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Agency

Solid Waste And
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December 1992
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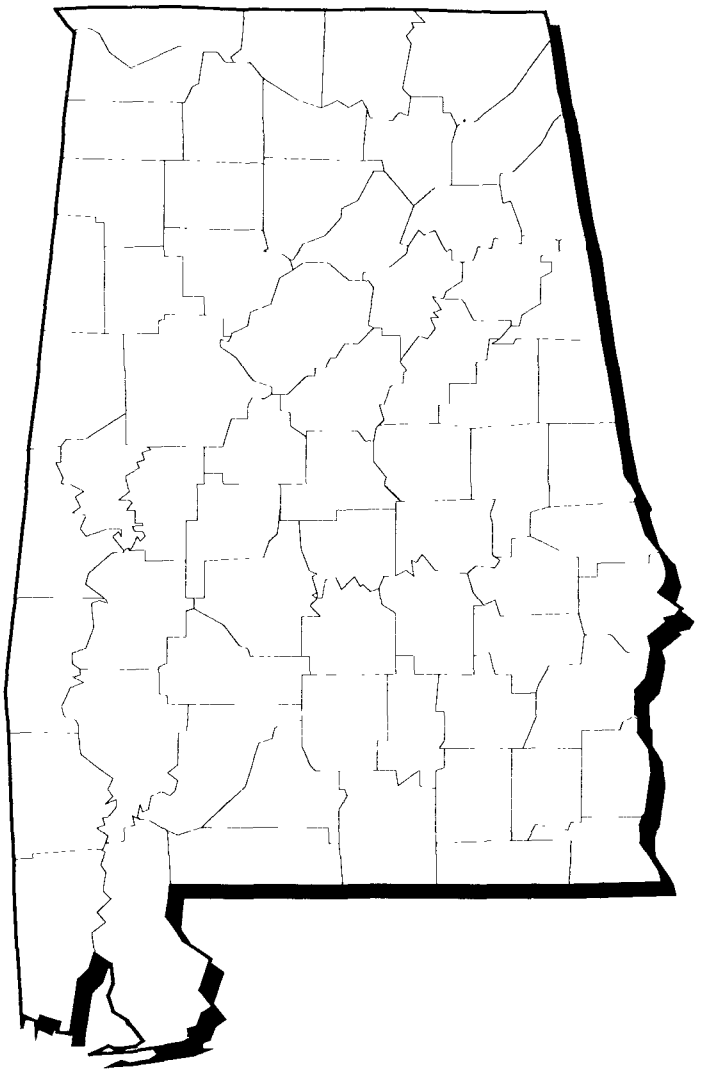
SUPERFUND: Progress at National Priority List Sites



ALABAMA 1992 UPDATE

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NATIONAL PRIORITIES LIST SITES:

Alabama

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INTRODUCTION

A BRIEF OVERVIEW OF SUPERFUND

During the second half of the Twentieth Century, the environmental consequences of more than 100 years of industrialization in the United States became increasingly clear. Authors such as Rachel Carson wrote passionately about the often-hidden environmental effects of our modern society's widespread use of chemicals and other hazardous materials. Their audience was small at first, but gradually their message spread. Growing concern turned to action, as people learned more about the environment and began to act on their knowledge

The 1970s saw environmental issues burst onto the national scene and take hold in the national consciousness. The first Earth Day was observed in 1970, the year that the U.S. Environmental Protection Agency (EPA) was founded. By the end of the 1970s, Love Canal in New York and the Valley of the Drums in Kentucky had entered the popular lexicon as synonyms for pollution and environmental degradation.

Superfund Is Established

The industrialization that gave Americans the world's highest standard of living also created problems that only a national program could address. By 1980, the U.S. Congress had passed numerous environmental laws, implemented by the EPA, but many serious hazardous waste problems were slipping through the cracks.

Responding to growing concern about public health and environmental threats from uncontrolled releases of hazardous materials, the U.S. Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Popularly known as Superfund, CERCLA had one seemingly simple job—to uncover and clean up hazardous materials spills and contaminated sites.

A Big Job

Few in Congress, the EPA, the environmental community, or the general public knew in 1980 just how big the nation's hazardous materials problem is. Almost everyone thought that Superfund would be a short-lived program requiring relatively few resources to clean up at most a few hundred sites. They were quite mistaken.

As the EPA set to work finding sites and gauging their potential to harm people and the environment, the number of sites grew. Each discovery seemed to lead to another, and today almost 36,000 hazardous waste sites have been investigated as potential hazardous waste sites. They are catalogued in the EPA's computerized database, CERCLIS (for the Comprehensive Environmental Re-

sponse, Compensation, and Liability Information System).

The damage to public health and the environment that each site in CERCLIS might cause is evaluated; many sites have been referred to State and local governments for cleanup. The EPA lists the nation's most serious hazardous waste sites on the National Priorities List, or NPL. (These Superfund sites are eligible for federally-funded cleanup, but whenever possible the EPA makes polluters pay for the contamination they helped create.) The NPL now numbers 1,275 sites, with 50 to 100 added each year. By the end of the century, the NPL may reach as many as 2,100 sites.

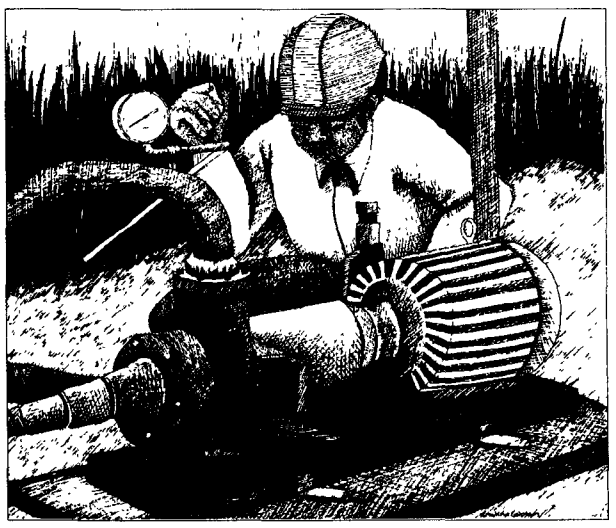
Superfund faces some of the most complex pollution problems ever encountered by an environmental program. Improperly stored or disposed chemicals and the soil they contaminate are one concern. More difficult to correct are the wetlands and bays, and the groundwater, lakes, and rivers often used for drinking water that are contaminated by chemicals spreading through the soil or mixing with storm water runoff. Toxic vapors contaminate the air at some sites, threatening the health of people living and working near by.

Superfund aims to control immediate public health and environmental threats by tackling the worst problems at the worst sites first. Wherever possible, Superfund officials use innovative treatment techniques—many developed or refined by the EPA—to correct hazardous materials problems once and for all. Many of the treatment techniques they use did not exist when the program was created.

The EPA Administrator had challenged Superfund to complete construction necessary for cleanup work at 130 NPL sites by the end of the 1992 federal fiscal year. By September 30, 1992, the end of fiscal year 1992, construction had been completed at a total of 149 NPL sites. Superfund is well on its way of meeting the Administrator's goal of completing construction at 200 NPL sites by the end of fiscal year 1993, and 650 sites by the end of fiscal year 2000.

Quick Cleanup at Non-NPL Sites

Long-standing hazardous waste sites are not Superfund's only concern. The EPA also responds to hazardous spills and other emergencies, hauling away chemicals for proper treatment or disposal. Superfund teams perform or supervise responses at rail and motor vehicle accidents, fires, and other emergencies involving hazardous substances. They also evacuate people living and working near by, if necessary, and provide clean drinking water to people whose own water is contaminated. Removal crews also post warning signs and take other precautions to keep people and animals away from hazardous substances.



Superfund employee prepares equipment for groundwater treatment.

Quick Cleanups, or Removals, are not limited to emergencies. When cleanup crews at contaminated sites find hazardous substances that immediately threaten people or the environment, they act right away to reduce the threat or to remove the chemicals outright. As the EPA implements the Superfund Accelerated Cleanup Model (SACM), more and more sites will undergo quick cleanups, and many of these will be cleaned up completely without ever being included on the NPL. (See "Streamlining Superfund: The Superfund Accelerated Cleanup Model.")

Some of Superfund's most significant gains in public health and environmental protection have been won by the removal program. As of March 31, 1992, the Emergency Response Program had logged more than 2,300 removal completions since Superfund was established.

Superfund employee removing drums from a Superfund site.

The Public's Role

Superfund is unique among federal programs in its commitment to citizen participation. Although the EPA is responsible for determining how dangerous a site is and how best to clean it up, the Agency relies on citizen input as it makes these decisions.

Community residents are often invaluable sources of information about a hazardous waste site, its current and previous owners, and the activities that took place there. Such information can be crucial to experts evaluating a site and its potential dangers.

Residents also comment on EPA cleanup plans by stating their concerns and preferences at public meetings and other forums and in formal, written comments to Agency proposals. The EPA takes these comments and concerns seriously, and has modified many proposals in response to local concerns. For, ultimately, it is the community and its citizens that will live with the results of the EPA's decisions and actions; it is only fair that citizens participate in the process.

A Commitment to Communication

The Superfund program is very serious about public outreach and communication. Community relations coordinators are assigned to each NPL site to help the public understand the potential hazards present, as well as the cleanup alternatives. Local information repositories, such as libraries or other public buildings, have been established near each NPL site to ensure that the public has an opportunity to review all relevant information and the proposed cleanup plans.

The individual State volumes contain summary fact sheets on NPL sites in each State and territory. Together, the fact sheets provide a concise report on site conditions and the progress made toward site cleanups as of March 1992. The EPA revises these volumes periodically to provide an up-to-date record of program activities. A glossary of key terms relating to hazardous waste management and Superfund site cleanup is provided at the back of this book.

INTRODUCTION

Superfund is, of course, a public program, and as such it belongs to everyone of us. This volume, along with other State volumes, comprises the EPA's report on Superfund progress to the program's owners for the year 1992.

STREAMLINING SUPERFUND: THE SUPERFUND ACCELERATED CLEANUP MODEL

Historically, critics and supporters alike have measured Superfund's progress by the number of hazardous waste sites deleted from the NPL. Although easy enough to tally, this approach is too narrow. It misses the major gains Superfund makes by reducing major risks at the nation's worst hazardous sites long before all clean-up work is done and the site deleted. It also ignores the Removal Program's contributions to meeting Superfund's twin mandates of maximizing public health and environmental protection.

Renewing Superfund's commitment to rapid protection from hazardous materials, the EPA is streamlining the program. The Superfund Accelerated Cleanup Model, or SACM, will take Early Actions, such as removing hazardous wastes or contaminated materials, while experts study the site. SACM also will combine similar site studies to reduce the time required to evaluate a site and its threats to people and the environment. This way, immediate public health and environmental threats will be addressed while long-term cleanups are being planned.

Emergencies such as train derailments and motor vehicle accidents will continue to be handled expeditiously. Teams of highly trained technicians will swing into action right away, coordinating the cleanup and removal of hazardous substances to ensure public safety as quickly as possible.

Breaking With Tradition

The traditional Superfund process begins with a lengthy phase of study and site assessment, but SACM will save time by combining separate, yet similar, activities. Each EPA Region will form a Decision Team of site managers, risk assessors, community relations coordinators, lawyers, and other experts to monitor the studies and quickly determine whether a site requires Early Action (taking less than five years), Long-term Action, or both.

While the site studies continue, the Decision Team will begin the short-term work required to correct immediate public health or environmental threats from the site. Besides removing hazardous materials, Early Actions include taking precautions to keep contaminants from moving off the site and restricting access to the site. Early Actions could eliminate most human risk from these sites, and Superfund will further focus its public participation and public information activities on site assessment and Early Action.

Long-Term Solutions

While Early Actions can correct many hazardous waste problems—and provide the bulk of public health and environmental protection—some contamination will take longer to correct. Cleanups of mining sites, wetlands, estuaries, and projects involving incineration of contaminants or restoration of groundwater can take far longer than the three to five years envisioned for Early Actions. Under SACM, these sites will be handled much as they are now.

Also under SACM, the EPA will continue its pursuit of potentially responsible parties who may have caused or contributed to site contamination. Expedited enforcement and procedures for negotiating potentially responsible party settlements will secure their participation. Superfund personnel will continue to oversee clean-up work performed by potentially responsible parties.

HOW SUPERFUND WORKS

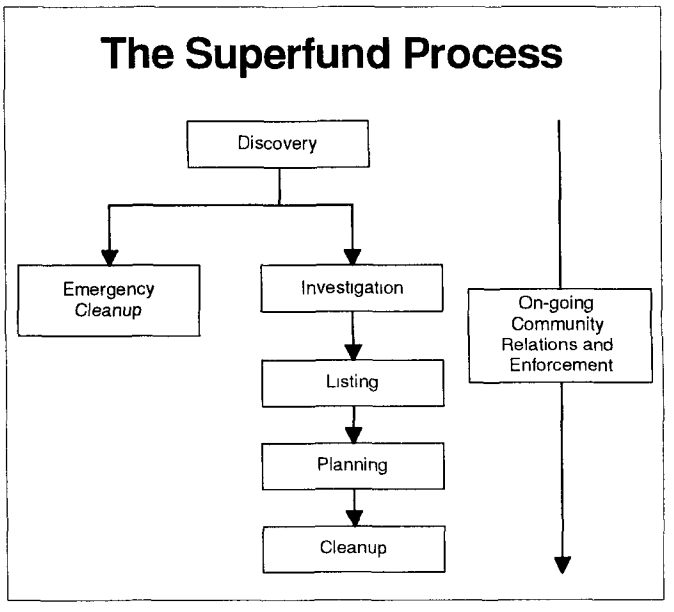
Each Superfund site presents a different set of complex problems. The same hazardous materials and chemicals often contaminate many sites, but the details of each site are different. Almost always, soil is contaminated with one or more chemicals. Their vapors may taint the air over and around the site. Contaminants may travel through the soil and reach underground aquifers which may be used for drinking water, or they may spread over the site to contaminate streams, ponds, and wetlands. The contaminating chemicals may interact with each other, presenting even more complicated cleanup problems.

Superfund's cleanup process is arduous and exacting. It requires the best efforts of hundreds of experts in science and engineering, public health, administration and management, law, and many other fields.

The average NPL site takes from seven to ten years to work its way through the system, from discovery to the start of long-term cleanup. Actual cleanup work can take years, decades if contaminated groundwater must be treated. Of course, imminent threats to public health or the environment are corrected right away.

