

Basing Superfund Cleanups on Future Land Uses: Promising Remedy or Dubious Nostrum?

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Abstract

Supporters of the effort to link cleanups at hazardous waste sites to the sites' expected land uses claim that amending language in the federal Superfund statute to allow this may yield a number of benefits. These include rationalizing the cleanup process and decreasing cleanup costs, promoting economic development in the local communities that host Superfund sites, and helping such communities exercise more control over the cleanups. However, interviews with Superfund stakeholders and a detailed case study call into question these arguments. The current role of land use in cleanup, uncertainties about whether economic development is likely at the bulk of Superfund sites, the long-run viability of institutional controls, the willingness of communities to accept cleanups that leave contamination on-site, and the nature of public involvement all suggest that the benefits of tying land use to remedy selection may not be so straightforward.

Key Words: land use, economic development, Superfund

JEL Classification Nos.: Q24, Q28, R52

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BASING SUPERFUND CLEANUPS ON FUTURE LAND USES: PROMISING REMEDY OR DUBIOUS NOSTRUM?

Kris Wernstedt, Robert Hersh, and Katherine Probst*

1. INTRODUCTION¹

Over the past several years, representatives of industry, citizens groups, and government agencies from around the country increasingly have called for setting cleanup standards and selecting cleanup remedies at federal Superfund sites in accordance with the intended future land uses at the sites. Linking cleanup more closely to the expected land use at the site, proponents argue, may lower cleanup costs, promote economic development in the local communities that host Superfund sites, and/or enhance local control over cleanups. This seemingly straightforward proposition has gained tremendous currency, and within the U. S. Congress, all major recent proposals to reauthorize the Superfund law have included language on land use in the remedy selection section. Although no one has claimed that incorporating land use into remedy selection would cure all of the perceived ills of the Superfund program, the concept nonetheless has been repeated so often and advocated with such enthusiasm that there seemingly is little doubt of its ultimate efficacy. Linking land use and remedy selection is seen as an inherently, unabashedly good thing to do.

The purpose of this paper is to describe some of the some of the popular arguments that assert cleanups should be based more closely on expected land uses and to expose some of the questionable assumptions or uncertainties that underlie these arguments. These assumptions and uncertainties are critical in determining whether the objectives of tying remedy selection to land use are likely to be met, yet in our view have received insufficient attention from the policy community and are not as straightforward or unambiguous as many appear to believe. In our discussion, we also consider how a change in Superfund policy to encourage greater consideration of land use issues might influence the economic development of local communities.

Our presentation draws on a larger study on the role of land use in the Superfund program. The larger study rests centrally on several case studies of Superfund sites where

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land use has played a significant role.² In this paper, we discuss one of these case studies, the Industri-Plex Superfund site near Boston, as well as examine the public positions (*i.e.*, those that have appeared in print) that stakeholders have taken on land use and remedy selection. We also draw on interviews that we have conducted with a number of representatives of different national groups involved in Superfund reauthorization.

In the next section, we provide background on the federal Superfund program and on the primary motivations of different stakeholders for supporting the linking of land use and remedy selection at Superfund sites. We then describe in section 3 how land use has been linked to remedy selection in proposed Superfund reauthorization legislation and in guidance issued by the U. S. Environmental Protection Agency (EPA). In section 4, we discuss some of the major uncertainties that bear on the usefulness of giving land use a more central role in remedy selection. Section 5 offers final summary comments.

2. BACKGROUND AND MOTIVATIONS

The federal Superfund law -- formally known as the Comprehensive Environmental Response, Compensation and Liability Act, or CERCLA -- was enacted more than fifteen years ago, largely in response to local and national outrage about contamination at several notorious sites that threatened the health of local communities. Since its inception in 1980, perhaps no other environmental program in this country has borne so much criticism for being inefficient and grossly expensive. The program's detractors can readily point to data to support their case: since 1980, cleanups have been completed at less than one-third of the nearly 1,300 sites that sit on the National Priorities List (NPL), the roster of sites that are eligible for Superfund cleanups. Of the sites that have been cleaned up, the best estimates of the average cost of remediation run from \$25 million to nearly \$30 million dollars per site, depending on the source of the estimate.³ Efforts to reform the law have been underway for years, in both Democratic and Republican Congresses and administrations.

Although the liability provisions of CERCLA have dominated much of the discussion in Superfund reform efforts, land use and its role in cleanup has attracted considerable attention. This reflects in part concerns that the costs of Superfund cleanups have exceeded the benefits, because (many allege) unrealistic future land use assumptions are made at Superfund sites and these assumptions require costly stringent cleanups which provide a level of

² Robert Hersh, Katherine Probst, Kris Wernstedt, and Jan Mazurek (1997) *Linking Land Use and Superfund Cleanups: Uncharted Territory* (Washington, D.C.: Resources for the Future); Jan Mazurek and Robert Hersh (1997) "Land Use and Remedy Selection: Experience from the Field -- The Abex Site," Resources for the Future Discussion Paper 97-26; Kris Wernstedt and Katherine N. Probst (1997) "Land Use and Remedy Selection: Experience from the Field -- The Industri-Plex Site," Resources for the Future Discussion Paper 97-27; Kris Wernstedt and Robert Hersh (1997) "Land Use and Remedy Selection: Experience from the Field -- The Fort Ord Site," Resources for the Future Discussion Paper 97-28.

³ Kate Probst, Don Fullerton, Robert E. Litan, and Paul R. Portney (1995) *Footing the Bill for Superfund Cleanups: Who Pays and How?* (Washington, D.C.: The Brookings Institution and Resources for the Future), p. 20.

protection which the likely use of the site does not justify. The attention given to land use in CERCLA reform efforts also reflects the fact that the existing language in the statute and in accompanying regulations provides few details about the role that land use should play in the cleanup process. Section 121 of the legislation, which addresses cleanup standards and remedy selection, mentions land use only indirectly, in a clause to the effect that the potential use of the surface and groundwater at a site may be considered in determining whether water quality criteria under the Clean Water Act are relevant and appropriate for setting cleanup standards. The preamble of the National Contingency Plan (NCP), the regulatory blueprint for implementing CERCLA, treats land use more explicitly, by stating that decision makers *may* consider more than one land use in the baseline risk assessment of an NPL site (this assessment is used to help develop remedial objectives at the site and define cleanup requirements). The NCP does not require residential use to be assumed, but it does suggest that the assumed future land use should both be reasonable and consistent with the potential threats that exist at each site; that is, it should reflect land use development patterns in the area and be protective even for the highest (most significant) threats.⁴ Under the law, EPA is given considerable discretion in assuming future uses, but generally conservative but realistic exposure assumptions are expected to guide the land use that is included in the baseline risk assessment.

