Supplement to the Washington State State Implementation Plan

Vancouver Air Quality Maintenance Area Second 10-year Carbon Monoxide Maintenance Plan

Approved by SWCAA Board of Directors
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Prepared by

Southwest Clean Air Agency

For more information

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Executive Summary

Vancouver, WA has been in compliance with the 8-hour carbon monoxide (CO) National Ambient Air Quality Standard (NAAQS) every year since 1992. In 1990, as a result of the passage of the Federal Clean Air Act Amendments (FCAAA) and the establishment of new national standards for CO, the Portland/Vancouver Air Quality Maintenance Area (AQMA) was deemed to be out of compliance or in 'nonattainment' with this standard. In 1995, the Portland /Vancouver AQMA was split into two separate airsheds for managing CO ambient standards. In 1996, U.S. Environmental Protection Agency (EPA) formally redesignated the Vancouver area from a CO nonattainment area to a CO maintenance area, once the EPA determined the area met the standard, approved a plan to maintain the standard for a 10-year period, and found that Vancouver had met the other requirements for redesignation. The Clean Air Act requires that an area redesignated from nonattainment to maintenance submit a plan for maintaining the NAAQS for a second 10-year period.

Therefore, this Vancouver CO Plan is submitted by the Southwest Clean Air Agency (SWCAA) for inclusion into the Washington State Implementation Plan (SIP) and will serve as the second 10-year CO maintenance plan for the Vancouver AQMA. This document demonstrates that the Vancouver area will be in compliance with the NAAQS for CO through 2016 and meets other EPA requirements.

The current NAAQS for CO is 9 ppm (or 10 mg/m3) for an 8-hour average and 35 ppm (or 40 mg/m3) for a 1-hour average, not to be exceeded more than once per year. The current 8-hour CO design value for the Vancouver CO area is 4.8 ppm based on 2004-2005 data, well below the standard. Also, the Vancouver CO area has shown a generally declining trend in the ambient 8-hour CO concentrations over the past several years.

This design value qualifies Vancouver to use the Limited Maintenance Plan (LMP) approach in preparing this CO maintenance plan. EPA detailed the limited maintenance plan approach in a memorandum entitled ``Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas" from Joseph Paisie, Group Leader, Integrated Policy and Strategies Group, Office of Air Quality Planning and Standards (OAQPS), dated October 6, 1995." (LMP Guidance).

According to the LMP guidance, EPA will consider the maintenance demonstration satisfied if the monitoring data show the design value is at or below, 7.65 parts per million (ppm), or 85 percent of the level of the 8-hour CO NAAQS. The design value must be based on eight consecutive quarters of data.

One of the requirements for an area to be eligible to use the Limited Maintenance Plan option is that there be no changes to the previous 10-years' plan control measures. The control measure set forth in the 1996 plan was the Washington State I/M program. While some changes in testing technology and in which model year vehicles are required to be tested have occurred, the program assures that emission control equipment is being maintained. Mobile sources represent over 60% of CO winter emissions, based on 2002 emission calculations. The Southwest Washington Regional Transportation Council's (RTC) Metropolitan Transportation Plan (MTP)[1]

[1] Metropolitan Transportation Plan for Clark County, Southwest Washington Regional Transportation Council, December 2005

predicts decreasing CO emission estimates. This decrease is, in part, due to federal automobile emission standards and fleet turnover. Other efforts identified in the MTP to improve traffic flow have contributed and continue to contribute to the reductions in pollutants from cars and trucks. Since vehicle use is growing two to three times faster than Washington's population growth[2], and since mobile sources are the largest contributor to CO emissions, maintaining the vehicle I/M program is important to maintaining current air quality and achieving predicted CO emissions reductions.

As mentioned above, EPA will consider the maintenance demonstration satisfied if the monitoring data show the design value is at or below, 7.65 parts per million (ppm), or 85 percent of the level of the 8-hour CO NAAQS. In addition, when EPA approves a limited maintenance plan, the motor vehicle emission budget (MVEB) is considered not constraining for the length of the maintenance period. Since the area is in compliance with the standard, no new control strategies or new regulations will be necessary. The Vancouver area meets the CO standard with existing control measures.

To verify continued attainment with the standard, SWCAA will track countywide, mobile emissions through the Washington Department of Ecology emission inventory triennially. If mobile emissions decrease as predicted, this will show that Vancouver is in compliance with the CO standard. Our contingency plan, should mobile emissions increase over 2005 levels, would include a tiered level of escalating response. First, SWCAA would determine if the increase is because of a change in emission calculation methodology. Then, if it appears that a true increase has occurred, SWCAA would evaluate options such as conducting a winter CO mobile emission inventory, some form of 'hot spot' analysis using a model such as the Washington State Intersection Screening Tool (WASIST) or some other method, or temporarily conducting CO monitoring. Should an exceedance be measured at the temporary monitoring site, a community advisory group could be formed to evaluate and choose emission reduction measures. Reinstatement of the oxygenated fuel rule could be considered. In the case of a violation of the standard, SWCAA could ask industrial sources to apply Lowest Achievable Emission Rate technology to their proposed projects. However, this option is unlikely to be recommended since industrial sources contribute only a small amount to the overall CO emission total. Due to the low measured CO values in Vancouver over the past ten years, SWCAA does not anticipate any future CO exceedances or violations of the 8-hour standard.

[2] Washington Department of Ecology, Focus on Motor Vehicle Emission Check Program, September 2004, Publication 96-1013-AIR (Rev 9/04)

1.0 Introduction

Carbon Monoxide (CO) is a colorless, odorless gas that displaces oxygen in the body's red blood cells through normal respiration. The major human-caused source of CO is incomplete combustion of carbon-based fuel through the use of gasoline-powered motor vehicles. Other important sources of CO are woodstoves, open burning and industrial boilers. Increased CO concentrations can occur during winter in urban areas when cooler temperatures contribute to incomplete combustion and when CO emissions are trapped near the ground by atmospheric inversions.

The Environmental Protection Agency (EPA) set two national health protection standards for CO: a one-hour standard of 35 parts per million and an eight-hour standard of 9 parts per million. Areas that have CO levels that are above the standard must develop and carry out plans to reduce CO emissions. Areas that previously violated these standards but are now in compliance, must submit plans to assure continued compliance.

