United States Environmental Protection Agency

EPA Proposes Cleanup Changes for Polluted Water

Crab Orchard National Wildlife Refuge

Marion, Illinois April 2013

Your opinion wanted

U.S. EPA invites your comments on the proposed changes to the cleanup plan for the Crab Orchard National Wildlife Refuge. Your input is important because U.S. EPA may modify or select another cleanup option based on public comments. There are several ways your voice can be heard during the **public comment period** that runs from April 17 through May 16, 2013.

- Fill out and return the enclosed comment form by the deadline.
- E-mail comments to U.S. EPA Remedial Project Manager **Nan Gowda** at gowda.nanjunda@epa.gov or fax to 312-582-5184.
- Attend the **public meeting** May 1, 2013, 7-9 p.m., Crab Orchard National Wildlife Refuge Visitor Information Center, Marion, and submit a written or oral statement.

Contacts

If you have questions about the comment period or public meeting or want to learn more about the refuge site you can contact these team members:

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The U.S. Environmental Protection Agency, working with the U.S. Fish and Wildlife Service and Illinois EPA, is proposing changes to the cleanup plan for a portion of the Crab Orchard National Wildlife Refuge in Marion. The proposed changes are aimed at an underground "plume" of water located in the eastern portion of the refuge (called “Plume 2” by U.S. EPA). A plume is a mass of contaminated water flowing underground. U.S. EPA had initially selected a cleanup plan for Plume 2 in 2007 that called for using electrical current to boil the water and remove the contaminated steam. Concerns about the safety of that system caused officials to re-evaluate and then develop additional cleanup options. From those alternatives, U.S. EPA prefers a cleanup plan that targets the contaminated soil contributing pollution to the plume. U.S. EPA’s preferred option calls for mixing iron into the contaminated soil to react with and degrade the pollutants. This option also includes monitoring groundwater pollution and prohibiting the installation of drinking water wells at the location until water quality is restored and meets health standards. “Groundwater” is an environmental term for underground sources of fresh water.

U.S. EPA will not select a final cleanup plan until after it reviews comments received from the public at a meeting and public comment period *(see left-hand box for ways you can participate in the decision-making process)*. U.S. EPA is issuing the proposed cleanup plan as part of its public participation responsibilities under the federal Superfund law.[1] U.S. EPA may modify the proposed cleanup plan or select another option based on new information or public comments so your opinion is important.

The groundwater at the Crab Orchard National Wildlife Refuge could potentially be tapped for drinking water, but the concentration of hazardous volatile organic compounds, or VOCs, currently makes it unsafe for human use. U.S. EPA is working with the U.S. Fish and Wildlife Service and Illinois EPA to clean up the pollution. U.S. EPA came up with five cleanup alternatives for Plume 2. The alternatives are described in more detail later in this fact sheet. U.S. EPA examined the costs and effectiveness of each cleanup alternative and then selected its preferred option pending public comments.

About the site

Crab Orchard National Wildlife Refuge, located five miles west of Marion, Ill., *(see map P. 4)* is centered on Crab Orchard Lake, a nine-mile long, 7,000-acre manmade reservoir built in 1940. The area also includes two smaller lakes. The refuge covers 43,000 acres and is managed by the U.S. Department of Interior Fish and Wildlife Service for wildlife, recreation, agriculture and industry. The industrial facilities are located within the eastern portion of the refuge. This area is generally closed to the public, except for limited access

[1] *Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA known as the Superfund law) requires public notice about this proposed cleanup plan through a meeting, comment period and newspaper announcement. This fact sheet summarizes information contained in the feasibility study and other documents that can be reviewed at the Crab Orchard Refuge office and at the Morris Library, Southern Illinois University, Carbondale.*

for workers and restricted access for hunters. The industries caused significant pollution and in 1987 U.S. EPA added the area to its National Priorities List. The NPL is a roster of the nation's hazardous waste sites eligible for cleanup under the federal Superfund program.

