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NATIONAL PRIORITIES LIST SITES: Arizona and Nevada

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

If you wish to purchase copies of any additional State volumes or the National Overview volume, ***Superfund: Focusing on the Nation at Large***, contact:

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INTRODUCTION: A BRIEF OVERVIEW

WHY THE SUPERFUND PROGRAM?

As the 1970s came to a close, a series of headline stories gave Americans a look at the dangers of dumping industrial and urban wastes on the land. First there was New York 's Love Canal. Hazardous waste buried there over a 25-year period contaminated streams and soil, and endangered the health of nearby residents. The result: evacuation of several hundred people. Then the leaking barrels at the Valley of the Drums in Kentucky attracted public attention, as did the dioxin tainted land and water in Times Beach, Missouri.

In all these cases, human health and the environment were threatened, lives were disrupted, property values depreciated. It became increasingly clear that there were large numbers of serious hazardous waste problems that were falling through the cracks of existing environmental laws. The magnitude of these emerging problems moved Congress to enact the Comprehensive Environmental Response, Compensation, and Liability Act in 1980. CERCLA — commonly known as the Superfund — was the first Federal law established to deal with the dangers posed by the Nation's hazardous waste sites.

After Discovery, the Problem Intensified

Few realized the size of the problem until EPA began the process of site discovery and site evaluation. Not hundreds, but thousands of potential hazardous waste sites existed, and they presented the Nation with some of the most complex pollution problems it had ever faced.

In the 10 years since the Superfund program began, hazardous waste has surfaced as a major environmental concern in every part of the United States. It wasn't just the land that was contaminated by past disposal practices. Chemicals in the soil were spreading into the groundwater (a source of drinking water for many) and into streams, lakes, bays, and wetlands. Toxic vapors contaminated the air at some sites, while at others improperly disposed or stored wastes threatened the health of the surrounding community and the environment.

EPA Identified More than 1,200 Serious Sites

EPA has identified 1,236 hazardous waste sites as the most serious in the Nation. These sites comprise the "National Priorities List": sites targeted for cleanup under the Superfund. But site discoveries continue, and EPA estimates that, while some will be deleted after lengthy cleanups, this list, commonly called the NPL, will continue to grow by approximately 100 sites per year, reaching 2,100 sites by the year 2000.

THE NATIONAL CLEANUP EFFORT IS MUCH MORE THAN THE NPL

From the beginning of the program, Congress recognized that the Federal government could not and should not address all environmental problems stemming from past disposal practices. Therefore, the EPA was directed to set priorities and establish a list of sites to target. Sites on the NPL (1,236) are thus a rela-

tively small subset of a larger inventory of potential hazardous waste sites, but they do comprise the most complex and environmentally compelling cases. EPA has logged more than 32,000 sites on its National hazardous waste inventory, and assesses each site within one year of being logged. In fact, over 90 percent of the sites on the inventory have been assessed. Of the assessed sites, 55 percent have been found to require no further Federal action because they did not pose significant human health or environmental risks. The remaining sites are undergoing further assessment to determine if long-term Federal cleanup activities are appropriate.

EPA IS MAKING PROGRESS ON SITE CLEANUP

The goal of the Superfund program is to tackle immediate dangers first, and then move through the progressive steps necessary to eliminate any long-term risks to public health and the environment.

The Superfund responds immediately to sites posing imminent threats to human health and the environment at both NPL sites and sites not on the NPL. The purpose is to stabilize, prevent, or temper the effects of a hazardous release, or the threat of one. These might include tire fires or transportation accidents involving the spill of hazardous chemicals. Because they reduce the threat a site poses to human health and the environment, immediate cleanup actions are an integral part of the Superfund program.

Immediate response to imminent threats is one of the Superfund 's most noted achievements. Where imminent threats to the public or environment were evident, EPA has completed or monitored emergency actions that attacked the most serious threats to toxic exposure in more than 1,800 cases.

The ultimate goal for a hazardous waste site on the NPL is a permanent solution to an environmental problem that presents a serious (but not an imminent) threat to the public or environment. This often requires a long-term effort. In the last four years, EPA has aggressively accelerated its efforts to perform these long-term cleanups of NPL sites. More cleanups were started in 1987, when the Superfund law was amended, than in any previous year. And in 1989 more sites than ever reached the construction stage of the Superfund cleanup process. Indeed construction starts increased by over 200 percent between late 1986 and 1989! Of the sites currently on the NPL, more than 500 — nearly half — have had construction cleanup activity. In addition, over 500 more sites are presently in the investigation stage to determine the extent of site contamination, and to identify appropriate cleanup remedies. Many other sites with cleanup remedies selected are poised for the start of cleanup construction activity. Measuring success by "progress through the cleanup pipeline," EPA is clearly gaining momentum.

EPA MAKES SURE CLEANUP WORKS

EPA has gained enough experience in cleanup construction to understand that environmental protection does not end when the remedy is in place. Many complex technologies — like those designed to clean up groundwater — must operate for many years in order to accomplish their objectives.

EPA 's hazardous waste site managers are committed to proper operation and maintenance of every remedy constructed. No matter who has been delegated responsibility for monitoring the cleanup work, the EPA will assure that the remedy is carefully followed and that it continues to do its job.

Likewise, EPA does not abandon a site even after the cleanup work is done. Every

five years the Agency reviews each site where residues from hazardous waste cleanup still remain to ensure that public and environmental health are still being safeguarded. EPA will correct any deficiencies discovered and report to the public annually on all five-year reviews conducted that year.

CITIZENS HELP SHAPE DECISIONS

Superfund activities also depend upon local citizen participation. EPA's job is to analyze the hazards and deploy the experts, but the Agency needs citizen input as it makes choices for affected communities.

Because the people in a community with a Superfund site will be those most directly affected by hazardous waste problems and cleanup processes, EPA encourages citizens to get involved in cleanup decisions. Public involvement and comment does influence EPA cleanup plans by providing valuable information about site conditions, community concerns and preferences.

This State volume and the companion National Overview volume provide general Superfund background information and descriptions of activities at each State NPL site. These volumes are intended to clearly describe what the problems are, what EPA and others participating in site cleanups are doing, and how we as a Nation can move ahead in solving these serious problems.

USING THE STATE AND NATIONAL VOLUMES IN TANDEM

To understand the big picture on hazardous waste cleanup, citizens need to hear about both environmental progress across the country and the cleanup accomplishments closer to home. The public should understand the challenges involved in hazardous waste cleanup and the decisions we must make — as a Nation — in finding the best solutions.

The National Overview volume — ***Superfund: Focusing on the Nation at Large*** — accompanies this State volume. The National Overview contains important information to help you understand the magnitude and challenges facing the Superfund program as well as an overview of the National cleanup effort. The sections describe the nature of the hazardous waste problem nationwide, threats and contaminants at NPL sites and their potential effects on human health and the environment, the Superfund program's successes in cleaning up the Nation's serious hazardous waste sites, and the vital roles of the various participants in the cleanup process.

This State volume compiles site summary fact sheets on each State site being cleaned up under the Superfund program. These sites represent the most serious hazardous waste problems in the Nation, and require the most complicated and costly site solutions yet encountered. Each State book gives a "snapshot" of the conditions and cleanup progress that has been made at each NPL site in the State through the first half of 1990. Conditions change as our cleanup efforts continue, so these site summaries will be updated periodically to include new information on progress being made.

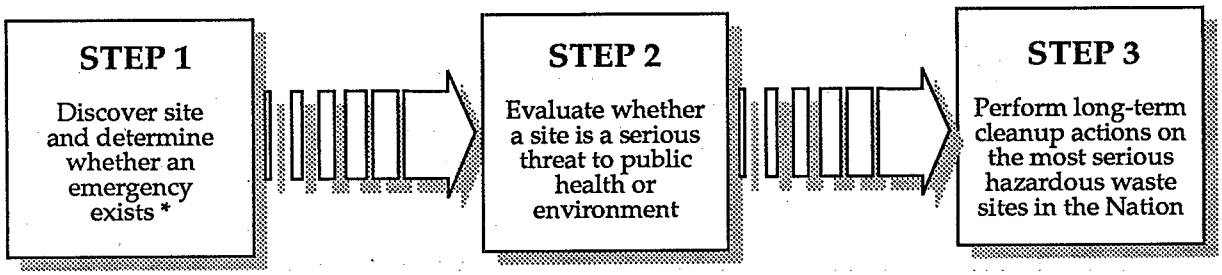
To help you understand the cleanup accomplishments made at these sites, this State volume includes a description of the process for site discovery, threat evaluation and long-term cleanup of Superfund sites. This description — ***How Does the Program Work to Clean Up Sites?*** — will serve as a good reference point from which to review the cleanup status at specific sites. A glossary also is included at the back of the book that defines key terms used in the site fact sheets as they apply to hazardous waste management.

SUPERFUND:

How Does the Program Work to Clean Up Sites?

The diverse problems posed by the Nation's hazardous waste sites have provided EPA with the challenge to establish a consistent approach for evaluating and cleaning up the Nation's most serious sites. To do this, EPA had to step beyond its traditional role as a regulatory agency to develop processes and guidelines for each step in these technically complex site cleanups. EPA has established procedures to coordinate the efforts of its Washington, D.C. Headquarters program offices and its front-line staff in 10 Regional Offices with the State governments, contractors, and private parties who are participating in site cleanup. An important part of the process is that any time during cleanup, work can be led by EPA or the State or, under their monitoring, by private parties who are potentially responsible for site contamination.

The process for discovery of the site, evaluation of threat, and long-term cleanup of Superfund sites is summarized in the following pages. The phases of each of these steps are highlighted within the description. The flow diagram below provides a summary of this three step process.



** Emergency actions are performed whenever needed in this three-step process*

FIGURE 1

Although this State book provides a current "snapshot" of site progress made only by emergency actions and long-term cleanup actions at Superfund sites, it is important to understand the discovery and evaluation process that leads up to identifying and cleaning up these most serious uncontrolled or abandoned hazardous waste sites in the Nation. This discovery and evaluation process is the starting point for this summary description.

How does EPA learn about potential hazardous waste sites?

STEP 1: SITE DISCOVERY AND EMERGENCY EVALUATION

Site discovery occurs in a number of ways. Information comes from concerned citizens — people may notice an odd taste or foul odor in their drinking water, or see half-buried leaking barrels; a hunter may come across a field where waste was dumped illegally. Or there may be an explosion or fire which alerts the State or local authorities to a problem. Routine investigations by State and local governments, and required reporting and inspection of facilities that generate, treat, store, or dispose of hazardous waste also help keep EPA informed about either actual or potential threats of hazardous substance releases. All reported sites or spills are recorded in the Superfund inventory (CERCLIS) for further investigation to determine whether they will require cleanup.

What happens if there is an imminent danger?

As soon as a potential hazardous waste site is reported, EPA determines whether there is an emergency requiring an immediate cleanup action. If there is, they act as quickly as possible to remove or stabilize the imminent threat. These short-term **emergency actions** range from building a fence around the contaminated area to keep people away or temporarily relocating residents until the danger is addressed, to providing bottled water to residents while their local drinking water supply is being cleaned up, or physically removing wastes for safe disposal.

