

JOINT COMMENTS OF
THE SUPERFUND SETTLEMENTS PROJECT AND
THE RCRA CORRECTIVE ACTION PROJECT
ON
EPA'S TWO GROUND WATER DISCUSSION PAPERS

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On May 10, 2004, EPA released two documents on the Agency's policies regarding the remediation of contaminated ground water ("Discussion Papers"). Both were developed by a Cross-Program Ground Water Task Force established under the One Cleanup Program within the Office of Solid Waste and Emergency Response. The stated purpose of the documents was "to promote dialogue" on the issues discussed among differing stakeholder groups, including "Federal and State regulatory officials, and members of the regulated community, as well as environmental and public interest groups." One of the papers is entitled "Cleanup Goals Appropriate for DNAPL Source Zones," and the other is "Ground Water Use, Value and Vulnerability as Factors in Setting Cleanup Goals." Comments were requested by July 31, 2004.

The Superfund Settlements Project ("SSP") and the RCRA Corrective Action Project ("RCAP") appreciate the opportunity to submit these combined comments on the two Discussion Papers. The SSP and RCAP have worked since their formation in 1986 and 1987, respectively, to provide constructive input to EPA on critical policy issues affecting the cleanup of contaminated sites. The members of these two organizations all have extensive experience in addressing these problems. As one indicator of the scope of that experience, the members of the SSP alone have spent over \$6 billion in the investigation and remediation of contaminated sites since the federal waste cleanup programs began.

We are pleased to submit these comments on these two Discussion Papers. For reasons set forth below, we believe it is appropriate – and indeed urgent – to stimulate further public consideration of these issues, and we commend EPA for doing so. We recognize that the papers themselves are designed simply to open discussion, and that they do not constitute statements of Agency policy even in a preliminary way. In order to move the dialogue forward, however, we will endeavor in these comments to set forth our views in a more direct way as to what major issues are presented by these topics and how they should be approached.

I. OVERVIEW

Critical Factors

The control and remediation of ground water is by far the most important element in the cleanup of most contaminated sites. For example, ground water remedies have been implemented or planned at 1,062 NPL sites, fully 70% of the sites listed on the NPL. OSWER, "Treatment Technologies for Site Cleanup: Annual Status Report (Eleventh Edition)" (February 2004) Ground water remediation is also the element with by far the heaviest long-term cost impacts.

Ground water issues have increasingly commanded top attention in the debate over national policy to govern remediation efforts. Concerns over ground water cleanup policy apply to both of the major federal programs – Superfund and RCRA – and extend as well to the federal Underground Storage Tank program, state regulatory programs, and voluntary cleanups.

The Discussion Papers perform a valuable function in focusing attention on elements of the national regulatory framework for remediation of contaminated waste sites that present a major need for reevaluation and reform. These elements were largely adopted and incorporated into the legal and policy framework during the 1980s when ground water issues were not well understood. There was scant public understanding of the patterns of migration of ground water, the technologies available for remediation, their limitations and costs, and alternative methods to control or prevent risks to human health. Yet there was intense public and political pressure on legislators and other government officials to take action on what was perceived as an imminent and serious threat to public health. The result is a set of requirements that in some instances are so rigid and unreasonable that they may be counterproductive and can present an obstacle to progress. We hope that a more open dialogue on these issues will lead to appropriate modifications and significant improvement.

Policy is Based on Unrealistic Assumptions About the Feasibility and Cost of Remediation.

It has become increasingly clear that, in addition to a plethora of complex technical and other issues, there is one central problem regarding cleanup of contaminated ground water: At a fundamental level, national policy on ground water remediation is not based on realistic assumptions regarding the feasibility and cost of removing contamination, but instead it reflects a naive and simplistic assumption that all contaminated ground water can be, and should be, restored to meet drinking water standards.

This disconnect between policy and reality causes huge negative impacts. It generates controversy and paralysis that obstructs progress in implementing important government programs, and it drives costs to wasteful levels for both private industry and governmental agencies.

Goals Are Not Based on Risk.

A second and related fundamental problem is that the site characterization and remedy selection elements of the RCRA and Superfund Programs are not adequately tied to risk assessment and risk management methodologies. In principle, risk assessment is central to the process. Certainly an effort is made to collect and assemble risk-based data to guide regulatory decisions. In the final analysis, however, other legal, policy, and historic factors carry final decisions away from direct reflection of the risk-based analyses.

