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Agency

Solid Waste And
Emergency Response
(5102 G)

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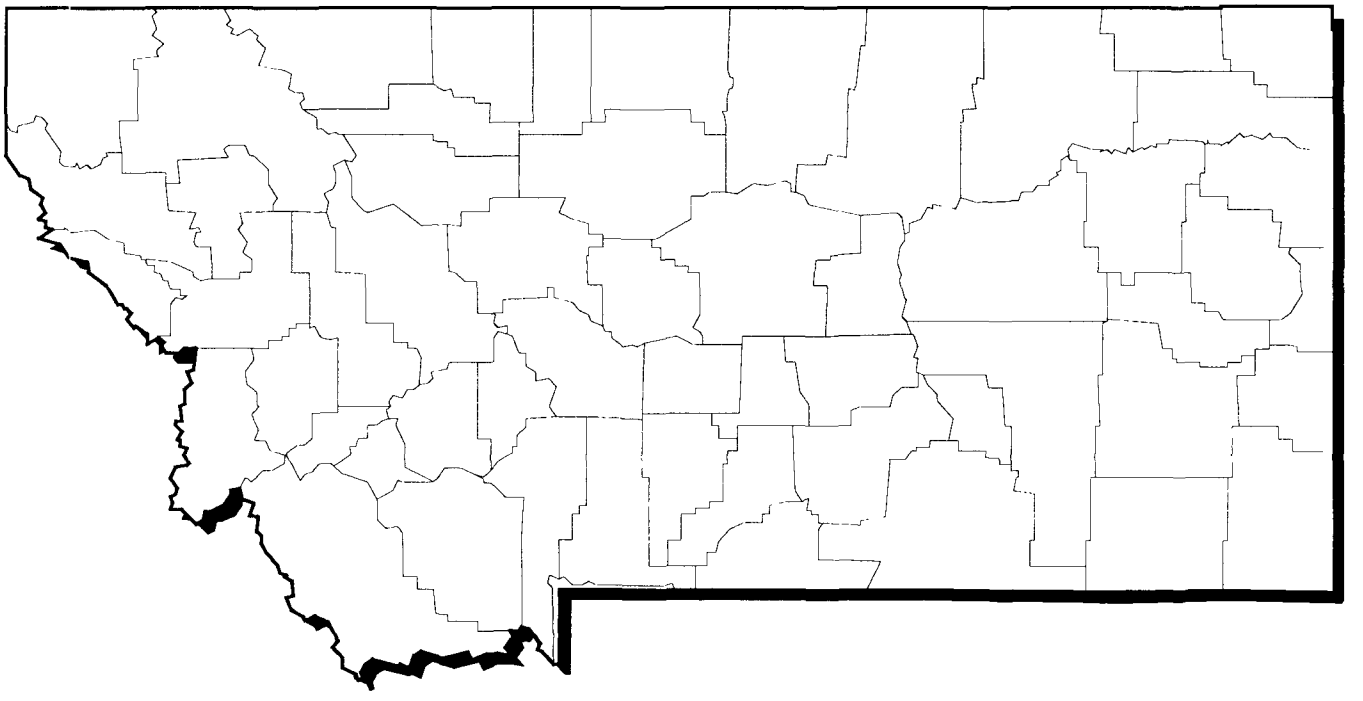
December 1992
PB93-963226

SUPERFUND: Progress at National Priority List Sites



MONTANA 1992 UPDATE

Publication #9200.5-727B
December 1992

NATIONAL PRIORITIES LIST SITES:

Montana

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.

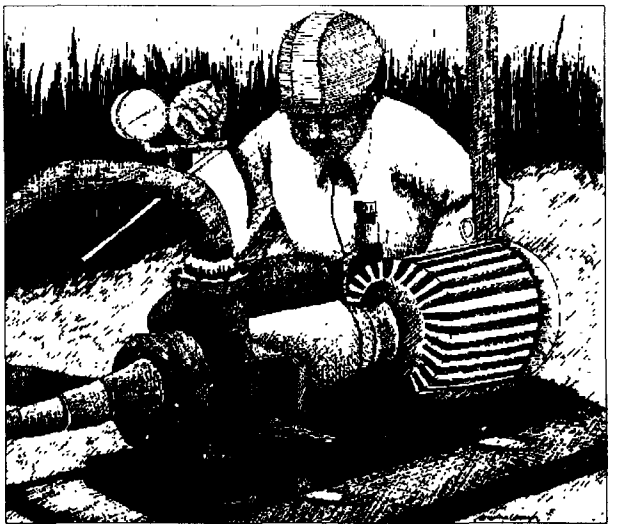
Superfund faces some of the most complex pollution problems ever encountered by an environmental program. Improperly stored or disposed chemicals and the soil they contaminate are one concern. More difficult to correct are the wetlands and bays, and the groundwater, lakes, and rivers often used for drinking 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

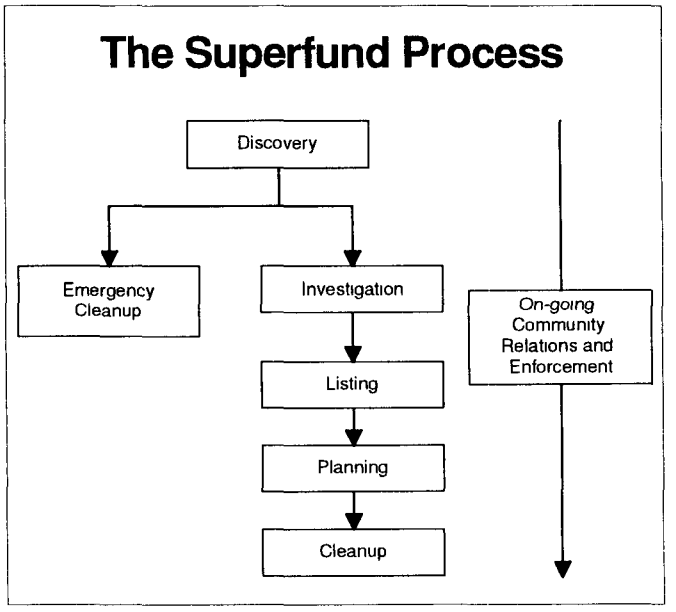
Each Superfund site presents a different set of complex problems. The same hazardous materials and chemicals often contaminate many sites, but the details of each site are different. Almost always, soil is contaminated with one or more chemicals. Their vapors may taint the air over and around the site. 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.