2.0 Background

2.1 General and Historical Information

The Portland, OR/Vancouver, WA CO Maintenance Area was designated a moderate CO nonattainment area per section 107(d)(1)(A) of the 1990 Federal Clean Air Act Amendments (FCAAA). The Vancouver CO Air Quality Management Area (AQMA) has met the CO National Ambient Air Quality Standard (NAAQS) every year since 1992. There have been two exceedances of the 8-hour standard since that time, but no violation of the standard since 1990.

On September 29, 1995, EPA approved the separation of the Portland, OR/Vancouver, WA CO nonattainment area into two distinct nonattainment areas, effective November 28, 1995.

Through a combined effort of the Southwest Clean Air Agency (SWCAA), the Washington Department of Ecology (Ecology), and the Southwest Washington Regional Transportation Council (RTC), a Redesignation Request/Maintenance Plan for the Vancouver CO area was prepared in 1995 in accordance with the requirements of the Federal Clean Air Act Amendments and EPA guidance.

On October 21, 1996, the EPA approved the redesignation request and the 10-year CO Maintenance Plan. EPA formally redesignated the Vancouver area from a CO nonattainment area to a CO maintenance area in 1996 after EPA determined the area met the CO standard, approved a plan to maintain the CO standard for a 10-year period, and found that Vancouver had met the other requirements for redesignation The first 10-year maintenance period ended on October 21, 2006. While CO concentrations in the Vancouver area continue to be significantly better than the air quality standard requires, Section 175A(b) of the Clean Air Act requires SWCAA to develop a second 10-year maintenance plan to ensure that the area will continue to achieve the CO NAAQS through 2016.

This Vancouver CO Plan is submitted for inclusion into the Washington State Implementation Plan (SIP) and will serve as the second 10-year CO maintenance plan for Vancouver, WA.

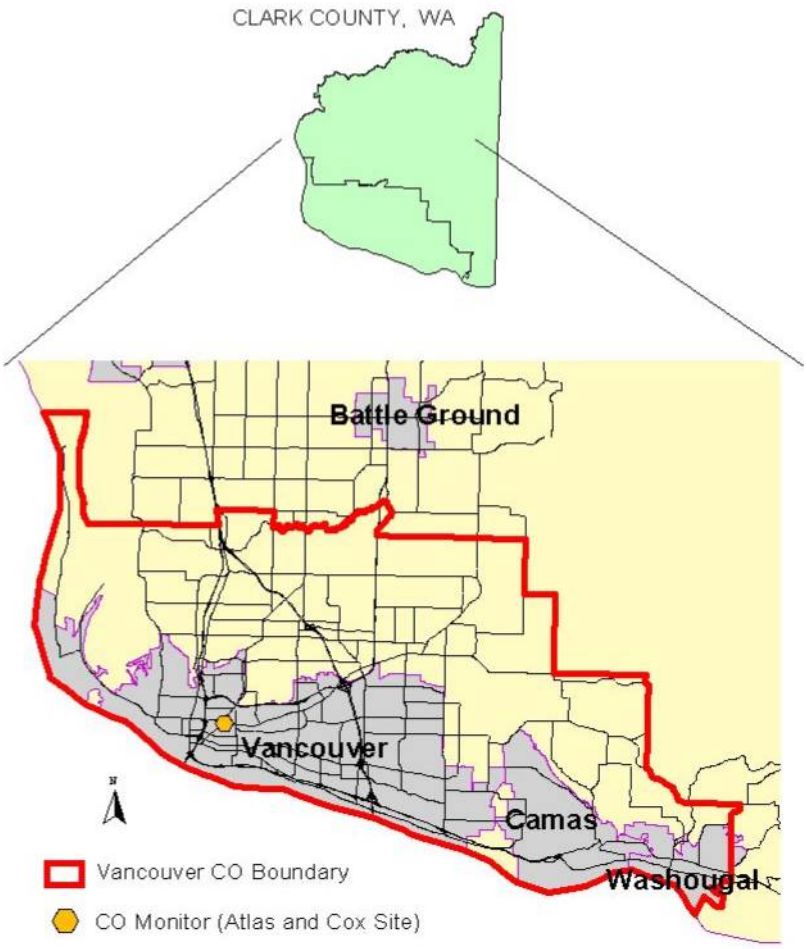
2.2 Planning direction

Vancouver qualifies for the Limited Maintenance Plan (LMP) option for the second 10-year maintenance plan. EPA's Limited Maintenance Plan approach is detailed in the EPA guidance memorandum "Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas" from Joseph Paisie of EPA OAQPS dated October 6, 1995. Therefore, SWCAA and Ecology are submitting a LMP to meet the federal requirement for a second 10-year period. A base year emissions inventory is required as part of a complete LMP submittal. The base year chosen for this work is 2002. SWCAA compiled the base year CO emission inventory with assistance from both Ecology and RTC.

2.3 Vancouver CO Maintenance Plan Area

The geographic area of the Vancouver CO maintenance area includes the high density urbanized southern portion of Clark County (see Figure 1 below). A legal description can be found in Appendix A. The boundaries of the emission inventory area correspond to the Vancouver CO maintenance area boundary.

Figure 1.Vancouver CO Maintenance Area



2.4 CO Monitoring Network

Up until October of 2006, the Vancouver CO maintenance area had a CO monitoring site located at the intersection of Fourth Plain Boulevard and Fort Vancouver Way. It was known as the Atlas and Cox site (EPA Site ID#530110010). Figure 1 also shows the location of this site. EPA granted approval to Ecology to remove the monitor in a memo dated May 1, 2006. A copy of this memo is included in Appendix B. Ecology removed the monitor from this site on October 5, 2006. There are no longer any CO monitors operating in the Vancouver CO maintenance area.

Historically, other CO monitors operated in the Vancouver area, but were discontinued with EPA approval when they were determined to no longer be needed due to low measured CO levels. The other locations were at the intersection of Highway 99 and 78th Street (1995-2000) and on Evergreen Boulevard between Main Street and Broadway (1978-1986).

3.0 Air Quality Status

The current NAAQS for CO is 9 ppm (or 10 mg/m^3) for an 8-hour average and 35 ppm (or 40 mg/m^3) for a 1-hour average, not to be exceeded more than once per year over at least two consecutive years. The Vancouver CO AQMA is currently a maintenance area for the 8-hour CO NAAQS. The Vancouver CO AQMA attained the carbon monoxide NAAQS based on air quality monitoring data from the Vancouver Atlas & Cox site from 1992-1993 and has not had a violation of the standard since that time. If a monitoring value exceeds 9 ppm, it is considered an exceedance of the standard. An exceedance is not a violation. If a nonoverlapping, monitored value exceeds the CO standard more than once in a year, then the area has violated the CO NAAQS.

