KNECHTEL

AIR QUALITY DATA SUMMARY

1975

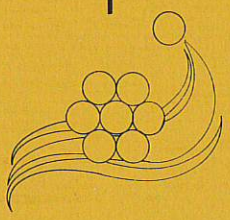
for counties of

KING

KITSAP

PIERCE

SNOHOMISH



measured and compiled by the
Technical Services Division

PUGET SOUND

AIR POLLUTION CONTROL AGENCY

1975
AIR QUALITY
DATA SUMMARY

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Technical Services Division

PUGET SOUND
AIR POLLUTION CONTROL AGENCY
410 West Harrison Street
P.O. Box 9863
Seattle, Washington 98109

Puget Sound Air Pollution Control Agency

Serving King, Kitsap, Pierce and Snohomish Counties
410 W. Harrison St., P.O. Box 9863, Seattle, WA 98109

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Technical Services Division
(206) 344-7325

PUGET SOUND AIR POLLUTION CONTROL AGENCY

1975

AIR QUALITY DATA SUMMARY

CONTENTS

INTRODUCTION

Presented herein is the air quality and meteorological data collected for the Central Puget Sound Region for the Year 1975. Data is presented so as to be intelligible to persons who may not be familiar with air quality and meteorological data, yet detailed enough for those who require information for decision making or scientific purposes.

The report begins with a description of the Agency's air monitoring system and the location of monitoring sites. The body of the report contains summaries of concentrations of each pollutant measured during 1975 and several analyses and interpretations of the data.

Air monitoring within the region cannot be described as comprehensive. The air is not being regularly monitored in certain outlying areas where population and human activities are on the increase. Air quality in such areas can only be estimated; budgetary constraints do not at this time permit additional monitoring there. Despite this, monitoring that is being done is sufficient to demonstrate overall trends particularly in and near industrial centers.

The chief objects of monitoring are to determine existing air quality in light of established standards, and to predict probable effects of additional pollutant loading to the atmosphere. Annual data for 1975 concerning a variety of pollutants is compared with standards in many of the tables and charts. But several years of data are required to measure progress in pollution control. Both 1975 data and other analyses show that levels of suspended particulate in the air is trending downward. A major decrease occurred in 1975 when numerous stations showed a decrease of 10 or more micrograms per cubic meter from 1974 levels. Some of this decrease can be attributed to the meteorological conditions that occurred on sampling days; the Agency is convinced that control efforts by industry also accounts for some of the decrease.

For specific information on air pollutants emitted by the aluminum industry, pulp and paper industry, and mobile sources (carbon monoxide, hydrocarbons and oxides of nitrogen), please contact the Washington State Department of Ecology, Olympia, Washington 98504.

During 1975, the Puget Sound Air Pollution Control Agency operated air sampling devices at 31 locations within the four-county area of jurisdiction. These sites can be categorized as: continuous automatic with telemetered data, and manually operated stations containing semiautomatic samplers.

TELEMETRY NETWORK

A 15 station telemetry network is operated within the four-county area in locations representing industrial, commercial and residential sections. This network provides real-time data for continuous surveillance of sulfur dioxide, coefficient of haze (a measure of suspended particulate and sometimes referred to as "soiling index"), wind speed and wind direction. Several stations measure additional parameters, such as ozone, nitrogen oxides, carbon monoxide, hydrocarbons, two levels of wind and delta-temperature between those wind levels. A computer at the Agency's Seattle office operates the network. It compiles, processes and prints out the data and summary information at regular intervals. During normal operation, five minute averages are obtained every 15 minutes, with one-hour and 24-hour moving averages compiled and printed each hour. Four-hour averages are also provided six times daily. During periods of poor air quality, continuous sampling may be selected with a printout every five minutes.

The processed data is converted to a scaled index value which defines air quality in relation to the stages of an air pollution episode. The reported index value for each of the three major metropolitan areas in our region (Everett, Seattle, Tacoma) is the value calculated from the highest 24-hour average of suspended particulate and/or sulfur dioxide. This information is made available to the news media and serves to keep the citizens informed of air quality on a continuing day-to-day basis.

MANUAL NETWORK

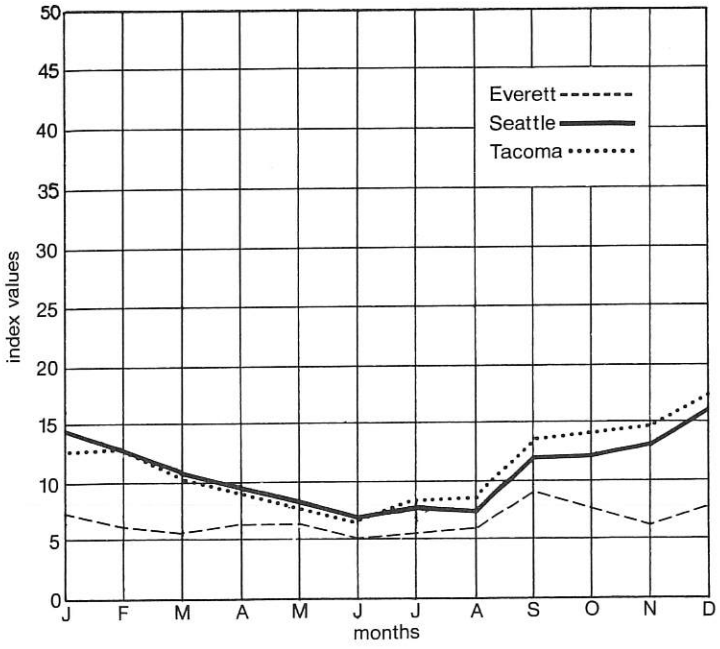
The manually operated network consists of a wind sensor at one location, and a high volume sampler located at each of 28 stations within the four-counties. The high volume samplers are operated every sixth day for a 24-hour period under control of preset electronic timers. The samplers collect particulate matter on specially prepared filter paper. The exposed filters are transported to the Agency laboratory where they are weighed. The results are then validated, recorded, and analyzed for use in determining the degree to which ambient air standards are being met.

The tables and graphs presented in this summary are generally self-explanatory. The data shows seasonal and geographic variability. Sufficient suspended particulate data is available to show seven year means at many stations.

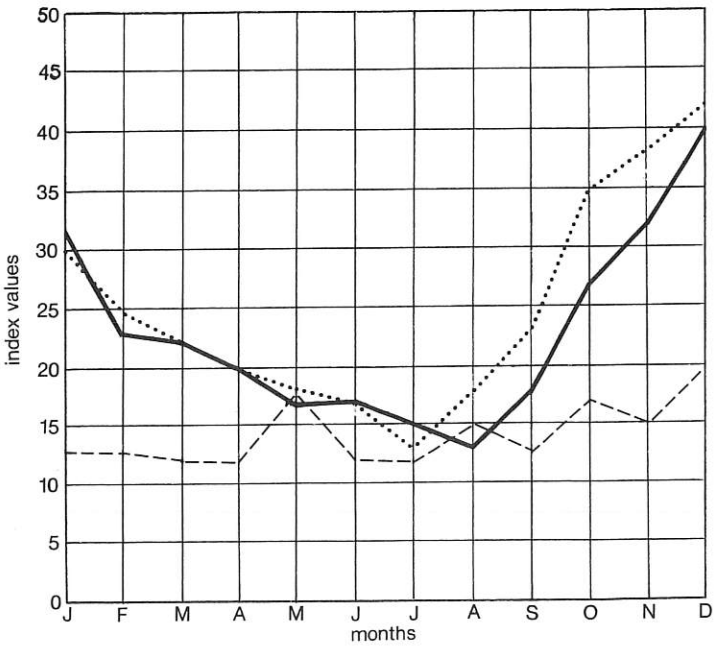
AIR QUALITY INDEX

The air quality index is a scalar value representing the average concentration of pollutants over a 24-hour period. An index is calculated three times a day, at 0800, 1200, and 1600 hours for each of the three geographic areas - Everett, Seattle and Tacoma. These values are tape-recorded Monday through Friday and are available to the news media through an unlisted telephone number. An index of 50 is defined as the alert stage of the Washington State Episode Avoidance Plan and is the lower limit for implementation of first stage source emission reduction actions. Values of 100 and 150 correspond to the warning and emergency stages respectively.

Monthly arithmetic mean for each area during 1975



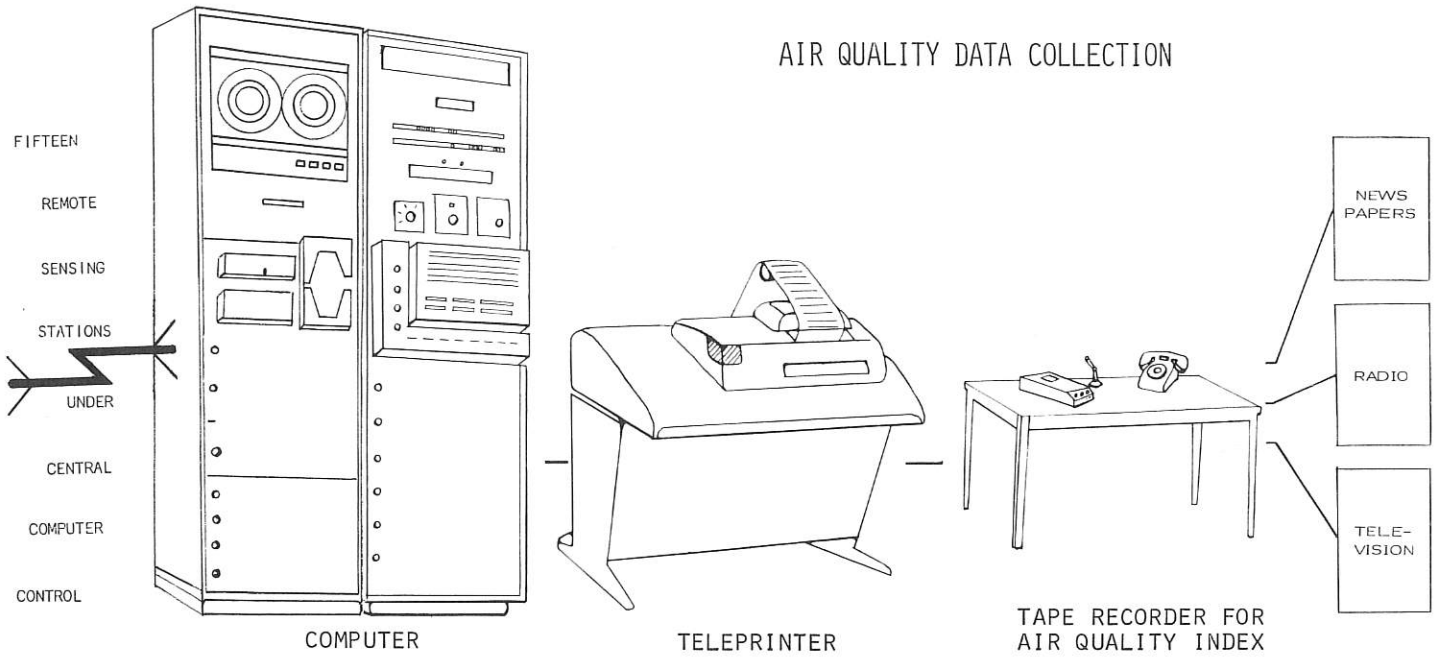
24-hour maximum value by month for each area during 1975



AIR STAGNATION ADVISORIES

Air stagnation advisories are issued by the National Weather Service when meteorological conditions are such that a significant build-up of air pollutants is considered likely. During 1975, no such advisories were issued or considered necessary. The chart on the right above indicates that a maximum 24-hour value of 40 was reached in Seattle and 42 was reached in Tacoma during December. In both cases, adverse meteorological conditions were of short duration and advisories were not issued.

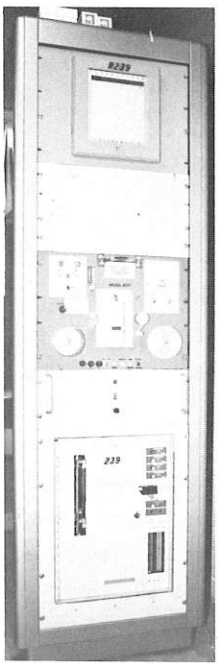
AIR QUALITY DATA COLLECTION



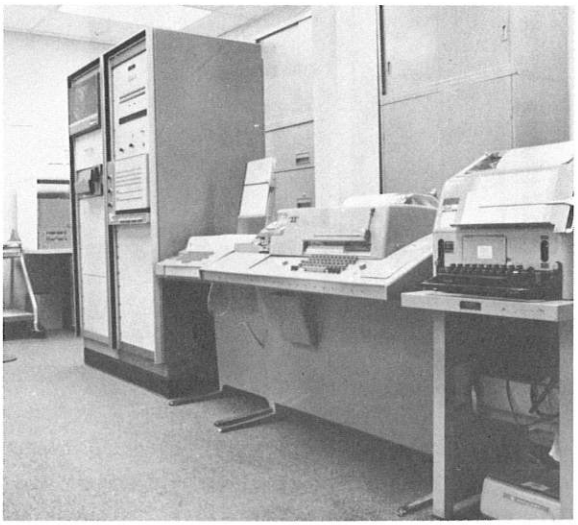
- Fifteen remote stations in the Puget Sound Region continuously monitor.

  WIND DIRECTION WIND SPEED SULFUR DIOXIDE SUSPENDED PARTICULATES (COH's)
  (Four stations have additional sensors)

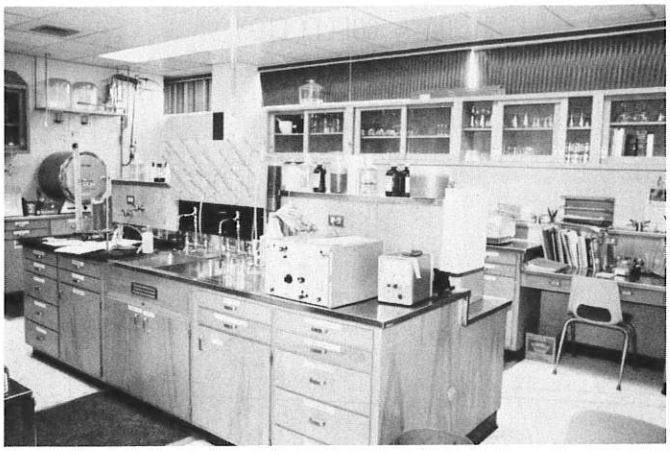
- Raw data is immediately telemetered to the central station computer via phone lines.
- Central station computer controls the entire network. It processes all raw data, and computes 5-minute, 1-hour, and 24-hour averages for immediate printout.
- Processed averages are printed by teleprinter on a continuous schedule around the clock each day of the year.
- All data is checked for validity or instrument malfunction by air quality specialists prior to use.
- Data is used to evaluate the attainment of ambient air quality standards and the effectiveness of the control plan; to maintain real-time surveillance for episode avoidance; and to report an air quality index to the public.
- After validation and elimination of erroneous data, the data is processed by off-line computer to provide a monthly summary containing the specific hourly averages, daily maximum, minimum, and mean, monthly arithmetic and geometric means, excesses of standards and pertinent identifying information.
- Permanent data files stored on magnetic tape or disk allow rapid retrieval for correlation with other data, trend analyses, atmospheric modeling, land use planning, and special studies.
- Nontelemetered data from semiautomatic instruments is manually reduced, punched on cards, processed, printed, and stored in similar permanent files for rapid retrieval.



On the left is one of the fifteen remote station equipment cabinets housing the sulfur dioxide monitor, the wind speed and direction signal conditioner and translator, the tape sampler for suspended particulates measured as COH (soiling index) and the telemetry electronics. The anemometer, wind direction sensor, and probes for SO_2 and COH are installed to obtain representative samples in the ambient air. Each station has a capability of fourteen separate sensors. Two stations are presently equipped with eleven sensors, one with six sensors and one with five. Other stations will continue to operate with either three or four sensors.

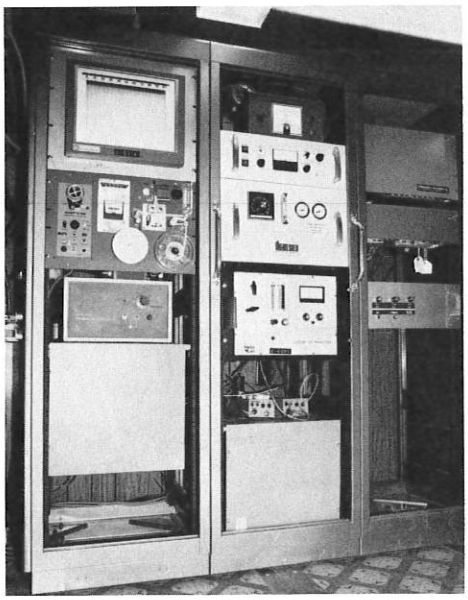


On the right is the central station computer whose functions are described above. One equipment rack contains the magnetic tape recorder and high speed paper tape reader; the 24K byte computer and telemetry interface electronics are in the other equipment rack. Next to it is a console printer which also serves as a standby system printer. The large teletype console prints the processed data and also contains a paper tape punch and reader. At the extreme right is a weather teletype.

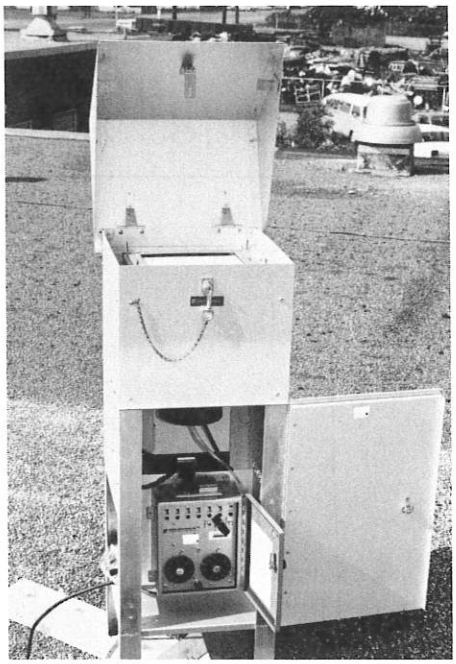


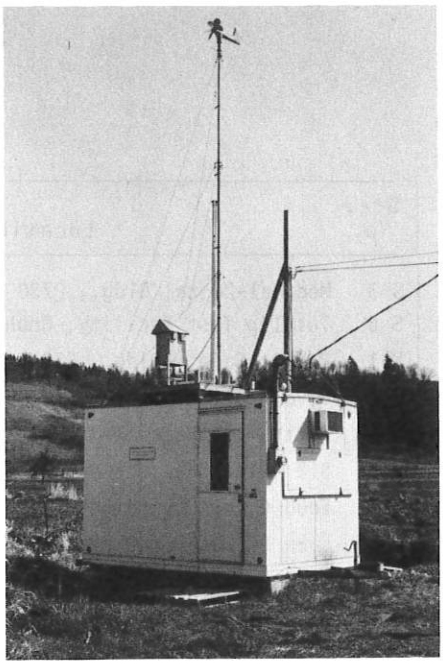
Collection of valid data requires extensive support from both the chemical and the instrument calibration laboratories. On the left is the Agency chemical laboratory. Here chemicals and gases are prepared for use in calibration of gas sampling equipment and are analyzed after calibration; filters for measurement of suspended particulates are conditioned and weighed; photomicrographs are made of pollution specimens undergoing microscopic analysis; spectrophotometric calibration is performed on neutral density filters used in the calibration of tape samplers; gravimetric, limited organic, and inorganic analysis is completed on industrial stack samples, etc.

All equipment requires calibration at scheduled intervals and/or after most repair work. On the left, a technician is calibrating one of a pair of Meloy Sulfur Analyzers. A pair of Davis Sulfur Dioxide Monitors and their recorders to his left are in the final phase of calibration prior to field installation. To his right are a hydrogen generator, a strip chart recorder, a second hydrogen generator and a Meloy Sulfur Analyzer. These instruments are calibrated in pairs using procedures outlined in the Federal Register.



Instrumentation in the Seattle City Light trailer described on the next page is shown at left and right above. At left, at the top of the first rack is a multipoint recorder which provides backup recording of all data except COH, wind and suspended particulates by high volume sampler. Below the recorder is a tape sampler with flow regulator for measuring COH. In the second rack is the remote delta-temperature device, the NO-NO_2-NOx instrument and the SO_2 instrument. The third rack contains the electronics for two levels of wind and the telemetry hardware for all measurements except suspended particulates collected by high volume sampler. At the right is another view of the instrument racks described above. Resting on the counter is a gas chromatograph for monitoring HC and CO together with its bottled pure air supply. Between the instrument racks and gas chromatograph is a cabinet housing bottled hydrogen for the SO_2 instrument and gas chromatograph.



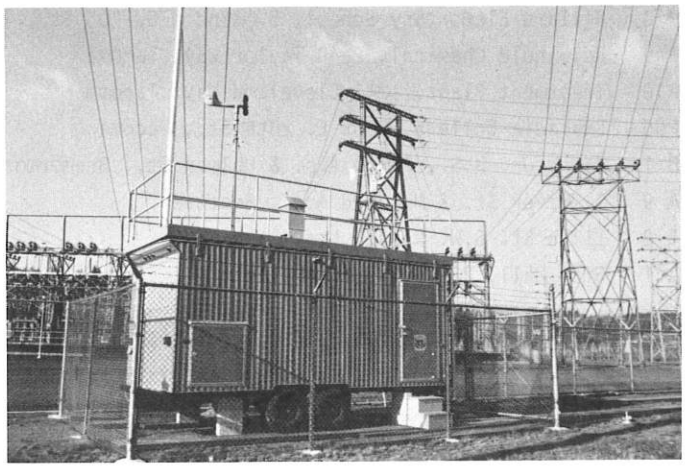


Above is a high volume air sampler used for measuring suspended particulates. This instrument, open for illustrative purposes, contains a specially prepared filter in the top portion of the protective cabinet and an electric timer at the base. This instrument is normally operated for a 24-hour period and will collect particulates as small as 0.3 microns with 99.7% efficiency. A micron is 0.001 millimeters or 0.000039 inches.

Most of the Agency equipment is located in schools, fire stations, city halls and commercial structures. In some areas, structures do not exist or do not meet the siting criteria. In these areas, trailers or portable buildings must be used as shelters for sampling equipment. At the top center is a portable building used at the McMicken Heights Reservoir, near SEA-TAC Airport. Visible on the roof are the total oxidant sampler, the high volume sampler, the wind sensing equipment, and the probes for SO_2, COH (tape sampler) and NO_2. Inside are the analyzers and the telemetry electronics.

On the top right is a portable building used at Kent. On the roof are the high volume sampler, the wind sensing equipment and probes for bringing air to the analyzers. This station measures SO_2, Ozone, COH, b_{scat} (a measure of light scatter by aerosols), wind speed, direction and suspended particulates by high volume sampler. All the data except suspended particulates measured by the high volume sampler are telemetered.

Below is one of two trailers owned by Seattle City Light and operated by the Agency. These well instrumented special purpose units provide environmental information for Seattle City Light at a power substation in the Duwamish Basin Industrial area and at a site near Marysville. Measurements include HC, CO, NO, NO_2, NOx, SO_2, COH, delta-temperature, wind and suspended particulates. All data is telemetered except suspended particulate measured by high volume samplers.