This reliance on factors other than risk brings in the ultimate commitment to restoring contaminated ground water to meet drinking water standards, which in turn drives application of pump and treat systems or source removal to unreasonable extremes. To date, we have ground water pump and treat systems operating at 713 NPL sites, or roughly half of all the sites on the NPL. OSWER, “Treatment Technologies for Site Cleanup: Annual Status Report (Eleventh Edition)” (February 2004).

Remedies Promise More Than They Can Deliver.

A third and final fundamental problem, also closely related to the first two, is that both policy and practice commonly ignore the practical reality that at most sites it is impossible to achieve immediate results in remediation of contaminated ground water. This leads to the practice of prescribing definitive remedial action for a site when the initial cleanup is being launched. A more measured and realistic approach would recognize that at most ground water sites, the parameters defining the problem are not yet fully understood or quantified, so that a staged implementation and monitoring strategy would be far more likely to produce sound and cost-effective remedial results.

EPA Policy and Practice

The driving force in creating the legal and policy framework of requirements for cleanup has been the goal of restoring contaminated ground water to satisfy drinking water MCL standards so that it would, at least theoretically, be available for use as public water supply. Several states adopted special legislation during the 1980s declaring that all ground water belongs to the state, that all ground water should be managed for drinking water supply, and therefore that all ground water should meet the MCLs.

EPA policy has reflected that approach. Under Superfund, where state legal requirements so dictate, EPA has been obligated to treat such requirements as ARARs (“applicable or relevant and appropriate requirements”) and incorporate them into their cleanup requirements, but even where states may not have adopted such standards EPA has commonly included them in their consent decrees as a matter of policy. This has usually taken the form of mandating pump and treat systems and specifying that such systems have to be operated until MCLs are satisfied.

Similarly, under RCRA Corrective Action, EPA has similarly embraced a long-held policy that all contaminated ground water should meet a standard of “full restoration to

maximum beneficial use.” This standard typically has been interpreted as meeting the MCLs.

It is important to note that this approach represents a policy decision that, for the most part, is not statutorily required. Apart from the dictate to achieve state ARARs, CERCLA leaves EPA free to balance a variety of criteria for selection of remedy. Likewise, the remedial standard set by Congress in RCRA is simply “protection of human health and the environment.” Thus, EPA has substantial latitude within which to exercise discretion. It has chosen, as an exercise of Agency policy, to set drinking water standards as the ultimate goal of ground water remediation. The central question that EPA is now raising through issuance of the two Discussion Papers is whether, in the light of current knowledge, that ultimate goal truly serves the public interest. We believe it does not.

The description of current policy set forth above is confirmed by numerous statements in the two Discussion Papers, particularly the paper focused on DNAPL. That paper (at page 3) states that, “[I]n general, ground waters have been designated by States as current or future sources of drinking water . . . [and for waters so designated] . . . cleanup goals typically include returning contaminated ground water to drinking water standards. . . MCLs.” The paper goes on to explain that “MCLs are typically to be attained within the contaminated aquifer and ‘throughout the plume’” (p. 4).

The DNAPL paper mentions several alternative approaches that are sometimes adopted, such as determinations that the MCL goals are “technically impracticable,” alternate cleanup limits, ground water containment zones, or ground water management zones. The reason for these alternate mechanisms is that where DNAPLs are present, they “are very difficult to clean up to drinking water standards” (p. 4). A stronger statement is quoted from the Executive Summary of the 2003 national panel report, “The DNAPL Remediation Challenge: Is There a Case for Source Depletion,” (EPA/600/R-03/143, December 2003)(“DNAPL Remediation Challenge”) which stated :

Although an MCL goal may be consistent with prevailing state and federal laws for all ground water considered a potential source of drinking water and is a goal that is easily comprehended by the public, *this goal is not likely to be achieved within a reasonable time frame in source zones at the vast majority of DNAPL sites.*

DNAPL Discussion Paper at 6 (emphasis added).

It is widely believed among industry experts and others that pump and treat systems will commonly have to be operated for more than one hundred years before MCL standards will be met, and that at many sites they will never be satisfied. The MCL goal can also lead to excessively demanding requirements for source removal.