The diagram to the right presents a simplified view of the cleanup process. The major steps in the Superfund process are:

- Site discovery and investigation to identify contaminants and determine whether emergency action is required;
- Emergency site work such as removing contaminants for proper treatment or disposal, and securing the site to keep people and animals away, if warranted by conditions at the site;
- Site evaluation to determine how people living and working nearby, and the environment, may be exposed to site contaminants;
- Detailed studies to determine whether conditions are serious enough to add the site to the National Priorities List of sites eligible for federally funded cleanup under Superfund;
- Selection, design, and implementation of a cleanup plan, after a thorough review of the most effective cleanup options, given site conditions, contaminants present, and their potential threat to public health or the environment.
- Follow-up to ensure that the cleanup work done at the site continues to be effective over the long term.



From the earliest stages, EPA investigators work hard to identify those responsible for the contamination. As their responsibility is established, the EPA negotiates with these "responsible parties" to pay for cleaning up the problem they helped create. This "enforcement first" policy saves Superfund Trust Fund monies for use in cleanups where the responsible parties cannot be identified, or where they are unable to fund cleanup work.

THE VOLUME

How to Use the State Book

The site fact sheets presented in this book are comprehensive summaries that cover a broad range of information. The fact sheets describe hazardous waste sites on the NPL and their locations, as well as the conditions leading to their listing ("Site Description"). The summaries list the types of contaminants that have been discovered and related threats to public and ecological health ("Threats and Contaminants"). "Cleanup Approach" presents an overview of the cleanup activities completed, underway, or planned. The fact sheets conclude with a brief synopsis of how much progress has been made in protecting public health and the environment. The summaries also pinpoint other actions, such as legal efforts to involve polluters responsible for site contamination and community concerns.

The fact sheets are arranged in alphabetical order by site name. Because site cleanup is a dynamic and gradual process, all site information is accurate as of the date shown on the bottom of each page. Progress always is being made at NPL sites, and the EPA periodically will update the site fact sheets to reflect recent actions and will publish updated State volumes. The following two pages show a generic fact sheet and briefly describe the information under each section.

How Can You Use This State Book?

You can use this book to keep informed about the sites that concern you, particularly ones close to home. The EPA is committed to involving the public in the decision making process associated with hazardous waste cleanup. The Agency solicits input from area residents in communities affected by Superfund sites. Citizens are likely to be affected not only by hazardous site conditions, but also by the remedies that combat them. Site cleanups take many forms and can affect communities in different ways. Local traffic may be rerouted, residents may be relocated, temporary water supplies may be necessary.

Definitive information on a site can help citizens sift through alternatives and make decisions. To make good choices, you must know what the threats are and how the EPA intends to clean up the site. You must understand the cleanup alternatives being proposed for site cleanup and how residents may be affected by each one. You also need to have some idea of how your community intends to use the site in the future, and you need to know what the community can realistically expect once the cleanup is complete.

The EPA wants to develop cleanup methods that meet community needs, but the Agency only can take local concerns into account if it understands what they are. Information must travel both ways in order for cleanups to be effective and satisfactory. Please take this opportunity to learn more, become involved, and assure that hazardous waste cleanup at "your" site considers your community's concerns.

THE VOLUME

NPL LISTING HISTORY

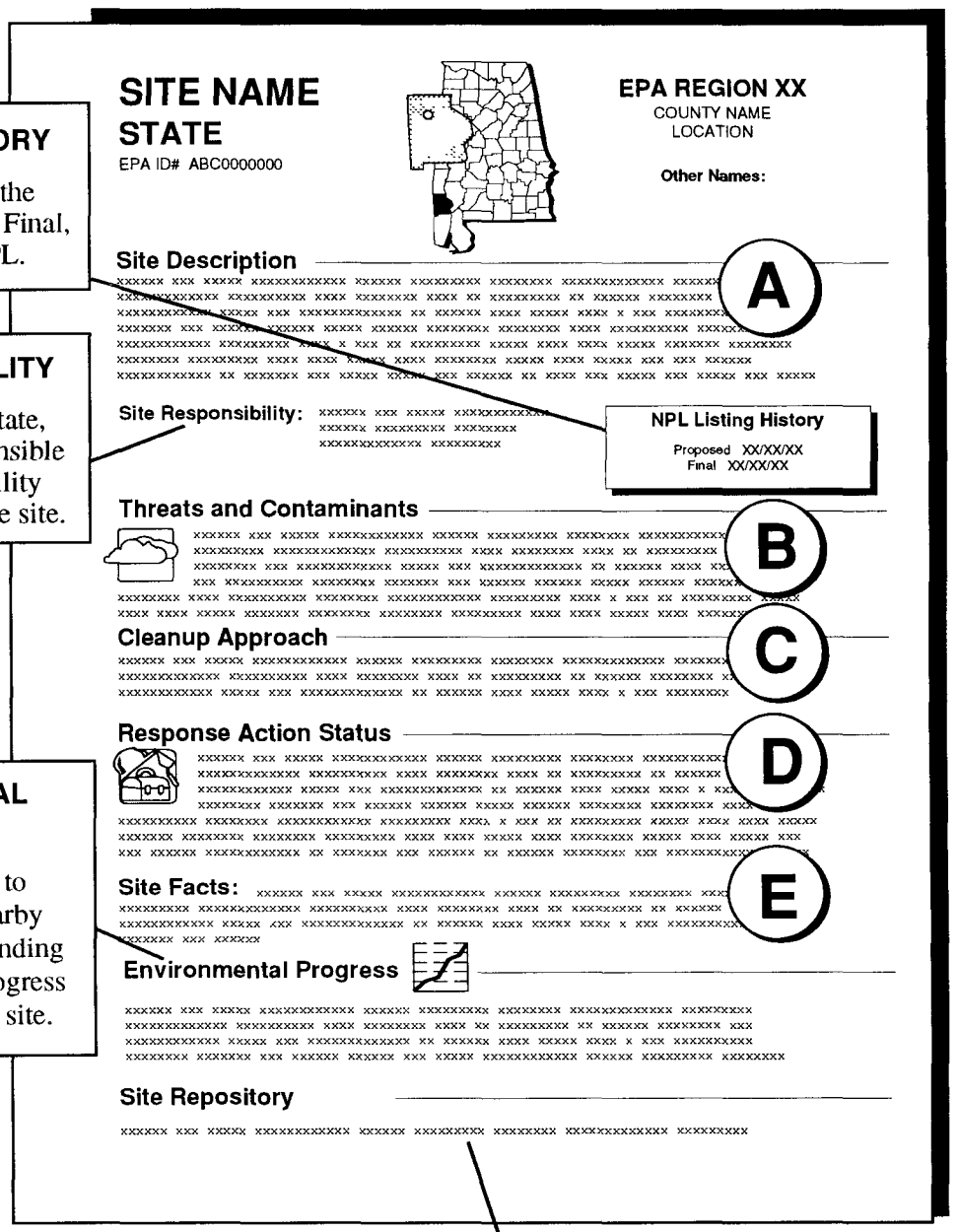
Provides the dates when the site was Proposed, made Final, and Deleted from the NPL.

SITE RESPONSIBILITY

Identifies the Federal, State, and/or potentially responsible parties taking responsibility for cleanup actions at the site.

ENVIRONMENTAL PROGRESS

Summarizes the actions to reduce the threats to nearby residents and the surrounding environment and the progress towards cleaning up the site.



SITE REPOSITORY

Lists the location of the primary site repository. The site repository may include community relations plans, public meeting announcements and minutes, fact sheets, press releases, and other site-related documents.

A

SITE DESCRIPTION

This section describes the location and history of the site. It includes descriptions of the most recent activities and past actions at the site that have contributed to the contamination. Population estimates, land usages, and nearby resources give readers background on the local setting surrounding the site.

B

THREATS AND CONTAMINANTS

The major chemical categories of site contamination are noted, as well as which environmental resources are affected. Icons representing each of the affected resources (may include air, groundwater, surface water, soil, and contamination to environmentally sensitive areas) are included in the margins of this section. Potential threats to residents and the surrounding environments arising from the site contamination also are described.

C

CLEANUP APPROACH

This section contains a brief overview of how the site is being cleaned up.

D

RESPONSE ACTION STATUS

Specific actions that have been accomplished or will be undertaken to clean up the site are described here. Cleanup activities at NPL sites are divided into separate phases, depending on the complexity and required actions at the site. Two major types of cleanup activities often are described: initial, immediate, or emergency actions to quickly remove or reduce imminent threats to the community and surrounding areas; and long-term remedial phases directed at final cleanup at the site. Each stage of the cleanup strategy is presented in this section of the summary. Icons representing the stage of the cleanup process (initial actions, site investigations, EPA selection of the cleanup remedy, engineering design phase, cleanup activities underway, and completed cleanup) are located in the margin next to each activity description.

E

SITE FACTS

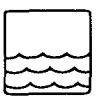
Additional information on activities and events at the site are included in this section. Often details on legal or administrative actions taken by the EPA to achieve site cleanup or other facts pertaining to community involvement with the site cleanup process are reported here.

THE VOLUME

The "icons," or symbols, accompanying the text allow the reader to see at a glance which environmental resources are affected and the status of cleanup activities at the site.

Icons in the Threats and Contaminants Section

Contaminated *Groundwater* resources in the vicinity or underlying the site. (Groundwater is often used as a drinking water source.)



Contaminated *Surface Water and Sediments* on or near the site. (These include lakes, ponds, streams, and rivers.)

Contaminated *Air* in the vicinity of the site. (Air pollution usually is periodic and involves contaminated dust particles or hazardous gas emissions.)

Contaminated *Soil and Sludges* on or near the site. (This contamination category may include bulk or other surface hazardous wastes found on the site.)

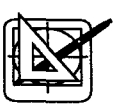
Threatened or contaminated *Environmentally Sensitive Areas* in the vicinity of the site. (Examples include wetlands and coastal areas or critical habitats.)

Icons in the Response Action Status Section

Initial, Immediate, or Emergency Actions have been taken or are underway to eliminate immediate threats at the site.

Site Studies at the site to determine the nature and extent of contamination are planned or underway.

Remedy Selected indicates that site investigations have been concluded, and the EPA has selected a final cleanup remedy for the site or part of the site.

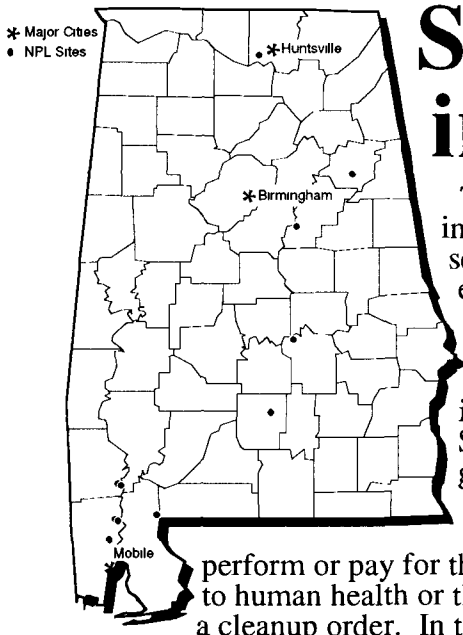


Remedy Design means that engineers are preparing specifications and drawings for the selected cleanup technologies.

Cleanup Ongoing indicates that the selected cleanup remedies for the contaminated site, or part of the site, currently are underway.

Cleanup Complete shows that all cleanup goals have been achieved for the contaminated site or part of the site.

A SUMMARY OF THE STATE PROGRAM



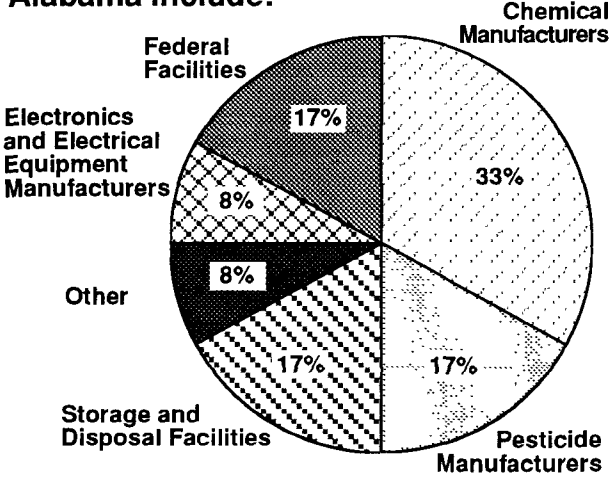
Superfund Activities in Alabama

The State of Alabama is located within EPA Region 4, which includes the eight southeastern States. The State covers 51,705 square miles. According to the 1990 Census, Alabama experienced nearly a four percent increase in population between 1980 and 1990, and is ranked twenty-second in U.S. population with approximately 4,102,000 residents.

The Alabama Hazardous Substance Cleanup Fund, enacted in 1988, provides enforcement authority and funding for the State's responsibility in the execution of the Superfund program. The statute grants the State the authority to determine a polluter's proportional contribution for site cleanup. Once determined the State is authorized to compel the polluters to perform or pay for their share of site cleanup. Unless there is an imminent threat to human health or the environment, a hearing is required prior to the State issuing a cleanup order. In the event that the State is unable to determine proportional contributions, the State relies on the judicial system to make final determinations. The statute also allows the State to issue site access orders, collect civil penalties, and recover the State's costs involved in cleanup. In practice, the State program encourages voluntary polluter participation. When no polluters willfully volunteer to address contamination at a site, the State uses the Hazardous Substance Cleanup Fund to perform small-scale removal actions itself or refers the case to the air or water programs, as appropriate. State funding may be used only at sites that are not on the Federal National Priority List at the time cleanup activities begin, as the fund is intended primarily for the small-scale, emergency removals of drums. In addition, the Fund may be used for the 10 percent contribution required from the State by the Federal Superfund program. The statute requires the State to provide the community with a 30-day comment period on the cleanup plan and to announce the proposed plan in a county-wide paper. Currently, 12 sites in the State of Alabama have been listed as final on the NPL. No new sites have been proposed for listing in 1992.

The Alabama Department of Environmental Management
implements the Superfund Program in the State of Alabama

Activities responsible for hazardous waste contamination in the State of Alabama include:



Facts about the 12 NPL sites in Alabama:

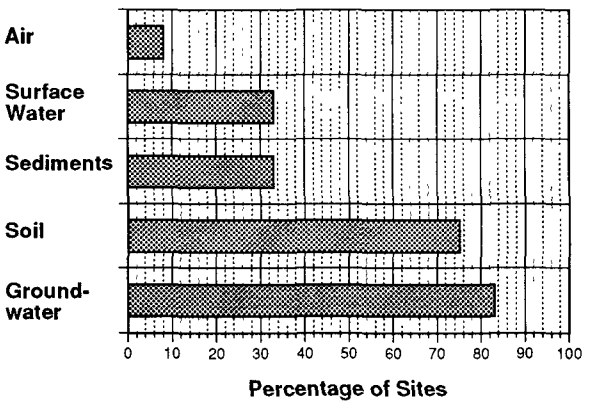
Immediate Actions (such as removing hazardous substances or restricting site access) were performed at eight sites.

