



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 30 2012

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

The Honorable Katherine Hammack
Assistant Secretary of the Army
Department of the Army
Installations, Energy and Environment
110 Army Pentagon
Washington, D.C. 20310-0110

Dear Ms. Hammack:

Thank you for the March 8, 2012 opportunity to meet with senior Department of Defense (DOD) representatives to discuss issues raised in your letter of November 1, 2011, regarding the transfer of property at several facilities in Kansas. At the Kansas Army Ammunition Plant (KSAAP), the EPA and the Army have reached agreement on a path forward to address environmental concerns, to include pesticides, and we understand that the KSAAP transfer is targeted for early May. We appreciate the collaborative effort that got us to this stage. In addition, we are waiting to hear from Sunflower Army Ammunition Plant (SFAAP) developers regarding a meeting date to discuss alternative cleanup options. The state of Kansas is the lead on cleanup at this site, but we are working with the state on the alternative cleanup options and further development.

At the conclusion of our March 8, 2012 meeting, the Army and the EPA agreed to establish a joint workgroup to discuss and resolve site-specific issues to provide more consistency in addressing pesticides. I suggest we proceed forward by identifying scenarios where pesticides could lead to the need to characterize the area where they were applied to know what steps are needed to protect public health. These areas may involve demolitions, excavations or other site-specific factors such as historical pesticide usage. In addition, the workgroup should make an early priority of looking for ways to engage States, Tribes, and affected communities, and to achieve a high degree of transparency of public information.

During our meeting, you raised the March 7, 2012 House Appropriations Committee hearing and questions with regard to progress in Army cleanup efforts. From the available record it seems when asked about cleanups, you answered that, "We probably have a handful of these occurring right now where the regulatory rules have changed while we're in the process of cleanup. So, we have a plan for cleanup that is well underway. It is funded, it is planned, it is scheduled, and then

there's a new set of regulations that are dropped in and all of a sudden we have to go to a plan B and completely change."

The EPA's position that these pesticides may be subject to corrective action authority under the Resource Conservation and Recovery Act (RCRA) is consistent with longstanding Agency policy. In addition, as science evolves and new hazards are identified, standards change to address those hazards in our regulatory and cleanup activities to ensure protectiveness. This is not a new set of regulations. I know DOD would want to join the EPA in using the best available science to produce cleanup results that are protective of public health. Regardless of the authority exercised to conduct cleanup of contamination by a Federal agency, CERCLA 120(h) sets forth requirements for conveying federal real property out of federal ownership. I am enclosing analysis prepared by the EPA regarding some of the legal analysis included in your November 1, 2011 letter.

At our March 8, 2012 meeting, you asked about the risk presented by the particular pesticides found at the sites we discussed. The pesticides commonly detected at the subject sites include chlordane, aldrin, dieldrin, and heptachlor, which were used to control termites. Acute and chronic exposure to these pesticides can cause numerous health effects and increase cancer risks. Although dependent on the pesticide and level and duration of exposure, studies on acute and chronic exposures of humans and animals to these pesticides have reported multiple neurologic effects, reproductive/development effects, and damage to the liver and kidneys. The commercial and domestic use of these pesticides, with the exception of the restricted use of heptachlor to control fire ants in electrical transformers, have been banned in the United States since the late 1980s due to their harmful effects on humans and ecosystems. I have enclosed the Agency for Toxic Substances and Disease Registry (ATSDR) fact sheets for chlordane, aldrin, dieldrin, and heptachlor, which present known human health and environmental impacts of these banned pesticides.

If you would like, feel free to contact me directly. Your staff may contact Reggie Cheatham at (703) 603-9089 or cheatham.reggie@epa.gov with any questions and to begin the workgroup process.

