EPA/540/4-90/017
September 1990

NATIONAL PRIORITIES LIST SITES:
Kansas

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.

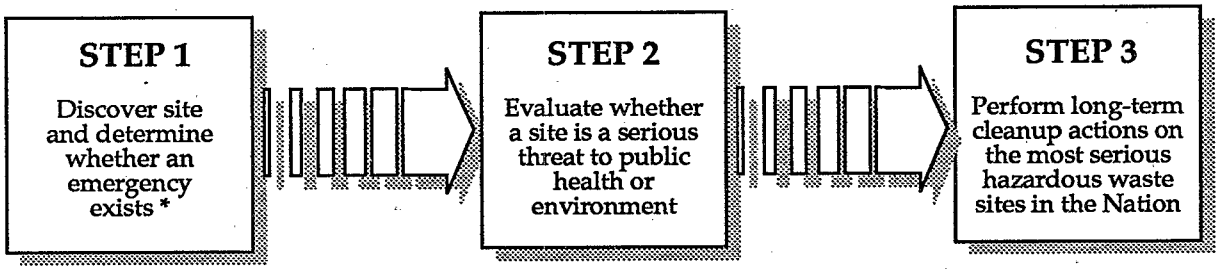
To help you understand the cleanup accomplishments made at these sites, this State volume includes a description of the process for site discovery, threat evaluation and long-term cleanup of Superfund sites. This description — ***How Does the Program Work to Clean Up Sites?*** — will serve as a good 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.

STEP 1: SITE DISCOVERY AND EMERGENCY EVALUATION

How does EPA learn about potential hazardous waste sites?

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.

STEP 2: SITE THREAT EVALUATION

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

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

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.

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

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.)

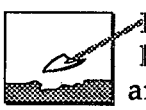
Contaminated **Surface Water and Sediments** on or near the site. (These include lakes, ponds, streams, and rivers.)

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

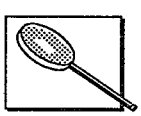
Contaminated **Soil and Sludges** on or near the site.

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.

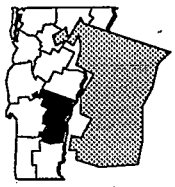
Site Responsibility

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

SITE NAME
STATE
EPA ID# ABC00000000



EPA REGION
CONGRESSIONAL DIST
County Name
Location

Aliases:

Site Description

Site Responsibility:

NPL LISTING HISTORY

Threats and Contaminants

Cleanup Approach

Response Action Status

Site Facts:

Environmental Progress

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.

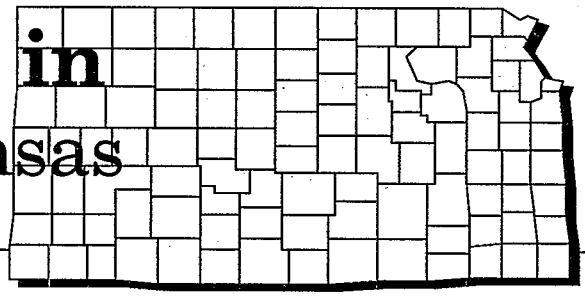
HOW CAN *YOU* USE THIS STATE BOOK?

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 Kansas



Kansas is located in the western north central United States, bordered by the Missouri River to the east, Colorado to the west, Nebraska to the north, and Oklahoma to the south. The State covers 82,277 square miles consisting of the hilly Osage Plains in the east, prairie and hills in the central region, and high plains in the western region of the State. Kansas experienced a 5.6 percent increase in populatin through the 1980s and currently has approximately 2,495,000 residents, ranking 32nd in U.S. populations. Principal State industries are machinery, agriculture, mining, and aerospace. Kansas produces processed foods, aircraft, petroleum products, and farm machinery.

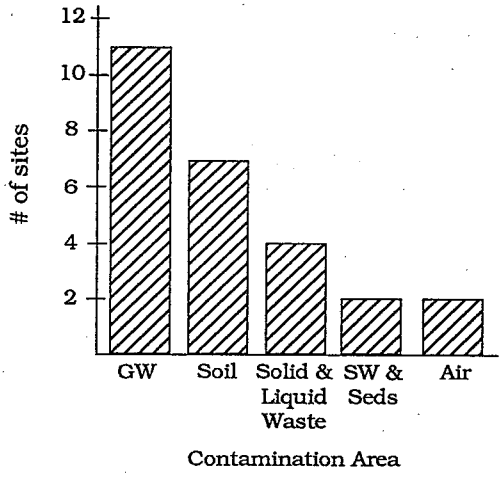
How Many Kansas Sites Are on the NPL?

Proposed	1
Final	10
Deleted	0
	11

Where Are the NPL Sites Located?

Cong. District 03	1 site
Cong. District 02	2 sites
Cong. District 04	4 sites
Cong. District 05	4 sites

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



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

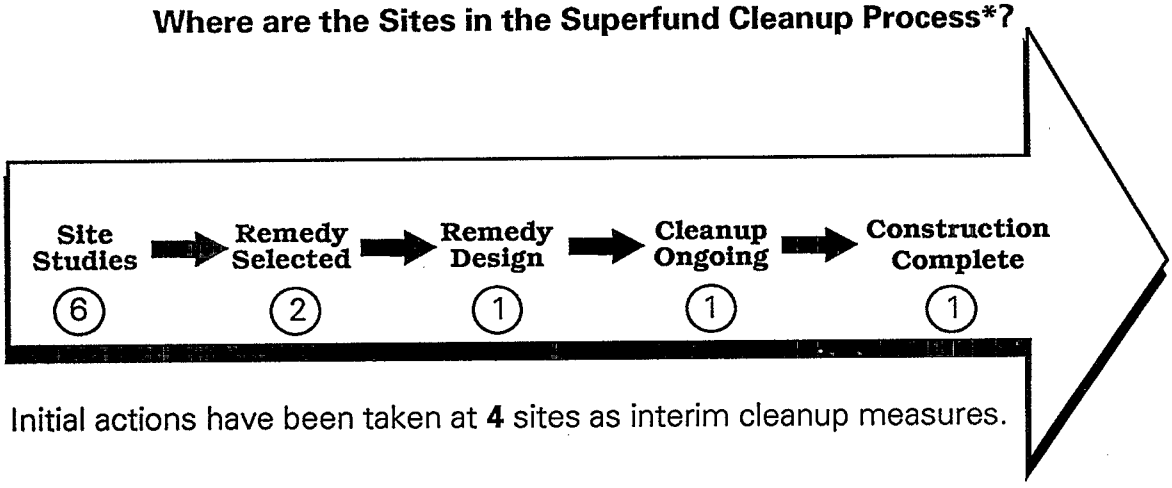
Soil, Solid and Liquid Waste: Volatile organic compounds (VOCs), heavy metals (inorganics), creosote (organics), and pesticides.

