36 ELR 10364 5-2006

ELR
NEWS & ANALYSIS

The Superfund Program at Its 25th Anniversary

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Editors' Summary: On December 11, 1980, President Jimmy Carter signed into law CERCLA, commonly referred to as Superfund, creating a federal program to clean up our nation's most polluted hazardous waste sites. Today, every state and nearly every territory of the United States has at least one Superfund site within its borders. In this Article, John Quarles and Michael Steinberg examine the first 25 years of the Superfund program. In so doing, they provide insight as to where this program may lead in the future.

I. Introduction

The 25th anniversary of Superfund[1] is a time to reflect upon the extraordinary history of this singular environmental law. This Article begins with an overview of that history. It then offers some observations about Superfund's achievements and about the evolving societal strategy for addressing contaminated sites. Finally, the Article examines some of the many challenges that still confront Superfund as it moves into its second quarter-century.

II. Historical Overview

It would be an understatement to say that in its 25 years of operation, the Superfund program has had a tumultuous history and has undergone fundamental change. No other environmental statute has been the source of so much controversy—or so much litigation. Our purpose here is to review just a few of the highlights.

A. Origins and Enactment

The Superfund program was launched in an atmosphere of crisis. Discovery of serious contamination at such sites as Love Canal in upstate New York and the "Valley of the Drums" in Kentucky caused widespread fear of grave dangers to public health. Little was known about the number or extent of hazardous waste disposal problems, and still less was known about how to deal with them. There were virtually no governmental programs or established expertise in this field, but the intense public anxieties created irresistible political momentum. Loosely modeled on the Clean Water Act's oil spill cleanup fund,[2] the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) statute—nicknamed "Superfund"—was cobbled together as a lame duck session of the U.S. Congress drew to a close. It was enacted on December 11, 1980,[3] without a single committee report addressing the bill that actually became law.

B. The Early 1980s

Superfund got off to a rocky start. It generated intense controversy, both at individual sites and at the national policy level. Most in industry were outraged at the retroactive, strict, and joint and several liability asserted by the U.S. Environmental Protection Agency (EPA) under the new statute. Several lawsuits challenged its constitutionality, but those attacks were rebuffed by the courts. At a few sites, there were highly publicized allegations of "sweetheart deals." Debate also raged over the methods of remediation, which in early cases often involved costly efforts to excavate contaminated material and then bury it in a more secure landfill. Criticism soon mounted that this would not provide a "permanent" solution because even the more secure landfill would someday need to be cleaned up. Environmental advocates pressed for more stringent standards to answer the pressing question: "How clean is clean?" In 1986, the Superfund Amendments and Reauthorization Act was enacted,[4] establishing the framework of the statute as it exists today.

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1. "Superfund" is the popular title of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§9601-9675, ELR STAT. CERCLA §§101-405. In 1986, the U.S. Congress reauthorized and amended CERCLA in fundamental ways by enacting the Superfund Amendments and Reauthorization Act (SARA), Pub. L. No. 99-499, 100 Stat. 1613 (1986). Subsequent amendments to CERCLA have been much narrower in scope.

2. 33 U.S.C. §1321.

3. *See* Kyle E. McSlarrow et al., *A Decade of Superfund Litigation: CERCLA Case Law From 1981-1991, in* SUPERFUND DESKBOOK 487 (Envtl. L. Inst. 1992).

4. *See* Timothy B. Atkeson et al., *An Annotated Legislative History of the Superfund Amendments and Reauthorization Act of 1986 (SARA), in* SUPERFUND DESKBOOK, *supra* note 3, at 1.