However, emergency actions can happen at any time an imminent threat or emergency warrants them — for example, if leaking barrels are found when cleanup crews start digging in the ground or if samples of contaminated soils or air show that there may be a threat of fire or explosion, an immediate action is taken.

If there isn't an imminent danger, how does EPA determine what, if any, cleanup actions should be taken?

STEP 2: SITE THREAT EVALUATION

Even after any imminent dangers are taken care of, in most cases contamination may remain at the site. For example, residents may have been supplied with bottled water to take care of their immediate problem of contaminated well water. But now it's time to figure out what is contaminating the drinking water supply and the best way to clean it up. Or

EPA may determine that there is no imminent danger from a site, so now any long-term threats need to be evaluated. In either case, a more comprehensive investigation is needed to determine if a site poses a serious but not imminent danger, and requires a long-term cleanup action.

Once a site is discovered and any needed emergency actions are taken, EPA or the State collects all available background information not only from their own files, but also from local records and U.S. Geological Survey maps. This information is used to identify the site and to perform a **preliminary assessment** of its potential hazards. This is a quick review of readily available information to answer the questions:

- Are hazardous substances likely to be present?
- How are they contained?
- How might contaminants spread?
- How close is the nearest well, home, or natural resource area like a wetland or animal sanctuary?
- What may be harmed — the land, water, air, people, plants, or animals?

Some sites do not require further action because the preliminary assessment shows that they don't threaten public health or the environment. But even in these cases, the sites remain listed in the Superfund inventory for record keeping purposes and future reference. Currently, there are more than 32,000 sites maintained in this inventory.

If the preliminary assessment shows that a serious threat *may* exist, what's the next step?

Inspectors go to the site to collect additional information to evaluate its hazard potential. During this **site inspection**, they look for evidence of hazardous waste, such as leaking drums and dead or discolored vegetation. They may take some samples of soil, well water, river water, and air. Inspectors analyze the ways hazardous materials could be polluting the environment — such as runoff into nearby streams. They also check to see if people (especially children) have access to the site.

How does EPA use the results of the site inspection?

Information collected during the site inspection is used to identify the sites posing the most serious threats to human health and the environment. This way EPA can meet the

requirement that Congress gave them to use Superfund monies only on the worst hazardous waste sites in the Nation.

To identify the most serious sites, EPA developed the Hazard Ranking System (HRS). The HRS is the scoring system EPA uses to assess the relative threat from a release or a potential release of hazardous substances from a site to surrounding groundwater, surface water, air, and soil. A site score is based on the likelihood a hazardous substance will be released from the site, the toxicity and amount of hazardous substances at the site, and the people and sensitive environments potentially affected by contamination at the site.

Only sites with high enough health and environmental risk scores are proposed to be added to EPA's **National Priorities List (NPL)**. That's why there are 1,236 sites are on the NPL, but there are more than 32,000 sites in the Superfund inventory. Only NPL sites can have a long-term cleanup paid for from the national hazardous waste trust fund — the Superfund. But the Superfund can and does pay for emergency actions performed at any site, whether *or not it's on the NPL.*

How do people find out whether EPA considers a site a national priority for cleanup using Superfund money?

The public can find out whether a site that concerns them is on the NPL by calling their Regional EPA office at the number listed in this book.

The proposed NPL identifies sites that have been evaluated through the scoring process as the most serious problems among uncontrolled or abandoned hazardous waste sites in the U.S. In addition, a site will be added to the NPL if the Agency for Toxic Substances and Disease Registry issues a health advisory recommending that people be moved away from the site. Updated at least once a year, it's only after public comments are considered that these proposed worst sites are officially added to the NPL.

Listing on the NPL does not set the order in which sites will be cleaned up. The order is influenced by the relative priority of the site's health and environmental threats compared to other sites, and such factors as State priorities, engineering capabilities, and available technologies. Many States also have their own list of sites that require cleanup; these often contain sites not on the NPL that are scheduled to be cleaned up with State money. And it should be said again that any emergency action needed at a site can be performed by the Superfund whether or not a site is on the NPL.

STEP 3: LONG-TERM CLEANUP ACTIONS

After a site is added to the NPL, what are the steps to cleanup?

The ultimate goal for a hazardous waste site on the NPL is a permanent, long-term cleanup. Since every site presents a unique set of challenges, there is no single all-purpose solution. So a five-phase "remedial response" process is used to develop consistent and workable solutions to hazardous waste problems across the Nation:

1. Investigate in detail the extent of the site contamination: **remedial investigation,**
2. Study the range of possible cleanup remedies: **feasibility study,**
3. Decide which remedy to use: **Record of Decision or ROD,**
4. Plan the remedy: **remedial design,** and
5. Carry out the remedy: **remedial action.**

This remedial response process is a long-term effort to provide a permanent solution to an environmental problem that presents a serious, but not an imminent threat to the public or environment.

The first two phases of a long-term cleanup are a combined **remedial investigation and feasibility study** (RI/FS) that determine the nature and extent of contamination at the site, and identify and evaluate cleanup alternatives. These studies may be conducted by EPA or the State or, under their monitoring, by private parties.

Like the initial site inspection described earlier, a remedial investigation involves an examination of site data in order to better define the problem. But the remedial investigation is much more detailed and comprehensive than the initial site inspection.

A remedial investigation can best be described as a carefully designed field study. It includes extensive sampling and laboratory analyses to generate more precise data on the types and quantities of wastes present at the site, the type of soil and water drainage patterns, and specific human health and environmental risks. The result is information that allows EPA to select the cleanup strategy that is best suited to a particular site or to determine that no cleanup is needed.

Placing a site on the NPL does not necessarily mean that cleanup is needed. It is possible for a site to receive an HRS score high enough to be added to the NPL, but not ultimately require cleanup actions. Keep in mind that the purpose of the scoring process is to provide a preliminary and conservative assessment of *potential* risk. During subsequent site investigations, the EPA may find either that there is no real threat or that the site does not pose significant human health or environmental risks.

How are cleanup alternatives identified and evaluated?

EPA or the State or, under their monitoring, private parties identify and analyze specific site cleanup needs based on the extensive information collected during the remedial investigation. This analysis of cleanup alternatives is called a **feasibility study.**

Since cleanup actions must be tailored exactly to the needs of each individual site, more than one possible cleanup alternative is always considered. After making sure that all potential cleanup remedies fully protect human health and the environment and comply with Federal and State laws, the advantages and disadvantages of each cleanup alternative are carefully compared. These comparisons are made to determine their effectiveness in the short- and long-term, their use of permanent treatment solutions, and their technical feasibility and cost.

To the maximum extent practicable, the remedy must be a permanent solution and use treatment technologies to destroy principal site contaminants. But remedies such as containing the waste on site or removing the source of the problem (like leaking barrels) are often considered effective. Often special pilot studies are conducted to determine the effectiveness and feasibility of using a particular technology to clean up a site. Therefore, the combined remedial investigation and feasibility study can take between 10 and 30 months to complete, depending on the size and complexity of the problem.

Does the public have a say in the final cleanup decision?

Yes. The Superfund law requires that the public be given the opportunity to comment on the proposed cleanup plan. Their concerns are carefully considered before a final decision is made.

The results of the remedial investigation and feasibility study, which also point out the recommended cleanup choice, are published in a report for public review and comment. EPA or the State encourages the public to review the information and take an active role in the final cleanup decision. Fact sheets and announcements in local papers let the community know where they can get copies of the study and other reference documents concerning the site.

The public has a minimum of 30 days to comment on the proposed cleanup plan after it is published. These comments can either be written or given verbally at public meetings that EPA or the State are required to hold. Neither EPA nor the State can select the final cleanup remedy without evaluating and providing written answers to specific community comments and concerns. This "responsiveness summary" is part of EPA's write-up of the final remedy decision, called the Record of Decision or ROD.

The ROD is a public document that explains the cleanup remedy chosen and the reason it was selected. Since sites frequently are large and must be cleaned up in stages, a ROD may be necessary for each contaminated resource or area of the site. This may be necessary when contaminants have spread into the soil, water and air, and affect such sensitive areas as wetlands, or when the site is large and cleaned up in stages. This often means that a number of remedies using different cleanup technologies are needed to clean up a single site.

If every cleanup action needs to be tailored to a site, does the design of the remedy need to be tailored too?

Yes. Before a specific cleanup action is carried out, it must be designed in detail to meet specific site needs. This stage of the cleanup is called the **remedial design**. The design phase provides the details on how the selected remedy will be engineered and constructed.

Projects to clean up a hazardous waste site may appear to be like any other major construction project but, in fact, the likely presence of combinations of dangerous chemicals demands special construction planning and procedures. Therefore, the design of the remedy can take anywhere from 6 months to 2 years to complete. This blueprint for site cleanup includes not only the details on every aspect of the construction work, but a description of the types of hazardous wastes expected at the

site, special plans for environmental protection, worker safety, regulatory compliance, and equipment decontamination.

Once the design is complete, how long does it take to actually clean up the site and how much does it cost?

The time and cost for performing the site cleanup — called the **remedial action** — are as varied as the remedies themselves. In a few cases, the only action needed may be to remove drums of hazardous waste and decontaminate them — an action that takes limited time and money. In most cases, however, a remedial action may involve different and expensive measures that can take a long time.

For example, cleaning polluted groundwater or dredging contaminated river bottoms can take several years of complex engineering work before contamination is reduced to safe levels. Sometimes the selected cleanup remedy described in the ROD may need to be modified because of new contaminant information discovered or difficulties that were faced during the early cleanup activities. Taking into account these differences, a remedial cleanup action takes an average of 18 months to complete and costs an average of $26 million per site.

Once the cleanup action is complete, is the site automatically "deleted" from the NPL?

No. The deletion of a site from the NPL is anything but automatic. For example, cleanup of contaminated groundwater may take up to 20 years or longer. Also, in some cases the **long-term monitoring** of the remedy is required to ensure that it is effective. After construction of certain remedies, operation and maintenance (e.g., maintenance of ground cover, groundwater monitoring, etc.) or continued pumping and treating of groundwater, may be required to ensure that the remedy continues to prevent future health hazards or environmental damage, and ultimately meets the cleanup goals specified in the ROD. Sites in this final monitoring or operational stage of the cleanup process are designated as "construction completed".

It's not until a site cleanup meets all the goals and monitoring requirements of the selected remedy that EPA can officially propose the site for "**deletion**" from the NPL. And it's not until public comments are taken into consideration that a site can actually be deleted from the NPL. Deletions that have occurred are included in the "Construction Complete" category in the progress report found later in this book.

Can EPA make parties responsible for the contamination pay?