Sincerely,



Mathy Stanislaus
Assistant Administrator

Enclosures: EPA Analysis
Chlordane ATSDR Fact Sheet
Aldrin ATSDR Fact Sheet
Dieldrin ATSDR Fact Sheet
Heptachlor ATSDR Fact Sheet

ENCLOSURE – EPA Analysis

The Department of the Army's letter of November 1, 2011 to Mathy Stanislaus, asked the EPA to reconsider the interpretation set forth in March 4, 2011 letters sent to Congresswoman Lynn Jenkins and Senators Jerry Moran and Pat Roberts. In the March 4 letters, EPA interpreted Section 3004(u) of the Resource Conservation and Recovery Act (RCRA) as providing authority to require cleanup at RCRA permitted facilities of soils contaminated with pesticides that were properly applied for their intended use when those pesticides no longer serve their intended purpose.

After carefully considering the concerns raised in your letter, and reviewing the information provided in the attachment to your letter, we affirm the interpretation of RCRA Section 3004(u) authority outlined in EPA's letters of March 4. We believe that the March 4 interpretation of EPA's authority was consistent with established Agency policy. Many of the concerns you raised reflect confusion regarding the applicability of the definitions of solid waste at RCRA Section 1004(27) and 40 C.F.R. Section 261.2(b), and of the ultimate impact of the Agency's interpretation.

As stated in your letter, EPA has long taken the position that pesticides, when they are properly applied for their intended use, are not solid wastes for purposes of regulation under RCRA, as they do not meet the regulatory definition of "abandoned" at Section 261.2(b).¹ EPA continues to support that position. However, the March 4 letters addressed a different question -- whether pesticides, properly applied for their intended use, may become "discarded" at some point in time, and thus become a "solid waste" under RCRA Section 1004(27).

EPA explained in the March 4 letters that pesticides can become "discarded" for purposes of Section 1004(27) under circumstances where they no longer serve their intended purpose. The determination that pesticides have become discarded must be made based on site-specific conditions in each case. In the case of unusable buildings at the KSAAP, the factors considered -- the intended use of the pesticides (to protect the buildings), the buildings' condition (no longer useable), the future intent to demolish the buildings, and the projected land use -- support the determination that the pesticides will no longer be used for their intended purpose and that they will become discarded when the property is sold. When pesticides are discarded, they become solid waste² pursuant to Section 1004(27), and subject to corrective action authority.

¹ See, for example, a letter dated September 29, 1986 from Eileen B. Clausen, Director, Chemical Assessment Division, Office of Solid Waste, USEPA to William L. Warren, in which EPA stated that "commercial chemical products listed in Section 261.33 are not solid wastes (and thus, not hazardous wastes) if they are applied to the land and that is their ordinary manner of use." found at: [http://yosemite.epa.gov/osw/rcra.nsf/b36c11f3e4ba870485256d0900711760/5886FA010316533A852568E300467F7F/\\$file/11182.pdf](http://yosemite.epa.gov/osw/rcra.nsf/b36c11f3e4ba870485256d0900711760/5886FA010316533A852568E300467F7F/$file/11182.pdf)

² EPA agrees that pesticides properly applied for their intended use do not become solid waste under 40 C.F.R. Section 261.2(b) as they do not meet the criteria of that section. Thus, such pesticides are not subject to most of the regulations governing the RCRA hazardous waste generator, transporter, and treatment, storage, and disposal facilities. However, despite not meeting the definition of solid waste in Section 261.2(b), such pesticides remain subject to the requirements for corrective action under Sections 3004(u) and 3008(h).

Section 3004(u) requires corrective action for releases of “hazardous wastes and hazardous constituents” at permitted RCRA treatment, storage, and disposal facilities.³ EPA has interpreted the language in Section 3004(u) to extend to all wastes that are hazardous within the statutory definition in Section 1004(5), not just those listed or identified by EPA.⁴ EPA has further interpreted that language to extend corrective action authority to address hazardous constituents that were contained within nonhazardous solid wastes.⁵ Thus, the pesticides that were used on and around the wooden buildings at the KSAAP will be subject to corrective action under Section 3004(u), as their hazardous nature is not in dispute.