In many ways, it is this discretion that EPA has in assuming future land uses that lies at the root of many parties' dissatisfaction with the Agency's current practice of incorporating land use into the remedy selection process. Indeed, many hold that the flexibility afforded to EPA almost inevitably results in the Agency conservatively assuming residential use. The proverbial child eating contaminated dirt at an industrial site has become something of a poster boy for parties in the reauthorization debate who claim that unrealistic land use assumptions and poor science are "driving" the selection of remedies at Superfund sites. Thus, critics have suggested that the Superfund program should move toward making more realistic land use assumptions, and toward tying cleanup standards and remedies to expected land uses. The three major reasons for doing so are to increase the efficiency of cleanups, to promote economic development, and to enhance local control over cleanups.

2.1 Increase the Efficiency of Cleanups

With cleanups still unfinished at nearly 1,000 NPL sites and with tens of thousands of unassessed hazardous waste sites throughout the country, some fraction of which are likely to be placed on the NPL, the need to fashion more efficient cleanup strategies is inescapable. Thus, a central argument that many offer for tying cleanup standards and remedies is to lower costs and speed cleanups. This, proponents assert, would create a more rational cleanup program. Conventional wisdom has long held that EPA typically assumes that contaminated sites will be used for residential purposes, even when industrial or commercial use is far more likely. This assumption, it is argued, forces stringent and costly cleanups to protect

⁴ National Oil and Hazardous Substances Pollution Contingency Plan, Federal Register 8666, 8710 (March 8, 1990).

potentially exposed residential populations even when it is highly improbable that anybody actually will live at or near the site.⁵ Even upper-level EPA management has expressed this view. Robert Sussman, former EPA Deputy Administrator, testified before the House Subcommittee on Transportation and Hazardous Materials in 1993 that:

In practice, future land use has often been assumed to be residential. In some of these cases, the existing and prior use of the land was not residential. Unrealistic assumptions about future land use could significantly increase the costs of cleanup without commensurate benefits.

Rigorous analyses of potential cost savings that may result from less restrictive assumptions are notoriously absent, but the U. S. Department of Energy (DOE) has estimated that at its five sites with the highest expected cleanup bills, total remediation costs range from \$150 billion to \$284 billion, depending in part on land use assumptions. The *likely* range of costs around its base case cost estimate (\$160 billion) is much smaller, however. Assuming an aggressive cleanup to support residential and agricultural uses, with site specific considerations, estimated cleanup costs are almost four percent higher than the base case estimate, while an assumption that cleanup will emphasize containment and post-cleanup industrial use yields slightly more than a three percent estimated savings from base case.⁶ Preliminary analysis from the Department of Defense (DOD) indicate a slightly higher savings from less restrictive assumptions. Admittedly, both the DOD and DOE estimates are largely conjecture, and these two kinds of sites differ from most private NPL sites in a number of ways. Nonetheless, even a modest savings of one percent on average at each NPL property could save hundreds of million of dollars in cleanup costs.⁷

⁵ Hazardous Waste Cleanup Project (1993) "Exaggerating Risk: How EPA's Risk Assessments Distort the Facts at Superfund Sites Throughout the United States," June; International City/County Management Association (1993) "Improving Remedy Selection and the Settlement Process," Preliminary Position Paper, ICMA's Superfund Consortium, August; James Lis and Melinda Warren (1994) *Reforming Superfund*, Policy Study Number 118, Center for the Study of American Business, Washington University, St. Louis, Mo., February; U.S. General Accounting Office (1994a) *Nuclear Cleanup: Completion of Standards and Effectiveness of Land Use Planning are Uncertain*, Report to the Chairman, Committee on Government Affairs, U.S. Senate, U.S. GAO/RCED-94-144, August; Kip Viscusi and James T. Hamilton (1994) "Superfund and Real Risks," *The American Enterprise*, vol. 5, no. 2, pp. 36-45.

⁶ U.S. Department of Energy, Office of Environmental Management (1996) *The 1996 Baseline Environmental Report, Volume 1*, DOE/EM-0290.

⁷ Data on cleanup costs at Superfund sites are woefully inadequate. Estimates of the average cost of an NPL cleanup include: \$25 million per site (Congressional Budget Office (1994) *The Total Costs of Cleaning Up Nonfederal Superfund Sites*, Washington, D.C.: US Government Printing Office); \$29 million per site (Probst *et al.*, 1995); and \$50 million per site (Colglazier, E. W., T. Cox, and K. Davis (1991) *Estimating Resource Requirements for NPL Sites*, Knoxville: Waste Management Research and Education Institute, University of Tennessee). The estimates differ to some degree because of different assumptions about the discount rate and the pace of cleanup, but they also reflect the fact that only a relatively few sites have actually been cleaned up and many of these are not required to report actual cleanup costs. Using the lowest estimate of \$25 million per site, a one percent average decrease in costs at each of the more than nearly 1,200 non-

In addition to the anticipated cost savings, many believe that basing cleanups on actual or planned future land uses also can promote a more rational cleanup process. For example, a 1989 report from the Congressional Office of Technology Assessment (OTA) discusses using the *current* risk at sites (based in large part on the current land use) to *prioritize* sites for cleanup, rather than continuing the practice of treating current and future risks equally.⁸ This would allow the sites that pose the highest current risks to be addressed first. OTA claims that roughly fifty percent of cleanup costs are directed at addressing future risks, with the unfortunate result that many sites with current risks do not receive immediate attention. Basing the timing of final, permanent cleanups on the current land use and current rather than hypothetical future exposure could mitigate this problem and yield higher immediate benefits for the same amount of resources, even if total cleanup costs for all sites remains constant.

Others also have argued for incorporating land use to facilitate the cleanup process. English *et al.* and GAO suggest that linking remedies to expected land uses can help speed the cleanup process at contaminated sites.⁹ If EPA bases cleanups on land use and, for example, allows restrictions to be placed on the future uses of a site in lieu of a more stringent cleanup (*e.g.*, prohibiting residential use and requiring cleanups to levels suitable for industrial uses), site owners, responsible parties, and/or municipalities may find it in their interests to pursue a faster cleanup because post-cleanup income-generating use is more realistic. In some cases, preparing a site for a new use could be accomplished while the site remediation is being carried out.

