



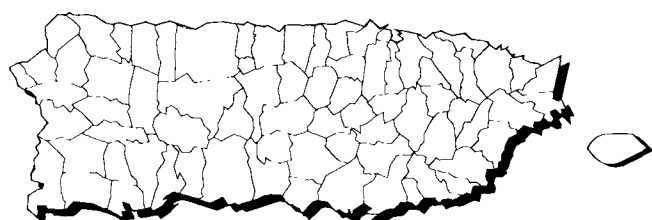
United States
Environmental Protection
Agency

Solid Waste And
Emergency Response
(5102 G)

EPA/540/R-93/048
December 1992
PB93-963238

SUPERFUND:

Progress at
National
Priority
List Sites



St. Thomas St. John

St. Croix

PUERTO RICO & VIRGIN ISLANDS 1992 UPDATE



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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-

INTRODUCTION

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

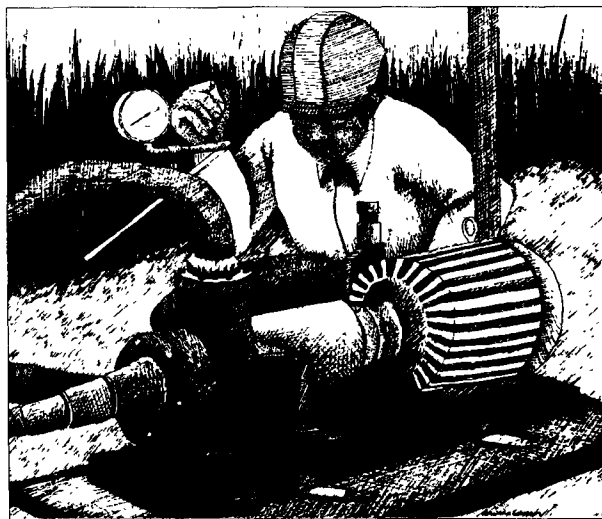
storm water runoff. Toxic vapors contaminate the air at some sites, threatening the health of people living and working near by.

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.

INTRODUCTION

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



Superfund employee removing drums from a Superfund site.

Program had logged more than 2,300 removal completions since Superfund was established.

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.

INTRODUCTION

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.

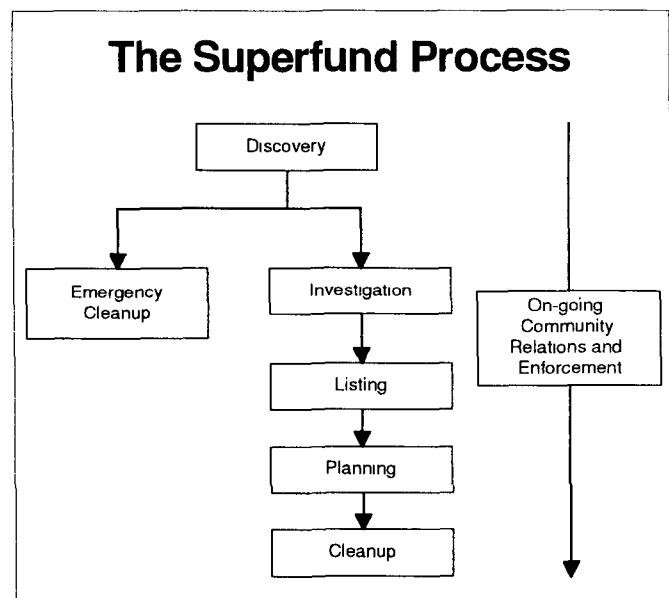
Superfund's cleanup process is arduous and exacting. It requires the best efforts of hundreds of experts in science and engineering, public health, administration and management, law, and many other fields.

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

SITE NAME STATE EPA ID# ABC0000000		EPA REGION XX COUNTY NAME LOCATION Other Names:
NPL LISTING HISTORY Provides the dates when the site was Proposed, made Final, and Deleted from the NPL.	Site Description	A
	Site Responsibility:	NPL Listing History Proposed XX/XX/XX Final XX/XX/XX
SITE RESPONSIBILITY Identifies the Federal, State, and/or potentially responsible parties taking responsibility for cleanup actions at the site.	Threats and Contaminants	B
	Cleanup Approach	C
ENVIRONMENTAL PROGRESS Summarizes the actions to reduce the threats to nearby residents and the surrounding environment and the progress towards cleaning up the site.	Response Action Status	D
	Site Facts:	E
	Environmental Progress	
Site Repository		

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.

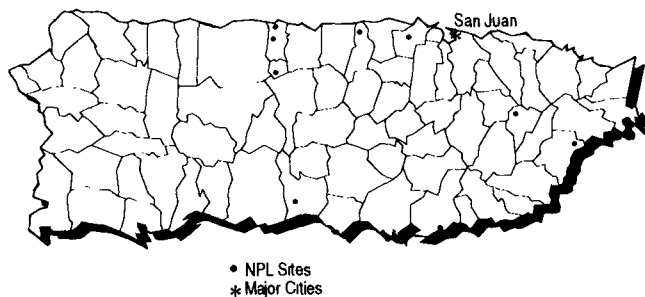


Cleanup Ongoing indicates that the selected cleanup remedies for the contaminated site, or part of the site, currently are underway.



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



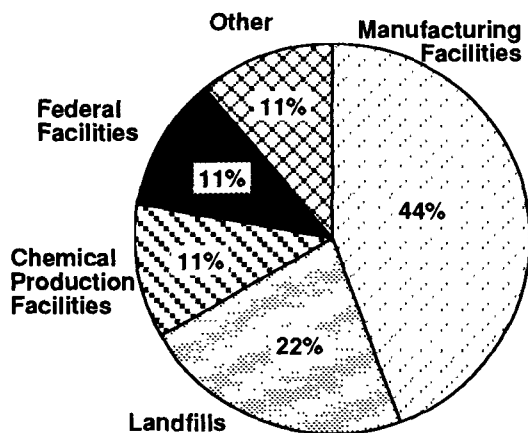
Superfund Activities in Puerto Rico

The Commonwealth of Puerto Rico is located within EPA Region 2, which also includes New York, New Jersey, and the Virgin Islands. The Commonwealth covers 3,435 square miles. According to the 1990 Census, Puerto Rico experienced a slight decrease in population between 1980 and 1990, with approximately 3,522,000 residents.