Seven sites endanger sensitive environments.

Seven sites are located near residential areas.

Most Sites Have Multiple Contaminants and Contaminated Media:

Media Contaminated at Sites



Contaminants Found at Sites

	Percentage of Sites
VOCs	67%
Heavy Metals	58%
Pesticides/Herbicides	25%
PCBs	8%
Creosotes	8%
Petrochemicals/Explosives	8%
Asbestos	8%

The Potentially Responsible Party Pays...

In the State of Alabama, potentially responsible parties are paying for or conducting cleanup activities at 10 sites.

For Further Information on NPL Sites and Hazardous Waste Programs in the State of Alabama Please Contact:

☎ EPA Region 4 Public Affairs Office	For information concerning community involvement	(404) 347-3004
☎ National Response Center	To report a hazardous waste emergency	(800) 424-8802
☎ The Alabama Department of Environmental Management: Special Projects Office	For information about the State's responsibility in the Superfund Program	(205) 260-2777
☎ EPA Region 4 Waste Management Division	For information about the Regional Superfund Program	(404) 347-5065
☎ EPA Superfund Hotline	For information about the Federal Superfund Program	(800) 424-9068

THE NPL REPORT

PROGRESS TO DATE

The following Progress Report lists all sites currently on, or deleted from, the NPL and briefly summarizes the status of activities for each site at the time this report was prepared. The steps in the Superfund cleanup process are arrayed across the top of the chart, and each site's progress through these steps is represented by an arrow (⇨) indicating the current stage of cleanup.

Large and complex sites often are organized into several cleanup stages. For example, separate cleanup efforts may be required to address the source of the contamination, hazardous substances in the groundwater, and surface water pollution, or to clean up different areas of a large site. In such cases, the chart portrays cleanup progress at the site's *most advanced* stage, reflecting the status of site activities rather than administrative accomplishments.

⇨ An arrow in the "Initial Response" category indicates that an emergency cleanup, immediate action, or initial action has been completed or currently is underway. Emergency or initial actions are taken as an interim measure to provide immediate relief from exposure to hazardous site conditions or to stabilize a site to prevent further contamination.

⇨ A final arrow in the "Site Studies" category indicates that an investigation to determine the nature and extent of the contamination at the site currently is ongoing or planned.

⇨ A final arrow in the "Remedy Selection" category means that the EPA has selected the final cleanup strategy for the site. At the few sites where the EPA has determined that initial response actions have eliminated site contamination, or that any remaining contamination will be naturally dispersed without further cleanup activities, a "No Action" remedy has been selected. In these cases, the arrows are discontinued at the "Remedy Selection" step and resume in the "Construction Complete" category.

⇨ A final arrow at the "Remedial Design" stage indicates that engineers currently are designing the technical specifications for the selected cleanup remedies and technologies.

⇨ A final arrow in the "Cleanup Ongoing" column means that final cleanup actions have been started at the site and currently are underway.

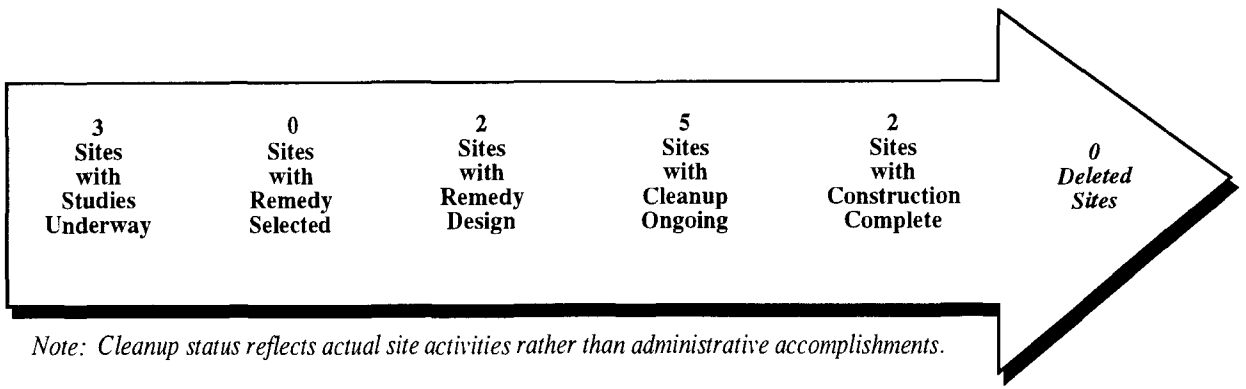
⇨ A final arrow in the "Construction Complete" category is used only when all phases of the site cleanup plan have been performed, and the EPA has determined that no additional construction actions are required at the site. Some sites in this category currently may be undergoing long-term operation and maintenance or monitoring to ensure that the cleanup actions continue to protect human health and the environment.

✓ A check in the "Deleted" category indicates that the site cleanup has met all human health and environmental goals and that the EPA has deleted the site from the NPL.

Further information on the activities and progress at each site is given in the site "Fact Sheets" published in this volume.

Progress Toward Cleanup at NPL Sites in the State of Alabama

Site Name	County	NPL	Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete	Deleted
ARMY AMMUNITION	TALLADEGA	Final	07/07/87		⇨	⇨	⇨	⇨		
ANNISTON ARMY DEPOT	CALHOUN	Final	03/15/89	⇨	⇨	⇨	⇨	⇨		
CIBA-GEIGY CORPORATION (MACINTOSH PLANT)	WASHINGTON	Final	09/24/84		⇨	⇨	⇨	⇨		
INTERSTATE LEAD CO (ILCO)	JEFFERSON	Final	06/10/86	⇨	⇨	⇨	⇨			
MOWBRAY ENGINEERING COMPANY	BUTLER	Final	09/08/83	⇨	⇨	⇨	⇨	⇨	⇨	
OLIN CORP(MCINTOSH PLANT)	WASHINGTON	Final	09/21/84	⇨	⇨					
PERDIDO GROUNDWATER CONTAMINATION	BALDWIN	Final	09/08/83	⇨	⇨	⇨	⇨			
REDWING CARRIERS, INC. (SARALAND)	MOBILE	Final	02/21/90	⇨	⇨					
STAUFFER CHEMICAL CO. (COLD CREEK)	MOBILE	Final	09/21/84		⇨	⇨	⇨	⇨		
STAUFFER CHEMICAL CO. (LEYMOYNE)	MOBILE	Final	09/21/84	⇨	⇨	⇨	⇨	⇨		
T. H. AGRICULTURE & NUTRITION CO. (MONTGOMERY PLANT)	MONTGOMERY	Final	08/30/90	⇨	⇨					
TRIANA/TENNESSEE RIVER	MADISON	Final	09/08/83		⇨	⇨	⇨	⇨	⇨	



Note: Cleanup status reflects actual site activities rather than administrative accomplishments.

ALABAMA ARMY AMMUNITION PLANT
ALABAMA
EPA ID# AL6210020008

EPA REGION 4
Talladega County
East of the Coosa River, north of Childersburg

Site Description

The Alabama Army Ammunition Plant (AAAP) covers approximately 5,170 acres just east of the Coosa River, 4 miles north of Childersburg. The plant was established in 1941 and was used for the manufacture of explosives including trinitrotoluene (TNT), dinitrotoluene, nitrocellulose, and tetryl. The Army ceased operations in 1945, but the plant was on standby status until 1973, when it was declared excess property. Most of the structures used in the manufacturing processes have been demolished or destroyed by controlled burning. Sources of contamination include disposal sites, as well as spills and general wastes including recycled acids from the manufacturing operations. Because the site is of a complex nature, and the site activities were so varied, the site has been divided into Areas A and B for cleanup purposes. Present use of the site includes timber cutting and licensed deer hunting. Land use around the site is primarily recreational, industrial, agricultural, or undeveloped. Three farms border the site and a small residential community lies several thousand feet southeast of the site next to Talladega Creek, which may be considered a groundwater divide located between AAAP and the City. Only an estimated 40 residents live within 1 to 2 miles of the site. There are other residences both north and south of the site, but they are buffered from the site by other industry or extensive undeveloped or wooded areas. Childersburg uses groundwater for drinking water. The total population using the river as a source of drinking water is estimated to be 1,800, and the population using groundwater is estimated to be 700.

Site Responsibility: This site is being addressed through Federal actions.

NPL LISTING HISTORY
Proposed Date: 10/15/84
Final Date: 07/07/87

Threats and Contaminants

Contaminants of concern on site are the nitroaromatic compounds, including TNT, which have been detected in the surface water and the groundwater, which is the main source of drinking water. Lead, asbestos, and nitroaromatic compounds have been detected in the soil. Coming in direct contact with or accidentally ingesting the contaminated groundwater, surface water, or soils could be a major health threat. There also is a possibility of a fire or explosion due to the nature of the wastes on site. Ecological risk will be evaluated as a part of the Army's continued study to determine the nature and extent of contamination and to identify alternatives for cleanup.

Cleanup Approach

The site is being addressed in three long-term remedial phases focusing on cleanup of stockpile soils at Area A, cleanup of groundwater and surface water contamination at Area B, and investigations of the effectiveness of Area A cleanup.

Response Action Status

Stockpile Soils at Area A: The Army completed an investigation for Area A of the site to evaluate the nature and the extent of the contamination. The results of the study helped the Army to decide on the engineering designs to be used to clean up the site. The EPA concurred with the selected procedures, and the Army has carried out the cleanup operation. The cleanup actions in Area A included soil excavation and decontamination of storage igloos and buildings. The work was completed in 1988. By 1992, all previously excavated and stockpiled soils are expected to be incinerated. Additional soil removal from Area A will be required under a future remedy decision.

Area B: The Army currently is investigating Area B of the site to evaluate the nature and the extent of the contamination. Previous investigations have found that groundwater contaminated with nitroaromatic compounds is above Federal drinking water standards, and surface water contaminated with nitroaromatics and lead also is above water quality standards. The investigation is scheduled to be completed in 1992. Once the study has been completed, the EPA will make a final remedy selection.

Area A: In 1990, the EPA began an investigation to determine if the Army had excavated and removed soils from Area A according to statutory requirements. This investigation is scheduled to be completed in 1993.

Site Facts: A Federal Facility Agreement has been filed between the Army, the Alabama Department of Environmental Management, and the EPA for cleanup actions at the site. AAAP also is participating in the Installation Restoration Program, a specially funded program established by the Department of Defense (DOD) in 1978 to identify, investigate, and control the migration of hazardous contaminants at military and other DOD facilities. The Army has selected 24 separate study areas within Areas A and B of the AAAP site.

Environmental Progress

The Army has cleaned up the contamination in Area A of the installation, and investigations into the extent of contamination in Area B and the remedy recommendations and selection are proceeding with assistance from the EPA. The potential for exposure to hazardous materials has been reduced while investigations into the final cleanup solution are taking place.

Site Repository

Earle A. Rainwater Memorial Library, The Alabama Room, 112 Ninth Avenue, SW, Childersburg, AL 35044

ANNISTON ARMY DEPOT (SOUTHEAST INDUSTRIAL AREA)

ALABAMA

EPA ID# AL3210020027

EPA REGION 4
Calhoun County
Anniston

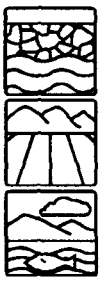
Site Description

The Anniston Army Depot (Southeast Industrial Area) site comprises 600 acres in the southeastern area of the Nichols Industrial Complex. This area consists of several shipping and warehouse buildings that have been used since 1948 for the repair and modification of combat vehicles and artillery equipment. The Depot's initial mission was limited to ammunition storage, refurbishment, testing, and decommissioning of combat vehicles and various types of military equipment. A 1979 study revealed that on-site disposal of wastes generated by chemical cleaning, painting, and plating operations had resulted in groundwater contamination. Two facilities were closed as a result of the 1979 investigations: a 2-million-gallon lagoon (A-Block Lagoon) and a landfill operation (Site Z-1). Approximately 39,000 residents live near the site in Anniston. The southeastern industrial area is drained by Dry Creek, which flows into Choccolocco Creek, a tributary of the Coosa River. Coldwater Spring is located adjacent to Dry Creek, approximately 1 1/2 miles south of the depot boundary. The spring is the primary source of drinking water for approximately 72,000 people in Calhoun County.

Site Responsibility: This site is being addressed through Federal actions.

NPL LISTING HISTORY
Proposed Date: 10/15/84
Final Date: 03/15/89

Threats and Contaminants



On-site groundwater is contaminated with heavy metals, chlorinated solvents, and volatile organic compounds (VOCs). A soil removal operation was conducted by the Army on two separate occasions to remove contaminated soils to a permitted treatment facility. The contamination included chromium, methylene chloride, trichloroethylene (TCE), phenols, and dichloroethylene. Aquatic life that may be at risk from contamination in the Coldwater Spring includes pygmy sculpin, water snake, crayfish, and various aquatic insects. If site-related contaminants have migrated into Coldwater Spring, residents could drink and be directly exposed to contaminated water.

Cleanup Approach

The site is being addressed in three stages: initial actions and two long-term remedial phases focusing on cleanup of groundwater and cleanup of the South East Industrial Area.

Response Action Status

Initial Actions: The Army excavated contaminated soil and removed it to an off-site approved disposal facility. This removal action was completed in 1983. The Army installed an air stripper in 1987 to treat the 400,000 to 900,000 gallons per day of groundwater pumped from underneath the Metal Finish Facility. It is recommended that a network of groundwater quality monitoring points be established to evaluate extraction system effectiveness in each area. These monitoring wells ideally would be sampled prior to groundwater extraction system start-up to establish baseline conditions, and at some regular interval thereafter (e.g., semi-annually).

Groundwater: A total of 16 extraction wells were installed in 1988: seven wells at the trench area (Site Z-1), six wells in the northeastern area, and three in the old landfill area. These wells were evaluated to provide a basis for site characterization and groundwater extraction system design and optimization. The extraction wells and treatment facilities are scheduled for construction completion in 1992. The extraction systems will operate for 24 continuous hours. Automatic on/off systems for intermittent operation (i.e., pumping) will be used for all wells, especially low-yielding wells in critical capture areas. Extraction system performance monitoring during the first 3 to 6 months of system operation will provide additional data on long-term aquifer behavior, draw-down effects, and contaminant capture. Actual cleanup activities began in late 1991.