Most of the individuals that we interviewed thought that, even if basing cleanup on future land use would not significantly change the type of remedy selected or the costs and speed of cleanup, linking land use and remedy selection more formally would help make the remedy selection process more transparent and consistent. Two reports by Clean Sites posit that a decision to make future use an early and a primary focus of the remediation process would strongly affect all aspects of site decision making.¹⁰ From Clean Sites' perspective, such a decision would establish clearer goals for site cleanup at the outset, which in turn would help remedies at different sites to be more consistent with each other. The 1990 report suggests that focusing on the expected land use could help define the applicable standards for cleanup (*i.e.*, the expected land use could guide the point of compliance of the applicable standard) and provide better information to the risk assessment (the expected land use would

Federal NPL sites would yield nearly \$300 million in savings, a large figure that would be even higher if, as is highly likely, new sites are added to the NPL and non-NPL sites also benefit from a land-use based cleanup approach.

⁸ U.S. Congress, Office of Technology Assessment (1989) *Coming Clean: Superfund's Problems Can be Solved*, OTA-ITE-433, Washington, D.C.: USGPO.

⁹ Mary R. English, *et al.* (1993) *Stakeholder Involvement: Open Process for Reaching Decisions About the Future Uses of Contaminated Sites*, Final Report, Knoxville: University of Tennessee, Waste Management Research and Education Institute; GAO (1994a).

¹⁰ Clean Sites (1994) *A Remedy for Superfund: Designing a Better Way of Cleaning Up America*, Alexandria, Va.: Clean Sites, February; Clean Sites (1990) *Improving Remedy Selection: An Explicit and Interactive Process for the Superfund Program*, Alexandria, Va.: Clean Sites, October.

drive exposure assumptions). Both of these are perceived as being inconsistently applied and of being notably weak elements of the current remedy selection process.

2.2 Promote Economic Development

The second primary impulse behind the call for linking land use and remedy selection -- the desire to promote local economic development -- arises principally from discontent with liability provisions of the Superfund law. When Congress enacted CERCLA in 1980, it aimed both at identifying and cleaning up sites contaminated with hazardous substances and at getting the responsible parties who had something to do with the site contamination to pay for the cleanup. To achieve the latter objective, the liability for cleanup under CERCLA (as interpreted by the courts) is retroactive, strict, and joint and several. This means that the responsible parties can be liable for cleanup even if their activities took place before the 1980 enactment of CERCLA (retroactive liability) and even if the parties were not negligent (strict liability). Joint and several liability refers to the fact that the government can hold one or more of the responsible parties liable for the entire cost of cleanup, even if other parties are liable.¹¹

Many argue that this strong liability provision presents a sharp disincentive for a party to redevelop an NPL site (see, for example, O'Reilly's argument in the *Yale Journal of Regulation*).¹² If an entity purchases such a property before cleanup is complete, it theoretically could become a responsible party that may be liable for cleanup. Even if it could wait until EPA had certified that the cleanup were complete (which is not really a realistic option), the entity could face additional cleanup liability and costs if EPA later determined that further remediation is necessary, even if land use had not changed. Furthermore, if it purchases the property after remediation and land use changes, with the subsequent site activities causing new human exposure to on-site contamination or the release of contamination, the entity may be liable for additional cleanup. In short, any entity that knowingly purchases contaminated property can be liable for cleaning up the site, even if the entity has not contributed to the contamination.

As a consequence, prospective purchasers of contaminated sites have long sought guarantees from the EPA and state counterparts that agencies will not sue the purchasers of contaminated properties. Since 1989, EPA has had a policy that allows prospective purchaser agreements, where the Agency enters into a covenants not to sue a prospective purchaser of a contaminated site in return for the purchaser providing either funds for cleanup or the cleanup itself. However, few actual agreements have been signed. The criteria for these agreements historically have been interpreted fairly narrowly, and for practical purposes have applied to sites "listed or proposed for listing on the NPL, those facilities at which monies [from the

¹¹ Probst, *et al.* (1995), pp. 13-14.

¹² James T. O'Reilly (1994) "Environmental Racism, Site Cleanup and Inner City Jobs: Indiana's Urban In-fill Incentives," *Yale Journal of Regulation*, 11, pp. 43-73.

Superfund Trust] have been expended, or those facilities which are the subject of a pending enforcement action."¹³

Sites not on the NPL and those not facing an enforcement action have little hope for these agreements and the liability release associated with them, yet even though they are not NPL sites many maintain that they still cower under the shadow of Superfund liability.¹⁴ As Fairbanks argues, even though it may be unlikely that a party would be held responsible under some of the above situations, the risk of this happening and perhaps even of being placed on the NPL (and the costs if it were) deter the purchase and development of contaminated sites.¹⁵ The argument follows that land use, as a proxy for cleanup standards at a given site, thus strongly influences the calculations of investment return that a prospective purchaser or developer would make, since she or he must compare the cost of cleanup with the stream of benefits that are likely to follow from development of the site. Many believe that *expectations* that residential cleanups ultimately will be required, because of a residential land use assumption, nourish the perception that cleanup costs to allow such a use will "exceed any possible gain from the new use" that will actually occupy the site.¹⁶ This expectation suppresses or even extinguishes reuse at the sites, regardless of whether the possible use would in fact require residential standards. A common extension of this logic is that communities often miss opportunities to expand their tax bases or to create new jobs because of the CERCLA chill cast on site redevelopment. Alternatively, absent a willingness to reuse an already developed site, many suggest that new development moves to currently undeveloped greenfield sites, thus potentially heightening urban sprawl, increasing the need for costly infrastructure extensions, or threatening the preservation of open space or environmentally sensitive areas.¹⁷ In either case, failing to base cleanups on anticipated land use, it is argued, inhibits reuse of such sites.

The long arm of CERCLA liability, some assert, therefore inhibits economic development at a wide range of sites that are thought to be contaminated with hazardous waste. Many proponents of Superfund reform suggest that the problem of NPL site redevelopment may be mitigated if the costs of cleanup can be driven down, thus yielding more favorable investment climate at NPL sites, and if the uncertainty over potential liability associated with site redevelopment can be lessened. One approach offered for doing this is to link land use, cleanup standards, and the remedial action, thus marrying cleanup with reuse.

¹³ OSWER Directive (1989) *Federal Register* 54,235, Aug. 18. Revised guidance on prospective purchaser agreements which was issued in 1995 has relaxed some of these restrictions.

¹⁴ This long shadow, of course, has motivated recent efforts to craft federal and state legislation to promote the redevelopment of brownfield sites.

¹⁵ Katherine Fairbanks (1996) "The Industri-Plex Model: Beneficial Reuse of a Superfund Site," *Boston College Environmental Affairs Law Review*, vol. 23, no. 4, pp. 851-883.

