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Frequently Asked Questions Polycyclic Aromatic Hydrocarbons (PAH) and the 6-10 Interchange Construction Project

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What was found in samples from fill used for the 6-10 interchange construction project?

When the Rhode Island Department of Environmental Management (RIDEM) studied samples from fill brought in for the construction project, they found levels of benzo[a]pyrene (B[a]P) and several other polycyclic aromatic hydrocarbons (PAHs) that required a cleanup according to Rhode Island's environmental regulations. That fill had only been used in a few locations that were later covered and was not used after the tests were performed.

What are polycyclic aromatic hydrocarbons (PAHs)?

PAHs are a group of chemicals that are most commonly formed by burning materials. They are found in the particles that make up smoke and exhaust from burning wood, coal, gasoline, and diesel. These particles are also sometimes known as soot or tar.

What are potential health effects from the PAHs at this site?

The overall risk of health effects from this project is very low given the limited exposure people had to PAHs at this site. Soil with the levels of PAHs found at this site would require decades of exposure to pose a significant risk.

What are the health concerns with exposure to PAHs at higher levels and/or for longer periods of time?

The amount of PAH exposure expected from this contaminated fill is not anticipated to cause health effects, particularly with the implementation of the site's soil management plan.

Longer-term exposure to much higher levels of PAHs in the environment, especially in tobacco smoke and food, is known to cause lung cancer, colon cancer, bladder cancer, and a variety of other cancers. Breathing in PAHs (for example, from smoking) is also known to cause heart attacks and lung diseases, such as emphysema and asthma, among other health effects.

Are the levels of PAHs found at this site unusual?

No. The levels of PAHs found at this site in the fill were typical of soils found in urban areas. The levels of B[a]P and other PAHs found in these samples were lower than the levels found in soil samples from sites without known contamination around Providence, Boston, and Springfield, MA during the 1990s, before recent steps to limit their pollution from electrical generation and motor vehicles, and are similar to levels found more recently in other cities.



How did PAHs get into this soil?

The widespread use of fossil fuels other than natural gas, including in vehicles and for generating electricity, pollutes the air with PAHs that fall from the air onto soil and other parts of urban environments. You can often see this as a blackish residue on urban windows.

PAHs are also formed as tires break down and are a major component of sealants used on hard surfaces like roofs and pavement. For example, coal tar pitch, a common component of sealants, is 50% or more PAHs, by weight. The widespread use of fossil fuels and their byproducts has led to potentially unsafe levels of PAHs in many urban soils. The soil used in this project was originally removed from another urban construction project, where it had likely been contaminated through air pollution and/or runoff from contaminated surfaces.

How are people normally exposed to PAHs?

Although there is very little potential for exposure to the PAHs found in this fill, PAH exposure through other sources is very common. According to the Agency for Toxic Substances and Disease Registry, a federal public health agency, the most important ways most Americans are exposed to PAHs are by inhaling tobacco and wood smoke (e.g. forest fires), and through eating foods that have PAHs in them (especially those that are dried, smoked, or charred). Eating contaminated food is the most common way non-smokers are exposed to PAHs.

Are children at higher risk from PAH exposure?

Children should not have any increased risk of health effects due to the PAHs in this fill. However, Children are at increased risk from PAHs from more common sources of exposure both because of the way that it causes cancer and because they are often exposed to higher levels than adults.

PAHs can permanently damage DNA, which starts a process that requires more steps before it can cause cancer. This process takes decades in adults but can occur more quickly in children because their bodies are still developing. Children, particularly infants and toddlers, are also more likely to accidentally or intentionally consume PAH-contaminated soils or dusts. Children breathe much more air, relative to their body weight, than adults and experience higher levels of exposure to PAHs and other chemicals in the air.

How can I avoid exposure to PAHs?

Although it is not necessary to avoid exposure to the PAHs found in this fill, there are a number of steps you can take to reduce PAH exposure in the general environment. For smokers, quitting smoking will be the best way to reduce exposure. Everyone can eat more foods that are prepared in ways that limit the production of PAHs. Boiling and microwaving do not produce PAHs, while drying, smoking, cooking over an open flame or frying produce higher levels.

Plants grown in soils with PAHs will absorb the chemicals, so avoid growing food in areas that have high levels of air pollution or near sealed parking lots or driveways. PAHs can also be absorbed through the skin. Since small children often put things in their mouth, limit their play in potentially contaminated soil or on sealed driveways and frequently clean their toys and play areas. You can also limit your exposure of PAHs by avoiding secondhand tobacco smoke, staying inside during poor air quality days, limiting the amount of time you spend in traffic, and by making sure you have proper ventilation when you are cooking.