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

Air: Radiation

*Appear at 25% or more sites

Where are the Sites in the Superfund Cleanup Process*?



Initial actions have been taken at **4** sites as interim cleanup measures.

Who Do I Call with Questions?

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

Kansas Superfund Office	(913) 296-1675
EPA Region VII Superfund Office	(913) 551-7052
EPA Public Information Office	(202) 477-7751
EPA Superfund Hotline	(800) 424-9346
EPA Region VII Superfund Public Relations Office	(913) 551-7003

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 Kansas

Page	Site Name	County	NPL	Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete
1	ARKANSAS CITY DUMP	COWLEY	Final	09/08/83		➡	➡	➡		
3	BIG RIVER SAND COMPANY	SEDGWICK	Final	06/10/86		➡	➡			➡
5	CHEROKEE COUNTY	CHEROKEE	Final	09/08/83	➡	➡	➡	➡	➡	
8	DOEPKE DISPOSAL (HOLLIDAY)	JOHNSON	Final	09/08/83		➡	➡			
10	FORT RILEY	GEARY	Prop	07/14/89		➡				
12	HYDRO-FLEX, INC.	SHAWNEE	Final	03/31/89		➡				
14	JOHN'S SLUDGE POND	SEDGWICK	Final	09/08/83	➡		➡			
16	OBEE ROAD SITE	RENO	Final	07/22/87	➡	➡				
18	PESTER REFINERY CO.	BUTLER	Final	03/29/89		➡				
20	STROTHER FIELD	COWLEY	Final	06/10/86	➡	➡				
22	29TH & MEAD GW CONTAMINATION	SEDGWICK	Final	02/21/90		➡				

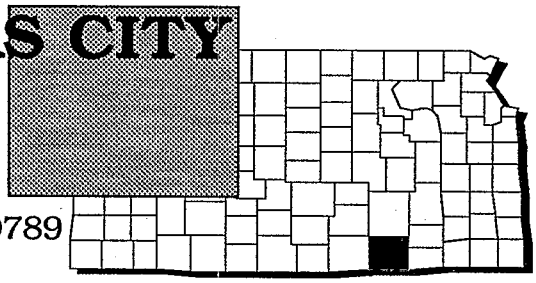
NPL:

Site Fact Sheets

ARKANSAS CITY DUMP

KANSAS

EPA ID# KSD980500789



REGION 7

CONGRESSIONAL DIST. 05

Cowley County

In southwest Arkansas City, 3 1/2 miles north of the Oklahoma State Line

Alias

Millikin Refinery

Site Description

The Arkansas City Dump is a 200-acre site in southwest Arkansas City. Municipal wastes were disposed of at the site after an explosion and fire in 1927 destroyed the oil refinery once located there. From 1916 until the mid-1920s, the refinery treated partially refined crude oil with sulfuric *acid* to separate out asphalt and paraffins. This process created an acid *sludge* as a waste product. Operators disposed of about 1 1/2 million cubic feet of sludge in the north waste area. Later, municipal and domestic solid wastes were disposed of at the site, mostly near the adjacent Arkansas River. Between 500,000 and 1 million gallons of residual oil product from the refinery operation are present in the subsurface soils. Such wastes tend to be acidic and contain potentially toxic concentrations of *polycyclic aromatics hydrocarbons* (PAHs). Much of the organic contamination is related to the release of petroleum products and cannot be addressed under the Superfund program because of a clause in the law that excludes cleanup of petroleum products. Fortunately, the organic contaminants do not present a current threat to human health or the environment. The remainder of the wastes at the site consist of domestic and municipal solid wastes. These wastes also do not appear to present a current threat to human health or the environment. The site lies within the 100-year floodplain of the Arkansas River and is separated from the river by a levee. The surrounding land includes commercial and residential areas. Approximately 6,500 people live within a 3-mile radius of the site. About 60 homes lie next to the eastern boundary, a city park lies to the southwest, and several businesses employ 100 to 150 people on the site. Groundwater *upgradient* from the site is used for drinking by Arkansas City and by private residences. Private wells *downgradient* from the site are used primarily for irrigation. The City's main water supply comes from wells across the river from the site and is not at risk of contamination by the site. All residents downgradient from the dump have access to the city's water supply.

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

NPL LISTING HISTORY

Proposed Date: 10/23/81

Final Date: 09/08/83

Threats and Contaminants

The air from a *borehole* on the site contains sulfur dioxide. Groundwater under the site is contaminated with PAHs, heavy metals, and ammonia. Soil contains PAHs associated with petroleum products. The undisturbed sludge may present a direct contact hazard; it contains sulfuric acid that may cause chemical burns or eye irritation. Contaminants have not been detected in the Arkansas River. Wells located *downslope* and east of the site show low levels of PAHs. These wells are used primarily for irrigation.

Cleanup Approach

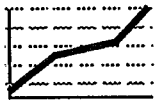
The site is being addressed in two *long-term remedial phases* focusing on source control and cleanup of the groundwater and *sediments*.

Response Action Status

Source Control: The EPA selected a remedy for the north waste area, seeking first to neutralize the acidic sludge that posed the greatest threat to public health. The remedy features: (1) neutralizing acid sludges in place by mixing with high pH materials; and (2) covering the north waste area with soil after treatment is complete. The EPA is designing the technical specifications for the remedy; they are expected to be completed by late 1990.

Groundwater and Sediments: By 1989, the EPA had assessed the remaining portions of the site, namely, the oil-contaminated sediments and groundwater, and determined that no further cleanup action was required for these areas.

