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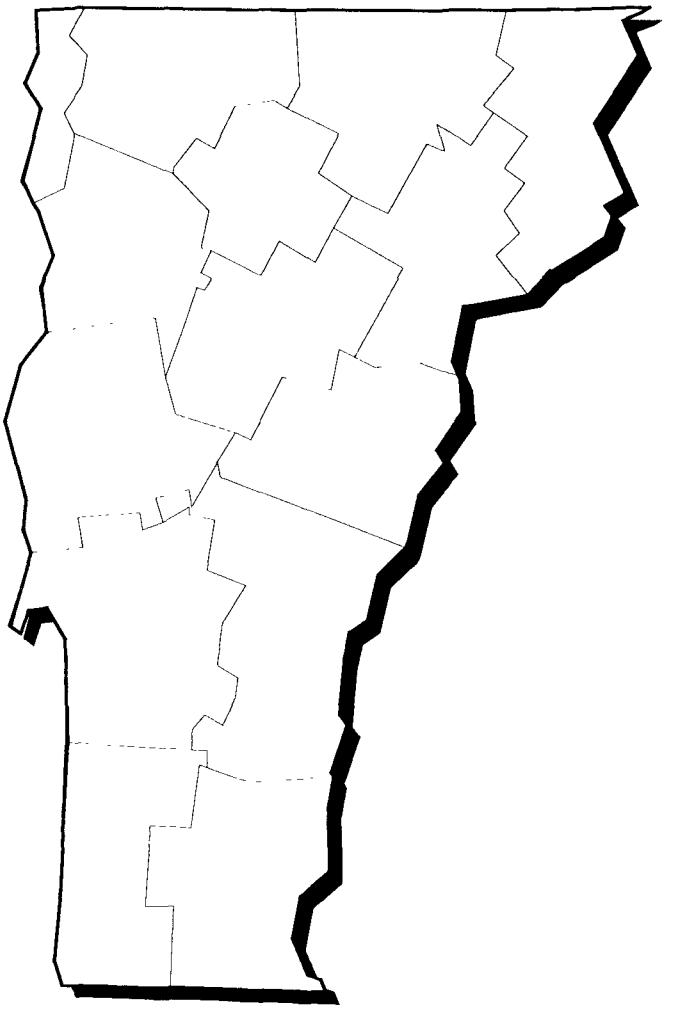
SUPERFUND: Progress at National Priority List Sites



VERMONT 1992 UPDATE

Publication #9200.5-744B
December 1992

NATIONAL PRIORITIES LIST SITES:

Vermont

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Emergency & Remedial Response
Office of Program Management
Washington, DC 20460

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INTRODUCTION

A BRIEF OVERVIEW OF SUPERFUND

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

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

Kentucky had entered the popular lexicon as synonyms for pollution and environmental degradation.

Superfund Is Established

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

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

A Big Job

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

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

sponse, Compensation, and Liability Information System).

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

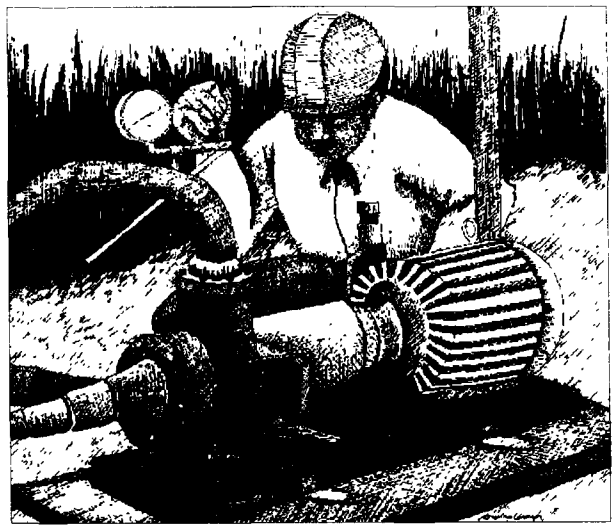
Superfund faces some of the most complex pollution problems ever encountered by an environmental program. Improperly stored or disposed chemicals and the soil they contaminate are one concern. More difficult to correct are the wetlands and bays, and the groundwater, lakes, and rivers often used for drinking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

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

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

Quick Cleanup at Non-NPL Sites

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



Superfund employee prepares equipment for groundwater treatment.

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

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

Superfund employee removing drums from a Superfund site.

The Public's Role

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

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

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

A Commitment to Communication

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

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

INTRODUCTION

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

STREAMLINING SUPERFUND: THE SUPERFUND ACCELERATED CLEANUP MODEL

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

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

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

Breaking With Tradition

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

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

Long-Term Solutions

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

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

HOW SUPERFUND WORKS

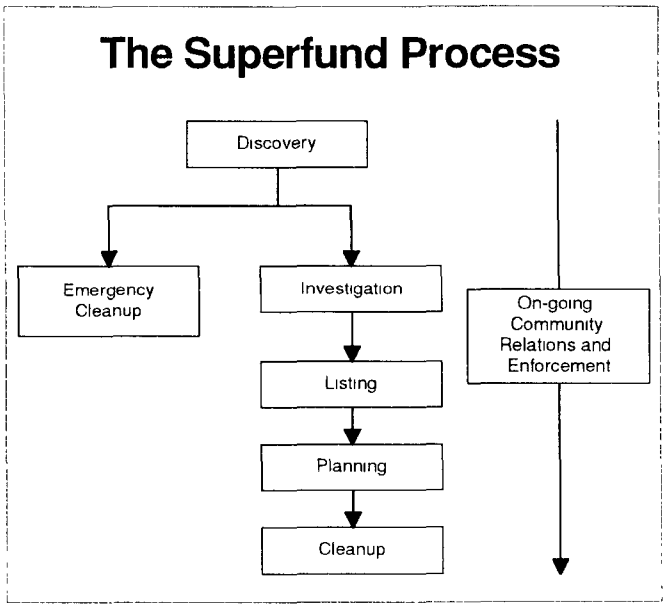
Each Superfund site presents a different set of complex problems. The same hazardous materials and chemicals often contaminate many sites, but the details of each site are different. Almost always, soil is contaminated with one or more chemicals. Their vapors may taint the air over and around the site.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