The Puerto Rico Environmental Emergencies Fund Act of 1987 creates funding for the Commonwealth to respond to and remove toxic substances or wastes in emergency situations. The statute grants the Commonwealth the authority to compel polluters who are liable for site contamination to conduct or pay for cleanup activities. If a polluter refuses to conduct cleanup activities, any expense incurred by the Commonwealth to respond to an environmental emergency may be recovered through an Administrative Order or a civil action. The Fund provides for administrative activities, emergency response actions, removals, long-term cleanup actions, and site investigations. Currently, nine sites in the Commonwealth of Puerto Rico have been listed as final on the NPL. No new sites have been proposed for listing in 1992.

The Environmental Quality Board implements the Superfund Program in the Commonwealth of Puerto Rico

Activities responsible for hazardous waste contamination in the Commonwealth of Puerto Rico include:



Facts about the nine NPL sites in Puerto Rico:



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



Five sites endanger sensitive environments.

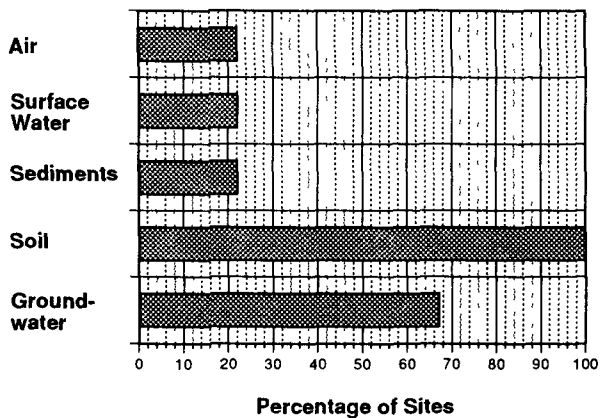


Eight sites are located near residential areas.

PUERTO RICO

Most Sites Have Multiple Contaminants and Contaminated Media:

Media Contaminated at Sites



Contaminants Found at Sites

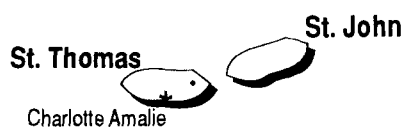
Percentage of Sites	
Heavy Metals	78%
VOCs	56%
Pesticides/Herbicides	22%

The Potentially Responsible Party Pays...

In the Commonwealth of Puerto Rico, potentially responsible parties are paying for or conducting cleanup activities at all eight sites.

For Further Information on NPL Sites and Hazardous Waste Programs in the Commonwealth of Puerto Rico Please Contact:

☎	EPA Region 2 Public Affairs Branch	For information concerning community involvement	(212) 264-2515
☎	National Response Center	To report a hazardous waste emergency	(800) 424-8802
☎	The Environmental Quality Board	For information about the State's responsibility in the Superfund Program	(809) 767-7712
☎	EPA Region 2 Emergency and Remedial Response Division	For information about the Regional Superfund Program	(212) 264-8672
☎	EPA Superfund Hotline	For more information about the Federal Superfund program	(800) 424-9068



★ Major Cities
• NPL Sites



Superfund Activities in the United States Virgin Islands

The United States Virgin Islands are located within EPA Region 2, which also includes New York, New Jersey, and Puerto Rico. The United States Virgin Islands consist of three main islands and some 50 islets, covering an estimated 136 square miles. According to the 1990 Census, the Virgin Islands have approximately 96,947 residents.

The United States purchased the Virgin Islands from Denmark in 1917. In 1931, the Department of the Interior took over the administration of the Virgin Islands from the Navy. The Constitution of the Virgin Islands, written in 1954, established a unicameral legislative body as well as executive and judicial branches of government. The Islands are represented in the United States Congress by one non-voting member. The Virgin Islands Safe Drinking Water Act grants local officials the authority to take action when drinking water supplies are threatened. A second statute, the Water Pollution Control Act, allows local officials to identify those operations that are the source of pollution and to clean up the contaminated sites. Currently, no sites in the Virgin Islands are listed as final on the NPL. One new site has been proposed for listing in 1992.

The Department of Planning and Natural Resources implements the Superfund Program in the Virgin Islands

Activities responsible for hazardous waste contamination in the Virgin Islands include:

Numerous activities including automotive operations, dry cleaning, and silk screening.

Facts about the NPL site in Virgin Islands:



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



No sites endanger sensitive environments.

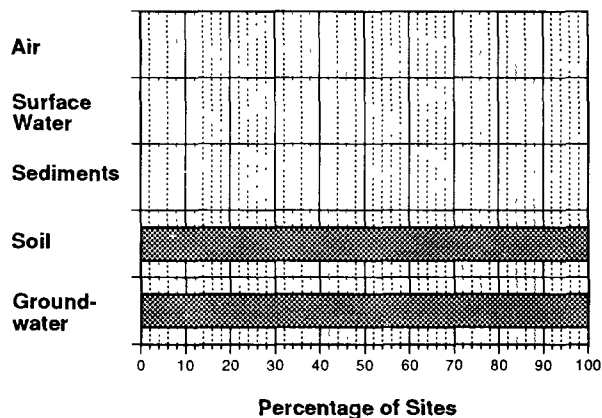


No sites are located near residential areas.

VIRGIN ISLANDS

Most Sites Have Multiple Contaminants and Contaminated Media:

Media Contaminated at Sites



Contaminants Found at Sites

Percentage of Sites	
VOCs	100%

The Potentially Responsible Party Pays...

In the United States Virgin Islands, potentially responsible parties are not paying for or conducting cleanup activities at the proposed site.

