United States Environmental Protection Agency

EPA Proposes Cleanup Plan for Residential Area

U.S. Smelter and Lead Refinery Superfund Site
East Chicago, Indiana July 2012

To clean up soil contamination in the USS Lead site residential area, the U.S. Environmental Protection Agency is proposing a cleanup plan.[1] The plan calls for EPA to dig up and remove contaminated soil and take it to an off-site facility. Each yard would then be restored with clean soil. Though lead is the most widespread contaminant, arsenic was also found at some locations.

The cleanup plan calls for removing up to 2 feet of contaminated soil and replacing it with clean soil, including 6 inches of topsoil. If workers find contamination deeper than 2 feet, they will lay down a barrier, such as orange construction fencing or landscape fabric, and place clean soil over the barrier. EPA would place controls on the property to ensure the barrier stays in place.

EPA proposed this cleanup plan after studying the site and considering a number of alternatives. EPA recommends Alternative 4A described on Page 3. It protects people and the environment, meets the applicable regulations, is cost-effective and will be effective in the long term.

Before making a final decision, EPA will hold a public meeting and seek comments from the public (*see box, left*). In consultation with the Indiana Department of Environmental Management, EPA may change its proposed plan or choose a new one based on public comments, so your opinion is important. The final cleanup plan will be part of an EPA document called the "record of decision."

Site location

The USS Lead site is made up of two separate areas called "operable units." Operable Unit 1, or OU1, is a 322-acre residential area bounded by East Chicago Avenue on the north, East 151st Street on the south, the Indiana Harbor Canal on the west and Parrish Avenue on the east (*see figure on Page 7*). OU2 is the former USS Lead facility on 151st Street. This proposed plan is only for OU1 – the residential area. The site history for OU2 is included for background information only.

Share your opinions

EPA invites your comments on this proposed cleanup plan from **July 12 to Aug. 11.** There are four ways for you to submit comments:

- Fill out and return the enclosed comment sheet.
- Orally or in writing at the public meeting.
- On the Internet at www.epa.gov/region5/cleanup/publiccomment/usslead-pubcomment.htm.
- Send a fax to Michael Berkoff, 312-353-1263.

Public meeting

Wednesday, July 25, 6:00 p.m.
East Chicago Public Library
2401 E. Columbus Ave.
East Chicago

After a brief presentation, EPA will hold a formal public meeting to accept comments on the proposed plan. A court reporter will record the meeting and all comments.

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You may call the EPA toll-free at 800-621-8431, 8:30 a.m. – 4:30 p.m., weekdays

[1] *Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA, known as the Superfund law) requires the publication of a notice announcing the proposed plan. It also requires a publicmeeting and public comment period. This fact sheet summarizes the technically written proposed plan and other site-related environmental reports that can be viewed at the East Chicago Public Library, 2401 E. Columbus Ave.; the Robert A. Pastrick Library Branch, 1008 W. Chicago Ave.; and the EPA Region 5 office in Chicago.*

Summary of site risks

As part of its investigation, EPA did a study known as a Human Health Risk Assessment. This tells EPA about the current and potential future effects on people from the soil contamination. The HHRA considers everyone who lives and works in the area to potentially be at risk.

The area includes residential, recreational, educational, and industrial and commercial properties. The school and park are included as residential properties because people at these locations are local residents.

The main way people in and around OU1 are exposed to lead is by touching the soil or inhaling small particles of soil. People may also swallow lead if they eat produce from home gardens or do not wash their hands between working in their yard and eating. EPA usually removes the top 2 feet of soil in garden areas and replaces it with 2 feet of clean soil. Because EPA does not know where future gardens may be located, workers will remove 2 feet of soil from the entire yard at each property.

Based on the HHRA and comparisons to naturally occurring levels of lead and arsenic in East Chicago, EPA considers a cleanup level of 400 milligrams per kilogram of lead and 26 mg/kg of arsenic in soil to be protective. Therefore, EPA evaluated alternatives with methods that would lower soil contamination to these levels or lower.