EPA agrees with the Army regarding the importance of consistency in addressing pesticide contaminated soils, and we expect that by clarifying this policy the Agency will promote consistent practices at all RCRA treatment, storage, and disposal facilities subject to corrective action authority, whether on federal or private lands. However, it should be noted that site-specific conditions will determine in each case whether and when pesticides become discarded. In addition, under Section 3006 of RCRA, EPA may authorize qualified states to administer and enforce the RCRA program within the state, including the RCRA corrective action program. Section 3009 of RCRA and the regulations at 40 C.F.R. Section 271.1(i) provide that States can impose requirements that are more stringent than the federal requirements.

Further, when a determination is made that pesticides have been discarded at a RCRA treatment, storage, or disposal facility, the level of pesticide contamination in the soils at each facility and other site-specific factors will determine whether corrective action is necessary to assure protection of human health and the environment. Thus, EPA disagrees with the Army’s concerns regarding the widespread impact of applying corrective action authority to pesticides that are discarded. However, EPA believes that where the level of pesticide contamination in the soils is sufficiently high to trigger corrective action requirements, and future use of the property could result in exposure, protection of human health and the environment requires that the contamination be addressed.

³ RCRA Section 3008(h) provides EPA corresponding authority to require corrective action at non-permitted RCRA treatment, storage, and disposal facilities.

⁴ Corrective Action for Solid Waste Management Units (SWMUs) at Hazardous Waste Management Facilities, 61 Fed. Reg. 19,432, 19,443 (proposed May 1, 1996).

⁵ Ibid.

This fact sheet answers the most frequently asked health questions (FAQs) about aldrin and dieldrin. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to aldrin and dieldrin happens mostly from eating contaminated foods, such as root crops, fish, or seafood. Aldrin and dieldrin build up in the body after years of exposure and can affect the nervous system. Aldrin has been found in at least 207 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA). Dieldrin has been found in at least 287 of the 1,613 sites.

What are aldrin and dieldrin?

Aldrin and dieldrin are insecticides with similar chemical structures. They are discussed together in this fact sheet because aldrin quickly breaks down to dieldrin in the body and in the environment. Pure aldrin and dieldrin are white powders with a mild chemical odor. The less pure commercial powders have a tan color. Neither substance occurs naturally in the environment.

From the 1950s until 1970, aldrin and dieldrin were widely used pesticides for crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, EPA banned all uses of aldrin and dieldrin in 1974, except to control termites. In 1987, EPA banned all uses.

What happens to aldrin and dieldrin when they enter the environment?

- Sunlight and bacteria change aldrin to dieldrin so that we mostly find dieldrin in the environment.
- They bind tightly to soil and slowly evaporate to the air.
- Dieldrin in soil and water breaks down very slowly.
- Plants take in and store aldrin and dieldrin from the soil.
- Aldrin rapidly changes to dieldrin in plants and animals.
- Dieldrin is stored in the fat and leaves the body very slowly.

How might I be exposed to aldrin or dieldrin?

- Dieldrin is everywhere in the environment, but at very low levels.

- Eating food like fish or shellfish from lakes or streams contaminated with either chemical, or contaminated root crops, dairy products, or meats.
- Air, surface water, or soil near waste sites may contain higher levels.
- Living in homes that were once treated with aldrin or dieldrin to control termites.

How can aldrin and dieldrin affect my health?

People who have intentionally or accidentally ingested large amounts of aldrin or dieldrin have suffered convulsions and some died. Health effects may also occur after a longer period of exposure to smaller amounts because these chemicals build up in the body.

Some workers exposed to moderate levels in the air for a long time had headaches, dizziness, irritability, vomiting, and uncontrolled muscle movements. Workers removed from the source of exposure rapidly recovered from most of these effects.

Animals exposed to high amounts of aldrin or dieldrin also had nervous system effects. In animals, oral exposure to lower levels for a long period also affected the liver and decreased their ability to fight infections. We do not know whether aldrin or dieldrin affect the ability of people to fight disease.

Studies in animals have given conflicting results about whether aldrin and dieldrin affect reproduction in male animals and whether these chemicals may damage the sperm.