Southeast Industrial Area: In 1990, the Army began a study of the nature and extent of site contamination. When it is completed, scheduled for 1993, appropriate cleanup remedies will be selected.

Site Facts: A Federal Facility Agreement has been negotiated between the Army, the Alabama Department of Environmental Management, and the EPA for cleanup actions. Anniston Army Depot is participating in the Installation Restoration Program, a specially funded program established by the Department of Defense (DOD) in 1978 to identify, investigate, and control the migration of hazardous contaminants at military and other DOD facilities. The Army has completed the records search phase and has finished an assessment of cleanup alternatives.

Environmental Progress

The Army already has taken several steps to improve conditions at the Anniston Army Depot (Southeast Industrial Area), such as excavating and removing contaminated soil and installing an air stripping treatment system to pump and treat contaminated groundwater. Cleanup activities are continuing, and extraction wells have been installed; therefore, the site currently does not pose an immediate threat to the public or to the environment.

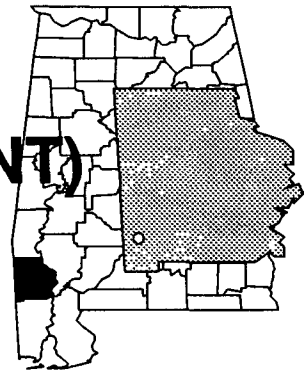
Site Repository

Anniston Public Library, 108 East Tenth Street, Anniston, AL 36202

CIBA-GEIGY CORPORATION (MCINTOSH PLANT)

ALABAMA

EPA ID# ALD001221902



EPA REGION 4
Washington County
McIntosh

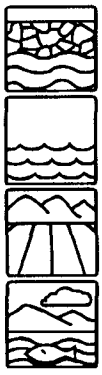
Site Description

The Ciba-Geigy Corporation (McIntosh Plant) produces industrial organic chemicals, pesticides, agricultural chemicals, and synthetic resins on a 1,500-acre site in McIntosh. The plant was built in the early 1950s, and the company formerly disposed of wastes in several on-site landfills and in an open burning area. Disposal of wastes is now carried out under EPA requirements. Pesticides have been found in soil and sediments downgradient of the burn area and in a drinking water well on the site. Prior to 1965, effluent from the plant flowed into the Tombigbee River after chemicals were neutralized in the facility's wastewater impoundment. However, an aeration basin and holding basin were constructed in 1965 to treat the effluent. Over the years, modifications have been made to the treatment system to meet State and Federal discharge standards. Approximately 2,200 residents of McIntosh receive drinking water from a public well within 3 miles of the site; however, most public wells are upstream from the site and do not appear to be contaminated. The closest residence is less than 1,000 feet away from the site. The Tombigbee River and freshwater wetlands are within 100 feet of several former disposal areas, and the wetlands area is subject to periodic flooding by the river.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 09/08/83
Final Date: 09/24/84

Threats and Contaminants



A drinking water well on the site is contaminated with lindane from former waste disposal practices. Sediments are contaminated with heavy metals including chromium and mercury. Soil is contaminated with DDT and lindane. Surface water contains volatile organic compounds (VOCs) including chlorobenzene, toluene, and phenols. Trespassers at the facility who accidently ingest or otherwise come into contact with contaminated groundwater, surface water, soil, or sediments may be at risk. Runoff from the site could threaten wetlands near the disposal areas.

Cleanup Approach

The site is being addressed in four long-term remedial phases focusing on cleanup of the groundwater; the affected deep aquifer and soil; the wetlands area; and the bluff line, flood plain and dilute ditch.

Response Action Status

Groundwater: The Ciba-Geigy Corporation installed a groundwater pumping system consisting of 10 fully penetrating alluvial pumping wells to intercept and remove contaminated groundwater from the shallow aquifer. The water removed from these wells is treated by the plant's on-site biological wastewater treatment system and is then discharged into the Tombigbee River. The EPA has determined that no further action is needed for this phase of the cleanup. Ciba-Geigy installed 43 monitoring wells and four corrective action monitoring wells to determine the effectiveness of the groundwater treatment system.

Deep Aquifer and Soil: In 1991, the Ciba-Geigy Corporation completed a study determining the type and extent of the soil and deep aquifer contamination at the site. The cleanup alternatives selected include the following: excavation of contaminated soils and sludges; on-site thermal treatment of approximately 65,000 cubic yards of highly contaminated soils and sludge; stabilization/solidification of approximately 62,300 cubic yards of moderately contaminated soils and sludge; disposal of treated soil and residual ash in an on-site Resource Conservation and Recovery Act (RCRA) approved landvault(s); in-situ soil flushing combined with extraction wells to cleanup areas where the risk based cleanup levels were not achieved before, excavation depth of 20 feet is reached; backfilling the excavated areas with common fill and vegetating the area; operation and maintenance of landvault(s) for a minimum of thirty years; and institutional control for land use and groundwater use. Innovative technologies such as in situ vacuum extraction or in situ bioremediation also may be used in addition to or instead of in situ soil flushing. The use of these technologies will be determined during the design phase.

Wetlands: In 1992, the Ciba-Geigy Corporation began a study to determine the nature and extent of contamination of the wetlands area. The study is expected to be completed in 1993, at which time a cleanup remedy will be selected.

Bluff Line, Flood Plain, and Dilute Ditch: The Ciba-Geigy Corporation also is studying the nature and extent of contamination of the bluff line, the flood plain, and the dilute ditch. These studies are expected to be completed in 1992, at which time a cleanup remedy will be selected.

Site Facts: The Ciba-Geigy Corporation is operating under a Federal hazardous waste management permit.

Environmental Progress

The EPA has determined that the groundwater cleanup phase of the Ciba-Geigy Corporation (McIntosh Plant) site cleanup is completed. Ciba-Geigy is monitoring the effectiveness of the groundwater treatment system through monitoring wells. Cleanup alternatives for the deep aquifer and soils have been selected and plans for cleanup activities are currently underway while investigations at the bluff line, flood plain, and dilute ditch, and wetlands are still ongoing.

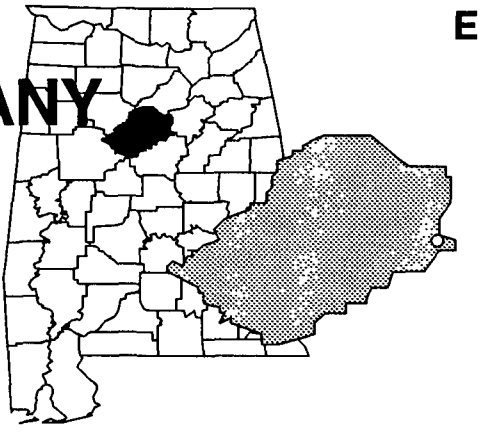
Site Repository

McIntosh Town Hall, Commerce Street, McIntosh, AL 36553

INTERSTATE LEAD COMPANY (ILCO)

ALABAMA

EPA ID# ALD041906173



EPA REGION 4
Jefferson County
Leeds

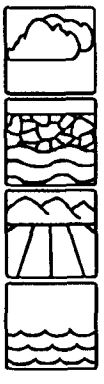
Site Description

Interstate Lead Company (ILCO) owns and operates this 12-acre lead battery reclamation facility and secondary lead smelter and has generated, treated, stored, and disposed of wastes containing lead on both its property and other numerous locations near the site. Slag from reclamation operations was used as fill at seven known sites, including the ILCO parking lot, the City of Leeds Landfill, Fleming's Patio, the Acmar Church of God, J & L Fabricators, Inc., the Connell property, and the Gulf Station. The unnamed tributary to Dry Creek, adjacent to the main facility and parking lot, contains lead-contaminated sediments. Approximately 3,000 people live within a 3-mile radius of the site, and the nearest home is less than 1/4 mile away from the site. Six of the locations listed above are within 3 miles of the springs and wells that supply drinking water to 6,000 families in Leeds. Access to most of the sites is unrestricted.

Site Responsibility: This site is being addressed through Federal, State, County, and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 09/18/85
Final Date: 06/10/86

Threats and Contaminants



The County measured elevated lead concentrations in the air south and southwest of the ILCO site in 1983 and 1984. The owner found lead and cadmium in groundwater under the facility in 1985. Groundwater and soil also contain chromium, nickel, and arsenic. The State detected lead in Dry Creek and an unnamed tributary next to the facility. Surface water and sediments also contain nickel and arsenic. People could be exposed to heavy metals by coming in direct contact with or accidentally ingesting contaminated soils or by drinking polluted groundwater. In addition, contaminants in nearby surface water could pose a health threat to residents who use the area for recreation.

Cleanup Approach

This site is being addressed in three stages: emergency actions and two long-term remedial phase focusing on source control and cleanup of the groundwater.

Response Action Status

Emergency Actions: In 1984, the EPA removed lead-bearing wastes from the Church of God area. ILCO has placed a synthetic liner over the parking lot, covered waste piles at the main facility, diverted runoff, and begun construction on a stormwater treatment system.

Source Control: In 1991, remedies were chosen to address the source of contamination at each of the seven sub-sites. At the ILCO parking lot and Fleming's Patio, lead-contaminated soils will be removed, treated, and then replaced. Batteries and other debris will be removed, stabilized, and disposed of on site or off site, as appropriate. These areas will be sampled for primary metal contamination associated with automotive batteries on a semi-annual basis. At the Gulf Station, J & L Fabricators, the Connell Property, and the Acmar Church of God, lead-contaminated sediments will be removed, transported to the ILCO parking lot, treated, and placed with the soils at the ILCO parking lot sub-site or replaced in their original sub-sites. The areas where soils are removed will be backfilled with clean material. Lead-contaminated sediments will be removed, dewatered, and transported to the ILCO parking lot for treatment with the soil. At the Leeds Municipal Landfill, a clay cap will be installed to cover the lead contaminated soils. Excavated areas at all sub-sites will be revegetated. In addition, access and deed restrictions and groundwater monitoring will be implemented at all sub-sites. Engineering designs for these activities are currently being developed and cleanup is expected to begin in mid-1993.

Groundwater: Studies of the groundwater at the Gulf Station and the Acmar Church of God properties have shown no contamination. The low levels of contamination at the J &L Fabricators, Fleming's Patio, and Connell Property will naturally attenuate over time, therefore, no cleanup activities are required. Groundwater monitoring is the only activity that will continue at these sub-sites. Preliminary studies at the Leeds Municipal Landfill indicates that the best remedy for treating contaminated groundwater is extraction, on-site treatment, and discharge of the decontaminated water into an adjacent surface drainageway. Groundwater monitoring would occur both during and after the extraction and treatment procedure. A final decision on the groundwater remedy is not expected until 1996.

Site Facts: ILCO signed a Consent Order, agreeing to conduct a study of site contamination and cleanup options on the main facility, parking lot, and tributaries to Dry Creek. These activities were to be conducted under provisions of the Resource Conservation and Recovery Act (RCRA). At the present time, however, ILCO is in bankruptcy.

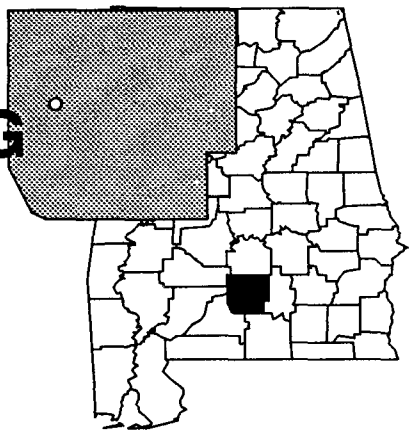
Environmental Progress

The removal of wastes, installation of the liner, and surface drainage control have reduced the potential for people to be exposed to hazardous materials at the Interstate Lead Company site while studies and cleanup actions take place.

Site Repository

Leeds Public Library, 802 Parkway Drive, S.E., Leeds, AL 35094

MOWBRAY ENGINEERING COMPANY
ALABAMA
EPA ID# ALD031618069



EPA REGION 4
Butler County
Greenville

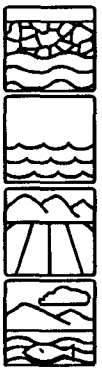
Site Description

The 3-acre Mowbray Engineering company site is located on a wetland which is saturated most of the time. The company, which has repaired electrical transformers since the early 1940s, discharged waste transformer oils containing polychlorinated biphenyls (PCBs) to the neighboring swamp for over 20 years. The swamp water ultimately drained into Persimmon Creek, which is used for fishing. From 1955 to 1974, operators drained, repaired, and refilled about 1,000 used transformers each year, each unit holding about 9 gallons of oil. In 1974, the owners installed a 3,000-gallon underground storage tank to collect waste oil, which was sold between 1974 and 1978. After that time, waste oil was recycled. Sampling over the years has yielded inconsistent results. In 1975, after a major fish kill in an adjacent stream, EPA analysts found only trace levels of PCBs, but when another kill occurred in 1980, they discovered significant levels of PCBs in swamp soils. An aquifer underlying the site supplies approximately 11,400 residents with drinking water; however, this aquifer was not affected by site contamination.

Site Responsibility: *This site is being addressed through* Federal and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 12/30/82
Final Date: 09/08/83

Threats and Contaminants



Sampling of the site's four monitoring wells revealed PCBs, carbon disulfide, and various volatile organic compounds (VOCs) in the groundwater. Sediments and soils downstream of the site and in the wetlands contained PCBs. Soil in the on-site processing area contained PCBs, polycyclic aromatic hydrocarbons (PAHs), and VOCs. Fish caught in 1981 at the confluence of Persimmon Creek and Tanyard Branch and downstream were contaminated with PCBs. Accidentally ingesting or coming in direct contact with contaminated groundwater, surface water, sediments or soil posed health threats. Eating contaminated fish was a possible health threat, until cleanup actions were taken.

Cleanup Approach

This site was addressed in two stages: immediate actions and a long-term remedial phase focusing on cleanup of the entire site.

Response Action Status

Immediate Actions: In 1981, the EPA sent emergency cleanup workers to the site to remove debris and the top 6 inches of PCB-contaminated swamp soil and disposed of these wastes at an EPA-approved facility.

Entire Site: In 1985, when soils in the stormwater drainage pathway were discovered to be highly contaminated with PCBs, the EPA devised a long-term cleanup strategy. The remedy selected for this site included: excavating, removing, and disposing of the underground storage tanks located on company property; treating or disposing of waste oils encountered in the swamp area and in the underground storage tanks by a method approved under the toxic substances control laws; diverting the drainage of surface runoff around the swamp area; excavating contaminated soils and incinerating them on or off the site, or alternatively stabilizing and solidifying them; grading and replanting the swamp; properly closing the abandoned water supply well on site; and conducting operation and maintenance activities as necessary. Cleanup was completed in 1991. Sampling conducted after each cleanup phase confirmed that site cleanup standards were met. The Mowbray Engineering Company site is in the process of being formally deleted from the NPL.