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

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

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

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



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

THE VOLUME

How to Use the State Book

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

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

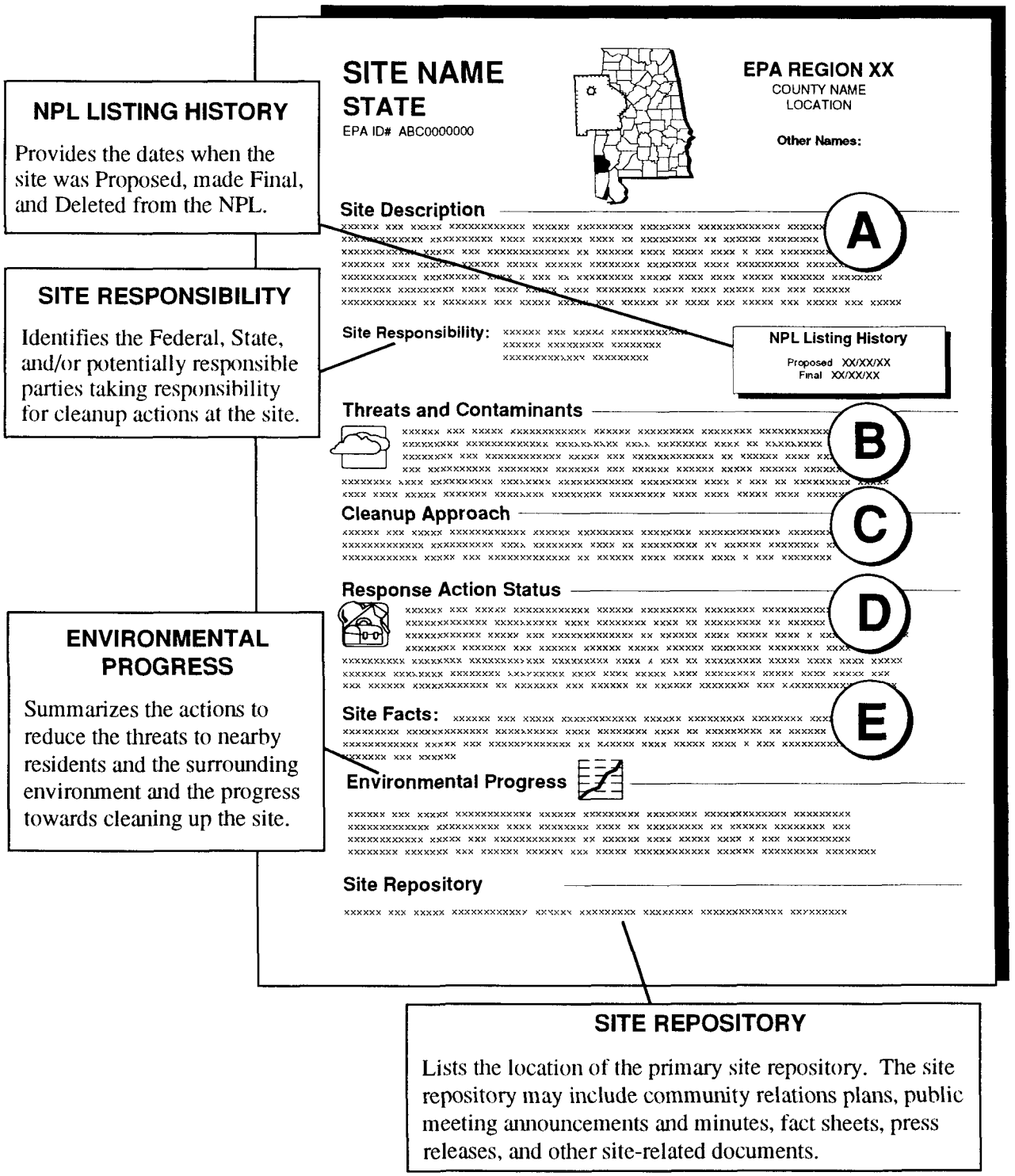
How Can You Use This State Book?

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

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

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

THE VOLUME



NPL LISTING HISTORY

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

SITE RESPONSIBILITY

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

ENVIRONMENTAL PROGRESS

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

SITE REPOSITORY

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

A

SITE DESCRIPTION

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

B

THREATS AND CONTAMINANTS

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

C

CLEANUP APPROACH

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

D

RESPONSE ACTION STATUS

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

E

SITE FACTS

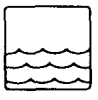
Additional information on activities and events at the site are included in this section. Often details on legal or administrative actions taken by the EPA to achieve site cleanup or other facts pertaining to community involvement with the site cleanup process are reported here.

THE VOLUME

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

Icons in the Threats and Contaminants Section

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



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

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

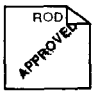
Contaminated *Soil and Sludges* on or near the site. (This contamination category may include bulk or other surface hazardous wastes found on the site.)

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

Icons in the Response Action Status Section

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

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



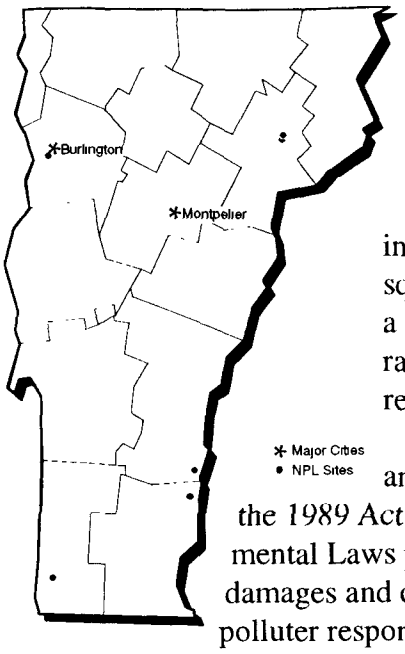
Remedy Selected indicates that site investigations have been concluded, and the EPA has selected a final cleanup remedy for the site or part of the site.