History and background

The U.S Smelter and Lead Refinery Inc. was a primary lead smelter. Smelting operations generated two primary waste materials – blast-furnace slag and lead-containing dust emitted by the blast furnace stack. Blast-furnace slag was stockpiled south of the plant building and spread once a year over an adjoining 21-acre wetland. The lead-containing dust was originally trapped in bag filters. Lead particles have been found downwind of the plant, however, which suggests that all of the lead-containing dust was not contained by the bag filters. The facility was later used to recover lead from scrap metal and old automobile batteries.

In the 1980s, several state and federal actions were taken against the company. In September 1985, the Indiana State Board of Health found USS Lead in violation of state law because lead particles were found downwind of the plant.

Previous investigations

OU1 has been sampled many times by different groups – EPA in 1985, Entact in 1999, EPA/IDEM in 2002, EPA RCRA in 2003 and EPA in 2006.

In 2003, EPA sampled soil in the residential area north of USS Lead and found high levels of lead contamination in some yards, with the highest lead levels being in the southern area, closer to the former smelter.

In 2004, EPA tasked management of USS Lead to the federal Superfund program for cleanup of the residential yards and the wetland.

In April 2006, EPA Superfund re-sampled 14 properties in the residential area. Analysis confirmed that at least 12 properties had lead contamination levels higher than 1,200 parts per million. That finding, combined with other studies, led to an emergency cleanup in 2008 targeting 15 properties. Thirteen of the 15 yards were cleaned up. An additional 16 properties with lead levels higher than 1,200 parts per million were cleaned up in 2011 based on the testing described below.

Between December 2009 and August 2010, EPA collected soil samples from a total of 88 properties, distributed nearly evenly over OU1 for uniform coverage of the area and to better understand the contamination. EPA sampled an average of three residential properties per block, collecting samples from front yards, back yards and drip zones. Drip zone samples were collected from soil beneath the gutters and downspouts of buildings to find out if airborne contamination had concentrated along drip lines of roofs. EPA also sampled the soil in gardens and play areas. Larger properties, such as parks and schools, were divided into quadrants

Remedial action objectives

RAOs are general descriptions of cleanup goals. RAOs are established by considering the medium of concern (soil, in OU1), risk levels of contaminants of concern (lead and arsenic), how the contaminants can get to people and what people are exposed.

EPA has identified the following RAO for OU1: *Reduce to acceptable levels the risk for people from exposure to contaminants of concern in surface and subsurface soil through ingestion, direct contact, or inhalation.*

Remedial action levels

RALs are long-term soil concentration levels used during the analysis and selection of cleanup options. The OU1 preliminary RALs comply with regulatory requirements and support the OU1 RAO. The RALs were calculated based on site-specific risks and hazards from the HHRA. The RALs listed in the table below address the RAO for soil and potential health risks associated with soil at OU1.

Analyte Group	Analyte Name	Units	OU1 Soil RAL
Metals	Arsenic	mg/kg	26.4
	Lead	mg/kg	400 (Residential) 800 (Industrial)

R5 USS LEAD FOIA 05/15/2017 ED_000981_00000459-00002

and each quadrant was sampled. These different sample areas within a property are referred to as "yards."

All soil samples were analyzed for lead. Some were also analyzed for various combinations of other metals, including arsenic, and organic compounds to provide a better understanding of chemical concentrations in shallow soil at OU1.

Yards: The term "yard" means one study area unit. Typically, a study area consists of a front yard and a back yard of residential properties or any quadrant of a park, commercial property, easement or school. A typical property consists of two or more yards.

Based on the representative sampling that was done, EPA estimates that as many as 723 of the 1,271 properties (57%) are likely to require cleanup.

What are the "Constituents of Concern"?

EPA and IDEM have identified two contaminants at this site that pose the greatest risk to human health.

Lead: Lead was detected in surface and subsurface soil at concentrations up to 9,406 mg/kg. Lead is highly toxic and exposure to lead can cause a range of health effects from behavioral problems and learning disabilities, to seizures and death. Children 6 years old and younger are most at-risk because their bodies are growing quickly, and exposure to lead can cause developmental problems.

