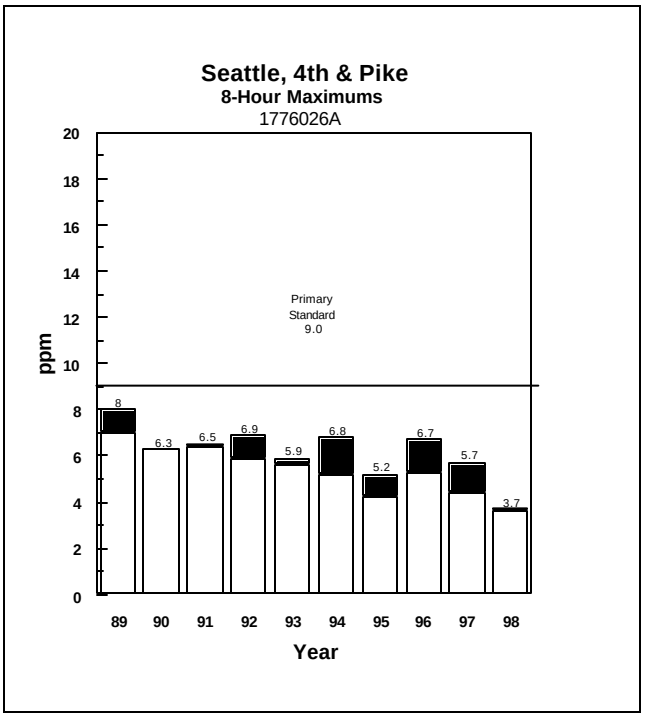


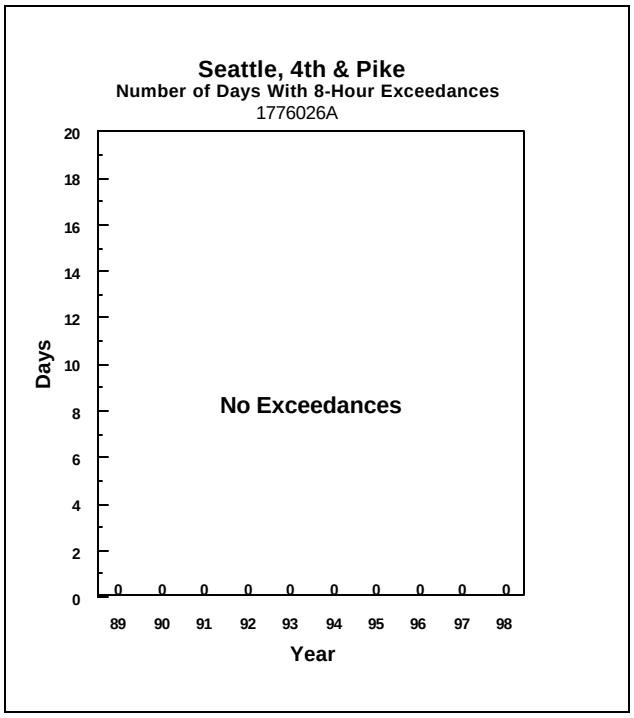


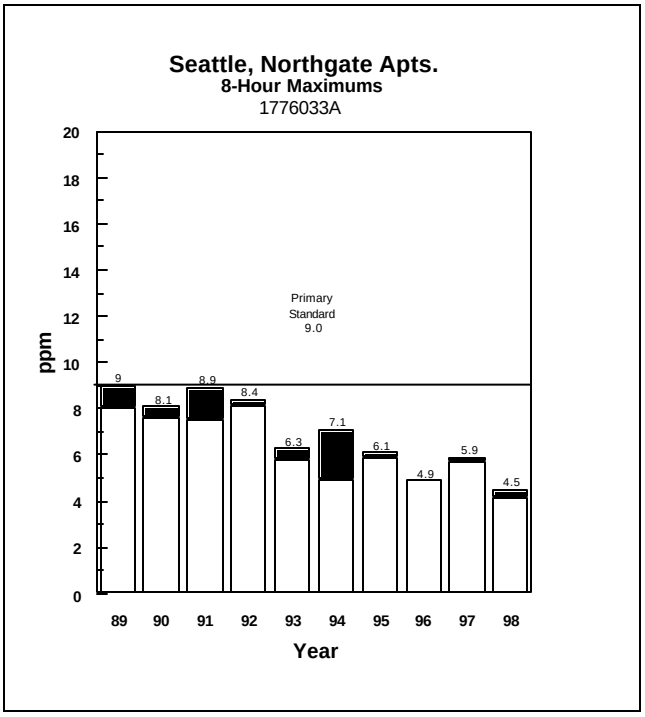


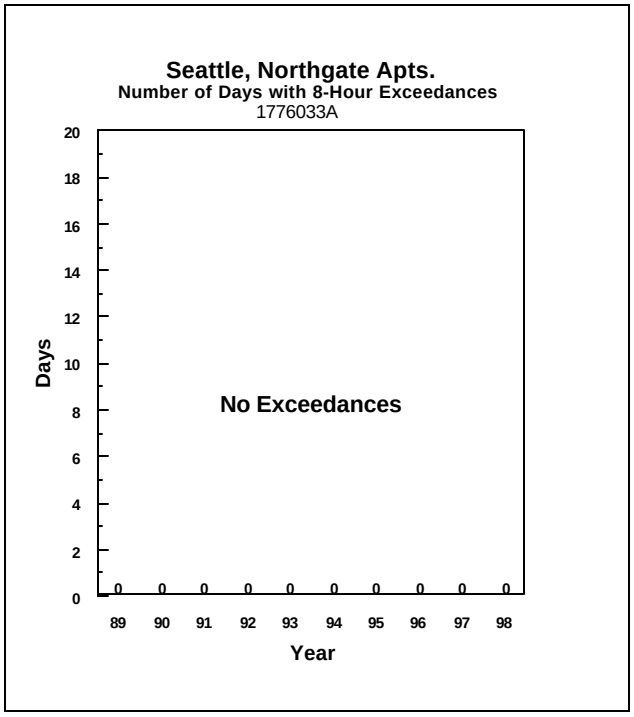


Carbon Monoxide

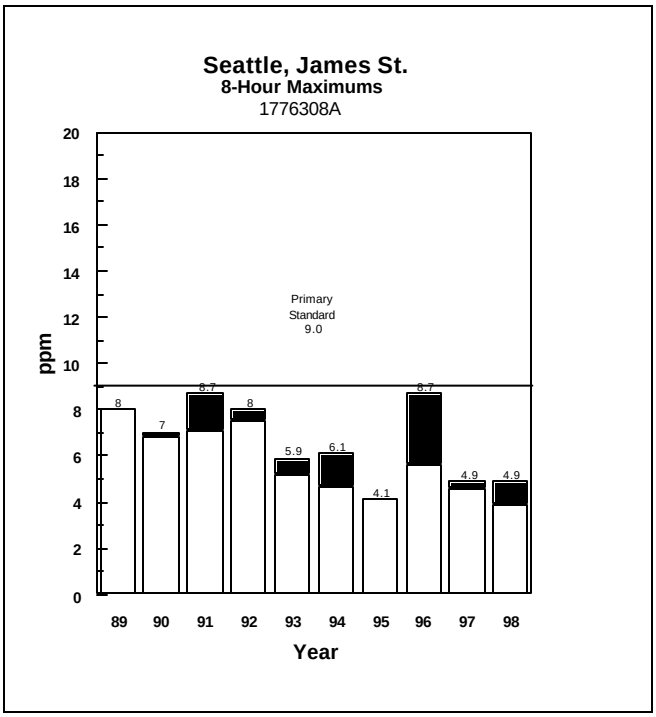


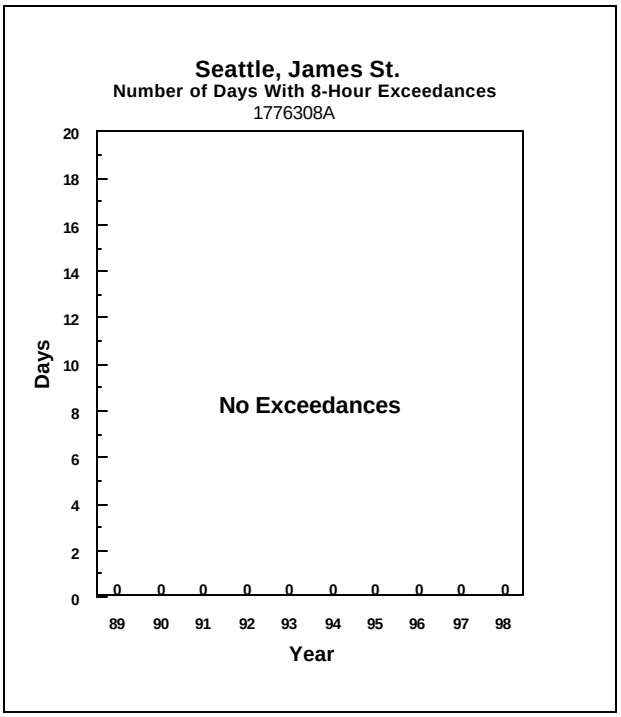


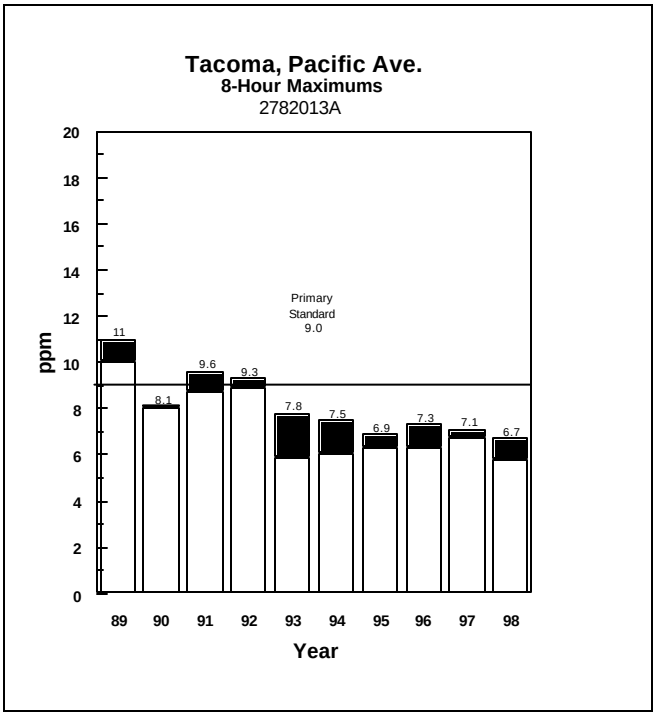


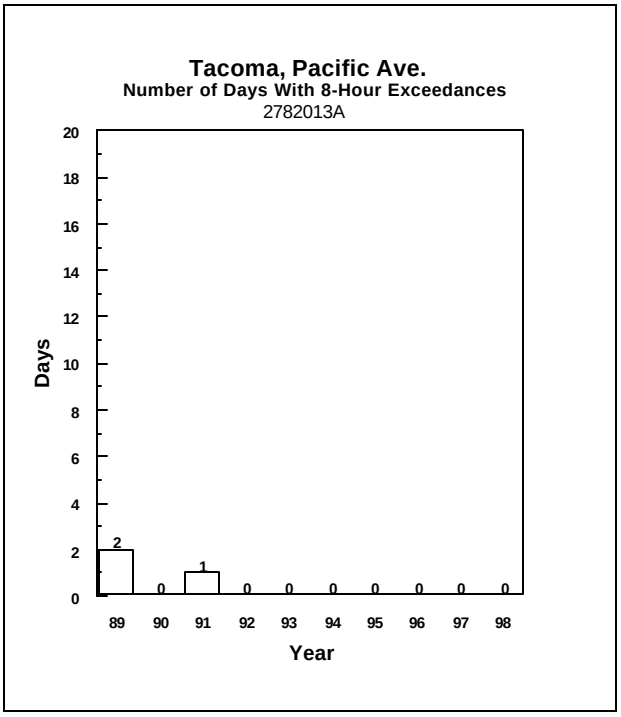


Carbon Monoxide

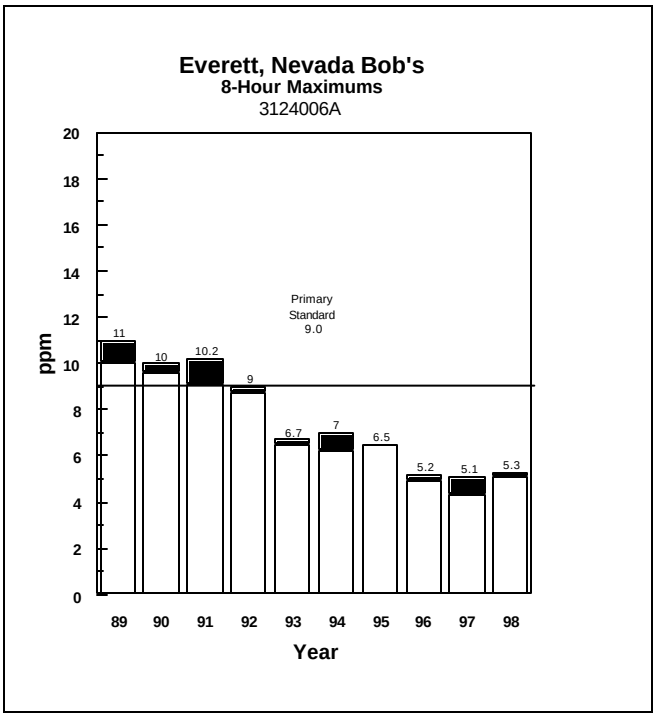


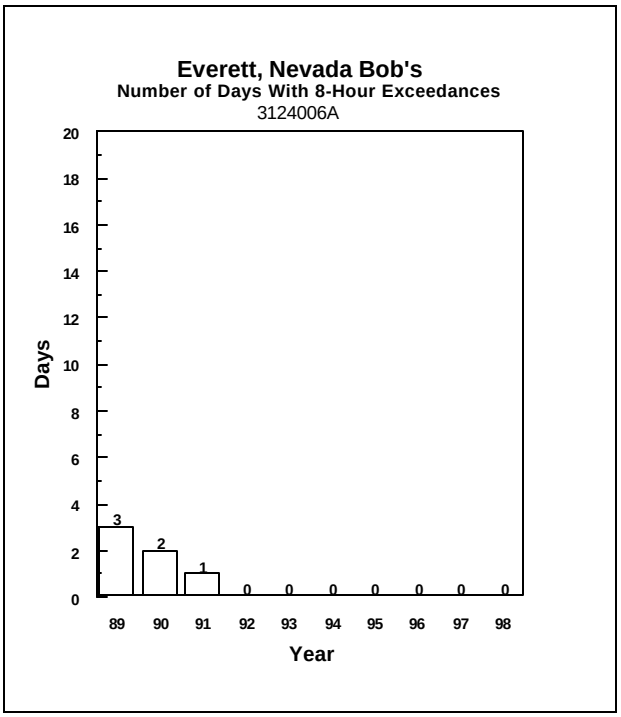


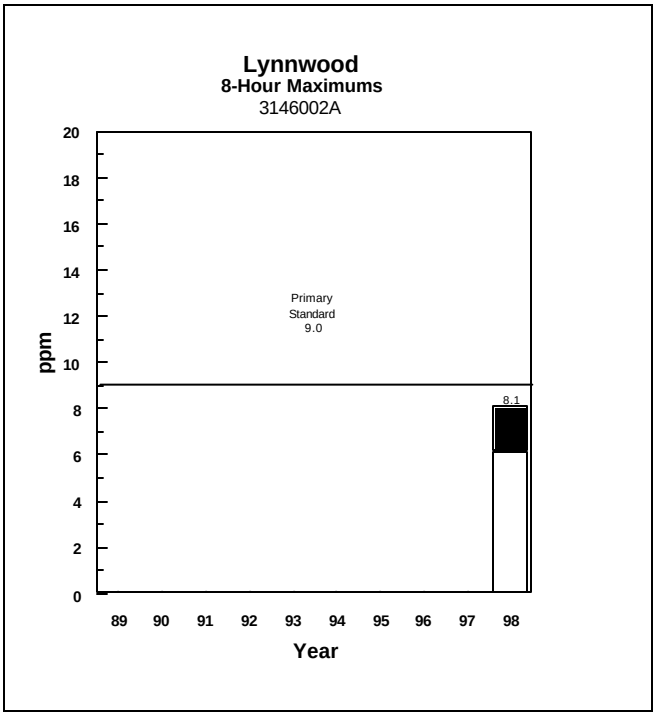


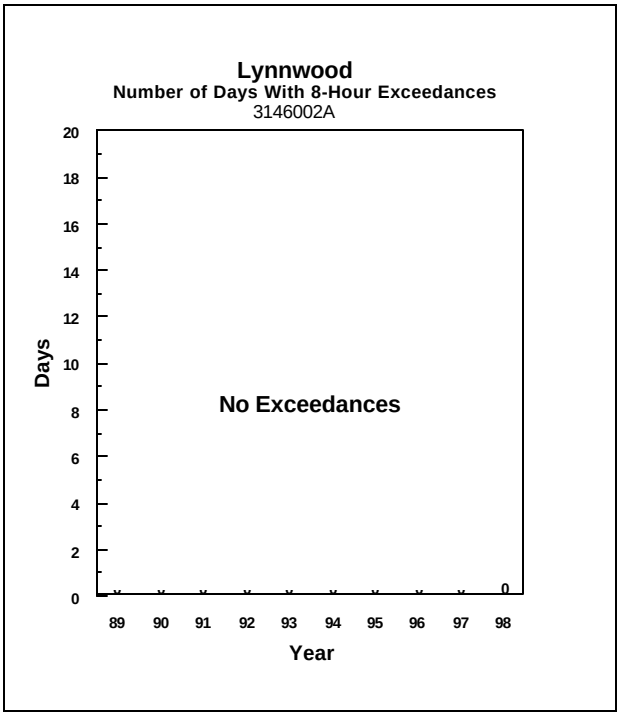


Carbon Monoxide









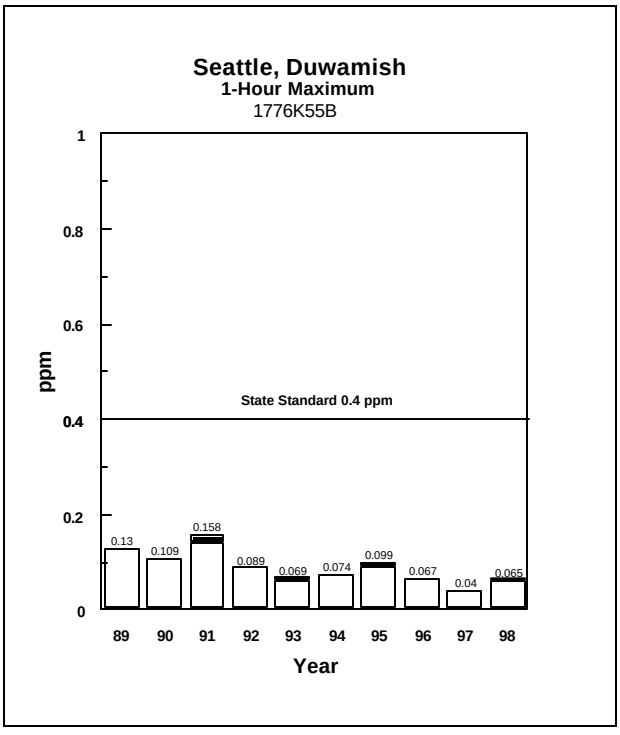
Sulfur Dioxide

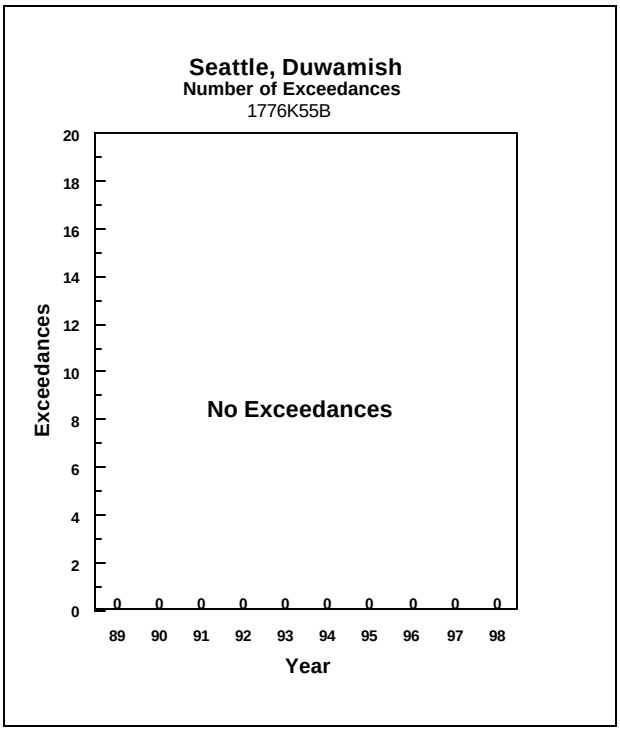
Sulfur Dioxide for 1998 (ppm)

Station	Location	1-Hour Maximum 1st	Date	2nd	Date	#1 Hr >.40	3-Hr Max Conc.	Date	#3 Hr >.50	24-Hr Max Conc.	Date	#24-Hour >.10	>.14	Ann. Mean
1776K55B	Seattle, Duwamish Trl.	.065	12/22	.062	07/08	0	.042	12/20	0	.018	12/22	0	0	.006
2782P16B	Tacoma, 54th Ave. N.E.	.087	10/21	.086	10/21	0	.080	10/19	0	.020	10/21	0	0	.005
2782P17B	Tacoma, Alexander Ave.	.185	07/22	.147	10/21	0	.090	07/20	0	.028	10/21	0	0	.006
3124S04B	Everett, Hoyt Ave.	.034	10/22	.031	08/13	0	.020	08/10	0	.025	10/21	0	0	.019

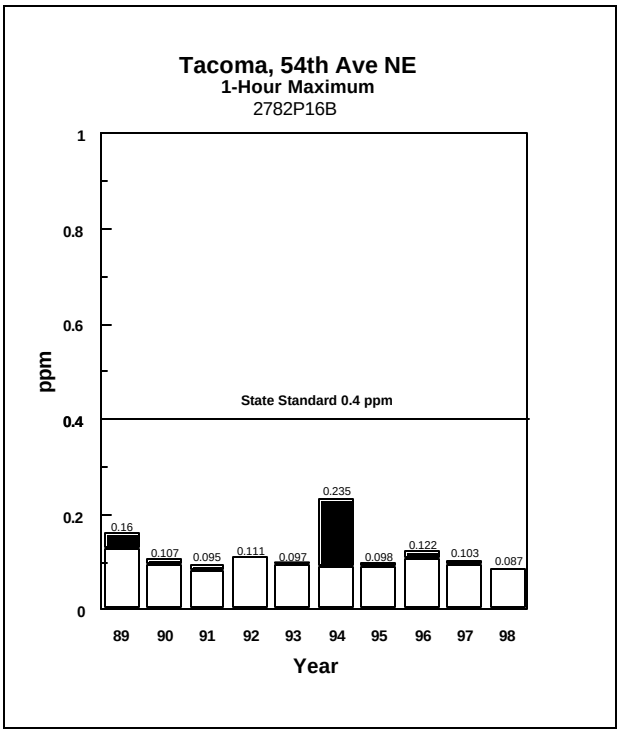
Sulfur Dioxide for 1998

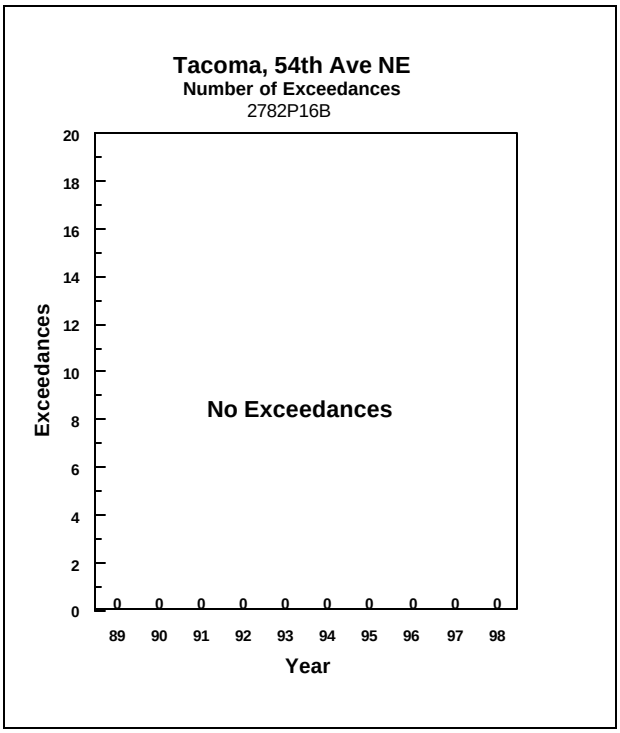
Station	Location	Period of Record	# Hours	# Days	% Valid Data
1776K55B	Seattle, Duwamish Trl.	Jan-Dec	8591	358	98
2782P16B	Tacoma, 54th Ave. N.E.	Jan-Dec	8109	338	93
2782P17B	Tacoma, Alexander Ave.	Jan-Dec	8067	336	92
3124S04B	Everett, Hoyt Ave.	Jan-Dec	8043	335	92

