
July 1995

SUPERFUND

Information on Current Health Risks





United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-261507

July 19, 1995

The Honorable Christopher S. Bond
Chairman, Committee on Small Business
United States Senate

Dear Mr. Chairman:

Superfund cost estimates are growing at a substantial rate. The Superfund program was authorized through 1994 at \$15.2 billion, covering over 1,100 nonfederal sites on the National Priorities List (NPL).¹ These figures could grow to \$75 billion (in 1994 dollars) and 4,500 nonfederal sites, according to the Congressional Budget Office (CBO).² Because of these escalating costs, congressional decisionmakers want to know more about the human health risks addressed by the program. Although the Administrator of the Environmental Protection Agency (EPA) recently testified to the Congress that approximately 73 million people live fewer than 4 miles from at least one Superfund site, much debate has occurred about the extent to which these sites pose health risks for cancer or other conditions, such as birth defects or nerve or liver damage.

To help measure the health risks from Superfund sites, you asked us to provide the best available information on (1) the extent to which sites may pose health risks under current land uses, as opposed to the risks that may develop if land uses change in the future; the nature of the current risks; and the types of environmental media (e.g., groundwater, soil, or air) that pose these risks and (2) whether EPA's short-term response actions to mitigate the health risks from Superfund sites have reduced the risks under current land uses. This report presents our findings on these issues as they relate to the 225 nonfederal NPL sites contained in EPA's data base on health risks from Superfund sites—the most comprehensive automated information available as of early 1995. These sites constitute most of the sites where EPA made cleanup decisions between 1991 and mid-1993. As agreed with your office, in our ongoing work for you we will examine other related issues, such as the nature of health risks from Superfund sites under future changes in land use.

¹The Congress created the Superfund program under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which authorized the Environmental Protection Agency (EPA), among other things, to clean up contamination at the nation's hazardous waste sites. EPA places the sites it considers to be the most severely contaminated on the NPL for cleanup.

²The Total Costs of Cleaning Up Nonfederal Superfund Sites, CBO (Washington, D.C.: Jan. 1994).

Results in Brief

About one-third (or 71) of the 225 sites contained in EPA's data base posed health risks serious enough to warrant cleanup, given current land uses.³ About another one-half (or 119) of the 225 sites did not pose serious health risks under current land uses but posed such health risks under EPA's projections about future changes in land use. The remainder of the sites did not pose health risks serious enough to warrant cleanup action under either current or future land uses. However, EPA may decide to clean up these remaining sites to comply with other federal or state regulations or because of a threat to the environment, such as contamination endangering a wetland. The current health risks at the 71 sites usually occurred through a single environmental medium, most commonly groundwater or soil. Of these 71 sites, 28 percent posed cancer risks; 30 percent posed risks for noncancer conditions, such as birth defects or nerve or liver damage; and the remainder posed risks for both cancer and other, noncancer conditions.

According to officials from EPA's Office of Emergency and Remedial Response, EPA's short-term response actions have temporarily mitigated the health risks that could immediately endanger the population surrounding the 71 sites that posed serious health risks under current land uses. Under EPA's policy, whenever a Superfund site poses such a health risk, a short-term response, known as a "removal action," will be undertaken. EPA's data indicate that various removal actions have occurred at 31 of the 71 sites. EPA officials caution that while removal actions clearly reduce health risks, information is not readily available to determine the extent to which the removal actions taken at these 31 sites affected the risks reported in the data base. The remaining 40 sites did not pose immediate risks substantial enough to warrant removal actions, according to the officials, although the sites still pose longer-term health risks under current land uses. For example, at some sites contaminated groundwater that does not immediately endanger surrounding populations may eventually reach the drinking water supplies used by current residents, thereby posing an eventual health risk.

Background

With the enactment of CERCLA in 1980, the Congress created the Superfund program authorizing EPA, among other things, to clean up contamination at hazardous waste sites. CERCLA also created a trust fund available for various cleanup activities and authorized EPA to compel the

³EPA considers the risk serious enough to warrant cleanup if (1) an individual has more than a 1 in 10,000 chance of developing cancer from exposure to the site's contaminants or (2) if exposure to the site's contaminants might exceed the level humans can tolerate without developing other ill health effects, such as birth defects or nerve or liver damage.

parties responsible for these sites to help conduct or pay for the cleanup. The Superfund program was extended in 1986 and in 1990 and is now being considered for reauthorization. Under CERCLA, EPA assesses contaminated areas and then places the sites it considers to be the most highly contaminated on the NPL for further investigation and cleanup.

