Superfund Cleanup Standards Reconsidered

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Summary

For Congress, the reauthorization of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), commonly known as Superfund, has particularly focused on two major areas of reform: liability and the selection of cleanup standards/remedies. This report addresses the latter, and within that general topic, discusses six issues that have received attention from a number of stakeholders: the role of risk assessment; cost-effectiveness of treatment; complete or partial elimination of what are called ARARs (the statutory requirement that Applicable or Relevant and Appropriate Requirements from federal and state environmental and facility-siting laws be applied to Superfund site cleanups) and elimination of the statute's preference for permanence and treatment; future land use considerations; the role of the states; and community involvement in the remedy selection process. The report contains brief summaries of the pertinent provisions of the leading Senate bill, S. 8, as it appears in the "draft chairman's mark" of August 26,1997.

To address the criticism that the Superfund program favors excessively costly remedies, some critics argue that the Environmental Protection Agency (EPA) should change its risk assessment procedures and increase the role of risk assessment in selecting remedies. Other recommended reforms include establishing a single national risk criterion for cleanup decisions rather than the current use of risk ranges. Some stakeholders suggest elevating the importance of cost in EPA's evaluation of alternative cleanup strategies. Cost is currently considered in evaluating alternatives; however, critics claim that the statute's deference to ARARs and its preference for permanence and treatment (as opposed to containing waste and controlling land use) have resulted in high cleanup costs. Some stakeholders cite Superfund's reliance on ARARs for determining site specific cleanup standards as the cause for lengthy debates over which federal or state regulations (or combinations thereof) apply to a site and for the selection of more costly remedies than are necessary to protect human health and the environment.

Stakeholders who advocate elevating the role of risk assessment in selecting remedies also urge increased consideration of a Superfund site's future land and water use. Many of these stakeholders advocate that state and local governments, rather than EPA, decide future land and ground water use. Some critics of Superfund claim that the current system of shared federal and state responsibility leads to delay, duplication of effort, confusion among stakeholders, and higher transaction costs. Some states want full Superfund authority, and others only want delegation of the federal program. Some stakeholders are in favor of full authority for the states, while others are concerned about the burden on businesses that responding to as many as 50 state programs could create. The degree of community involvement in the process of selecting cleanup remedies is an additional topic of debate.

Though often heavily criticized since its passage, the goals of Superfund are widely supported. Since 1980, the program has improved practices in the management of hazardous wastes to protect human health and the environment, and is an evolving instrument.

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Introduction

A key issue in the 105th Congress is reforming the Superfund program, which cleans up the nation's most hazardous waste sites. While the program has improved the practices in managing hazardous wastes to protect human health and the environment, there appears to be consensus between the public and private sectors that reform is necessary to increase the pace of cleanups and lower remedial costs, although there is disagreement over how to accomplish this objective. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), P.L. 96-510, established the Superfund program, and the Environmental Protection Agency (EPA) administers it and is responsible for adding hazardous waste sites to the National Priorities List (NPL). The law provides for cleanup and emergency response for hazardous substances released into the environment, cleanup of inactive hazardous waste disposal sites, and retroactive, strict, joint, and several liability for potentially responsible parties (PRPs). The Superfund Amendments and Reauthorization Act of 1986 (SARA), P.L. 99-499, revised and expanded CERCLA and introduced new cleanup standards into the program in an attempt by Congress to add statutory language which would clarify for federal officials and PRPs appropriate cleanup remedies to be selected for contaminated sites. While SARA's intent was to improve the quality and pace of site remediation, critics maintain that Superfund's problems have not been solved.

The current debate in Congress on the reauthorization of Superfund has focused particularly on two major areas: liability reform and remedy selection/cleanup standards. This is not to say that there is total agreement in other areas. Allowing the states to assume as much of the Superfund program as they are able and willing to do appears to have fairly wide acceptance, but a subject of serious debate is under what conditions (if any) EPA can re-assert its jurisdiction over a facility. CERCLA's natural resource damage provisions are also contentious as business interests seek to place limits on the amounts they could be assessed to restore or replace lost or devalued resources. There appears to be fairly broad agreement on other topics, such as allowing communities a greater voice in the decision-making process, recognizing and expanding the brownfields program for cleaning up less serious sites, and assisting states with their voluntary cleanup programs.

Three committees have a primary role in reauthorizing the program: Environment and Public Works in the Senate; and Commerce, and Transportation and Infrastructure in the House. (The taxes that feed the Superfund trust fund are under the jurisdiction of the House Ways and Means, and Senate Finance

Committees.[1]) All three have held hearings in the present Congress,[2] as well as in the 103rd and 104th.

Senator Bob Smith, chairman of the Environment Subcommittee on Superfund, Waste Control, and Risk Analysis introduced S. 8 on January 21, 1997, one of 10 bills put forth as the Senate Republican Agenda for the 105th Congress. In late August the subcommittee released a "draft chairman's mark" of S. 8 that was the result of negotiations with the administration and Democratic senators.[3] A hearing on the revised bill was held September 4. The markup scheduled for September 11 was postponed to allow further discussions.

In the House, an effort reportedly is being made to achieve consensus between the majority and minority before a bill is introduced. The Commerce and Transportation Committees are working independently of each other. According to news reports, majority and minority staff in both committees have exchanged draft language on several titles of a bill, including one on remedy selection and cleanup standards. The Transportation staffs reportedly are meeting and negotiating virtually daily, and expect to have a bill out before the end of October. EPA is providing technical assistance but is not currently participating in the exchange of views.[4]

Stakeholders with an interest in Superfund include PRPs, attorneys, the insurance industry, medical health professionals, citizen and environmental organizations, federal agencies involved in Superfund cleanups, state and local governments, the remediation technology industry, and land development firms. Many of these stakeholders have broadly criticized Superfund and argue that the statute's cleanup standards are partly responsible for the slow place of cleanups due to the extensive process required to select remedies and have led to cleanup costs that are higher than necessary to protect human health and the environment. Superfund's critics believe that the statute's cleanup standards must be changed to improve the

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[1] For a discussion of Superfund's taxing and trust fund provisions, please refer to CRS Report 96-774 E, *Taxes to Finance Superfund*, by (name redacted).

[2] Senate Environment and Public Works held hearings on March 4, 1997 (oversight of brownfields cleanup), March 5 (stakeholder views of S. 8), and September 4 (stakeholder views of the chairman's mark of S. 8). House Transportation and Infrastructure held hearings on March 5, 1997 (lessons from the states), March 12 (views of EPA Administrator Carol Browner), and April 10 (stakeholder views on EPA's management of the program, administrative changes, and proposals for legislation). House Commerce held hearings on February 14 and March 7 (field hearings in New York City and Columbus, Ohio, on federal barriers to common sense cleanups), and September 4 (views of members on operation of the program).

[3] The text of the draft chairman's mark, as well as a CRS summary of the draft are available at the committee's website:
http://www.senate.gov/~epw/

[4] Telephone communications with committee staff, September 1-12, 1997, and press reports, e.g., "Bipartisan Agreement Not Yet Reached in Transportation Committee, Aide Says," *Daily Environment Report*, September 26, 1997, p. A-5; "Democrats Offer Eight Reform Goals in Attempt to Prod House Subcommittee," *Environment Reporter*, September 12, 1997, p. 845; and "House Democrats Defend Remedy Proposal from Industry Criticism," *Superfund Report*, August 20, 1997, p. 5-7.

program's pace and lower cleanup costs. To address these concerns while protecting public health, Congress is attempting further to define Superfund's cleanup goals and the methods used to attain these goals.

To assist Congress in its consideration of proposals to revise Superfund's cleanup standards, this report discusses the existing standards under current law and recommendations for revising them offered by stakeholders in the debate. The report relies primarily on information provided in congressional hearings, including the one held on September 4, 1997, by Senate Environment and Public Works. Among the questions being asked about reforming Superfund's cleanup standards are:

- Should cleanup decisions be based more on risk assessment considerations and less on fixed numerical criteria?
- Is the statute's preference for treatment and permanent solutions reasonable?
- How much weight should the cost of a remediation be given in the cleanup decision?
- Should cleanup decisions be based on a single health risk value or on a range of them?
- Do scientists have the capability to accurately predict health effects from various levels of exposure for all who may come in direct or indirect contact with the hazardous substances involved?