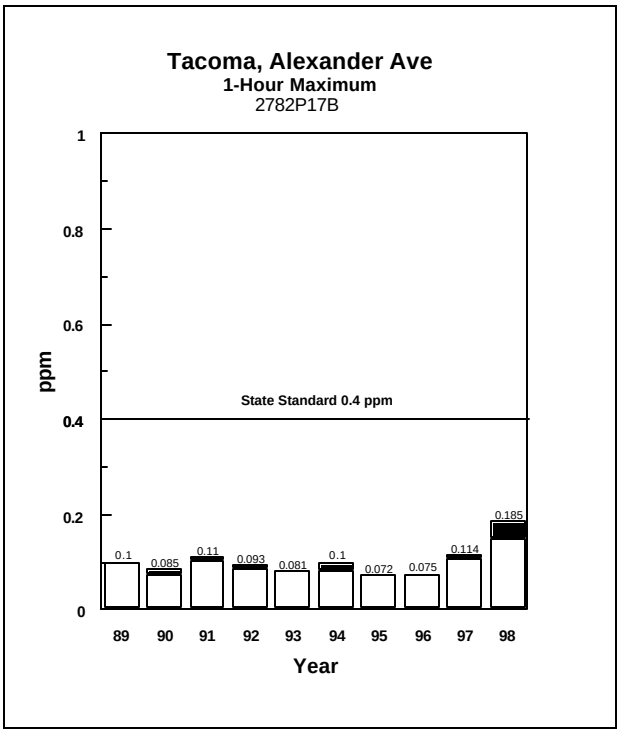


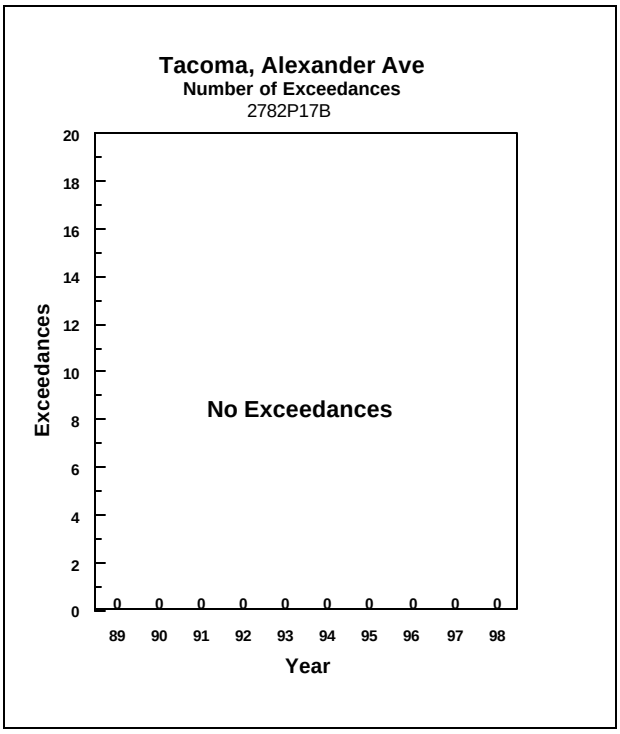


Sulfur Dioxide

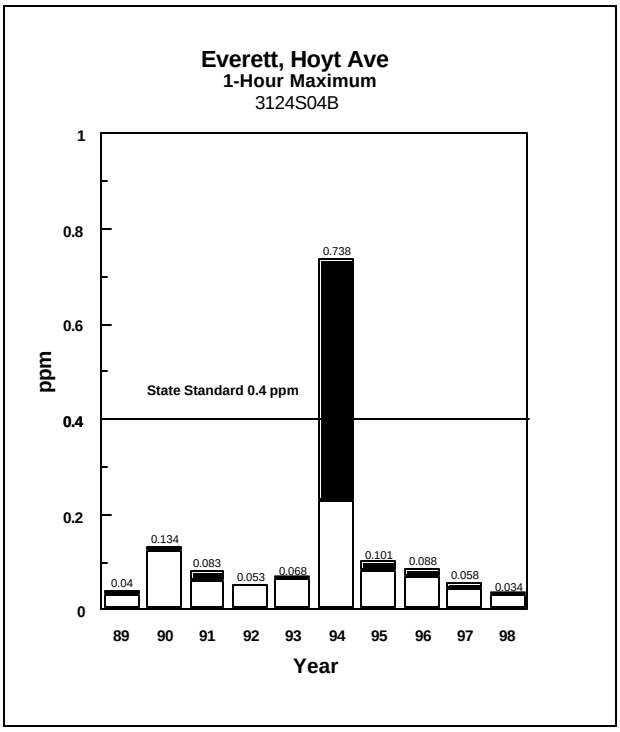


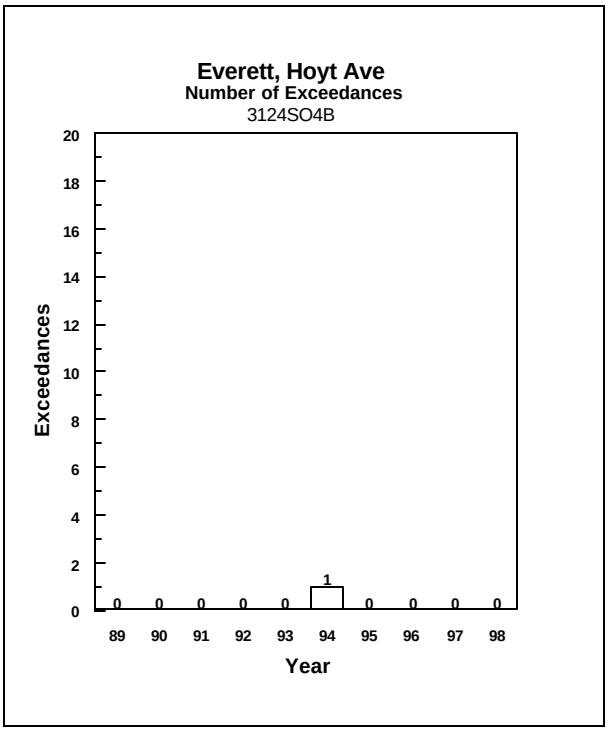






Sulfur Dioxide





Nitrogen Dioxide

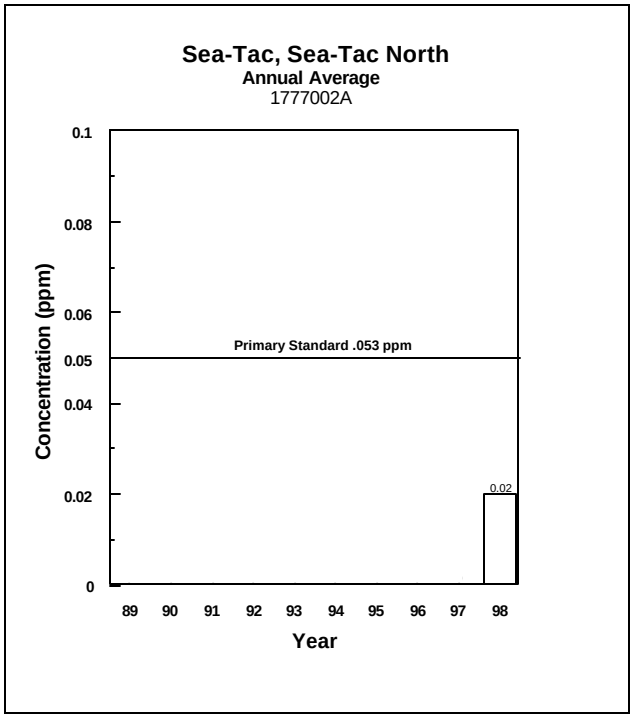
Nitrogen Dioxide for 1998 (ppm)

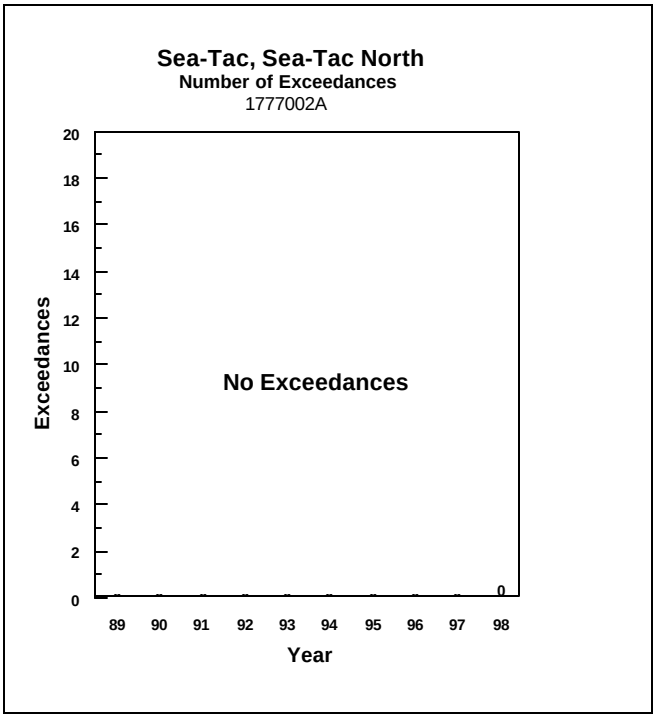
Station	Location	Max. 1-Hr	Date	Max. 24-Hr.	Date	Ann. Avg
1777002A	Sea-Tac, Sea-Tac North	.061	09/06	.041	10/21	.020*
1777003A	Sea-Tac,Tyee Valley Golf	.066	08/28	.035	07/27	.016*
1776029A	Seattle, Beacon Hill	.076	07/28	.042	02/19	.020*

* Average based on less than 12 months of data.

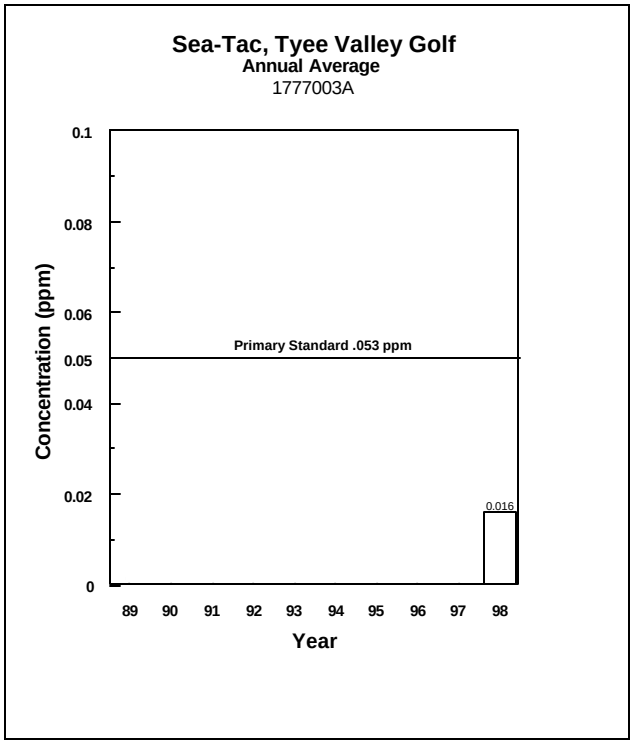
Nitrogen Dioxide for 1998

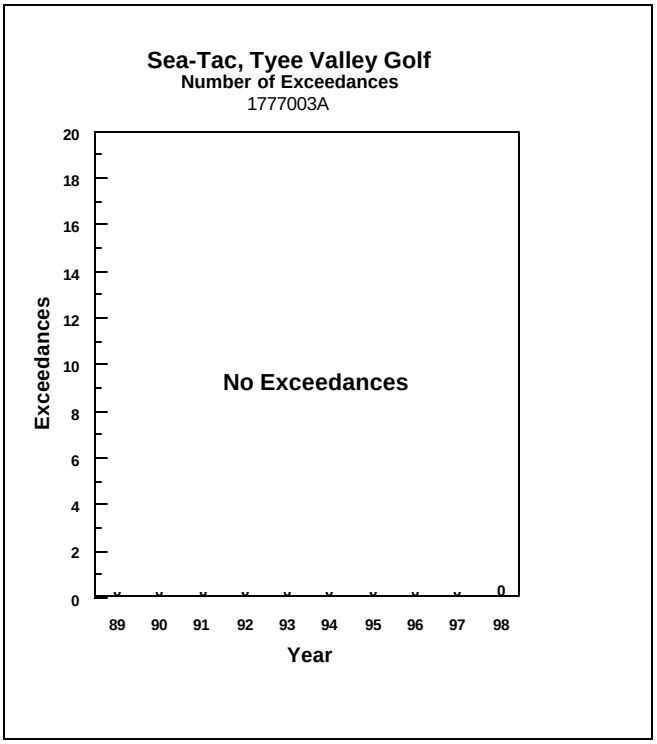
Station	Location	Period of Record	# Hours	# Days	% Valid Data
1777002A	Sea-Tac, Sea-Tac North	Jun-Dec	5871	245	92
1777003A	Sea-Tac, Tyee Valley Golf	Jun-Dec	4226	176	92
1776029A	Seattle, Beacon Hill	Apr-Oct	7995	333	91

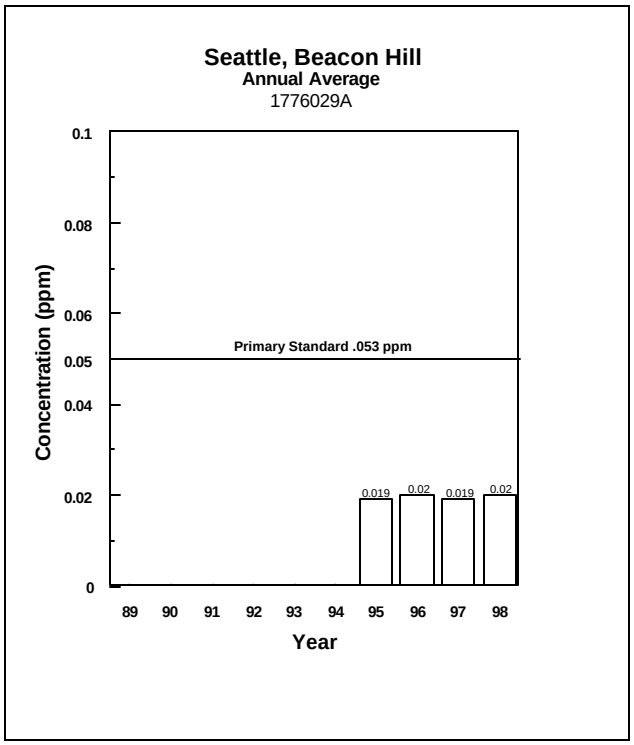


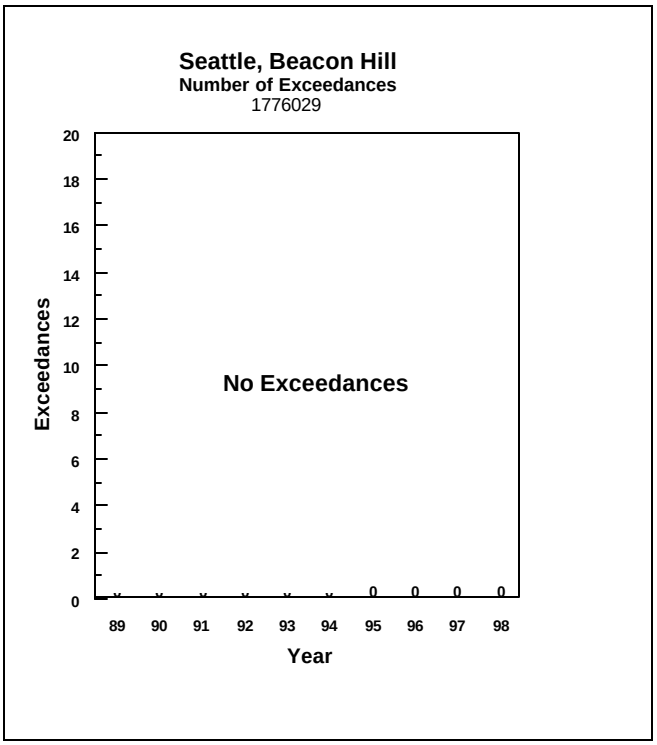


Nitrogen Dioxide









Ozone

8-Hour Ozone for 1998 (ppm)

Station	Location	1st High Conc.	1st High Date	4th High Conc.	4th High Date
1700002A	King Co., Lake Samm	.089	07/26	.063	08/02
1700004A	King Co., Enumclaw FS#3	.050	06/05	.047	04/30
1700007A	King Co., Enumclaw	.106	07/27	.100	07/26
1758001A	King Co., North Bend	.078	08/02	.073	08/30
1758002A	King Co., Mud Mountain	.111	07/28	.086	08/03
1776029A	Seattle, Beacon Hill	.049	04/30	.042	09/15
2700007A	Pierce Co., Pack Forest	.108	07/28	.086	09/01
2700016A	Pierce Co., Rainier #2	.063	04/29	.061	04/21
2700017A	Pierce Co., Rainier #3	.083	08/30	.070	07/26

1-Hour Ozone for 1998 (ppm)

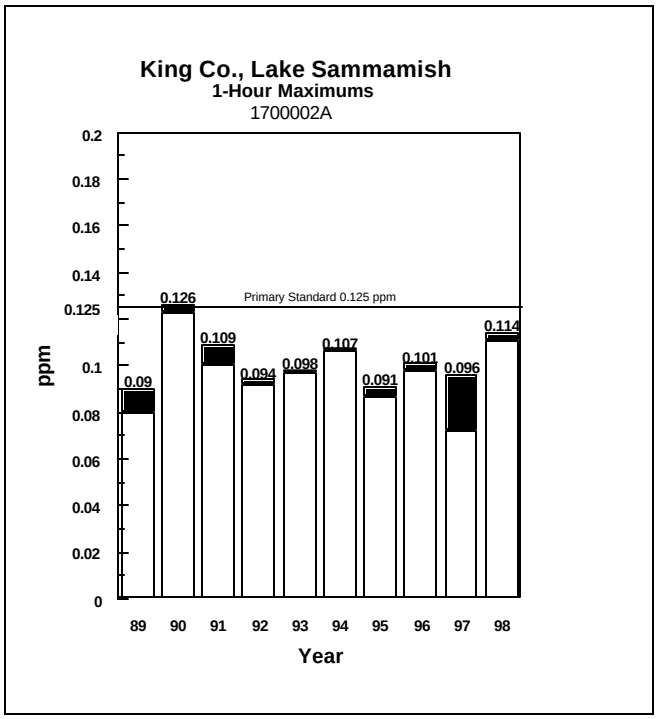
Station	Location	1-Hour Maximums 1ST High Conc.	1ST High Date	2nd High Conc.	2nd High Date	2nd Day High* Conc.	2nd Day High* Date	Exc. Days
1700002A	King Co., Lake Samm	.114	07/28	.111	07/26	.111	07/26	0
1700004A	King Co., Enumclaw FS#3	.062	06/06	.061	05/01	.061	05/01	0
1700007A	King Co., Enumclaw	.133	07/28	.128	07/27	.128	07/27	2
1758001A	King Co., North Bend	.101	07/27	.094	08/31	.094	08/31	0
1758002A	King Co., Mud Mountain	.135	07/28	.135	07/27	.135	07/27	2
1776029A	Seattle, Beacon Hill	.059	07/29	.055	05/05	.055	05/05	0
2700007A	Pierce Co., Pack Forest	.140	07/27	.139	07/27	.126	07/26	2
2700016A	Pierce Co., Rainier #2	.065	04/21	.065	04/08	.065	04/08	0
2700017A	Pierce Co., Rainier #3	.098	09/01	.092	07/27	.092	07/27	0

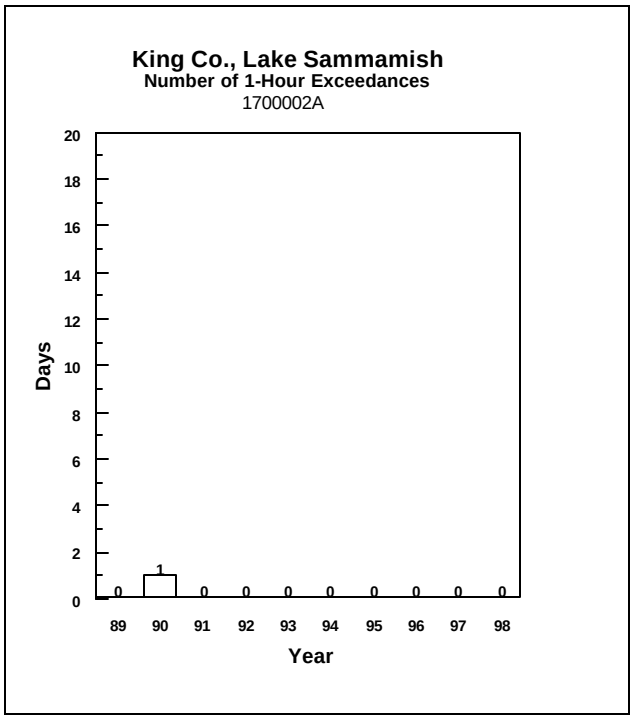
* 2nd Day High = Second day with the highest 1-hour average.

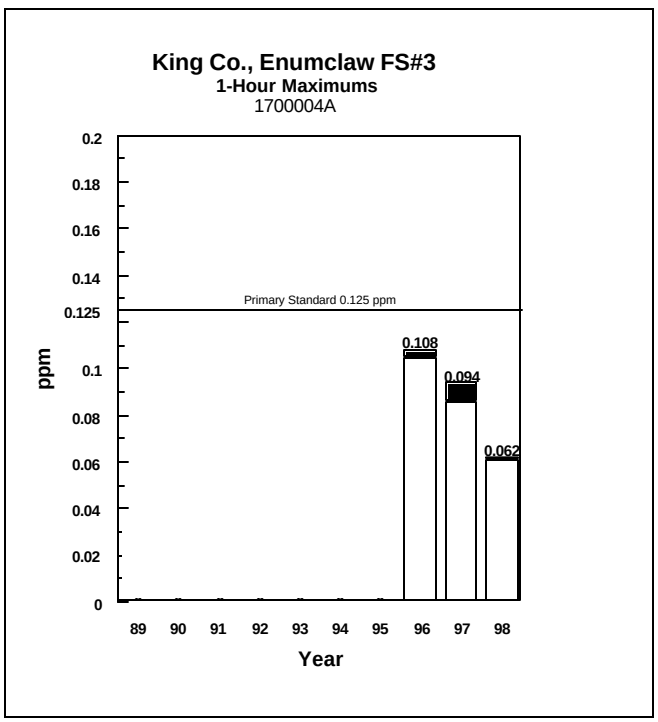
Ozone for 1998

Station	Location	Period of Record	# Hours	# Days	% Valid Data
1700002A	King Co., Lake Samm	Apr-Oct	5039	210	98
1700004A	King Co., Enumclaw FS#3	Apr-Oct	1724	72	99
1700007A	King Co., Enumclaw	Apr-Oct	4974	207	97
1758001A	King Co., North Bend	Jun-Oct	3584	149	99
1758002A	King Co., Mud Mountain	Jul-Oct	2748	115	99
1776029A	Seattle, Beacon Hill	Apr-Oct	5057	211	99
2700007A	Pierce Co., Pack Forest	Apr-Oct	5039	210	98
2700016A	Pierce Co., Rainier #2	Apr-Jul	4156	173	92
2700017A	Pierce Co., Rainier #3	Jul-Dec	3039	127	74

Ozone

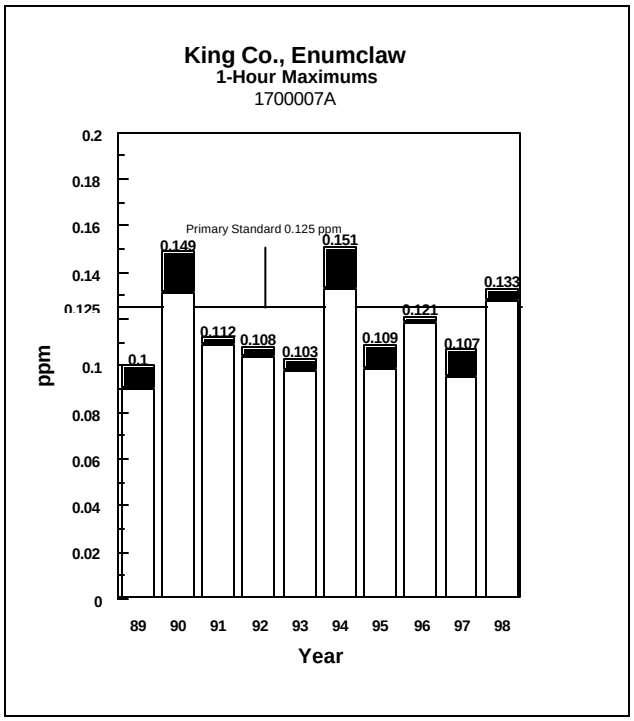

King Co., Lake Sammamish
1-Hour Maximums
1700002A
ppm
Primary Standard 0.125 ppm
0.09
0.126
0.109
0.094
0.098
0.107
0.091
0.101
0.096
0.114
Year


King Co., Lake Sammamish
Number of 1-Hour Exceedances
1700002A
Days
Year


King Co., Enumclaw FS#3
1-Hour Maximums
1700004A
ppm
Primary Standard 0.125 ppm
0.108
0.094
0.062
Year


King Co., Enumclaw FS#3
Number of 1-Hour Exceedances
1700004A
Days
No Exceedances
Year

Ozone


King Co., Enumclaw
1-Hour Maximums
1700007A
ppm
Primary Standard 0.125 ppm
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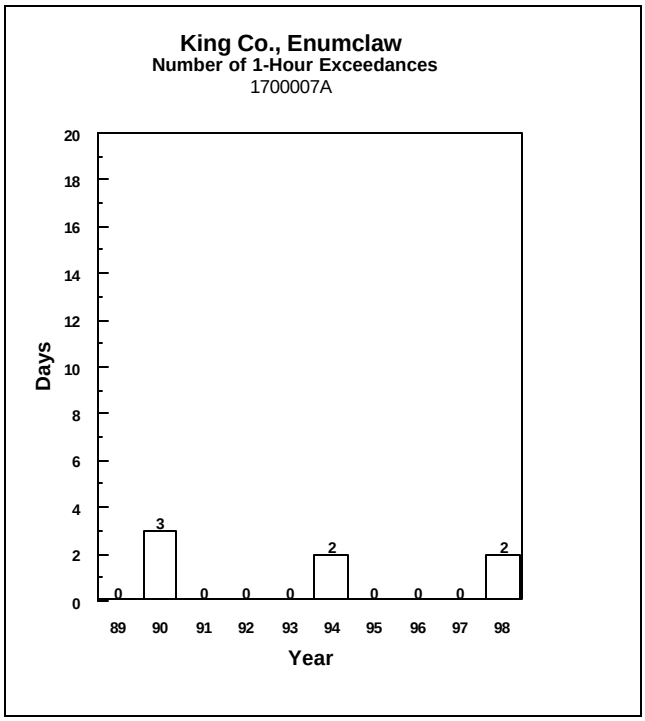
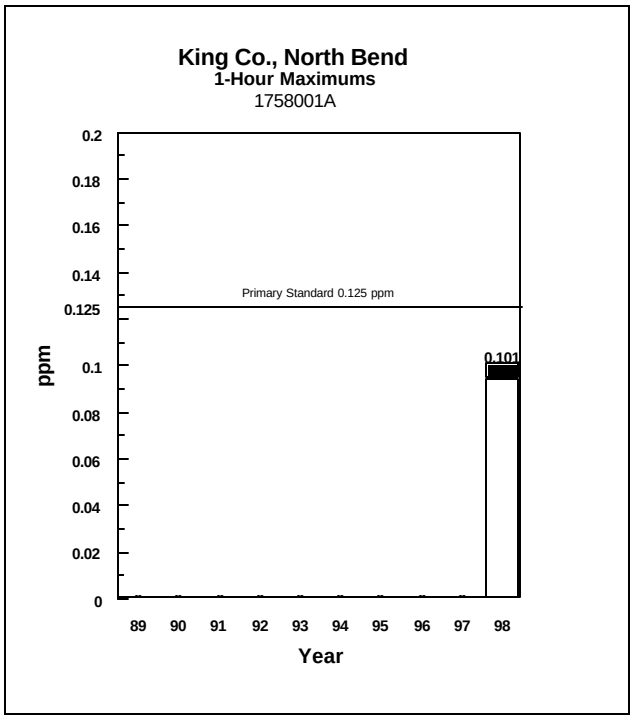
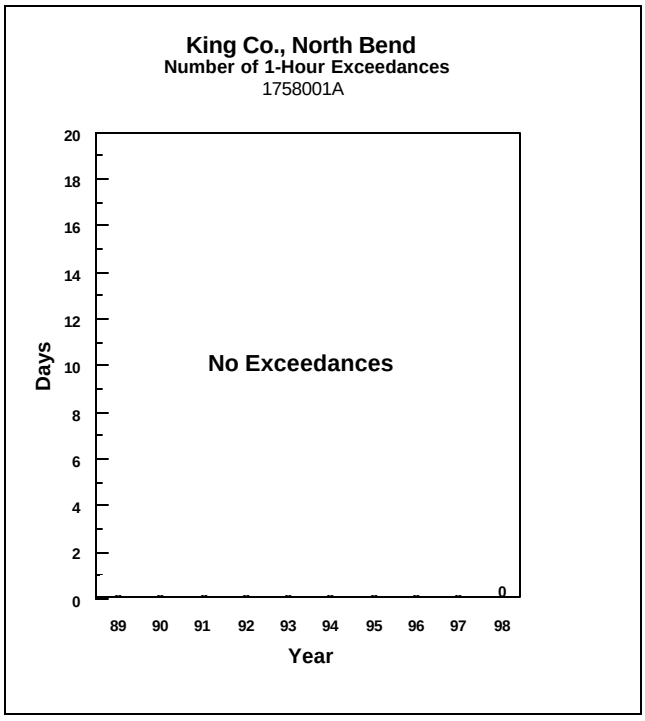
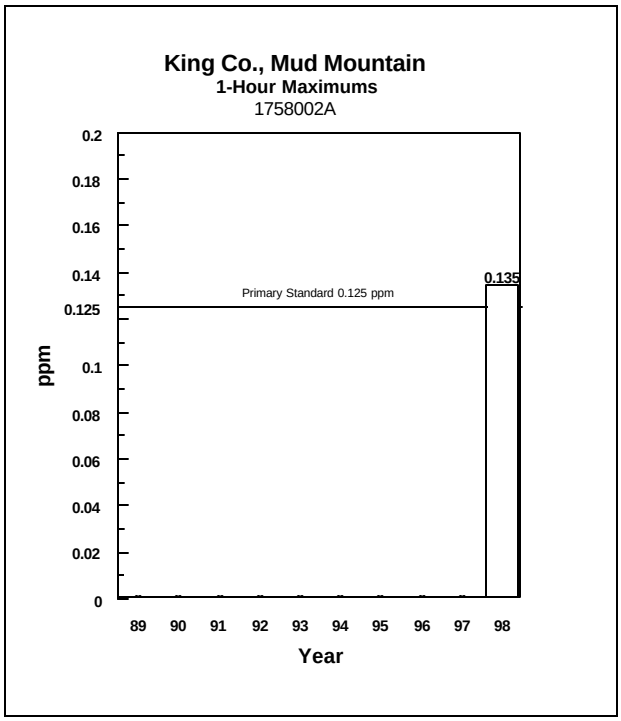
0.149
0.112
0.108
0.103
0.151
0.109
0.121
0.107
0.133
Year

