



EPA SUPERFUND UPDATE

NORTHEAST CHEMICAL COMPANY SITE

WILMINGTON, NEW HANOVER COUNTY, NORTH CAROLINA

REGION 4

INTRODUCTION

The purpose of this fact sheet is to provide information related to the Engineering Evaluation/Cost Analysis (EE/CA) being conducted at the Northeast Chemical Company site (the "site") in Wilmington, N.C. As part of the EE/CA process, EPA is required to hold a 30-day public comment period in order to ask for public input on the selection of the preferred alternatives for the site. If you have any questions or comments regarding the information in this fact sheet, please send them to the mailing address or email address provided at the end of this fact sheet.

The EE/CA is being conducted in accordance with the Administrative Order on Consent (AOC) entered into voluntarily by Koch Sulfur Products Company and Estech Inc., the successors in interest to the Northeast Chemical Company site, and the United States Environmental Protection Agency (USEPA), pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

The two overall objectives of the EE/CA at the site are to:

- determine the nature and extent of contamination present;
- evaluate potential current and future risks posed to human health and the environment caused by the release or threatened release of hazardous substances, pollutants, or contaminants at or from the site into the environment; and
- develop and evaluate alternatives for a non-

time-critical removal action to prevent, mitigate, or otherwise respond to the migration or the release or threatened release of hazardous substances.

SITE DESCRIPTION AND HISTORY

The 44-acre site is located at 2500-2700 US Highway 421, on the west bank of the Northeast Cape Fear River, in Wilmington, North Carolina. The Site is currently used for the manufacturing of sulfuric acid and other mixed acids by Southern States Chemical Company.

Phosphate fertilizer manufacturing occurred at the site from the early 1900s to the 1970s. Phosphate-based fertilizer manufacturing at the site generally involved reacting phosphate ores with sulfuric acid to produce phosphoric acid, the building block of Nitrogen-Phosphorus-Potassium (N-P-K) agricultural fertilizers. Sulfuric acid was made at the site and stored in lead-lined chambers.

Environmental impacts typically associated with phosphate-based fertilizer manufacturing facilities include elevated concentrations of metals, particularly lead and arsenic in soil, groundwater, and sediment, as well as acidic pH conditions.

From April through July 2000, the EPA conducted a removal action on a portion of the site known as the Flowers property. The EPA treated/stabilized in place eight grids of soil approximately 100 by 100 feet each to a depth of 2 to 4 feet, or until groundwater was encountered. A vinyl sheet piling wall was also installed along the Northeast Cape Fear River to prevent migration of contamination into the river.

A second, extensive source removal action was

implemented in July and August 2002 to remove the source material in the berm, as well as contaminated soil in the northern portion of the Southern States property. Source material was excavated, stabilized on-site, and transported off-site for disposal.

Summary of Field Data Collected and Analyzed During the EE/CA

Fieldwork was conducted from March to June 2003 to collect environmental data for the site. Additional sampling took place at the site in February and March 2003. The following is a brief bullet summary of the February and March 2003 data:

- a total of 99 soil borings were evaluated during the EE/CA; slag and magenta-stained soil was identified in 26 of the borings, ranging in thickness from 0.5 to 6 feet;
- surface and subsurface soil samples were collected and analyzed from the 99 soil borings; arsenic concentrations ranged from 0.78 mg/kg (parts-per-million) to 4,600 mg/kg, while lead ranged from 1.2 mg/kg to 9,500 mg/kg; pH values in soil ranged from 1.8 to 11;
- groundwater samples were collected from 21 on-site, monitoring wells; arsenic concentrations ranged from less than 10 ug/l (or parts-per-billion) to 1,400 ug/l, while lead concentrations ranged from less than 5 ug/l to 950 ug/l; pH values in groundwater ranged from 1.27 to 7.7;
- twenty-five (25) sediment samples were collected from 13 sample locations; arsenic concentrations ranged from “non detect” to 730 mg/kg, while lead concentrations ranged from 2.2 mg/kg to 2,800 mg/kg; and
- five surface water samples were collected; levels of arsenic, copper, lead, and zinc exceeded the EPA Region 4 ecological screening values and/or the North Carolina salt water quality standards.