For Further Information on NPL Sites and Hazardous Waste Programs in the United States Virgin Islands Please Contact:

☎	EPA Region 2 Public Affairs Branch	For information concerning community involvement	(212) 264-2515
☎	National Response Center	To report a hazardous waste emergency	(800) 424-8802
☎	The Department of Planning and Natural Resources: Division of Environmental Protection	For information about the Islands' responsibility in the Superfund Program	(809) 774-3320
☎	EPA Region 2 Emergency and Remedial Response Division	For information about the Regional Superfund Program	(212) 264-8672
☎	EPA Superfund Hotline	For more 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

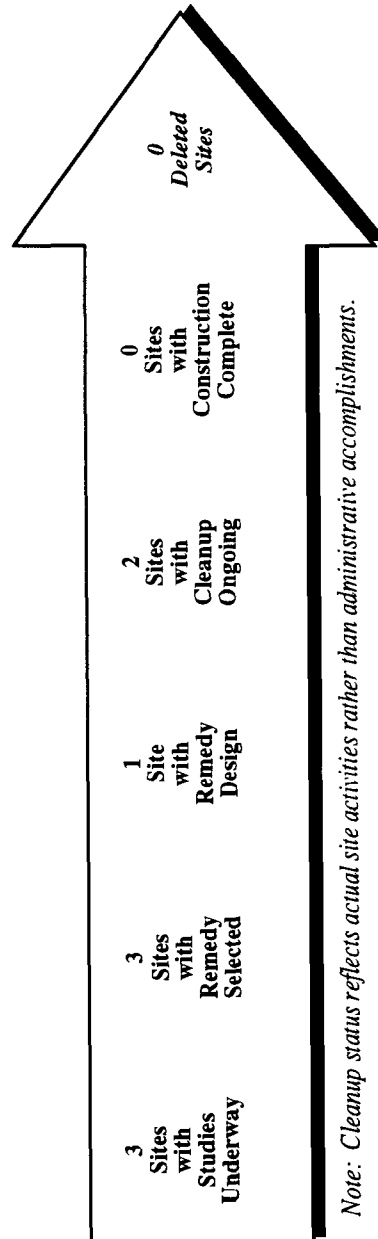
determined that initial response actions have eliminated site contamination, or that any remaining contamination will be naturally dispersed without further cleanup activities, a "No Action" remedy has been selected. In these cases, the arrows are discontinued at the "Remedy Selection" step and resume 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 Puerto Rico

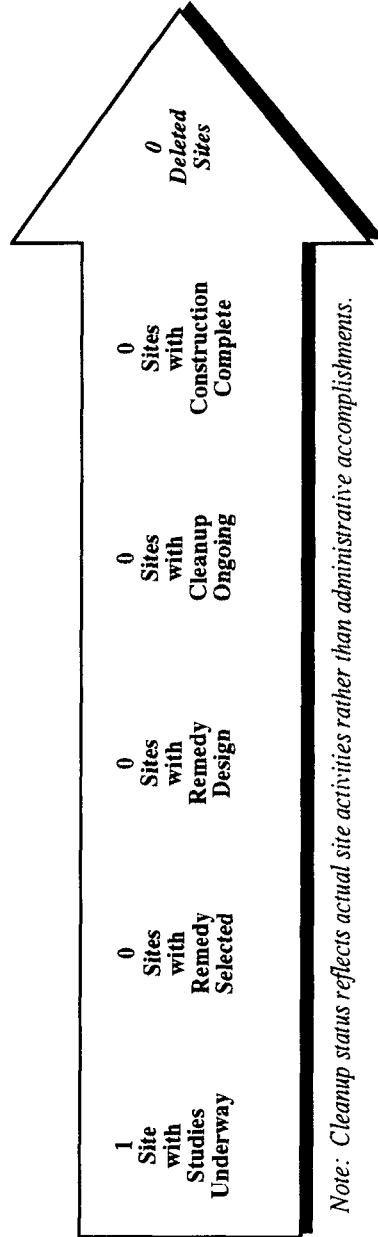
Site Name	County	NPL Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete	Deleted
BARCELONETA LANDFILL	FLORIDA	Final	09/08/83	⇐					
FIBERS PUBLIC SUPPLY WELLS	GUAYAMA	Final	09/08/84	⇐	⇐				
FRONTERA CREEK	HUMACAO	Final	09/08/83	⇐	⇐				
GE WIRING DEVICES	JUANA DIAZ	Final	09/08/83	⇐	⇐	⇐			
JUNCOS LANDFILL	JUNCOS	Final	09/08/83	⇐	⇐				
NAVAL SECURITY GROUP ACTIVITY	TOA BAJA	Final	10/04/89	⇐					
RCA DEL CARIBE	BARCELONETA	Final	09/08/83	⇐					
UPJOHN FACILITY	BARCELONETA	Final	09/21/84	⇐	⇐	⇐	⇐		
VEGA ALTA PUBLIC SUPPLY WELLS	VEGA ALTA	Final	09/21/84	⇐	⇐	⇐	⇐		



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

Progress Toward Cleanup at NPL Sites in the Virgin Islands

Site Name	County	NPL Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete	Deleted
TUTU WELLFIELD	TUTU	Proposed 02/07/92	⇒	⇒					



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

BARCELONETA LANDFILL PUERTO RICO

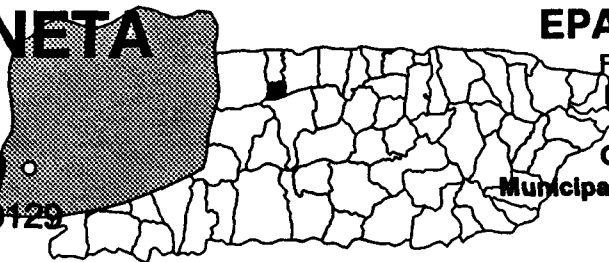
EPA ID# PRD980509129

EPA REGION 2

Florida County
Florida Afuera

Other Names:

Municipal Landfill Barceloneta



Site Description

The 20-acre Barceloneta Landfill site is an active landfill. About 300 tons of hazardous wastes have been placed in sinkholes, some of which are 100 feet deep. No artificial or natural barrier exists to keep wastes from moving into the groundwater; the limestone formations underlying the site promote the rapid transport of contaminants. Groundwater is the drinking source in the area and is also used for irrigation. No contamination has been found off site to date, but pollution of drinking supplies is suspected. The surrounding area is commercial, residential, and agricultural. Approximately 12,000 people live within a 3-mile radius of the site, and the nearest home is about 500 feet away. Area residents use the site for scavenging and for driving all-terrain vehicles. People swim and fish in Quebrada Cimarrona, a stream located on the site.

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



Preliminary on-site sampling results have identified various heavy metals and volatile organic compounds (VOCs) in sludges. The same sampling data disclosed the VOC toluene in surface water and heavy metals in water runoff. Those using the site may experience adverse health effects from touching contaminated soils and inhaling contaminated dust. Swimming in the on-site stream may be a health risk, as well as eating fish from the contaminated waters. Cattle grazing on adjacent land may be exposed to contamination from the site. Furthermore, the area of the site is a breeding ground for the Puerto Rican boa, designated as an endangered species by the U.S. Fish and Wildlife Service.