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

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

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

A SUMMARY OF THE STATE PROGRAM



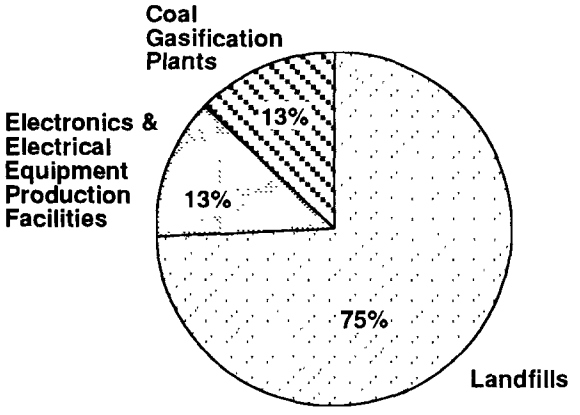
Superfund Activities in Vermont

The State of Vermont is located within EPA Region 1, which includes the six States of New England. The State covers 9,273 square miles. According to the 1990 Census, Vermont experienced a 10 percent increase in population between 1980 and 1990, and is ranked forty-eighth in U.S. population with approximately 563,000 residents.

The Vermont Solid Waste Management Law, most recently amended in 1987, the Vermont Water Pollution Control Law, and the 1989 Act Relating to Administrative Enforcement of Specified Environmental Laws provide enforcement authorities and provisions to collect punitive damages and civil penalties for site cleanup. The statutes provide that any polluter responsible for site contamination is liable for site cleanup regardless of fault or amount of contributed pollution. The State is required to give the polluter the opportunity to cleanup the site and, in practice, it has been successful in encouraging 95 percent of polluters to clean up sites voluntarily. In the event that a polluter refuses to participate in cleanup activities, the State has strong enforcement authorization to request information, subpoena documents, and recover the State's costs involved in cleanup. In addition to the required 10 percent contribution from the State under the Federal Superfund program, the State Environmental Contingency Fund is used for site investigations, emergency response, studies and design, and long-term cleanup actions. Although there is no formal procedure for public participation, the State is required to notify municipalities of sites that fall within their borders and to designate sites on the deed register. Currently, eight sites in the State of Vermont have been listed as final on the NPL. No new sites have been proposed for listing in 1992.

The Agency of Natural Resources
implements the Superfund Program in the State of Vermont

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



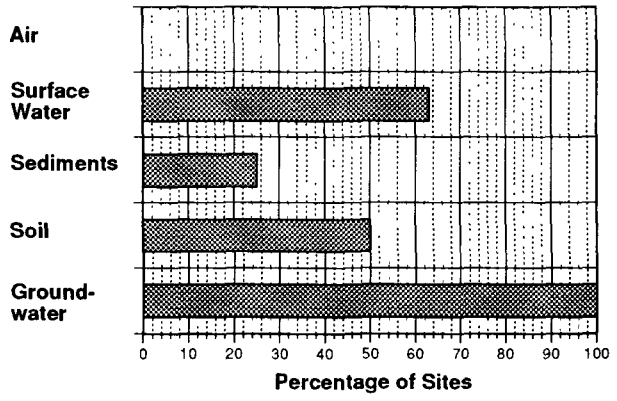
Facts about the eight NPL sites in Vermont:

- Immediate Actions (such as removing hazardous substances or restricting site access) were performed at four sites.
- Four sites endanger sensitive environments.
- Eight sites are located near residential areas.

VERMONT

Most Sites Have Multiple Contaminants and Contaminated Media:

Media Contaminated at Sites



Contaminants Found at Sites

	Percentage of Sites
VOCs	100%
Heavy Metals	63%
PCBs	34%
Creosotes	25%
Acids	13%
Cyanide	13%

The Potentially Responsible Party Pays...

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

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

☎	EPA Region 1 Superfund Community Relations Office	For information concerning community involvement	(617) 565-2713
☎	National Response Center	To report a hazardous waste emergency	(800) 424-8802
☎	The Agency of Natural Resources: Department of Environmental Conservation, Hazardous Material Management Division, Hazardous Sites Management Section	For information about the State's responsibility in the Superfund Program	(802) 244-8702
☎	EPA Region 1 Superfund Office: Waste Managment Division	For information about the Regional Superfund Program	(617) 573-5707
☎	EPA Superfund Hotline	For information about the Federal Superfund Program	(800) 424-9068

THE NPL REPORT

PROGRESS TO DATE

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

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

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

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

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

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

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

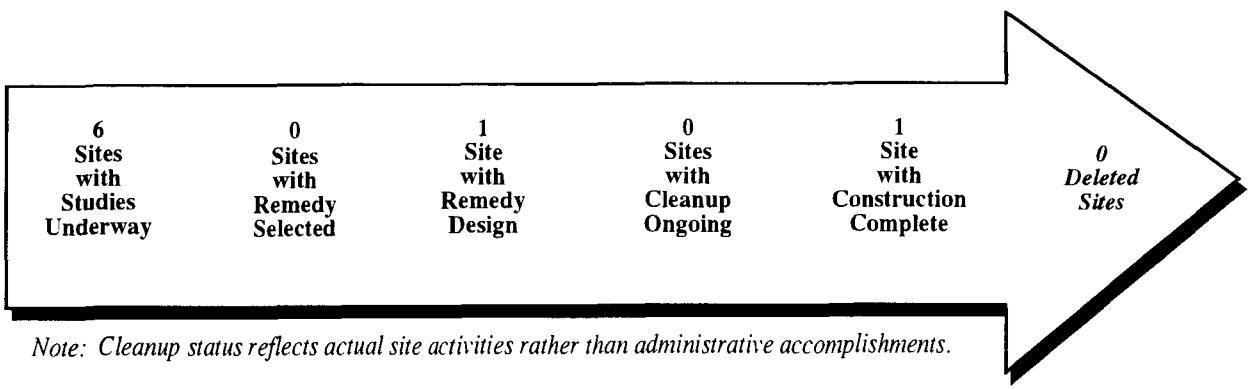
⇨ A final arrow in the "Construction Complete" category is used only when all phases of the site cleanup plan have been performed, and the EPA has determined that no additional construction actions are required at the site. Some sites in this category currently may be undergoing long-term operation and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