There are two major objections to a rigid policy of applying MCL standards at all sites with contaminated ground water. The first is that in situations where circumstances

indicate that the MCLs can never be achieved, or can be achieved only after more than one hundred years, site owners will understandably fight to avoid such requirements and regulators will be reluctant to force their adoption. Preclusion of more reasonable alternatives is in itself an obstacle to progress.

The other big objection is cost. Cost effectiveness is an essential component of any sound regulatory framework. *See, e.g., Ohio v. United States EPA*, 997 F.2d 1520, 1532 (D.C. Cir. 1993) (“The statutory language [of CERCLA] places as much emphasis on the selection of cost-effective remedies as it does on the selection of permanent remedies.”) An approach that functions as though money is irrelevant, especially one that does entail exorbitant cost, will naturally be a target of criticism – as it should be.

Approaches of the Two Discussion Papers

Although the DNAPL Discussion Paper is, as its title implies, primarily focused on issues specifically related to DNAPL, it does point to the more basic question raised above, because the DNAPL element at the site is the component that most frequently presents the intractable difficulties that defy solution within a reasonable time and at a reasonable cost. The Discussion Paper highlights this fundamental problem with a specific section devoted to the “Need for Alternative Cleanup Goals,” which quotes from a 1994 National Research Council report that stated, “all regulatory agencies should recognize that ground water restoration to health-based goals is impracticable with existing technologies at a large number of sites” (p. 6).

The clear need under these circumstances is for EPA to expand and fully utilize the flexibility available for setting cleanup goals and selecting remedies. This will encourage the selection of ground water remedies that meet a basic standard of common sense. Historically, EPA has tended to take an overly narrow view of the flexibility available to it, and then to use that flexibility only very infrequently. Although the DNAPL Discussion Paper mentions a number of regulatory mechanisms that could provide flexibility (TI determinations, ACLs, ground water containment or management zones – *see* p. 4), the listing is far from complete. Moreover, the paper fails to describe those mechanisms in any depth, or – most important of all – to embrace the potential for more widespread use of them. That is one of the major weaknesses of this document.

The Ground Water Use Discussion Paper follows a somewhat similar path. In addition to providing helpful general information, it clearly acknowledges the basic difficulties affecting remediation options. It quotes from EPA’s 1991 policy document, “Protecting the Nation’s Ground Water: EPA’s Ground Water Strategy for the 1990’s”:

Ground Water remediation activities must be prioritized to limit the risk of adverse effects to human health first, and then to restore currently used and reasonable expected sources of drinking water and ground water closely hydrogeologically connected to surface waters, *whenever such restorations are practicable and attainable.*

Given the costs and technical limitations associated with ground water cleanup, a framework should be established that ensures the environment and public health benefit from each dollar spent is maximized.

Use Discussion Paper at pp. 3-4 (emphasis added).

The Use Discussion Paper then recounts past efforts to encourage states to institute Comprehensive Ground Water Protection Programs (“CSGWPPs”), acknowledging that “relatively few States have pursued” such plans.

Unfortunately, the paper does not develop in any depth the major policy issues that should be addressed with respect to use and value of specific areas of ground water in the context of determinations as to what remedial efforts are in the public interest. Although the paper acknowledges the need to assure that the “environment and public health benefit from each dollar spent is maximized, it is important to take the next step and consider whether that goal is advanced by the emphasis on “restoration.” A strong contention could be made that at many sites the costs of pursuing restoration to meet drinking water standards may be unreasonable, either because there is little likelihood of actual future use of such waters or because such restoration is not feasible.

Further detailed comments on each of the papers are provided below.

II. CLEANUP GOALS APPROPRIATE FOR DNAPL SOURCE ZONES

SSP and RCAP support the concept of enabling an informal discussion about setting appropriate cleanup goals for DNAPL source zones. First and foremost the DNAPL Discussion Paper acknowledges that the issue is real and needs to be dealt with. It also offers a number of options worthy of consideration. The paper succeeds at capturing a wide range of views, although it does not succeed at drawing our attention towards the core of the problem or to direct our future efforts.