PUGET SOUND AIR POLLUTION CONTROL AGENCY

ATMOSPHERIC SAMPLING NETWORK

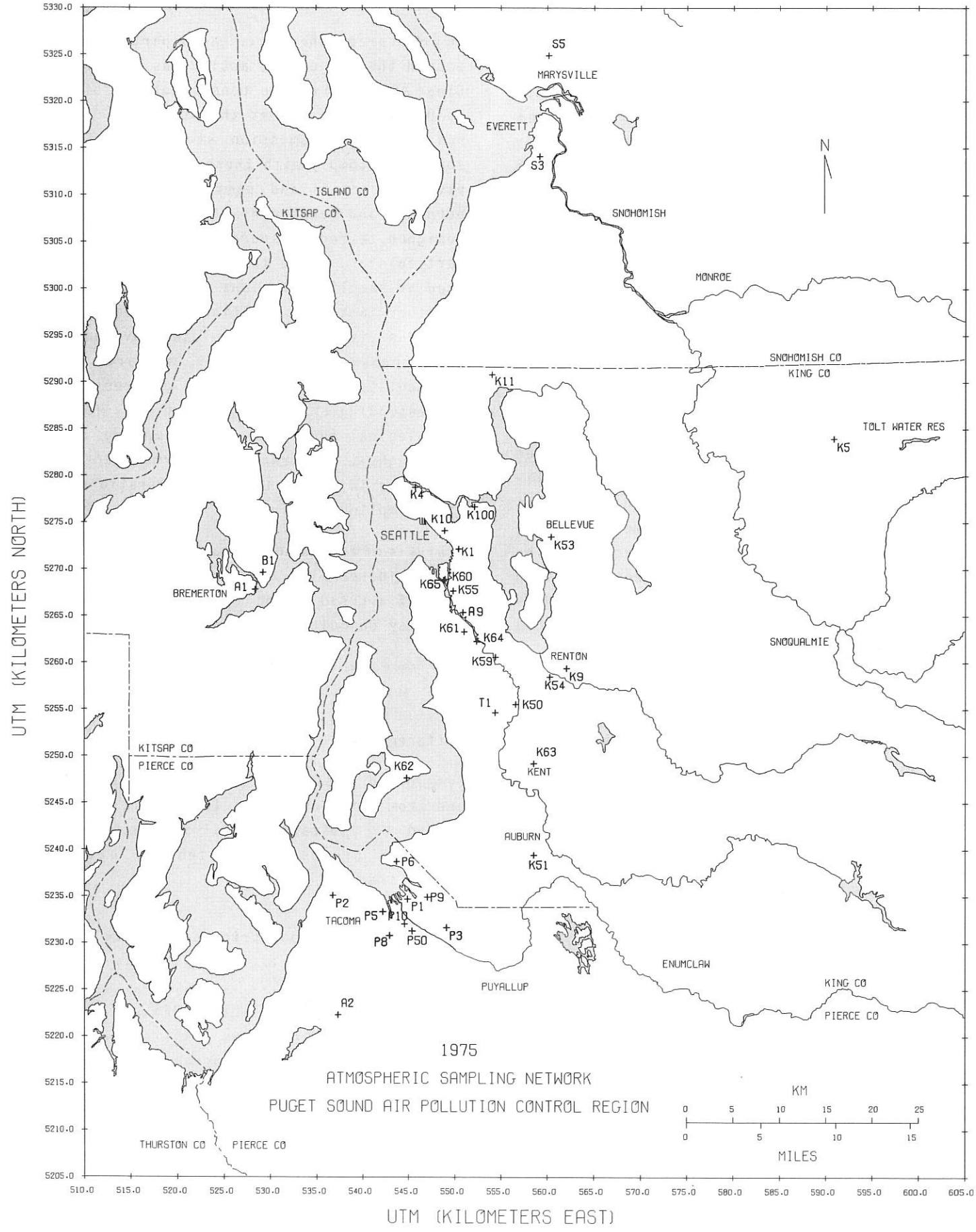
1975

Sta. No.	Location	1	2	3	4	5	6	7	8	9	10
S 3	Medical-Dental Bldg., 2730 Colby Ave., Everett	x	x	x	x						
S 5	Tulalip Test Facility, Snohomish Co.	x	x	x	x	x	x		x	x	x
K 1	Public Safety Bldg., 604-3rd Ave., Seattle	x									
K 4	USCG Station, 2700 W. Commodore Way, Seattle	x									
K 5	Tolt River Watershed (East of Lake Joy)	x									
K 9	S.E. Dist. Health Center, 12015 S.E. 128th St., Renton	x									
K10	Food Circus Building, Seattle Center	x	x	x	x						
K11	Lake Forest Park Rsvr., N.E. 195th & 46th N.E., Seattle				x						
K50	Southcenter, Andover Park E., Tukwila	x	x	x	x						
K51	115 East Main St. & Auburn Ave., Auburn	x									
K53	Puget Power Bldg., 10604 N.E. 4th, Bellevue	x									
K54	Municipal Bldg., 200 Mill Ave. S., Renton	x									
K55	Duwamish, 4500 Blk. E. Marginal Way S., Seattle	x	x	x	x						
K59	Duwamish Valley, 12026-42nd Ave. S., King Co.	x									
K60	Harbor Island, 3400 13th Ave. S.W., Seattle	x									
K61	South Park, 723 S. Concord St., Seattle	x									
K62	S.W. 248th & 59th S.W., Maury Island		x		x						
K63	1234 N. Central Ave., Kent	x	x	x	x			x			
K64	10,000 W. Marginal Way S.W., Seattle	x	x	x	x	x	x		x	x	x
K65	Harbor Island, 3419 13th Ave. S.W., Seattle		x		x						
K100	NWS Urban Site, 2725 Montlake Blvd. E., Seattle				x						
T 1	McMicken Hts., S. 176th & 42nd Ave. S., King Co.	x	x	x	x						
P 1	2316 E. 11th St. & Thorne Rd., Tacoma	x		x	x						
P 2	N. 26th & Pearl St., Tacoma	x	x	x	x						
P 3	Fife Sr. H.S., 5616 20th E., Fife	x									
P 5	Hess Bldg., 901 Tacoma Ave. S., Tacoma	x									
P 6	Meeker Jr. H.S., 1526 51st St. N.E., Tacoma	x	x	x	x						
P 8	Willard Elementary School, S. 32nd & S. "D" St., Tacoma	x	x	x	x						
P 9	Reichhold Chemical, 2340 Taylor Way, Tacoma	x									
P10	Treatment Plant, 1241 Cleveland Way, Tacoma	x									
P50	Cascadia College, 2002 E. 28th St., Tacoma	x									
B 1	Dewey Jr. H.S., Perry Ave. & Holman St., Bremerton	x	x	x	x						
A 9	S. River St. & Maynard Ave., Seattle	x									
A 2	112th St. S.W. & Loch Lea, Lakewood	x									
A 1	City Hall, 239 4th St., Bremerton	x									

"A" Codes operated by Washington State Department of Ecology

TYPE OF SAMPLING

1. High Volume Sampler
2. Sulfur Dioxide (SO_2)
3. Soiling Index (COH)
4. Wind Speed & Direction
5. Nitrogen Dioxide (NO_2)
6. Nitrogen Oxides (NO_X)
7. Ozone
8. Hydrocarbons (nonmethane)
9. Carbon Monoxide (CO)
10. Delta Temperature


S5
MARYSVILLE
EVERETT
S3
N
ISLAND CO
KITSAP CO
SNOHOMISH
MONROE
SNOHOMISH CO
KING CO
K11
TOLT WATER RES
K5
K4
K10
K100
SEATTLE
BELLEVUE
K53
K1
B1
A1
BREMERTON
K60
K65
K55
A9
K61
K64
K59
RENTON
K9
K54
T1
K50
SNOQUALMIE
KITSAP CO
PIERCE CO
K62
K63
KENT
AUBURN
K51
P6
P2
P9
P1
TACOMA
P5
P10
P8
P50
P3
ENUMCLAW
PUYALLUP
KING CO
PIERCE CO
A2
1975
ATMOSPHERIC SAMPLING NETWORK
PUGET SOUND AIR POLLUTION CONTROL REGION
KM
0 5 10 15 20 25
0 5 10 15
MILES
THURSTON CO
PIERCE CO
UTM (KILOMETERS NORTH)
5330.0 5325.0 5320.0 5315.0 5310.0 5305.0 5300.0 5295.0 5290.0 5285.0 5280.0 5275.0 5270.0 5265.0 5260.0 5255.0 5250.0 5245.0 5240.0 5235.0 5230.0 5225.0 5220.0 5215.0 5210.0 5205.0
510.0 515.0 520.0 525.0 530.0 535.0 540.0 545.0 550.0 555.0 560.0 565.0 570.0 575.0 580.0 585.0 590.0 595.0 600.0 605.0
UTM (KILOMETERS EAST)

ANALYSIS OF SUSPENDED PARTICULATES

The Agency operates a network of high volume samplers which monitors suspended particulates at several locations within Snohomish, King, Kitsap, and Pierce Counties. These samplers have operated on an intermittent schedule sampling continuously for 24 hours every third day from February 1965 through December 1968, every fourth day from January 1969 through December 1972, and every sixth day since January 1973. A total of 18 stations have acquired at least four years of data through the end of 1975; two Seattle area stations have been operating continuously since February, 1965 thus accumulating eleven years of data.

In April 1971 the Federal Government promulgated national primary and secondary ambient air standards for suspended particulates. Later in the year the Agency's existing standard for suspended particulates was modified so that it was identical to the national secondary standard. This sets a value of 60 micrograms per cubic meter, annual geometric mean, which shall not be exceeded. The standard is written in terms of a geometric mean rather than an arithmetic mean because the distribution of air quality data is better described by the geometric statistic.

As a result of the averaging period indicated by the standard, a minimum of one year of sampling is required at any location to assess the suspended particulate levels with respect to the annual standard. As additional years of data are acquired, the suspended particulate levels become better documented at that location. These levels are a complex function of emissions from many sources, meteorological diffusion and dispersion of these emissions, and the surrounding topographic features.

For example, valleys are topographic features that limit the free movement of air thus contributing to the trapping of suspended particulates emitted from sources in the valley. Meteorological patterns follow average seasonal and annual cycles; however, each year varies somewhat from average conditions. Source emissions also change with time.

In urban areas where suspended particulate levels exceed the standards, action was required by the Clean Air Act to reduce concentrations of suspended particulates to meet the standards. The Agency has implemented emission standards and required sources to comply with these standards, encouraged paving of roads and parking lots, reduced open burning, and taken many other individual actions designed to reduce source emissions of suspended particulates. Since the air quality levels measured at sampling stations are a complex function of other factors in addition to changes in source emissions, it is never absolutely evident whether an increase or decrease in measured suspended particulate concentrations is a direct result of corresponding changes in source emissions. Meteorological conditions on sampling days that are slightly different from normal can have considerable influence on the concentrations measured at a sampling station.

Analysis of trends in air quality must, therefore, be considered with all factors in mind. Assessment of a trend based on only a year or two of data may be quite erroneous.

The pages which follow this narrative provide 1975 suspended particulate data in several formats which interpret and analyze the data in different ways.

Summarized suspended particulate data for 1975 and from previous years in graphic form is included to indicate spatial and temporal variations and trends. These tables, graphs, and charts are:

The 1974 and 1975 annual geometric mean isopleth maps indicate the horizontal distribution of suspended particulates throughout the region. The value for any given location may be easily interpolated and assessed with respect to the annual standard of 60 micrograms per cubic meter (geometric mean). The development of these annual average isopleth maps require the input of (1) measured air quality data, (2) meteorological conditions, (3) topographic influences, i.e., land, water, valleys and hills, (4) demography of the area, and (5) the particulate emissions of all sources. These maps delineate the areas which exceed the standard and provide information on the change from one calendar year to the next.

An analysis technique which allows a reasonable determination of trends is the moving mean or average. As applied to suspended particulates, a 12 month moving geometric mean relates directly to the annual standard. This moving mean is calculated simply by computing the 12 month geomtric mean for consecutive 12 month intervals and identifying each resultant value with the ending month for the particular 12 month interval. These values may be easily plotted on a graph to depict observed concentrations which relate directly to the annual standard. As more and more years of data are acquired at a sampling station the power of the technique to portray a trend is enhanced.

A variation of this technique which does even a better job of portraying a trend, but requires more years of data, is calculation of the moving geometric mean in multiples of 12 months. For example, 24 and 36 month moving geometric means smooth out some of the year to year variations in meteorology and short-term changes in source emissions to more clearly depict the trend.

These analysis techniques were applied to suspended particulate monitoring stations in the Puget Sound region which had acquired at least four years of data through the end of 1975. The longer moving geometric means were applied as the data base permitted.

Data has been acquired continuously at the Public Safety Building in Seattle since February, 1965. The 12 month moving geometric mean plot (page 12) shows short-term fluctuations, but also depicts a long-term downward trend which appears to level out just below the value of the annual standard. This long-term trend is even more evident in the 24 and 36 month moving geometric mean graphs. Assessment of a trend based on isolated 12 month segments of the 12 month moving geometric mean trace could easily be erroneous; for example, the period from July to November 1974 indicates a sharp upward trend and just the opposite during the same period in 1975.

The other Seattle area station with about ten years of data is located at 2700 West Commodore Way. The 12 month moving geometric mean plot (page 12) indicates a long-term downward trend with values generally below the annual standard except for an upturn during 1973. In February 1974, a reversal of the short-term uptrend occurred and was sustained through 1975. The 24 and 36 month moving geometric mean graphs more clearly depict the long-term downward trend which appears to level off during the past three years.

Parallel to depicting levels of suspended particulates in the urban areas, it is important to document these concentrations in the non-urban regions. The Agency has operated a single station near the Tolt Water Reservoir in the foothills of the Cascade Mountains since November, 1966. The 12, 24, and 36 month moving geometric mean graphs (page 13) all depict a reasonably constant value of about 14 micrograms per cubic meter which is neither increasing nor decreasing. This value is considered to be an average background value for the air of the Puget Sound region. Evidently this station is not significantly affected by the urbanized areas in the Puget Sound region.

Two areas in the Puget Sound region have exceeded the standard regularly since monitoring was initiated. These are the industrialized Duwamish Valley in south Seattle and the tideflats in

Tacoma. The 12 month moving geometric mean for the station on Thorne Road (tideflats) in Tacoma (page 13), which has been operating since August, 1967, demonstrates a decrease into 1972 followed by an increase in 1973 and a decrease the first half of 1974, and all through 1975. Values droped below the annual standard in mid-1975. The 36 month moving geometric mean plot indicates a steady long-term downward trend at this location.

Another station just south of the tideflats but influenced by emissions from this source area, shows a similar pattern exhibiting greater extremes over the past three years. Located at 2002 E. 28th Street, Tacoma, this station has been operational since April 1, 1970. The 12 month moving geometric mean trace (page 17) depicts a rapid climb from December 1971 to January 1973, then a decrease at about the same rate until August 1974, and then a rise to the end of the year. A steady decrease is noted during 1975. The 36 month moving geometric mean trace indicates a fairly steady long-term trend through 1974 and a steady decline in 1975.

A station in the Duwamish industrial area at 4500 E. Marginal Way South began operation in August, 1971. The 12 month moving geometric mean plot at this station (page 14) initially shows values averaging about 77 micrograms per cubic meter. Then the values decrease from mid-1973 to the annual standard in mid-1974, increase again during the last half of 1974, level off through July 1975 and decrease the remainder of the year. The 24 and 36 month moving geometric mean plots show a steady downward trend.

The 12 month moving geometric mean for the Auburn station (page 15) indicated a fairly steady climb from January 1972 to December 1973, and at that time exceeded the annual standard for suspended particulates. Since 1974 there was a general decrease. Both the 24 and 36 month moving geometric mean plots depict a fairly level long-term trend.

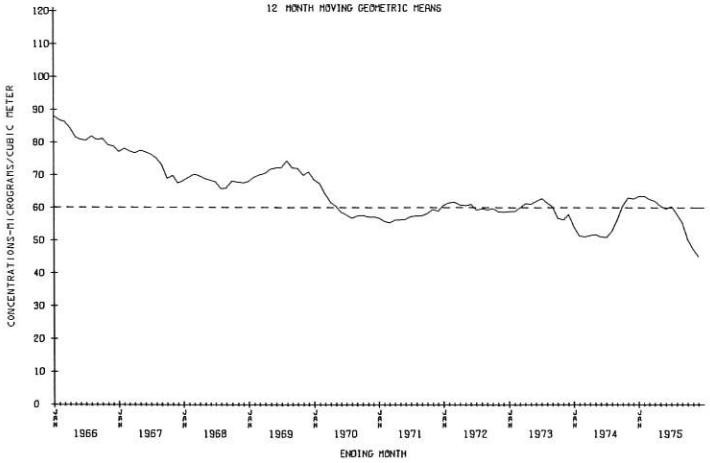
Analysis of data acquired at 10 other suspended particulate monitoring stations includes the communities of Bellevue, Renton, Everett and Bremerton in addition to other sites in the greater Seattle and Tacoma areas. The values at all of these stations are below the annual standard. The graphs for two stations in the Renton area (page 19), show some evidence of a slight downward trend; data from the communities of Bellevue, Everett, and Bremerton reflect reasonably constant levels. Most of the graphs for the additional sites in the greater Seattle and Tacoma areas depict evidence of a long-term downward trend.

In summary, this analysis shows that air quality levels of suspended particulates are decreasing in the major urban areas. Continued effort is required to reduce levels to meet the standards in the industrialized Duwamish Valley of Seattle and to maintain levels below standards in the industrialized tideflats area of Tacoma. Outlying areas where growth is expected require continuing and increased monitoring, particularly in valleys which serve as a natural restriction in the dispersion of pollutants.

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

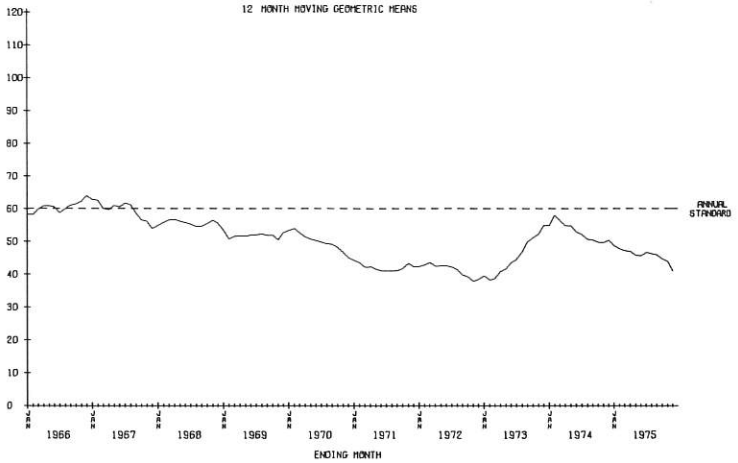


PUBLIC SAFETY BUILDING, 604 - 3RD AVE, SEATTLE

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

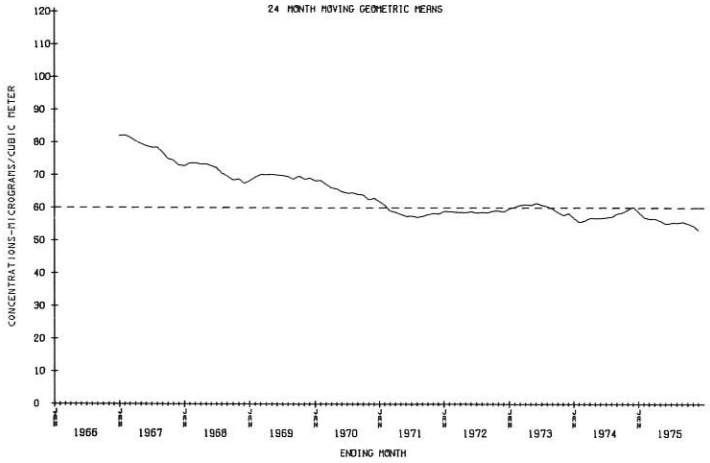
12 MONTH MOVING GEOMETRIC MEANS



USCG STATION, 2700 W COMMODORE WAY, SEATTLE

SUSPENDED PARTICULATES

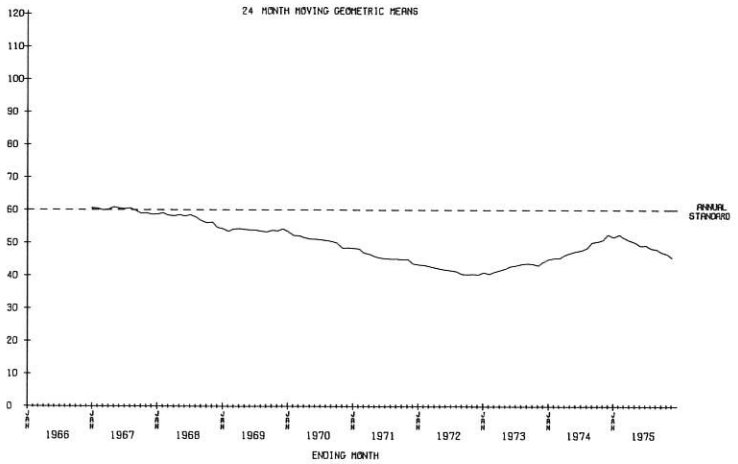
24 MONTH MOVING GEOMETRIC MEANS



PUBLIC SAFETY BUILDING, 604 - 3RD AVE, SEATTLE

SUSPENDED PARTICULATES

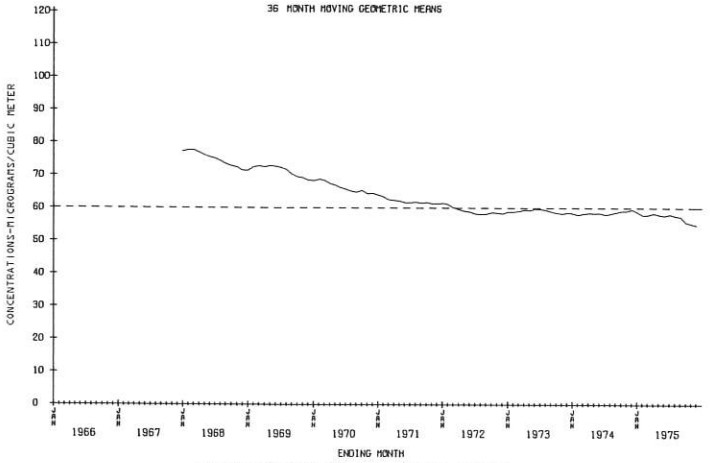
24 MONTH MOVING GEOMETRIC MEANS



USCG STATION, 2700 W COMMODORE WAY, SEATTLE

SUSPENDED PARTICULATES

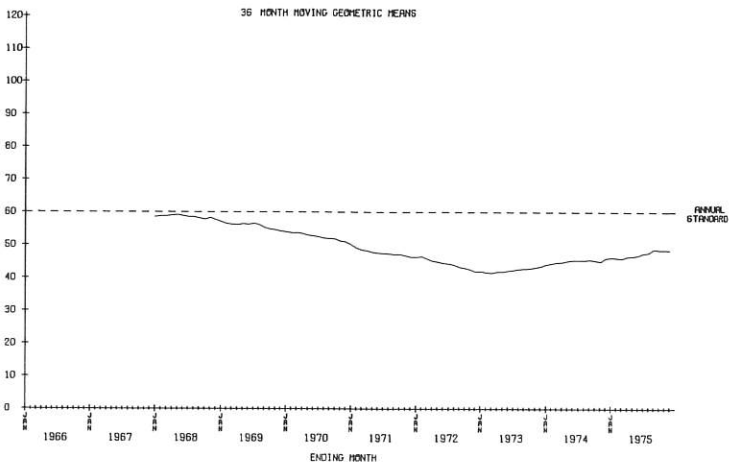
36 MONTH MOVING GEOMETRIC MEANS



PUBLIC SAFETY BUILDING, 604 - 3RD AVE, SEATTLE

SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS

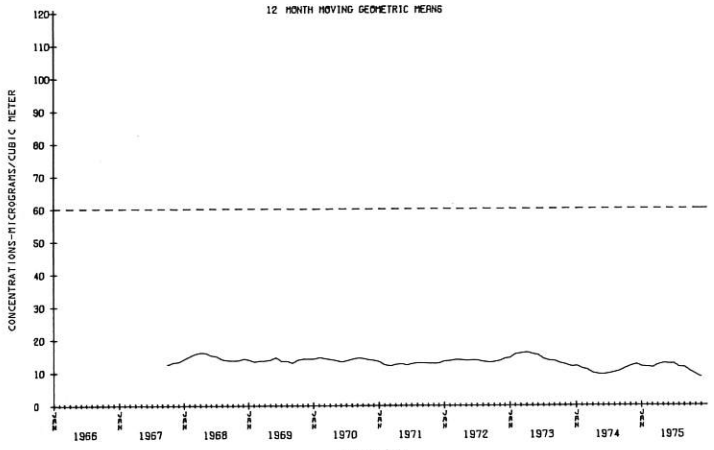


USCG STATION, 2700 W COMMODORE WAY, SEATTLE

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

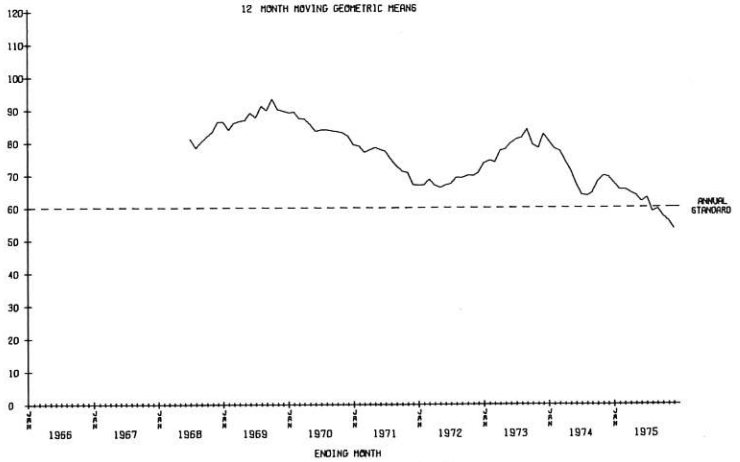


TOLT RIVER WATERSHED (EAST OF LAKE JOY)

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

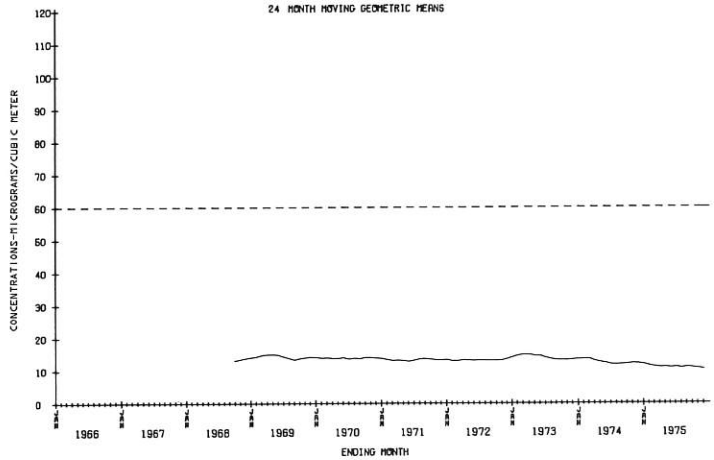
12 MONTH MOVING GEOMETRIC MEANS



2316 E 11TH ST AND THORNE ROAD, TACOMA, WA

SUSPENDED PARTICULATES

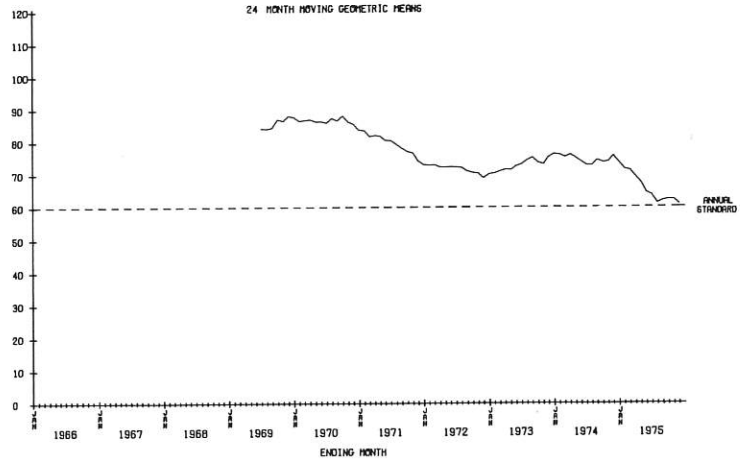
24 MONTH MOVING GEOMETRIC MEANS



TOLT RIVER WATERSHED (EAST OF LAKE JOY)