C. The Late 1980s

In response to demands to treat, i.e., destroy, hazardous substances rather than simply relocate them, remedial action shifted to the "dig-and-burn" practice of incineration. This prompted new complaints attacking the exorbitant cost of cleanup. EPA encountered contract management problems (and some huge cost overruns) in its early efforts to perform these remedial actions. Meanwhile, criticism also mounted that the program was functionally deficient—bogged down in disputes and endless negotiations. Most of the money seemed spent on lawyers and transaction costs, with little progress in actual cleanup. Communities near Superfund sites complained that nothing seemed to be happening. In at least some cases, they were correct.

D. 1989 to 1992

In May 1989, following a 90-day management review directed by EPA's new Administrator, William Reilly, EPA issued a report that ushered in the era of "Enforcement First." This came to encompass both an intensified effort to have potentially responsible parties (PRPs) perform and pay for work at Superfund sites, as well as a vigorous assertion of enforcement authority against those PRPs. With a decade of experience behind it, the program began to show progress in accomplishing actual cleanups. At the same time, criticism emerged from a different direction based on studies of the enormous costs that would result from "treatment" of hazardous substances combined with assertions that risks had been exaggerated and that the benefits produced by such vast expenditures would be limited. Other complaints arose against the new enforcement policy, claiming that EPA was unfairly singling out deep pocket defendants to bear a disproportionate share of the work and costs. Dialogue groups sponsored by the Keystone Center and other organizations began to lay a foundation for further changes in the program.

E. 1993 to 1994

The evolving public debate over Superfund crystallized in efforts to overhaul the Superfund statute. President William J. Clinton spoke about the need for Superfund reform in his State of the Union Addresses. Under the leadership of EPA Administrator Carol Browner, the Clinton Administration developed a legislative proposal, the Superfund Reform Act (SRA), which it sent to Congress in early 1994.[5] An important feature of that bill was its recognition of containment as one of the alternatives for remediation that should be considered, thus directly acknowledging a need to achieve cost-effectiveness in the cleanup program.

Through months of intense but bipartisan negotiations, the SRA was expanded to address many other problems with the Superfund program. An orphan share funding system was created for the national priorities list (NPL) sites, with allocations performed by neutrals determining how much the Superfund would pay at each site. The maturation of state cleanup programs and the growing roles of local communities were also recognized. The resulting bill was approved by the U.S. House of Representatives Energy and Commerce Committee by a vote of 44 to 0. Unfortunately, further progress in the House was stalled by a peripheral dispute over applying the Davis-Bacon Act's minimum wage provisions to government-funded Superfund projects. Although the SRA died when the 103d Congress adjourned in October 1994, the bipartisan support for that approach remained in effect, and it influenced EPA's subsequent policies and decisions.

F. 1995 to the Present

In the decade since 1995, Superfund has achieved levels of operational progress and public acceptance it had never before experienced. Much of the credit for that improvement is attributable to a far-reaching set of administrative reforms announced by EPA in October 1995 that reduced the elements of confrontation between the government and PRPs and achieved numerous specific improvements in program management.[6] In addition, building on past experience and accomplishments, EPA made solid progress each year in moving sites on the NPL into remedial construction and bringing sites to construction completion. At the same time, greater awareness has developed of the vast universe of other sites—several hundred thousands at least, and in varying stages of contamination—that are being addressed by state programs, voluntary action, the federal Resource Conservation and Recovery Act[7] program, or in other ways. Attention is being given to the role that EPA should continue to play under the Superfund law with respect to remediation of sites not on the NPL and to how federal activity should mesh with other governmental mechanisms to assure appropriate remediation and environmental protection at those sites. Much has changed in 25 years.

III. General Observations

In reviewing the long and difficult history of this major government program, many observations and comments might be made. The following are among the most significant.