Cleanup history

U.S. EPA divides complex cleanup projects into smaller, more manageable parts called "operable units" or OUs. The Crab Orchard industrial section contains seven OUs. The proposed cleanup plan changes involve an operable unit labeled the PCB OU. In a legal decree, Schlumberger Industries Inc. was named as the financially responsible party for the PCB OU. U.S. EPA, Fish and Wildlife Service, Illinois EPA and Schlumberger have been working on the PCB OU since 1990 by cleaning up contaminated soil and monitoring underground water supplies. The monitoring discovered the groundwater was heavily polluted with VOCs in three areas *(referred to as Plumes 1, 2 and 3, see map P. 4).* VOCs are often used in manufacturing and are dangerous because they easily evaporate or dissolve in water. VOCs include numerous kinds of chemicals with long names such as dichloroethene and trichloroethylene.

In 2007, U.S. EPA signed a document called a record of decision amendment or ROD Amendment, which concerned the groundwater cleanup actions for Plumes 1 and 3. At that time, the electrical treatment was also proposed for Plume 2, but concerns about potential stray voltage harming workers or igniting stored military munitions stopped that idea. The current proposed cleanup plan is designed to deal with contamination related to Plume 2. The VOCs connected to Plume 2 were found to be saturating the soil around two industrial buildings. The latest proposed cleanup plan is designed to stop the spread of Plume 2 and eventually lower the concentration of the VOCs in the groundwater to safe levels for drinking.

Risks to people and the environment

Currently, the contaminated groundwater is not being used for drinking water and so is not threatening human health. But the state of Illinois has classified the underground water supply as a potential drinking water source. Federal law requires potential water supplies to meet health standards. But at certain spots in this particular industrial area the concentration of dangerous chemicals is at least 10,000 times greater than the allowable limits for drinking water.

Cleanup options

As mentioned earlier, groundwater testing identified a distinct plume in the PCB OU. Plume 2 is located near Buildings I-1-2 and I-1-3. All of the cleanup options include monitoring of the underground water to confirm whether the cleanup method works. And all of the options include "institutional controls," which in this case means prohibiting the digging of water wells in the area until the underground water supplies meet drinking water standards. The cleanup options include various combinations of the following cleanup techniques:

- **Excavation** is a technology that uses digging equipment to remove contaminated soil. The contaminated soil is then disposed of at an appropriate off-site landfill.
- **Soil Mixing with Zero Valent Iron (ZVI)** is a technology that uses a large auger system equipped with nozzles to add clay-granular ZVI "slurry" into the soil while mechanically breaking up and mixing the soil. Slurry is a word describing a liquid mixture, in this case water and clay. The ZVI degrades the VOCs through chemical reactions and also promotes subsequent biological decay of the VOCs.
- **Thermal Conductive Heating** is a technology that uses heat generated through electrical power to move the VOCs, which are then collected and appropriately managed.

U.S. EPA evaluated each cleanup alternative against nine criteria required by law *(see box P. 3 for an explanation of the criteria).* The options are summarized below, but full details are available in the technical documents on file at the Crab Orchard Refuge Headquarters and SIU's Morris Library.

Alternative 1: No Action – U.S. EPA always includes a no action option as a comparison point for the other alternatives. No Cost.

Alternative 2: Excavation, Long-Term Management, and Institutional Controls. Cost – $10 million.

Alternative 3: Soil Mixing with Zero Valent Iron *(this is U.S. EPA's preferred option)* – This option includes monitoring of the underground water to confirm whether the cleanup method works. It also includes long-term management and institutional controls. Cost –$1.3 million.

Alternative 4: Source Area Thermal Conductive Heating, Long-Term Management, and Institutional Controls. Cost – $4 million.

Alternative 5: Long-Term Management and Institutional Controls. Cost – $344,000.

Evaluation of Cleanup Alternatives

U.S. EPA evaluated the various cleanup options for Plume 2 against the nine criteria required by the Superfund law and selected its preferred Alternative 3.

Options were first judged in terms of how well they protect human health and the environment and whether they comply with environmental laws. If an option meets these two criteria, it is then evaluated against the remaining criteria.

All of the alternatives, with the exception of Alternative 1 (No Action), provide adequate protection of human health and the environment and comply with environmental laws (ARARs).

Explanation of evaluation criteria

U.S. EPA compares each cleanup option or alternative with these nine criteria established by federal law:

1. Overall protection of human health and the environment examines whether an option protects both human health and the environment. This standard can be met by reducing or removing pollution or by reducing exposure to it.