Summary of Streamlined Risk Evaluation

Based on the analytical data collected during the EE/CA, a streamlined risk evaluation was performed to assess the potential risks to both human and ecological receptors. The following is a bullet summary of the screening-level evaluation:

- concentrations of lead and arsenic in surface and

subsurface soil exceed the USEPA- and North Carolina Department of Environment and Natural Resources (NCDENR)-approved action levels, or cleanup criteria, for protection of human health (i.e., 100 mg/kg for arsenic and 1,200 mg/kg for lead, assuming industrial land use);

- three of the sediment sample locations had Category 3 and 4 Effects Range Median (ERM) Quotients, indicating the highest potential for adverse impacts to ecological receptors; the remaining sediment locations had Category 1 or 2 ERM Quotients, indicating a lower potential for adverse impacts to ecological receptors;
- two sediment samples contained clinker or magenta-stained soil, generally associated with elevated levels of metals; and
- elevated levels of metals in groundwater exceed levels known to cause adverse effects to both human health and ecological receptors.

Summary of Removal Action Objectives

Based on the results of the streamlined risk evaluation, the following removal action objectives (RAOs) were developed for the site:

- eliminate the potential for human exposure to soil with elevated levels of lead and arsenic (including the clinker or magenta-stained soil);
- reduce the potential for continued acidification of groundwater from acid-forming materials;
- reduce the potential for elevated levels of lead and arsenic in soil from leaching into groundwater;
- reduce the potential for the off-site migration of groundwater containing elevated levels of lead and arsenic, into the Northeast Cape Fear River; and
- reduce the potential for ecological receptor exposure to sediments with elevated levels of lead and arsenic.

Summary of Alternatives Evaluated for Upcoming Non-Time-Critical Removal Action

Four alternatives were developed and evaluated to

address site-related contamination. One of the four alternatives is the “No Action” alternative; the other three alternatives involve different cleanup options to address the soil, sediment, and groundwater contamination. The four alternatives are as follows:

- **Alternative 1** is a “No Action” alternative, which serves as a baseline to evaluate the other soil alternatives. This alternative would not reduce levels of contaminants in soil at the site, or minimize exposure to site-related contamination in the soil; therefore, this alternative would not be protective of human health and the environment. Soil alternative 1 would not involve any cleanup activities. There are no costs associated with the “no action” alternative. Compared to the other alternatives, the “no action” alternative does not provide as much protection as the other alternatives, and the cost would be considerably less than the other alternatives.
- **Alternative 2** would include the installation of a one-foot thick cap comprised of clean soil and limestone chips over the portion of the site known as the Flowers property. The objective of the cap would be to minimize potential future direct contact exposure to human beings, minimize future runoff of soil into the Northeast Cape Fear River, and reduce future infiltration of elevated lead and arsenic from soil to groundwater.

Contaminated soil on the Southern States Company property, as well as contaminated river sediment adjacent to the Southern States property, would be excavated, treated on-site, and transported off-site for disposal. Approximately 31,800 cubic yards of contaminated soil, and 2,000 cubic yards of contaminated sediment, would require stabilization and/or neutralization. Soil excavations would be backfilled with clean soil. Removing the amount of contaminated soil and sediment from the site would reduce the potential exposure to human beings, minimize future runoff of soil into the Northeast Cape Fear River, and reduce future infiltration of lead and arsenic from soil to groundwater.

A Permeable Reactive Barrier (PRB) would be installed along the bank of the Northeast Cape Fear River to neutralize the pH of the groundwater, as well as reduce levels of arsenic and lead. The PRB is a wall that would be

constructed downgradient of the area with known groundwater contamination, and filled with reactive materials such as zero valence iron, compost or the mineral apatite, and limestone. Groundwater would be treated as it passed through the reactive material in the wall. The dimensions of the PRB would be approximately 600 feet long by 4 feet wide by 30 feet deep. Long-term groundwater monitoring would be required to monitor the effectiveness of the PRB. Treating the groundwater would reduce the potential exposure to human beings, and minimize migration of contaminated groundwater into the Northeast Cape Fear River.

