# Tacoma Smelter Plume Prioritizing Child-Use Areas for Soil Sampling – Pierce County

WASHINGTON STATE DEPARTMENT OF ECOLOGY

## Introduction

As a part of the Tacoma Smelter Plume project, child-use areas (such as schools, parks, childcare centers) in Pierce County will be sampled beginning in March 2003. Child-use area sampling is currently underway in parts of King County. The purpose of this fact sheet is to explain the system that has been developed for prioritizing the areas to be sampled.

## Child Use Area Studies

Elevated concentrations of arsenic and lead have been found in the soils of King and Pierce counties. Air emissions from the former Asarco smelter in Ruston were the likely source. The Washington State Departments of Ecology and Health, Public Health – Seattle & King County, and the Tacoma-Pierce County Health Department are concerned about potential exposure to people, especially young children. High levels of arsenic can cause cancer, and lead can cause developmental disabilities in people. Children under six are the population most at risk for arsenic and lead exposure because they play directly in dirt where they can ingest contaminated soil through their mouths and inhale dust through their noses. Ecology and the health agencies are sampling soil from child-use areas – areas where children play regularly – in King and Pierce counties to determine the potential exposures. We are considering these common types of child-use areas for sampling:

- Elementary schools
- Preschools
- Childcare centers
- Parks and playfields
- Camps

We are also interested in other informal play or activity centers, such as community gardens, nature education centers, vacant lots, or play areas associated with apartment complexes, public housing, houses of worship, mobile home parks, or youth clubs.

## Study Objectives

The main focus for the sampling studies is to identify locations where the arsenic and lead contamination potentially poses the greatest risks to young children, under current conditions. The results will be used to focus health education programs and determine what actions may be needed to reduce exposure. While we would like to sample all child-use areas, we are unable to do so because of funding limitations. Hence, we are prioritizing the child-use areas. This prioritization takes two forms. First, a Study Zone was defined where the highest levels of contamination are expected (over 100 parts per million of arsenic in soil). Second, child-use areas within the study zone will be prioritized for sampling.

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**INFORMATION REPOSITORIES**

**Documents can be reviewed at Pierce County libraries:**

Main Library
1102 Tacoma Avenue South
Tacoma, WA 98402
(253) 591-5620

Moore Library
215 South 56th Street
Tacoma, WA 98498
(253) 591-5650

Anna Lemon Wheelock Library
3722 North 26th Street
Tacoma, WA 98407
(253) 591-5640

Department of Ecology
300 Desmond Drive
PO Box 47775
Olympia, WA 98504-7775

Ecology's web site:
http://www.ecy.wa.gov/programs/tcp/sites/Tacoma_smelter/ts_hp.htm

For special accommodation needs or language translation assistance, call Molly Gibbs, Ecology's Public Involvement Specialist at (360) 407-6179 or (TTY) at 711 or 1-800-833-6388.

To receive a copy of the **Tacoma Smelter Plume video**, which covers the following:

- Project history, overview
- Health risk assessment
- Protective measures (How to reduce your exposure to contaminated soils)

Email your mailing address to Molly Gibbs at mgib461@ecy.wa.gov

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## The Defined Study Zone

Child-use area sampling will take place in those areas most likely to have the highest concentrations of arsenic and lead. We know from past studies that the contamination levels decrease with distance from the smelter. Contamination levels also follow wind patterns closely, with higher levels of contaminants reaching further away from the smelter in the main downwind directions. The maximum concentrations at each location from previous footprint studies were compared to distances from the smelter in each wind direction, and a mathematical equation was used to calculate distances from the smelter where soil concentrations of arsenic could be over 100 parts per million. (It is also likely that many areas have concentrations of arsenic below 100 parts per million.) The calculated distance for each wind sector was drawn on a map to define the study boundaries. (**See Attached Map).** Child-use areas within this zone will be prioritized for sampling.

