Cleanup Levels & Action Levels for Soil Arsenic and Lead

The Tacoma Smelter Plume covers a 1,000 square mile area of King, Pierce, Thurston, and Kitsap counties. The former Asarco Smelter in Ruston and North Tacoma polluted soils in the area with arsenic and lead. The smelter released these toxic metals into the air during nearly 100 years of operation.

The area closest to the former smelter is part of a federal Superfund cleanup site. The U.S. Environmental Protection Agency (EPA) is cleaning up yards in the Ruston/North Tacoma Study Area of the Superfund site.

The Washington Department of Ecology (Ecology) is addressing soil contamination within and outside the Superfund site (page 3). Ecology has limited funding for cleanup, so we have to focus on areas we are most concerned about:

- **Child play areas -** We began with schools, childcares, parks, camps, and multi-family public housing through the Soil Safety Program.
- **Residential yards -** We are now planning to clean up yards, but only the most contaminated ones.

Purpose of this FAQ

This fact sheet explains two key concepts for making cleanup decisions and the science behind them:

- **Cleanup level -** The level of arsenic and lead in soil must be less than or equal to the cleanup level for Ecology to consider an area cleaned up.
- **Action level -** Ecology or EPA will clean up soil when arsenic or lead levels are greater than or equal to the action level.

The FAQ also explains what Ecology plans to clean up and how Ecology will address yards in the Ruston/North Tacoma Study Area. See page 6 for photos of a play area cleanup.

TOPICS

FOR MORE INFORMATION

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Site Document Locations

Ecology's cleanup website
http://www.ecy.wa.gov/toxics/tacoma-smelter.html

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Cleanup Levels

Q: What are the cleanup levels for Tacoma Smelter Plume contamination?

A: The cleanup level for arsenic is 20 parts per million (ppm). The cleanup level for lead is 250 ppm. These cleanup levels protect both human health and the environment.

Q: Why is the arsenic cleanup level 20 ppm?

A: Ecology sets cleanup levels based on state law—the Model Toxics Control Act. For cancer-causing contaminants, we set cleanup levels to protect people against an increased lifetime cancer risk at one in a million. For arsenic, the risk-based cleanup number would be 0.67 ppm. However, arsenic occurs naturally in soils at levels higher than 0.67 ppm. In Washington, we consider "urban background" arsenic to be 20 ppm. That is where we set the cleanup level.

Q: What is the risk level at 20 ppm arsenic?

A: We estimate that being exposed to 20 ppm arsenic in soils may increase cancer risk by 30 in one million. That means in a population one million people, there may be 30 cases above the background cancer rate. In other words, there would be 30 more cases of cancer than if there were no arsenic in soil.

Q: Why is the lead cleanup level 250 ppm?

A: Lead can cause learning difficulties and behavioral problems in infants and children. The level of lead in blood helps predict the potential for harm. Levels are in micrograms of lead per one-tenth liter of blood (ug/dL).

In 1991, Ecology set a soil cleanup level for lead of 250 ppm. This level should keep blood lead levels under 15 ug/dL for 99 percent of children, when soil is the main way they are exposed.

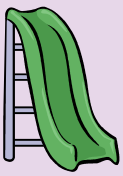
When Ecology set this level, if a child's blood lead level was over 15 ug/dL, the Centers for Disease Control and Prevention had certain recommendations. It advised looking for possible sources of lead in the child's environment and educating the family on ways to reduce exposure.

