U.S. EPA Proposes Cleanup Plan for Tar Pollution

North Shore Gas South Plant

Waukegan, Illinois May 2015

You are invited

On Wednesday, May 20, 2015, U.S. EPA will hold an open house from 3 to 6 p.m. and a public meeting from 6 to 7:30 p.m. at the Lilac Cottage in Bowen Park, 1911 N. Sheridan, Waukegan. Public comments will be accepted at the meeting.

Read the proposed plan

You may review the detailed cleanup plan at http://www.epa.gov/region05/cleanup/northshoregassouth/ or one of the information repositories:

Waukegan Public Library
128 N. County St.
Waukegan

U.S. EPA Region 5 Offices
77 W. Jackson Blvd.
7th Floor Records Center
Chicago

Public comment period

U.S. EPA encourages you to comment on the proposed plan during the comment period May 6 - June 5. There are several ways to submit written comments:

- Fill out and mail the enclosed comment sheet.
- Go to http://www.epa.gov/region05/cleanup/northshoregassouth/

Contact information

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The U.S. Environmental Protection Agency is proposing a cleanup plan to manage an area of undissolved tar-like liquids beneath the North Shore Gas South Plant in Waukegan, Illinois. The tarry substance is called dense non-aqueous phase liquid, or DNAPL. The cleanup plan proposes an alternative that will deal with the DNAPL by pumping water through the pollution and then collecting it. DNAPL is the primary source of groundwater contamination at the site. "Groundwater" is an environmental term for underground supplies of fresh water. This is an interim action to specifically tackle the DNAPL. A final cleanup plan to manage other soil and groundwater contamination will be issued after these cleanup steps are completed.

This proposed plan fact sheet provides background information about the South Plant, describes cleanup alternatives U.S. EPA considered for the DNAPL area, and identifies the federal Agency's recommended alternative.[1]

Before making a final decision, U.S. EPA will seek comments from the public (see box, left). The federal Agency, in consultation with Illinois EPA, may select a different cleanup alternative based on public comments; so your opinion is important. The final cleanup plan will be part of a document called the Record of Decision, or ROD.

About the site

The 23-acre South Plant is a former manufactured gas plant, or MGP site. Manufactured gas plants were very common in the last half of the 19th century and first half of the 20th. They extracted gas from coal and piped it to homes and businesses for lighting, heating and cooking. Unfortunately, the process produced hazardous byproducts that were usually just buried on-site. The South Plant includes the 1.9-acre former MGP property located at 2 N. Pershing Road and 1 S. Pershing Road in Waukegan (*see Figure 1 on next page*), and several adjacent properties.

The site property is bounded to the north by a city-owned Metra train parking lot and to the west by a Union Pacific Railroad yard. South Waukegan Harbor and Lake Michigan are located about 600 feet east of the property. South Waukegan Harbor was constructed in the mid-1980s as a marina for recreational boats and has a southern exit to Lake Michigan. The Waukegan River is located 1,000 feet south of the property and flows east past the Akzo property into Lake Michigan.

[1] *Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, known as the Superfund law) requires publication of a notice and a proposed plan. It also requires a public comment period and the opportunity for a public meeting. This fact sheet summarizes the technical written proposed plan and other site-related environmental reports that can be viewed online, at the Waukegan Public Library, 128 N. County St., and at the EPA offices in Chicago.*

Site history

Most MGPs stopped operating by the 1960s and were torn down. Typical MGPs included buildings, oil tanks and storage sheds. The Waukegan Pipeline Service Co. constructed the original South Plant MGP in 1897 and the Waukegan Gas, Light, and Fuel Co. purchased it in 1898. North Shore Gas acquired the facility in 1900. The Former South Plant MGP operated from 1898 to 1927. NSG shut it down in 1927 but later operated it during high demand periods between 1935 and 1946. NSG permanently closed the South Plant MGP in 1946 and demolished it in 1951.

The site generated various byproducts and wastes such as coal tar, wastewater sludge, ash, tar/oil emulsions, polynuclear aromatic hydrocarbons, or PAHs, and inorganic chemicals such as cyanide, arsenic and lead. These contaminants have been found in the site soil, groundwater (including DNAPL), and adjacent surface water and sediment samples.

Site cleanup history

Illinois EPA conducted initial soil testing activities at the site in 1991. Since the early 1990s, North Shore Gas has performed investigations and cleanup activities at the South Plant MGP site. NSG has taken soil and groundwater samples to identify sources of contamination. The utility also conducted tests to identify the DNAPL area in groundwater at the site.

NSG conducted a site investigation in 1999 to further evaluate effects on human health and the environment. This investigation involved soil and groundwater sampling for chemical compounds, metals and cyanide. Most of the soil samples showed contaminants in the upper 3 feet of soil. Effects from oily and petroleum compounds were present in soil and groundwater.

What are DNAPLs?

U.S. EPA proposes a cleanup plan to manage an area of DNAPL contamination below the South Plant site. DNAPLs are made up of dense oily liquids, such as gasoline, chlorinated solvents like TCE or PCE, and wood-treating chemicals such as creosote, that do not readily mix with water.

