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DEPARTMENT OF ENVIRONMENTAL QUALITY
INTERNAL MANAGEMENT DIRECTIVE ON
PRIORITIZING AND SELECTING AIR TOXICS GEOGRAPHIC AREAS

I. PURPOSE

This Internal Management Directive describes how DEQ prioritizes and selects high priority geographic areas for purposes of the Oregon Air Toxics Program. It explains how the Portland area is the highest priority air toxics geographic area.

II. AUTHORITY

OAR 340-246-0010 through 0230. Specifically, OAR 340-246-0150 requires DEQ to prioritize and select geographic areas.

III. APPLICABILITY

1) This Directive applies to communities throughout Oregon and specifically to the Portland area.
2) This Directive is intended solely as guidance for Department staff.
3) This Directive does not create any rights, duties, obligations, or defenses, implied or otherwise, in any third parties. It is not intended for use in pleading, at hearing, or at trial.
4) This Directive does not constitute rulemaking by the Environmental Quality Commission and may not be relied upon to create a right or benefit, substantive or procedural, enforceable by law or in equity, by any person.

IV. DISCUSSION AND DIRECTIVE

1. The Oregon Air Toxics Program

In its National Air Toxics Assessment (NATA) the U.S. Environmental Protection Agency (EPA) estimated that concentrations of sixteen toxic air pollutants in Oregon are high enough to warrant public health concern. In light of this, and other data, the Oregon Department of Environmental Quality (DEQ) established the Oregon Air Toxics Program to systematically identify air toxics problems and set up methods to reduce risk in communities throughout the state.

The Oregon Environmental Quality Commission (EQC) adopted rules in October 2003 that established the Oregon Air Toxics Program. In August 2006, with the advice of a technical committee, the EQC adopted rules setting ambient benchmarks for 51 air toxics in Oregon based on levels protective of human health that consider sensitive populations.

Air toxics benchmarks, expressed as micrograms of a specific toxic chemical per cubic meter of air, are levels that a person could breathe for a lifetime without any non-cancer health effects, and without increasing their cancer risk by more than one in a million.

The Oregon Air Toxics Program uses three complementary approaches to reduce the release of toxics air pollutants: geographic, source category and safety net. The geographic approach relies on affected stakeholders and community members, working with DEQ, to identify toxic air contaminants of concern in a specific geographic area, determine their sources, and develop strategies that will reduce people's exposure to those chemicals.

The source category approach addresses reductions for categories of pollutants statewide. DEQ's initial effort to reduce emissions from a statewide source category was the Oregon Clean Diesel Initiative. Under this strategy DEQ has promoted diesel emission reductions at truck stops, from tug boats and construction equipment, and on school buses.

The safety net approach is for rare industrial "hot spot" problems where a particular facility may not be adequately addressed by federal air toxics regulations or a geographic approach, and emissions cause elevated risk to people nearby.

2. Information about Air Toxics in Oregon

NATA is the primary source of information about air toxics nationally. NATA was first released in 2002 and was based on air toxics emission data collected in 1996. In the second release of NATA in 2006, data collected for 1999 indicated levels of concern for various air toxics. This data, along with estimates of people's risk from exposure demonstrated potential problems associated with air toxics. EPA generally updates NATA every three years. NATA includes emissions and ambient concentrations for 177 air toxics, plus diesel particulate matter (PM) for every census tract in the nation. It also includes an exposure and risk assessment (cancer and non-cancer) for 133 of these toxics (including diesel PM). NATA uses the latest EPA-approved models for air toxics emissions and pathways, and high quality information about sources of air toxics.

DEQ has monitored for air toxics in several areas of the state. This information, while limited, is useful to validate air toxics modeling estimates. A 1999-2000 monitoring study measured concentrations at five sites in the Portland area for a full year. DEQ conducted an additional year-long air toxics monitoring study in Portland in 2005. Both of these studies followed EPA-approved monitoring methods. The studies demonstrated fairly similar concentrations of most gaseous air toxics, many related to vehicle emissions, throughout the city. Higher concentrations of some pollutants, especially a few metals, were found in localized areas.

