



DEPARTMENT OF  
**ECOLOGY**  
State of Washington

## **2013 Ambient Air Monitoring Network Report**

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# **2013 Ambient Air Monitoring Network Report**

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# Acronyms

AQS	EPA's Air Quality System database
BAM	Beta Attenuation Monitor
BCAA	Benton County Clean Air Agency
CBSA	Core Based Statistical Area
CFR	Code of Federal Regulations
CSA	Combined Statistical Area
CSN	Chemical Speciation Network
CO	Carbon Monoxide
DOE	Department of Ecology
DV	Design Value
FDMS	Filter Dynamic Measurement System
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FRM	Federal Reference Method
IMPROVE	Interagency Monitoring of Protected Visual Environments
MSA	Metropolitan Statistical Area
NAQQS	National Ambient Air Quality Standard
NATTS	National Air Toxics Trends Station
NCore	National Core multi-pollutant station
NO	Nitric Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
NO <sub>y</sub>	Total Reactive Nitrogen Dioxides
NWCAA	Northwest Clean Air Agency
O <sub>3</sub>	Ozone
ORCAA	Olympic Region Clean Air Agency
Pb	Lead
PM <sub>2.5</sub>	Particulate Matter equal to or less than 2.5 microns in diameter
PM <sub>10</sub>	Particulate Matter equal to or less than 10 microns in diameter
PM <sub>10-2.5</sub>	Particulate Matter equal to or less than 10 microns in diameter and equal to or greater than 2.5 microns
PPB	Parts per billion
PPM	Parts per million
PQAO	Primary Quality Assurance Organization
PSCAA	Puget Sound Clean Air Agency
PSD	Prevention of Significant Deterioration
QA	Quality Assurance
QA	Quality Control
SLAMS	State or Local Air Monitoring Station
SO <sub>2</sub>	Sulfur Dioxide
SPMS	Special Purpose Monitoring Site
SRCAA	Spokane Region Clean Air Agency
SWCAA	Southwest Clean Air Agency
STN	Speciation Trends Network
TEOM	Tapered Element Oscillating Microbalance
TSP	Total Suspended Particulate
µg/m <sup>3</sup>	Micrograms per cubic meter
USEPA	United States Environmental Protection Agency

VOC  
YRCAA

Volatile Organic Compound  
Yakima Region Clean Air Agency

# Executive Summary

## Purpose of the report

The Department of Ecology (Ecology) reviews its ambient air quality monitoring network each year to ensure that it collects adequate, representative, and useful air quality data on which to base policy decisions. This report summarizes the results of the 2013 review. These results include:

- Identifying modifications to Ecology's ambient air monitoring network since the 2012 annual network report
- Identifying proposed modifications to the network for the upcoming year
- Documenting Ecology's ambient air quality monitoring needs, goals, and priorities

## Carbon Monoxide, (CO, 42101)

**Recommendations/Modifications:** Ecology and its partners have divested of traditional CO monitoring at all except Spokane (3<sup>rd</sup> & Washington) and believe continuing to divest is the best use of state resources.

**Additional Monitors:** Trace level carbon monoxide is monitored at the Seattle Beacon Hill and Cheeka Peak NCore sites. A carbon monoxide monitor is scheduled to be collocated with NO<sub>2</sub> monitoring at the Seattle area near-roadway site in 2014.

## Ozone (O<sub>3</sub>, 44201)

**Recommendations/Proposed Modifications:** None

**Additional Monitors:** None. Ecology provides support for ozone monitoring performed by local air agencies in Anacortes and Spokane. Continue all identified sites

## Nitrogen Dioxide (NO, 42600, 42601, 42612)

**Recommendations/Proposed Modifications:** Ecology monitors for the reactive nitrogen species (NO<sub>y</sub>) at NCore Seattle Beacon Hill which includes NO<sub>2</sub>. Olympic Region Clean Air Agency (ORCAA) monitors for the reactive nitrogen species (NO<sub>y</sub>) at Rural NCore Cheeka Peak. It is assumed most if not all the NO<sub>y</sub> measured at Beacon Hill and Cheeka Peak is composed of NO<sub>2</sub>.

**Additional Monitors:** One NO<sub>2</sub> monitor will be sited in 2014 as part of the EPA near-road network as funding and permitting are allowed. A second near-road NO<sub>2</sub> monitor is planned for 2015 if funding and permitting are allowed.

## **Sulfur Dioxide (SO<sub>2</sub>, 42401)**

**Recommendations/Proposed Modifications:** None

**Additional Monitors:** None

## **Particulate Matter 10 (PM<sub>10</sub>, 81102)**

**Recommendations/Proposed Modifications:** None

**Additional Monitors:** None. Continue all identified sites

Comment: The Lacey College Street PM<sub>2.5</sub> nephelometer site (530670013) is being used to assure continued compliance with the PM<sub>10</sub> NAAQS as well as to confirm the Thurston County Maintenance Area (TCMA) continues to meet the qualification criteria of EPA's Limited Maintenance Plan (LMP) approach.

A 3-year NPM<sub>10</sub> design value estimate below 150µg/m<sup>3</sup> demonstrates compliance with the PM<sub>10</sub> NAAQS for the TCMA. This value for 2010 to 2012 is 43µg/m<sup>3</sup>. A 5-year NPM<sub>10</sub> design value below 98µg/m<sup>3</sup> demonstrates the TCMA continues to qualify for the LMP approach. This value for 2008 to 2012 is 45 µg/m<sup>3</sup>. These current design value estimates demonstrate the TCMA complies with the PM<sub>10</sub> standard and continues to meet EPA's LMP qualification criteria.

## **Particulate Matter 2.5 (PM<sub>2.5</sub>, 88101, 88502)**

**Additional Monitors:** Wenatchee Fifth St. was established in late 2012 replace Wenatchee Alaska.

**Recommendations/Modifications:** Vancouver 4<sup>th</sup> Plain FRM was discontinued 3/13. The Vancouver FEM is now the primary instrument. Continue all identified sites

**Notes:** Nephelometers are not EPA equivalent method compliance instruments and design values are estimates.

Ecology uses the Washington Air Quality Advisory (WAQA) for reporting PM<sub>2.5</sub> to inform and protect citizens of Washington. WAQA reporting is more protective of human health. Ecology's goal is to keep 24-hour concentrations below 20µg/m.

In addition, some monitors in areas of Washington are not intended to be solely NAAQS based. Certain monitors are used for protection of human health by calling burn bans during home heating season, making daily decisions for agricultural burning and health information- reporting PM<sub>2.5</sub> values.

## **Meteorological Monitoring (Met. 61101, 61102, 62101)**

**Additional Monitors:** None.

**Recommendations/Modifications:** Continue all identified sites

## **Lead (Pb 14129)**

**Additional Monitors:** None.

**Recommendations/Modifications:** \*Sampling concluded for the Pb Airport Study at Auburn Municipal and Harvey Field Airport in December 2012.

## **Trace Gas Monitoring**

**Additional Monitors:** None

**Recommendations/Modifications:** Continue all identified sites

## **NCore**

**Additional Monitors:** None

**Recommendations/Modifications:** None. Continue all identified sites

## **Other – Contracted Sites Tribal/EPA**

**Additional Monitors:** A new monitoring site at Harrah on the Yakama Reservation was established in late 2012.

**Recommendations/Modifications:** \*Monitoring was suspended at Taholah the fall of 2011. EPA continues to work with the Quinault Nation to determine the future of monitoring there.

## **Other – Contracted Sites USFS**

**Additional Monitors:** None

**Recommendations/Modifications:** None

## **Other – Contracted Local Air Agencies**

**Additional Monitors:** None

**Recommendations/Modifications:** None

**Note:** Ecology provides technical support for Anacortes, Cheeka Peak and Spokane Augusta ozone. Technical support can include repair and calibration, quality assurance, telemetry and data management.

## Background information

The United States Environmental Protection Agency (EPA) ambient air quality surveillance regulations (Code of Federal Regulations, Title 40, Part 58 (40 CFR Part 58) require states to establish air quality surveillance systems in their State Implementation Plans (SIPs). An air quality surveillance system consists of a network of State and Local Air Monitoring Stations (SLAMS). These stations measure ambient concentrations of those air pollutants for which 40 CFR Part 50 sets standards.

## Monitoring network requirements

SLAMS must meet requirements of 40 CFR Part 58 contained in:

- Appendix A (Quality Assurance Requirements)
- Appendix C (Ambient Air Quality Monitoring Methodology)
- Appendix D (Network Design Criteria)
- Appendix E (Probe and Path Siting Criteria)

States determine if they conform to Appendices A and C in part through periodic systems and performance audits (per Section 2.4 of Appendix A). States conform to Appendices D and E by conducting an annual network review of their air quality surveillance systems (per 40 CFR 58.20(d)). The annual network review:

- Determines if an ambient air quality monitoring network is achieving its required air monitoring objectives
- Identifies changes to the network needed to enable an organization to meet its objectives

## Using monitoring data

Ecology uses its air monitoring data to:

- Determine compliance with the National Ambient Air Quality Standards (NAAQS)
- Determine maximum pollutant concentrations
- Forecast air quality
- Evaluate the effectiveness of air pollution control programs
- Evaluate the effects of air pollution on public health
- Track the progress of SIPs
- Support dispersion models
- Determine air quality trends
- Develop responsible and cost-effective pollution control strategies
- Analyze pollution episodes
- Assist with permitting work

# Introduction

The Code of Federal Regulations, Title 40, Part 58 (40 CFR Part 58) contains the federal Environmental Protection Agency's (EPA's) ambient air quality surveillance regulations. Section 58.20 requires states to establish air quality surveillance systems in their State Implementation Plans (SIPs). The air quality surveillance system consists of a network of designated State and Local Air Monitoring stations (SLAMS). These stations measure ambient concentrations of those air pollutants for which standards exist in 40 CFR Part 50 and Part 58, Appendices A (Quality Assurance Requirements), C (Ambient Air Quality Monitoring Methodology), D (Network Design Criteria) and E (Probe and Path Siting Criteria). States determine compliance with Appendices A and C in part through periodic systems and performance audits (per Section 2.4 of Appendix A). States comply with Appendices D and E by conducting an annual network review of their air quality surveillance systems (per 40 CFR 58.20(d)). The annual network review determines if the network achieved its required air monitoring objectives and if it should be modified (e.g., termination, relocation or establishment of monitoring stations) to meet those objectives. The main purpose of this review is to ensure that an ambient air quality monitoring network collects adequate, representative, and useful air quality data on which to base policy decisions. The ambient air quality data from Ecology's network is used for a variety of purposes, including:

- Determining compliance with the National Ambient Air Quality Standards (NAAQS)
- Determining the location of maximum pollutant concentrations
- Determining the effectiveness of air pollution control programs
- Evaluating the effects of air pollution on public health
- Tracking the progress of SIPs
- Supporting dispersion models
- Developing responsible, cost-effective, control strategies
- Developing air quality trends
- Analyze pollution episodes
- Assist with permitting work

## Regulatory Requirements and Other Data Needs

### Appendix D Requirements

Appendix D of 40 CFR 58 describes concepts for designing the SLAMS network. It addresses monitoring objectives and the criteria for selecting the location and number of air monitoring stations. The concepts and guidance in Appendix D, as well as other non-regulatory EPA data needs, should be considered when evaluating the adequacy of the SLAMS network.

### Monitoring Objectives and Spatial Scales

Appendix D calls for the design of SLAMS networks to meet a minimum of six basic objectives:

- (1) Determine the highest pollutant concentrations expected in the area covered by the network
- (2) Determine representative pollutant concentrations in areas of high population density
- (3) Determine the impact of significant sources or source categories on pollutant concentrations in the ambient air

- (4) Determine general background pollutant concentrations
- (5) Determine the regional extent of pollutant transport between populated areas
- (6) Determine the impacts (e.g., visibility impairment, vegetation effects) in more rural and remote areas on the secondary (i.e., welfare) standards

SLAMS networks are designed to provide data for meeting the monitoring objectives described above and to assist EPA and states in solving environmental problems.

Appendix D also provides guidance on spatial scales of representativeness for stations in a SLAMS network (Table 1). Ideally, the monitor is located so that its sample represents the air quality over the entire area that the monitoring station is intended to represent (Table 2).

**Table 1: Relationship between Monitoring Objectives and Scale of Representativeness**

Monitoring Objectives	Appropriate Siting Scales
Highest concentration	Micro, middle, neighborhood, urban
Population	Neighborhood, urban
Source impact	Micro, middle, neighborhood
General/Background	Neighborhood, urban, regional
Regional transport	Urban/regional
Welfare-related impacts	Urban/regional

**Table 2: Summary of Spatial Scales for SLAMS**

	Scales Applicable for SLAMS						
	SO <sub>2</sub>	CO	O <sub>3</sub>	NO <sub>2</sub>	Pb	PM <sub>10</sub>	PM <sub>2.5</sub>
Micro.....	✓	✓			✓	✓	✓
Middle.....	✓	✓	✓	✓	✓	✓	✓
Neighborhood	✓	✓	✓	✓	✓	✓	✓
Urban.....	✓		✓	✓	✓	✓	✓
Regional.....	✓		✓		✓	✓	✓

**Number of State and Local Air Monitoring Stations**

Appendix D to 40 CFR Part 58 does not contain criteria for determining the total number of stations in the SLAMS network, except for requiring a minimum number of SLAMS lead, SO<sub>2</sub>, and PM<sub>2.5</sub> sites. For lead, EPA requires state and local agencies to focus their network design efforts on establishing monitoring stations around lead stationary sources which generate or have the potential to generate exceedances of the quarterly lead NAAQS. Sources around which lead monitoring networks should be established are those emitting half ton or more per year. Other factors affect the number of stations in the network.