Chemicals that are denser than water, such as those found at the South Plant site, create DNAPLs because they tend to sink to the bottom of groundwater. The DNAPL found at the South Plant MGP site is the main source of the groundwater contamination above it.

The DNAPL is a continuing source of groundwater contamination at the site and needs to be removed or contained, preferably by treatment, due to its toxicity and volume.

Contamination by DNAPLs can be difficult to clean up because they can move through soil and groundwater until they are blocked by a barrier that allows the liquid to pool. DNAPLs are also slow to dissolve.

Figure 1: North Shore Gas – South Plant Location

Between 2002 and 2006, North Shore Gas conducted additional investigations on the South Plant site and on surrounding properties.

Based on these investigations, between 2003 and 2004, NSG excavated a layer of 3.5 feet of contaminated soil and disposed of it off-site. Some areas had deeper soil excavations extending to the top of the water table. NSG then installed a plastic liner in the excavated area and backfilled with clean soil.

In 2006, the utility began removing DNAPL contamination from groundwater in 19 locations on the site. As of January 2015, about 1,370 gallons of DNAPL have been recovered. NSG estimates the total amount of DNAPL present in the subsurface at the site at about 527,000 gallons.

Risks to human health and the environment

Under the supervision and review of U.S. EPA, NSG conducted a study of potential risks to public health and the environment. The following general conclusions came out of the risk assessment:

- DNAPL is a continuing source of groundwater contamination. The site groundwater does not meet drinking water standards and it should not be used for that purpose. (The City of Waukegan obtains its municipal water supply from Lake Michigan.)
- Construction crews working on the site could be exposed to contaminated soil, groundwater and harmful vapors.
- There are potential vapor risks in certain areas of the site if houses or factories were built on top of the contaminated groundwater.

NSG also evaluated risks to wildlife on the site and concluded that the area is highly industrialized and does not support wildlife habitat.

Based on these conclusions, U.S. EPA determined the preferred cleanup plan identified in this fact sheet is necessary to protect human health and the environment.

Cleanup options considered

U.S. EPA considered seven cleanup alternatives for the DNAPL contamination. Each alternative identified below was evaluated in detail against the selection criteria established by federal law (*see box, right*). The last two criteria, state and community acceptance, will not be assessed until after the comment period ends June 5.

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** determines whether an option is protective through the reduction or removal of pollution or by reducing exposure to it.
2. **Compliance with applicable or relevant and appropriate requirements (ARARs)** evaluates whether the options comply with federal and state laws and requirements or if waivers apply.
3. **Long-term effectiveness and permanence** considers how well an alternative will work over time, including how safely remaining contamination can be managed.
4. **Reduction of toxicity, mobility or volume through treatment** evaluates how well each option reduces the harmful effects, movement and the amount of contaminants.
5. **Short-term effectiveness** considers how long the cleanup will take and the risks to workers, residents and the environment during its construction.
6. **Implementability** looks at how practical an option is and whether materials and services are readily available.
7. **Cost** includes the expenses for buildings, equipment, materials, labor, operation and maintenance over the life of the remedy. A cleanup is considered cost-effective if its costs are proportionate to its overall effectiveness.
8. **State acceptance** is whether the state environmental agency — in this case Illinois EPA — agrees with the recommended option. The EPA evaluates this criterion after receiving public comments.
9. **Community acceptance** considers the opinions of the public about the proposed cleanup plan. U.S. EPA evaluates this criterion after a public hearing and comment period.

Because some contamination would remain on the site under all alternatives, U.S. EPA would conduct a review every five years on the property to make sure human health and the environment remain protected.

D1 – No Action
Under the no-action alternative, U.S. EPA would take no further actions to deal with potential exposure to DNAPL at the site or to clean up the DNAPL as a continual source of groundwater contamination. There is a cost because of future site reviews. The no-action alternative is used as a baseline for comparisons to the other alternatives. **Cost: $50,000**

D2 – Institutional Controls
Under Alternative D2, U.S. EPA would place institutional controls such as site restrictions on the property to minimize human exposure to DNAPL. Because DNAPL is found in groundwater, institutional controls would restrict the use of the underground water supplies as a drinking water source until health standards are met. This alternative would also require worker cautions as well as health and safety planning to protect potential future construction workers from exposure to DNAPL. **Cost: $129,000**

D3 – Vertical Engineered Barrier
Under Alternative D3, U.S. EPA would install a vertical engineered barrier around the DNAPL contamination. The vertical engineered barrier would contain both the groundwater and DNAPL, thereby reducing the movement of the contamination. **Cost: $13.3 million**

D4 – Horizontal Well DNAPL Recovery
Under Alternative D4, U.S. EPA would install several horizontal wells in the DNAPL-contaminated groundwater. DNAPL would pass through the wells and flow to a collection point where it would be pumped into collection containers for off-site treatment and disposal. Although several vertical wells are in operation at the site, the horizontal wells would be able to remove a greater amount of DNAPL. **Cost: $4.6 million**