¹⁶ Bernard Reilly (1993) "Barriers to Urban Renewal Presented by Superfund" remarks presented at the ICMA Chicago Seminar, April 1 (cited in Lis and Warren).

¹⁷ International City/County Management Association (1993).

At the same time, perhaps a stronger, albeit less openly advanced, argument is that reform of CERCLA may loosen the bonds that inhibit economic development at non-NPL sites as well. These sites, which are far more numerous and are generally less contaminated than NPL sites, also may have higher economic development potential. Changing the liability structure of CERCLA is an obvious way to try to release some of this potential, but broadening the role that the future land use may play in shaping cleanup standards may be a less threatening and more achievable means for doing so.

2.3 Enhance Local Control Over Cleanup

A third common rationale for linking land use and remedy selection is that such a link might increase state and local government involvement and control over cleanups. Many also believe that tying cleanup standards and remedies to anticipated land uses may increase the quantity and quality of public involvement in the Superfund program, an element of the program's requirements since the 1986 amendments to the legislation. Section 117 of CERCLA currently requires that an opportunity be provided for public comment on the proposed remedial plan and makes available technical assistance grants to qualified community groups, so that communities threatened by NPL site contamination can interpret technical information and, presumably, participate more meaningfully in meetings on proposed remedial actions. However, EPA long has been criticized for the efficacy of its efforts to involve the public. A 1994 report by the General Accounting Office (GAO), while acknowledging that EPA met community relations activities required by statute, nonetheless reported that many residents near the Superfund sites that GAO visited believed that EPA often did not involve enough of the affected public in a timely fashion, failed to listen to the inputs of residents or involve them in Agency decisions, and did an inadequate job in disseminating information.¹⁸

Proponents of tying land use to remedy selection suggest that such a link may mitigate some of these public involvement problems. Their argument rests centrally on the generally unassailable claim that land use inherently is a local phenomenon, and land use planning and development historically a local government function. Thus, the proponents argue, albeit on less firm ground, if land use becomes a more active consideration in the Superfund process, local governments likely will have more say and local citizens may show more interest in the Superfund site.

This local involvement could yield more efficient cleanups because local players may be more willing to opt for less stringent cleanup if that cleanup promotes site development, increases tax revenues, and helps create jobs. Furthermore, local governments in theory are more in touch than distant federal regulators with what residents want. They also are held more accountable for protecting their citizens' health and local environments, as well as facilitating local economic activity. This discussion figures prominently in reports from the

¹⁸ U.S. General Accounting Office (1994b) *Superfund: EPA's Community Relations Efforts Could be More Effective*, U.S. GAO/RCED-94-156.

National Commission on Superfund, National Advisory Committee on Environmental Policy and Technology, Clean Sites, U.S. GAO, and the International City/County Management Association.¹⁹ It also appears in papers, testimony, and interviews from business groups, environmental justice advocates, and state and local government representatives from across the spectrum.²⁰

The International City/County Management Association (ICMA) has moved perhaps the furthest in articulating how local governments could bring land use more directly into the remedy selection process. ICMA proposes a process whereby local governments would outline their land preferences at a site and EPA could concur or object. If EPA disagrees with the local government, the courts or a mediator could settle the dispute. Once agreement is reached, the community, responsible parties, and EPA would sign a consent decree. This decree would contain the cleanup standards which would need to be met at the site predicated on the land use, and once the standards are met, the liability of the responsible parties for the remedy would be terminated (which could stimulate development of the site, as suggested in the previous section). A party proposing a land use not covered in the consent decree would bear any additional cleanup costs, and EPA would bear additional cleanup costs if it imposes more stringent standards. Undergirding this proposal is the notion that sites would be returned to productive use more quickly if EPA placed greater emphasis on containment and risk reduction, and local governments selected land uses which required less stringent cleanups.²¹

This triad of assumed benefits -- less costly cleanups based on anticipated land use, increased economic development, and heightened public involvement and local control over cleanup -- has engendered a great deal of political support for giving more prominence to land use in Superfund cleanup decisions. It bears noting that not all Superfund stakeholders have jumped on the bandwagon, but many large corporations responsible for cleanup at multiple NPL sites, small businesses or landowners with cleanup responsibilities at just one site, municipal development and planning officials, state regulatory agencies, local elected representatives and residents, and some environmental justice advocates have at times pushed strongly for setting standards and basing cleanups in accordance with expected land use. Others, such as some national-level environmental groups, while not advocating a policy that tailors the degree of cleanup to land use, nonetheless have been willing to allow land use considerations to shape remedies under certain conditions (*e.g.*, full community participation

¹⁹ National Commission on Superfund (1994) *Final Consensus Report of the National Commission on Superfund*, Joint Project of the Keystone Center and the Environmental Law Center of Vermont Law School, March 1; National Advisory Committee on Environmental Policy and Technology (NACEPT) (1993) "NACEPT Discussion Draft on Remedy Selection Reform," October 4; Clean Sites (1994, 1990); U.S. GAO (1994a); ICMA (1993).

²⁰ Lis and Warren (1994); Association of State and Territorial Solid Waste Management Officials (1995) "How Clean is Clean Enough," Superfund Reauthorization Position Paper.

²¹ International City/County Management Association (1993); International City/County Management Association (undated) "Community Involvement Summary Statement," ICMA's Superfund Consortium.

in determining the land use).²² This agreement among many of the parties, at least at the rhetorical level, is remarkable, particularly in the context of the battle lines drawn over much of the rest of Superfund. This is not to say that voices calling for promoting the role of land use have spoken in harmony, nor does the consensus that land use should be included more deliberately obviate the underlying stark differences among the stakeholders. For instance, forces supporting economic development at a site may not be at all anxious to allow local government or public control over development, and local citizens may be quite unwilling to allow a less-than-Cadillac cleanup that would not permit residential use. Nonetheless, the concept of tying remedy selection to the future land use has had remarkable resilience and popularity, and congressional representatives have taken up the cause with alacrity.

3. REAUTHORIZATION OF CERCLA AND EPA LAND USE GUIDANCE

Proposed CERCLA reauthorization bills in both the 103rd and 104th Congresses have included language that gives land use more prominence in remedy selection decisions. In the 103rd Congress, CERCLA reauthorization bills H.R. 3800 and S. 1834 (and later H.R. 4916) directly tackled the issue of land use and remedy selection. Section 502 in the proposed house bills would have amended the remedy selection portion (section 121) of existing CERCLA legislation and required the President to take into account the "reasonably anticipated future uses of land" at Superfund sites in selecting a remedy. The new language listed seven factors that would be considered in identifying the future use. These included the views of the local community, history of land use of the site and surrounding area, federal or state land use designations, current zoning and local land use plans, potential for economic development, closeness of the site contamination to sensitive populations or areas, and current plans of the site owner.