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

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

Progress Toward Cleanup at NPL Sites in the State of Vermont

Site Name	County	NPL	Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete	Deleted
BENNINGTON MUNICIPAL SANITARY LANDFILL	BENNINGTON	Final	03/31/89		⇨					
BFI SANITARY LANDFILL	WINDHAM	Final	10/04/89	⇨	⇨					
BURGESS BROTHERS LANDFILL	BENNINGTON	Final	03/31/89		⇨					
DARLING HILL DUMP	CALEDONIA	Final	10/04/89	⇨	⇨	⇨	⇨	⇨	⇨	
OLD SPRINGFIELD LANDFILL	WINDSOR	Final	09/08/83	⇨	⇨	⇨	⇨			
PARKER SANITARY LANDFILL	CALEDONIA	Final	02/21/90		⇨					
PINE STREET CANAL	CHITTENDEN	Final	09/01/83	⇨	⇨					
TANSITOR ELECTRONICS, INC.	BENNINGTON	Final	10/04/89		⇨					

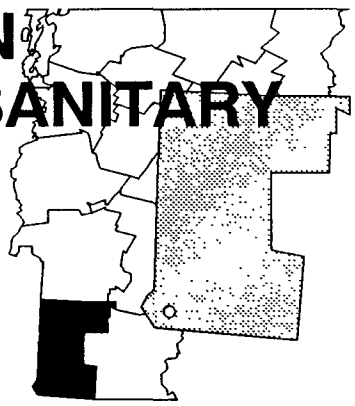


Note: Cleanup status reflects actual site activities rather than administrative accomplishments.

BENNINGTON MUNICIPAL SANITARY LANDFILL

VERMONT

EPA ID# VTD981064223



EPA REGION 1
Bennington County
Off Houghton Lane

Site Description

The Bennington Landfill, located off Houghton Lane in Bennington, is a municipal sanitary landfill on 28 acres. The area was a sand and gravel pit until it began operation as a landfill in 1969. The Town of Bennington purchased the site in 1985. Several Bennington industries dumped liquid wastes into an unlined lagoon on the site from 1969 to 1975. Town records indicate that polychlorinated biphenyls (PCBs), organic solvents, and lead were disposed of at the site. The lagoon was closed in 1975; workers landfilled it after attempts to dry it up failed. An underground drain system built in 1976 is designed to lower the groundwater level below the landfill. The system discharges through a culvert into an unlined, ponded area. Approximately 2,200 residents within 3 miles of the site use private wells. The area surrounding the site is mainly rural residential. Morgan Spring, a bedrock water source 3 miles south of the landfill, is used regularly to supplement the Bennington water system.

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

NPL LISTING HISTORY
Proposed Date: 06/21/88
Final Date: 03/31/89

Threats and Contaminants

Groundwater discharging through a culvert from beneath the site contains PCBs, heavy metals including lead and arsenic, and volatile organic compounds (VOCs) including benzene and xylene. In 1986, the Vermont Department of Environmental Conservation detected contaminants in the groundwater discharging from the culvert into an unlined, ponded area. The State believes the ponded area had caught fire in the past. The State found several flammable materials in it. The site is not completely fenced, making the potential for direct contact with contaminants a possibility. A freshwater wetland is 500 feet east of the culvert and may be subject to contamination from the site. Hewitt Brook, which originates from this wetland, is used for trout fishing.

Cleanup Approach

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

Response Action Status

Entire Site: A potentially responsible party began a study of the nature and extent of contamination at the site in mid-1991. The study will assess the risks to human health and the environment. The results of the study, expected in late 1994, will be used to determine cleanup alternatives.

Environmental Progress

The EPA has assessed the Bennington Landfill site and determined that no immediate actions are necessary while site studies are underway.

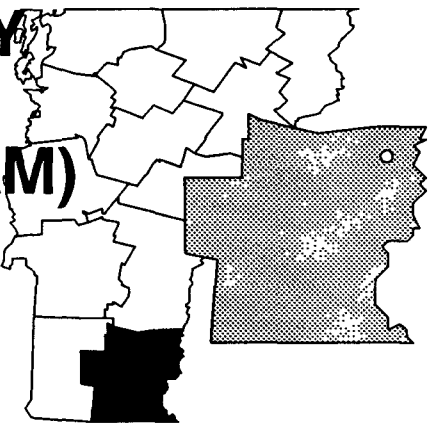
Site Repository

Bennington Public Library, 101 Silver Street, Bennington, VT 05201

BFI SANITARY LANDFILL (ROCKINGHAM)