Site Facts: In 1990, the potentially responsible parties signed a Consent Decree, in which they agreed to assume complete responsibility for the operation and maintenance of the site and to pay for past investigation and cleanup activities.

Environmental Progress

All cleanup activities are completed at the Mowbray Engineering Company site, and the EPA expects to delete the site from the NPL in 1994. Cleanup activities have eliminated all soil, surface water, and groundwater contamination, making the site safe to nearby residents and the environment. The EPA is currently in the process of conducting a 5-year review at the site to verify that the remedy continues to be protective of public health and the environment.

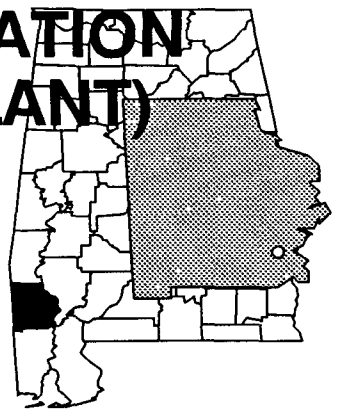
Site Repository

Greenville Public Library, 101 Adams Street, Greenville, AL 36037

OLIN CORPORATION (MCINTOSH PLANT)

ALABAMA

EPA ID# ALD008188708



EPA REGION 4

Washington County
McIntosh

Other Names:
Olin Corp. Old Plant Landfill
Olin Corp-Mercury
Olin Corp Lime Slurry Ponds

Site Description

The 1,500-acre Olin Corp (McIntosh Plant) has been used since the 1950s to manufacture chlorine and caustic soda, using a mercury core process. In 1956, Olin constructed a pesticide and organic chemical plant. The plant closed in 1982, and Olin switched from the mercury cell process to the diaphragm cell process, which is being used today. Olin's past waste disposal practices may have contaminated groundwater. On-site wells that once provided the plant's drinking water are known to be contaminated. In 1980, Olin began installing monitoring wells and found heavy metals and chlorinated aromatic compounds. Nearby wells supply water to the community of McIntosh and to the Ciba-Geigy and Olin plants. The closest residence is less than a mile from the site. There are an estimated 220 people residing within a 1-mile radius of the site. Also within 1 mile of the site is a sizable wetlands area. The Tombigbee River is to the east of the site.

Site Responsibility: This site is being addressed through Federal, State, and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 09/08/83
Final Date: 09/21/84

Threats and Contaminants

On-site wells that once provided the plant's drinking water are known to be contaminated with chromium, lead, mercury, and chlorinated aromatic compounds. Monitoring also has shown contamination with benzene, carbon tetrachloride, and other volatile organic compounds (VOCs). Accidentally ingesting or coming in direct contact with volatile components of groundwater may pose potential health risks to individuals. Soils in the vicinity of the active plant were contaminated with hexachlorobenzene. The site is presently secured, reducing the risk of exposure to contaminants. The adjacent river and wetland areas may be threatened by contaminants from the site.

Cleanup Approach

This site is being addressed in two phases: initial actions and a long-term remedial phase focusing on cleanup of the entire site.

Response Action Status

Initial Actions: Contaminated areas were covered in 1984 to prevent the infiltration of rainwater. The site also was secured. In 1990, contaminated soils were removed from the active plant facility after having been identified during a maintenance activity.

Entire Site: The parties potentially responsible for the site contamination are continuing to study the groundwater problem and report results regularly to the State. A water quality study will be conducted on the Tombigbee River and the wetlands near the plant to determine the extent of contamination by mercury and other contaminants discharged from the plant into the natural basin near the river. A full-scale study of contamination at the site and evaluation of possible cleanup techniques began in 1990, with completion scheduled for 1993.

Environmental Progress

Initial actions to cover contaminated areas, remove contaminated soils, and secure the site have reduced the risks of exposure to contaminants at the Olin Corporation (McIntosh Plant) site while further studies take place.

Site Repository

McIntosh Town Hall, Commerce Street, McIntosh, AL 36553

PERDIDO GROUNDWATER CONTAMINATION

ALABAMA

EPA ID# ALD980728703

EPA REGION 4
Baldwin County
Perdido

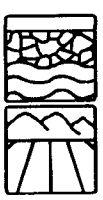
Site Description

The 15-acre Perdido Groundwater Contamination site was contaminated as a result of a 1965 train derailment on the Louisville and Nashville Railroad (now CSX Transportation, Inc.). Tank cars spilled approximately 7,600 gallons of benzene into drainage ditches, which then seeped into the underlying aquifer. The contaminated area is about 300 yards downgradient of the derailment site. Another possible source of contamination is a cluster of several underground storage tanks located 1,900 feet from the derailment area. In 1981, residents became concerned about the taste and odor of the well water. The State confirmed contamination of nine wells. As a result of the identification of the benzene-contaminated wells, a Baldwin County Health officer recommended that residents within a 1-mile radius of the derailment use alternate water supplies. Wells no longer are being used for drinking water; however, some well water may be used for livestock and gardens. The Town of Perdido has a population of approximately 450, of which 250 residents were directly affected by contaminated well water. Within a 1-mile radius of the site are about 125 houses and businesses. The surrounding area is agricultural; livestock grazing and timber logging for paper production are the primary activities. A junior high school is 2,000 feet to the south of the train derailment location.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 12/30/82
Final Date: 09/08/83

Threats and Contaminants



The groundwater and soil are contaminated with benzene from the derailed tank cars. Contaminated drinking water is not a threat to area residents, since an alternate water supply was provided. However, ingestion of benzene may occur if contaminated well water is being used to water livestock and gardens. Because benzene does not have a tendency to be absorbed by soil, but seeps down into groundwater, there is little threat of direct contact with the soil.

Cleanup Approach

This site is being addressed in two stages: an emergency response and a long-term remedial phase focusing on groundwater cleanup at the site.

Response Action Status

Emergency Response: The National Guard provided two water tanks for affected residents. CSX Transportation voluntarily connected 150 residences within 1 mile downgradient of the site to the Atmore municipal water supply system in 1983.

Groundwater: In 1988, the EPA selected a remedy to clean up the groundwater that includes pumping and treating the water by using air stripping and treating the spent benzene-laden air with activated carbon adsorption. Air stripping is a process in which contaminants are removed by forcing a stream of air through the water. Carbon adsorption involves forcing the air through tanks containing activated carbon, a specially treated material that attracts the contaminants. Once the water is treated, it will be released into the aquifer. The air will be monitored and discharged after carbon adsorption treatment, and groundwater will be monitored after the cleanup to ensure that cleanup goals have been met. CSX completed construction of the groundwater treatment system in early 1992. Actual cleanup of the groundwater also was initiated in 1992 and is expected to be completed in late 1993.

Site Facts: CSX Transportation agreed in 1983 to install a groundwater treatment system.

Environmental Progress

With the provision of an alternative water supply to affected residents, no immediate threats exist at the Perdido Groundwater Contamination site while a groundwater treatment system is being operated and further cleanup activities take place.

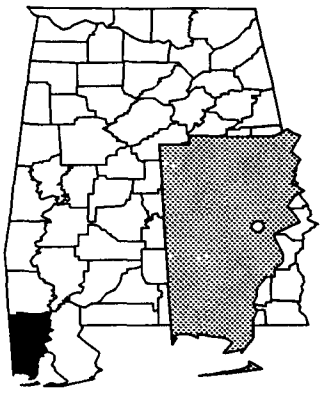
Site Repository

Bay Minette Public Library, 119 West Second Street, Bay Minette, AL 36507

REDWING CARRIERS, INC. (SARALAND)

ALABAMA

EPA ID# ALD980844385



EPA REGION 4
Mobile County
Saraland

Site Description

Redwing Carriers, Inc. began operations as a chemical transporting business on this 1-acre site in 1961 and was used as a parking and washing terminal for company trucks. The trucks carried numerous substances, including asphalt, diesel fuel, weed killer, oil, and sulfuric acid. After the site was sold by Redwing in 1971, it was covered with fill material, graded, and an apartment complex was built on it. Residents of the complex became concerned after tar-like material began oozing to the surface at numerous locations, including the building courtyard and parking lot. In 1985, the EPA detected high levels of volatile organic chemicals (VOCs) in the soil and the leachate coming from the tar-like material. The apartment complex houses approximately 160 people. The City of Saraland Water Department provides drinking water to 19,000 people. The water is obtained from three 100-foot-deep wells less than 2 miles from the site.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 06/24/88
Final Date: 02/21/90

Threats and Contaminants

Soil around the apartment complex and leachate from the tar oozing to the surface are contaminated with various VOCs from the former site activities. The aquifer underlying the site may be contaminated. The drinking water potentially is threatened by the site contamination. People who come in direct contact with the tar-like substance oozing from the ground may be at risk.

Cleanup Approach

This site is being addressed in two stages: initial actions and a single long-term remedial phase focusing on cleanup of the entire site.

Response Action Status

Initial Actions: Redwing removed some of the contaminated soil to a federally approved hazardous waste facility. The company periodically inspects the site and removes any tar rising to the surface.

Entire Site: Redwing Carriers, under EPA monitoring, is conducting a study to determine the extent of contamination at the site. Once the study is completed, scheduled for 1992, various alternatives for cleaning up the area will be recommended. Redwing will continue to remove any tar oozing to the surface while the site study is underway.

Site Facts: The EPA sent notice letters in 1990 to the potentially responsible parties, requiring a study to determine the nature and extent of the contamination. An Administrative Order on Consent with the potentially responsible parties requires them to conduct cleanup activities whenever the tar-like material seeps to the surface of the complex.

Environmental Progress

By continually removing the contaminated leachate from the site, the potential for exposure to hazardous materials at the Redwing Carriers, Inc. (Saraland) site is reduced while further investigations and cleanup activities are taking place.

Site Repository

Saraland Public Library, 111 Saraland Loop Road, Saraland, AL 36571

STAUFFER CHEMICAL CO. (COLD CREEK PLANT)

ALABAMA

EPA ID# ALD095688875

EPA REGION 4

Mobile County
Twenty miles north of Mobile

Other Names:
ICI Plant

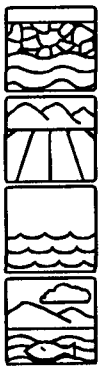
Site Description

The 947-acre Stauffer Chemical Company's Cold Creek Plant manufactures pesticides and formerly operated two on-site landfills to dispose of process wastes including liquids and solids contaminated with pesticides, solvents, and heavy metals. Stauffer reports that the two landfills are lined with natural clay and are covered with plastic caps. The landfills are graded, planted with grass, and fenced. Stauffer maintains monitoring wells at the two landfills. This site and Stauffer Le Moyne Plant, another nearby NPL site, are being treated in a combined effort. There are several sparsely populated rural communities within a few miles of the site. Also, there are 20 residential drinking water supply wells within 2 miles of the site.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 09/08/83
Final Date: 09/21/84

Threats and Contaminants



The groundwater and soil are contaminated with various volatile organic compounds (VOCs) including carbon disulfide. Sediments are polluted with heavy metals including mercury. Accidentally ingesting or coming in direct contact with contaminated groundwater and soil pose a health hazard to individuals. Also, exposure to mercury-contaminated Cold Creek Swamp sediment and fish may pose a significant threat to public health.

Cleanup Approach

This site is being addressed in three long-term remedial phases focusing on cleanup of groundwater, solid waste management units, and Cold Creek Swamp.

Response Action Status

Groundwater: In 1989, the EPA selected the following remedy to clean up the site: modify the existing groundwater interception and treatment system; install additional monitoring and installation wells; continue extracting groundwater from the surface aquifer through existing and additional intercept wells; monitor groundwater movement at the site to determine the adequacy of the remedial action; conduct treatability studies as appropriate for source treatment; and decommission wells no longer needed for monitoring. Akzo Chemicals and ICI Americas jointly will clean up the site. Designs intended to modify the groundwater treatment unit were started by the potentially responsible parties in 1990 and are expected to be completed in 1992. The existing groundwater treatment system has been in operation since 1989.

Solid Waste Management Units: The solid waste management units are active, federally regulated waste facilities. An investigation to determine the nature and extent of contamination in these units is being conducted by the potentially responsible parties and is expected to be completed in 1994.

Cold Creek Swamp: The parties potentially responsible for the site contamination were asked to perform an investigation into the nature and extent of contamination at Cold Creek Swamp and to determine long-term remedial actions for cleanup. The study began in 1990 and is expected to be completed in 1993, after which final cleanup remedies will be selected.

Site Facts: There is concern that an adjacent rayon manufacturer uses contaminated groundwater in the manufacturing process.

Environmental Progress

The plastic cap on the landfills and the fence have reduced the potential for exposure to hazardous substances at the Stauffer Chemical Co. (Cold Creek Plant) while awaiting the final cleanup actions.

Site Repository

Toulminville Public Library, 22318 St. Stephens Road, Mobile, AL 36613

STAUFFER CHEMICAL CO. (LE MOYNE PLANT)

ALABAMA

EPA ID# ALD008161176

EPA REGION 4

Mobile County
Twenty miles north of Mobile

Other Names:
Akzo Plant
Axis Plant

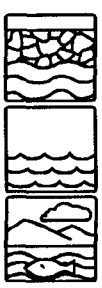
Site Description

The Stauffer Chemical Company's Le Moyne Plant began operations in the early 1950s and manufactured carbon disulfide. In 1964, the company produced chlorine and caustic soda, using the mercury cell process. In 1974, the plant expanded again, producing additional industrial inorganic compounds. During the 1950s and the 1960s, Stauffer used an on-site landfill located east of the manufacturing facility, between the plant and the Mobile River. Stauffer reported that the landfill contained drums of wastes that included organics, solvents, heavy metals, acids, and bases. The landfill was constructed in native clay and covered with a vinyl plastic cap. Topsoil was spread over the cap, and the area was revegetated and fenced. Wastes were held in clay-lined ponds on site and then discharged to Cold Creek Swamp. Groundwater, sediments, and surface water around the site are contaminated. The Stauffer Le Moyne Plant and the Stauffer Cold Creek Plant, another nearby NPL site, are being treated in a combined effort. The site is located in an industrial area where approximately 1,600 people are employed by all the industrial facilities in the area. There are a few sparsely populated rural communities within a few miles of the site. Groundwater is the sole source of drinking water in this area, and approximately 4,000 people, including the employees of the local industries and the residents of the Axis community, are served by wells within 3 miles of the site.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 09/08/83
Final Date: 09/21/84

Threats and Contaminants



The groundwater in the vicinity of the landfill and ponds is contaminated with various volatile organic compounds (VOCs) including carbon disulfide. Mercury has been found in the sediments of the Cold Creek Swamp. Thiocyanates also were found in sediments under nearby Halby Pond. People could be exposed to the contaminants through direct contact or accidental ingestion and inhalation of contaminated groundwater and sediments. Also, people could be exposed to mercury by eating fish contaminated by Cold Creek Swamp.