2. Compliance with applicable or relevant and appropriate requirements (ARARs) ensures options comply with federal, state and local laws.

3. Long-term effectiveness and permanence evaluates how well an option will work over the long-term, including how safely remaining contamination can be managed.

4. Reduction of toxicity, mobility or volume through treatment determines how well the option reduces the toxicity, movement and amount of pollution.

5. Short-term effectiveness compares how quickly an option can help the situation and how much risk exists while the option is under construction.

6. Implementability evaluates how feasible the option is and whether materials and services are available in the area.

7. Cost includes not only buildings, equipment, materials and labor but also the cost of maintaining the option for the life of the cleanup.

8. State acceptance determines whether the state environmental agency (in this case Illinois EPA) accepts the option. U.S. EPA evaluates this criterion after receiving public comments.

9. Community acceptance considers the opinions of nearby residents and other stakeholders about the proposed cleanup plan. U.S. EPA evaluates this standard after a public meeting and comment period.

A summary of the evaluation of the remaining criteria are discussed in more detail below.

- **Long-term effectiveness and permanence:** Alternatives 1 and 5 take longer to work than Alternatives 2, 3, and 4.
- **Reduction of Toxicity, Mobility, Volume (TMV):** Alternatives 3 and 4 are effective in reducing the TMV of contaminants in the groundwater through treatment. Alternatives 1, 2, and 5 do not use treatment as a cleanup component.
- **Short-term effectiveness:** Alternative 2 poses a high short-term risk to workers and the community due to the transportation of hazardous and nonhazardous waste from the excavated area to disposal facilities. Alternative 3 has the lowest short-term risk because it will be completed quickly. Alternative 4 takes longer than Alternative 3, but poses less short-term risk than Alternative 2.
- **Implementability:** All of the alternatives are easily implemented administratively. Alternatives 1, 4 and 5 are relatively easy to implement technically. Alternative 2 is technically feasible, but the depth of the excavation and presence of potential obstacles make this alternative more difficult to implement than the others. Alternative 3 is technically feasible and not as logistically challenging as Alternatives 2 and 4 since it requires less time to implement.
- **Cost:** Alternative 5 has the lowest total cost and Alternative 2 has the highest total cost. Costs for Alternatives 3 and 4 fall between those of Alternatives 2 and 5. No costs are associated with Alternative 1 (No Action).
- **State Acceptance:** Illinois EPA, as a support agency, will review the preferred cleanup plan for acceptance, and U.S. EPA will evaluate the state's assessment.
- **Community Acceptance:** U.S. EPA will accept oral and written comments on the proposed cleanup plan during the public meeting on May 1, 2013, and throughout the 30-day public comment period that runs until May 16, 2013.

For Plume 2, U.S. EPA prefers Alternative 3, which calls for soil mixing with zero-valent iron to treat the soil source of the plume, long-term management and institutional controls. This alternative was preferred over the others because it protects human health and the environment, complies with ARARs, has better effectiveness than other alternatives, satisfies preference for treatment and has lower cost ($1.3 million) compared to Alternatives 2 and 4.