The law's lack of a national uniform level of cleanup has been a major source of controversy for the Superfund program. The reauthorization debate in the 104th and 105th Congress has provided a forum for stakeholders to outline their recommendations and proposals for reforming Superfund's cleanup standards. This report discusses the following issues that have arisen in the debate:

- the role of risk assessment;
- cost-effectiveness of treatment;
- elimination of applicable or relevant and appropriate requirements (ARARs) and preference for treatment and permanence;
- future land, ground water, and other resource use;
- the role of the states; and
- community involvement in the remedy selection process.

Administrative Reforms to the Superfund Program

In response to the debate over Superfund's problems, EPA began to implement a series of administrative reforms in 1993 to increase the pace of cleanups and lower cleanup costs while maintaining the same standards of protection for human health and the environment. While the revisions have not altered Superfund's cleanup standards, they have simplified the process of selecting remedial actions at certain sites through the use of presumptive remedies, which are cleanup solutions that EPA has successfully used at particular categories of sites. The advantage of using them is that they are preapproved and not subject to the time and costs of extensive

analysis required for other remedies. So far, EPA claims the use of presumptive remedies has resulted in faster cleanups and that, overall, its reforms have reduced the average cleanup time by more than one year.[5] At a hearing held in April 1997, the Superfund Settlements Project (a business organization with ten corporate members) testified that EPA's administrative changes have helped to improve Superfund, but alone are not sufficient to solve the program's problems.[6] The Project's members argued that comprehensive legislation is necessary to revise the current cleanup standards and process of selecting remedies if the pace of cleanups is to increase and remedial costs are to decrease.

Stakeholder Views

EPA and the states determine cleanup standards for each site based on statutory requirements and preferences, and based on ARARs, which are state and federal laws and regulations determined to be applicable, or relevant and appropriate. EPA uses risk assessments to set cleanup levels if no such standards have been established for the contaminants at the site.

The selection of "applicable, relevant, and appropriate" laws and regulations is highly discretionary because each site has its own set of unique conditions which must be evaluated. Many stakeholders have argued that ARARs and other factors have led to confusion about which cleanup levels are required, cleanup costs that are unnecessarily high, and sites that have been cleaned to different risk goals. One proposal for reform is to place more emphasis on risk assessment (eliminating the ARARs requirement) when determining how clean a site should be rendered. Supporters of this proposal claim that the elimination of the statute's ARARs requirement would result in less costly site remediations and savings to the Superfund program. Some stakeholders also would like to see modification of EPA's risk assessment methods to reduce reliance on what they see as overly protective assumptions and models.

The Superfund program has also been criticized as being too slow in achieving its goal. Delays in cleanup have been attributed to the statute's ambiguity regarding cleanup levels, as well as other factors. To address this issue, some participants in the Superfund reform debate advocate establishing a single, national risk management goal which would also provide equal protection from hazardous waste for all communities.

PRPs have complained that EPA has little regard for the cost-effectiveness of its selected remedies. CERCLA requires the implementation of cost-effective

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[5] Carol M. Browner, Administrator, Environmental Protection Agency. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. March 5, 1997. *Superfund Cleanup Acceleration Act of 1997*. S. Hrg. 105-60. 105th Congress, 1st Session. p. 345.

[6] Superfund Settlements Project. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 500.

remedial actions for contaminated sites; however, it also requires that the degree of cleanup "at a minimum assures protection of human health and the environment."[7] One of the challenges of the current Superfund reauthorization effort is to calibrate these goals in combination and produce workable solutions. Some reform proposals seek to elevate the importance of cost considerations in the Superfund remedy selection process. Others want to reduce costs by facilitating selection of remedies that have historically been effective (often referred to as presumptive remedies).

Some stakeholders have called for complete or partial elimination of the ARARs requirement in order to streamline the process used to establish site cleanup standards and to enable EPA to place heavier emphasis on risk assessment and cost of a remedial action. In addition to eliminating the ARARs requirement, some critics call for the elimination of the statutory preference for permanent treatment solutions. At a hearing held in April 1997, the Chemical Manufacturers Association testified that the selection of remedies should be based on realistic assessments of risk and considerations of technical practicability, reliability, cost, and community acceptance not by artificial preferences and standards.[8] Some critics also claim that containment measures, institutional controls such as deed restrictions, and treatment should be considered equally among remedies and argue that a preference for treatment should be reserved for "hot spots" of contamination.

There is broad consensus that future land use must be considered in determining the appropriate cleanup standard on which to base a remedial design. "Appropriate" consideration of land use is expected to lead to more cost-effective cleanups at a reasonable pace. Land use is currently considered in the remedy selection process. However, critics claim that states and local governments should have more input into future land use determinations. Others argue that if cleanup decisions are not based on conservative land use assumptions (i.e., residential or recreational, as opposed to industrial), communities that are located near non-residential areas, for example industrial sites, will be at greater health risk than those communities which are not located near such sites.

Some stakeholders claim that the current system of shared federal and state responsibility has caused delay, duplication of effort, and confusion among stakeholders. The issue is whether states should be given full program authority or whether states should be given program delegation. Full program authority would enable states with such authority to implement their own versions of a Superfund program, while program delegation would give states the authority to implement the federal program. Notably, however, some others oppose any increase in state responsibility.

The success of Superfund is measured not only by the number of sites cleaned and reasonable costs associated with running the program, but also by public

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[7] CERCLA, as amended, Section 121(d)(1).

[8] Chemical Manufacturers Association. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 491.

acceptance of treatment decisions which affect their communities. SARA recognized the importance of community involvement with the introduction of the Technical Assistance Grants (TAG) program, which provides citizens with information on the selection and implementation of cleanup remedies at sites adjacent to their communities. Current suggestions for reform include increasing earlier community involvement in the decision making process and expanding the TAG program to increase public understanding of cleanup decisions.

In response to some of the stakeholder concerns discussed above, S. 8 would establish a general rule requiring the selection of a cost-effective remedy that protects human health and the environment, and attains or complies with applicable federal and state laws. Remedial actions would be selected according to site-specific conditions and risks based on the reasonably anticipated future use of the site. Regarding ARARs, S. 8 would retain the applicable requirements of federal and state law but would require states to re-examine other "relevant and appropriate" requirements (although they are not called that in the bill). The bill would require a remedy, if technically practicable, to protect uncontaminated ground water and to restore contaminated ground water. The bill would remove the preference for permanence and treatment; it would allow the de-listing and reuse of the uncontaminated portions of Superfund sites; and it would provide for expedited de-listing of sites where construction to perform a remedial action is complete but activities to operate and maintain it continue.

Cleanup Standards: What the Current Law Requires

In 1980, the original Superfund statute included little guidance for regulators or PRPs when evaluating alternatives for cleaning up sites.

> Section 104(c)(4) of CERCLA required selection of remedial actions that were in accordance with the National Contingency Plan 'to the extent practicable' and that provided for 'cost-effective response which provides a balance between the need for protection of the public health and welfare ... and the availability of amounts from the fund....'[9]

CERCLA's original cleanup requirements proved to be subject to interpretation, and cleanup decisions were often subject to delay and challenge. In 1986, SARA amended CERCLA to introduce new cleanup standards. The new standards, which are in effect today, were Congress's attempt at providing statutory guidance on the question of "how clean is clean?"

Current law requires EPA and other federal agencies to comply with federal and state ARARs when determining cleanup standards to be followed for wastes treated on-site. The statute does not contain its own cleanup standards; rather, it relies on ARARs to ensure that 1) response actions are protective of human health and the

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[9] Hayes, David J., and Conrad B. MacKerron. *Superfund II: A New Mandate; A BNA Special Report* [*Environment Reporter*, v. 17, no. 42, Part II, February 13, 1987]. Washington, The Bureau of National Affairs. p. 37.

environment, and 2) applicable state and federal laws and regulations are not violated during the cleanup procedure. The statute also requires that numerical standards derived from the Safe Drinking Water Act and water quality criteria established under the Federal Water Pollution Control Act would be applicable to the cleanup process if determined relevant and appropriate by federal and state regulators. In addition, the law states a strong preference for permanence and treatment of wastes instead of containment and discourages off-site disposal options, but does not address land use requirements:

> Remedial actions in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants, and contaminants is a principal element, are to be preferred over remedial actions not involving such treatment.[10]

For cases in which there are no federal or state ARARs, the law requires EPA to select remedial actions that assure protection of human health and the environment and that are relevant and appropriate.[11] In practice, EPA's guidance documents call for a level of remediation that will protect the public from unacceptable cancer and non-cancer health risks or adverse environmental effects.[12] Such remediation generally provides a level of protection within the range of 1 in 10,000 to 1 in 1,000,000 in lifetime cancer risk or below a predetermined index for non-carcinogens.[13]

The Role of Risk Assessment

Some critics of Superfund claim that EPA's risk assessment procedure should be changed because it is responsible for the slow pace of remediation and that it leads to excessive cleanup costs by assuming unrealistic dangers to human health and the environment. Some stakeholders recommend that "more realistic" assumptions of pathways through which exposure could occur are necessary and support a larger role for risk assessment in the remedy selection process. Other critics, pursuing more stringent policies, believe that EPA's current use of risk ranges is unacceptable. Instead, they advocate the establishment of a single, national risk criterion for cleanup decisions.