Cleanup Approach

This site is being addressed in four stages: initial actions and three long-term remedial phases focusing on groundwater cleanup, cleanup of Cold Creek Swamp, and cleanup of the solid waste management units.

Response Action Status

Initial Actions: Three extraction wells, with an aeration pond and surface water discharge, have been pumping and treating contaminated groundwater since 1980.

Groundwater: Stauffer Chemical assumed responsibility to study the nature and the extent of the contamination in the groundwater and to conduct subsequent cleanup activities. The study was completed in 1989. The following methods have been selected to augment the existing groundwater cleanup at the site: modification of the existing groundwater system; installation of additional monitoring and extraction wells; extraction of groundwater from the surface aquifer through existing and additional intercept wells; monitoring of groundwater on site to determine the adequacy of the cleanup action; performance of studies to determine the best approach for treating the source of contamination; and decommissioning of wells no longer needed for monitoring. Designs of the modified groundwater treatment unit are expected to be completed by late 1992. Meanwhile, the existing treatment system continues to operate.

Cold Creek Swamp: The parties potentially responsible for the site contamination were asked to perform an investigation to determine the nature and extent of contamination at Cold Creek Swamp and to identify long-term remedial actions for cleanup. The investigation, started in 1990, is planned to be completed in 1993. After this investigation is complete, final cleanup remedies will be selected.

Solid Waste Management Units: The solid waste management units are active federally regulated waste facilities. An investigation to determine the nature and extent of contamination in the units began in 1990. Additional studies will be performed on the source units (disposal ponds), following the design of the modified groundwater treatment unit.

Site Facts: An Administrative Order on Consent was signed between the EPA and Stauffer Chemical in 1986 to investigate the site in an effort to determine the nature and extent of the contamination. Stauffer Chemical is responsible for the studies. In 1990, a Consent Decree was entered requiring the potentially responsible parties to design and implement the selected groundwater remedy. There is concern that a rayon manufacturer adjacent to the Stauffer Chemical plants may be using contaminated groundwater in processing operations.

Environmental Progress

Extraction wells have been pumping contaminated groundwater since 1980, reducing the potential for exposure to hazardous materials while further cleanup activities continue at the Stauffer Chemical Co. (Le Moyne Plant) site.

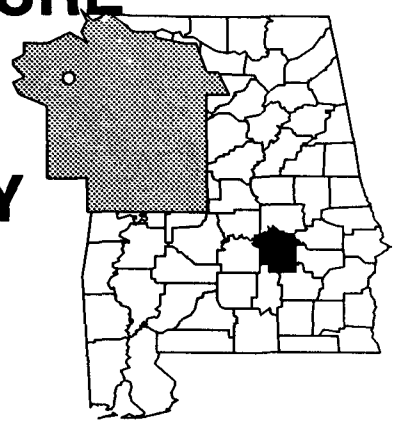
Site Repository

Toulminville Public Library, 22318 St. Stephens Road, Mobile, AL 36613

T.H. AGRICULTURE & NUTRITION COMPANY (MONTGOMERY PLANT)

ALABAMA

EPA ID# ALD007454085



EPA REGION 4
Montgomery County
Downtown Montgomery

Site Description

The 11 1/2-acre T.H. Agricultural & Nutrition Company (Montgomery Plant) site previously was used to distribute pesticides. The southern boundary of the site was extended by approximately 5 acres. A former pesticide formulation operation owned by Pennwait (now Atochem North America, Inc.) was located on this adjacent 4-acre plot. Releases from this property may have affected the former T.H. Agriculture property. During the 1970s and, possibly, the late 1960s, the company operated under the name of Thomson-Hayward Chemical Company, but this company closed in 1980. The company changed its name to T.H. Agricultural & Nutrition Company in 1981. When the plant operated, insecticides, herbicides, and other chemical wastes were buried in pits and trenches covering 1 acre of the plant site. The City of Montgomery's water supply division has 21 wells within 3 miles of the site, and this system serves approximately 250,000 people.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 06/24/88
Final Date: 08/30/90

Threats and Contaminants

Lindane was discovered in the groundwater on and off the site. Drinking contaminated groundwater is a potential health hazard to the nearby residents.

Cleanup Approach

This site is being addressed in two stages: immediate actions and a long-term remedial phase focusing on cleanup of the entire site.

Response Action Status

Immediate Actions: In 1981, T.H. Agricultural & Nutrition Company voluntarily agreed to remove 2,900 cubic yards of contaminated soil to a federally approved facility.

Entire Site: In 1991, the parties potentially responsible for the site contamination began an investigation to evaluate the nature and extent of contamination and to determine remedies for site cleanup. Cleanup activities will begin upon completion of the investigation in 1993.

Site Facts: An Administrative Order on Consent was signed between the EPA and Atochem North America, Inc. in March 1991, requiring the company to conduct site investigations. In addition, a 700,000 gallon-lined-lagoon was closed in cooperation with the Alabama Department of Environmental Management on the adjacent 5 acres in 1978.

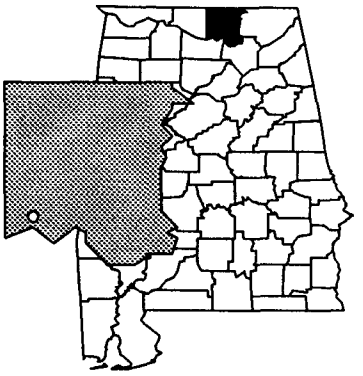
Environmental Progress

The removal of contaminated soil has reduced the potential for exposure to hazardous materials at the T.H. Agricultural & Nutrition Company (Montgomery Plant) site while investigations are taking place.

Site Repository

Not established.

TRIANA/ TENNESSEE RIVER
ALABAMA
EPA ID# ALD983166299



EPA REGION 4
Madison County
Triana, near Huntsville

Other Names:
USA Redstone Arsenal
Olin Corp/Huntsville Plant
US Army Missile Command
Triana (Redstone) Arsenal

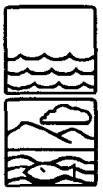
Site Description

The Triana/Tennessee River site occupies approximately 1,400 acres, near the small town of Triana. It is situated along 20 miles of the Tennessee River and its tributaries. The pesticide DDT was manufactured for commercial use by a lessee, Olin Corp., at Redstone Arsenal (RSA) in Huntsville between 1947 and 1970. The manufacturing, handling, and disposal practices at the facility led to the discharge of DDT residues through RSA's drainage system into the Huntsville Spring Branch-Indian Creek tributary system, which enters the Tennessee River. An estimated 475 tons of DDT residues accumulated in the sediment of the tributary system. The plant was closed and demolished in 1971. The area surrounding the site is rural and has a population of 600 residents. The community has been affected by the contamination because the residents depend on, to some extent, locally caught fish for food. Until the introduction of a water supply system in 1967, residents used water from Indian Creek and the Tennessee River.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 10/23/81
Final Date: 09/08/83

Threats and Contaminants



Huntsville Spring Branch-Indian Creek and the Tennessee River have shown signs of contamination with DDT. Eating fish from contaminated rivers, creeks, and streams could be harmful to the health of the public. Drinking water from these sources also may be a potential health threat. To a lesser extent, coming in direct contact with the sediments from the contaminated river, creek, or tributaries may be harmful. The contamination of the Tennessee River and its tributaries has affected the recreational use of the area. The Huntsville Spring Branch flows through the Wheeler Wildlife Refuge, and contamination threatens the wildlife there.

Cleanup Approach

This site is being addressed in a long-term remedial phase focusing on cleanup of the entire site.

Response Action Status

Entire Site: The Olin Corporation submitted its final engineering design for cleaning up the site in 1986 and began construction on the initial cleanup phase. All construction was completed in 1987. The methods that were used to clean up the site included: bypassing, and burying on site, the most heavily contaminated channel area; and continuing programs for fish and water studies and investigations of the movement of contaminants through the water and the fish. Fish, water, and sediment monitoring will continue in order to determine progress made at the site. Targeted cleanup standards are scheduled to be met in 1998. The first year's monitoring showed reduced levels of DDT in selected fish species. Average DDT concentrations in the water column are significantly lower than original conditions throughout the Huntsville Spring Branch-Indian Creek system. In the 1990 data, DDT concentrations in fish decreased by a range of 39 percent to 90 percent, with an average of a 72 percent decrease in contaminant concentrations from original conditions.

Site Facts: In 1983, Olin and the EPA settled on Olin's responsibility to conduct a study of the site and on the final design for its cleanup. The settlement included a Consent Decree that required Olin to develop and carry out a remedial plan to isolate DDT from the nearby population and environment. The final remedy plan, now being implemented, was submitted and reviewed by a panel consisting of representatives from the EPA, the Tennessee Valley Authority, the Fish and Wildlife Service, the Department of the Army, the Alabama Department of Environmental Management, and the Olin Corporation. This panel is overseeing Olin's cleanup action until it meets the performance standards.

Environmental Progress

Initial cleanup activities have been completed at the Triana/Tennessee River site. The parties potentially responsible for site contamination, under EPA guidance, will continue to oversee monitoring activities at the site and ensure the long-term effectiveness of the treatment methods used.

Site Repository

Town Hall, Town of Triana, 640 Sixth Street, Madison, AL 35758

GLOSSARY

Terms Used in the NPL Book

This glossary defines terms used throughout the NPL Volumes. The terms and abbreviations contained in this glossary apply specifically to work performed under the Superfund program in the context of hazardous waste management. These terms may have other meanings when used in a different context. A table of common toxic chemicals found at NPL sites, their sources, and their potential threats is located on page G-15

Acids: Substances, characterized by low pH (less than 7.0), that are used in chemical manufacturing. Acids in high concentration can be very corrosive and react with many inorganic and organic substances. These reactions possibly may create toxic compounds or release heavy metal contaminants that remain in the environment long after the acid is neutralized.

Administrative Order On Consent: A legal and enforceable agreement between the EPA and the parties potentially responsible for site contamination. Under the terms of the Order, the potentially responsible parties (PRPs) agree to perform or pay for site studies or cleanups. It also describes the oversight rules, responsibilities, and enforcement options that the government may exercise in the event of non-compliance by potentially responsible parties. This Order is signed by PRPs and the government; it does not require approval by a judge.

Administrative Order [Unilateral]: A legally binding document issued by the EPA, directing the parties potentially responsible to perform site cleanups or studies (generally, the EPA does not issue Unilateral Orders for site studies). This type of Order is not signed by the PRPs and does not require approval by a judge.

Aeration: A process that promotes breakdown of contaminants in soil or water by exposing them to air.

Agency for Toxic Substances and Disease Registry (ATSDR): The Federal agency within the U.S. Public Health Service charged with carrying out the health-related responsibilities of CERCLA.

Air Stripping: A process whereby volatile organic chemicals (VOCs) are removed from contaminated material by forcing a stream of air through the contaminated material in a pressurized vessel. The contaminants are evaporated into the air stream. The air may be further treated before it is released into the atmosphere.

Ambient Air: Any unconfined part of the atmosphere. Refers to the air that may be inhaled by workers or residents in the vicinity of contaminated air sources.

Applicable or Relevant and Appropriate Requirements (ARARs): Federal, State, or local laws which apply to Superfund activities at NPL sites. Both emergency and long-term actions must comply with these laws or provide sound reasons for allowing a waiver. ARARs must be identified for each site relative to the characteristics of the site, the substances found at the site, or the cleanup alternatives being considered for the site.

Aquifer: An underground layer of rock, sand, or gravel capable of storing water within cracks and pore spaces, or between grains. When water contained within an aquifer is of sufficient quantity and quality, it can be tapped and used for drinking or other purposes. The water contained in the aquifer is called groundwater. A "sole source aquifer" supplies 50 percent or more of the drinking water of an area.

Artesian (Well): A well made by drilling into the earth until water is reached, which, due to internal pressure, flows up like a fountain.

Asbestos: A mineral fiber that can pollute air or water and is known to cause cancer or asbestosis when inhaled.

Attenuation: The naturally occurring process by which a compound is reduced in concentration over time through adsorption, degradation, dilution, or transformation.

Background Level: The amount of a substance typically found in the air, water, or soil from natural, as opposed to human, sources.

Baghouse Dust: Dust accumulated in removing particulates from the air by passing it through cloth bags in an enclosure.

Bases: Substances characterized by high pH (greater than 7.0), which tend to be corrosive in chemical reactions. When bases are mixed with acids, they neutralize each other, forming salts.

Berm: A ledge, wall, or a mound of earth used to prevent the migration of contaminants.

Bioaccumulate: The process by which some contaminants or toxic chemicals gradually collect and increase in concentration in living tissue, such as in plants, fish, or people, as they breathe contaminated air, drink contaminated water, or eat contaminated food.

Biological Treatment: The use of bacteria or other microbial organisms to break down toxic organic materials into carbon dioxide and water.

Bioremediation: A cleanup process using naturally occurring or specially cultivated microorganisms to digest contaminants and break them down into non-hazardous components.

Bog: A type of wetland that is covered with peat moss deposits. Bogs depend primarily on moisture from the air for their water source, are usually acidic, and are rich in plant residue [see Wetland].

Boom: A floating device used to contain oil floating on a body of water or to restrict the potential overflow of waste liquids from containment structures.

Borehole: A hole that is drilled into the ground and used to sample soil or ground-water.

Borrow Pit: An excavated area where soil, sand, or gravel has been dug up for use elsewhere.

Cap: A layer of material, such as clay or a synthetic material, used to prevent rainwater from penetrating and spreading contaminated materials. The surface of the cap generally is mounded or sloped so water will drain off.

Carbon Adsorption: A treatment system in which contaminants are removed from groundwater and surface water by forcing water through tanks containing activated carbon, a specially treated material that attracts and holds or retains contaminants.

Carbon Disulfide: A degreasing agent formerly used extensively for parts washing. This compound has both inorganic and organic

properties, which increase cleaning efficiency. However, these properties also cause chemical reactions that increase the hazard to human health and the environment.

Carbon Treatment: [see Carbon Adsorption].

Cell: In solid waste disposal, one of a series of holes in a landfill where waste is dumped, compacted, and covered with layers of dirt.

CERCLA: [see Comprehensive Environmental Response, Compensation, and Liability Act].

Characterization: The sampling, monitoring, and analysis of a site to determine the extent and nature of toxic releases. Characterization provides the basis for acquiring the necessary technical information to develop, screen, analyze, and select appropriate cleanup techniques.