SUSPENDED PARTICULATES

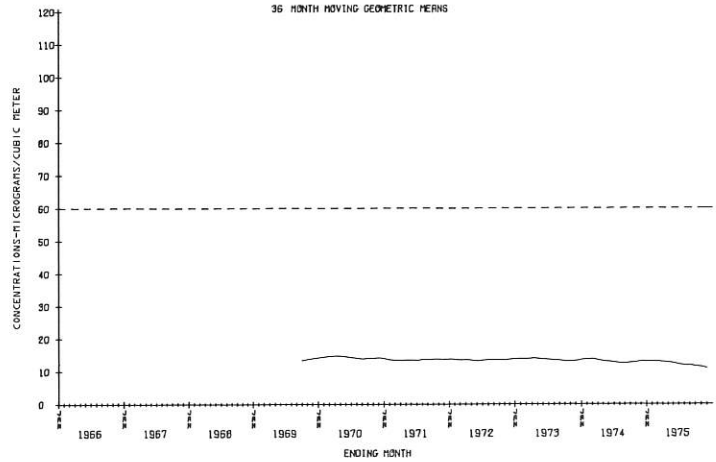
24 MONTH MOVING GEOMETRIC MEANS



2316 E 11TH ST AND THORNE ROAD, TACOMA, WA

SUSPENDED PARTICULATES

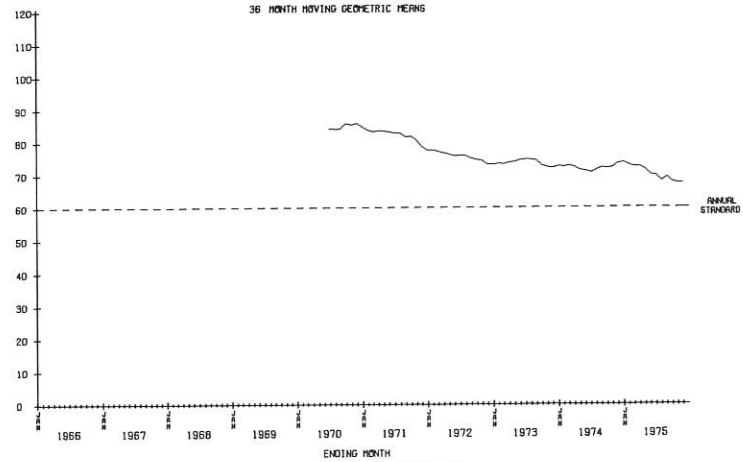
36 MONTH MOVING GEOMETRIC MEANS



TOLT RIVER WATERSHED (EAST OF LAKE JOY)

SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS

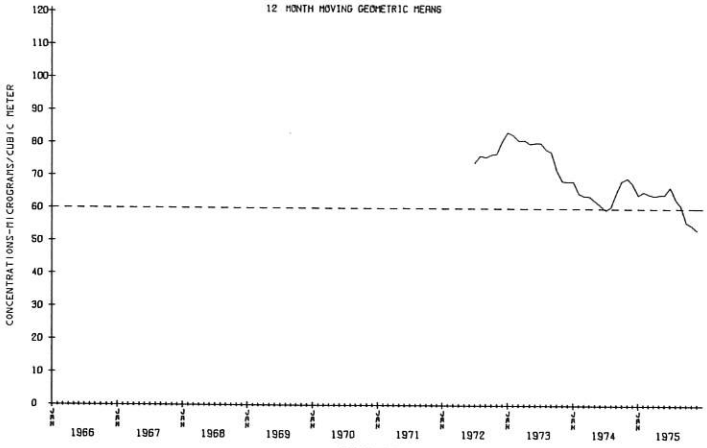


2316 E 11TH ST AND THORNE ROAD, TACOMA, WA

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

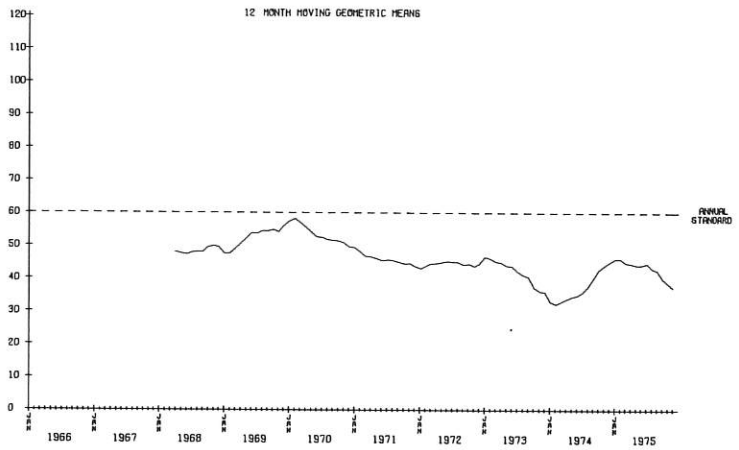


DUWAMISH, 4500 BLK E MARGINAL WAY S, SEATTLE

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

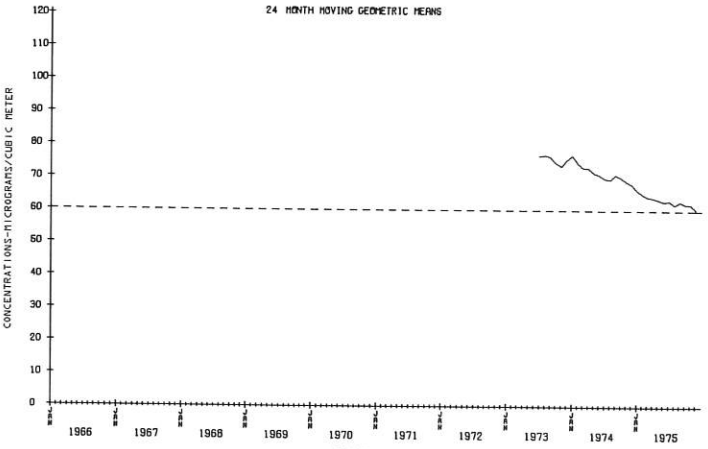
12 MONTH MOVING GEOMETRIC MEANS



FOOD CIRCUS BUILDING, SEATTLE CENTER

SUSPENDED PARTICULATES

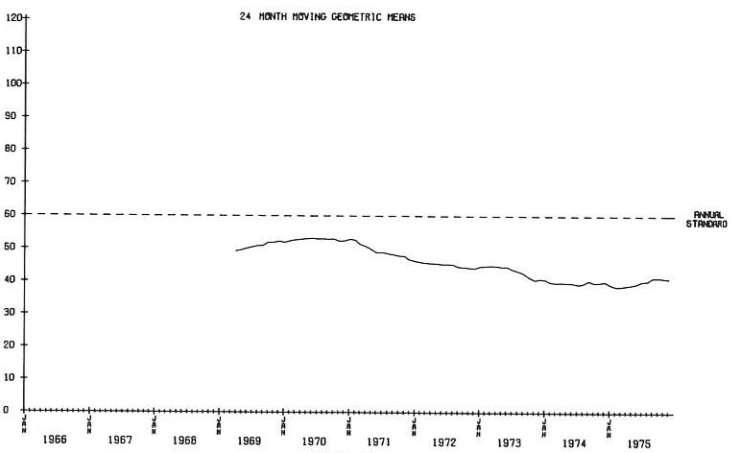
24 MONTH MOVING GEOMETRIC MEANS



DUWAMISH, 4500 BLK E MARGINAL WAY S, SEATTLE

SUSPENDED PARTICULATES

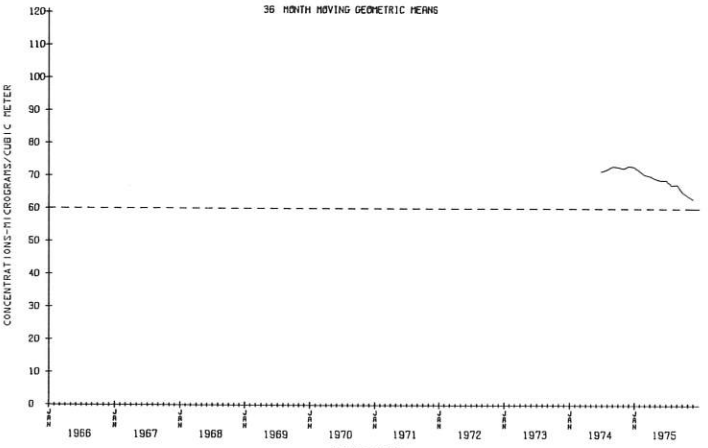
24 MONTH MOVING GEOMETRIC MEANS



FOOD CIRCUS BUILDING, SEATTLE CENTER

SUSPENDED PARTICULATES

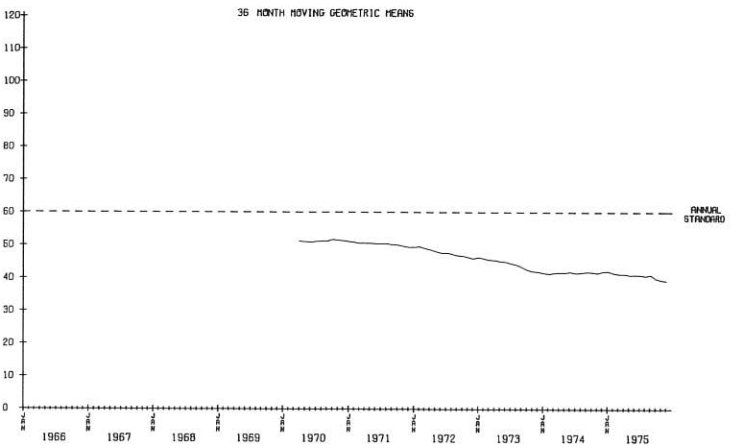
36 MONTH MOVING GEOMETRIC MEANS



DUWAMISH, 4500 BLK E MARGINAL WAY S, SEATTLE

SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS

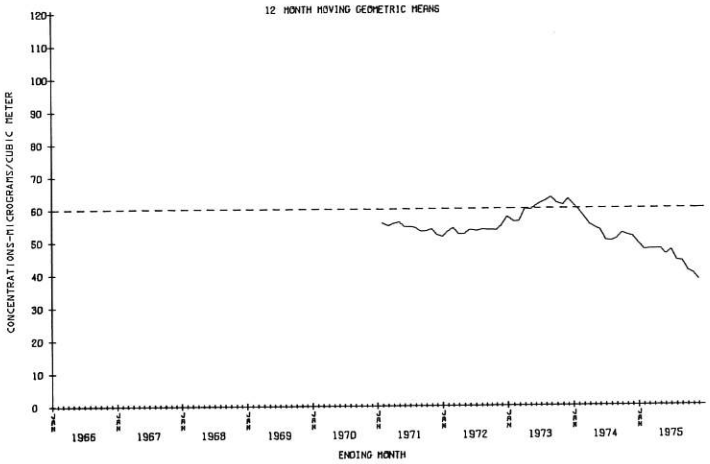


FOOD CIRCUS BUILDING, SEATTLE CENTER

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

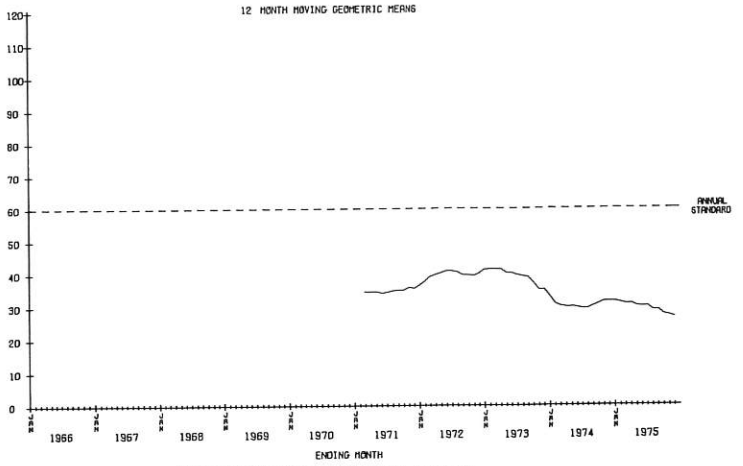


115 EAST MAIN STREET & AUBURN AVE. AUBURN. WA

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

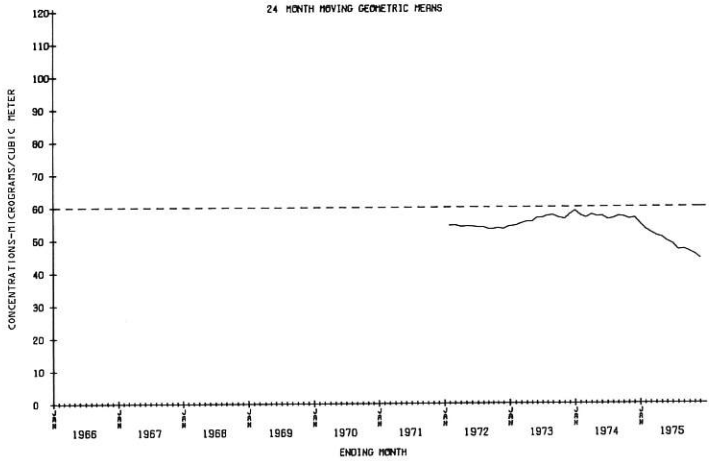
12 MONTH MOVING GEOMETRIC MEANS



PUGET POWER BUILDING. 10604 NE 4TH. BELLEVUE

SUSPENDED PARTICULATES

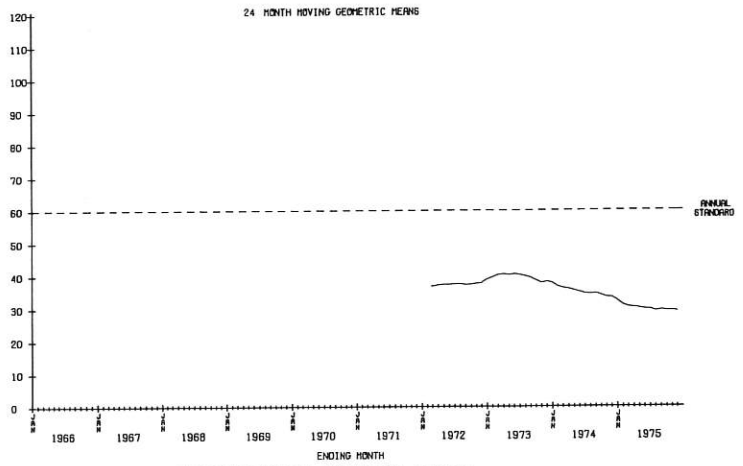
24 MONTH MOVING GEOMETRIC MEANS



115 EAST MAIN STREET & AUBURN AVE. AUBURN. WA

SUSPENDED PARTICULATES

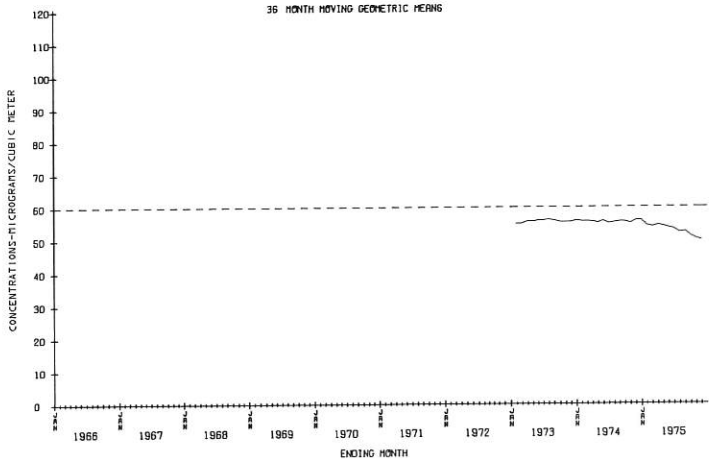
24 MONTH MOVING GEOMETRIC MEANS



PUGET POWER BUILDING. 10604 NE 4TH. BELLEVUE

SUSPENDED PARTICULATES

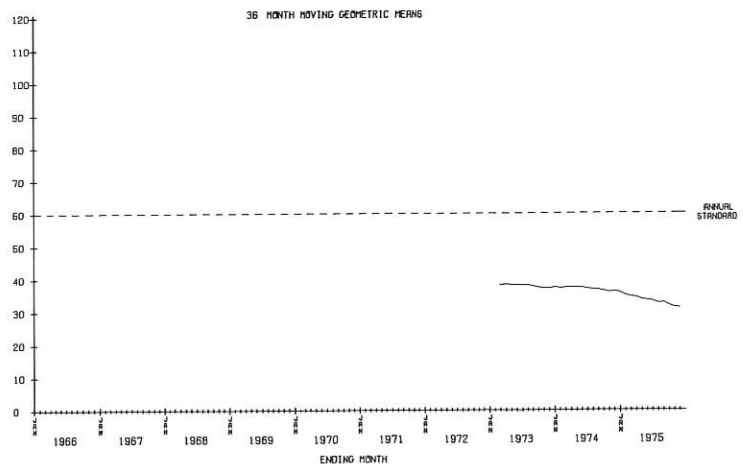
36 MONTH MOVING GEOMETRIC MEANS



115 EAST MAIN STREET & AUBURN AVE. AUBURN. WA

SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS

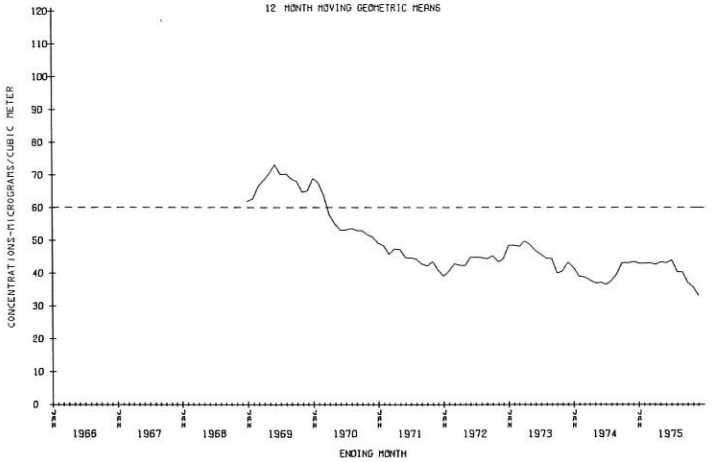


PUGET POWER BUILDING. 10604 NE 4TH. BELLEVUE

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

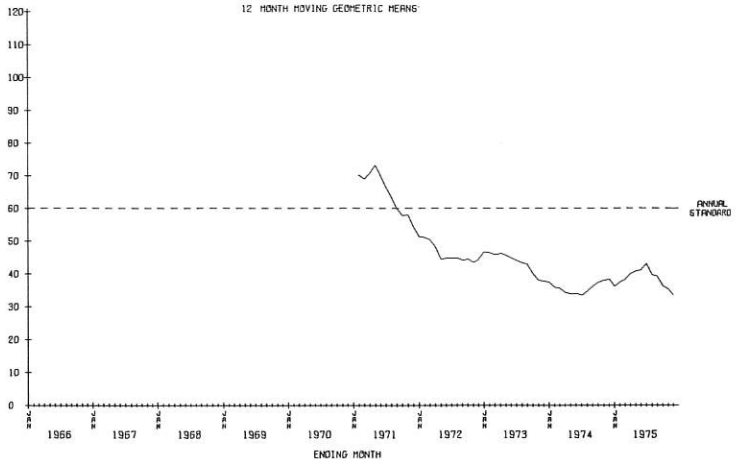


FIFE SR HIGH SCHOOL, 5616-20TH E, FIFE, WASH

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

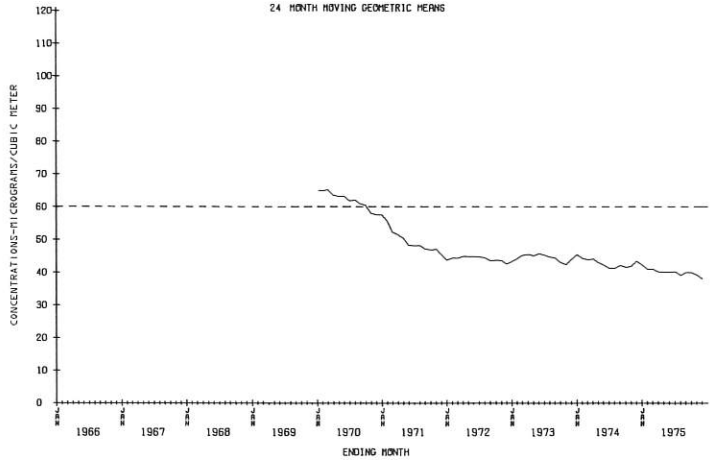
12 MONTH MOVING GEOMETRIC MEANS



MEEKER JR HS, 1526 - 51ST STREET NE, TACOMA

SUSPENDED PARTICULATES

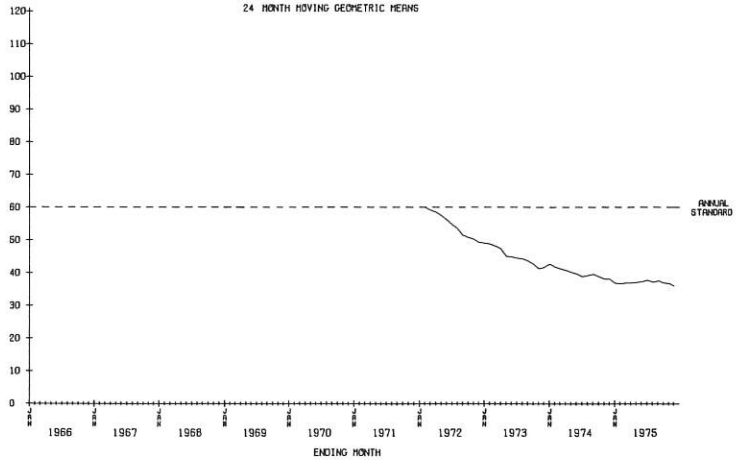
24 MONTH MOVING GEOMETRIC MEANS



FIFE SR HIGH SCHOOL, 5616-20TH E, FIFE, WASH

SUSPENDED PARTICULATES

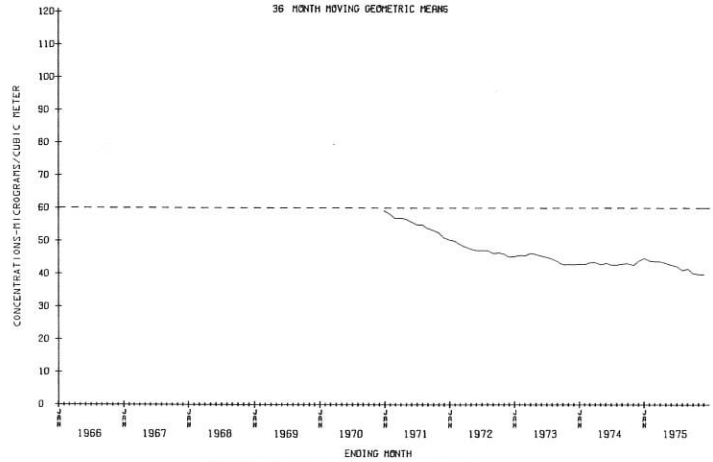
24 MONTH MOVING GEOMETRIC MEANS



MEEKER JR HS, 1526 - 51ST STREET NE, TACOMA

SUSPENDED PARTICULATES

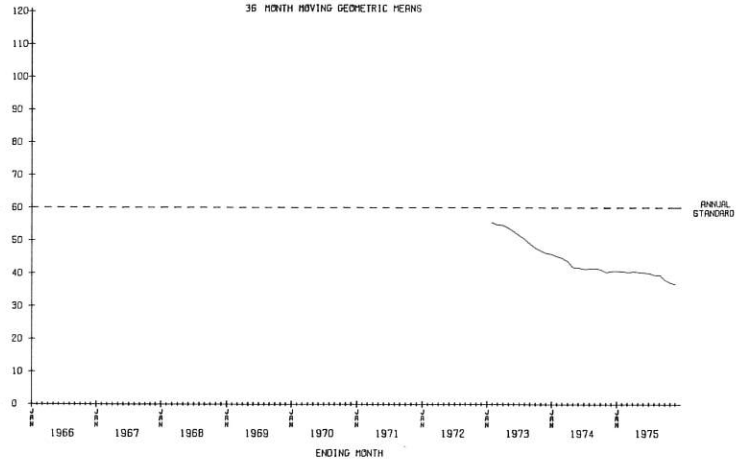
36 MONTH MOVING GEOMETRIC MEANS



FIFE SR HIGH SCHOOL, 5616-20TH E, FIFE, WASH

SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS

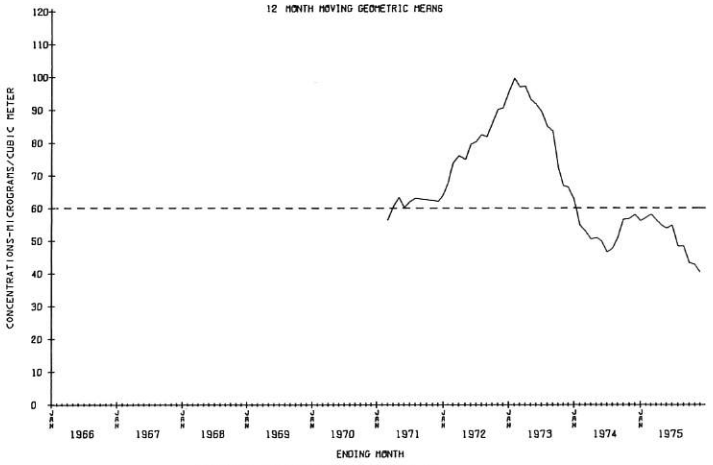


MEEKER JR HS, 1526 - 51ST STREET NE, TACOMA

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

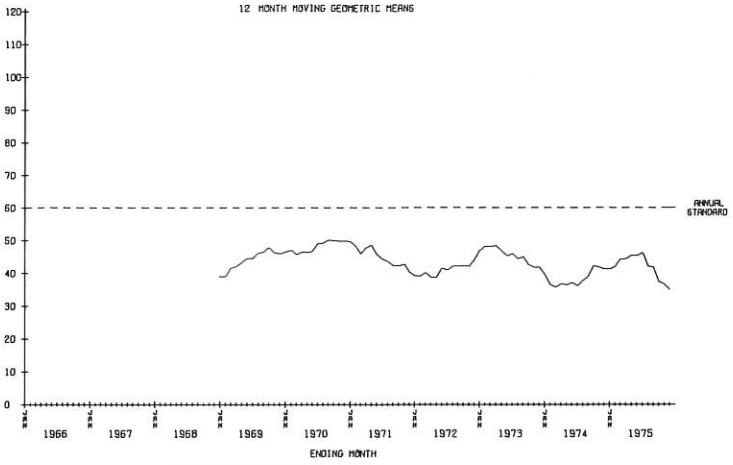


CASCADIA, 2002 E 28TH ST, TACOMA, WA

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

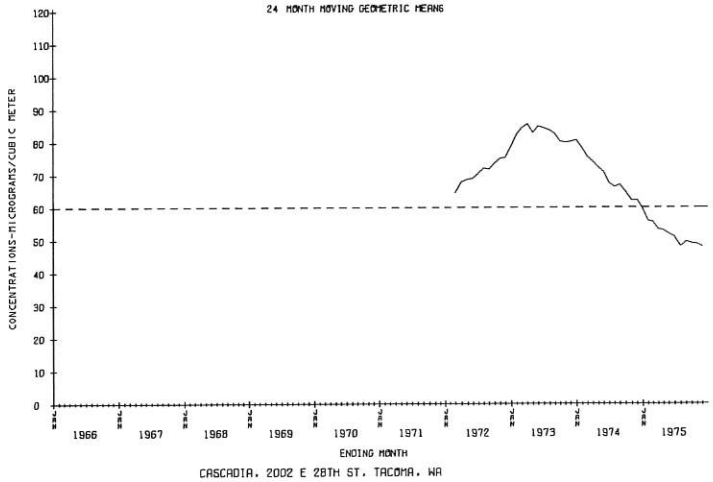
12 MONTH MOVING GEOMETRIC MEANS



N 26TH AND PEARL STREET, TACOMA

SUSPENDED PARTICULATES

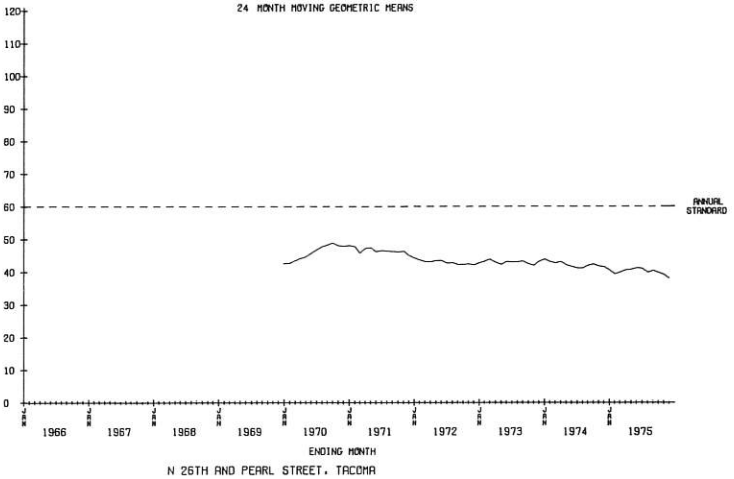
24 MONTH MOVING GEOMETRIC MEANS



CASCADIA, 2002 E 28TH ST, TACOMA, WA

SUSPENDED PARTICULATES

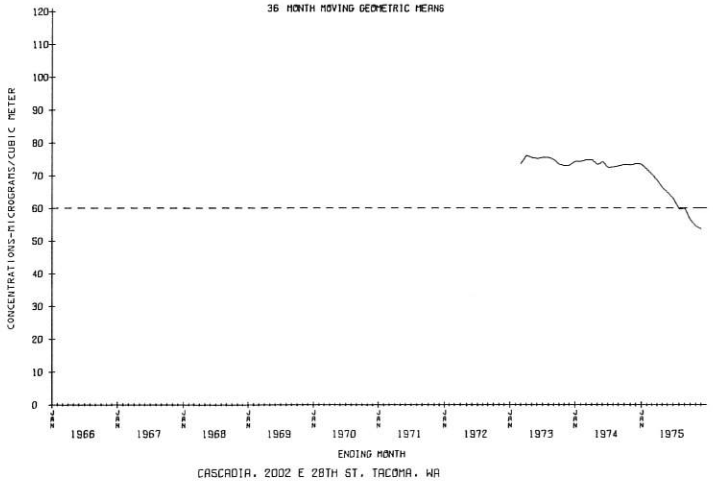
24 MONTH MOVING GEOMETRIC MEANS



N 26TH AND PEARL STREET, TACOMA

SUSPENDED PARTICULATES

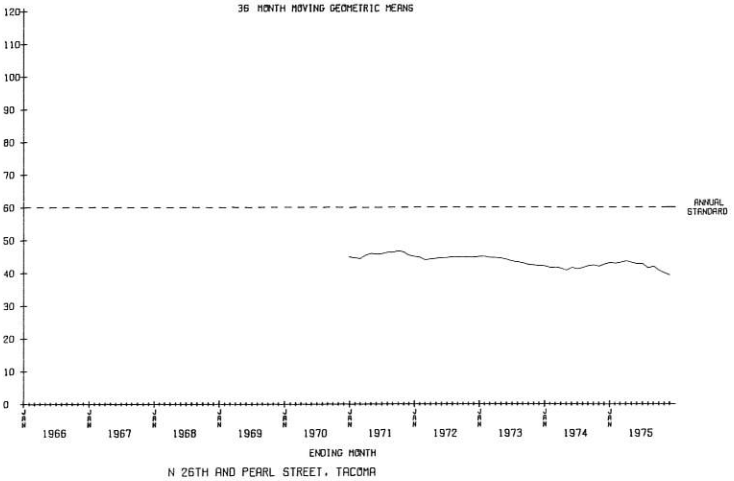
36 MONTH MOVING GEOMETRIC MEANS



CASCADIA, 2002 E 28TH ST, TACOMA, WA

SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS

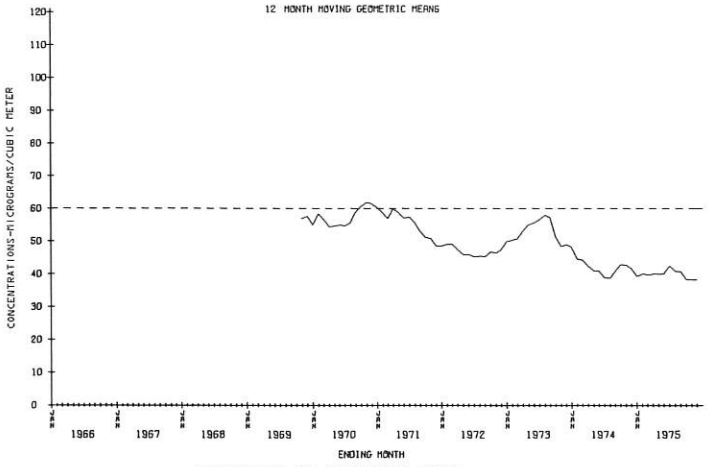


N 26TH AND PEARL STREET, TACOMA

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

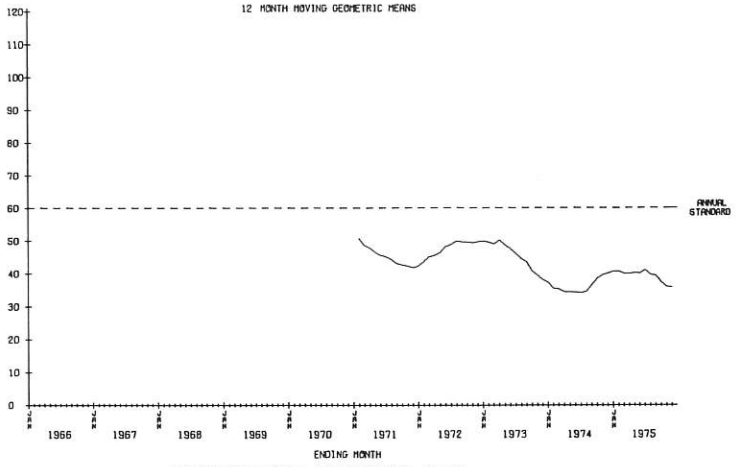


HESS BUILDING, 901 TACOMA AVE S, TACOMA

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

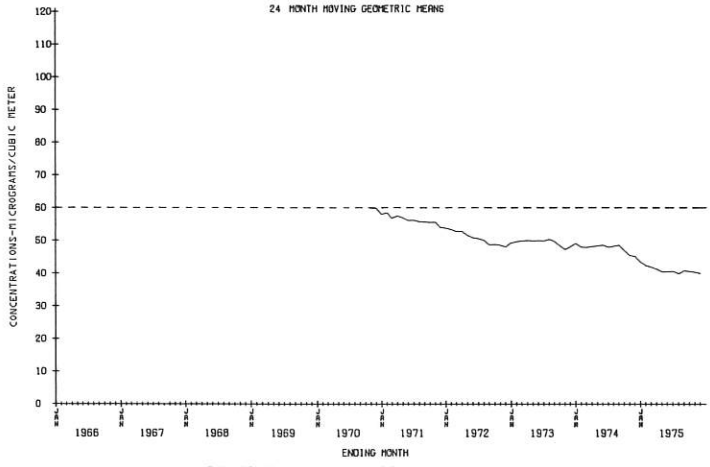
12 MONTH MOVING GEOMETRIC MEANS



MEDICAL-DENTAL BLDG, 2730 COLBY AVE, EVERETT

SUSPENDED PARTICULATES

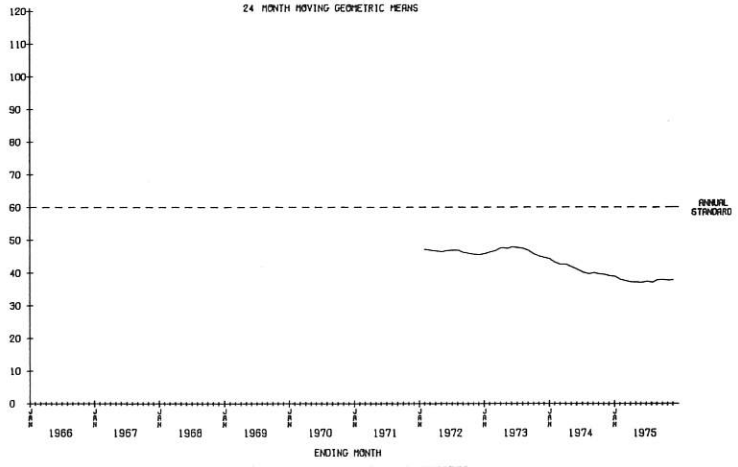
24 MONTH MOVING GEOMETRIC MEANS



HESS BUILDING, 901 TACOMA AVE S, TACOMA

SUSPENDED PARTICULATES

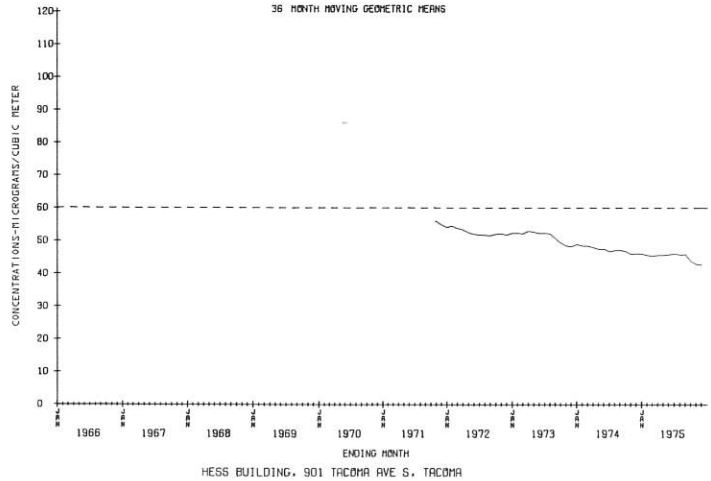
24 MONTH MOVING GEOMETRIC MEANS



MEDICAL-DENTAL BLDG, 2730 COLBY AVE, EVERETT

SUSPENDED PARTICULATES

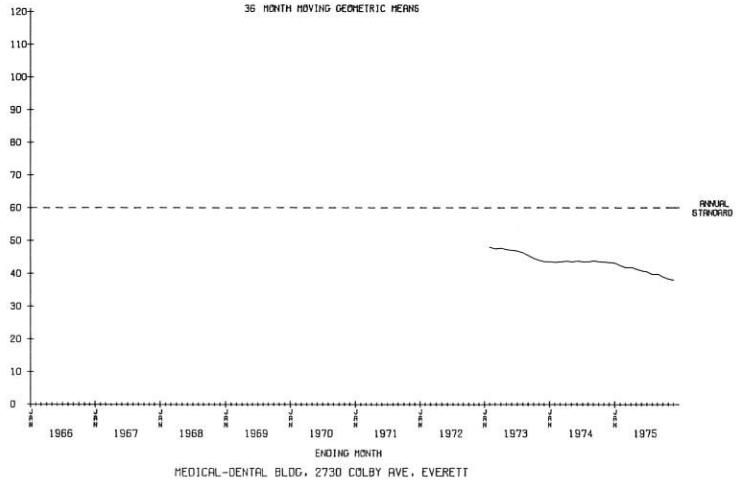
36 MONTH MOVING GEOMETRIC MEANS



HESS BUILDING, 901 TACOMA AVE S, TACOMA

SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS

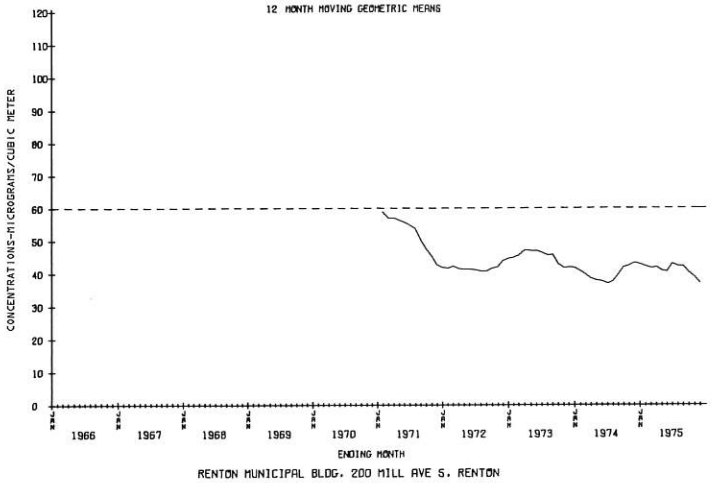


MEDICAL-DENTAL BLDG, 2730 COLBY AVE, EVERETT

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

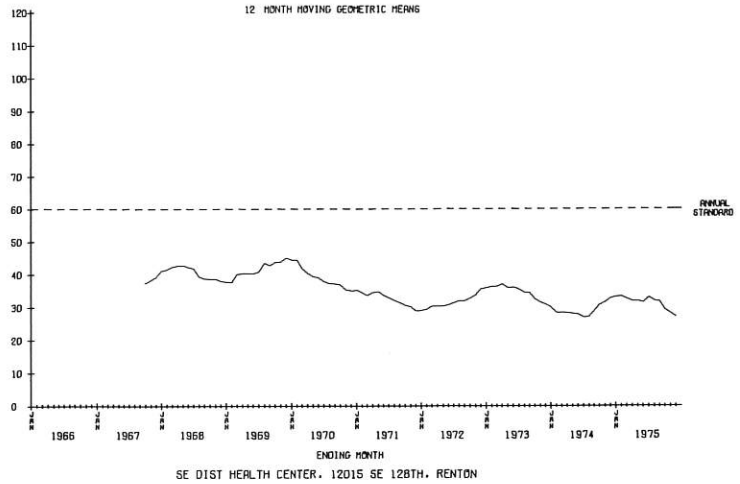


RENTON MUNICIPAL BLDG. 200 MILL AVE S. RENTON

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

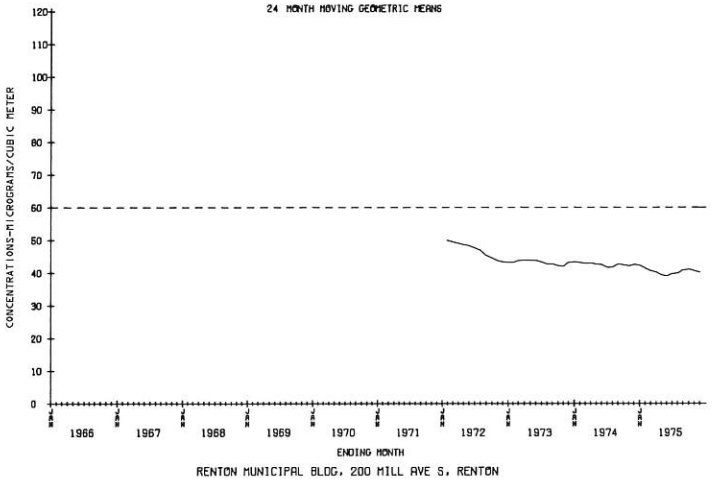
12 MONTH MOVING GEOMETRIC MEANS



SE DIST HEALTH CENTER. 12015 SE 128TH. RENTON

SUSPENDED PARTICULATES

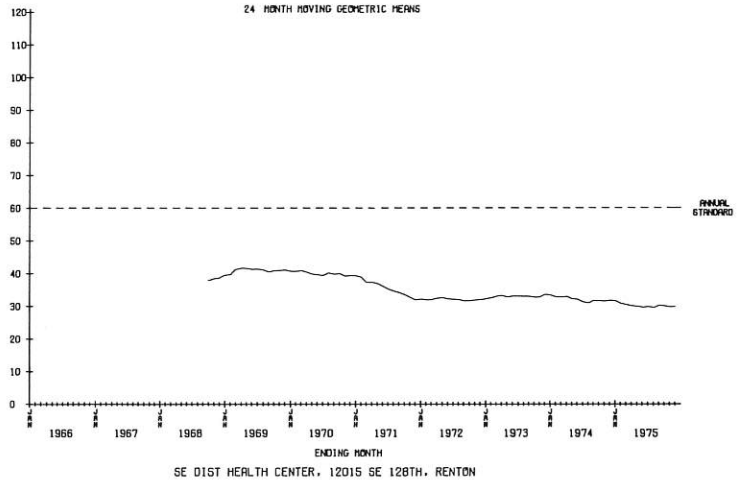
24 MONTH MOVING GEOMETRIC MEANS



RENTON MUNICIPAL BLDG, 200 MILL AVE S, RENTON

SUSPENDED PARTICULATES

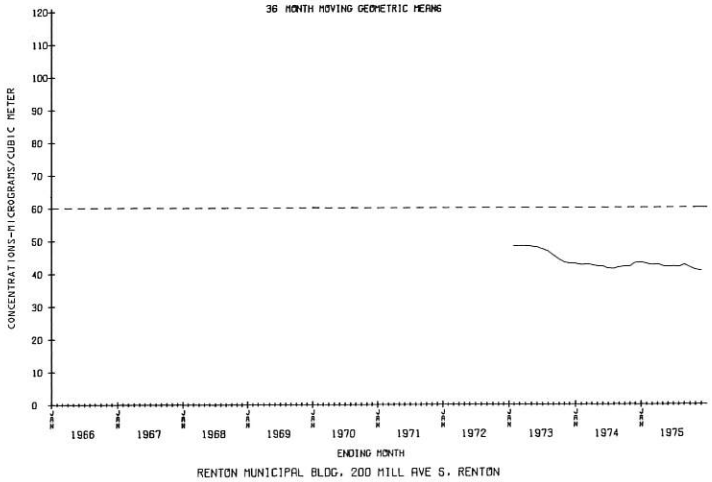
24 MONTH MOVING GEOMETRIC MEANS



SE DIST HEALTH CENTER, 12015 SE 128TH, RENTON

SUSPENDED PARTICULATES

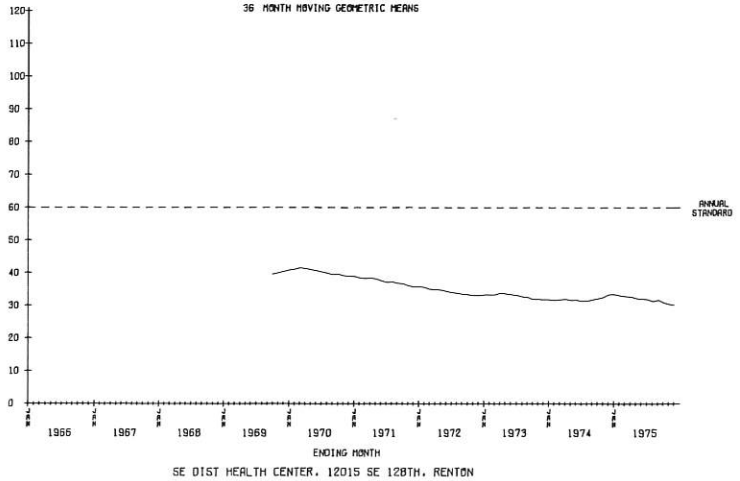
36 MONTH MOVING GEOMETRIC MEANS



RENTON MUNICIPAL BLDG, 200 MILL AVE S, RENTON

SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS

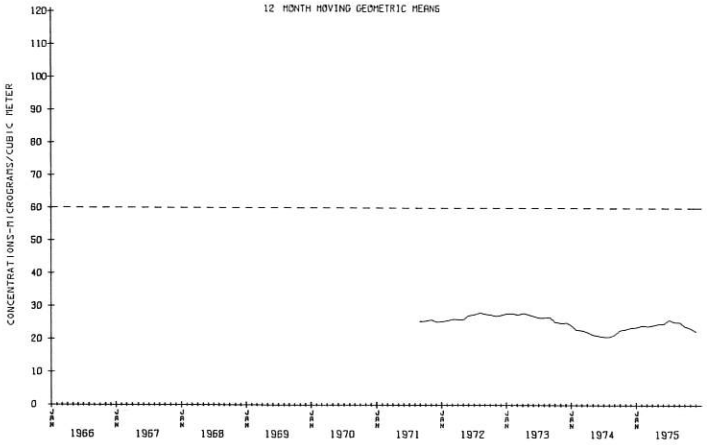


SE DIST HEALTH CENTER, 12015 SE 128TH, RENTON

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

12 MONTH MOVING GEOMETRIC MEANS

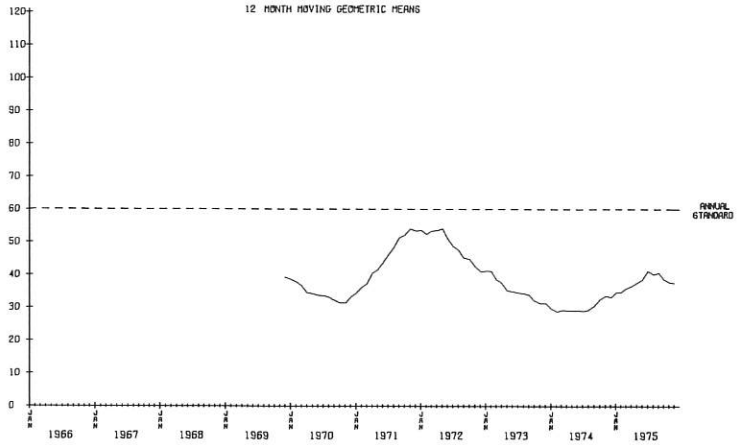


DEWEY JR HS. PERRY AVE & HOLMAN ST. BREMERTON

PUGET SOUND AIR POLLUTION CONTROL AGENCY

SUSPENDED PARTICULATES

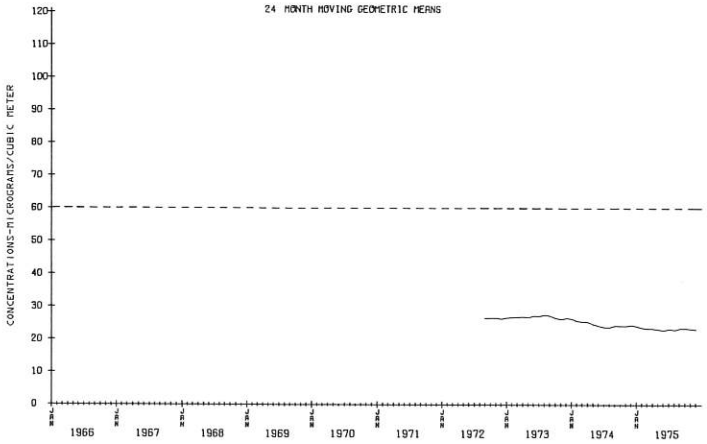
12 MONTH MOVING GEOMETRIC MEANS



(DOE) CITY HALL. 239 4TH ST. BREMERTON

SUSPENDED PARTICULATES

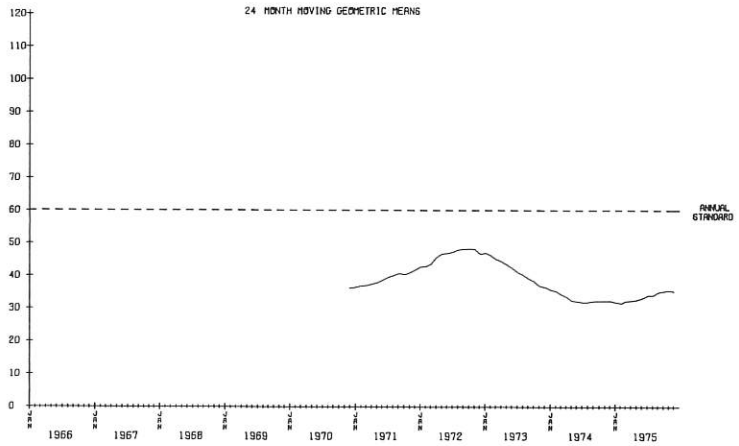
24 MONTH MOVING GEOMETRIC MEANS



DEWEY JR HS. PERRY AVE & HOLMAN ST. BREMERTON

SUSPENDED PARTICULATES

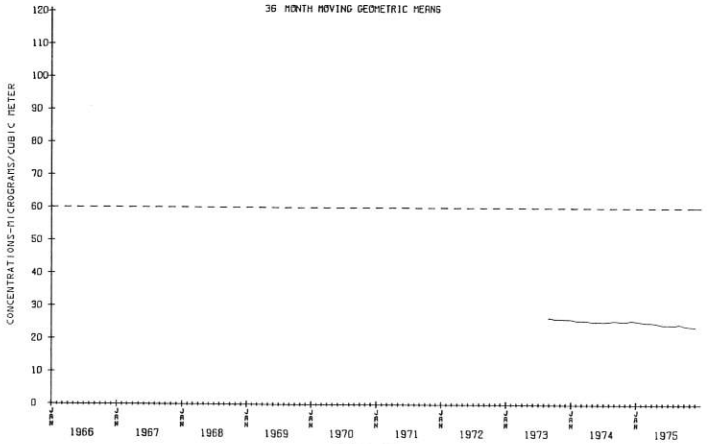
24 MONTH MOVING GEOMETRIC MEANS



(DOE) CITY HALL. 239 4TH ST. BREMERTON

SUSPENDED PARTICULATES

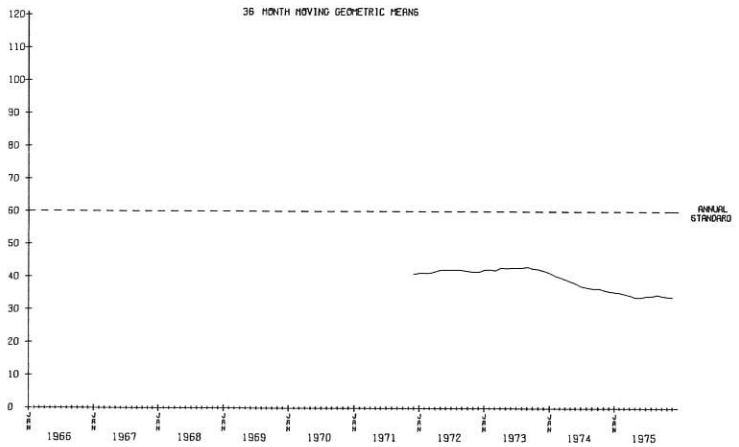
36 MONTH MOVING GEOMETRIC MEANS



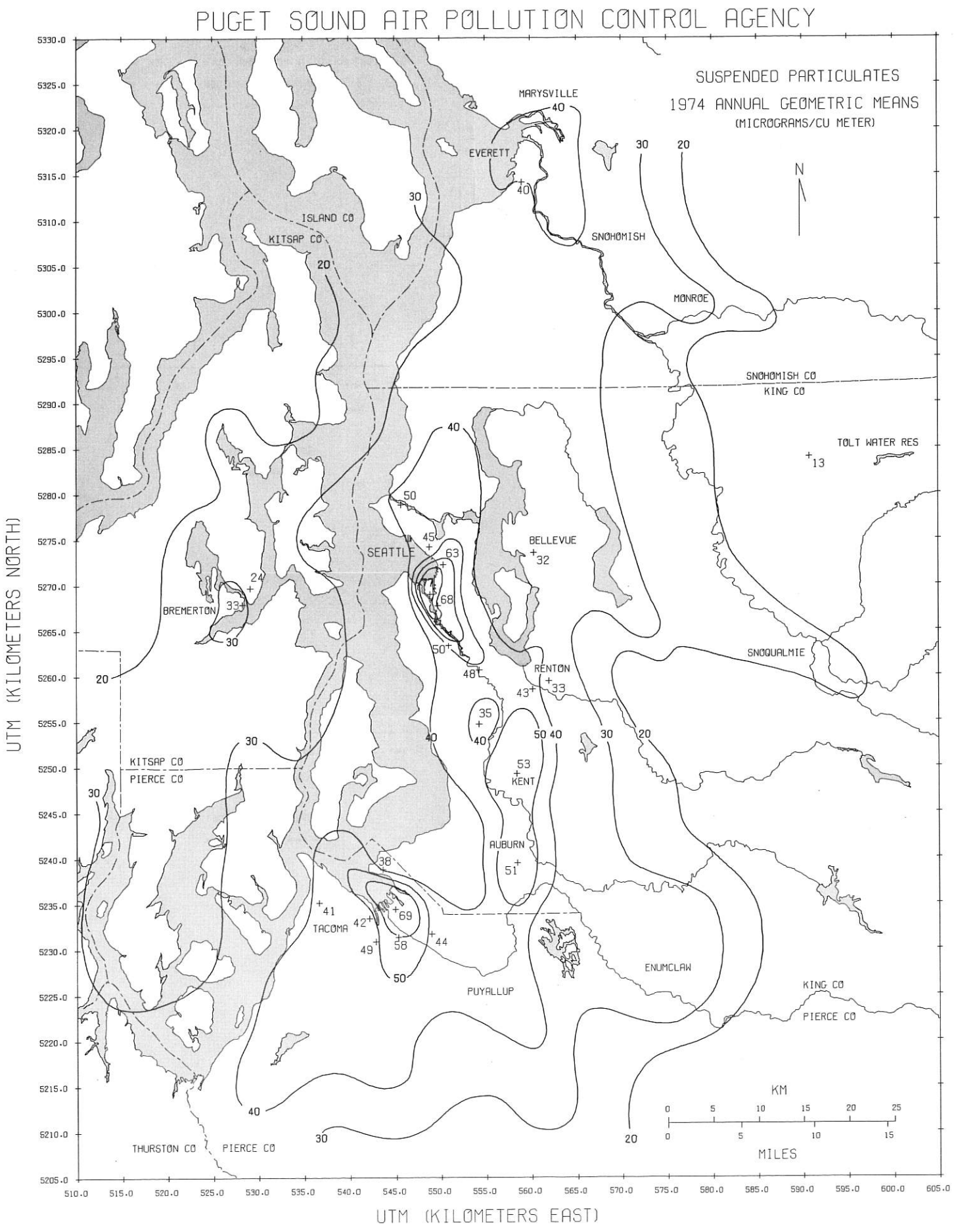
DEWEY JR HS. PERRY AVE & HOLMAN ST. BREMERTON

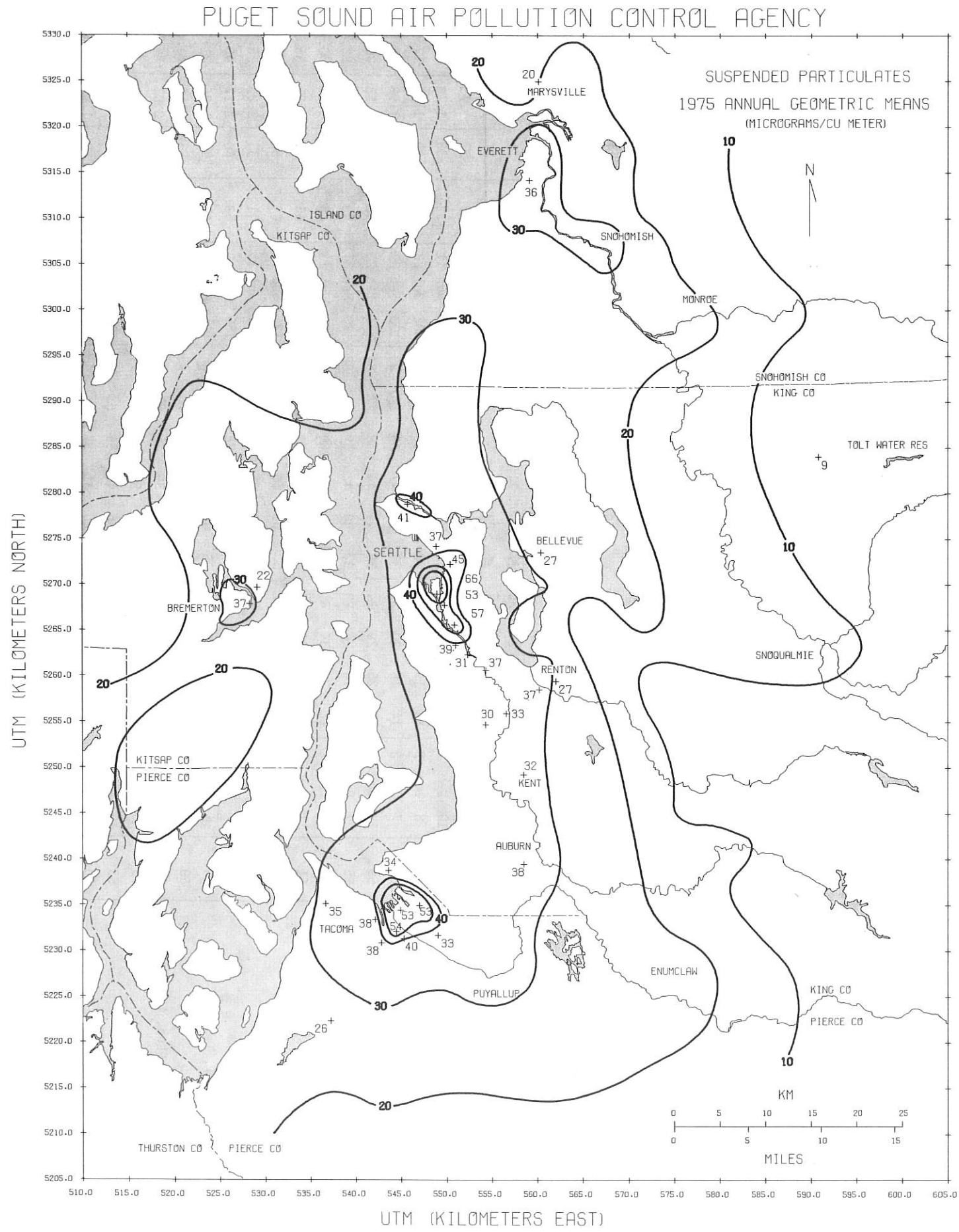
SUSPENDED PARTICULATES

36 MONTH MOVING GEOMETRIC MEANS



(DOE) CITY HALL. 239 4TH ST. BREMERTON


PUGET SOUND AIR POLLUTION CONTROL AGENCY
SUSPENDED PARTICULATES
1974 ANNUAL GEOMETRIC MEANS
(MICROGRAMS/CU METER)
N
MARYSVILLE
EVERETT
ISLAND CO
KITSAP CO
SNOHOMISH
MONROE
SNOHOMISH CO
KING CO
TOLT WATER RES
SEATTLE
BELLEVUE
BREMERTON
RENTON
SNOQUALMIE
KITSAP CO
PIERCE CO
KENT
AUBURN
TACOMA
ENUMCLAW
PUYALLUP
KING CO
PIERCE CO
THURSTON CO
PIERCE CO
KM
MILES
UTM (KILOMETERS NORTH)
UTM (KILOMETERS EAST)


PUGET SOUND AIR POLLUTION CONTROL AGENCY
SUSPENDED PARTICULATES
1975 ANNUAL GEOMETRIC MEANS
(MICROGRAMS/CU METER)
N
