

Tacoma Smelter Plume Prioritizing Child-Use Areas For Soil Sampling



Introduction

As a part of the Tacoma Smelter Plume project, child-use areas (such as schools, parks, childcare centers) in parts of King and Pierce Counties will be sampled beginning in early 2003. 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. 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 preparing to sample 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 if early action is necessary. 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). Second, child-use areas within the study zone will be prioritized for sampling.

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 per 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

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INFORMATION REPOSITORIES

Documents can be reviewed at SW King County libraries:

Burien Library
14700 Sixth SW
Burien, WA 98166
(206) 243-3490

Des Moines Library
21620 11th Ave S.
Des Moines, WA 98198
(206) 824-6066

Federal Way Regional Library
34200 1st Way S.
Federal Way, WA 98003
(253)838-3668

Vashon Library
17210 Vashon Hwy SW
Vashon Island, WA 98070

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

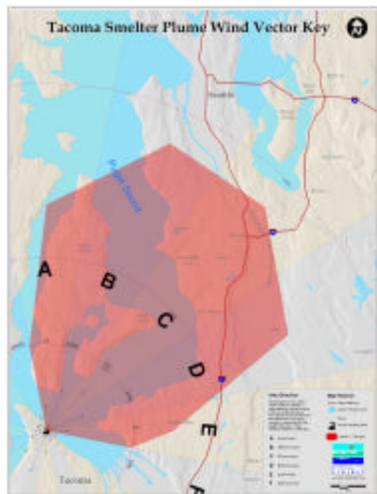
Ecology's web site:
http://www.ecy.wa.gov/programs/tcp/sites/Tacoma_smelter/ts_hp.htm

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 1-800-877-8973.

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where soil concentrations of arsenic could be over 100 parts per million. The calculated distance for each wind sector was drawn on a map to define the study boundaries. Child-use areas within this zone will be prioritized for sampling. The study zone captures nearly all areas where concentrations of arsenic may be over 100 parts per million, however the data are highly variable. It is also likely that many areas within the concentration zone have concentrations of arsenic below 100 parts per million.



Prioritizing Child-use Areas

The Tacoma-Pierce County Health Department, Public Health – Seattle & King County, and Ecology are identifying the child-use areas within the study zones. The agencies developed a simple formula for prioritizing the child-use areas that we believe targets the worst areas 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 (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 from eight borings or holes. Sampling is scheduled to take place this winter/spring.

King County

Current funding allows for about 70 child-use areas to be sampled in King County – that is approximately 175 individual play areas. As this is only a small portion of the number of areas where children play in the study zone, we are seeking ways to ensure representative coverage while targeting the worst areas first. Seventy five to eighty percent of the sampling will take place at the highest priority areas. Twenty to twenty five percent of the sampling will be spread out within the study zone. A grid and other information that allows equitable distribution of sampling, including your community’s highest priority areas, will be used to spread out these sample locations.

Public Meetings have been scheduled at the following locations:

Oct. 30, 2002 - 6:30 - 8:00 pm
Federal Way Council Chambers
33530 1st Way South
Federal Way, WA 98003-6210

November 6 - 6:30 - 8:00 pm
Highline Community College, Bldg 3 Rm. 103
South 240th & Pacific Highway South
Des Moines, WA 98198-9800

November 18- 7:00 - 9:00 pm
Sponsor: Vashon Maury Island Comm. Council
Get the Scoop on Our Dirt Symposium
Chautauqua Elementary School
9309 SW Cemetery Rd. Vashon Island, WA 98070

November 20, - 6:30 - 8:00 pm
City of Tukwila; Location to be confirmed
Call Molly Gibbs at (360) 407-7169

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:

$$\text{Score} = 1 + ([1986 - \text{Year}] / [1986 - 1890])^4$$

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