Arsenic: Arsenic was detected in surface and subsurface soil at concentrations up to 567 mg/kg. Exposure to arsenic can cause various health effects, such as irritation of the stomach and intestines, decreased production of red and white blood cells, skin changes, lung irritation, and increased risk of developing skin, lung, liver or lymphatic cancer.

Cleanup alternatives considered

EPA considered six alternatives for cleaning up OU1. The Agency checked each option against three broad criteria: protectiveness (both short-term and long-term), implementability (including technical and administrative feasibility) and relative cost (capital and operation and maintenance). Each alternative must also comply with appropriate laws and regulations.

This screening evaluation reduced the number of alternatives. EPA eliminated Alternative 2 (institutional controls) and Alternative 5 (in-place treatment by chemical stabilization) because they would not be effective. Alternative 2 does not reduce human health risk because the contaminated soil would remain in place. Alternative 5 was eliminated because the long-term effectiveness of in-place stabilization has not been proven.

Four alternatives passed the initial screening process and were evaluated against seven criteria required by Superfund law (*see box, Page 4*). State and community acceptance are evaluated after EPA proposes a cleanup plan and holds a public comment period.

The recommended alternative provides the best balance of the nine criteria and meets the requirements of federal law. It also protects public health and the environment over the long term, complies with tribal, state and local regulations and is cost effective.

Here are summaries of the four remaining alternatives.

Alternative 1 – No action: EPA always includes this as a comparison point for other options. Under this option, EPA would do nothing to clean up the contaminated property, so there would be no effect on potential health risks. **Cost: $0**

Alternative 3 – On-site soil cover and institutional controls. Contamination would be left in place and capped with a 12-inch-thick soil cover. A visible barrier, such as orange construction fencing or landscape fabric, would be placed over the contaminated soil and then covered with clean soil. The soil cover would consist of 6 inches of imported select borrow material topped with 6 inches of clean top soil. The cover would be placed directly on top of the existing yard and each yard would be restored to its pre-cleanup condition after the soil cover is put in place.

The soil cover would be inspected and repaired as necessary twice a year for the first five years, followed by an annual inspection for years six through 30. Annual repairs would include regrading portions of the cover, placing additional soil to maintain the 12-inch cover and seeding or sodding the yards as needed. Institutional controls, such as limiting gardening to raised beds, would be put in place so that users of the site would not be exposed to contaminants. Also, any subsurface work such as utility maintenance or foundation work must be done in accordance with EPA guidance to protect workers and residents. Sufficient coverage of contaminated soil must be maintained and placed on the yard to return the yard to its original surface. If in the future the yard had to be dug up again past two-feet deep, the marker material would indicate that contaminated soil still existed and additional precautions or steps would need to be taken. **Cost: $ 18.2 million**

Alternative 4A - Excavation of soil exceeding RALs and off-site disposal, plus *ex-situ* treatment option. (EPA's Recommended Alternative) This involves

removing up to two feet of contaminated soil and disposing of it in an off-site landfill. Some treatment using chemical stabilization might be needed after excavation to handle soil with the highest levels of lead contamination. Since no local stockpile area has been identified, the soil would be loaded directly into roll-off containers and taken to the landfill. If EPA identifies a stockpiling location that is acceptable to the community, then it will reconsider stockpiling.

If EPA finds contaminated soil at a depth greater than 24 inches below ground surface, a visual barrier, such as orange construction fencing or landscape fabric, would be put down before workers place the clean backfill soil. Institutional controls would be implemented to protect the barrier.

Excavated soil would be replaced with clean soil, including 6 inches of topsoil, to maintain the original grade. Each yard would be restored to its pre-cleanup condition. Once the properties are sodded or seeded, EPA would water, fertilize and cut the grass for 30 days. After that, property owners would be responsible for the maintenance of their own yards. If any highly contaminated soil is left in place deeper than 24 inches below the ground, EPA would review the cleanup every five years. **Cost: $ 28.9 million**

Alternative 4B - Excavation to native sand, off-site disposal and *ex-situ* treatment. Similar to 4A except this option includes removing all soil down to native sand in the affected yards. Excavated soil would be disposed at an approved landfill and, as necessary, soil with the highest concentrations of lead would be treated using chemical stabilization. Based on sampling results, it is estimated that native sand would be found at no more than 24 inches below ground. EPA found native sand at various levels, some as deep as 24 inches. Sample results showed the native sand beneath the fill soils at the site is both clean and by sight very easily distinguished from soil and fill material. The cost estimate assumes that all soil above the native sand would be dug up and disposed of offsite. The same stockpiling issue exists in 4B as in 4A.

