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Agency

Solid Waste And
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November 1990

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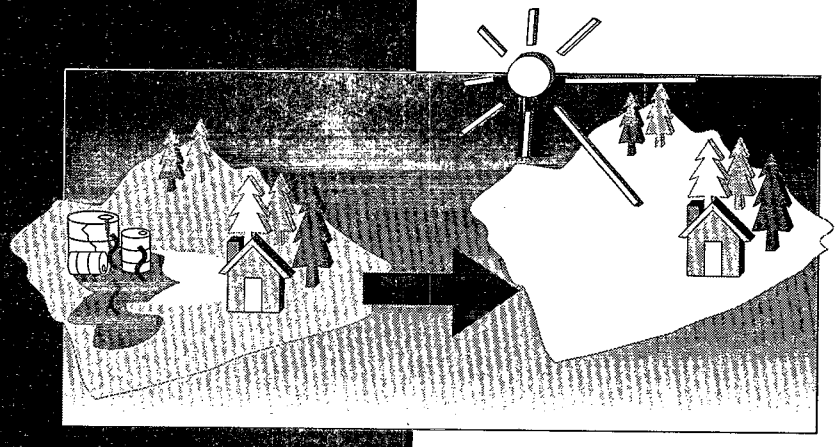
SUPERFUND:

ENVIRONMENTAL PROGRESS



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SUPERFUND:
Environmental Progress

U.S. Environmental Protection Agency
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Office of Program Management
Washington, DC 20460

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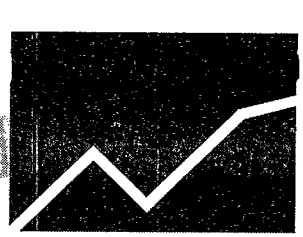


Executive Summary

Superfund, the Nation's program to clean up uncontrolled hazardous waste sites, is now ten years old. During this time thousands of actions have been taken to protect people and the environment from the hazards these sites pose. Some of these actions have been responses to emergencies such as hazardous waste spills, while others have been long term actions to clean up contamination that may have been accumulating for decades.

While Superfund has made many gains in terms of protection of human health and the environment, to date little attention has been paid to any measures other than the number of sites deleted from the National Priorities List. This report explains some of Superfund's environmental progress in terms of new measures called environmental indicators. These indicators relate to:

1. **Controlling Acute Threats to People and the Environment**
2. **Achieving Long-Term Cleanup Goals for Sites; and**
3. **Removing Contamination from the Environment.**

The following information shows that EPA has indeed made substantial progress in making these sites safe in the short term, and clean in the long term.

SUPERFUND — ENVIRONMENTAL PROGRESS

A Snapshot of the Superfund Program

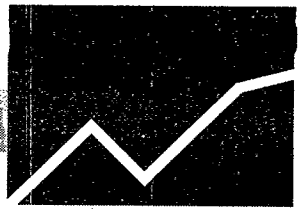
Hazardous waste, improperly disposed over time. . . complex chemical combinations. . .contamination that may affect surface water, soil or groundwater. . . properties that change hands leaving indistinct records. . . pioneer technology. . .and evolving scientific knowledge. These are some of the challenges facing the Environmental Protection Agency as it cleans up America's abandoned hazardous waste sites.

There are currently about 1200 sites on the National Priorities List (NPL), EPA's list of the worst hazardous waste sites in the Nation.

WHAT IS THE NATIONAL PRIORITIES LIST?

Congress directed EPA to apply Superfund monies to the Nation's most serious hazardous waste sites. In response, the Agency developed the Hazard Ranking System, which evaluates and scores site threats. Any site that tops the System's cutoff score joins the National Priorities List. This list, which encompasses the most serious sites yet discovered, currently stands at 1,236.

EPA or State agencies are working at each NPL site, identifying the contaminants and the threats they pose, estimating the risks faced by people and the environment, designing remedies, or actively cleaning up sites. Each year, EPA also responds to several hundred emergencies—hazardous waste spills and fires in abandoned industrial buildings, for example—that involve dangerous chemicals.



Each emergency is unique in its environmental urgency, populations at risk, chemical mixtures, and physical setting. The combination of the 1,236 NPL sites and the hundreds of emergencies at non-NPL sites each year creates a cleanup problem of unprecedented complexity.

The Superfund program is now ten years old and has only recently come to grips with a challenging array of conflicting expectations for the performance of this program. The law directs EPA to protect public health by meeting strict cleanup standards at each site. At the same time EPA must contend with limited time and money, as well as with State and community acceptance. Prompt and effective cleanup are expected at all sites on the NPL, using a finite pool of resources. New treatment technologies must be tried and developed, yet human and ecological health must be guaranteed. And the pressure for faster cleanups remains constant.