SLAMS SO<sub>2</sub> monitoring requirements for counties not within the boundaries of any Consolidated Metropolitan Statistical Area/Metropolitan Statistical Area (CMSA/MSA) are based on the emissions of SO<sub>2</sub> in the airshed. A minimum number of SO<sub>2</sub> SLAMS sites are required for targeted sources of SO<sub>2</sub> emissions. Other than these requirements, the optimum size of a particular SLAMS network involves

tradeoffs between data needs and available resources which can best be resolved during the network design process.

## **Appendix E Requirements**

Appendix E contains siting criteria to be applied to ambient air quality analyzers or samplers after the general site location has been selected based on the monitoring objectives and spatial scales of representativeness presented in Appendix D and summarized in Section 2.1 of this document. The siting criteria presented in Appendix E are summarized in Table 3.

### **Other Ambient Air Monitoring Data Needs**

Washington has used special purpose monitors (SPMs) throughout the State. They are used for a variety of purposes, including Washington's Air Quality Advisory program, ambient air quality assessment and special studies such as secondary aerosol and ozone precursor assessments. SPM monitoring sites often utilize Federal Reference Method (FRM) sampling equipment, and are operated in accordance with CFR requirements for quality assurance and quality control. SPM designation for criteria pollutant monitoring sites allows Ecology to assess ambient particulate levels within regions of the State, while providing the flexibility to relocate the sites if it is determined there is no concern for NAAQS violations in the area (typically after three years of data collection). SPM sites may be added to Ecology's SLAMS network when a NAAQS exceedance has been recorded, or if elevated pollutant concentrations are consistently measured at the site.

**Table 3: Summary of Probe and Monitoring Path Siting Criteria**

Pollutant	Scale [maximum monitoring path length, meters]	Height from ground to probe or 80% of monitoring path (meters)	Horizontal and vertical distance from supporting structures to probe or 90% of monitoring path (meters)	Distance from trees to probe or 90% of monitoring path (meters)
SO <sub>2</sub>	Middle [300m] Neighborhood, Urban, and Regional [1km]	3-15	>1	>10
CO	Micro, Middle [300m] Neighborhood [1km]	3±0.5; 3-15	>1	>10
O <sub>3</sub>	Middle [300m] Neighborhood, Urban, and Regional [1km]	3-15	>1	>10
Ozone precursors	Neighborhood and urban [1km]	3-15	>1	>10
NO <sub>2</sub>	Middle [300m] Neighborhood and Urban [1km]	3-15	>1	>10
PM <sub>10</sub>	Micro; Middle, Neighborhood, Urban and Regional	2-7 (Micro); 2-15 (All other scales)	>2 (All scales, horizontal distance only)	>10 (All scales)

## Network Review Procedure

### Network Review Team and Preparation

Network report participants include the Washington State Department of Ecology Air Quality staff. Sufficient information is provided to determine compliance of the network with regulatory network design and siting requirements specified in 40 CFR Part 58, Appendices D and E as to determine compliance of the network design and siting requirements specified for all special ambient air monitoring networks.

### Network Modifications

Modifications to the SLAMS network are addressed in 40 CFR 58.25, 58.36, and 58.46, respectively. Under Section 58.25, States are required to annually develop and implement schedules to modify the SLAMS network to eliminate any unnecessary stations or to correct any inadequacies indicated by the annual network review required by 58.20(d). As part of the annual network review, evaluations of the special networks established as partnership agreements between EPA and Ecology should also be conducted. Modifications to these networks should be recommended as a result of this annual report.

An important objective of the network modification process is determining whether or not sufficient ambient air quality information and data are being provided by the regulatory and other special monitoring networks to satisfy the principal data needs. If sufficient air quality data are not being collected, the deficient area must be identified and corrective action taken to resolve the problem. Conversely, if it is determined that excessive data are being collected (e.g., there are redundant sites resulting in data that agree closely), then efforts need to be taken to determine where disinvestment should be made and on what schedule.

Network modifications may be initiated by EPA or proposed by Ecology and agreed to by EPA. Network modifications may result from revisions to the Part 58 regulations, systems audits, site visits, or performance evaluations; special studies/saturation sampling, population increases/decreases; air quality concentrations consistently recorded below the NAAQS; loss of permission to use a site; demolition of a building which is used for monitoring; building construction; growth of trees; changes in roadways; change in neighborhood type of use, etc.

## **Determining Compliance with Appendix D and Special Monitoring Requirements**

Ecology uses this review to determine whether it is meeting the number of monitors required by the Part 58 Appendix D design criteria requirements, and whether the monitors properly located based on the monitoring objectives and spatial scales of representativeness presented in Appendix D.

### **Number and Location of Monitors**

For SLAMS, the number of monitors required and their locations are not specified in the regulations but rather are determined by EPA Region 10 and Ecology on a case-by-case basis. EPA and Ecology ensure that SLAMS meet the monitoring objectives specified in Appendix D. Adequacy of the network is determined by using a variety of tools. Appropriate location of monitors can be determined on the basis of stated objectives.

Monitor locations are based on the objectives specified in Appendix D, Section 3. Most often, these locations are those that have high concentrations and large population exposure. Population information may be obtained from the latest census data and ambient monitoring data from AQS. If zip codes for various monitoring locations are obtained, use of electronic media census information and GIS-based information can be more easily combined with ambient monitoring data.

For special monitoring needs, program documents applicable to the network must be reviewed to determine the goals and specific siting criteria for the network. Compliance with monitoring objective determinations of the special network should be conducted using procedures similar to those used for Appendix D evaluations (are the number of monitors appropriate and are the monitors properly located).

## **Determining Compliance with Appendix E Requirements**

Applicable siting criteria for SLAMS are specified in 40 CFR 58, Appendix E. The on-site visit itself consists of the physical measurements and observations needed to determine compliance with the Appendix E requirements, such as height above the ground level, distance from trees, paved or vegetative ground cover, etc.

# Network Evaluation and Recommendations/Modifications

## Carbon Monoxide (CO, 42101)

National Ambient Air Quality Standard (NAAQS):

- 1-hour average concentration not to exceed 35 ppm, on more than one occasion in a calendar year, measured at any monitoring site.
- 8-hour average concentration not to exceed 9 ppm for any 8-hour period, on more than one occasion in a calendar year, measured at any monitoring site.

Washington’s carbon monoxide monitoring network is comprised of one site statewide. Trace level carbon monoxide is measured at two sites statewide.

**Table 4: Carbon Monoxide, Parameter code 42101**

AQS #	Site Name	Est.	Type	Scale	Sampling Frequency	Action for 2013
530630049	Spokane, 3 <sup>rd</sup> & Washington	1/1/97	SLAMS	Micro	Continuous	Continue*
530330080	Seattle Beacon Hill	2006	NCore	Urban	Continuous	Continue
530090013	Cheeka Peak	2006	Rural NCore	Regional	Continuous	Continue

**Additional Monitors:** Trace level carbon monoxide is monitored at the Seattle Beacon Hill and Cheeka Peak NCore sites. A carbon monoxide monitor is scheduled to be collocated with NO monitoring at the Seattle area near-roadway site in 2014.

**\*Recommendations/Modifications:** Ecology and its partners have divested of traditional CO monitoring at all but one site and believe continuing to do so is the best use of state resources.

### Spokane, 3<sup>rd</sup> & Washington – SLAMS

AQS # 530630049

Address: W. 408 3<sup>rd</sup> Avenue, Spokane

Monitoring objective: Highest Concentration

Method code: 054

LAT/LONG: 047 39' 13" / 117 25' 07"

MSA: Spokane, WA

### Comments

3<sup>rd</sup> & Washington is a micro scale SLAMS site established in 1997. It is located in the downtown core of Spokane in a highly-traveled commercial area. The site is currently used for maintenance plan purposes. Spokane is a former CO nonattainment area.

### Exceedences

This site has not exceeded the daily or annual standard for CO in **over 10 years**.

## Trace Level Carbon Monoxide

**Seattle, Beacon Hill – NCore**

AQS # 530330080

Address: 4103 Beacon Avenue S., Seattle

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 593

LAT/LONG: 047 34' 58" / 122 18' 30"

MSA: Seattle-Bellevue-Everett, WA

**Cheeka Peak (ORCAA) Rural NCore**

AQS#530090013

Address: Cheeka Peak, Clallam County

Sampling: Continuous

Monitoring objective: Rural NCore

Method code: 593

LAT/LONG: 048 17' 12" / 124 37' 13"

MSA: Not in an MSA

## Ozone (O<sub>3</sub>, 44201)

National Ambient Air Quality Standards (NAAQS):

- 8-hour average of the 4<sup>th</sup> highest measured O<sub>3</sub> concentration averaged over three consecutive years, not to exceed 0.075 ppm at any given monitoring site.

Washington's ozone monitoring network is comprised of eleven sites statewide.

**Table 5: Ozone, Parameter code 44201**

AQS #	Site Name	Est.	Type	Scale	Sampling Frequency	DV (2012)	Action For 2013
530009013	Cheeka Peak	2006	Rural NCore	Regional	Continuous	0.053	Continue
530630001	Cheney, Turnbull	4/1/99	SLAMS	Urban	Continuous	0.059	Continue
530730005	Custer/Loomis	5/89	SLAMS	Urban	Continuous	0.046	Continue
530330023	Enumclaw, Mud Mtn.	7/8/98	SLAMS	Urban	Continuous	0.066	Continue
530330010	Issaquah, Lake Sam	12/1/75	SLAMS	Urban	Continuous	0.055	Continue
530530012	Mt. Rainier, Jackson Visitor Center	7/13/98	SLAMS	NPS supported	Continuous	0.056	Continue
530330017	North Bend, NB Way	6/1/98	SLAMS	Urban	Continuous	0.058	Continue
530330080	Seattle, Beacon Hill	4/1/97	NCore	Urban	Continuous	0.044	Continue
530630046	Spokane, Greenbluff	4/1/90	SLAMS	Urban	Continuous	0.059	Continue
530110011	Vancouver, Blairmont	4/1/90	SLAMS	Urban	Continuous	0.056	Continue
530670005	Yelm, Northern Pacific	5/1/06	SLAMS	Urban	Continuous	0.056	Continue

**Additional Monitors:** None. Ecology provides support for ozone monitoring performed by local air agencies in Anacortes and Spokane.

**Recommendations/Proposed Modifications:** None

### Ozone

#### Cheeka Peak (ORCAA) NCore

AQS#530090013

Address: Cheeka Peak, Clallam County

Sampling: Continuous

Monitoring objective: Rural NCore

**Comments:** Cheeka Peak is a rural NCore site located at the Northwestern tip of Washington State. It is recognized as a national transport site.

Method code:

LAT/LONG: 048 17' 12" / 124 37' 13"

MSA: Not in an MSA

#### Cheney, Turnbull - SLAMS

AQS # 530630001

Address: S. 26010 Smith Road, Cheney

Monitoring objective: Population Exposure

**Comments:** Turnbull is a background/transport scale site located at the Turnbull Wildlife Refuge, south of Spokane. It is a high-concentration and background/transport site for the Spokane area. A CFR required site by population.

Method code: 056

LAT/LONG: 047 24' 55" / 117 31' 49"

MSA: Spokane, WA

**Exceedences:** This site has not exceeded the 8-hour ozone standard in the past 3 years.

**Custer/Loomis - SLAMS**

AIRS # 530730005

Method code: 056

Address: 1330 Loomis Trail Road, Custer

LAT/LONG: 048 95' 25" / -122 55' 45"

Monitoring objective: Transport

MSA: Bellingham, WA

**Comments:** Custer/Loomis site provides data from Canadian impacts as modeling information for the Puget Sound Ozone network.

**Exceedences:** This site has not exceeded the eight hour standard for Ozone in the past 3 years.

**Enumclaw, Mud Mountain Dam - SLAMS**

AQS # 530330023

Method code: 056

Address: 30525 SE Mud Mountain Road, Enumclaw

LAT/LONG: 047 08' 28" / 121 56' 09"

Monitoring objective: Regional Transport

MSA: Seattle-Bellevue-Everett, WA

**Comments:** Mud Mountain Dam is an urban scale State and Local Monitoring Site (SLAMS) established in 1998 located 30 miles East of Seattle, near Enumclaw. Mud Mountain is at the end of the ozone transport zone near the Cascade Mountains. Mud Mountain has been the highest reading site in the ozone network.

**Exceedences:** This site **has** exceeded the 8-hour standard in the past 3 years (2010, 2012).

**Issaquah, Lake Sammamish - SLAMS**

AQS # 530330010

Method code: 056

Address: 20050 SE 56<sup>th</sup> (Lk. Sammamish SP), Issaquah

LAT/LONG: 047 33' 07" / 122 02' 40"

Monitoring objective: Population Exposure

MSA: Seattle-Bellevue-Everett, WA

**Comments:** Lake Sammamish is an urban scale site established in 1975 located east of Seattle, within Lake Sammamish State Park. The Lake Sammamish site is a long-term trends site.

**Exceedences:** This site has not exceeded the 8-hour standard in the past 3 years.

**Mt. Rainier, Jackson Visitor Center - SLAMS**

AQS # 530530012

Method code: 056

Address: Jackson Visitor Center, Mount Rainier

LAT/LONG: 046 47' 07" / 121 43' 58"

Monitoring objective: Background

MSA: Tacoma, WA

**Comments:** The Jackson Visitor Center site is a regional scale site established in 1998.

**Exceedences:** This site has not exceeded the 8-hour ozone standard in the past 3 years.

**North Bend, North Bend Way - SLAMS**

AQS # 530330017

Method code: 056

Address: 42404 SE North Bend Way, North Bend

LAT/LONG: 047 29' 23" / 121 46' 24"

Monitoring objective: Population Exposure

MSA: Seattle-Bellevue-Everett, WA

**Comments:** North Bend Way is an urban scale site established in 1998 located outside of North Bend, 25 miles East of Seattle. North Bend typically indicates some of the highest readings in the ozone network.