Risk assessment is the determination, through formal or informal scientific procedures, of probable health and other effects from exposure to a potential danger (the term is also applied to the field underlying and establishing such

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[10] CERCLA, as amended, Section 121(b)(1).

[11] CERCLA, as amended, Section 121(d)(1).

[12] Environmental Protection Agency. Office of Solid Waste and Emergency Response. *Guidance for Evaluating the Technical Impracticability of Ground Water Restoration*. EPA/540-R-93-080. September 1993. p. 9.

[13] Ibid.

determinations). For purposes of this report, risk assessment refers to various EPA methods for evaluating and comparing risks at Superfund sites.[14]

EPA currently uses risk assessment at several points in the Superfund program. It first conducts rough risk assessments at each site to determine whether contaminants pose a current or potential threat to human health or the environment. If EPA determines that a site poses a significant threat, the agency adds it to the NPL. These risk assessments adhere to methods detailed in the National Contingency Plan (NCP, codified at 40 CFR 300). Appendix A to the NCP describes the Hazard Ranking System (HRS) as:

> the principle mechanism the Environmental Protection Agency (EPA) uses to place sites on the National Priorities List (NPL). The HRS serves as a screening device to evaluate the potential for releases of uncontrolled hazardous substances to cause human health or environmental damage. The HRS provides a measure of relative rather than absolute risk. It is designed so that it can be consistently applied to a wide variety of sites.[15]

For NPL sites, EPA then uses risk assessment to determine the necessary level of cleanup and to evaluate appropriate cleanup remedies. The remedial investigation and feasibility study (RI/FS) phase of the Superfund program uses risk assessment to characterize the nature and extent of risks posed by uncontrolled hazardous waste sites and for evaluating remedial options.[16] The remedial investigation (RI) gathers information sufficient to support a risk management decision, including likely current and future risk associated with human exposures to releases from the site. The feasibility study (FS) develops, screens, and evaluates alternative remedial actions. During the FS phase, EPA determines the cleanup goals necessary for protecting human health and the environment. First, EPA develops preliminary objectives for performing remedial actions based on readily available information such as ARARs and numerical criteria. Then, EPA bases the final objectives on results of the baseline risk assessment and an evaluation of expected exposures and associated risks for each alternative.

As described by EPA, the intent of the RI/FS process is to provide a "dynamic, flexible process that can and should be tailored to specific circumstances at individual sites; it is not a rigid step-by-step approach that must be conducted identically at every site."[17] Some critics have claimed that, in practice, EPA does not apply this flexibility and that the agency selects excessively costly remedies more often than cost-effective ones. Many stakeholders have argued that the current risk assessment process is responsible for the selection of exceedingly costly remedies.

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[14] For more information about risk assessment, please refer to CRS Issue Brief 94036, *The Role of Risk Analysis and Risk Management in Environmental Protection*, by (name re dacted).

[15] 40 C.F.R. Part 300, Appendix A, section 1.0.

[16] CERCLA, as amended, Section 120(e).

[17] Environmental Protection Agency. Office of Emergency and Remedial Response. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*. EPA/540/G-89/004. October 1988. p. 1-3.

An EPA guidance document on the RI/FS process addresses the challenges faced by project managers:

> The project manager's central responsibility is to determine how best to use the flexibility built into the process to conduct an efficient and effective RI/FS that achieves high quality results in a timely and cost-effective manner. A significant challenge project managers face in effectively managing an RI/FS is the inherent uncertainties associated with the remediation of uncontrolled hazardous waste sites.[18]

Some stakeholders criticize EPA's cautious approach in exercising the flexibility built into the statute. However, one reason that EPA takes this approach is because considerable information to assess health risks is still not available, and medical research has shown that health effects are linked to exposure to toxic wastes, though levels of effect are often unclear. In addressing the link between health effects and exposure to toxic substances, Barry L. Johnson, Ph.D., Assistant Administrator of the Agency for Toxic Substances and Disease Registry (ATSDR, the federal agency responsible for health-related authorities under CERCLA), testified at a hearing held in May 1995 about health effects from exposure to hazardous substances.[19] In summary, ATSDR found that proximity to hazardous waste sites seems to be associated with a small to moderate increased risk of some kinds of birth defects and, less well documented, some specific cancers and health problems.[20] At a hearing held in April 1997, Bailus Walker, Ph.D., represented the American Public Health Association and provided a public health perspective on dealing with toxic substances that can affect human health:

> The underlying purpose of Superfund is to prevent disease and disability due to toxic exposures. Human exposures to toxic substances have many potential adverse health outcomes, including neurological damage, birth defects, and cancer. Preventing the exposure of entire communities to potentially devastating health consequences is no less important than protecting people from infectious diseases such as polio or diphtheria, or protecting them from food poisoning. Identifying potential health hazards and cleaning up hazardous waste sites are just as important in protecting public health as vaccinating children or requiring safe food processing.[21]

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[18] Ibid.

[19] Barry L. Johnson, Ph.D., Assistant Surgeon General, Public Health Service, Department of Health and Human Services. Testimony submitted to the House Committee on Commerce, Subcommittee on Commerce, Trade, and Hazardous Materials. May 23, 1995. *Superfund Reauthorization: Remedy Selection*. H. Hrg. 104-30. 104th Congress, 1st Session. p. 51.

[20] ATSDR partially funded a study released in June 1997 by the California Department of Health Service's Birth Defects Monitoring Program, which concluded that women living within 1/4 mile of a Superfund site during the first trimester of pregnancy were between two and four times as likely to have children with certain birth defects.

[21] Bailus Walker, Ph.D., American Public Health Association. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for* (continued...)

Those who support EPA's expansive public health approach (including some in the scientific community) claim that scientists may have been too optimistic in assessing health implications from exposure to toxics (that is, they may underestimate risk). They maintain that it is necessary for EPA to use adequate safety margins in their health assessments because critical information about the link between hazardous waste and health effects is still lacking. ATSDR asked the National Research Council (NRC) to review current knowledge of human health effects caused by exposure to hazardous waste sites. Their 1991 report maintained: "Until better evidence is developed, prudent public policy demands that a margin of safety be provided regarding potential health risks from exposures to substances from hazardous waste sites."[22] It explained, "We do no less in designing bridges and buildings. We do no less in establishing criteria for scientific credibility. We must surely do no less when the health and quality of life of Americans are at stake."[23]

Critics of EPA's risk assessment methodology believe that the agency's caution has become excessive to the point of precluding reasonable choices of less costly remedies. For example, the National Environmental Policy Institute has attacked EPA's method of estimating risk, claiming that worst case scenarios are used when more moderate ones could sufficiently protect human health and the environment.[24] In response, Elliott Laws, Assistant Administrator for EPA's Office of Solid Waste and Emergency Response testified:

> Prior to 1990, Superfund risk assessments relied heavily on the 'worst case scenario.' Since then we have used a peer reviewed guidance for risk assessments that employs site specific information on contaminant concentrations, exposure pathways and land use, which make the risk assessment more realistic. EPA's current risk assessment process seeks to protect the majority of individuals near Superfund sites.[25]

At a hearing held in April 1997, the Chemical Manufacturers Association (CMA) disagreed and claimed that EPA's current risk assessments continue to be based on unrealistic exposure pathways and improbable assumptions about individual vulnerability to health effects. Further, CMA stated that EPA has not yet implemented certain administrative reforms to address this problem:

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[21](...continued)
Legislation. H. Hrg. 105-8. 105th Congress, 1st Session. p. 519-520.