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

We do not know whether aldrin or dieldrin affect reproduction in humans.

How likely are aldrin and dieldrin to cause cancer?

There is no conclusive evidence that aldrin or dieldrin cause cancer in humans. Aldrin and dieldrin have been shown to cause liver cancer in mice. The International Agency for Research on Cancer (IARC) has determined that aldrin and dieldrin are not classifiable as to human carcinogenicity. The EPA has determined that aldrin and dieldrin are probable human carcinogens.

How can aldrin and dieldrin affect children?

Children can be exposed to aldrin and dieldrin in the same way as adults. There are no known unique exposure pathways for children. Children who swallowed amounts of aldrin or dieldrin much larger than those found in the environment suffered convulsions and some died, as occurred in adults. However, we do not know whether children are more susceptible than adults to the effects of aldrin or dieldrin.

We do not know whether aldrin or dieldrin cause birth defects in humans. Pregnant animals that ingested aldrin or dieldrin had some babies with low birth weight and some with alterations in the skeleton. Dieldrin has been found in human breast milk, therefore, it can be passed to suckling infants.

How can families reduce the risk of exposure to aldrin and dieldrin?

- Since aldrin and dieldrin are no longer produced or used, exposure to these compounds will occur only from past usage.
- Because aldrin and dieldrin were applied to the basement of some homes for termite protection, before buying a home families should investigate what, if any, pesticides have been used within the home.

Is there a medical test to show whether I've been exposed to aldrin and dieldrin?

There are laboratory tests that can measure aldrin and dieldrin in your blood, urine, and body tissues. Because aldrin changes to dieldrin fairly quickly in the body, the test has to be done shortly after you are exposed to aldrin. Since dieldrin can stay in the body for months, measurements of dieldrin can be made much longer after exposure to either aldrin or dieldrin. The tests cannot tell you whether harmful health effects will occur. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The EPA limits the amount of aldrin and dieldrin that may be present in drinking water to 0.001 and 0.002 milligrams per liter (mg/L) of water, respectively, for protection against health effects other than cancer. The EPA has determined that a concentration of aldrin and dieldrin of 0.0002 mg/L in drinking water limits the lifetime risk of developing cancer from exposure to each compound to 1 in 10,000.

The Occupational Safety and Health Administration (OSHA) sets a maximum average of 0.25 milligrams of aldrin and dieldrin per cubic meter of air (0.25 mg/m³) in the workplace during an 8-hour shift, 40 hour week. The National Institute for Occupational Safety and Health (NIOSH) also recommends a limit of 0.25 mg/m³ for both compounds for up to a 10-hour work day, 40-hour week.

The Food and Drug Administration (FDA) regulates the residues of aldrin and dieldrin in raw foods. The allowable range is from 0 to 0.1 ppm, depending on the type of food product.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Aldrin/Dieldrin (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about chlordane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to chlordane occurs mostly from eating contaminated foods, such as root crops, meats, fish, and shellfish, or from touching contaminated soil. High levels of chlordane can cause damage to the nervous system or liver. This chemical has been found in at least 171 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is chlordane?

(Pronounced klôr'dân')

Chlordane is a manufactured chemical that was used as a pesticide in the United States from 1948 to 1988. Technical chlordane is not a single chemical, but is actually a mixture of pure chlordane mixed with many related chemicals. It doesn't occur naturally in the environment. It is a thick liquid whose color ranges from colorless to amber. Chlordane has a mild, irritating smell.

Some of its trade names are Octachlor and Velsicol 1068. Until 1983, chlordane was used as a pesticide on crops like corn and citrus and on home lawns and gardens.

Because of concern about damage to the environment and harm to human health, the Environmental Protection Agency (EPA) banned all uses of chlordane in 1983 except to control termites. In 1988, EPA banned all uses.

What happens to chlordane when it enters the environment?

- Chlordane entered the environment when it was used as a pesticide on crops, on lawns and gardens, and to control termites.
- Chlordane sticks strongly to soil particles at the surface and is not likely to enter groundwater.

