Project Title

PORTLAND, OREGON
AIR TOXICS COMMUNITY ASSESSMENT MONITORING PROJECT

Applicant

State of Oregon
Department of Environmental Quality
Air Quality Division

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The Oregon Department of Environmental Quality (Oregon DEQ, ODEQ) is pleased to propose this community ambient air toxics monitoring study in response to the U.S Environmental Protection Agency's (EPA) request for grant applications. This solicitation comes at a particularly opportune time as we are beginning to implement the new state air toxics program. With EPA's support, Oregon will be able to provide local citizens with critical information about local air toxics problems and begin the process of reducing the health impact of those chemicals.

By supporting Oregon's risk based approach, EPA will also be advancing the objectives of its Integrated Urban Air Toxics Strategy. EPA and ODEQ both recognize that ambient measurement data is essential to convince stakeholders that some air toxics concentrations warrant concern. Only measurements will be accepted as an indication of whether some neighborhoods in a community are disproportionately at risk. But monitoring can also be used to validate models capable of predicting ambient concentrations and source contributions. By giving models greater credibility, through monitoring validation, they can become important tools for planning and informed decision making. If successful, the Oregon Program can help EPA achieve its Clean Air Act goals of reducing air toxics emissions and the health risk they pose in urban areas.

INTRODUCTION

The 1996 National-scale Air Toxics Assessment (NATA) done by the U.S. Environmental Protection Agency estimated that concentrations of sixteen toxic chemicals in Oregon were high enough to warrant public health concern. Air monitoring by the Oregon Department of Environmental Quality since that study has measured concentrations of air toxics in the Portland airshed that are comparable to the model estimates.

In light of this, and other evidence, ODEQ has worked to establish a systematic risk based process for identifying and reducing public health problems caused by air toxics in communities throughout the state. The Oregon Environmental Quality Commission adopted rules in October 2003 that created the Oregon Air Toxics Program.

This Program approaches the problem of air toxics in three ways. The primary approach (Geographic) relies on community members in population centers, working with ODEQ, to identify toxic air contaminants of concern, determine their sources, and develop strategies that will reduce peoples' exposure to those chemicals. A second approach (Source Category) identifies source sectors responsible for air toxics problems that may be common to several areas in the state, making a sector-based strategy preferable. An example might be backyard burning. The third approach (Safety Net) provides a process to identify and reduce emissions from individual pollution sources located outside the larger population centers that are causing "hot spots" of air toxics risk to nearby residents.

The geographic approach is at the heart of the Oregon Air Toxics Program and ODEQ has been working hard to develop the scientific tools needed to help communities

accomplish the challenging tasks of solving their air toxics problems. This grant provides an opportunity to significantly advance the Program. Based on the criteria in the rules, Portland will be selected in 2006 to begin implementing the geographic approach. With this grant, ODEQ can gather current, comprehensive data that will jump-start the process of community planning and lead to emissions and health risk reductions.

OBJECTIVES

This Portland air toxics monitoring project will provide information that will uniquely advance the objectives of both state and national air toxics strategies.

- **Characterize concentration variations across the urban airshed, and in predicted problem areas.** Oregon DEQ will provide the community with measured toxic air pollution levels that they can compare to health effect levels, giving them a better appreciation of the scope of the problem. With a careful analysis of specific pollutant concentrations by season, ODEQ will have a strong rationale for specific emissions reductions strategies. This is especially true in the Pacific Northwest where residential wood heating in winter is often implicated in causing air quality problems.
- **Assess the ability of local scale models to predict ambient concentrations.** The 2005 emissions inventory and local scale modeling that will be done following this study will allow comparisons to the measured 2005 concentrations. If successful, this will give stakeholders confidence in the model's predictive ability, which is essential to future community based emissions reduction planning processes.
- **Document changes in ambient air toxics concentrations.** Ambient air concentrations in 2005 can be compared to values obtained in 1999 to assess the effectiveness of past Federal and State regulatory and voluntary emissions reduction efforts. These measurements will also provide a baseline for determining if emissions reduction strategies developed as part of the State Program are working.
- **Advance the science of ambient air toxics concentration measurement.** This grant will allow us to field test new and improved techniques for measuring ambient air toxics that have been developed by EPA and others.
- **Provide a demonstration of a community based problem solving**. It is the process of screening modeling, monitoring for confirmation, and then refined modeling for planning and evaluation that is embodied in the Oregon rules. On a national level a process such as this, which engages individuals and small business owners, could be far more effective in reducing population exposure to urban air toxics than technology based standards.