[22] National Academy of Sciences, National Research Council. *Environmental Epidemiology Public Health and Hazardous Wastes*. National Academy Press, Washington, D.C., 1991. p. 21

[23] Ibid. p. 270.

[24] Steven J. Milloy, National Environmental Policy Institute. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. April 5, 1995. *Superfund Reassessment and Reauthorization: Risk Assessment*. S. Hrg. 104-279. 104th Congress, 1st Session. p. 504.

[25] Elliott P. Laws, Assistant Administrator, Office of Solid Waste and Emergency Response, Environmental Protection Agency. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. April 5, 1995. *Superfund Reassessment and Reauthorization: Risk Assessment*. S. Hrg. 104-279. 104th Congress, 1st Session. p. 533.

> With regard to *procedure*, EPA reports that it has granted 28 requests from PRPs to perform risk assessments and denied only two in FY1996 and the first quarter of FY1997. Again, there may be disagreement over the precise numbers. But there is no question that EPA is now approving PRP requests to conduct risk assessments in cases where they would have denied requests before this reform was put in place. CMA welcomes this change, and applauds the agency's efforts. With regard to *substance*, on the other hand, EPA's initiative to focus risk assessments on more realistic exposure scenarios is not in place yet and thus cannot be implemented at the sites. According to EPA, moreover, this reform can be expected no sooner than 1998. In the meantime, there is still concern that many risk assessments will continue to include unrealistic exposure scenarios.[26]

Other critics, pursuing more rigorous regulation, complain that the current risk assessment process is too flexible and consequently responsible for differing cleanup goals, remedies, and costs site-by-site across the country. A number of stakeholders, including environmental organizations, state and local governments, and environmental health organizations call for the establishment of a single risk management goal. Environmental organizations and community groups have been opposed to EPA's use of the risk range, described in the Cleanup Standards section of this report, because it affords EPA the latitude to provide communities with differing levels of protection without explanation. The Environmental Defense Fund supports a national uniform cleanup goal that would assure communities around the country a baseline with a high level of protection and require the evaluation of risks to groups with higher susceptibility to exposure than the average individual, such as children, chronically ill persons, and subsistence farmers.[27] PRPs and communities have often been left wondering how and why a particular cleanup remedy was selected. Some have argued that establishing a national risk protocol would avoid site-by-site debate and confusion by requiring EPA to develop national cleanup models and standards. In the 103rd Congress, the Administration's unsuccessful Superfund reauthorization bill (H.R.3800/S.1834) included the establishment of national cleanup goals and methodologies. In the 104th and 105th Congresses, legislation to reform Superfund has not proposed national cleanup goals or methodologies.

EPA also uses risk assessments to develop priorities for funding cleanup projects. As part of its administrative reforms to Superfund, EPA established a National Risk-Based Priority Panel in August 1995.[28] The panel ranks the priority

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[26] Chemical Manufacturers Association. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 486.

[27] Karen Florini, Senior Attorney, Environmental Defense Fund. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. March 5, 1997. *Superfund Cleanup Acceleration Act of 1997*. S. Hrg. 105-60. 105th Congress, 1st Session. p. 387.

[28] Carol M. Browner, Administrator, Environmental Protection Agency. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. March 12, 1997. *Superfund Reauthorization: Views of* (continued...)

of cleanup projects based on risk rather than ranking sites simply on a first-come, first-served basis as in previous years. The panel ranks projects according to the principle of addressing the worst problems first. The panel's evaluation of a site includes the following factors: risks to human health and the environment, stability and characteristics of the contaminants, and economic, social, and program management considerations. Generally, cleanup projects are funded in the order of priority as recommended by the panel. EPA reports that by early 1997 the panel had ranked projects totaling nearly $1 billion in cleanup costs.

S. 8 addresses the role of risk assessment in cleanup decisions by requiring remedies to be not only cost-effective but also to be selected on the basis of a facility-specific risk evaluation and future use. A remedy would be considered to protect human health if it has a risk range for cancer resulting from exposure at the facility of 1 in 10,000 to 1 in 1,000,000 for the affected population and if exposure to non-carcinogens does not pose an appreciable risk of deleterious effects. In selecting a remedy, EPA must take into account exposure pathways based on anticipated future use (industrial, commercial, residential, etc.). The risk evaluation must use chemical- and site-specific testing data, and where that data is unavailable, an acceptable range of realistic and scientifically supportable default assumptions regarding human exposure and site-specific conditions, instead of worst case assumptions; must ensure that the exposed populations and all pathways are accurately evaluated; must consider current and anticipated future use of land and water resources in estimating exposure; and must consider the use of institutional controls. The following balancing factors are to be considered in selecting a remedy: effectiveness in protecting health and the environment, long-term reliability, short-term risks during cleanup, acceptance by the community, technical feasibility from an engineering perspective, and reasonableness of cost.

Cost-Effectiveness of Treatment

According to some critics of Superfund, CERCLA's lack of national cleanup standards, its reliance on ARARs, and its preference for permanent cleanups and use of treatment technologies have resulted in cleanup remedies that are more stringent and more costly than necessary to protect human health and the environment. The existing statutory requirements for remedial actions specifically call for consideration of the cost-effectiveness of the selected remedy. Cost is one of nine criteria that EPA uses when analyzing alternatives for a remedial action.[29] However, EPA recognizes that, in practice, cleanup costs are often high due to the statute's deference to ARARs and its preference for permanence and treatment.[30] A number

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[28](...continued)
EPA Administrator Carol Browner. H. Hrg. 105-8. 105th Congress, 1st Session. p. 269.

[29] Environmental Protection Agency. Office of Emergency and Remedial Response. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*. EPA/540/G-89/004. October 1988. p. 6-3.

[30] Carol M. Browner, Administrator, Environmental Protection Agency. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on (continued...)

of stakeholders have offered proposals which would require EPA to consider the cost-effectiveness of a cleanup solution as a more prominent factor in its evaluation of alternatives to a remedial action.

One suggestion to reduce program costs is to permit the use of "presumptive remedies" or remedies that EPA has historically used at particular categories of sites, which could be preapproved in order to avoid costs of extensive analysis currently required. However, some critics oppose using presumptive remedies because they essentially offer generic solutions that may not be able to address specific problems with contamination sufficiently, which could lower the level of protection for human health and the environment. Steven A. Herman, Assistant Administrator of EPA's Office of Enforcement and Compliance and Timothy Fields, Jr., Acting Assistant Administrator of EPA's Office of Solid Waste and Emergency Response, testified at a hearing held in April 1997 that EPA has begun to use presumptive remedies successfully at certain types of sites:

> Presumptive remedies are based on scientific and engineering analyses performed at similar Superfund sites and are used to eliminate duplication of effort, facilitate site characterization, and simplify analysis of cleanup options. EPA issued presumptive remedy guidances for the following: municipal landfill sites, sites with volatile organic compounds in soil, wood treater sites (with an update two years later), and a ground water presumptive response strategy. Regions are reporting significant reductions in costs and time required to complete remedies. A recent Office of Inspector General report focused on an independent review of the use of a presumptive remedy and concluded that 'Use of a presumptive remedy increased consistency in decision making by taking advantage of lessons learned at similar sites, and allowed speedup of the Feasibility Study process.'[31]

Some advocates believe that accomplishments in state hazardous waste cleanup programs can suggest effective ways to reform Superfund. The state of Michigan revised the cleanup standards for its program after examining certain elements that it considered to be overly conservative. Russell J. Harding, Director of the Michigan Department of Environmental Quality, testified that costs have significantly declined as a result of revising the state's cleanup standards:

> These changes [in cleanup standards] resulted in a 50% reduction in our cleanup costs. The principal reasons for these astounding cost savings were adopting land-use-based cleanups, allowing no-action ground water cleanups, eliminating a previous presumption that a useable aquifer was always a viable migration

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[30](...continued)
Water Resources and Environment. June 27, 1995. *Superfund Reauthorization: Federal Agency Perspectives*. H. Hrg. 104-22. 104th Congress, 1st Session. p. 861.

[31] Steven A. Herman, Assistant Administrator, Office of Enforcement and Compliance Assurance and Timothy Fields, Jr., Acting Assistant Administrator, Office of Solid Waste and Emergency Response, Environmental Protection Agency. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 449-450.