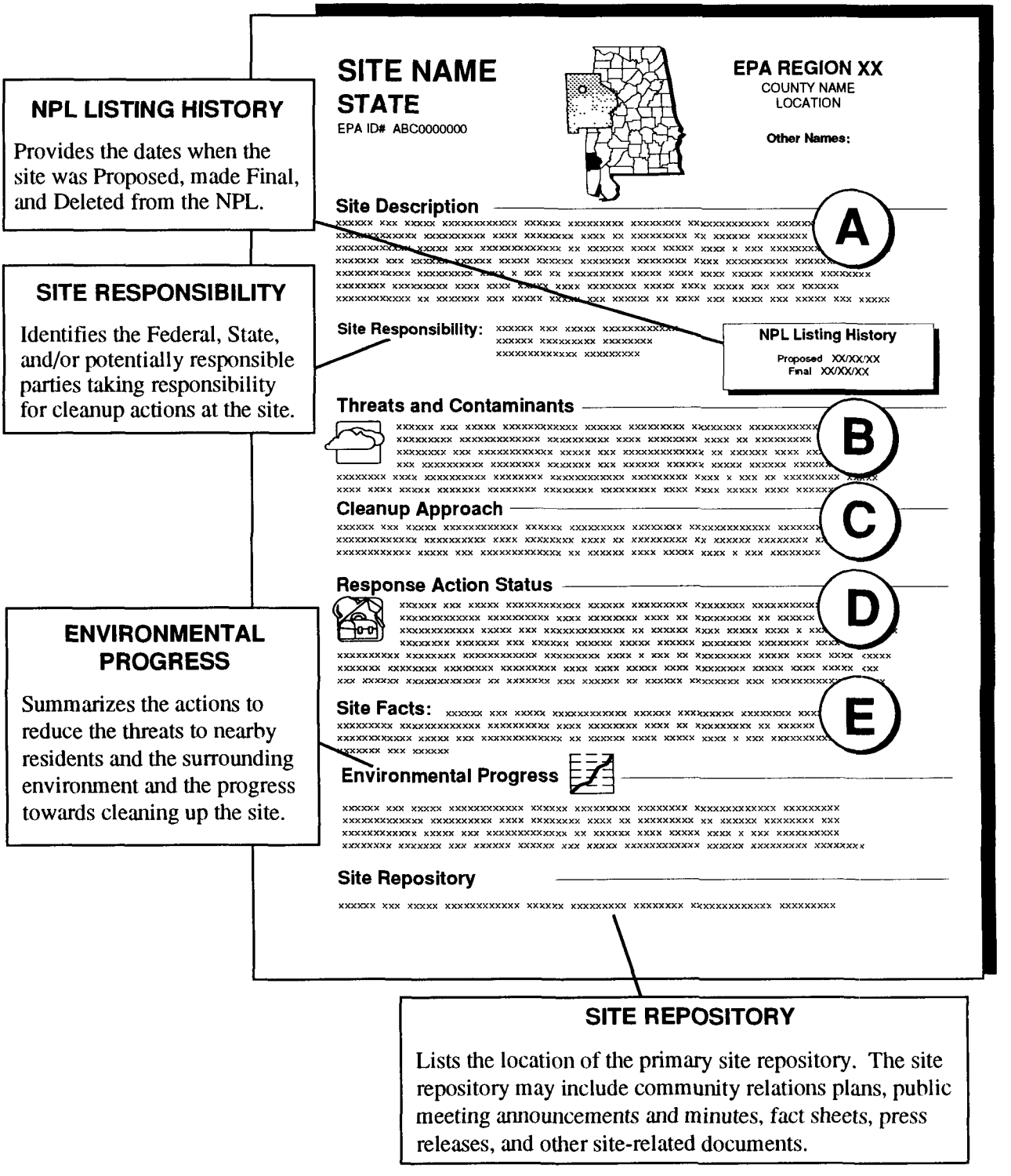
How Can You Use This State Book?

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 NAME
STATE
EPA ID# ABC0000000
EPA REGION XX
COUNTY NAME
LOCATION
Other Names:
Site Description
A
Site Responsibility:
NPL Listing History
Proposed XX/XX/XX
Final XX/XX/XX
Threats and Contaminants
B
Cleanup Approach
C
Response Action Status
D
Site Facts:
E
Environmental Progress
Site Repository
SITE REPOSITORY
Lists the location of the primary site repository. The site repository may include community relations plans, public meeting announcements and minutes, fact sheets, press releases, and other site-related documents.

A

SITE DESCRIPTION

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

B

THREATS AND CONTAMINANTS

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

C

CLEANUP APPROACH

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

D

RESPONSE ACTION STATUS

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

E

SITE FACTS

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

THE VOLUME

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

Icons in the Threats and Contaminants Section

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

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

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

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

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

Icons in the Response Action Status Section

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

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

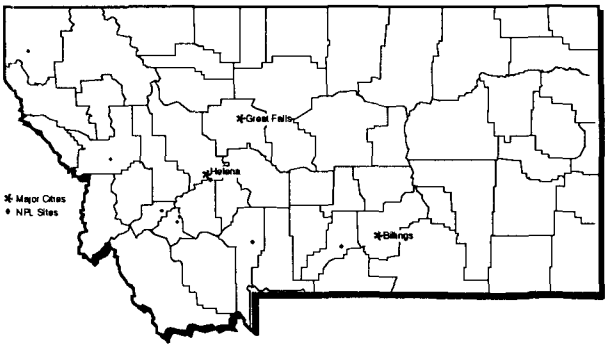
Remedy Selected indicates that site investigations have been concluded, and the EPA has selected a final cleanup remedy for the site or part of the site.

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

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

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

A SUMMARY OF THE STATE PROGRAM



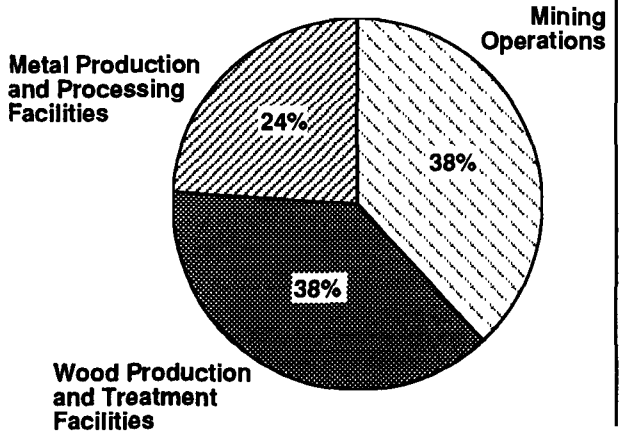
Superfund Activities in Montana

The State of Montana is located within EPA Region 8, which includes the six north central States extending from the mid-western plains to the Rocky Mountains. The State covers 147,046 square miles. According to the 1990 Census, Montana experienced nearly a 2 percent increase in population between 1980 and 1990, and is ranked forty-fourth in U.S. population with approximately 799,000 residents.

The Environmental Quality Protection Fund Act of 1985 provides the State the authority to make polluters liable for site cleanup, collect penalties and punitive damages from polluters, and recover costs from polluters who refuse to participate in site cleanup activities. The Montana legislature expanded the provisions of this statute by passing the Montana Comprehensive Environmental Cleanup and Responsibility Act of 1989. The 1989 statute broadened the State's enforcement authority. In practice, the State is required to attempt good-faith negotiations with polluters to determine responsibilities for cleanup activities and costs. Taxes collected in a trust fund from natural resource extractions, and money obtained from cost recovery activities and penalty assessments are used to pay for State cleanup activities, including emergency response actions, removal and long-term cleanup actions and site investigations. In addition, the fund provides the 10 percent contribution from the State required by the Federal Superfund program. Currently, eight sites in the State of Montana have been listed as final on the NPL. No new sites have been proposed for listing in 1992.

The Montana Department of Health and Environmental Sciences implements the Superfund Program in the State of Montana

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



Facts about the eight NPL sites in Montana:

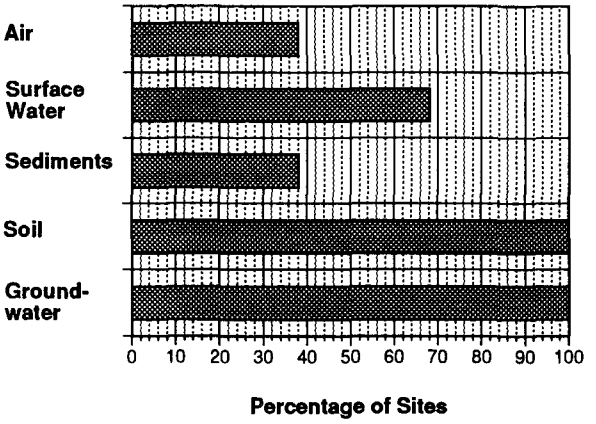
Immediate Actions (such as removing hazardous substances or restricting site access) were performed at all eight sites.

Two sites endanger sensitive environments.