A. Major Accomplishment by EPA

Although the Superfund program has generated extraordinary levels of controversy and criticism, it can now be recognized as an arena in which EPA has achieved a high level of success. After starting out with little or no practical knowledge of the problems to be addressed, the Agency has, over time, developed institutional capability and expertise, solved problems, improved relationships, and ultimately established a program that operates effectively and performs a critical function in society. Tens of thousands of contaminated sites have been evaluated, short-term removal actions have been taken at several thousand of those sites, and longer term remedial actions are slowly being completed at the most severely contaminated sites. A topic of intense public concern—once dominated by controversy and emotion—has been brought under control, buttressed by sound

5. H.R. 3800, 103d Cong. (1994). For a perceptive discussion of the fate of the SRA, see Rena I. Steinzor, *The Reauthorization of Superfund: Can the Deal of the Century Be Saved?*, 25 ELR 10016 (Jan. 1995). *See also* James E. Satterfield, *High Hopes and Failed Expectations: The Environmental Record of the 103d Congress*, 25 ELR 10089 (Feb. 1995).

6. Superfund Settlement Project, EPA's Superfund Reforms: A Report on the First Year of Implementation (1996).

7. 42 U.S.C. §§6901-6992k, ELR Stat. RCRA §§1001-11011.

technical understanding and a general public recognition that actions that should be taken are being taken. During that process and in recent years, EPA has worked to improve relationships with PRPs and has largely replaced the atmosphere of hostile confrontation with attitudes of reasonable cooperation and mutual respect. EPA deserves to be extremely proud of its accomplishments in this field.

B. The Role of Industry

Industry also has made major contributions to the success of this program. Perhaps unfairly, industry initially bore the brunt of criticism for disposal practices that, in essence, had reflected the values and scientific knowledge of society in an earlier era. Stung by such criticism and offended by a harsh liability system (many regarded it as totally unfair), much of industry initially protested and resisted the obligations imposed on it by the Superfund statute.

By the mid- to late 1980s, however, those attitudes had changed, and most national corporations accepted the imperative that they must participate constructively in addressing this national problem. At site after site across the country, those companies rose to the challenge. They organized PRP groups, established committees within those groups, investigated the conditions of contamination, and developed action proposals. Once EPA selected the remedies, those companies carried out remedial actions, and today they are managing operations and maintenance (O&M) at most sites. They provided the leadership, the technical resources, and the funding to perform required work at an ever-increasing percentage of contaminated sites.

Welcoming the more cooperative spirit that EPA has demonstrated since adoption of the administrative reforms in 1995, those companies have themselves taken growing pride in the results of this program. They have earned the right to be regarded as constructive partners in the achievement of success under Superfund.

C. Government Sites

In any review of the Superfund program, it is essential, in order to retain proper perspective, that one recognize the enormous significance of government-owned and government-operated facilities in the overall national problem of contaminated sites. In point of fact, by far the largest and most threatening sites in the country are those created by the federal government, mainly the U.S. Department of Energy (DOE) and the U.S. Department of Defense (DOD).[8] Quite appropriately, expenditures by the federal government in cleaning up its own sites have dwarfed expenditures by both EPA and PRPs in addressing sites contaminated by private industry.[9] In addition, many of the most contentious sites—co-disposal landfills—are often owned, operated, and used by municipalities. Superfund policy debate tends to focus on the private side of the picture, especially because Superfund dollars are not used to clean up the federally owned DOD or DOE sites. But in evaluating both the problems and successes of the program, one must never forget the huge involvement by government on both sides of this issue.

IV. Transaction Costs and Allocation

Notwithstanding the success of Superfund in providing a process through which action has been achieved to clean up multiparty hazardous waste disposal sites, the mechanism is inherently highly inefficient.[10] The funding vehicle to pay for these cleanups is the retroactive, strict, and joint and several liability imposed by the law. That liability principle can be justified to some extent on the basis that those who created a problem should pay their share of the costs for its solution. Yet that principle must be administered in a way that respects fundamental fairness. The concept of fairness—based on who caused the problem—has been subverted, however, by political considerations, as EPA and the U.S. Department of Justice (DOJ) stretched the Superfund liability net to capture ever more of American industry, while simultaneously helping certain favored categories of PRPs, such as lenders, scrap dealers, and municipal solid waste generators, to avoid liability for their actions.