> pathway for contaminants leaching from soil, and changing the acceptable cancer risk level from 1 in 1,000,000 to 1 in 100,000.[32]

The Department of Defense (DOD) currently has 123 hazardous waste sites on the NPL. In the 104th Congress, the department proposed reforms intended to cut costs and speed the cleanup of contaminated sites. At a hearing held on June 27, 1995, DOD's Deputy Under Secretary of Defense for Environmental Security, Sherri W. Goodman, recommended modifications to the remedy selection process, one of which was:

> Elevate the role of cost when considering other factors in remedy selection. Currently, cost-effectiveness is one of nine considerations regulators use in making a cleanup decision. By elevating the importance of cost, we can provide a more prudent use of our resources.[33]

To date, DOD has not stated its current position on Superfund reform at hearings during the 105th Congress.

Senator Smith's bill would require that EPA select a cost-effective remedy that protects human health and the environment and complies with other federal and state laws. It elevates the role of cost when selecting remedies by defining "technically impracticable" to mean impracticable due to engineering infeasibility or unreliability, *or inordinate costs* (emphasis added). Also, reasonableness of cost is one of six factors that must be balanced when selecting a remedy. (The other five are: effectiveness in protecting health and the environment, reliability in protection over the long-term, the short-term risk posed by implementing the remedy, acceptability to the community, and implementability).

The bill would direct EPA to establish presumptive remedies for commonly encountered types of contaminated facilities; presumptive remedies would not be limited to treatment, but may include institutional and standard engineering controls. The bill also would require EPA to establish remedy review boards to determine whether a cleanup plan is consistent with cleanup standards under section 121 of CERCLA, and to consider the reasonableness of the cost and other factors. This provides an opportunity for the PRPs to argue for an alternative treatment that would be less costly.

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[32] Russell J. Harding, Director, Michigan Department of Environmental Quality. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. March 5, 1997. *Superfund Reauthorization: Lessons from the States.* H. Hrg. 105-8. 105th Congress, 1st Session. p. 100.

[33] Sherri W. Goodman, Deputy Under Secretary of Defense for Environmental Security, Department of Defense. Testimony submitted to the Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. June 27, 1995. *Superfund Reauthorization: Federal Agency Perspectives*. H. Hrg. 104-22. 104th Congress, 1st Session. p. 892.

ARARs and Preference for Permanence and Treatment

ARARs

CERCLA section 121(d)(2)(A) requires that selected remedial actions for hazardous wastes left on-site attain legally Applicable or Relevant and Appropriate standards, Requirements, criteria, or limitations. State ARARs must be met if they are more stringent than the federal requirements. Federal environmental laws cited in CERCLA include: the Toxic Substances Control Act, the Safe Drinking Water Act, the Clean Air Act, the Clean Water Act, the Marine Protection, Research and Sanctuaries Act, and the Solid Waste Disposal Act. CERCLA also requires that the remedial action:

> shall require a level or standard of control which at least attains Maximum Contaminant Level Goals established under the Safe Drinking Water Act and water quality criteria established under section 304 or 303 of the Clean Water Act, where such goals or criteria are relevant and appropriate under the circumstances of the release or threatened release.[34]

There is broad support for eliminating the statute's ARARs requirement and its preference for permanence and treatment. Critics argue that they have artificially tilted the remedy selection process towards more costly remedies than are necessary to protect human health and the environment. According to GAO, cleanup levels established by standards, such as ARARs, are generally more stringent than cleanup levels established by risk assessments.[35] This supports the common assertion that cleanups based on standards are generally more costly than cleanups based on risk assessments. The Chemical Manufacturers Association argues that ARARs also can diminish the effectiveness of the risk assessment process because they possibly may overturn risk-based decisions.[36] If the ARARs requirement is eliminated, some advocate establishment of a national cleanup standard which could be used for all Superfund sites.

Debate over which federal or state regulations (or combinations thereof) are relevant and appropriate at a given site has often been cited as time consuming.

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[34] CERCLA, as amended, Section 121(d)(2)(A). For carcinogens, EPA sets Maximum Contaminant Level Goals at zero.

[35] Lawrence J. Dyckman, Associate Director, General Accounting Office. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. June 22, 1995. *Superfund Reauthorization: CBO, GAO, and Superfund "Think Tanks"*. H. Hrg. 104-22. 104th Congress, 1st Session. p. 733.

[36] Chemical Manufacturers Association. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 486-487.

PRPs have an obvious interest in favoring the standard which is easiest and most economical to attain. EPA and state regulators frequently disagree on which regulations should apply. These negotiations can add months to the process. Despite these criticisms, the National Governors Association (NGA) opposes the elimination of state applicable standards and promulgated state relevant and appropriate requirements at NPL sites.[37] In addition to NGA's opposition, Jay J. Manning, Senior Assistant Attorney General for the state of Washington, testified that retaining applicable state standards is essential to ensuring a consistent level of cleanup throughout a state at both its NPL and non-NPL sites:

> For the federal program to have any credibility at all, applicable state standards must be met.... [T]he public will not believe that cleanups conducted under CERCLA are adequately protective of human health and the environment if they are not required to meet state standards. Finally, if CERCLA sites are not required to meet state standards, the result will be the anomalous situation of neighboring contaminated sites, one on the National Priorities List and the other subject to state law, being cleaned up to different standards. It is obvious that this should be avoided, and it can be by requiring that CERCLA cleanups meet applicable state standards.[38]

While some stakeholders in the debate call for eliminating the ARARs requirement, others call for eliminating only the relevant and appropriate requirements (RARs). This approach would keep the substantive demands found in federal and state law that specifically address hazardous substances at a site ("applicable"), but drop those requirements that appear sufficiently similar that some EPA or state regulators might consider their use well suited to the particular site ("relevant and appropriate"). Presumably, the debate could be speeded up by reducing the number of regulations over which EPA and states could argue.

S. 8 states that a remedy must comply with the substantive requirements of federal and state environmental and facility-siting laws applicable to the conduct of the remedial action or to the determination of the cleanup level. More stringent state requirements may be applied at NPL sites if the state demonstrates that they are generally applicable and consistently applied to remedial actions, and the state publishes and identifies the applicable requirements to the President.

Federal hazardous waste management provisions of the Solid Waste Disposal Act would not apply to the return of "contaminated media into the same media in ... then-existing areas of contamination at the facility." Federal and state procedural requirements, including permitting requirements, would not apply to response actions conducted on site at the facility. Waivers from the substantive requirements of federal and state environmental and facility siting laws are authorized for specified

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[37] Richard Gimello, National Governors Association. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. March 5, 1997. *Superfund Cleanup Acceleration Act of 1997*. S. Hrg. 105-60. 105th Congress, 1st Session. p. 383.

[38] Jay J. Manning, Senior Assistant Attorney General of Washington. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. March 5, 1997. *Superfund Reauthorization: Lessons from the States.* H. Hrg. 105-8. 105th Congress, 1st Session. p. 143-144.

reasons; however, the President must publish findings, including documentation and an explanation of how the remedial action meets the cleanup requirements of section 121. If no applicable federal or state standard exists for a contaminant, a remedial action must meet a standard that the President determines to be protective.

The Preference for Permanence and Treatment

Section 121(b) of CERCLA requires a remedial action "that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable." As noted above, many advocate eliminating this preference. Some advocate total elimination of this provision, while others advocate retaining the preference for permanent remedies and treatment at "hot spots" only. The American Petroleum Institute supports the elimination of CERCLA's preference for permanence and treatment and claims that this preference is a major factor in delaying cleanup.[39] Superfund Reform '95 (a broad coalition of the insurance industry, small and large businesses, and some local governments) called for eliminating both the ARARs requirement and the preference for permanence and treatment. In its place, they recommended that:

> final decisions on remedy selection issues should be made by comparing the costs and net human health and environmental benefits of the alternatives, with priority for funding directed at real and significant risks to human health. No remedy should be selected for which benefits are not reasonably related to the costs.[40]

At a hearing held in June 1995, the Department of Energy's Assistant Secretary for Environmental Management, Thomas P. Grumbly, testified, "The current law's preference for treatment/permanence should be narrowed and replaced with the concept of long-term reliability and a preference for the treatment of 'hot spots' [of contamination]."[41] There appears to be consensus among stakeholders seeking these reforms that containment measures and institutional controls should be required for sites where permanent treatment is not achieved. However, institutional controls, such as restricting land uses, can be difficult to maintain over the long-term if interest in developing the land heightens in future years.