**Exceedences:** This site **has** exceeded the 8-hour ozone standard in the past 3 years (2012).

**Seattle, Beacon Hill – NCore**

AQS # 530330080

Method code: 056

Address: 4103 Beacon Avenue S., Seattle

LAT/LONG: 047 34' 58" / 122 18' 30"

Monitoring objective: Population Exposure

MSA: Seattle-Bellevue-Everett, WA

**Comments:** Beacon Hill is an urban scale NCore site located south of downtown Seattle, within a City of Seattle park/reservoir. In addition to ozone, the site is used for monitoring trace level CO, SO<sub>2</sub>, NO<sub>y</sub>, PM<sub>2.5</sub>, air toxics, speciation and other studies. Seattle Beacon Hill is also a long-term trend and research site.

**Exceedences:** This site has not exceeded the 8-hour standard in the past 3 years.

**Spokane, Greenbluff - SLAMS**

AQS # 530630046

Method code: 056

Address: E. 9814 Greenbluff Road, Spokane

LAT/LONG: 047 49' 37" / 117 16' 31"

Monitoring objective: Population Exposure

MSA: Spokane, WA

**Comments:** Greenbluff is an urban scale site located near Spokane. Greenbluff is used with Cheney to identify ozone patterns for the Spokane area. It is a CFR population required site.

**Exceedences:** This site has not exceeded the 8-hour ozone standard in the past 3 years.

**Vancouver, Blairmont - SLAMS**

AQS # 530110011

Method code: 056

Address: 1500 SE Blairmount Drive, Vancouver

LAT/LONG: 045 36' 37" / 122 30' 59"

Monitoring objective: Population Exposure

MSA: Portland-Vancouver, OR-WA

**Comments:** Blairmont is an urban scale site near downtown Vancouver. The site represents the Portland/Vancouver airshed and part of the ozone maintenance planning effort of the Southwest Clean Air Agency (SWCAA).

**Exceedences:** This site has not exceeded the 8-hour ozone standard in the past 3 years.

**Yelm, Northern Pacific - SLAMS**

AQS # 530670005

Method code: 056

Address: 931 Northern Pacific Road, Yelm

LAT/LONG: 046 57' 03" / 122 35' 43"

Monitoring objective: Population Exposure

MSA: Olympia, WA

**Comments:** Yelm is an urban scale site originally established in 1997 and relocated in 2006. The Yelm site is located in a commercial/residential area. Yelm represents ozone transport impacts in the South Puget Sound area.

**Exceedences:** This site **has** exceeded the 8-hour ozone standard in the past 3 years (2012).

## Nitrogen Dioxide (NO, 42600, 42601, 42612)

National Ambient Air Quality Standards (NAAQS):

- Annual arithmetic average concentration not to exceed 0.053 ppm at any monitoring site.
- New 1-hour NO standard at the level of 100 parts per billion (ppb).

Washington's nitrogen dioxide monitoring network is comprised of two trace level NO<sub>y</sub> monitors at NCore sites (statewide). A NO<sub>2</sub> monitor will be sited in 2013/2014 as part of the near-roadway network.

**Table 6: Nitrogen Dioxide Parameter codes 42600, 42601, 42612**

AQS #	Site Name	Est.	Type	Scale	Sampling Frequency	Action for 2013
530330080	Seattle Beacon Hill	2006	NCore	Urban	Continuous	Continue
530090013	Cheeka Peak	2006	Rural NCore	Regional	Continuous	Continue
TBD	Seattle/10 <sup>th</sup> & Weller	1/2013-4	SLAMS	Micro	Continuous	Install
TBD	Tacoma	1/2014-5	SLAMS	Micro	Continuous	Planning

**Additional Monitors:** One NO<sub>2</sub> monitor will be sited in 2014 as part of the EPA near-road network as funding and permitting are allowed. A second near-road NO<sub>2</sub> monitor is planned for 2015 if funding and permitting are allowed.

**Recommendations/Proposed Modifications:** Ecology monitors for the reactive nitrogen species (NO<sub>y</sub>) at NCore Seattle Beacon Hill which includes NO<sub>2</sub>. Olympic Region Clean Air Agency (ORCAA) monitors for the reactive nitrogen species (NO<sub>y</sub>) at Rural NCore Cheeka Peak. It is assumed most if not all the NO<sub>y</sub> measured at Beacon Hill and Cheeka Peak is composed of NO<sub>2</sub>.

**Comment:**

**Seattle, Beacon Hill - NCore**

AQS #530330080  
 Address: 4103 Beacon Avenue S., Seattle  
 Monitoring objective: Population Exposure

Method code: 599  
 LAT/LONG: 047 34' 58" / 122 18' 30"  
 MSA: Seattle-Bellevue-Everett, WA

**Cheeka Peak (ORCAA) Rural NCore**

AQS#530090013  
 Address: Cheeka Peak, Clallam County  
 Monitoring objective: Rural NCore

Method code: 599  
 LAT/LONG: 048 17' 12" / 124 37' 13"  
 MSA: Not in an MSA

## Sulfur Dioxide (SO<sub>2</sub>, 42401)

National Ambient Air Quality Standards (NAAQS)

- One hour primary standard of 75parts per billion (ppb)
- Secondary standard of 0.05 parts per million(ppm) Not to be exceeded more than once per year

Washington’s sulfur dioxide monitoring network is comprised of two trace level SO<sub>2</sub> monitors at NCore sites (statewide).

**Table 7: Sulfur Dioxide Parameter code 42401**

AQS #	Site Name	Est.	Type	Scale	Sampling Frequency	Action for 2013
530330080	Seattle Beacon Hill	4/1997	NCore	Urban	Continuous	Continue
530090013	Cheeka Peak	2006	Rural NCore	Regional	Continuous	Continue

**Additional Monitors:** None

**Recommendations/Proposed Modifications:** None

### Seattle, Beacon Hill - NCore

AQS #530330080

Address: 4103 Beacon Avenue S., Seattle

Monitoring objective: Population Exposure

Method code: 560

LAT/LONG: 047 34' 58" / 122 18' 30"

MSA: Seattle-Bellevue-Everett, WA

### Cheeka Peak (ORCAA) Rural NCore

AQS#530090013

Address: Cheeka Peak, Clallam County

Sampling: Continuous

Monitoring objective: Rural NCore

Method code: 560

LAT/LONG: 048 17' 12"/ 124 37' 13"

MSA: Not in an MSA

## Particulate Matter 10 (PM<sub>10</sub>, 81102)

National Ambient Air Quality Standard (NAAQS), 1987:

- Twenty-four hour average PM<sub>10</sub> concentration not to exceed 150µg/m<sup>3</sup> on more than one occasion per year when averaged over three years.
- Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the EPA revoked the annual PM<sub>10</sub> standard in 2006 (effective December 17, 2006).

Washington's PM<sub>10</sub> monitoring network consists of four sites statewide, including one collocated site.

**Table 8: Particulate Matter 10 PM<sub>10</sub>, Parameter code 81102**

AQS#	Site Name	Est.	Type	Scale	Sampling Type	Action for 2013
530650004	Colville, S Oak	11/96	SLAMS	Neighborhood	Continuous	Continue
530050002	Kennewick, Metaline Ave	10/94	SLAMS	Neighborhood	Continuous	Continue
530630021	Spokane, Augusta Ave.	3/09	SLAMS	Middle	1/6	Continue
530630021	Spokane, Augusta Ave.	3/09	Collocated	Middle	1/12	Continue
530770009	Yakima, S 4th	4/00	SLAMS	Neighborhood	1/6	Continue

**Additional Monitors:** None. The Lacey College Street PM<sub>2.5</sub> nephelometer site (530670013) is being used to assure continued compliance with the PM<sub>10</sub> NAAQS as well as to confirm the Thurston County Maintenance Area (TCMA) continues to meet the qualification criteria of EPA's Limited Maintenance Plan (LMP) approach.

A 3-year NPM<sub>10</sub> design value estimate below 150µg/m<sup>3</sup> demonstrates compliance with the PM<sub>10</sub> NAAQS for the TCMA. This value for 2010 to 2012 is 43µg/m<sup>3</sup>. A 5-year NPM<sub>10</sub> design value below 98µg/m<sup>3</sup> demonstrates the TCMA continues to qualify for the LMP approach. This value for 2008 to 2012 is 45µg/m<sup>3</sup>. These current value estimates demonstrate the TCMA complies with the PM<sub>10</sub> standard and continues to meet EPA's LMP qualification criteria.

**Recommendations/Proposed Modifications:** None

### PM<sub>10</sub>

#### Colville, S Oak - SLAMS

AQS # 530650004

Address: 215 South Oak, Colville

Monitoring objective: Population Exposure

**Comments:** S Oak is a neighborhood scale site for PM<sub>10</sub> established in 1996, located in the commercial/residential area of Colville.

**Exceedences:** This site has exceeded the standard for PM<sub>10</sub> in the past 3 years (2011).

Method code: 079

LAT/LONG: 048 32' 41" / 117 54' 13"

MSA: Not in an urban area

**Kennewick, Metaline Ave - SLAMS**

AQS # 530050002

Method code: 079

Address: 5929 West Metaline, Kennewick

LAT/LONG: 046 13' 06" / 119 12' 03"

Monitoring objective: Population Exposure

MSA: Richland-Kennewick-Pasco, WA

**Comments:** Metaline is a neighborhood scale site for PM<sub>10</sub> established in 1994 and located in the downtown Kennewick area. It is representative of Kennewick which is subject to windblown dust.

**Exceedences:** This site has not exceeded the standard for PM<sub>10</sub> in the past 3 years.

**Spokane, Augusta Ave. - SLAMS**

AQS # 530630021

Method code: 079/063

Address: 3104 E. Augusta Ave., Spokane

LAT/LONG: 047 39' 39" / 117 21' 26"

Monitoring objective: Population Exposure

MSA: Spokane, WA

**Comments:** Augusta Ave. is a middle scale site for PM<sub>10</sub> established in 1972, located in a commercial area of Spokane. The site is representative of the Spokane area which is a past PM<sub>10</sub> nonattainment area.

**Exceedences:** This site has not exceeded the standard for PM<sub>10</sub> in the past 3 years.

**Yakima, S 4th – SLAMS**

AQS # 530770009

Method code: 079/063

Address: 402 South 4<sup>th</sup> Avenue, Yakima

LAT/LONG: 046 35' 42" / 120 30' 44"

Monitoring objective: Population Exposure

MSA: Yakima, WA

**Comments:** S 4th is a neighborhood scale site for PM<sub>10</sub> located in a commercial/residential area near downtown Yakima. The site is representative of the Yakima area which was a past PM<sub>10</sub> nonattainment area.

**Exceedences:** This site has not exceeded standard for PM<sub>10</sub> in the past 3 years.

## Particulate Matter 2.5 (PM<sub>2.5</sub>, 88101, 88502)

National Ambient Air Quality Standard (NAAQS):

- 3-year average of the 98<sup>th</sup> percentile 24-hour concentration not to exceed 35µg/m<sup>3</sup> at any population-oriented monitoring site in a monitoring area.
- Three-year annual average PM<sub>2.5</sub> concentration not to exceed 15µg/m<sup>3</sup> from a single community-oriented monitoring site or the spatial average of eligible community-oriented sites in a monitoring area.

Washington's PM<sub>2.5</sub> monitoring network consists of forty-four sites, plus one collocated site.

**Table 9: Particulate Matter PM<sub>2.5</sub>, Parameter codes 88101, 88502**

AQS#	Site Name	Type	Sample Type	Sampling Frequency	DV 2012	Action for 2013
530272002	Aberdeen Division St	SLAMS	Continuous	Continuous	10.1	Continue
530330037	Bellevue, Bellevue Way	SLAMS	Continuous	Continuous	11.8	Continue
530730015	Bellingham, Yew Street	SLAMS	Continuous	Continuous	13.2	Continue
530350007	Bremerton Spruce	SPMS	Continuous	Continuous	*	Continue
530030004	Clarkston	SLAMS	Continuous	Continuous	26.7	Continue
530410004	Chehalis	SLAMS	Continuous	Continuous	14.8	Continue
530090013	Cheeka Peak	Rural NCore	Continuous	Continuous	5.8	Continue
530650004	Colville	SLAMS	Continuous	Continuous	23.2	Continue
530610020	Darrington, Fir St	SLAMS	Continuous	Continuous	26.6	Continue
530130002	Dayton, W. Main	SLAMS	Continuous	Continuous	14.3	Continue
530370002	Ellensburg	SLAMS	Continuous	Continuous	38.9	Continue
530050002	Kennewick, Metaline Ave	SLAMS	Continuous	Continuous	18.8	Continue
530332004	Kent, James & Central	SLAMS	Continuous	Continuous	21.2	Continue
530670013	Lacey, College St	SLAMS	Continuous	Continuous	20.3	Continue
530750005	LaCrosse, Hill St	SLAMS	Continuous	Continuous	13.3	Continue
530330024	Lake Forest Park, Ballinger Way	SLAMS	Continuous	Continuous	21.5	Continue
530150015	Longview, 30 <sup>th</sup> Ave	SLAMS	Continuous	Continuous	15.8	Continue
530610005	Lynnwood, 212 <sup>th</sup>	SLAMS	Continuous	Continuous	17.8	Continue
530611007	Marysville, 7th Ave	SLAMS	Continuous	Continuous	21.5	Continue
530210002	Mesa, Pepoit Way	SLAMS	Continuous	Continuous	18.2	Continue
530251002	Moses Lake, Balsam St	SLAMS	Continuous	Continuous	18.6	Continue
530570015	Mt. Vernon, S Second St	SLAMS	Continuous	Continuous	9.8	Continue
530330017	North Bend, North Bend Way	SLAMS	Continuous	Continuous	16.4	Continue
530090009	Port Angeles, W 14th St	SLAMS	Continuous	Continuous	15.9	Continue
530310003	Port Townsend, San Juan Ave	SLAMS	Continuous	Continuous	12.4	Continue
530750003	Pullman, Dexter Ave	SLAMS	Continuous	Continuous	17.1	Continue
530531018	Puyallup, 128 <sup>th</sup> St	SLAMS	Continuous	Continuous	21.2	Continue
530010003	Ritzville, Alder St	SLAMS	Continuous	Continuous	15.8	Continue
530750006	Rosalia, Josephine St	SLAMS	Continuous	Continuous	13.5	Continue
530330080	Seattle, Beacon Hill	NCore	SEQ/Continuous	1/3	14 FRM	Continue
530330057	Seattle, E Marginal Way	SLAMS	Continuous	Continuous	21	Continue
530330048	Seattle, Olive St	SLAMS	Continuous	Continuous	15	Continue
530450007	Shelton, W. Franklin	SLAMS	Continuous	Continuous	18.8	Continue
530630021	Spokane, Augusta	SLAMS	SEQ/Continuous	1/6	28.3 FRM	Continue
530630047	Spokane, Monroe Street	SLAMS	Continuous	Continuous	21.9	Continue