At a purely practical level, the allocation system is encumbered by the huge evidentiary challenges of determining whose waste went to which site, especially with respect to activities that occurred two, three, four, or five decades earlier, even sometimes dating back to the 19th century. This funding mechanism has raised vast amounts of money to pay for many costly cleanups, but the investigation, negotiation, and litigation it has spawned are notorious. It is not a system one wants to lean on except under absolute necessity. The inclination of government officials to aggressively maximize use of that funding source, in contrast to use of public funds generated from broad revenue sources, appears to reflect more of a political imperative than any inherent sense of logic or fairness.

V. Societal Strategy

Through thousands of decisions at individual sites and the ongoing process of policy evolution, our government has gradually developed a general strategy for response to contaminated sites. Among the principal elements of that strategy are the following.

A. Pervasiveness of Contamination

At first it was thought that there were a limited number of sites with serious contamination, which perhaps could have been cleaned up in a few years to fully cure the problem. With a loss of innocence, we now know otherwise. The commonplace distribution and use of heavy metals, solvents, and other chemicals and hazardous substances throughout industry, agriculture, and households have created a pervasive dispersal of contaminants across the American landscape. Certain locations of concentrated disposal

8. Milton Russell et al., Hazardous Waste Remediation: The Task Ahead (Hazardous Waste Remediation Project, Univ. of Tenn. 1991).

9. The annual appropriation for DOE cleanup programs at DOE sites is approximately the same amount as EPA's entire annual appropriation for all EPA programs and activities combined.

10. As one federal judge observed: "Our Government, God bless her, is a bureaucratic monster which, by definition, runs inefficiently." United States v. Bell Petroleum Servs., Inc., 734 F. Supp. 771, 781, 20 ELR 21120, 21123 (W.D. Tex. 1990), *rev'd in part, vacated in part*, 3 F.3d 889 (5th Cir. 1993), *remanded*, 64 F.3d 202, 25 ELR 21575 (5th Cir. 1995).

have produced notoriously high levels of contaminants, but hundreds of thousands of other locations also reveal significant contamination, albeit sometimes at barely detectable levels.

B. Nature of Risks

Surprisingly, the widespread distribution of contaminants at low concentrations may not produce the significant risks to public health that were at first assumed, particularly under current land use patterns.[11] At many areas of serious contamination, reasonable assurance often can be provided that exposure pathways can be cut off through control measures that will preclude contact between the contaminants and human receptors. Though it would be irresponsible to ignore the contaminant loadings throughout the national ecosystem, it also appears factually accurate to conclude that in most situations significant threats of injury to human health either do not exist or can be controlled with proper management and vigilance.[12]

C. Reuse and Redevelopment

In recent years, it has been increasingly recognized that a major objective of programs addressing contaminated sites must be to achieve the return of such property to productive use in society. Particularly in areas of historic industrial development where major sections of urban and metropolitan areas were long devoted to industrial operations, it is unacceptable to leave those properties sealed off and consigned to "warehouse" status because the costs of remediation of such areas would exceed their market value after remediation. The prevalence of such areas, commonly referred to as "brownfields," has driven policy debate to confront difficult realities of the tension between goals of restoration to original background purity and goals of returning land to productive use after effective controls have been achieved to prevent risks to health.

D. Cost-Effectiveness

It has also become clear that cost-effectiveness must be incorporated as one of the principles governing management of cleanup programs.[13] Despite original hopes for universal removal and destruction of contaminants, as well as the continuing desire to achieve full restoration of contaminated groundwater to meet drinking water standards, it is evident that there are many locations where it is not technologically feasible and/or would be financially unwise to pursue objectives of "absolutist" cleanup. In this area of national life—as in virtually every other—a balance must be struck at some point on the continuum between perfection and practicality. To the extent that Superfund is viewed as a national program for the protection of public health, there are many other federal programs that provide far greater health benefits for the costs associated with them.[14]

E. Distribution of Responsibility

It also has become clear that the Superfund program itself cannot address the full universe of contaminated sites. The massive number of such sites—hundreds of thousands—exceeds any plausible reach of direct federal involvement. Instead, a mix of governmental responsibility, with some significant reliance also on structured voluntary action by private parties, is clearly dictated. The role of Superfund should be restricted to the most severely contaminated sites in the country as well as to those presenting other distinctive factors that make them more difficult to address.