3.1 Exceedances

EPA AirData data shows only one exceedance of the 8-hour CO standard since 1995. This exceedance occurred in 1999. The 1999 exceedance did not constitute a violation of the standard because CO readings did not exceed 9 ppm more than once in that year. One other exceedance since 1992 occurred in 1994 and predates data shown in AirData. Table 1 below shows the 8-hour values for CO for all published AirData data for the years 1995 through 2005. Vancouver has not violated the CO National Ambient Air Quality Standard (NAAQS) since redesignation in 1996.

Table 1. Vancouver Atlas and Cox station, Monitored CO Values and Exceedances

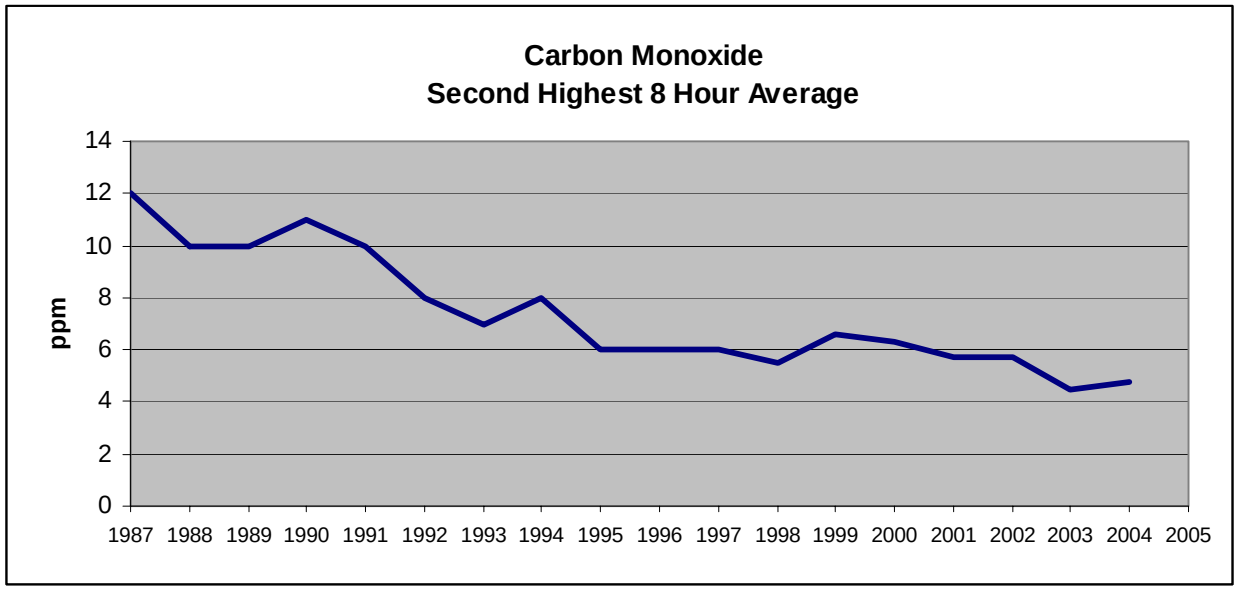
8-hour values			
1st Max	2nd Max	# Exceed	Year
6.8	6.3	0	1995
6.8	6.4	0	1996
6.6	6.0	0	1997
5.7	5.5	0	1998
10.1	6.7	1	1999
6.7	6.2	0	2000
5.9	4.7	0	2001
5.9	5.7	0	2002
4.7	4.5	0	2003
5	4.8	0	2004
4.9	4.6	0	2005

Values from US EPA - AirData Monitor Values Report - Criteria Air Pollutants
Downloaded 15-Mar-2006 at 10:35:41 AM (USA Eastern time zone)

3.2 Second Highest 8-hour Averages

The CO standard cannot be exceeded more than once per year. The second highest high values are used to determine compliance. The second highest highs from 1987 through 2005 are shown in Figure 2 below. The figure shows that CO values have been decreasing consistently since 1991.

Figure 2. Second highest 8-hour CO history for the Vancouver, WA Atlas and Cox site

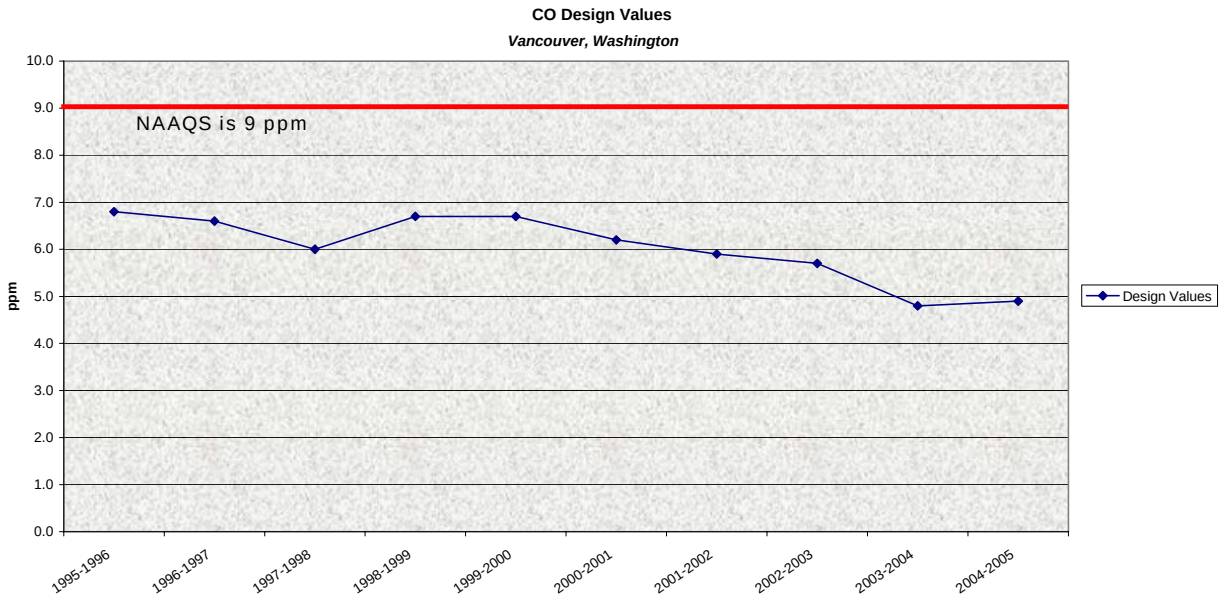


Monitored attainment has not been due to unusual or extreme occurrences in Vancouver's weather patterns. Conditions that can lead to CO exceedances historically occur in the winter, from the end of October through the end of January. Prolonged periods with little vertical mixing usually result in air stagnation that can result in increased CO concentrations. Over the past 14 years, there has been ample opportunity for variability and potential for stagnant winter weather conditions that could have lead to higher CO levels, but CO values have continued to decrease.