By performing an analysis that rates and prioritizes the issues in a methodical way we have identified the critical few considerations that need to be pursued to advance solutions to the problem of setting appropriate cleanup goals in DNAPL source zones. Our analysis is based on: a realistic appraisal about the application of source-zone depletion technologies, the identification and elimination of suppositions or concepts that appear to be taken for granted despite there being no broad-based consensus or demonstration of their validity, and a weighting of the severity of the identified problems in the problems/options matrix to arrive at a functional ranking of the options.

General Comments

The tone throughout the DNAPL Discussion Paper implies that the technologies that comprise source-zone treatment (chemical oxidation, thermal treatment, surfactant/cosolvent flushing, steam injection, etc.) are widely available and proven to work in all types of hydrogeologic environments. This tone also implies that source-zone

treatment technology development is more advanced than it really is. Certainly it has come a long way, and certainly we would not wish to discourage continued research or its application; however, it is not appropriate to suggest that the technology is widely available and ready to be applied to a full range of remediation projects. It has been attempted at field scales in controlled situations or in relatively simple geologic settings.

Claims are made (often by the technology vendors) that the technologies have been used “to varying degrees of success” (p.4, line 33) or that “significant advancement has been made in the development of these technologies” (p. 4, line 36). This is misleading language, especially considering that Problem Statement No. 5 is itself a recognition that there are no accepted performance measures to evaluate the effectiveness of DNAPL mass removal. The simple truth is that these are emerging technologies.

On p. 4 of the discussion paper there is brief mention of four reasons why the technologies are not applied. They are valid reasons, and reason No. 2 (MCL attainment) should be given more emphasis because it is the core of the problem. The discussion paper cites and quotes the useful “DNAPL Remedial Challenge.” This citation is helpful and important to the discussion, especially the quote that is reprinted on p.6, lines 35-38:

Thus the exclusive reliance on this [MCL] goal inhibits the application of source zone depletion technologies because *achieving MCLs in the source zone is beyond the capabilities of currently available in-situ technologies in most geologic settings.* (Emphasis added.)

The Executive Summary of this report further states, at p. xiii:

An additional uncertainty at most sites is the fraction of the contaminant mass in the DNAPL source zone that may be present in diffusion-controlled, low permeability zones. If the metric for successful remediation is the achievement of MCLs, the source depletion goal must include depletion of the dissolved and sorbed phase mass in addition to the DNAPL mass. *In-situ technologies for source zone depletion are generally limited in their ability to remove contaminant mass from these low-permeability zones . . .* (Emphasis added.)

The report notes that this is an important research topic.

The reason that source-zone depletion is not applied more frequently is that MCLs are not achievable, largely because of matrix diffusion effects, and to some degree because of incomplete characterization.

Comments on Specific Problem Statements

Problem Statement No. 2

Technology developers say that continued adherence to overly stringent cleanup goals for DNAPL source zones inhibits the potential use of existing technologies and is detrimental to the development of new methods.

Technology developers view the problem as “overly stringent cleanup goals ... inhibit[ing] the use of existing technologies.” The statement has a built-in, untested, presumption that the technologies are inherently worthwhile and that they would be more applicable if cleanup goals were less stringent. The problem is being improperly cast in such a way as to presume that source depletion has an intrinsic value. The real issue and the critical question to setting appropriate cleanup goals is to protect human health and the environment. It is not to try to make source depletion seem worthwhile.

More to the point, emerging technologies are not used because they do not fix the problem – that is, they have not been shown to provide a measurable improvement to the protectiveness of human health. Technology developers claim to remove “*significant* quantities of DNAPL from the source zone” (emphasis added), but again what are the performance criteria upon which the claim is based? Loosely used, imprecise modifiers such as “significant” only draw our attention away from the real issue.

It is through the process of applying alternative cleanup goals, in a risk-based, site-specific framework, that the site-specific departure from MCLs are supposed to be used (perhaps more often than they presently are) to define what is necessary to protect human health and the environment with assurance. Thus, the real issue is more correctly stated in Problem Statement No. 1 as, “cleanup to MCLs is not a realistic goal for DNAPL zones, yet alternative goals are rarely used.”

Problem Statement No. 3

Federal and State site managers say that alternative cleanup goals often cannot be applied because the DNAPL source zone has not been distinguished from the overall plume.