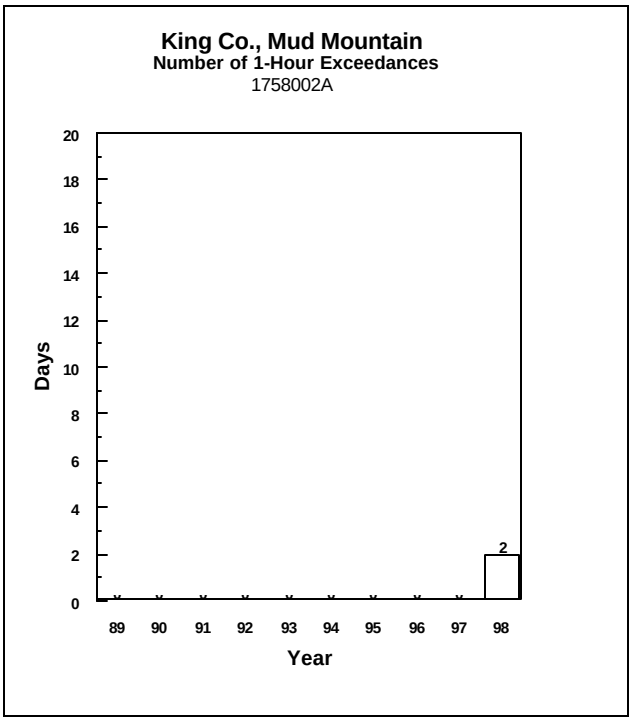

King Co., Enumclaw
Number of 1-Hour Exceedances
1700007A
Days
0
3
0
0
0
2
0
0
0
2
Year

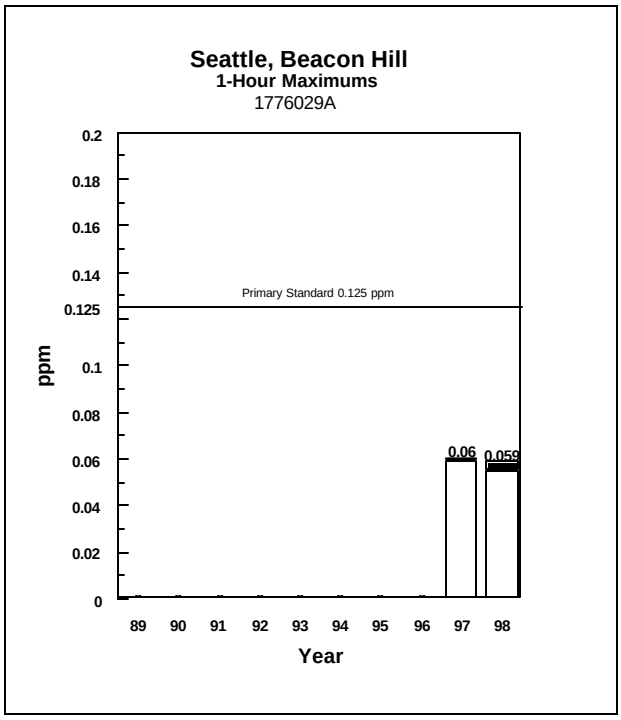

King Co., North Bend
1-Hour Maximums
1758001A
ppm
Primary Standard 0.125 ppm
0.101
Year

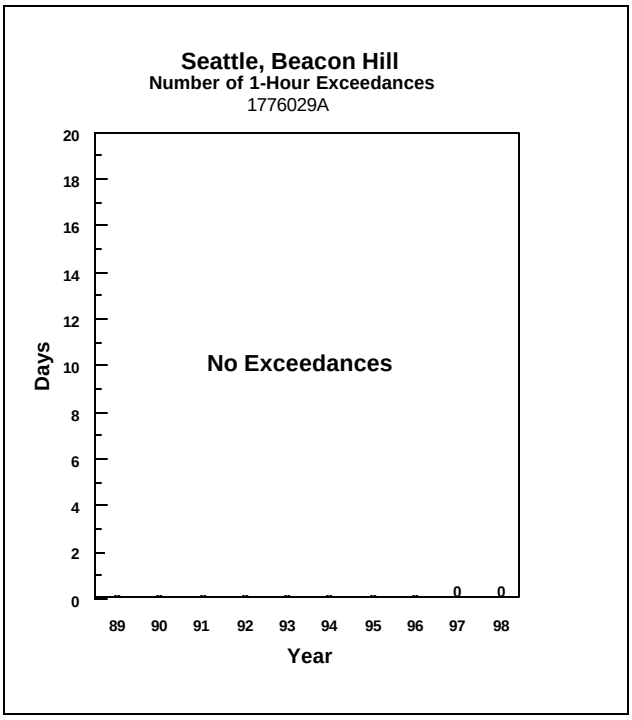

King Co., North Bend
Number of 1-Hour Exceedances
1758001A
Days
No Exceedances
0
Year

Ozone

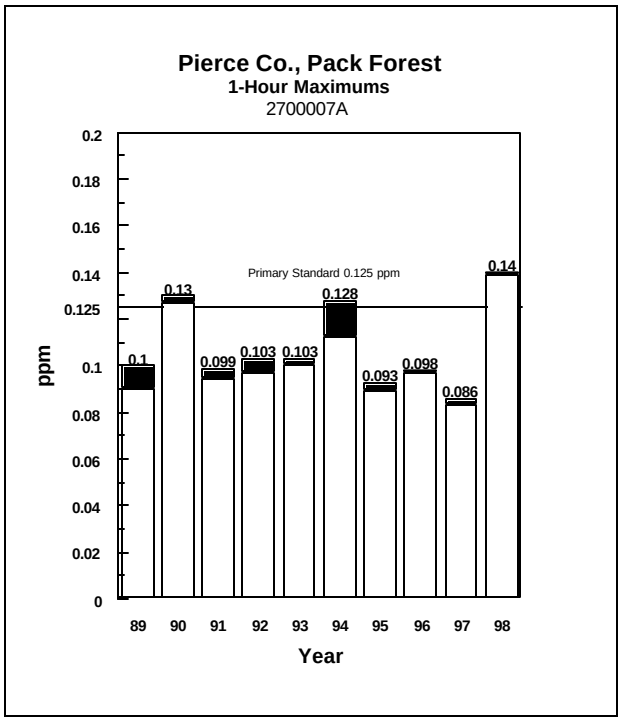

King Co., Mud Mountain
1-Hour Maximums
1758002A
ppm
Primary Standard 0.125 ppm
0.135
0.2
0.18
0.16
0.14
0.125
0.1
0.08
0.06
0.04
0.02
0
89 90 91 92 93 94 95 96 97 98
Year

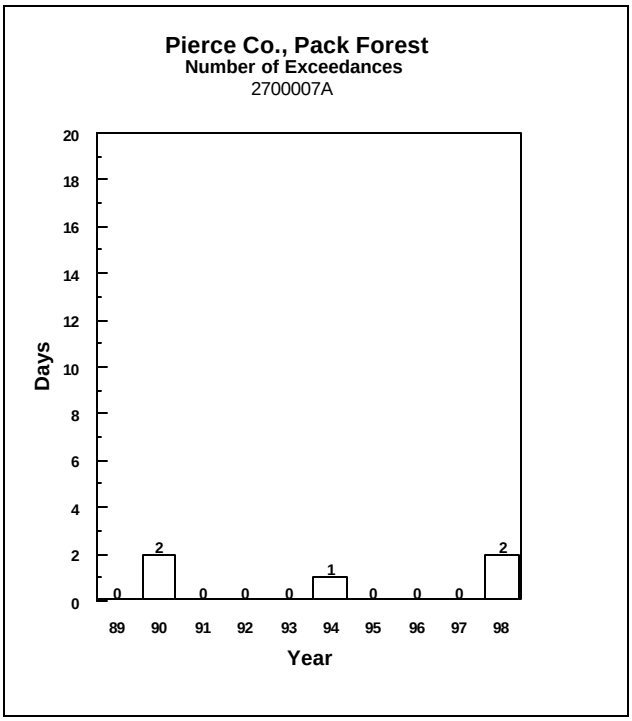

King Co., Mud Mountain
Number of 1-Hour Exceedances
1758002A
Days
2
20
18
16
14
12
10
8
6
4
2
0
89 90 91 92 93 94 95 96 97 98
Year

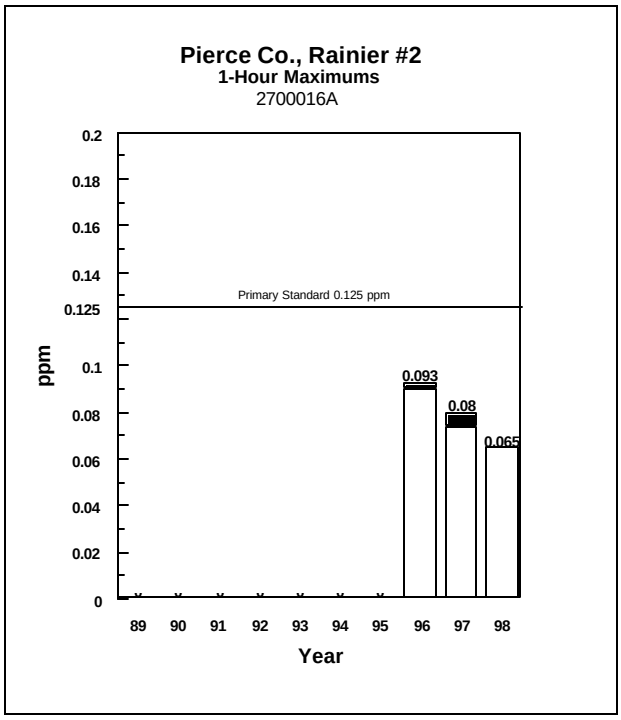

Seattle, Beacon Hill
1-Hour Maximums
1776029A
ppm
Primary Standard 0.125 ppm
0.06
0.059
0.2
0.18
0.16
0.14
0.125
0.1
0.08
0.06
0.04
0.02
0
89 90 91 92 93 94 95 96 97 98
Year

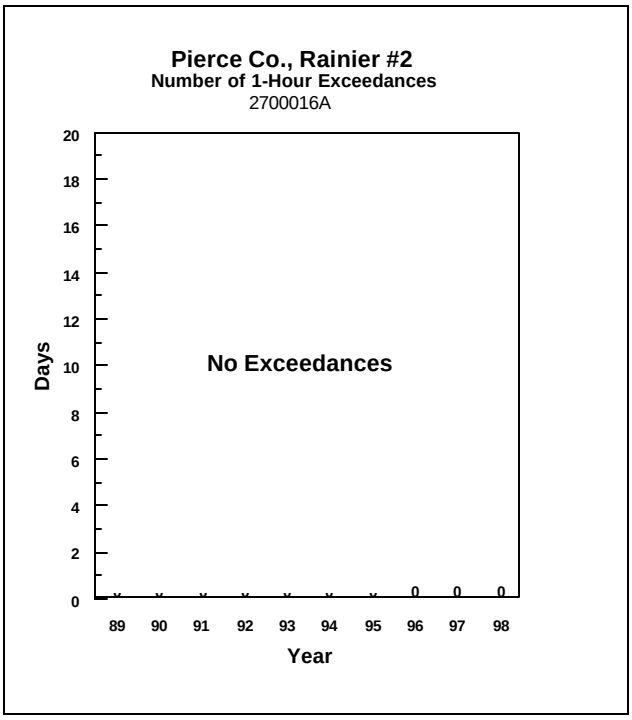

Seattle, Beacon Hill
Number of 1-Hour Exceedances
1776029A
Days
No Exceedances
0
0
20
18
16
14
12
10
8
6
4
2
0
89 90 91 92 93 94 95 96 97 98
Year

Ozone

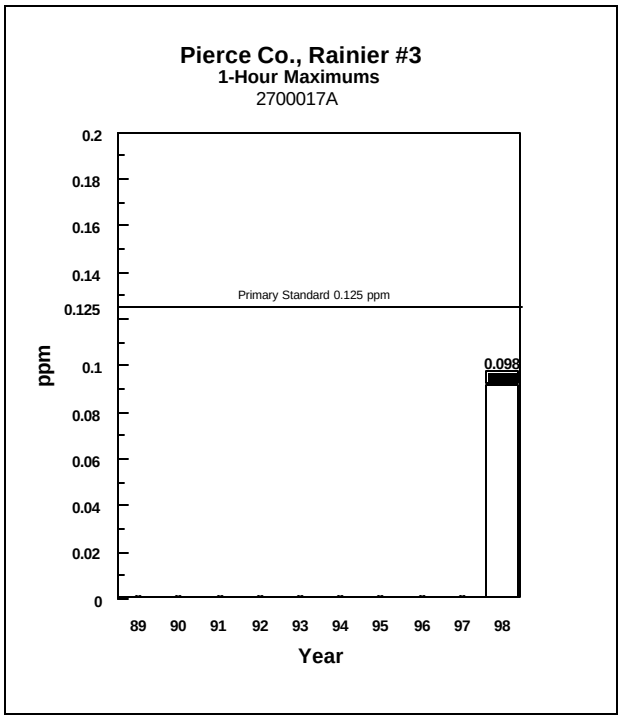

Pierce Co., Pack Forest
1-Hour Maximums
2700007A
ppm
Primary Standard 0.125 ppm
0.1
0.13
0.099
0.103
0.103
0.128
0.093
0.098
0.086
0.14
Year

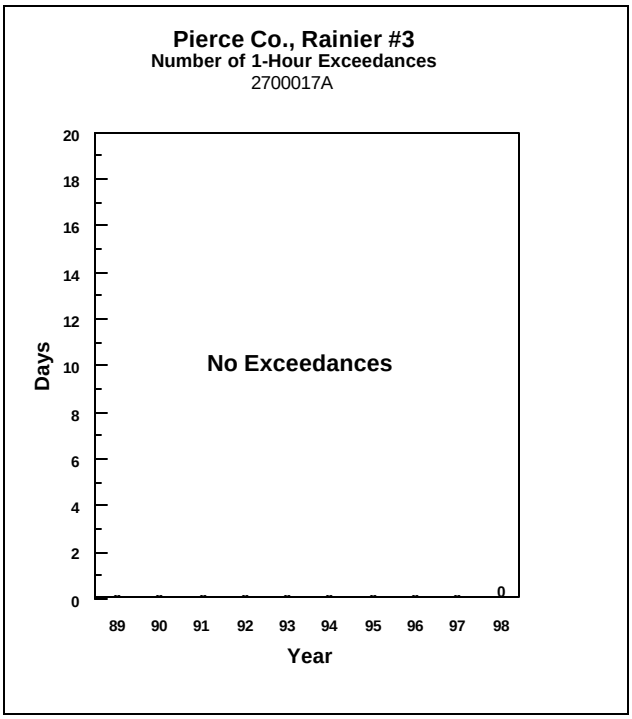

Pierce Co., Pack Forest
Number of Exceedances
2700007A
Days
0
2
0
0
0
1
0
0
0
2
Year


Pierce Co., Rainier #2
1-Hour Maximums
2700016A
ppm
Primary Standard 0.125 ppm
0.093
0.08
0.065
Year


Pierce Co., Rainier #2
Number of 1-Hour Exceedances
2700016A
Days
No Exceedances
Year

Ozone


Pierce Co., Rainier #3
1-Hour Maximums
2700017A
ppm
0.2
0.18
0.16
0.14
0.125
0.1
0.08
0.06
0.04
0.02
0
Primary Standard 0.125 ppm
0.098
89
90
91
92
93
94
95
96
97
98
Year


Pierce Co., Rainier #3
Number of 1-Hour Exceedances
2700017A
Days
20
18
16
14
12
10
8
6
4
2
0
No Exceedances
0
89
90
91
92
93
94
95
96
97
98
Year

Particulate Matter

PM_{10} Annual Arithmetic Means ($\mu g/m^3$)

Station	Location	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
0688012D	Vanc Moose Lodge		24*	25	23	22	22	17	17	19	14
0688014D	Vanc. Wa. Elem. Sch.			37*	22	22	20	16	16	18	15*
0844004D	Lonview, City Shops	30	26	27	24	25	22	22	20	23*	19

*Average based on less than 12 months of data.

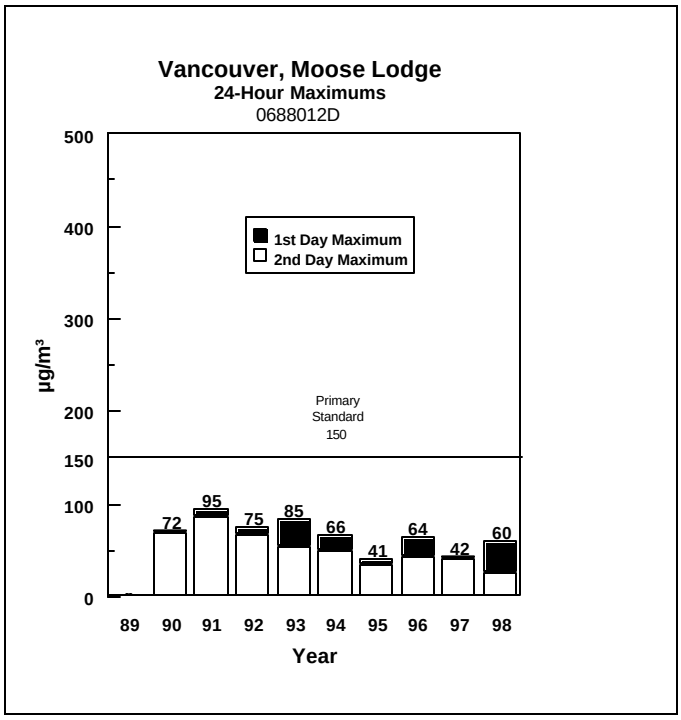
PM_{10} for 1998 ($\mu g/m^3$)

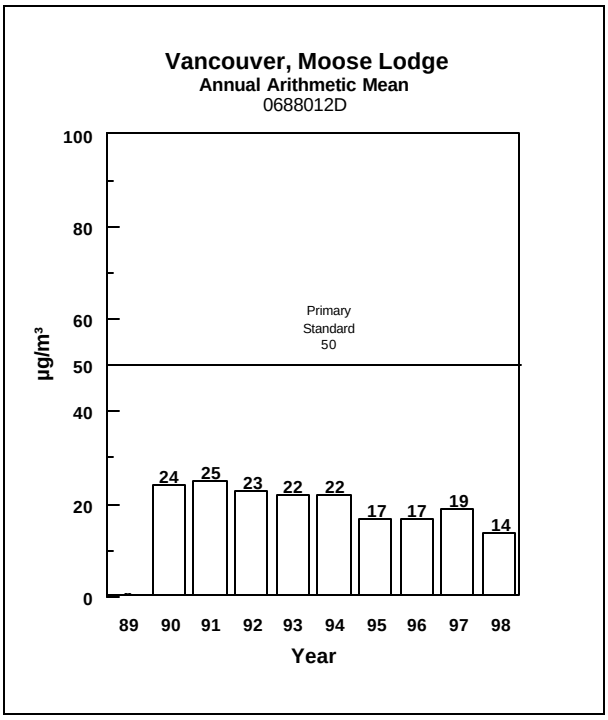
Station	Location	1st high Conc.	Date	2nd High Conc.	Date
0688012D	Vanc. Moose Lodge	60	4/29	26	7/28
0688014D	Vanc. Wa. Elem. Sch.	56	4/29	35	3/06
0844004D	Longview, City Shops	59	4/29	45	3/12

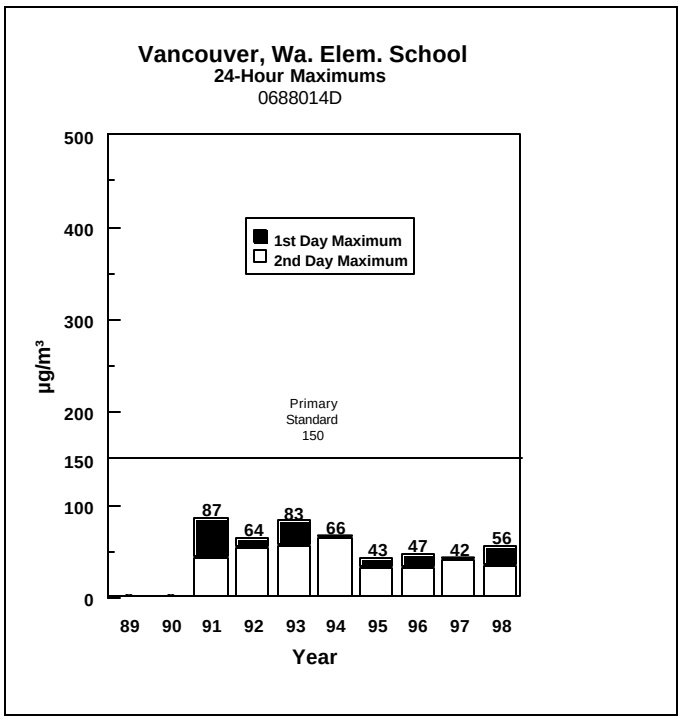
PM_{10} for 1998

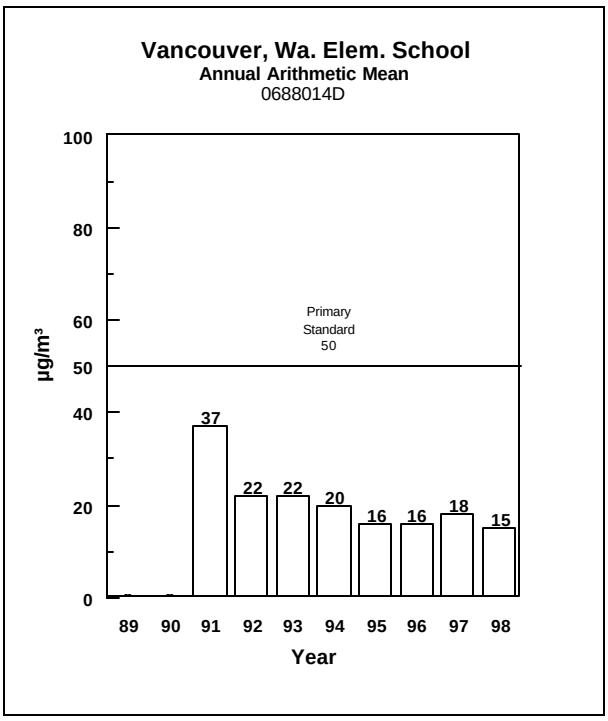
Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
0688012D	Vanc. Moose Lodge	Jan-Dec	1/6	61	100
0688014D	Vanc. Wa. Elem. Sch.	Jan-Sep	1/6	42	100
0844004D	Longview, City Shops	Jan-Dec	1/6	61	100

Particulate Matter

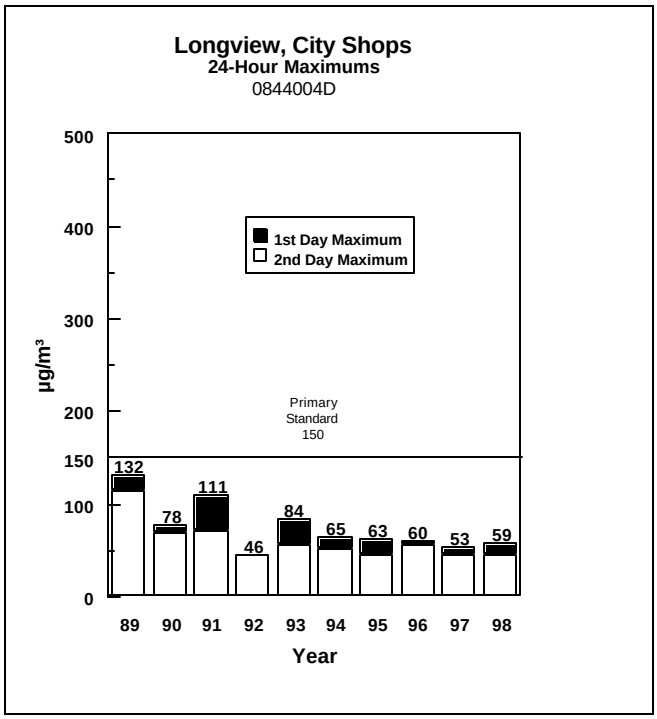


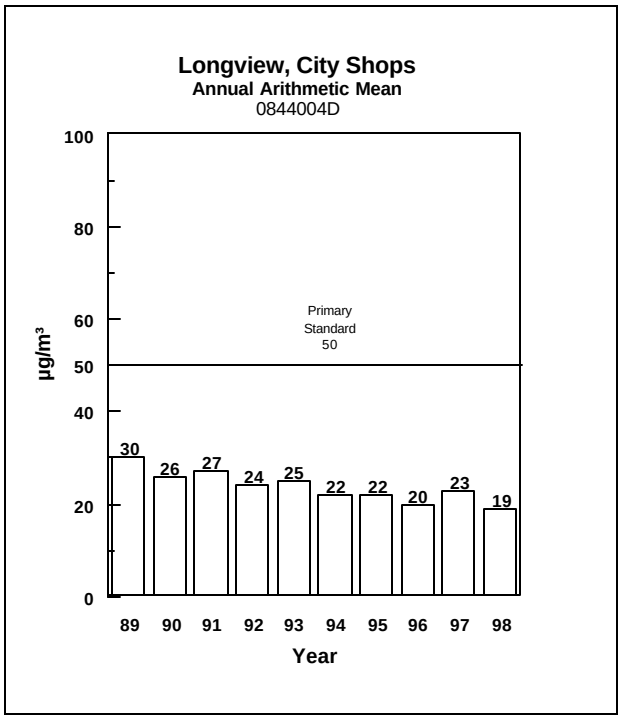






Particulate Matter





Carbon Monoxide

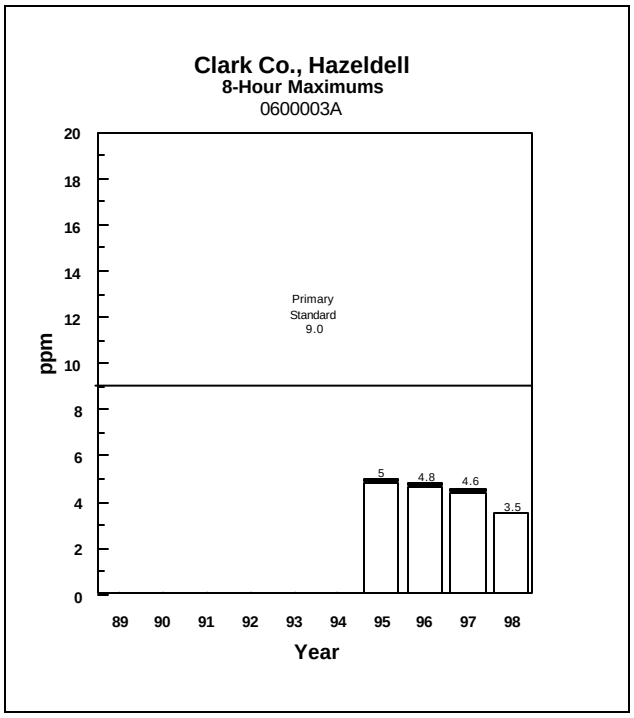
Carbon Monoxide for 1998 (ppm)