DEQ also conducted a modeling study in the Portland Area called the Portland Air Toxics Assessment (PATA), which was adjusted for local topography, weather and emission patterns. This local scale model, coupled with better detail about the location of emissions, including traffic data, gave PATA the capability to predict problem areas

within the Portland region. For each pollutant, model estimates were plotted as maps that provided more detail about air toxics concentrations across the region.

3. Prioritizing Geographic Areas

a. Background

Under the Oregon State Air Toxics Program rules, DEQ is tasked with prioritizing geographic areas with air toxics problems statewide, based on the order of risk to populations (OAR 340-246-0150). The rules also require that following prioritization DEQ select the first high priority area to initiate emission reduction planning. High priority areas are defined as locations where concentrations of air toxics exceed benchmark concentrations and pose cancer risk above ten in a million or non-cancer risk above a hazard quotient of one with the potential for serious adverse health effects.

During prioritization, DEQ considers six factors:

1. The number of pollutants above health-based benchmarks and the level at which they exceed the benchmarks;
2. The potency or toxicity of pollutants that exceed the benchmarks;
3. The number of people exposed to air toxics, and the levels of exposure;
4. The presence of potentially sensitive populations;
5. The effectiveness of local control strategies and,
6. If known, the risk posed by multiple pollutants and pollutant mixtures.

The first and third factors of pollutant magnitude and population exposure are the most basic and important considerations for prioritizing geographic areas. The second factor, potency or toxicity of pollutants has been incorporated into each health-based benchmark, so it is not considered separately. DEQ expects that the fourth factor, sensitive populations, will be useful to rank areas that are very close in order. Knowledge of sensitive populations also informs the emission reduction planning process. The fifth and sixth factors could be considered if there is adequate information available. At this time, DEQ estimates that in all high priority geographic areas, local control strategies would result in at least some level of emission reductions. Because the science of pollutant mixtures, synergy and antagonism is not well developed, DEQ does not have enough information about multiple pollutant interactions to know how they could affect public health in Oregon.

b. County Data

Using NATA data for each county, DEQ developed a list of counties with the highest risk from air toxics. Table 1 below shows total cancer risk and the average hazard index for non-cancer effects for ten counties. For each county, it shows how many air toxics are more than ten times above a benchmark, and how many are more than one time above a benchmark. For example, there are 14 air toxics above benchmarks in Multnomah County: three exceed a benchmark by more than ten times, and eleven exceed a benchmark by one to ten times. Table 1 reflects the number of people exposed to air toxics by listing county population. Excess cancer risk, or the number of cancer cases that could be caused by air toxics within each county (Total Risk x Population) shows potential risk to the population.

Table 1
High Priority Counties

	Portland Area				Salem	Eugene	Medford	The Dalles	Coos Bay	St. Helens
	Multnomah	Washington	Clackamas	Yamhill	Marion	Lane	Jackson	Wasco	Coos	Columbia
Total Risk from NATA 1999	1.10E-04	7.70E-05	6.70E-05	4.7x10-5	6.6x10-5	6.3x10-5	5.8x10-5	4.2x10-5	4.1x10-5	4.1x10-5
	110/mill	77/mill	67/mill	47/mill	66/mill	63/mill	58/mill	42/mill	41/mill	41/mill
Av HI from NATA 1999	14.6	7.6	7.3	1.2	6	3.7	8.3	3.1	5.9	4.6
>10 x Benchmarks	3	2	2	1	3	2	2	1	1	0
>1 x Benchmarks	11	11	11	12	9	10	10	7	9	11
Population	660,000	445,000	338,000	85,000	285,000	323,000	181,000	24,000	63,000	44,000
Excess Cancer Risk	73	34	23	4	19	20	11	1	3	2

c. High Priority Geographic Areas

Table 1 indicates that the Portland metropolitan area, evaluated using data from Multnomah, Washington, Clackamas, and Yamhill counties, has the highest population risk for air toxics. Using the basic prioritization factors of the number of air toxics above benchmarks, the magnitude of benchmark exceedances and the number of people exposed to air toxics, DEQ designates the Portland area as the highest priority geographic area under Oregon's State Air Toxics Program. Other high priority geographic areas in order of severity are in Salem, Eugene, Medford, The Dalles, Coos Bay, and St. Helens.