AQS#	Site Name	Type	Sample Type	Sampling Frequency	DV 2012	Action for 2013
530530031	Tacoma, Alexander Ave	SLAMS	Continuous	Continuous	21.6	Continue
530530029	Tacoma, S L Street	SLAMS	SEQ/Continuous	1/1	28.3 FRM	Continue
530530029	Tacoma, S L Street	Co-loc	SEQ/Continuous	1/12	Begin 4/12	Continue
530110013	Vancouver, 4th Plain	SLAMS	Continuous FEM	Continuous	25.9 FRM	Continue
530710005	Walla Walla, 12 <sup>th</sup> St	SLAMS	Continuous	Continuous	18.3	Continue
530070006	Wenatchee	SLAMS	Continuous	Continuous	*	Discontinue
53007011	Wenatchee Fifth St.	SPMS	Continuous	Continuous	*	New
530110022	Yacolt, Yacolt Rd.	SLAMS	Continuous	Continue	13.6	Continue
530770009	Yakima, S 4 <sup>th</sup> Ave	SLAMS/ SPMS	SEQ/Continuous	1/3	30.7 FRM	Continue

Asterisk \* denotes sites with less than 3 years data.

**Notes:** Nephelometers are not EPA equivalent method compliance instruments and design values are estimates.

Ecology uses the Washington Air Quality Advisory (WAQA) for reporting PM<sub>2.5</sub> to inform and protect citizens of Washington. WAQA reporting is more protective of human health. Ecology's goal is to keep 24-hour concentrations below 20µg/m<sup>3</sup>.

In addition, some monitors in areas of Washington are not intended to be solely NAAQS based. Certain monitors are used for protection of human health by calling burn bans during home heating season, making daily decisions for agricultural burning and health information- reporting PM<sub>2.5</sub> values.

**Additional Monitors:** Wenatchee Fifth St. was established in late 2012 and replaced Wenatchee Alaska.

**Recommendations/Modifications:** Vancouver 4<sup>th</sup> Plain FRM was discontinued 3/13. The Vancouver FEM is now the primary instrument. Continue all other sites as described.

## PM<sub>2.5</sub>

### Aberdeen, Division St - SLAMS

AQS #530272002

Address: 359 North Division, Aberdeen

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 046 58' 21" / 123 49' 54"

MSA: Not in an MSA

**Comments:** The Aberdeen site is neighborhood scale. The site represents impacts to the Aberdeen and Grays Harbor area from smoke related to home heating and mobile sources. It is used for curtailment calls during home heating season.

### Bellevue, Bellevue Way - SLAMS

AQS #530330037

Address: 305 Bellevue Way, Bellevue

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 047 36' 47" / 122 12' 06"

MSA: Seattle-Bellevue-Everett, WA

**Comments:** The Bellevue Way site is neighborhood scale. It is representative of mobile source and smoke impacts in the area and used for curtailment calls during home heating season.

**Bellingham, Yew Street - SLAMS**

AQS #530730015

Address: 2412 Yew Street, Bellingham

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 048 45' 46" / 122 26' 25"

MSA: Bellingham, WA

**Comments:** Bellingham, Yew Street site is neighborhood scale. It is impacted by smoke related to home heating in the Bellingham/Whatcom County area and used for curtailment calls during home heating season.

**Bremerton, Spruce - SPMS**

AQS # 530350007

Address: 3250 Spruce Ave, Bremerton

Sampling: FEM continuous

Monitoring objective: Population Exposure

Method code: 771/181

LAT/LONG: 047 59' 26" / 122 62' 73"

MSA: Bremerton, WA

**Comments:** Bremerton Spruce replaced Bremerton Meadowdale in 2012. Bremerton Spruce is a neighborhood scale residential site which meets EPA siting criteria. It provides air quality information to a population of 280,000 Kitsap residents.

**Chehalis, Market Blvd – SLAMS**

AQS # 530410004

Address: 350 N. Market, Chehalis

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 046 66' 40"/122 96' 73"

UA: Not in an urban area

**Comments:** Chehalis is a neighborhood scale site established in late 2009. It is located in a mixed/residential area of Chehalis. It is impacted by smoke from home heating and used for curtailment calls during home heating season.

**Cheeka Peak (ORCAA) Rural NCore**

AQS#530090013

Address: Cheeka Peak, Clallam County

Sampling: Continuous

Monitoring objective: Rural NCore

Method code: 771

LAT/LONG: 048 17' 12"/ 124 37' 13"

MSA: Not in an MSA

**Comments:** Cheeka Peak is a regional scale site established in 2006 as a national transport site.

**Clarkston, STP – SLAMS**

AQS # 530030004

Address: 13<sup>th</sup> Street and Port Way, Clarkston

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 046 25' 32"/ 117 3' 35"

UA: Not in an urban area

**Comments:** Clarkston is a neighborhood scale site established in 1993 as a PM<sub>10</sub> site and converted to PM<sub>2.5</sub> in 2007, is located in a mixed/residential area of Clarkston.

**Colville – SLAMS**

AQS # 530650004

Address: 215 S. Oak Street, Colville

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 048 32' 41" / 122 54' 13"

UA: Not in an urban area

**Comments:** S Oak is a neighborhood scale site for PM<sub>2.5</sub> originally established in 1996 as a PM<sub>10</sub> site and converted to PM<sub>2.5</sub> in 2009, is located in the commercial/residential area of Colville.

**Darrington, Fir St – SLAMS**

AQS #530610020 Method code: 181  
Address: 1085 Fir St, Darrington LAT/LONG: 048 14' 49" / 121 36' 11"  
Sampling: FEM continuous  
Monitoring objective: Population Exposure MSA: Not in an urban area  
**Comments:** Darrington is neighborhood scale residential site impacted by smoke from home heating.

**Dayton, 206 W. Main - SLAMS**

AQS # 530130002 Method code: 771  
Address: 206 W. Main, Dayton LAT/LONG: 046.3180"/ 117.9850  
Sampling: Continuous  
Monitoring objective: Population Exposure UA: Not in an urban area  
**Comments:** Dayton is a neighborhood scale small-community site located in Eastern Washington impacted by smoke from burning activities in the area.

**Ellensburg, Ruby St - SLAMS**

AQS # 530370002 Method code: 771  
Address: 201 North Ruby Street, Ellensburg LAT/LONG: 046 59' 37" / 120 32' 42"  
Sampling: Continuous  
Monitoring objective: Population Exposure MSA: Not in an urban area  
**Comments:** Ellensburg is a neighborhood scale site established in 1995 as a PM<sub>10</sub> site and converted to PM<sub>2.5</sub> in 2006. It is located in a residential area of Ellensburg impacted by smoke from home heating devices and used for curtailment calls during home heating season.

**Kennewick, Metaline Ave - SLAMS**

AQS #530050002 Method code: 771  
Address: 5929 W Metaline, Kennewick LAT/LONG: 046 13' 06" / 119 12' 03"  
Sampling: Continuous  
Monitoring objective: Population Exposure MSA: Richland, Kennewick, and Pasco, WA  
**Comments:** Kennewick is neighborhood scale site. The site is impacted from smoke from home heating devices and agricultural sources and is geographically representative of the Tri-Cities area. Kennewick is used for curtailment calls during home heating season.

**Kent, James & Central – SLAMS**

AQS #530332004 Method code: 181  
ADDRESS: 614 N Railroad, Kent LAT/LONG: 047 23' 10" / 122 13' 55"  
Sampling: FEM continuous  
Monitoring objective: Population Exposure MSA: Seattle-Bellevue-Everett, WA  
**Comments:** Kent is neighborhood scale site in the South Puget Sound that is impacted from mobile sources, light industry and smoke from home heating devices. The site is representative of the Kent Valley area.

**Lacey, College St - SLAMS**

AQS #530670013 Method code: 771  
Address: 1900 College St SE, Lacey LAT/LONG: 047 01' 43" / 122 49' 15"  
Sampling: Continuous  
Monitoring objective: Population Exposure MSA: Olympia, WA  
**Comments:** Lacey College Street is a neighborhood scale site impacted by smoke from home heating devices. The site is representative of the Olympia/Thurston County area. The monitor at this site is also used to determine compliance with the PM<sub>10</sub> NAAQS as well as documenting the area continues to qualify for EPA's Limited Maintenance Plan (LMP) option.

**LaCrosse, Hill St - SLAMS**

AQS #530750005

Address: 100 Hill Street, LaCrosse

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 046 48' 55" / 117 52' 26"

MSA: Not in an urban area

**Comments:** LaCrosse is neighborhood scale small-community monitor in Eastern Washington impacted by smoke from burning. LaCrosse is used for daily agricultural burn decisions and curtailment calls during home heating season .It also provides modeling and mapping information.

**Lake Forest Park, Ballinger Way - SLAMS**

AQS #530330024

Address: 17171 Bothell Way NE, Lake Forest Park

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 702/704

LAT/LONG: 047 45' 18" / 122 16' 50"

MSA: Seattle-Bellevue-Everett, WA

**Comments:** Lake Forest Park is neighborhood scale site impacted by smoke from home heating devices and mobile sources from two adjacent arterials. It is used for curtailment calls during home heating season.

**Longview, 30<sup>th</sup> Ave - SLAMS**

AQS #530150015

Address: 1324 30th Ave, Longview

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 046 08' 22" / 122 57' 43"

MSA: Longview, WA

**Comments:** Longview is a neighborhood scale site impacted by smoke from home heating. It is representative of the Longview/Kelso area and is used for curtailment calls during home heating season.

**Lynnwood, 212th - SLAMS**

AQS #530610005

Address: 6120 212th SW, Lynnwood

Sampling: FEM continuous

Monitoring objective: Population Exposure

Method code: 181

LAT/LONG: 047 48' 23" / 122 19' 00"

MSA: Seattle-Bellevue-Everett, WA

**Comments:** Lynnwood is neighborhood scale site impacted by smoke during home heating season. Lynnwood is representative of south Snohomish County.

**Marysville, 7<sup>th</sup> Ave – SLAMS**

AQS #530611007

Address: 1605 7th ST, Marysville

Sampling: FEM continuous

Monitoring objective: Population Exposure

Method code: 181

LAT/LONG: 048 03' 18" / 122 10' 33"

MSA: Seattle-Bellevue-Everett, WA

**Comments:** Marysville is a neighborhood scale site impacted by smoke during the home heating season, mobile sources, and light industry. It is representative of the Marysville/North Snohomish County area.

**Mesa, Pepoit Way - SLAMS**

AQS #530210002

Address: 200 Pepoit Way, Mesa

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 046 34' 32" / 119 00' 25"

MSA: Not in an urban area

**Comments:** Mesa is a neighborhood scale small-community site in Eastern Washington impacted by agricultural sources and smoke from home heating. It is used for daily agricultural burn decisions and curtailment calls during home heating season.

**Moses Lake, Balsam St - SLAMS**

AQS #530251002

Address: 412 S Balsam St, Moses Lake

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 047 07' 50" / 119 16' 22"

MSA: Not in an urban area

**Comments:** Moses Lake is a neighborhood scale small-community site in Eastern Washington impacted by agricultural sources and smoke from home heating sources. It is used for daily agricultural burn decisions and curtailment calls during home heating season.

**Mt. Vernon, S Second St - SLAMS**

AQS #530570015

Address: 1600 South Second St, Mount Vernon

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 048 24' 37" / 122 20' 16"

MSA: Not in an urban area

**Comments:** Mt. Vernon is a neighborhood scale small-community site impacted by home heating devices. Mt. Vernon is used for curtailment calls during home heating season.

**North Bend, North Bend Way - SLAMS**

AQS #530330017

Address: 42404 SE North Bend Way, North Bend

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 047 29' 23" / 121 46' 24"

MSA: Seattle-Bellevue-Everett, WA

**Comments:** North Bend is a neighborhood scale transport/background PM<sub>2.5</sub> site for the Puget Sound impacted by smoke from home heating devices. North Bend is used for curtailment calls during home heating season. North Bend is collocated with ozone and meteorological equipment.

