



Study: Health Risks Within EPA's Safety Levels

Confined Disposal Facility, Indiana Harbor and Shipping Canal

East Chicago, Indiana

December 2006

Open house and public meeting scheduled

EPA will be hosting an open house and public meeting about the Supplemental Risk Assessment for the confined disposal facility on **Thursday, Dec. 14, 2006. The public meeting will be at 6:30-9 p.m. at East Chicago Central High School, 1100 W. Columbus Drive, East Chicago, Ind.** The meeting will give you the opportunity to hear more information about the study and ask questions.

EPA project team members will also be available for individual questions before the meeting at an open house. **The open house will be held from 3:30-5 p.m. at the Roberto Clemente Community Center, 3616 Elm St., East Chicago, Ind.**

Contact us

If you want more information or need special accommodations for the meeting contact these EPA team members:

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A U.S. Environmental Protection Agency (EPA) study found relatively low health risks to nearby residents from a planned disposal area in East Chicago that will secure polluted mud (sediment) dredged out of the Indiana Harbor and Shipping Canal. The special study is called a supplemental risk assessment (SRA). It looked at the potential pollution that could be released from the site called a confined disposal facility or CDF. The study also examined how much people could be exposed to that pollution and the likelihood (risk) that potentially exposed people could get sick.

The supplemental risk assessment was done by EPA to respond to concerns from the East Chicago community about the safety of the CDF that will be built and operated by the U.S. Army Corps of Engineers (the Corps). The disposal facility is currently under construction on 186 acres of a former refinery site in East Chicago (*see map inside*) and will contain sediment dredged from the harbor and canal starting in 2009. Cancer risks from possible exposure to the contaminated sediment were found to be within EPA's established safety levels. The health risk study also determined residents near the site are relatively safe from getting non-cancer illnesses such as respiratory, nerve and organ damage and reproductive problems. The SRA also looked at the dangers of being exposed to lead and a hazardous chemical called dioxin and concluded those health risks will be comparatively low. (*See the Q&A sections below for more details. The complete supplemental risk assessment can be viewed online at: epa.gov/region5/sites/indianaharbor/*) The supplemental risk assessment will be discussed at a **public meeting Thursday, Dec. 14, at 6:30-9pm at East Chicago Central High School**. Members of the EPA risk assessment team will also be available at an **open house from 3:30-5 p.m. on Dec. 14** to answer any questions residents might have before the meeting. The open house will be held at the **Roberto Clemente Community Center, 3616 Elm St., East Chicago Ind.** (see shaded box on left).

Results similar to past assessment

A new SRA was undertaken in response to public concerns about both the operation of the disposal facility and the previous risk assessment done in 1995. The latest study took a different approach and expanded on the work done 11 years ago. The new risk study evaluated the potential health risks from the CDF that will have to operate under rules limiting pollution releases set by the Indiana Department of Environmental Management (IDEM). Scientists performed the latest health risk assessment with the assumption the CDF will conform to those limits. The results of both the 1995 study and this SRA are similar in terms of estimated cancer and non-cancer risks. In order to maintain channel depths in the Indiana Harbor and Shipping Canal, the Corps must periodically dredge the bottom sediment. The harbor was last dredged in 1972. The area around the harbor, shipping canal and the Grand Calumet River is highly industrialized so the

sediment deposited in the harbor and canal over the years is contaminated with numerous kinds of industrial waste including metals, chemicals and pesticides.

Harbor dredging is expected to begin in 2009. Dredging will also be a positive step toward a cleaner environment by stopping the flow of a lot of pollution into Lake Michigan. EPA Region 5 recognized the continuing health and environmental concerns about the disposal operations and wanted to ensure a safe project so it agreed to conduct another health risk study.

Questions and Answers

EPA has been getting a lot of questions about the supplemental risk assessment so here are some answers along with additional details about the SRA results:

What is a risk assessment?

A risk assessment is a study evaluating health threats posed by potentially hazardous activities or substances under specified conditions.

How was the supplemental risk assessment conducted?

This study examined the effects of 53 different chemicals of concern. In order to determine how the chemicals might move or be deposited, five years of local weather information was used to account for wind, storms and temperatures. Indiana sets limits on the amount of vapors and dust the disposal facility can release each year. To be conservative in estimating health risks, the study assumed the CDF would release the maximum amount of emissions allowed each year. However, IDEM's permit requires the CDF to operate below that limit. This study also took into account the operating schedule that will be followed by the Corps once the dredging begins. Dredging is expected to occur three months out of the year for 30 years. Scientists performing the risk assessment wanted to estimate maximum exposures to pollution from the CDF that a person might have so they made the following assumptions about people living or working near the disposal facility:

- 30 years of possible exposure to pollutants from the CDF for adult residents (30 years is the operating life of the CDF)
- 350 days per year of exposure
- Daily consumption of vegetables from a home garden and fish from local waterways
- Multiple exposures to the contamination through several different methods such as breathing, skin contact, etc.

The following groups were considered for cancer and non-cancer health effects:

- Adults and children living in six nearby neighborhoods
- Students attending two schools near the CDF
- Adults and children who eat fish from nearby waterways
- Adults and children who eat homegrown produce
- Nursing infants

The SRA evaluated the following exposure routes or pathways:

- Chronic (long-term) and acute (short-term) inhalation of vapors and dust from the CDF by adults, children and students
- Long-term consumption of home-grown produce by adults and children
- Chronic incidental swallowing (ingestion) of soil by adults, children and students
- Long-term consumption by adults and children of fish caught in local waterways
- Long-term skin contact with contaminated sediment and soil by adults, children and students

How is risk estimated?