A New Strategy for the Program — *Worst Problems at Worst Sites First*

In June of 1989, William K. Reilly, the new Administrator of EPA, commissioned a Task Force to examine the difficulties experienced by the Superfund program. The result of this study, the *Superfund Management Review*, not only examines many of the chronic problems encumbering the program, but also outlines a clear new strategy for Superfund. The strategy emphasizes more use of EPA's enforcement powers to ensure that polluters pay to clean up the problems they created. It also revitalizes the Agency's approach to Fund-financed cleanup actions. Reduced to its environmental essence, the new Superfund mission is "make sites safe, make sites clean, and bring new technology to bear on the problem." In this way, EPA can work on the "worst problems at worst sites first." The heart of the new mandate is to streamline and better focus Superfund on the environmental problems that pose the greatest threats nationwide.

> ***" make sites safe, make sites clean, and bring new technology to bear on the problem."***

EPA's new "worst problems at worst sites first" strategy means a new emphasis on *incremental* site cleanups to target attention on highest priority problems found in three environmental *pathways*: land, groundwater, and surface water

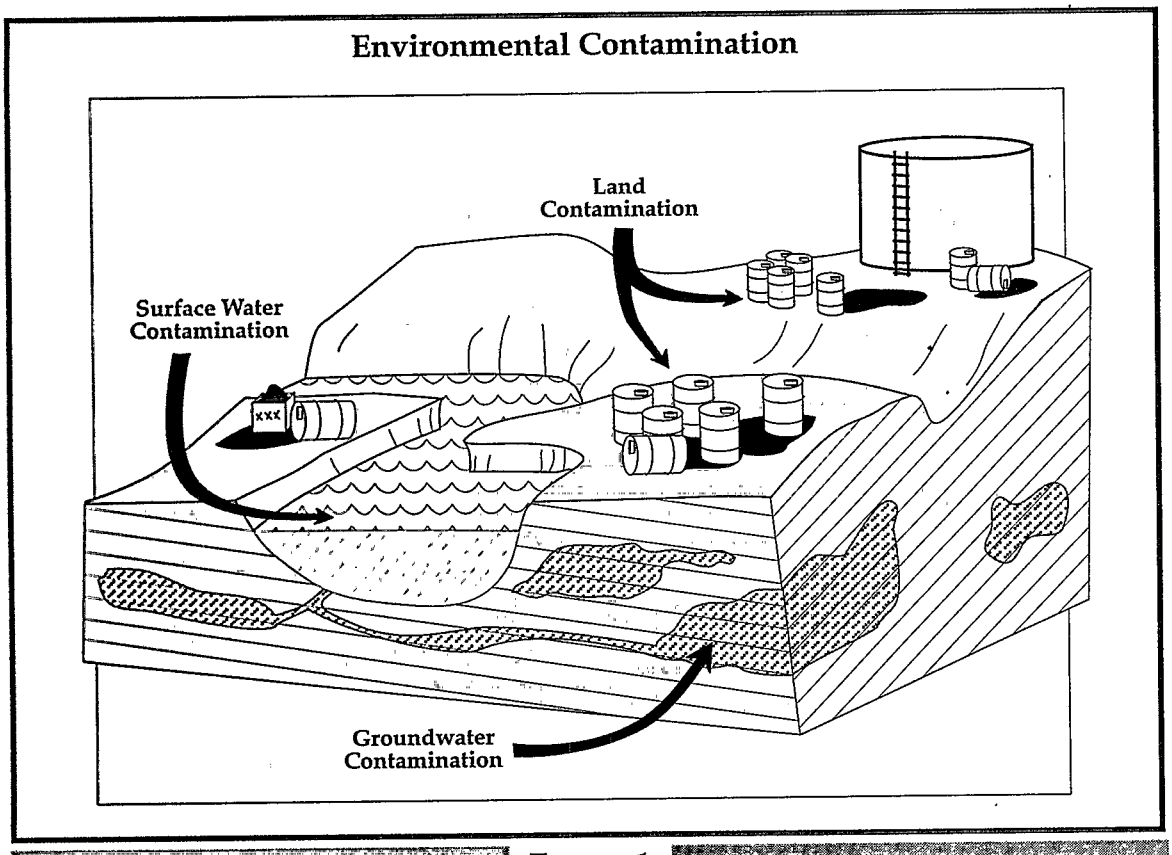
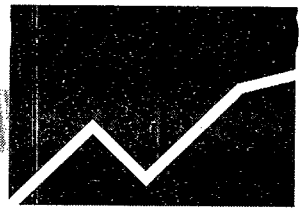


FIGURE 1

(see Figure 1). Instead of concentrating on continuous and complete cleanup of a few major sites, resources must be apportioned to assure the greatest degree of public safety at the largest number of sites, while the longer process of total site cleanup on a national scale steadily moves forward. Thus, deleting a site from the NPL becomes an increasingly distant goal, as we focus on the more meaningful task of solving immediate problems affecting public health and safety.