**Port Angeles, W 14<sup>th</sup> St - SLAMS**

AQS #530090009

Address: 1139 W 14th St., Port Angeles

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 048 06' 59" / 123 27' 52"

MSA: Not in an MSA

**Comments:** Port Angeles is a neighborhood scale site adjacent to Olympic National Park, a Class 1 Area and impacted by smoke from home heating sources. Port Angeles is used for curtailment calls during home heating season.

**Port Townsend, San Juan Ave - SLAMS**

AQS #530310003

Address: 3939 San Juan Avenue, Port Townsend

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 771

LAT/LONG: 048 07' 45" / 122 46' 46"

MSA: Not in an MSA

**Comments:** Port Townsend is neighborhood scale SLAMS site impacted by smoke from home heating devices. Port Townsend is used for curtailment calls during home heating season. It is representative of the east Jefferson County area.

**Pullman, Dexter Ave - SLAMS**

AQS #530750003

Address: 240 SE Dexter, Pullman

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Pullman is a neighborhood scale site is in Eastern Washington impacted by smoke from burning. Pullman is used for daily agricultural burn decisions and curtailment calls during home heating season.

Method code: 771

LAT/LONG: 046 43' 28" / 117 10' 46"

MSA: Not in an MSA

**Puyallup, 128<sup>th</sup> St - SLAMS**

AQS #530531018

Address: 9616 128th St E, Puyallup

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Puyallup is a neighborhood scale site impacted by smoke from home heating devices in the Pierce County South Hill area.

Method code: 771

LAT/LONG: 047 08' 24" / 122 18' 01"

MSA: Seattle-Bellevue-Everett, WA

**Ritzville, Alder St - SLAMS**

AQS #530010003

Address: 109 W Alder, Ritzville

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Ritzville is a neighborhood scale small-community located in Eastern Washington impacted by smoke from burning activities in the area. Ritzville is used for making daily agricultural burn decisions and curtailment calls during home heating season.

Method code: 771

LAT/LONG: 047 07' 43" / 118 22' 55"

UA: Not in an urban area

**Rosalia, Josephine St - SLAMS**

AQS #530750006

Address: 906 S Josephine Avenue, Rosalia

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Rosalia is a neighborhood scale small-community site located in Eastern Washington impacted by smoke from burning in the area. Rosalia is used for making daily agricultural burning decisions and curtailment calls during home heating season.

Method code: 771

LAT/LONG: 047 13' 52" / 117 22' 08"

UA: Not in an urban area

**Seattle, Beacon Hill - NCore**

AQS #530330080

Address: 4103 Beacon Avenue S., Seattle

Sampling: FRM 1/3 & FEM continuous

Monitoring objective: Population Exposure

**Comments:** Seattle, Beacon Hill is an urban scale NCORE site. Seattle Beacon Hill is collocated with an FEM, FRM, meteorological equipment as well as toxics and speciation monitoring.

Method code: 118/181

LAT/LONG: 047 34' 58" / 122 18' 30"

MSA: Seattle-Bellevue-Everett, WA

**Seattle/Duwamish - SLAMS**

AQS #530330057

Address: 4401 E Marginal Way S., Seattle

Sampling: FEM continuous

Monitoring objective: Population Exposure

**Comments:** Seattle Duwamish is a neighborhood scale site located in the Duwamish River Valley impacted by mobile source diesel emissions and industrial sources. This site is FEM equipped and suitable for comparison to the PM<sub>2.5</sub> NAAQS.

Method code: 181

LAT/LONG: 047 56' 32" / 122 34' 05"

MSA: Seattle-Bellevue-Everett, WA

**Seattle, Olive St - SLAMS**

AQS #530330048

Address: 1624 Boren Avenue, Seattle

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Seattle, Olive Street was established in 2002 as a micro scale PM<sub>2.5</sub> site adjacent to Interstate 5 designed to measure effects of mobile source diesel emissions. This site is not suitable for comparison to the PM<sub>2.5</sub> NAAQS.

Method code: 771

LAT/LONG: 047 36' 55" / 122 19' 48"

MSA: Seattle-Bellevue-Everett, WA

**Shelton, W. Franklin - SLAMS**

AQS #530450007

Address: 122 W. Franklin, Shelton

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Shelton is a neighborhood scale site established in 2001 and relocated in April 2011. Shelton is impacted by smoke from home heating devices and used for curtailment calls during home heating season.

Method code: 771

LAT/LONG: 047 213' 55" / 123 100' 81"

MSA: Not in an MSA

**Spokane, Augusta - SLAMS**

AQS #530630021

Address: 3104 E. Augusta Ave., Spokane

Sampling: FRM 1/3 & continuous

Monitoring objective: Population Exposure

**Comments:** Spokane Augusta Ave. is a neighborhood scale site impacted by smoke from home heating devices and light industrial sources. The site is equipped with an FRM and suitable for comparison to the PM<sub>2.5</sub> NAAQS.

Method code: 118/702/704

LAT/LONG: 047 39' 39" / 117 21' 26"

MSA: Spokane, WA

**Spokane, Monroe Street - SLAMS**

AQS #530630047

Address: N 4601 Monroe St., Spokane

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Spokane, Monroe St. is a neighborhood scale site impacted by smoke from home heating devices and is representative of the area.

Method code: 771

LAT/LONG: 047 42' 03" / 117 25' 30"

MSA: Spokane, WA

**Tacoma, Alexander Ave - SLAMS**

AQS #530530031

Address: 2301 Alexander Avenue, Tacoma

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Tacoma, Alexander Ave is a neighborhood scale site impacted by smoke from home heating devices and industrial point sources on the Tacoma Tide flats. The site is representative of the NE Tacoma/Fife area.

Method code: 771

LAT/LONG: 047 15' 56" / 122 23' 09"

MSA: Seattle-Bellevue-Everett, WA

**Tacoma, S L St - SLAMS/SLAMS**

AQS #530530029

Address: 7802 South L St., Tacoma

Sampling: FRM 1/1 & FEM continuous

Monitoring objective: Population Exposure

**Comments:** Tacoma, L Street is a neighborhood scale site impacted by smoke from home heating devices. The site is equipped with an FEM & FRM and suitable for comparison to the PM<sub>2.5</sub> NAAQS.

Method code: 118/181

LAT/LONG: 047 11' 11" / 122 27' 06"

MSA: Seattle-Bellevue-Everett, WA

**Vancouver, 4<sup>th</sup> Plain – SLAMS**

AQS #530110013

Address: 8205 E 4th Plain Boulevard, Vancouver

Sampling: FEM

Monitoring objective: Population Exposure

**Comments:** Vancouver, 4<sup>th</sup> Plain is a neighborhood scale site impacted by smoke from home heating devices. The site is equipped with an FEM and suitable for comparison to the PM<sub>2.5</sub> NAAQS. FRM discontinued 3/31/2013.

Method code: 118

LAT/LONG: 045 38' 55" / 122 35' 16"

MSA: Portland-Vancouver, OR-WA

**Walla Walla, 12<sup>th</sup> St - SLAMS**

AQS #530710005

Address: 200 S 12<sup>th</sup>, Walla-Walla

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Walla Walla is a neighborhood scale small-community site located in Eastern Washington impacted by smoke from burning activities in the area.

Method code: 771

LAT/LONG: 046 03' 32" / 118 21' 06"

UA: Not in an urban area

**Wenatchee, Alaska Way - SLAMS - DISCONTINUE**

AQS # 530070006

Address: 600 Alaska Street, Wenatchee

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Wenatchee is a neighborhood scale site established in 1994 as a PM<sub>10</sub> site and converted to PM<sub>2.5</sub> in 2006. Wenatchee is located in a residential area and impacted by smoke from multiple sources including home heating devices and wildfires.

Method code: 771

LAT/LONG: 047 25' 06" / 120 19' 14"

UA: Not in an urban area

**Wenatchee, Fifth St. – SPMS - NEW**

AQS#53007011

Address: 1300 Fifth St.

Sampling: FEM Continuous

Monitoring objective: Population Exposure

**Comments:** Wenatchee Fifth St. was established in late 2012 as a neighborhood scale site to replace Wenatchee Alaska Way. Wenatchee is located in a residential area and impacted by smoke from home heating and wildfires.

Method code: 181

LAT/LONG: 047 43' 06" / 120 34' 19"

UA: Not in an urban area

**Yacolt, Yacolt Rd. – SLAMS**

AQS #530110022

Address: 406 W. Yacolt Rd., Yacolt

Sampling: Continuous

Monitoring objective: Population Exposure

**Comments:** Yacolt is a neighborhood scale site impacted by smoke from home heating devices and is representative of the area.

Method code: 771

LAT/LONG: 045 86' 63" / 122 40' 88"

MSA: Vancouver, WA

**Yakima, S 4<sup>th</sup> Ave – SLAMS (FRM)/SPMS (FEM)**

AQS #530770009

Address: 402 South 4th Avenue, Yakima

Sampling: 1/3 FRM & FEM continuous

Monitoring objective: Population Exposure

**Comments:** Yakima is a neighborhood scale site impacted by smoke from burning sources in the area. The site is equipped with an FRM and suitable for comparison to the PM<sub>2.5</sub> NAAQS.

Method code: 118/771

LAT/LONG: 046 35' 42" / 120 30' 44"

MSA: Yakima, WA



## Other – Contracted Sites USFS

**Table 10: Other Contracted Sites USFS**

AQS#	Site Name	Est.	Type	Scale	Sampling Type	Action for 2013
530070007	Chelan	2002	SLAMS	Neighborhood	Continuous	Continue
530070010	Leavenworth	2002	SLAMS	Neighborhood	Continuous	Continue
530770007	Naches	2008	SLAMS	Neighborhood	Continuous	Continue
530470009	Twisp	2002	SLAMS	Neighborhood	Continuous	Continue
530470010	Winthrop	2002	SLAMS	Neighborhood	Continuous	Continue

**Additional Monitors:** None

**Comments:**\* Nephelometers are not EPA equivalent method compliance instruments and design values are estimates.

**Chelan, Woodin Ave - SLAMS**

AQS#530070007- USFS  
 Address: 428 W. Woodin Avenue, Chelan  
 Sampling: Continuous  
 Monitoring objective: Population Exposure

Method code: 771  
 LAT/LONG: 047 50' 18" / 120 01' 23"  
 MSA: Not in an urban area

**Leavenworth, Evans St. - SLAMS**

AQS#530070010- USFS  
 Address: 330 Evans Street, Leavenworth  
 Sampling: Continuous  
 Monitoring objective: Population Exposure

Method code: 771  
 LAT/LONG: 047 35' 56" / 120 39' 53"  
 MSA: Not in an urban area

**Naches, Hwy 12 - SLAMS**

AQS#530770007- USFS  
 Address: 10237 Hwy 12, Naches  
 Sampling: Continuous  
 Monitoring objective: Population Exposure

Method code: 771  
 LAT/LONG: 046 43' 47" / 120 42' 13"  
 MSA: Not in an urban area

**Twisp, Glover St - SLAMS**

AQS#530470009- USFS  
 Address: 118 South Glover Street, Twisp  
 Sampling: Continuous  
 Monitoring objective: Population Exposure

Method code: 771  
 LAT/LONG: 48° 21' 51" / 120 12' 40"  
 MSA: Not in an urban area

**Winthrop, W Chewuch Rd. - SLAMS**

AQS#530470010-FS  
 Address: 24 West Chewuch Road, Winthrop  
 Sampling: Continuous  
 Monitoring objective: Population Exposure

Method code: 771  
 LAT/LONG: 048 28' 38" / 120 11' 26"  
 MSA: Not in an urban area

## Other – Contracted Sites Tribal/EPA

**Table 11: Other - Contracted Sites Tribal/EPA**

AQS#	Site Name (Tribe)	Est.	Type	Scale	Sampling Type	Action for 2013
530770017	Harrah (Yakama)	2012	SPMS	Neighborhood	Continuous	Continue
530090014	Neah Bay (Makah)	2008	SLAMS	Neighborhood	Continuous	Continue
530270008	Oakville (Chehalis)	2006	SLAMS	Neighborhood	Continuous	Continue
530470013	Omak (Colville)	2010	SLAMS	Neighborhood	Continuous	Continue
530530022	Puyallup (Puyallup)	2008	SLAMS	Neighborhood	Continuous	Continue
530270009	Taholah (Quinault)	2004	SLAMS	Neighborhood	Continuous	TBD*
530770015	Toppenish (Yakama)	2006	SLAMS	Neighborhood	Continuous	Continue
530610011	Tulalip (Tulalip)	2011	SLAMS	Neighborhood	Continuous	Continue
530650002	Wellpinit (Spokane)	2006	SLAMS	Neighborhood	Continuous	Continue
530770016	White Swan (Yakama)	2009	SLAMS	Neighborhood	Continuous	Continue

**Additional Monitors:** A new monitoring site at Harrah was established in late 2012.

**Recommendations/Modifications:** \*Monitoring was suspended at Taholah the fall of 2011. EPA continues to work with the Quinault Nation to determine the future of monitoring there.