CLEANUP LEVELS

Ecology and EPA

Arsenic = 20 parts per million (ppm)
Lead = 250 ppm

ACTION LEVELS



Child Play Areas (Ecology)

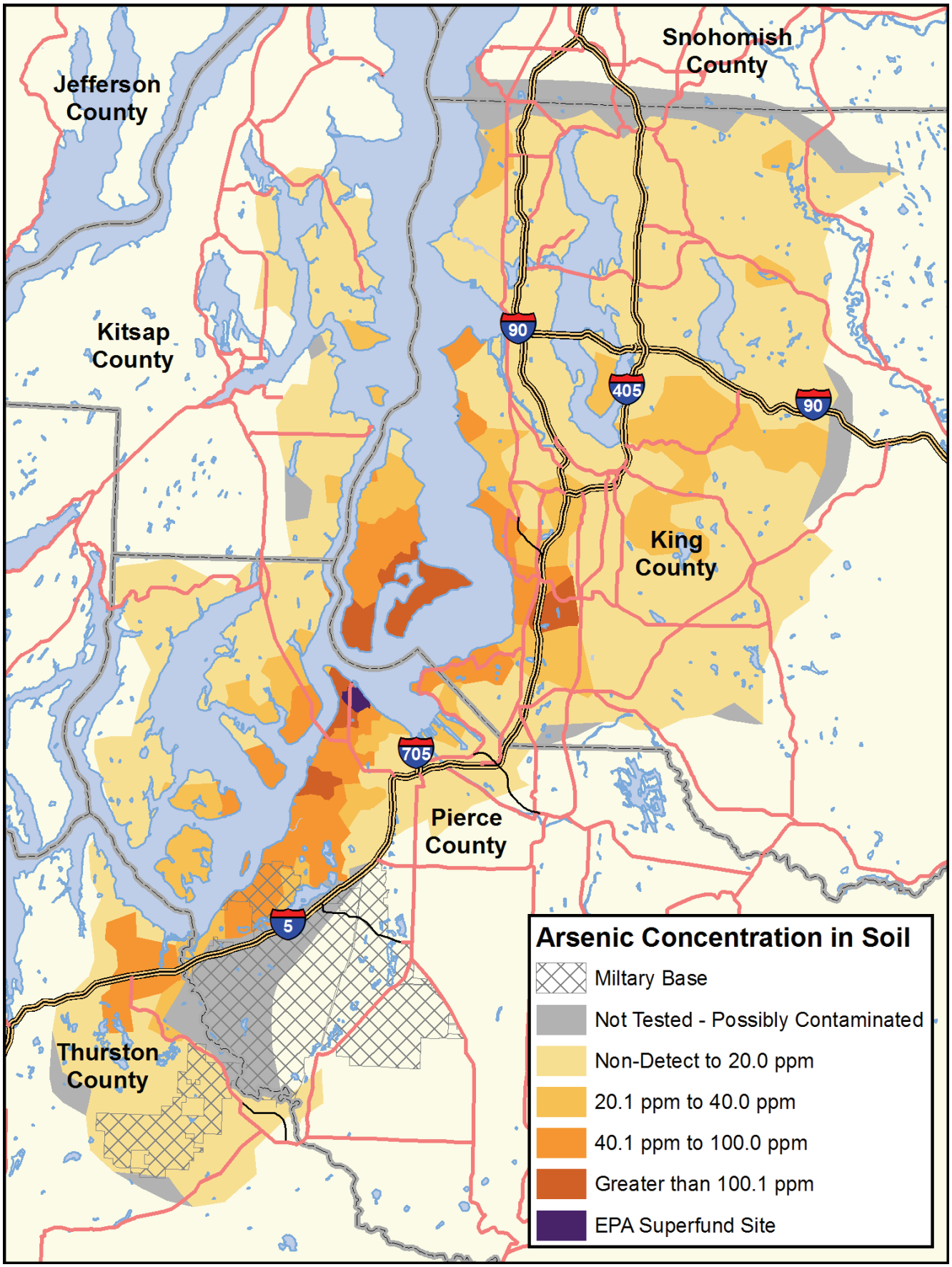
Arsenic = 20 ppm
Lead = 250 ppm

Residential Yards (Ecology)

Arsenic = 100 ppm
Lead = 500 ppm

Ruston/North Tacoma Study Area (EPA)

Arsenic = 230 ppm
Lead = 500 ppm


Jefferson County
Snohomish County
Kitsap County
King County
Pierce County
Thurston County
90
405
90
705
5
Arsenic Concentration in Soil
Miltary Base
Not Tested - Possibly Contaminated
Non-Detect to 20.0 ppm
20.1 ppm to 40.0 ppm
40.1 ppm to 100.0 ppm
Greater than 100.1 ppm
EPA Superfund Site

Ecology Action Levels

Q: What is Ecology's action level for arsenic and lead at child play areas?