Seven sites are located near residential areas.

Most Sites Have Multiple Contaminants and Contaminated Media:

Media Contaminated at Sites



Contaminants Found at Sites

	Percentage of Sites
Heavy Metals	88%
Dioxin	38%
Creosotes	38%
VOCs	25%
Furans	13%

The Potentially Responsible Party Pays...

In the State of Montana, 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 Montana Please Contact:

☎	EPA Region 8 Public Affairs Branch	For information concerning community involvement	(303) 294-1120
☎	National Response Center	To report a hazardous waste emergency	(800) 424-8802
☎	The Montana Department of Health and Environmental Sciences: Solid and Hazardous Waste Bureau, Superfund Section	For information about the State's responsibility in the Superfund Program	(406) 449-4067
☎	EPA Region 8 Hazardous Waste Management Division	For information about the Regional Superfund Program	(303) 294-7630
☎	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.

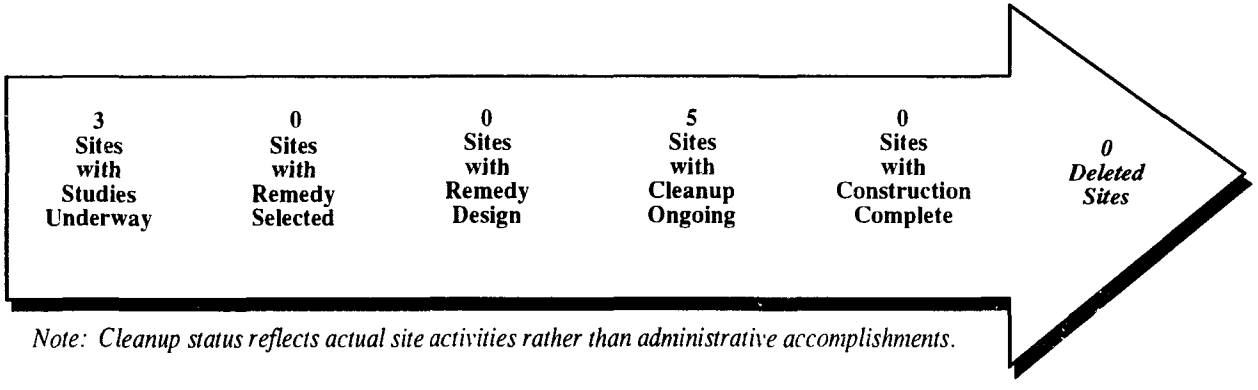
⇨ A final arrow in the "Construction Complete" category is used only when all phases of the site cleanup plan have been performed, and the EPA has determined that no additional construction actions are required at the site. Some sites in this category currently may be undergoing long-term operation and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

Site Name	County	NPL	Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete	Deleted
ANACONDA COMPANY SMELTER	DEER LODGE	Final	09/08/83	⇨	⇨	⇨	⇨	⇨		
EAST HELENA SITE	LEWIS & CLARK	Final	09/21/84	⇨	⇨	⇨	⇨	⇨		
IDAHO POLE COMPANY	GALLATIN	Final	06/10/86	⇨	⇨					
LIBBY GROUNDWATER CONTAMINATION	LINCOLN	Final	09/08/83	⇨	⇨	⇨	⇨	⇨		
MILLTOWN RESERVOIR SEDIMENTS	MISSOULA	Final	09/08/83	⇨	⇨	⇨	⇨	⇨		
MONTANA POLE AND TREATING	SILVER BOW	Final	07/22/87	⇨	⇨					
MOUAT INDUSTRIES	STILLWATER	Final	06/10/86	⇨	⇨					
SILVER BOW CREEK/BUTTE AREA	SILVER BOW	Final	09/08/83	⇨	⇨	⇨	⇨	⇨		

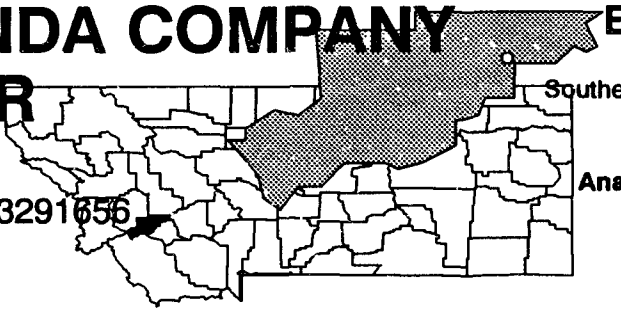


Note: Cleanup status reflects actual site activities rather than administrative accomplishments.

ANACONDA COMPANY SMELTER

MONTANA

EPA ID# MTD093291656



EPA REGION 8

Deer Lodge County
Southern end of Deer Lodge Valley

Other Names:
Anaconda Reduction Works
Washoe Works
Old Works
New Works

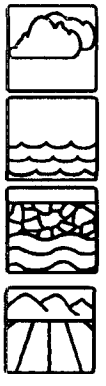
Site Description

The Anaconda Company Smelter site covers several thousand acres at the southern end of Deer Lodge Valley. From 1884 to 1980, the Anaconda Company extracted copper from ore. Wastes from smelting operations were distributed over a vast area by mechanical operations, slurry ditches, and the wind. The smelting processes produced wastes high in metals. The wastes include about 185 million cubic yards of concentrated mine tailings (ore wastes), about 27 million cubic yards of furnace slags, approximately 360,000 cubic yards of flue dust, and tens of square miles of contaminated soils. Investigations in 1984 found that Mill Creek, the closest community to the site, had the highest levels of contamination of any inhabited areas around the smelter. Mill Creek had a population of 100 people; it is now uninhabited and the houses have been demolished. Anaconda, with a population of 10,000 people, is 1/2 mile west of the smelter.

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

NPL LISTING HISTORY
Proposed Date: 12/23/82
Final Date: 09/08/83

Threats and Contaminants



Airborne contaminants include arsenic, cadmium, and lead from wind-blown contaminated soil and beryllium from waste disposal areas. Surface water, groundwater, and soil contain arsenic, cadmium, copper, zinc, and lead from the smelting operations. Environmental testing of the community and biological testing of pre-school children led the EPA to conclude that contamination in the Mill Creek area posed an imminent and substantial threat to the health of residents. The accidental ingestion of contaminated soil or groundwater could pose a health threat to the nearby population. Inhaling airborne contaminants also may increase health risks.

Cleanup Approach

The site is being addressed in twelve stages: an emergency action and eleven long-term remedial phases focusing on the cleanup of specific areas of contamination at the site.

Response Action Status

Emergency Action: Between 1986 and 1987, the EPA and the Federal Emergency Management Agency (FEMA) temporarily relocated residents of Mill Creek.

Site-Wide: The EPA prepared an umbrella order and general work plan that addresses all subsequent study activities on the Anaconda site. ARCO analyzed and identified suitable locations for a waste repository on the Anaconda property. The EPA, ARCO, and the State have developed computerized techniques for data handling and validation to speed analysis and cleanup. Air monitoring data are being collected to support ongoing and future investigations.

Mill Creek: The EPA selected a remedy for Mill Creek in 1987 featuring: permanently relocating all Mill Creek residents; stabilizing the area temporarily; storing relocation or demolition debris and disposing of it, along with contaminated soils from Mill Creek, in the final cleanup of Anaconda; regrading and replanting areas disturbed by relocation/demolition activities; monitoring and maintaining the vegetation and the fence installed around the area; and imposing short-term controls on access and land use. Mill Creek residents were permanently relocated by ARCO in 1988. All cleanup activities were completed in late 1988.