PROPOSED WORK PLAN

As required by the grant, Oregon DEQ is committed to providing resources and cooperating with EPA in establishing and operating an air toxics monitoring network in the Portland airshed. Table 1 shows which agency will provide the resources for the six sites and the measurements proposed in this study.

Table 1

	NE	***NW***	***SE***	***Downtown***	***Beaverton***	***Vancouver***
TO-15	ODEQ	ODEQ	ODEQ	EPA	EPA	EPA
TO-11A	ODEQ	ODEQ	ODEQ	EPA	EPA	EPA
TO-13A	ODEQ	ODEQ	ODEQ	EPA	EPA	EPA
PM_{10}-IO-3	ODEQ	ODEQ	ODEQ	EPA	EPA	EPA
$PM_{2.5}$-Speciate	ODEQ					
Aethelometer	ODEQ	EPA	EPA			CGV*
Acrolein	EPA	EPA	EPA	EPA	EPA	EPA
Cr (VI)	ODEQ	ODEQ	EPA	EPA	EPA	EPA
PFGC / VOC	EPA					

*Columbia Gorge Visibility Study

The following components are included in the scope of work for this project.

COMPONENT 1 - MONITORING SITES

The Portland, Oregon / Vancouver, Washington metropolitan area has significant topographic features that separate the airshed into distinct sections. Located at the confluence of two rivers, much of it is within a broad valley/floodplain, with a range of hills on the west separating the central city from the western suburbs. The Columbia River on the north separates Portland from Vancouver, although it has traditionally been considered a single airshed for planning purposes. The Willamette River, which divides Portland into its east and west sides, influences air flow to some extent.

This grant will allow ODEQ to establish three new monitoring sites and expand the range of pollutants measured at three existing sites in the Portland metropolitan area. Sites will be located in all the major quadrants of the city, providing information about the effect of topography as well as source influence. Each site will meet EPA's neighborhood-scale siting criteria and will represent a mix of surrounding land uses, although in most cases either point, area, or mobile sources will predominate.

A map of the Portland urban area with existing and proposed sites indicated, along with land use designations, is provided in Attachment 1. This Attachment also contains a detailed description of each of the monitoring sites and its source influences.

COMPONENT 2 - AMBIENT AIR TOXICS MEASUREMENTS

Oregon DEQ believes that developing new and improved methods of measuring ambient concentrations of air toxics is important. However, a higher priority for these community assessment projects should be to solidify the use of consistent methods across the country, coupled with adequate control and assessment to assure quality. This is necessary to provide consistently credible data for program implementation and decision making. ODEQ will follow all sampling, analysis, and quality assurance requirements specified in the Request for Applications.

EPA's Quality Assurance Policy requires that State, Local, or Tribal governments receiving financial assistance under the authority of 40 CFR Part 31 and 35 are required

to develop a Quality Management Plan (QMP). The Oregon Department of Environmental Quality has an agency-wide QMP, reviewed and approved by EPA Region X. The QMP is implemented by the organization's executive leadership, documenting the quality policy, describing the quality system, and identifying the environmental programs to which the quality system applies. Further, the Oregon DEQ Laboratory Division has a QMP for the ambient air monitoring program, which has also been reviewed and approved by EPA Region X.

1. Data Quality Objectives (DQO)

Oregon DEQ has followed the development of sampling and analysis methods as reflected in the latest Technical Assistance Documents for the National Air Toxics Trends (NATTS) network, and will continue to do so. If awarded this grant, ODEQ will develop DQO in consultation with EPA Region X. Presumptive objectives based on the NATTS DQO are:

- For 1-in-6 day sampling frequency at least an 85% quarterly completeness;
- Measurement precision controlled to a coefficient of variation of no more than 15%;
- Measurement bias controlled to a coefficient of variation of no more than 15%;
- Minimum detection limits below the concentration associated with 1-in-a-million cancer risk.