D5 – Physically Enhanced DNAPL Recovery ***(This is U.S. EPA's preferred cleanup option.)***
Under Alternative D5, U.S. EPA would try to increase DNAPL removal by pumping groundwater through the area of contamination. This should increase the flow of DNAPL to the horizontal and vertical wells where the material would be collected and pumped into collection containers for off-site treatment and disposal. The federal Agency estimates the amount of DNAPL would be reduced over a seven-year period. **Cost: $10.6 million**

D6 – Chemically Enhanced DNAPL Recovery
Under Alternative D6, U.S. EPA would increase DNAPL removal by injecting chemical compounds into the area of DNAPL contamination. These compounds would help to break down the DNAPL. This alternative is similar to D5, where DNAPL would be collected and pumped into containers for off-site treatment and disposal. The EPA estimates that the amount of DNAPL would be reduced over a four-year period. **Cost: $14.3 million**

D7 – Thermally Enhanced Recovery
Under Alternative D7, U.S. EPA would heat the soil and groundwater to increase DNAPL removal or even destroy the substance. The federal Agency estimates that the amount of DNAPL would be reduced over a four-year period. **Cost: $33.8 million**

Preferred cleanup alternative

U.S. EPA proposes Alternative D5 be selected as the interim cleanup approach to manage DNAPL for the South Plant site. In comparing the alternatives (see table on page 7), cleanup experts with the federal Agency believe Alternative D5 provides the best balance of the evaluation criteria among all the DNAPL removal options.

Removal of DNAPL from the base of the aquifer will protect people and the environment and minimize the potential for DNAPL-contaminated groundwater to move to Lake Michigan and the Waukegan River. Removal of DNAPL will also reduce the risk to potential future construction workers performing excavations at the site. Alternative D5 will also meet federal and state requirements and meet the main remedial action objective by removing recoverable DNAPL mass from the aquifer. It is also effective in the long-term and permanent by reducing the DNAPL mass that is contaminating groundwater. Finally, Alternative D5 is cost-effective.

What's next?

Before making a final decision, U.S. EPA and Illinois EPA officials will review all comments from the public. The EPA will respond to the comments and make those responses available in the final decision document. U.S. EPA could change its recommended cleanup plan based on public comments and its consultation with Illinois EPA.

The federal Agency will announce its final cleanup plan in a local newspaper advertisement. Copies of the final plan will be available at the Waukegan Public Library, in the EPA Records Center in Chicago, and at www.epa.gov/region5/cleanup/northshoregassouth.

Use This Space to Write Your Comments

U.S. EPA is interested in your comments on the proposed cleanup plan for the North Shore Gas South Plant site. You may use the space below to write your comments. You may submit this at the May 20 public meeting, or detach, fold, stamp and mail. Comments must be postmarked by June 5. If you have any questions, please contact Heriberto León directly at 312-886-6163, or toll free at 800-621-8431, ext. 66163, weekdays 8:30 a.m. – 4:30 p.m. Comments may also be faxed to Heriberto León at 312-697-2754 or sent via the Internet at www.epa.gov/region5/cleanup/northshoregassouth and link to the public comment form.

Name _____

Affiliation _____

Address _____

City _____ **State** _____ **ZIP** _____

North Shore Gas South Plant Comment Sheet

fold

Place
First
Class
Postage
Here

Heriberto León
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Comparison of DNAPL Cleanup Alternatives*

	D1 No Action	D2 Institutional Control	D3 Vertical Engineered Barrier	D4 Horizontal Well DNAPL Recovery	D5** Physically Enhanced DNAPL Recovery	D6 Chemically Enhanced DNAPL Recovery	D7 Thermally Enhanced DNAPL Recovery
Evaluation Criteria							
Threshold Criteria							
Protection of Human Health and Environment	○	●	●	●	●	●	●
Compliance with ARARs	○	◉	◉	●	●	●	●
Balancing Criteria							
Long-Term Effectiveness and Permanence	○	◉	●	●	●	●	●
Reduction of Toxicity, Mobility, or Volume	○	○	◉	●	●	●	●
Short-Term Effectiveness	○	●	●	●	●	●	●
Implementability	**N/A**	●	●	●	●	●	●
Cost	$50,000	$129,000	$13.4 million	$4.6 million	$10.6 million	$14.3 million	$33.8 million

○ = does not meet criteria ◉ = partially meets criteria ● = meets criteria **N/A** = not applicable

*Full details about the proposed alternatives are in the proposed plan on file at the information repositories or on the Web: http://www.epa.gov/region05/cleanup/northshoregassouth/

**U.S. EPA's preferred alternative

U.S. EPA Proposes Cleanup Plan Seeks Public Comments

3 p.m. – Open House
6 p.m. – Public Meeting
Wednesday, May 20, 2015

Lilac Cottage in Bowen Park
1911 N. Sheridan Road

Public comment period May 6 to June 5, 2015

If you will need special accommodations at the meeting, contact Community Involvement Coordinator Heriberto León (*See contact information on Page 1.*)

North Shore Gas South Plant: EPA Proposes Cleanup Plan

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Environmental Protection
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