MARYSVILLE
EVERETT
ISLAND CO
KITSAP CO
SNOHOMISH
MONROE
SNOHOMISH CO
KING CO
TOLT WATER RES
SEATTLE
BELLEVUE
BREMERTON
RENTON
SNOQUALMIE
KITSAP CO
PIERCE CO
KENT
AUBURN
TACOMA
ENUMCLAW
PUYALLUP
KING CO
PIERCE CO
THURSTON CO
PIERCE CO
KM
MILES
UTM (KILOMETERS NORTH)
UTM (KILOMETERS EAST)

SUSPENDED PARTICULATE
Percentage Frequency Distributions
(Micrograms per cubic meter of air)
1975

Location	No. of Samples	Min.	Date	Frequency Distribution-Percent 10	20	30	40	50	60	70	80	90	95	Max.	Date	Arith. Mean	Geo. Mean	Std. Geo. Dev.	Std. Arith. Dev.
Tolt River Watershed	53	1	Dec 2	3	4	4	5	8	10	15	20	31	32	48	Jul 11	13	9	2.48	11.36
Tulalip Test Facility	55	7	Nov 14	10	12	15	17	19	21	25	31	49	53	70	Sep 27	23	20	1.76	14.70
Medical-Dental Bldg., Everett	60	11	Dec 2	16	24	28	32	35	42	51	59	69	72	87	Apr 30	41	36	1.69	19.43
USCG Station, Seattle	60	9	Dec 2	24	26	32	37	40	43	49	59	68	93	175	Dec 20	47	41	1.66	29.46
Food Circus Bldg., Seattle Center	60	15	Dec 2	21	24	28	33	38	43	48	53	57	65	121	Dec 20	41	37	1.53	18.64
Public Safety Bldg., Seattle	60	17	Dec 2	26	31	35	38	43	52	54	61	74	77	138	Dec 20	49	45	1.51	22.30
Harbor Island, Seattle	60	20	Nov 8	30	43	50	56	65	76	89	102	124	147	165	Dec 20	75	66	1.68	37.20
4500 Blk. E. Marg. Way S., Seattle	60	20	Dec 2	27	32	38	42	51	59	72	94	104	128	158	Nov 20	62	53	1.71	33.79
S. River St. & Maynard, Seattle*	58	10	Dec 2	27	34	39	43	62	69	85	96	115	120	168	Nov 20	66	57	1.80	36.22
South Park, Seattle	60	9	Dec 2	16	22	26	31	39	47	53	77	94	107	116	Mar 7	47	39	1.89	29.48
10000 W. Marg. Way S.W., Seattle	60	7	Dec 2	15	20	22	25	29	34	39	48	70	76	107	Dec 20	36	31	1.77	21.93
Duwamish Valley, King County	60	10	Dec 2	18	22	27	32	36	39	50	58	76	89	146	Dec 20	43	37	1.72	25.27
Puget Power Bldg., Bellevue	58	9	Dec 2	14	18	21	24	27	30	34	39	46	52	92	Dec 20	30	27	1.58	14.33
S.E. Dist. Health Center, Renton	60	6	Feb 11	10	14	20	25	26	29	38	53	69	74	88	Sep 21	33	27	1.96	21.44
Municipal Bldg., Renton	60	11	Dec 2	18	22	29	34	37	40	49	62	79	91	106	Sep 21	43	37	1.73	23.26
Southcenter, Tukwila	60	10	Dec 2	16	20	25	29	32	36	46	59	68	80	116	Jun 11	39	33	1.74	22.34
McMicken Hts., King County	60	8	Dec 2	16	19	22	24	28	32	42	50	61	66	82	Jul 23	34	30	1.67	17.94
1234 N. Central Ave., Kent	59	7	Dec 2	14	16	20	25	33	38	47	63	84	93	100	Sep 27	41	32	1.99	26.96
Main St. & Auburn Ave., Auburn	59	14	Dec 2	21	25	29	34	36	41	44	58	72	84	101	Dec 20	42	38	1.58	20.70
Meeker Jr. H.S., Tacoma	56	7	Dec 2	16	18	24	28	32	38	42	58	70	88	135	Mar 31	40	34	1.82	26.41
2340 Taylor Way, Tacoma[a]	45	9	Dec 2	22	26	34	41	53	69	86	100	124	140	162	Jul 23	65	53	2.02	40.74
Tideflats, Tacoma	61	11	May 24	26	32	34	46	56	68	75	91	110	119	195	Sep 24	63	53	1.81	36.37
1241 Cleveland Way, Tacoma[a]	43	24	Dec 26	28	34	37	42	53	61	66	85	107	111	134	Sep 27	60	54	1.62	29.68
Fife Sr. H.S., Fife	60	3	Dec 2	12	17	22	28	37	43	51	64	74	85	102	Jul 23	41	33	2.08	25.19
Cascadia College, Tacoma	61	7	Dec 2	14	20	24	33	39	48	63	88	126	132	156	May 30	53	40	2.17	40.06
Willard Elem. School, Tacoma	60	6	Dec 2	14	23	26	31	35	49	54	72	89	106	134	Mar 7	47	38	1.96	31.00
Hess Bldg., Tacoma	60	13	Dec 2	20	24	29	32	37	41	47	56	70	79	135	Dec 20	43	38	1.64	24.88
112th St. S.W. & Loch Lea, Lakewood*	60	5	Feb 11	9	15	18	21	28	31	39	48	67	79	95	Sep 10	33	26	2.03	22.32
N. 26th & Pearl, Tacoma	60	6	Dec 2	12	18	24	29	36	44	54	74	91	99	118	May 30	45	35	2.12	30.25
City Hall, Bremerton*	53	10	Dec 8	18	25	30	34	41	46	49	56	62	68	94	Jul 5	41	37	1.61	17.67
Dewey Jr. H.S., Bremerton	60	8	Mar 19	12	14	16	19	21	25	31	37	40	46	56	Dec 20	25	22	1.62	12.09

* Washington State Department of Ecology Stations

[a] Sampling started 3/31/75

SUSPENDED PARTICULATE
Monthly Arithmetic Averages
(Micrograms per cubic meter)
1975

Location	Monthly Arithmetic Averages												No. of Obs.	Arith. Mean	Geo. Mean
	J	F	M	A	M	J	J	A	S	O	N	D			
Tolt River Watershed	4.7	4.4	9.6	13.4	17.5	13.4	27.6	15.5	30.5	5.9	3.8	3.5	53	13	9
Tulalip Test Facility	16.3	18.0	23.9	26.0	21.9	26.3	32.3	34.4	52.8	16.5	10.4	15.6	55	23	20
Medical-Dental Bldg., Everett	39.1	32.4	41.0	48.3	42.2	36.7	51.8	37.1	60.6	35.8	27.5	32.5	60	41	36
USCG Station, Seattle	46.6	58.5	44.5	46.3	37.7	35.5	49.4	36.1	56.6	46.3	53.9	54.4	60	47	41
Food Circus Bldg., Seattle Center	42.8	44.9	43.2	42.0	38.5	40.9	41.7	35.1	58.2	30.2	28.3	43.8	60	41	37
Public Safety Bldg., Seattle	52.6	50.4	61.5	58.4	41.0	39.2	50.9	43.9	61.6	38.5	35.7	52.1	60	49	45
Harbor Island, Seattle	63.8	76.0	97.0	85.5	75.1	79.7	79.0	62.4	92.7	56.3	60.6	65.0	60	75	66
4500 Blk. E. Marg. Way S., Seattle	60.8	72.0	68.2	67.6	61.9	58.3	66.8	45.2	91.4	41.0	55.1	50.4	60	62	53
S. River St. and Maynard, Seattle*	50.5	49.8	76.5	72.0	73.2	60.8	89.6	51.8	108.2	47.5	62.0	31.0	58	66	57
South Park, Seattle	48.3	45.6	56.6	53.8	49.0	48.3	53.1	29.9	81.0	27.7	28.3	41.7	60	47	39
10000 W. Marg. Way S.W., Seattle	31.7	29.9	46.8	43.0	31.4	36.9	44.7	27.0	55.9	24.2	24.4	34.3	60	36	31
Duwamish Valley, King County	39.0	33.5	47.4	47.8	41.2	37.8	58.1	36.1	63.9	26.7	35.1	45.9	60	43	37
Puget Power Bldg., Bellevue	29.0	27.3	32.2	33.6	23.1	26.8	34.6	25.6	44.5	23.2	19.8	33.3	58	30	27
S.E. Dist. Health Center, Renton	23.4	30.0	32.1	33.4	30.7	30.1	52.6	40.0	63.1	19.8	16.2	27.7	60	33	27
Municipal Bldg., Renton	33.4	31.7	38.9	42.7	30.1	35.0	65.7	56.0	79.7	34.1	26.0	38.3	60	43	37
Southcenter, Tukwila	41.1	29.7	35.3	39.4	35.4	48.3	50.6	35.8	58.8	26.4	29.8	35.4	60	39	33
McMicken Hts., King County	31.6	27.9	34.4	39.4	33.0	35.0	47.9	29.4	59.6	22.2	21.1	27.3	60	34	30
1234 N. Central Ave., Kent	28.8	23.8	38.6	50.6	48.0	47.9	51.1	32.8	79.4	22.0	28.5	32.7	59	41	32
Main St. & Auburn Ave., Auburn	35.2	36.7	45.6	47.2	50.0	36.4	50.8	37.9	74.0	27.2	31.3	39.3	59	42	38
Meeker Jr. H.S., Tacoma	22.5	56.1	64.9	64.8	45.7	39.6	47.7	29.0	52.4	24.0	23.3	29.7	56	40	34
2340 Taylor Way, Tacoma[a]				82.5	79.9	67.8	75.6	42.2	104.4	43.2	42.3	54.1	45	65	53
Tideflats, Tacoma	41.8	49.0	66.1	63.6	60.1	41.2	76.5	54.1	119.6	56.4	57.9	51.3	61	63	53
1241 Cleveland Way, Tacoma[a]				73.8	60.8	62.0	62.0	43.5	92.4	43.7	33.8	50.4	43	60	54
Fife Sr. H.S., Fife	34.3	36.3	47.6	43.5	40.0	43.7	60.1	32.3	72.4	23.5	26.9	32.5	60	41	33
Cascadia College, Tacoma	31.6	33.6	72.7	62.6	61.9	52.6	64.7	37.8	117.4	27.2	36.4	38.3	61	53	40
Willard Elem. School, Tacoma	41.8	49.1	63.6	54.4	47.7	47.1	51.6	27.9	86.9	32.0	39.4	22.4	60	47	38
Hess Bldg., Tacoma	34.2	39.0	37.4	44.1	34.0	37.4	51.9	40.9	70.7	37.4	43.8	50.5	60	43	38
112th St. S.W. & Loch Lea, Lakewood*	28.6	22.4	33.7	31.2	26.6	33.4	42.4	20.4	80.2	27.8	29.4	16.5	60	33	26
N. 26th & Pearl, Tacoma	32.8	34.3	55.5	52.8	55.6	57.3	48.5	32.0	81.5	23.9	29.5	32.8	60	45	35
City Hall, Bremerton*	40.4	36.2	48.2	47.0	53.0	39.6	54.6	35.4	55.4	35.0	34.0	27.8	53	41	37
Dewey Jr. H.S., Bremerton	24.2	22.6	24.6	27.5	22.5	22.8	31.4	21.9	40.9	20.0	19.6	22.2	60	25	22

* Washington State Dept. of Ecology Stations

[a] Sampling started 3/31/75

STANDARDS: (24-hour & annual)

150 $\mu g/m^3$ 24-hour average not to be exceeded more than once per year.
60 $\mu g/m^3$ Annual geometric mean never to be exceeded.