2. Quality Assurance Project Plan (QAPP)

If awarded this grant, ODEQ will develop a QAPP for ambient monitoring of air toxics and provide a project-specific plan for obtaining the type and quality of environmental data needed for this study. The QAPP will document how quality assurance (QA) and quality control (QC) are applied to each environmental data operation to assure that the results obtained are of the type and quality needed and expected. This QAPP will be submitted to EPA Region X for review and approval prior to beginning ambient air monitoring.

3. Standard Operating Procedures (SOP)

Oregon DEQ will develop and submit SOP to EPA Region X, prior to implementation, for all the ambient air measurements proposed. For those measurements that are being used at the NATTS sites, the same sampling and analysis protocols will be followed to enhance consistency between this project and the NATTS. Where non-standard technologies are proposed, ODEQ will include SOP in the QAPP that describe the methods and quality controls.

4. Sample collection and analysis

Sampling will begin in January 2005 and continue for one year. The primary focus of the project will be to measure annual average air concentrations of a comprehensive list of air toxics using integrated 24-hour samples collected for either gas or particulate analysis. Table 2 indicates the urban air toxics core pollutants that will be monitored as required by the grant.

Table 2

TO-11A	TO-13A	TO-15	IO-3
Acetaldehyde	7-PAH	Benzene	Arsenic
Formaldehyde		1,3-butadiene	Beryllium
		Carbon tetrachloride	Cadmium
		Chloroform	Chromium
		1,2-dichloropropane	Lead
		Methylene chloride	Manganese
		Tetrachloroethene	Nickel
		Trichloroethene	
		Vinyl chloride	

The ODEQ Laboratory will perform analyses using EPA's TO Compendium of Methods:

- Method TO-15 for volatile organic compounds;
- Method TO-11A for carbonyls (aldehydes and ketones);
- Method TO-13A for semi-volatile organics; and
- Method IO-3 with ICP/MS for particulate (PM_{10}) trace metals.

These sampling and analysis methods are capable of measuring over 100 chemicals present in the ambient air. All valid samples will be analyzed and chemicals beyond the urban core group will be reported.

5. New and advanced technologies

The Oregon DEQ proposes to assist EPA in its development of new and improved methods for measuring several key air toxics. Specifically, hexavalent chromium, acrolein, and diesel particulate matter have been identified as important health risk "drivers" for which sampling and analysis methods are yet to be standardized.

In 2003 Oregon DEQ began contracting with Eastern Research Group, Inc. (ERG) to analyze samples collected at the Northeast and Northwest Portland sites for hexavalent chromium (Cr(VI)). For ODEQ this grant will make Cr(VI) measurements possible at all six sites, providing an opportunity to characterize levels across the city. ODEQ proposes to contract with ERG to do the analysis of the Cr(VI) samples. As the national contract lab, ERG will gain valuable knowledge about the stability and handling of samples shipped across the country.

Oregon DEQ anticipates that by 2005 the EPA will have sufficiently developed a method for acrolein measurement to use it with confidence in this study. This proposal therefore includes sampling and analysis for acrolein at all six sites. The ODEQ laboratory is likely to be equipped to do this analysis so the proposal includes funds for that analytical work.

EPA has identified measurements of Black Carbon using an Aethelometer as the preferred method for determining diesel PM concentrations. ODEQ is proposing to purchase two aethelometers to add to the one we have recently purchased. A fourth instrument, now being used in the Columbia Gorge Visibility project, may be available

for this study. These two-channel instruments will be deployed in areas where we expect they will provide valuable information about both diesel PM and wood smoke impacts.

Oregon DEQ is also proposing to use Dr. Robert O'Brien's Pneumatic Focusing Gas Chromatograph (PFGC, patent pending) at one site for the full sampling year. Dr. O'Brien, from Portland State University, has previously demonstrated this method to EPA.

This instrument obtains continuous speciated VOC analysis by compressing an air sample to high pressure and injecting it into a field-located, portable gas chromatograph, also maintained at high pressure. Pressurization concentrates the sample and removes water vapor, thereby increasing sensitivity and allowing automation. The instrument draws a sample continuously through a sample loop and periodically compresses and injects it into the PFGC. Samples are taken and analyzed every 30-60 minutes and 20-30 individual VOCs are resolved. This instrument focuses samples as large as a half liter, achieving 50 ppt sensitivity for benzene. This dual column instrument allows measurement of both nonpolar and polar compounds. Since the instrument also captures the methane peak, and since methane is quite constant in concentration at ~ 1.8 ppm in all areas away from large methane sources (e.g. landfills), this methane peak can serve as an internal standard for the integral flame ionization detector.