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: In 1988, the EPA began an intensive study of pollution problems at the site. This investigation currently is being conducted by the parties potentially responsible for contamination at the site under EPA monitoring, and is exploring the nature and extent of soil and water contamination. The study is scheduled for completion in 1993, at which time the EPA will select the best strategies for final site cleanup.

Site Facts: Two Notice Letters were sent to potentially responsible parties in 1983. In 1988, an additional search for potentially responsible parties identified several parties that had used the landfill. In late 1990, an Administrative Order on Consent was signed between the EPA and several potentially responsible parties in which the parties agreed to complete the site investigation.

Environmental Progress



After adding this site to the NPL, the EPA performed preliminary investigations and determined that no immediate actions were required at the Barceloneta Landfill site while further studies are being completed and the long-term cleanup activities are being planned.

Site Repository



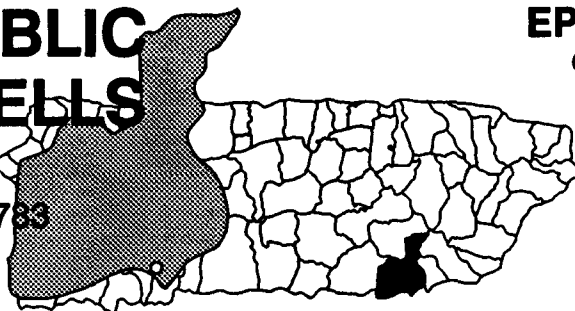
Barceloneta City Hall, Barceloneta, PR 00617

FIBERS PUBLIC SUPPLY WELLS PUERTO RICO

EPA ID# PRD980763783

EPA REGION 2

Guayama County
Guayama



Site Description

The Fibers Public Supply Wells serve as a stand-by water supply for Guayama. Four of the five wells were closed due to contamination by halogenated solvents. The U.S. Geological Survey detected the contamination in 1982 during a survey of public water wells. A synthetic fiber manufacturing plant operated in an area believed to be immediately upgradient of the supply wells. Wastewater from solvent cleaning of the machinery was emptied into two lagoons near the southwestern corner of the site before liners were installed in 1969, as well as later, when the liners were not intact. In 1985, the two wastewater settling ponds were converted into a stormwater retention basin. This conversion consisted of removing approximately 2,000 cubic yards of soil from the lagoons. The material was then spread over the northwestern corner of the project site. The wastewater subsequently was piped to an off-site biological treatment system. During the excavation process, the liners in some areas of both of the lagoons were found missing. A pharmaceutical manufacturing facility currently operates on the site. The Fibers Public Supply Wells site is located in an industrial and agricultural area in the Municipality of Guayama, with a population of approximately 41,000. There are approximately 50 residents living adjacent to 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



On-site monitoring well sampling results identified various volatile organic compounds (VOCs) believed to have originated from a nearby synthetic fiber manufacturer. The soil also is contaminated with various VOCs. Individuals may be at risk if direct contact is made with contaminated groundwater or soil. Closing the contaminated wells has reduced the potential for drinking contaminated groundwater.

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: Water supply wells were closed after a 1982 survey detected contamination.



Entire Site: In 1991, the parties potentially responsible for site contamination completed an investigation into the nature and extent of contamination at the site. The EPA selected the following remedies for cleanup of the site: pumping and treating groundwater; discharging the treated water to the Puerto Rico Environmental Quality Board irrigation canal; and removing contaminated soils from the site. Design of the selected remedies is expected to begin in late 1992, with actual cleanup activities to follow soon after.

Site Facts: Phillips Petroleum Company and the Chevron Chemical Company signed an Administrative Order on Consent in 1985 to perform an investigation into the extent of contamination and to identify alternative technologies for cleanup. American Home Products Corporation (AHP) signed an Administrative Order in 1986, agreeing to conduct sampling and analysis at the plant site. Furthermore, AHP signed a new Order in 1989 to perform a more detailed field investigation.

Environmental Progress



By removing the contaminated water wells from service, the potential for exposure to contaminated drinking water has been virtually eliminated. After adding this site to the NPL, the EPA performed preliminary investigations at the Fibers Public Supply Wells site and determined that no other immediate actions are required while design of the final remedies are being planned.

Site Repository



Guayama Public Library, Guayama, PR 00655

FRONTERA CREEK

PUERTO RICO

EPA ID# PRD980640965



EPA REGION 2

Humacao County
Rio Abajo

Other Names:
Ciudad Cristiana

Site Description

The 100-acre Frontera Creek site consists of areas that lie east of the town of Junquito and extend to the creeks that enter into the Caribbean Sea, industrial properties adjacent to Frontera Creek, North and South Frontera Lagoons, and the Ciudad Cristiana Housing Development. From 1971 until 1981, various nearby industrial properties discharged industrial waste directly into Frontera Creek. The public became concerned about the Creek's possible contamination in 1977, following the death of thirty cows that had grazed in the affected area. Subsequent investigations by the EPA and several local industries confirmed that contaminants, including mercury and the pesticide lindane, were present in the Creek. Several industries were identified as contributing to site contamination. The Puerto Rico Environmental Quality Board (PREQB) fined one of them, Technicon, for discharging mercury into the Creek in 1978. The 500 residents of the housing development of Ciudad Cristiana, which was built along the Creek in 1979, began to complain of health problems within a year after their arrival. Blood and urine samples of the residents, obtained by the Puerto Rico Department of Health (PRDH), showed above-normal concentrations of mercury. In addition, investigations conducted by the PREQB found that soil in and near the development was contaminated with mercury. As a result, the Governor of Puerto Rico ordered an immediate permanent evacuation of the 500 residents of Ciudad Cristiana. Studies conducted by the EPA and the Agency for Toxic Substances and Disease Registry (ATSDR) concluded that the mercury levels were not high enough to warrant an immediate evacuation of the residents. However, the EPA proceeded with a full investigation of the Frontera Creek site because of the known contamination. Local residents used the lagoons for fishing and recreation; the fish and the shellfish caught there were important components of the local diet.