## Prioritizing Child-use Areas

The Tacoma-Pierce County Health Department is identifying the child-use areas within the study zone. Currently, the Health Department has identified all elementary schools, public parks, and licensed child care facilities within the study zone. Other types of sites which may be sampled include play areas at private parks, churches, apartment complexes, or vacant lots where children play.

The agencies developed a simple formula for prioritizing the child-use areas that we believe targets the worst sites first, with the highest potential for exposure to young children. The formula includes factors for: 1) numbers of children present at the property; 2) potential highest level of contamination at the property (calculated based on past studies); 3) how recently the property was developed or redeveloped (contaminants are often less in sites where development has occurred); and 4) how much contact a child is likely to have with the soils on the property. A score is figured for each one of the factors, then added together to figure a total score for the property. The second factor, for soil concentration, was "weighted" at 1.5 times the weight of the other factors to reflect the idea that the sampling should be focused on child-use areas with the greatest potential for high contamination levels. The child-use areas are then ranked in order of their score.

## Sampling Child-use Areas

The individual areas where children play at a child-use property will be sampled. For example, a private childcare will likely have one play area, perhaps the backyard; whereas a school will likely have several play areas – playground, ball fields, garden. Soil samples will be collected from the top 6 inches of soils from 8-10 locations around the play area.

In Pierce County, funds allow for up to 300 individual play areas to be sampled.

The sampling is scheduled to begin in March 2003, and to continue through summer of 2003. Results of the study will be released periodically throughout the project.

### The Prioritization Formula:

F1+1.5F2+F3+F4

where each factor is scored 1, 3, or 5 (comparable to low, moderate, or high).

**Factor 1 (F1)–Population.** F1 considers the number of young children potentially exposed at a child-use property. High priority (score of 5) is given to those locations where a large number of young children (under the age of 6) may be exposed. Scores are assigned as follows:

| | |
|---|---|
| 1 to 12 children | score = 1 |
| 13 to 50 children | score = 3 |
| More than 50 children | score = 5 |

**Factor 2 (F2)–Soil Arsenic Concentration.** F2 considers the level of soil arsenic to which children may be exposed. Priority is given to child-use properties where greater levels of soil arsenic could occur, based on evaluations of previous footprint data. Scores are assigned as follows:

| | |
|---|---|
| Less than 150 parts per million (ppm) | score = 1 |
| 150 to 250 ppm | score = 3 |
| Greater than 250 ppm | score = 5 |

The soil concentration factor is weighted more heavily (multiplied by 1.5), to bias child-use area sampling in those areas of greatest impact from smelter emissions.

**Factor 3 (F3)–Property Development.** F3 considers the period of time since property development, or major redevelopment, for deposited smelter contaminants to accumulate in the soil. Priority is given to properties where a longer period for contaminant accumulation has occurred. Scores (ranging from 1 to 5) are calculated as follows:

Score = 1 + ([1986 – Year]/[1986-1890] 4.

The smelter began operation in 1890, and ceased operations in 1986.

**Factor 4 (F4)–Soil Contact Frequency and Duration.** F4 considers the likely frequency (e.g., days per year) and duration (e.g., hours per day) of a child's contact with the soil at a given type of child-use facility. Priority is given to child-use areas where a greater amount of time is spent by children. Scores are assigned as follows:

| | |
|---|---|
| Camps | score =1 |
| Parks, playfields, vacant lots, gardens | score = 3 |
| Schools, preschools, childcare centers | score = 5 |