County air toxics data usually reflects areas of concern in populated regions of each county. For some counties, air toxics problems may be minimal or confined to developed areas. When DEQ defines a geographic area for air toxics reduction planning, it will generally designate portions of counties with elevated risk from air toxics. With each release of EPA NATA data, DEQ will re-evaluate high priority geographic areas and revise its prioritization. DEQ does not expect that updated NATA data will affect Portland's ranking as the highest priority geographic area because air toxics concentrations are closely linked to population size and motor vehicle use.

d. Sensitive Populations

Young children, older adults or people with asthma, lung or heart disease may be more sensitive to the effects of air toxics. To inform its prioritization process and future emission reduction plans, DEQ has assembled data about sensitive populations in the ten Oregon counties most affected by air toxics. Table 2 provides information on disease for

each county as an indicator of potentially sensitive populations. Because Portland is the highest priority geographic area, DEQ plans no further analysis of sensitive population data until it begins to determine the second geographic area.

Table 2
Sensitive Populations

	Multnomah	Washington	Clackamas	Yamhill	Marion	Lane	Jackson	Wasco	Coos	Columbia
Sensitive Populations										
Age <5 yrs old	6.7%	7.5%	5.5%	6.3%	7.3%	5.4%	5.4%	5.8%	4.8%	5.6%
Age > 65 yrs old	10.7%	8.9%	11.7%	11.8%	11.8%	13.9%	16.2%	17.1%	19.8%	11.3%
Lung cancer incidence rate per 100,000	60.6	48.1	54.2	56	58.4	59.2	55.6	61.5	77.8	74.5
Chronic Lower Respiratory Disease incidence rate per 100,000	48.4	38.1	45.1	47.8	49	49.4	51.4	79.3	59.9	58.4
Asthma prevalence (% of population)	8.90%	9.10%	9.60%	10.90%	8.90%		8.40%	9.10%	8.70%	9.70%
Heart attack prevalence (% population)	3%	2%	3%	4%	4%	3%	4%	5%	6%	4%

4. Selecting Air Toxics Geographic Areas

a. Background

Under the Oregon State Air Toxics Program rules, after prioritizing geographic areas with air toxics problems statewide, DEQ must select a high priority area for emission reduction planning (OAR 340-246-0150). A geographic area is formally selected by publication of a notice in the Secretary of State's Bulletin (OAR 340-246-0150). This notice was published on February 1, 2008; approximately 18 months after EQC adopted the first set of air toxics benchmarks. There was no public comment involved with this notice. Public participation occurs through advisory committee and stakeholder involvement during development of an air toxics reduction plan.

In selecting a geographic area, DEQ considers representative monitoring conducted using EPA approved methodology, as well as any relevant estimates of modeled air toxics concentrations. Because monitoring and modeling indicate that the Portland area has the highest population risk, DEQ selected it as the first air toxics geographic area. This determination was reached by applying key prioritization factors: the number of air toxics above benchmarks, the magnitude of benchmark exceedances, and the number of people

exposed to air toxics. For more information see the February 1, 2008 Secretary of State Bulletin Notice on Selection of the Portland Region as an Air Toxics Geographic Area, and supporting attachment in Air Quality Division Rule Coordinator Files.

b. Geographic Area Selection

Because the Portland geographic area selection is a template for future actions, this directive includes steps and justification for Portland area analysis and decisions. In PATA, at least eight air toxics were estimated in concentrations above benchmarks, four of these were more than ten times above benchmarks. In the 1999 NATA, Portland's most populated county, Multnomah, had 14 air toxics above benchmarks, three of these more than ten times above benchmarks. While modeling yields more comprehensive information about air toxics concentrations across large geographic areas, Oregon's air toxics regulations require that DEQ base geographic area selection on representative monitoring data compared to ambient benchmark concentrations at locations where people may be exposed (OAR 340-246-0150). Using only monitoring data, DEQ has measured five air toxics above benchmarks in Portland, two more than ten times.