3.3 Design Value

The design value, or the compliance level used to compare against the standard, is the higher of the two annual second highs in a two year calendar period. Figure 3 shows design values from 1995 through 2005 based on EPA AirData. The Vancouver AQMD 8-hour average design value is 4.8 ppm based on 2004 and 2005 data, which is the most recent data in AirData. The design value for the 1-hour average is 6.9 ppm. The AirData values for the Vancouver site can be found in Appendix C. 1991 was the last year a second highest high value for a two year period was over 9 ppm. Once the 1992 value was averaged with the previous two years, the value fell below 9 ppm.

Figure 3. Vancouver CO Area Design Values, 1995-2005



SWCAA requested that Ecology petition EPA asking for permission to discontinue monitoring in a letter dated March 20, 2006. Permission was granted to Ecology by EPA by a memo dated May 1, 2006. Monitoring ended at the Atlas and Cox site on October 5, 2006.

4.0 Existing CO Control Strategies

One of the requirements for an area to be eligible to use the Limited Maintenance Plan option is that there be no changes to the previous 10-year Maintenance Plan Control Measures. SWCAA does not plan to change the initial 10-year Maintenance Plan's control strategy for the next 10-year period. The control measure included in Vancouver's 1996 CO plan was the Washington State motor vehicle inspection and maintenance (I/M) program. The Washington State I/M Program as it currently exists is maintained as a control strategy in this second 10-year plan. Additionally, there are current requirements for new industrial sources inside or impacting the maintenance plan area found in SWCAA 400.

The Vancouver portion of the Portland-Vancouver Ozone Maintenance Plan contains control strategies adopted for the reduction of ozone precursors. These control strategies also contribute to reductions of CO emissions. Many of these strategies provide benefits beyond criteria pollutant emission reductions and also help to reduce air toxics, greenhouse gas emissions and contribute to traffic congestion reduction, energy savings, and overall cost-savings for the transportation systems. Other programs such as Commute Trip Reduction also contribute to reducing CO emissions.

Although the 1995 Vancouver CO Maintenance Plan submittal did not establish any new control measures, the plan did take credit for the expanded and enhanced (at that time) vehicle inspection and maintenance program required for the Ozone Maintenance Plan. The I/M program has undergone a few changes since the original CO plan, but is still in place.

4.1 Washington State I/M Program

The 1990 Federal Clean Air Act Amendments (FCAAA) required that areas not meeting standards that had not yet implemented a motor vehicle inspection and maintenance (I/M) program do so. An I/M Program measures emissions from motor vehicles. If excessive levels of emissions are found, the vehicle must be repaired.

The Washington State Plan to attain the ozone standard in southern Clark County submitted to EPA in 1992 extended the State's existing I/M Program into the Vancouver area[3]. The I/M Program became operational in southern Clark County on June 1, 1993. Accordingly, emission calculations for mobile sources in south Clark County have since included reductions attributed to the I/M program.

The 1996 ozone maintenance plan for southern Clark County brought changes to the boundaries for the I/M Program. The vehicle emission boundary was expanded to Brush Prairie, Battle Ground, Ridgefield and La Center postal zip codes as of January 1, 1997; the testing methodology was changed to the Acceleration Simulation (ASM) mode; test standards were strengthened; testing was expanded to NO_X emissions (although NOx results were not included in the pass/fail results), and a gas cap leak detection check was instituted. EPA approval of the Clark County and Portland maintenance plans allowed EPA to redesignate the Portland-Vancouver AQMA to attainment for the 1-hour ozone NAAQS.

Since January 1, 2000, the I/M Program has exempted vehicles that are less than five or more than 25 years old from emissions testing.

Vehicle emission test procedures have been modified over the years to better address real driving conditions. Since 1996, vehicles have been equipped with On Board Diagnostic Systems (OBD) that provide a comprehensive overview of the emissions control system. The I/M Program transitioned to OBD testing for newer vehicles on July 1, 2002. Since 2006, gas cap checks are no longer performed on 2000 and newer model year vehicles because OBD checks are relied on to detect evaporative emission control system leaks including gas cap leaks.

The Vancouver area is maintaining the CO NAAQS standard with the current I/M program in place. The ongoing, routine checks assure that emission control systems on Washington's fleet are continuing to operate properly over time, preserving the emission control functionality and protecting air quality. A contract is in place for conducting I/M testing until 2012. The current Washington state I/M regulations are found in WAC 173-422.

4.2 Requirements for New Sources in a Maintenance Plan Area

SWCAA Section 400-111 contains measures intended to prevent a new or modified source from causing an ambient air quality standard violation. This section also requires offsets for new and modified major stationary industrial sources of CO over 100 tons in the maintenance plan area or that impacts the maintenance area. Industrial (point) sources contribute a small percentage to the total CO emissions (see Section 6.1). There is currently no growth allowance established for new CO sources.

[3] Previously the program only applied to Puget Sound and Spokane.

4.3 Additional Strategies

The following additional programs also contribute to CO reductions:

- Commute Trip Reduction (CTR) program originally passed in 1991 (RCW 70.94.521-551) and since replaced by The CTR Efficiency Act (ESSB 6556) - works with major employers in the state's most populous counties to encourage employees to commute without driving alone.
- Commute Trip Reduction Efficiency Act passed on March 29, 2006, effective July, 2007.
- CTR Performance Grants - the Washington Department of Transportation oversees the Trip Reduction Performance Program that was passed by the Washington State legislature in 2003 to reduce the number of vehicle trips.
- Public education and outreach
    - Air Pollution Advisories (formerly called Clean Air Action Days) are called when weather forecasts indicate a high probability for air pollution to approach levels that are unhealthy for sensitive groups. NW Airquest developed and maintains a model that can be used to predict pollution levels. This model can also be used to identify when stagnation periods are likely to occur. On cold winter days that have potential to trap pollutants near the ground, SWCAA and the Oregon Department of Environmental Quality (DEQ) work with local media and industry to encourage residents to carpool or take the bus to work and avoid burning to reduce their personal impact on air pollution.
    - Public presentations – SWCAA offers presentations as requested to various school and community groups, addressing local concerns about air pollution and pollution prevention. These presentations address personal impacts on air pollution, related health issues and local measures to address pollution.
    - Public interaction – SWCAA frequently distributes information and brochures at community events including fire district open houses, festivals and county fairs.
    - Educational materials – SWCAA routinely distributes informational brochures to residents concerned about pollution.