Dr. O'Brien's research group has designed the PFGC to be compatible with a personal computer, making it possible to integrate data collection with data management and analysis. The Department believes this technique has great potential for using temporal patterns to identify local sources of air toxics, leading to more focused emissions reduction strategies.

6. Frequency of Sampling

Several different sampling schedules will be followed in this project. Sampling for carbonyls (including acrolein), volatile organics, PM_{10} metals, and Cr (VI) will be done on a one in six day schedule, to coincide with the national particulate network. Semi-volatile organics (7-PAH) will be collected on a one in 12 day schedule.

7. Meteorological Monitoring

Oregon DEQ maintains a network of meteorology sites in the Portland area that complement National Weather Service monitoring at Portland International and other regional airports. Nine stations, located within the PATA modeling domain, were used in that study and are available for future modeling and data analysis. Operation of this network during the study period will continue to be supported by ODEQ funds.

8. Other Air Quality Monitoring

Oregon DEQ operates a network of air monitoring sites in the Portland area. Among these, the Northeast Portland site is part of EPA's national speciated $PM_{2.5}$ network. Measurements at these sites will allow comparisons of air toxics concentrations with that of criteria and other pollutants. Sites located in more remote locations to the north and south, Sauvie Island (summer) and Spangler Road (winter) respectively, will provide useful background information for data analysis.

COMPONENT 3 - TECHNICAL ASSESSMENTS

Because the Oregon DEQ Laboratory is participating in the NATTS program, EPA will provide technical assessments during this study that will help demonstrate data quality for the Portland network as well. The components of the NATTS technical assessments as we understand them are outlined below. Quality Assurance activities account for more than 10% of the budget for this project.

1. Technical Systems Audits (TSA)

- **Internal TSA –** Oregon DEQ will perform technical systems audits of the ambient air monitoring activities as part of the internal quality system procedures described in the QAPP. ODEQ will collect duplicate samples for each integrated sampling method at one site each sample day, and also perform replicate analyses on at least 10% of the samples in the Laboratory.
- **External TSA** – Oregon DEQ will participate in all assessments requested of NATTS Laboratories.
- **Laboratory TSA -** EPA, using contractors and EPA Regional offices, will audit the ODEQ laboratory.
- **Field TSA –**The EPA Regional Offices will perform assessments of field activities during there normal TSA audit schedules.

Oregon DEQ will rely on EPA to provide **Calibration Cylinder Certification** by EPA's Las Vegas laboratory for ODEQ Laboratory VOC calibration cylinders; **Proficiency Test** samples once each calendar quarter; and **Through-the-Probe Performance Evaluations**.

The ODEQ Laboratory has a history of excellent performance in analyzing air samples. Oregon DEQ operates four $PM_{2.5}$ speciation sites and has one of the few state laboratories doing speciation analysis. The Lab successfully passed a recent EPA audit of these activities.

2. Data Quality Assessment

If awarded this grant, Oregon DEQ will develop verification and validation procedures to be included in the QAPP, and reviewed and approved by the EPA Region X office. ODEQ will also describe in the QAPP the type and frequency of QA reports that will be distributed as part of project reporting. These reports will include information on detectability, precision, bias, and completeness of the data and indicate whether the data quality objectives specified for this project are being achieved.

COMPONENT 4 - RESULTS REVIEW, ANALYSIS, AND REPORTING

As required by the grant, all ambient concentration data obtained by ODEQ will be reported quarterly to EPA's Air Quality System (AQS) database. The final report summarizing the activities carried out in the project, the environmental data obtained, and the performance assessment results will also be submitted to EPA.

NEXT STEPS

After the monitoring component of the grant work is completed Oregon DEQ will be able to use this comprehensive measurement data to advance a number of Oregon Air Toxics Program objectives. In addition to gathering ambient air toxics data it is important that ODEQ improve the Oregon air toxics emissions inventory, and gain experience with air toxics dispersion modeling techniques. Good information, from emissions inventories, modeling, and air monitoring are all necessary to provide a convincing scientific basis to stakeholders involved in reducing the health impact of air toxics. This is the same rationale EPA uses for NATA.