Controls on future land use would be established to ensure the cap and PRB remain in place, and the use of groundwater at the site is prohibited. This alternative would be protective of human health and the environment. Implementation of this alternative is technically feasible, and the materials and qualified commercial contractors are readily available. The estimated cost of alternative 2 is \$7,203,816.

Compared to the other alternatives, this alternative would be more protective than alternative 1. Alternatives 2, 3, and 4 would all provide protection of human health and the environment. Alternative 2 would cost more than the other three alternatives.

- **Alternative 3** would include the installation of a one-foot thick cap comprised of clean soil and limestone chips over the portion of the Site known as the Flowers property. The objective of the cap would be to minimize potential future direct contact exposure to human beings, minimize future runoff of soil into the Northeast Cape Fear River, and reduce future infiltration of metals from soil to groundwater.

Contaminated soil on the Southern States Company property, as well as contaminated river sediment adjacent to the Southern States property, would be excavated, treated on-site, and transported off-site for disposal. Approximately 31,800 cubic yards of contaminated soil, and 2,000 cubic yards of contaminated sediment, would require stabilization or neutralization. Soil excavations would be backfilled with clean soil.

Groundwater with metals contamination and/or low pH in the eastern half of the Southern States Chemical property would be neutralized by

injecting 100 mg/l calcium hydroxide solution into the aquifer. Neutralizing the pH, or reducing the acidity of the groundwater, would reduce the levels of lead and arsenic in the groundwater. The spacing of injection points would be determined using computer modeling or a pilot test. Treating the groundwater would reduce the potential exposure to human beings, and minimize migration of contaminated groundwater into the Northeast Cape Fear River. Controls on future land use would be established to ensure the cap in place, and the use of groundwater at the site is prohibited. Long-term groundwater monitoring would be required to monitor the effectiveness of the groundwater neutralization. The estimated cost of alternative 3 is \$6,346,726.

Compared to the other alternatives, alternative 3 would be more protective of human health and the environment than alternative 1. Alternatives 2, 3, and 4 would all provide protection of human health and the environment. The cost of alternative 3 would be much greater than the other soil alternatives.

- **Alternative 4** would include the installation of a one-foot thick cap comprised of clean soil and limestone chips over the portion of the site known as the Flowers property. The objective of the cap would be to minimize potential future direct contact exposure to human beings, minimize future runoff of soil into the Northeast Cape Fear River, and reduce future infiltration of metals from soil to groundwater.

A total volume of approximately 14,594 cubic yards of contaminated surface soil on the Southern States Company property, and approximately 2,000 cubic yards of contaminated river sediment adjacent to the Southern States property, would be excavated, neutralized on-site, and transported off-site for disposal. Soil excavations would be backfilled with clean soil. Reducing the amount of contaminated soil and sediment at the site would reduce the potential exposure to human beings, minimize future runoff of soil into the Northeast Cape Fear River, and reduce future infiltration of lead and arsenic from soil to groundwater.

An estimated 18,758 cubic yards of contaminated, subsurface soil would be stabilized in-place by mechanically mixing the soil with a reagent. Soil samples would be collected to confirm they meet the site-specific

cleanup criteria.

Groundwater with metals contamination and/or low pH in the eastern half of the Southern States Chemical property would be neutralized by injecting 100 mg/l calcium hydroxide solution into the aquifer. Neutralizing the pH or reducing the acidity of the groundwater would reduce the levels of lead and arsenic in the groundwater. The spacing of injection points would be determined using computer modeling or a pilot test. Treating the groundwater would reduce the potential exposure to human beings, and minimize migration of contaminated groundwater into the Northeast Cape Fear River. Long-term groundwater monitoring would be required to monitor the effectiveness of the groundwater neutralization.