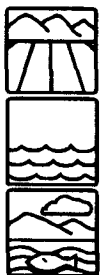
Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/08/83

Threats and Contaminants



On-site soils, specifically in the Ciudad Cristiana area, are contaminated with mercury and pesticides, as is the surface water in Frontera Creek and the two lagoons hydraulically connected to it. Area residents, especially those in the Ciudad Cristiana, are exposed to mercury in the sediments and soil, but the level is too low to present a threat to public health. Eating the shellfish and fish from the two freshwater lagoons also could present a health risk. The area of the Caribbean Sea into which Frontera Creek flows could become affected by site contaminants. In addition, contaminants from the site pose a threat to the brown pelican, an endangered species that is found nearby.

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: An investigation into site contamination was conducted by the potentially responsible parties. The EPA determined that the cleanup remedy will include the excavation of contaminated sediments in the Technicon ditch leading to Frontera Creek. In addition, contaminated soils on the Technicon property will be removed. Design of these selected cleanup activities is scheduled to begin in late 1992, with actual cleanup activities to follow soon after.

Site Facts: An Administrative Order on Consent was signed by the potentially responsible parties in 1986, requiring them to perform an investigation of site contamination.

Environmental Progress



After adding this site to the NPL, the EPA performed preliminary investigations and determined that no immediate actions were required to protect the residents living near the Frontera Creek site while final cleanup activities are being designed.

Site Repository



Office of the Mayor, Humacao City Hall, Humacao, PR 00661

GE WIRING DEVICES PUERTO RICO

EPA ID#PRD090282757

EPA REGION 2

Juana Diaz County
Juana Diaz



Site Description

The General Electrical (GE) Company Wiring Devices manufactured mercury light switches at this 5-acre site from 1957 until 1969. Approximately 1/2 ton of mercury was discarded, along with 4,000 cubic yards of defective switch parts and plastic scraps in a 1/2-acre waste area located on the site. A concrete retaining wall and a fence separate the waste area from nearby residences. An estimated 500,000 gallons of water found just beneath the surface have accumulated within the waste area as a result of rainfall and infusion of groundwater in the waste pit. Investigations at the site have shown that contamination of the water table may occur due to the migration of water through the clay layer that exists beneath the waste area. There are approximately 10,000 people living within 3 miles of the waste area. Groundwater in the area is used as a source of drinking water, with a public supply well located approximately 1,500 feet west of the waste area.

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



Groundwater, soil, and debris located in the waste area are contaminated with mercury from the former manufacturing activities. The inhalation of mercury vapors from the site poses the greatest potential health risk. Mercury detected on site is primarily organic mercury, considerably more toxic than other forms. During excavation, workers could be exposed to mercury-contaminated soils. Groundwater from the site is flowing towards the west and could eventually contaminate the San Jacaques River.

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: The potentially responsible party installed a storm drain system and retaining wall in 1982 as a preliminary action to control migration of surface mercury contamination toward nearby residential areas.



Entire Site: Based on the results of the site investigation, the EPA has selected the final methods to be used for cleanup of the site including: conducting treatability studies as part of the remedy design on soil and debris and treating waste material, water, and contaminated on-site surface soil with a process that separates the mercury from soils with leaching agents and metal recovery; disposing of treated material at waste areas located on the site; conducting additional groundwater and soil investigations; and monitoring groundwater and air to ensure the effectiveness of the cleanup actions. The first phase of groundwater, soil, and air sampling has been completed by the potentially responsible party. Treatability studies conducted by the U.S. Bureau of Mines have found hydrometallurgical treatment of mercury waste to be ineffective. The potentially responsible party has conducted additional treatability studies and found that thermal process treatments would yield good results but not size/separation process treatments. Another possible treatment would involve a different kind of separation of mercury from the soil. Treatability studies are expected to be completed in mid-1992.

Site Facts: An Administrative Order of Consent was signed by GE to undertake the investigation to determine the nature and extent of contamination and to identify alternatives for cleanup, as well as to take on the responsibility for designing the methods and conducting the overall cleanup of the site.

Environmental Progress



The immediate actions described above stopped the potential migration of contaminants from the GE Wiring Devices site to nearby residential areas, making it safer while further studies are being completed and long-term cleanup activities are being planned.

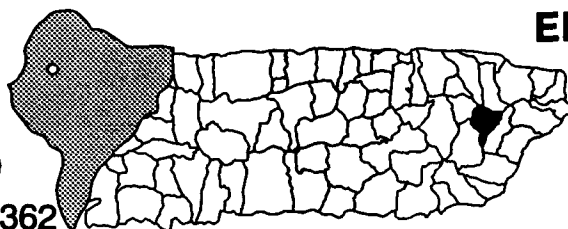
Site Repository



Mayor's Office, Calle Degetan #35, Juana Diaz, PR 00665

JUNCOS LANDFILL PUERTO RICO

EPA ID# PRD980512362



EPA REGION 2

Juncos County
Juncos

Site Description

The 11-acre Juncos Landfill is a closed municipal landfill at which thermometers containing mercury have been dumped. Small leachate seeps and soil erosion were evident during the site inspections conducted by the EPA. Of greatest concern is a new housing development adjacent to the landfill, although most of the homes are not yet occupied. The new community will be served by a public water supply. Tests by the EPA in 1982 indicated that soil and air may contain high concentrations of mercury. Limited barriers exist to prevent local residents or animals from entering the site. There are approximately 10,000 people living within a 3-mile radius of the site. Several small creeks are located near the landfill.

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 air is contaminated with various heavy metals and volatile organic compounds (VOCs). The groundwater and soil are contaminated with heavy metals. Mercury poisoning is the potential health concern for people living near the site. Inhaling the contaminated air and touching or accidentally ingesting the contaminated soil could lead to mercury poisoning and other health hazards. Vegetables grown in the contaminated soil may bioaccumulate heavy metals and could pose a potential health threat to individuals who eat them. Pollutants may seep from the landfill into the nearby creeks and harm local wildlife.

Cleanup Approach

This site is being addressed in three stages: immediate actions and two long-term remedial phases focusing on cleanup of the landfill and cleanup of contaminated groundwater.

Response Action Status



topsoil.

Immediate Actions: In 1984, the parties potentially responsible for the contamination posted signs and installed a partial fence around the site; they also covered the landfill and the discarded mercury-containing thermometers with



will involve the installation of a flexible synthetic cap over the landfill area.