**Comments:**\* Nephelometers are not compliance instruments and design values are estimates.

### Harrah, (Yakama) – SPMS

AQS#530770017

Address: 3851 N Harrah Rd

Sampling: Continuous PM<sub>2.5</sub>/PM<sub>10</sub> & meteorology

Method code: 702/704/079

LAT/LONG: 046 40' 85" / 120 54' 39"

Monitoring objective: Population Exposure

### Neah Bay, (Makah) - SLAMS

AQS#530090014

Address: 159 Waada View, Neah Bay

Sampling: Continuous PM<sub>2.5</sub>

Method code: 771

LAT/LONG: 048 22' 19" / 124 35' 43"

Monitoring objective: Population Exposure

### Oakville, (Chehalis) - SLAMS

AQS#530270008

Address: 252 Howanut Drive, Oakville

Sampling: Continuous PM<sub>2.5</sub> & meteorology

Method code: 771

LAT/LONG: 046 49' 23" / 123 09' 40"

Monitoring objective: Population Exposure

### Omak, Howanut Dr (Colville) - SLAMS

AQS#530470013

Address: 8<sup>th</sup> Ave & Omak/Okanogan Rd

Sampling: Continuous PM<sub>2.5</sub> & meteorology

Method code: 771

LAT/LONG: 048. 39' 99" / 119 518' 96"

Monitoring objective: Population Exposure

### Puyallup, 66th Ave (Puyallup) - SLAMS

AQS#530530022

Address: 5722 66<sup>th</sup> Avenue E. Puyallup

Sampling: Continuous PM<sub>2.5</sub>

Method code: 771

LAT/LONG: 047 12' 19" / 122 20' 19"

Monitoring objective: Population Exposure

**Taholah, Chitwhin Dr (Quinalt) - SLAMS**

AQS#530270009

Address: 600 Chitwin Drive, Taholah

Sampling: Continuous PM<sub>2.5</sub>

Method code: 771

LAT/LONG: 047 20' 37" / 124 17' 13"

Monitoring objective: Population Exposure

**Toppenish, Ward Rd (Yakama) - SLAMS**

AQS#530770015

Address: 141 Ward Road, Toppenish

Sampling: Continuous PM<sub>2.5</sub> & meteorology

Method code: 771

LAT/LONG: 046 23' 07" / 120 18' 49"

Monitoring objective: Population Exposure

**Tulalip, Reuben Shelton Dr. (Tulalip) - SLAMS**

AQS#530610011

Address: 3107 Reuben Shelton Dr, Tulalip

Sampling: Continuous PM<sub>2.5</sub>

Method code: 771

LAT/LONG: 047 06' 90" / 122 27' 50"

Monitoring objective: Population Exposure

**Wellpinit, Ford-Wellpinit Rd (Spokane) - SLAMS**

AQS#530650002

Address: 5298 Ford-Wellpinit Road, Wellpinit

Sampling: Continuous PM<sub>2.5</sub>

Method code: 771

LAT/LONG: 047 53' 19" / 117 59' 19"

Monitoring objective: Population Exposure

**White Swan (Yakama) - SLAMS**

AQS#530770016

Address: 621 Signal Peak Rd, White Swan

Sampling: Continuous PM<sub>2.5</sub> & meteorology

Method code: 771

LAT/LONG: 046.37' 54" / 120 72' 93"

Monitoring objective: Population Exposure

**Other – Contracted Local Air Agencies**

**Table 12: Other - Contracted Local Air Agencies**

AQS#	Site Name	Est.	Type	Scale	Sampling Type	Action for 2013
530570011	Anacortes	2012	SLAMS	Urban	Continuous	Continue
530090013	Cheeka Peak	2006	Rural NCore	Regional	Continuous	Continue
530630021	Spokane Augusta	2010	SLAMS	Urban	Continuous	Continue

**Additional Monitors:** None

**Note:** Ecology provides technical support for Anacortes, Cheeka Peak and Spokane Augusta ozone. Technical support can include repair and calibration, quality assurance, telemetry and data management.

**Anacortes, O Street – SLAMS**

Ozone

AQS # 530570011

Address: 202 O Street, Anacortes

Sampling: Continuous

Monitoring objective: Population exposure

Method code: 056

LAT/LONG: 048 52' 05" / 122 61' 42"

MSA: Not an Urban area

**Cheeka Peak (ORCAA) NCore**

Nephelometer, ozone, trace gas and meteorological

AQS#530090013

Address: Cheeka Peak, Clallam County

Sampling: Continuous

Monitoring objective: Rural NCore

Method code: 771, 056,

LAT/LONG: 048 17' 12" / 124 37' 13"

MSA: Not in an MSA

**Spokane, Augusta - SLAMS**

Ozone

AQS #530630021

Address: 3104 E. Augusta Ave., Spokane

Sampling: Continuous

Monitoring objective: Population Exposure

Method code: 056

LAT/LONG: 047 39' 39" / 117 21' 26"

MSA: Spokane, WA

**Meteorological Monitoring (Met. 61101, 61102, 62101)**

**Table 13: Met Monitoring, Parameter codes, 61101, 61102, 62101**

AQS#	Site Name	Est.	Type	Scale	Sampling Type	Action for 2013
530090013	Cheeka Peak	5/06	WS, WD, Ta	Regional	Continuous	Continue
530650004	Colville	3/11	WS, WD, Ta	Neighborhood	Continuous	Continue
530330023	Enumclaw Mud Mtn.	7/08/98	WS, WD, Ta	Urban	Continuous	Continue
530050005	Kennewick	00/00/12	WS, WD, Ta	Middle	Continuous	Continue
530330017	North Bend	6/1/98	WS, WD, Ta	Regional	Continuous	Continue
530330080	Seattle Beacon Hill	6/4/79	WS, WD, Ta	Urban	Continuous	Continue
530630021	Spokane Augusta Ave.	3/09	WS, WD, Ta	Neighborhood	Continuous	Continue
530531016	Tacoma Tower	1/1/91	WS, WD, Ta	Urban	Continuous	Continue
530110011	Vancouver Blairmount	12/19/07	WS, WD, Ta	Neighborhood	Continuous	Continue

**Additional Monitors:** None.

**Recommendations/Modifications:** Continue all listed sites as described.

**Cheeka Peak, Rural NCore**

AQS #530090013

Address: Cheeka Peak

Monitoring objective: Special Studies

Method code: 050, 020, 040

LAT/LONG: 048 29' 78" / 124 62' 49"

MSA: Not in an MSA

**Colville – SLAMS**

AQS # 530650004

Address: 215 S. Oak Street

Monitoring objective: Population Exposure

Method code: 050, 020, 040

LAT/LONG: 048 32' 41" / 122 54' 13"

UA: Not in an urban area

**Enumclaw, Mud Mountain Dam - SLAMS**

AQS # 530330023

Address: 30525 SE Mud Mountain Road, Enumclaw

Monitoring objective: Regional Transport

Method code: 050, 020, 040

LAT/LONG: 047 08' 28" / 121 56' 09"

MSA: Seattle-Bellevue-Everett, WA

**Kennewick, Metaline Ave - SLAMS**

AQS#530050002

Address: 5929 W Metaline, Kennewick

Monitoring objective: Population Exposure

Method code: 050, 020, 040

LAT/LONG: 046 13' 06" / 119 12' 03"

MSA: Richland, Kennewick and Pasco, WA

**North Bend, North Bend Way - SLAMS**

AQS #530330017

Address: 42404 SE North Bend Way, North Bend

Monitoring objective: Population Exposure

Method code: 050, 020, 040

LAT/LONG: 047 29' 23" / 121 46' 24"

MSA: Seattle-Bellevue-Everett, WA

**Seattle, Beacon Hill - NCore**

AQS # 530330080

Address: 4103 Beacon Avenue S., Seattle

Monitoring objective: Population Exposure

Method code: 050, 020, 040

LAT/LONG: 047 34' 58" / 122 18' 30"

MSA: Seattle-Bellevue-Everett, WA

**Spokane, Augusta Ave. - SLAMS**

AQS #530630021

Address: 3104 E. Augusta Ave., Spokane

Monitoring objective: Population Exposure

Method code: 050, 020, 040

LAT/LONG: 047 39' 39" / 117 21' 26"

MSA: Spokane, WA

**Tacoma, Tower Drive - SLAMS**

AQS #530531016

Address: Tower Drive, Tacoma

Monitoring objective: Population exposure

Method code: 050, 020, 040

LAT/LONG: 47.30444° / 122.4120

MSA: Seattle-Bellevue, Everett, WA

**Vancouver, Blairmont - SLAMS**

AQS # 530110011

Address: 1500 SE Blairmount Drive, Vancouver

Monitoring objective: Population Exposure

Method code: 050, 020, 040

LAT/LONG: 045 36' 37" / 122 30' 59"

MSA: Portland-Vancouver, OR-WA

**Lead (Pb 14129)**

**Table 14: Pb Lead, Parameter code 14128**

<b>AQS#</b>	<b>Site Name</b>	<b>Est.</b>	<b>Type</b>	<b>Scale</b>	<b>Sampling Type</b>	<b>Action for 2013</b>
530330080	Seattle, Beacon Hill	2010	NCore	Urban	1/6	Continue
530330029	Auburn, Municipal AF	12/11	Special Studies	Microscale	1/6	Discontinued 2012*
530330029	Auburn, Collocated	12/11	Special Studies	Microscale	1/12	Discontinued 2012*
530610013	Snohomish, Harvey Field	12/11	Special Studies	Microscale	1/6	Discontinued 2012*

**Additional Monitors:** None.

**Recommendations/Modifications:** \* Sampling concluded for the Pb Airport Study at Auburn Municipal and Harvey Field Airport in December 2012.

**Seattle, Beacon Hill - NCore**

AQS #530330080  
 Address: 4103 Beacon Avenue S., Seattle  
 Monitoring objective: Population Exposure

Method code: 085  
 LAT/LONG: 047 34' 58" / 122 18' 30"  
 MSA: Seattle-Bellevue-Everett, WA

**Auburn Municipal – Special Studies**

AQS #530330029  
 Address: 400 23<sup>rd</sup> St. NE, Auburn  
 Monitoring objective: Special Studies

Method code: 085  
 LAT/LONG: 047. 32' 23"/-122 22' 60"  
 MSA: Seattle-Bellevue-Everett, WA

**Harvey Field – Special Studies**

AQS #530610013  
 Address: 9900 Airport Way, Snohomish  
 Monitoring objective: Special Studies

Method code: 085  
 LAT/LONG: 047. 90' 23"/-122 10'03"  
 MSA: Seattle-Bellevue-Everett, WA

## Trace Gas Monitoring

**NCore – Precursor Gas & Multi-Pollutant Monitoring** – From an emission source perspective, multiple pollutants and their precursors are released simultaneously (e.g., a combustion plume with nitrogen, carbon, hydrocarbon, mercury, sulfur gases, and particulate matter). Meteorological processes that shape pollutant movement, atmospheric transformations, and removal act on all pollutants. Numerous chemical and physical interactions underlie the dynamics of particle and ozone formation and the adherence of air toxics on surfaces of particles.

Overwhelming programmatic and scientific interactions across pollutants have demanded a movement toward integrated air quality management. Multi-pollutant air monitoring benefits health assessments and emissions strategy development. Health studies with access to multi-pollutant data will be better positioned to identify effects of different pollutants, particularly when concentration, composition, and population types are included. Air quality models and source attribution methods used for strategy development also benefit from the multi-pollutant approach. Modelers will be able to perform more robust evaluations by checking performance on several variables to ensure the model produces results for correct reasons and not through compensating errors. As emission sources are characterized by a multiplicity of pollutant releases, related source apportionment models yield more conclusive results from use of multi-pollutant measurements. Multi-pollutant measurements also streamline monitoring operations and offer increased diagnostic capabilities to improve instrument performance.

The multi-pollutant monitoring provided for these needs by starting to fill the measurement gaps that have accumulated over the years. The objective of this strategy is to provide for the following important needs:

- Improved data flow and timely reporting to the public
- Future NAAQS compliance determinations and revisions
- Support for development of emissions strategies
- Assess effectiveness of air pollution control programs
- Data for scientific and health-based studies

**Table 15: Trace Gas Monitoring**

AQS#	Site Name	Est.	Type	Scale	Sampling Type	Action for 2013
530330080	Seattle Beacon Hill	4/1997	NCore	Urban	Continuous	Continue
530090013	Cheeka Peak	5/2006	Rural NCore	Regional	Continuous	Continue

**Additional Monitors:** None

**Recommendations/Modifications:** Continue listed sites as described.

**Table 16: NCore Parameters Seattle Beacon Hill**

Parameter	Parameter Code	Sampling/ Analysis Method	Sampling schedule	Spatial Scale	Instrument Type	Action for 2013
Ozone	44201	Continuous		Urban	API 440 E	Continue
SO <sub>2</sub> trace	42401	Continuous		Urban	Thermo 42C	Continue
CO trace	42101	Continuous		Urban	API 300EU	Continue
NO <sub>y</sub> trace	42600	Continuous		Urban	Thermo 42C-Y	Continue
PM <sub>2.5</sub> mass	88101	Manual	1/3	Urban	Thermo 2025	Continue
PM <sub>2.5</sub> Continuous	88502	Continuous		Urban	Thermo FDMS TEOM	Continue
PM <sub>2.5</sub> Speciation	88502	Continuous & Manual	1/3	Urban	Met One SSAS & URG 3000N Carbon , Sunset Labs OCEC	Continue
PM <sub>10-2.5</sub>	86101	Manual	1/3	Urban	Thermo 2025	Continue
PM <sub>10-2.5</sub> Speciation	<b>Not sampling</b>	<b>Not sampling</b>	<b>Not sampling</b>	Urban	None	TBD
WS & WD	61101/61102	Continuous		Urban	RM Young 05305	Continue
Ambient temperature	62101	Continuous		Urban	RM Young Platinum probe	Continue
Delta Temperature	62106	Continuous		Urban	RM Young	Continue
Ambient pressure	64101	Continuous		Urban	RM Young	Continue
Relative humidity	62201	Continuous		Urban	Rotronics	Continue

**Seattle, Beacon Hill - NCore**

AQS #530330080

Address: 4103 Beacon Avenue S., Seattle

Monitoring objective: Special Studies

LAT/LONG: 047 34' 58" / 122 18' 30"

MSA: Seattle-Bellevue-Everett, WA

**Comments**

Seattle Beacon Hill is an Urban scale site for trace level CO, SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>2.5</sub>, air toxics, speciation and other studies. Also measured at Seattle Beacon Hill: PM<sub>2.5</sub> chemical speciated particulate matter, volatile organic compounds, metals, carbonyls and semi-volatile (PAH). Data from this site also supports Particulate Research Center activities.