VI. Future Challenges

At this point, there might be some temptation to ease off on the reappraisal of Superfund and put the program on autopilot to complete the work at the remaining NPL sites.[15] Certainly, the end is now in sight to complete the basic remediation at those high priority sites. That progress, combined with the improvements instituted through the administrative reforms, has reduced controversy and relieved political pressure. The cries heard only a few years ago that "Superfund is broken" and must be radically restructured have largely disappeared. The incontrovertible progress achieved surely warrants celebration.

Nonetheless, major issues remain. The job is not yet finished, and it would be a serious mistake to conclude that further improvement is unneeded. Instead, major challenges still face the Superfund program and fundamental correction is required at many points. Highlights include those set forth below.

A. Reconsideration of Remedy Decisions

There was great fear when, in 1995, EPA announced its plans to review prior decisions on remedy selection. Some expected that nothing would change. Others feared the floodgates had been opened. What followed instead was an orderly and sound process. It involved a minority of sites where remedial action was underway, but at many of those sites changes were made that sharply reduced total costs without sacrifice of environmental protection.

11. Damage to ecosystems may occur more widely, though the science needs to be better developed to accurately evaluate its significance.

12. Hazardous Waste Cleanup Project, Exaggerating Risk: How EPA's Risk Assessments Distort the Facts at Superfund Sites Throughout the United States (1993).

13. Superfund does consider "cost-effectiveness" to a limited extent. After EPA develops a list of remedial alternatives that are protective, meet applicable or relevant and appropriate requirements (ARARs), satisfy the preferences for treatment and permanence, etc., Superfund then asks whether the cost of each alternative is "proportional to" its effectiveness. 40 C.F.R. §300.430(f)(1)(ii)(D) (2005). In other words, does a more costly remedy achieve greater benefits? But the more fundamental questions—such as the value of meeting ARARs and satisfying the preferences in the first place—are not asked.

14. Hazardous Waste Cleanup Project, Sticker Shock: Recognizing the Full Cost of Superfund Cleanups 16-18 (1993). Examples include the National Cancer Institute's American Stop Smoking Intervention Study, which funded anti-smoking programs in 17 states, and the Centers for Disease Control and Prevention's National Breast and Cervical Cancer Early Detection Program, which helps low-income, uninsured, and underserved women gain access to lifesaving screening programs for the early detection of cervical cancers and precancerous lesions.

15. Congress directed EPA to commission a study of the cost of completing work on the NPL. That study, published in 2001, concluded that EPA's funding needs would peak in fiscal year 2003 and then gradually decline from 2003 to 2009. Resources for the Future, Superfund's Future—What Will It Cost? xxi–xxviii (2001).

The obvious targets for that review have largely all been completed, but now a new category of needs has come into focus. At many sites, the remedial programs put in place are extremely costly to operate, and at some of those sites the benefits are narrow. In particular, the O&M costs for many groundwater recovery and treatment systems are way out of line—notably at sites where science now demonstrates that no improvement is being achieved in groundwater quality. EPA needs to place a major emphasis on a new process to review the "back end" O&M requirements of consent decrees entered into many years ago without the benefit of knowledge that now has become available. A streamlined process is required to address this need.

B. Administrative Reforms

Likewise, as great as the accomplishments under the administrative reforms have been, much work remains unfinished. The following include examples where further efforts are needed.