- It can stay in the soil for over 20 years.
- Most chlordane leaves soil by evaporation to the air.
- It breaks down very slowly.
- Chlordane doesn't dissolve easily in water.
- It builds up in the tissues of fish, birds, and mammals.

How might I be exposed to chlordane?

- By eating crops grown in soil that contains chlordane.
- By eating fish or shellfish caught in water that is contaminated by chlordane.
- By breathing air or touching soil near homes treated for termites with chlordane.
- By breathing air or by touching soil near waste sites or landfills.

How can chlordane affect my health?

Chlordane affects the nervous system, the digestive system, and the liver in people and animals. Headaches, irritability, confusion, weakness, vision problems, vomiting, stomach cramps, diarrhea, and jaundice have occurred in people who breathed air containing high concentrations of chlordane or accidentally swallowed small amounts of chlordane. Large amounts of chlordane taken by mouth can cause convulsions and death in people.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

A man who had long-term skin contact with soil containing high levels of chlordane had convulsions. Japanese workers who used chlordane over a long period of time had minor changes in liver function.

Animals given high levels of chlordane by mouth for short periods died or had convulsions. Long-term exposure caused harmful effects in the liver of test animals.

We do not know whether chlordane affects the ability of people to have children or whether it causes birth defects. Animals exposed before birth or while nursing developed behavioral effects later.

How likely is chlordane to cause cancer?

The International Agency for Research on Cancer has determined that chlordane is not classifiable as to its carcinogenicity to humans. Studies of workers who made or used chlordane do not show that exposure to chlordane is related to cancer, but the information is not sufficient to know for sure. Mice fed low levels of chlordane in food developed liver cancer.

Is there a medical test to show whether I've been exposed to chlordane?

Laboratory tests can measure chlordane and its breakdown products in blood, fat, urine, feces, and breast milk. The amount of breakdown products measured in body fat or breast milk does not tell how much or how long ago you were exposed to chlordane or if harmful effects will occur.

Has the federal government made recommendations to protect human health?

In 1988, the EPA banned all uses of chlordane. The EPA recommends that a child should not drink water with more

than 60 parts of chlordane per billion parts of drinking water (60 ppb) for longer than 1 day. EPA has set a limit in drinking water of 2 ppb.

EPA requires spills or releases of chlordane into the environment of 1 pound or more to be reported to EPA.

The Food and Drug Administration (FDA) limits the amount of chlordane and its breakdown products in most fruits and vegetables to less than 300 ppb and in animal fat and fish to less than 100 ppb.

The Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Health and Safety (NIOSH), and the American Conference of Governmental Industrial Hygienists (ACGIH) set a maximum level of 0.5 milligrams of chlordane per cubic meter (mg/m^3) in workplace air for an 8-hour workday, 40-hour workweek. These agencies have advised that eye and skin contact should be avoided because this may be a significant route of exposure.

Glossary

Carcinogenicity: Ability to cause cancer.

Long-term: Lasting one year or longer.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

ppb: Parts per billion.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1994. Toxicological profile for chlordane (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about heptachlor and heptachlor epoxide. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: The primary exposure to heptachlor and heptachlor epoxide is from contaminated foods and milk. Little is known about their health effects in humans. At high levels, they may cause damage to your liver and nervous system. Exposure of animals during gestation and infancy can result in damage to the nervous system and the immune systems. Heptachlor and heptachlor epoxide have been found in at least 210 and 200, respectively, of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are heptachlor and heptachlor epoxide?

Heptachlor is a manufactured chemical and doesn't occur naturally. Pure heptachlor is a white powder that smells like camphor (mothballs). The less pure grade is tan. Trade names include Heptagran®, Basaklor®, Drinox®, Soleptax®, Termide®, Gold Crest H-60®, and Velsicol 104®.

Heptachlor was used extensively in the past for killing insects in homes, buildings, and on food crops. These uses stopped in 1988. Currently it can only be used for fire ant control in underground power transformers.