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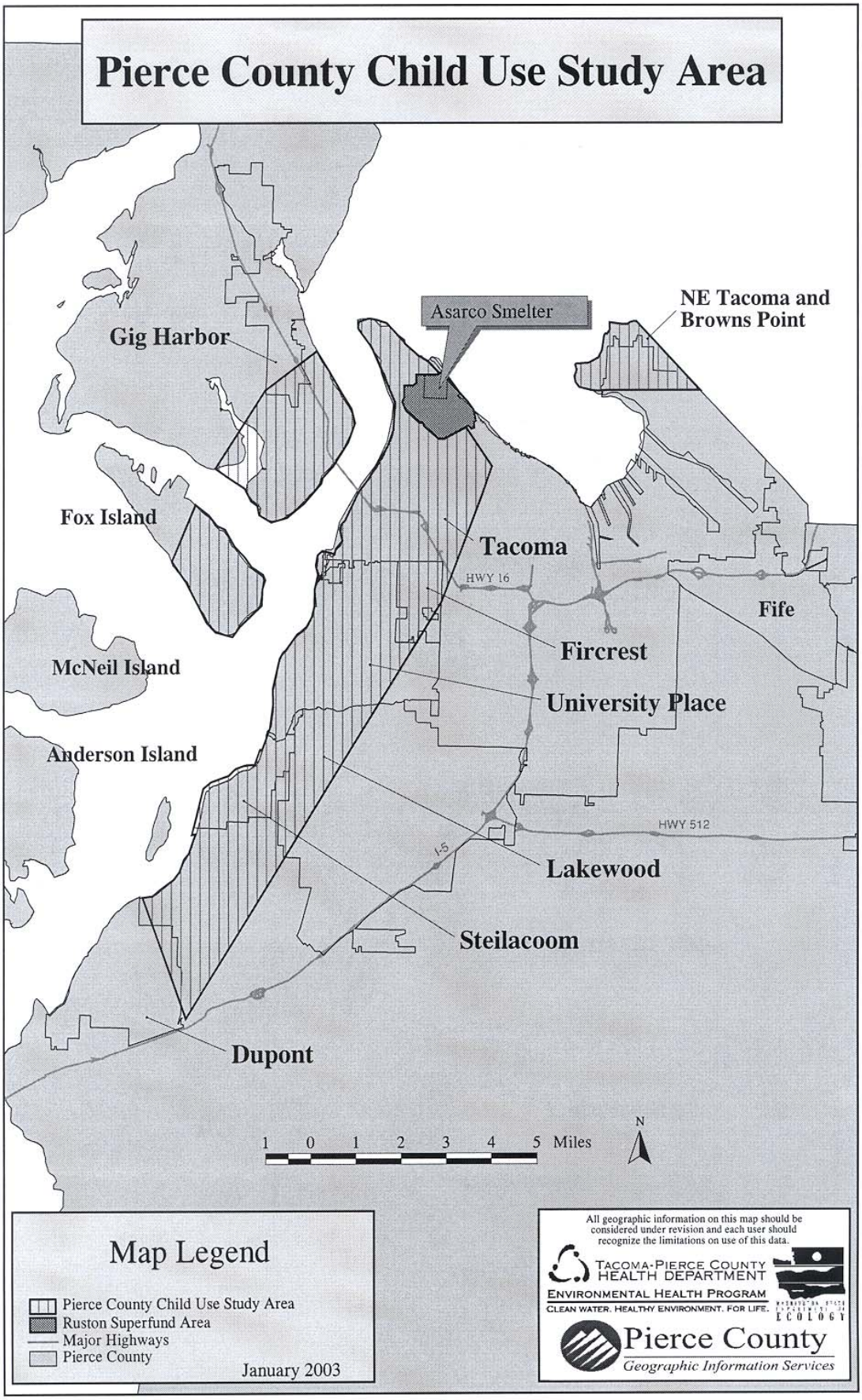
Pierce County Child Use Study Area
Asarco Smelter
NE Tacoma and
Browns Point
Gig Harbor
Fox Island
Tacoma
HWY 16
Fife
Fircrest
McNeil Island
University Place
Anderson Island
HWY 512
I-5
Lakewood
Steilacoom
Dupont
1 0 1 2 3 4 5 Miles
N
Map Legend
Pierce County Child Use Study Area
Ruston Superfund Area
Major Highways
Pierce County
January 2003
All geographic information on this map should be considered under revision and each user should recognize the limitations on use of this data.
Tacoma-Pierce County Health Department
Environmental Health Program
Clean water. Healthy environment. For life.
Pierce County
Geographic Information Services