Landfill: The potentially responsible parties began a study in 1984 to evaluate the nature and extent of the contamination associated with the landfill wastes. The work was completed in 1991. The remedy for site cleanup was chosen in 1991 and



best suited for cleanup of the groundwater.

Groundwater Contamination: An investigation currently is underway to determine the nature and extent of groundwater contamination at the site. Once the investigation is completed, expected in 1993, a remedy will be selected that is

Site Facts: A Consent Order was signed with Becton Dickinson, in which the company was made responsible for immediate corrective actions at the landfill in 1984. An Administrative Order also was issued by the EPA in 1984 to Becton Dickinson to study the nature and extent of contamination at the site.

Environmental Progress



The immediate actions described above have limited access to the site and have reduced the potential for exposure to hazardous materials at the Juncos Landfill site while further studies and cleanup activities are taking place.

Site Repository



Juncos Public Library, Apartado 2306, Calle Alagarin Final, Juncos, PR 00666

NAVAL SECURITY GROUP ACTIVITY. PUERTO RICO

EPA ID# PR4170027383

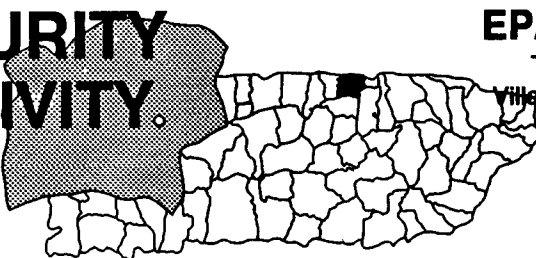
EPA REGION 2

Toa Baja County

Village of Sabana Seca

Other Names:

Sabana Seca



Site Description

The 2,200-acre Naval Security Group Activity site, a naval communications station which operates a high-frequency direction finding facility, lies next to Sabana Seca, about 11 miles west of San Juan, and is divided into North and South Tracts. From the early 1950s through 1970, the operation's Public Works Department deposited all waste generated at the station at various areas on the South Tract. Materials included paints, solvents, waste oil, and battery acid. A pest control shop also was run on the South Tract from the 1950s through 1979. Workers spilled various pesticides around the shop building. They also mixed pesticides and cleaned applicators in a sink outside the shop that discharged directly to the ground. In 1984, soil samples showed elevated levels of arsenic, lead, and chlordane. Rain could wash soil contaminants through a drainage ditch to a marsh, and the fractured limestone bedrock may allow pollutants to move into the groundwater. Initial studies identified seven potentially contaminated sites, including the former pest control shop and a leachate ponding area. Approximately 47,000 people living in and around the station obtain drinking water from public wells within 3 miles of the site. Groundwater also is used for stock watering and industrial processes. Surface water within 3 miles downstream of the shop is used for recreational fishing. The San Pedro Marsh, a large coastal wetland, is within 1,000 feet of both tracts.

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

NPL LISTING HISTORY

Proposed Date: 06/24/88

Final Date: 10/04/89

Threats and Contaminants



Soils outside the pest control shop are contaminated with various heavy metals and pesticides. PCB-contaminated materials from another off-site location are stored near the pest control shop. Potential routes for migration of contaminants may threaten the sensitive coastal wetlands. The Cocal River is known to support numerous fish, as well as crab and shrimp species. Blue Land Crabs are abundant in the San Pedro Swamp and are recreationally harvested from it. Stormwater runoff from the shop enters a drainage ditch that empties into a stream. The Puerto Rican boa, designated by the U.S. Fish and Wildlife Service as an endangered species, has been sighted in numerous locations on the station.

Cleanup Approach

This site is being addressed in three stages: an initial action and two long-term remedial phases focusing on cleanup of shop soil and water pollution, and cleanup of the pistol range disposal and leachate pond areas.

Response Action Status



Initial Action: In 1988, the Navy installed a fence around the former pest control shop to prevent exposure to the spilled pesticides.



Shop Soil and Water Pollution: The Navy is expected to begin an intensive study of pesticide shop soil and water pollution at the site in 1992. This investigation will explore the nature and extent of contamination and will recommend the best strategies for final cleanup. Contaminated leachate at the leachate ponding area apparently originates from the municipal landfill off site, but is being included in the studies to protect base water supplies.



Pistol Range Disposal and Leachate Pond Areas: Beginning in 1992, the Navy is scheduled to conduct an investigation of the pistol range disposal and leachate pond areas. Several monitoring wells will be installed to determine whether the Navy water supply is in danger.

Site Facts: An Interagency Agreement has been signed by the EPA, the Navy, and the Commonwealth of Puerto Rico. A Letter of Intent to execute the Agreement has been signed by all parties. The site is participating in the Installation Restoration Program, a specially funded program established by the Department of Defense (DOD) to identify, investigate, and control the migration of hazardous contaminants at military and other DOD facilities.

Environmental Progress



Initial fencing of the site has eliminated the possibility of exposure to spilled pesticides around the shop at the Naval Security Group Activity site while further studies leading to the selection of a final cleanup remedy are being completed.

Site Repository

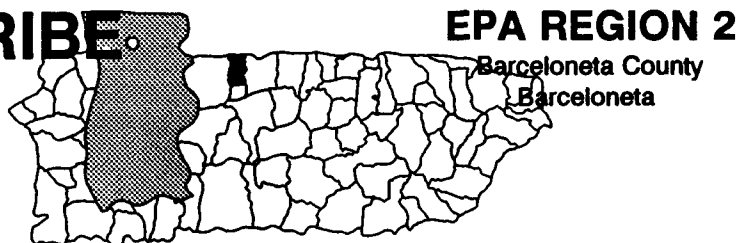


Jamie Fondella Garriga Public Library, Toa Baja, PR 00659

RCA DEL CARIBE

PUERTO RICO

EPA ID# PRD090370537



Site Description

The 20-acre RCA Del Caribe site manufactured masks for television screens and has been in operation since 1971. General Electric Company acquired RCA in 1986 and has phased out operations since 1987. RCA manufactured aperture masks for color television picture tubes. Spent ferric chloride solution from these operations was stored in four lined surface lagoons. These lagoons were breached due to sinkhole development, which discharged approximately 1 million gallons of ferric chloride into the sinkholes. Since 1982, the ferric chloride has been stored in tanks. Process water contaminated with ferric chloride was treated in an on-site wastewater treatment system. The generated sludge was placed into two sludge drying beds and in at least two lagoons. The approximately 12,000 people residing within 3 miles of the site depend on groundwater for drinking water. There is a public water supply well located approximately 3/4 mile from the site. The surrounding area is dedicated to pineapple growing and cattle raising.