A: Ecology is already doing partial cleanups—just the play areas—where arsenic or lead is over the state cleanup level. That means the "action level" for arsenic is 20 ppm and lead is 250 ppm.

Q: What do sampling results mean?

A: You look at the average of all sampling results and the highest value. A play area exceeds Ecology's action level if:

- Average arsenic is over 20 ppm or highest value is over 40 ppm; or
- Average lead is over 250 ppm or highest value is over 500 ppm.

Q: How did Ecology set the action levels for child play areas?

A: We set our action levels at the state cleanup levels because they are the most protective of human health. Schools and childcares have multiple children playing outside many days of the year. Also, there may be less supervision of hand-washing and other measures that can reduce exposure to soils, than at home.

Q: What is Ecology's proposed action level for cleaning up residential yards?

A: The proposed action level is 100 ppm arsenic or 500 ppm lead. Ecology will clean up yards to below the state cleanup level of 20 ppm arsenic and 250 ppm lead.

Q: What is the risk level at 100 ppm arsenic?

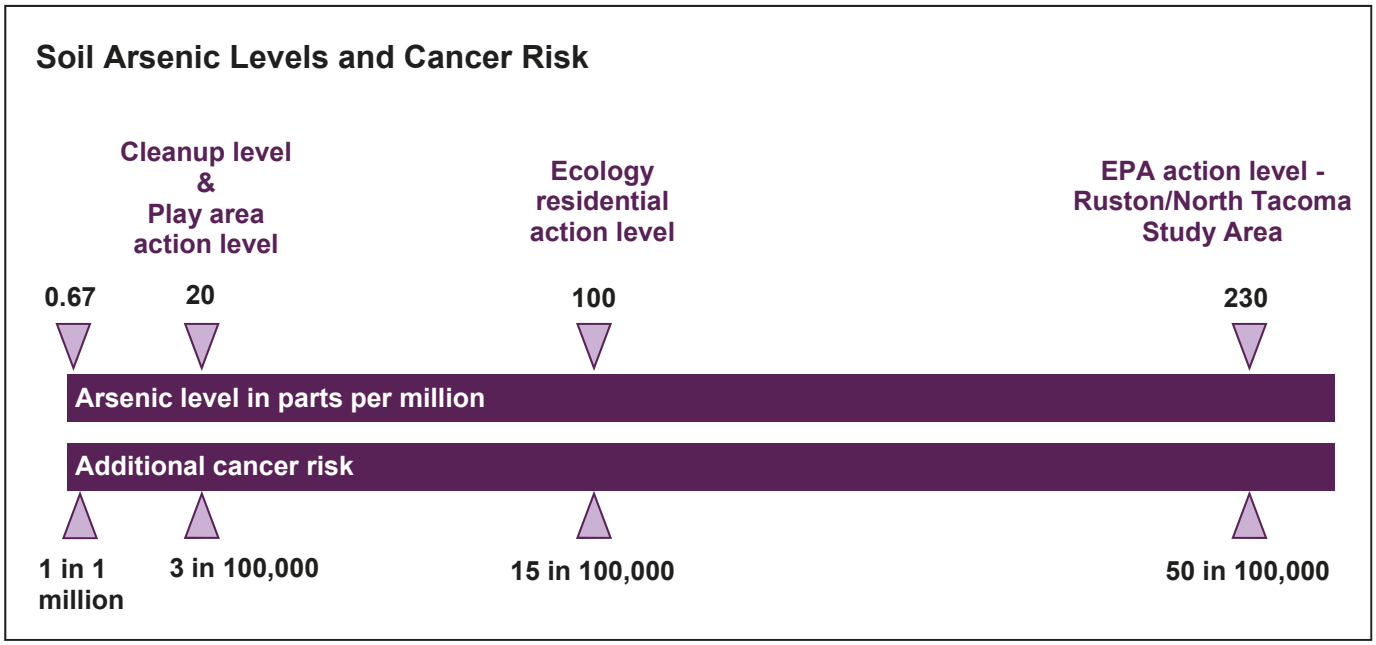
A: We estimate that being exposed to 100 ppm arsenic in soils may increase cancer risk by 150 in one million. That means in a population of one million people, there may be 150 cases above the background cancer rate. This is five times higher than the risk at 20 ppm.