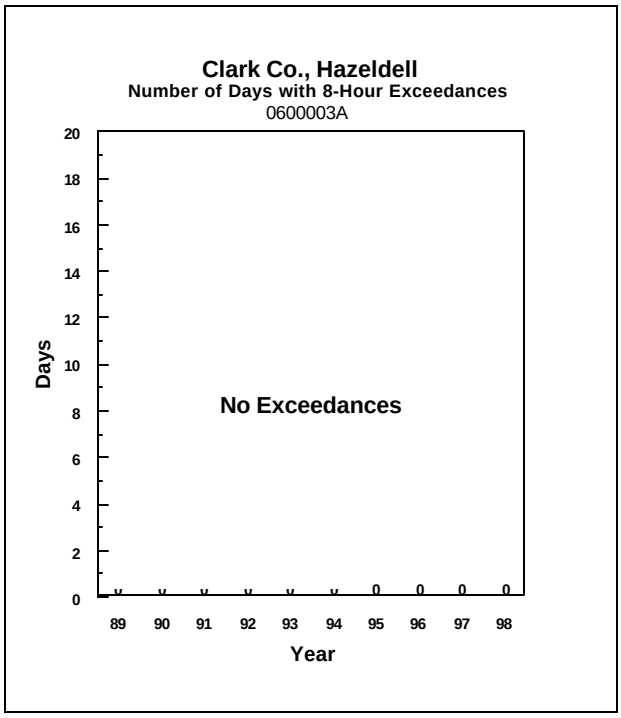
Station	Location	1-Hour Maximums 1st High Conc.	1st High Date	2nd High Conc.	2nd High Date	8-Hour Maximum 1st High Conc.	1st High Date	2nd High * Conc.	2nd High * Date	2nd Day High 8-Hr. Conc.	2nd Day High 8-Hr. Date	Exc
0600003A	Clark Co., Hazel Dell	5.1	11/30	5.0	1/2	3.5	01/10	3.5	01/9	3.5	01/9	0
0688011A	Vancouver, Atlas & Cox	8.7	10/23	7.6	1/7	5.7	10/23	5.5	01/7	5.5	01/7	0

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

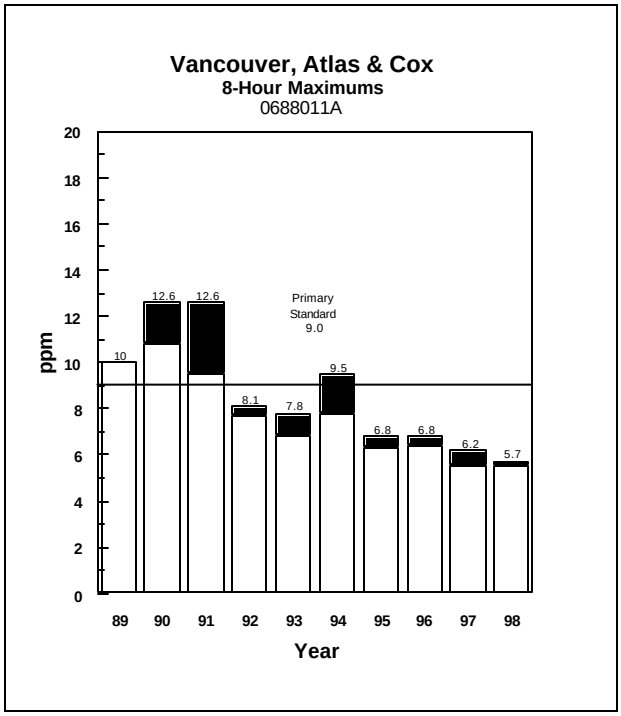
Carbon Monoxide for 1998 (ppm)

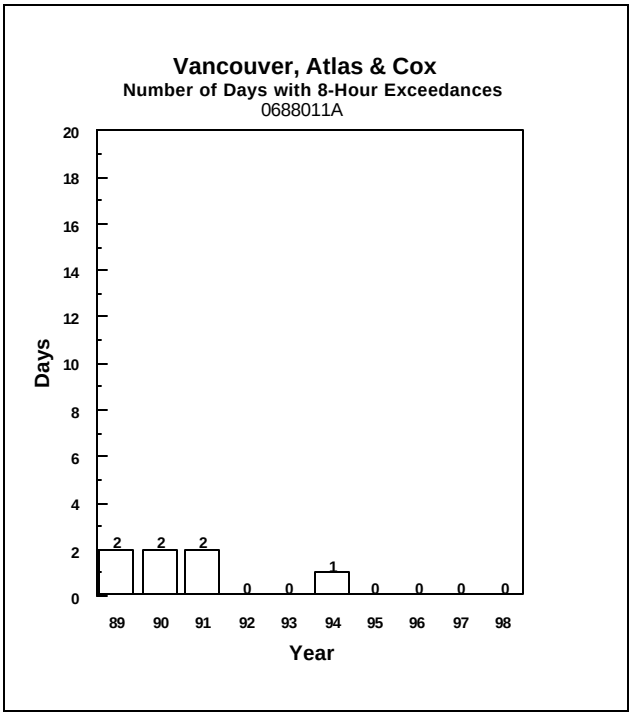
Station	Location	Period of Record	# Hours	# Days	%Valid Data
0600003A	Clark Co., Hazel Dell	Jan-Dec	8701	363	99
0688011A	Vancouver, Atlas & Cox	Jan-Dec	8159	340	93





Carbon Monoxide





Nitrogen Dioxide

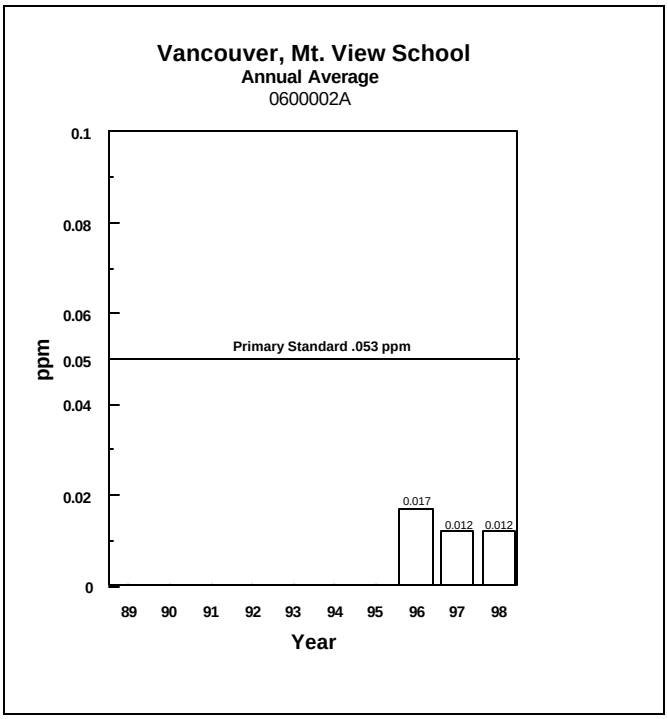
Nitrogen Dioxide for 1998 (ppm)

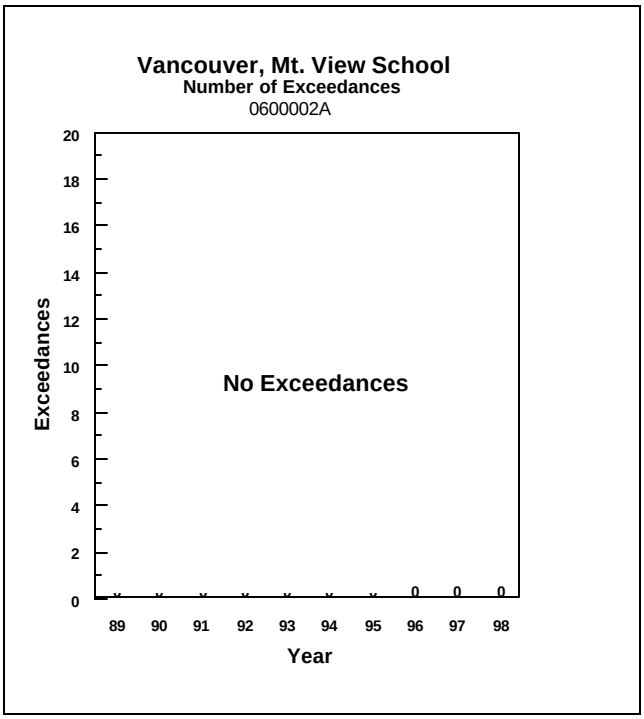
Station	Location	Max. 1-Hr	Date	Max. 24-Hr	Date	Ann. Avg.
0600002A	Vancouver, Mt. View School	.055	09/15	.028	04/29	.012
0800003A	Castle Rock	.032	10/16	.017	10/20	.005
0800004A	Woodland	.036	10/22	.019	10/22	.007

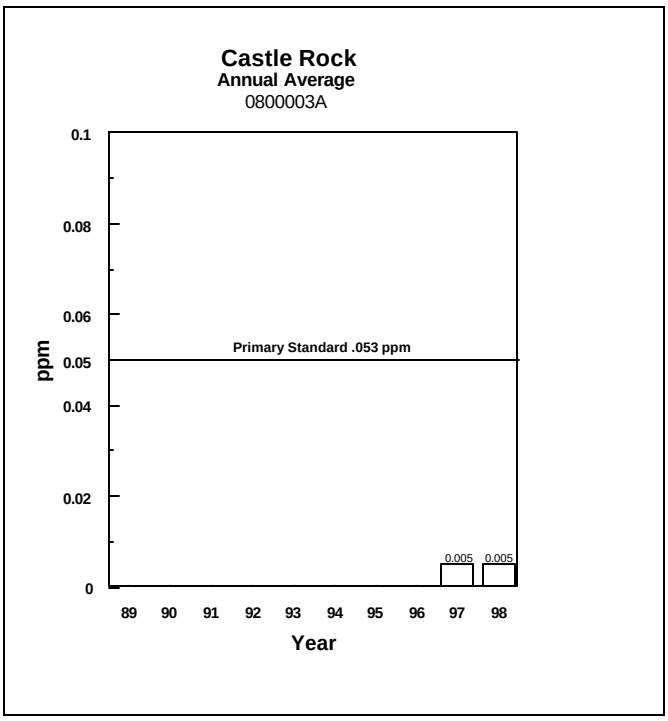
Nitrogen Dioxide for 1998

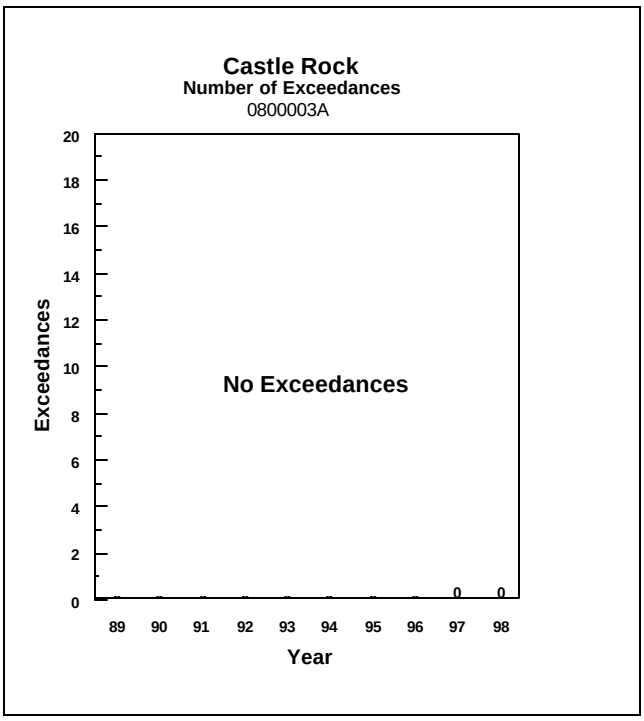
Station	Location	Period of Record	# Hours	# Days	% Valid Data
0600002A	Vancouver, Mt. View School	Apr-Oct	5856	244	95
0800003A	Castle Rock	Apr-Oct	4629	193	90
0800004A	Woodland	Apr-Oct	4197	175	93

Nitrogen Dioxide

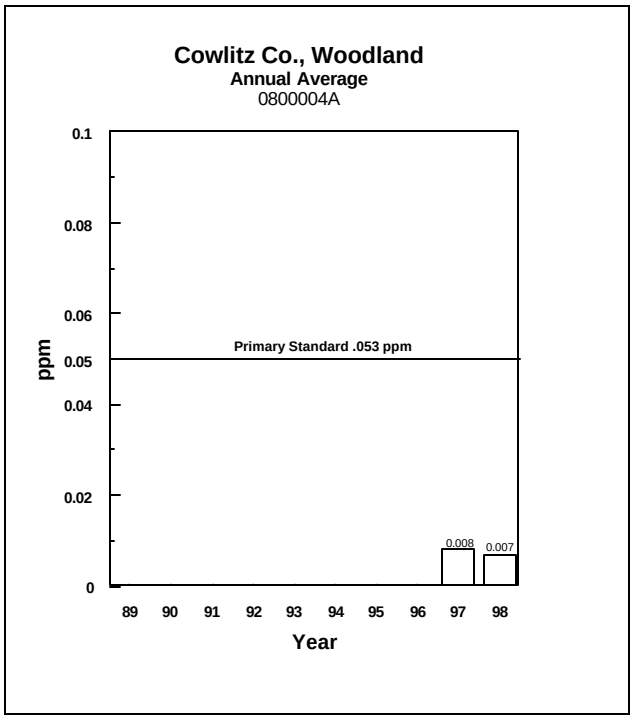


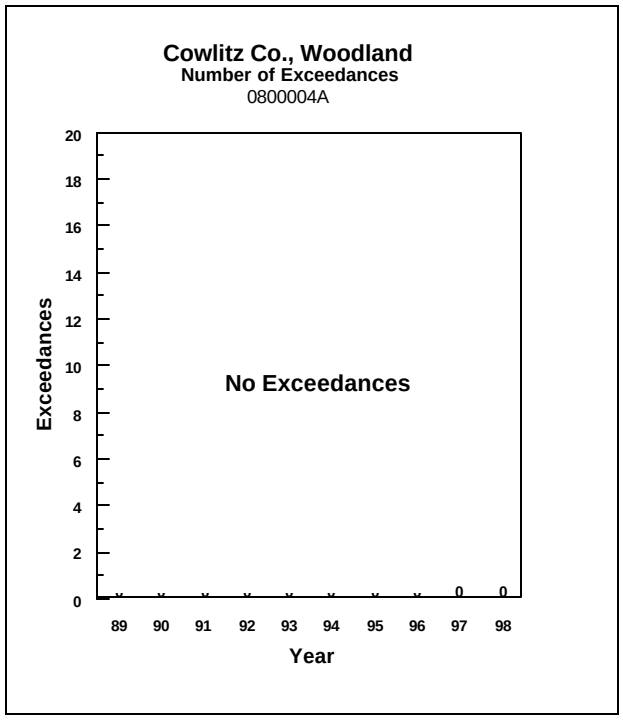






Nitrogen Dioxide





Ozone

8-Hour Ozone for 1998 (ppm)

		8-Hour Maximums			
		1st High		4th High	
Station	Locations	Conc.	Date	Conc.	Date
0600002A	Vancouver, Mt. View School	.078	7/26	.070	8/27
0600005A	Hockinson	.083	7/26	.070	7/25
0800003A	Castle Rock	.077	7/26	.070	8/03
0800004A	Woodland	.089	7/27	.074	8/27
2100006A	Lewis Co. Packwood Lake	.063	8/31	.057	8/03

1-Hour Ozone for 1998 (ppm)

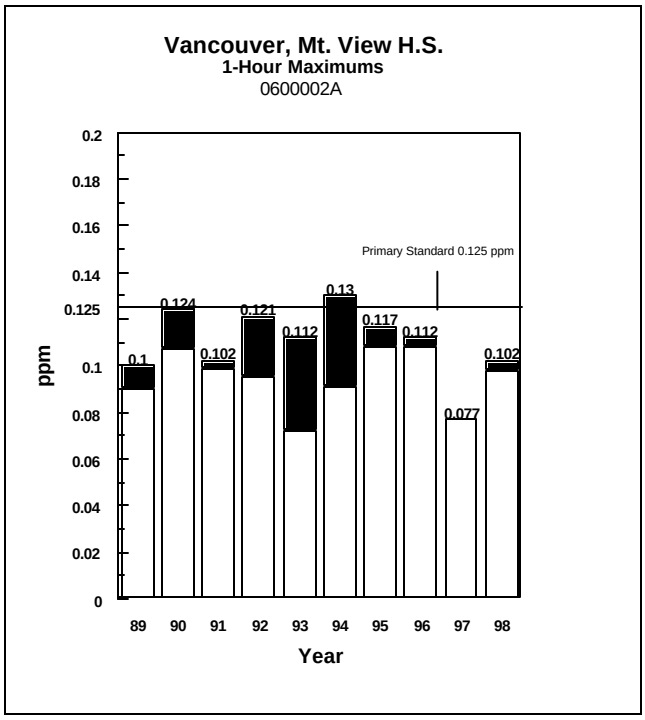
		1-Hour Maximums					
		1st High		2nd High		2nd Day High*	
Station	Locations	Conc.	Date	Conc.	Date	Conc.	Date
0600002A	Vancouver, Mt. View School	.102	7/27	.098	7/27	.092	8/28
0600005A	Hockinson	.101	7/27	.097	7/28	.097	7/28
0800003A	Castle Rock	.098	7/26	.096	7/26	.094	8/04
0800004A	Woodland	.103	7/27	.102	7/27	.081	8/31
2100006A	Lewis Co. Packwood Lake	.073	9/01	.068	9/01	.065	8/05

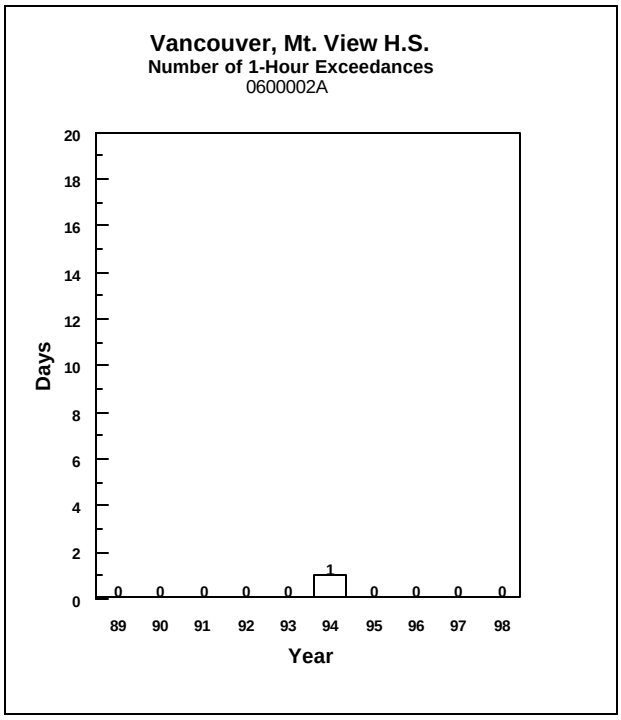
* 2nd Day High – Second day with the highest 1-hour average.

Ozone

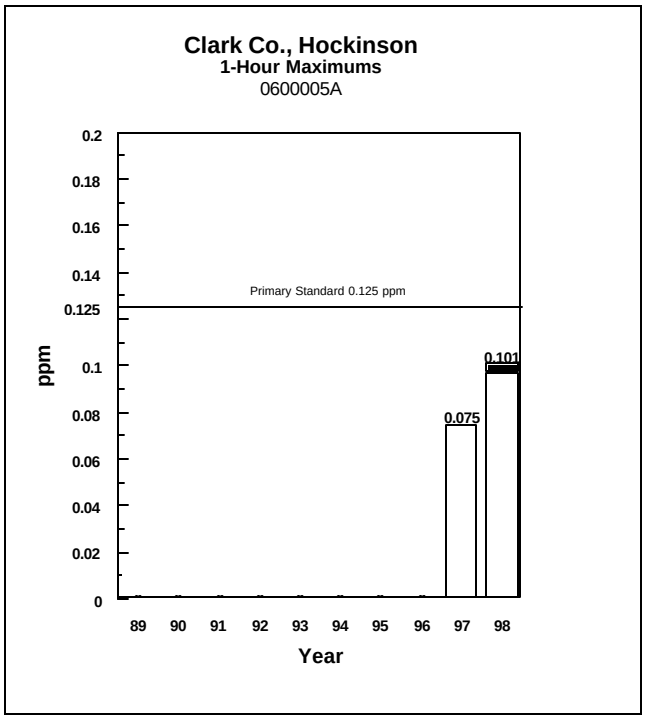
Ozone for 1998

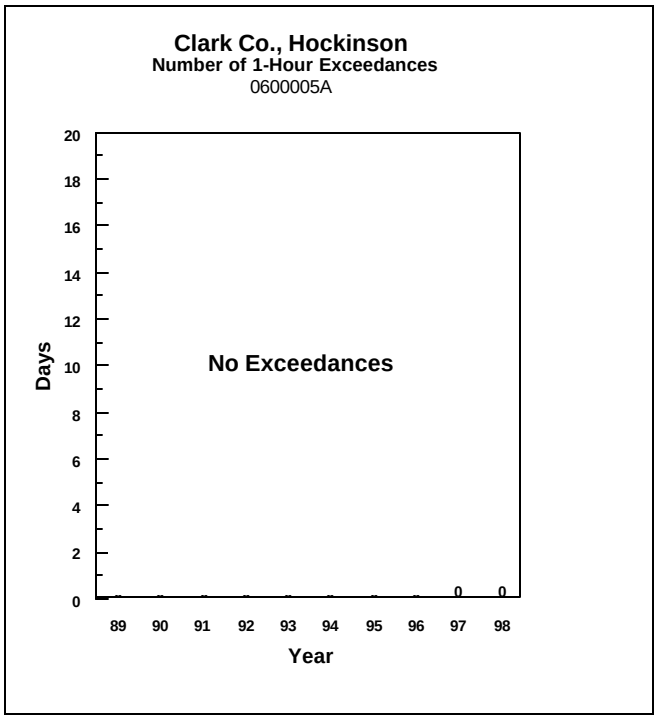
Station	Location	Period of Record	# Hours	# Days	% Valid Data
0600002A	Vancouver, Mt. View School	Apr-Oct	5053	211	98
0600005A	Hockinson	Apr-Oct	5085	212	99
0800003A	Castle Rock	Apr-Oct	4812	201	94
0800004A	Woodland	Apr-Oct	4788	200	99
2100006A	Lewis Co. Packwood Lake	May-Oct	4210	175	97

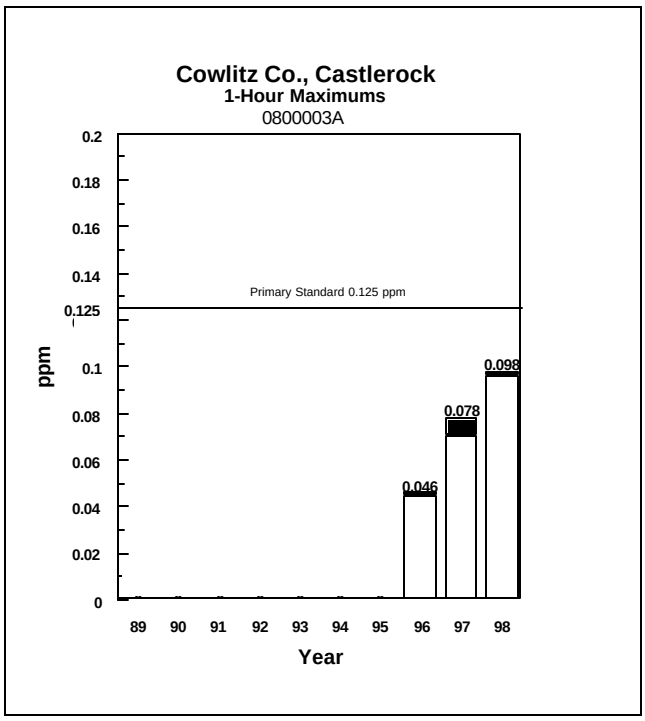




Ozone


Clark Co., Hockinson
1-Hour Maximums
0600005A
ppm
Primary Standard 0.125 ppm
0.075
0.101
Year