Chemical Fixation: The use of chemicals to bind contaminants, thereby reducing the potential for leaching or other movement.

Chromated Copper Arsenate: An insecticide/herbicide formed from salts of three toxic metals: copper, chromium, and arsenic. This salt is used extensively as a wood preservative in pressure-treating operations. It is highly toxic and water-soluble, making it a relatively mobile contaminant in the environment.

Cleanup: Actions taken to eliminate a release or threat of release of a hazardous substance. The term "cleanup" sometimes is used interchangeably with the terms remedial action, removal action, response action, or corrective action.

Closure: The process by which a landfill stops accepting wastes and is shut down under Federal guidelines that ensure the protection of the public and the environment.

Comment Period: A specific interval during which the public can review and comment on various documents and EPA actions related to site cleanup. For example, a comment period is provided when the EPA proposes to add sites to the NPL. Also, there is minimum 3-week comment period for community members to review and comment on the remedy proposed to clean up a site.

Community Relations: The EPA effort to establish and maintain two-way communication with the public. The goals of community relations programs include creating an understanding of EPA programs and related actions, assuring public input into decision-making processes related to affected communities, and making certain that the Agency is aware of, and responsive to, public concerns. Specific community relations activities are required in relation to Superfund cleanup actions [see Comment Period].

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Congress enacted the CERCLA, known as Superfund, in 1980 to respond directly to hazardous waste problems that may pose a threat to the public health and the environment. The EPA administers the Superfund program.

Confluence: The place where two bodies of water, such as streams or rivers, come together.

Confined Aquifer: An aquifer in which groundwater is confined under pressure that is significantly greater than atmospheric pressure.

Consent Decree: A legal document, approved and issued by a judge, formalizing an agreement between the EPA and the parties potentially responsible for site contamination. The decree describes cleanup actions that the potentially responsible parties are required to perform, or the costs incurred by the government that the parties will reimburse, and the roles, responsibilities, and enforcement options that the government may exercise in the event of non-compliance by potentially responsible parties. If a settlement between the EPA and a potentially responsible party includes cleanup actions, it must be in the form of a Consent Decree. A Consent Decree is subject to a public comment period.

Consent Order: [see Administrative Order on Consent].

Containment: The process of enclosing or containing hazardous substances in a structure, typically in a pond or a lagoon, to prevent the migration of contaminants into the environment.

Contaminant: Any physical, chemical, biological, or radiological material or substance whose quantity, location, or nature produces undesirable health or environmental effects.

Contingency Plan: A document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or other accident that releases toxic chemicals, hazardous wastes, or radioactive materials into the environment.

Cooperative Agreement: A contract between the EPA and the States, wherein a State agrees to manage or monitor certain site cleanup responsibilities and other activities on a cost-sharing basis.

Cost Recovery: A legal process by which potentially responsible parties can be required to pay back the Superfund program for money it spends on any cleanup actions [see Potentially Responsible Parties].

Cover: Vegetation or other material placed over a landfill or other waste material. It can be designed to reduce movement of water into the waste and to prevent erosion that could cause the movement of contaminants.

Creosotes: Chemicals used in wood preserving operations and produced by distillation of tar, including polycyclic aromatic hydrocarbons and polynuclear aromatic hydrocarbons [see PAHs and PNAs]. Contaminating sediments, soils, and surface water, creosotes may cause skin ulcerations and cancer through prolonged exposure.

Culvert: A pipe used for drainage under a road, railroad track, path, or through an embankment.

Decommission: To revoke a license to operate and take out of service.

Degradation: The process by which a chemical is reduced to a less complex form.

Degrease: To remove grease from wastes, soils, or chemicals, usually using solvents.

Deletion: A site is eligible for deletion from the NPL when Superfund response actions at the site are complete. A site is deleted from the NPL when a notice is published in the Federal Register.

De minimis: This legal phrase pertains to settlements with parties who contributed small amounts of hazardous waste to a site. This process allows the EPA to settle with small, or *de minimis* contributors, as a single group rather than as individuals, saving time, money, and effort.

Dewater: To remove water from wastes, soils, or chemicals.

Dike: A low wall that can act as a barrier to prevent a spill from spreading.

Dioxin: An organic chemical by-product of pesticide manufacture which is known to be one of the most toxic man-made chemicals.

Disposal: Final placement or destruction of toxic, radioactive, or other wastes; surplus or banned pesticides or other chemicals; polluted soils; and drums containing hazardous materials. Disposal may be accomplished through the use of approved secure landfills, surface impoundments, land farming, deep well injection, or incineration.

Downgradient: A downward hydrologic slope that causes groundwater to move toward lower elevations. Therefore, wells *downgradient* of a contaminated groundwater source are prone to receiving pollutants.

Ecological Assessment: A study of the impact of man-made or natural activity on living creatures and their environment.

Effluent: Wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Emission: Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities.

Emulsifiers: Substances that help in mixing materials that do not normally mix; e.g., oil and water.

Endangerment Assessment: A study conducted to determine the risks posed to public health or the environment by contamination at NPL sites. The EPA or the State conducts the study when a legal action is to be taken to direct the potentially responsible parties to clean up a site or pay for the cleanup. An endangerment assessment supplements an investigation of the site hazards.

Enforcement: EPA, State, or local legal actions taken against parties to facilitate settlements; to compel compliance with laws, rules, regulations, or agreements; or to obtain penalties or criminal sanctions for violations. Enforcement procedures may vary, depending on the specific requirements of different environmental laws and related regulatory requirements. Under CERCLA, for example, the EPA will seek to require potentially responsible parties to clean up a Superfund site or pay for the cleanup [see Cost Recovery].

Erosion: The wearing away of land surface by wind or water. Erosion occurs naturally from weather or surface runoff, but can be intensified by such land-related practices as farming, residential or industrial development, road building, or timber-cutting. Erosion may spread surface contamination to off-site locations.

Estuary (estuarine): Areas where fresh water from rivers and salt water from nearshore ocean waters are mixed. These areas may include bays, mouths of rivers, salt marshes, and lagoons. These water ecosystems shelter and feed marine life, birds, and wildlife.

Evaporation Ponds: Areas where sewage sludge or other watery wastes are dumped and allowed to dry out.

Feasibility Study: The analysis of the potential cleanup alternatives for a site. The feasibility study usually starts as soon as the remedial investigation is underway. In this volume, the feasibility study is referred to as a site study [see also Remedial Investigation].

Filtration: A treatment process for removing solid (particulate) matter from water by passing the water through sand, activated carbon, or a man-made filter. The process is often used to remove particles that contain contaminants.

Flood Plain: An area along a river, formed from sediment deposited by floods. Flood plains periodically are innundated by natural floods, which can spread contamination.

Flue Gas: The air that is emitted from a chimney after combustion in the burner occurs. The gas can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles, and many chemical pollutants.

Fly Ash: Non-combustible residue that results from the combustion of flue gases. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, as well as many other chemical pollutants.

French Drain System: A crushed rock drain system constructed of perforated pipes, which is used to drain and disperse wastewater.

Gasification (coal): The conversion of soft coal into gas for use as a fuel.

General Notice Letter: [See Notice Letter].

Generator: A facility that emits pollutants into the air or releases hazardous wastes into water or soil.

Good Faith Offer: A voluntary offer, generally in response to a Special Notice letter, made by a potentially responsible party, consisting of a written proposal demonstrating a potentially responsible party's qualifications and willingness to perform a site study or cleanup.

Groundwater: Water that fills pores in soils or openings in rocks to the point of saturation. In aquifers, groundwater occurs in sufficient quantities for use as drinking and irrigation water and other purposes.

Groundwater Quality Assessment: The process of analyzing the chemical characteristics of groundwater to determine whether any hazardous materials exist.

Halogens: Reactive non-metals, such as chlorine and bromine. Halogens are very good oxidizing agents and, therefore, have many industrial uses. They are rarely found by themselves; however, many chemicals such as polychlorinated biphenyls (PCBs), some volatile organic compounds (VOCs), and dioxin are reactive because of the presence of halogens.

Hazard Ranking System (HRS): The principal screening tool used by the EPA to evaluate relative risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. The HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or groundwater and on other factors such as nearby population. The HRS score is the primary factor in deciding if the site should be on the NPL.

Hazardous Waste: By-products of society that can pose a substantial present or potential hazard to human health and the environment when improperly managed. Hazardous waste possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Heavy Metals: Metallic elements with high atomic weights, such as arsenic, lead, mercury, and cadmium. Heavy metals are very hazardous even at low concentrations and tend to accumulate in the food chain.

Herbicide: A chemical pesticide designed to control or destroy plants, weeds, or grasses.

Hot Spot: An area or vicinity of a site containing exceptionally high levels of contamination.

Hydrocarbons: Chemical compounds that consist entirely of hydrogen and carbon.

Hydrology: The properties, distribution, and circulation of water.

Hydrogeology: The geology of groundwater, with particular emphasis on the chemistry and movement of water.

Impoundment: A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

Incineration: A group of treatment technologies involving destruction of waste by controlled burning at high temperatures, e.g., burning sludge to reduce the remaining residues to a non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Infiltration: The movement of water or other liquid down through soil from precipitation (rain or snow) or from application of wastewater to the land surface.

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant.

Injection Well: A well into which waste fluids are placed, under pressure, for purposes of disposal.

Inorganic Chemicals: Chemical substances of mineral origin, not of basic carbon structure.

Installation Restoration Program: The specially funded program established in 1978 under which the Department of Defense has been identifying and evaluating its hazardous waste sites and controlling the migration of hazardous contaminants from those sites.

Intake: The source from where a water supply is drawn, such as from a river or water body.

Interagency Agreement: A written agreement between the EPA and a Federal agency that has the lead for site cleanup activities, setting forth the roles and responsibilities of the agencies for performing and overseeing the activities. States often are parties to interagency agreements.

Interim (Permit) Status: Conditions under which hazardous waste treatment, storage, and disposal facilities, that were operating when regulations under the RCRA became final in 1980, are temporarily allowed by the EPA to continue to operate while awaiting denial or issuance of a permanent permit. The facility must comply with certain regulations to maintain interim status.

Lagoon: A shallow pond or liquid waste containment structure. Lagoons typically are used for the storage of wastewaters, sludges, liquid wastes, or spent nuclear fuel.

Landfarm: To apply waste to land or incorporate waste into the surface soil, such as fertilizer or soil conditioner. This practice commonly is used for disposal of composted wastes and sludges.

Landfill: A disposal facility where waste is placed in or on land. *Sanitary* landfills are disposal sites for non-hazardous solid wastes. The waste is spread in layers, compacted to the smallest practical volume, and covered with soil at the end of each operating day. Secure *chemical* landfills are disposal sites for hazardous waste. They are designed to minimize the chance of release of hazardous substances into the environment [see Resource Conservation and Recovery Act].

Leach, Leaching [v.t.]: The process by which soluble chemical components are dissolved and carried through soil by water or some other percolating liquid.

Leachate [n]: The liquid that trickles through or drains from waste, carrying soluble components from the waste.

Leachate Collection System: A system that gathers liquid that has leaked into a landfill or other waste disposal area and pumps it to the surface for treatment.

Liner: A relatively impermeable barrier designed to prevent leachate (waste residue) from leaking from a landfill. Liner materials include plastic and dense clay.

Long-term Remedial Phase: Distinct, often incremental, steps that are taken to solve site pollution problems. Depending on the complexity, site cleanup activities can be separated into several of these phases.

Long-term Response Action: An action which requires a continuous period of on-site activity before cleanup goals are achieved. These actions typically include the extraction and treatment of groundwater and monitoring actions.

Marsh: A type of wetland that does not contain peat moss deposits and is dominated by vegetation. Marshes may be either fresh or saltwater and tidal or non-tidal [see Wetland].

Migration: The movement of oil, gas, contaminants, water, or other liquids through porous and permeable soils or rock.

Mill Tailings: [See Mine Tailings].

Mine Tailings: A fine, sandy residue left from mining operations. Tailings often contain high concentrations of lead, uranium, and arsenic or other heavy metals.

Mitigation: Actions taken to improve site conditions by limiting, reducing, or controlling toxicity and contamination sources.

Modeling: A technique using a mathematical or physical representation of a system or theory that tests the effects that changes on system components have on the overall performance of the system.

Monitoring Wells: Special wells drilled at specific locations within, or surrounding, a hazardous waste site where groundwater can be sampled at selected depths and studied to obtain such information as the direction in which groundwater flows and the types and amounts of contaminates present.

National Priorities List (NPL): The EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term cleanup under Superfund. The EPA is required to update the NPL at least once a year.

Natural Attenuation: [See Attenuation].

Neutrals: Organic compounds that have a relatively neutral pH, complex structure and, due to their organic bases, are easily absorbed into the environment. Water is the most commonly known neutral, however, naphthalene, pyrene, and trichlorobenzene also are examples of neutrals.

Nitroaromatics: Common components of explosive materials, which will explode if activated by very high temperatures or pressures; 2,4,6-Trinitrotoluene (TNT) is a nitroaromatic.

Notice Letter: A General Notice Letter notifies the parties potentially responsible for site contamination of their possible liability. A Special Notice Letter begins a 60-day formal period of negotiation during which the EPA is not allowed to start work at a site or initiate enforcement actions against potentially responsible parties, although the EPA may undertake certain investigatory and planning activities.

The 60-day period may be extended if the EPA receives a good faith offer from the PRPs within that period. [See also Good Faith Offer].

On-Scene Coordinator (OSC): The predesignated EPA, Coast Guard, or Department of Defense official who coordinates and directs Superfund removal actions or Clean Water Act oil- or hazardous-spill corrective actions.

Operation and Maintenance: Activities conducted at a site after a cleanup action is completed to ensure that the cleanup or containment system is functioning properly.

Organic Chemicals/Compounds: Chemical substances containing mainly carbon, hydrogen, and oxygen.

Outfall: The place where wastewater is discharged into receiving waters.

Overpacking: Process used for isolating large volumes of waste by jacketing or encapsulating waste to prevent further spread or leakage of contaminating materials. Leaking drums may be contained within oversized barrels as an interim measure prior to removal and final disposal.

Pentachlorophenol (PCP): A synthetic, modified petrochemical that may be used as a wood preservative because of its toxicity to termites and fungi. It is a common component of creosotes and can cause cancer.

Perched (groundwater): Groundwater separated from another underlying body of groundwater by a confining layer, often clay or rock.

Percolation: The downward flow or filtering of water or other liquids through subsurface rock or soil layers, usually continuing downward to groundwater.