Yes. Based on the belief that "the polluters should pay," after a site is placed on the NPL, the EPA makes a thorough effort to identify and find those responsible for causing contamination problems at a site. Although EPA is willing to negotiate with these private parties and encourages voluntary cleanup, it has the authority under the Superfund law to legally force those potentially responsible for site hazards to take specific cleanup actions. All work performed by these parties is closely guided and monitored by EPA, and must meet the same standards required for actions financed through the Superfund.

Because these enforcement actions can be lengthy, EPA may decide to use Superfund monies to make sure a site is cleaned up without unnecessary delay. For example, if a site presents an imminent threat to public health and the environment, or if conditions at a site may worsen, it could be necessary to start the cleanup right away. Those responsible for causing site contamination are liable under the law for repaying the money EPA spends in cleaning up the site.

Whenever possible, EPA and the Department of Justice use their legal enforcement authorities to require responsible parties to pay for site cleanups, thereby preserving the Superfund for emergency actions and sites where no responsible parties can be identified.

HOW TO:

USING THE STATE VOLUME

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 National Priorities List (NPL) and their locations, as well as the conditions leading to their listing ("Site Description"). They 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 on 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 following two pages show a generic fact sheet and briefly describes the information under each section. The square "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.

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.)

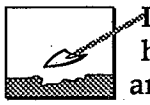
Contaminated **Surface Water and Sediments** on or near the site. (These include lakes, ponds, streams, and rivers.)

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

Contaminated **Soil and Sludges** on or near the site.

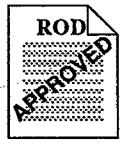
Threatened or contaminated **Environmentally Sensitive Areas** in the vicinity of the site. (Examples include wetlands and coastal areas, critical habitats.)

Icons in the *Response Action Status* Section

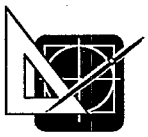


Initial Actions have been taken or are underway to eliminate immediate threats at the site.

Site Studies at the site are planned or underway.



Remedy Selected indicates that site investigations have been concluded and 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 — are currently underway.

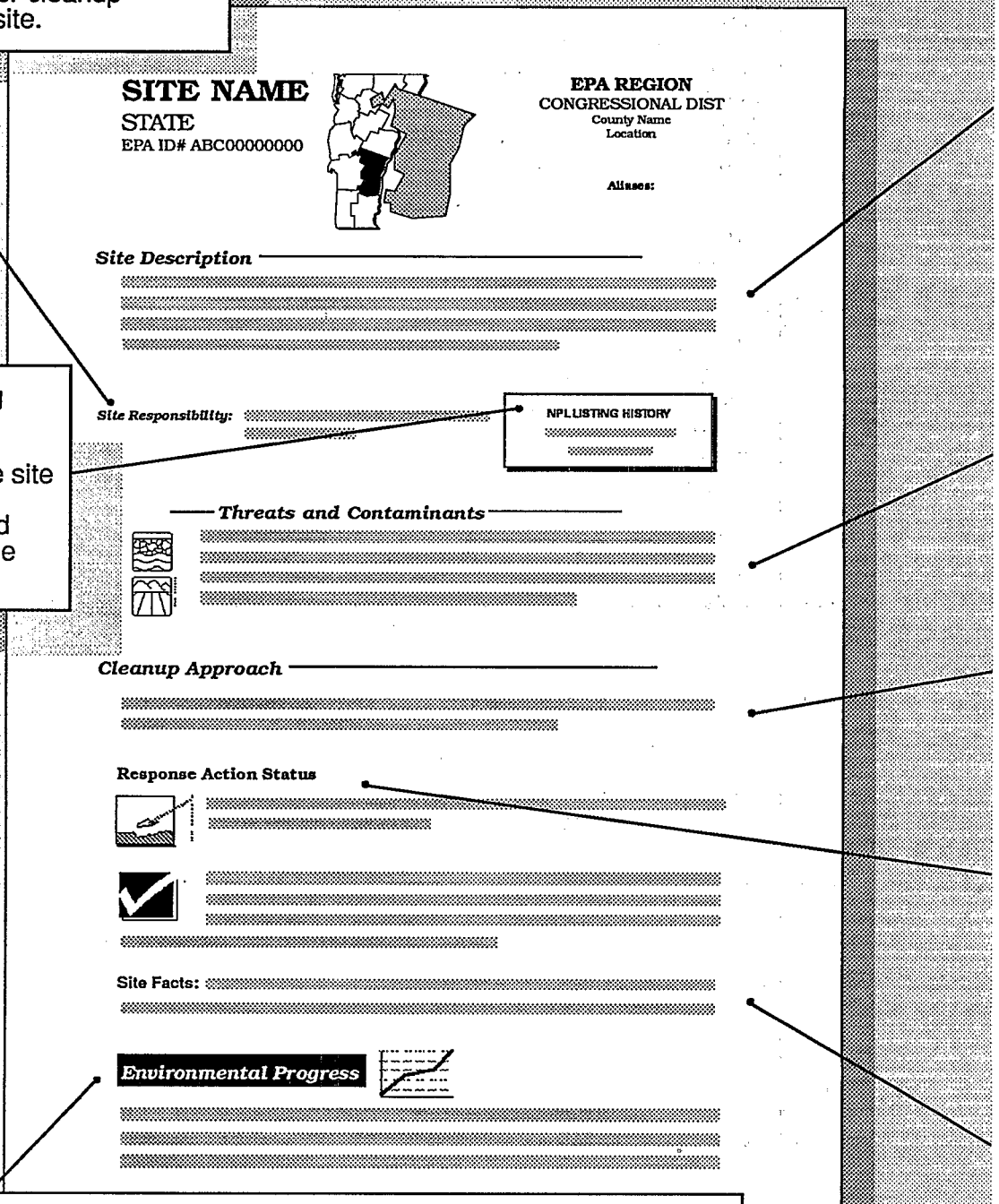
Cleanup Complete shows that all cleanup goals have been achieved for the contaminated site or part of the site.

Site Responsibility

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

NPL Listing History

Dates when the site was Proposed, made Final, and Deleted from the NPL



Environmental Progress

A summary of the actions to reduce the threats to nearby residents and the surrounding environment; progress towards cleaning up the site and goals of the cleanup plan are given here.

WHAT THE FACT SHEETS CONTAIN

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. Throughout the site description and other sections of the site summary, technical or unfamiliar terms that are *italicized* are presented in the glossary at the end of the book. Please refer to the glossary for more detailed explanation or definition of the terms.

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 are also described. Specific contaminants and contaminant groupings are italicized and explained in more detail in the glossary.

Cleanup Approach

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

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 are often 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.

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 EPA to achieve site cleanup or other facts pertaining to community involvement with the site cleanup process are reported here.

How To

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 is always being made at NPL sites, and EPA will periodically update the Site Fact Sheets to reflect recent actions and publish updated State volumes.

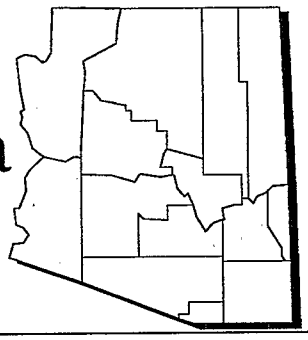
HOW CAN *YOU* USE THIS STATE BOOK?

You can use this book to keep informed about the sites that concern you, particularly ones close to home. EPA is committed to involving the public in the decisionmaking 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 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 to know what the community can realistically expect once the cleanup is complete.

EPA wants to develop cleanup methods that meet community needs, but the Agency can only 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.

NPL Sites in State of Arizona



The State of Arizona is located in the southwestern United States, bordered by California and Nevada to the west, Mexico to the south and sharing a common border with Utah, Colorado and New Mexico to the northeast. Arizona covers 114,000 square miles consisting of the Colorado plateau, including the Grand Canyon, the Mexican Highlands, and the Sonoran Desert. The State experienced a 28.4 percent increase in population during the 1980s and currently has approximately 3,489,000 residents, ranking 25th in U.S. populations. Principal State industries include manufacturing, tourism, mining and agriculture. Arizona manufactures electronics, printing and publishing, foods, primary and fabricated metals, aircraft and missiles, and apparel.

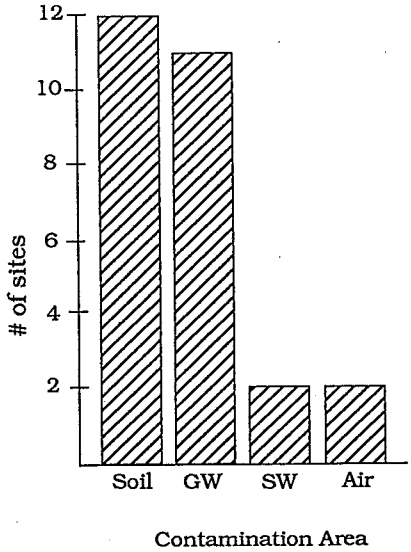
How Many Arizona Sites Are on the NPL?

Proposed	6
Final	8
Deleted	1
	12

Where Are the NPL Sites Located?

Cong. District 01	3 sites
Cong. District 02	4 sites
Cong. District 03	3 sites
Cong. District 04	2 sites

How are Sites Contaminated and What are the Principal* Chemicals ?



Soil, Solid and Liquid Wastes: Volatile organic compounds (VOCs) and heavy metals (inorganics).

Groundwater: Volatile organic compounds (VOCs), and heavy metals (inorganics).

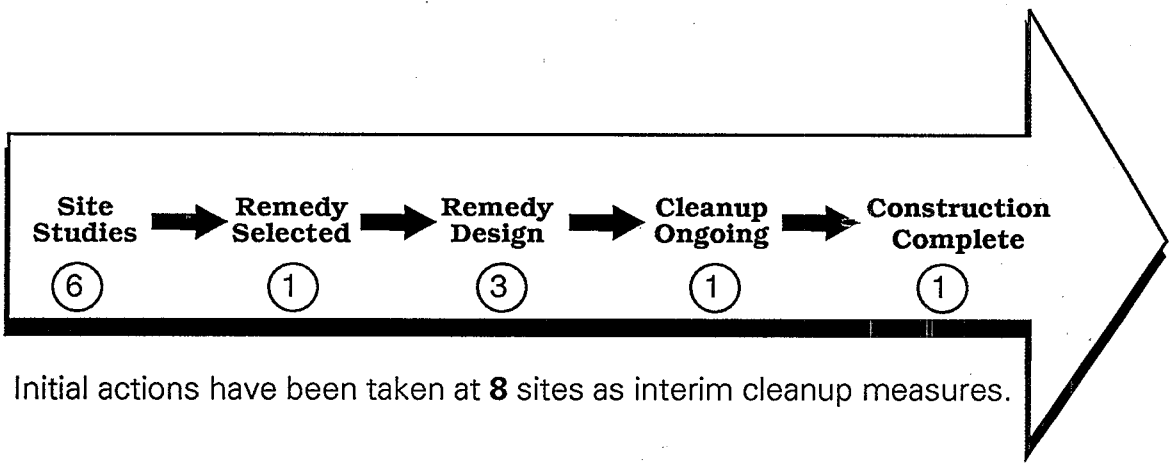
Surface Water: Heavy metals (inorganics), volatile organic compounds (VOCs), and radiation.