Clark Co., Hockinson
Number of 1-Hour Exceedances
0600005A
Days
No Exceedances
Year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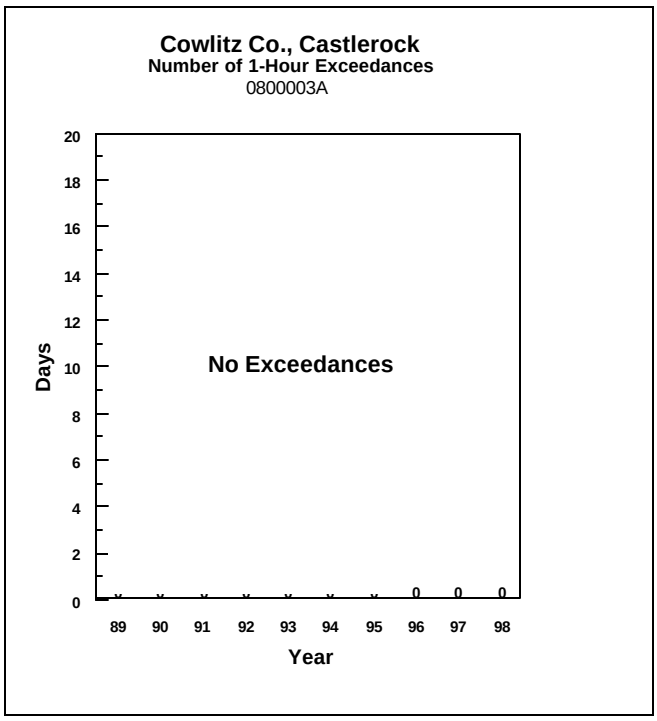
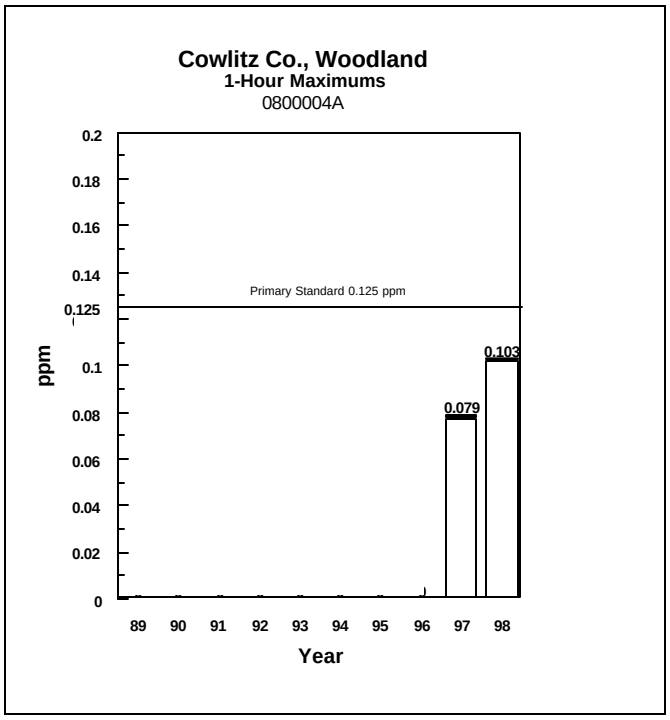
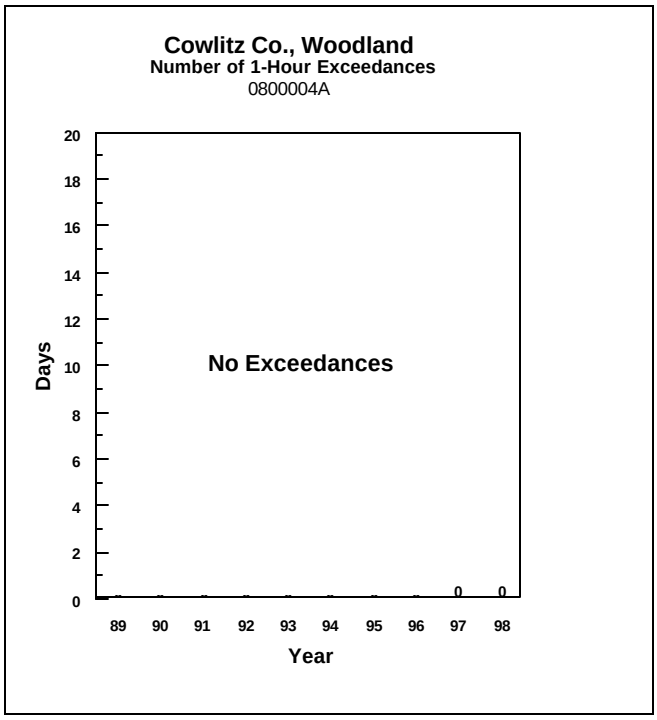
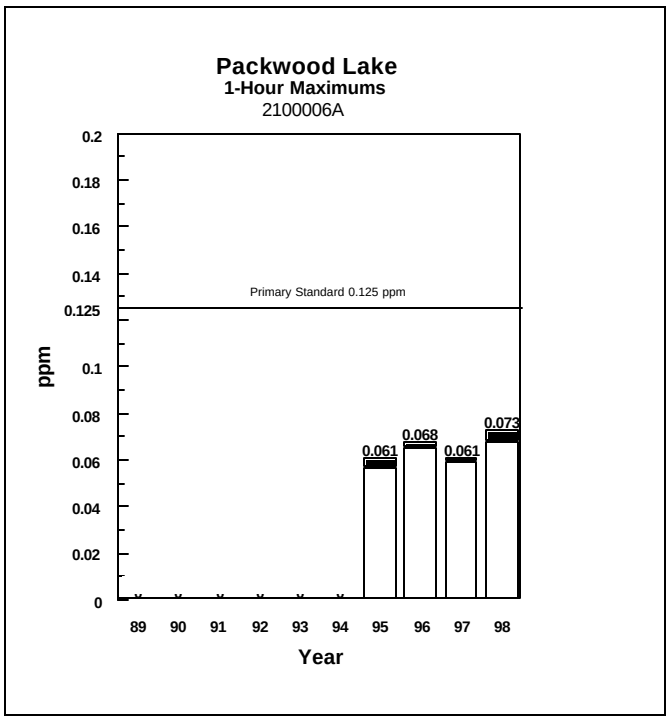
1-Hour Maximums
0800003A
ppm
Primary Standard 0.125 ppm
0.046
0.078
0.098
Year

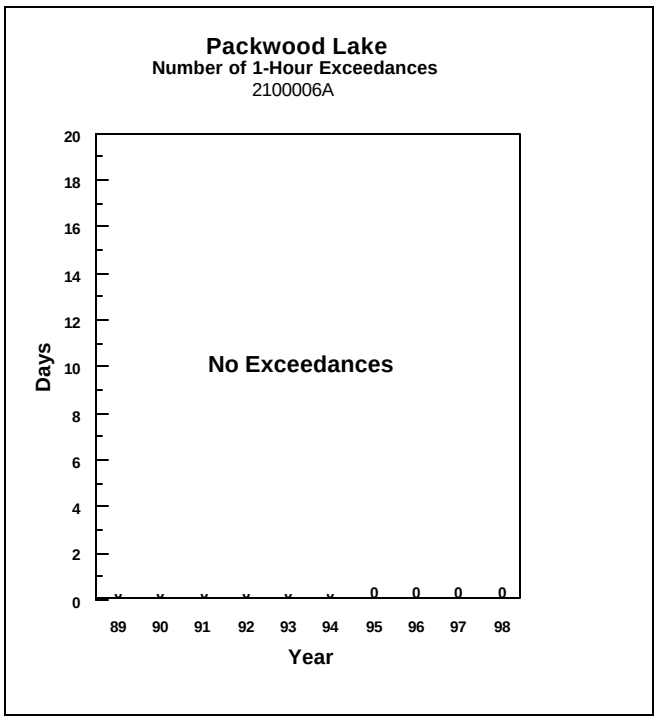

Cowlitz Co., Castlerock
Number of 1-Hour Exceedances
0800003A
Days
No Exceedances
Year

Ozone


Cowlitz Co., Woodland
1-Hour Maximums
0800004A
ppm
Primary Standard 0.125 ppm
0.079
0.103
Year


Cowlitz Co., Woodland
Number of 1-Hour Exceedances
0800004A
Days
No Exceedances
Year


Packwood Lake
1-Hour Maximums
2100006A
ppm
Primary Standard 0.125 ppm
0.061
0.068
0.061
0.073
Year


Packwood Lake
Number of 1-Hour Exceedances
2100006A
Days
No Exceedances
Year

Spokane Area

Particulate Matter

PM_{10} Annual Arithmetic Means ($\mu g/m^3$)

Station	Location	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
3200020E	Spokane, Rockwood						26*	24	23	25	24
3214999E	Cheney, Turnbull Sl			27*	17	18	17	11	13	13	13
3250004E	Spokane, Millwood C.H.	43*	45	41*	35	39	34	28	31	26	26
3278009E	Spokane, Crown Z	45	48	46*	45	43	38	32	32	29	31
3278040A	Spokane, Auto Gl.	41	39	37	39	43	34	28	32	29	31*
3278046A	Spokane, Monroe St.							20*	23	24	22

*Average based on less than 12 months of data.

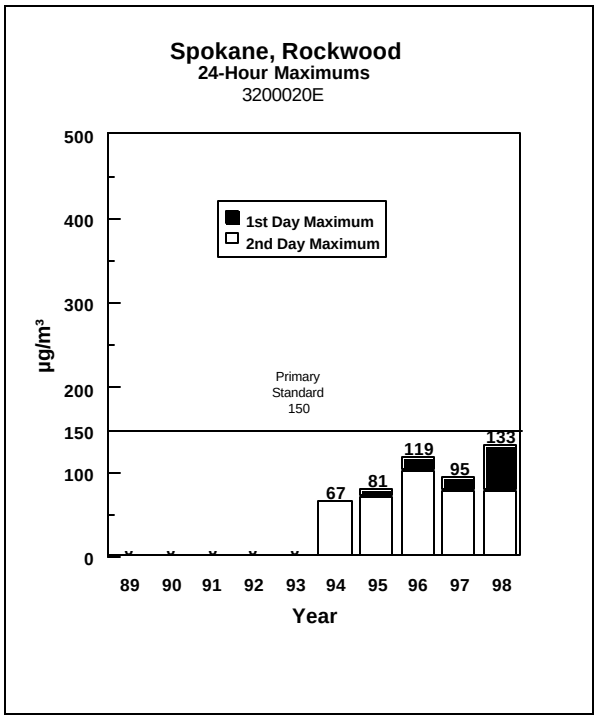
PM_{10} for 1998 ($\mu g/m^3$)

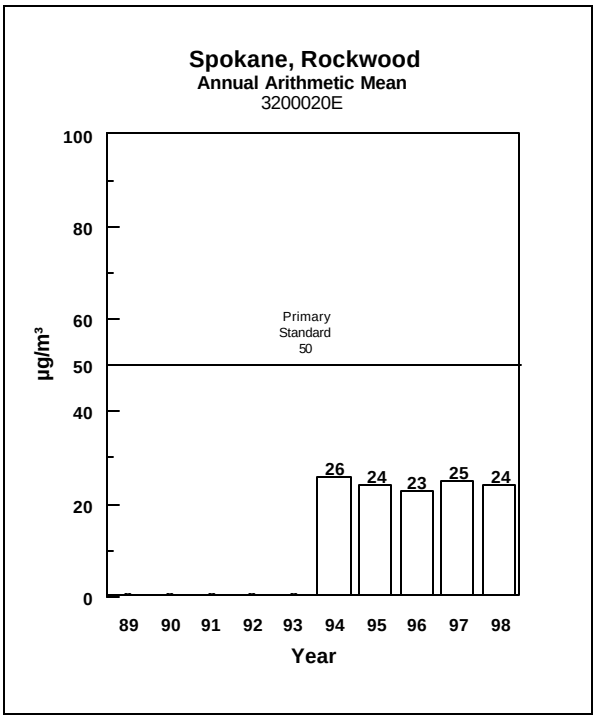
Station	Location	1st high Conc.	1st high Date	2nd High Conc.	2nd High Date
3200020E	Spokane, Rockwood	133	7/28	79	4/29
3214999E	Cheney, Turnbull Sl	64	4/29	43	7/28
3250004E	Millwood, Millwood C.H.	113	7/28	85	4/29
3278009E	Spokane, Crown Z	95	4/29	87	7/28
3278040A	Spokane, Auto Gl.	83	4/29	63	3/20
3278046A	Spokane, Monroe St.	85	4/29	76	7/28

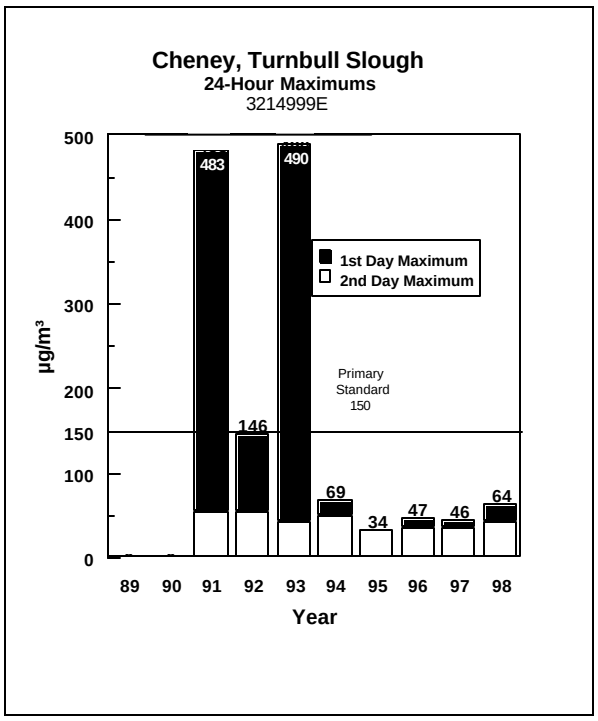
PM_{10} for 1998

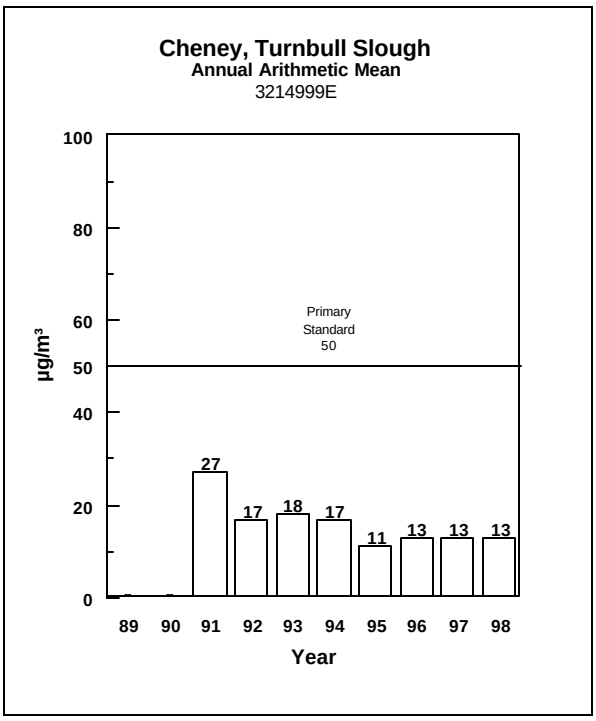
Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
3200020E	Spokane, Rockwood	Jan-Dec	1/1	337	92
3214999E	Cheney, Turnbull Sl.	Jan-Dec	1/6	59	97
3250004E	Millwood, Millwood C. H.	Jan-Dec	1/6	59	97
3278009E	Spokane, Crown Z	Jan-Dec	1/1	324	98
3278040A	Spokane, Auto Gl.	Jan-May	1/6	25	96
3278046A	Spokane, Monroe, St.	Jan-Dec	1/6	61	100

Particulate Matter

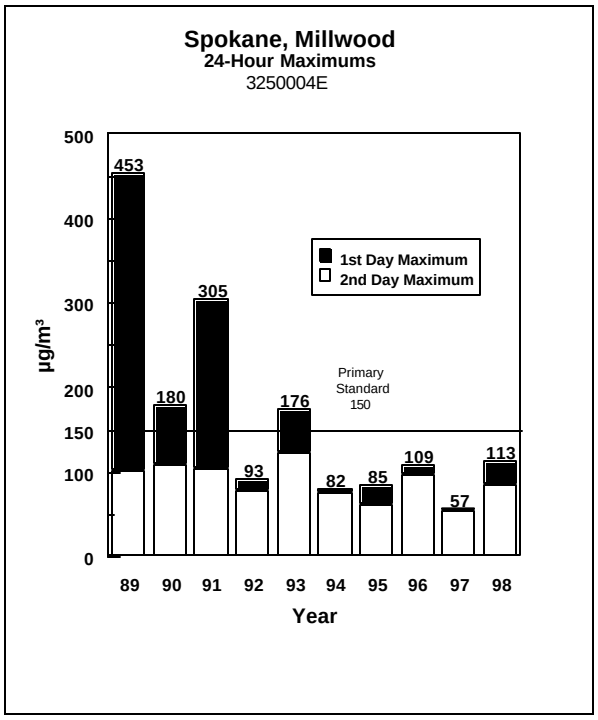


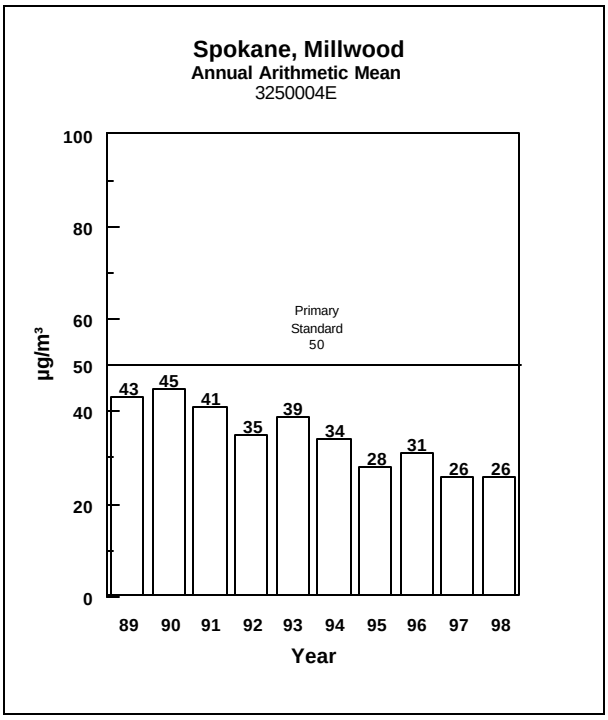


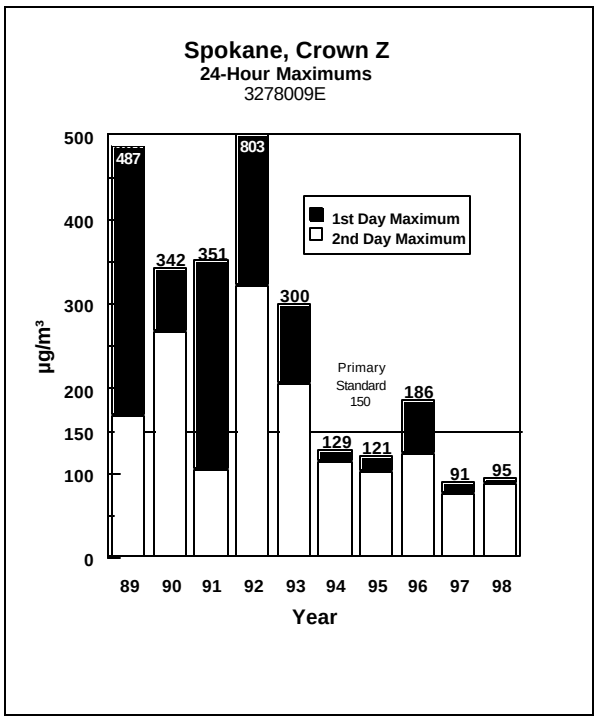


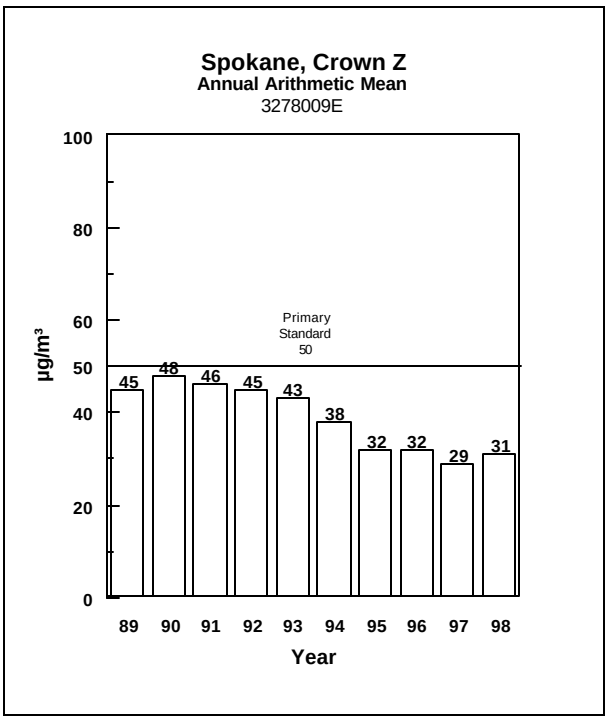


Particulate Matter

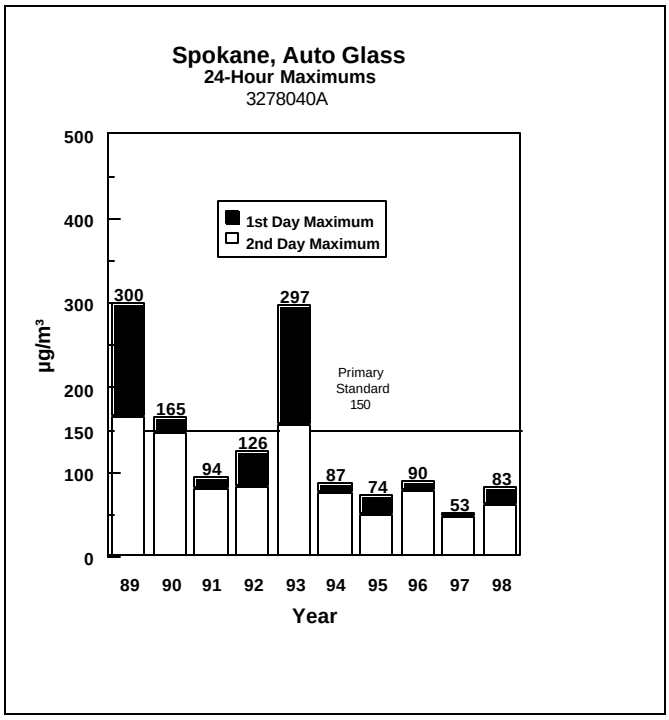


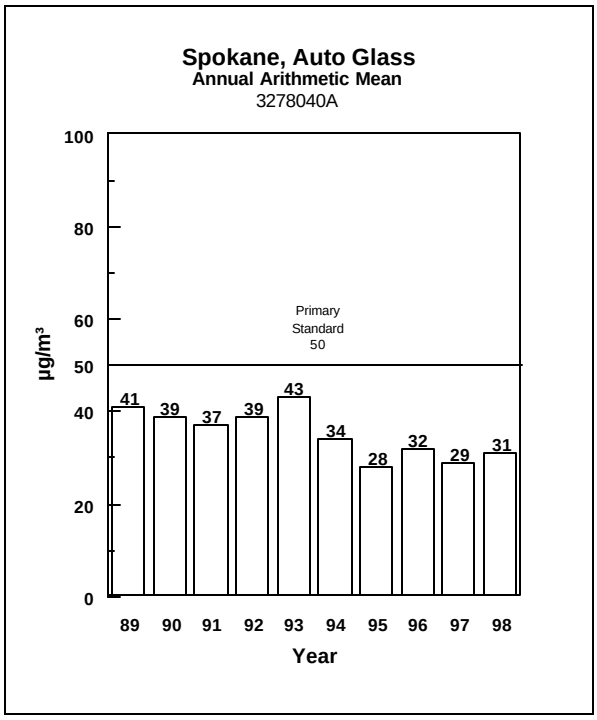


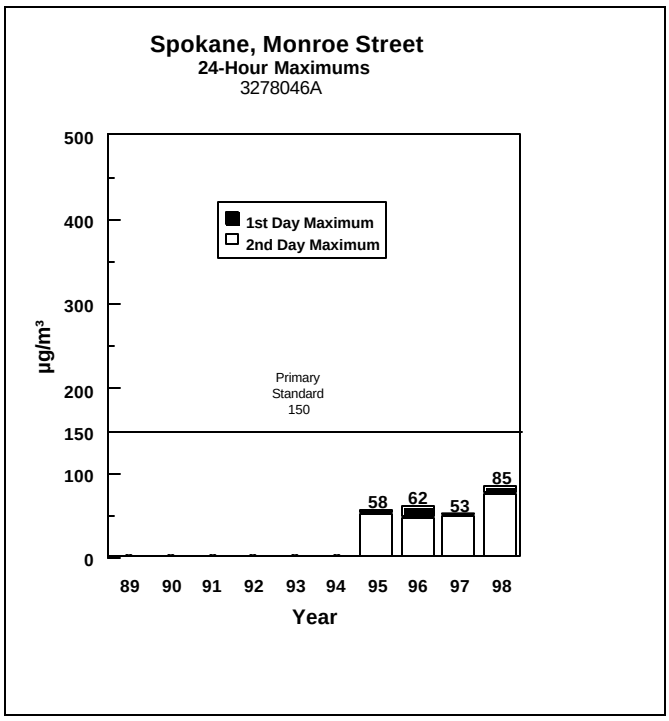


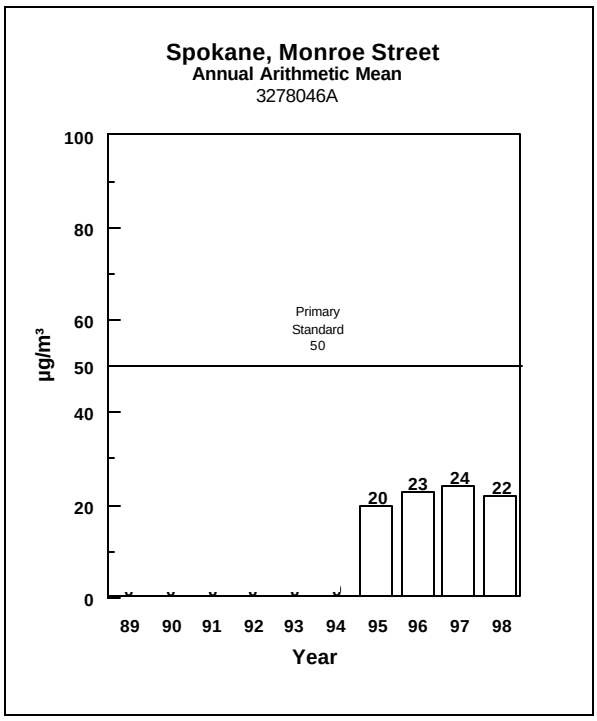


Particulate Matter









Carbon Monoxide

Carbon Monoxide for 1998 (ppm)

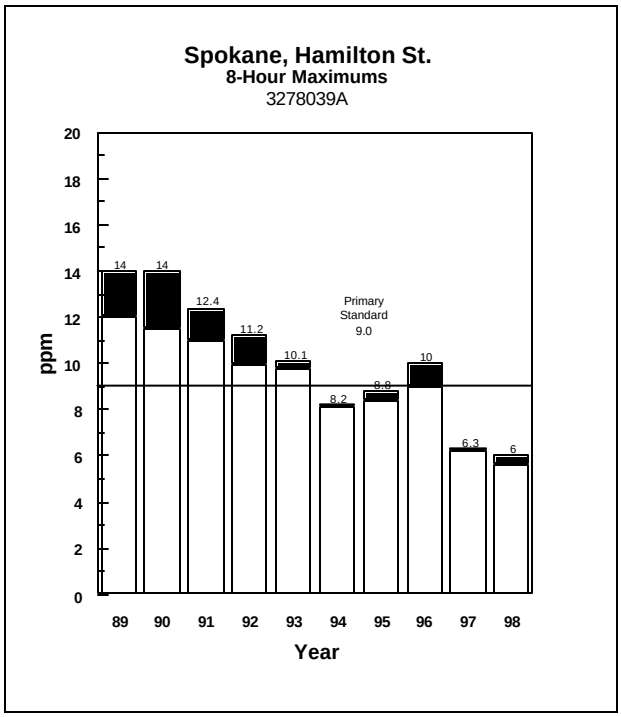
Station	Location	1-Hour Maximums 1st High Conc.	1st High Date	2nd High Conc.	2nd High Date	8-Hour Maximums 1st High Conc.	1st High Date	2nd High Conc.	2nd High Date	2nd Day High* Conc.	2nd Day High* Date
3278039A	Spokane, Hamilton St.	8.7	12/30	8.6	09/17	6.0	10/27	5.6	12/30	5.6	12/30
3278043A	Spokane, Back Door Tavern	9.1	10/27	8.5	10/27	5.2	10/27	5.1	11/03	5.1	11/03
3278045A	Spokane, Spokane Club	9.0	10/22	8.5	10/27	5.0	10/27	4.7	09/17	4.7	09/17
3278047A	Spokane, 3rd Ave. & Wa. N	10.4	10/27	8.3	10/22	5.7	10/21	5.4	10/27	5.4	10/27
3278048A	Spokane, 3rd Ave. & Wa. S	12.2	01/26	12.0	10/27	7.7	12/30	6.8	10/27	6.8	10/27
3278049A	Spokane, Gonzaga	4.0	12/30	3.6	12/30	2.2	12/30	1.7	12/30	1.5	12/22

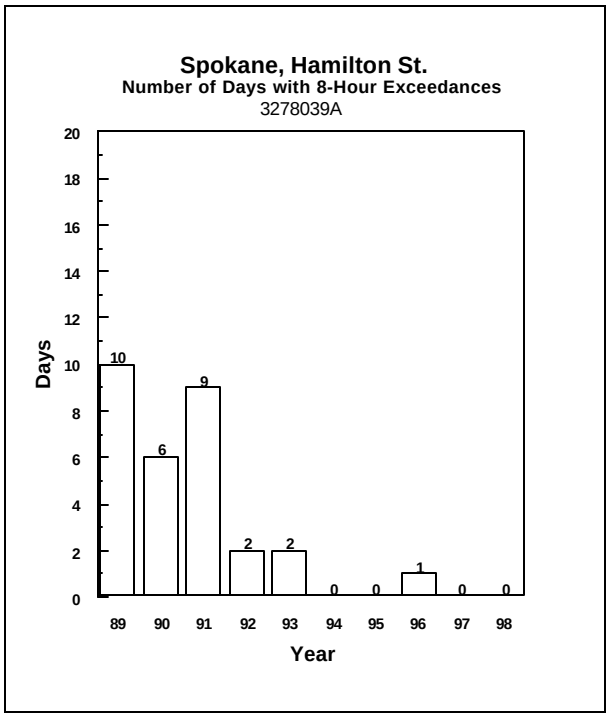
2nd Day High = Second day with the highest 8-hour average.