**Table 17: NCore Parameters Cheeka Peak**

Parameter	Parameter Code	Sampling/Analysis Method	Sampling schedule	Spatial Scale	Instrument Type	Action for 2013
Ozone	44201	Continuous	Continuous	Rural	API T400	Continue
SO <sub>2</sub> trace	42401	Continuous	Continuous	Rural	API T100U	Continue
CO trace	42101	Continuous	Continuous	Rural	API 300EU	Continue
NO <sub>y</sub> trace	42600	Continuous	Continuous	Rural	API T200U	Continue
PM <sub>2.5</sub> mass	88101	Manual	IMPROVE	Rural	IMPROVE	Continue
PM <sub>2.5</sub> Continuous	88502	Continuous	Continuous	Rural	Radiance Research M903 Nephelometer Correlated	Continue
Light Scatter	11203	Continuous	Continuous	Rural	“ “	Continue
Visibility	63101	Continuous	Continuous	Rural	“ “	Continue
PM <sub>2.5</sub> Speciation	88502	Manual	IMPROVE	Rural	IMPROVE	Continue
PM <sub>10-2.5</sub>	<b>Not sampling</b>	<b>Not sampling</b>	<b>Not sampling</b>	Rural	None	TBD
PM <sub>10-2.5</sub> Speciation	<b>Not sampling</b>	<b>Not sampling</b>	<b>Not sampling</b>	Rural	None	TBD
WS, WD & sigma	61101/61102 /61106	Continuous	Continuous	Rural	RM Young PSD Quality	Continue
Ambient temperature	62101	Continuous	Continuous	Rural	RM Young Platinum probe	Continue
Ambient pressure	64101	Continuous	Continuous	Rural	RM Young	Continue
Relative humidity	62201	Continuous	Continuous	Rural	Rotronics	Continue

**Cheeka Peak, Rural NCore**

AQS #530090013

Address: Cheeka Peak

Monitoring objective: Special Studies

LAT/LONG: 048 29' 78"/124 62' 49"

MSA: Not in an MSA

**Comments**

Cheeka Peak is a Regional scale Rural NCore site in Clallam County. Parameters measured at Cheeka Peak are: PM<sub>2.5</sub>, ozone, trace-level CO, SO<sub>2</sub>, NO<sub>y</sub>, PM<sub>2.5</sub>, and meteorology.

## Toxics

### Toxics

**Collocated National Air Toxics Trend Site (NATTS)** - In addition to the STN and NCore Precursor Gas Monitoring Programs, Beacon Hill is also a designated National Air Toxics Trend Site (NATTS). The primary objectives of Washington's National Air Toxics Trends Site Monitoring Program include but are not limited to:

- Provide long-term air toxic monitoring data in order to establish and track trends.
- Evaluate the air toxic program's progress by characterizing air toxics concentrations, and determining their spatial and temporal differences between cities and regions over time.
- Provide representative air toxic data to support exposure assessments (i.e. determine health risks).
- Determine where air toxics emissions come from (source apportionment).
- Provide air toxic data for evaluating modeling results that are used for exposure assessments.
- Assess the effectiveness of the air toxic program's emission reduction and control strategies.

**Table 18: Toxics**

AQS#	Site Name	Est.	Type	Scale	Sampling Type	Action for 2013
530330080	Seattle Beacon Hill	4/1997	NCore	Urban	Manual	Continue

**Additional Monitors:** None

**Recommendations/Modifications:** Continue listed site as described.

#### **Seattle, Beacon Hill - NCore**

AQS #530330080

Address: 4103 Beacon Avenue S., Seattle

Monitoring objective: Special Studies

Method code: 593/560/574

LAT/LONG: 047 34' 58" / 122 18' 30"

MSA: Seattle-Bellevue-Everett, WA

#### **Comments**

Seattle Beacon Hill is a designated National Air Toxics Trends Site (NATTS). Seattle Beacon Hill monitoring station was nominated by the National Air Toxics Committee and chosen by EPA headquarters to represent urban scale air toxics in the Pacific Northwest. It is currently the only designated urban scale NATTS located in the Pacific Northwest.

## Speciation

**Chemical Speciation Trends Network (CSN)** - The PM<sub>2.5</sub> Chemical Speciation Program continues to have a significant role in the new Monitoring Strategy. Washington's Speciation Trends Network (STN) site is located at Jefferson Park on Beacon Hill in Seattle. The primary goal of the PM<sub>2.5</sub> speciation monitoring is to:

- Provide long-term data in order to establish and track trends
- Determine the spatial and temporal differences of PM<sub>2.5</sub> composition between cities and regions over time
- Provide representative PM<sub>2.5</sub> speciation data to support exposure assessments (i.e. determine health risks)
- Determine where PM<sub>2.5</sub> emissions come from (source apportionment)
- Evaluate modeling results that are used for exposure assessments
- Assess the effectiveness of the program's emission reduction and control strategies

**Table 19: Speciation**

AQS#	Site Name	Est.	Type	Scale	Sampling Type	Action for 2013
530330080	Seattle Beacon Hill	4/1997	NCore	Urban	1/3	Continue
530611007	Marysville	2009	SLAMS	Neighborhood	1/6	Continue
530530029	Tacoma L St	2008	SLAMS	Neighborhood	1/6	Continue
530110013	Vancouver	2002	SLAMS	Neighborhood	1/6	Continue
530770009	Yakima	2002	SLAMS	Neighborhood	1/6	Continue

**Additional Monitors:** None

**Recommendations/Modifications:** None

### Seattle, Beacon Hill -NCore

AQS #530330080

Address: 4103 Beacon Avenue S., Seattle  
Monitoring objective: Population Exposure

Method code:

LAT/LONG: 047 34' 58" / 122 18' 30"  
MSA: Seattle-Bellevue-Everett, WA

**Supplemental Speciation Sites** - In addition to the Seattle Beacon Hill speciation trends network site, the State operates four supplemental speciation sites. These supplemental sites are located at:

### Marysville, 7<sup>th</sup> Ave – (PSCAA)

AQS #530611007

Address: 1605 7th ST, Marysville  
Monitoring objective: Population Exposure

Method code:

LAT/LONG: 048 03' 18" / 122 10' 33"  
MSA: Seattle-Bellevue-Everett, WA

### Tacoma, L Street (PSCAA)

AQS #530530029

Address: 7802 South L St., Tacoma  
Monitoring objective: Population Exposure

Method code:

LAT/LONG: 047 11' 11" / 122 27' 06"  
MSA: Seattle-Bellevue-Everett, WA

**Vancouver, 4<sup>th</sup> Plain (SWCAA)**

AQS #530110013

Address: 8205 NE 4th Plain Boulevard, Vancouver

Monitoring objective: Population Exposure

Method code:

LAT/LONG: 045 38' 55" / 122 35' 16"

MSA: Portland-Vancouver, OR-WA

**Yakima, S 4<sup>th</sup> (YRCAA)**

AQS #530770009

Address: 402 South 4th Avenue, Yakima

Monitoring objective: Population Exposure

Method code:

LAT/LONG: 046 35' 42" / 120 30' 44"

MSA: Yakima, WA

# References

1. Code of Federal Regulations, Title 40, Part 58, Appendix A, B, C, D & E.
2. Code of Federal Regulations, Title 40, Part 50.
3. Code of Federal Regulations, Title 40, Part 53.
4. Code of Federal Regulations, Title 40, Part 58.
5. U.S. EPA Revised Requirements for Designation of Reference and Equivalent Methods for PM<sub>2.5</sub> and Ambient Air Quality Surveillance for Particulate Matter -Final Rule. 40 CFR, Parts 53 and 58. Federal Register, 62 (138):38763-38853. July 18, 1997.
6. U.S. EPA Revisions to Ambient Air Monitoring Regulations – Final Rule. 40 CFR, Parts 53 and 58. Federal Register 7: 61236. October 17, 2006
7. U.S. EPA National Ambient Air Quality Standards for Particulate Matter – Final Rule. 40 CFR Parts 50, 51, 52, 53, and 58. January 15, 2013
8. Guidance for Network Design and Optimum Site Exposure for PM<sub>2.5</sub> and PM<sub>10</sub>, EPA-454/R-99-022, December 15, 1997.
9. SLAMS/NAMS/PAMS Network Review Guidance, EPA-454/R-98-003, March 1998.
10. Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD), EPA-450/4-87-007, May 1987.
11. Guideline on Ozone Monitoring Site Selection, EPA-454/R-98-002, August 1998.

# Attachment A

## Yakima 24-Hour PM<sub>2.5</sub> NAAQS Compliance, 2010-2012

Revised April 30, 2013

### Overview

Yakima met EPA's 75 percent quarterly PM<sub>2.5</sub> data completeness requirement in 2010, 2011 and the first three quarters of 2012. In the fourth quarter of 2012 completeness was only 73 percent.

Section 4.2(b) of Appendix N to Part 50—Interpretation of the National Ambient Air Quality Standards for PM<sub>2.5</sub> states

...where the explicit 75 percent quarterly data capture requirement is not met, the 24-hour PM<sub>2.5</sub> NAAQS DV shall still be considered valid if it passes the maximum quarterly value data substitution test.

The maximum quarterly value data substitution test is valid when the quarterly completeness is less than 75 percent but at least 50 percent. For each quarter not meeting 75 percent data completeness, the highest PM<sub>2.5</sub> concentration reported in the three years under consideration is identified. This maximum quarterly value is substituted for all missing data in the quarter that does not meet the completeness requirement. If after substitution, the recalculated test design value is less than or equal to the level of the standard, then the "incomplete" PM<sub>2.5</sub> NAAQS design value is deemed to have passed the diagnostic test and is valid and the 24-hour PM<sub>2.5</sub> NAAQS is deemed to have been met in the three-year period.

### Results

The fourth quarter 2012 data completeness of 73 percent failed to meet the 75 percent data completeness requirement. The highest PM<sub>2.5</sub> concentration reported for the fourth quarter of 3-year period 2010-2012 was 39.0 µg/m<sup>3</sup> in 2011. After substitution of this maximum quarterly value for all missing 2012 fourth quarter data, the 2012 98<sup>th</sup> percentile is 39.0 µg/m<sup>3</sup> and the 2010-2012 diagnostic test design value is 35 µg/m<sup>3</sup>, which meets the 24-hour PM<sub>2.5</sub> NAAQS. As a result the "incomplete" design value of 31.0 µg/m<sup>3</sup> is deemed to have passed the diagnostic test and is valid. As a result Yakima is deemed to have met the 24-hour PM<sub>2.5</sub> NAAQS in 2010-2012.

The attached worksheets provide details of the calculations.

### Attachments

Worksheet: maximum quarterly value diagnostic test

Worksheet: Yakima 2012 data analysis

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 AIR QUALITY SYSTEM  
 PRELIMINARY DESIGN VALUE REPORT

Report Date: Feb. 14, 2013

Pollutant: Site-Level PM<sub>2.5</sub> - Local Conditions (88101)  
 Standard Units: Micrograms/cubic meter (LC) (105)  
 NAAQS Standard: PM<sub>2.5</sub> 24-hour 2006 / PM<sub>2.5</sub> Annual 2006  
 Statistic: Annual Weighted Mean Level: 15  
 Statistic: Annual 98th Percentile Level: 35

Design Value Year: 2012

REPORT INCLUDES MEASUREMENTS WITH EXCEPTIONAL EVENT FLAGS.

State Name: Washington

Site ID / STREET ADDRESS	2012					2011					2010					24-Hour		Annual	
	Cred.	Comp.	98th	Wtd.		Cred.	Comp.	98th	Wtd.		Cred.	Comp.	98th	Wtd.		Design Valid	Design Valid		
	Days	Qtrs	Perctil	Mean	Cert.	Days	Qtrs	Perctil	Mean	Cert.	Days	Qtrs	Perctil	Mean	Cert.	Value	Ind.	Value	Ind.
53-073-0015 2412 YEW ST	32	1	10.8*	4.1*	N					*					*	11	N	4.1	N
53-077-0009 402 SOUTH 4TH AVE	106	3	26.9*	9.0*	N	114	4	30.2	8.7	N	115	4	35.1	8.5	N	31	N	8.7	N

*a bit  
 substitution of the max  
 Q4 from  
 2010-2012*

35  
 The PM<sub>2.5</sub> standard is  
 deemed to have been met

39.0  
 30.2  
 35.1  
 3 104.3  
 34.8 ~ 35

- Notes:
1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
  2. Some PM<sub>2.5</sub> 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
  3. Annual Values not meeting completeness criteria are marked with an asterisk (\*\*).