Air: Volatile organic compounds (VOCs), and asbestos.

*Appear at 25% or more sites

continued

Where are the Sites in the Superfund Cleanup Process*?



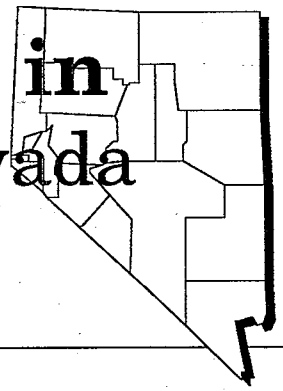
Who Do I Call with Questions?

The following pages describe each NPL site in Arizona, providing specific information on threats and contaminants, cleanup activities, and environmental progress. Should you have questions, please call one of the offices listed below:

Arizona Superfund Office	(602) 257-2215
EPA Region IX Superfund Office	(415) 744-1519
EPA Public Information Office	(202) 477-7751
EPA Superfund Hotline	(800) 424-9346
EPA Region IX Superfund Public Relations Office	(415) 744-1764

*Cleanup status reflects phase of site activities rather than administrative accomplishments.

NPL Sites in State of Nevada



The State of Nevada is bordered on the north by Oregon and Idaho, Utah and Arizona to the east, and California on the west and southwest. The State covers 110,561 square miles consisting mostly of the Mojave Desert in the southwest and the Rocky Mountains in the northeast. Nevada experienced a 31.7 percent increase in population during the 1980s and currently has approximately 1,054,000 residents, ranking 41st in U.S. populations. Principal State industries include gaming, tourism, mining, manufacturing, government, agriculture, warehousing and trucking. Nevada manufactured goods include gaming devices, electronics, chemicals, and stone-clay-glass products.

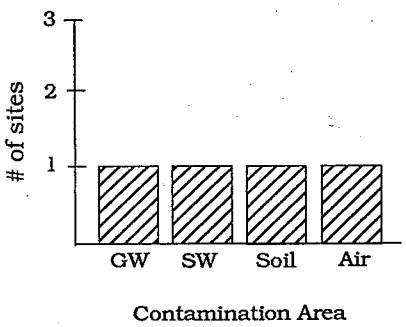
How Many Nevada Sites Are on the NPL?

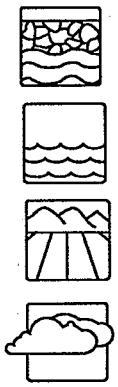
Proposed	1
Final	0
Deleted	0
	1

Where Are the NPL Sites Located?

Cong. District 01	1 site

How are Sites Contaminated and What are the Principal* Chemicals ?





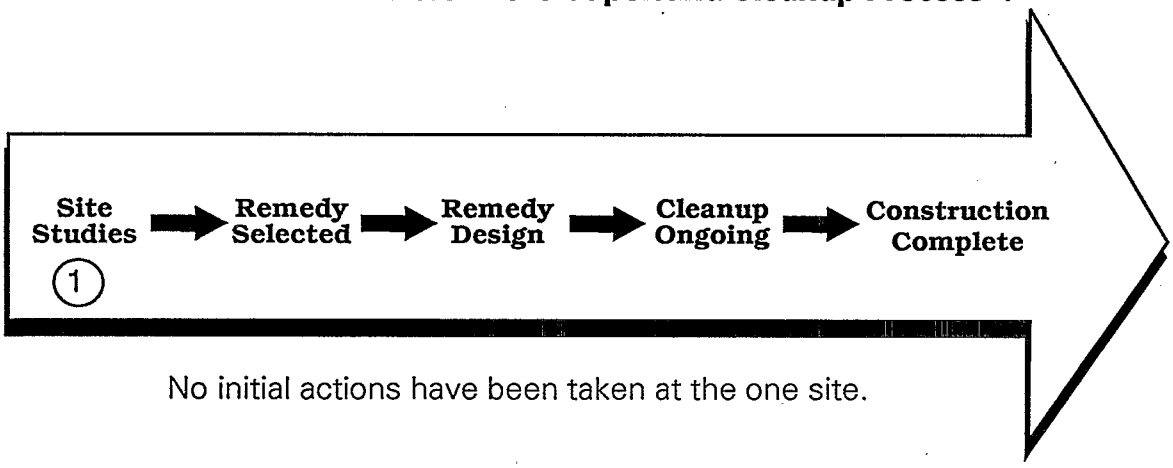
Groundwater: Heavy metals (mercury and inorganics).

Surface Water: Heavy metals (mercury and inorganics).

Soil: Heavy metals (mercury and inorganics).

Air: Heavy metals (mercury and inorganics).

Where are the Sites in the Superfund Cleanup Process*?



No initial actions have been taken at the one site.

Who Do I Call with Questions?

The following pages describe each NPL site in Nevada, providing specific information on threats and contaminants, cleanup activities, and environmental progress. Should you have questions, please call one of the offices listed below:

Nevada Superfund Office	(702) 885-4670
EPA Region IX Superfund Office	(415) 744-1519
EPA Public Information Office	(202) 477-7751
EPA Superfund Hotline	(800) 424-9346
EPA Region IX Superfund Public Relations Office	(415) 744-1764

*Cleanup status reflects phase of site activities rather than administrative accomplishments.

The NPL Progress Report

The following Progress Report lists the State 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 (➡) which indicates the current stage of cleanup at the site.

Large and complex sites are often 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 or initial action has been completed or is currently underway. Emergency or initial actions are taken as an interim measure to provide immediete relief from exposure to hazardous site conditions or to stabilize a site to prevent further contamination.
- ➡ An arrow in the "Site Studies" category indicates that an investigation to determine the nature and extent of the contamination at the site is currently ongoing or planned to begin in 1991.
- ➡ An 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 is selected. In these cases, the arrows in the Progress Report are discontinued at the "Remedy Selection" step and resume in the final "Construction Complete" category.
- ➡ An arrow at the "Remedial Design" stage indicates that engineers are currently designing the technical specifications for the selected cleanup remedies and technologies.
- ➡ An arrow marking the "Cleanup Ongoing" category means that final cleanup actions have been started at the site and are currently underway.
- ➡ A 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 may currently be undergoing long-term pumping and treating of groundwater, operation and maintenance or monitoring to ensure that the completed cleanup actions continue to protect human health and the environment.

The sites are listed in alphabetical order. 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 Arizona

Page	Site Name	County	NPL	Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete
1	APACHE POWDER COMPANY	COCHISE	Prop	06/10/86	➡	➡				
3	HASSAYAMPA LANDFILL	MARICOPA	Final	07/22/87		➡				
5	INDIAN BEND WASH AREA	MARICOPA	Final	09/01/83		➡	➡	➡		
7	LITCHFIELD AIRPORT AREA	MARICOPA	Final	09/01/83		➡	➡	➡	➡	
9	LUKE AIR FORCE BASE	MARICOPA	Prop	07/14/89	➡	➡				
11	MESA AREA GROUND WATER CONTAM.	MARICOPA	Prop	06/10/86	➡	➡				
13	MOTOROLA INC (52ND STREET PLANT)	MARICOPA	Final	10/04/89	➡	➡	➡	➡		
15	MOUNTAIN VIEW MOBILE HOMES	GILA	Delete	04/18/88	➡	➡	➡	➡	➡	➡
17	NINETEENTH AVENUE LANDFILL	MARICOPA	Final	09/01/83	➡	➡	➡			
19	TUCSON INTL AIRPORT AREA	PIMA	Final	09/01/83	➡	➡	➡	➡		
21	WILLIAMS AIR FORCE BASE	MARICOPA	Final	11/21/89	➡	➡				
23	YUMA MARINE CORPS AIR STATION	YUMA	Final	02/22/90		➡				

Progress Toward Cleanup at NPL Sites in the State of Nevada

25	CARSON RIVER MERCURY SITE	LYON	Prop	10/04/89		➡				

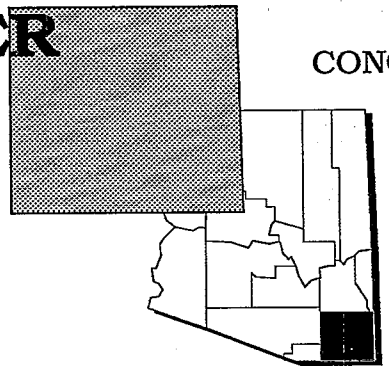
NPL:

Site Fact Sheets

APACHE POWDER COMPANY

ARIZONA

EPA ID# AZD008399263



REGION 9

CONGRESSIONAL DIST. 02

Cochise County

St. David

Site Description

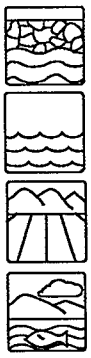
The 945-acre Apache Powder Company site has manufactured explosives and fertilizers since 1922. Prior to 1971, all wastewater was disposed of by flushing it into dry washes; the water then soaked into the ground or flowed into the San Pedro River. Since 1971, the company has been storing the wastewater in holding ponds. The water in these holding ponds contains high levels of nitrates, and the ponds may have leaked nitrates into the groundwater. In 1980, the EPA found high levels of heavy metals in one of the ponds. Ten shallow wells *downgradient* from the facility were found to contain nitrates. Approximately 1,100 people depend on wells for drinking water within 3 miles of the site. The nearest residence is less than 1/4 mile from the facility. Alfalfa is grown commercially within the vicinity of the site and is used as feed for cattle. Elevated levels of nitrates have been detected in the San Pedro River, which borders the site.

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

NPL LISTING HISTORY

Proposed Date: 06/10/86

Threats and Contaminants



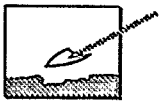
Groundwater and surface water contain nitrates, nitrites, and strontium. Soil and holding pond *sludge* contain nitrates, nitrites, lead, chromium, zinc, and strontium. People who ingest contaminated groundwater, surface water, soil, or sludges may be at risk. Wildlife in or around the San Pedro River may be harmed by contaminants leaking into the river.

continued

Cleanup Approach

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

Response Action Status

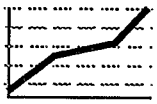


Immediate Actions: In 1987, as a result of earlier water quality testing by the EPA, Apache Powder Company began providing bottled water to area residents whose well water was found to be contaminated.

Entire site: In 1989 the EPA began an investigation to determine the type and extent of contamination at the site. Once the investigation is completed in 1992, measures will be recommended for site cleanup. This investigation will include a study of the surface water pattern and sources, the location and *hydrology* of groundwater *aquifiers,* and background levels of various chemicals and metals.

Site Facts: In 1989, Apache Powder Company refused to enter into a *Consent Agreement* requiring Apache to conduct an investigation of site contamination and the potential for public health and environmental threats.