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 heavy metals including chromium, beryllium, selenium, and iron from the former manufacturing process wastes. Potential health threats may exist if individuals touch or accidentally ingest the contaminated groundwater or soil.

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 potentially responsible party has begun an investigation to determine the nature and extent of contamination and to identify alternatives for cleanup. Four monitoring wells have been drilled and groundwater and soil samples have been collected as part of the investigation. The investigation is scheduled to be completed in 1993. Once completed, the EPA will evaluate the study findings and will select the final cleanup remedies to address contaminated soils and groundwater at the site.

Site Facts: Under an Administrative Order, General Electric Company will conduct site studies and address closure requirements at the site.

Environmental Progress



After adding this site to the NPL, the EPA performed preliminary investigations at the RCA Del Caribe site and determined that no immediate actions were required while further investigations leading to the selection of a final cleanup remedy for the site are being conducted.

Site Repository

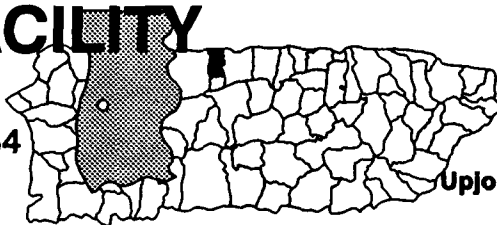


Office of the Mayor, City Hall, Barceloneta, PR 00617

UPJOHN FACILITY

PUERTO RICO

EPA ID# PRD980301154



EPA REGION 2

Barceloneta County
Barceloneta

Other Names:

Upjohn Manufacturing Company
Carbon Tet. Spill

Site Description

The 2-acre Upjohn Facility site contains a pharmaceutical manufacturing plant. In 1982, approximately 15,300 gallons of waste material leaked from an underground storage tank on the site. Six wells were sampled for contamination shortly after the leak; four were taken out of service, and one on the adjacent A.H. Robins property was commissioned as a recovery well. The population affected by the contaminated wells was given alternative water supplies and subsequently, the company installed a replacement well and connected one area to the public water system. Upjohn also installed 22 groundwater monitoring wells. In 1984, various areas of the facility were covered with a fiberglass-reinforced concrete pad to prevent rainwater from seeping into the ground. The company installed an extraction well downgradient of the spill area that intercepted the majority of the contaminated groundwater before it left the site. A total of 19 vacuum extraction wells were employed to withdraw the volatile contaminants from the soil. Over 10,000 gallons of carbon tetrachloride have been removed from the soil and groundwater. Upjohn ceased all use of carbon tetrachloride by 1986. The Upjohn facility is located in a sparsely populated area. Two communities, Tiburones and Garrochales, with a population of approximately 3,000 people, are directly affected by the site. The island's largest aquifer is underneath the site and supplies drinking water to 12,000 people. In addition, the aquifer discharges to a wetland area that supports a large aquatic and bird population. The Rio Grande de Arecibo and Rio de Manati are located along the borders 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



Groundwater is contaminated with volatile organic compounds (VOCs), including carbon tetrachloride and chloroform, as well as various heavy metals, from the former manufacturing process wastes. The soil is contaminated with carbon tetrachloride. Those who come in contact with or drink the water from the wells tapping the aquifer may be at risk. The aquifer discharges into wetlands, and the pollutants may harm nearby wildlife.

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: Upjohn conducted a study of the site in 1983, and the company performed a number of preliminary actions which included providing alternative water supplies to the affected people, covering some areas to prevent the migration of contaminants, and installing extraction wells to remove contaminants from soil and groundwater. However, the EPA determined that additional measures were needed to ensure that the site will not pose a future threat to public health or the environment.



Entire Site: In 1988, the EPA selected a remedy to clean up the site by: (1) continuing to pump the groundwater using the extraction wells in-place, removing the contaminants by forcing a stream of air through the water, treating the contaminants before releasing them into the atmosphere, and discharging the treated water into a sinkhole on the property; (2) completing a new public water supply well to replace the contaminated Garrochales #3 well; (3) adding new extraction wells if the others prove to be successful in removing contamination; (4) monitoring the site long-term to ensure the treatments have been effective; and (5) re-evaluating the site within 5 years to determine whether operations need to be continued or modified. Upjohn, has been pumping and treating the groundwater since 1982. In 1992, Upjohn completed construction of the Garrochales #3 replacement well and began drilling groundwater monitoring wells that will provide the information needed to design the remaining cleanup remedies. All work is scheduled to be completed in late 1993.

Site Facts: In 1987, the EPA and Upjohn entered into a Consent Order to perform studies on the site. In 1989, the EPA issued a Unilateral Administrative Order requiring Upjohn to design and conduct the cleanup remedies selected by the EPA in 1988.

Environmental Progress



The groundwater extraction and treatment process that began as an immediate action, as well as the removal of contaminants from the soil, has reduced the potential for exposure to hazardous substances at the Upjohn Facility site. Groundwater treatment continues to reduce contamination levels, so the site can meet established health and ecological standards.

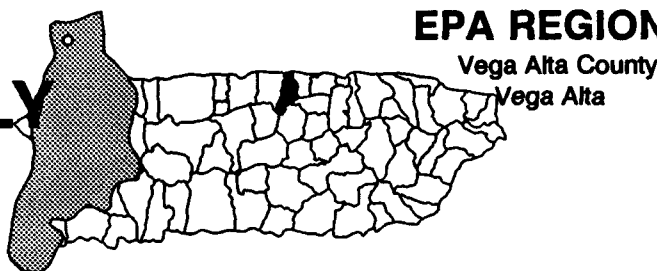
Site Repository



Office of the Mayor, City Hall, Barceloneta, PR 00617

VEGA ALTA PUBLIC SUPPLY WELLS PUERTO RICO

EPA ID# PRD980763775



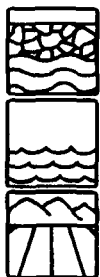
Site Description

The Vega Alta Public Supply Wells site covers 50 acres and consists of six active and four inactive wells. The wells currently supply about 4 million gallons of water each day to Vega Alta and the surrounding residential areas. The Puerto Rico Aqueduct and Sewer Authority (PRASA) is responsible for operating and maintaining the public water supply system. The U.S. Geological Survey sampled the wells in 1983 and found volatile organic compounds (VOCs) in the Ponderosa well. Subsequently, this well and the GE 1 well were shut down due to contamination. The PRASA constructed Bajura 3 well to eliminate the water supply shortage. In 1989, GE 2 and Bajura 3 wells were shut down by the PRASA because of non-compliance with drinking water standards. Maguayo wells were constructed by PRASA to compensate for the shortage. In 1984, an air stripper was installed at the Ponderosa well, which removes contaminants by forcing a stream of air through the water. This process continued until 1985, when technical problems with the air stripper arose. Approximately 27,600 people live near the site.