Other anticipated changes in the future include:

- Implementation of California motor vehicle standards for low emission vehicles beginning with the 2009 model year.

5.0 State Implementation Plan Requirements

Section 175A(b) of the FCAA requires that a nonattainment area that is redesignated as a maintenance area submit two consecutive 10-year maintenance plans. EPA approved the first 10-year Vancouver CO Maintenance Plan as part of a redesignation request in 1996. The SIP submittal developed under this Plan will satisfy the Federal Clean Air Act requirement for the second 10-year Vancouver CO Maintenance Plan. This submittal also updates the transportation conformity requirements for the Vancouver CO maintenance area.

6.0 CO Limited Maintenance Plan

The Vancouver area is eligible for the Limited Maintenance Plan (LMP) approach. This approach simplifies the plan preparation process. EPA has allowed areas whose monitored air quality values are at or less than 85% of the CO NAAQS to submit a simpler maintenance plan than those areas where CO levels are not as low. On October 6, 1995, a guidance memorandum was issued on the *Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas* by Joseph W. Paisie of EPA. This guidance states that an area must have a design value less than 85% of the 8-hour CO standard (7.65 ppm) to qualify for a LMP approach. The Vancouver CO maintenance area currently has an 8-hour CO design value of 4.8 ppm based on 2004-2005 data. Since the design value for the Vancouver AQMA is less than 7.65 ppm, the AQMA is eligible for the LMP option. The LMP approach does not require future year emission projections or a maintenance demonstration. A LMP must include an attainment inventory, provisions for verification of continued attainment, a contingency plan and a statement regarding conformity determinations. Due to the low measured CO values in Vancouver over the past 10-years, SWCAA does not anticipate that CO levels will approach levels that would violate or exceed the 8-hour CO standard.

6.1 Attainment Inventory

SWCAA, Ecology and RTC updated the attainment emission inventory for the second 10-year Vancouver CO Maintenance Plan. This inventory is consistent with EPA's most recent guidance on Maintenance Plan emission inventories and is in a "typical winter day" format. The base year for this inventory and the maintenance plan is 2002. For this 2002 base year inventory, an area-specific total will be given for each source category. The source categories inventoried are shown in Table 2. The inventory includes sources and activities inside the Vancouver CO AQMA. Appendix D summarizes the methodologies used in calculating the base year emission inventory. No future year emission inventory information is needed for this Second 10-year CO Maintenance Plan because future emissions estimates are not required by a LMP. This is because areas meeting the criteria for a LMP have design values so low that EPA considers them at little or no risk of a violation. Although forecasted future year inventories will not be calculated as part of this submission, the methodologies summarized in Appendix D will allow for consistency if future CO winter emission inventories are calculated.

Table 2. Source Categories Inventoried for 2002 CO Emissions

Source Category
Point Sources
Onroad Mobile Sources
Nonroad Mobile Sources from EPA NONROAD 2004 (Excluding Ships, Locomotives and Aircraft)
Ships
Locomotives
Aircraft
Residential Yard Waste Burning
Residential Trash Burning
Residential Wood Combustion
Residential and Commercial Fuel Combustion

Table 3 shows the pounds of CO emitted per winter day by source category. The largest category of CO emissions by far is onroad mobile sources.

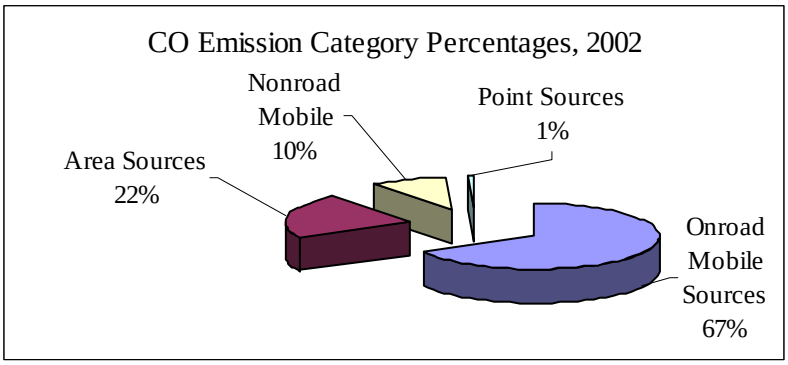
Table 3. Vancouver 2002 CO emissions

Source Category	*Pounds /winter day*
Onroad Mobile Sources	383,058
Area Sources	126,377
Nonroad Mobile Sources	56,837
Point Sources	4,396
Total	570,669

Figure 4 illustrates the dominant contribution mobile sources make to the total CO emitted in winter. Onroad mobile sources represent 67% of total winter CO emissions and area sources represent 22%.

Figure 4. Vancouver CO Emission Categories and Percentages,

(average pounds per winter day)



The subtotals for these categories are shown in Table 4 below. For details on emission calculations for these categories, see Appendix D.