Pesticide: A substance or mixture of substances intended to prevent, destroy, or repel any pest. If misused, pesticides can accumulate in the foodchain and contaminate the environment.

Petrochemicals: Chemical substances produced from petroleum in refinery operations and as fuel oil residues. These include fluoranthene, chrysene, mineral spirits, and refined oils. Petrochemicals are the bases from which volatile organic compounds (VOCs), plastics, and many pesticides are made. These chemical substances often are toxic to humans and the environment.

Phenols: Organic compounds that are used in plastics manufacturing and are by-products of petroleum refining, tanning, textile, dye, and resin manufacturing. Phenols are highly poisonous.

Physical Chemical Separation: The treatment process of adding a chemical to a substance to separate the compounds for further treatment or disposal.

Pilot Testing: A small-scale test of a proposed treatment system in the field to determine its ability to clean up specific contaminants.

Plugging: The process of stopping the flow of water, oil, or gas into or out of the ground through a borehole or well penetrating the ground.

Plume: A body of contaminated groundwater flowing from a specific source. The movement of the groundwater is influenced by such factors as local groundwater flow patterns, the character of the aquifer in which groundwater is contained, and the density of contaminants [see Migration].

Pollution: Generally, the presence of matter or energy whose nature, location, or quantity produces undesired health or environmental effects.

Polycyclic Aromatic Hydrocarbons or Polyaromatic Hydrocarbons (PAHs): PAHs, such as pyrene, are a group of highly reactive organic compounds found in motor oil. They are a common component of creosotes and can cause cancer.

Polychlorinated Biphenyls (PCBs): A group of toxic chemicals used for a variety of purposes including electrical applications, carbonless copy paper, adhesives, hydraulic fluids, microscope immersion oils, and caulking compounds. PCBs also are produced in certain combustion processes. PCBs are extremely persistent in the environment because they are very stable, non-reactive, and highly heat resistant. Chronic exposure to PCBs is believed to cause liver damage. It also is known to bioaccumulate in fatty tissues. PCB use and sale was banned in 1979 with the passage of the Toxic Substances Control Act.

Polynuclear Aromatic Hydrocarbons (PNAs): PNAs, such as naphthalene, and biphenyls, are a group of highly reactive organic compounds that are a common component of creosotes, which can be carcinogenic.

Polyvinyl Chloride (PVC): A plastic made from the gaseous substance vinyl chloride. PVC is used to make pipes, records, raincoats, and floor tiles. Health risks from high concentrations of vinyl chloride include liver cancer and lung cancer, as well as cancer of the lymphatic and nervous systems.

Potable Water: Water that is safe for drinking and cooking.

Potentially Responsible Parties (PRPs): Parties associated with a Superfund site who may be liable for the cost of remedying the release of hazardous substances. This may include owners or operators of the site or transporters who disposed of materials at the site. PRPs may admit liability, or liability may be determined by a court of law. PRPs may sign a Consent Decree or Administrative Order on Consent to participate in the site cleanup without admitting liability.

Precipitation: The removal of solids from liquid waste so that the solid and liquid portions can be disposed of safely; the removal of particles from airborne emissions. Electrochemical precipitation is the use of an anode or cathode to remove the hazardous chemicals. Chemical precipitation involves the addition of some substance to cause the solid portion to separate.

Preliminary Assessment: The process of collecting and reviewing available information about a known or suspected waste site or release to determine if a threat or potential threat exists.

Pump and Treat: A groundwater cleanup technique involving the extracting of contaminated groundwater from the subsurface and the removal of contaminants, using one of several treatment technologies.

Radionuclides: Elements, including radium and uranium-235 and -238, which break down and produce radioactive substances due to their unstable atomic structure. Some are man-made, and others are naturally occurring in the environment. Radon, the gaseous form of radium, decays to form alpha particle radiation, which cannot be absorbed through skin. However, it can be inhaled, which allows alpha particles to affect unprotected tissues directly and thus cause cancer. Radiation also occurs naturally through the breakdown of granite.

RCRA: [See Resource Conservation and Recovery Act].

Recharge Area: A land area where rainwater saturates the ground and soaks through the earth to reach an aquifer.

Record of Decision (ROD): A public document that explains which cleanup alternative(s) will be used to clean up sites listed on the NPL. It is based on information generated during the remedial investigation and feasibility study and consideration of public comments and community concerns.

Recovery Wells: Wells used to withdraw contaminants or contaminated groundwater.

Recycle: The process of minimizing waste generation by recovering usable products that might otherwise become waste.

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup following the remedial design [see Cleanup].

Remedial Design: A phase of site cleanup where engineers design the technical specifications for cleanup remedies and technologies.

Remedial Investigation: An in-depth study designed to gather the data necessary to determine the nature and extent of contamination at a Superfund site, establish the criteria for cleaning up the site, identify the preliminary alternatives for cleanup actions, and support the technical and cost analyses of the alternatives. The remedial investigation is usually done with the feasibility study. In this volume, the remedial investigation is referred to as a site study [see also Feasibility Study].

Remedial Project Manager (RPM): The EPA or State official responsible for overseeing cleanup actions at the site.

Remedy Selection: The selection of the final cleanup strategy for the site. At the few sites where the EPA has determined that initial response actions have eliminated site contamination, or that any remaining contamination will be naturally dispersed without further cleanup activities, a "No Action" remedy is selected [see Record of Decision].

Removal Action: Short-term immediate actions taken to address releases of hazardous substances [see Cleanup].

Residual: The amount of a pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment, or the particulates remaining in air after the air passes through a scrubber.

Resource Conservation and Recovery Act (RCRA): A Federal law that established a regulatory system to track hazardous substances from the time of generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent new, uncontrolled hazardous waste sites.

Retention Pond: A small body of liquid used for disposing of wastes and containing overflow from production facilities. Sometimes retention ponds are used to expand the capacity of such structures as lagoons the store waste.

Runoff: The discharge of water over land into surface water. It can carry pollutants from the air and land and spread contaminants from its source.

Scrubber: An air pollution control device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

Sediment: The layer of soil, sand, and minerals at the bottom of surface waters such as streams, lakes, and rivers, that absorbs contaminants.

Seeps: Specific points where releases of liquid, usually leachate, form from waste disposal areas, particularly along the lower edges of landfills.

Seepage Pits: A hole, shaft, or cavity in the ground used for the storage of liquids, usually in the form of leachate, from waste disposal areas. The liquid gradually leaves the pit by moving through the surrounding soil.

Septage: Residue remaining in a septic tank after the treatment process.

Sinkhole: A hollow depression in the land surface in which drainage collects; associated with underground caves and passages that facilitate the movement of liquids.

Site Characterization: The technical process used to evaluate the nature and extent of environmental contamination, which is necessary for choosing and designing cleanup measures and monitoring their effectiveness.

Site Inspection: The collection of information from a hazardous waste site to determine the extent and severity of hazards posed by the site. It follows, and is more extensive than, a preliminary assessment. The purpose is to gather information necessary to score the site, using the Hazard Ranking System, and to determine if the site presents an immediate threat that requires a prompt removal action.

Slag: The fused refuse or dross separated from a metal in the process of smelting.

Sludge: Semi-solid residues from industrial or water treatment processes that may be contaminated with hazardous materials.

Slurry Wall: Barriers used to contain the flow of contaminated groundwater or subsurface liquids. Slurry walls are constructed by digging a trench around a contaminated area and filling the trench with an impermeable material that prevents water from passing through it. The groundwater or contaminated liquids trapped within the area surrounded by the slurry wall can be extracted and treated.

Smelter: A facility that melts or fuses ore, often with an accompanying chemical change, to separate the metal. Emissions from smelters are known to cause pollution.

Soil Gas: Gaseous elements and compounds that occur in the small spaces between particles of soil. Such gases can move through or leave the soil or rock, depending on changes in pressure.

Soil Vapor Extraction: A treatment process that uses vacuum wells to remove hazardous gases from soil.

Soil Washing: A water-based process for mechanically scrubbing soils in-place to remove undesirable materials. There are two approaches: dissolving or suspending them in the wash solution for later treatment by conventional methods, and concentrating them into a smaller volume of soil through simple particle size separation techniques [see Solvent Extraction].

Stabilization: The process of changing an active substance into inert, harmless material, or physical activities at a site that act to limit the further spread of contamination without actual reduction of toxicity.

Solidification/Stabilization: A chemical or physical reduction of the mobility of hazardous constituents. Mobility is reduced through the binding of hazardous constituents into a solid mass with low permeability and resistance to leaching.

Solvent: A substance capable of dissolving another substance to form a solution. The primary uses of industrial solvents are as cleaners for degreasing, in paints, and in pharmaceuticals. Many solvents are flammable and toxic to varying degrees.

Solvent Extraction: A means of separating hazardous contaminants from soils, sludges, and sediment, thereby reducing the volume of the hazardous waste that must be treated. It generally is used as one in a series of unit operations. An organic chemical is used to dissolve contaminants as opposed to water-based compounds, which usually are used in soil washing.

Sorption: The action of soaking up or attracting substances. It is used in many pollution control systems.

Special Notice Letter: [See Notice Letter].

Stillbottom: Residues left over from the process of recovering spent solvents.

Stripping: A process used to remove volatile contaminants from a substance [see Air Stripping].

Sumps: A pit or tank that catches liquid runoff for drainage or disposal.

Superfund: The program operated under the legislative authority of the CERCLA and Superfund Amendments and Reauthorization Act (SARA) to update and improve environmental laws. The program has the authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health, welfare, or the environment. The "Superfund" is a trust fund that finances cleanup actions at hazardous waste sites.

Surge Tanks: A holding structure used to absorb irregularities in flow of liquids, including liquid waste materials.

Swamp: A type of wetland that is dominated by woody vegetation and does not accumulate peat moss deposits. Swamps may be fresh or saltwater and tidal or non-tidal [see Wetlands].

Thermal Treatment: The use of heat to remove or destroy contaminants from soil.

Treatability Studies: Testing a treatment method on contaminated groundwater, soil, etc., to determine whether and how well the method will work.

Trichloroethylene (TCE): A stable, colorless liquid with a low boiling point. TCE has many industrial applications, including use as a solvent and as a metal degreasing agent. TCE may be toxic to people when inhaled, ingested, or through skin contact and can damage vital organs, especially the liver [see Volatile Organic Compounds].

Unilateral [Administrative] Order: [see Administrative Order].

Upgradient: An upward hydrologic slope; demarks areas that are higher than contaminated areas and, therefore, are not prone to contamination by the movement of polluted groundwater.

Vacuum Extraction: A technology used to remove volatile organic compounds (VOCs) from soils. Vacuum pumps are connected to a series of wells drilled to just above the water table. The wells are sealed tightly at the soil surface, and the vacuum established in the soil draws VOC-contaminated air from the soil pores into the well, as fresh air is drawn down from the surface of the soil.

Vegetated Soil Cap: A cap constructed with graded soils and seed for vegetative growth, to prevent erosion [see Cap].

Vitrification: The process of electrically melting wastes and soils or sludges to bind the waste in a glassy, solid material more durable than granite or marble and resistant to leaching.

Volatile Organic Compounds (VOCs): VOCs are manufactured as secondary petrochemicals. They include light alcohols, acetone, trichloroethylene, perchloroethylene, dichloroethylene, benzene, vinyl chloride, toluene, and methylene chloride. These potentially toxic chemicals are used as solvents, degreasers, paints, thinners, and fuels. Because of their volatile nature, they readily evaporate into the air, increasing the potential exposure to humans. Due to their low water solubility, environmental persistence, and widespread industrial use, they are commonly found in soil and groundwater.

Waste Treatment Plant: A facility that uses a series of tanks, screens, filters, and other treatment processes to remove pollutants from water.

Wastewater: The spent or used water from individual homes or industries.

Watershed: The land area that drains into a stream or other water body.

Water Table: The upper surface of the groundwater.

Weir: A barrier to divert water or other liquids.

Wetland: An area that is regularly saturated by surface or groundwater and, under normal circumstances, is capable of supporting vegetation typically adapted for life in saturated soil conditions. Wetlands are critical to sustaining many species of fish and wildlife. Wetlands generally include swamps, marshes, and bogs. Wetlands may be either coastal or inland. Coastal wetlands have salt or brackish (a mixture of salt and fresh) water, and most have tides, while inland wetlands are non-tidal and freshwater. Coastal wetlands are an integral component of estuaries.

Wildlife Refuge: An area designated for the protection of wild animals, within which hunting and fishing are either prohibited or strictly controlled.

Some Common Contaminants at NPL Sites

Contaminant Category	Example Chemical Types	Sources	Potential Health Threats*
Heavy Metals	Arsenic, Barium, Beryllium, Cadmium, Cobalt, Copper, Chromium, Lead, Manganese, Mercury, Nickel, Silver, Selenium, Zinc	Electroplating, batteries, paint pigments, photography, smelting, thermometers, fluorescent lights, solvent recovery	Tumors, cancers, and kidney, brain, neurological, bone and liver damage
Volatile Organic Compounds (VOCs)	Trichloroethylene (TCE), Perchloroethylene (PCE), Acetone, Benzene, Ketone, Methyl chloride, Toluene, Vinyl Chloride, Dichlorethylene	Solvents and degreasers, gasoline octane enhancers, oils and paints, dry cleaning fluids, chemical manufacturing.	Cancers, kidney and liver damage, impairment of the nervous system resulting in sleepiness and headaches, leukemia
Pesticides/ Herbicides	Chlordane, DDT 4-4, DDE, Heptachlor, Aldrin, Endrin, Atrazine, Dieldrin, Toxaphene	Agricultural applications, pesticide and herbicide production	Various effects ranging from nausea to nervous disorders. Dioxin is a common by-product of the manufacture of pesticides and is both highly toxic and a suspected carcinogen.
Polychlorinated biphenyls (PCBs)	—	Electric transformers and capacitors, insulators and coolants, adhesives, caulking compounds, carbonless copy paper, hydraulic fluids.	Cancer and liver damage.
Creosotes	Polyaromatic hydrocarbons (PAHs), Polynuclear aromatics (PNAs), Phenolic Tars, Pentachlorophenol (PCP)	Wood preserving, fossil fuel combustion	Cancers and skin ulcerations with prolonged exposure
Radiation (Radionuclides)	Radium-226, Radon, Uranium-235, Uranium-238	Mine tailings, radium products, natural decay of granites	Cancer

Sources: *Toxic Chemicals—What They Are, How They Affect You (EPA, Region 5)*
Glossary of Environmental Terms (EPA, 1988)

**The potential for risk due to these contaminants is linked to a number of factors; for example, the length and level of exposure and environmental and health factors such as age.*

*U.S. G.P.O.:1993-341-835:81022