Environmental Progress

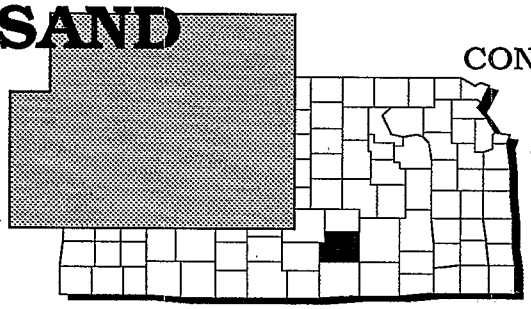


The technical specifications for the source control remedy for the Arkansas City Dump site are currently being designed by the EPA. The EPA has determined that the site does not pose an immediate threat to the public or the environment while awaiting the planned cleanup activities.

BIG RIVER SAND COMPANY

KANSAS

EPA ID# KSD980686174



REGION 7

CONGRESSIONAL DIST. 04

Sedgwick County

4900 W. 21st St., Wichita

Site Description

The Big River Sand Company site is a 123-acre sand and gravel mining operation that lies 1/2 mile west of the Arkansas River and next to the Wichita Valley Center Floodway. The western half of the site has been, and continues to be, extensively mined. The eastern half belongs to the former owner of the entire 123 acres. During the 1970s, roughly 2,000 drums of paint-related waste were disposed of on the site, next to a 5-acre sand quarry lake. In 1978, Big River Sand Company bought 80 acres of the site and, in 1982, under the sales agreement and a court order, the previous owner started moving the drums to his side of the property. Nearly 200 drums had been transferred before the Kansas Department of Health and Environment stopped the action. The facility was not licensed to store or dispose of the waste, and on-site workers had no protective equipment. The State's intervention in 1982 showed that drums were damaged, corroded, and leaking. Waste solvents and paint *sludges* from several drums contained metals and *volatile organic compounds* (VOCs), which were flammable. In 1984, the State and the property owner completed a surface cleanup. All paint wastes were taken off site, as were about 2,000 barrels and four large solvent storage tanks. State analysts found solvents and heavy metals in nearby residential wells in 1982 and 1984. Approximately 25 homes lie within 1/4 mile west of the property. Two offices and three homes are located on its southern edge. An estimated 1,000 people draw drinking water from wells within a 3-mile radius of the site. Groundwater is also used for crop irrigation and industrial processes.

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: 06/10/86

Threats and Contaminants

On-site groundwater and private wells contain low levels of metals such as lead and selenium from the former drum storage practices. Surface soils contained metals and organic contaminants. This site presents no significant threat to human health or the environment since cleanup actions and natural processes have reduced contaminant levels; however, people using private wells in the area should be advised that the natural levels of iron, manganese, and selenium in their wells are higher than standards recommend.

Cleanup Approach

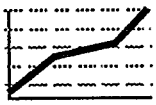
The site is being addressed in a single *long-term remedial phase* focused on cleanup of the entire site.

Response Action Status

Entire Site: After an intensive study of the soil and groundwater contamination at this site, the EPA selected a remedy of "No Further Action" in 1988. The EPA and the State agree that the site does not pose a significant threat to public health or the environment, and that undertaking additional cleanup steps would not be appropriate. The EPA started the process of deleting this site from the NPL in August of 1988.

Site Facts: The State ordered a potentially responsible party to conduct cleanup of surface contamination in September 1982.

Environmental Progress

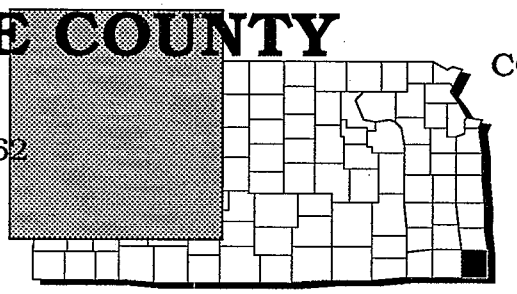


After intensive investigations, the EPA and the State determined that the Big River Sand site does not pose a threat to the community or the environment, and the process to delete the site from the NPL is currently under way.

CHEROKEE COUNTY

KANSAS

EPA ID# KSD980741862



REGION 7

CONGRESSIONAL DIST. 05

Cherokee County

Aliases:
Tar Creek Area Site
Tri-State Mining District
Tar Creek-Cherokee County

Site Description

The Cherokee County Kansas site is a mining area covering about 110 square miles in Cherokee County. It is part of a larger area sometimes called the Tri-State Mining District, which encompasses Cherokee County, Jasper County in Missouri, and Ottawa County in Oklahoma. One hundred years of widespread lead and zinc mining created piles of *mine tailings,* covering 4,000 acres in southeastern Cherokee County alone. The mine tailings contain lead, zinc, and cadmium, and these same metals have *leached* into the shallow groundwater. *Runoff* from the waste piles also moves contaminants into nearby streams. The EPA has divided this site into six subsites that correspond to six general mining locations. Cleanup work is further along at the Galena subsite, in the east-central portion of the entire site, than at the other subsites. This 25-square-mile area has large tracts of mine and mill wastes, water-filled craters where the ground has collapsed, open mine shafts, and pits. Wastes have affected the quality of the shallow groundwater, a primary drinking source for the residents of the area, and the surface water. Several heavy metals were found in water samples from private wells. Surrounding lands are used for residences, business, light industry, farming, and grazing. Of the 22,320 people living in Cherokee County, 3,600 of them reside in Galena. Galena's city water does not contain contaminants. Another 1,100 residents live outside the town and depend on groundwater from the contaminated *aquifer* for drinking supplies.

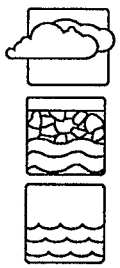
Site Responsibility: This site is being addressed through Federal and *potentially responsible parties'* actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/08/83

Threats and Contaminants



Radon gas from the mining operations has been detected in the air around the Galena subsite. Private wells in Galena contain lead, cadmium, selenium, zinc, and chromium. *Acidic* waters in mine shafts throughout the site contain significant concentrations of lead, zinc, and cadmium, as do the tailings piles and the surface water in the mine pits and streams across the site. Risks to human health include accidentally ingesting soil or mine wastes while playing in contaminated areas; inhaling contaminated household dust; stirring up and inhaling metal-laden

dusts while motorbiking on the tailings piles; touching contaminated soils, wastes, or surface waters; or consuming contaminated surface waters, foodstuffs, or groundwater. Acid mine drainage containing dissolved heavy metals contributes to the transport of heavy metals into the Spring River, Short Creek, and Shoal Creek, and analysts have found contamination in fish from local surface waters. Polluted mine water also surfaces in Oklahoma's Tar Creek.