Table 4. 2002 Emission Inventory, Main Source Category Subtotals

Vancouver CO Maintenance Area Carbon Monoxide 2002 Emission Summary Main Source Category		**CO Emissions Pounds per Winter Day (lb/d)**
Point Sources		
Major Point Sources (>50 tpy each)		3,414
Minor Point Sources (> 1 tpy each)		983
	Sub Total:	**4,396**
Onroad Mobile Sources		
Freeway		80,751
Arterial		259,080
Ramp		21,413
Local		21,414
Intra-Zonal		401
	Sub Total:	**383,058**

Table 4. 2002 Emission Inventory, Main Source Category Subtotals, Continued

Non-road Mobile Sources			
	Aircraft		1,070
	Commercial Marine Vessels		385
	Recreational Marine		182
	Railroads		380
	Railway Maintenance Equip.		60
	Lawn and Garden Equipment		14,871
	Recreational Vehicles		585
	Light Commercial equip.		24,689
	Industrial Equip.		6,204
	Construction Equip.		8,413
		Sub Total:	**56,837**
Area Sources			
	Small Industrial Sources < 1 tpy each		88
	Residential/Commercial Fuel Combustion		1,556
	Residential Wood Combustion		122,226
	Trash Burning*		1,411
	Residential Yard Waste Burning		1,096
		Sub Total:	**126,377**
		Total:	570,669

*illegal throughout the state

In 2002, the two largest sources of wintertime CO emissions are onroad mobile sources and residential wood combustion. Nonroad sources contribute 10% of the total CO on a typical winter day. The two subcategories in Nonroad mobile sources that were the largest for 2002 are Lawn and Garden equipment and Light Commercial Equipment (e.g., generators, pumps, gas compressors, welders, pressure washers, air compressors). In the area source category, residential wood combustion is still the largest contributor. Residential wood combustion represents 21% of the overall lbs/day CO emissions.

6.1.1 Onroad Mobile Sources

Onroad mobile source CO emissions were 383,058 lbs/winter day as shown in Table 3 and Table 4. Emissions calculations were prepared by the Southwest Washington Regional Transportation Council (RTC) using MOBILE6.2 per EPA's February 24, 2004 policy guidance memorandum. Average Daily Vehicle Miles Traveled (ADVMT) for the Vancouver area are calculated by RTC using their regional travel model. These values are entered into EPA's MOBILE6.2 model and seasonally adjusted emissions of CO are produced. Emission rates were generated for unique combinations of: facility type, vehicle type, speed, and I/M area. Local data was used for the following input parameters: evaluation month, registration distribution, temperature, humidity, inspection and maintenance (I/M) program, speed by facility type, and fuel parameters for Reid vapor pressure (RVP), fuel program, diesel sulfur content. The parameters are described in Appendix D. In Table 5 below the ADVMT and grams/day used in calculating CO emissions are presented. Converting grams per day to lbs per day results in 383,058 lbs/day CO from mobile sources shown in Table 5.

Table 5. RTC ADVMT and Mobile 6.2 output for Vancouver Winter CO emissions

Road type	Winter ADVMT	Winter CO, grams/day	Winter CO, lbs/day
Freeway	1,108,668	36,627,855	80,751
Arterial	3,725,487	117,515,879	259,080
Ramp	239,143	9,712,707	21,413
Local	364,097	9,713,120	21,414
Intra-Zonal	6,811	181,688	401
Total.	5,444,206	173,751,248	383,058

6.1.2 Area Sources

EPA describes area sources as "facilities or activities whose individual emissions do not qualify them as point sources. Area sources represent numerous facilities or activities that individually release small amounts of a given pollutant, but collectively they can release significant amounts of a pollutant."[4] Point sources with CO emission of less than one ton per year are not included in the point sources totals but summed and included with the area sources. In addition to small point sources, area sources for this inventory include residential and commercial fuel combustion, residential wood combustion, trash burning, and residential yard waste burning. There were either no emissions or no activities from prescribed burning in the Vancouver AQMA. Emissions are typically estimated by multiplying the activity level by an emission factor in mass per activity or other methodologies consistent with EPA's guidance. Often, population or household values are used as surrogates.

Area sources represent 22% of the total CO emissions. Of that 22%, the largest contributor is residential wood combustion. Woodstoves were inventoried using the 2001 WSU statewide woodstove survey. Emission factors were taken from EPA's AP42.

6.1.3 Nonroad Mobile Sources

Locomotive and commercial marine vessel emissions were inventoried using EPA calculation methodology guidance and the latest activity data from 2002 for the respective category. Aircraft landing and takeoff data from 2004 was used as a surrogate for 2002 emissions as 2004 data was readily available. Emission factors were taken from EPA guidance documents.

All other emissions from nonroad mobile emission sources within the Vancouver CO AQMA were calculated based on the latest version of EPA's nonroad model (NONROAD2005). This includes recreational vehicles, commercial and recreational marine vessels, agricultural, construction and industrial equipment and lawn and garden equipment. There were either no emissions or no activities from airport service, agricultural, logging, mining or oil field vehicles/equipment in the Vancouver AQMA. The largest contributor in this emission category is light commercial equipment, (i.e., generators and pumps, gas compressors, welders and pressure washers). Nonroad emissions contributed 10% to the total CO emissions on a typical winter day in 2002.

[4] Handbook for Criteria Pollutant Inventory Development: A Beginner's Guide for Point and Area. Sources United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711. EPA-454/R-99-037, September 1999.

6.1.4 Point Sources

Under EPA's definition, point sources are defined as any stationary source with CO emissions greater than or equal to 100 tons per year (tpy). For this 2002 inventory, SWCAA elected to reduce this threshold because the information is readily available. A 50 tpy threshold was used in the 1992 inventory for the first 10-year Vancouver CO maintenance plan. SWCAA maintains an extensive emission inventory for smaller point sources in Clark County. Facilities with emissions of over one tpy were included in the point source total. Emissions information for one large pulp and paper source within the Vancouver CO maintenance area was provided by Ecology. Stationary sources within the maintenance area with CO emissions of less than one ton per year in 2002 were summed and included with the area source category totals. Point sources contribute about 4,396 pounds or less than 1% to the total CO on a winter day.

6.1.5 Changes in Source Category Contributions

In the 1992 inventory used for the initial 1995 CO redesignation request/maintenance plan submittal, the largest CO emissions categories were onroad mobile sources, industrial sources, and residential wood combustion. Since that time the largest industrial source of CO (Vanalco, Inc.) has closed. Therefore, one large difference between the 1992 inventory and the 2002 inventory is that the contribution from point sources is considerably smaller. In 1992, point sources represented 21% of the total; in 2002 they contribute less than 1% to the total. In 2002, onroad mobile sources are still by far the largest contributor to CO winter time emissions; cars and trucks contribute 383,058 pounds per day of CO or 67%, although the overall amount of CO from onroad mobile sources is also declining.