The accompanying report to H.R. 3800 cites EPA's own observation that land use assumptions are critical for determining protective contaminant concentration levels for a site. It also notes that the distinction between unrestricted and restricted uses lies at the heart of the debate over future land use. Sites planned for unrestricted uses, which typically entail residential households, suggest a higher (more stringent) level of cleanup than restricted uses (*i.e.*, industrial or commercial), since the potential exposure of the residential population to dangerous site contaminants is thought to be higher (more frequent or of longer duration) than the potential exposure of workers in commercial or industrial areas. At the same time, the H.R. 3800 report is careful to note that the remedy selection process must remain sensitive to the possibility that current industrial use at a site may give way to residential use in the future.

More recent reauthorization proposals in the 104th Congress include Representative Oxley's and Senator Smith's bills, H. R. 2500 and S. 1285, respectively. Both of these

²² Velma Smith (1993) Testimony before the House Energy and Commerce Committee, Subcommittee on Transportation and Hazardous Materials (Friends of the Earth), February 24; Linda Greer (1995) Testimony before the Senate Committee on Environment and Public Works, Subcommittee on Superfund, Waste Control and Risk Assessment (Natural Resources Defense Council), April 5.

proposals include language that ties cleanups more tightly with the current or planned land use at the site, or more generally the use that has "a substantial probability of occurring."²³ S. 1285, which defines protection of human health and the environment based on actual or planned land use, even includes a section that describes how to determine the land use upon which cleanups are to be based. In section 101 of this bill, this use includes the actual (*i.e.*, the current) use, use that is authorized by local zoning or land use decisions, and any other reasonably anticipated land use that has a substantial probability of occurring.²⁴

Although all of these reauthorization efforts have stalled, EPA has attempted to clarify the role of land use in remedy selection in a directive on land use that the Agency released in May, 1995 (OSWER Directive No. 9355.7-04). The directive specified that EPA should consult with local land use planning officials and the local public in the scoping phase of the Remedial Investigation/Feasibility Study (RI/FS) to help develop an early understanding of the "reasonably anticipated future uses" of the Superfund site. Furthermore, the directive noted clearly that the reasonably anticipated future land uses should be taken into consideration when developing remedial action objectives in the RI/FS. In short, the guidance gave land use a more prominent role in influencing the construction and selection of remedial alternatives.

4. UNCERTAINTIES IN LINKING LAND USE AND REMEDY SELECTION

The arguments outlined above may explain how a relatively large and diverse group of stakeholders could support or at least accept the more central position given to land use in the remedy selection process in the proposed CERCLA reauthorization bills. One may remain skeptical, however, about whether the assumed benefits of revamping Superfund policy along these lines are likely to be realized. In this section, we briefly discuss a number of key considerations that likely will shape and perhaps constrain the effectiveness of land use based remedies. Our discussion is based in part on our case study of the Industri-Plex Superfund site near Boston.

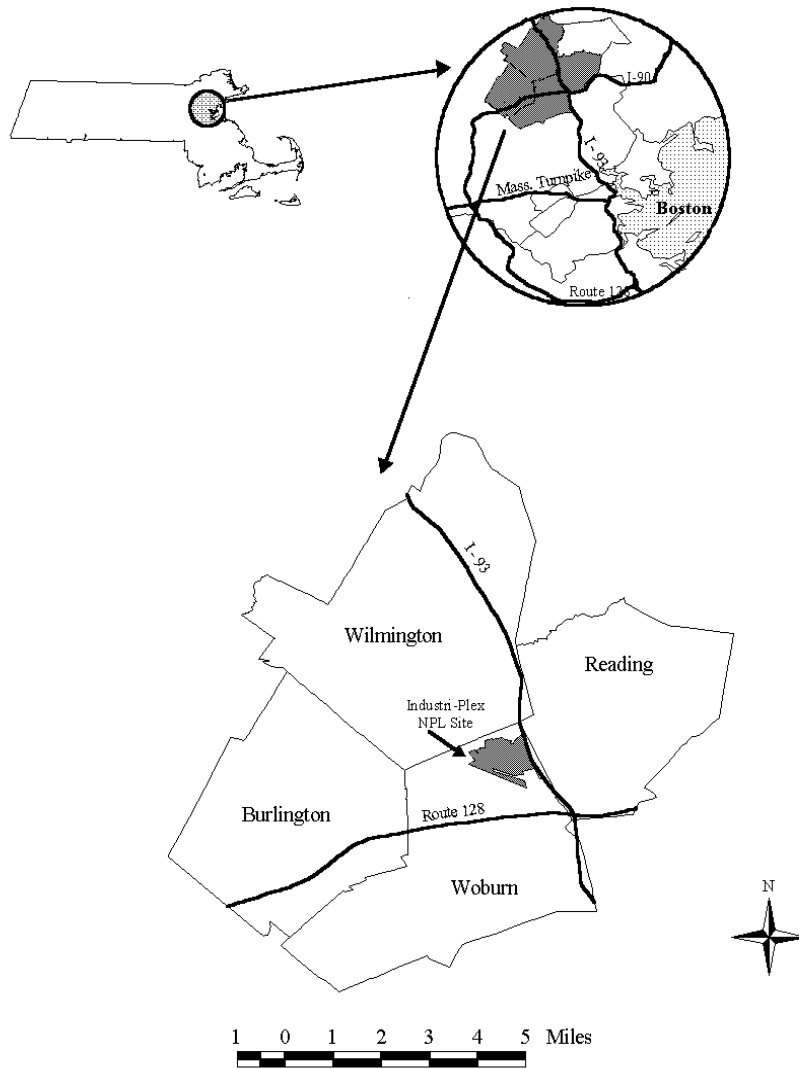
4.1 Case Study

By way of background, Industri-Plex is a large, 245-acre tract in Woburn, Massachusetts that lies immediately west of I-93 and nearly one mile north of Route 128 (see Figure 1, below). Added to the NPL in 1983, the contamination at the site (arsenic, lead, and chromium in soils and benzene and toluene in the groundwater) is the legacy of over 100 years of industrial activity. Cleanup efforts at the site include capping the soil and capture and treatment of contaminated air and water. These efforts are consistent with industrial and commercial future uses, rather than with a residential use scenario. Institutional controls,

²³ Section 102, HR 2500, 104th Congress, 2nd Session (1996); Section 402, S 1285, 104th Congress, 2nd Session (1996).