Controls on future land use can ensure the cap and the treated subsurface soil remain in place, and the use of groundwater at the site be prohibited. Implementation of this alternative is technically feasible, and the materials and qualified contractors are readily available. The estimated cost of alternative 4 is \$3,430,993. Alternative 4 would be more protective of human health and the environment than alternative 1. Alternative 4 would cost significantly more than alternative 1, but significantly less than alternatives 2 and 3.

Summary of the Preferred Alternative to Address Contamination at the Site

After conducting an analysis of the various four alternatives summarized in this fact sheet, based on cost, short-term and long-term effectiveness, and implementability, EPA has selected the following alternative to address the soil, sediment, and groundwater contamination at the site.

Alternative 4 - Cap the Flowers Property, Excavate Surface Soils on Southern States Property and Sediments, Neutralize/Stabilize and Dispose Off-Site, In-Situ Stabilization of Subsurface Soil, Neutralize Groundwater, and Long-term Monitoring

When compared with the other alternatives, alternative 4 is the preferred alternative to address contamination at the site for the following reasons:

- capping the Flowers property would minimize potential future direct contact exposure to human beings, minimize future runoff of soil into the Northeast Cape Fear River, and reduce future infiltration of lead and arsenic from soil to groundwater;
- neutralizing/stabilizing the contaminated surface soil, and transporting the treated material off-site for disposal, would be protective of human health by reducing the potential for human exposure to elevated levels of lead and arsenic in soil;
- neutralizing/stabilizing the contaminated surface soil, and transporting the treated material off-site for disposal, would be protective of the environment by minimizing the future migration of soil with elevated levels of lead and arsenic from the site into the Northeast Cape Fear River;
- neutralizing/stabilizing the contaminated subsurface soil would be protective of human health and the environment by reducing the potential for human exposure, reducing the potential for continued acidification of groundwater from acid-forming materials, and reducing the potential leaching of lead and arsenic from soil into groundwater;
- removing contaminated sediment from the Northeast Cape Fear River, treating it on-site, and transporting it off-site for disposal, would reduce the potential for adverse impacts to ecological receptors;
- controls of future land use can ensure the potential exposure to contaminants in soil is minimized, ensure the cap remains in place, and the use of groundwater at the site is prohibited;
- alternative 4 offers a balance between effectiveness and cost, (i.e., it would be protective of human health and the environment, at a much lower cost than alternatives 2 and 3);
- neutralization/stabilization of soil, neutralization of groundwater, and soil capping technologies are considered technically feasible because they have been successfully implemented at other sites, and the materials and qualified commercial contractors are readily available; and
- EPA and NCDENR concur that alternative 4 is the preferred alternative to address the contamination at the site.

SUMMARY OF UPCOMING EVENTS

EPA will respond to each comment received during the 30-day comment period. EPA will then make the final selection of the alternatives to address contamination at the site, taking the public comments into consideration. EPA will write an Action Memorandum providing the basis for the selected alternatives. Within approximately the next 12 months, design documents will be prepared for the non-time-critical removal action. The exact time table for implementing the non-time-critical removal action at the site will be developed during the design process. EPA will provide additional information to the public at the completion of the design process.

EPA 30-Day Comment Period

EPA will begin a 30-day comment period beginning on July 30, 2004 and ending on August 27, 2004. If you have any questions or comments about the information in this fact sheet, including the preferred alternatives proposed for the non-time-critical removal action, please submit them in writing to the address below or you may e-mail your comments to mallary.ken@epa.gov. All comment should be received or postmarked by August 27, 2004.

Mr. Ken Mallary, Remedial Project Manager
US EPA
Superfund Remedial and Site Assessment Branch
61 Forsyth Street, SW
Atlanta, GA 30303

For further questions, please contact Angela Miller, Community Involvement Coordinator at (404)562-8561 or Ken Mallary, Remedial Project Manager at (404)562-8802 or (800)435-9233.

For more information regarding the Site, please visit the Administrative Record at the following location:

New Hanover County Public Library
201 Chestnut Street
Wilmington, NC 28401

Name: _____ Phone: _____

Address: _____

Questions/Comments: (you may continue on the reverse side)