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

NPL LISTING HISTORY
Final Date: 09/21/84

Threats and Contaminants



Groundwater, sediments, and soil are contaminated with various VOCs. People who accidentally ingest or come in direct contact with the contaminants in the affected wells may be at risk.

Cleanup Approach

This site is being addressed in two long-term remedial phases focusing on cleanup of the entire site and groundwater cleanup.

Response Action Status



Entire Site: In 1987, the EPA selected a remedy to clean up the site by: installing individual treatment systems for PRASA wells GE 1, GE 2, and Bajura 3 and discharging the treated effluent into the PRASA distribution system; treating the Ponderosa well by air stripping and discharging the treated effluent into Honda Creek; shutting down the Monterrey 2 and G & M private wells and hooking up the affected residents to the PRASA distribution system; and conducting an investigation to fully assess and evaluate the source of the contamination. The EPA modified the remedy in 1989 in response to a request of the Puerto Rico Environmental Quality Board (PREQB). All treated water will be discharged to Honda Creek as a result of this change. Long-term cleanup activities began in 1992.



Groundwater: A second investigation was initiated by the potentially responsible parties to determine the potential for the contaminated groundwater plume to migrate from the present treatment area. Based on the study results, expected in 1993, additional groundwater treatment remedies may be required.

Site Facts: General Electric, Motorola, Harman Automotive, The West Company, and the Puerto Rico Industrial Development Corporation were issued a Unilateral Order by the EPA in 1989 to clean up groundwater contamination at the site.

Environmental Progress



After adding this site to the NPL, the EPA performed preliminary investigations and determined that no immediate actions were required at the Vega Alta Public Supply Wells site while long-term groundwater cleanup activities take place.

Site Repository



City Hall, Arpartado 292, Vega Alta, PR 00762

TUTU WELLFIELD VIRGIN ISLANDS

EPA ID# VID982272569



EPA REGION 2

Tutu
Eastern Central St. Thomas



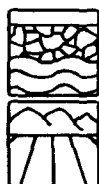
Site Description

The Tutu Wellfield site, located in a mountainous semi-rural area, is a plume of contaminated groundwater covering an area approximately 108 acres in size. This contamination was first detected when a strong petroleum odor coming from the Tillet Well, a public water supply well for the area, was reported. An investigation conducted by the Virgin Islands Department of Planning and Natural Resources (VIDPNR) indicated that volatile organic compounds (VOCs) were contaminating several public, institutional, commercial, and private wells. Water from some of these wells was transported to other parts of the island. Many contaminated wells, including the Tillet Well, were subsequently shut down. In 1987, an Administrative Order was issued to two potentially responsible parties requiring them to investigate the impact that the release of petroleum from their underground storage tanks had on the surrounding environment. Additional sources identified by EPA include: a third gasoline station, two auto repair stations, two Territorial governmental agencies, a dry cleaner, and a silk screening operation. These operations contain various contaminants such as petroleum and waste-oil underground storage tanks, drum storage areas, contaminated catch basins, oil separators, floor drains, a sump holding tank, a leaching pit, above-ground storage tanks, and an evaporation pit. These operations also involved various toxic materials, including solvent-based auto flushes, dry cleaning fluids, dye strippers, ammonia hydroxide, and mineral spirits. Tutu Wellfield is part of the Upper Turpentine Run Basin. A stream leading to Turpentine Run is located a few hundred feet from the site; Turpentine Run is approximately 3 miles from Mangrove Lagoon, which is hydraulically connected to the Caribbean Sea. The Atlantic Ocean is 1 mile from the site. Public and private wells within 4 miles of the site formerly supplied drinking water to an estimated 1,600 people.

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

NPL LISTING HISTORY
Proposed Date: 02/07/92

Threats and Contaminants



Groundwater, including several wells, is contaminated with VOCs, such as benzene, toluene, and trichloroethene (TCE). Contaminants found in the groundwater also were detected in the soil. Individuals could be at risk by touching or ingesting contaminated groundwater or soil.

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 response to the detection of contaminants in groundwater, VIDPNR closed down Tillet Well, three private wells, and 13 commercial wells in 1987. The EPA followed this action up with the decontamination of five residential cisterns using CERCLA emergency funds. An alternative water supply was provided to these residences while monitoring of the remaining wells continued. In 1990, three potentially responsible parties took over the monitoring program and extended water lines to additional residences affected by contamination in groundwater.



Entire Site: An investigation into the nature and extent of contamination at the site began in early 1992. The results of this investigation, scheduled for completion in 1994, will be used to determine the best alternatives for site cleanup.

Site Facts: VIDPNR issued an Administrative Order to Tutu Service Station and Tutu Esso Car Care in 1987. This Order required them to investigate the impact that the release of petroleum from their underground storage tanks had on the surrounding environment. Seven additional potentially responsible parties were identified later in 1987. A Unilateral Administrative Order was issued in 1990 by the EPA to O'Henry Cleaners, Esso Standard Oil Co., and Texaco Caribbean Inc. requiring them to take over the removal actions initiated by the EPA in 1990.

Environmental Progress



Immediate actions such as closing down contaminated wells and providing safe drinking water to affected residences have reduced the risks posed to the health and safety of the nearby population and environment while additional site investigations are being completed.

Site Repository



Not established.

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.

GLOSSARY

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 ground-water 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.

GLOSSARY

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.

GLOSSARY

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].

GLOSSARY

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 inundated 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.

GLOSSARY

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.

GLOSSARY

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 contaminants 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.

GLOSSARY

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 con-

tamination 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 to 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.

GLOSSARY

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.

GLOSSARY

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, Dichloroethylene	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.