VERMONT

EPA ID# VTD980520092



EPA REGION 1

Windham County
Rockingham

Other Names:
Rockingham Landfill

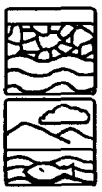
Site Description

Fifteen acres of the BFI Sanitary Landfill (Rockingham) site, consisting of 103 acres in Rockingham, were used as a sanitary landfill. In the early 1960s, the site served as a borrow area for construction of Interstate 91. In 1977, Browning-Ferris Industries, Inc. (BFI) bought the landfill from an individual who had started operations in 1968. State files indicate that industrial wastes, including heavy metals, bases, pesticides, and volatile organic compounds (VOCs), were deposited in the unlined disposal area from 1968 to 1979 by the previous owner and BFI. In 1983, Vermont licensed the site as a municipal landfill certified to accept hazardous waste from small generators. The landfill was closed in 1991. The Vermont Department of Environmental Conservation (VT DEC) reports that nearby residential and monitoring wells downgradient of the site have been contaminated since 1979. There are two leachate collection ponds on site. A tar cap covers a portion of the landfill to prevent the infiltration of rainwater; however, cracks in the cap have been observed, and it is covered with new refuse. Approximately 2,700 people live within a mile of the site, and 6,400 residents live within 3 miles. Several homes with contaminated wells near the site now receive water from a new well provided by BFI. More than 4,500 people in Vermont and New Hampshire obtain drinking water from public and private wells within 3 miles of the landfill. The Connecticut River is 560 feet to the east, along the drainage route of surface water leaving the site.

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

NPL LISTING HISTORY
Proposed Date: 06/21/88
Final Date: 10/04/89

Threats and Contaminants



The groundwater contains contamination from VOCs and heavy metals including chromium, copper, lead. Drinking water from contaminated wells in the area poses a threat to public health. The Connecticut River also may receive contaminants via groundwater discharge, posing a threat to its quality and aquatic life.

Cleanup Approach

The site is being addressed in two stages: initial actions and a long-term remedial phase directed at cleanup of the entire site.

Response Action Status

Initial Actions: As an initial action, BFI is providing an alternate drinking water supply to residences with contaminated wells.

Entire Site: BFI has been conducting groundwater monitoring since 1979. The EPA will conduct an investigation into the nature and extent of contamination at the site. The study is expected to begin in late 1992, with completion scheduled for 1994. The investigation will define the contaminants of concern and will recommend cleanup strategies.

Site Facts: The State issued three orders to the owner between 1980 and 1983, requiring BFI to determine the hydrogeology of the landfill, monitor on-site groundwater, and provide drinking water to affected residents nearby.

Environmental Progress

The installation of an alternate water source has reduced the potential for exposure to contaminated groundwater, making the BFI Sanitary Landfill site safer while studies leading to final cleanup actions are underway.

Site Repository

Not established.

BURGESS BROTHERS LANDFILL

VERMONT

EPA ID# VTD003965415

EPA REGION 1
Bennington County
Woodford

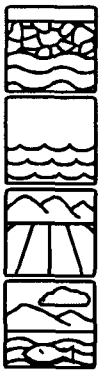
Site Description

The 60-acre Burgess Brothers Landfill is located in Woodford. The site is still owned by the Burgess family and borders the Green Mountain National Forest. Burgess Brothers Construction Company, of nearby Bennington, operated the facility as a sand pit, salvage yard, and dump from the 1940s until the mid-1970s. The site is still operating as a salvage yard and a sand pit. For 20 years, Union Carbide Corp.'s Bennington Plant disposed of wastes from battery manufacturing at the site; an unknown quantity of lead sludge between 1956 and 1971; and the equivalent of 47,780 drums of hazardous wastes from 1971 to 1976. The wastes were dumped into and buried in unlined settling lagoons next to the sand pit bank. Studies conducted by both the State and Union Carbide have determined that soils, groundwater, and surface water both on and downgradient of the site are contaminated with heavy metals and volatile organic compounds (VOCs). The site area is largely rural and is sparsely populated, but 13,900 people live within 3 miles of the site. Residents draw drinking water from private and public wells; the nearest well is 1/2 mile from the lagoons. A spring used to supply drinking water to Bennington is 1 1/2 miles to the west of the site. Barney Brook and the Waloomsic River are within 3 miles downstream of the site; both are used for recreation. A freshwater wetland is located approximately 1/4 mile from the site.

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

NPL LISTING HISTORY
Proposed Date: 06/21/88
Final Date: 03/31/89

Threats and Contaminants



Groundwater, surface water, and soils are contaminated with heavy metals, including mercury and lead, and VOCs, including vinyl chloride and trichloroethylene (TCE). The site is unrestricted; direct contact with contaminated soils or surface water is a potential health risk. There are sensitive areas nearby, including freshwater wetlands and National Forest land, both of which are used for recreational purposes and which could be polluted by site contamination.

Cleanup Approach

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

Response Action Status

Entire Site: The potentially responsible parties began an investigation in 1991 to determine the nature and extent of contamination. Recommendations for the selected cleanup methods for soil, surface water, and groundwater will be offered at the conclusion of this study, scheduled for 1994.

Environmental Progress

The EPA has evaluated this site and determined that no immediate actions are necessary to ensure that the public and environment are not at risk. Studies at the Burgess Brothers Landfill are being conducted and final cleanup alternatives are being evaluated while the EPA continues to monitor the site.

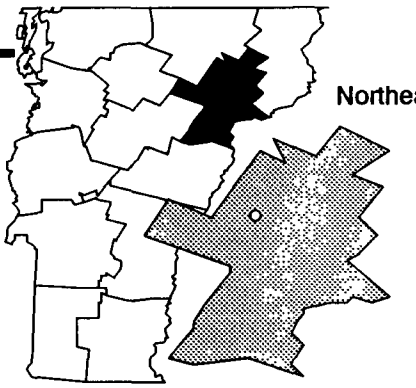
Site Repository

Not established.