6.2 Maintenance Demonstration

As explained in the 1995 Limited Maintenance Plan (LMP) guidance memorandum, the maintenance demonstration requirement is considered to be satisfied if the monitoring data show that the area is meeting the air quality criteria for limited maintenance areas (i.e., the area CO design level is 85% of exceedance level or less than or equal to 7.65 ppm) and the area continues to meet this level through the effective date of plan approval. The Vancouver area has a design value of 4.8, which is less than 7.65 ppm, the air quality criteria value for a limited maintenance area. The LMP guidance memorandum also states, "EPA believes if the area begins the maintenance period at or below 85 percent of the exceedance levels, the air quality along with the continued applicability of PSD requirements, any control measure already in the SIP, and Federal measures[5], should provide adequate assurance of maintenance over the initial 10-year maintenance period." Since the Vancouver area meets these criteria, the maintenance demonstration requirement is satisfied.

6.3 Verification of Continued Attainment

The LMP guidance contains provisions for continued operation of an appropriate EPA approved air quality monitoring network to verify continuing attainment with the CO standard. SWCAA and Ecology requested permission to remove the monitor from the 'Atlas and Cox' site in Vancouver, WA. Because of Vancouver's compliance history, EPA granted Ecology permission to take the last CO monitor in the Vancouver CO maintenance area out of service on May 1, 2006; the monitor was physically removed on October 5, 2006.

[5] e.g., 40 CFR Part 86 Federal Motor Vehicle Emission Control Program

The Vancouver AQMD has been in compliance with the CO NAAQS every year since 1992, and was redesignated a CO maintenance area in 1996. Since redesignation the CO limit for the 8-hour average of 9 ppm was exceeded once on January 5, 1999. However, since CO values did not exceed the standard more than once in that year, there was no violation of the NAAQS. The 1-hour CO limit of 35 ppm has never been exceeded in this area. Design values have been declining consistently over the last ten years as shown in Section 3. Also, the Metropolitan Transportation Plan for Clark County predicts that CO emissions will be well below the SIP budget and are expected to continue to drop for the foreseeable future. Therefore, emission monitoring for CO is no longer necessary. EPA approval was granted to Ecology to remove the monitor in a memo dated May 1, 2006; the monitor was physically removed October 5, 2006.

SWCAA will track countywide mobile emissions through the Ecology emission inventories triennially. If emissions decrease as predicted, verification of attainment will be considered satisfied. Countywide annual and winter emissions for 2002 and draft values for 2005 are shown in the table below. If the triennial emission inventory shows that annual county-wide on road mobile emissions increase over 2005 levels, the contingency plan will be triggered.

Table 6. Ecology 2002 and 2005 Clark County Onroad Mobile Emissions, Winter and Annual

Clark County CO Onroad emissions in tons	
2002 Inventory	
winter	annual
23,100	86,714
2005 Inventory (draft)	
winter	annual
17,292	61,114

from draft triennial emissions inventory, provided by Sally Otterson, Washington Department of Ecology, October 23, 2006

6.4 Contingency Plan

A contingency plan for a CO maintenance area is required. SWCAA will evaluate Vancouver area compliance as described in the Verification of Continued Attainment section above through evaluation of the periodic emissions inventory.

The following are those contingency measures identified in the 1996 plan. In the case of:

- An *exceedance* of the 8 hour standard, SWCAA would identify and analyze the exceedance. If the cause was deemed to be transportation related, SWCAA committed to coordinating with RTC to identify an appropriate localized control measure or measures.
- A monitored *violation* of the 8 hour standard, the oxygenated fuel program would be implemented as soon as practical but not later than the following winter season.
- A *second violation*, New Source Review requirements, LAER and offsets for major new (and major modifications of) CO industrial sources would be triggered.

For this 2007 CO Maintenance Plan, if the triennial emission inventory shows that annual county-wide on road mobile emissions have increased over 2005 levels, the contingency plan will be triggered. Specifically, should annual onroad mobile emissions increase over the 2005 level of 61,114 tons in 2008, 2011, or 2014, SWCAA would use the following approach to

identify any necessary actions. The following measures and a tiered level of escalating response will be followed:

First, SWCAA would determine if the increase is a function of a change in emission calculation methodology.

Then, if it appears that a true increase has occurred, SWCAA will consider:

- Conducting a *winter* CO mobile emission inventory, if these numbers are not readily available in the next few triennial mobile emission inventories.
- Evaluating other source categories, such as woodstove use,
- Conducting "hot spot" analyses using a model such as WASIST at a specific location or other method.

Should hot spot analysis result in a CO value greater than 7 ppm (for an 8 hour average), SWCAA will consider

- Temporarily conducting CO monitoring.

Should an exceedance be measured at a monitoring site in the Vancouver AQMA,

- A community advisory group (or Technical Advisory Committee) could be formed to evaluate and choose CO emission reductions options.
- This group could consider potential reinstatement of the oxygenated fuel program (WAC 173-492, SWCAA 492), although this seems unlikely (see discussion below).

Should a violation of the CO standard occur while conducting monitoring, SWCAA may require that new or modified industrial sources of CO apply Lowest Achievable Emission Rate (LAER) technology to their project for CO and any pollutant for which the source is classified as major. SWCAA 400-111 describes these requirements. Since industrial sources contribute such a small percentage to the total CO emissions, it is unlikely that these sources will be targeted for reduction efforts.

Other CO emission reduction measures will be considered as may be identified in the analysis. Committing to further study in this way gives SWCAA flexibility in choosing an appropriate approach if and when the need arises.

6.4.1 Oxygenated Fuel Requirements

Oxygenated fuel requirements in winter, spelled out in SWCAA 492, were a control strategy at one time, but were shifted to contingency measures in 1996. The program rule requiring that Vancouver establish a wintertime oxygenated fuel program became effective in 1992. The program was not needed to demonstrate compliance with the standard through the last maintenance period. While the FCAA allows the elimination of this program upon redesignation to attainment status, Section 175A(d) requires that all control measures contained in the SIP prior to redesignation be included as contingency measures in the Maintenance Plan. Therefore, the oxygenated fuel program, wherein the use of fuel with no less than 2.7% oxygenate from November 1 through February 29th is required, must be kept as a potential contingency measure. However, it should be noted it would be extremely difficult to reinstate this program. SWCAA, RTC and Ecology would likely evaluate other options along with the oxygenated fuel program should it become necessary.

In March 2006, the Washington State legislature passed a biofuels bill (Engrossed Substitute Senate Bill 6508) that requires "By December 1, 2008, motor vehicle fuel licensees under chapter 82.36 RCW, other than motor vehicle fuel distributors, shall provide evidence to the Department of Licensing that at least two percent of total gasoline sold in Washington, measured on a quarterly basis, is denatured ethanol." Small increases in the oxygen content of gasoline result in small decreases in wintertime CO emissions.