Recently, a local scale dispersion modeling and risk characterization study covering just the Portland metropolitan area was undertaken by EPA in collaboration with ODEQ. The objective of the Portland Air Toxics Assessment (PATA) was to refine the NATA methodology for local scale use. It was designed to provide greater insight into the concentration gradients that exist in an urban area, where there can be substantial differences in land use, population densities, and the locations of highways, industries, and other air pollution generating activities. While not explicitly an objective of the project, ODEQ staff involvement has resulted in significant state capacity building that will be critical to implementing the State Program.

EMISSIONS INVENTORY

Oregon DEQ compiled the first comprehensive state-wide air toxics emissions inventory for the 1996 emissions year and submitted it to EPA as part of the 1996 NATA. This inventory was updated and improved for the 1999 NATA. As part of PATA, ODEQ compiled a detailed inventory for the Portland airshed in 1999 that included substantial refinements in the emissions information provided to the modelers. More importantly, for PATA the regional planning agency, METRO, provided a state-of-the-art Portland area on-road mobile source emissions inventory for 1999 using their travel demand model and EPA's MOBILE 6.2. Other inventory enhancements specific to PATA included better spatial resolution for non-road mobile sources, such as marine vessels, railroads, and construction activity.

A statewide inventory is now being completed for 2002 and will be sent to EPA as part of the National Toxics Inventory and the 2002 NATA. Statewide inventories for 2005 and 2008 are also planned, using the refined methods developed for PATA in the Portland airshed, with updated emissions factors and activity levels. The grant requirements for a complete emissions inventory for the study area will be met. However, the 2005 inventory cannot be done during the grant time frame because that data will not be available. This emissions inventory work will not be charged to the grant.

CLARIFYING SPATIAL CONCENTRATION PATTERNS

Since the late 1980's Oregon has attempted to characterize concentrations of ambient air toxics in Portland and other areas. In 1987 ODEQ participated in EPA's Urban Air Toxics Monitoring Program with a single site that simply demonstrated that air toxics could be found in Portland's air. A seasonal monitoring study was done in 1993-94 to attempt to compare woodstove and motor vehicle impacts in different parts of Portland.

A “hot spot” type study was done with community partners in 1997-98 in the residential Northwest Portland neighborhood, which borders the largest industrial area in the state.

The most extensive monitoring study was done in 1999-2000 when five sites were established in the Portland area and concentrations measured for a full year. This study demonstrated fairly similar concentrations of most gaseous air toxics, many related to mobile sources, throughout the city. Higher concentrations of some pollutants, especially a few metals, were found in localized areas. Following data analysis, the Northeast Portland site was established as representative of the urban area to measure trends in ambient concentrations and the effectiveness of emissions reduction strategies.

Oregon DEQ has also attempted to clarify spatial concentration gradients in the Portland airshed using modeling. The Portland Air Toxics Assessment set out to improve upon the national-scale assessment by utilizing a dispersion model (CALPUFF) that could account for local variations in topography and meteorology. By using this local scale model, along with better resolution of source locations, PATA was designed with the capability to predict problem areas within the urban area. The ambient concentration estimates now becoming available from PATA in fact indicate substantial gradients for some of the pollutants modeled. These estimates have been plotted as isopleth maps for each pollutant. By using these maps ODEQ can give community members a much better picture of concentration levels and gradients across the city.

Measured values and model estimates will be used together as ODEQ moves ahead with Portland emissions reduction planning. The risk characterization, based on these concentration maps, will help determine the boundaries for the Portland geographic planning area. This will also set the stage for the community planning process, by helping people understand the spatial extent of the general air toxics problem and by pinpointing localized areas of impact that may require special consideration.

CORRELATING RESULTS WITH COMMUNITY EMISSIONS REDUCTION EFFORTS

The concentrations measured in this study will serve two purposes. Now that some Federal major and area source air toxics standards have been implemented, monitoring in 2005 should show improvements in air quality since 1999, demonstrating the effectiveness of past efforts. In addition, correlating measured concentrations with emissions reduction efforts is a critical element of the community-based approach in Oregon’s new air toxics program. The Portland air toxics advisory committee must develop a 10 year plan, with three year milestones, leading to the ambient concentration goals. Monitoring will be relied upon to determine if goals have been met.