DARLING HILL DUMP

VERMONT

EPA ID# VTD980520118



EPA REGION 1

Caledonia County
Northeast portion of Lyndon (Lyndonville)

Other Names:
Lyndonville Town Dump

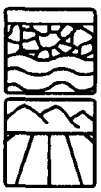
Site Description

The Darling Hill site is an inactive dump that occupies approximately 3 1/2 acres at the top of a steep hill along Darling Hill Road in rural Lyndon. From 1952 to 1972, the Village of Lyndonville leased and operated the dump. The dump was used for the disposal of light industrial and municipal wastes. Ray O. Parker and Son, Inc. of Lyndonville leased and operated the dump from 1972 to 1983 and purchased it in 1983. During this time, the dump was used mainly for the disposal of scrap wood, metal, demolition materials, and industrial wastes. The site continued operating until the 1980s; in 1989 it was closed. An estimated 92,000 gallons of liquid industrial wastes were dumped directly on the ground at the unlined site, as were 2,000 tons of liquid, semi-liquid, and solid industrial wastes including metal-plating rinse water, alkali degreasers, and organic solvents. The depth to groundwater below the dump is more than 100 feet. The village well field, serving 3,200 people, is 1/2 mile to the southwest of the dump. An additional 460 people use private wells within 3 miles of the site. About 300 feet west of the site, and down a steep hill, is the West Branch of the Passumpsic River, which meets the East Branch about 1/2 mile farther south. The river is used for recreational fishing and boating.

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

NPL LISTING HISTORY
Proposed Date: 06/21/88
Final Date: 10/04/89

Threats and Contaminants



Metal plating rinse waters, alkali degreasers, and organic solvents were dumped on the ground at the site. However, the EPA has determined that the low levels of volatile organic compounds (VOCs), including trichlorethylene (TCE) and toluene, in the groundwater and soil do not pose a risk to public health and the environment because of the use of the carbon filtration system.

Cleanup Approach

The site is being addressed in through initial actions; further investigations showed that no other cleanup actions are required.

Response Action Status

Initial Actions: The Darling Hill Dump was closed in 1989. In 1991, the potentially responsible parties, under EPA oversight, installed a carbon filtration system to ensure a safe municipal water supply.

Entire Site: In 1992, following an investigation into the nature and extent of contamination at the site by the potentially responsible parties and a public comment period, the EPA determined, because of the success of the initial actions, no further actions were necessary at the site. The EPA concluded that the low levels of contaminant concentrations in the soil and groundwater do not pose a threat to people or the environment. The Village of Lyndonville now operates the carbon filtration system as needed to ensure that the municipal water supply remains safe. Monitoring of private wells and the municipal water supply continues to ensure the long-term effectiveness of the initial actions.

Site Facts: Two Consent Orders were signed in 1989 requiring the parties potentially responsible for the site contamination to perform an investigation and install a carbon filtration system at the municipal well field. The Consent Order to remove contaminants from the groundwater was terminated due to the low levels of contamination in the groundwater found during the site study. The village of Lyndonville now operates the carbon treatment system as necessary.

Environmental Progress

Installation of a carbon filter in the municipal water supply by the potentially responsible parties helps ensure that the low levels of groundwater contaminants remain within Federal standards. The Order to cleanup the groundwater has been terminated due to the low levels of contaminants. The operation of the carbon filtration system was turned over to the Village of Lyndonville, which continues to monitor the groundwater.

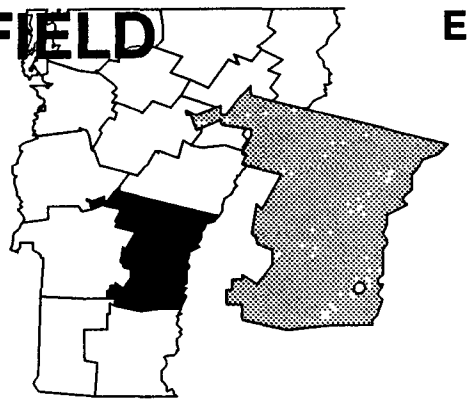
Site Repository

Town Hall, Town of Lyndon, 24 Main Street, Lyndonville, VT 05851

OLD SPRINGFIELD LANDFILL

VERMONT

EPA ID# VTD000860239



EPA REGION 1
Windsor County
Springfield

Site Description

The Springfield Landfill site covers 9 acres of a 30-acre parcel of land. The landfill was operated by the Town of Springfield between 1947 and 1968 for the disposal of municipal solid waste and hazardous industrial liquid and semi-liquid waste. The site currently is owned by Springfield Mobile Estates, which operates a trailer park that once consisted of 38 mobile homes. Approximately 60 people resided in the trailer park, which was built on top of the landfill. All residents have moved as of June 1990, after having sold their trailers to the parties potentially responsible for the site contamination. Investigation of the site found volatile organic compound (VOC) contamination in a spring and in a residential well near the mobile home park. The EPA began investigations at the site in 1976, following a resident's complaint of foul-smelling water. Four areas of contamination have been identified at the site where industrial waste was either disposed of separately in trenches or mixed with municipal waste. Approximately 500 people live within a 1-mile radius of the site. Many area residences are hooked up to the public drinking water system. Residents upstream of the site rely upon private wells for drinking water. The land use within a 1-mile radius is primarily low-density residential housing, light agriculture, undeveloped forest land, and commercial development. The site is on a terrace above, and 1/4 mile west of, the Black River. Leachate from the site flows out of the side of the steep slopes next to the landfill and eventually reaches the Black River and Seavers Brook; however, neither is used as a drinking water source.

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

NPL LISTING HISTORY
Proposed Date: 12/01/82
Final Date: 09/01/83

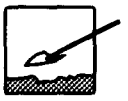
Threats and Contaminants

The groundwater, surface water, and sediments are contaminated with VOCs including benzene and vinyl chloride. The on-site soil is contaminated with VOCs, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). On-site workers and residents are at risk by coming in direct contact with or ingesting contaminated groundwater, surface water, soils, or sediments.

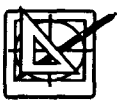
Cleanup Approach

The site is being addressed in three stages: immediate actions and two long-term remedial phases concentrating on leachate and groundwater cleanup and source control.