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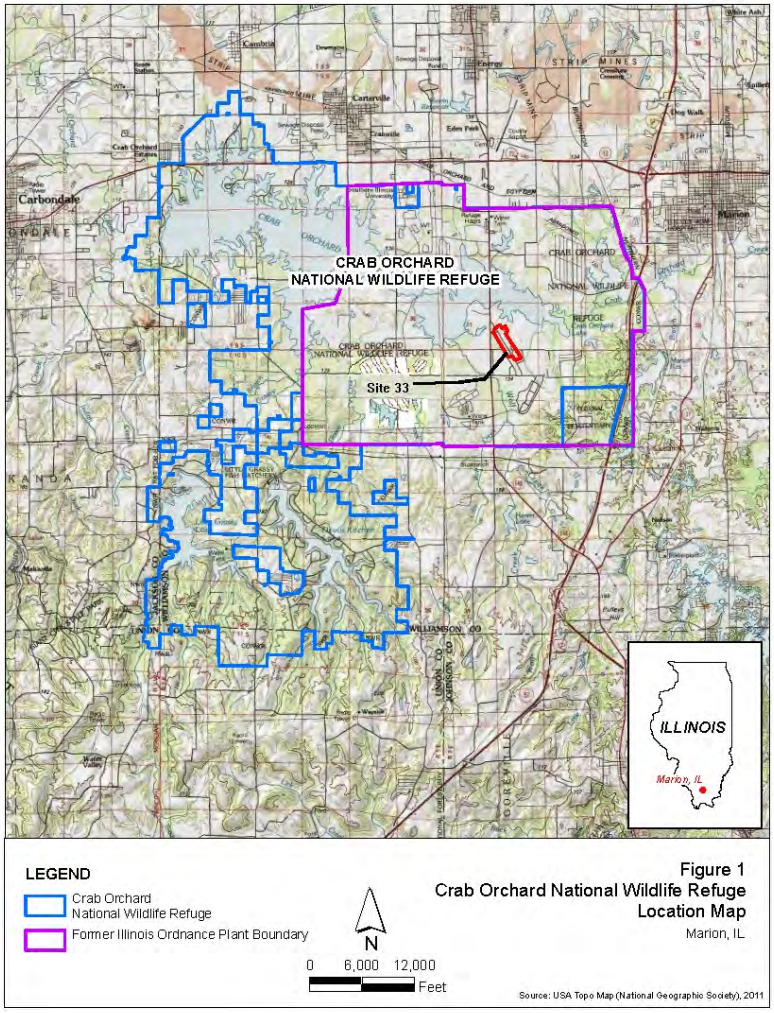

Figure 1
Crab Orchard National Wildlife Refuge
Location Map
Marion, IL

Left *– Map shows location of Crab Orchard National Wildlife Refuge west of Marion, Ill. One section of the refuge (Site 33) used as an industrial area is the subject of these proposed cleanup plan changes.*

Below – *Map shows the locations of contaminated plumes under industrial sections of the wildlife refuge. A plume is a mass of contaminated underground water. These proposed cleanup plan changes concern Plume 2.*