EPA responds to hazardous substances at Superfund sites through “removal” and “remedial” actions. Removal actions are generally short-term (less than 1 year), low-cost (under \$2 million) measures intended to address actual or potential releases of hazardous substances that pose a threat to human health or the environment. Although many removal actions are temporary measures to prevent exposure by stabilizing conditions at a site or limiting access to the site, some removal actions may permanently clean up contamination.⁴ Typical removal actions include installing security measures at a site, removing tanks or drums of hazardous substances from a site, or excavating contaminated soil. By contrast, remedial actions are long-term measures intended to permanently mitigate the risks from a site. Typical remedial actions include treating or containing contaminated soil, constructing underground walls to control the movement of groundwater, and incinerating hazardous wastes.

Once a site is on the NPL, EPA conducts a “remedial investigation” to determine whether the nature and extent of the contamination at the site warrant remedial action. One component of this investigation is a baseline risk assessment to evaluate the health risks the site would pose if no cleanup occurred.⁵ For the baseline risk assessment, EPA evaluates health risks under both “current land-use conditions” and “alternate future land-use conditions.” As an example, a site would pose health risks under current land-use conditions if local residents used groundwater containing a hazardous level of contaminants from the site as drinking water or if contaminated groundwater could eventually reach the wells of distant residents. By contrast, a site would pose health risks under alternate future land-use conditions if future land development would expose people to health risks from the site’s contaminants, even if the site may not pose risks under current land uses.

⁴According to officials in EPA’s Office of Emergency and Remedial Response, while permanent removal actions are preferred over temporary measures, EPA must consider several factors, including competing needs at other sites, in determining the appropriate removal action for a site.

⁵At some sites, EPA may take removal actions before the risk assessment occurs, which could reduce somewhat the risk estimated in the baseline assessment of the site.

At each site, EPA assesses the cancer risk, as well as the risk for other ill health conditions (noncancer risk), posed by the contaminants in groundwater, soil, surface water, sediment, air, and other environmental media to determine if these risks warrant cleanup. In the case of cancer, EPA considers the risk serious enough to warrant cleanup if the risk assessment indicates more than a 1 in 10,000 probability that exposure to the site's contaminants may cause an individual to develop cancer. In the case of noncancer health effects, such as birth defects or nerve or liver damage, EPA considers the risk serious enough to warrant cleanup if the risk assessment indicates that exposure to the site's contaminants might exceed the level that the human body can tolerate without developing ill health effects.

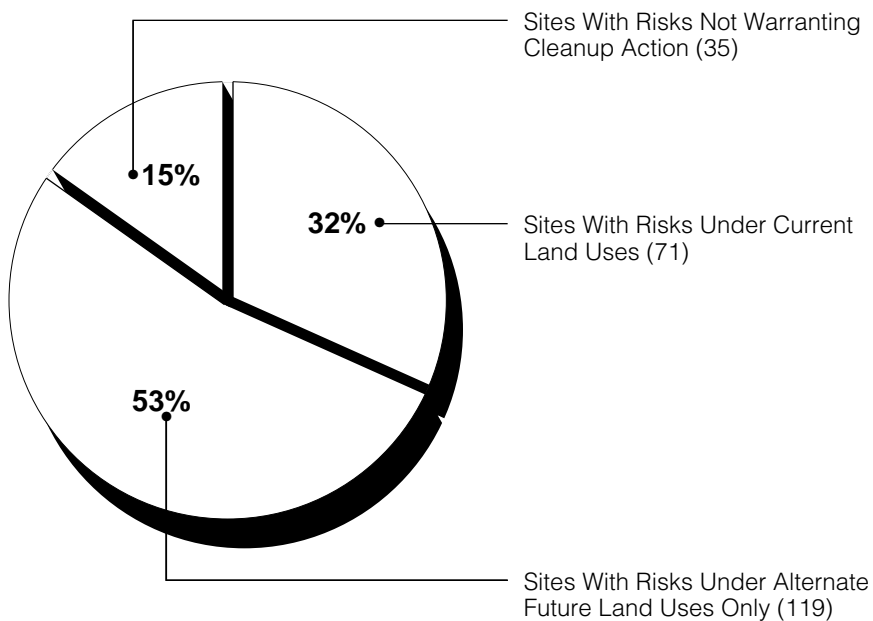
EPA's Responsive Electronic Link and Access Interface (RELAI) data base, from which we drew information for this report, is the most comprehensive and current automated source of EPA's data on the health risks of Superfund sites. Created in 1993, this data base contains information about health risks from EPA's risk assessments and other documents related to 225 nonfederal sites, which constitute most of the sites where EPA made cleanup decisions between 1991 and mid-1993.