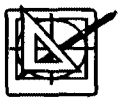
Response Action Status



Immediate Actions: In 1984, the potentially responsible parties connected area residents to the public water supply. In a separate action in 1987, the EPA temporarily relocated 42 families while testing was conducted on the site. The families returned to their homes later that year.



Leachate and Groundwater: The remedy selected by the EPA for cleanup of leachate and groundwater includes: construction of an underground system to collect leachate passing through the site; installation of wells to extract contaminated groundwater; on-site treatment of the collected leachate and groundwater or possible removal of the leachate and groundwater to a publicly owned treatment works; monitoring the site; and additional studies to determine how to isolate the landfill waste materials from the groundwater. The EPA also plans to place restrictions on the future use of groundwater underlying the contaminated area. The potentially responsible parties are preparing the technical specifications and design for the selected cleanup plan. Pre-design field work was completed in mid-1991. Cleanup activities are scheduled to begin once the design phase is completed in late 1992.



Source Control: Additional studies were conducted to determine alternatives for preventing waste materials from entering the groundwater. The investigation was completed in 1990. In late 1991, the potentially responsible parties began design of a variety of methods to provide source control at the site. These methods include capping Waste Areas 2, 3, and 4; collecting ground and surface water in french drains; extracting groundwater in Waste Area 3 with source control wells; collecting and venting landfill gases; stabilizing side slopes; conducting operation and maintenance activities; limiting use of the site via institutional controls; and submitting the area to review every five years. Actual site cleanup is expected to begin in early 1993.

Site Facts: An Administrative Order was issued in 1984, requiring the potentially responsible parties to supply an alternate water source. A second Administrative Order was issued in 1989, requiring a study for a second long-term remedial phase. A partial Consent Agreement was signed in 1990 requiring that the potentially responsible parties conduct cleanup activities for leachate and groundwater. A second partial Consent Decree was signed in 1991, requiring the potentially responsible parties to conduct cleanup activities for source control.

Environmental Progress

Provision of a safe drinking water supply and the other actions performed at the Old Springfield Landfill site have reduced the risk of exposure to contaminated materials while the site awaits construction of the remedies addressing leachate, groundwater, and the source of contamination.

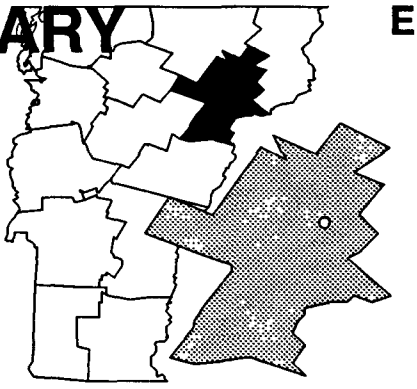
Site Repository

Springfield Public Library, Main Street, Springfield, VT 05156

PARKER SANITARY LANDFILL

VERMONT

EPA ID# VTD981062441



EPA REGION 1
Caledonia County
Lyndon

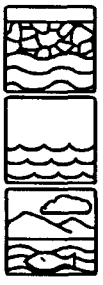
Site Description

The Parker Sanitary Landfill is a 25-acre site that has operated as a solid waste landfill since 1972. Before 1983, approximately 1 million gallons of liquid wastes and 760 tons of solid or semi-solid wastes including metal plating wash waters, waste oils, electroplating sludges, paint sludges, chlorinated solvent sludges, caustic cleaners, and metallic salts were disposed of in at least three areas of the landfill. Liquid and sludge wastes were poured directly onto the ground or into unlined pits and lagoons. During a site inspection in 1984, the State detected contaminants in a stream bordering the landfill, in groundwater at the landfill, and in four private wells 1/2 mile from the landfill. The site is located in a residential area, and an estimated 3,200 people obtain drinking water from a municipal well field approximately 2 miles from the landfill; 124 private wells are within 3 miles. The stream flows into the Passumpsic River, which is used for recreational activities.

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

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

Threats and Contaminants



Groundwater and stream surface waters are contaminated with volatile organic compounds (VOCs) including trichloroethylene (TCE). The site is unfenced, making it possible for direct contact with hazardous substances. Trespassers may be threatened by coming in direct contact with or ingesting contaminated groundwater, surface water, or soil. Also, contaminated fish or waterfowl may pose a threat if eaten.

Cleanup Approach

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

Response Action Status

Entire Site: Some of the parties potentially responsible for the site contamination are studying the contamination at the site. The investigation is identifying contaminants and will recommend alternatives for the final cleanup. The work plan was approved in 1991. Once the study is completed, expected in 1993, the EPA will evaluate the findings and will select the cleanup remedies to address the site contamination.

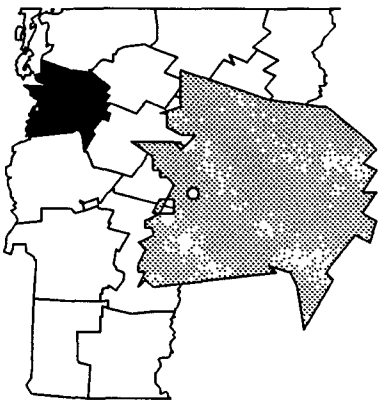
Environmental Progress

Following listing of this site on the NPL, the EPA completed a site assessment and determined that the site presently poses no immediate threat to public health or the environment while it undergoes site investigations and future cleanup actions.