Q: Why did Ecology set different action levels for yards?

A: Ecology does not have the resources to clean up every yard over 20 ppm arsenic or 250 ppm lead. An action level helps us prioritize our limited funding. This still leaves us the option to clean up yards with arsenic and lead below the action levels in the future, if we have funding.

Q: How did Ecology set the proposed action levels for yards?

A: The proposed action level of 100 ppm for arsenic uses less conservative cancer risk assumptions while still protecting for non-cancer health effects. We adjusted the risk level to the upper end of the nationally-acceptable cancer risk of one in ten thousand. For lead, the action level increases the chance of blood lead levels exceeding 15 ug/dL from one percent to five percent.



EPA Action Levels

Q: What is EPA's action level for the Ruston/North Tacoma Study Area?

A: EPA set an action level of 230 ppm arsenic. EPA cleans up these yards to the state cleanup level of 20 ppm arsenic or lower. Between 20 and 230 ppm, EPA relies on education to protect human health.

Q: How did EPA set its action level?

A: EPA also looks at human health risk when deciding where to take action. The action level of 230 ppm equates to an additional cancer risk of one in 2,000. This is within EPA's "acceptable risk range." For this site, EPA decided that community education would protect human health where arsenic was between 20 and 230 ppm.

Q: What does Ecology propose doing about yards in the Ruston/North Tacoma Study Area with over 100 ppm arsenic left in soils?

A: Ecology proposes offering more cleanup to most homes with between 100 and 230 ppm arsenic. In some cases, EPA has already placed a thick enough protective layer of new soil over the arsenic contamination. Ecology will only clean up yards where there is a risk of human exposure. We will be able to provide more details once we have designed our cleanup program.

Ecology's Yard Sampling and Cleanup Program

Q: When will Ecology start the yard cleanup program?

A: We plan to design the program and take public input during the first half of 2012. Soil sampling should start around the end of 2012 and cleanup work would begin in 2013. Work will likely begin in the Ruston/North Tacoma area, which has high arsenic and lead levels. South Vashon-Maury Island is also a priority due to high contamination levels.

Q: Can I sign up now?

A: No, we have not yet designed the program. You can join our mailing list by contacting Hannah Aoyagi at 360-407-6790 or Hannah.Aoyagi@ecy.wa.gov.

Q: What will sampling look like?

A: Before Ecology's contractor can sample, the homeowner must sign a form that gives them permission to access to the yard. Sampling involves digging small holes, scraping soil samples out, and refilling them. It usually takes a few hours.

Q: What will cleanup look like?

A: We use two main cleanup methods for Tacoma Smelter Plume contamination:

- **Excavation and removal** - Digging up contaminated soil and disposing of it in a landfill.
- **Capping** - Covering over contaminated soil with a geotextile (fabric) layer and clean soil.

Cleanup may take around two weeks for a normal yard and it will be disruptive. We will consult with homeowners on restoring the landscaping. In most cases, we will work around large trees and existing structures.

Play area before cleanup

Digging out contaminated dirt

New soil and sod create a safer play area