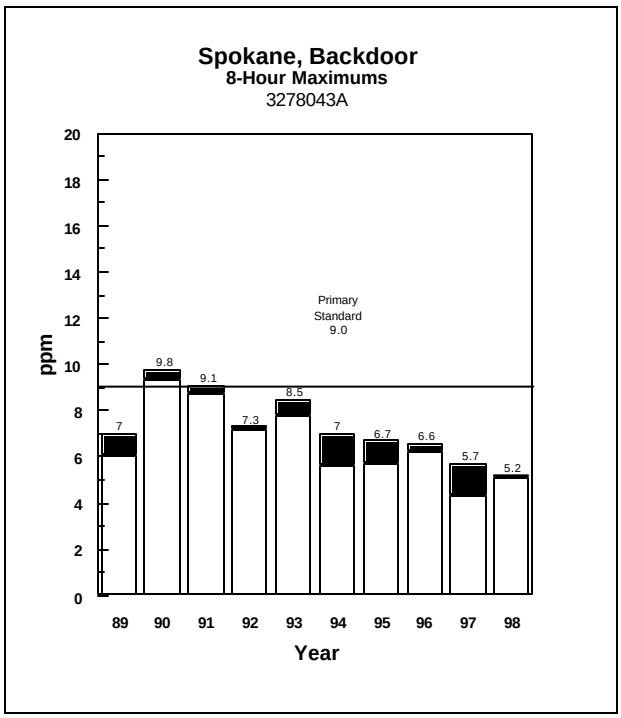
Carbon Monoxide for 1998 (ppm)

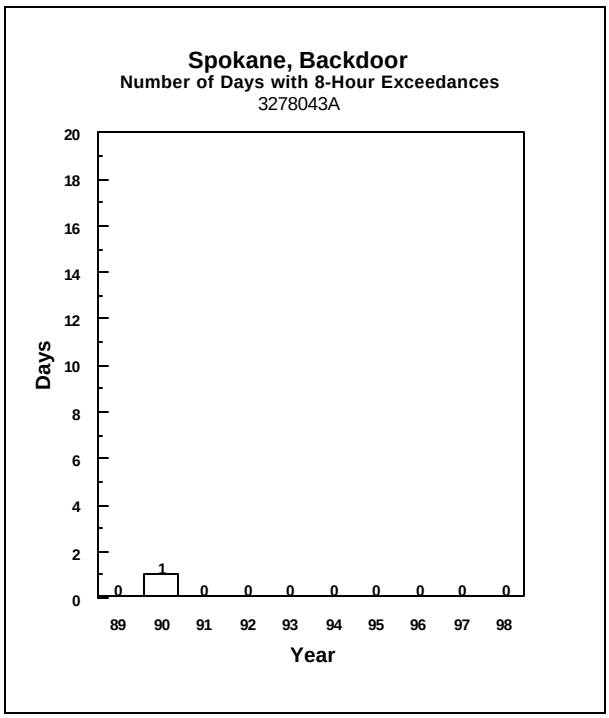
Station	Location	Period of Record	# Hours	# Days	% Valid Data
3278039A	Spokane, Hamilton St.	Jan-Dec	8699	362	99
3278043A	Spokane, Back Door Tavern	Jan-Dec	8695	362	99
3278045A	Spokane, Spokane Club	Jan-Dec	8611	359	98
3278048A	Spokane, 3rd Ave. & Wa. N	Jan-Dec	8633	360	99
3278048A	Spokane, 3rd Ave. & Wa. S	Jan-Dec	8530	355	97
3278049A	Spokane, Gonzaga	Dec	249	10	98

Carbon Monoxide

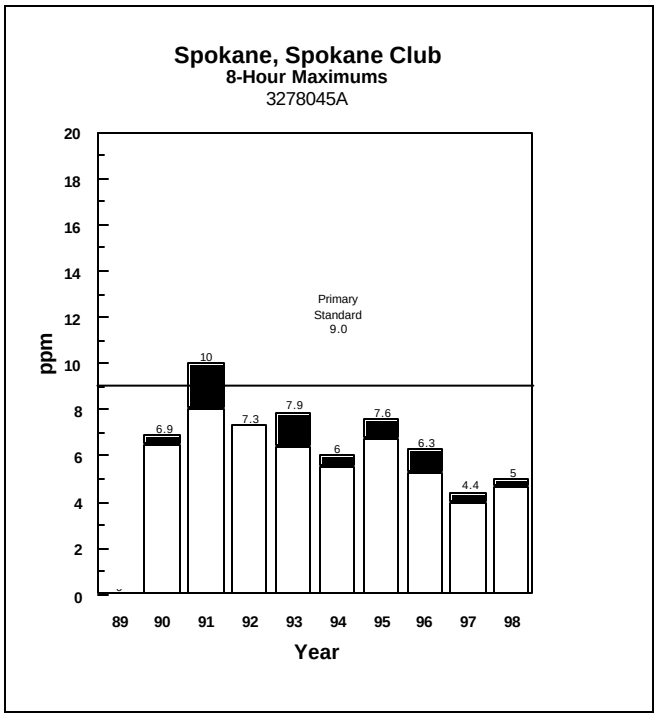


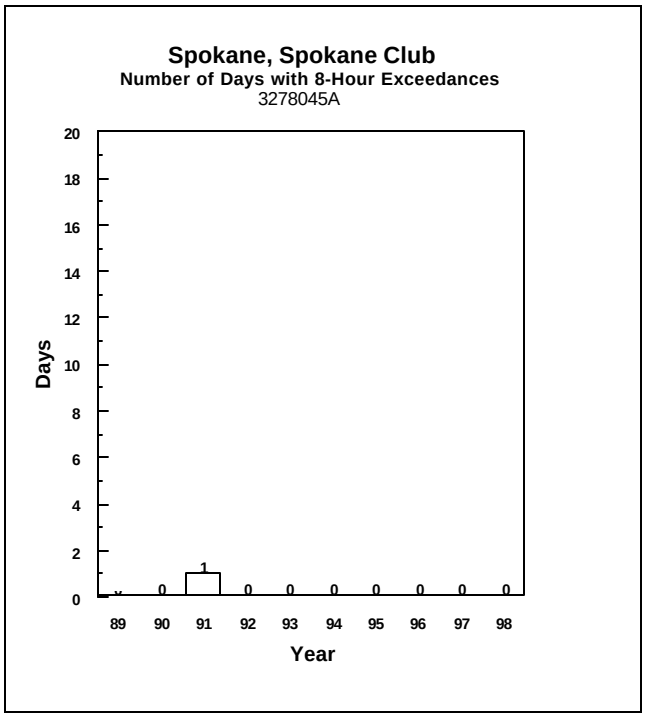


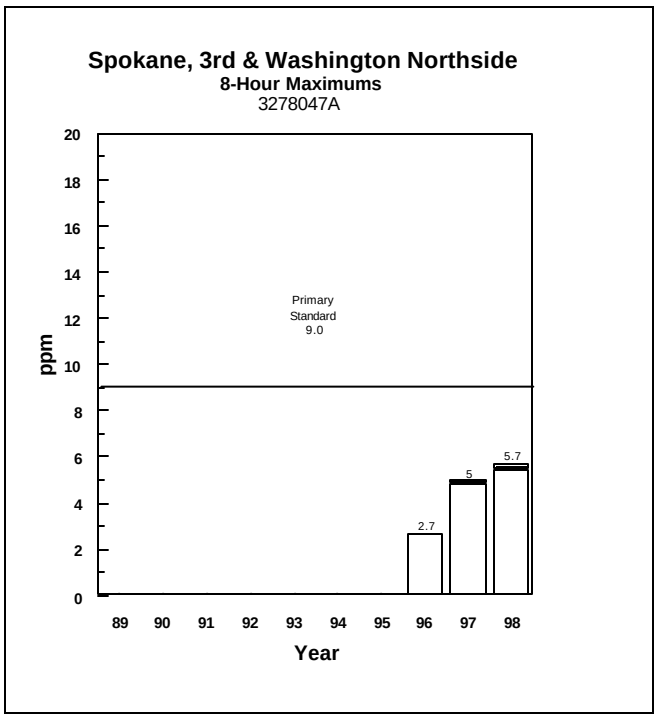


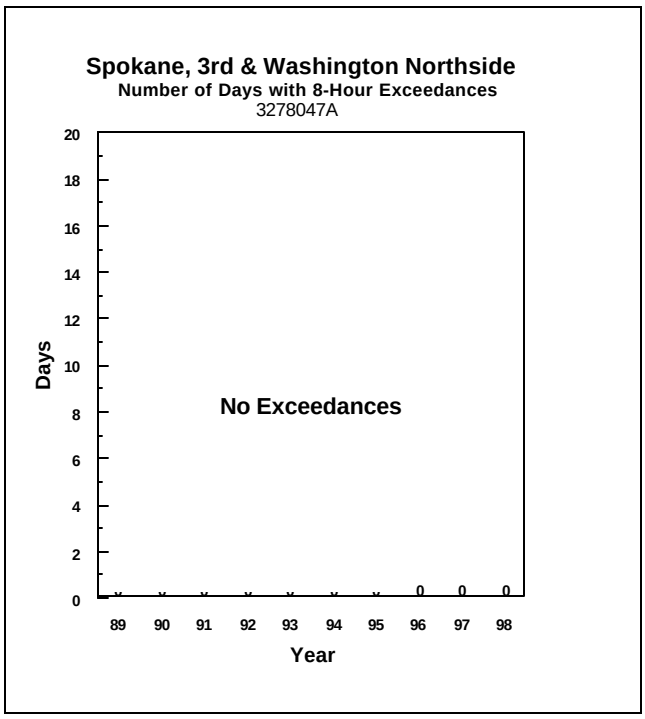


Carbon Monoxide

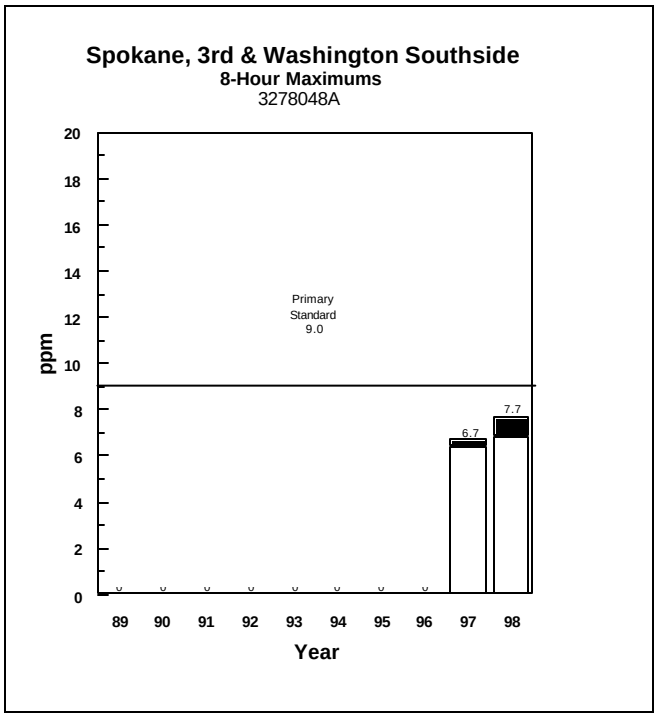


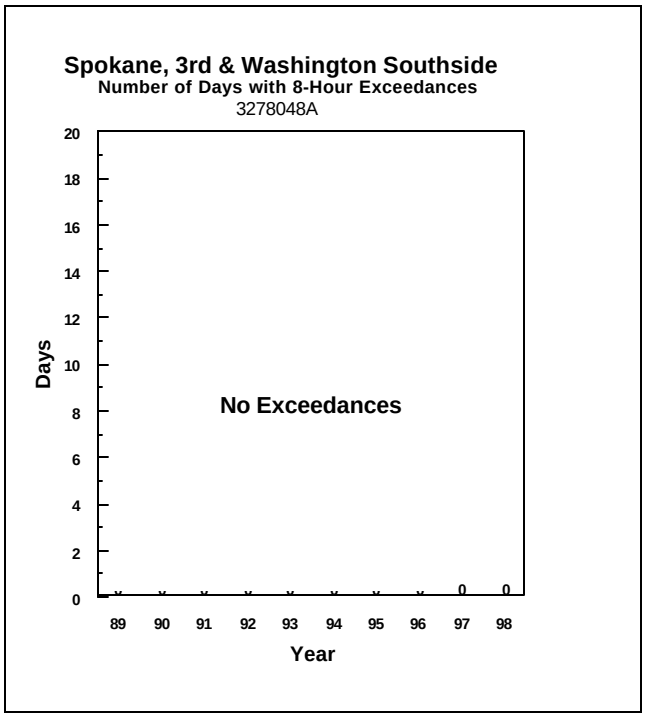


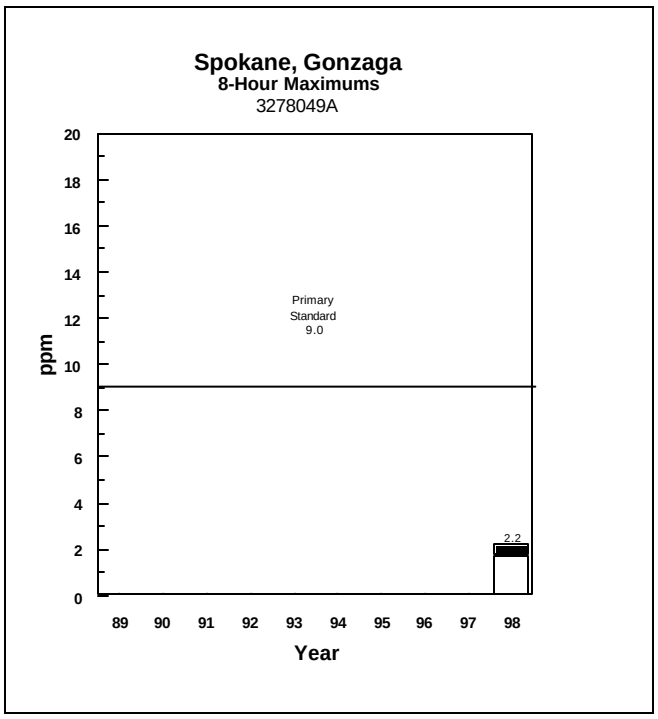


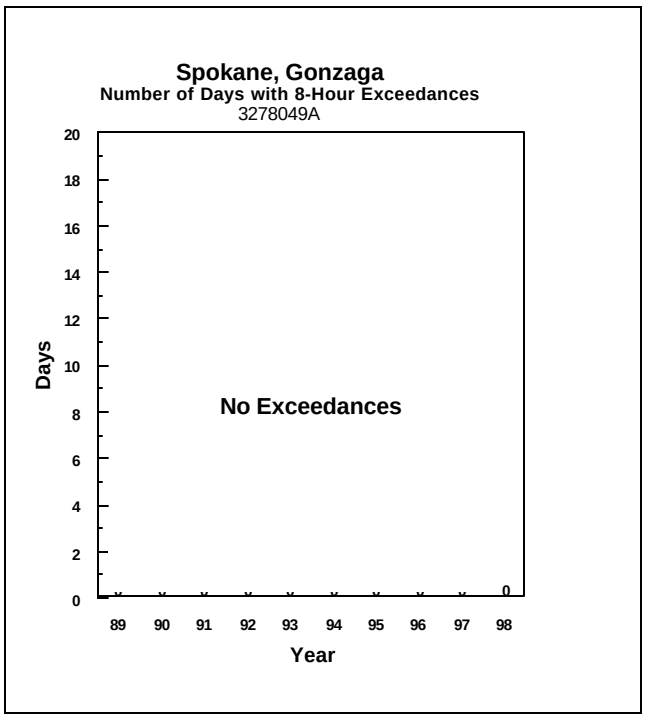


Carbon Monoxide









Ozone

8-Hour Ozone for 1998 (ppm)

Station	Location	8-Hour Maximums 1st High Conc.	1st High Date	4th High Conc.	4th High Date
3200019A	Spokane Co., Greenbluff	.074	8/29	.071	8/7

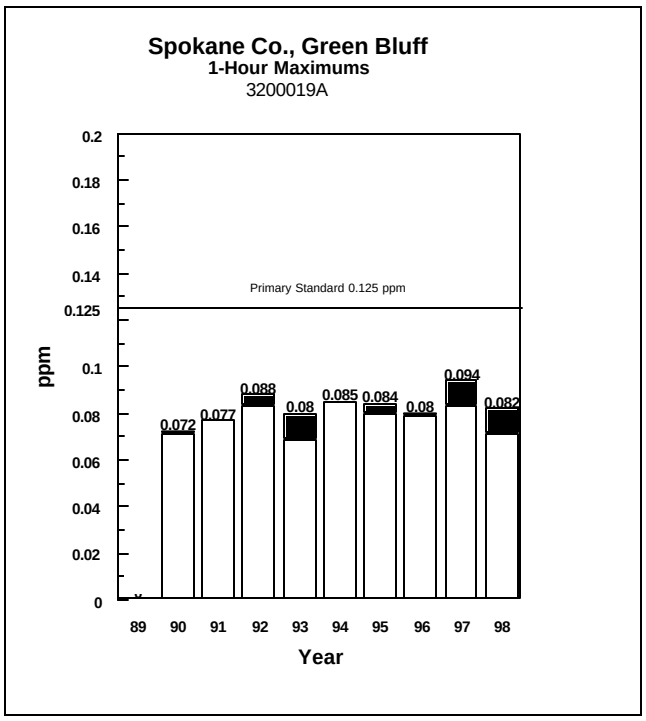
1-Hour Ozone for 1998 (ppm)

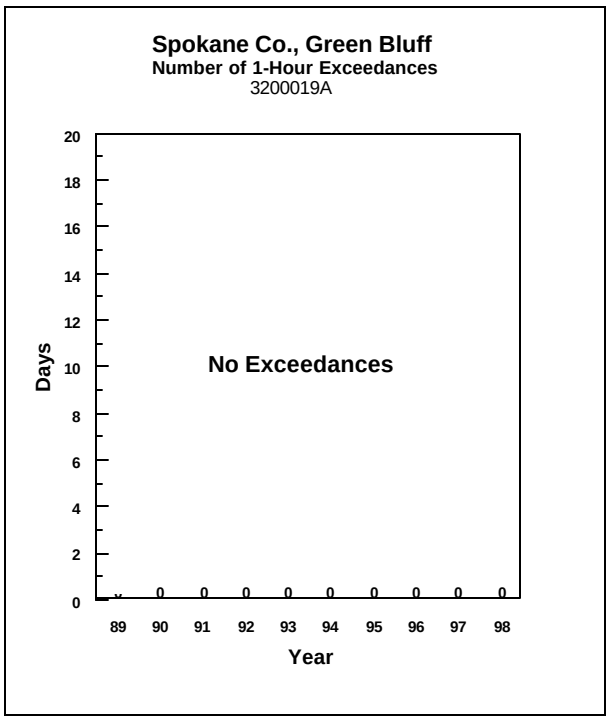
Station	Location	1-Hour Maximums 1st High Conc.	1st High Date	2nd High Conc.	2nd High Date	2nd Day High* Conc.	2nd Day High* Date
3200019A	Spokane Co., Greenbluff	.082	8/30	.071	8/07	.086	8/30

*2nd Day High-Second day with the highest 1-Hour average.

Ozone for 1998

Station	Location	Period of Record	# Hours	# Days	% Valid Data
3200019A	Spokane, Greenbluff	Apr-Oct	4821	201	94





Yakima Area

Particulate Matter

PM_{10} Annual Arithmetic Means ($\mu g/m^3$)

Station	Location	1989	1990	991	1992	1993	1994	1995	1996	1997	1998
3978006F	Sunnyside, Cf. Kamiakin Elem.								36*	29	24*
3978007F	Sunnyside, Harrison Md. Sch.										26*
3996008F	Yakima, Garfield Elem.		34	44	32	38	31	24*	35	37	26
3996009F	Yakima, YVCC Sndqst.	66*	33	37	33	31	27	26*	44*	29	25

*Average based on less than 12 months of data.

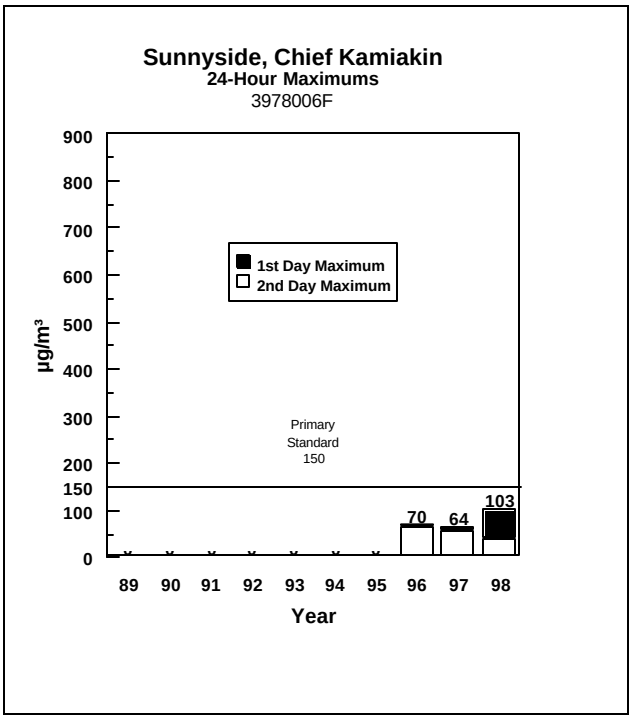
PM_{10} for 1998 ($\mu g/m^3$)

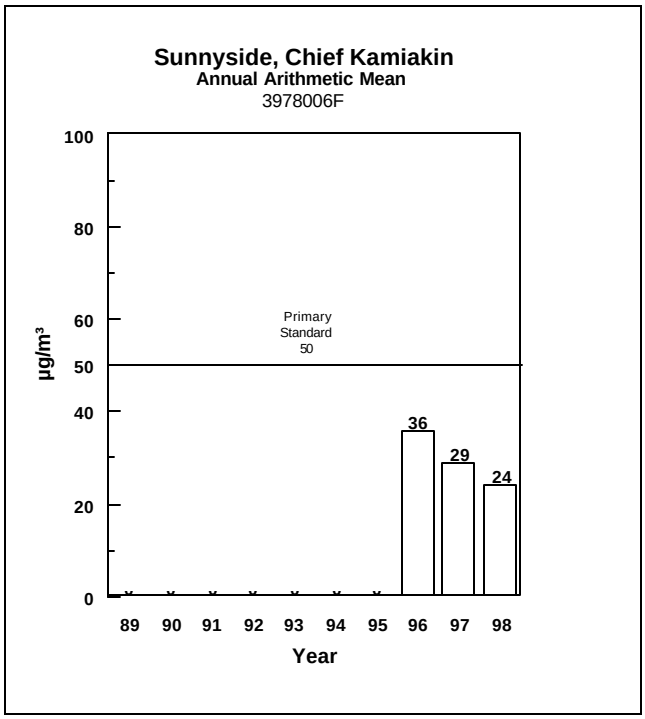
Station	Location	1st high Conc.	Date	2nd High Conc.	Date
3978006F	Sunnyside, Cf. Kamiakin Elem.	103	4/29	41	07/10
3978007F	Sunnyside, Harrison Md. Sch.	57	9/02	48	10/20
3996008F	Yakima, Garfield Elem.	97	4/29	66	02/10
3996009F	Yakima, YVCC Sndqst.	85	5/01	81	04/29

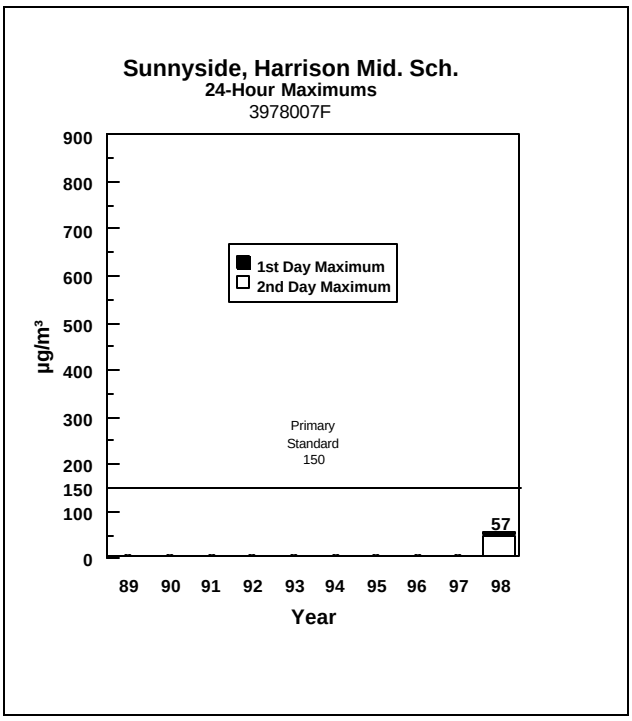
PM_{10} for 1998

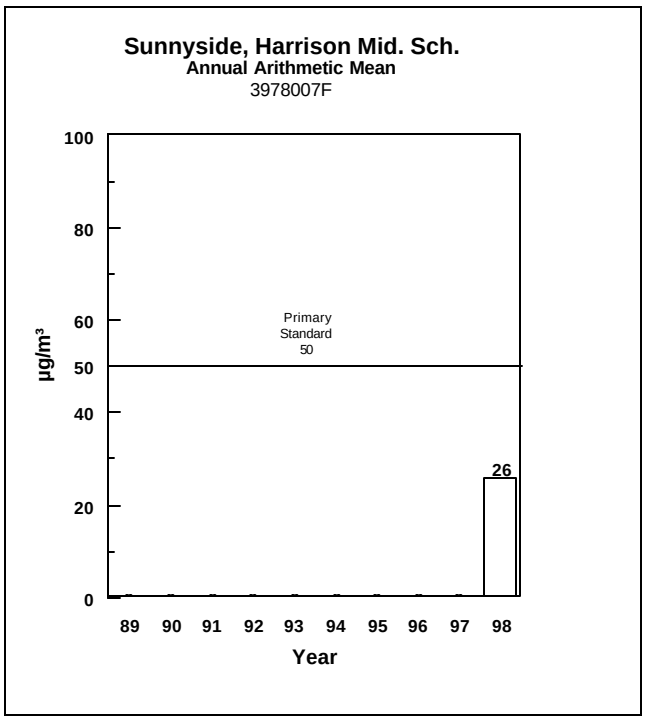
Station	Location	Period of Record	Samp. Freq.	# Samples	% Valid Data
3978006F	Sunnyside, Cf. Kamiakin Elem.	Jan-Jul	1/6	29	91
3978007F	Sunnyside, Harrison Md. Sch	Aug-Dec	1/6	21	91
3996008F	Yakima, Garfield Elem.	Jan-Dec	1/6	61	100
3996009F	Yakima, YVCC Sndqst.	Jan-Dec	1/2	168	92