1. Orphan Share

In the 1995 reforms, EPA held out the promise of public funding to cover the "orphan share"—that portion assigned in the allocation process to parties that cannot be found or are now defunct. EPA then put this program into effect by offering to forgive or waive its past cost claims, but only for new settlements, and only up to a "cap" set at 25% of the cost of the work to be performed by the settling PRPs.[16] Although the Agency compiles statistics showing widespread application of this policy, in the view of many PRPs, the orphan share often amounts to little more than the reduction in past cost claims that routinely would have been negotiated in any case due to deficiencies in the records of past costs and other related issues. This issue has become the captive of broader budgetary debates affecting funding for the overall program that have thus far precluded it from achieving the benefits to fairness that were originally anticipated.

2. Oversight

In its 1995 reforms, EPA promised to "reduce" unnecessary oversight activities. Thereafter, EPA backed away from that commitment. The government has never presented clear criteria to govern what oversight is appropriate, nor has it established an accounting system to track and report its actual oversight costs at specific sites. EPA has taken steps to improve communications with PRPs on oversight activities. However, the subject remains in confusion, with widespread belief among PRPs that loose management by EPA allows the Agency's oversight contractors to incur excessive costs. Indeed, numerous studies and reports bear out that view.

3. Special Accounts

Another of the 1995 reforms was the promise by EPA to establish special accounts for funds it has collected through settlements with certain PRPs at specific sites. The intent was to make such funds available for use at those sites—presumably use by PRPs doing the work at those sites. It is understood that over $1 billion has been collected and deposited in those special accounts, but in just a handful of cases has EPA taken the necessary second step to release those funds to PRPs performing remedial work. Instead, EPA has used most of that money itself. Practical ground rules for disbursement are required so that, through release of those funds, they can achieve the benefits promised.

4. Cost Recovery

EPA claims for recovery of its "past response costs" remain a source of deep frustration to PRPs, primarily because of the absence of transparency in the government cost accounting systems. Bills are issued for hundreds of thousands of dollars (or more) without any narrative summary of the work performed. Confusion and frustration were magnified by the 1999 change in EPA's methodology for imposing indirect costs on top of its actual (or "direct") payroll costs. The government needs to do a far more effective job of explaining and communicating its policies and practices.

5. Enforcement Practices

A number of concerns have been strongly expressed that EPA Superfund enforcement practices do not reflect the spirit of the administrative reforms as they have been carried out in other areas. One specific example is that although the Model Remedial Design/Remedial Action (RD/RA) Consent Decree[17] was revised in some details over the last few years, a more thorough reevaluation and updating is needed to eliminate needless barriers to settlement.[18]

6. Institutional Controls

An important policy issue often lurking in the debate over remedial measures at specific sites involves the use and the role of institutional controls (ICs). Reliance on ICs often provokes criticism based on fears that such controls will not be enforced.[19] Nonetheless, at the vast majority of NPL sites some elements of containment have been incorporated into the remedial program, usually buttressed by one or more ICs. Such measures, in fact, are not inherently less reliable than any other measures that must be continued long term into the future—including, for example, such engineering measures as groundwater recovery and treatment. EPA has

16. For example, if the orphan share at a site is 30%, the settling PRPs agree to perform a $10 million cleanup, and EPA's past costs at the site are $1.5 million, then EPA would typically waive or forgive its claim for that $1.5 million. Note that the actual orphan share of the new cleanup is twice that amount, or $3 million.

17. *See, e.g.*, Model RD/RA Consent Decree (May 2001) (available from the ELR Guidance & Policy Collection, ELR Order No. AD04993); U.S. EPA, Model RD/RA Consent Decree (July 8, 1991) (available from the ELR Guidance & Policy Collection, ELR Order No. AD00126); U.S. EPA, Model RD/RA Consent Decree (July 13, 1995) (available from the ELR Guidance & Policy Collection, ELR Order No. AD04737).