Environmental Progress

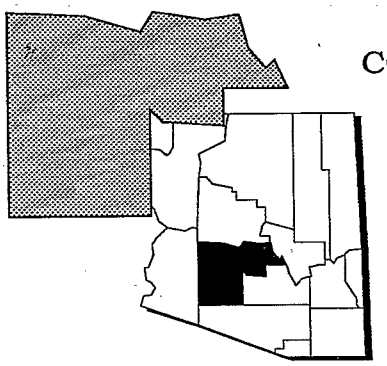


The immediate action described above has provided a safe drinking supply to affected residents and eliminated the potential of exposure to contaminated drinking water. This initial action will continue to protect residents near the Apache Powder Company site until planned cleanup activities are completed.

HASSAYAMPA LANDFILL

ARIZONA

EPA ID# AZD980735666



REGION 9

CONGRESSIONAL DIST. 03

Maricopa County

40 miles west of Phoenix

Site Description

The 77-acre Hassayampa Landfill site has been used as a municipal *landfill* since 1961 and accepted approximately 3,000,000 gallons and 4,000 tons of hazardous waste. The hazardous wastes were deposited in unlined trenches from 1979 to 1980. In 1981, the Arizona Department of Health Services (ADHS) installed three monitoring wells on site, one in which *volatile organic compounds* (VOCs) have been detected. Approximately 350 people draw drinking water from private wells and 2,800 acres of farmland are irrigated by wells within 3 miles of the site. The distance to the nearest residence from the site is 1 mile. Hassayampa River, an intermittent stream, is 3/4 miles east of the landfill.

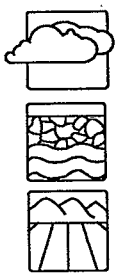
Site Responsibility: This site is being addressed through Federal and *potentially responsible parties'* actions.

NPL LISTING HISTORY

Proposed Date: 06/10/86

Final Date: 07/22/87

Threats and Contaminants



Ambient air contains very low levels of VOCs. Groundwater sampling results have also identified various VOCs. Soils beneath the waste pits contain VOCs, heavy metals, pesticides, and lime wastes. Potential health risks may exist for individuals who ingest the contaminated groundwater or inhale volatilized contaminants.

Cleanup Approach

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

continued

Response Action Status

Entire Site: Under EPA monitoring, the parties potentially responsible for the contamination initiated an investigation in 1988 to determine the type and extent of contamination at the site and to identify alternative technologies for the cleanup. The investigation is scheduled for completion in 1991. The EPA is conducting a risk assessment, scheduled for completion in 1990, to determine the level of risk to area residents and the surrounding environment.

Site Facts: In 1987, the EPA sent *Special Notice Letters* informing 108 individuals and companies of their potential responsibility for wastes associated with the site.

Environmental Progress

After adding this site to the NPL, the EPA performed preliminary investigations and determined the Hassayampa Landfill site does not pose an immediate threat to public health or the environment. The EPA will review the results of the ongoing risk assessment to determine if interim cleanup actions are necessary to reduce the potential for exposure to hazardous waste sources at the site while further studies are taking place and cleanup activities are being planned.

INDIAN BEND WASH AREA

ARIZONA

EPA ID# AZD980695969

REGION 9

CONGRESSIONAL DIST. 04

Maricopa County

Parts of Scottsdale, Tempe, and Phoenix, and the Salt River Indian Reservation

Site Description

The Indian Bend Wash Area site is over six square miles in length and covers twelve square miles. In 1981, the cities of Scottsdale and Phoenix discovered *volatile organic compounds* (VOCs) in seven municipal supply wells. These contaminants appear to have originated from several industrial facilities that operated in the northern portion of the Indian Bend Wash Area (IBW); two of these facilities, Motorola and Beckman, are located *upgradient* from five municipal water wells. Six of seven contaminated wells were removed from service shortly after discovery; the seventh was equipped with a treatment service to remove VOCs, then returned to full service. Some facilities at the southern portion of the Indian Wash Bend area (SIBW) have discharged heavy metals, cyanides, and *acids* into the ground. *Landfills* at this area have received a variety of hazardous materials, including vinyl chloride and foundary slag . Approximately 70 percent of the city of Scottsdale's municipal water needs are supplied by groundwater. Approximately 130,000 people live in Scottsdale.

Site Responsibility:

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

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/01/83

Threats and Contaminants

Groundwater is contaminated with VOCs, boron, methane, chloroform, lead, and zinc. Soil is contaminated with VOCs, cyanides, acids, and heavy metals including chromium and lead. Surface water also contains VOCs. People could be exposed to chemicals from the site if they accidentally ingested or touched contaminated groundwater, soil, or surface water. Groundwater at the site is used to irrigate various crops and feed livestock. Contaminants could *bioaccumulate* in agricultural products that use contaminated groundwater.

Cleanup Approach

This site is being addressed in six *long-term remedial phases* focusing on cleanup of: the Northern Indian Bend Wash area, the Scottsdale area, the Southern Indian Bend Wash area, the Beckman Industries area, the Motorola area, and the Siemens area.

Response Action Status

Northern Indian Bend Wash: The EPA is addressing the NIBW as a separate area of study from SIBW, because the contaminants may come from a different source. An investigation into the extent and type of contamination was begun in 1984. The investigation is scheduled to be completed in 1990 and will include recommendations on the best alternatives for cleaning up the site.

Scottsdale Area: In 1988 the EPA selected a clean up alternative which included: 1) *containment* of contaminants by extracting groundwater from the middle and lower parts of the *aquifier* by pumping five city of Scottsdale wells; and 2) *air stripping* to clean the contaminated groundwater. The remedy includes granular activated carbon to extract the contaminants from the stream of air. The parties potentially responsible for site contamination are scheduled to complete the design of the cleanup activities by 1990 and finish the work in 1993.

Southern Indian Bend Wash: The EPA began a study of the nature and extent of contamination at SIBW in 1988 and plans to complete it in 1991. The report will include alternative recommendations for final cleanup of the site.

Beckman Industries Area: The EPA began an investigation into the nature and extent of contamination at this area in 1984 and it is scheduled to be completed in 1990.

Motorola Area: The parties potentially responsible began an investigation into the nature and extent of contamination at the area in 1984 and expect to complete the investigation in 1990.

Siemens Area: The parties potentially responsible began a study of the nature and extent of contamination at this area in 1989 and expects to complete it in 1990.

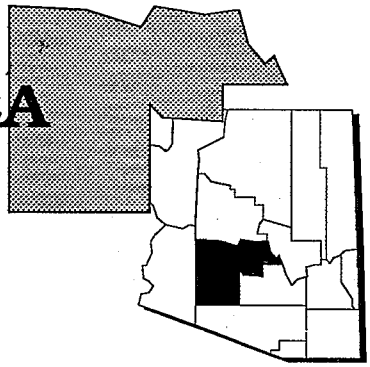
Environmental Progress

After adding this site to the NPL, the EPA performed preliminary investigations and determined that no immediate actions were required at the Indian Bend Wash site while further studies are taking place and cleanup activities are being planned.

LITCHFIELD AIRPORT AREA

ARIZONA

EPA ID# AZD980695902



REGION 9

CONGRESSIONAL DIST. 03

Maricopa County
Goodyear

Aliases:
Litchfield Airport Industrial Area
Phoenix-Litchfield Airport Area
Phoenix Goodyear Airport Area

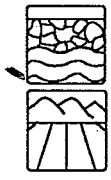
Site Description

The Litchfield Airport Area is a 40 square mile site which covers part of the present Phoenix-Goodyear Airport. In 1981, the Arizona Department of Health Services discovered contaminated groundwater near the Airport. The State also found contaminated groundwater at Unidynamics, a facility located north of the site. Soils were found to contain *trichloroethylene* (TCE) at both areas. The EPA sampled 89 wells in the area. Although 43 of these wells were found to contain TCE at levels that exceed federal health standards, no water containing contaminants above these levels has been used in the municipal supply system since 1981. Since 1983, the EPA has been working to study the nature and extent of contamination at the site. The EPA is conducting a joint study with the Arizona Department of Environmental Quality, Arizona Department of Water Resources, Goodyear Tire & Rubber Company (Goodyear), the U.S. Department of Defense (DOD), and Unidynamics Phoenix, Inc. (Unidynamics). The combined population of Avondale and Goodyear is approximately 30,000 people.

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

NPL LISTING HISTORY
Proposed Date: 12/30/82
Final Date: 09/01/83

Threats and Contaminants



Groundwater and soil contain *volatile organic compounds* (VOCs) and chromium. The EPA concluded that, although TCE and other chemicals contaminate the groundwater in the vicinity of the site, the risk to people is minimal because the contaminated groundwater is currently not being used for drinking water. Although the cities of Goodyear and Avondale use groundwater for their drinking water supplies, their drinking water currently meets all State and Federal standards.

continued

Cleanup Approach

This site is being addressed in four *long-term remedial phases* that focus on cleanup of contamination that affects the entire site, cleanup of the Airport Treatment Plant/ Section 16, cleanup of the Unidynamics area, and cleanup of the southern portion of the site.

Response Action Status

Entire Site: In 1989, the EPA selected two methods to address contamination at the site: pumping and treating contaminated groundwater through *air stripping*; and, by extracting soil vapors by vacuum using *carbon treatment* to control emissions. The EPA is scheduled to begin the design of these components in 1991 and complete the design in 1992, when actual work to cleanup the site will also begin.

Airport Treatment Plant/Section 16: In 1987, the EPA selected a cleanup strategy to control the movement and level of contaminants in the shallow groundwater directly below the site. Water from the shallow groundwater will be pumped from beneath a portion of the site where the highest levels of contaminants have been detected. The extracted water will be treated through air stripping and returned to the shallow groundwater system. Goodyear Tire and Rubber began to pump and treat the shallow groundwater under the site in 1989.

Unidynamics: In 1989, the EPA selected a cleanup remedy that includes a soil vapor extraction system to be used for the soil contamination. Unidynamics is scheduled to design the selected remedy and begin cleanup of the contamination at this area in 1992.

Southern Portion: In 1989, the EPA completed an analysis of various alternatives to address contamination at this area which includes a soil vapor extraction system for soil contamination and a pump and treat system for contamination in the deep groundwater.

Site Facts: In 1988, the EPA, the DOD, and Goodyear Tire & Rubber Company finalized an agreement whereby Goodyear Tire will carry out cleanup activities for part of the shallow groundwater contaminated under the southern section of the site.

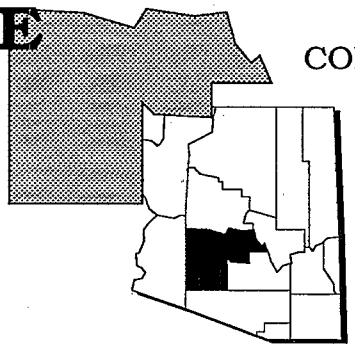
Environmental Progress

A water treatment facility has been constructed and is currently in operation at the site to reduce contamination of the shallow groundwater. Remedies have been selected at the remaining portions of the site that, once under way, will address other contaminated groundwater resources and contaminated soils.