Cleanup Approach

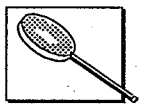
The site is being addressed in six stages: immediate actions and five *long-term remedial phases* directed at an alternate water supply; cleanup of the Spring River, Treece, and Baxter Springs subsites; and cleanup of the groundwater and surface water.

Response Action Status

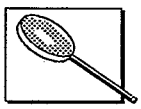
Immediate Actions: The EPA installed water treatment units on eight contaminated wells in Galena in 1986. In 1987, they undertook a county-wide well inventory and water supply monitoring program for public and private sources of water. This study showed that two more homes needed the treatment units. These units were installed, and along with the other units, continue to be maintained by the EPA. An alternate source of drinking water will be provided for two residences with wells contaminated by cadmium. Bottled water is being supplied to these residences until the alternate public water supply is operational.

Alternate Water Supply: The EPA selected an approach for supplying an alternate source of water to Galena in 1987. It features: (1) collecting clean groundwater through existing wells owned by the city; (2) distributing that water through a pipeline network to the houses, businesses, and farms within the subsite, but outside the municipal water system; (3) rehabilitating two wells needed for the project; and (4) drilling a new well if the existing ones cannot be fixed. The remedy includes the construction and equipment necessary to establish an alternate water supply to the area. Based on public comments, the EPA decided to amend the cleanup actions to include construction of deep aquifer wells to collect water. These wells will be maintained and operated independent of the City of Galena. System construction began in summer 1989, when the EPA began building two elevated water storage tanks. Drilling began on the first of two wells in late 1989. Water line construction cannot begin until all 418 water line easements have been acquired; to date, 326 easements have been acquired. Easement acquisition activities are expected to be completed in 1990, with water line construction activities now scheduled to commence in September 1990.

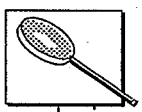
continued



Spring River Subsite: The Spring River runs through all the other subsites, and will be handled appropriately, pursuant to each respective subsite cleanup plan.



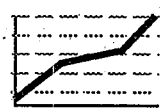
Treece Subsite: The EPA initiated investigative activities at the Treece subsite in 1988. The parties potentially responsible for contamination of this area took over the study in early 1990. This investigation is exploring the nature and extent of soil and water pollution at the subsite, and will recommend the best strategies for final cleanup. It is slated for completion in 1992.



Baxter Springs Subsite: The EPA initiated an investigation at the Baxter Springs subsite in 1987. The parties potentially responsible for contamination of this area took over the study in early 1990. This study is exploring the nature and extent of soil and water pollution at the subsite, and will recommend the best strategies for final cleanup.

Galena Groundwater and Surface Water: In 1989, the EPA, with the agreement of the State, selected a remedy for cleaning up the groundwater and surface water in the Galena subsite. It includes: (1) removing and selectively placing mine waste below the ground surface; (2) diverting surface streams to avoid the contaminants; (3) recontouring the land surface to control runoff and erosion; and (4) investigating deep aquifer wells. The engineering design for this remedy is expected to be completed in 1991.

Environmental Progress

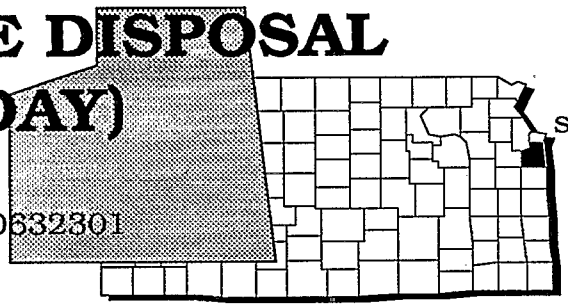


The EPA and the parties potentially responsible for the site contamination at the Cherokee County site have been actively involved in providing water treatment systems and a temporary alternate water supply to affected residents, reducing the potential for exposure to contaminants while further studies and cleanup actions are under way.

DOEPKE DISPOSAL (HOLLIDAY)

KANSAS

EPA ID# KSD980632301



REGION 7

CONGRESSIONAL DIST. 03

Johnson County

Southern bluffs of the Kansas River Valley

Alias:
Doepke-Holliday Site

Site Description

Between 1963 and 1970, the 80-acre Doepke Disposal Service site operated as a private industrial and commercial *landfill* and accepted unknown quantities of wastes such as paint *sludges*, solvents, pesticides, metal sludges, and fiberglass resins. Liquids *seeping* from the site flow through a *culvert* under Holliday Drive into the Kansas River. In the early 1960s, wastes were generally burned prior to burial. When open burning became unacceptable, pond storage of liquids was required. In 1966, with County approval, 374 drums of various pesticides and solvents were placed with fire debris in a trench; its exact location is unknown. When the State closed the site in 1970, the site was covered and terraced. Approximately 150 people live within 1 mile of the site, and 25,000 live within 3 miles. Residents of Johnson County get drinking water from 21 wells in the Kansas River *alluvial aquifer* and from a river *intake* about 3/4 mile downstream of the site; 200,000 people are served by these systems. About 30 wells lie within 3 miles; the nearest is 1/2 mile away. Contaminants are not *migrating* off site in large enough concentrations to affect water quality in the Kansas River.

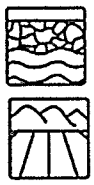
Site Responsibility: This site is being addressed through Federal and *potentially responsible parties'* actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/08/83

Threats and Contaminants



The groundwater, soil, and *leachate* are contaminated with a variety of *volatile organic compounds* (VOCs), pesticides, *polychlorinated biphenyls* (PCBs), *polycyclic aromatic hydrocarbons* (PAHs), and heavy metals from former waste disposal activities. Subsurface soils and wastes contain significant concentrations of contaminants and could threaten people working or trespassing on the site. On-site contaminated groundwater is not being used, so exposure to contaminants is unlikely.

Cleanup Approach

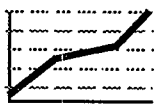
This site is being addressed in a single *long-term remedial phase* focusing on cleanup of the entire site.