It is extremely unlikely that the Vancouver area will experience CO emission increases that would cause levels to approach the NAAQS.

6.5 Conformity Determinations

One means of demonstrating conformity of Federal actions is to ensure transportation projects are consistent with emissions budgets for the maintenance area. The LMP guidance states that the motor vehicle emission budgets (MEVB) in limited maintenance plan areas may be treated as essentially not constraining for the length of the maintenance period because it is unreasonable to expect that the area will experience so much growth that a violation of the CO NAAQS will result. Therefore, the regional emissions analyses, (i.e., motor vehicle emission budgets), is not needed. Project conformity requirements (i.e., CO hot spot analyses) and consultation will still be in effect for the Vancouver CO AQMA. RTC will continue to review project conformity and conduct project conformity analysis when requested for the Vancouver area. Current regional conformity requirements under the 1996 Vancouver CO Maintenance Plan will be in effect until EPA determines that the conformity demonstration provisions in the second 10-year Vancouver CO maintenance plan are adequate or until the new CO maintenance plan is approved and adopted.

The Southwest Regional Transportation Council's (RTC) Metropolitan Transportation Improvement Program (MTIP) 2005 report demonstrates that the Vancouver CO maintenance area is in compliance with its regional conformity budget requirements. Decreasing winter CO emissions are estimated for mobile sources while fulfilling current regional conformity requirements.

This Vancouver CO plan covers the period through 2016. The RTC report shows decreasing emissions throughout the length of this plan. Winter CO emission estimates for mobile sources from their report is shown below in Table 7.

Table 7. Emission Estimates for Mobile Sources, Winter CO

	Winter CO (lbs)
Year	Emissions Estimate
2006	249,352
2009	238,636
2019	199,405

Southwest Regional Transportation Council, Metropolitan Transportation Plan for Clark County, Updated December 2005, page A-23

6.6 Risk of a Future Violation

Since Vancouver has not violated the CO NAAQS since redesignation in 1996, and since the 2004-2005 design value is 4.8 ppm, far below the 8-hour standard of 9 ppm, the Vancouver area is at little risk of future violations. CO levels have been consistently below the CO NAAQS for ten years. Also, the RTC Metropolitan Transportation Plan for Clark County concludes that the CO emission estimates for mobile sources will continue to decrease through the life of this plan. Mobile sources emissions represented the majority of the winter CO emissions in 2002 and have historically been the largest contributor to winter CO emissions. Still, reductions in this source category are predicted, so continued overall reductions for this pollutant are expected.

Because of efforts by RTC to optimize traffic flow and federal automobile standards as well as other pollution prevention efforts, it is unlikely that CO levels will be problematic for the Vancouver area in the future. Since CO levels have been well beneath the standard for many years and the design value for the area is also well below the standard, there is very little risk that CO levels will increase and threaten air quality in the Vancouver Area.

References

Southwest Washington Regional Transportation Council, *Metropolitan Transportation Plan for Clark County*, updated December 6, 2005.

Paisie, Joseph W., EPA OAQPS, *Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas*, October 6, 1995

Appendixes

Appendix A Description of the Vancouver CO Maintenance Area
Appendix B Memo granting permission for Atlas and Cox site monitor removal
Appendix C EPA AirData values for Atlas and Cox site, 1996-2005
Appendix D Vancouver 2002 Seasonal Emission Inventory Detail
Appendix E Washington State and SWCAA Rules – Control Strategies and Contingency Plan Regulations

Appendix A - Description of the Vancouver CO Maintenance Area Boundary

The Vancouver CO Maintenance Area Boundary

The CO maintenance area boundary description begins at the northwest corner at the intersection of the section line on the south side of Section 36 of T4N.R1W and the north side of Section 1 of T3N.R1W. The boundary turns southward following the east shores of Lake River, until it would intersect with the 14900 block NW, then easterly to join with NW 149th Street. This boundary runs until it meets the western edge of Interstate 5, then north to 159th Street and east on 159th Street to the east side of NE 50th Avenue. On 50th Avenue the boundary runs south until it joins the south bank of Salmon Creek, following the south branch of the creek until it reaches NE Caples Road (currently SR-502) until it intersects with NE 144th Street. The boundary continues eastward along the south side of NE 144th Street following the 14400 block plane to where it would join with the west side of NE 212th Avenue, then southward to the south side of NE 109th Street. The boundary continues east on NE 109th Street, then southerly along the west side of NE 232nd Avenue to where the 23200 block joins with the northern edge of NE 58th Street. The boundary continues east on NE 58th Street until the 5800 block intersects with the western edge of Livingston Road. The boundary follows Livingston Road south until it turns into NE 292nd Avenue. Staying on the plane of the 29200 block, the boundary proceeds south until it joins SE Blair Road. The boundary follows along the southwest side of Blair Road south-eastward to its intersection with Washougal River Road. The boundary proceeds eastward at the northern edge of the 2000 block to SE 20th Street. The boundary continues east on SE 20th Street until it intersects the western edge of SE Jennings Road (352nd Avenue), then south along the 4900 plane to SE 49th Avenue. The boundary follows the 4900 plane south until it intersects Evergreen Boulevard (the eastern edge of current Washougal City Limits). The boundary continues south along the Washougal City limits to the State border along the section line on the west side of Section 21 of T1N.R4E. The boundary follows the Clark County line (State Boundary) down the Columbia River until it connects at the northwest corner of the boundary at the section line of Section 36 of T4N.R1W and the north side of Section 1 of T3N.R1W.

Appendix B – Memo Granting Permission to Remove Monitor

Appendix C - EPA AirData values for Atlas and Cox site, 1996-2005

Appendix D - Vancouver 2002 Seasonal Emission Inventory Detail

Appendix E - Washington State and SWCAA Rules – Control Strategies and Contingency Plan Regulations

SWCAA Regulations

SWCAA 400 – General Regulations for Air Pollution Sources, last updated 12-14-06

SWCAA 400-111 Requirements for New Sources in a Maintenance Plan Area, as adopted 12/14/06

SWCAA 492 – Oxygenated Fuels, effective November 21, 1996

Washington State Regulations

Chapter 173-422 - Motor Vehicle Emission Inspection, effective date June 3, 2002

Chapter 173-492 - Motor Fuel Specifications for Oxygenated Gasoline, 9/18/96