Excavated soil would be replaced with clean soil, including 6 inches of top soil, to maintain the original grade. Each yard would be restored to its pre-cleanup condition. Once the properties are sodded or seeded, EPA would water, fertilize and cut the grass for 30 days. After that, property owners would be responsible for the maintenance of their own yards.

This alternative would result in the removal of all affected soil (since excavations would go down to the native sand, and the native sand layer is clean). There would be no need for institutional controls or for five-year reviews. **Cost: $43.8 million**

Evaluation criteria

EPA uses nine criteria to compare cleanup options:

1. **Overall protection of human health and the environment** addresses whether an alternative adequately protects both human health and the environment. The cleanup plan can meet this criterion by reducing or eliminating contaminants or by reducing exposures to them.
2. **Compliance with applicable or relevant and appropriate requirements** assures that each project complies with federal, tribal and state laws and regulations.
3. **Long-term effectiveness and permanence** evaluates how well an option will work in the long term, including how safely remaining contaminants can be managed.
4. **Reduction of toxicity, mobility or volume through treatment** addresses how well the option reduces the toxicity (the chemical makeup of a contaminant that makes it dangerous), movement and amount of contaminants.
5. **Short-term effectiveness** is how quickly the project achieves protection, as well as its potential to be harmful to human health and the environment while it's being constructed.
6. **Implementability** evaluates the technical feasibility of the cleanup plan, and whether materials and services are available to carry out the project.
7. **Cost** includes estimated capital or startup costs, such as the cost of buildings, treatment systems and monitoring wells. The criterion also considers costs to implement the plan, and operate and maintain it over time. Examples include laboratory analysis and personnel to operate equipment.
8. **State acceptance** is whether the state environmental agency, in this case the Indiana Department of Environmental Management, agrees or disagrees with EPA's recommended alternative.
9. **Community acceptance** evaluates how well the community near the site accepts the option. EPA evaluates community acceptance after it receives and evaluates public comments on its recommended alternative.

Evaluation of alternatives

EPA compared each alternative to nine criteria (*see chart, Page 6*). EPA concluded the "no-action" alternative would not protect people or the environment and it was eliminated from consideration.

Alternatives 3, 4A and 4B would protect human health and the environment. They address potential exposure to contaminants by covering or removing the contaminated soil. Alternative 4B would eliminate potential exposure because all of the contaminated soil would be removed down to native sand. Alternative 3 would leave contaminated soil behind at all properties under a soil cover. Additionally, its protectiveness would completely depend on the long-term maintenance of the soil cover. Alternative 4A would leave contaminated soil in place at the few properties where contamination exists below 2 feet down. Where contaminated soil remains at depth, EPA would rely on institutional controls (such as prohibiting digging) to prevent exposure.

Alternatives 3, 4A and 4B would achieve the regulatory requirements that are either applicable or relevant and appropriate.

All three remaining alternatives are proven technologies that meet the requirements for long-term effectiveness and permanence. Compared to Alternative 3, Alternatives 4A and 4B provide an additional level of protectiveness because waste will be removed and disposed off-site. Alternative 4B provides the greatest degree of long-term effectiveness and permanence because all highly contaminated soil would be removed.

Alternatives 4A and 4B would reduce the toxicity and mobility of soil with high lead levels through ex-situ treatment prior to disposal, but would not reduce the volume of contaminated materials. Since no treatment is applied under Alternative 3, this alternative would not reduce the toxicity, mobility or volume of contaminated material.

Each of the alternatives would have short-term effects, including increased potential for exposure to lead-contaminated soil and construction-related risks.