AIR QUALITY SYSTEM  
RAW DATA REPORT

Feb. 19, 2011

(88101) PM2.5 - Local Conditions

SITE ID: 53-077-0009 POC: 1  
COUNTY: (077) Yakima  
CITY: (80010) Yakima  
SITE ADDRESS: 402 SOUTH 4TH AVE  
SITE COMMENTS:

STATE: (51) Washington  
AQRN: (230) SOUTH CENTRAL WASHINGTON  
URBANIZED AREA: (9260) YAKIMA, WA  
LAND USE: COMMERCIAL  
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:  
LATITUDE: 46.5980560009  
LONGITUDE: -120.439167  
UTM ZONE:  
UTM NORTHING:  
UTM EASTING:  
ELEVATION-MSL: 326  
PROBE HEIGHT: 2

SUPPORT AGENCY: (1195) Yakima County Clean Air Authority  
MONITOR TYPE: SIAWS  
COLLECTION AND ANALYSIS METHOD: (118) R & P Model 2025 PM2.5 Sequential  
PQAO: (1136) Washington State Department Of Ecology

REPORT FOR: 2012

DURATION: 24 HOUR  
UNITS: Micrograms/cubic meter (µC)  
MIN DETECTABLE: 2

MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1	3.7		3.6					3.5				
2						2.7	3.8				39.0 <sup>(1)</sup>	3.1
3		5.5		3.6	3.1				2.9	6.3		
4	18.3		7.6					6.8				
5						1.1					39.0	39.0
6		5.3		3.4	5.6				5.1	9.3		
7	26.9 <sup>(3)</sup>		10.1					7.9				
8						1.8	7.3				6.4	9.8
9		15.7		5.5	4.1				6.1	12.3		
10	8.1		2.5					4.8				
11						4.1	8.5				14.9	39.0
12		15.2		2.3	5.7				19.1	20.1		
13	22.6		1.2					14.9				
14						2.7	9.1				10.5	39.0
15		11.0		3.4	6.5				15.5	39.0 <sup>(2)</sup>		
16	16.1		2.0					10.2				
17						1.1					39.0	4.7
18		5.1		3.2	4.8				26.9	9.9		
19	6.9		1.9					10.8				
20											39.0	
21		11.6		4.3	2.3				54.2 <sup>(1)</sup>	4.2		12.9
22	23.0		4.9									
23												
24		11.6		4.9	1.7				29.2 <sup>(2)</sup>	7.6		
25	6.5		4.2					4.8				
26							7.5				16.2	9.7
27		4.3		2.2	4.9				21.7	17.1		
28	26.2		2.3					4.6				
29						3.9	3.7				16.9	8.7
30				1.6	3.0				9.0	8.6		
31	20.5							4.5				
NO.:	11	9	10	10	10	7	6	11	10	9	9 <sup>(10)</sup>	7 <sup>(11)</sup>
MAX:	26.9	15.7	10.1	5.5	6.5	4.1	9.1	14.9	54.2	20.1 <sup>(10)</sup>	17.7	15.1
MEAN:	16.25	9.48	4.03	3.44	4.17	2.34	6.65	6.52	18.97	10.60	13.77	9.14
ANNUAL OBSERVATIONS:	106											
ANNUAL MEAN:			6.91									
ANNUAL MAX:					54.2							

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (\*\*\*) indicates that the region has reviewed the value and does not concur with the qualifier.

Q1-30

Q2-27

Q3-27

Highest 4th Q(2010-2012) = 39.0

Q4-22

N/Qmax substitution = 30

Total = 106

with substitutions = 114

98th percentile - 3rd high = 106 data set = 26.9  
114 data set = 39.0

# Attachment B

## Yakima, WA Continuous PM<sub>2.5</sub> Monitor Assessment

2013 Annual Monitoring Network Plan  
April 10, 2013

### BACKGROUND

The SLAMS site for monitoring fine particulate (PM<sub>2.5</sub>) in Yakima, WA is located at 402 South 4<sup>th</sup> Ave. The SLAMS site 53-077-0009 uses a filter-based Federal Reference Method (FRM) sampler to determine PM<sub>2.5</sub> concentrations.

On October 4, 2011 a PM<sub>2.5</sub> continuous Federal Equivalent Method (FEM) monitor started operating at the same site. The FEM monitor was designated a Special Purpose Monitor (SPM) to allow time to gain experience with monitor operation and to evaluate measured concentrations against the FEM. Federal regulations allow a SPM to operate for 24 months before collected data are eligible for comparison to the NAAQS. The local air agency, Yakima Regional Clean Air Agency, adjusted the monitor to improve operation through the first 9 months of operation. The final adjustments were made on July 17, 2012. Newly adopted federal regulations (40 CFR §58.10(b) (13) and §58.11(e)) allow the State of Washington to use the annual monitoring report as the vehicle for determining whether data from a continuous PM<sub>2.5</sub> FEM of sufficient quality to be compared to the NAAQS. Washington State's assessment and recommendation follow.

### YAKIMA PM<sub>2.5</sub> FEM ASSESSMENT

Tim Hanley and Adam Reff (2011) developed methods for assessing continuous PM<sub>2.5</sub> monitors (see also EPA, 2012). "Hanley statistics" were developed for the South 4<sup>th</sup> Ave monitoring site in Yakima for all valid, quality-assured FRM-FEM data pairs between October 4, 2011 and December 29, 2012. Attached "two-pager" graphical analyses of individual FRM-FEM data pairs show data from the FEM monitor adjustment period in red and data after July 17, 2012 final adjustment in green. The performance criteria of 40 CFR 58.11(e) apply to the analysis as follows:

- (1) The acceptable concentration range may include values down to 0 µg/m<sup>3</sup>. There were no 0 µg/m<sup>3</sup> values in the data set. The lowest concentration was 1.1 µg/m<sup>3</sup>.
- (2) The minimum number of sampling sites shall be at least one. The Yakima site meets these criteria.
- (3) The minimum number of methods shall include at least one FRM and at least one FEM. The Yakima site has one R & P 2025 PM<sub>2.5</sub> sequential FRM sampler and one Thermo 1400 TEOM with 8500 FDMS FEM monitor.
- (4) The regulation specifies the precision statistic does not apply to a monitoring network assessment.
- (5) All seasons must be covered with no more than 36 consecutive months of data aggregated together. The analysis addresses 15 consecutive months (October 2011–December 2012) which cover all four seasons as defined by Hanley (see EPA, 2012): Winter, December 21 to March 20; Spring, March 21 to June 20; Summer, June 21 to September 20; and Fall, September 21 to December 20.
- (6) The key statistic metric is the bias both additive and multiplicative of the PM<sub>2.5</sub> continuous FEM compared to the collocated FRM. Correlation is required to be reported but failure to meet the correlation criteria is not by itself a reason to exclude data from a continuous FEM monitor.

These metrics are addressed on the attached “two-pager” summary of assessment results.

- The additive and multiplicative bias assessments are shown in the additive vs. multiplicative bias summary graphic and the individual seasonal assessments. These indicate the following
  - All data (October 2011 to December 2012) and Fall data (September 21 to December 20) meet acceptable limits
  - Winter data (December 21 to March 20), Spring data (March 21 to June 20), and Summer data (June 21 to September 20) do not meet acceptable limits.

- The FEM-FRM correlation is shown on the continuous FEM(y) vs. FRM(x) PM<sub>2.5</sub> graphic.

$$y = 0.96x + 1.82$$

$$R = 0.95$$

- The correlation coefficient calculations shown on the R(y) vs. FRM CCV(x) graphic indicate
  - Fall and Winter data meet the minimum correlation coefficient limits for FEM approval.
  - All data falls just below the minimum correlation coefficient for FEM approval.
  - Summer data does not meet the minimum correlation coefficient for FEM approval.
  - Spring data fails to meet not just the minimum correlation coefficient for FEM approval but the minimum correlation coefficient for AQI reporting as well.

The above in combination with the graphics in the attachment make it clear that for the data set as a whole there is a high correlation between FRM and FEM data, the data set as whole meets acceptable additive and multiplicative bias limits, and arguably has an acceptable correlation coefficient. However this is not the entire story.

Adjustments were made to the continuous FEM to improve performance until July 17, 2011. The data set for this assessment extends through the end of 2012. In effect the data set for the continuous FEM monitor as it is running today cover only two seasons (Summer and Fall 2012). Without a longer data records we cannot know how all the adjustments made through July 17, 2012 have affected monitor performance for better or worse.

An examination of the FRM-FEM difference graphic indicates that positive and negative differences are not spread randomly throughout the year. Examination of the seasonal graphics confirms that the FEM always reads higher than the FRM in the Spring and Summer. The observed difference is as great as 15 µg/m<sup>3</sup> in September 2012. On the other hand there is a tendency made more definite after the final July adjustment for FRM concentrations to be higher than FEM values in the Fall and Winter.

Examining seasonal rather than the data set as a whole, only Fall meets acceptable additive and multiplicative bias limits. As stated above EPA’s regulations consider bias to be the key statistical metric.

#### RECOMMENDATIONS

In light of the Hanley statistics for the data set as a whole and individual seasons and the continual adjustments made to the continuous PM<sub>2.5</sub> monitor to July 2012, the state of Washington recommends the following:

1. The continuous PM<sub>2.5</sub> FEM monitor should not be used in comparisons of monitoring data to the PM<sub>2.5</sub> NAAQS for period covered by the 2013 annual monitoring network plan.
2. The Yakima, WA continuous PM<sub>2.5</sub> FEM monitor should be assessed for its suitability for comparison to the PM<sub>2.5</sub> NAAQS in the 2014 annual monitoring network plan.

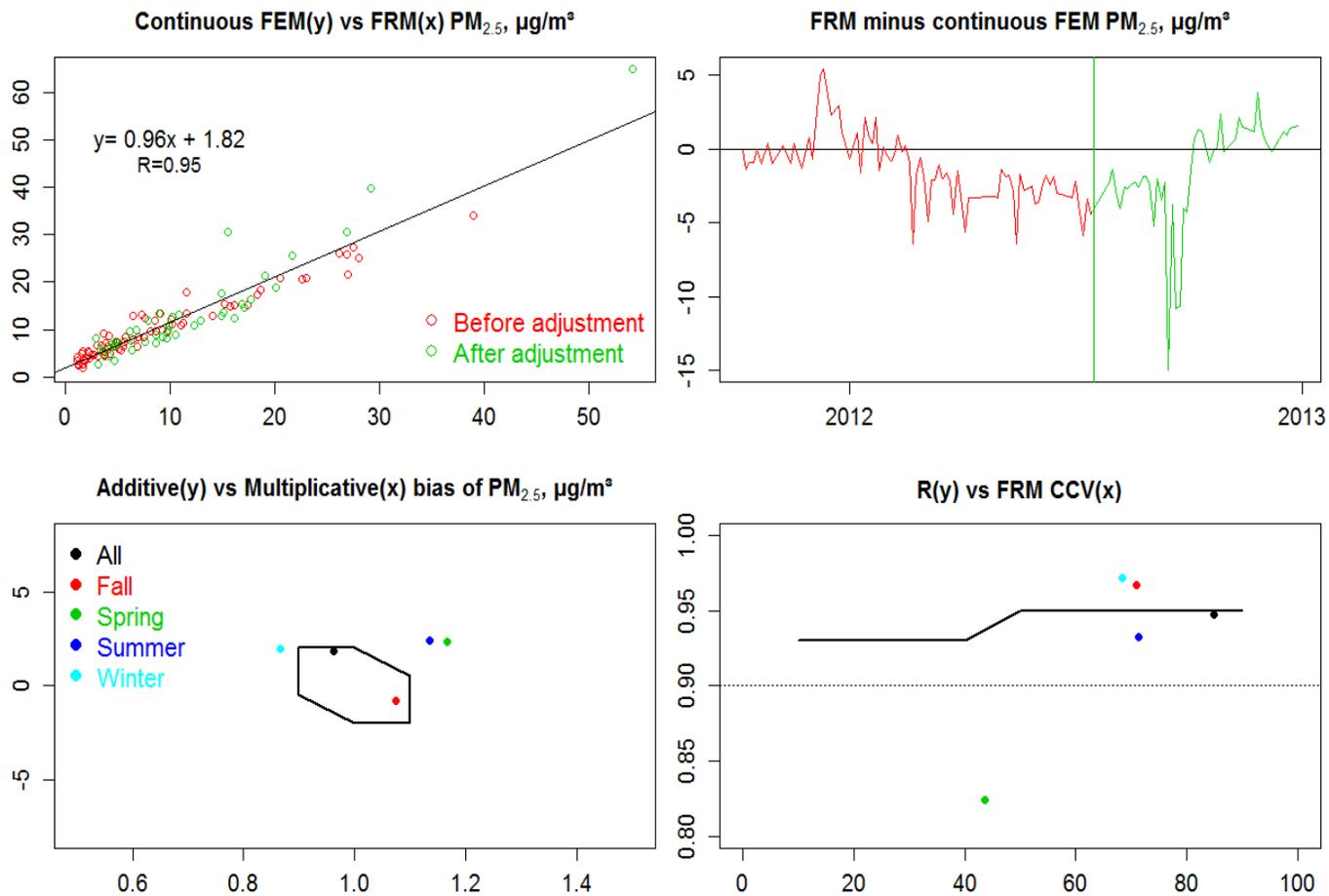
We note as an SPM Yakima, WA continuous PM<sub>2.4</sub> FEM monitor data is not currently compared to the PM<sub>2.5</sub> NAAQS.

## REFERENCES

- EPA, 2006, 40CFR Part 53, Subpart C—Procedures for Determining Comparability Between Candidate Methods and Reference Methods, especially 51.35(g) and (h) and associated Table C-4 and Figures C-2 and C-4.
- EPA, 2012, Technical Note—PM<sub>2.5</sub> Continuous Monitor Comparability Assessment, EPA Office of Air Quality Planning and Standards, Research Triangle Park, NC.
- EPA, 2013, 40 CFR Part 58, especially §58.10(b) (13) and §58.11(e) regarding annual monitoring plan and network technical requirements respectively.
- Hanley, Tim and Adam Reff, 2011, Assessment of PM<sub>2.5</sub> FEMs Compared to Collocated FRMs (including Attachment 2), Memorandum to PM NAAQS Docket, EPA-HQ-OAR-2007-0492.

ATTACHMENT  
Hanley Statistics for Yakima, WA

Site 53-077-0009 (Yakima, WA) PM<sub>2.5</sub> FEM vs FRM comparison: Oct 2011- Dec 2012 data



Site 53-077-0009: Yakima, WA PM<sub>2.5</sub> FEM vs FRM comparison