Environmental Indicators — *New Measures of Progress*

The last several years have seen the emergence of a strong infrastructure in the Superfund program to enable more efficient and effective cleanups. The program is making real environmental gains and has developed a new means of portraying environmental progress. These new measures—Environmental Indicators—have been developed to illustrate in terms more familiar to the public, tangible improvements to the environment brought about by the Superfund program. The program can now report on three environmental indicators that directly relate to the Administrator's new strategy for Superfund:

1. Making Sites Safe — Controlling Acute Threats to People and the Environment

2. Making Sites Clean — Achieving Long-Term Cleanup Goals for Sites

3. Bringing Technology to Bear on the Problem — Removing Contamination from the Environment

To evaluate its pursuit of the "worst problems at worst sites first" strategy, the Superfund program reviewed the work done between 1980 and 1989 on:

- The approximately 1200 sites on the National Priorities List, and

- The approximately 1300 additional emergency actions at sites not on the NPL.

The condition of the land, groundwater, and surface water has substantially improved.

The environmental information gathered on these sites will continue to be updated on a yearly basis.

Cleanup activities at these sites were performed by EPA, the State, and parties who had caused the contamination. These activities resulted in measurable environmental progress. The condition of the land, groundwater, and surface water has substantially improved. The information gathered resulted in the following conclusions.

Progress in Controlling Immediate Threats — *Has EPA Made Sites Safe?*

• EPA has evaluated over 1200 sites on the National Priorities List for immediate risks to the public or the environment. To date 356 sites on the NPL have needed emergency response action, and in every case emergency response actions have been taken to make these sites safe (see Figure 2).

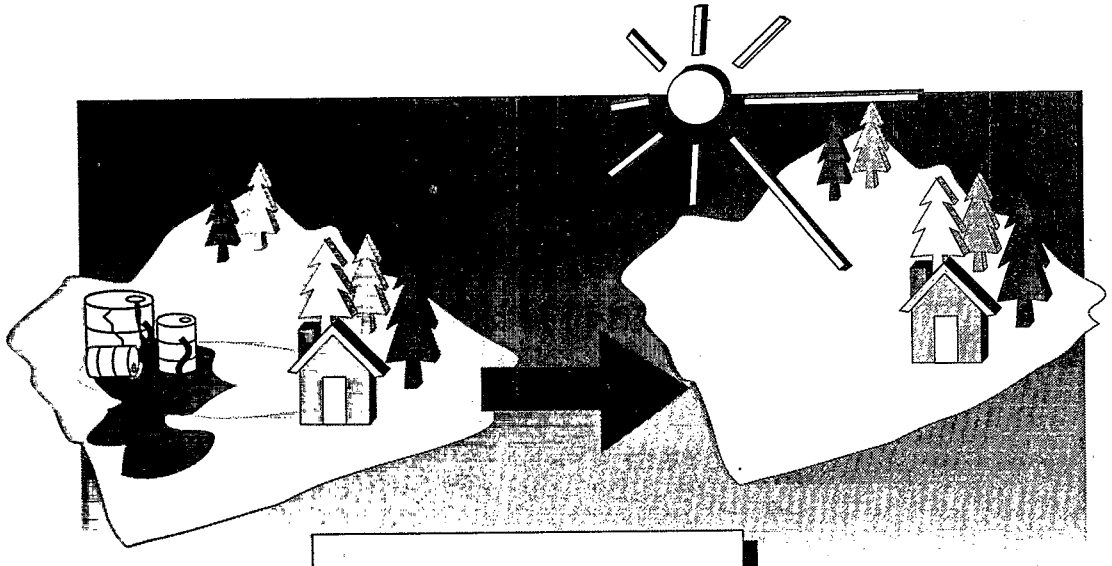
• EPA performed over 1300 emergency actions at non-NPL sites to make them safe.

• Emergency actions performed at both NPL and non-NPL sites to control immediate threats to the public health and the environment include:

– Stabilizing hazardous waste to prevent fires and explosions,

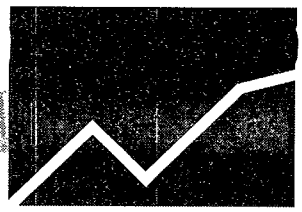
– Evacuating and relocating people, to protect them from exposure to hazardous wastes,

Superfund Sites Made Safe or Clean



356 NPL Sites Made Safe
1300 Non-NPL Sites Made Safe
318 NPL Sites Becoming Clean

FIGURE 2



- Removing, treating, or containing wastes,
- Providing emergency water supplies, and
- Providing site security to keep people away from hazardous sites.