²⁴ Section 401, S 1285, 104th Congress, 2nd Session (1996).

FIGURE 1. Location of Industri-Plex Superfund Site (Woburn, Massachusetts)



which are meant to control exposure to the contamination that is left on the site and which we discuss in more detail below, are also an important part of the remedy.

A Custodial Trust set up under the 1989 consent decree at the site holds title to about one-half of the site. This Custodial Trust is an unusual entity for the Superfund world, insofar as it neither is a responsible party nor has any regulatory oversight authority. Rather, it has been given the responsibility to actively market its property to reimburse the City of Woburn, EPA, and the responsible parties for their costs associated with site investigation and cleanup. To fulfill its fiduciary obligations to these beneficiaries, it has actively promoted development of the entire site (for example, a planned interchange on I-93 will improve access to the site and regional transportation authorities are contemplating locating a transportation center with a commuter rail station and a 2,500 to 5,000 car parking lot).

Many offer the Industri-Plex cleanup process -- a process they argue that has led to lower remedial costs and heightened economic development, and given more control to local players interested in reuse at the site -- as a Superfund success. Not surprisingly, this is not a universal view, and elsewhere we explore some of the tensions that have arisen at the site (Wernstedt and Probst, 1997). For the present purposes, however, the site is extremely useful for exploring some of the considerations that we believe warrant more attention in discussions about basing cleanups on land use. In the next five subsections, we examine the considerations, presenting each as a question. Although the questions are not fully answerable at present, we draw on both the Industri-Plex experience and informal interviews with stakeholders who participated in Superfund reauthorization efforts in the 103rd and 104th Congresses to explore the implications of each consideration we raise.

4.2 Are land use assumptions and remedies likely to change if land use is given a more central role in remedy selection?

Every stakeholder that we interviewed agreed that popular opinion to the contrary, the current practice of remedy selection at NPL sites does not ignore land use nearly as much as conventional wisdom would have it. In the last several years, egregious examples of residential level cleanups in clearly industrial or commercial areas have not been as common as they were in the earlier years of the Superfund program. Thus, most believe that remedies would *not* change significantly directly as a result of incorporating land use into remedy selection. In fact, the evidence shows that land use assumptions in risk assessments already range widely, even without the specific language that is sought in CERCLA reauthorization. A recent EPA-sponsored study of 226 sites with a Record of Decision (ROD) -- the document that details the remedial action that will be undertaken -- signed between 1991 and 1993 shows that thirty-six percent of the RODs identified industrial land use and twenty-five percent of the RODs identified residential land use as the expected future land use.²⁵ Another EPA-sponsored study of 196 sites with completed cleanups under the Superfund program,

²⁵ U.S. Environmental Protection Agency (1995a) *Land Use Decisions in the Remedial Process*, OSWER 9355.0-55, EPA/540/R-95/037, PB95-963230. The 226 sites in the report represent 226 operable units (OUs) rather than 226 separate NPL sites. An operable unit represents an area at a NPL site that is designated to receive a separate remedial investigation and action. Each Superfund site can have multiple OUs, although it is more common for a single Superfund site to have only one OU.

found that thirty-three percent of the sites had an assumed future land use of commercial or industrial, and 21 percent had an assumed future land use of residential.²⁶

At the Industri-Plex site, the ROD detailing the selected remedy was signed in 1986, three years before revised regulatory language in the NCP gave more prominence to the role that land use could play in remedy selection and eight years before land use was contemplated as being a significant influence on remedy selection in H.R. 3800. Nonetheless, anticipated land use *did* shape the remedy that was selected in the 1986 ROD, in large part because economic redevelopment of the site was considered highly desirable. Residential use of the site was not considered a viable option, in part because associated cleanup costs likely would have exceeded \$100 million. During the public comment period before the ROD was signed, the City of Woburn and the local economic development authority argued for *higher* levels of cleanup to allow commercial and industrial use (and therefore more expensive remedies) rather than the lower levels ultimately selected in the ROD. Currently, in the final stages of remedy implementation, an alternative cap with an incremental cost of \$ 750 thousand to \$ 1 million is being proposed for a portion of the site. This alternative cap and cover would provide a higher level of protection and allow a regional transportation project to be built at the site.

Despite the experience of Industri-Plex and the more general evidence mentioned above, many still maintain that land use needs to be tied more integrally and formally to the remedy selection process. This in part derives from continuing dissatisfaction with the discretion that EPA has in assuming land use and in setting cleanup standards. Perhaps more importantly, however, many hope that other reforms that may accompany the integration of land use into remedy selection may reform Superfund in desirable directions. In particular, these reforms could include a movement away from a current statutory preference for treating contamination and providing a permanent cleanup, setting standards based on current existing risks rather than on future potential risks, and using more narrowly defined applicable standards that apply at the point of exposure. All of these efforts could lead to significantly lower cost remedies.

4.3 Is it realistic to expect economic development at NPL sites?

Much of the enthusiasm for making land use an integral part of remedy selection to promote economic development is most appropriate for non-NPL sites, as noted earlier. This distinction is often lost in discussions of CERCLA-induced barriers to economic development. Although anecdotal evidence clearly suggests that some Superfund properties offer economic development opportunities, it is an unanswered question how common this is for the bulk of the 1,300 plus NPL sites. A host of factors such as existing infrastructure, proximity to markets and suppliers, access to a skilled labor pool, demand for new plants, and availability of credit shape the economic potential of property. Taking land use into account

²⁶ U.S. Environmental Protection Agency (1995b) *Relationship of Projected Future Land Use at Completed Sites to Post-Remedial Land Use*, OSWER 9355.0-56, EPA/540/R-95/038, PB95-9638231. The 196 sites in the report represent 196 operable units (OUs) rather than 196 separate NPL sites. See previous note.

while designing a remedy likely will increase the development potential of a site, but it is unclear whether this will be sufficient to realize the development.

Clearly, at Industri-Plex the answer to the question of whether economic development will occur is a resounding "yes!" This begs two obvious questions, however. First, is the site a successful development story because it has the three standard features of any successful real estate story, the proverbial "location, location, location"? Most NPL sites do not occupy such a valuable and developable site as Industri-Plex. For instance, the anticipated sale price for a portion of the land that the Custodial Trust holds title to is several times the largest sale price for *any* single real estate transaction in the Boston area, NPL or non-NPL. Second, if the attractiveness of the Industri-Plex site had not been enhanced by public investments in the highway interchange, local roads, and (potentially) the regional transportation center, would it be as developable? The public money invested in Industri-Plex is by definition unavailable for investment elsewhere, so the real question is whether the investments yield the highest net public benefit.