Site Repository

Cobleigh Public Library, 70 Depot Street, Lyndonville, VT 05851

PINE STREET CANAL
VERMONT
EPA ID# VTD980523062



EPA REGION 1
Chittenden County
Burlington

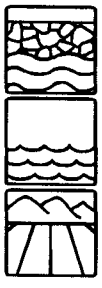
Site Description

The Pine Street Canal site covers 80 acres and consists of a portion of the Pine Street Canal, a turning basin, an adjacent filled-in wetland, an area formerly known as Maltex Pond, and an additional portion of land. In 1908, a coal gasification plant began operating on Pine Street, southeast of the canal. The plant ceased operations in 1966. Plant wastewaters and residual oil and wood chips saturated with organic compounds were directly discharged or disposed of in the Pine Street Canal wetland. During the 1960s and 1970s, an oil-like material was detected seeping from the wetland into Pine Street Canal, the turning basin, and Maltex Pond. The State detected high levels of organic compounds associated with coal tar at several locations on the site, which is along the proposed location of a major highway. The State is concerned that construction will release organic compounds to the canal and possibly to Lake Champlain, the source of Burlington's drinking water. There are several single and multiple-family dwellings, including apartment buildings, within a mile of the site. Burlington has an approximate population of 39,100.

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

NPL LISTING HISTORY
Proposed Date: 10/01/81
Final Date: 09/01/83

Threats and Contaminants



Contaminants in the groundwater include polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) including benzene, toluene, and xylenes. The sediment is contaminated with polychlorinated biphenyls (PCBs), PAHs, and VOCs. The surface water is polluted with semi-volatile organic compounds and VOCs. The soil contains PAHs, VOCs, and heavy metals including lead. Cyanide also has been detected in the soil. There is unrestricted public access to the site, although access is difficult because of marshy terrain. Trespassers may be at risk by touching or ingesting contaminated surface water, groundwater, soil, or sediment, or by swimming in the canal. In addition, eating contaminated fish may pose a health hazard. Portions of the site are seasonally flooded, permitting the spread of contamination. The site has been posted with warning signs by the City of Burlington and the Vermont Department of Health.

Cleanup Approach

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

Response Action Status

Emergency Actions: In 1985, the EPA conducted emergency actions by excavating 500 cubic yards of coal tar, solidifying it, and disposing of it in an approved facility. The Maltex Pond area also was capped with clay, covered with topsoil, and seeded. A temporary fence was erected, and some sampling was conducted.

Entire Site: The EPA currently is studying the nature and extent of the contamination at the site. The EPA has conducted field investigations including a soil gas survey, a geophysical survey, air sampling, ecological studies, surface water and sediment sampling, soil sampling, installation of monitoring wells, and groundwater sampling. The field work was completed in January 1991. Treatability studies to aid in remedy selection are underway. The study is expected to be completed in late 1992 and cleanup measures are expected to be identified shortly thereafter..

Environmental Progress

The emergency removal of coal tar, capping of the Maltex Pond area, and construction of a fence have reduced the potential of exposure to hazardous substances, making the Pine Street Canal site safer while it awaits further cleanup activities.

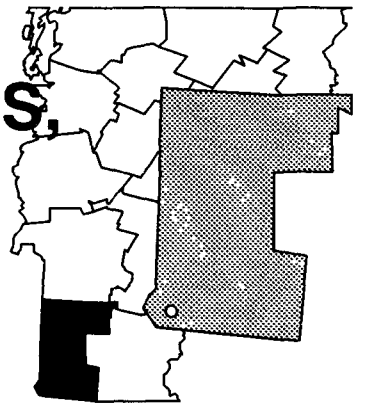
Site Repository

Fletcher Free Public Library, 235 College Street, Burlington, VT 05401

TANSITOR ELECTRONICS, INC.

VERMONT

EPA ID# VTD000509174



EPA REGION 1
Bennington County
Bennington

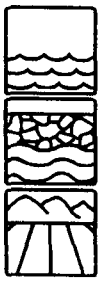
Site Description

Tansitor Electronics, Inc. manufactures electronic capacitors and is located on approximately 36 acres in a mostly rural area of Bennington. According to the Vermont Department of Environmental Conservation (VT DEC), Tansitor disposed of the equivalent of 115 drums of process wastes directly into an unnamed stream or onto the ground. An estimated 1,500 residents of Vermont and New York obtain drinking water from private wells within 3 miles of the site. Runoff from the disposal area, overflow from a contaminated pond, and the process wastes have entered the perennial stream that joins Brown's Brook, which is used for recreational activities, within 3 miles of the site.

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

NPL LISTING HISTORY
Proposed Date: 06/21/88
Final Date: 10/04/89

Threats and Contaminants



The VT DEC found that the on-site surface water, groundwater, sediment, and soils were contaminated with silver, boron, and volatile organic compounds (VOCs). Process wastes were found to contain materials consisting of the VOCs trichloroethane and acetone, oils, and acid sludges. Due to the absence of contaminants in drinking water supplies, the site does not pose an imminent threat to the health of the nearby population; however, environmental damage has occurred to soils, surface water, and groundwater.

Cleanup Approach

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

Response Action Status

Entire Site: EPA emergency response staff collected water and sediment samples to determine whether immediate action was warranted. In 1990, potentially responsible parties began a comprehensive investigation to determine the extent of contamination and to evaluate alternative technologies for cleanup. Field work is scheduled to be completed in late 1992 and the study is expected to be completed in early 1993.

Environmental Progress

The EPA assessed the conditions on the site and determined that no immediate actions were required to make the Tansitor Electronics, Inc. site safer while site studies proceed.

Site Repository

Benning Public Library, 101 Silver Street, Bennington, VT 05201

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 groundwater and surface water by forcing water through tanks containing activated carbon, a specially treated material that attracts and holds or retains contaminants.

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

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

Carbon Treatment: [see Carbon Adsorption].

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

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

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

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

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

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

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

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

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

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

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

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

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

Consent Order: [see Administrative Order on Consent].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

General Notice Letter: [See Notice Letter].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Mill Tailings: [See Mine Tailings].

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

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

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

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

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

Natural Attenuation: [See Attenuation].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

RCRA: [See Resource Conservation and Recovery Act].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Special Notice Letter: [See Notice Letter].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Water Table: The upper surface of the groundwater.

Weir: A barrier to divert water or other liquids.

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

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

Some Common Contaminants at NPL Sites

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

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

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

* U.S. G.P.O.:1993-341-835:81035