- EPA has protected thousands of people through these actions:
  - Over 267,000 people supplied with alternative water for their home water supplies.
  - Almost 20,000 people evacuated or relocated to protect them from hazardous substances; 87% have returned to their homes, the rest were permanently relocated.

Progress in Reaching Goals for Permanent Site Cleanup — *Is EPA Making Sites Clean?*

Superfund has performed actual "hands on" work leading to permanent cleanup...

- Every site on the NPL has received attention under the Superfund program.

- To date Superfund has completed the field investigations and engineering studies necessary to start cleanups at over 1000 sites (see Figure 2).

- Superfund has performed actual "hands on" work leading to the permanent cleanup of 318 NPL sites. This action includes:
  - Construction and operation of permanent treatment facilities, incinerators, and pumping stations, to clean the land, surface water, and groundwater.
  - Placing contaminated materials in secure disposal facilities.

- Many of these same sites also had emergency action to control immediate threats to people and the environment.

• At these 318, sites Superfund has significant work underway on 409 land, groundwater, and surface water *pathways*, and of these has completely cleaned up 82 *pathways*.

Using Technology to Remove Contamination from the Environment — *Is EPA Bringing Technology to Bear on the Problem?*

• Enormous amounts of contaminated materials have been treated, isolated, neutralized, or removed from the environment (see Figure 3). Preliminary counts, where information is available, reveal:

- 9,400,000 cubic yards of contaminated soil and solid waste have been taken out of the environment and properly disposed—enough to cover more than 5000 football fields, a foot deep.

- 3,880,000,000 gallons of contaminated groundwater have been treated and returned to the environment — over 15 gallons for every person in the United States.

Waste Removed from the Environment

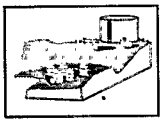
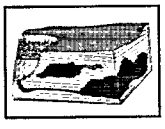
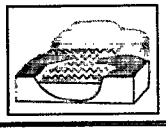
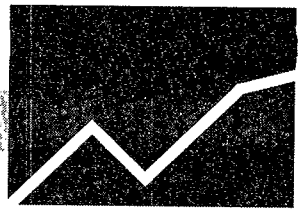
Pathway		Volumes Addressed
	**Land Surface:**	
	Soil	4,130,000 cubic yards
	Solid Waste	5,270,000 cubic yards
	Liquid Waste	1,000,000,000 gallons
	Groundwater:	3,880,000,000 gallons
	**Surface Water:**	104,000,000 gallons

FIGURE 3



- 1,000,000,000 gallons of liquid wastes have been removed from the soil and treated

- 104,000,000 gallons of contaminated surface water have been cleaned and made reusable.

• Treatment, the most permanent way to deal with hazardous waste problems, was part of the cleanup in more than 70 percent of the NPL site remedies selected in 1989; in 1987, treatment was used in only half of the remedies selected. Treatment technologies include:

The use of treatment, especially "innovative" technologies, will continue to increase.

- incineration,
- air stripping,
- bioremediation
- pumping and treating groundwater, and
- thermal treatment.

• To date, it has been more technically feasible to isolate and contain soils contaminated with hazardous substances to prevent contact with people or the environment. Groundwater and surface water are most often treated to make them safe for reentry into the environment.

• As we start new cleanups, the use of treatment, especially "innovative" treatment technologies, will continue to increase.

So Where Does the Superfund Program Stand?

Superfund has now reached operating speed, and is starting to show real progress. Yes, there is more work to do, and more technologies to develop to elimi-

nate the dangers of these wastes. Resources are limited and some sites may take decades to totally clean up. We now understand more clearly than ever that sites that have festered 40-50 years won't vanish overnight. The work goes on.

Since final cleanup is a distant goal in many cases, the public is better served by our "Worst First" approach where the most urgent problems are dealt with first, and total site cleanups are completed in the long term. In fact, the Worst First concept for reducing risk to people and the environment is gaining momentum Agency-wide in all of our environmental programs. As new sites continue to be added to the NPL, priorities will evolve and change to reflect relative risks of the sites we encounter. Observers who measure Superfund's success by the number of sites deleted from the NPL may be frustrated by this new approach. But protection of public health and the environment is Superfund's first goal, and that goal is best met by our Worst Problems At Worst Sites First Strategy. It will become ever more important to understand and recognize the tremendous amount of incremental work that is being done by Superfund nationwide in reaching this goal. This report shows some of the success of this endeavor.

". . . protection of public health and the environment is Superfund's first goal."

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