SUSPENDED PARTICULATE
(Micrograms per cubic meter)
1975

Frequency of Concentrations Exceeding Specified Levels

A. Number of observations exceeding 150 $\mu g/m^3$
B. Number of observations exceeding 60 $\mu g/m^3$
C. Total number of observations

Location	Jan.			Feb.			Mar.			Apr.			May			June			July			Aug.			Sept.			Oct.			Nov.			Dec.			Annual		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Tolt River Watershed			5			4			3			4			5			4			4			5			5			4			5			5					53
Tulalip Test Facility			5			4			6			5			5			5			3		1	3		1	4			5			5			5			2	55
Medical-Dental Bldg., Everett			5		1	4		1	6		1	5		1	5			5		1	5		1	5		2	5		1	5		1	5		1	5			11	60
USCG Station, Seattle		1	5		2	4		2	6		1	5			5			5			5			5		1	5		2	5	1	1	5	1	1	5	2	11	60
Food Circus Bldg., Seattle Center		1	5			4		1	6			5			5			5			5			5		2	5			5			5		1	5			5	60
Public Safety Bldg., Seattle		2	5		1	4		2	6		2	5			5			5		2	5			5		2	5			5		1	5		1	5			13	60
Harbor Island, Seattle		2	5		2	4	1	4	6		3	5		3	5		4	5		4	5		2	5		5	5		2	5	1	1	5	1	1	5	3	33	60
4500 Blk. E. Marg. Way S., Seattle		2	5		2	4			3	6		2	5		2	5		2	5		3	5		1	5		4	5			5	1	1	5		1	5	1	23	60
S. River St. & Maynard, Seattle*		2	4		2	4	1	3	6		3	5		4	6		2	5		5	5		2	5		5	5		1	4	1	1	5			4	2	30	58
South Park, Seattle		1	5		1	4			3	6		2	5		1	5		1	5		1	5			5		4	5			5		1	5		1	5			16	60
10000 W. Marg. Way S.W., Seattle			5			4			1	6		2	5			5		1	5		1	5			5		2	5			5			5		1	5			8	60
Duwamish Valley, King County		1	5			4			1	6		2	5		1	5		1	5		1	5			5		3	5			5		1	5		1	5			12	60
Puget Power Bldg., Bellevue			5			4				6			5			5			4			4			5			5			5			5		1	5			1	58
S.E. Dist. Health Center, Renton			5		1	4			1	6			5			5			5		2	5		1	5		3	5			5			5		1	5			9	60
Municipal Bldg., Renton			5			4			1	6		2	5			5			5		3	5		2	5		4	5			5		1	5		1	5			14	60
Southcenter, Tukwila		1	5			4				6		1	5		1	5		1	5		1	5		1	5		3	5			5		1	5		1	5			11	60
McMicken Hts., King County			5			4				6		2	5			5		1	5		1	5			5		3	5			5			5			5			7	60
1234 N. Central Ave., Kent			5			4			1	6		2	5		1	4		1	5		2	5			5		4	5			5		1	5		1	5			13	59
Main St. & Auburn Ave., Auburn			5			4			2	6		1	5		1	5			5		1	5			5		3	4			5		1	5		1	5			10	59
Meeker Jr. H.S., Tacoma			5		2	4			1	3		2	4		2	5		1	5		1	5			5		1	5			5			5		1	5			11	56
2340 Taylor Way, Tacoma[a]										1		3	5		4	5		2	4		3	5		1	5		5	5		1	5		1	5		1	5			21	45
Tideflats, Tacoma			5		1	4			4	6		3	5		2	5			5		4	5		2	5	1	6	6		2	5	1	1	5		1	5	2	26	61
1241 Cleveland Way, Tacoma[a]									1	1		4	5		2	5		2	5		3	5		1	5		4	5		1	5			2		1	5			19	43
Fife Sr. H.S., Fife			5			4			1	6		2	5		1	5		1	5		1	5		1	5		4	5			5		1	5		1	5			13	60
Cascadia College, Tacoma			5			5			4	6		2	5	1	1	5		1	5		3	5		1	5		5	5			5		1	5		1	5	1	19	61
Willard Elem. School, Tacoma			5		1	4			3	6		2	5		1	5		1	5		1	5			5		4	5			5		1	5			5			14	60
Hess Bldg., Tacoma			5			4				6		1	5			5			5		1	5		1	5		3	5			5		1	5		1	5			8	60
112th St. S.W. & Loch Lea,Lakewood*			5			5			1	6			5			5			5		1	5			5		5	5			5		1	5			4			8	60
N. 26th & Pearl, Tacoma		1	5			4			3	6		2	5		1	5		2	5		1	5		1	5		4	5			5		1	5		1	5			17	60
City Hall, Bremerton*			5			4			1	6			2			1			5		1	5			5		2	5			5		1	5		1	5			6	53
Dewey Jr. H.S., Bremerton			5			4				6			5			5			5			5			5			5			5			5							60
		14	144		16	118		2	45	170		47	150		1	29	151		24	152		48	151		19	153		1	94	154		10	153		5	21	152		2	24	153		11	391	1801

* Washington State Department of Ecology stations.
[a] Sampling started 3/31/75

The Washington State Department of Ecology (DOE) has statewide jurisdiction over mobile sources of pollution (motor vehicles). The DOE operates equipment that measures motor vehicle related pollutants in certain areas of the State. During 1975, carbon monoxide analyzers were operated at 15 locations in the Puget Sound Air Quality Control Region for periods varying from several weeks to a full year. Some of these stations were in operation prior to 1975.

The carbon monoxide data presented below was extracted from the Department of Ecology monthly data summary and from the DOE publication "Annual Summary of Ambient Air Quality Data for Selected Monitoring Stations in the State." Detailed information regarding hourly, daily and seasonal averages and trends, site information, and emission control strategies may be obtained by contacting the Department of Ecology.

In general, high ambient levels of carbon monoxide occur near congested, slow moving or stalled automobile traffic when low level winds are light and stable meteorological conditions exist. Peak concentrations generally coincide with the week day morning and evening traffic peaks. Minimum values generally occur during the night and on weekends.

The ambient air quality standard for carbon monoxide states that concentrations measured in the ambient air shall not exceed 9 ppm maximum 8 hour average or 35 ppm maximum one hour concentration, neither to be exceeded more than once per year. An alert is to be declared when carbon monoxide reaches 15 ppm for an eight hour average and meteorological conditions are such that the concentrations can be expected to remain at or above that level for 12 or more hours or increase unless control actions are taken (Washington Administrative Code (WAC) 18-08-030(2)). The warning level is 30 ppm for an eight hour average and the emergency level is 40 ppm for an eight hour average with meteorological conditions as indicated above.

The table below lists the maximum one hour and 8 hour averages measured during 1975 with the total number of days the eight hour average was in excess of 9 ppm at least once.

CARBON MONOXIDE - PPM

1975

Location	Period of Record	1 hr. Max.	8 hr. Max.	No. Days 8 hr. > 9 ppm
Seattle				
6770 E. Marginal Way South	Jan. 1 - Dec. 31	13	10	1
1300 South Dearborn	Jan. 1 - Oct. 23	29	18	89
1000 - 4th Avenue South	Jan. 1 - Dec. 31	18	13	4
City Hall, 5th & James St.	Jan. 1 - Dec. 31	25	18	39
909 - 4th Avenue	May 9 - June 3	11	7	0
1004 Boren Avenue	Oct. 25 - Dec. 31	16	10	1
1200 - 6th Avenue	Dec. 17 - Dec. 31	20	14	6
Second & University	April 1 - Dec. 31	23	16	11
1408 - 4th Avenue	Jan. 1 - Dec. 31	25	15	31
609 Westlake Avenue North	Jan. 1 - Mar. 21	19	10	7
N.E. 112th & 5th Ave. N.E.	Jan. 1 - May 8	18	8	0
Tacoma				
112th St. S.W. & Loch Lea, Lakewood	Jan. 1 - Dec. 31	10	7	0
901 Tacoma Avenue South	Sept. 1 - Dec. 31	16	12	2
715 South 11th Street	Jan. 1 - Dec. 31	17	11	2
Bellevue				
606 - 110th Ave. N.E.	Nov. 26 - Dec. 31	13	10	1

PHOTOCHEMICAL OXIDANTS

STANDARD: 0.08 ppm for a 1 hour average not to be exceeded more than once per year.

Photochemical reactivity may be defined as the tendency of an atmospheric system containing organic substances (such as reactive hydrocarbons) and nitrogen oxides to undergo, under the influence of ultraviolet radiation and appropriate meteorological conditions, a series of chemical reactions that result in the type of air pollution referred to as photochemical oxidants. This reaction requires some time (2 to 5 hours) to take place, therefore the maximum concentrations of photochemical oxidants can normally be expected from 5 to 15 miles downwind of the sources that emit reactive hydrocarbons and nitrogen oxides.

Since ultraviolet radiation is a necessary part of this reaction, the summer months with more hours of sunlight and with the sun at a higher elevation angle is the season with the highest probability of occurrence of photochemical oxidants. Light northerly winds normally accompany the sunny clear days in this region during the summer; therefore, the highest probability of occurrence of maximum concentrations of photochemical oxidants is 5 to 15 miles south of the source areas emitting reactive hydrocarbons and nitrogen oxides. The maximum values normally occur between noon and sunset.

During 1975, the Agency operated one instrument in the Green River valley at Kent. The The Department of Ecology operated one in the Seattle industrial area and two in the Tacoma area. All the instruments were specific for Ozone.

OZONE

(Concentration in parts per million)

1975

STANDARD: 0.08 ppm 1-hour average not to be exceeded more than once per year

Location	Period of Operation	Maximum 24-Hour Average	Maximum 4-Hour Average	Maximum 1-Hour Average	Hours Exceeding 0.08 ppm	No. of Days > .08 PPM
1234 N. Central Ave., Kent	Jan. 1 - Dec. 31	0.04 ppm	0.11 ppm	0.13 ppm	5	2
6770 E. Marg. Way S.W., Seattle	Jan. 1 - Dec. 31	0.03 ppm	0.06 ppm	0.06 ppm	0	0
901 Tacoma Ave., Tacoma	Jan. 1 - Dec. 31	0.06 ppm	0.11 ppm	0.13 ppm	19	5
112th St. S.W. & Loch Lea, Lakewood	Jan. 1 - Dec. 31	0.04 ppm	0.09 ppm	0.09 ppm	10	5

Ozone is measured on a continuous basis using the gas phase chemiluminescence method.

OXIDES OF NITROGEN (NOx)
(Concentration in parts per million)
1975

STANDARD: None

Location	Period of Operation	Annual Arith. Mean	Maximum 24-Hour Average	Maximum 1-Hour Average
Tulalip Test Facility	Jan. 23 - Dec. 31	.009 ppm	0.08 ppm	0.45 ppm
10000 W. Marg. Way S.W., Seattle	Jan. 14 - Dec. 31	.078 ppm	0.44 ppm	0.94 ppm

Nitrogen Oxides are measured on a continuous method using the gas phase chemiluminescence method.

NITROGEN DIOXIDE
(Concentration in parts per million)
1975

STANDARD: 0.05 ppm annual arithmetic mean not to be exceeded

Location	Period of Operation	Maximum 24-Hour Average	Maximum 1-Hour Average	Arith. Mean For Period Of Operation
Tulalip Test Facility	Mar. 3 - Dec. 31	0.02 ppm	0.06 ppm	0.002 ppm
10000 W. Marg. Way S.W., Seattle	Feb. 19 - Dec. 31	0.10 ppm	0.38 ppm	0.018 ppm

Nitrogen Dioxide is measured on a continuous basis using the gas phase chemiluminescence method.

HYDROCARBONS (NONMETHANE)
(Concentration in parts per million)
1975

STANDARD: 0.24 ppm 3-hour average (6 a.m. to 9 a.m.) not to be exceeded more than once per year

Location	Period of Operation	Maximum 3-Hour Average[a]	# Days 3-Hour Avg. Exceeded 0.24 ppm[a]
Tulalip Test Facility	Oct. 1 - Dec. 31	0.23 ppm	0
10000 W. Marg. Way S.W., Seattle	Sept. 4 - Dec. 31	1.49 ppm	51

[a] Applies only to the period 6 a.m. through 9 a.m. daily

Nonmethane Hydrocarbons are measured on a continuous basis using the catalytic combustion - Flame Ionization Detection method.

SULFUR DIOXIDE POLLUTION ROSE FREQUENCY DISTRIBUTION

Sulfur dioxide and wind are measured continuously on a simultaneous basis at 14 monitoring stations. These data are reduced to hour averages and stored in historical data files for further summary and analysis. The Sulfur Dioxide Pollution Rose is an analysis depicting the wind direction associated with various sulfur dioxide concentrations for each simultaneous hour of observation.

The sulfur dioxide pollution roses (pages 30 through 36) are tabular arrays with sulfur dioxide summarized in columns and wind directions summarized in rows. Each table value is the total number of hour average observations for which the indicated sulfur dioxide concentration was observed at a given wind direction. Occurrences of sulfur dioxide with very light winds at the station appear in the next to the last row of the table.

This analysis allows an assessment of the location of source(s) having the most prominent effect on sulfur dioxide air quality at the station. When the period of sampling is substantial enough (a full year or more of data) this analysis technique becomes a reliable method to document source-receptor relationships. Caution must be exercised in the interpretation of these relationships since the wind direction at the receptor may not completely represent the transport wind between a source and the receptor.

This analysis also provides a frequency distribution of all the hour average sulfur dioxide concentrations at the station. The distribution is presented in the row of column totals. The first column (0.00 to 0.00) presents specifically the occurrence of 0.00 hour average sulfur dioxide readings.

Finally, the column of row totals provides a frequency distribution of hourly wind direction (to 16 points of the compass) or simply a wind rose without respect to speed.

The table below provides the 1975 average of sulfur dioxide at all stations and maximums recorded. Page 37 contains a table of occurrences exceeding specified levels of Regulation I.

SULFUR DIOXIDE
(Concentrations in parts per million by volume)
1975

Location	Annual Arith. Mean	Maximum 24-Hour Average	Maximum 1-Hour Average	Maximum 5-Minute Avg. Exc. 1.00 ppm
Tulalip Test Facility[a]	.000	.01	.02	
Medical-Dental Bldg., Everett	.006	.09	.60	1.41
Food Circus Bldg., Seattle Center	.006	.06	.20	
3419 13th Ave. S.W., Seattle[b]	.007	.12	.77	
4500 Blk. E. Marginal Way S., Seattle	.006	.05	.28	
10000 W. Marginal Way S.W., Seattle[c]	.003	.03	.17	
Southcenter, Tukwila	.002	.02	.28	
McMicken Hts., King County	.010	.06	.36	
1234 N. Central Ave., Kent	.002	.03	.29	
Maury Island, King County	.007	.09	.43	1.07
Meeker Jr. H.S., Tacoma	.003	.03	.30	
Willard Elem. School, Tacoma	.003	.03	.36	
N. 26th & Pearl, Tacoma	.006	.04	.56	1.46
Dewey Jr. H.S., Bremerton	.002	.02	.10	

a Sampling started 6/ 5/75
b Sampling started 4/14/75
c Sampling started 5/ 2/75

STANDARDS:
0.02 ppm for 365 days never to be exceeded
0.10 ppm for 24 hours never to be exceeded
0.40 ppm for 1 hour never to be exceeded
1.00 ppm for 5 minutes not to be exceeded more than twice in 8 hours

PUGET SOUND AIR POLLUTION CONTROL AGENCY - FREQUENCY DISTRIBUTION OF HOURLY AVERAGES

TULALIP TEST FACILITY, SNOHOMISH CO, WA

JUN, JUL, AUG, SEP, OCT, NOV, DEC, 1975

WIND DIRECTION (DEGREES)	SULFUR DIOXIDE (PPM) .00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N (349 - 011)	498	15															513
NNE (012 - 033)	30	2															32
NE (034 - 056)	11																11
ENE (057 - 078)	4	2															6
E (079 - 101)	6																6
ESE (102 - 123)	17	1															18
SE (124 - 146)	81	4															85
SSE (147 - 168)	508	51															559
S (169 - 191)	413	45															458
SSW (192 - 213)	220	28															248
SW (214 - 236)	143	19															162
WSW (237 - 258)	60	3															63
W (259 - 281)	57	2															59
WNW (282 - 303)	92	4															96
NW (304 - 326)	130	3															133
NNW (327 - 348)	284	17															301
CALM AND LIGHT/VARIABLE	1785	63															1848
TOTALS	4339	259															4598

MEDICAL-DENTAL BLDG, 2730 COLBY AVE, EVERETT
ALL MONTHS 1975

WIND DIRECTION (DEGREES)	SULFUR DIOXIDE (PPM) .00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N (349 - 011)	162	26	4														192
NNE (012 - 033)	122	20	3	2													147
NE (034 - 056)	126	26				1											153
ENE (057 - 078)	124	24															148
E (079 - 101)	163	30															193
ESE (102 - 123)	477	78	1														556
SE (124 - 146)	1687	192	5														1884
SSE (147 - 168)	864	153	3														1020
S (169 - 191)	285	52															337
SSW (192 - 213)	158	30															188
SW (214 - 236)	62	14															76
WSW (237 - 258)	90	21	2														113
W (259 - 281)	806	473	80	18	8	2	4	2		1							1394
WNW (282 - 303)	194	281	123	63	41	21	32	8	2		3	2	4				774
NW (304 - 326)	316	174	31	10	2			1					1				535
NNW (327 - 348)	274	42	4		1												321
CALM AND LIGHT/VARIABLE	146	74	13														233
TOTALS	6056	1710	269	93	52	24	36	11	2	1	3	2	5				8264

PUGET SOUND AIR POLLUTION CONTROL AGENCY - FREQUENCY DISTRIBUTION
OF HOURLY AVERAGES

FOOD CIRCUS BUILDING, SEATTLE CENTER
JAN, FEB, MAR, MAY, JUN, AUG, SEP, OCT, NOV, DEC, 1975

		SULFUR DIOXIDE (PPM)																
WIND DIRECTION (DEGREES)		.00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N	(349 - 011)	236	34	3	1													274
NNE	(012 - 033)	266	35	6	3													310
NE	(034 - 056)	568	114	8	1	1												692
ENE	(057 - 078)	266	49	14	5													334
E	(079 - 101)	97	19	3	3													122
ESE	(102 - 123)	90	10															100
SE	(124 - 146)	92	14	4	1			1										112
SSE	(147 - 168)	242	65	23	10	2		1										343
S	(169 - 191)	679	465	143	45	16	9	7	1									1365
SSW	(192 - 213)	703	256	63	11	11	5	4										1053
SW	(214 - 236)	233	78	8	3													322
WSW	(237 - 258)	213	76	12	6													307
W	(259 - 281)	222	63	10	3													298
WNW	(282 - 303)	64	18	2														84
NW	(304 - 326)	106	9	1														116
NNW	(327 - 348)	297	35	2														334
CALM AND LIGHT/VARIABLE		134	73	20	10	4	1	1										243
TOTALS		4508	1413	322	102	34	15	14	1									6409

HARBOR ISLAND, 3419 13TH AVE SW, SEATTLE, WA
APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, 1975

		SULFUR DIOXIDE (PPM)																
WIND DIRECTION (DEGREES)		.00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N	(349 - 011)	59	70	24	17	12	6	6	2	3	4	1		1		1		206
NNE	(012 - 033)	33	35	6	2	2	4	1	1					1				85
NE	(034 - 056)	138	49	1														188
ENE	(057 - 078)	82	40	1	1													124
E	(079 - 101)	34	13															47
ESE	(102 - 123)	12	6	2														20
SE	(124 - 146)	127	36	5	1													169
SSE	(147 - 168)	468	150	20	4													642
S	(169 - 191)	627	274	56	7	3	1	1										969
SSW	(192 - 213)	256	56	6	1	1	1	1										322
SW	(214 - 236)	163	25	3	2													193
WSW	(237 - 258)	112	29	1	1													143
W	(259 - 281)	44	20	1														65
WNW	(282 - 303)	48	19	2	1													70
NW	(304 - 326)	445	187	5	2	1	1											641
NNW	(327 - 348)	386	195	19	13	8	2	6	4	2								635
CALM AND LIGHT/VARIABLE		234	146	10	1	1												392
TOTALS		3268	1350	162	53	28	15	15	7	5	4	1		2		1		4911

PUGET SOUND AIR POLLUTION CONTROL AGENCY - FREQUENCY DISTRIBUTION OF HOURLY AVERAGES

DUWAMISH, 4500 BLK E MARGINAL WAY S, SEATTLE
JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, NOV, DEC, 1975

		SULFUR DIOXIDE (PPM)																
WIND DIRECTION (DEGREES)		.00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N	(349 - 011)	208	130	38	16	10	5	1										408
NNE	(012 - 033)	259	70	14		3		1										347
NE	(034 - 056)	280	55	6	2													343
ENE	(057 - 078)	152	36	8														196
E	(079 - 101)	83	16	1	1													101
ESE	(102 - 123)	54	14	1														69
SE	(124 - 146)	212	69	5	2													288
SSE	(147 - 168)	504	172	12														688
S	(169 - 191)	706	262	34	5	1	1											1009
SSW	(192 - 213)	798	230	38	7	2	1	2										1078
SW	(214 - 236)	449	118	25	8	4	1											605
WSW	(237 - 258)	169	28	5														202
W	(259 - 281)	91	24	3														118
WNW	(282 - 303)	221	49	7	3	1	1											282
NW	(304 - 326)	331	157	24	11	3	5	5		1								537
NNW	(327 - 348)	253	162	55	13	2	4	2	1									492
CALM AND LIGHT/VARIABLE		740	286	40	10	4	1	1										1082
TOTALS		5510	1878	316	78	30	19	12	1	1								7845

10,000 W MARGINAL WAY SW, SEATTLE, WASH.

MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, 1975

		SULFUR DIOXIDE (PPM)																
WIND DIRECTION (DEGREES)		.00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N	(349 - 011)	133	38	1														172
NNE	(012 - 033)	180	25															205
NE	(034 - 056)	173	14															187
ENE	(057 - 078)	66	10			1												77
E	(079 - 101)	19																19
ESE	(102 - 123)	14	3															17
SE	(124 - 146)	150	13	1			1											165
SSE	(147 - 168)	1014	133	4	3	2		1	1									1158
S	(169 - 191)	481	143	18	8	1	2	2										655
SSW	(192 - 213)	368	135	23	11	4	2	1										544
SW	(214 - 236)	264	68	6	1	1												340
WSW	(237 - 258)	159	17	3														179
W	(259 - 281)	86	11															97
WNW	(282 - 303)	103	31	4														138
NW	(304 - 326)	302	85	3	1	1	1											393
NNW	(327 - 348)	276	86	2	1	1												366
CALM AND LIGHT/VARIABLE		323	73	4														400
TOTALS		4111	885	69	25	11	6	4	1									5112

PUGET SOUND AIR POLLUTION CONTROL AGENCY - FREQUENCY DISTRIBUTION OF HOURLY AVERAGES

SOUTH CENTER, ANDOVER PARK EAST, TUKWILA, WA
JAN, FEB, MAR, APR, MAY, JUN, JUL, SEP, OCT, NOV, 1975

WIND DIRECTION (DEGREES)	SULFUR DIOXIDE (PPM) .00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N (349 - 011)	501	58															559
NNE (012 - 033)	180	20															200
NE (034 - 056)	53	5	2														60
ENE (057 - 078)	35	2															37
E (079 - 101)	49																49
ESE (102 - 123)	63	2															65
SE (124 - 146)	71	4	1														76
SSE (147 - 168)	245	40															285
S (169 - 191)	742	69	4	1													816
SSW (192 - 213)	845	105	6	5	1												962
SW (214 - 236)	469	123	17	6			1	1									617
WSW (237 - 258)	177	41	8	1	1												228
W (259 - 281)	64	10	1	1													76
WNW (282 - 303)	35	5															40
NW (304 - 326)	103	10	2	1													116
NNW (327 - 348)	350	51	3														404
CALM AND LIGHT/VARIABLE	926	93	3	1		1											1024
TOTALS	4908	638	47	16	2	1	1	1									5614

MCMICKEN HTS, S 176TH & 42ND AV S, KING CO, WA
ALL MONTHS 1975

WIND DIRECTION (DEGREES)	SULFUR DIOXIDE (PPM) .00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N (349 - 011)	177	337	26	1	1												542
NNE (012 - 033)	409	440	15	3	1												868
NE (034 - 056)	168	197	4														369
ENE (057 - 078)	82	67	1														150
E (079 - 101)	81	33	2														116
ESE (102 - 123)	82	45															127
SE (124 - 146)	86	64	3														153
SSE (147 - 168)	285	198	9			1											493
S (169 - 191)	355	257	8		1	1											622
SSW (192 - 213)	392	337	36	8	3	3	2	1		1							783
SW (214 - 236)	462	722	223	89	49	20	13	3	2								1583
WSW (237 - 258)	179	204	48	14	7	5	3	2									462
W (259 - 281)	55	71	9	1													136
WNW (282 - 303)	36	41	6														83
NW (304 - 326)	37	55	3		1												96
NNW (327 - 348)	81	129	9	1													220
CALM AND LIGHT/VARIABLE	444	577	50	11	5	1		1	1								1090
TOTALS	3411	3774	452	128	68	31	18	7	3	1							7893

PUGET SOUND AIR POLLUTION CONTROL AGENCY - FREQUENCY DISTRIBUTION OF HOURLY AVERAGES

1234 NORTH CENTRAL AVENUE, KENT, WA
ALL MONTHS 1975

WIND DIRECTION (DEGREES)	SULFUR DIOXIDE (PPM) .00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N (349 - 011)	612	24															636
NNE (012 - 033)	329	17	1														347
NE (034 - 056)	106	5															111
ENE (057 - 078)	59	2															61
E (079 - 101)	136	3															139
ESE (102 - 123)	219	1															220
SE (124 - 146)	255	4															259
SSE (147 - 168)	642	26	1														669
S (169 - 191)	1100	55	6														1161
SSW (192 - 213)	622	32	4	2													660
SW (214 - 236)	411	74	13	4		1				1							504
WSW (237 - 258)	249	79	26	8	3		3										368
W (259 - 281)	203	58	16	4	2	1	1										285
WNW (282 - 303)	109	19	5	2													135
NW (304 - 326)	94	12	1		2												109
NNW (327 - 348)	183	25	3	2	1												214
CALM AND LIGHT/VARIABLE	2091	201	15	7	1	1	1										2317
TOTALS	7420	637	91	29	9	3	5			1							8195