Old Works/East Anaconda Development Areas: In 1988, the EPA and ARCO began a study for an expedited cleanup action in the Old Works area that is of high risk to public health and the environment. The study addressed flood-plain wastes and Old Works waste piles. The Old Works study was completed in late 1991; cleanup actions began in 1992. These activities include constructing a stream-side protection system and site access restrictions. In addition, the EPA is currently conducting an intensive study of the Old Works subsite. The study is exploring the nature and extent of pollution at the Old Works area and once completed will recommend the best cleanup options. It is scheduled for completion in late 1993.

Smelter Hill: In 1988, the EPA and ARCO began an intensive study of the soil and groundwater contamination around Smelter Hill. Workers collected several thousand field samples in the course of investigating groundwater, soils, and area vegetation. The study, which also will recommend the best options for final cleanup at this subsite, is slated for completion in late 1994.

Beryllium Disposal Areas: The EPA and ARCO began a study for expedited cleanup actions in the beryllium disposal areas in late 1989. The accelerated study was completed in mid-1991 and cleanup actions began in 1992. The beryllium disposal wastes are being removed and disposed of in a federally-approved disposal facility. Cleanup actions are expected to be completed in late 1992.

Community Soils: The EPA and ARCO began an intensive study of neighborhoods adjacent to the Old Works area. The study was completed in mid-1991 and cleanup actions started later that year. Cleanup actions include removing contaminated soils from several neighborhood yards and adjacent undeveloped lots and replacing the contaminated soil with clean fill. Completion of the cleanup actions is expected in late 1992.

Flue Dust: When Mill Creek residents were temporarily relocated in 1986, ARCO covered the flue dust, the most concentrated contaminant on the site, and treated road dust to make it less mobile. In 1987, the EPA and ARCO began evaluating an innovative technique to reduce the mobility of the flue dust compounds now stored on the site. ARCO began an intensive study of flue dust contamination in 1989, which was completed in mid-1991. A remedy was selected in late 1991 to stabilize the flue dust and dispose of it in an engineered repository. Engineering designs began in early 1992, with cleanup actions scheduled to begin in mid-1993.

Arbiter Waste: The EPA and ARCO started a study for an expedited cleanup action in the Arbiter Plant disposal ponds in early 1990. The study was completed in mid-1991. Cleanup actions to remove the arbiter waste and dispose of it in a federally-approved repository began in 1992. Cleanup actions are expected to be completed in late 1992.

Regional Water and Waste: Groundwater monitoring began in early 1992 to provide data for future investigations. In early 1993, the EPA is scheduled to begin studying pollution of the regional groundwater, seeking to establish the nature and extent of the problem. The feasibility study to propose the best approaches for final cleanup is expected to begin by 1995.

Soils: In 1991, the EPA and ARCO began a screening study to explore the nature and extent of community and regional soil pollution. The feasibility study to select the best options for final cleanup is expected to begin by 1995.

Site Facts: In 1984, ARCO entered into an Administrative Order on Consent with the EPA to conduct investigations on 13 areas of the site. A second Administrative Order on Consent was entered into in 1986 between ARCO and the EPA for an expedited investigation of the Mill Creek area. In 1988, ARCO and the EPA negotiated a Consent Decree, under which ARCO would permanently relocate the residents of Mill Creek. In the same year, ARCO and the EPA also entered into an Administrative Order on Consent to conduct studies on the Flue Dust and Smelter Hill areas and to conduct expedited cleanup actions for the Old Works/East Anaconda Development Areas area. In 1990, ARCO and the EPA amended the 1988 Administrative Order to conduct an accelerated cleanup action on the Arbiter Plant and beryllium disposal areas.

Environmental Progress 

Permanently relocating of Mill Creek residents, limiting access to the site, covering flue dust, and imposing land use controls have reduced threats to public health from the Anaconda Company Smelter site. However, the EPA has determined that high concentrations of heavy metals in waste piles, tailings, and soils from the smelter operations continue to pose a threat. The EPA is currently conducting additional emergency actions to remove heavily contaminated soils and eliminate immediate threats while investigations leading to final cleanup activities are taking place.

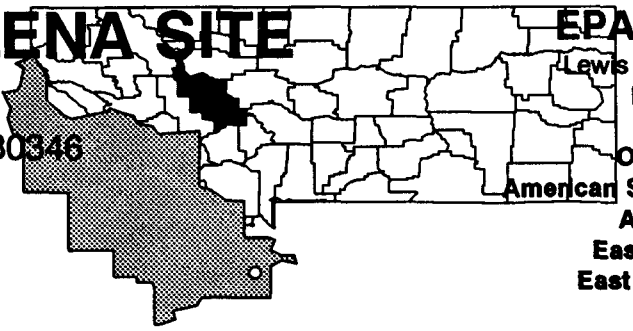
Site Repository 

Hearst Free Library, 401 Main Street, Anaconda, MT 59701

EAST HELENA SITE

MONTANA

EPA ID# MTD006230346



EPA REGION 8
Lewis and Clark County
East Helena

Other Names:
American Smelting and Refining
ASARCO Inc.
East Helena Plant
East Helena Smelter

Site Description

The East Helena Site is comprised of approximately 100 square miles of residential and rural agricultural land around the Town of East Helena. A lead smelter is still active on the site. For over 100 years, lead and zinc smelting operations have deposited contaminants into the Helena Valley. Public access to the smelter is restricted in the operating areas of the plant. Approximately 1,600 people live within 1 1/2 miles of the site. Most of the area residences are hooked up to the municipal water supply system; however, some residents still maintain private wells.

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

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

Threats and Contaminants

Air in the vicinity of the site, as well as the shallow groundwater, are contaminated with heavy metals, including arsenic, cadmium, and lead. Surface soils located in an 8 1/2-square-mile area around the smelter contain the same metals as the groundwater in addition to chromium, mercury, and copper. Area residents may be subject to exposure of site-related particulates that have become airborne. Contaminated shallow groundwater does not pose a threat because it is not used for domestic water supply, and there is no possibility of direct contact. Health advisories were issued in 1988 to area residents warning them against consuming some locally grown produce. Advisories also have been issued concerning Wilson Irrigation Ditch, a contaminated irrigation ditch that passes through a number of yards and play fields.

Cleanup Approach

The site is being addressed in four stages: initial actions and three long-term remedial phases focusing on source control, cleanup of soils, and the cleanup of remaining contaminated areas at the site.

Response Action Status

Initial Actions: An expedited cleanup action began in mid-1991 to remove contaminated soils from residential areas, parks, playgrounds, streets, and alleys. The potentially responsible party at the site, ASARCO, is performing this work and expects to complete these removal activities in 1995.

Source Control: In late 1989, the EPA selected the remedy to eliminate a source of contamination at the site. The process ponds are a source of inorganic contamination of soils, groundwater, and surface waters. The remedy includes isolating the process waters from the groundwater by constructing steel storage tanks, replacing leaking equipment, and doing other repairs. The soils and pond sediments, contaminated by decades of seepage, will be excavated and smelted. Contaminated pond process water will be treated by on-site coprecipitation technology. The remedy designs of these technologies were completed in early 1992. A potentially responsible party began cleanup activities shortly thereafter. Preliminary studies addressing soil and bioaccumulation of contaminants in locally raised livestock and crops were conducted by ASARCO in 1987 and 1989. As a result of the studies, the EPA has undertaken a separate cleanup action for the residential soils and Wilson Irrigation Ditch.

Soils: Based on the completed studies, ASARCO will perform the expedited soils cleanup action described in the initial actions for this site. In addition, ASARCO is conducting further studies to evaluate other soil contamination and define soils disposal options. This study, expected to be completed in 1994, will provide the basis for final EPA selection of soils cleanup.