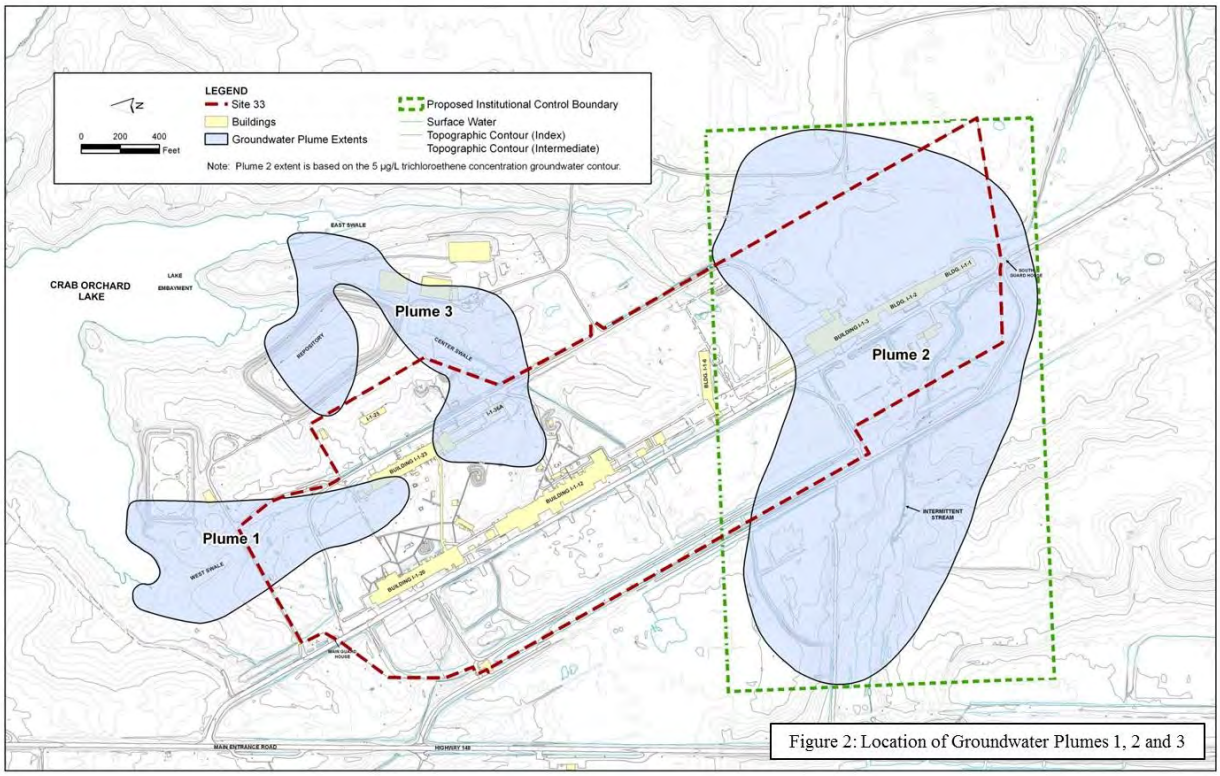

Figure 2: Location of Groundwater Plumes 1, 2 and 3

Use This Space to Write Your Comments

U.S. EPA is interested in your comments on the proposed changes to the cleanup plan for the Crab Orchard National Wildlife Refuge Plume 2. You may use the space below to write your comments. You may submit this at the May 1, 2013, public meeting, or detach, fold, stamp and mail to U.S. EPA Project Manager Nan Gowda. Comments must be postmarked by May 16, 2013. If you have any questions, please contact U.S. EPA Community Involvement Coordinator Cheryl Allen at 312-353-6196, or toll free at 800-621-8431, 8:30 a.m. – 4:30 p.m., weekdays. Comments may also be faxed to Nan Gowda at 312-582-5184 or sent by the Internet at www.epa.gov/region5/cleanup/sangamo/index.html.

Name _____

Affiliation _____

Address _____

City _____ State _____ ZIP _____

Crab Orchard National Wildlife Refuge
Comment Sheet

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Place
First
Class
Postage
Here

Nan Gowda
U.S. EPA Remedial Project Manager
Superfund Division
U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, Il 60604-3590

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The preferred Alternative 3 will take 75 to 280 years to clean up the contaminated plume.

Next steps

U.S. EPA, in conjunction with the Illinois EPA and the U.S. Fish and Wildlife Service, will provide information regarding the cleanup of the PCB OU within the Crab Orchard National Wildlife Refuge Superfund site to the public through public meetings, in the Administrative Record for the site and in announcements published in the *Marion Daily Republican* and *Southern Illinoisan* newspapers. U.S. EPA encourages the public to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted at the location by reading the more detailed technical documents online at www.epa.gov/region5/cleanup/sangamo/index.html or in the information repositories.

U.S. EPA and the other agencies will evaluate public reaction to the preferred cleanup option during the comment period and public meeting before deciding on a final choice. Based on new information or public comments, U.S. EPA may modify its proposed option or select another of the cleanup alternatives outlined in this fact sheet.

U.S. EPA encourages you to review and comment on the cleanup choices. Much more technical detail on the cleanup alternatives is available in the official documents on file at the Crab Orchard Refuge Headquarters and Morris Library at Southern Illinois University. U.S. EPA will respond to the comments in a file called a responsiveness summary, which will be part of the final decision document called the record of decision amendment. The ROD amendment describes the final cleanup plan selected for the site. U.S. EPA will announce the selected cleanup plan in a local newspaper and will place a copy on file in the information repositories.

Map below shows a close-up view of the proposed treatment area and the location of monitoring wells and soil borings.