Response Action Status

Entire Site: The EPA selected a remedy for this site in 1989 featuring: (1) removal and off-site treatment of contaminated liquids currently ponded underground in the area of the former surface *impoundments*; (2) construction of an impermeable multi-layer *cap* over the majority of the waste disposal area; (3) collection and, if necessary, off-site treatment of significant groundwater seepage; (4) extended groundwater monitoring to evaluate the effectiveness of the remedy; and (5) deed and access restrictions. The EPA is negotiating with the potentially responsible parties for performance of the remedy. The cleanup activities are scheduled to begin in 1991.

Site Facts: In 1987, Deffenbaugh Industries, Inc. entered into a *Consent Agreement* with the EPA to study site contamination and develop cleanup options.

Environmental Progress

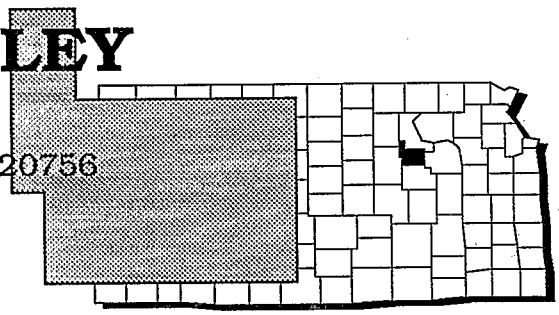


Following the listing of this site on the NPL, the EPA completed a site assessment and determined that the Doepke Disposal site poses no immediate threat to public health or the environment while further studies and cleanup actions are being taken.

FORT RILEY

KANSAS

EPA ID# KS6214020756



REGION 7

CONGRESSIONAL DIST. 02

Geary County

Near Junction City

Site Description

The Fort Riley site is a 152-square-mile Army base. Fort Riley, established in 1853, has been a major fort since the Civil War. Its operations are diverse and involve seven *landfills*, numerous motor pools, burn and firefighting pit areas, hospitals, pesticide and mixing areas, dry cleaners, and shops. *Volatile organic compounds* (VOCs), pesticides, waste motor oils, chlorinated solvents, and mercury were deposited in landfills above and below the water table and were spilled or dumped on the ground near buildings. The most serious problems are the sanitary landfill at Camp Funston and spills of dry cleaning solvents and pesticide residues at the Main Post. Groundwater along the Republican and Kansas Rivers is the sole source of drinking water for Fort Riley, Ogden, and Junction City. A Fort Riley water supply well is 3/4 mile from a former dry cleaning building. Municipal and Army wells within 3 miles of the base provide drinking water for approximately 47,800 people. Groundwater also is used for crop irrigation. People use the Kansas River along the site property for recreational activities.

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

NPL LISTING HISTORY

Proposed Date: 07/14/89

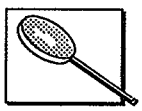
Threats and Contaminants

A 1984 study revealed vinyl chloride and other VOCs, in shallow monitoring wells *downgradient* of the Camp Funston landfill. Pesticides have been found in soils. Landfill debris contains waste oils and *degreasing* solvents. This site is in the floodplains of the Republican and the Kansas Rivers, and high waters could move contaminants into these recreational streams. Fort Riley is the winter home of the endangered bald eagles, and exposure to chemicals there is a threat to them.

Cleanup Approach

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

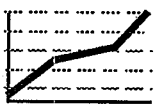
Response Action Status



Entire Site: In 1990, under EPA monitoring, the Army will begin an intensive study of soil and groundwater contamination at the site. The Army Corps of Engineers has written plans for an intensive investigation of the Camp Funston landfill and a preliminary investigation at the Old Dry Cleaning facility and Pesticide Storage Building. Under an *Interagency Agreement,* Fort Riley will investigate other potential areas of contamination on the installation.

Site Facts: Fort Riley is participating in the *Installation Restoration Program* (IRP). The Department of Defense runs this program on its own facilities to identify, investigate, and clean up contamination from hazardous materials.

Environmental Progress

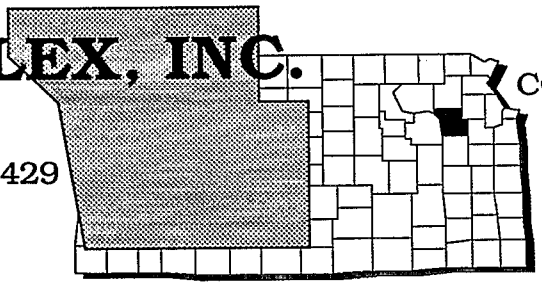


After adding this site to the NPL, the EPA and the Army Corps of Engineers assessed site conditions and determined that there were no immediate actions needed at the Fort Riley site while studies and long-term cleanup activities are taking place.

HYDRO-FLEX, INC.

KANSAS

EPA ID# KSD007135429



REGION 7

CONGRESSIONAL DIST. 02

Shawnee County

Topeka

Site Description

Since 1970, Hydro-Flex, Inc. has manufactured specialized tubing, hoses, heat exchangers, and fittings at this 3-acre site. From 1970 to 1981, operators discharged rinse water and *sludges* from a chromate metal finishing bath through a septic tank and into a series of buried silos. Wastes were also discharged into the on-site well. These open-ended vertical shafts were filled with porous fill material and penetrated to within 2 feet of an *aquifer* that is the sole source of drinking water in the area. Operators discharged a maximum 320 gallons per day to the silos, and periodically allowed overflow of wastes from the third silo onto neighboring cropland. These techniques were abandoned when municipal sewers became available in 1981. The silos were filled with sand and covered with earth. In 1987, the Kansas Department of Health and the Environment detected process-related metals in on-site wells. A 1989 site visit showed that access to the site is unrestricted, but tall grass had covered the disposal areas and they appeared untouched for some time. The only evidence of the past disposal practice is distressed plant growth and discolored soils over the three areas. Approximately 30 people live within a 1-mile radius of the site, many in older residences that predate the industrial zoning of the area. Approximately 6,500 people obtain drinking water from public and private wells within 3 miles of the site. The Kansas River and Soldier Creek are within a 1-mile radius of the site, and Topeka's surface water *intake* on the Kansas River is located about 1 mile to the south. Two public supply wells lie about 1 1/2 miles northeast of the site.

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

NPL LISTING HISTORY

Proposed Date: 06/24/88

Final Date: 03/31/89

Threats and Contaminants

Groundwater both on and off the site is contaminated with various heavy metals. The chief threat to human health from this site is drinking contaminated groundwater.