One-Third of Sites Posed Risks Under Current Land Uses

About 32 percent (71) of the 225 sites in EPA's data base posed serious health risks under the land uses current at the time of the risk assessment. About 53 percent (119) of the 225 sites did not pose risks warranting cleanup under current land uses, but posed such risks under EPA's projections about future changes in land use.⁶ The remaining 15 percent (35) of the sites did not pose health risks serious enough to warrant cleanup action under either current or future land uses. As we noted earlier, EPA may still decide to clean up these remaining sites because of federal or state regulations or because of a threat to the environment, such as contamination endangering a wetland. Figure 1 summarizes the extent of the health risks posed by the 225 sites.

⁶According to EPA officials, the Superfund program is supposed to address significant health risks under both current and future land uses. About 85 percent of sites in the RELAI data base meet EPA's criteria for serious health risk under either current or future land uses.

Figure 1: Percentage of 225 Superfund Sites With Risks Warranting Cleanup Under Current or Future Land Uses



Note: Sites posing risks under current land uses are assumed to pose both current and future risks.

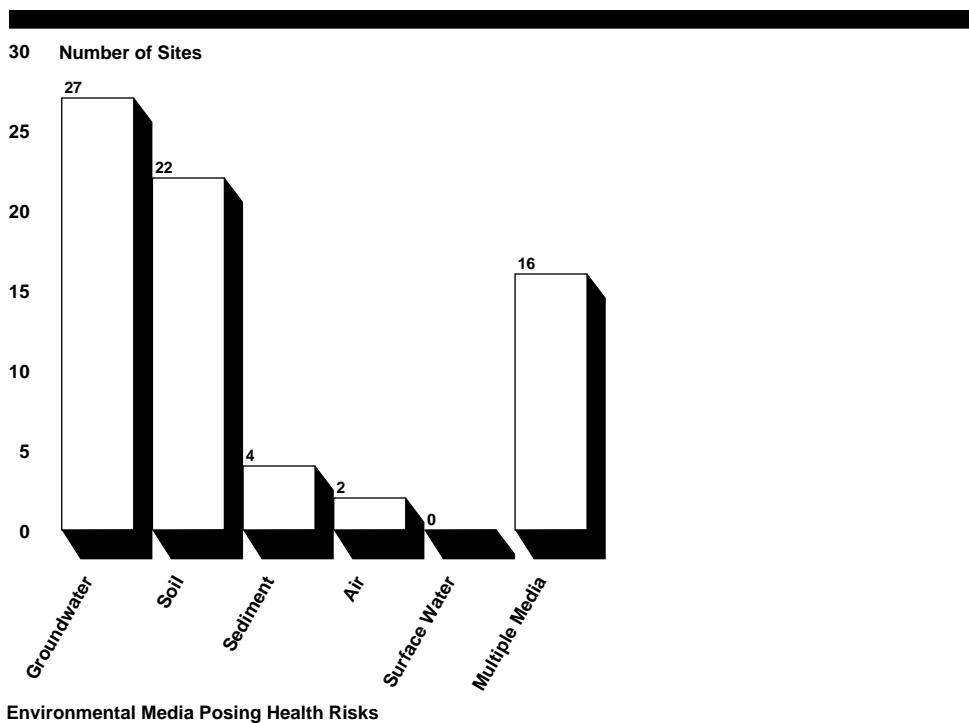
Source: GAO's analysis of data from EPA's RELAI data base.

Our analysis of EPA's data on the 71 sites posing health risks under current land uses indicates the following:

- at 77 percent (55) of the sites, a single environmental medium, usually groundwater or contaminated soil, posed the health risks and
- at the remaining 23 percent (16) of the sites, multiple environmental media posed the health risks.

Figure 2 compares the environmental media posing health risks at the 71 sites under current land uses.