Opposing those who seek to eliminate the preference for permanent treatment solutions, Tom Udall, Attorney General of New Mexico, and representing the

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[39] Larry L. Lockner, American Petroleum Institute. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. March 5, 1997. *Superfund Cleanup Acceleration Act of 1997*. S. Hrg. 105-60. 105th Congress, 1st Session. p. 424.

[40] John F. Spisak, Superfund Reform '95. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. June 20, 1995. *Superfund Reauthorization: Business, Insurers, and Contractor Perspectives*. H. Hrg. 104-22. 104th Congress, 1st Session. p. 369.

[41] Thomas P. Grumbly, Assistant Secretary for Environmental Management, Department of Energy. Testimony submitted to the Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. June 27, 1995. *Superfund Reauthorization: Federal Agency Perspectives*. H. Hrg. 104-22. 104th Congress, 1st Session. p. 907.

National Association of Attorneys General, claims that retaining CERCLA's preference for permanence and treatment can provide greater health, environmental, and economic benefits than containment offers. He argued this viewpoint in the following testimony at a hearing held in March 1997:

> We believe it would be inappropriate to place remedies that merely contain hazardous substances, or that limit access to hazardous substances with a fence or a deed restriction, on equal footing with remedies that actually clean up hazardous substances. Clearly, total and permanent elimination or immobilization of hazardous substances is of far greater benefit to the local community and to society at large. The environment is restored, future health threats are eliminated, and property is opened up for development or other useful purposes.... Furthermore, containment remedies require greater expenditures for long-term monitoring and operation and maintenance than do treatment remedies. Containment remedies are much more prone to failure than treatment remedies, as Congress recognized in 1986.[42]

S. 8 would eliminate CERCLA's preference for permanence. In its place the bill would require that the reliability of the remedy over the long-term be one of six factors to be considered and balanced in selecting the remedy. As noted previously, the other five factors are the remedy's effectiveness in protecting human health and the environment, short-term risks posed by implementing the remedy, acceptability to the community, technical feasibility from an engineering perspective, and reasonableness of the remedy's cost.

The bill also abolishes the preference for treatment except at "hot spots," discrete areas containing a hazardous substance that cannot be reliably contained and that present a substantial risk to human health and the environment. However, containment may be used instead of treatment for a relatively small hot spot at a landfill or mining site in specified circumstances. Also, in conducting remedial action reviews, EPA should give priority consideration to RODs that were issued before October 1, 1993, and that involve primarily ground water treatment for dense, nonaquaeous phase liquids.

The "Technical Impracticability" Waiver

CERCLA identifies six circumstances that, if met, allow for the waiver of ARARs.[43] One of these waivers, the technical impracticability (TI) waiver, may be granted if "compliance with such requirements [ARARs] is technically impracticable from an engineering perspective."[44] EPA has issued a guidance document for evaluating the technical impracticability of ground water restoration to promote "the careful and realistic assessment of the technical capabilities at hand to manage risks

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[42] Tom Udall, Attorney General of New Mexico and representative of the National Association of Attorneys General. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. March 5, 1997. *Superfund Cleanup Acceleration Act of 1997*. S. Hrg. 105-60. 105th Congress, 1st Session. p. 437.

[43] CERCLA, as amended, Section 121(d)(4).

[44] Ibid.

posed by ground water contamination."[45] Since issuing the guidance in 1993, EPA has promoted its implementation by establishing headquarters and regional contact personnel for transfer of TI related information, and by outlining a basic process for evaluation of TI decision documents. However, some critics in government and industry claim that EPA's approach to using this waiver authority greatly diminishes opportunities for cost savings. In practice, the implementation of "TI waivers" is often stymied by political issues such as some states' reluctance to accept the "TI waiver" option.

The most important application of the TI waiver is for the case of certain ground water restorations. For example, the presence of dense nonaqueous-phase liquids, commonly known as DNAPLs, at hazardous waste sites has complicated many ground water cleanups.[46] DNAPLs are organic compounds that will not dissolve in water, which poses significant technological barriers to removing them from contaminated ground water. Based on current technology, the attainment of drinking water standards (an ARAR) at sites contaminated with DNAPLs is impracticable.

A National Research Council (NRC) report discussed EPA's implementation of the TI waiver. EPA has issued a technical policy to address sites contaminated with DNAPLs, which the NRC's Committee on Ground Water Cleanup Alternatives supported in its report.[47] However, the committee and other stakeholders were concerned with EPA's general practice of granting a TI waiver only after the cleanup remedy fails in attaining the initial goals. The committee concluded, "Although the committee sees value in ensuring that best possible efforts are employed to address DNAPL contamination, a requirement that a remedial action be designed to achieve the impossible (based on current technology) is counterproductive."[48]

In a followup report, the NRC's Committee on Innovative Remediation Technologies reiterated that technological problems with cleaning up certain types of ground water contaminants, such as DNAPLs, have not been resolved. The committee concluded that more information and experimentation is necessary to develop new cleanup technologies that are capable of addressing problematic types of contaminants:

> [I]mproving the availability of technologies for cleaning up contaminated sites and the ability to compare these technologies based on rational scientific evaluation will require research, field work, and improved data collection and technology transfer. The development of new remediation approaches will require close links between laboratory and field studies and access to field demonstration sites with the freedom to change process operations during testing. Parallel activities involving field investigations in concert with laboratory and

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[45] Environmental Protection Agency. Office of Solid Waste and Emergency Response. *Guidance for Evaluating the Technical Impracticability of Ground Water Restoration*. EPA/540-R-93-080. September 1993.

[46] Some examples of compounds likely to exist as DNAPLs are chlorinated solvents, coal tars, and transformer oil.

[47] National Academy of Science, National Research Council. *Alternatives for Ground Water Cleanup*. National Academy Press, Washington, D.C. 1994. p. 258

[48] Ibid., p. 259.

> theoretical work will help identify key issues and thus focus scientific and engineering activities on the most critical topics related to remediation.[49]

Further, the committee argued that the current regulatory structure can impede the development of innovative treatment solutions and examined the use of market incentives to spur new cleanup technologies:

> The principal change necessary to move to a market-oriented approach to remediation technology development is to take advantage of the power of financial self interest rather than relying on the force of regulation alone. The objective is to develop a market that is quantifiable, with reasonably well-defined risks and a commensurate opportunity to create financial returns from solving problems. That is, both the vendor *and* the customer must perceive financial benefit from improved remediation of contaminated properties, while still protecting the interest of the affected public in ensuring that sites are cleaned up. Capital will flow to the remediation technology market when it becomes evident that new technologies can create real value for customers.[50]

As noted on page 14, S. 8 specifically includes cost in the definition of "technically impracticable": the term "means impracticable due to engineering infeasibility or unreliability or inordinate costs."[51] The bill states that a remedy shall seek to protect *uncontaminated* ground water unless it is technically impracticable. And, a remedy shall seek to restore for beneficial use *contaminated* ground water that is potentially suitable for drinking water, unless it is technically impracticable. If *contaminated* ground water is not potentially suitable for drinking water, the remedy shall attain a standard protective of whatever its current or future use is. Ground water shall not be considered suitable for drinking water if naturally occurring conditions prevent it, or if it is so contaminated by broad-scale human activity (unrelated to a facility release) that restoration is technically impracticable, or if it is physically incapable of yielding 150 gallons a day to a well or spring (unless it is currently used as drinking water). If achieving the cleanup goals at a site is technically impracticable, a technically practicable remedy is to be chosen that minimizes risk to health and the environment by cost-effective means.

Future Land, Ground Water, and Resource Use

Many believe that, to accomplish cleanups cost-effectively and at a pace that is conducive to the protection of human health and the environment, the future use of land, ground water, and other resources must be considered in determining the appropriate cleanup standard and the remedial design. Future uses are currently considered in the remedial investigation/feasibility study. However, critics argue that the statute encourages overly conservative risk assessments based on unrealistic pathways through which exposure can occur. In response to this criticism, EPA

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[49] National Academy of Science, National Research Council. *Innovations in Ground Water and Soil Cleanup*. National Academy Press, Washington, D.C. 1997. p. 141.