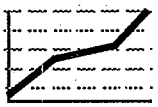
Cleanup Approach

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

Response Action Status

Entire Site: Under State monitoring, the parties potentially responsible for site contamination are conducting an investigation to determine the nature and extent of contamination and strategies for final cleanup. The investigation is scheduled to be completed in 1992.

Environmental Progress

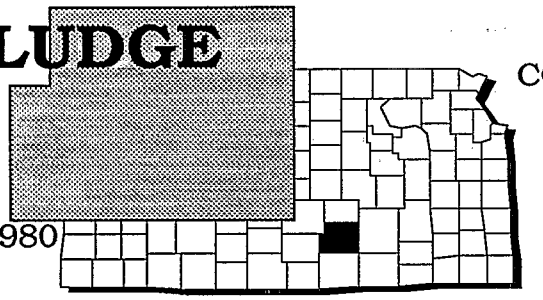


Following listing of this site on the NPL, the EPA determined that the Hydro-Flex site poses no immediate threat to public health or the environment while the potentially responsible parties complete further studies and start long-term cleanup activities.

JOHNS' SLUDGE POND

KANSAS

EPA ID# KSD980631980



REGION 7

CONGRESSIONAL DIST. 04

Sedgwick County

Wichita

Alias:
Johns' Oil Sludge Pit

Site Description

The Johns' Sludge Pond site covers 1/2 acre and is located in a sparsely populated, heavily industrialized area within the northern limits of the City of Wichita. From 1951 to 1970, Super Refined Oil, which is no longer in business, recycled waste oil and disposed of an estimated 7,000 cubic yards of oily *sludge* into an unlined pond. The principal hazard associated with the site was the *acidity* of the sludge and the water layer above it. Historically, the site would overflow periodically during periods of heavy rainfall, releasing its contents to the surrounding surface waters. Most of the site was owned by the Johns' Estate. The City of Wichita condemned the remainder of the site in the 1970s to provide drainage along the adjacent highway and, as a result, owns the remainder of the property. A drainage ditch adjacent to the site carries surface water from the site to Chisholm Creek, 1 1/2 miles *downgradient* of the site; Chisholm Creek flows into a concrete ditch receiving *runoff* from the adjacent highway and empties into the Arkansas River south of the city. Approximately 175 people reside within 1 mile of the site, and 3,000 people are within 3 miles of the site. A number of private wells are in the area. Fishing takes place in a *borrow pit* located adjacent to the site.

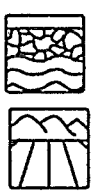
Site Responsibility: This site is being addressed through Federal and *potentially responsible parties'* actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/08/83

Threats and Contaminants

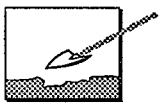


The EPA found heavy metals including lead, cadmium, and chromium, as well as *volatile organic compounds* (VOCs) and *polychlorinated biphenyls* (PCBs) in groundwater on and very near the site. The sludge contains PCBs and heavy metals including aluminum, lead, chromium, and zinc. The acid sludge was neutralized and then encapsulated on site. Therefore, it poses no threat to human health or the environment.

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

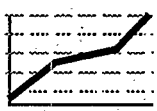


Initial Actions: Under EPA monitoring, the City of Wichita's Department of Public Works removed sludge from the *impoundment* and stockpiled it on the adjacent ground surface; installed a compacted clay soil liner on the bottom and sidewalls of the empty impoundment; solidified stockpiled sludge with cement kiln dust and redeposited it in the lined disposal *cell*; constructed a compacted clay *cap* above the solidified sludge; and covered the cap with soil and vegetation. Deed restrictions were placed on the property, preventing land uses which would interfere with the effectiveness of these actions. The site was fenced to prevent dirt bike riding and other activities that could damage the cap and cover, and no trespassing signs were posted. The EPA decided to install additional monitoring wells to determine the direction of groundwater flow and the nature and degree of contamination, if any, of downgradient groundwater. Sedgwick County and the City of Wichita are conducting post-*closure* monitoring and maintenance of the cap and vegetative cover under the plan previously approved by the EPA.

Entire Site: After an intensive study of the site and consultation with the State of Kansas, the EPA determined that no further cleanup actions are required for the Johns' Sludge Pond at this time. The EPA finds that the cleanup already conducted at the site by the City of Wichita meets standards to protect human health and the environment.

Site Facts: In 1983, the EPA issued a *Consent Order* to the City of Wichita requiring the City to submit a site cleanup plan for EPA's approval. An interim cleanup plan was submitted, approved, and implemented. The EPA evaluated the adequacy of the interim cleanup and, in 1989, determined that no further action is required at the site, except for continued site monitoring and maintenance.

Environmental Progress

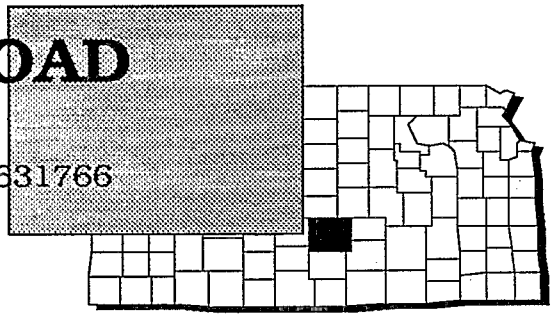


The numerous cleanup actions performed by the City of Wichita have greatly reduced the potential for exposure to hazardous substances at the Johns' Sludge Ponds site. The EPA has determined that no further cleanup actions are needed at this time, and that the site is once again safe to nearby residents and the environment. The site will be closely monitored to assure long-term effectiveness of the cleanup actions.

OBEE ROAD

KANSAS

EPA ID# KSD980631766



REGION 7

CONGRESSIONAL DIST. 04

Reno County

Obeeville

Alias:
Hutchison City Dump

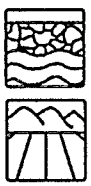
Site Description

The Obee Road site is a *plume* of contaminated groundwater located in Obeeville. An investigation in 1983 by the Kansas Department of Health and Environment (KDHE) was prompted by a citizen's concerns over the taste and odor of his well water. Sampling by KDHE showed *volatile organic compounds* (VOCs) in the shallow *aquifer*. The source of the contamination is suspected to be an old city *landfill* on the eastern edge of the Hutchinson Municipal Airport. Before closing in 1973, the landfill accepted unknown quantities of liquid wastes and sludges from local industries as well as solvents from small metal-finishing operations at local aircraft plants. The landfill is now covered with vegetation. Septic tank systems in the area are another potential source of contamination. Approximately 1,900 people in Obeeville obtained drinking water from private wells that drew water from the contaminated aquifer before alternate water sources were provided. The area around the site is rural; some residents have farm animals on their property.