Utilizing the estimates from PATA, Oregon DEQ is currently developing emissions reduction strategies that will be applied to important sources of air toxics in the Portland airshed. (Modeling has the added advantage of estimating source contributions and providing a rationale for developing emissions reduction strategies.) This Portland Early Emissions Reduction Project will emphasize voluntary reduction strategies, likely focusing on small business source sectors such as auto body painting and repair, degreasing and surface coating operations, and commercial boilers. Outreach and technical assistance aspects of this project will be implemented during 2004. Reducing

diesel PM emissions is another action being implemented in advance of developing the community-devised plan required by the Oregon Program. Ultra-low sulfur diesel fuel should be available in the Portland market in late 2004. These efforts will impact the airshed slowly so that measurements made during this grant period will provide a baseline from which improvements in ambient air quality can be assessed.

MODEL TO MONITOR COMPARISONS

Dispersion modeling of 2005 emissions, with exposure modeling, risk characterization, and source contribution estimates will be integral parts of the technical analysis provided to the local advisory committee in Portland. Comparisons of the 2005 measured values to modeling estimates will determine whether models achieve credibility with the public and can be relied upon for strategy development, or must be further improved.

Oregon DEQ plans to use this 2005 ambient air toxics concentration data as a validation tool for at least three different modeling methodologies. EPA will predict ambient concentrations in Portland using the ASPEN model for the 2005 NATA. ODEQ, using the experience gained in PATA with CALPUFF, will also model 2005 emissions.

However, a model that includes chemical transformations would be even better, especially for pollutants such as acrolein and formaldehyde where secondary formation is critical. The Northwest International Air Quality Environmental Science and Technology Consortium (NW-AIRQUEST) was formed to develop, operate, and improve urban and regional numerical air quality forecast systems and create an archival database of simulated atmospheric data. This group originally developed predictive capability for ozone, nitrogen oxides, and other species concentrations in western Washington using MM5 forecasts and CALGRID. This effort has now been expanded to perform regional transport forecasts of air toxics concentrations that extend through the Portland area (called AIRPACT2). Plans are underway to upgrade the dispersion model to CMAQ, which has the capability to estimate chemical transformations. Since these predictions are archived, Oregon DEQ will be able to compare the measured values from 2005 to the estimates provided by this advanced model.

TIME FRAME AND BUDGET

Milestone	***Start Date***	***Duration***	***Budget Estimate***
Submit Grant Application	March 31, 2004		
Grant Awarded	May 2004		
Submit Quality Assurance Plan to Region X	September 2004		
Quality Assurance Plan Approved	November 2004		
Equipment purchase and site set-up	September 2004	3 months	$ 122,000
Sampling	January 2005	12 months	$ 100,000
Analysis	February 2005	12 months	$ 215,242
Technical Assessments	January 2005	13 months	$ 56,000
Final Report and Presentation	January 2006	3 months	$ 2,000

ATTACHMENT 1
MONITORING LOCATIONS

North Roselawn
This site, located in the North/Northeast quadrant of the city is representative of a typical inner city neighborhood. The sampling location is in an open lot surrounded by homes and small apartment buildings. This medium density residential area is within a half kilometer of a variety of commercial businesses, some light manufacturing, and city arterial streets. About a kilometer away is the busiest transportation corridor (Interstate 5) in the city. Major industrial and Port facilities on both sides of the Willamette River are on the west, two to four kilometers away. There is another industrial/Port area about the same distance to the north along the Columbia River. Members of the Environmental Justice Action Group believe that this area of the city is disproportionately affected by its proximity to pollution sources, making monitoring here important for equity reasons. This site has served as the Department's primary air toxics monitoring site since the 1999 study. It is now transitioning into a component of Portland's NCORE Level 2 strategy.

Northwest Portland
This site in the Northwest quadrant of the city is on a residential street and is on the boundary between the highest density residential area in the city and Portland's primary industrial area. Located in a parking lot for the neighborhood post office, it is within a half kilometer of a small commercial area, a foundry, and numerous metal finishing operations. Railroad yards, Port operations, including fuel handling facilities, wood products and other manufacturing businesses, and a major traffic bridgehead are within a kilometer. The West Hills, less than a half kilometer from this site, create a barrier to air movement to the west and restrict dispersion of pollution. Neighborhood concerns have driven a variety of suspended and deposited metals studies at this site since the 1999 project.