Remaining Areas: The work plan submitted in 1990 for the remaining areas proposed that a comprehensive site-wide study for all contamination and effective cleanup methods be completed. ASARCO has completed soil, garden vegetable, grain, and fish sampling, which has confirmed contamination and led to the issuance of local health advisories. Regularly conducted groundwater sampling within the residential area has revealed arsenic contamination above drinking water standards in shallow wells. ASARCO has drilled additional groundwater wells to define the contamination. The study and remedy alternatives for this phase of site cleanup are expected to be completed in 1995.

Site Facts: In 1984, the EPA and ASARCO entered into an Administrative Order on Consent, under which the company performed a preliminary investigation into site contamination. A second Administrative Order on Consent was signed by the EPA, the State, and ASARCO in 1988 to conduct additional investigations. In 1991, a third Administrative Order on Consent was signed by EPA and ASARCO for the residential soils removal action.

Environmental Progress

Preliminary evaluations by the EPA determined that removal of contaminated residential soils and Wilson Irrigation Ditch sediments were necessary. This removal will eliminate the immediate sources of site soil contamination, while further soil cleanup and investigations leading to the selection of the final cleanup remedy for the groundwater and remaining areas of contamination are being completed.

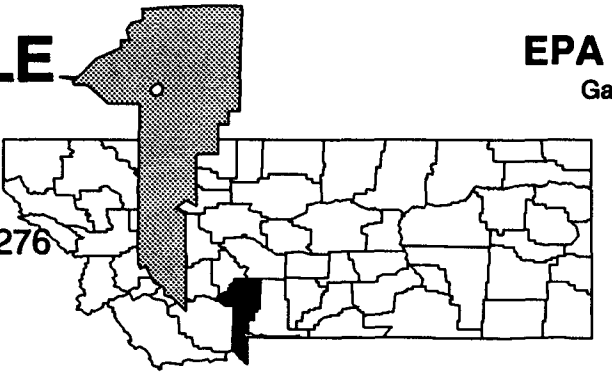
Site Repository

Not yet fully established; some records are located at East Helena City Hall, 7 East Main, East Helena, MT 59635.

IDAHO POLE COMPANY

MONTANA

EPA ID# MTD006232276



EPA REGION 8

Gallatin County
Bozeman

Site Description

The Idaho Pole Company began treating wood products with creosote in 1946 at this 50-acre site in Bozeman. In 1952, the company switched to pentachlorophenol (PCP) in the treating process. The facility has a history of contamination problems with surface water discharge. The current wood treating operation has no discharge; however, past spills and disposal practices have resulted in soil, groundwater, and surface water contamination with PCP and polycyclic aromatic hydrocarbons (PAHs). Groundwater in the area is shallow and flows north to northwest, discharging into Rocky Creek. The State found quantities of PCP in a tributary to Rocky Creek in 1978. Access to the site is restricted by a barbed-wire fence and warning signs. The facility is bordered on the north and west by residential and industrial areas. Agricultural and residential areas lie to the south and east. The nearest home is less than 1/2 mile from the site. About 1,250 people live within 3 miles of the site and use groundwater as a source of drinking water.

Site Responsibility: The site is being addressed through a combination of Federal, State, and potentially responsible parties' actions.

NPL LISTING HISTORY
Proposed Date: 10/15/84
Final Date: 06/10/86

Threats and Contaminants

Groundwater on site is contaminated with PCP, PAHs, and dioxins. Site soils contain volatile organic compounds (VOCs) such as benzene, toluene, and styrene. Surface water on the site contains PCP. Ditches and trenches on the site contained various forms of dioxins and organic compounds. Accidental ingestion or direct contact with contaminated groundwater, soil, and surface water are potential health risks. Surface water runoff from contaminated areas on the site could potentially harm Rocky Creek.

Cleanup Approach

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

Response Action Status

Immediate Actions: After its 1978 investigation, the State ordered Idaho Pole to eliminate discharges to Rocky Creek and to stop disposing of waste in areas where it was likely to pollute State waters. The company built an intercepter trench along a portion of the property line to halt some of the PCP migration through the groundwater. In 1983, the EPA and the State sampled the trench and found that PCP was moving away from the plant. Under orders from the State Water Quality Bureau, Idaho Pole installed and is sampling 15 monitoring wells at the site. Sludges produced in vats are drummed and transported to a licensed hazardous waste disposal site. The intercepter trench and absorbent pad system recover oily liquids from the groundwater prior to its leaving the site.

Entire Site: The State began an intensive study of soil and water pollution in mid-1990. This investigation into the nature and extent of contamination problems at the site was completed in late 1991. Proposals for site cleanup were opened to the public in early 1992. Public comment on cleanup alternatives now is being reviewed. Final selection of a cleanup remedy is expected in late 1992.

Site Facts: In 1978, the State issued a Compliance Order requiring Idaho Pole to take measures to eliminate discharges into Rocky Creek and to prevent the future disposal of waste in locations where it was likely to migrate into State waters.

Environmental Progress

The installation of the intercepter trench and absorbent pad system have successfully reduced the migration of wastes through the groundwater at the Idaho Pole Company site while the investigation leading to the final cleanup remedies was being completed.

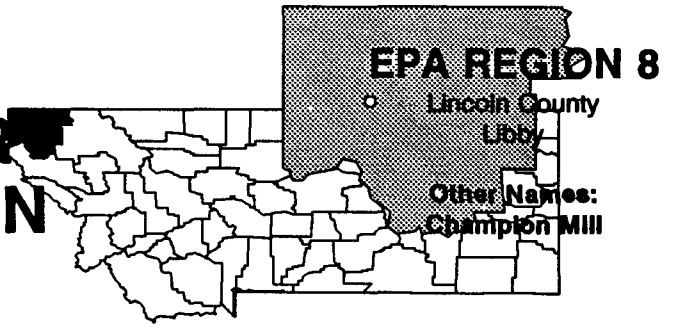
Site Repository

Bozeman Public Library, 220 East Larnme, Bozeman, MT 59715

LIBBY GROUNDWATER CONTAMINATION

MONTANA

EPA ID# MTD980502736



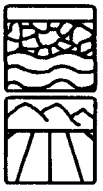
Site Description

The Libby Groundwater Contamination site is located on the grounds of the Champion International Corporation lumber and plywood mill in Libby. Between 1946 and 1969, wood treating fluids were disposed of and spilled at several different locations on the mill property. Wastewater and tank bottom sludges from the wood treating fluid tanks periodically were removed and hauled to waste pits. In 1979, shortly after private wells were installed, some area homeowners smelled a creosote odor in their water. The EPA sampled the groundwater and soil and found it to be contaminated. The contaminated soil is within the confines of the facility; however, groundwater contamination extends into the City of Libby. The City of Libby and the surrounding areas have a population of approximately 11,000. The site is bordered by Flower Creek, Libby Creek, and the Kootenai River.

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

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

Threats and Contaminants



Groundwater is contaminated with pentachlorophenol (PCP) and polycyclic aromatic hydrocarbons (PAHs), in addition to heavy metals. Soils are contaminated with PCP, PAHs, and, to a lesser extent, dioxins. Individuals who come in contact with or accidentally ingest the soil or water from private wells may be exposed to contamination. If the contaminant plume reaches the Kootenai River or Flower and Libby Creeks, the wildlife in the area may be harmed by the pollutants.

Cleanup Approach

The site is being addressed in three stages: an initial action and two long-term remedial phases focusing on cleanup of the groundwater, and cleanup of the soil, lower aquifer, and source control.

Response Action Status

Initial Action: In 1985, the Champion International Corporation began a water distribution plan under which residents with contaminated groundwater wells agreed to cease using their wells and to use water from the public water system operated by the City of Libby instead. The source of the public water supply is uncontaminated water from a reservoir upstream of Flower Creek. The Champion International Corporation continues to provide monetary compensation to the well owners to pay for the metered water. The company also sealed and locked the previously operating wells. The program will be terminated upon the elimination of the threat of contamination or if other alternatives become available.