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

NPL LISTING HISTORY
Proposed Date: 01/22/87
Final Date: 07/22/87

Threats and Contaminants

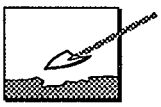


Groundwater is contaminated with VOCs, such as *trichloroethylene* (TCE), vinyl chloride, and chloroform. Soil is contaminated with VOCs such as meta-xylene and toluene. Although the residents in the area are now connected to the public water supply, the private wells have not been plugged. Therefore, there is the possibility the contaminated groundwater may be used for domestic purposes, such as watering gardens. Should the contaminants accumulate in the vegetables, people who eat them may be at risk. In addition, people who touch or accidentally ingest the contaminated soil may suffer adverse health effects.

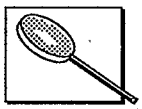
Cleanup Approach

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

Response Action Status



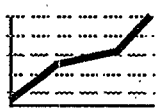
Initial Action: In 1985, the City of Hutchison constructed a water line extension to the residents affected by the contaminated well water. An alternate water supply was also provided to the Obee school system, adjacent to the landfill, which was drawing water from a contaminated well.



Entire Site: The potentially responsible parties, under State supervision, are conducting a study to determine the extent of the problem and to identify the sources responsible. This study, due to be completed in 1992, will lead to the selection of the final cleanup alternative.

Site Facts: In March 1990, a group of the parties potentially responsible for site contamination signed a *Consent Agreement* with KDHE to complete an investigation of the site.

Environmental Progress

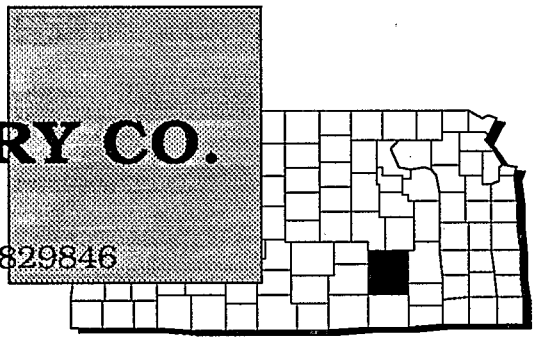


Providing an alternative water supply greatly reduced the potential for exposure to contaminants. After adding the Obee Road site to the NPL, the EPA determined that no other immediate actions were required to make the site safer while the investigations leading to a selection of a final cleanup remedy are taking place.

PESTER REFINERY CO.

KANSAS

EPA ID# KSD000829846



REGION 7

CONGRESSIONAL DIST. 05

Butler County

El Dorado

Site Description

The Pester Refinery Co. site occupies 10 acres in El Dorado. Refinery operations began in 1917. Refining wastes have been stored in the burn pond. These materials were periodically ignited through the mid-1970s. The burn pit is adjacent to the West Branch of the Walnut River, which is used for recreational activities. In 1987, the Kansas Department of Health and Environment (KDHE) found *seepage* from the *impoundment* entering the river and later the same year confirmed contamination of the river. Seepage from the burn pond has been diked, forming a seepage pit. Rainwater and contaminated pond water, which have accumulated at the *lagoon* surface, have overflowed on occasion and discharged to the river and adjacent floodplain. An estimated 160 people obtain drinking water from private wells within 3 miles of the site.

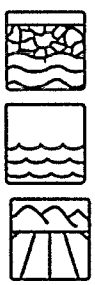
Site Responsibility: This site is being addressed through Federal and State actions.

NPL LISTING HISTORY

Proposed Date: 06/24/88

Final Date: 03/29/89

Threats and Contaminants

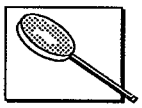


Groundwater contaminants include *volatile organic compounds* (VOCs) such as vinyl chloride and lead. Heavy metals including lead and chromium and VOCs have contaminated the burn pond *sediments*. The soil is contaminated with heavy metals. The burn pond *sludge* and surface water are contaminated with heavy metals and VOCs. Direct contact with contaminated soil, sediments, or water could be a health threat. Accidental ingestion of these media could also pose a health risk. This site lies within the 100-year floodplain, and if flooding did occur, contamination could spread.

Cleanup Approach

The site is being addressed in a single *long-term remedial phase* directed at cleanup of the entire site.

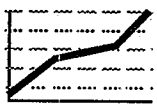
Response Action Status



Entire Site: The State is conducting negotiations with potentially responsible parties to investigate the nature and extent of the contamination at the site. The study is expected to be completed in 1992.

Site Facts: In 1986, the State issued an *Administrative Order* to Pester to conduct studies on how to close the impoundment. The owner has demonstrated that he cannot afford to pay for the cleanup and has filed for bankruptcy. A past owner and the creditors of the bankrupt entity are presently negotiating with the State.

Environmental Progress

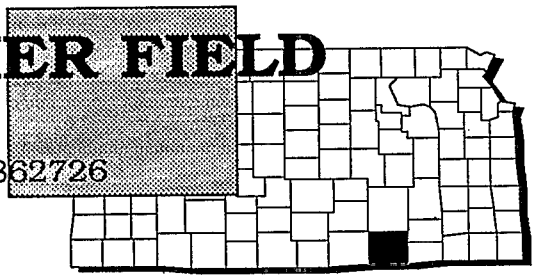


After listing the Pester Refinery site on the NPL, the EPA determined that no immediate actions were necessary while investigations leading to the selection of a final cleanup remedy are taking place.

STROTHER FIELD

KANSAS

EPA ID# KSD980862726



REGION 7

CONGRESSIONAL DIST. 05

Cowley County

Near Winfield and Arkansas City

Site Description

Strother Field Industrial Park is located near Winfield and Arkansas City and covers approximately 2 square miles. Until 1946, the site was a military facility. The site now consists of about 20 industrial and commercial businesses as well as two inactive solid waste *landfills*. The landfills were used for the disposal of various industrial wastes. Groundwater contamination with *volatile organic compounds* (VOCs) has been documented. Until 1983, the Strother Field Commission operated a water supply system, consisting of eight wells on the site. The groundwater is no longer used for drinking, but still is used for industrial processes. Drinking water was brought in by tank truck until the Commission installed two wells *upgradient* of the contaminant *plume*. Approximately 2,300 people live within a 3-mile radius of the site. The size of the worker population at the industries on the site is approximately 2,000. There are private and public wells located in the vicinity of the site; some private wells are in the industrial park.