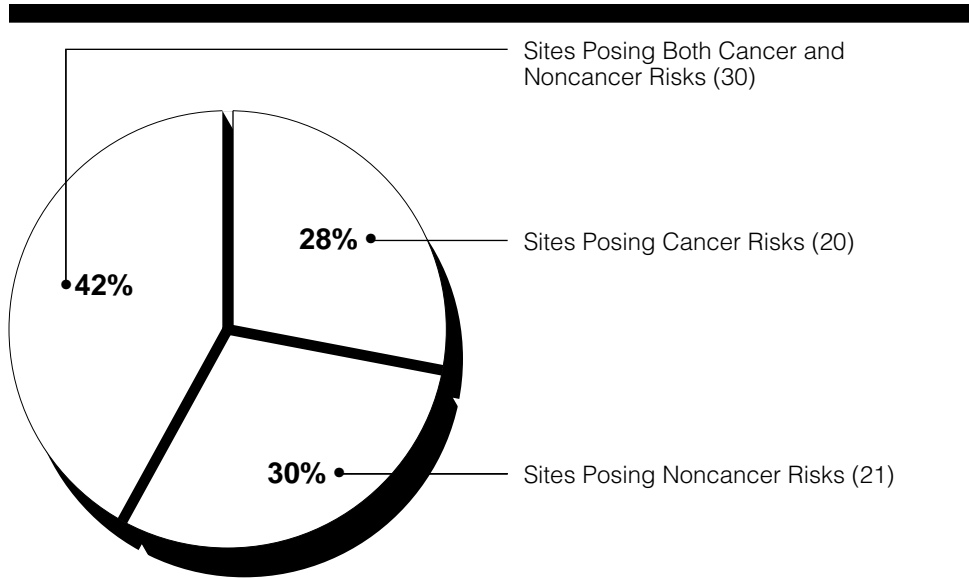
Figure 2: Environmental Media Posing Health Risks Under Current Land Uses at 71 Superfund Sites



Source: GAO's analysis of data from EPA's RELAI data base.

EPA's data for the 71 sites also indicate that 28 percent posed cancer risks, 30 percent posed noncancer risks, and 42 percent posed both cancer and noncancer risks. EPA's noncancer risk category includes such conditions as birth defects or nerve or liver damage. Figure 3 compares EPA's data on the cancer and noncancer risks posed by the 71 Superfund sites.

Figure 3: Percentage of Sites Posing Cancer or Noncancer Health Risks Under Current Land Uses

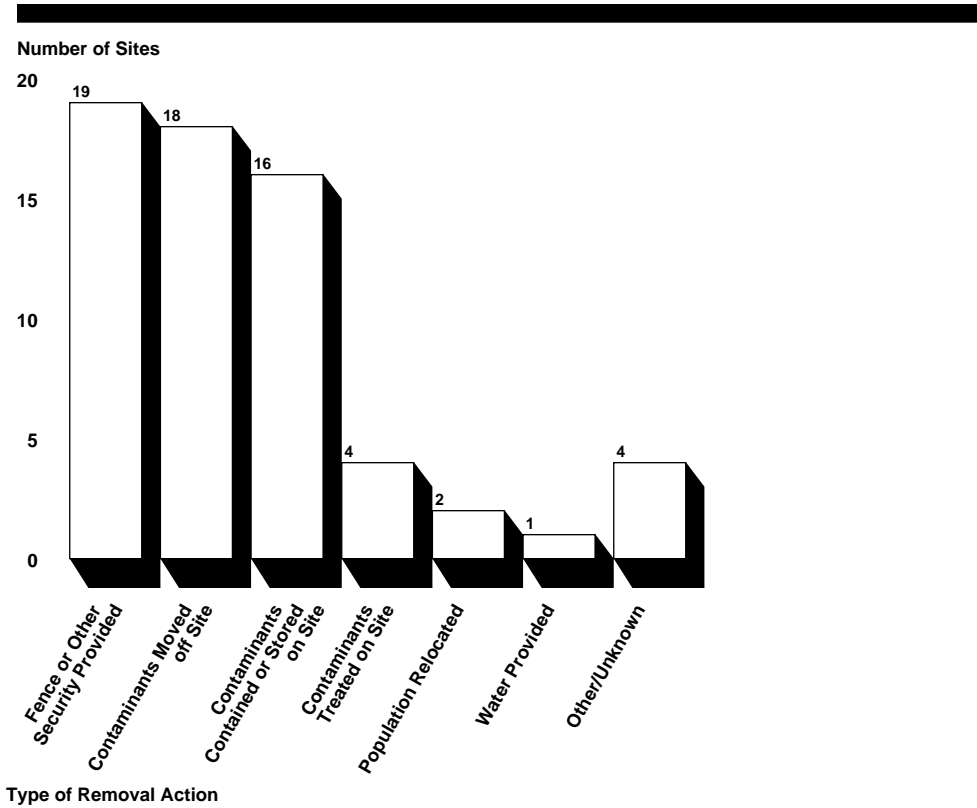


Source: GAO's analysis of data from EPA's RELAI data base.

