United States
Environmental Protection
Agency

Cleanup Numbers Developed for Tittabawassee River Floodplain

Tittabawassee River, Saginaw River & Bay Site
Midland, Saginaw and Bay City, Michigan August 2014

For more information

You can see documents related to the Tittabawassee River, Saginaw River and Bay site in information repositories set up by EPA and MDEQ:

Grace A. Dow Memorial Library
1710 W. Saint Andrews St.
Midland

Hoyt Main Library
505 Janes Ave.
Saginaw

Alice and Jack Wirt Public Library
500 Center Ave.
Bay City

Information Office

EPA's community information office is at 804 S. Hamilton St., Suite 111, Saginaw. Or call 989-401-5509.

On the Web

Go to
www.epa.gov/region5/cleanup/dowchemical

Contact EPA

If you have questions, contact:

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The U.S. Environmental Protection Agency, working with the Michigan Department of Environmental Quality, is cleaning up dioxin-contaminated soil in frequently flooded areas along the Tittabawassee River – sometimes called the eight-year floodplain. EPA's goal is to protect everyone who lives, works or plays in the floodplain.

The two agencies have agreed on what EPA calls "site-specific cleanup numbers," or exactly how much dioxin warrants a cleanup. These numbers are unique to the floodplain area.

EPA will clean up Maintained Residential Areas with more than 250 parts of dioxins in a trillion parts of soil – a measure known as "parts per trillion," or "ppt." This applies to floodplain portions of homeowners' yards, places used as lawns, play areas, gardens, etc.

The Agency will clean up other areas with more than 2,000 ppt of dioxins. This applies to floodplain portions of farms, parks, commercial properties and natural areas, including unmaintained parts of properties and the Shiawassee National Wildlife Refuge.

How the cleanup numbers will be applied

EPA will not clean up the entire eight-year floodplain. The federal and state agencies will work together to evaluate each property. If dioxin levels at a property are higher than the appropriate site-specific cleanup number, EPA officials will work closely with the owner on specific plans and schedules. Once the cleanup is done – or if no cleanup is needed – EPA will give the owner a confirmation letter.

How the cleanup numbers were developed

In developing the cleanup numbers, EPA and MDEQ considered many factors, all unique to the floodplain, including:

- **Climate.** In this part of Michigan, the ground is snow-covered or frozen for about 90 days a year. On those "indoor days," people are not exposed to soil at all.
- **Exposures from house dust and soil.** Dioxin levels in dust are lower than in floodplain soil. EPA assumed people are exposed only to dust on indoor days. On outdoor days, the assumption is 45 percent of exposure is from soil and 55 percent from dust.
- **Amount of dioxins that may be taken up into the body.** Dow ran tests on animals using floodplain soil to see how much dioxin is taken into the body. This is called a "bioavailability study." Floodplain dioxins are not completely bioavailable. Tests on rats and pigs showed that, on average, 43 percent of the dioxins got into their bodies.
- **Where people spend time and how they use the floodplain.** People use different parts of the floodplain in different ways, so exposure varies. There are three areas where soil exposure may

occur (*see diagram below*). Zone A includes areas around homes outside the floodplain; no cleanup is expected here because dioxin levels are typically low. Zone B includes Maintained Residential Areas, where the 250 ppt level applies because the potential for exposure is greater than in other areas. Zone C includes natural areas or work areas – such as farms – where the 2,000 ppt level applies because the potential for exposure to dioxin is lower than in Maintained Residential Areas.

EPA and MDEQ estimated exposure frequency in each zone to develop cleanup numbers. To come up with numbers for all age groups, the agencies considered factors such as body weight, skin surface area and amount of soil ingested, evaluating all health risks. The final numbers are based on young children, who are most sensitive.

When people work or play outdoors, they can accidentally eat a small amount of dirt or get dirt on their skin. When the dirt is contaminated, people are exposed to small amounts of dioxins. EPA's cleanup numbers will ensure people are safe when they come in contact with Tittabawassee floodplain soil.

The cleanup numbers are not based on potential exposure from eating animals raised or caught on the floodplain, or on potential ecological risks. EPA and MDEQ will continue to evaluate those exposures.

Dioxins and potential exposure

EPA and MDEQ have studied the Tittabawassee River extensively. Dioxins, primarily furans, are the main contaminant in floodplain soil. Levels vary, and some areas are not contaminated at all. The term "dioxins" refers to a large family of similar chemicals, including furans. EPA has concluded that dioxins may cause cancer or other health effects such as thyroid or reproductive issues, depending on exposure.