LUKE AIR FORCE BASE

ARIZONA

EPA ID# AZ0570024133



REGION 9

CONGRESSIONAL DIST. 03

Maricopa County

Glendale

Site Description

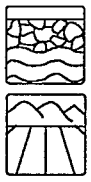
Construction of the 4,198-acre Luke Air Force Base (LAFB) site began in 1941 with the primary mission of providing advanced flight training to fighter pilots. Accidental discharges and waste disposal practices at LAFB have resulted in soil and groundwater contamination. Approximately 26 sites are subject to further investigation: two fire training areas; a waste oil and fuels underground storage tank area; a series of waste oil disposal trenches; the surface drainage canals receiving oily wastes; a sewage treatment plant *effluent* canal; the site of an abandoned Defense Reutilization and Marking Office; a radiological disposal area; nine land disposal sites; an old incinerator site; a former outside transformer storage site; two leaking underground storage tank sites; an abandoned surface *impoundment*; an ammunition storage area; and the base production wells. Contaminants on site include organic solvents and paint strippers, waste oil spills, petroleum spills, metal plating wastes, hydraulic fluids, and radiological wastes. There are approximately 4,900 military personnel and dependents living on base. Civilian and other military personnel who commute to the base daily from off base areas brings the total daily base population to approximately 8,000. The cities of Goodyear, Youngtown, and Phoenix depend on water from the Phoenix groundwater basin that underlies the site, for public water supplies.

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

NPL LISTING HISTORY

Proposed Date: 07/14/89

Threats and Contaminants

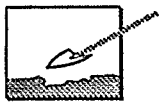


Groundwater and soil are contaminated with *volatile organic compounds* (VOCs) resulting from diverse processes that take place on the site. Potential human health hazards include accidental ingestion or direct contact with contaminated materials.

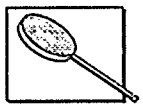
Cleanup Approach

This site is being addressed in two stages: initial actions and two *long-term remedial phases* focusing on cleanup of the entire site and soil contamination.

Response Action Status



Initial Actions: Completed initial cleanup actions include closing a former waste oil and contaminated fuel storage site, removing the tanks and *capping* the area with concrete, and installing monitoring wells.

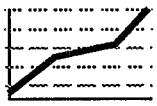


Soil Contamination: An investigation into the soil contamination around the North Fire Training Area, South Fire Training Area, Facility 993 and an abandoned surface impoundment began in 1990. At the conclusion of the investigation, alternative recommendations will be made for cleanup of the site.

Entire Site: A base wide investigation into the extent and type of contamination also began in 1990. At the conclusion of the investigation, alternative recommendations will be made for cleanup of the remaining contamination areas identified at the site.

Site Facts: The Luke Air Force Base site is participating in the *Installation Restoration Program* (IRP), a federally funded Department of Defense mechanism to identify, investigate, and control hazardous waste on military installations. A Federal Facilities Agreement to conduct the site cleanup plan is scheduled for execution in 1990.

Environmental Progress

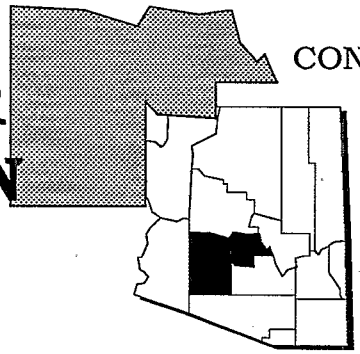


The closing of the waste oil and fuel storage site, removing tasks, capping the area and installing monitoring wells have greatly reduced the potential for exposure to hazardous materials at the Luke Air Force Base site making the site safer while further studies and cleanup activities are being planned.

MESA AREA GROUND WATER CONTAMINATION

ARIZONA

EPA ID# AZD980886287



REGION 9

CONGRESSIONAL DIST. 01

Maricopa County

Mesa

Site Description

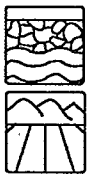
The Mesa Ground Water Contamination site is located on an industrial area where semiconductors have been manufactured since 1966. In 1983, *volatile organic compounds* (VOCs) were detected in water from a supply well at a manufacturing site. At the time, this well was operated by Motorola, Inc. for the City of Mesa, and was used only for the production of deionized water. Several monitoring wells were installed in 1983 and a *plume* of VOCs was discovered to extend to one mile southeast of the facility. The contamination was found in the shallow *aquifer*. The City of Mesa and Salt River Project pumps water from the deep aquifer, which is separated by 350 feet from the shallow aquifer. Approximately 126,000 people live within 3 miles of the site. The closest wells to the site are owned by the Salt River Project and pump into the Tempe Canal. The canal is a source of irrigation water and water for the South Tempe Municipal Water Treatment Plant.

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

NPL LISTING HISTORY

Proposed Date: 06/10/86

Threats and Contaminants



Contaminants in the groundwater underlying the site included VOCs and freon. The soil was also shown to be contaminated with VOCs. A health threat may exist if area residents accidentally ingest or come into direct contact with contaminated groundwater.

Cleanup Approach

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

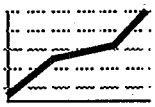
continued

Response Action Status

Immediate Actions: Motorola initiated a groundwater reclamation program in 1984, under which the reclaimed groundwater was pumped to cooling towers for use in place of water from a deep supply well. In 1986, a soil gas extraction system was installed along an abandoned solvent line. The extraction system was continuously operated until 1987. Vapors containing VOCs extracted from the soils were collected by vacuum pumping and passed through a carbon filter before emission into the atmosphere.

Entire Site: An investigation into the extent and type of contamination is scheduled for completion in 1990. At that time, recommendations for the cleanup alternatives, and final selection of a cleanup strategy for contamination areas will be made.

Environmental Progress

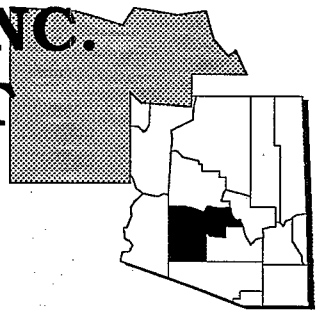


Initial actions to decontaminate soils and the groundwater reclaimation activities have greatly reduced the potential for exposure to contamination at the Mesa Groundwater Contamination site while studies are taking place and cleanup activities are being planned.

MOTOROLA, INC. (52ND STREET PLANT)

ARIZONA

EPA ID# AZD009004177



REGION 9

CONGRESSIONAL DIST. 01

Maricopa County

Phoenix

Alias:

Motorola, Inc. Discrete Semiconductor

Site Description

The 90-acre Motorola, Inc. (52nd Street Plant) site manufactures semiconductor and related components using solvents in the production process. In 1983, Motorola tested some underground storage tanks for leaks. Results showed that one tank containing *volatile organic compounds* (VOCs) was leaking. Further investigations determined the groundwater and soil was contaminated. Motorola detected contamination in monitoring wells at least 1 mile from the facility. Although the site lies in an area with drinking water provided by municipal water service, 28 private wells have been identified around the site. Water for irrigation is provided by the Salt River Project. Approximately 500 residents live within 1 mile of this NPL site.

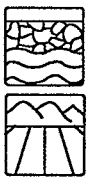
Site Responsibility: This site is being addressed through Federal, State, and *potentially responsible parties'* actions.

NPL LISTING HISTORY

Proposed Date: 10/15/84

Final Date: 10/04/89

Threats and Contaminants



Groundwater underlying the site, soil, and soil gas contain various VOCs from solvent use at the site. People who accidentally ingest or come into direct contact with contaminated groundwater and soil may be at risk.

Cleanup Approach

This site is being addressed in two stages: an initial actions and two *long-term remedial phases* that both focus on cleanup of the contaminated groundwater *plume*.

Response Action Status

Initial Actions: Motorola has taken several interim actions to monitor and develop treatment remedies for contaminated groundwater. In 1983 and 1984, Motorola installed 22 on-site and 6 off-site monitoring wells. In 1986, additional monitoring wells were installed. The company also initiated an on-site groundwater treatment program that included treatability testing, design and installation of a pilot treatment plant; treatment of groundwater; and use of the *effluent* in the plant's air fume scrubbers.

Groundwater Plume (First Action): In 1988, the EPA selected a remedy to clean a portion of the site by recovering the soil gas and groundwater and treating them in an on-site facility. Soil gas from the main source areas will be extracted and *alluvial* groundwater will be pumped. In addition, off-site groundwater also will be pumped. Both the soil gas and the contaminated groundwater will be treated by *carbon adsorption* at the facility. The treated groundwater will then be used in the manufacturing processes, replacing potable water supplied by the City of Phoenix. Motorola, under State monitoring, is designing the technical specifications for the cleanup. Once the design phase is finished in 1990, the cleanup will begin.

Groundwater Plume (Second Action): Motorola, under State monitoring, is conducting an investigation of the remaining portion of the contaminant plume. Once this investigation is completed in 1992, measures will be recommended for site cleanup.

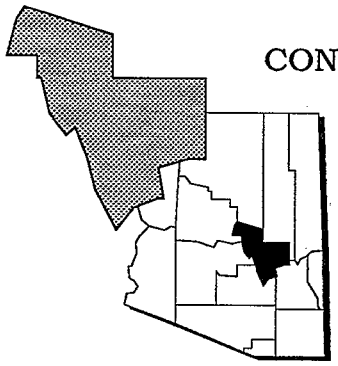
Environmental Progress

After adding this site to the NPL, the EPA performed preliminary investigations and determined that no other immediate actions, besides the initial treatment of groundwater by Motorola, were required at the Motorola, Inc. site while further studies are taking place and cleanup activities are being planned.

MOUNTAIN VIEW MOBILE HOMES

ARIZONA

EPA ID# AZD980735724



REGION 9

CONGRESSIONAL DIST. 04

Gila County

2 miles from Globe

Alias:
Globe Site

Site Description

The 17-acre Mountain View Mobile Homes site was developed in 1973 on the site of the former Metate Asbestos Corporation chrysotile asbestos mill. In 1979, asbestos contamination of the site was discovered by local health officials inspecting the waste disposal system. Small piles of asbestos *mill tailings* were found against the abandoned mill structures and the adjacent railroad tracks. Before 1973, three mills in the area processed chrysotile asbestos ore from nearby mines. Because they failed to meet new EPA standards for their emission, two of the mills were ordered closed by the County in 1973. Before closing, however, the owner of one of the mill sites obtained a permit to rezone the property into a residential subdivision. Asbestos mill tailings were used as primary *landfill* material before the site was partially covered with top soil. Before it shut down, this mill continued operations for several weeks as residents moved into the subdivision. The mill buildings and asbestos-laden equipment remained standing in the middle of the mobile homes. The third mill, with its large pile of asbestos mill tailings, continued to operate a few hundred yards from the mobile homes. Approximately 100 to 130 people lived in the mobile home park. The Town of Globe has a population of 8,000 and the adjacent town of Miami has 3,000 residents.

Site Responsibility: This site was addressed through Federal and State actions.