SW 248TH & 59TH AVE. SW, MAURY ISLAND, WASH.
ALL MONTHS 1975

WIND DIRECTION (DEGREES)	SULFUR DIOXIDE (PPM) .00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N (349 - 011)	259	36	3														298
NNE (012 - 033)	78	10			1												89
NE (034 - 056)	57	8	3	1													69
ENE (057 - 078)	88	5		1													94
E (079 - 101)	103	5	1	3													112
ESE (102 - 123)	495	78	29	18	10	3	8						1				642
SE (124 - 146)	577	114	24	12	8	9	1	2			1						748
SSE (147 - 168)	467	74	20	7	5	4	6	2		1		1					587
S (169 - 191)	448	138	45	12	5	7	5	2	1	1							664
SSW (192 - 213)	428	199	77	36	28	12	18	5	6	1							810
SW (214 - 236)	402	90	24	6	2	3	1	1									529
WSW (237 - 258)	184	36		1		1											222
W (259 - 281)	116	12	5	2													135
WNW (282 - 303)	132	13	2	1			1										149
NW (304 - 326)	667	84	3														754
NNW (327 - 348)	1024	90	1														1115
CALM AND LIGHT/VARIABLE	352	80	16	6	3	4	3	1									465
TOTALS	5877	1072	253	106	62	43	43	13	7	3	1	1	1				7482

PUGET SOUND AIR POLLUTION CONTROL AGENCY - FREQUENCY DISTRIBUTION OF HOURLY AVERAGES

MEEKER JR HS, 1526 - 51ST STREET NE, TACOMA
JAN, FEB, APR, MAY, JUN, JUL, 1975

SULFUR DIOXIDE (PPM)

WIND DIRECTION (DEGREES)	.00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N (349 - 011)	418	9	1														428
NNE (012 - 033)	373	8	1	1													383
NE (034 - 056)	128	7															135
ENE (057 - 078)	46		1														47
E (079 - 101)	53	4															57
ESE (102 - 123)	57	5	1		1												64
SE (124 - 146)	131	50	17		1												199
SSE (147 - 168)	232	50	5	2													289
S (169 - 191)	292	19	1	1													313
SSW (192 - 213)	436	5	1														442
SW (214 - 236)	470	6	2	1													479
WSW (237 - 258)	194	21	4	1	1	2	1										224
W (259 - 281)	61	22	11	5	4	1		1									105
WNW (282 - 303)	70	20	12	4	3		4	2									115
NW (304 - 326)	104	17	10	2	1	1	2										137
NNW (327 - 348)	98	5				1											104
CALM AND LIGHT/VARIABLE	338	33	6	2		3	1		1								384
TOTALS	3501	281	73	19	11	8	8	3	1								3905

WILLARD ELEM SCHOOL, S 32ND & S 'D' ST, TACOMA
JAN, FEB, MAR, APR, MAY, AUG, SEP, OCT, DEC, 1975

SULFUR DIOXIDE (PPM)

WIND DIRECTION (DEGREES)	.00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N (349 - 011)	553	164	25	9	4	2	3		1	1							762
NNE (012 - 033)	203	104	7														314
NE (034 - 056)	93	48	6														147
ENE (057 - 078)	75	11	1														87
E (079 - 101)	45	8			1												54
ESE (102 - 123)	61	10															71
SE (124 - 146)	75	11	1														87
SSE (147 - 168)	90	14															104
S (169 - 191)	527	61	3														591
SSW (192 - 213)	1053	80	4														1137
SW (214 - 236)	494	50	8	1													553
WSW (237 - 258)	286	31	3	3													323
W (259 - 281)	105	17	4	2		1	2										131
WNW (282 - 303)	53	9	2	3	1	1	2	1									72
NW (304 - 326)	27	8	3		1												39
NNW (327 - 348)	140	34	6	1					1								182
CALM AND LIGHT/VARIABLE	337	156	19	4	2	2											520
TOTALS	4217	816	92	23	9	6	7	1	2	1							5174

PUGET SOUND AIR POLLUTION CONTROL AGENCY - FREQUENCY DISTRIBUTION OF HOURLY AVERAGES

N 26TH AND PEARL STREET, TACOMA
ALL MONTHS 1975

WIND DIRECTION (DEGREES)		SULFUR DIOXIDE (PPM) .00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N	(349 - 011)	141	53	22	9	7	5	4	3		1	1		1				247
NNE	(012 - 033)	291	196	75	34	25	14	30	10	4	7	4		1				691
NE	(034 - 056)	625	239	38	20	10	9	6	4	2					1			954
ENE	(057 - 078)	198	83	15	2	3	3	8	2		1							315
E	(079 - 101)	101	45	11	1	1			1									160
ESE	(102 - 123)	71	25	1	1	1	1											100
SE	(124 - 146)	85	22			1												108
SSE	(147 - 168)	192	23	1														216
S	(169 - 191)	510	14															524
SSW	(192 - 213)	874	7	1														882
SW	(214 - 236)	1206	13	2														1221
WSW	(237 - 258)	1201	26	1														1228
W	(259 - 281)	627	29	6	1													663
WNW	(282 - 303)	178	12	4	1								1					196
NW	(304 - 326)	75	6	5	1	4		1	1									93
NNW	(327 - 348)	58	28	4	3	1		3	2									99
CALM AND LIGHT/VARIABLE		525	178	35	19	5	3	5	1	1	3		2	1				778
TOTALS		6958	999	221	92	58	35	57	24	7	12	5	3	3	1			8475

DEWEY JR HS, PERRY AVE & HOLMAN ST, BREMERTON
ALL MONTHS 1975

WIND DIRECTION (DEGREES)		SULFUR DIOXIDE (PPM) .00 TO .00	.01 TO .02	.03 TO .04	.05 TO .06	.07 TO .08	.09 TO .10	.11 TO .15	.16 TO .20	.21 TO .25	.26 TO .30	.31 TO .35	.36 TO .40	.41 TO .50	.51 TO .60	.61 TO .70	OVER .70	TOTALS
N	(349 - 011)	303	8															311
NNE	(012 - 033)	496	38															534
NE	(034 - 056)	500	42	1														543
ENE	(057 - 078)	182	13		1													196
E	(079 - 101)	355	36	1														392
ESE	(102 - 123)	281	23	1	1													306
SE	(124 - 146)	128	14	2														144
SSE	(147 - 168)	119	23	1		1												144
S	(169 - 191)	356	39	2	2													399
SSW	(192 - 213)	969	144	11	1	1												1126
SW	(214 - 236)	978	321	27	5	1	1											1333
WSW	(237 - 258)	293	62	7														362
W	(259 - 281)	90	17		1													108
WNW	(282 - 303)	56	7															63
NW	(304 - 326)	60	3															63
NNW	(327 - 348)	137	7															144
CALM AND LIGHT/VARIABLE		1056	200	22	4	1	1											1284
TOTALS		6359	997	75	15	4	2											7452

SULFUR DIOXIDE
(Concentrations in parts per million by volume)
1975

Frequencies of Concentrations Exceeding Specified Levels

A. Number of occurrences > 1.00 ppm for 5 minutes.
B. Number of occurrences > 0.25 ppm for 1 hour.
C. Number of occurrences > 0.40 ppm for 1 hour.

Location	Jan.			Feb.			Mar.			Apr.			May			June			July			Aug.			Sept.			Oct.			Nov.			Dec.			Annual		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Tulalip Test Facility[a]																																							
Medical-Dental Bldg., Everett				4	4	3	2	2					2	1					1						2	7	2										10	15	5
Food Circus Bldg., Seattle Center																																							
3419 13th Ave. S.W., Seattle[b]													1						7	3					4	1		1									13	4	
4500 Blk. E. Marg. Way S., Seattle																			1																		1		
10000 W. Marg. Way S.W., Seattle[c]																																							
Southcenter, Tukwila																												1									1		
McMicken Hts., King County	1												1																								2		
1234 N. Central Ave., Kent																						1															1		
Maury Island							3			1	2		1									1			2	1		2			2	1		3		1	16	2
Meeker Jr. H.S., Tacoma										1						2																				3		
Willard Elem. School, Tacoma										1																		1									2		
N. 26th & Pearl, Tacoma	1						3	2					1	6	1	2	1	1	2	1					6	1		4	1		4			2	9	1	8	35	6
Dewey Jr. H.S., Bremerton																																							
All Station Frequencies	2			4	4	3	5	7		1	4		3	10	1	2	3	1	11	4		2			2	19	5	9	1		6	1		2	12	1	19	89	17

STANDARDS: 1.00 ppm for 5 minutes not to be exceeded more than once in 8 hours.
0.40 ppm for 1 hour never to be exceeded.
0.25 ppm for 1 hour not to be exceeded more than twice in seven consecutive days.
0.10 ppm for 24 hours not to be exceeded more than once in a year.
(NOTE: 1 occurrence on July 28, 1975 at 3419 Ave. S.W., Seattle)

NOTE: A three hour average of 0.51 ppm occurred at the Medical-Dental Bldg. in Everett on February 20, 1975. (See National Standards on back cover)

a Sampling started 6/ 5/75
b Sampling started 4/14/75
c Sampling started 5/ 2/75

COEFFICIENT OF HAZE SUMMARY

(COH's/1000 Linear Feet)

1975

Location	Monthly Arithmetic Averages												Arith.[a] Mean	Geo.[a] Mean
	J	F	M	A	M	J	J	A	S	O	N	D		
Tulalip Test Facility	0.29	0.26	0.23	0.25	0.19	0.19	0.17	0.15	0.30	0.28	0.28	0.31	0.24	0.19
Medical-Dental Bldg., Everett	0.45	0.36	0.35	0.40	0.37	0.30	0.34	0.37	0.56	0.44	0.37	0.48	0.40	0.33
Food Circus Bldg., Seattle Center	0.65	0.60	0.39	0.39	0.36	0.32	0.37	0.38	0.61	0.61	0.54	0.75	0.50	0.41
4500 Blk. E. Marg. Way S., Seattle	0.78	0.76	0.60	0.56	0.41	0.33	0.37	0.40	0.69	0.70	0.72	0.91	0.60	0.44
10000 W. Marg. Way S.W., Seattle	0.75	0.67	0.56	0.48	0.37	0.27	0.34	0.34	0.62	0.63	0.70	0.92	0.55	0.39
Southcenter, Tukwila	0.68	0.60	0.50	0.45	0.46	0.40	0.35	0.24	0.65	0.49	0.48	0.67	0.52	0.39
McMicken Hts., King County	0.67	0.56	0.48	0.44	0.39	0.32	0.38	0.36	0.58	0.53	0.49	0.68	0.49	0.40
1234 N. Central Ave., Kent	0.59	0.51	0.39	0.47	0.31	0.19	0.24	0.25	0.54	0.44	0.43	0.53	0.40	0.30
Meeker Jr. H.S., Tacoma	0.42	0.40	0.29	0.29	0.22	0.17	0.19					0.42	0.29	0.21
Tideflats, Tacoma[b]							0.49	0.49	0.79	0.77	0.79	0.99	0.72	0.54
Willard Elem. School, Tacoma	0.76	0.81	0.60	0.53	0.46	0.35	0.41	0.42	0.83	0.66	0.81	1.02	0.64	0.48
N. 26th & Pearl, Tacoma	0.52	0.53	0.35	0.34	0.25	0.23	0.23	0.24	0.47	0.43	0.52	0.72	0.40	0.29
Dewey Hr. H.S., Bremerton	0.37	0.35	0.26	0.27	0.21	0.15	0.17	0.17	0.24	0.31	0.26	0.39	0.27	0.21
Weighted Arithmetic Mean[c]	0.58	0.53	0.42	0.40	0.33	0.27	0.32	0.32	0.57	0.52	0.53	0.69		

a Developed from all available hourly values

b Sampling started July 1, 1975

c Means weighted by number of readings per month

Coefficient of Haze is a measure of the light extinction produced by suspended particulate in air. These measurements are made over half hour periods on a continuous basis using tape samplers. Federal, State or local standards have not been established for this measurement. In the Washington State Episode Avoidance Plan, a 24-hour average of 3.0 COH is the Alert level, 5.0 COH is the Warning level and 7.0 COH is the Emergency level. The highest 24-hour average (2.5 COH) and the maximum hourly average (4.7 COH) were recorded December 20-21 at Willard Elementary School, Tacoma.

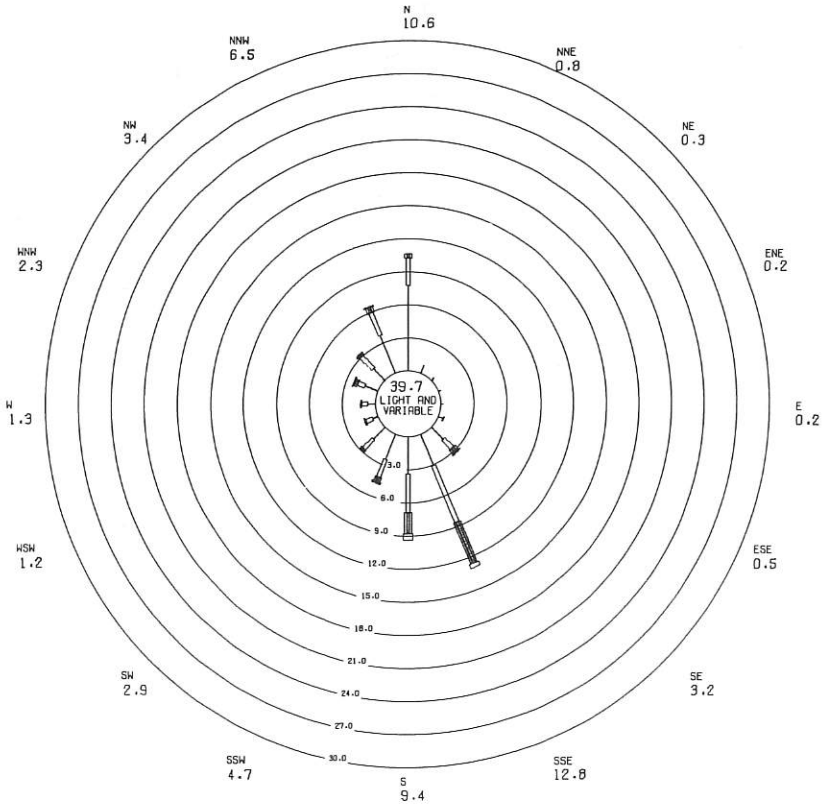
WIND ROSES

The measurement of wind speed and direction concomitant with air quality is essential to the evaluation and control of air pollution in any given area. Wind speeds below four knots usually result in higher air pollutant concentrations. Wind direction information is essential for determining which sources or source areas affect a specific station.

A wind rose is a graphical means of summarizing the winds for a given time period. It is essentially a count, expressed as a percentage frequency, of the number of observations which had a particular direction and speed during that time period.

In these roses, representing 1975 winds, each spoke points in the direction from which the wind blows. The length of each segment of a spoke indicates the relative frequency of winds of different speeds. Using the scale located to the lower right of each rose, these lengths may be converted to percentages of the total observations.

The percentage frequency of winds from any given direction (without regard to speed) is expressed numerically beneath that direction on the perimeter of the roses. The percentage frequency of light and variable winds (winds less than 1.5 knots) is shown in the center of the rose.



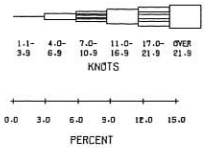
HOUR AVERAGE SURFACE WINDS

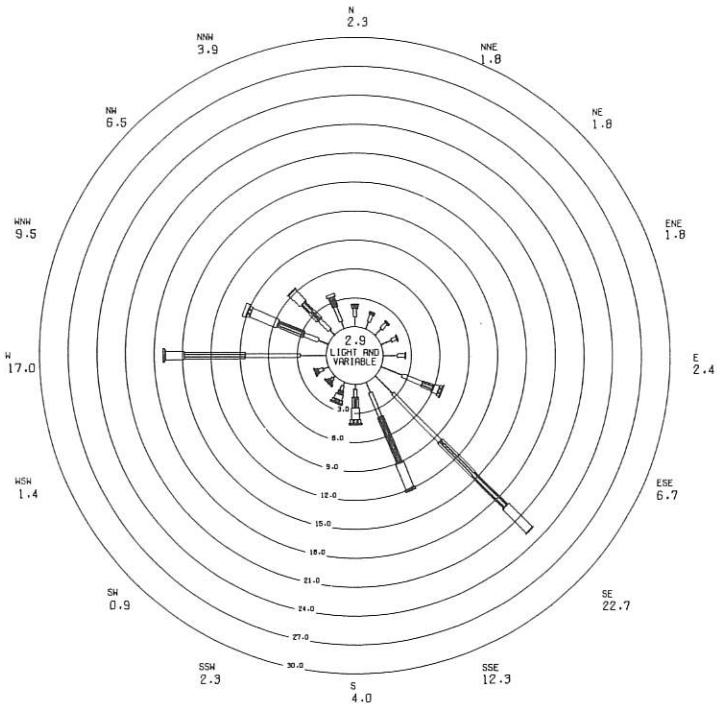
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY TULALIP TEST FACILITY, SNOHOMISH CO. WA

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,273





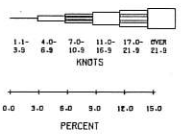
HOUR AVERAGE SURFACE WINDS

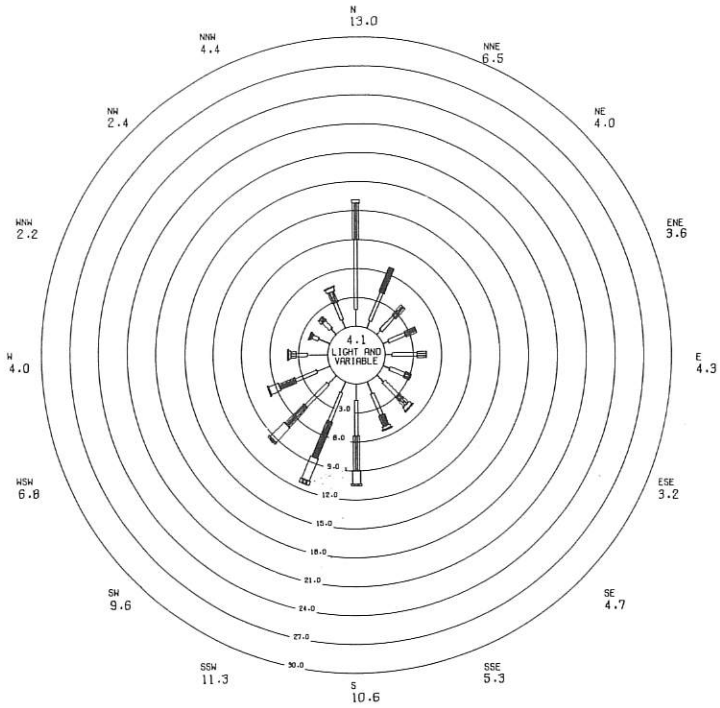
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
MEDICAL-DENTAL BLDG. 2730 COLBY AVE. EVERETT

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,364





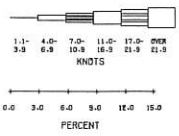
HOUR AVERAGE SURFACE WINDS

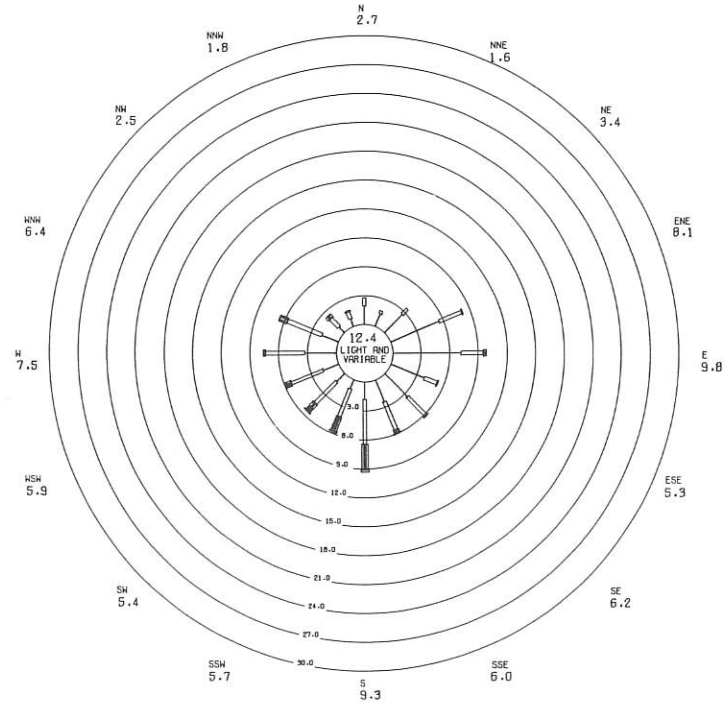
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
LAKE FOREST PARK RSVR. NE 195TH & 46TH AVE NE

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 7,875





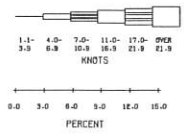
HOUR AVERAGE SURFACE WINDS

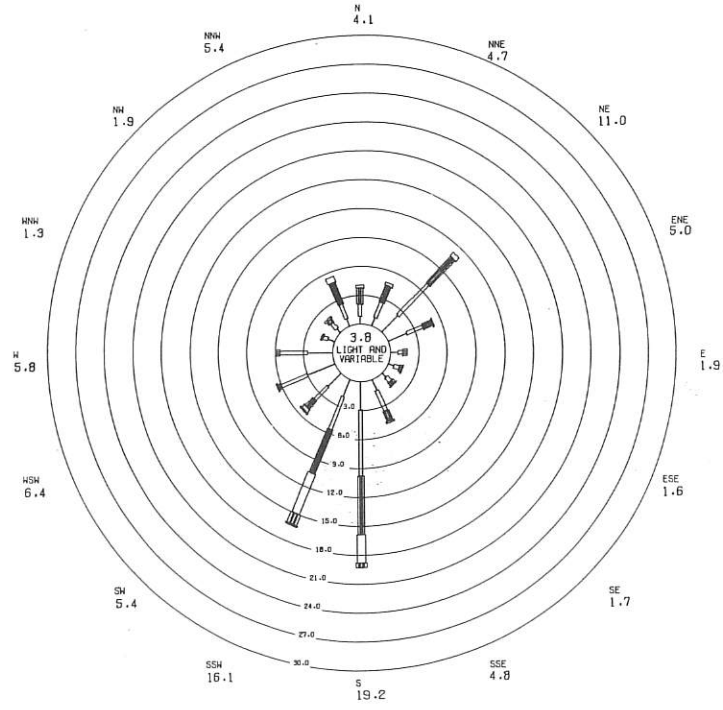
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
NWS URBAN SITE. 2725 MONTLAKE BLVD E. SEATTLE

INCLUSIVE DATES- JAN-AUG, DEC 1975

TOTAL OBSERVATIONS- 5,693





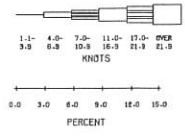
HOUR AVERAGE SURFACE WINDS

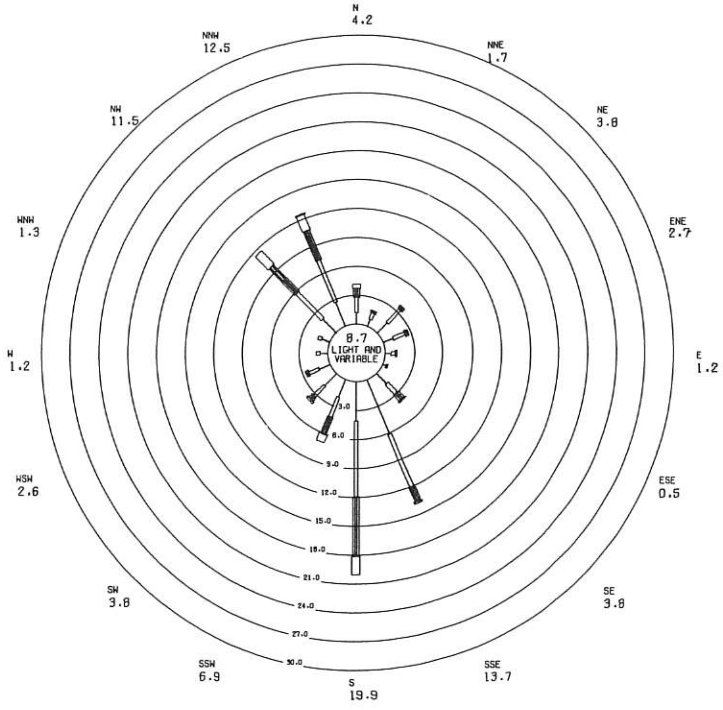
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
FOOD CIRCUS BUILDING. SEATTLE CENTER

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,084





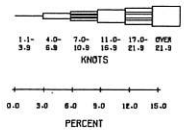
HOUR AVERAGE SURFACE WINDS

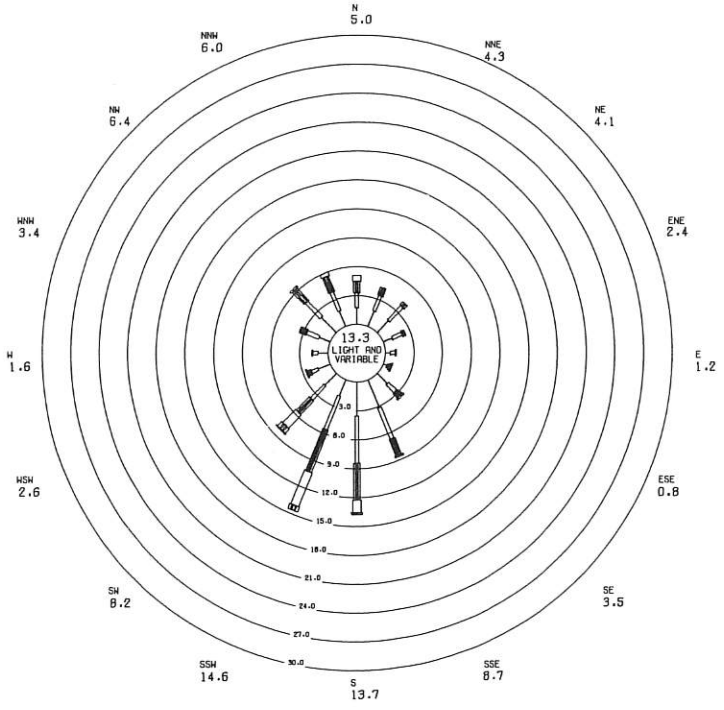
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
HARBOR ISLAND, 3419 13TH AVE SW, SEATTLE, WA