On p. xiii of the “DNAPL Remediation Challenge” report Executive Summary, it is concluded that site characterization tools, though imperfect and sometimes costly, are adequate for source delineation and the measurement of source-zone depletion performance. Refinement of the available tools and the development of newer techniques is being pursued. Therefore, Problem Statement No. 3, “alternative goals often can’t be applied because the DNAPL zone has not been distinguished from the overall plume,” may be considered a secondary or complicating factor rather than a critical problem (such as Problem Statement Nos. 1 and 5).

Problem Statement No. 4

Federal and State site managers are concerned that alternative cleanup goals have uncertain reliability and long-term costs.

Problem Statement No. 4 takes the focus away from the real problem. There is some uncertainty with regard to long-term reliability and costing of engineered and institutional controls. However, the uncertainties associated with the deployment of source-removal technologies are vastly greater than they are for the alternative remedies. The majority of source-depletion technology applications have eventually resulted in a rebound of contaminant concentrations in ground water. In some situations, data were not acquired for more than a few months following completion of the source depletion tests; nonetheless claims of success or partial success have often been made. This is not a basis from which a site manager would want to predict reliability or cost.

We disagree with the implication that reliability and costs for engineered and institutional costs cannot be reasonably estimated. For example, when properly designed and maintained, pump and treat is quite effective at hydraulically controlling plumes and the costs are predictable and reasonable for that purpose. Thus, Problem Statement No. 4 is incorrectly conveyed as a detractor to the implementation of alternative cleanup goals simply to build a case for source treatment. The problem should more appropriately be phrased as “Site managers are concerned that source depletion technologies have uncertain reliability and long-term costs.” Whatever the limitations are for predicting the reliability and costs associated with alternative remedies that combine engineered and institutional controls, they are even greater for source zone depletion technologies.

Problem Statement No. 6

Site owners say that source depletion should not be a cleanup goal because the potential benefits of DNAPL mass removal are outweighed by disadvantages.

The potential benefits of DNAPL mass removal are at present conjectural. In particular, the idea that long-term costs may be reduced by source removal activities is not demonstrable. Site owners may consider implementing source treatment in the expectation of getting some regulatory relief (and cost savings) in plume management requirements, only to find that the relief is not forthcoming and the ongoing site management costs remain the same or increase. This relates back to Problem Statement No. 1, which indicates that there is not now, and may not be in the future, a regulatory drive to deviate from MCLs as the cleanup objective.

We think it is important to emphasize the caveats embedded in the “DNAPL Remediation Challenge” where it summarizes the potential benefits of source depletion. There are statements such as, “there is a range of benefits, from a risk management perspective, that *may* result from DNAPL source-zone depletion,” or “[T]hese benefits can be achieved *if* the source depletion option can result in the following outcomes . . .” (emphasis added). Nowhere in that report does the Expert Panel claim that the benefits have yet been shown to be achievable. Rather the conclusion is that there is more research to be done, and it is all premised on the need to step away from MCLs as the de facto cleanup goal by embracing alternative remedies that rely on both engineering and institutional controls to manage risk.

Likewise, the potential disadvantages are highly conjectural. Problem Statement No. 6 is so loaded with “what-ifs” as to become an unnecessary hindrance to solving the dilemma of setting cleanup goals for source zones. The potential advantages and disadvantages are real enough, and should be considered during site-specific decision-making about whether and what technologies to use. They do not, however, add to the functionality of setting cleanup goals.

Problem Statements Nos. 7 and 8

Managers of Federal and State cleanup programs say that flexibility in setting appropriate cleanup goals for DNAPL source zones is also a concern when revisiting operating remedies. Federal and State site managers say that they should be able to revisit technical impracticability (TI) decisions.

Problem Statements Nos. 7 and 8 both shift the focus way from what we would regard as the real problem here. That problem is EPA’s extreme reluctance to waive MCLs or other similar standards as technically impracticable and to establish alternative standards. To date, for example, TI waivers have been issued at about 5% of all NPL sites. So the real problem is that waivers are issued so infrequently.

Setting appropriate cleanup goals for DNAPL zones is cited (Problem Statement No. 7) as being a problem when revisiting operating remedies. This is not a problem, but rather, revisiting the remedy is quite simply a good management practice.