Southeast Portland
The site in Southeast Portland has been our primary particulate neighborhood impact site for over twenty years. It is also used to monitor VOC and NO_x for ozone planning purposes. Located in an empty lot in a predominantly single family housing residential neighborhood, this was one of the first places in the country where woodstove impacts on ambient fine particulate concentrations were recognized. Residential wood heating is still considered a very significant area source in the Pacific Northwest. Large arterials, with some commercial activity, can be found within a half kilometer. A high volume Interstate link (I-205) is one to two kilometers away. No significant industrial facilities are within four kilometers.

Downtown Portland
This will be a new site located within the central business district. Modeling estimates from the Portland Air Toxics Assessment suggest that a location farther south than our old site would measure higher values because of higher traffic volumes and more congestion. Model to monitor comparisons from that study also suggest that the sampling height should be no higher than one story above street level. This site would primarily be influenced by motor vehicles, both from Interstate highways and surface streets. No significant point sources are within four kilometers.

Beaverton
This new site would be located in a suburban residential area west of the West Hills. Both monitored concentrations and modeled estimates from the 1999 study suggest that this area is spatially distinct from the central city and the east side. However, model estimates indicate that there is an area of high ambient concentrations, resulting primarily from area and mobile sources located in these western suburbs. Some industry can be found more than a kilometer away to the north and east. Measurements at a site location guided by model predictions would help to confirm the model's ability to handle the terrain features and wind regime of the Portland airshed.

Vancouver, Washington
As already mentioned, Vancouver is considered an integral part of this airshed. Not only is commuter traffic a shared pollutant source, but the prevailing winds can easily carry pollutants generated in one state, from point or area sources, across the river to the other. The Southwest Washington Clean Air Agency and ODEQ have worked well together to solve ozone and particulate problems in this airshed.

The monitoring site will be located in a residential area within less than a half kilometer of the Columbia River. Residents of this neighborhood have expressed concerns about air toxics released at the Portland International Airport just across the river. A major railroad line runs between the neighborhood and the river, and barge traffic on the river is significant. Siting will attempt to minimize the impact of on-road mobile sources. This neighborhood is more than two kilometers away from major industrial and port facilities, but the nature of wind movement in the Columbia Gorge can episodically bring pollutants in from some distance away.

ATTACHMENT 2
KEY PERSONNEL

Gregg Lande, Air Toxics Specialist, **Project Manager**
Twenty seven years of experience working at Oregon DEQ in air monitoring, laboratory analysis, quality assurance, airshed planning, and air toxics program development.
M.S. Environmental Health, 1980, Harvard School of Public Health

Annette Liebe, Air Quality Planning Manager
Three years experience working at nonprofit environmental organizations. Ten years working at Oregon DEQ in airshed planning, including six years as Manager.
J.D. Natural Resource, Environmental, and Ocean & Coastal Law, University of Oregon
B.A. Communications, University of Colorado

Jeffrey Smith, Air Quality Monitoring Manager
Twenty six years experience at Oregon DEQ working at the Laboratory Division in AQ monitoring, including five years as the Manager of the section.
M.S. Nuclear Engineering, University of Wisconsin

RaeAnn Haynes, Inorganic Laboratory Manager
Twelve years of experience working at the Oregon DEQ Laboratory as a laboratory analyst, Quality Assurance Manager and Inorganic Laboratory Manager. Thirteen additional years of experience as a chemist including seven years as a manager in a variety of laboratories including industrial and government facilities. Federal Drinking Water Lab certification officer.
M.S. Chemistry, 1979, University of Colorado
B.S. Chemistry, 1976, University of Oregon

Eugene Foster, Organic Laboratory Manager
Fourteen years of experience working at the Oregon DEQ in water monitoring, watershed planning, and standards development prior to returning to the laboratory as a manager.
Ph.D. Toxicology, 1998, Oregon State University
B. S. Fisheries, University of Missouri

Daniel Hickman, Laboratory Technical Services Manager
Twenty nine years experience in the Oregon DEQ Laboratory performing air, water, and solid and hazardous waste monitoring and analysis. Lead assessor and administrator of ODEQ portion of the Oregon Environmental Laboratory Accreditation Program.
Federal Drinking Water Lab certification officer.