In the case of the CDF, when we talk about health risk, we are talking about the chances of the release of pollutants contained in the secured sediment affecting somebody's health. That chance is expressed in what is called a probability, such as a "one in a million" risk of getting cancer.

Complicated mathematical calculations and formulas are used to determine the final risk for cancer and non-cancer hazard estimates. But the calculations can be summed up in this simple formula:

$$\text{Risk} = \text{Hazard} \times \text{Exposure}$$

Most people see hazard and risk as the same thing, but they are not to environmental scientists. To scientists, hazard is a **potential** source of harm to human health and the environment. The emphasis is on the word potential. Exposure is easier to understand. It involves coming in contact with dangerous substances. It can be hard to understand how hazard, exposure and risk relate to each other. An example that might help is frostbite. Everyone knows that extreme cold poses a hazard (potential problem). But if you wear boots, gloves, a coat and a hat, your chances of getting frostbitten go

way down. In other words, the risk posed by the cold is directly related to how much you are exposed to it.

Health experts are looking at the same kind of factors involved in the confined disposal facility. We know the dredged sediment contains dangerous substances. But the risk of getting sick for local residents and students depends on how much and for how long they are exposed to the pollutants. Risk assessments try to answer these questions.

What are the major conclusions of the latest supplemental risk assessment?

EPA estimates two types of chronic (long-term) human health risks: The risk of developing cancer and the risk of developing non-cancer illnesses. The risk of developing cancer is expressed as the chance or probability that an individual will develop cancer sometime during their lifetime from exposure to pollutants from the CDF. Using the worst-case exposure scenarios for the CDF mentioned in a previous answer, the highest risk of developing cancer for an individual adult or child is estimated to be 1.4 people in 100,000 people (expressed mathematically as 1.4×10^{-5}).

Probabilities do not say for certain that any individual person will absolutely develop cancer from the pollution source, just that there is a chance it could happen. This worst-case cancer health risk found in the latest SRA is considered to be within EPA's established health and safety levels (more than 10 people in 100,000). It must be remembered that almost everyone in the highly industrialized United States is exposed to pollution every day. The challenge is determining at what level the exposure to contamination becomes too dangerous. The health risk from the CDF is not zero, but it is in the range that EPA says is relatively safe.

For non-cancer illness, the study's results show that no individual chemical displays a "hazard quotient" above a level of 1.0. A hazard quotient indicates the extent to which an estimated level of chemical exposure is expected to cause adverse health effects. The hazard quotient is a ratio obtained by comparing the estimated chemical exposure level to a safe or "no effect" exposure level that should not cause serious illness even over the long term. A hazard quotient is determined for each chemical through each exposure pathway. The hazard quotients for all chemicals are then added, and the combined hazard quotients are called the "hazard index" for that exposure pathway.

For an estimated hazard index of **less than 1.0**, EPA will generally recommend no further action; for an estimated hazard index **greater than 1.0**, EPA will generally recommend some sort of action to cut down on the possible exposure to pollutants and health risk. The total hazard index for all the CDF chemicals combined is below 1.0.

EPA also evaluated possible exposure from the confined disposal facility to lead. Lead can be especially harmful to young children and pregnant women. Potential exposure to lead releases from the CDF could occur as the result of wind-blown particles landing on soil in the vicinity of the site. Exposure to lead emissions cannot be evaluated the same way cancer and non-cancer risks are estimated. Instead, EPA uses a complicated computer model that estimates possible increases in blood lead levels for children living near a lead source. The model showed potential lead releases from the CDF will not be significant.

EPA also evaluated dioxin exposure. For local adult residents, dioxin exposure was through locally caught fish and backyard garden vegetables. For 1-year-old infants, dioxin exposure was through breast milk. The dioxin exposure estimates from the CDF were compared with the average national exposures to adults and infants. The dioxin exposures estimated from the disposal site are much lower than the national averages, so the estimated dioxin pollution released from the CDF is not expected to increase health risks.

Finally, the EPA risk assessment examined what may happen when high winds occasionally blow dust and vapors off the disposal site. When compared with levels of pollutants that can cause illness, the study shows the health risks from breathing short-term concentrations of contaminated dust and vapor from the CDF are low.

What will happen in the future to protect our health?

The state of Indiana has set limits on the amount of air pollution that can be released from the site. In order to show that it is staying under this limit, the Corps will conduct modeling (a scientific tool to predict air emissions from the site). The Corps will also operate monitors around the site to measure dust and vapors coming from the CDF when it starts operating. If the site does not exceed the air pollution limits, the health risks should not increase.

East Chicago Public Libraries
Main Branch
and
2401 E. Columbus Drive

Robert Pastrick Branch
1008 W. Chicago Avenue

and at the following locations:

epa.gov/regions/sites/indianaharbor/

The entire supplemental risk assessment as well as this fact sheet are available online at :

Complete SRA Documents

The confined disposal facility is being constructed under strict design standards to stop the pollutants in the dredged sediment from leaking onto nearby land or seeping into underground water (called groundwater in environmental terms). The Army Corps of Engineers will dredge the sediment with a "clamsHELL" bucket and will transport the sand, silt and clay mixture down the canal by barge to the CDF. Water will be added to the sediment so that it can be pumped through a pipe into the disposal site. This practice will avoid having to load and unload sediment from trucks. The dredging is expected to continue 30 years with the actual work performed about three months each year. After 30 years of operation, the site will be capped with clay, soil and grass. It will be maintained and monitored to prevent leaks or releases. Even though EPA did the supplemental risk assessment, the Corps is the lead agency for building and operating the disposal facility.

Dredging and the CDF



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