Removal Actions Have Reduced Immediate Health Risks

According to officials from the Office of Emergency and Remedial Response (OERR), EPA's removal program has mitigated the immediate health risks from Superfund sites, at least temporarily. EPA's policy requires a short-term response whenever a Superfund site poses a health risk that immediately endangers the surrounding populations. According to the OERR officials, under the removal program EPA has periodically evaluated the NPL sites and has taken intervening steps at those sites determined to pose immediate threats to health. EPA's data indicate that removal actions have occurred at 31 of the 71 sites that posed risk under current land uses. Figure 4 shows the various types of removal actions taken at these 31 sites.

Figure 4: Removal Actions at 31 Superfund Sites Posing Immediate Health Risks Under Current Land Uses



Note: The total number of removal actions exceeds 31 because EPA has performed multiple removal actions at some sites.

Source: GAO's analysis of data from EPA's RELAI data base.

OERR officials caution that while removal actions have mitigated the immediate health risks at these sites, information is not readily available to determine the extent to which removal actions have affected the health risks reported in the data base. According to these officials, the available information does not indicate whether the removal actions removed or treated only enough contaminants to mitigate the risks that immediately endangered a site's surrounding population. For example, a small pile of highly contaminated soil might have been removed, mitigating the immediate risks to children playing nearby but having little effect on the site's more extensive soil contamination.

OERR officials also caution that the available information does not indicate the extent to which the health risks reported in the data base may already reflect the effect of the removal actions. In some cases, a removal action may have taken place before the risk assessment. OERR officials are uncertain about whether, in such cases, risk assessors might have considered the effect of the removal in reporting the site’s health risks.

Of the 71 sites posing risks under current land uses, 40 sites did not pose immediate threats substantial enough to warrant removal actions, according to OERR officials. These officials explained that although these sites did not pose risks that immediately endanger nearby populations, they still pose risks under current land-use conditions. For example, according to these officials, at some sites contaminated groundwater has not yet reached drinking water. However, under current land uses, the groundwater could eventually reach a drinking water supply, thereby posing a health risk. Table 1 categorizes these 40 sites by the environmental media posing the current health risk.

Table 1: Forty Sites Posing Health Risks Under Current Land Uses That Have Not Warranted Removal Action

Environmental medium that posed health risks	Number of sites that have not warranted removal actions
Groundwater	18
Soil	13
Sediment	2
Air	1
Surface water	0
Multiple media	6
Total	40

Source: GAO’s analysis of data from EPA’s RELAI data base.

Agency Comments

We requested that EPA provide comments on a draft of this report. On June 19, 1995, we met with officials from EPA’s OERR, including the Chief, Response Operations Branch, to obtain the agency’s comments on the draft report. The officials told us that they were generally satisfied that the information presented in the report is accurate. The officials provided additional perspectives on several issues discussed in the report and also suggested technical corrections on a few matters. We revised the draft report to incorporate these comments.

Scope and Methodology

To provide information on the extent to which Superfund sites may pose serious health risks under current land uses and on the nature of those risks, we analyzed pertinent information from EPA's most comprehensive data base on the health risks from Superfund sites. While we did not independently verify the accuracy of EPA's data, we reviewed the agency's data collection and verification guidelines and internal quality assurance procedures, and determined these internal controls to be adequate. We worked closely with EPA officials to ensure a proper interpretation and analysis of the data. Although the Agency for Toxic Substances and Disease Registry—the Public Health Service agency responsible for identifying health problems in the communities around Superfund sites—also assesses sites' health risks, we did not analyze the agency's evaluation data on Superfund sites for this report because of time constraints.

To provide information on whether EPA's short-term response actions have reduced the health risks from Superfund sites, we obtained EPA's data on the removal actions that have occurred at the 71 sites where current health risks existed. Although we did not verify this information, we discussed the information and EPA's removal policy and actions with officials from OERR's Response Standards and Criteria and Response Operations branches.

We performed our work between April and June 1995 in accordance with generally accepted government auditing standards.

As arranged with your office, unless you publicly announce this report's contents earlier, we plan no further distribution until 10 days after the date of this letter. At that time, we will send copies to the Administrator, EPA; the Director, Office of Management and Budget; and other interested parties. We will also make copies available to others on request.

The major contributors to this report are listed in appendix I. If you or your staff have any questions about this report, please call me at (202) 512-6111.

Sincerely yours,

A handwritten signature in black ink, consisting of a stylized 'P' followed by 'F. Guerrero' in a cursive script.

Peter F. Guerrero
Director, Environmental
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