Particulate Matter

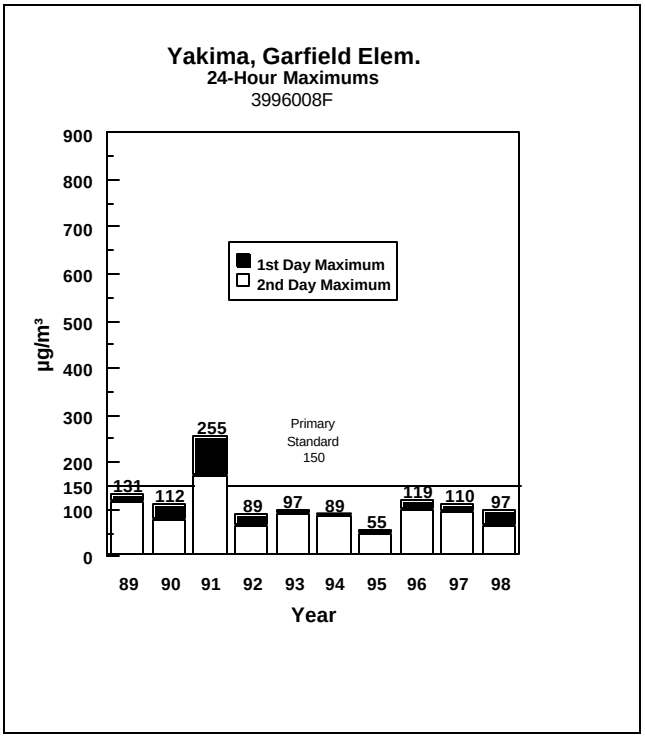


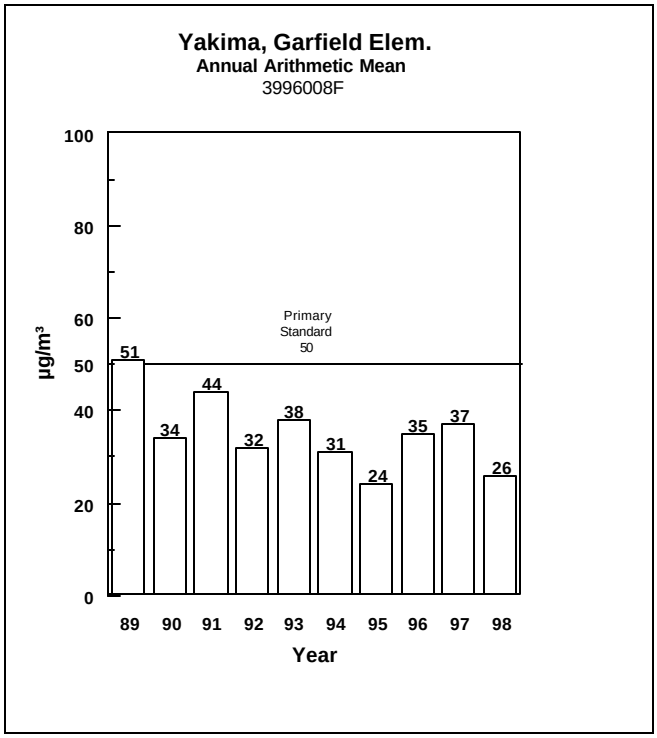


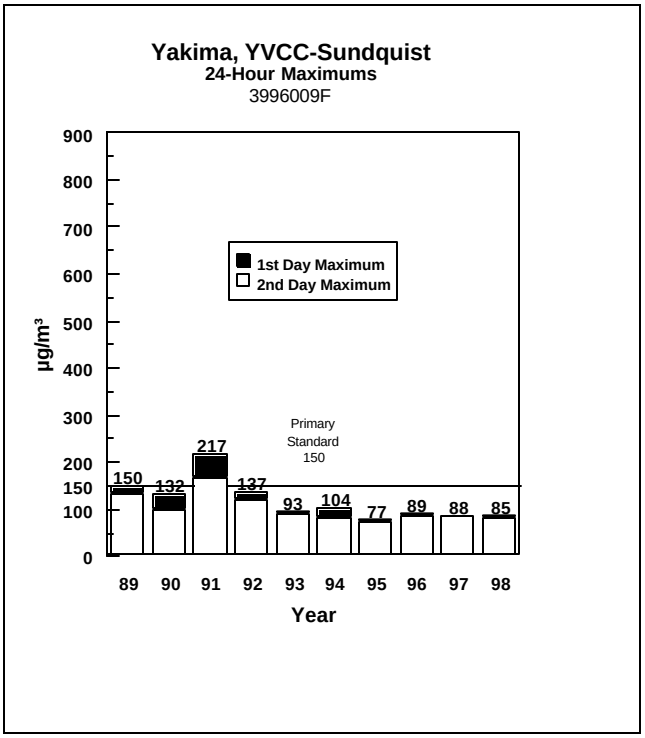


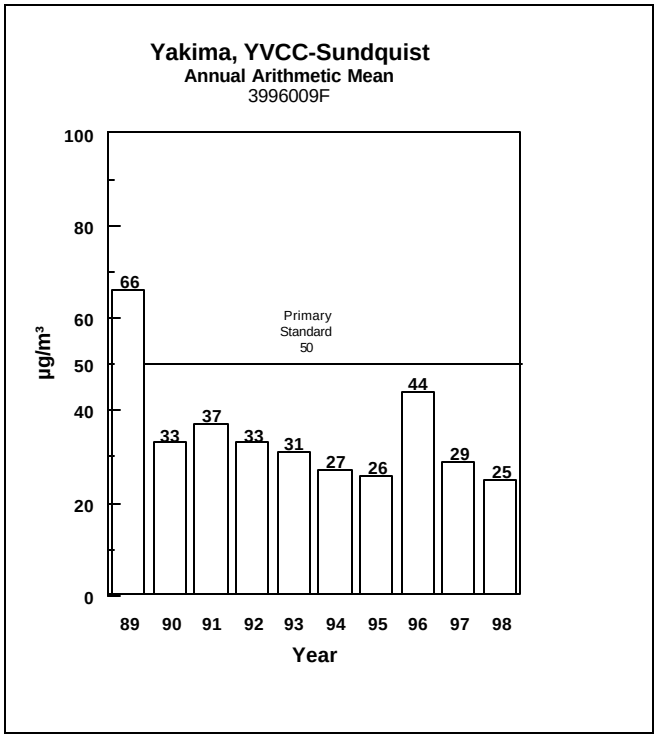


Particulate Matter









Carbon Monoxide

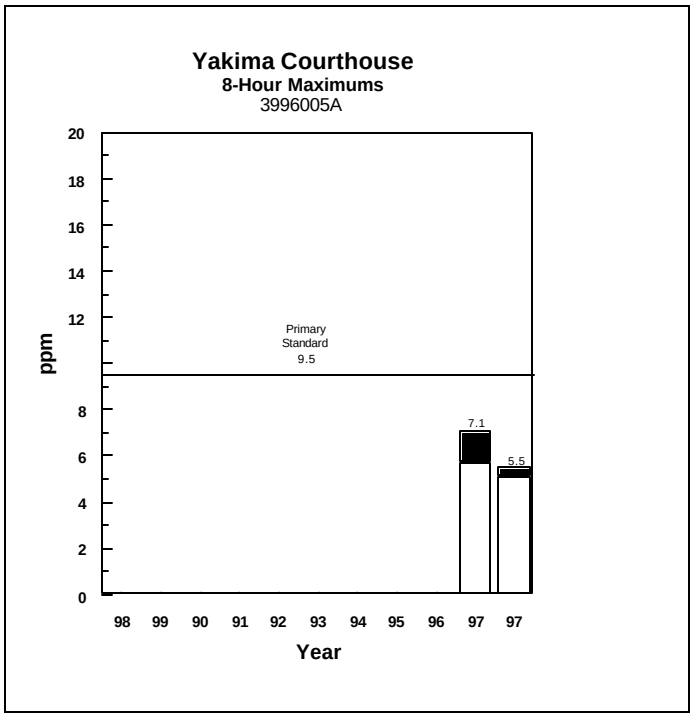
Carbon Monoxide for 1998 (ppm)

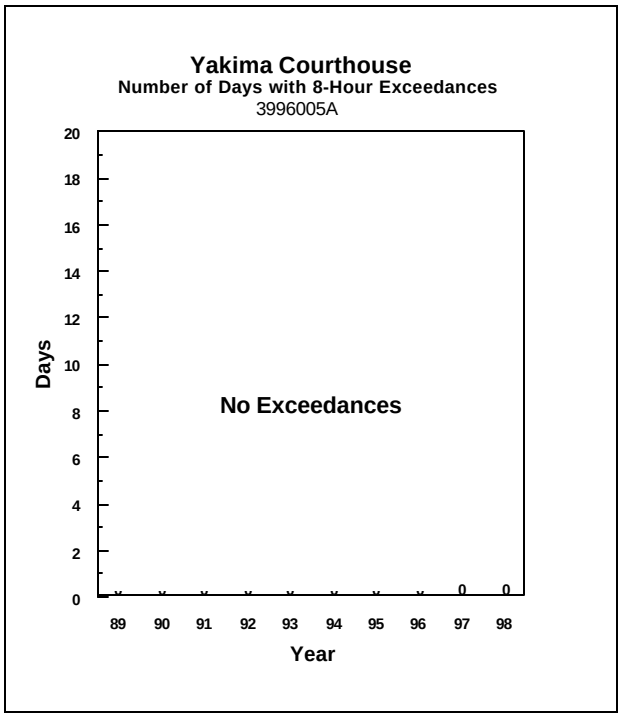
Station	Location	1-Hour Maximums 1st High Conc.	Date	2nd High Conc.	Date	8-Hour Maximums 1st High Conc.	Date	2nd High Conc.	Date	2nd Day * Conc.	Date
3996005A	Yakima Co. Crthse.	9.3	1/15	8.0	1/14	5.5	1/15	5.1	1/14	5.1	1/14

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

Carbon Monoxide for 1998

Station	Location	Period of Record	#Hours	# Days	% Valid Data
3996005A	Yakima Co., Crthse.	Jan-Dec	8160	340	93





Visibility Monitoring

Visibility Monitoring for 1998

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

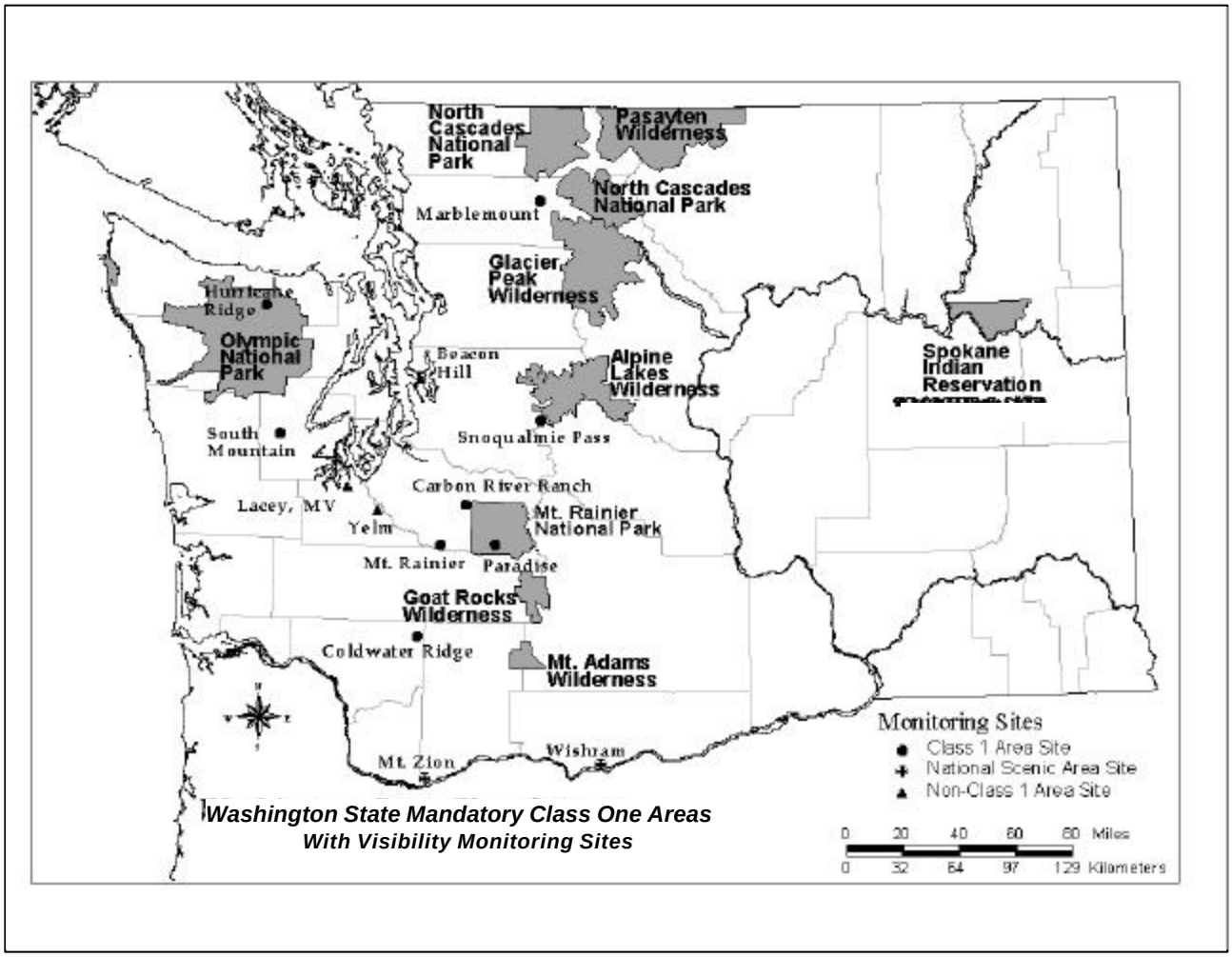
As in past years, Ecology's visibility monitoring at or near Class I areas for the 1998 season involved the operation of nephelometers at several sites in western Washington. Sites operated were South Mountain, Paradise Visitor Center, Carbon River Ranch, Marblemount and Hurricane Ridge. Nephelometers measure the scattering of light (b_{scat}) which is the major component of visibility degradation. Visibility is considered significantly impaired when the nephelometer one hour average is greater than or equal to 0.5 b_{scat} x 10^{-4} (a visual range of approximately 78 kilometers). Data from these sites is presented in graphs on the following pages.

It is interesting to note the unusually high number of impaired hours at Marblemount in August and September. This impairment was a result of a wildfire that burned near the site between August 29 and September 6, 1998.

Visibility is also monitored with nephelometers by Ecology and local air quality agencies at various non-Class I area sites in western Washington. This includes Mt. Zion in the Columbia River Gorge National Scenic Area, Coldwater Ridge in the Mt. St. Helens National Monument, Beacon Hill in Seattle, Yelm and Lacey. Nephelometer data from these sites is presented here for comparison with the Class I area sites.

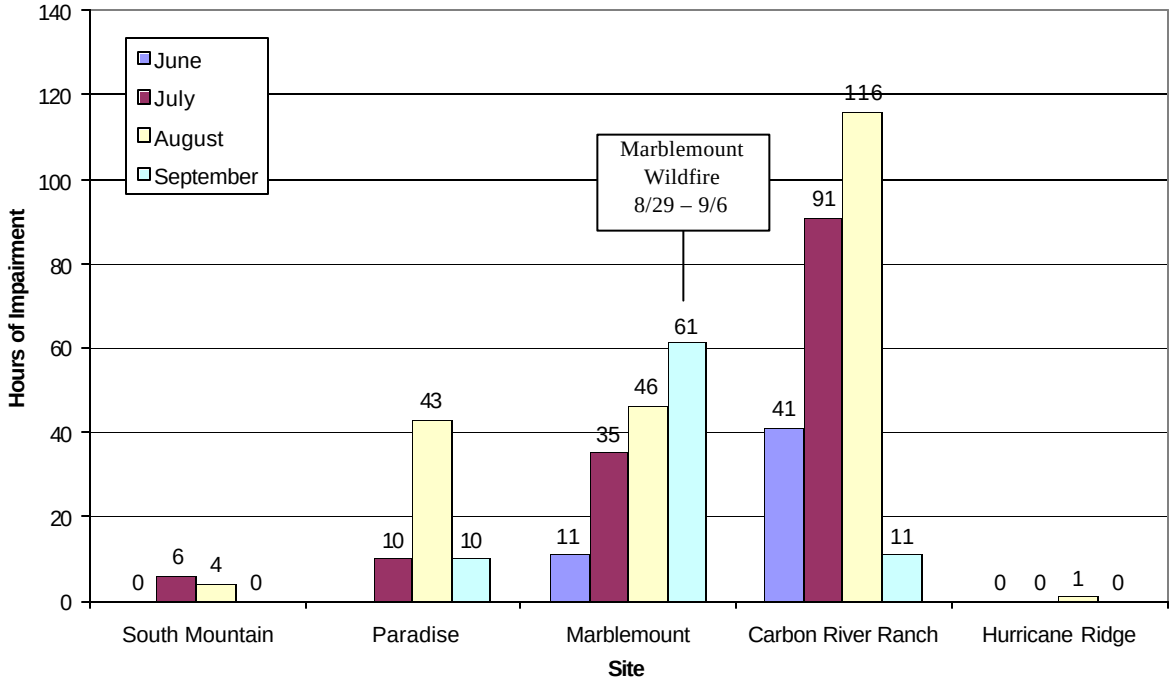
The National Park Service and the U.S. Forest Service also monitor visibility at two long-term Class I area sites, Mt. Rainier and Snoqualmie Pass. These two sites are part of the national IMPROVE (**I**nteragency **M**onitoring of **PRO**tected **V**isual **E**nvironments) network. $PM_{2.5}$ and PM_{10} samples are collected at these sites and are then chemically analyzed to reconstruct visibility levels and to determine which pollutant species contribute to visibility degradation. Data from these two sites were recently analyzed as part of Ecology's visibility protection long-term strategy review. "Review of the Washington State Visibility Protection Plan-Final Chapter", Ecology Publication 99-206, July 1999, is available by contacting Tami Dahlgren at (360) 407-6830. Some of this data is presented in graphs on the following pages. Visibility in these graphs is shown as light extinction (b_{ext}) and is expressed as inverse megameters (Mm^{-1}). Simply said, visibility becomes worse as light extinction increases. For reference, a light extinction value of 100 Mm^{-1} is equal to a visual range of 39 kilometers. Rayleigh scatter (b_{ray}) is the amount of light scatter caused by pure air and is included in the graphs.

IMPROVE data from the Mt. Zion and Wishram sites in the Columbia River Gorge National Scenic Area was also analyzed this year and is reported in "Visibility Monitoring Data Analysis for the Columbia River Gorge National Scenic Area" (September 1, 1996 – August 31, 1997), Ecology Publication 99-202, February 1999. Some of this data is presented in graphs on the following pages.

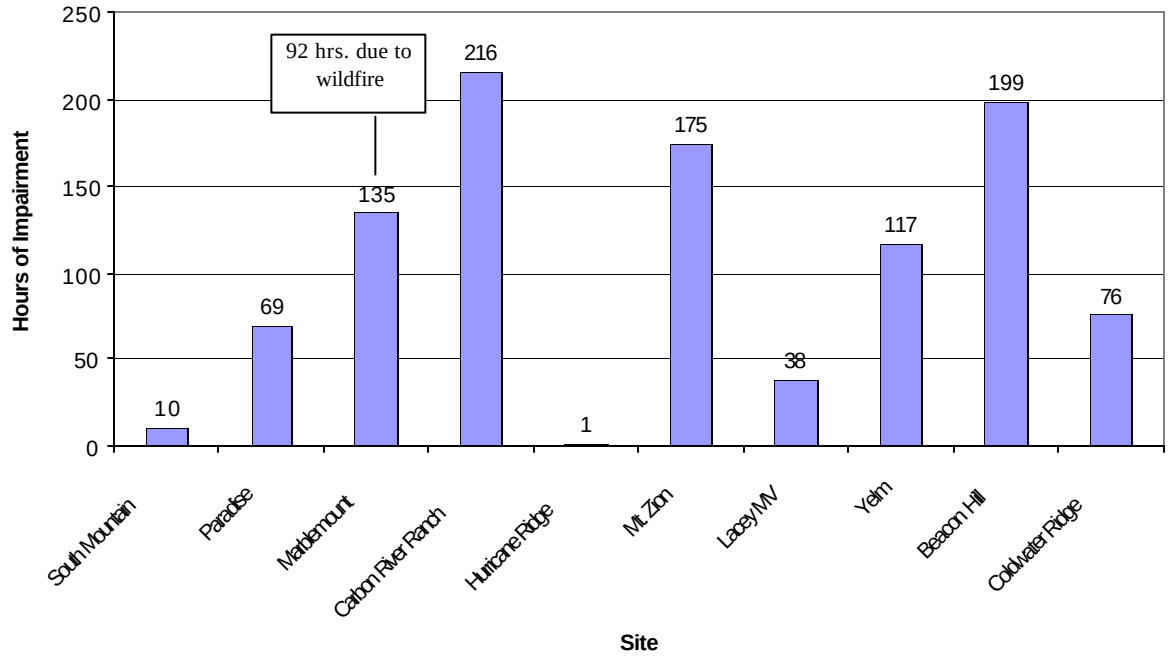


Data from these sites are presented in the graphs on pages 79-84.

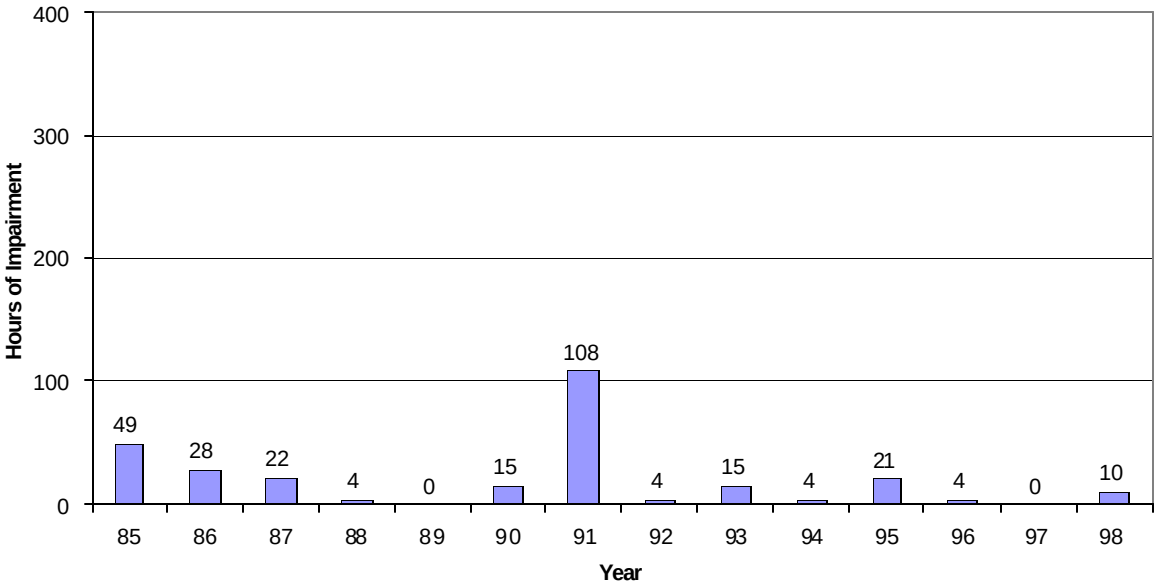
Hours of Visibility Impairment at Class I Areas - 1998
(adjusted for missing data)



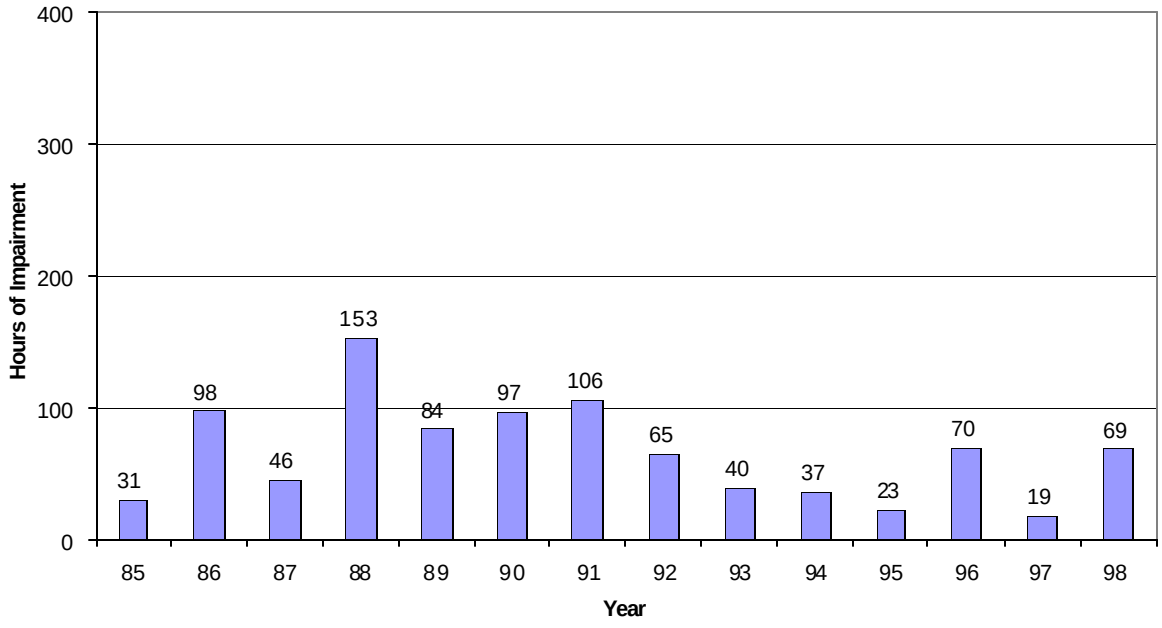
Comparison of Class I Area Visibility With Other Non-Class I Areas
July 1 - Labor Day, 1998
(adjusted for missing data)



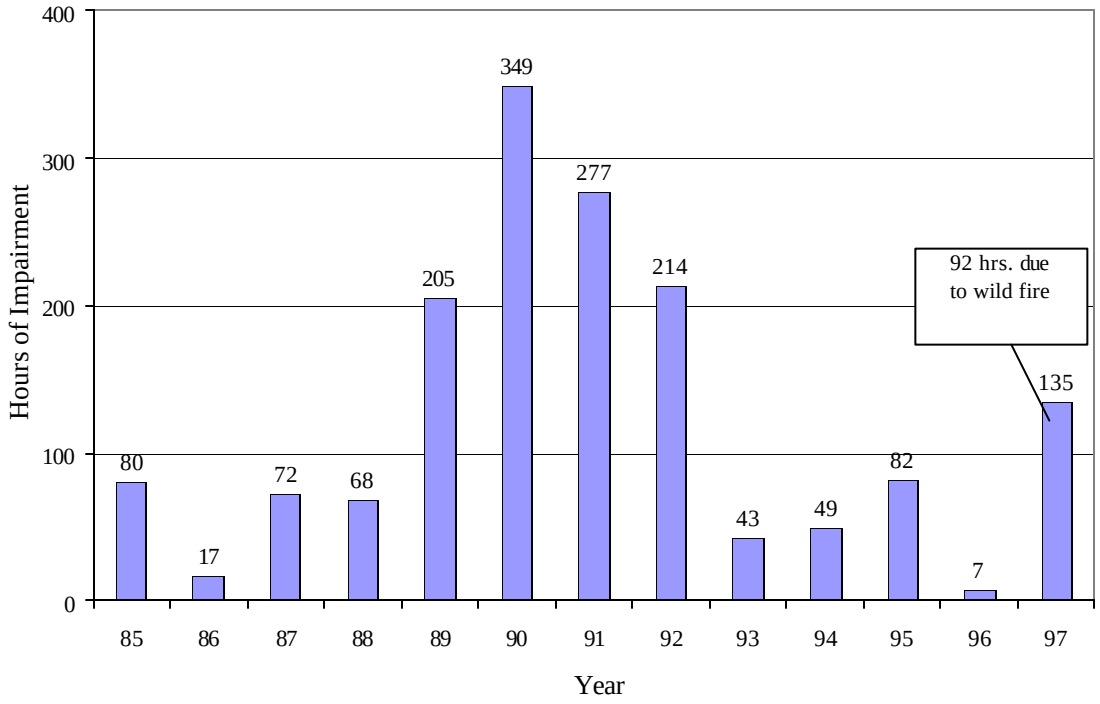
South Mountain
Hours of Visibility Impairment
July 1 - Labor Day