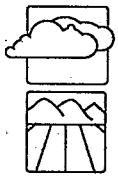
NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/01/83

Delete Date: 04/18/88

Threats and Contaminants



The air and soils on the site were shown to be contaminated with asbestos. Prior to site cleanup, area residents who touched or accidentally ingested the asbestos-containing soil may have been at risk. In addition, breathing asbestos fibers posed a potential for adverse health effects.

Cleanup Approach

This site was addressed in two stages: initial actions and a single *long-term remedial phase* that focused on cleanup of the entire site.

Response Action Status

Initial Actions: In 1980, the State provided temporary housing for the residents while the site was being decontaminated. The old mill buildings were demolished, and top soil was used to cover the contaminated soil. Wind, water, and human activity soon eroded the soil covering which exposed the asbestos tailings again.

Entire Site: In 1983, the EPA selected a remedy to clean up the site by permanently relocating the mobile home residents; cleaning the site and demolishing and burying on site all the homes and sewage treatment plant; closing the site by covering it with either clay or a synthetic material, placing clean soil on top of the site; fencing the area; and periodically inspecting and maintaining the site. Permanent relocation of all residents was completed in 1985 and ownership of the purchased property was transferred to the State. Following relocation of the residents, the site was cleaned. The homes and other structures were crushed and buried on site in two natural depressions. Drainage culverts and enclosed pipes were installed to reduce the potential for erosion of the cover soils. A filter fabric was placed over the entire site to act as a physical barrier to upward movement of asbestos fibers and to prevent erosion. Clean soil was placed over the filter fabric and compacted and crushed rock was added to complete the cover. The site was fenced to protect the integrity of the cover. The State has agreed to maintain of the site for a minimum of 20 years. The EPA and the State have determined that the site is protective of human health and the environment and that no further cleanup is required. The site was deleted from the NPL in 1988.

Site Facts: The Metate Asbestos mill was ordered closed by the Gila County Air Quality Control District in 1973.

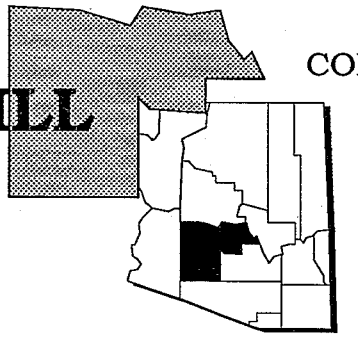
Environmental Progress

The numerous cleanup and relocation activities described above have eliminated the potential of exposure to asbestos-laden materials at the Mountain View Mobile Homes site. Area residents have been relocated and cleanup actions have successfully controlled site contamination. The EPA and the State have determined that the site is now safe for nearby residents and the environment and have deleted the site from the NPL.

NINETEENTH AVENUE LANDFILL

ARIZONA

EPA ID# AZD980496780



REGION 9

CONGRESSIONAL DIST. 02

Maricopa County

Phoenix

Alias:
Salt River Landfills

Site Description

The 213-acre Nineteenth Avenue Landfill site operated as a sanitary *landfill* between 1957 and 1979. One 200-acre portion of the site, *Cell* A, is located on the northern bank of the Salt River. A 13-acre portion of the landfill, Cell A-1, is located on the south bank of the Salt River. In the past, sand and gravel companies excavated material along a 7-mile stretch of the Salt River. The City of Phoenix took over several of these pits for use as waste disposal sites. The Nineteenth Avenue Landfill accepted municipal, radioactive, hospital, and industrial wastes. Portions of the landfill are within the 100-year floodplain of the Salt River. Early in 1979, the river flooded, raising the water table and filling several pits. The high water also breached several dikes, opening landfill cells and causing refuse to wash into the river. Water also infiltrated directly into the cells, increasing the potential for *leachate* movement. Leachate is being generated from the site and is contaminating the groundwater. In addition, saturation of the waste has generated excess amounts of methane gas. The landfill was closed by the State in 1979. The population within 6 miles is approximately 6,000 people. The nearest residence is 1/3 mile from the site. The area's primary drinking water is provided by the City of Phoenix water distribution system. The municipal system draws water from surface water sources over 30 miles away. The nearest drinking water supply well is over 3 miles away. An industrial well and an agricultural well are located 200 feet and 800 feet from the site, respectively.

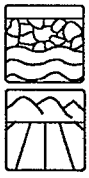
Site Responsibility: This site is being addressed through Federal and *potentially responsible parties'* actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/01/83

Threats and Contaminants



Groundwater contains *volatile organic compounds* (VOCs); heavy metals including arsenic, barium, mercury, and nickel; and beta radiation. Refuse in the landfill contains VOCs and pesticides. Soil contains VOCs, *polychlorinated biphenyls* (PCBs), and pesticides. The generation and *migration* of methane gas is a potential hazard. Methane may collect and reach explosive levels in enclosed buildings or other structures adjacent to the site. Soil, groundwater, and refuse are contaminated; however, the possibility of human exposure to these contaminants is unlikely since there are no residential areas within 1/4 mile of the site and groundwater is not used for drinking water. Area residences and site workers who accidentally touch or ingest the contaminated groundwater, soil, or refuse may suffer adverse health effects.

continued

Cleanup Approach

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

Response Action Status

Immediate Actions: Earthen *berms* were constructed on the site to limit access. The site was covered with sand, gravel, and stones. In 1981, the city installed a system to collect methane gas and has also installed monitoring wells to sample the groundwater.

Entire Site: In 1989, the EPA selected a remedy to clean up the landfill by: (1) installing a gas collection and treatment system; (2) covering the landfill with clay or a synthetic material to prevent water from coming into contact with the buried materials; and (3) preventing erosion of the landfill by the construction of bank protection levees between the river and the landfill. In 1990, The City of Phoenix is scheduled to begin designing the technical specifications to clean up the site. Once the design phase is completed in 1991, cleanup activities will begin.

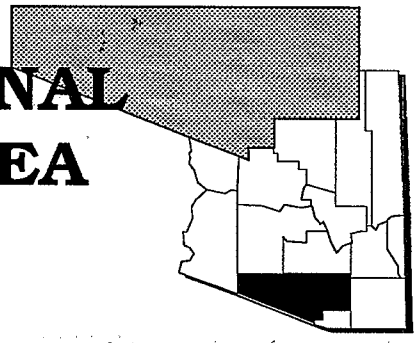
Environmental Progress

Methane control devices installed at the site have eliminated any potential for acccumulation and explosion at the site. The construction of berms and covering of the site and installation of monitoring wells, have greatly reduced the potential for exposure to contaminated materials while planned cleanup remedies are being designed and constructed at the Nineteenth Avenue Landfill site.

TUCSON INTERNATIONAL AIRPORT AREA

ARIZONA

EPA ID# AZD980737530



REGION 9

CONGRESSIONAL DIST. 02

Pima County

Tucson

Aliases:
Hughes Aircraft Company
USAF Plant 44

Site Description

The 24-square-mile Tucson International Airport Area (TIAA) site includes the Tucson International Airport, portions of the San Xavier Indian Reservation, residential areas of the Cities of Tucson and South Tucson, and the Air Force Plant #44/Hughes Aircraft Company facility. At least 20 facilities have operated in the TIAA area since 1942 including aircraft and electronics facilities, which discharged waste liquids directly into the soil; fire drill training areas, where wastes from training operations were left in unlined pits; and unlined *landfills*, which received various wastes from several sources. The first indications of groundwater contamination at TIAA appeared in the early 1950s, when elevated levels of chromium were detected in a municipal supply well adjacent to the U.S. Air Force Plant #44. The U.S. Air Force Plant #44, which has been operated under contract by the Hughes Aircraft Company (HAC) since 1951, is believed a major contributor to groundwater contamination. The facility used *trichloroethylene* (TCE) as a metal *degreaser* and chromium in electroplating. Wastewater and spent solvents were discharged into unlined ditches or disposed of in waste pits and ponds. Surface water flowed off HAC property and onto the San Xavier Reservation. Beginning in 1976, lined wastewater holding ponds were constructed to receive wastewater discharges. The State also closed a well at the plant because of high levels of chromium. A second source of contamination at the TIAA site is believed to be the Tucson Airport Hangar Area, which was occupied by various defense contractors from 1942 to 1958. During this period, *volatile organic compounds* (VOCs) were used and disposed of on site and in the airport landfill. Other more recent occupants of the hangar also may have contributed to the groundwater contamination. Sources of contamination at the northern and eastern edges of the airport are believed to be the Arizona Air National Guard, the Burr-Brown Corporation, and West-Cap Arizona. The localized groundwater contamination due to these facilities is situated east of the main contaminant *plume*. The City of Tucson is dependent on groundwater for its water supply. Before the discovery of groundwater contamination, wells within the site boundaries provided water for over 47,000 people. The Santa Cruz River borders the site.

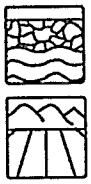
Site Responsibility: This site is being addressed through Federal, State, and *potentially responsible parties'* actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/01/83

Threats and Contaminants

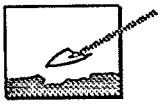


Groundwater underlying the site and soil contain VOCs and chromium. People who touch or accidentally ingest contaminated groundwater and soil may be at risk.

Cleanup Approach

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

Response Action Status



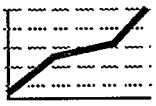
Immediate Actions: In 1981, the City of Tucson began closing all municipal wells that exceeded the State levels and notified private well users of potential risks. Since 1987, the Air Force has been extracting and treating groundwater in the southern portion of the site. By 1987, 35 lined wastewater holding ponds have been constructed to receive process waste water.

Groundwater: In 1988, the EPA selected a remedy to treat the groundwater in the northern portion of the site by pumping and treating the contaminated groundwater using packed column aeration, followed by discharging the treated water to the municipal water distribution system and treating the emissions from the treatment process using granular activated carbon. The parties potentially responsible for site contamination, under EPA monitoring, are designing the technical specifications for the groundwater pump and treat system. Once the design phase is completed in 1991, the cleanup activities will begin.

Soils: In 1990, the potentially responsible parties, under EPA monitoring, began an investigation to determine the type and extent of soil contamination north and west of the Air Force Plant. This investigation is expected to be completed in 1991, when measures will be recommended for soil cleanup.

Site Facts: In 1989, the EPA issued an *Administrative Order* to the parties potentially responsible for site contamination requiring them to clean up the groundwater and soil.

Environmental Progress

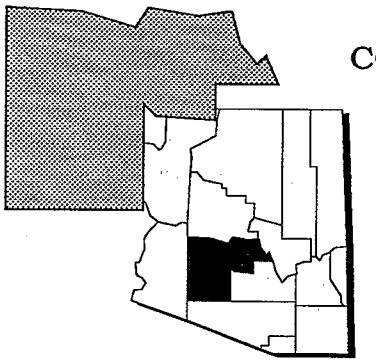


Contaminated drinking supplies have been removed from service and initial actions have been taken to control further contamination at the site and commence treating contaminated groundwater. Additional cleanup remedies are currently being designed or planned that will address remaining contamination areas and restore the site to safety levels.