Groundwater: In 1986, the EPA selected a remedy to reduce exposure to groundwater contamination by continuing and expanding the water distribution plan sponsored by the Champion International Corporation. The remedy also called for the enactment of an ordinance that prohibits the installation of new wells for drinking water or irrigation, but allows well installation for use in closed systems. The company completed all actions selected in the remedy in late 1986.

Soil, Lower Aquifer, and Source Control: In 1988, the EPA selected a remedy to clean up the soil and lower aquifer and to contain the source of the contamination by the following methods: excavating and consolidating 45,000 cubic yards of contaminated soil and debris in the waste pit area, treating it by an enhanced natural chemical breakdown process using microorganisms, and disposing of it in two lined treatment cells that will be capped; collecting highly contaminated groundwater in the upper aquifer system and treating it by bioremediation using microorganisms; treating the remaining contamination by adding oxygen and nutrients to the groundwater through injection wells; initiating pilot tests and studies to evaluate technologies that may be used to clean up the lower aquifer; and monitoring the site for five years to ensure the cleanup has been effective. The EPA has approved the technical specifications for design of the remedial action and the Champion International Corporation, under EPA monitoring, has completed construction of the land treatment units and the bioreactor facilities. All contaminated soil has been excavated, additional monitoring and injection wells are being installed, and treatment of soils and upper aquifer groundwater has begun. A pilot test to determine the feasibility of bioremediation treatment of the lower aquifer is complete. The company will complete additional hydrogeologic characterization of the lower aquifer and monitor the plume. The EPA and the Champion International Corporation will complete a second risk assessment of the lower aquifer and have agreed to complete a small-scale feasibility study to facilitate selection of a final remedy for the lower aquifer.

Site Facts: In 1983, the St. Regis Corporation and the EPA signed an Administrative Order on Consent for the company to study contamination at the site. The Champion International Corporation purchased the St. Regis Corporation in 1985 and has taken over its obligations to the Order. In 1989, the EPA and the Champion International Corporation signed a Consent Decree in which the company agreed to pay the U.S. Government past and future oversight costs and to complete implementation of the cleanup action.

Environmental Progress 

The provision of an alternate water supply and capping of the contaminated private wells have eliminated contaminated drinking water sources and the potential for exposure to hazardous substances at the Libby Groundwater Contamination site while excavation of contaminated soil and other cleanup actions are taking place.

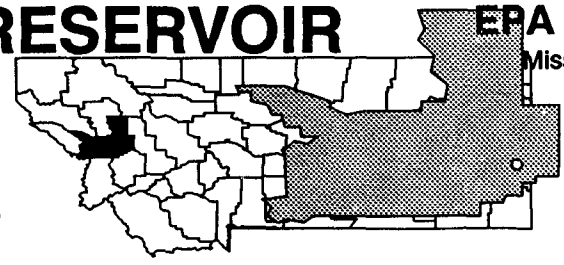
Site Repository 

Office of the County Sanitarian, Lincoln County Annex, 418 Mineral Avenue, Libby, MT 59923

MILLTOWN RESERVOIR SEDIMENTS

MONTANA

EPA ID# MTD980717565



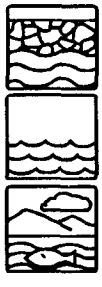
Site Description

The Milltown Reservoir Sediments site covers 800 acres in Milltown. In 1906, a hydroelectric dam was constructed, forming a reservoir that trapped sediments from mining, milling, and smelting operations in the Upper Clark Fork Valley. During the years since the construction, the reservoir storage has been almost filled with approximately 120 million cubic feet of sediments. In 1981, Milltown's four community water supply wells, serving 33 residences, were found to be contaminated with arsenic and other heavy metals. Residents were advised not to use this water for drinking or cooking and to use alternate supplies of water. Approximately 91 people live within 1/2 mile of the site. The nearest house is 100 meters away. The site is adjacent to the Milltown Dam, where the Big Blackfoot River joins the Clark Fork River. The rivers are used for recreational activities.

Site Responsibility: The site is being addressed through a combination of Federal, State, and potentially responsible parties' actions.

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

Threats and Contaminants



Groundwater and sediments are contaminated with metals, including arsenic and manganese. The Clark Fork River and Milltown Reservoir contain elevated levels of copper, arsenic, zinc, and cadmium. An alternate water supply has been provided, and contaminated wells have been taken out of service; therefore, residents have little chance of exposure to contaminants by drinking the water. People who swim or fish in the Clark Fork River arm of the reservoir may be exposed to pollutants. Fish kills have been reported downstream of the dam. Access to the site is unrestricted, and the potential exists for direct contact with contaminated areas.

Cleanup Approach

The site is being addressed in four stages: an initial action and three long-term remedial phases focusing on the water supply, reservoir sediment source control, and the cleanup of Clark Fork River.

Response Action Status

Initial Action: In 1983, volunteers using National Guard equipment supplied residences with door-to-door water service on a biweekly basis for three months.

Water supply: In 1984, the EPA selected a remedy to clean up the Milltown water supply by constructing a new well from a separate aquifer; constructing a new distribution system; flushing the plumbing system of each house to remove contaminants from the water system and plumbing; and testing the water quality to ensure standards have been met. In 1985, the EPA added a supplemental remedy, which included replacement of household water supply equipment that remained a source of contamination and continued sampling of individual residences to ensure the sources of contamination had been removed. The State completed the new water supply system and the installation of household water equipment in 1985.

Reservoir Sediment Source Control: The potentially responsible party, under EPA monitoring, is studying the extent of the sediment contamination at the site. The study is expected to be completed in 1996. A second investigation will be undertaken to ensure there is no threat to human health or the environment caused by contamination downstream from the reservoir. The EPA completed a study in 1989 which indicated that no environmental damage had been caused by the downstream contamination. The EPA also is conducting a separate risk assessment in consultation with an advisory committee, which includes representatives from the public and the potentially responsible parties.

Clark Fork River: An investigation into the nature and extent of contamination of the Clark Fork River, which is downstream from the reservoir, is scheduled to begin in 1993. This investigation will evaluate whether contaminated sediment from the reservoir has been transported by the river and if there are any other potential water quality problems.

Site Facts: The EPA and a potentially responsible party signed an Administrative Order on Consent, under which the party agreed to study the extent of site contamination.

Environmental Progress

The construction of new water supply wells and the replacement of household water supply equipment have provided a safe drinking water supply to affected residents, reducing the potential health threats from contaminated groundwater while investigations leading to cleanup of the sources of contamination continue at the Milltown Reservoir Sediments site.

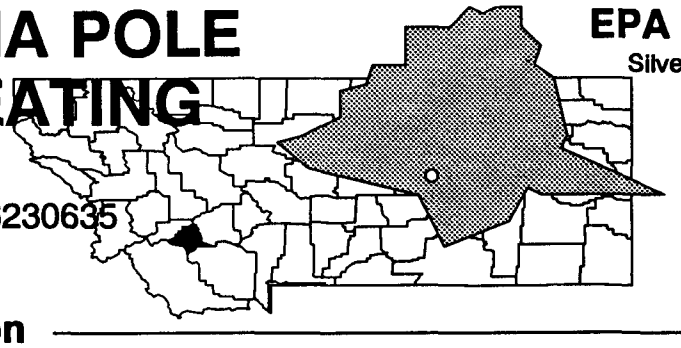
Site Repository

Missoula Public Library, 301 East Main, Missoula, MT 59802

MONTANA POLE AND TREATING

MONTANA

EPA ID# MTD006230635



EPA REGION 8

Silver Bow County
Butte

Site Description

The Montana Pole and Treating site is an abandoned 40-acre wood treatment facility in Butte. From 1946 to 1983, the facility preserved utility poles, posts, and bridge timbers with pentachlorophenol (PCP). Hazardous substances from the pole-treating operations were discharged into a ditch adjacent to the plant that ran towards Silver Bow Creek. On site are five pole barns containing approximately 10,000 cubic yards of contaminated soil. About 16,000 gallons of contaminated waste oil have been collected and are stored on site. Tanks, vats, pipes, and equipment were cut up and stored in the pole barns. There are forty 55-gallon drums of PCP-contaminated sludges on site. Montana Pole is in a residential/industrial area. The nearest residence is 100 yards from the site. The nearest private well is 1/5 mile downgradient from the site.