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: 06/10/86

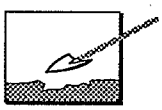
Threats and Contaminants

Samples collected and analyzed by the State indicated the presence of VOCs, including *trichloroethylene* (TCE) in several wells used for industrial processes only. The contaminated groundwater may pose health risks to individuals who drink it accidently or come in direct contact with it, or cleanup workers who may inhale VOCs generated from the *air stripping* operations taking place on the site.

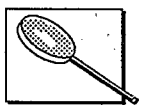
Cleanup Approach

The 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



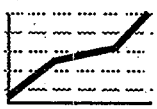
Immediate Actions: After the use of the industrial park wells as a source of drinking water was discontinued, water was brought in by tank trucks. The Strother Field Commission installed two wells upgradient of the contaminated plume to supply water. Two of the eight wells remained in use to supply process water for the industries located on the field. For the last several years, the Strother Field Commission has pumped these wells in order to contain groundwater contamination beneath the site. In 1985, General Electric installed groundwater extraction wells and air stripping towers to remove VOCs from the groundwater under an *Administrative Order* with KDHE.



Entire Site: The State will monitor an investigation by potentially responsible parties, scheduled to begin in 1990, that will identify the types of contaminants remaining in the groundwater and other areas and remedies for final site cleanup.

Site Facts: In 1985, the State issued an Administrative Order to General Electric Co., one of the parties potentially responsible for wastes associated with the northern zone of the site. The order called for the company to sample soil; monitor groundwater; construct a groundwater flow model and use it to help locate, construct, and operate withdrawal wells under the guidance of the State; and to submit a plan for a treatment and disposal system. The State issued another Administrative Order in January 1986 to each of the four potentially responsible parties associated with the southern zone of the site. The order requires one potentially responsible party to treat the water from the public supply well, each of the companies to drill monitoring wells on the southern end of the field, and three of the parties to submit data on chemical use during the past 20 years. In March 1990, General Electric signed a *Consent Agreement* with the KDHE to complete an investigation of the site.

Environmental Progress

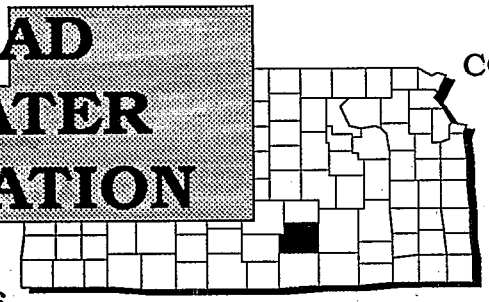


The Strother Field Commission and General Electric, in conjunction with the State and the EPA, have greatly reduced the possibility of drinking contaminated groundwater by supplying a safe drinking water source and installing a treatment system for the groundwater while studies into a final cleanup solution for the Strother Field site are under way.

29TH & MEAD GROUNDWATER CONTAMINATION

KANSAS

EPA ID# KSD007241656



REGION 7

CONGRESSIONAL DIST. 04

Sedgwick County

Wichita

Site Description

The 29th & Mead Groundwater Contamination site covers approximately 1,440 acres at the intersection of 29th and Mead Streets in a highly industrialized area of Wichita. Heavy metals and organic contamination are present in significant concentrations in shallow on- and off-site wells, according to tests conducted by the Kansas Department of Health and Environment (KDHE) and the U.S. Geological Survey from 1983 to 1986. The actual boundary and the extent of groundwater contamination have not been clearly defined. There are several potential industrial sources of contamination in the area that include both facilities currently in operation and facilities that have ceased operations. An estimated 3,300 people obtain drinking water from public and private wells drawing from the shallow *aquifer* within 3 miles of the site.

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

NPL LISTING HISTORY

Proposed Date: 06/24/88

Final Date: 02/21/90

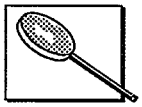
Threats and Contaminants

The groundwater is contaminated with *volatile organic compounds* (VOCs) including *trichloroethylene* (TCE), carbon tetrachloride, toluene, and vinyl chloride from as-yet-undetermined sources. The contaminated groundwater could adversely affect the health of individuals if it is accidentally ingested. Also, the contamination on site could pollute Chisholm Creek, which is used for recreational purposes.

Cleanup Approach

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

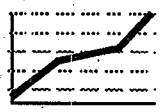
Response Action Status



Entire Site: The parties potentially responsible for the groundwater contamination are carrying out an investigation on the site to determine the extent and the nature of the contaminants. The work is expected to be completed in 1991. The results of the investigation will determine the methods to be used for the site cleanup. The site cleanup is expected to be completed by 1995.

Site Facts: KDHE has identified more than 70 parties potentially responsible for the wastes associated with groundwater contamination at and in the vicinity of the site. In 1987, the parties organized a steering committee to negotiate future investigation and remedial activities. In 1989, the steering committee signed a *Consent Agreement* with the KDHE to complete an investigation of the site.

Environmental Progress



Extensive investigations are taking place to determine the source of contamination at the 29th and Mead Groundwater Contamination site so that cleanup efforts may be started. The EPA has determined that the site does not currently pose an immediate threat to the neighboring communities or the environment as long as the contaminated wells are not used.

GLOSSARY:

TERMS USED IN THE FACT SHEETS

This glossary defines the italicized terms used in the site fact sheets for the State of Kansas. 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. Therefore, 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.

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.

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.

Borehole: A hole drilled into the ground used to sample soil and groundwater.

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

GLOSSARY

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.

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.

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

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

Consent Order: [see Administrative Order on Consent].

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.

Downslope: [see Downgradient].

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.

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

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

Lagoon: A shallow pond where sunlight, bacterial action, and oxygen work to purify wastewater. Lagoons are typically used for the storage of wastewaters, sludges, liquid wastes, or spent nuclear fuel.

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.

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.

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

Polychlorinated Biphenyls (PCBs): A group of toxic chemicals used for a variety of purposes including electrical applications, carbonless copy paper, adhesives, hydraulic fluids, microscope 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.

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

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

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.