4.4 What is the long-run viability of using land use as a way to manage risk at a NPL site?

George Wyeth of the USEPA clarifies an important distinction that is often blurred in discussions about the role of land use in remedy selection.²⁷ This distinction relates to viewing land use as a factor in a risk assessment -- predicting or evaluating the likely land use so that one can estimate the likely risk at the site for negative human health or environmental effect -- versus viewing land use as a tool for risk management. Under the latter perspective, one would look to control or manage risk by imposing controls on land use such as zoning, permitting, or deed restrictions. It is these controls, which are referred to in the Superfund lexicon as institutional controls, that we found in our interviews and case study to be one of the most troubling and contentious aspects of land use based cleanups.

Institutional controls -- defined generically as "legal, non-engineering measures to prevent human exposure to contaminants" -- are restrictions that include zoning, permitting requirements, and deed restrictions that specify how a property can be used. They are intended to act as a barrier, to separate the public from levels of contamination that exceed acceptable health risks. Based on our interviews, many stakeholders responsible for cleanups (*e.g.*, responsible parties and DOD) appear confident that institutional controls and containment can provide sufficient protection into the indefinite future.²⁸ Some community and environmental groups and state and local governments, on the other hand, are less than confident on this score.

The importance of institutional controls in any program that looks to marry land use with cleanup can not be overemphasized. Such controls are the *sine qua non* of land use and remedy selection. Absent effective institutional controls, it is largely unrealistic to leave

²⁷ George Wyeth (1996) "Land Use and Cleanups: Beyond the Rhetoric," *Environmental Law Reporter*, 26, pp. 10358-10363.

²⁸ ICMA (1993).

contamination at Superfund sites and still protect human health and the environment. The potential difficulties with implementing and enforcing these controls are several, however.

Although there is some precedence for federal government involvement in land use controls at the local level (*e.g.*, the U.S. Army Corps of Engineers section 404 dredge and fill permit program for wetlands), the ability (and desirability) of the federal government to enforce Superfund institutional controls at the local level is an unresolved and thorny issue. Whatever the degree of federal involvement, the local community probably will need to play a substantial role (in enforcing permitting programs, for example). This could lead to difficulties if the community has an incentive to relax the controls (to allow higher-value uses, for example, as happened at the Love Canal site, the progenitor of the NPL) or if it lacks the technical or financial capability to enforce them. The controls also may be vulnerable to changing legal interpretations about the nature of property rights. Given the prominent influence of the courts to date in the evolution of Superfund, the judiciary likely will play an important role in shaping the responsibilities of the players with respect to land use and remedy selection.

Institutional controls at the Industri-Plex site have been discussed in the site's Record of Decision, Consent Decree, and Remedial Action Plan, yet still have not been completed. The responsible parties and landowners have submitted mandatory design proposals for the institutional controls but these have been rejected by the EPA, purportedly because the Agency viewed them as being overly complex and full of legal prescriptions that many of the twenty-one landowners at the site who would need to abide by the controls would not easily understand. At the time of this writing, a working group of representatives of the EPA, landowners, Massachusetts Department of Environmental Protection, responsible parties, and the Custodial Trust are developing a draft outline of the controls.

The ongoing effort to develop the controls has proved difficult, if not contentious. In addition to the sheer complexity of the site itself, the difficulty of developing the controls derives in large part from their dual function: to prevent exposure to contamination at the site and maintain the effectiveness of the remedy, on the one hand, and to allow property owners to change their land use activities (and therefore disturb the remedy) on the other hand. Given the long time period that the controls need to be in force (for hundreds of years, potentially), they need to be largely self-administering and self-enforcing, with regulators acting directly only if the self-enforced system fails. They rely significantly on deed restrictions that run in perpetuity, yet such restrictions by definition restrict the rights of property owners and potentially detract from the value of their properties.

Given these constraints and the relative paucity of experience of developing institutional controls in such a complex situation as we find at Industri-Plex (because of the size of the site, the wide array of on-going and planned business activities, and the large number of affected parties), in many ways the development of the controls at Industri-Plex can be viewed as an important experiment. It remains to be seen how successful this experiment will be in managing risk while promoting development. However, it is already clear that the somewhat halting development of the controls over the last ten years, and the

separate paths that this development has taken from the development and implementation of the mostly-completed structural components of the site cleanup, call into question whether the risk at the site is being managed in the most efficient or integrated fashion.

4.5 Will communities accept less than unrestricted use?

As noted earlier, most of the stakeholders expressed in interviews the belief that the public and local governments need to participate fully to make the incorporation of land use into remedy selection effective. This introduces a potential problem, however, insofar as local groups who have little or no financial stake in cleanup costs may have little incentive to accept a cleanup to a lower (*i.e.*, less protective) standard. This may be particularly true if liability for additional remediation is capped once an agreed-upon cleanup standard is reached, leaving the local government or prospective developers responsible for additional cleanup that may be required if land use changes. Local groups may lose effective control over subsequent development at a site if the cleanup constrains the subsequent range of activities that could take place at the site. If local groups perceive this, they may not support cleanups that allow only restricted use. At DOD sites where land use has been tied rather explicitly to cleanup standards and remedy selection, some local governments and citizens have pushed for the highest cleanup standards, arguing that an unrestricted use would allow a wider range of future development at the site.²⁹

Countering this line of reasoning, however, responsible parties and many independent experts claim that when communities are involved in site decision making, the communities rarely push for full cleanups (*i.e.*, those that will provide the highest level of protection possible) as a matter of course. Rather, they advocate for what they see as a "reasonable" cleanup, which in some cases means that they will support lower cleanup standards. Stringent cleanups, such as those that incinerate contaminants on site or those that greatly increase truck traffic due to off-site removal of large volumes of contaminated soil, are often quite invasive and disruptive. In addition, stringent cleanups may preclude economic activity at a site for a lengthy period, either because of the invasive nature of the remedial action itself or because a local employer is forced out of business because it is required to absorb high cleanup costs. This could dampen local employment opportunities and/or tax revenues. Some limited anecdotal evidence supports the claim that the public may support lower-level cleanups if it perceives that jobs are at stake.