18. *See* Information Network for Superfund Settlements, Superfund Cleanup Decision Handbook (2d ed. 1995).

19. Such criticisms bear reexamination in light of the Uniform Environmental Covenants Act (UECA), which is designed to ensure that ICs will be enforceable despite any state common-law doctrines that might have hampered such enforcement. To date, the UECA had been enacted into law in 12 states and was introduced in the legislatures of at least 12 more states. *See* UECA News, *What's New, at* http://www.environmentalcovenants.org/ueca/UECAnews/UECAnews.htm (last visited Apr. 4, 2006).

articulated criteria to govern the use of ICs and now needs to communicate more strongly that these measures are proper and appropriate when used within such policy guidance.

7. Groundwater Restoration

EPA also needs to rationalize more effectively its policy and expectations with respect to the cleanup of contaminated groundwater. It is reasonable to require efforts at groundwater restoration where meaningful progress can be accomplished at reasonable cost. At many sites, however, that simply is not feasible, and endless pumping and treatment of groundwater with low concentrations of contaminants can be extravagantly wasteful, to say nothing of needlessly depleting an often scarce natural resource. Technical impracticability waivers, though long recognized in statute and even approved in EPA policy, have in practice been issued infrequently and only after years of fruitless pumping. EPA needs to provide leadership in developing broader public understanding of the limits of technological capability, particularly in circumstances where full protection can be readily obtained against any public exposure to the contaminants.

8. Sediment Sites

The question of how to deal with contaminated sediments in rivers, harbors, and estuaries remains a daunting challenge. Dredging remedies are being compelled at certain locations without any clear policy rationale as to their selection nor any appreciation as to the implications of starting down this path. Virtually every industrialized river system could be deemed unsafe under certain criteria. However, these remedial efforts may cause more damage than allowing natural processes to degrade contamination or bury it. Society presently faces the prospect of enormous disparities in treatment between sites that are subjected to dredging action and those that are not. Better scientific understanding and a balance of risk and benefits are imperative.

9. Brownfields

During the past 10 years, increasing attention has been placed on returning contaminated sites to productive use. Often that has involved redevelopment for industrial or commercial purposes, while other sites have been converted to recreational use or wildlife preservation. Such constructive accomplishment may easily be precluded by unrealistic requirements as to acceptable levels of concentration that must be achieved before reuse will be permitted. The unwillingness of EPA and the DOJ to support state decisions on brownfields by withdrawing the threat of a future Superfund action is a serious deterrent to many projects. Incentives also must be provided to *owners* of contaminated property analogous to those currently authorized for *purchasers* of contaminated property in order to achieve the full potential of brownfields programs.

10. Rampdown and Devolution

A different type of challenge—one rooted in institutional relationships—is presented by questions as to future responsibility for the management and cleanup of contaminated sites. Present circumstances indicate that the huge majority of such sites will be addressed pursuant to state programs, and in many cases remedial work will be carried out under voluntary programs. The federal role likely will evolve more toward providing leadership and technical expertise, with actual direct involvement occurring only in exceptional cases. Again, better understanding and active communication efforts will be needed to assure a smooth and successful transition.

VII. Conclusion

The future of Superfund will be far different from its past. The first quarter-century of this program has been marked by confusion and turmoil, gradually giving way to better understanding and solid achievement. The federal government has played the dominant role, and huge multiparty sites with severe contamination have occupied center stage. In future decades, however, dominant attention will shift to many thousands of sites rather than hundreds of sites. Most of those sites will be significantly (but not severely) contaminated, and at those sites, the opportunities for cost-effective source removal and treatment may be quite limited. Conducting required investigation and remedial measures will depend on broad-based public understanding and support. Without question, the states will play a much larger role than they have played in the past 25 years. For EPA, which will have a principal responsibility in shaping this future, the challenge to provide wise and effective leadership will continue to be daunting.