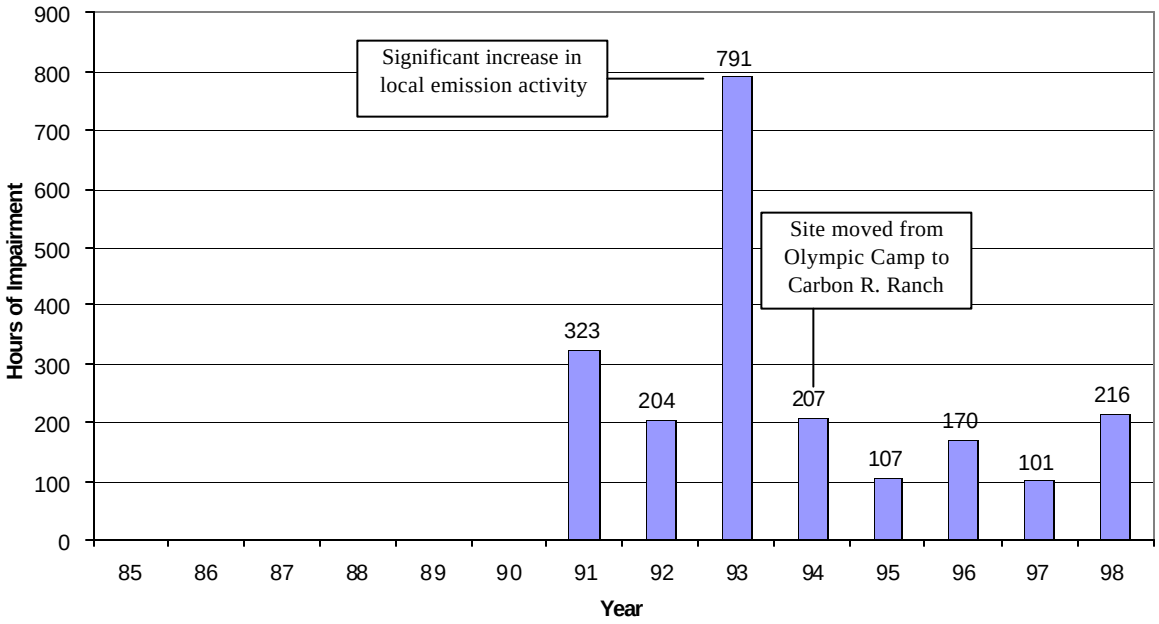
Paradise
Hours of Visibility Impairment
July 1 - Labor Day



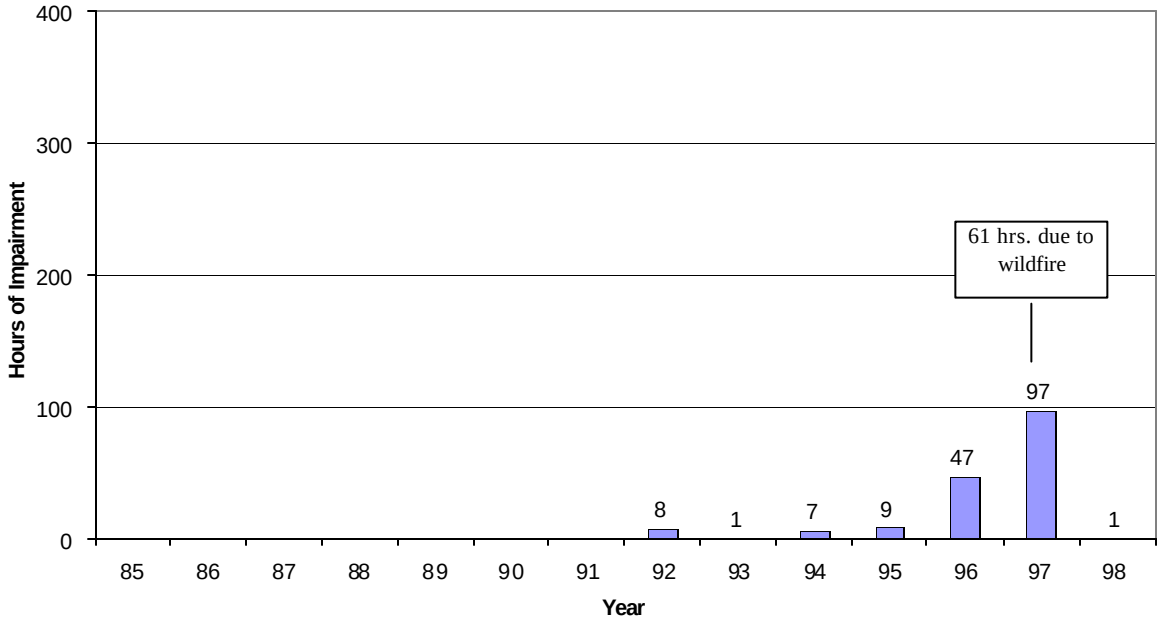
Marblemount/Newhalem
Hours of Visibility Impairment
July 1 – Labor Day



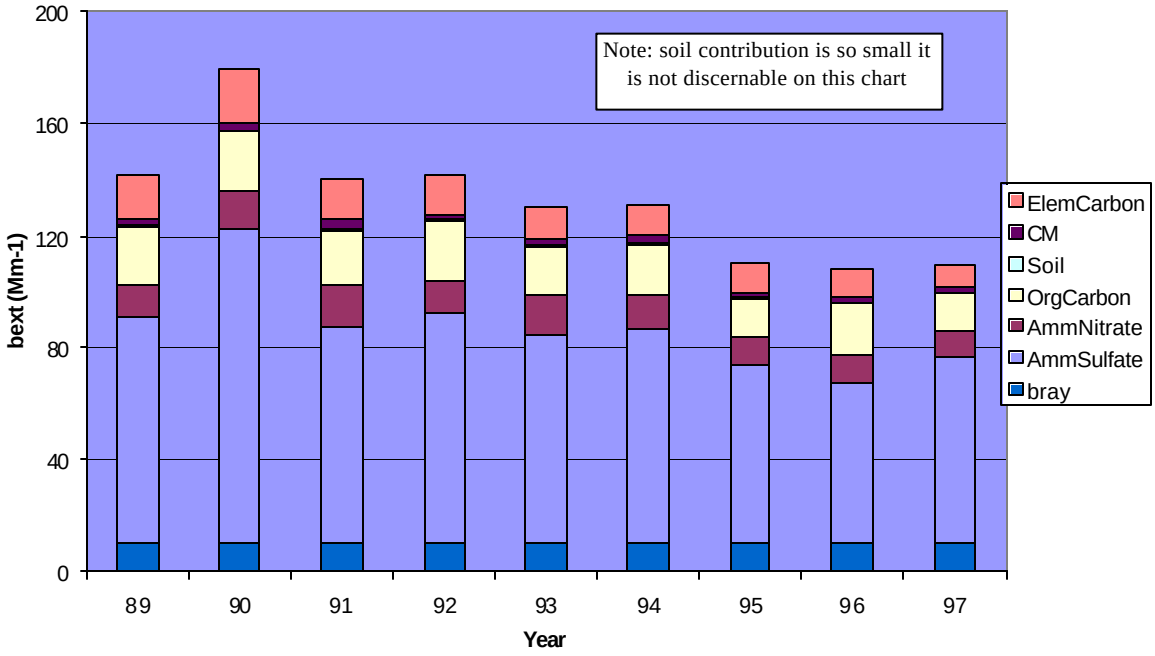
Carbon River Ranch/Oly Camp
Hours of Visibility Impairment
July 1 - Labor Day



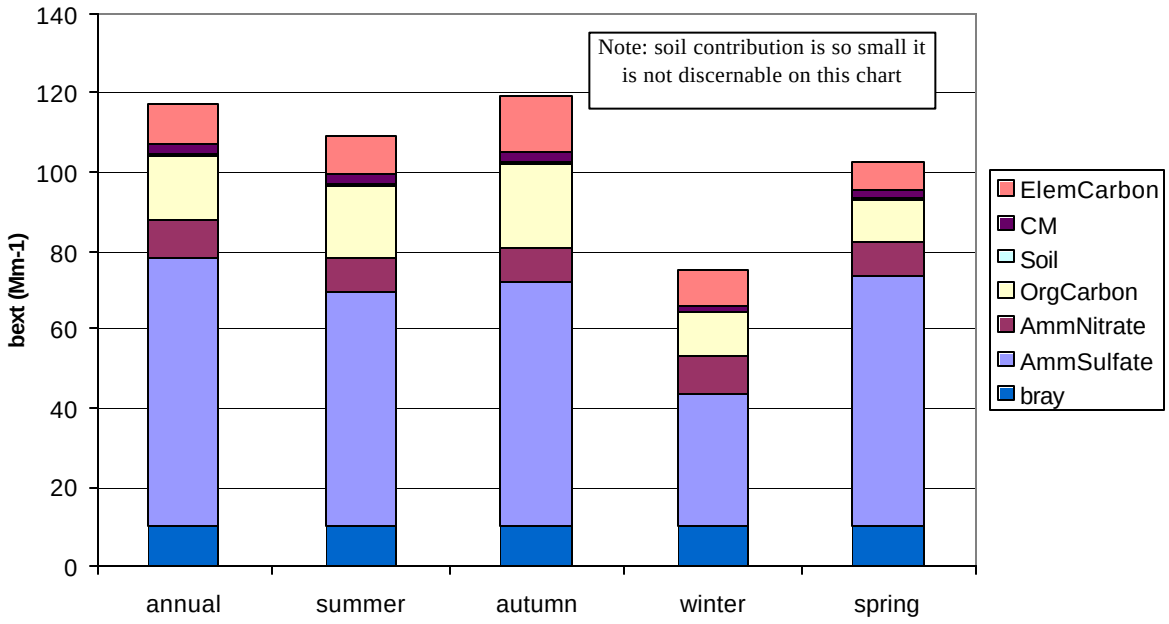
Hurricane Ridge
Hours of Visibility Impairment
July 1 - Labor Day



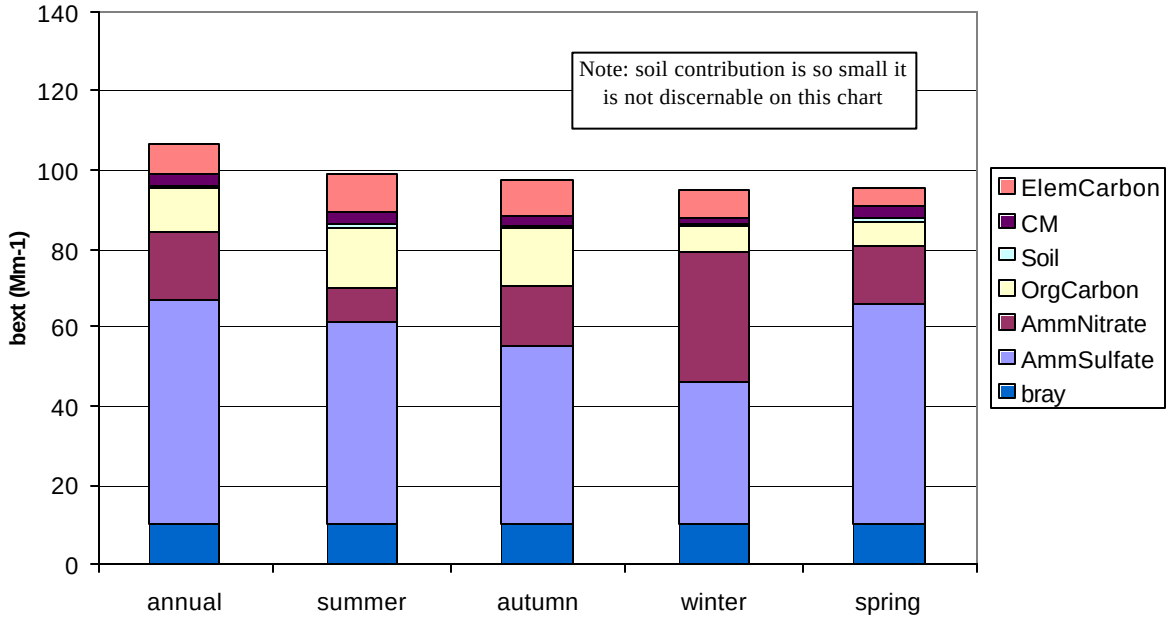
Mt. Rainier long-term light extinction trends
for worst visibility days
(12/1/88 - 11/30/97)



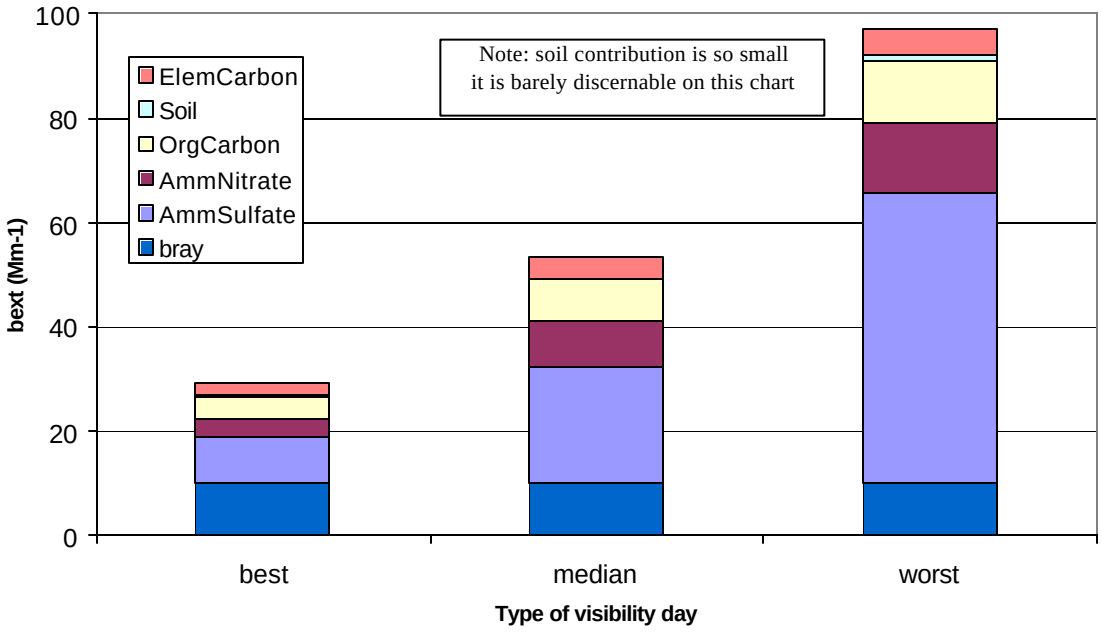
Mount Rainier average species contributions to light extinction for worst visibility days
12/1/94 - 11/30/97



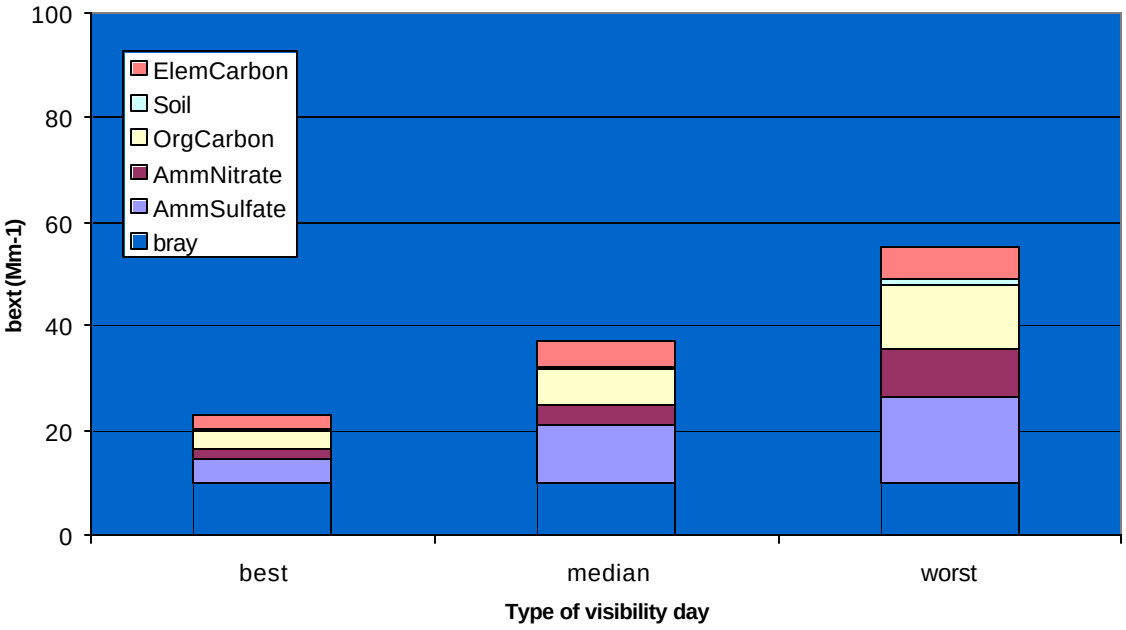
Snoqualmie Pass average species contribution to light extinction for worst visibility days
12/1/94 - 11/30/97



Mt. Zion annual average contributions to light extinction
9/1/96 - 8/31/97



Wishram annual average contributions to light extinction
9/1/96 - 8/31/97



Air Quality Program staff checks the automated and manual method data received from air monitoring sites for precision and accuracy. The following graphs show the 95 percent probability limits for each parameter measured. The horizontal lines show the Air Quality Program's objectives.

Figure 1. Summary of Automated Method Precision

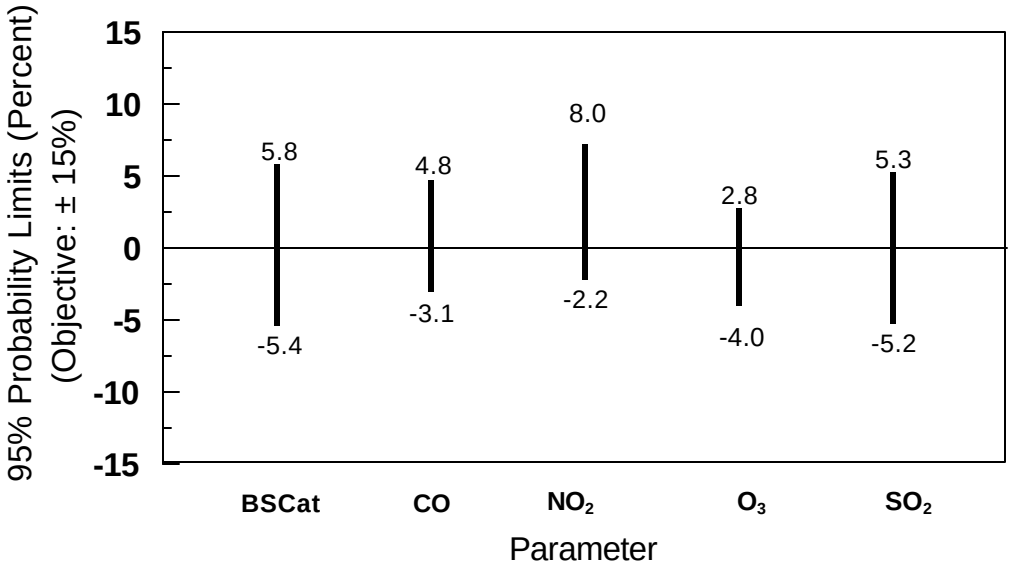


Figure 2. Summary of Carbon Monoxide (CO) Automated Method Accuracy

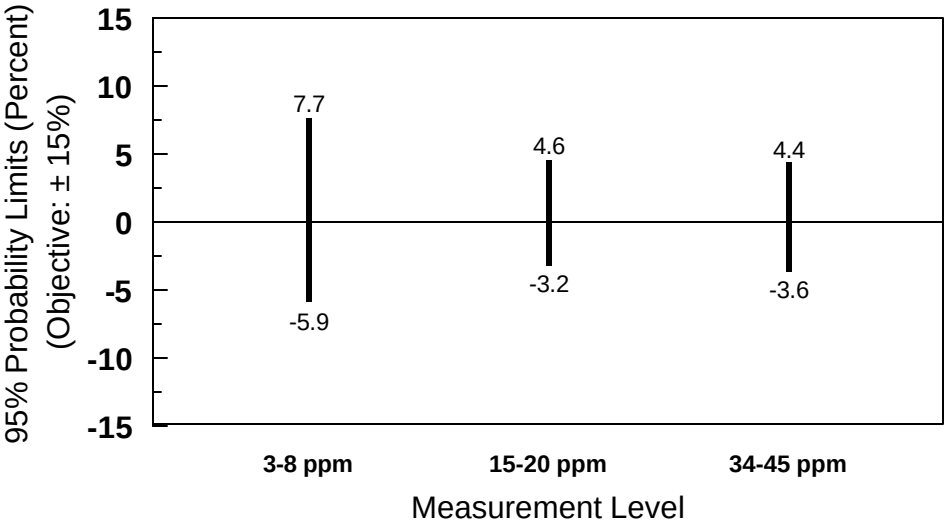


Figure 3. Summary of Nitrogen Dioxide (NO_2) Automated Method Accuracy

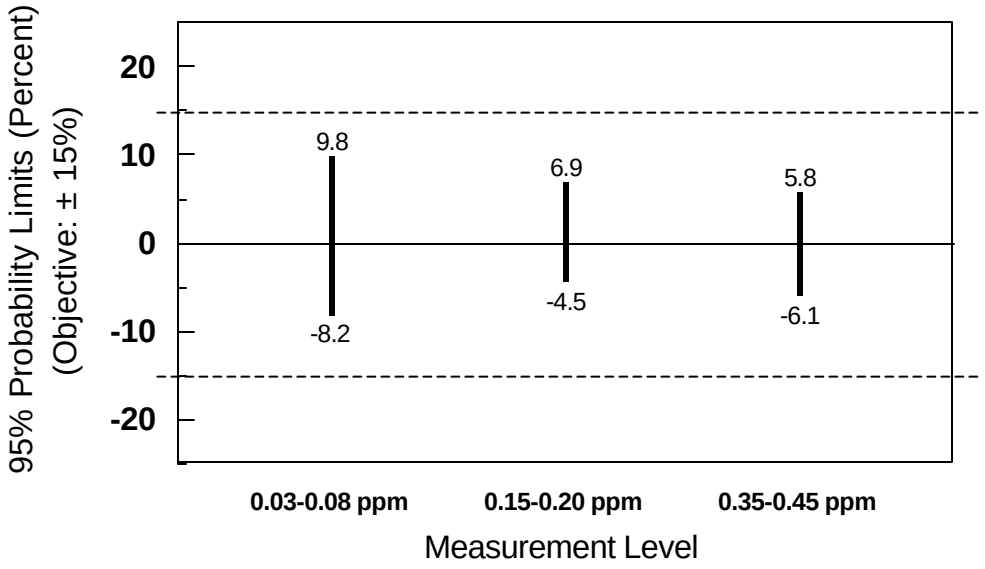


Figure 4. Summary of Ozone (O_3) Automated Method Accuray

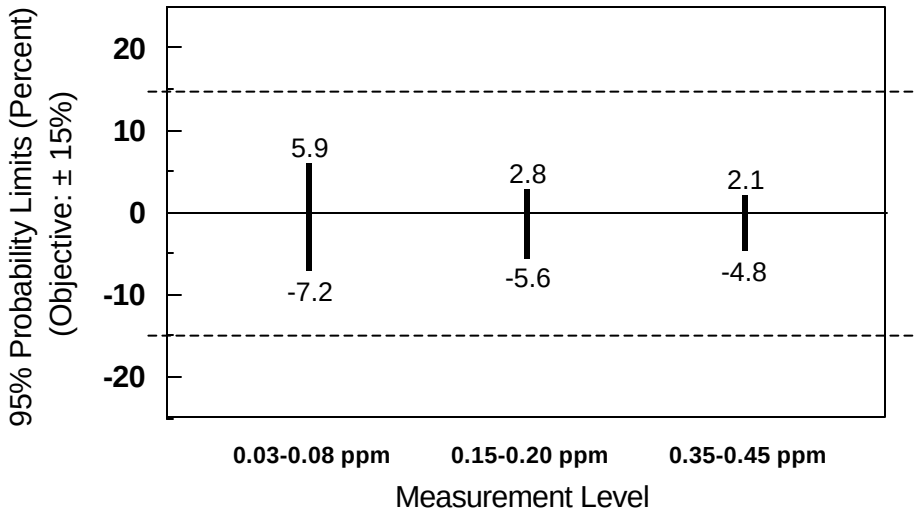


Figure 5. Summary of Sulfur Dioxide (SO_2) Automated Method Accuray

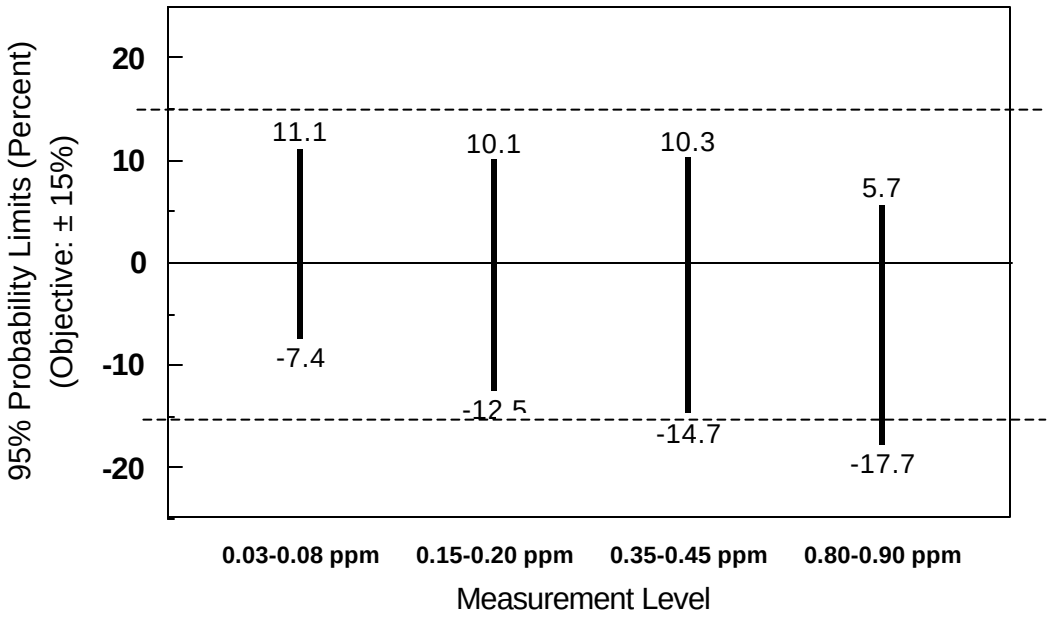


Figure 6. Summary of Manual Method Method Precision