[50] Ibid., p. 60-61.

[51] S.8 (draft chairman's mark of August 26, 1997), section 401. As printed, there is no comma in the definition.

reports that it is working to incorporate reasonable assumptions about future land use when conducting site investigations. Steven A. Herman, Assistant Administrator of EPA's Office of Enforcement and Compliance Assurance and Timothy Fields, Jr., Acting Assistant Administrator of EPA's Office of Solid Waste and Emergency Response, testified:

> EPA has improved its cleanup decisions by consistently using reasonable assumptions about current and future land use. Recognizing that land may be appropriate for uses other than residential use can yield a more realistic risk assessment and less expensive remedy. EPA is working with local land use planning authorities, other government officials and the public as early as possible during site investigation to develop reasonable land use assumptions to use in the decision making process.... Currently, about 60% of EPA's Records of Decision include a land use scenario other than residential land use, typically where there is no residential land use on-site or adjacent to the site.[52]

Stakeholders favoring greater consideration of future land uses include the chemical industry, small and large businesses, the National Governors Association, local government organizations such as the U.S. Conference of Mayors, National League of Cities, and National Association of Counties, the Department of Energy, and the Department of Defense. The National Realty Committee, a business organization representing real estate companies, believes that future land uses should play a significant role in determining the extent to which a site is cleaned up:

> We also need to see more progress in resolving a problem sometimes referred to as 'how clean is clean.' It is critical to obtain more standardization in this area as well as appropriate tiering of cleanup levels so they track anticipated land uses. An industrial project is not going to be a children's playground any time soon. To require cleanups that assume such a land use will only result in the permanent idling of many properties.[53]

Three land use reforms frequently proposed are: consideration of actual or planned future land and other resource use during the remedial investigation/feasibility study; use of institutional controls such as deed restrictions to protect human health; and contaminated ground water remedy selection based on future use and exposure, with treatment designated only for aquifers that are currently supplying drinking water or are reasonably expected to supply drinking water in the future.

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[52] Steven A. Herman, Assistant Administrator, Office of Enforcement and Compliance Assurance and Timothy Fields, Jr., Acting Assistant Administrator, Office of Solid Waste and Emergency Response, Environmental Protection Agency. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 450.

[53] John Gates, National Realty Committee. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 397.

Some environmental groups are cautious about any provisions that would make land use considerations central to the process of selecting remedies. While the Environmental Defense Fund (EDF) believes that the consideration of future land use at a site is appropriate when choosing a remedy, it cautions against focusing solely on the future use of a site and ignoring the uses of neighboring areas. Karen Florini, a Senior Attorney with EDF, urged that:

> Superfund must protect the health of site neighbors, not just individuals who will be present on the site itself, given the well-documented ability of contaminants to migrate off-site (e.g., as wind-blown contaminated dust or as vapors).[54]

Organizations and groups active in the environmental justice movement are concerned that if more emphasis is placed on future land use considerations, communities located near areas considered to be less worthy of a high standard for cleanup will be at greater health risk than communities which are not located near such sites. Environmental justice pursues fair and equitable protection against any environmental hazard, including exposure to hazardous wastes, of all people regardless of race or socioeconomic status. The incorporation of a single, national risk goal combined with consideration of a community's anticipated future land use and institutional controls, if necessary, might resolve this concern. Advocates for increased consideration of land use counter these arguments by claiming that risk management goals would not be lowered, and therefore, protection of human health would not be compromised.

S. 8 would require that the risk evaluation at each facility consider reasonably anticipated future use of land and water resources. In developing assumptions regarding reasonably anticipated future *land* uses, the President must consider the views of local officials and community members and consider specified factors, including current zoning, the future plans of the land use regulatory authority, recent land use history, development patterns, population projections, federal and state land use designations, and the plans of the owner or operator of the facility. In developing assumptions regarding reasonably anticipated future *ground water* and *surface water* uses, the President must give substantial deference to classifications in a state comprehensive ground water protection program and consider other designations or plans adopted by the governmental unit that regulates surface or ground water use planning in the area. Future use must also be taken into account for contaminated ground water that is not suitable for drinking water, to protect it (and any connected surface water) if technically practicable, for whatever its anticipated use is.

The Role of States in the Remedy Selection Process

A substantial number of critics find that the current system of shared EPA and state responsibility for implementing and funding the Superfund program has caused

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[54] Karen Florini, Senior Attorney, Environmental Defense Fund. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. March 5, 1997. *Superfund Cleanup Acceleration Act of 1997*. S. Hrg. 105-60. 105th Congress, 1st Session. p. 387.

excessive delays in cleanup, duplication of effort, and confusion among stakeholders. They argue that states are better equipped to tailor remedies to sites within their borders cost-effectively and that an expanded state role would result in faster cleanups with lower transaction costs. Accordingly, a number of states seek full Superfund authority.

The law does not provide for delegation of Superfund program authority to the states as it has for other environmental laws such as the Clean Water Act and RCRA. At present, EPA and states can enter into cooperative agreements on a site-by-site basis that authorize the states to undertake most of the cleanup activities the Agency would perform, excluding remedy selection. Full program authority would enable states with such authority to implement their own versions of a Superfund program, while program delegation would give states the authority to implement the federal program.

The federal government is primarily responsible for implementing the Superfund program, though states play important roles in selecting remedies and funding Superfund site cleanups. The statute's ARARs requirement recognizes state standards and regulations. Under current law, a state is financially responsible for 10% of the cleanup costs covered by the Superfund trust fund and for the full cost of operating and maintaining the selected remedy. In addition, a state must make off-site disposal facilities available if necessary and must provide 20 years of hazardous waste treatment or disposal capacity for all hazardous waste reasonably expected to be generated within its borders. A state is required to pay for 50% of all response costs if it or a locality within its borders operated the site. If a state cannot fulfill these requirements, EPA cannot obligate money from the trust fund for the cleanup.

The National Association of Attorneys General supports delegating federal authority to qualified states and also endorses granting full program authority to states with existing cleanup programs:

> Other federal environmental statutes, such as RCRA, allow EPA to authorize qualified states to implement their own program in lieu of the federal program. Authorization would allow states with successful, effective cleanup programs to implement those programs at all sites, including NPL sites within their borders.... [S]tate cleanup programs have succeeded based upon remedy selection and liability provisions chosen by the states to meet the needs and desires of their citizens for adequate protection of health, safety and the environment — areas in which states have traditionally exercised significant authority. These programs are fully capable, as currently implemented, to take over cleanup of NPL sites.[55]

The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) supports the position that states with adequate experience and essential resources to manage hazardous waste cleanups should have the flexibility

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[55] Tom Udall, Attorney General of New Mexico and representative of the National Association of Attorneys General. Testimony submitted to the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control, and Risk Assessment. March 5, 1997. *Superfund Cleanup Acceleration Act of 1997*. S. Hrg. 105-60. 105th Congress, 1st Session. p. 433.

to decide whether to implement the federal program. James C. Colman, Assistant Commissioner for the Massachusetts Bureau of Waste Site Cleanups and spokesperson for ASTSWMO, testified that a state role is essential in cleaning up all sites subject to liability under CERCLA to the same level of protection across an entire state:

> Where state goals and standards have been established, they should be applied consistently at all sites subject to CERCLA liability in that state regardless of the lead agency. This includes not only NPL sites but brownfield/voluntary cleanup sites and federal facilities. A uniformly applicable cleanup process in a state will eliminate the often paradoxical inconsistency found where similar sites in close proximity are cleaned up to different levels for reasons which have little to do with the actual risk posed. It provides an expectation of consistency to responsible parties, nearby residents and other stakeholders involved in the cleanup process.[56]

Other stakeholders interested in increasing the role of the states include some local governments, PRPs, the insurance and manufacturing industries, and some nonprofit organizations interested in Superfund reauthorization. These stakeholders claim that part of the problem with the current remedy selection process is that EPA has the authority to preempt a state-selected remedy. Further, some believe that the threat of EPA preemption causes participation in voluntary cleanup actions to be a risky venture. A business that participates in voluntary cleanups may face CERCLA liability even after liability under state law is resolved. Some claim that if states had full Superfund authority this risk would disappear. At least 35 states have voluntary cleanup programs for less serious hazardous waste sites.