Similarly, we see no reason why there cannot be the flexibility to revisit TI decisions (Problem Statement No. 8). Certainly any site manager will want to be able to make most use of the best available technology at any given time in an effort to best manage the cost-benefit trade-offs. Again, this is good management practice.

These factors are not particularly critical to the issue of setting cleanup goals for source zones.

III. Ground Water Use, Value and Vulnerability as Factors in Setting Cleanup Goals

We strongly support the central role that ground water use, value, and vulnerability issues should play in setting cleanup goals. Unfortunately, few remedy selection decisions today are based on these considerations. Instead, as discussed above, current EPA policy tends to prejudge the cleanup goals at most sites based on the assumption that complete cleanup to drinking water standards is both necessary and feasible. Those mistaken assumptions are what cry out for reexamination, discussion, and progress.

The Discussion Paper on Use, Value, and Vulnerability (the “Use Discussion Paper”), unlike the DNAPL Discussion Paper, does not address these key issues with regard to ground water remediation. Its 4 Problem Statements address the symptoms, rather than the underlying problems (e.g., Problem Statement 3 reads: “There is lack of agreement among stakeholders regarding methods to determine which ground waters are ‘reasonably

expected' to be sources of drinking water, and how those decisions should influence cleanup objectives”).

Moreover, the Use Discussion Paper focuses on “prioritization” as a key goal. EPA does not explain in any concrete way what it means by “prioritization.” In any event, although prioritization may be a good thing, what is needed far more urgently are better decisions on ground water remediation. EPA does not explain how “prioritization” would help achieve them.

In addition, the Use Discussion Paper does not develop the distinction between the goal of protecting public health and the goal of restoring potential drinking water sources. In the Background section (page 3), the overall goal of ground water policy is stated “to prevent adverse effects to human health and the environment and to protect the environmental integrity of the nation’s ground water resources.” The paper then states that remediation activities “must be prioritized to limit the risk of adverse effects to human health first, and then to restore currently used and reasonably expected sources of drinking water . . . wherever such restorations are practicable and attainable.” (Quotations from the EPA 1991 Ground Water Strategy document.)

Although the objectives of protection and restoration are often stated in the same breath, they are in fact two distinct and separate objectives, often with radically different remedial actions required to achieve them. It often is possible to achieve effective protection of public health in a fraction of the time and at a fraction of the cost that would be required to achieve the goal of restoration. The factual data required and the scale of benefits to be achieved should be the subjects of entirely different types of analysis. It would be helpful for this paper to address that difference.

Finally, the 7 Options mentioned in the Use Discussion Paper also focus on second- and third-tier issues, such as prioritization and greater consistency, rather than on the fundamental policy issues that are in need of attention. None of the 7 Options appears to hold much promise for addressing the central challenges in the area of ground water remediation.

IV. Conclusion

In summary, ground water remediation is the most important part of the cleanup of contaminated sites. But national policy and regulatory practice with respect to this critical element are severely flawed. The deficiencies in policy and practice create continual controversy, delay progress, mislead the public, and lead to wasteful expenditures.

There is one central reason for the deficiencies in both policy and practice. It is the failure to apply the knowledge we now possess as to what technology can accomplish, how much it will cost, and how long it will take. This disregard of practical realities contributes to the lingering hope that it will someday be possible to restore all contaminated ground water to meet drinking water standards. The Discussion Papers

contain numerous statements from earlier EPA documents that confirm the inability to achieve that goal.

At the same time, there certainly is a wide range of effective actions that can be utilized to remediate contaminated ground water, to control its migration, and to provide full protection of public health, based on a thorough analysis of the conditions at each site and a realistic evaluation of what measures will be most successful under those conditions. A more pragmatic approach will better promote the public interest and contribute to greater progress.

SSP and RCAP commend EPA for their thoughtful efforts in developing the two Discussion Papers. We believe they offer a strong potential to encourage resolution of the fundamental problems associated with ground water remediation, if they lead EPA to pursue a fresh review of the basic policy issues that are summarized above in Part I of these comments. We especially urge EPA to proceed with further development of the issues and options addressed in the DNAPL Discussion Paper and to press forward with a deeper analysis of the factors suggested by the Use Discussion Paper. We look forward to continuing to contribute to this dialogue as it proceeds.