Acrolein and diesel particulate matter are two compounds modeled at levels more than ten times above benchmarks for which there are currently no reliable monitoring or analysis methods. In the group of air toxics which can be reliably monitored, benzene and polycyclic aromatic hydrocarbons (PAH) were measured at levels more than ten times above the benchmarks. Acetaldehyde, nickel and arsenic were measured at levels between one and ten times above benchmarks. These pollutants are produced largely by combustion in diesel and gasoline vehicle engines, and combustion of other fuels, including wood, for energy and heating. Comparing both modeled and monitored data to benchmark concentrations, the Portland area qualified for selection as Oregon's first air toxics geographic area. Monitoring in communities outside of Portland will support future geographic area selections.

5. Describing an Air Toxics Geographic Area

a. Background

The air toxics rules require DEQ to describe a boundary of the highest priority geographic area before it begins emission reduction planning. Boundary criteria that DEQ considers include:

- Areas of impact (where people are exposed);
- Population density;
- Areas of influence (where sources are located);
- Meteorology;
- Geography and topography;
- All air toxics exceeding ambient benchmarks; and
- Coordination with criteria pollutant boundaries for attainment of the National Ambient Air Quality Standards.

Describing and providing notification of an air toxics geographic area boundary are first steps in the emission reduction planning process. DEQ describes this boundary as a study area rather than a formal designation because we expect it to change as we run

models, analyze monitoring information and discuss potential strategies with stakeholders.

b. Description of the Study Area

As with the selection process, formation of a Portland study area boundary provides an example for future actions. For the Portland air toxics geographic area, DEQ considered criteria pollutant SIP boundaries, Vehicle Inspection Program boundaries, the Metro planning boundary, areas of expected future development and total air toxics risk by census tract. By roughly matching the Ozone Air Quality Maintenance Area boundary, census tracts with higher risk, and areas of expected growth, DEQ selected a study area of 295 census tracts in the Portland region. They encompass many communities surrounding the City of Portland that make up the larger metropolitan area. DEQ has named the Portland geographic planning effort "Portland Air Toxics Solutions" or "PATS".

When categorized by total risk of all cancer-causing air toxics in the NATA 1999, the PATS area census tracts represent total risk greater than 60 in a million. These listed census tracts form a workable study area for purposes of technical analysis and include many growing communities such as Sandy, Hillsboro and Wilsonville. With the best information available at the time of area selection, DEQ determined that the study area includes areas of greatest impact, areas of influence, areas of population density and all known air toxics causing elevated risk in the Portland area.

While the entire state has air toxics risk levels above one in a million, it is necessary to define geographic areas with elevated risk to create a manageable region for study, planning and implementation of emission reduction measures. Oregon Air Toxics Program rules allow DEQ the flexibility to use its best judgment in this process. As it proceeds with future selections, DEQ should consider using the total risk level or other unique regional spatial criteria that best define workable geographic areas. Initial study areas can be modified based on new information or developments in the stakeholder process.

V. POINT OF CONTACT

Questions pertaining to this Directive should be directed to Sarah Armitage, Air Quality Planning at 503-229-5186, Armitage.Sarah@deq.state.or.us.

VI. EFFECTIVE DATE

This Directive is effective on February 27, 2008.

2/27/08
Date

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Date

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Pursuant to OAR 340-200-0020(66)(d)(B)