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

NPL LISTING HISTORY
Proposed Date: 06/10/86
Final Date: 07/22/87

Threats and Contaminants

The groundwater and soils are contaminated with PCPs, dioxins, furans, volatile organic compounds (VOCs), and metals. The sludge also is contaminated with PCPs, dioxins, and furans, and PCP has been detected in Silver Bow Creek. Accidental ingestion and direct contact with groundwater, surface water, soil, and sludge pose hazards to human health. Contaminants may enter the air naturally or during cleanup operations, presenting another potential source of exposure to contaminants.

Cleanup Approach

The site is being addressed in two stages: an immediate action and a long-term remedial phase focusing on the entire site.

Response Action Status

Immediate Action: The EPA completed a cleanup action in late 1988 to halt the seepage of PCP and diesel oil into Silver Bow Creek. Contaminated soils were excavated and stored on site. The site has been fenced, and monitoring wells and oil recovery trenches were installed. A temporary groundwater-soil separation treatment system was put into operation to separate PCP-contaminated oil from the groundwater. The treated water is pumped upgradient to infiltration galleries. The State is overseeing the continued interception of the waste oil. In early 1991, the EPA conducted a cleanup of oil-contaminated soil, following the release of 3,000 gallons of contaminated oil from a holding tank. Approximately 16,000 gallons of contaminated oil have been intercepted and are stored on site.

Entire Site: A potentially responsible party is conducting an investigation to determine the nature and extent of contamination at the site. The investigation is expected to be completed in early 1993, at which time the EPA will select a cleanup remedy.

Site Facts: In January 1990, Special Notice Letters were sent to three potentially responsible parties. A Consent Order to conduct an investigation of site contamination was negotiated with the Atlantic Richfield Company (ARCO).

Environmental Progress

The EPA has taken measures to prevent further contamination of Silver Bow Creek, and additional actions were taken to remove the immediate sources of soil contamination, to treat groundwater, and to restrict access to the site. These actions have greatly reduced the potential for exposure to hazardous substances while site investigations are conducted to determine permanent cleanup remedies for the Montana Pole and Treating facility.

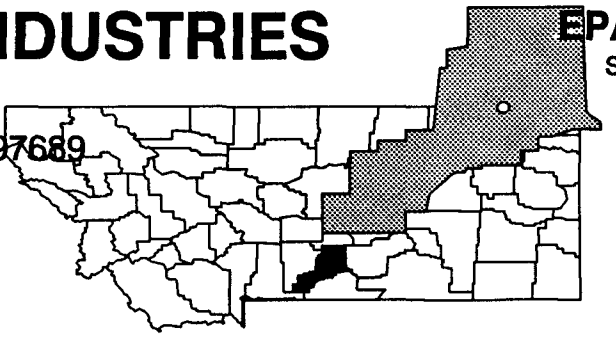
Site Repository

Butte-Silver Bow Library, 106 West Broadway, Butte, MT 59701

MOUAT INDUSTRIES

MONTANA

EPA ID# MTD021997689



EPA REGION 8

Stillwater County
Columbus

Site Description

Mouat Industries processed chromium ore into high-grade sodium dichromate in the late 1950s and early 1960s on this site in the City of Columbus. The process produced wastes containing hexavalent chromium and sodium dichromate. In 1973, the Anaconda Minerals Company removed a waste pile and treated the area to remove hexavalent chromium remaining in the soil. In early 1975, gravel was imported and placed on the site from a depth of 6 inches to 3 feet. By late 1976, yellow mineral deposits containing chromium were evident on top of the ground. Currently, the property is occupied by a company using resorcinol-phenol glues in the manufacturing of laminated wood products. Waste from washing the manufacturing equipment is run through two septic tanks. The remaining liquid is pumped to an outdoor waste storage pit and later spread on the adjacent land to the east of the on-site building. The site has been fenced to restrict access. The Yellowstone River and a public golf course are located south of the site. Migration of contaminants from the Mouat Industries site has contaminated ponds on the golf course. Approximately 300 people reside within the vicinity of the site. Private wells are in use within 1/4 mile of the site.

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

NPL LISTING HISTORY
Proposed Date: 10/15/84
Final Date: 06/10/86

Threats and Contaminants

The groundwater, surface waters, soil, and sediment are contaminated with chromium. Direct contact with and accidental ingestion of contaminated soil, groundwater, and sediments are potential health risks; however, private wells are not contaminated. Hay is grown and livestock is raised in the vicinity of the site. Bioaccumulation of contaminants in livestock and commercial agricultural products increases the potential health threat from this site.

Cleanup Approach

The site is being addressed in two stages: immediate actions and a single long-term remedial action focusing on the entire site.

Response Action Status

Immediate Actions: In 1990, the EPA erected a chain-link fence around a waste pile. At the request of the EPA, the City of Columbus redirected an existing drainage ditch that channeled runoff directly onto contaminated soils at the site. Monitoring wells that were drilled in the 1970s were capped. Removal and treatment of on-site contaminated soil is scheduled to begin in mid-1992.

Entire Site: The EPA plans to begin an investigation in 1993 to determine the nature and extent of contamination and to identify alternatives for cleanup. Completion of the investigation is expected in early 1995.

Environmental Progress

Early actions to restrict access to the site, including erecting a fence and diverting runoff, have reduced the potential for exposure to hazardous substances from the Mouat Industries site. The EPA is evaluating the site to determine if additional actions are warranted to protect public health and the environment while site investigations and cleanup activities are being planned.

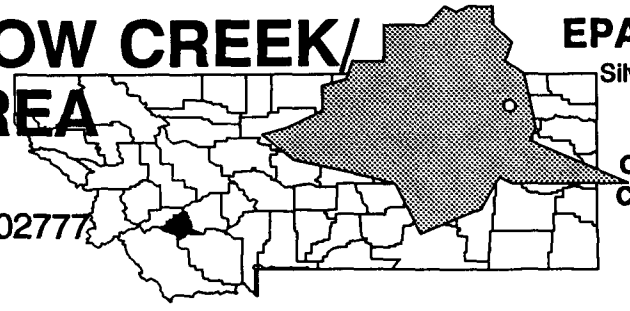
Site Repository

Not established.

SILVER BOW CREEK/ BUTTE AREA

MONTANA

EPA ID# MTD980502777



EPA REGION 8

Silver Bow County
Butte

Other Names:
Clark Fork Site
Butte Site

Site Description

The boundary of the Silver Bow Creek/Butte Area site begins above Butte, near the Continental Divide, and extends westward along Silver Bow Creek and the Clark Fork River to the Milltown Reservoir. The site covers about 140 miles of stream and riparian habitat. Silver Bow Creek and the Clark Fork River were used as a conduit for mining, smelting, industrial, and municipal wastes for over 100 years. Vast mine tailings deposits are found along the creek and river. These deposits have been dispersed over the entire flood plain and contain elevated levels of metals. The Silver Bow Creek/Butte Area site is one of four contamination areas, together known as the Clark-Fork Sites, that include the Milltown Reservoir, Anaconda Company Smelter, and Montana Pole & Treating, all sites on the NPL.