WILLIAMS AIR FORCE BASE

ARIZONA

EPA ID# AZ7570028582



REGION 9

CONGRESSIONAL DIST. 01

Maricopa County
Chandler

Site Description

The 4,127-acre Williams Air Force Base (WAFB) site was commissioned as a flight training school in 1941. Contaminants from base activities include organic solvents and paint strippers, petroleum spills, metal plating wastes, hydraulic fluids, pesticides, and radiological wastes. Discharges and disposal at WAFB have resulted in soil and groundwater contamination. Ten sites have been identified as contaminated areas including two fire training areas, a fuel storage area, two surface storm drainage areas, a hazardous material storage area, a *landfill*, a pesticide burial pit, a radiological disposal area, and several underground storage tanks. Approximately 3,000 military personnel are stationed at WAFB as well as 860 civilian employees. Many of the military personnel live off base in one of the surrounding towns. The total population living on base, including dependents, is approximately 2,700. On an average workday, the population of the base rises to over 5,000.

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

NPL LISTING HISTORY

Proposed Date: 07/14/89

Final Date: 11/21/89

Threats and Contaminants

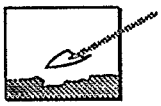
Groundwater contains *volatile organic compounds* (VOCs), nitrates, and heavy metals including lead, cadmium, nickel, and chromium. Soils also contain various VOCs from past disposal practices. The contaminated groundwater and soil could be potential health hazards through accidental ingestion or touching.

Cleanup Approach

This site is being addressed in three stages: an initial action and two *long-term remedial phases* focusing on cleanup of the entire site and the Liquid Fuels Storage Area.

continued

Response Action Status



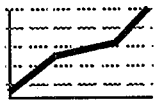
Initial Action: The Southwest Drainage System was cleaned in 1988 by installing a soil cement and concrete *cap* on the ditch. A number of monitoring wells were installed and the *hydrogeology* of the area was investigated. In 1990, a small pesticide drum burial site was excavated, and radiological materials were removed from another burial site and disposed of. The removal of approximately 20 underground storage tanks and free product removal also is planned for 1990.

Entire Site: The Air Force has developed a work plan and began an investigation at the site in 1990 to determine the nature and extent of the contamination at all impacted areas of the base. The results of the investigation are expected in 1993 and will be used to evaluate different cleanup methods.

Liquid Storage Area: In 1990, an investigation into the type and extent of contamination was initiated at the waste liquids storage area. At the conclusion of the investigation, alternative recommendations for cleanup of the area will be presented and evaluated to select a final cleanup strategy.

Site Facts: This site is participating in the *Installation Restoration Program* (IRP), a federally funded Department of Defense program used to identify, investigate, and control hazardous wastes at military installations.

Environmental Progress

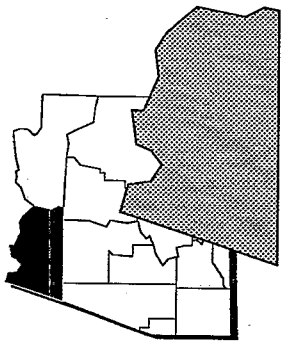


Cleaning the Southwest Drainage System, installing monitoring wells and removing pesticide drums and radiological materials have greatly reduced the potential for exposure to contaminated materials at the Williams Air Force Base site while studies and cleanup activities are taking place.

YUMA MARINE CORPS AIR STATION

ARIZONA

EPA ID# AZ0971590062



REGION 9

CONGRESSIONAL DIST. 02

Yuma County

2 miles from Yuma

Site Description

Since the mid-1950s, large volumes of waste fuels and solvents from refueling and servicing of airplanes have been disposed of directly onto the ground or into unlined pits at the 3,000-acre Yuma Marine Corps Air Station site. In addition, combustible materials such as fuel oil and organic solvents have been deposited on the ground and burned during fire training exercises. The Navy has identified *volatile organic compounds* (VOCs) in soil at the site. Approximately 5,700 people live on site and usually obtain their drinking water from the Colorado River through an irrigation canal. However, during maintenance work on the canal that lasts for one month each year, drinking water comes from an on-station well. An additional 3,300 base employees use water from this well. The city of Yuma is 2 miles from the site with a summer population of 60,000 and a winter population of 180,000. The city uses groundwater for drinking water purposes. Groundwater also supplies agricultural and industrial users.

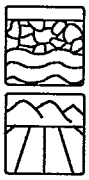
Site Responsibility: This site is being addressed through Federal actions.

NPL LISTING HISTORY

Proposed Date: 06/24/88

Final Date: 02/22/90

Threats and Contaminants



Groundwater and soils on the site contain various VOCs and other contaminants including residues from tear gas, ammunition, napalm paints and photographic processing chemicals. The contaminated soil could pose a health hazard to individuals if it is accidentally touched or ingested. The Colorado River which runs close to the site, could become polluted from the site contaminants.

Cleanup Approach

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

continued

Response Action Status

Entire Site: The Marine Corps is conducting a site investigation to evaluate the nature and extent of the contamination. The results of the study will be used to evaluate different cleanup alternatives and to select the most preferred methods that will protect human health and provide a long term solution to site contamination.

Site Facts: Yuma Marine Corps Air Station is participating in the *Installation Restoration Program* (IRP). This specially funded program was established in 1978 under which the Department of Defense has been identifying and evaluating its past hazardous waste sites and controlling the *migration* of hazardous contaminants from those sites.

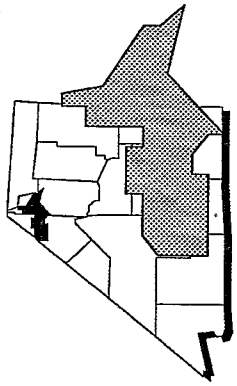
Environmental Progress

After adding this site to the NPL, the EPA performed preliminary investigations and determined that no immediate actions were required at the Yuma Marine Corps Air Station site while further studies and cleanup activities are being planned.

CARSON RIVER MERCURY SITE

NEVADA

EPA ID# NVD980813646



REGION 9

CONGRESSIONAL DIST. 01

Lyon and Churchill Counties

Site Description

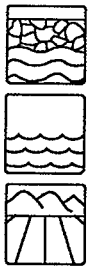
The Carson River Mercury site consists of a 50-mile stretch of the Carson River, beginning between Carson City and Dayton, and extending downstream through the Lahontan Reservoir, which has been contaminated by mercury used in the amalgamation of gold and silver. In the late 1800s, large amounts of mercury were used during the milling of the Comstock Lode near Virginia City. Ore mined from the lode was transported to mill sites where it was crushed and mixed with mercury to amalgamate the precious metals. Of the original 75 sites, 12 sites along the Carson River in the Brunswick Canyon area were frequently used due to the availability of water power. Mercury *mine tailings,* resulting from the mill site operations, have been found 5 miles up Brunswick Canyon, 3 miles up Six Mile Canyon, and within the Carson Plains. Areas near the Comstock Lode where extensive mining occurred, such as Gold Canyon, may also be major sources of mercury-contaminated mine tailing piles. Annual rains transport mercury from the tailings piles in the canyons to the Carson River, where the Nevada Division of Environmental Protection (NDEP) has documented extensive mercury contamination. The NDEP sampled the water and *sediments* from the Carson River and found elevated levels of mercury attributed to the tailings piles in various areas of the Carson River. Approximately 1,400 people obtain drinking water from wells within 3 miles from the site, the nearest within 2,000 feet of the site.

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

NPL LISTING HISTORY

Proposed Date: 10/04/89

Threats and Contaminants



Groundwater, surface water, sediments, and soils at site areas are contaminated with mercury. Possible health threats include direct contact or accidentally ingesting the contaminants. Additionally, *runoff* from contaminated site areas may facilitate the spread of contamination to other unaffected environments.

Cleanup Approach

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

Response Action Status

Entire Site: The EPA is planning to conduct an investigation into the nature and extent of contamination at the site. Alternative technologies will be selected for site cleanup activities, will be evaluated and scheduled to begin soon after this study is completed.

Environmental Progress

At the time that this summary was written, this site just obtained NPL status and it was too early to discuss environmental progress. The EPA will be performing a study to assess the need for any intermediate actions required to make the site safer while waiting for cleanup actions to begin. Results of this assessment will be described in our next edition.

GLOSSARY:

Terms Used in the Fact Sheets

This glossary defines the italicized terms used in the site fact sheets for the States of Arizona and Nevada. The terms and abbreviations contained in this glossary are often defined in the context of hazardous waste management as described in the site fact sheets, and apply specifically to work performed under the Superfund program. Thus, these terms may have other meanings when used in a different context.

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 may possibly 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 EPA and the parties potentially responsible for site contamination. Under the terms of the Order, the potentially responsible parties 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 EPA directing the parties potentially responsible to perform site cleanups or studies (generally, EPA does not issue unilateral orders for site studies).

Air Stripping: A process whereby volatile organic chemicals (VOCs) are removed from contaminated material by forcing a stream of air through it 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.

Alluvial: An area of sand, clay, or other similar material that has been gradually deposited by moving water, such as along a river bed or the shore of a lake.

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.

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.

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.

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 is generally 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 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.

Consent Order: [see Administrative Order on Consent].

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

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

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.

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

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

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.

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.

Landfill: A disposal facility where waste is placed in or on land.

Leachate [n]: The liquid that trickles through or drains from waste, carrying soluble components from the waste. **Leach, Leaching [v.t.]:** The process by which soluble chemical components are dissolved and carried through soil by water or some other percolating liquid.

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 a number of these phases.

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

Mine (or Mill) Tailings: A fine, sandy residue left from ore milling operations. Tailings often contain high concentrations of lead and arsenic or other heavy metals.

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 EPA is not allowed to start work at a site or initiate enforcement actions against potentially responsible parties, although EPA may undertake certain investigatory and planning activities. The 60-day period may be extended if EPA receives a good faith offer [see Good Faith Offer] within that period.

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.

Polychlorinated Biphenyls (PCBs): A group of toxic chemicals used for a variety of purposes including electrical applications, carbonless copy paper, adhesives, hydraulic fluids, microscope emersion oils, and caulking compounds. PCBs are also produced in certain combustion processes. PCBs are extremely persistent in the environment because they are very stable, non-reactive, and highly heat resistant. Burning them produces even more toxins. Chronic exposure to PCBs is believed to cause liver damage. It

is also known to bioaccumulate in fatty tissues. PCB use and sale was banned in 1979 with the passage of the Toxic Substances Control Act.

Potentially Responsible Parties (PRPs): Parties, including owners, who may have contributed to the contamination at a Superfund site and may be liable for costs of response actions. Parties are considered PRPs until they admit liability or a court makes a determination of liability. This means that PRPs may sign a consent decree or administrative order on consent [see Administrative Order on Consent] to participate in site cleanup activity without admitting liability.

Runoff: The discharge of water over land into surface water. It can carry pollutants from the air and land into receiving waters.

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

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

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 also Volatile Organic Compounds].

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

Volatile Organic Compounds (VOCs): VOCs are made 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.