Workers could be exposed to dust and contaminated soil during excavation. During construction, there could be increased traffic and noise from construction vehicles, increased wear on local roads, potential for vehicle accidents and other risks associated with construction work. A health and safety plan will help prevent some of these problems, as will keeping excavation areas properly wetted to reduce dust, planning truck routes to minimize disturbances to the surrounding community, and other best management practices.

Alternative 3 requires the least disturbance of lead-contaminated soil and shortest construction time. Compared to Alternative 3, Alternatives 4A and 4B would have greater short-term effects because of the amount of materials moved to and from the site, as well as the increased duration of construction.

Alternative 3 would take an estimated 18 months to complete, while 4A would probably take roughly 26 months, and 4B about 40 months. The longer a project takes, the greater the potential for problems from truck traffic and vehicle accidents, construction-related and exposure risks to workers, and additional qualitative impacts to the local community, such as noise and dust.

All of the alternatives can be readily implemented and have been used successfully for other environmental cleanup projects. Alternative 3 is more difficult to implement than 4A and 4B, since it requires more detailed design plans to maintain safe grading for each yard. Raising the grade of affected yards by 1 foot under Alternative 3 would pose technical and administrative challenges.

IDEM supports EPA's recommended alternative, 4A. Community acceptance will be evaluated after the public comment period (*see box, Page 1*).

EPA's recommended alternative

EPA recommends Alternative 4A because it has the best balance of the evaluation criteria. Once implemented it would:

- Immediately prevent exposure to contaminated soil that poses a risk to residents.
- Prevent future exposure to residents with minimal property use restrictions.
- Allow current land uses to continue.

Alternative 4A would achieve these goals within a reasonable time and at a lower cost. It requires minimal efforts to maintain long-term protectiveness. It meets the threshold criteria, offers a high degree of long-term effectiveness and permanence, and represents the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria.

Based on the information available at this time, EPA and IDEM agree that Alternative 4A will protect human health and the environment, comply with regulatory criteria, be cost-effective, and use permanent solutions and alternative treatment technologies to the maximum extent practicable.

Next steps

Before EPA makes its decision final, the Agency will consult with IDEM and review public comments.

EPA encourages you to review and comment on the proposed cleanup plan. More detail on the cleanup options is available in the official documents on file at the information repositories at the East Chicago Public Library 2401 E. Columbus Ave. and the Robert A. Pastrick Library Branch, 1008 W. Chicago Ave. or EPA's website at www.epa.gov/region5/cleanup/usslead.

EPA will respond to the comments in a document called a "responsiveness summary," a part of the record of decision that describes the final cleanup plan.

The Agency will announce the selected cleanup plan in a local newspaper and will place a copy in the information repositories and post it on EPA's website.

Chart comparing cleanup options with the nine Superfund remedy selection criteria

Evaluation Criterion	Alternative 1	Alternative 3	Alternative 4A*	Alternative 4B
Overall Protection of Human Health and the Environment	*	*	*	*
Compliance with ARARs	*	*	*	*
Long-term Effectiveness and Permanence	*	*	*	*
Reduction of Toxicity, Mobility, or Volume through Treatment	*	*	*	*
Short-term Effectiveness	N/A**	*	*	*
Implementability	N/A**	*	*	*
Alternative Cost ($ millions)	$0	$18.2	$28.9	$43.8
State Acceptance	The State of Indiana supports EPA's preferred Alternative4A.			
Community Acceptance	Will be evaluated after the public comment period			

* Fully meets criterion * Partially meets criterion * Does not meet criterion

* EPA's preferred alternative
** N/A: not applicable, since no remedy is being implemented in the No-Action Alternative

Map showing the boundaries of Operating Unit 1.

EPA Proposes Soil Cleanup Plan for

USS Lead Site East Chicago, Indiana

(details inside)

Attend an information session and public meeting to find out more about the recommended cleanup plan and to provide your comments to EPA.

Wednesday, July 25, 2012, 6:00 p.m.
East Chicago Public Library
2401 E. Columbus Ave.
East Chicago

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