Some community groups are apprehensive about the proposed delegation of Superfund authority to states and advocate judicious oversight by EPA if delegation occurred. One concern is that some states will not be as rigorous in their cleanup decisions as the federal program, which would necessarily lead to less protection of human health and the environment. Some also believe that state public participation programs have not measured up to the federal program. Ohio Citizen Action (a consumer and environmental activist organization) opposes full delegation of federal authority to states and does not support allowing states to implement their own programs in place of the federal one. Jane Forrest, Environmental Projects Director for Ohio Citizen Action, testified:

> We object strongly to the idea of allowing NPL sites to be cleaned up through state programs with little or no EPA, local government, or citizen involvement or oversight. In Ohio's case, that program would be a disaster.[57]

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[56] James C. Colman, Assistant Commissioner for the Massachusetts Bureau of Waste Site Cleanups and spokesperson for the Association of State and Territorial Solid Waste Management Officials. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 367.

[57] Jane Forrest, Environmental Projects Director, Ohio Citizen Action. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on (continued...)

S. 8 offers a flexible approach that is largely consistent with the recommendations of the National Association of Attorneys General and the ASTSWMO in that it would allow a state either (1) to be authorized to implement its own cleanup program, in lieu of CERCLA, at any non-federal facility listed on the NPL, or (2) to be delegated as much of the federal cleanup program as it is willing and capable of administering at the NPL sites of its own choosing. States would be able to request delegation of all or a portion of Superfund authorities, including remedy selection. The bill would designate the state as the sole authority to perform the transferred responsibility(ies). EPA may not perform a removal or take an administrative or judicial action at a transferred site without the state's permission, unless there is an emergency, or EPA obtains a declaratory judgment in U.S. district court. States would be able to request EPA to remove all or part of a transferred facility from the NPL, which the agency shall do if it is not inconsistent with CERCLA. The trust fund would continue to pay its share of cleanup costs at delegated sites. The 50% state cost-share requirement at state-operated facilities would be repealed. The state cost share would be the lower of 10%, or a percentage determined by the Office of Management and Budget. The bill would provide funding to authorized and delegated states, some of which would be on a facility-specific basis.

Community Involvement in the Remedy Selection Process

There is general agreement that the current process for involving communities in the decision making process does not speed up Superfund cleanups and that it often makes individuals feel alienated and powerless regarding their community's future. Without significant community support, a hazardous waste cleanup project can face problems such as challenges to selected remedies, delays in cleanup, and active public opposition. In some cases, a lack of involvement has led communities to take legal action to halt the cleanup. In other cases, community involvement has not proven helpful and has delayed needed decisions without notable benefit.

After CERCLA had been in existence for 5 years, many stakeholders recognized the importance of involving communities in the process of selecting remedies. As a result, SARA added section 117 to the statute with the intent of increasing the level of community involvement. However, section 117 only requires that a site's remedial action plan be made available to the public, that the public have an opportunity to make comments on the plan and any changes to it, and that EPA answer those comments and explain any significant differences in the final plan.

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[57](...continued)
Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 386.

SARA authorized technical assistance grants (TAGs) to assist communities in understanding and commenting on the plan. (See box below.) As of July 1997, EPA has awarded TAGs to communities at 193 Superfund sites, about 14% of the total number of sites currently on and deleted from the NPL.[58] Although section 117 provided the public some access, for the most part it has not engendered active involvement of communities in the decision making process.

The Technical Assistance Grants (TAG) Program

To ensure that communities affected by Superfund sites are informed about the selection and implementation of cleanup remedies, Section 117 of SARA created the Technical Assistance Grants (TAG) program. Up to $50,000 may be provided to a community "to obtain technical assistance in interpreting information with regard to the nature of the hazard, remedial investigation and feasibility study, record of decision, remedial design, selection and construction of remedial action, operation and maintenance, or removal action at such facility." Recipients of grants are required to contribute 20% of the total cost of assistance for which the grant is made, though this may be waived in cases of financial hardship. The TAG program has been criticized as being less successful than originally hoped. Some critics have recommended that a Technical Assistance Grant be awarded before a site is listed on the NPL. Environmental community groups such as the North Baton Rouge Environmental Association and the Communities at Risk Network have proposed other reforms to the TAG program such as: simplification of the application process; elimination of the matching funds requirement; and removal of the 3-year restriction.

At a hearing held in June 1995, the Department of Energy's Assistant Secretary for Environmental Management, Thomas P. Grumbly, made the following argument in support of involving affected communities:

> Superfund should be reformed to incorporate community involvement earlier in the remedy selection process. We have often been criticized for not adequately addressing local circumstances when we evaluate the risks associated with a site or determining the method or level of cleanup. For too long, community groups have felt shut out of the process of site remediation decision making, discussions of future land use options, and the risk evaluation process. Community involvement should be an integral part of the remedy selection process that will, in the long run, make the risk assessment and management process more open, and more democratic.[59]

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[58] Telephone conversation with Suzanne Wells, Director, Community Involvement and Outreach Center, Office of Emergency and Remedial Response, Environmental Protection Agency. August 13, 1997.

[59] Thomas P. Grumbly, Assistant Secretary for Environmental Management, Department of Energy. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. June 27, 1995. *Superfund Reauthorization: Federal Agency Perspectives*. H. Hrg. 104-22. 104th Congress, (continued...)

To facilitate community involvement in the remedy selection process at DOE, the department created an Office of Public Accountability in its Environmental Management Program. It is monitoring progress in increasing stakeholders' trust and confidence levels, and improvement has been indicated.

The Chemical Manufacturers Association supports increased levels of community involvement in cleaning up NPL sites, proposes the expansion of the TAG program, and recommends coordination with formal community groups to ensure that citizens have an organized mechanism through which they can participate in the cleanup process:

> Communities need to have adequate input into the remedy selection and implementation process at Superfund sites.... By providing local citizens with opportunities for early and active participation in the evaluation of remedial options, the entire procedure becomes more transparent, resulting in greater credibility in, and commitment to, the selected remedy. Informed communities are more likely to support reasoned Agency decisions.... CMA supports establishing formal community groups to improve communication between EPA, PRPs, and the communities that live around Superfund sites.... Furthermore, the existing Technical Assistance Grants ("TAGs") [program] could be increased to help community groups obtain full access to information and an early and on-going voice throughout the remedy selection process. Formal community groups should be supported, where they exist, by making them the only eligible group for a TAG.[60]

S. 8 would require EPA to inform and consult with the affected community and to consider their views in developing and implementing the remedial action plan. It also directs EPA to assist in establishing Community Advisory Groups (CAGs) that would serve as information conduits to and from EPA, the states, and PRPs. In addition, the bill continues the TAG program grants of $50,000, but allows a waiver of that limit. The bill eliminates the current law fund-matching requirement, and authorizes early disbursement to the TAG recipient in advance of the recipient's making expenditures to be covered by the grant; up to $5,000 may be advanced at a time.

Conclusion

This report has outlined issues in the debate on reforming Superfund's cleanup standards. These issues reflect criticisms and proposals which have been presented at congressional hearings during the 104th and 105th Congress and which are central to the Superfund reauthorization debate. The views summarized in this report are

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[59](...continued)
1st Session. p. 911-912.

[60] Chemical Manufacturers Association. Testimony submitted to the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. April 10, 1997. *Superfund Reauthorization: EPA's Management of the Superfund Program, Administrative Changes, and Proposals for Legislation*. H. Hrg. 105-8. 105th Congress, 1st Session. p. 494-495.

those most frequently delivered on the subject of cleanup standards and remedy selection.

Proponents and opponents of proposed reforms, such as repealing the statute's requirement to meet "relevant and appropriate" requirements or ensuring that risk assessment plays a larger role in the remedy selection process, confront formidable questions: What should be the goal of the Superfund program? Should sites be cleaned to eliminate all remnants of waste and pollutants, or should sites be cleaned to a level that is simply sufficient to protect human health? The distinction between the two is significant — the former takes a more expansive approach to environmental protection, while the latter takes an approach that may better accommodate economic considerations. If the goal should be the protection of human health, how protective and complete should the cleanup be? And who decides? If the goal is to achieve a certain level of environmental cleanliness, should national standards be established to define the level of cleanliness required? Though there is little consensus on the answers, Superfund's stakeholders seek to alleviate the confusion over the program. To lessen this confusion, Congress is attempting to further define Superfund's cleanup goals and the methods used to attain these goals.