Heptachlor epoxide is also a white powder. Bacteria and animals break down heptachlor to form heptachlor epoxide. The epoxide is more likely to be found in the environment than heptachlor.

What happens to heptachlor and heptachlor epoxide when they enter the environment?

- Heptachlor doesn't dissolve easily in water; heptachlor epoxide dissolves more easily
- They stick strongly to soil particles and evaporate slowly to air.
- Heptachlor epoxide can stay in the soil and water for many years.

- Plants can take up heptachlor from the soil. Levels of heptachlor and heptachlor epoxide can build up in the tissues of fish and cattle.

How might I be exposed to heptachlor or heptachlor epoxide?

- Eating fish, dairy products, and fatty meats from animals exposed to heptachlor in their food.
- Breast milk from mothers who had high exposures can expose breastfed infants.
- Drinking water, breathing air, or touching soil at waste sites that contain these substances.

How can heptachlor and heptachlor epoxide affect my health?

There is no reliable information on health effects in humans. Liver damage, excitability, and decreases in fertility have been observed in animals ingesting heptachlor. The effects are worse when the exposure levels were high or when exposure lasted many weeks.

Although there is very little information on heptachlor epoxide, it is likely that similar effects would also occur after exposure to this compound.

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>**How likely are heptachlor and heptachlor epoxide to cause cancer?**

Lifetime exposure to heptachlor resulted in liver tumors in animals. The International Agency for Research on Cancer (IARC) and the EPA have classified heptachlor as a possible human carcinogen. EPA also considers heptachlor epoxide as a possible human carcinogen.

How can heptachlor and heptachlor epoxide affect children?

Animals exposed to heptachlor during gestation and infancy may be very sensitive to heptachlor and heptachlor epoxide. Changes in nervous system and immune function were found in these animals. Exposure to higher doses of heptachlor in animals can also result in decreases in body weight and death in newborn animals.

How can families reduce the risks of exposure to heptachlor and heptachlor epoxide?

- People who live in homes where heptachlor was used for termite control or on farms where heptachlor was used on crops may have a higher risk of exposure through contaminated crops, soil, water, and air. To avoid exposure from contaminated soil, you should discourage your children from eating dirt. Make sure they wash their hands frequently and before eating. Discourage children from putting their hands in their mouths or other hand-to-mouth activities.
- Heptachlor and heptachlor epoxide are also persistent in food and milk. Eating fish from contaminated water can increase exposure to heptachlor. Do not fish or eat fish from contaminated water. Local fishing advisories can tell you if the water is contaminated.

Is there a medical test to determine whether I've been exposed to heptachlor or heptachlor epoxide?

Laboratory tests can detect heptachlor and heptachlor epoxide in blood, fat, breast milk, and body tissues after exposure to high levels of these chemicals. These tests are

not commonly available at your doctor's office. Most often, the test for heptachlor epoxide is used because heptachlor is quickly changed into heptachlor epoxide in your body. Blood samples are used most often because they are easy to collect. These tests are specific for heptachlor and heptachlor epoxide.

Methods for measuring heptachlor and heptachlor epoxide in body fat are more precise and can detect lower levels than tests that measure levels in blood. If heptachlor or heptachlor epoxide is found in your blood or fat, it is not possible to tell when you were exposed to these chemicals or if harmful health effects will occur.

Has the federal government made recommendations to protect human health?

The EPA requires that drinking water should not contain more than 0.0004 milligrams heptachlor per liter of water (0.0004 mg/L) and 0.0002 mg heptachlor epoxide per liter of water (0.0002 mg/L).

The FDA controls the amount of heptachlor and heptachlor epoxide on raw food crops and on edible seafood. The limit on food crops is 0.01 parts heptachlor per million parts food (0.01 ppm). The limit in milk is 0.1 parts per million of milk fat. The limit on edible seafood is 0.3 ppm.

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.5 milligrams heptachlor per cubic meter of workplace air (0.5 mg/m³) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Heptachlor and Heptachlor Epoxide (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