At Industri-Plex, it appears as if much of the community accepts or even welcomes restricted use at the site. Few have argued forcefully for cleaning the site up to a residential standard, and a wide range of community members have actively promoted non-residential development of the site. Even the local environmental group has not generally opposed commercial and industrial redevelopment *per se*, accepting it as an eventuality years ago (they have opposed allowing redevelopment before completion of the remedy, however). However,

²⁹ Raymond T. Swenson (1995) "Military Base Closures: Remediation and Compliance Issues are Major Challenges to Civilian Redevelopment," *Journal of Environmental Law and Practice*, vol. 2, no. 4, pp. 27-38.

somewhat ironically, in the past some business interests supported more soil excavation and a higher level of cleanup to protect property values and to provide a remedy that would not constrain future development of the site. More recently, the most vocal opposition to the use-restrictions has come from landowners at the site who fear losing the ability to develop their property as they see fit. Recently, the City Council voted unanimously to rezone a portion of the site from light industrial to "box" retail (suitable for furniture outlets or home improvement centers) to allow higher value uses. Although this does not relate directly to the interplay between the remedy and land use restrictions, it does highlight the importance that the community places on redevelopment of the site. Moreover, with only a few exceptions, recent reports in the local media about the Industri-Plex site have emphasized redevelopment rather than cleanup aspects of the site.

4.6 Can the public be involved effectively?

Adequate public participation is a recurrent concern in land use planning practice, since typically only a small segment of a community has the time, resources, or sufficient interest to get involved in community decision-making. Local governments themselves are often unable or unwilling to represent a broad public. Furthermore, land use is often divisive, and thus it is not a straightforward exercise in listening to the unified voice of a community, since multiple interests may be competing for different land uses. This is an important consideration in the context of incorporating land use into remedy selection, since this ostensibly is an effort to give local citizens a stronger voice in cleanup decisions. Not surprisingly, the history of public involvement in Superfund cleanup to date indicates that citizens who are actively engaged often burn out after a few years. Unfortunately, according to a 1994 analysis by the Congressional Budget Office, it takes on average twelve years to complete a Superfund cleanup (from the time of initial listing on the NPL to completion of a site's remedy).³⁰ Thus, a remedy selection policy that is predicated on effective public participation may encounter difficulties if it requires active and consistent citizen involvement for a significant part of the cleanup process.

In addition, some have expressed concern about the environmental justice implications of basing cleanups on anticipated land use, since a possible outcome of this is lower-level cleanups in inner city communities with large minority populations and extensively contaminated former industrial sites.³¹ Given high residential densities, population (as opposed to individual) exposure is potentially large in such areas, and cumulative risks from other hazards already may be high. If environmental justice issues like these are not adequately treated -- and the record of successfully addressing such concerns at Superfund sites not surprisingly is mixed -- some support for linking land use and remedies may be lost.

³⁰ Beider (1994), cited in Probst, *et al.* (1995), p. 18.

³¹ Deeohn Ferris (1993) "Future Use Would Continue Past Inequities," *The Environmental Forum*, vol. 10, no. 6, p. 36.

At Industri-Plex, a very active citizen's group devoted itself to public health and environmental concerns throughout much of the cleanup process. This group reviewed site investigation and remedial action documents, commenting widely to EPA all the way up to when the remedy began to be implemented. Since that time, however, the involvement of the group has lessened considerably and it has effectively disbanded. This partly reflects the unusual circumstance of the group's beginning; it arose largely from the concern with another NPL site located nearby, which allegedly had contributed to high childhood leukemia rates in the area, and when interest in that second site waned, interest in the Industri-Plex site also fell off. Perhaps more centrally, it reflects a shifting public interest. Most of the recent public participation at the site has come from economic development advocates and those concerned with the adequacy of the transportation structure in the region, including the Woburn mayoral and city planning offices.

Several stakeholders have expressed the opinion that EPA, even while meeting all formal requirements for public comment, has not made public involvement a priority at the site. The Custodial Trust, on the other hand, has actively courted the community, involving legislative representatives at the local, state, and federal levels, cultivating contacts with the media, hosting or participating in local events such as Woburn's Earth Day celebration and conservation day, and attending public meetings on Industri-Plex and often playing a major role in presenting and explaining developments at Industri-Plex to the public. By most accounts, it has quite effectively mobilized Woburn citizens interested in development at the site. It is thus quite clear that the public can be involved at a site like Industri-Plex, although it remains an open question whether this success can be repeated at other sites and whether it can be extended to involving the community more fully in the public health and environmental aspects of Superfund cleanups.

5. SUMMARY

The integration of land use into the Superfund remedy selection process appears to be a straightforward proposition that many if not most Superfund stakeholders support, or at least tacitly accept. Such an integration offers the hope of rationalizing the cleanup process and saving scarce cleanup dollars, improving the economic development prospects of local communities with Superfund sites in their midst, and helping such communities gain more control over the cleanup process. These are laudatory goals that in themselves raise few objections.

The question of course is whether making land use a more central feature of the remedy selection process will in fact achieve these goals. We claim that this question in turn hinges on a number of possible misperceptions about current practice (*e.g.*, the degree to which land use already is incorporated into cleanup decisions) and uncertainties about whether economic development is realistic or likely at the bulk of the NPL sites, the long-run viability of institutional controls, the willingness of communities to accept cleanups that leave contamination on-site, and the nature of public involvement. It is possible that language can be crafted and the Superfund program altered in such a way that the presumed benefits of

linking land use and remedy selection will materialize. However, the limited evidence available and our analysis suggests that one must be cautious in assuming that all of the anticipated benefits will in fact follow from such a reform effort. The uncertainties discussed above warrant more scrutiny at the least.

The major contribution of this paper, we believe, is to point out that much of the current debate over land use and remedy selection is at best remarkably naive, or perhaps disingenuous. For example, many incorrectly claim that EPA completely ignores land use in its risk assessments during the cleanup process. Others who see the increasing reliance on institutional controls at Superfund sites, mistakenly assume that this is evidence that such controls work. Some oversimplify the problem of selecting site land uses, apparently believing that determining future land use is a straightforward matter of looking on a zoning map or consulting with a local planner. Others erroneously may view economic development at NPL sites as an uncomplicated matter of allowing wholly privately financed activities to generate badly needed jobs.

Our challenge to the economic development community interested in promoting reuse of Superfund sites, and to readers who see the issue of site cleanup from the perspective of public health, grass roots activism, or efficient public administration, is to carry their knowledge to the forefront of the public policy arena. Bringing such expertise to bear in the reauthorization debate can lead to a more sophisticated discussion, advance the rigor of analyses, and add more substance to further the worthy goals of rationalizing cleanup, enhancing economic development, and promoting local control.