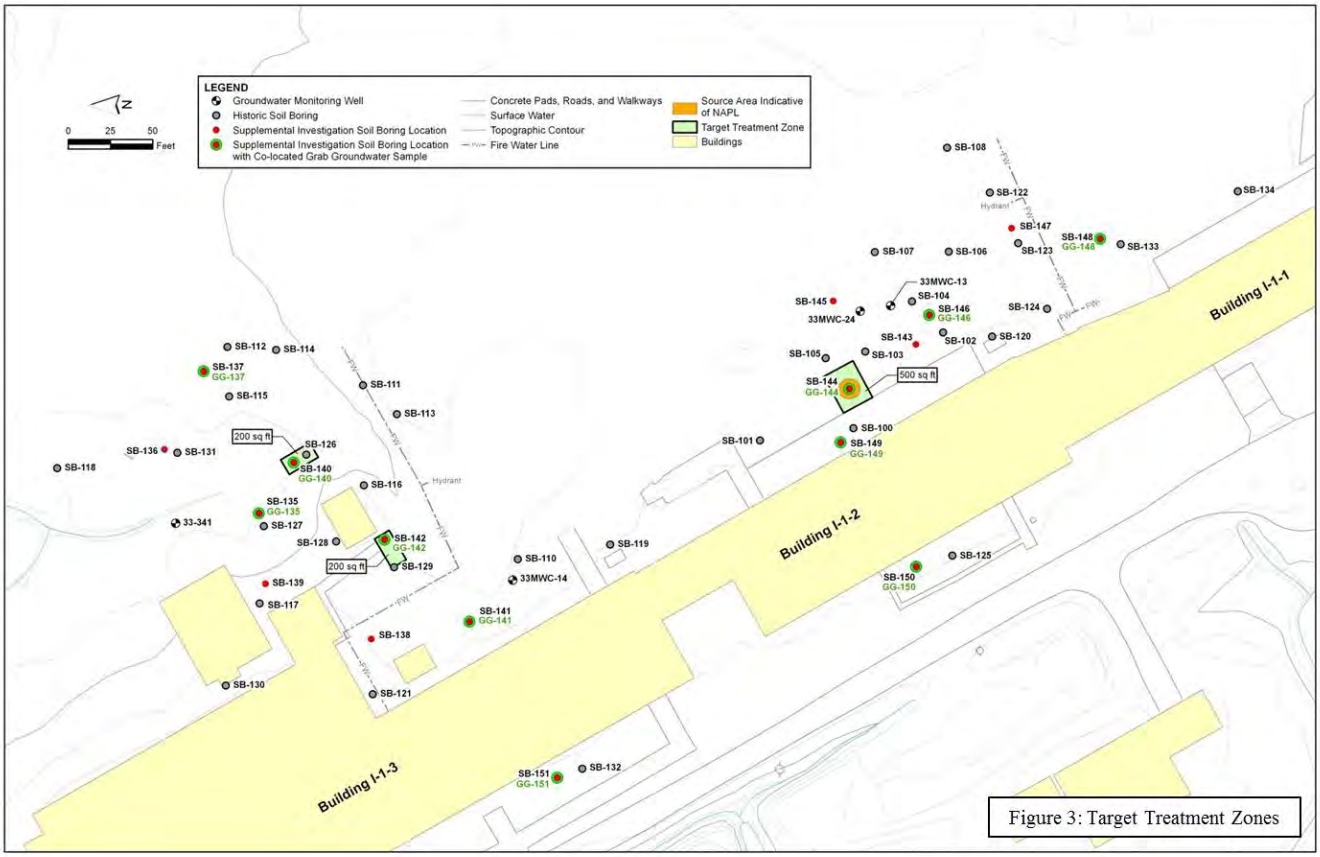

Figure 3: Target Treatment Zones

Cleanup Plan Changes Proposed for Crab Orchard National Wildlife Refuge

Marion, Illinois

Public Meeting: May 1, 2013
Comment Period: April 17 – May 16, 2013

(details inside)

More information

If you need special accommodations to attend the public meeting, please contact Ms. Suzanne Hamilton of the U.S. Fish and Wildlife Service at 618-998-5961 one week prior to the meeting.

Crab Orchard National Wildlife Refuge Visitor Information Center
Marion, Illinois
Located five miles west of Marion, and five miles south of Herrin, on state Route 148. From Marion, go west on Illinois 13 about three miles west of Interstate 57 to Route 148. Turn left and go south two and a half miles. The Visitors Center is located on the left.

Website:
www.epa.gov/region5/cleanup/sangamo/index.html

CRAB ORCHARD NATIONAL WILDLIFE REFUGE: Proposed Cleanup Changes

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