INCLUSIVE DATES- APR-DEC 1975

TOTAL OBSERVATIONS- 5,961





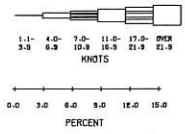
HOUR AVERAGE SURFACE WINDS

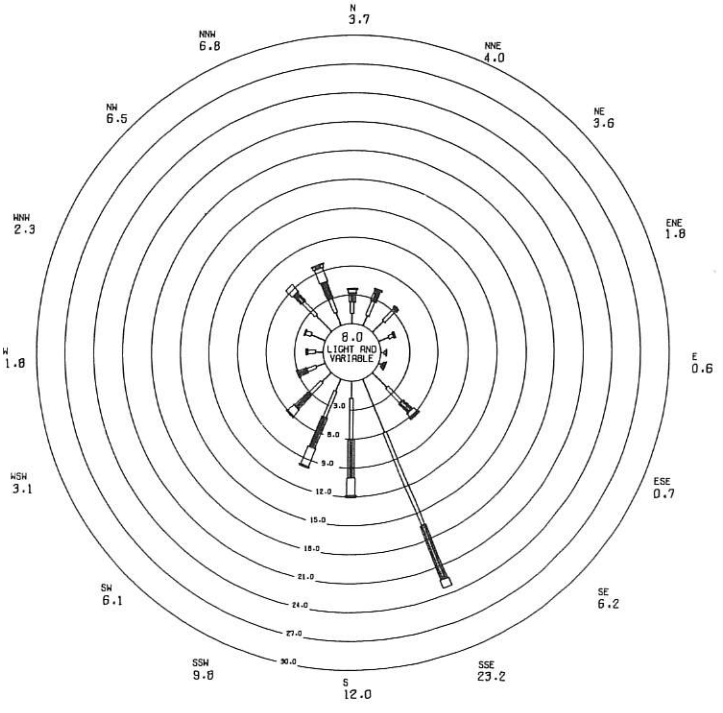
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
DUWAMISH, 4500 BLK E MARGINAL WAY S, SEATTLE

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,496





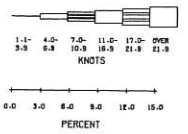
HOUR AVERAGE SURFACE WINDS

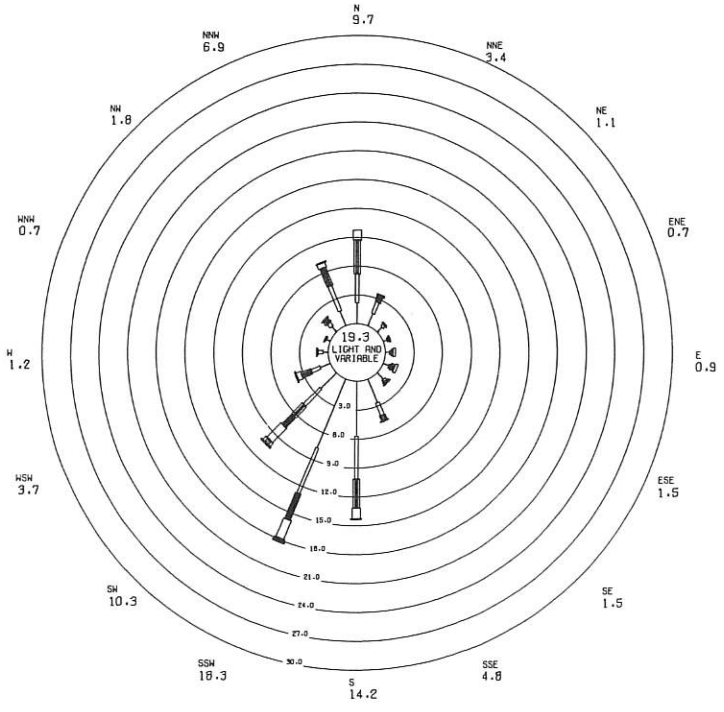
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
10,000 W MARGINAL WAY SW, SEATTLE, WASH.

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 7,968





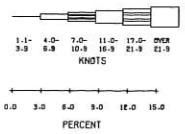
HOUR AVERAGE SURFACE WINDS

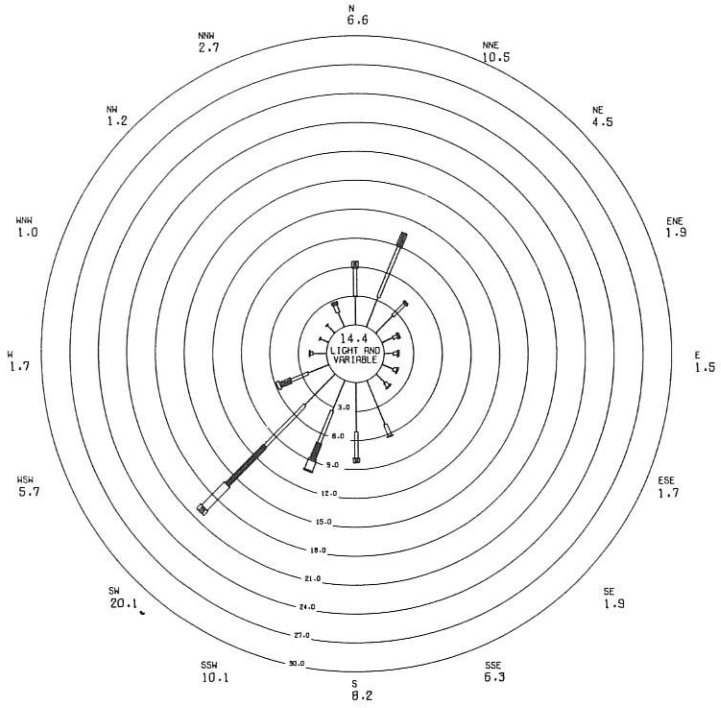
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
SOUTH CENTER, ANDOVER PARK EAST, TUKWILA, WA

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 7,890





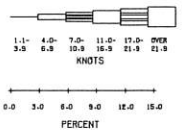
HOUR AVERAGE SURFACE WINDS

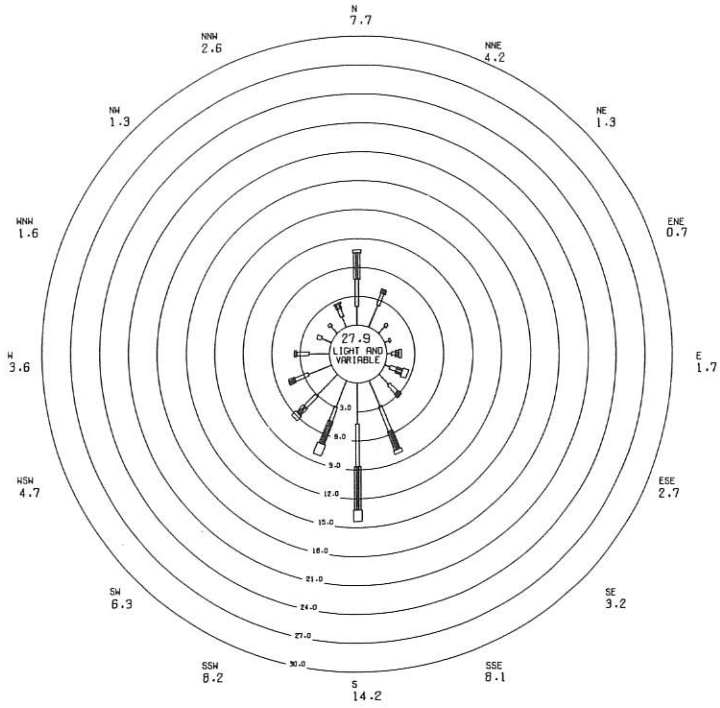
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
MCMICKEN HTS. S 176TH & 42ND AV S. KING CO. WA

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,552





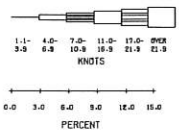
HOUR AVERAGE SURFACE WINDS

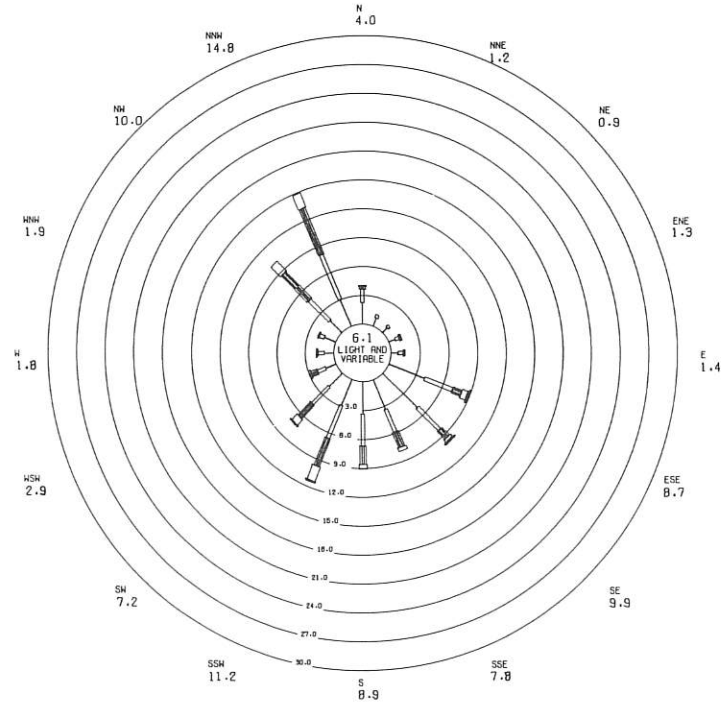
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
1234 NORTH CENTRAL AVENUE, KENT, WA

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,368





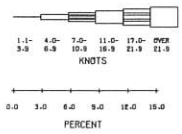
HOUR AVERAGE SURFACE WINDS

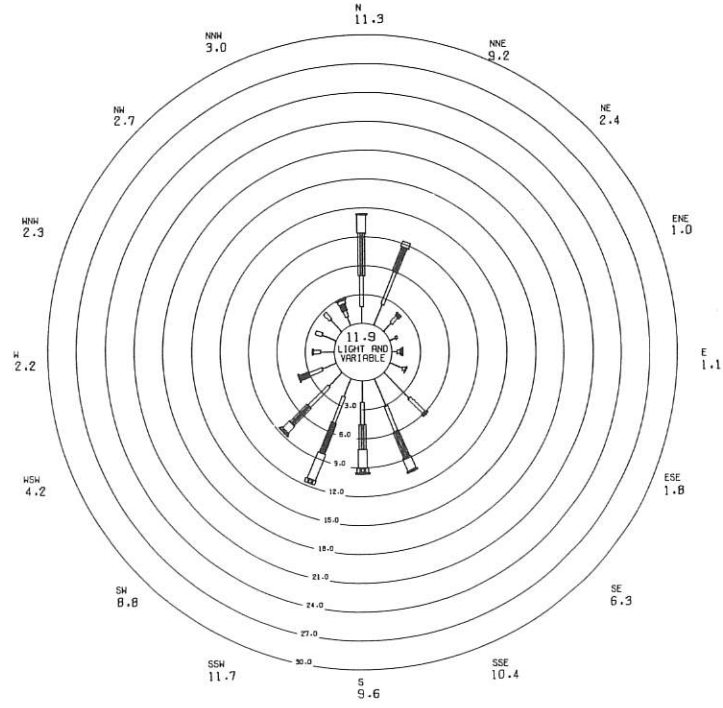
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
SW 248TH & 59TH AVE. SW. MAURY ISLAND, WASH.

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 7,826





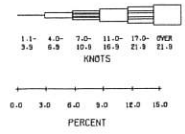
HOUR AVERAGE SURFACE WINDS

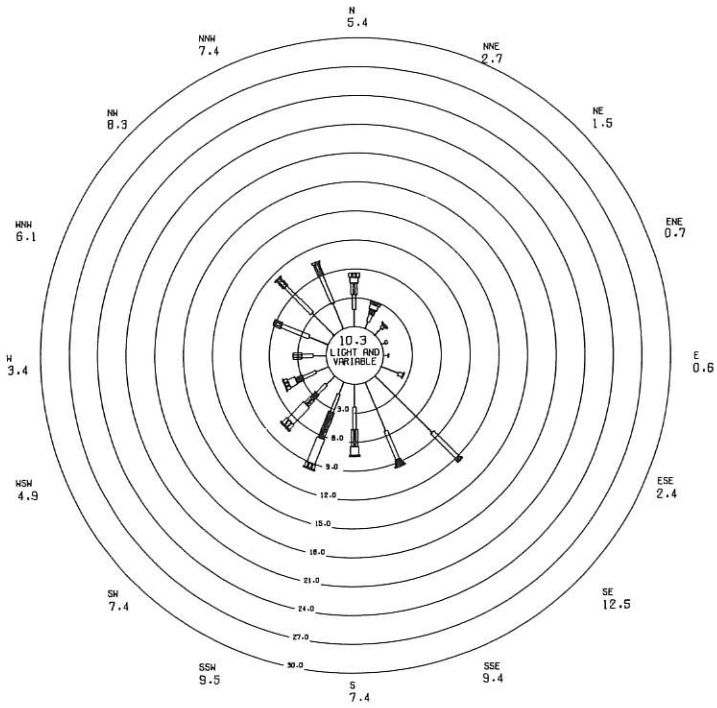
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
MEEKER JR HS. 1526 - 51ST STREET NE. TACOMA

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,551





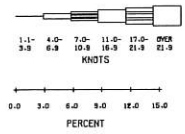
HOUR AVERAGE SURFACE WINDS

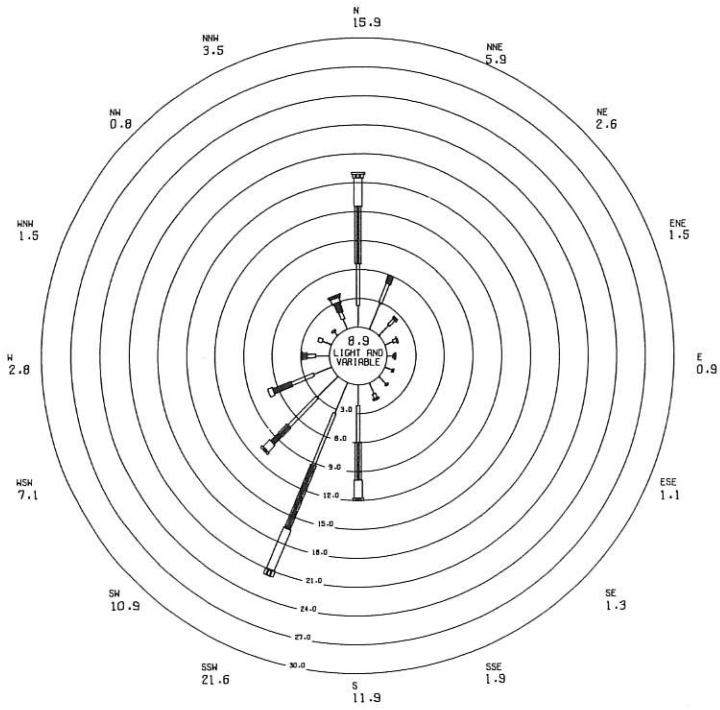
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
2316 E 11TH ST AND THORNE ROAD. TACOMA. WA

INCLUSIVE DATES- JUL. AUG. SEP. OCT. NOV. DEC. 1975

TOTAL OBSERVATIONS- 3,991





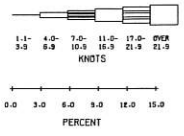
HOUR AVERAGE SURFACE WINDS

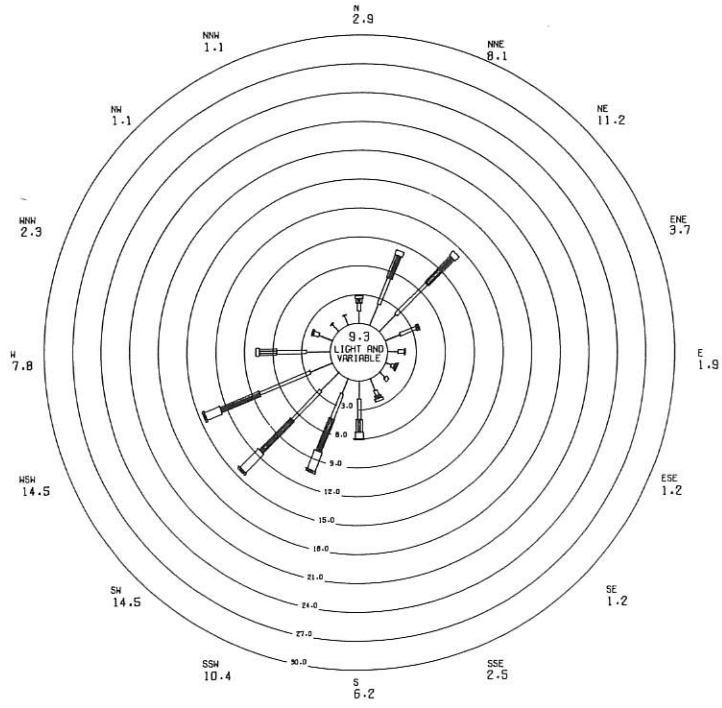
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
WILLARD ELEM SCHOOL. S 32ND & S 'O' ST. TACOMA

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,565





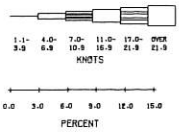
HOUR AVERAGE SURFACE WINDS

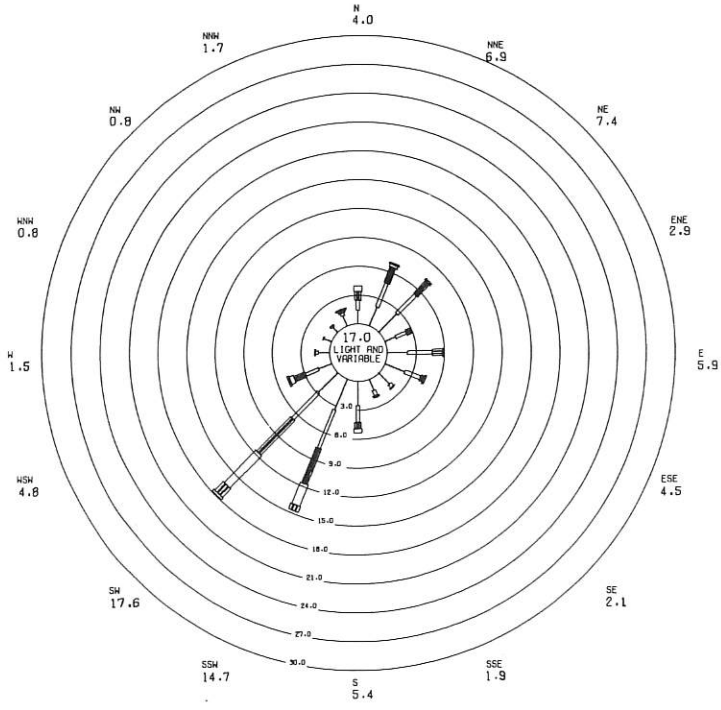
PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
N 26TH AND PEARL STREET. TACOMA

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,563





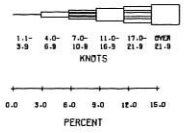
HOUR AVERAGE SURFACE WINDS

PERCENTAGE FREQUENCY OF OCCURRENCE

STATION LOCATION- PUGET SOUND AIR POLLUTION CONTROL AGENCY
DEWEY JR HS. PERRY AVE & HOLMAN ST. BREMERTON

INCLUSIVE DATES- ALL MONTHS 1975

TOTAL OBSERVATIONS- 8,608



CONVERSION TABLE

Air quality standards for gases are defined in terms of micrograms (μg) or milligrams (mg) per cubic meter as well as in parts per million. As this data summary expresses measurements for gaseous pollutants in terms of ppm, the following conversion table is for the convenience of those of our readers who wish to interpret our results in terms of $\mu g/m^3$ or mg/m^3. Conversion factors are extracted from the Federal Register, assuming a pressure of 760 mm Hg and a 25°C temperature.

Pollutant	Multiply PPM by	To Obtain
CO	1.145	mg/m^3
NO_2	1880	$\mu g/m^3$
O_3	1961	$\mu g/m^3$
SO_2	2619	$\mu g/m^3$

AMBIENT AIR QUALITY STANDARDS

SULFUR OXIDES

The presence of sulfur oxides in the ambient air has been associated with a variety of respiratory diseases and increased mortality rates. They represent a significant economic burden and have a nuisance impact. When sulfur oxides are inhaled with small particles, the effect on health is increased. Inhalation of sulfur dioxide can cause increased airway resistance by constricting lung passages.

PARTICULATES

Small discrete masses of solid or liquid matter dispersed in the atmosphere, especially those of one micron or less in diameter, are associated with a variety of adverse effects on public health and welfare. Particulate matter in the respiratory tract may produce injury by itself, or it may act in conjunction with gases to increase the effect on the body. Small particles suspended in the air are chiefly responsible for reduced visibility in the Puget Sound area. Soiling of buildings and other property is a common effect of high particulate levels.

CARBON MONOXIDE

Carbon monoxide reacts with the hemoglobin in red blood cells to decrease the oxygen-carrying capacity of the blood. The national primary standard for carbon monoxide was based on evidence that levels of carboxyhemoglobin in human blood as low as 2.5% may be associated with impairment of ability to discriminate time intervals. The national ambient air quality standards for carbon monoxide are intended to protect against the occurrence of carboxyhemoglobin levels above 2%. Note: Smoking up to 2 packs of cigarettes a day raises carboxyhemoglobin levels to about 5%. This is equivalent to exposure for 8 or more hours to 30 ppm of carbon monoxide.

	NATIONAL					WASHINGTON STATE		PUGET SOUND REGION	
	PRIMARY		SECONDARY		Notes		Notes		Notes
SULFUR OXIDES	$\mu g/m^3$	ppm	$\mu g/m^3$	ppm		ppm		ppm	
Annual Average	80	.03			a	.02	a	.02	a
30-day Average								.04	a
24-hour Average	365	.14			b	.10	b	.10	a
3-hour Average			1300	.50	b				
1-hour Average						.25	c	.25	c
1-hour Average						.40	d	.40	a
5-min. Average								1.00	d
SUSPENDED PARTICULATES	$\mu g/m^3$	ppm	$\mu g/m^3$	ppm		$\mu g/m^3$		$\mu g/m^3$	
Annual Geom. Mean	75	---	60	---	a	60	a	60	a
24-hour Average	260	---	150	---	b	150	b	150	b
CARBON MONOXIDE	mg/m^3	ppm							
8-hour Average	10	9	same		b	same		same	
1-hour Average	40	35			b				
PHOTOCHEMICAL OXIDANTS	$\mu g/m^3$	ppm							
1-hour Average	160	.08	same		b	same but applies only 10 a.m. - 4 p.m. 4/1 thru 10/31		same as National	
NITROGEN DIOXIDE	$\mu g/m^3$	ppm							
Annual Average	100	.05	same		a	same		same	
HYDROCARBONS (Less Methane)	$\mu g/m^3$	ppm							
3-hour Average	160	.24	same		b e	same but applies only 4/1 thru 10/31		same as National	
PARTICLE FALLOUT						$grams/m^2/mo.$			
Industrial Areas						10			
Commercial-Residential Areas						5			

ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter

a Never to be exceeded
b Not to be exceeded more than once per year
c Not to be exceeded more than twice in seven days
d Not to be exceeded more than once in eight hours
e Applies to 3-hour period 6 to 9 a.m. daily

PHOTOCHEMICAL OXIDANTS

Photochemical oxidants are produced in the atmosphere when nitrogen oxides and some hydrocarbons are exposed to sunlight. Photochemical oxidants cause irritation to the mucous membranes, damage to vegetation and deterioration of materials. They affect the clearance mechanism of the lungs and alter resistance to respiratory bacterial infections. The national primary air quality standard for photochemical oxidants is based on evidence of increased frequency of asthma attacks for some people on days when hourly averages reach 0.1 ppm. Eye irritation is possible when atmospheric concentrations reach this level.

NITROGEN DIOXIDE

Nitric oxide results from the fixation of nitrogen and oxygen at high temperatures as in fuel combustion. There are several atmospheric reactions which lead to the oxidation of nitric oxide to nitrogen dioxide, and the presence of nitrogen dioxide in ambient air is essential to the production of photochemical oxidants. The presence of nitrogen dioxide in ambient air has been associated with a variety of respiratory diseases.

HYDROCARBONS

Defined as organic compounds composed exclusively of carbon and hydrogen, hydrocarbons are primarily associated with the use of petroleum products. They are the main components of photochemical smog. Hydrocarbons alone have no known effect on human health; therefore the sole purpose of prescribing a hydrocarbon standard is to control photochemical oxidants.

PSAPCA 4/76