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

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

Threats and Contaminants

Wind-blown particles, groundwater, surface water and soil are contaminated with heavy metals including copper, iron, and lead. Silver Bow Creek and the Clark Fork River contain metals from Butte to Milltown. The tailings dispersed along the creek and river severely limit aquatic life forms and have caused fish kills in the river. Potential health threats include direct contact with and accidental ingestion of contaminated soil and groundwater and inhalation of contaminated air particles.

Cleanup Approach

The site is being addressed in eight stages: immediate actions and seven long-term remedial phases focusing on the West Camp/Travona Shaft Area; Warm Springs Ponds; Butte Priority Soils; Berkeley Pit; Rocker Timber Framing and Treating; Streamside Tailings; and Lower Area I and Butte soils.

Response Action Status

Immediate Actions: In Walkerville, the EPA and the potentially responsible parties excavated and stabilized approximately 300,000 cubic yards of lead-contaminated soil from mine waste dumps in 1988. Contaminated soil was removed from four earthen basements and 23 residential yards. Concrete basements were constructed, and 18 inches of clean fill and sod were placed in the residential yards. In Timber Butte, approximately 40,000 cubic yards of contaminated soil were moved to a temporary on-site repository in 1989. Contaminated soil was removed from two residential yards. Clean soil was placed on the excavated areas and revegetated. ARCO removed highly contaminated materials in the Rocker Timber Framing and Treating area, under State supervision. Arsenic wood treating wastes, contaminated soils, and wood chips were hauled to a licensed hazardous waste disposal facility. Equipment and debris were consolidated on the site and buried. Major areas of the site were covered with topsoil and seeded. In 1990, approximately 100,000 cubic yards of contaminated soil were removed from 24 waste dumps and seven residential yards in Butte and Walkerville. In 1991, an additional 11 waste dump areas were either removed or partially removed and capped in place. Elevated levels of arsenic and lead were detected in soils at the smelter site. In late 1991, under a Unilateral Order, the potentially responsible parties removed approximately 40,000 cubic yards of contaminated soil to a temporary on-site containment area. The containment area was capped and fenced.

West Camp/Travona Shaft Area: In 1989, under EPA supervision, the potentially responsible parties addressed rising mine waters in the West Camp/Travona Shaft area by constructing a pumping and piping system to the sewer line on Iron Street. Mine water has been pumped to the Metro Plant at a rate of approximately 200 gallons per minute since early 1990. Pumping continues on an intermittent basis as necessary to maintain the level below the control level.

Warm Springs Ponds: The three Warm Springs Ponds cover 2,400 acres at the confluence of Silver Bow, Mill, Willow, and Warm Springs creeks. The ponds were constructed by the Anaconda Company between 1911 and 1959 in an attempt to trap tailings before they entered the Clark Fork River, which begins immediately below the ponds. An investigation of the ponds was completed in 1989. Public comments were extensive and led to a decision to expedite certain cleanup plans in 1990 in a portion of the area, the Mill-Willow Bypass. The bypass contains approximately 200,000 cubic yards of tailings and contaminated soils that are a principal cause of fish kills. In 1990 and 1991, the tailings and contaminated soils were excavated and consolidated in Pond 3. The ponds contain 19 million cubic yards of tailings and contaminated soils. The selected remedy to clean up the three active Warm Spring Ponds includes removing the Mill-Willow Bypass tailings and placing them on top of tailings in the berms of Pond 3; reinforcing all ponds and upgrading their treatment capabilities; dewatering Pond 1 and covering it with a cap and vegetation; wet-closing Pond 2; and enlarging Pond 3 to handle a 100-year flood. Groundwater interception trenches are being installed to divert groundwater to Pond 3 for treatment. The potentially responsible parties designed the selected remedy in late 1991, and began cleanup activities in mid-1992.

Butte Priority Soils: The Butte area has been divided into 36 high priority soil areas that will be addressed in two phases. The first phase will address source areas (mine waste dumps, railroad beds, or other related mines wastes) in or adjacent to the 36 high priority soil areas and receptor areas (residential yards, gardens, parks, and playgrounds) in the 36 priority soil areas. Field work is expected to begin in 1992. Approximately 5 1/2 million cubic yards of contaminated mine waste will be removed or stabilized in place throughout the cleanup. The second phase will consist of an investigation that will assess the actions already taken, all other areas of contamination, storm runoff, and future land use problems in Butte and Walkerville.

Berkeley Pit: The EPA and the State are concerned about the rising water in the pit because contaminated mine water may eventually migrate into the shallow aquifer and Silver Bow Creek. The potentially responsible parties initiated an investigation in mid-1990, but the EPA assumed control in late 1991. The study is expected to be completed in mid-1994.

Rocker Timber Framing and Treating: ARCO is leading an investigation of contaminants in the Rocker Timber Framing and Treating area. Investigation activities began late in 1991. Completion of the study and selection of cleanup remedies are slated for late 1994.

Streamside Tailings: Late in 1991, ARCO, with State oversight, began investigations into the nature and extent of contamination of the streamside tailings area. The study is slated for completion in late 1994. Two large-scale demonstration projects will be conducted during 1992 and 1993.

Lower Area I and Butte Soils: The EPA is currently conducting an expedited cleanup action to remove tailings and 350,000 tons of manganese stockpiled on the site. The materials are being stored temporarily on another portion of the site. The investigations to determine remedy alternatives are ongoing and expected to be completed in 1994.

Site Facts: Several potentially responsible parties signed an Administrative Order on Consent to conduct a portion of the work for the Berkeley Pit flooding; the other parties were issued a Unilateral Order to perform the remaining tasks. The State issued a Unilateral Order, requiring ARCO to remove highly contaminated materials in the Rocker Timber Framing and Treating area. In 1989, the EPA issued an Administrative Order on Consent to the potentially responsible parties to either discharge the West Camp water to the Butte Metro Plant, meeting all pre-treatment requirements, or to construct a treatment facility, meeting classification discharges for toxic metals and drinking water standards for arsenic. In addition, in late 1991, the State of Montana and ARCO reached agreement on an Administrative Order on Consent for ARCO to conduct an investigation at the Streamside Tailings area of the site.

Environmental Progress

Numerous cleanup actions have been completed at the Silver Bow Creek/Butte Area site, including the excavation of contaminated soil in Walkerville, Timber Butte; the construction and implementation of a pumping and piping system in the West Camp/Travona Shaft area; and the removal of contaminated soil in the Rocker Timber Framing and Treating area. These actions have reduced the potential health threats to the surrounding communities; however, the EPA has determined that high concentrations of metal in soils and drainage from the smelter still pose risks.

Site Repository

Butte-Silver Bow Library, 106 West Broadway, Butte, MT 59701

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 off-site locations.

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

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

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

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

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

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

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

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

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

General Notice Letter: [See Notice Letter].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Mill Tailings: [See Mine Tailings].

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

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

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

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

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

Natural Attenuation: [See Attenuation].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

RCRA: [See Resource Conservation and Recovery Act].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Special Notice Letter: [See Notice Letter].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Water Table: The upper surface of the groundwater.

Weir: A barrier to divert water or other liquids.

Wetland: An area that is regularly saturated by surface or groundwater and, under normal circumstances, is capable of supporting vegetation typically adapted for life in saturated soil conditions. Wetlands are critical to sustaining many species of fish and wildlife. Wetlands generally include swamps, marshes, and bogs. Wetlands may be either coastal or inland. Coastal wetlands have salt or brackish (a mixture of salt and fresh) water, and most have tides, while inland wetlands are 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.:1993-341-835:81046